MOLDINO
The Edge To Innovation

# CUTTING TOOLS PRODUCTS CATALOGUE

## 切削工具 商品カタログ

**2023~2024**

超硬エンドミル
異形工具

# 超硬エンドミル
# Carbide End Mills

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EPP(□□)-CR …… A249
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EMX□-CR-TH …… A259
EHHRE-TH3 …… A263
CEPR-CR-TH …… A265
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EGR-HD …… A279
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CBN-EPSR …… A281
EPDR-TH …… A283

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HGOS-PN …… A304
EPP3-CS …… A308
EPSF(□)-PN …… A310
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EPP(□)4(-□)-CS …… A332
EPP(□□) …… A336
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EPQ□-CS …… A369
EAP-TH …… A371
EMXA …… A374
EPDS-SD …… A378
EPAS-SD …… A380
EC□-SD …… A381
EC□-HD …… A382
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Stocked by specified distributor

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EPBC …… A409
CEPB(□□) …… A411
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BES-C …… A415
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BESS …… A421
BES(-□) …… A421
YB-CS …… A422
JBE□□ …… A422
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GB□ …… A425
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SES(-□) …… A439
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TES …… A440
FE7 …… A440
GS□ …… A441
GXR …… A441
HTE-C …… A443
HTS□ …… A444
FE4 …… A445
GTB …… A445
EPRB-C …… A446
DEB-C …… A448
RIB-CR-C …… A449
EPRI-C …… A450
DES-C …… A452
RIB-C …… A453
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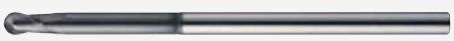
## 商品コード別（アルファベット順） By item code (alphabetical order)


AES …… A386
BEK …… A161
BEK(□□)-C …… A415
BES-C …… A415
BES(-□) …… A421
BESL(-□)-C …… A418
BESS …… A421
BH□□ …… A456
CBN-EHB …… A147
CBN-EPSB …… A151
CBN-EPSR …… A281
CEP□-TH …… A352
CEP□□ …… A355
CEPB(□□) …… A411
CEPR-CR …… A267
CEPR-CR-TH …… A265
DEB-C …… A448
DES-C …… A452
EAP-CR-TH …… A269
EAP-TH …… A371
EB4HR-ATH …… A132
EC□-HD …… A382
EC□-SD …… A381
ECRB-PN …… A137
EFB …… A153
EGB-HD …… A145
EGDB-HD …… A143
EGDR-HD …… A277
EGR-HD …… A279
EHHB-ATH …… A127
EHHBE-TH3 …… A124
EHHRE-TH3 …… A263
EHX-□□□□-TH … A398
EMB(□)E-ATH …… A110
EMB(P)-TH …… A168
EMM(-TH) …… A384
EMX□-(-SR)-TH …… A346
EMX□-CR-TH …… A259
EMXA …… A374
EMXA-CR …… A272
EPAB-SD …… A142
EPAS-SD …… A380
EPBC …… A409
EPBPN …… A158
EPBPX …… A160
EPBT …… A102
EPBTS-TH …… A100
EPCDS …… A383
EPDB-SD …… A140
EPDB(-□□) …… A405
EPDBE(-□□□) …… A72
EPDBEH(-F)-TH3 …… A56
EPDBP-TH …… A162
EPDBPE-ATH …… A84
EPDR-TH …… A283
EPDRE-ATH …… A194
EPDREH2-TH3 …… A172
EPDREH4-TH3 …… A174
EPDRF-TH …… A216
EPDRP-TH …… A210
EPDS-SD …… A378
EPDS(-□□) …… A430
EPDSE(-□□□) …… A292
EPHB-PN …… A130
EPJS(□□)-J …… A427
EPP-CR-TH …… A247
EPP(□)-TH …… A328
EPP(□)4(-□)-CS …… A332
EPP(□□) …… A336
EPP(□□)-CR …… A249
EPP3-CS …… A308
EPQ(□□)-CS …… A455
EPQ□-CS …… A369
EPR(□□) …… A429
EPRB-C …… A446
EPRI-C …… A450
EPSB-□-TH …… A154
EPSBE(-□)-TH …… A97
EPSF(□)-PN …… A310
EPSM(□□)-PN …… A311
EPSM□-R-PN …… A235
EPSW(□)-PN …… A361
ER5HS-PN …… A257
ER8WB-ATH …… A254
ES8WB-ATH …… A344
ESHB-H/N-TH …… A108
ETM(□□)-TH …… A226
ETR(P)-TH …… A222
FE4 …… A445
FE6 …… A425
FE7 …… A440
GB□ …… A425
GS□ …… A441
GTB …… A445
GXB …… A426
GXR …… A441
HES(□)2 …… A390
HES(□)2-C …… A387
HES(□)4 …… A396
HES(□)4-C …… A394
HGOB(□□)-PN …… A104
HGOF-TH …… A232
HGOS-PN …… A304
HPB(□□)-C …… A156
HPSLN-C …… A385
HTE-C …… A443
HTS□ …… A444
HYPB-C …… A156
HYPS-C …… A385
JBE□□ …… A422
KES(□) …… A440
PCDB …… A146
PES□2 …… A435
PES□2-C …… A434
PESR4 …… A435
PESR4-C …… A434
RIB-C …… A453
RIB-CR-C …… A449
SCE …… A280
SES(-□) …… A439
TES …… A440
Y□-CS …… A437
YB-CS …… A422
多刃テーパラジアス …… A276

Selection criteria table according to carbide end mill shape

# 超硬エンドミル形状別 選定目安表

| タイプ Type | 商品コード Item Code | 商品名称 Product | コーティング Coating | 工具仕様 Specification | 刃数 No. of flutes | 外径 Tool Dia. |
|---|---|---|---|---|---|---|
| 超硬ボールエンドミル Carbide ball end mills | EPDBEH-F-TH3 ※ | エポックディープボールエボリューションハード-TH3　ショートシャンクタイプ<br>Epoch Deep Ball Evolution Hard-TH3 -Short shank type | TH3 | ロングネック<br>Long neck | 2 | 0.1～2.5 |
| | EPDBEH-TH3 ※ | エポックディープボールエボリューションハード-TH3　レギュラーシャンクタイプ<br>Epoch Deep Ball Evolution Hard-TH3 -Regular shank type | TH3 | ロングネック<br>Long neck | 2 | 0.1～12 |
| | EPDBEH-TH3 ※ | エポックディープボールエボリューションハード-TH3　ストロングネックタイプ<br>Epoch Deep Ball Evolution Hard-TH3- Strong neck type | TH3 | ストロングネック<br>Strong neck | 2 | 0.1～1 |
| | EPDBE-ATH ※ | エポックディープボールエボリューション（ATHコーティング）<br>Epoch Deep Ball Evolution (ATH Coating) | ATH | ロングネック<br>Long neck | 2 | 0.1～ 6 |
| | EPDBE-PN ※ | エポックディープボールエボリューション（PNコーティング）<br>Epoch Deep Ball Evolution (PN Coating) | PN | ロングネック<br>Long neck | 2 | 0.1～ 6 |
| | EPDBPE-ATH ※ | エポックペンシルディープボールエボリューション<br>Epoch Pencil Deep Ball Evolution | ATH | ペンシルネック<br>Pencil neck | 2 | 0.2～12 |
| | EPSBE-TH ※ | エポックスーパーハードボールエボリューション 標準規格品<br>Epoch Super Hard Ball Evolution -Standard rating product | ATH | ロングネック<br>Long neck | 2 | 0.1～ 2 |
| | EPSBE-H-TH ※ | エポックスーパーハードボールエボリューション 高精度規格品<br>Epoch Super Hard Ball Evolution -High accuracy rating product | ATH | レギュラーネック<br>Regular neck | 2 | 0.1～ 2 |
| | EPBTS-TH ※ | エポックTHハードボールストロング<br>Epoch TH Hard Ball Strong | ATH | レギュラー刃長<br>Regular | 2 | 3 ～12 |
| | EPBT ※ | エポックTHハードボール<br>Epoch TH Hard Ball | TH | レギュラー刃長<br>Regular | 2 | 1 ～20 |
| | HGOB-PN ※ | エポックパナシアボール<br>Epoch Panacea Ball | PN | レギュラー刃長<br>Regular | 2 | 0.3～20 |
| | HGOBLS-PN ※ | エポックパナシアボール ロングシャンク<br>Epoch Panacea Ball -Long shank | PN | ロングシャンク<br>Long shank | 2 | 6 ～20 |
| | ESHB-H-TH ※ | エポックシュリンクマスターボール 高精度規格品<br>Epoch Shrink Master Ball -High accuracy rating products | TH | レギュラー刃長<br>Regular | 2 | 1 ～12 |
| | ESHB-N-TH ※ | エポックシュリンクマスターボール 標準規格品<br>Epoch Shrink Master Ball -Standard rating products | TH | レギュラー刃長<br>Regular | 2 | 1 ～12 |
| | EMBE-ATH ※ | エポックメガフィードボール エボリューション　ストレートタイプ<br>Epoch Mega Feed Ball Evolution -Straight type | ATH | レギュラー刃長<br>Regular | 3 | 1 ～20 |
| | EMBPE-ATH ※ | エポックメガフィードボール エボリューション　ペンシルネック<br>Epoch Mega Feed Ball Evolution -Pencil Neck | ATH | ペンシルネック<br>Pencil neck | 3 | 1 ～12 |
| | EHHBE-TH3 ※ | エポック ハイハードボール-TH3<br>Epoch High Hard Ball-TH3 | TH3 | レギュラー刃長<br>Regular | 4 | 1 ～12 |
| | EHHB-ATH ※ | エポック ハイハードボール<br>Epoch High Hard Ball | ATH | レギュラー刃長<br>Regular | 4 | 1 ～12 |
| | EPHB-PN | 高能率仕上げ用6枚刃ボールエンドミル<br>6 Flutes Ball End Mill for High-efficiency Finishing | PN | レギュラー刃長<br>Regular | 6 | 6 ～12 |
| | EB4HR-ATH ※ | エポックリブ溝加工用テーパボールエンドミル<br>Taper Ball End Mill for High Accuracy Rib Slotting | ATH | レギュラー刃長<br>Regular | 4 | 0.6～1.2 |
| | ECRB-PN ※ | エポックコンビネーションリブボール<br>Epoch Combination Rib Ball | PN | レギュラー刃長<br>Regular | 4 | 0.8・1 |
| | EPDB-SD ※ | エポックSD（S-DLC）ディープボール<br>Epoch SD(S-DLC) Deep Ball | SD | ロングネック<br>Long neck | 2 | 0.2～ 5 |
| | EPAB-SD ※ | エポックSD（S-DLC）ボール<br>Epoch SD(S-DLC) Ball | SD | レギュラー刃長<br>Regular | 2 | 6 ～12 |
| | EGDB-HD ※ | エポックHDコーティング ディープボールエンドミル<br>Epoch HD Coating Deep Ball End Mill | HD | ロングネック<br>Long neck | 2 | 0.4～ 3 |
| | EGB-HD ※ | エポックHDコーティング ボールエンドミル<br>Epoch HD Coating Ball End Mill | HD | レギュラー刃長<br>Regular | 2 | 4 ～10 |
| | PCDB | 多結晶焼結ダイヤモンドボールエンドミル<br>Poly Crystalline Diamond Ball End Mill | | | — | 0.4～ 1 |
| | CBN-EHB ※ | エポックCBNハイプレシジョンボールエンドミル<br>Epoch CBN High Precision Ball End Mill | | ロングネック<br>Long neck | 2 | 0.2～ 2 |

| 形状 Shape | 対応被削材 Applicable work material | | | | | | | | | 加工用途 Applications | 掲載頁 Page | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | P | | H | | | M | S | N | | | 寸法表 Size list | 切削条件 Cutting conditions |
| | 炭素鋼・合金鋼 Carbon steels, Alloy steels | プリハードン鋼45HRC以下 Pre-harden Steels under 45 HRC | 高硬度45HRC超え55HRC以下 High-hardened over 45HRC to under 55HRC | 高硬度55HRC超え65HRC以下 High-hardened over 55HRC to under 65HRC | 高硬度65HRC超え High-hardened over 65HRC | ステンレス鋼 Stainless steels | チタン合金・耐熱合金 Titanium alloy, Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy | | | |
| | ○ | ○ | ◎ | ◎ | ◎ | ○ | ◎ | ○ | ○ | 溝 Slotting 彫込み Die-sinking 曲面 Profiling R Radius 細部 Miniature | A56 | A64 |
| | ○ | ○ | ◎ | ◎ | ◎ | ○ | ◎ | ○ | ○ | 溝 Slotting 彫込み Die-sinking 曲面 Profiling R Radius 細部 Miniature | A58 | A64 |
| | ○ | ○ | ◎ | ◎ | ◎ | ○ | ◎ | ○ | ○ | 溝 Slotting 彫込み Die-sinking 曲面 Profiling R Radius 細部 Miniature | A63 | A64 |
| | ○ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ | 溝 Slotting 彫込み Die-sinking 曲面 Profiling R Radius 細部 Miniature | A72 | A78 |
| | ◎ | ◎ | ◎ | ○ | | ◎ | ◎ | ◎ | ◎ | 溝 Slotting 彫込み Die-sinking 曲面 Profiling R Radius 細部 Miniature | A75 | A78 |
| | ○ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ | 彫込み Die-sinking 曲面 Profiling R Radius 取りのこし Rest Material Machining 玉プチ Corner Recessing 細部 Miniature | A84 | A89 |
| | | ○ | ◎ | ◎ | ◎ | ○ | ◎ | ○ | ○ | 溝 Slotting 彫込み Die-sinking 曲面 Profiling R Radius 細部 Miniature | A97 | A99 |
| | | ○ | ◎ | ◎ | ◎ | ○ | ◎ | ○ | ○ | 溝 Slotting 彫込み Die-sinking 曲面 Profiling R Radius 細部 Miniature | A98 | A99 |
| | ○ | ◎ | ◎ | ◎ | ◎ | ○ | ◎ | ○ | ○ | 彫込み Die-sinking 曲面 Profiling R Radius ヘリカル Helical | A100 | A101 |
| | ○ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ | 彫込み Die-sinking 曲面 Profiling R Radius ヘリカル Helical | A102 | A103 |
| | ◎ | ◎ | ◎ | ○ | | ○ | | ◎ | ◎ | 平面 Planing 曲面 Profiling R Radius 取りのこし Rest Material Machining | A104 | A105 |
|  | ◎ | ◎ | ◎ | ○ | | ○ | | ◎ | ◎ | 彫込み Die-sinking 曲面 Profiling R Radius ヘリカル Helical 取りのこし Rest Material Machining 玉プチ Corner Recessing | A104 | A107 |
| | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ | 彫込み Die-sinking 曲面 Profiling R Radius ヘリカル Helical | A108 | A109 |
| | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ | 彫込み Die-sinking 曲面 Profiling R Radius ヘリカル Helical | A108 | A109 |
| | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ | 高能率側面切削 Adaptive milling 彫込み Die-sinking 曲面 Profiling R Radius | A110 | A113 |
| | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ | 彫込み Die-sinking 曲面 Profiling R Radius 取りのこし Rest Material Machining 玉プチ Corner Recessing 細部 Miniature | A111 | A116 |
| | ○ | ◎ | ◎ | ◎ | ◎ | | | | | 高能率側面切削 Adaptive milling 側面 Side Cutting 彫込み Die-sinking 曲面 Profiling R Radius | A124 | A125 |
| | ○ | ◎ | ◎ | ◎ | ◎ | | | | | 高能率側面切削 Adaptive milling 側面 Side Cutting 彫込み Die-sinking 曲面 Profiling R Radius | A127 | A128 |
| | ◎ | ◎ | | | | ◎ | | | | 曲面 Profiling R Radius 取りのこし Rest Material Machining | A130 | A131 |
| | ◎ | ◎ | ◎ | | | | | | | テーパボール Radius Taper | A132 | A134 |
| | ◎ | ◎ | ○ | | | | | | | テーパボール Radius Taper 細部 Miniature | A137 | A138 |
| | | | | | | | | ◎ | ◎ | 溝 Slotting 彫込み Die-sinking 曲面 Profiling R Radius 細部 Miniature | A140 | A141 |
| | | | | | | | | ◎ | ◎ | 彫込み Die-sinking 曲面 Profiling R Radius ヘリカル Helical | A142 | A142 |
| | グラファイト・FRP・高Siアルミニウム合金など for Graphite, FRP, High Si aluminum alloy, etc | | | | | | | | | 溝 Slotting 彫込み Die-sinking 曲面 Profiling R Radius 細部 Miniature | A143 | A144 |
| | | | | | | | | | | 彫込み Die-sinking 曲面 Profiling R Radius ヘリカル Helical | A145 | A145 |
| | | ◎ | ◎ | ◎ | ◎ | | | | | 曲面 Profiling R Radius | A146 | |
| | | | ○ | ◎ | ◎ | | | | | 平面 Planing 彫込み Die-sinking 曲面 Profiling R Radius 取りのこし Rest Material Machining 細部 Miniature | A147 | A148 |

Selection criteria table according to carbide end mill shape

# 超硬エンドミル形状別 選定目安表

| タイプ Type | 商品コード Item Code | 商品名称 Product | コーティング Coating | 工具仕様 Specification | 刃数 No. of flutes | 外径 Tool Dia. |
|---|---|---|---|---|---|---|
| 超硬ボールエンドミル Carbide ball end mills | CBN-EPSB ※ | エポックCBNハスーパーボールエンドミル<br>Epoch CBN Super Ball End Mill | | ロングネック<br>Long neck | 2 | 0.2～ 2 |
| | EFB ※ | エポックファインボール　一磨きレスー<br>Epoch fine Ball -Migaki- | C | レギュラー刃長<br>Regular | 2 | 1 ～12 |
| | EPSB-H-TH ※ | エポックスーパーハードボール 首下長1.5DCタイプ(高精度規格品)<br>Epoch Super Hard Ball Under neck 1.5DC type (High-accuracy rating product) | TH | レギュラーネック<br>Regular Neck | 2 | 0.1～ 2 |
| | EPSB-N-TH ※<br>首下長 Under Neck Length 1.5DC | エポックスーパーハードボール 首下長1.5DCタイプ(標準規格品)<br>Epoch Super Hard Ball Under neck 1.5DC type (Standard rating product) | TH | レギュラーネック<br>Regular Neck | 2 | 0.1～ 2 |
| | EPSB-N-TH ※<br>首下長 Under Neck Length 3DC | エポックスーパーハードボール 首下長3DCタイプ(標準規格品)<br>Epoch Super Hard Ball Under neck 3DC type (Standard rating product) | TH | ロングネック<br>Long Neck | 2 | 0.1～ 2 |
| | HPBS-C ※ | エポック精密小径エンドミル ショートネック・ボール<br>EpochPrecision Miniature Ball End Mill -Short Neck | C | ショートネック<br>Short Neck | 2 | 1 ～ 6 |
| | HYPB-C ※ | エポック精密小径エンドミル レギュラーネック・ボール<br>Epoch Precision Miniature Ball End Mill -Regular Neck, Regular | C | レギュラーネック<br>Regular Neck | 2 | 0.2～ 6 |
| | HPBLN-C ※ | エポック精密小径エンドミル　ロングネック・ボール<br>Epoch Precision Miniature Ball End Mill -Long Neck | C | ロングネック<br>Long Neck | 2 | 0.5～ 6 |
| | EPBPN ※ | エポックペンシルネックボール<br>Epoch Pencil Neck Ball | C | ペンシルネック<br>Pencil neck | 2 | 1 ～12 |
| | EPBPX ※ | エポックペンシルロングネックボール<br>Epoch Pencil Long Neck Ball | C | ペンシルネック<br>Pencil neck | 2 | 1 ～12 |
| | BEK | 超硬強力形ボールエンドミル<br>Carbide Ball End Mills | | ショート刃長<br>Short | 2 | 0.3~20 |
| | EPDBP-TH ※ | エポックペンシルディープボール<br>Epoch Pencil Deep Ball | TH | ペンシルネック<br>Pencil neck | 2 | 0.2~10 |
| | EMB-TH ※ | エポックメガフィードボール　首下ストレート<br>Epoch Mega Feed Ball -Straight Neck | TH | レギュラー刃長<br>Regular | 3 | 2 ～20 |
| | EMBP-TH ※ | エポックメガフィードボール　ペンシルネック<br>Epoch Mega Feed Ball -Pencil Neck | TH | ペンシルネック<br>Pencil neck | 3 | 4 ～10 |
| 超硬ラジアスエンドミル Carbide radius end mills | EPDREH2-TH3 ※ | エポックディープラジアスエボリューションハード-TH3 2枚刃<br>Epoch Deep Radius Evolution Hard-TH3 2 Flutes | TH3 | ロングネック<br>Long neck | 2 | 0.2～ 1 |
| | EPDREH4-TH3 ※ | エポックディープラジアスエボリューションハード-TH3 4枚刃<br>Epoch Deep Radius Evolution Hard-TH3 4 Flutes | TH3 | ロングネック<br>Long neck | 4 | 4 ～ 6 |
| | EPDRE-ATH ※ | エポックディープラジアスエボリューション<br>Epoch Deep Radius Evolution | ATH | ロングネック<br>Long neck | 2 | 0.2～ 6 |
| | EPDRP-TH ※ | エポックペンシルディープラジアス<br>Epoch Pencil Deep Radius | TH | ペンシルネック<br>Pencil neck | 2 | 0.2～ 3 |
| | EPDRF-TH ※ | エポックディープラジアスF<br>Epoch Deep Radius F | TH | ロングネック<br>Long neck | 4 | 1 ～ 6 |
| | ETR-TH ※ | エポックターボリブ　首下ストレート<br>Epoch Turbo Rib -Straight Neck | TH | ロングネック<br>Long neck | 4 | 1 ～ 3 |
| | ETRP-TH ※ | エポックターボリブ　ペンシルネック<br>Epoch Turbo Rib -Pencil Neck | TH | ペンシルネック<br>Pencil neck | 4 | 1 ～ 3 |
| | ETM-TH ※ | エポックターボミル　首下ストレート・コーナR付き<br>Epoch Turbo Mill -Straigh Neck, Corner Radius | TH | レギュラー刃長<br>Regular | 4 | 2 ～20 |
| | ETMLN-TH ※ | エポックターボミル　ロングネック・コーナR付き<br>Epoch Turbo Mill -Long Neck, Corner Radius | TH | ロングネック<br>Long Neck | 4 | 4 ～16 |
| | ETMP-TH ※ | エポックターボミル　ペンシルネック・コーナR付き<br>Epoch Turbo Mill -Pencil Neck, Corner Radius | TH | ペンシルネック<br>Pencil Neck | 4 | 2 ～16 |
| | HGOF2-TH ※ | エポックGターボ　2枚刃<br>Epoch G Turbo -2 flutes | ATH | レギュラー刃長<br>Regular | 2 | 2 ～12 |
| | HGOF4-TH ※ | エポックGターボ　4枚刃<br>Epoch G Turbo -4 flutes | ATH | レギュラー刃長<br>Regular | 4 | 2 ～12 |
| | EPSM-CR-PN ※ | エポックSUSマルチ　レギュラー刃・コーナR付き<br>Epoch SUS Multi -Regular, Corner Radius | PN | レギュラー刃長<br>Regular | 4 | 1 ～20 |

※:エポックエンドミルです。Epoch End Mill



| 形状 Shape | 対応被削材 Applicable work material | | | | | | | | | 加工用途 Applications | 掲載頁 Page | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | P | | H | | | M | S | N | | | 寸法表 Size list | 切削条件 Cutting conditions |
| | 炭素鋼・合金鋼 Carbon steels, Alloy steels | プリハードン鋼45HRC以下 Pre-harden Steels under 45 HRC | 高硬度45HRC超え55HRC以下 High-hardened over 45HRC to under 55HRC | 高硬度55HRC超え65HRC以下 High-hardened over 55HRC to under 65HRC | 高硬度65HRC超え High-hardened over 65HRC | ステンレス鋼 Stainless steels | チタン合金・耐熱合金 Titanium alloy, Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy | | | |
| | | | ○ | ◎ | ◎ | | | | | 平面 Planing, 彫込み Die-sinking, 曲面 Profiling, R Radius, 取りのこし Rest Material Machining, 細部 Miniature | A151 | A152 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 曲面 Profiling | A153 | A153 |
| | | ○ | ◎ | ◎ | ◎ | ○ | ◎ | ○ | ○ | 溝 Slotting, 彫込み Die-sinking, 曲面 Profiling, R Radius, 細部 Miniature | A154 | A155 |
| | | ○ | ◎ | ◎ | ◎ | ○ | ◎ | ○ | ○ | 溝 Slotting, 彫込み Die-sinking, 曲面 Profiling, R Radius, 細部 Miniature | A154 | A155 |
| | | ○ | ◎ | ◎ | ◎ | ○ | ◎ | ○ | ○ | 溝 Slotting, 彫込み Die-sinking, 曲面 Profiling, R Radius, 細部 Miniature | A155 | A155 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 溝 Slotting, 彫込み Die-sinking, 曲面 Profiling, R Radius, 細部 Miniature | A156 | A157 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 溝 Slotting, 彫込み Die-sinking, 曲面 Profiling, R Radius, 細部 Miniature | A156 | A157 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 溝 Slotting, 彫込み Die-sinking, 曲面 Profiling, R Radius, 細部 Miniature | A157 | A157 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 彫込み Die-sinking, 曲面 Profiling, R Radius, ヘリカル Helical, 取りのこし Rest Material Machining, 玉プチ Corner Recessing, 細部 Miniature | A158 | A159 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 彫込み Die-sinking, 曲面 Profiling, R Radius, ヘリカル Helical, 取りのこし Rest Material Machining, 玉プチ Corner Recessing | A160 | A161 |
| | ○ | ○ | | | | ○ | ○ | ◎ | ◎ | 彫込み Die-sinking, 曲面 Profiling, R Radius, ヘリカル Helical | A161 | |
| | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ | 彫込み Die-sinking, 曲面 Profiling, R Radius, 取りのこし Rest Material Machining, 玉プチ Corner Recessing, 細部 Miniature | A162 | A165 |
| | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ | 彫込み Die-sinking, 曲面 Profiling, R Radius | A168 | A169 |
| | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ | 彫込み Die-sinking, 曲面 Profiling, R Radius | A170 | A171 |
| | ○ | ○ | ◎ | ◎ | ◎ | ○ | ◎ | ○ | ○ | 溝 Slotting, 彫込み Die-sinking, 曲面 Profiling, R Radius, 細部 Miniature, 取りのこし Rest Material Machining | A172 | A180 |
| | ○ | ○ | ◎ | ◎ | ◎ | ○ | ◎ | ○ | ○ | 溝 Slotting, 彫込み Die-sinking, 曲面 Profiling, R Radius, 細部 Miniature, 取りのこし Rest Material Machining | A174 | A184 |
| | ○ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ | 溝 Slotting, 彫込み Die-sinking, 曲面 Profiling, R Radius, 細部 Miniature, 取りのこし Rest Material Machining | A194 | A200 |
| | ○ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ | 彫込み Die-sinking, 曲面 Profiling, R Radius, 細部 Miniature, 取りのこし Rest Material Machining | A210 | A212 |
| | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ | 溝 Slotting, 彫込み Die-sinking, 曲面 Profiling, R Radius, 細部 Miniature, 取りのこし Rest Material Machining | A216 | A219 |
| | ◎ | ◎ | ◎ | ○ | | ○ | ◎ | ○ | ○ | 溝 Slotting, 彫込み Die-sinking, 曲面 Profiling, R Radius, 細部 Miniature, 取りのこし Rest Material Machining | A222 | A224 |
| | ◎ | ◎ | ◎ | ○ | | ○ | ◎ | ○ | ○ | 彫込み Die-sinking, 曲面 Profiling, R Radius, 細部 Miniature, 取りのこし Rest Material Machining | A223 | A225 |
| | ◎ | ◎ | ◎ | ○ | | ○ | ◎ | ○ | ○ | 彫込み Die-sinking, 曲面 Profiling, R Radius | A226 | A228 |
| | ◎ | ◎ | ◎ | ○ | | ○ | ◎ | ○ | ○ | 彫込み Die-sinking, 曲面 Profiling, R Radius | A226 | A228 |
| | ◎ | ◎ | ◎ | ○ | | ○ | ◎ | ○ | ○ | 彫込み Die-sinking, 曲面 Profiling, R Radius | A227 | A228 |
| | ◎ | ◎ | ◎ | ◎ | | ○ | ◎ | ○ | ○ | 平面 Planing, 側面 Side Cutting, 溝 Slotting, 彫込み Die-sinking, ヘリカル Helical | A232 | A233 |
| | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ | 平面 Planing, 溝 Slotting, 彫込み Die-sinking, ヘリカル Helical | A232 | A234 |
| | ◎ | ◎ | | | | ◎ | ◎ | ◎ | ◎ | 平面 Planing, 側面 Side Cutting, 溝 Slotting, 彫込み Die-sinking, 曲面 Profiling, R Radius, ヘリカル Helical | A235 | A240 |

Selection criteria table according to carbide end mill shape

# 超硬エンドミル形状別 選定目安表

| タイプ Type | 商品コード Item Code | 商品名称 Product | コーティング Coating | 工具仕様 Specification | 刃数 No. of flutes | 外径 Tool Dia. |
|---|---|---|---|---|---|---|
| 超硬ラジアスエンドミル Carbide radius end mills | EPSML-CR-PN ※ | エポックSUSマルチ　ロング刃･コーナR付き<br>Epoch SUS Multi -Long, Corner Radius | PN | ロング刃長<br>Long | 4 | 6 ～20 |
| | EPSM-5DC-CR-PN ※ | エポックSUSマルチ　首下5DC･コーナR付き<br>Epoch SUS Multi -Under neck 5DC, Corner Radius | PN | ロングネック<br>Long Neck | 4 | 1 ～20 |
| | EPP-CR-TH ※ | エポックTHパワーミル　コーナR付き<br>Epoch TH Power Mill -Corner Radius | TH | レギュラー刃長<br>Regular | 4 | 3 ～20 |
| | EPP-CR ※ | エポックパワーミル　レギュラー刃･コーナR付き<br>Epoch Power Mill -Regular, Corner Radius | C | レギュラー刃長<br>Regular | 4 | 3 ～25 |
| | EPPL-CR ※ | エポックパワーミル　ロング刃･コーナR付き<br>Epoch Power Mill -Long, Corner Radius | C | ロング刃長<br>Long | 4 | 6 ～25 |
| | EPPLS-CR ※ | エポックパワーミル　ロングシャンク･コーナR付き<br>Epoch Power Mill -Long Shank, Corner Radius | C | ロングシャンク<br>Long Shank | 4 | 3 ～17 |
| | ER8WB-ATH | 立壁／底面仕上げ用8枚刃エンドミル　ラジアス<br>8-flutes End Mill for Vertical Wall/Bottom Face Finishing -Radius | ATH | | 8 | 6 ～12 |
| | ER5HS-3.5DC-PN | 高能率側面切削用エンドミル　首下3.5DC<br>End mill for adaptive milling -Under neck 3.5DC | PN | | 5 | 6 ～20 |
| | ER5HS-5DC-PN | 高能率側面切削用エンドミル　首下5DC<br>End mill for adaptive milling -Under neck 5DC | PN | | 5 | 6 ～20 |
| | EMXR-3DC-TH ※ | エポックミルス タイプR 4枚刃･ラジアス･ストレート･3DC<br>Epoch Mirus Type R -4flutes, Radius, Straight, 3DC | ATH | ロングネック<br>Long Neck | 4 | 6 ～12 |
| | EMXR-5DC-TH ※ | エポックミルス タイプR 4枚刃･ラジアス･ストレート･5DC<br>Epoch Mirus Type R -4flutes, Radius, Straight, 5DC | ATH | ロングネック<br>Long Neck | 4 | 6 ～12 |
| | EMXN-3DC-TH ※ | エポックミルス タイプN 4枚刃･ラジアス･ストレート･3DC<br>Epoch Mirus Type N -4flutes, Radius, Straight, 3DC | ATH | ロングネック<br>Long Neck | 4 | 6 ～12 |
| | EMXN-5DC-TH ※ | エポックミルス タイプN 4枚刃･ラジアス･ストレート･5DC<br>Epoch Mirus Type N -4flutes, Radius, Straight, 5DC | ATH | ロングネック<br>Long Neck | 4 | 6 ～12 |
| | EHHRE-TH3 ※ | エポックハイハードラジアス<br>Epoch High Hard Radius | TH3 | レギュラー刃長<br>Regular | 4,6 | 1 ～12 |
| | CEPR-CR-TH ※ | エポックTHハード　レギュラー刃長･コーナR付き<br>Epoch TH Hard -Regular, Corner Radius | TH | レギュラー刃長<br>Regular | 6 | 6 ～20 |
| | CEPR-CR ※ | エポック21　レギュラー刃･コーナR付き<br>Epoch21 -Regular, Corner Radius | C | レギュラー刃長<br>Regular | 6,8 | 6 ～30 |
| | EAP4-CR-TH ※ | エポックエアロパワーミル 4枚刃 コーナR付き<br>Epoch Aero Power Mill -4 flutes, Corner Radius | TH | レギュラー刃長<br>Regular | 4 | 6 ～20 |
| | EAP6-CR-TH ※ | エポックエアロパワーミル 6枚刃 コーナR付き<br>Epoch Aero Power Mill -6 flutes, Corner Radius | TH | レギュラー刃長<br>Regular | 6 | 6 ～20 |
| | EMXA2 ※ | エポックミルス タイプA 2枚刃<br>Epoch Mirus Type A -2 flutes | | レギュラー刃長<br>Regular | 2 | 10～25 |
| | EMXA3 ※ | エポックミルス タイプA 3枚刃<br>Epoch Mirus Type A -3 flutes | | レギュラー刃長<br>Regular | 3 | 3 ～16 |
| | | 多刃テーパラジアスエンドミル<br>Multi Flutes Taper Radius End Mill | PN | レギュラー刃長<br>Regular | 9,12 | 11～19 |
| | EGDR-HD ※ | エポックHDコーティング ディープラジアスエンドミル<br>Epoch HD Coating Deep Radius End Mill | HD | ロングネック<br>Long neck | 2 | 0.5～ 3 |
| | EGR-HD ※ | エポックHDコーティング ラジアスエンドミル<br>Epoch HD Coating Radius End Mill | HD | レギュラー刃長<br>Regular | 2 | 4 ～10 |
| | SCE | セラミックエンドミル コーナRタイプ<br>Ceramic End Mill Corner Radius Type | | レギュラー刃長<br>Regular | 6 | 6 ～12 |
| | CBN-EPSR ※ | エポックCBNスーパーラジアスエンドミル<br>Epoch CBN Super Radius End Mill | | ロングネック<br>Long neck | 2 | 0.2～ 3 |
| | EPDR-TH ※ | エポックディープラジアス<br>Epoch Deep Radius | TH | ロングネック<br>Long neck | 2 | 0.2～ 3 |

※:エポックエンドミルです。Epoch End Mill



Selection criteria table according to carbide end mill shape

| 形状 Shape | 対応被削材 Applicable work material | | | | | | | | | 加工用途 Applications | 掲載頁 Page | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | P | | H | | | M | S | N | | | 寸法表 Size list | 切削条件 Cutting conditions |
| | 炭素鋼・合金鋼 Carbon steels, Alloy steels | プリハードン鋼45HRC以下 Pre-harden Steels under 45 HRC | 高硬度45HRC超え55HRC以下 High-hardened over 45HRC to under 55HRC | 高硬度55HRC超え65HRC以下 High-hardened over 55HRC to under 65HRC | 高硬度65HRC超え High-hardened over 65HRC | ステンレス鋼 Stainless steels | チタン合金・耐熱合金 Titanium alloy, Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy | | | |
| | ◎ | ◎ | | | | ◎ | ◎ | ◎ | ◎ | 側面 Side Cutting, 曲面 Profiling, R Radius | A237 | A246 |
| | ◎ | ◎ | | | | ◎ | ◎ | ◎ | ◎ | 平面 Planing, 側面 Side Cutting, 溝 Slotting, 彫込み Die-sinking, 曲面 Profiling, R Radius, ヘリカル Helical | A238 | A243 |
| | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ | 平面 Planing, 側面 Side Cutting, 溝 Slotting, 彫込み Die-sinking, 曲面 Profiling, R Radius, ヘリカル Helical | A247 | A248 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | | | 平面 Planing, 側面 Side Cutting, 溝 Slotting, 彫込み Die-sinking, 曲面 Profiling, R Radius, ヘリカル Helical | A249 | A251 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | | | 側面 Side Cutting, 曲面 Profiling, R Radius | A249 | A253 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | | | 側面 Side Cutting, 曲面 Profiling, R Radius | A250 | A253 |
| | ○ | ◎ | ◎ | | | | | | | 平面 Planing, 側面 Side Cutting, 溝 Slotting, 彫込み Die-sinking, 曲面 Profiling | A254 | A255 |
| | ◎ | ◎ | | | | ○ | ○ | | | 適応能率側面切削 Adaptive milling, 平面 Planing, 側面 Side Cutting, 曲面 Profiling, ヘリカル Helical | A257 | A258 |
| | ◎ | ◎ | | | | ○ | ○ | | | 適応能率側面切削 Adaptive milling, 平面 Planing, 側面 Side Cutting, 曲面 Profiling, ヘリカル Helical | A257 | A258 |
| | ◎ | ◎ | ○ | | | | | ○ | ○ | 平面 Planing, 側面 Side Cutting, 溝 Slotting, 彫込み Die-sinking, 曲面 Profiling, R Radius, ヘリカル Helical, 座ぐり Spot facing, 取りのこし Rest Material Machining | A259 | A261 |
| | ◎ | ◎ | ○ | | | | | ○ | ○ | 平面 Planing, 側面 Side Cutting, 溝 Slotting, 彫込み Die-sinking, 曲面 Profiling, R Radius, ヘリカル Helical, 座ぐり Spot facing, 取りのこし Rest Material Machining | A259 | A262 |
| | ◎ | ◎ | ○ | | | | | ○ | ○ | 平面 Planing, 側面 Side Cutting, 溝 Slotting, 彫込み Die-sinking, 曲面 Profiling, R Radius, ヘリカル Helical, 座ぐり Spot facing, 取りのこし Rest Material Machining | A260 | A261 |
| | ◎ | ◎ | ○ | | | | | ○ | ○ | 平面 Planing, 側面 Side Cutting, 溝 Slotting, 彫込み Die-sinking, 曲面 Profiling, R Radius, ヘリカル Helical, 座ぐり Spot facing, 取りのこし Rest Material Machining | A260 | A262 |
| | | | ○ | ◎ | ◎ | | | | | 彫込み Die-sinking, 曲面 Profiling, R Radius | A263 | A264 |
| | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | | | 適応能率側面切削 Adaptive milling, 側面 Side Cutting, 曲面 Profiling, R Radius | A265 | A266 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | | | 適応能率側面切削 Adaptive milling, 側面 Side Cutting, 曲面 Profiling, R Radius | A267 | A268 |
| | | | | | | ◎ | ◎ | ○ | ○ | 平面 Planing, 側面 Side Cutting, 溝 Slotting, 彫込み Die-sinking, 曲面 Profiling, R Radius, ヘリカル Helical | A269 | A270 |
| | | | | | | ◎ | ◎ | ○ | ○ | 側面 Side Cutting, 曲面 Profiling, R Radius | A269 | A271 |
| | | | | | | | | ◎ | ◎ | 平面 Planing, 側面 Side Cutting, 溝 Slotting, 彫込み Die-sinking, ヘリカル Helical, 座ぐり Spot facing | A272 | A274 |
| | | | | | | | | ◎ | ◎ | 平面 Planing, 側面 Side Cutting, 溝 Slotting, 彫込み Die-sinking, ヘリカル Helical, 座ぐり Spot facing | A272 | A274 |
| | | | | | | ◎ | ◎ | | | 平面 Planing, 側面 Side Cutting, 曲面 Profiling | A276 | A276 |
| | グラファイト・FRP・高Siアルミニウム合金など for Graphite, FRP, High Si aluminium alloy, etc | | | | | | | | | 溝 Slotting, 彫込み Die-sinking, 曲面 Profiling, R Radius, 細部 Miniature, 取りのこし Rest Material Machining | A277 | A278 |
| | | | | | | | | | | 平面 Planing, 側面 Side Cutting, 溝 Slotting, 彫込み Die-sinking, 曲面 Profiling, R Radius, ヘリカル Helical | A279 | A279 |
| | | | | | | | ◎ | | | 平面 Planing, 側面 Side Cutting | A280 | A280 |
| | | | ○ | ◎ | ◎ | | | | | 平面 Planing, 彫込み Die-sinking, R Radius, 取りのこし Rest Material Machining, 細部 Miniature | A281 | A282 |
| | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ | 溝 Slotting, 彫込み Die-sinking, 曲面 Profiling, R Radius, 細部 Miniature, 取りのこし Rest Material Machining | A283 | A286 |

Selection criteria table according to carbide end mill shape

# 超硬エンドミル形状別 選定目安表

| タイプ Type | 商品コード Item Code | 商品名称 Product | コーティング Coating | 工具仕様 Specification | 刃数 No. of flutes | 外径 Tool Dia. |
|---|---|---|---|---|---|---|
| 超硬スクエアエンドミル Carbide square end mills | EPDSE-ATH ※ | エポックディープスクエアエボリューション(ATHコーティング) Epoch Deep Square Evolution (ATH Coating) | ATH | ロングネック Long neck | 2 | 0.1～ 6 |
| | EPDSE-PN ※ | エポックディープスクエアエボリューション(PNコーティング) Epoch Deep Square Evolution (PN Coating) | PN | ロングネック Long neck | 2 | 0.1～ 6 |
| | HGOS2-PN ※ | エポックパナシアスクエア 2枚刃 Epoch Panacea Square -2 flutes | PN | レギュラー刃長 Regular | 2 | 0.2～20 |
| | HGOS4-PN ※ | エポックパナシアスクエア 4枚刃 Epoch Panacea Square -4 flutes | PN | レギュラー刃長 Regular | 4 | 1 ～20 |
| | EPP3-CS ※ | エポックCSパワーミル 3枚刃 Epoch CS Power Mill -3Flutes | CS | レギュラー刃長 Regular | 3 | 2 ～25 |
| | EPSF-PN ※ | エポックSUSフィニッシュ レギュラー刃 Epoch SUS Finish -Regular | PN | レギュラー刃長 Regular | 4 | 3 ～12 |
| | EPSFM-PN ※ | エポックSUSフィニッシュ ミディアム刃 Epoch SUS Finish -Medium | PN | ミディアム刃長 Medium | 4 | 3 ～12 |
| | EPSFL-PN ※ | エポックSUSフィニッシュ ロング刃 Epoch SUS Finish -Long | PN | ロング刃長 Long | 4 | 3 ～12 |
| | EPSMS-PN ※ | エポックSUSマルチ ショート刃 Epoch SUS Multi -Short | PN | ショート刃長 Short | 4 | 1 ～20 |
| | EPSM-PN ※ | エポックSUSマルチ レギュラー刃 Epoch SUS Multi -Regular | PN | レギュラー刃長 Regular | 4 | 1 ～20 |
| | EPSMM-PN ※ | エポックSUSマルチ ミディアム刃 Epoch SUS Multi -Medium | PN | ミディアム刃長 Long | 4 | 3 ～20 |
| | EPSML-PN ※ | エポックSUSマルチ ロング刃 Epoch SUS Multi -Long | PN | ロング刃長 Long | 4 | 6 ～20 |
| | EPSMLS-PN ※ | エポックSUSマルチ ロングシャンク Epoch SUS Multi -Long shank | PN | ロングシャンク Long Shank | 4 | 3 ～17 |
| | EPSM-3DC-PN ※ | エポックSUSマルチ 首下3DC Epoch SUS Multi -Under neck 3DC | PN | ロングネック Long Neck | 4 | 1 ～20 |
| | EPSM-5DC-PN ※ | エポックSUSマルチ 首下5DC Epoch SUS Multi -Under neck 5DC | PN | ロングネック Long Neck | 4 | 1 ～20 |
| | EPPS-TH ※ | エポックTHパワーミル ショート刃 Epoch TH Power Mill -Short | TH | ショート刃長 Short | 4 | 3 ～20 |
| | EPP-TH ※ | エポックTHパワーミル レギュラー刃 Epoch TH Power Mill -Regular | TH | レギュラー刃長 Regular | 4 | 3 ～20 |
| | EPPM-TH ※ | エポックTHパワーミル ミディアム刃 Epoch TH Power Mill -Medium | TH | ミディアム刃長 Medium | 4 | 3 ～20 |
| | EPPL-TH ※ | エポックTHパワーミル ロング刃 Epoch TH Power Mill -Long | TH | ロング刃長 Long | 4 | 6 ～20 |
| | EPP4-CS ※ | エポックCSパワーミル レギュラー刃 Epoch CS Power Mill -Regular | CS | レギュラー刃長 Regular | 4 | 3 ～20 |
| | EPPS-P-CS ※ | エポックCSパワーミル"ピンカド" ショート刃 Epoch CS Power Mill "PINKADO" -Short | CS | ショート刃長 Short | 4 | 1 ～12 |
| | EPP-P-CS ※ | エポックCSパワーミル"ピンカド" レギュラー刃 Epoch CS Power Mill "PINKADO" -Regular | CS | レギュラー刃長 Regular | 4 | 1 ～20 |
| | EPPS ※ | エポックパワーミル ショート刃 Epoch Power Mill -Short | C | ショート刃長 Short | 4 | 2 ～25 |
| | EPP ※ | エポックパワーミル レギュラー刃 Epoch Power Mill -Regular | C | レギュラー刃長 Regular | 4 | 2 ～25 |
| | EPPM ※ | エポックパワーミル ミディアム刃 Epoch Power Mill -Meduim | C | ミディアム刃長 Medium | 4 | 3 ～20 |
| | EPPL ※ | エポックパワーミル ロング刃 Epoch Power Mill -Long | C | ロング刃長 Long | 4 | 3 ～20 |
| | EPPLS ※ | エポックパワーミル ロングシャンク Epoch Power Mill -Long Shank | C | ロングシャンク Long Shank | 4 | 3 ～20 |

※:エポックエンドミルです。Epoch End Mill



| 形状 Shape | 対応被削材 Applicable work material | | | | | | | | | 加工用途 Applications | 掲載頁 Page | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | P | | H | | | M | S | N | | | 寸法表 Size list | 切削条件 Cutting conditions |
| | 炭素鋼・合金鋼 Carbon steels, Alloy steels | プリハードン鋼45HRC以下 Pre-harden Steels under 45 HRC | 高硬度45HRC超え55HRC以下 High-hardened over 45HRC to under 55HRC | 高硬度55HRC超え65HRC以下 High-hardened over 55HRC to under 65HRC | 高硬度65HRC超え High-hardened over 65HRC | ステンレス鋼 Stainless steels | チタン合金・耐熱合金 Titanium alloy, Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy | | | |
| | ○ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ | 側面 Side Cutting / 溝 Slotting / 細部 Miniature | A292 | A298 |
| | ◎ | ◎ | ◎ | ○ | | ◎ | ◎ | ◎ | ◎ | 側面 Side Cutting / 溝 Slotting / 細部 Miniature | A295 | A298 |
| | ◎ | ◎ | ○ | | | ◎ | ○ | ◎ | ◎ | 平面 Planing / 側面 Side Cutting / 溝 Slotting / 彫込み Die-sinking / ヘリカル Helical / 座ぐり Spot facing | A304 | A306 |
| | ◎ | ◎ | ○ | | | ◎ | ○ | ◎ | ◎ | 平面 Planing / 側面 Side Cutting / 彫込み Die-sinking / ヘリカル Helical / 座ぐり Spot facing | A305 | A306 |
| | ◎ | ◎ | ◎ | ○ | | ◎ | ◎ | ◎ | ◎ | 平面 Planing / 側面 Side Cutting / 溝 Slotting / 彫込み Die-sinking / ヘリカル Helical / 座ぐり Spot facing | A308 | A309 |
| | ◎ | ◎ | | | | ◎ | ◎ | ◎ | ◎ | 平面 Planing / 側面 Side Cutting / 溝 Slotting / ヘリカル Helical / 座ぐり Spot facing | A310 | A325 |
| | ◎ | ◎ | | | | ◎ | ◎ | ◎ | ◎ | 側面 Side Cutting | A310 | A327 |
| | ◎ | ◎ | | | | ◎ | ◎ | ◎ | ◎ | 側面 Side Cutting | A310 | A327 |
| | ◎ | ◎ | | | | ◎ | ◎ | ◎ | ◎ | 平面 Planing / 側面 Side Cutting / 溝 Slotting / ヘリカル Helical / 座ぐり Spot facing | A311 | A319 |
| | ◎ | ◎ | | | | ◎ | ◎ | ◎ | ◎ | 平面 Planing / 側面 Side Cutting / 溝 Slotting / ヘリカル Helical / 座ぐり Spot facing | A313 | A319 |
| | ◎ | ◎ | | | | ◎ | ◎ | ◎ | ◎ | 側面 Side Cutting | A315 | A324 |
| | ◎ | ◎ | | | | ◎ | ◎ | ◎ | ◎ | 側面 Side Cutting | A315 | A324 |
| | ◎ | ◎ | | | | ◎ | ◎ | ◎ | ◎ | 側面 Side Cutting | A316 | A322 |
| | ◎ | ◎ | | | | ◎ | ◎ | ◎ | ◎ | 平面 Planing / 側面 Side Cutting / 溝 Slotting / ヘリカル Helical / 座ぐり Spot facing | A317 | A319 |
| | ◎ | ◎ | | | | ◎ | ◎ | ◎ | ◎ | 平面 Planing / 側面 Side Cutting / 溝 Slotting / ヘリカル Helical / 座ぐり Spot facing | A318 | A322 |
| | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ | 平面 Planing / 側面 Side Cutting / 溝 Slotting | A328 | A329 |
| | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ | 平面 Planing / 側面 Side Cutting / 溝 Slotting | A328 | A330 |
| | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ | 側面 Side Cutting | A328 | A331 |
| | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ | 側面 Side Cutting | A328 | A331 |
| | ◎ | ◎ | ◎ | ○ | | ◎ | ◎ | ◎ | ◎ | 平面 Planing / 側面 Side Cutting / 溝 Slotting | A332 | A333 |
| | ◎ | ◎ | ◎ | ○ | | ◎ | ◎ | ◎ | ◎ | 平面 Planing / 側面 Side Cutting / 溝 Slotting | A332 | A335 |
| | ◎ | ◎ | ◎ | ○ | | ◎ | ◎ | ◎ | ◎ | 平面 Planing / 側面 Side Cutting / 溝 Slotting | A332 | A335 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 平面 Planing / 側面 Side Cutting / 溝 Slotting | A336 | A339 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 平面 Planing / 側面 Side Cutting / 溝 Slotting | A337 | A341 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 側面 Side Cutting | A338 | A343 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 側面 Side Cutting | A338 | A343 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 側面 Side Cutting | A338 | A343 |

Selection criteria table according to carbide end mill shape

# 超硬エンドミル形状別 選定目安表

| タイプ Type | 商品コード Item Code | 商品名称 Product | コーティング Coating | 工具仕様 Specification | 刃数 No. of flutes | 外径 Tool Dia. |
|---|---|---|---|---|---|---|
| 超硬スクエアエンドミル Carbide square end mills | ES8WB-ATH | 立壁／底面仕上げ用8枚刃エンドミル　スクエア<br>8-flutes End Mill for Vertical Wall/Bottom Face Finishing -Square | ATH | | 8 | 6 ～12 |
| | EMXR-TH ※ | エポックミルス タイプR 4枚刃・スクエア・ストレート<br>Epoch Mirus Type R -4flutes, Square, Straight | ATH | レギュラー刃長<br>Regular | 4 | 6 ～20 |
| | EMXR-SR-TH ※ | エポックミルス タイプR 4枚刃・スクエア・セミロングシャンク<br>Epoch Mirus Type R -4flutes, Square, Semi long shank | ATH | セミロングシャンク<br>Semi Long Shank | 4 | 7 ～13 |
| | EMXN-TH ※ | エポックミルス タイプN 4枚刃・スクエア・ストレート<br>Epoch Mirus Type N -4flutes, Square, Straight | ATH | レギュラー刃長<br>Regular | 4 | 6 ～20 |
| | EMXN-SR-TH ※ | エポックミルス タイプN 4枚刃・スクエア・セミロングシャンク<br>Epoch Mirus Type N -4flutes, Square, Semi long shank | ATH | セミロングシャンク<br>Semi Long Shank | 4 | 7 ～13 |
| | CEPS-TH ※ | エポックTHハード　ショート刃<br>Epoch TH Hard -Short | TH | ショート刃長<br>Short | 4,6 | 1 ～ 6 |
| | CEPR-TH ※ | エポックTHハード　レギュラー刃<br>Epoch TH Hard -Regular | TH | レギュラー刃長<br>Regular | 4,6,8 | 1 ～32 |
| | CEPL-TH ※ | エポックTHハード　ロング刃<br>Epoch TH Hard -Long | TH | ロング刃長<br>Long | 4,6,8 | 3 ～25 |
| | CEPR ※ | エポック21　レギュラー刃<br>Epoch21 -Regular | C | レギュラー刃長<br>Regular | 4,6,8 | 1 ～32 |
| | CEPL ※ | エポック21　ロング刃<br>Epoch21 -Long | C | ロング刃長<br>Long | 4,6,8 | 3 ～32 |
| | CEPLS ※ | エポック21　ロングシャンク<br>Epoch21 -Long Shank | C | ロングシャンク<br>Long Shank | 6,8 | 6 ～32 |
| | CEPH ※ | エポックハード<br>Epoch Hard | C | レギュラー刃長<br>Regular | 4,6 | 3 ～20 |
| | CEPU ※ | エポックユニバーサル<br>Epoch Universal | C | レギュラー刃長<br>Regular | 4 | 4 ～20 |
| | EPSW-PN ※ | エポックSUSウェーブ　レギュラー刃<br>Epoch SUS Wave -Regular | PN | レギュラー刃長<br>Regular | 3,4 | 4 ～20 |
| | EPSWL-PN ※ | エポックSUSウェーブ　ロング刃<br>Epoch SUS Wave -Long | PN | ロング刃長<br>Long | 4 | 6 ～20 |
| | EPSW-3DC-PN ※ | エポックSUSウェーブ　首下3DC<br>Epoch SUS Wave -Under neck 3DC | PN | ロングネック<br>Long Neck | 3,4 | 4 ～20 |
| | EPSW-5DC-PN ※ | エポックSUSウェーブ　首下5DC<br>Epoch SUS Wave -Under neck 5DC | PN | ロングネック<br>Long Neck | 3,4 | 4 ～20 |
| | EPQR-CS ※ | エポックラフィング　レギュラー刃<br>Epoch Roughing -Regular | CS | レギュラー刃長<br>Regular | 4 | 6 ～20 |
| | EPQL-CS ※ | エポックラフィング　ロング刃<br>Epoch Roughing -Long | CS | ロング刃長<br>Long | 4 | 6 ～20 |
| | EAP4-TH ※ | エポックエアロパワーミル 4枚刃<br>Epoch Aero Power Mill -4 flutes | TH | レギュラー刃長<br>Regular | 4 | 6 ～20 |
| | EAP6-TH ※ | エポックエアロパワーミル 6枚刃<br>Epoch Aero Power Mill -6 flutes | TH | レギュラー刃長<br>Regular | 6 | 6 ～20 |
| | EMXA3 ※ | エポックミルス タイプA 3枚刃（メーカー在庫品）<br>Epoch Mirus Type A -3 flutes (Manufacture stocked products) | | レギュラー刃長<br>Regular | 3 | 3 ～16 |
| | EMXA2 ※ | エポックミルス タイプA 2枚刃（セミオーダー品）<br>Epoch Mirus Type A -2 flutes (Semi-order products) | 受注生産<br>Order Made | レギュラー刃長<br>Regular | 2 | 10～25 |
| | EMXA3 ※ | エポックミルス タイプA 3枚刃（セミオーダー品）<br>Epoch Mirus Type A -3 flutes (Semi-order products) | 受注生産<br>Order Made | レギュラー刃長<br>Regular | 3 | 3 ～16 |
| | EPDS-SD ※ | エポックSD（S-DLC）ディープスクエア<br>Epoch SD(S-DLC) Deep Square | SD | ロングネック<br>Long neck | 2 | 0.5～ 4 |
| | EPAS-SD ※ | エポックSD（S-DLC）スクエア<br>Epoch SD(S-DLC) Square | SD | レギュラー刃長<br>Regular | 2 | 3 ～12 |
| | ECH-SD ※ | エポックCFRPエンドミル　タイプH<br>Epoch CFRP End Mill Type H | SD | レギュラー刃長<br>Regular | 4 | 6 ～12 |

※:エポックエンドミルです。Epoch End Mill



Selection criteria table according to carbide end mill shape

| 形状 Shape | 対応被削材 Applicable work material | | | | | | | | | | 加工用途 Applications | 掲載頁 Page | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | P | | H | | | M | S | N | | | | 寸法表 Size list | 切削条件 Cutting conditions |
| | 炭素鋼・合金鋼 Carbon steels, Alloy steels | プリハードン鋼45HRC以下 Pre-harden Steels under 45 HRC | 高硬度45HRC超え55HRC以下 High-hardened over 45HRC to under 55HRC | 高硬度55HRC超え65HRC以下 High-hardened over 55HRC to under 65HRC | 高硬度65HRC超え High-hardened over 65HRC | ステンレス鋼 Stainless steels | チタン合金・耐熱合金 Titanium alloy, Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy | | | | |
| | ○ | ◎ | ◎ | | | | | | | | 平面 Planing, 側面 Side Cutting, 溝 Slotting, 彫込み Die-sinking, 曲面 Profiling | A344 | A345 |
| | ◎ | ◎ | ○ | | | | | ○ | ○ | | 平面 Planing, 側面 Side Cutting, 溝 Slotting, 彫込み Die-sinking, 曲面 Profiling, R Radius, ヘリカル Helical, 座ぐり Spot facing, 取りのこし Fettaina/Hacking | A346 | A348 |
| | ◎ | ◎ | ○ | | | | | ○ | ○ | | 平面 Planing, 側面 Side Cutting, 溝 Slotting, 彫込み Die-sinking, 曲面 Profiling, R Radius, ヘリカル Helical, 座ぐり Spot facing, 取りのこし Fettaina/Hacking | A346 | A349 |
| | ◎ | ◎ | ○ | | | | | ○ | ○ | | 平面 Planing, 側面 Side Cutting, 溝 Slotting, 彫込み Die-sinking, 曲面 Profiling, R Radius, ヘリカル Helical, 座ぐり Spot facing, 取りのこし Fettaina/Hacking | A347 | A348 |
| | ◎ | ◎ | ○ | | | | | ○ | ○ | | 平面 Planing, 側面 Side Cutting, 溝 Slotting, 彫込み Die-sinking, 曲面 Profiling, R Radius, ヘリカル Helical, 座ぐり Spot facing, 取りのこし Fettaina/Hacking | A347 | A349 |
| | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | | | | 高能率側面切削 Adaptive milling, 側面 Side Cutting | A352 | A353 |
| | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | | | | 高能率側面切削 Adaptive milling, 側面 Side Cutting | A352 | A353 |
| | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | | | | 側面 Side Cutting | A352 | A354 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | | | | 高能率側面切削 Adaptive milling, 側面 Side Cutting | A355 | A357 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | | | | 側面 Side Cutting | A355 | A358 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | | | | 側面 Side Cutting | A356 | A358 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | | | | 側面 Side Cutting | A356 | A359 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | | 側面 Side Cutting, 溝 Slotting | A356 | A360 |
| | ◎ | ◎ | | | | ◎ | ◎ | ◎ | ◎ | | 平面 Planing, 側面 Side Cutting, 溝 Slotting, 彫込み Die-sinking, 曲面 Profiling, R Radius, ヘリカル Helical, 座ぐり Spot facing | A361 | A364 |
| | ◎ | ◎ | | | | ◎ | ◎ | ◎ | ◎ | | 側面 Side Cutting | A362 | A368 |
| | ◎ | ◎ | | | | ◎ | ◎ | ◎ | ◎ | | 平面 Planing, 側面 Side Cutting, 溝 Slotting, 彫込み Die-sinking, 曲面 Profiling, R Radius, ヘリカル Helical, 座ぐり Spot facing | A363 | A364 |
| | ◎ | ◎ | | | | ◎ | ◎ | ◎ | ◎ | | 平面 Planing, 側面 Side Cutting, 溝 Slotting, 彫込み Die-sinking, 曲面 Profiling, R Radius, ヘリカル Helical, 座ぐり Spot facing | A363 | A366 |
| | ◎ | ◎ | ○ | | | ◎ | ◎ | ◎ | ◎ | | 側面 Side Cutting, 溝 Slotting | A369 | A370 |
| | ◎ | ◎ | ○ | | | ◎ | ◎ | ◎ | ◎ | | 側面 Side Cutting | A369 | A370 |
| | ○ | | | | | ◎ | ◎ | | | | 平面 Planing, 側面 Side Cutting, 溝 Slotting | A371 | A372 |
| | ○ | | | | | ◎ | ◎ | | | | 側面 Side Cutting | A371 | A373 |
| | | | | | | | | ◎ | ◎ | | 平面 Planing, 側面 Side Cutting, 溝 Slotting, 彫込み Die-sinking, ヘリカル Helical, 座ぐり Spot facing | A374 | A376 |
| | | | | | | | | ◎ | ◎ | | 平面 Planing, 側面 Side Cutting, 溝 Slotting, 彫込み Die-sinking, ヘリカル Helical, 座ぐり Spot facing | A375 | A376 |
| | | | | | | | | ◎ | ◎ | | 平面 Planing, 側面 Side Cutting, 溝 Slotting, 彫込み Die-sinking, ヘリカル Helical, 座ぐり Spot facing | A375 | A376 |
| | | | | | | | | ◎ | ◎ | | 側面 Side Cutting, 溝 Slotting, 細部 Miniature | A378 | A379 |
| | | | | | | | | ◎ | ◎ | | 側面 Side Cutting, 溝 Slotting, 細部 Miniature | A380 | A380 |
| | CFRP,GFRP等 CFRP and GFRP, etc | | | | | | | | | | 平面 Planing, 側面 Side Cutting, 溝 Slotting, 彫込み Die-sinking, ヘリカル Helical, 座ぐり Spot facing | A381 | A381 |

Selection criteria table according to carbide end mill shape

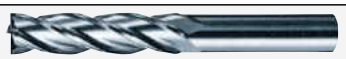
# 超硬エンドミル形状別 選定目安表

| タイプ Type | 商品コード Item Code | 商品名称 Product | コーティング Coating | 工具仕様 Specification | 刃数 No. of flutes | 外径 Tool Dia. |
|---|---|---|---|---|---|---|
| 超硬スクエアエンドミル Carbide square end mills | ECX-SD ※ | エポックCFRPエンドミル　タイプX<br>Epoch CFRP End Mill Type X | SD | レギュラー刃長<br>Regular | 3 | 6 ～12 |
| | ECN-HD ※ | エポックCFRPトリムカッタ　タイプN<br>Epoch CFRP Trim Cutter Type N | HD | レギュラー刃長<br>Regular | — | 6 ～12 |
| | ECW-HD ※ | エポックCFRPトリムカッタ　タイプW<br>Epoch CFRP Trim Cutter Type W | HD | レギュラー刃長<br>Regular | — | 6 ～12 |
| | EPCDS ※ | エポックシャイニングスクエア<br>Epoch Shining Square | | レギュラー刃長<br>Regular | 4,6 | 0.1～ 1 |
| | EMM ※ | エポックマイクロエンドミル<br>Epoch Micro End Mill | | | 2 | 0.03~0.5 |
| | EMM-TH ※ | エポックマイクロエンドミル(THコーティング)<br>Epoch Micro End Mill (TH Coating) | Micro TH | | 2 | 0.03~0.5 |
| | HYPS-C ※ | エポック精密小径エンドミル　レギュラーネック<br>Epoch Precision Miniature End Mill -Regular Neck | C | レギュラーネック<br>Regular Neck | 2 | 0.2～ 6 |
| | HPSLN-C ※ | エポック精密小径エンドミル　ロングネック<br>Epoch Precision Miniature End Mill -Long Neck | C | ロングネック<br>Long Neck | 2 | 0.5～ 6 |
| | AES | 超硬アルミ用エンドミル<br>Carbide End Mills for Aluminium | | レギュラー刃長<br>Regular | 2 | 1 ～20 |
| | HES2-C | 超硬Cコートエンドミル　2枚刃 レギュラー刃<br>C Coating Carbide End Mills -2 Flutes, Regular | C | レギュラー刃長<br>Regular | 2 | 0.1～30 |
| | HESM2-C | 超硬Cコートエンドミル　2枚刃 ミディアム刃<br>C Coating Carbide End Mills -2 Flutes, Medium | C | ミディアム刃長<br>Medium | 2 | 3 ～25 |
| | HESL2-C | 超硬Cコートエンドミル　2枚刃 ロング刃<br>C Coating Carbide End Mills -2 Flutes, Long | C | ロング刃長<br>Long | 2 | 1 ～25 |
| | HES2 | 超硬エンドミル　2枚刃 レギュラー刃<br>Carbide End Mills -2 Flutes, Regular | | レギュラー刃長<br>Regular | 2 | 0.1～30 |
| | HESM2 | 超硬エンドミル　2枚刃 ミディアム刃<br>Carbide End Mills -2 Flutes, Medium | | ミディアム刃長<br>Medium | 2 | 3 ～30 |
| | HESL2 | 超硬エンドミル　2枚刃 ロング刃<br>Carbide End Mills -2 Flutes, Long | | ロング刃長<br>Long | 2 | 1 ～25 |
| | HES4-C | 超硬Cコートエンドミル　4枚刃 レギュラー刃<br>C Coating Carbide End Mills -4 Flutes, Regular | C | レギュラー刃長<br>Regular | 4 | 2 ～30 |
| | HESM4-C | 超硬Cコートエンドミル　4枚刃 ミディアム刃<br>C Coating Carbide End Mills -4 Flutes, Medium | C | ミディアム刃長<br>Medium | 4 | 3 ～30 |
| | HESL4-C | 超硬Cコートエンドミル　4枚刃 ロング刃<br>C Coating Carbide End Mills -4 Flutes, Long | C | ロング刃長<br>Long | 4 | 3 ～25 |
| | HES4 | 超硬エンドミル　4枚刃 レギュラー刃<br>Carbide End Mills -4 Flutes, Regular | | レギュラー刃長<br>Regular | 4 | 2 ～30 |
| | HESM4 | 超硬エンドミル　4枚刃 ミディアム刃<br>Carbide End Mills -4 Flutes, Medium | | ミディアム刃長<br>Medium | 4 | 3 ～30 |
| | HESL4 | 超硬エンドミル　4枚刃 ロング刃<br>Carbide End Mills -4 Flutes, Long | | ロング刃長<br>Long | 4 | 3 ～25 |
| ヘッド交換式エンドミル Exchangeable Head End Mill | EHX-ETM-TH | EHXエンドミル（刃先形状:エポックターボミル）<br>EHX End Mill (Head type : Epoch Turbo Mill) | ATH | レギュラー刃長<br>Regular | 4 | 12～20 |
| | EHX-H-ETM-TH | EHXエンドミル（刃先形状:エポックターボミル）オイルホール付き<br>EHX End Mill (Head type : Epoch Turbo Mill) with oil hole | ATH | レギュラー刃長<br>Regular | 4 | 12～20 |
| | EHX-CEPR-TH | EHXエンドミル（刃先形状:エポック21）<br>EHX End Mill (Head type : Epoch21) | ATH | レギュラー刃長<br>Regular | 6 | 12～20 |
| | EHX-EPP-TH | EHXエンドミル（刃先形状:エポックパワーミル）<br>EHX End Mill (Head type : Epoch Power Mill) | ATH | レギュラー刃長<br>Regular | 4 | 12～20 |
| | EHX-ASC | EHXエンドミル用超硬ホルダ<br>Carbide Holder for EHX End Mill | | | | |

※:エポックエンドミルです。Epoch End Mill



Selection criteria table according to carbide end mill shape

| 形状 Shape | 対応被削材 Applicable work material | | | | | | | | | 加工用途 Applications | 掲載頁 Page | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | P | | H | | | M | S | N | | | 寸法表 Size list | 切削条件 Cutting conditions |
| | 炭素鋼・合金鋼 Carbon steels, Alloy steels | プリハードン鋼45HRC以下 Pre-harden Steels under 45 HRC | 高硬度45HRC超え55HRC以下 High-hardened over 45HRC to under 55HRC | 高硬度55HRC超え65HRC以下 High-hardened over 55HRC to under 65HRC | 高硬度65HRC超え High-hardened over 65HRC | ステンレス鋼 Stainless steels | チタン合金・耐熱合金 Titanium alloy, Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy | | | |
| | CFRP,GFRP等 CFRP and GFRP, etc | | | | | | | | | 平面 Planing, 側面 Side Cutting, 溝 Slotting, 彫込み Die-sinking, ヘリカル Helical, 座ぐり Spot facing | A381 | A381 |
| | | | | | | | | | | 平面 Planing, 側面 Side Cutting, 溝 Slotting, 彫込み Die-sinking, ヘリカル Helical, 座ぐり Spot facing | A382 | A382 |
| | | | | | | | | | | 平面 Planing, 側面 Side Cutting, 溝 Slotting, 彫込み Die-sinking, ヘリカル Helical, 座ぐり Spot facing | A382 | A382 |
| | 超硬合金用 for Cemented carbide | | | | | | | | | 平面 Planing | A383 | A383 |
| | ◎ | ◎ | ○ | | | ○ | ○ | ○ | ○ | 平面 Planing, 溝 Slotting | A384 | A384 |
| | ◎ | ◎ | ◎ | ○ | | ○ | ○ | ○ | ○ | 平面 Planing, 溝 Slotting | A384 | A384 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 溝 Slotting, 彫込み Die-sinking, 細部 Miniature | A385 | A385 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 溝 Slotting, 彫込み Die-sinking, 細部 Miniature | A385 | A385 |
| | | | | | | | | ○ | ◎ | 側面 Side Cutting, 溝 Slotting, 座ぐり Spot facing | A386 | A386 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 側面 Side Cutting, 溝 Slotting, 座ぐり Spot facing | A387 | A389 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 側面 Side Cutting | A388 | |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 側面 Side Cutting | A388 | A389 |
| | ○ | ○ | | | | ○ | ○ | ◎ | ◎ | 側面 Side Cutting, 溝 Slotting, 座ぐり Spot facing | A390 | A392 |
| | ○ | ○ | | | | ○ | ○ | ◎ | ◎ | 側面 Side Cutting | A391 | |
| | ○ | ○ | | | | ○ | ○ | ◎ | ◎ | 側面 Side Cutting | A391 | A393 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 側面 Side Cutting | A394 | A395 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 側面 Side Cutting | A394 | |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 側面 Side Cutting | A394 | A395 |
| | ○ | ○ | | | | ○ | ○ | ◎ | ◎ | 側面 Side Cutting | A396 | A397 |
|  | ○ | ○ | | | | ○ | ○ | ◎ | ◎ | 側面 Side Cutting | A396 | |
| | ○ | ○ | | | | ○ | ○ | ◎ | ◎ | 側面 Side Cutting | A396 | A397 |
| | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ | 彫込み Die-sinking, 曲面 Profiling, R Radius | A398 | A402 |
| | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ | 彫込み Die-sinking, 曲面 Profiling, R Radius | A398 | A402 |
| | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | | | 適応荒側面切削 Adaptive milling, 側面 Side Cutting | A398 | A403 |
| | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ | 平面 Planing, 側面 Side Cutting, 溝 Slotting | A399 | A404 |
| | | | | | | | | | | | A400 | |

Selection criteria table according to carbide end mill shape

# 超硬エンドミル形状別 選定目安表

| タイプ Type | 商品コード Item Code | 商品名称 Product | コーティング Coating | 工具仕様 Specification | 刃数 No. of flutes | 外径 Tool Dia. |
|---|---|---|---|---|---|---|
| 特定代理店在庫品 Stocked by Specified distributor | EPDB ※ | エポックディープボール(CSコーティング) Epoch Deep Ball (CS Coating) | CS | ロングネック Long neck | 2 | 0.1～ 6 |
| | EPDB-TH ※ | エポックディープボール(THコーティング) Epoch Deep Ball (TH Coating) | TH | ロングネック Long neck | 2 | 0.1～ 6 |
| | EPBC ※ | エポックCSパワーボール Epoch CS Power Ball | CS | レギュラー刃長 Regular | 2 | 1 ～20 |
| | CEPB2 ※ | エポックボール 2枚刃 Epoch Ball -2 Flutes | C | レギュラー刃長 Regular | 2 | 1 ～25 |
| | CEPBLS ※ | エポックボール ロングシャンク Epoch Ball -Long Shank | C | ロングシャンク Long Shank | 2 | 1 ～25 |
| | CEPB4 ※ | エポックボール 4枚刃 Epoch Ball -4 Flutes | C | レギュラー刃長 Regular | 4 | 6 ～12 |
| | BEK-C | 超硬Cコート強力形ボール C Coating Carbide Ball End Mills BEK | C | ショート刃長 Short | 2 | 0.3～20 |
| | BEKLS-C | 超硬Cコート強力形ボール ロングシャンク C Coating Carbide Ball End Mills BEK -Long Shank | C | ロングシャンク Long Shank | 2 | 1 ～25 |
| | BES-C | 超硬Cコートボール C Coating Carbide Ball End Mills | C | レギュラー刃長 Regular | 2 | 1 ～25 |
| | BESL-C | 超硬Cコート深彫り用ボール 首下テーパ C Coating Carbide Ball End Mills for Contouring -Taper Neck | C | ロングネック Long Neck | 2 | 3 ～12 |
| | BESL-S-C | 超硬Cコート深彫り用ボール 首下ストレート C Coating Carbide Ball End Mills for Contouring -Straight Neck | C | ロングネック Long Neck | 2 | 3 ～25 |
| | BESS | 超硬ミニチュアボールエンドミル Carbide Miniature Ball End Mills | | レギュラー刃長 Regular | 2 | 0.3～ 3 |
| | BES | 超硬ボールエンドミル Carbide Ball End Mills | | レギュラー刃長 Regular | 2 | 1 ～25 |
| | BES-M | 超硬プラ型用ボールエンドミル Carbide Ball End Mills for Plastic Mold | | レギュラー刃長 Regular | 2 | 1 ～20 |
| | YB-CS | CSコート超硬エンドミル ボール CS Coating Carbide End Mill -Ball | CS | レギュラー刃長 Regular | 2 | 1 ～20 |
| | JBER | ジェットボール レギュラー Jet Ball -Regular | C | レギュラー刃長 Regular | 2 | 6 ～20 |
| | JBELS | ジェットボール ロングシャンク Jet Ball -Long Shank | C | ロングシャンク Long Shank | 2 | 6 ～20 |
| | FE6 | 超硬型彫用ボールエンドミル Carbide Ball End Mills for Mold | | レギュラー刃長 Regular | 2 | 4 ～20 |
| | GBR | 超硬グラファイト用ボールエンドミル レギュラー刃 Carbide Ball End Mills for Graphite -Regular | | レギュラー刃長 Regular | 2,4 | 2 ～20 |
| | GBL | 超硬グラファイト用ボールエンドミル ロング刃 Carbide Ball End Mills for Graphite -Long | | ロング刃長 Long | 2,4 | 2 ～20 |
| | GXB | 超硬グラファイト用ボールエンドミル ロングシャンク Carbide Ball End Mills for Graphite -Long Shank | | ロングシャンク Long Shank | 2,4 | 2 ～20 |
| | GBS | 超硬グラファイト用ボールエンドミル レギュラー刃 専用機用 Carbide Ball End Mills for Graphite -Regular | | レギュラー刃長 Regular | 2,4 | 2 ～25 |
| | GBD | 超硬グラファイト用ボールエンドミル ロングシャンク 専用機用 Carbide Ball End Mills for Graphite -Long Shank | | ロングシャンク Long Shank | 2,4 | 2 ～25 |
| | EPJS-J ※ | エポックじゅうおう-J レギュラー刃・コーナR付き Epoch Juoh-J -Regular, Corner Radius | C | レギュラー刃長 Regular | 2 | 4 ～12 |
| | EPJSLS-J ※ | エポックじゅうおう-J ロングシャンク・コーナR付き Epoch Juoh-J -Long Shank, Corner Radius | C | ロングシャンク Long Shank | 2 | 4 ～12 |
| | EPR ※ | エポックハイフィードラジアス 首下ストレート・コーナR付き Epoch High Feed Radius -Straight Neck, Corner Radius | TH | レギュラー刃長 Regular | 3 | 2 ～20 |
| | EPRPN ※ | エポックハイフィードラジアス ペンシルネック・コーナR付き Epoch High Feed Radius -Pencil Neck, Corner Radius | TH | ペンシルネック Pencil Neck | 3 | 2 ～16 |

※:エポックエンドミルです。Epoch End Mill



| 形状 Shape | 対応被削材 Applicable work material | | | | | | | | | 加工用途 Applications | 掲載頁 Page | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | M | S | N | | | 寸法表 Size list | 切削条件 Cutting conditions |
| | 炭素鋼・合金鋼 Carbon steels, Alloy steels | プリハードン鋼 45HRC以下 Pre-harden Steels under 45 HRC | 高硬度45HRC超え55HRC以下 High-hardened over 45HRC to under 55HRC | 高硬度55HRC超え65HRC以下 High-hardened over 55HRC to under 65HRC | 高硬度65HRC超え High-hardened over 65HRC | ステンレス鋼 Stainless steels | チタン合金・耐熱合金 Titanium alloy, Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy | | | |
| | ◎ | ◎ | ◎ | ○ | | ◎ | ◎ | ◎ | ◎ | 溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / 細部 Miniature | A405 | A407 |
| | ○ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ | 溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / 細部 Miniature | A405 | A407 |
| | ◎ | ◎ | ◎ | ○ | | ◎ | ◎ | ◎ | ◎ | 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical | A409 | A410 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical | A411 | A412 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical / 取りのこし Rest Material Machining / 玉プチ Corner Recessing | A411 | A413 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 曲面 Profiling / R Radius / ヘリカル Helical | A411 | A414 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical | A415 | A416 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical / 取りのこし Rest Material Machining / 玉プチ Corner Recessing | A415 | A417 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical | A415 | |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical / 取りのこし Rest Material Machining / 玉プチ Corner Recessing | A418 | A419 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical / 取りのこし Rest Material Machining / 玉プチ Corner Recessing | A418 | A420 |
| | ○ | ○ | | | | ○ | ○ | ◎ | ◎ | 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical / 細部 Miniature | A421 | |
| | ○ | ○ | | | | ○ | ○ | ◎ | ◎ | 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical | A421 | |
| | ○ | ○ | | | | ○ | ○ | ◎ | ◎ | 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical | A421 | |
| | ◎ | ○ | | | | ○ | ○ | ◎ | ◎ | 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical | A422 | A422 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical | A422 | A423 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical / 取りのこし Rest Material Machining / 玉プチ Corner Recessing | A422 | A424 |
| | ○ | ○ | | | | ○ | ○ | ◎ | ◎ | 彫込み Die-sinking / 曲面 Profiling / R Radius | A425 | |
| | グラファイト用 for Graphite | | | | | | | | | 溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical | A425 | A425 |
| | | | | | | | | | | 溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius | A425 | A425 |
| | | | | | | | | | | 溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius | A426 | A425 |
| | | | | | | | | | | 溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical | A426 | A426 |
| | | | | | | | | | | 溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical | A426 | A426 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 側面 Side Cutting / 溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical | A427 | A428 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 側面 Side Cutting / 溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical | A427 | A428 |
| | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ | 彫込み Die-sinking / 曲面 Profiling / R Radius | A429 | A429 |
| | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ | 彫込み Die-sinking / 曲面 Profiling / R Radius | A429 | A429 |

Selection criteria table according to carbide end mill shape

# 超硬エンドミル形状別 選定目安表

| タイプ Type | 商品コード Item Code | 商品名称 Product | コーティング Coating | 工具仕様 Specification | 刃数 No. of flutes | 外径 Tool Dia. |
|---|---|---|---|---|---|---|
| 特定代理店在庫品 Stocked by Specified distributor | EPDS ※ | エポックディープスクエア(CSコーティング) Epoch Deep Square (CS Coating) | CS | ロングネック Long neck | 2 | 0.1～ 4 |
| | EPDS-TH ※ | エポックディープスクエア(THコーティング) Epoch Deep Square (TH Coating) | TH | ロングネック Long neck | 2 | 0.1～ 4 |
| | PESS-C | 超硬Cコートエンドミル"ピンカド" 2枚刃 ショート刃 C Coating Carbide End Mills "PINKADO" -2 Flutes, Short | C | ショート刃長 Short | 2 | 1 ～20 |
| | PESR2-C | 超硬Cコートエンドミル"ピンカド" 2枚刃 レギュラー刃 C Coating Carbide End Mills "PINKADO" -2 Flutes, Regular | C | レギュラー刃長 Regular | 2 | 1 ～20 |
| | PESR4-C | 超硬Cコートエンドミル"ピンカド" 4枚刃 レギュラー刃 C Coating Carbide End Mills "PINKADO" -4 Flutes, Regular | C | レギュラー刃長 Regular | 4 | 2 ～20 |
| | PESS | 超硬エンドミル"ピンカド" 2枚刃 ショート刃 Carbide End Mills "PINKADO" -2 Flutes, Short | | ショート刃長 Short | 2 | 1 ～20 |
| | PESR2 | 超硬エンドミル"ピンカド" 2枚刃 レギュラー刃 Carbide End Mills "PINKADO" -2 Flutes, Regular | | レギュラー刃長 Regular | 2 | 1 ～12 |
| | PESR4 | 超硬エンドミル"ピンカド" 4枚刃 レギュラー刃 Carbide End Mills "PINKADO" -4 Flutes, Regular | | レギュラー刃長 Regular | 4 | 2 ～12 |
| | YS-CS | CSコート超硬エンドミルスクエア ショート刃 ピンカド CS Coating Carbide End Mill Square -Short Pinkado | CS | ショート刃長 Short | 2 | 0.2～20 |
| | YR-CS | CSコート超硬エンドミルスクエア レギュラー刃 ピンカド CS Coating Carbide End Mill Square -Regular, Pinkado | CS | レギュラー刃長 Regular | 4 | 1 ～20 |
| | SES-C | 超硬Cコートスーパーヘリカルエンドミル C Coating Carbide Super Helical End Mills | C | レギュラー刃長 Regular | 2,3 | 2 ～20 |
| | SES | 超硬スーパーヘリカルエンドミル Carbide Super Helical End Mills | | レギュラー刃長 Regular | 2,3,4 | 2 ～30 |
| | KES | 超硬キー溝用エンドミル プラス公差 Carbide End Mills for Key-way -Plus Tolerance | | レギュラー刃長 Regular | 2 | 2 ～16 |
| | KESU | 超硬キー溝用エンドミル マイナス公差 Carbide End Mills for Key-way -Minus Tolerance | | レギュラー刃長 Regular | 2 | 2 ～16 |
| | TES | 超硬高硬度材用エンドミル Carbide End Mills for High Hardened Steel | | レギュラー刃長 Regular | 2 | 2 ～12 |
| | FE7 | 超硬型彫り用エンドミル スケア刃 Carbide End Mills for Mold - Square | | レギュラー刃長 Regular | 2 | 4 ～20 |
| | GSR | 超硬グラファイト用スケアエンドミル レギュラー刃 Carbide End Mills for Graphite -Regular, Square | | レギュラー刃長 Regular | 2,4 | 2 ～20 |
| | GSL | 超硬グラファイト用スケアエンドミル ロング刃 Carbide End Mills for Graphite -Long, Square | | ロング刃長 Long | 2,4 | 2 ～20 |
| | GXR | 超硬グラファイト用スケアエンドミル ロングシャンク Carbide End Mills for Graphite -Long Shank | | ロングシャンク Long Shank | 2,4 | 2 ～20 |
| | GSE | 超硬グラファイト用スケアエンドミル レギュラー刃 専用機用 Carbide End Mills for Graphite -Regular, Square | | レギュラー刃長 Regular | 4 | 2 ～30 |
| | GSD | 超硬グラファイト用スケアエンドミル ロングシャンク 専用機用 Carbide End Mills for Graphite -Long Shank, Square | | ロングシャンク Long Shank | 4 | 2 ～30 |
| | HTE2-C ※ | エポックテーパ 2枚刃 Epoch Taper -2 Flutes | C | レギュラー刃長 Regular | 2 | 1 ～10 |
| | HTE4-C ※ | エポックテーパ 4枚刃 Epoch Taper -4 Flutes | C | レギュラー刃長 Regular | 4 | 3 ～10 |
| | HTS | 超硬テーパエンドミル レギュラー刃 Carbide Taper End Mills -Regular | | レギュラー刃長 Regular | 2,4 | 3 ～12 |
| | HTSL | 超硬テーパエンドミル ロング刃 Carbide Taper End Mills -Long | | ロング刃長 Long | 2 | 1 ～ 3 |
| | HTSB | 超硬テーパボールエンドミル Carbide Taper Ball End Mills | | レギュラー刃長 Regular | 2,4 | 3 ～12 |
| | FE4 | 超硬型彫り用エンドミル テーパボール刃 Carbide End Mills for Mold -Taper Ball End | | レギュラー刃長 Regular | 2 | 2 ～ 6 |

※:エポックエンドミルです。Epoch End Mill



| 形状 Shape | 対応被削材 Applicable work material | | | | | | | | | 加工用途 Applications | 掲載頁 Page | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | M | S | N | | | 寸法表 Size list | 切削条件 Cutting conditions |
| | 炭素鋼・合金鋼 Carbon steels, Alloy steels | プリハードン鋼45HRC以下 Pre-harden Steels under 45HRC | 高硬度45HRC超え55HRC以下 High-hardened over 45HRC to under 55HRC | 高硬度55HRC超え65HRC以下 High-hardened over 55HRC to under 65HRC | 高硬度65HRC超え High-hardened over 65HRC | ステンレス鋼 Stainless steels | チタン合金・耐熱合金 Titanium alloy, Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy | | | |
| | ◎ | ◎ | ◎ | ○ | | ◎ | ◎ | ◎ | ◎ | 側面 Side Cutting / 溝 Slotting / 細部 Miniature | A430 | A432 |
| | ○ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ | 側面 Side Cutting / 溝 Slotting / 細部 Miniature | A430 | A432 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 側面 Side Cutting / 溝 Slotting / 座ぐり Spot facing | A434 | A436 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 側面 Side Cutting / 溝 Slotting / 座ぐり Spot facing | A434 | A436 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 側面 Side Cutting | A434 | A436 |
| | ○ | ○ | | | | ○ | ○ | ◎ | ◎ | 側面 Side Cutting / 溝 Slotting / 座ぐり Spot facing | A435 | A436 |
| | ○ | ○ | | | | ○ | ○ | ◎ | ◎ | 側面 Side Cutting / 溝 Slotting / 座ぐり Spot facing | A435 | A436 |
| | ○ | ○ | | | | ○ | ○ | ◎ | ◎ | 側面 Side Cutting | A435 | A436 |
| | ◎ | ○ | | | | ○ | ○ | ◎ | ◎ | 側面 Side Cutting / 溝 Slotting / 座ぐり Spot facing | A437 | A438 |
| | ◎ | ○ | | | | ○ | ○ | ◎ | ◎ | 側面 Side Cutting | A437 | A438 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 側面 Side Cutting / 溝 Slotting | A439 | A439 |
| | ○ | ○ | | | | ○ | ○ | ◎ | ◎ | 側面 Side Cutting / 溝 Slotting | A439 | A439 |
| | ○ | ○ | | | | ○ | ○ | ◎ | ◎ | 溝 Slotting | A440 | |
| | ○ | ○ | | | | ○ | ○ | ◎ | ◎ | 溝 Slotting | A440 | |
| | ○ | ○ | | | | ○ | ○ | ◎ | ◎ | 側面 Side Cutting | A440 | |
| | ○ | ○ | | | | ○ | ○ | ◎ | ◎ | 側面 Side Cutting | A440 | |
| | グラファイト用 for Graphite | | | | | | | | | 側面 Side Cutting / 溝 Slotting / 座ぐり Spot facing | A441 | A441 |
| | | | | | | | | | | 側面 Side Cutting / 溝 Slotting / 座ぐり Spot facing | A441 | A441 |
| | | | | | | | | | | 側面 Side Cutting / 溝 Slotting | A441 | A441 |
| | | | | | | | | | | 側面 Side Cutting / 溝 Slotting / 座ぐり Spot facing | A442 | A442 |
| | | | | | | | | | | 側面 Side Cutting / 溝 Slotting / 座ぐり Spot facing | A442 | A442 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | テーパ Taper | A443 | A443 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | テーパ Taper | A443 | A443 |
| | ○ | ○ | | | | ○ | ○ | ◎ | ◎ | テーパ Taper | A444 | |
| | ○ | ○ | | | | ○ | ○ | ◎ | ◎ | テーパ Taper | A444 | |
| | ○ | ○ | | | | ○ | ○ | ◎ | ◎ | テーパ Taper | A444 | |
| | ○ | ○ | | | | ○ | ○ | ◎ | ◎ | テーパボール Radius Taper | A445 | |

Selection criteria table according to carbide end mill shape

# 超硬エンドミル形状別 選定目安表

| タイプ Type | 商品コード Item Code | 商品名称 Product | コーティング Coating | 工具仕様 Specification | 刃数 No. of flutes | 外径 Tool Dia. | |
|---|---|---|---|---|---|---|---|
| 特定代理店在庫品 Stocked by Specified distributor | GTB | 超硬グラファイト用テーパボールエンドミル　ショート刃<br>Carbide Taper Ball End Mills for Graphite -Short | | ショート刃長<br>Short | 2 | 2 ～16 | |
| | EPRB-C ※ | エポックリブボール<br>Epoch RIB Ball | C | レギュラー刃長<br>Regular | 4 | 0.6～ 3 | |
| | DEB-C | 超硬Cコート"リブカットボール"<br>C Coating Carbide End Mills "RIB-CUT Ball" | C | ロングネック<br>Long Neck | 2 | 0.6～ 2 | |
| | RIB-CR-C | 超硬Cコートエンドミル"リブスター"コーナR付き<br>C Coating Carbide End Mills "RIB STAR" Corner Radius | C | レギュラー刃長<br>Regular | 6 | 1 ～ 3 | |
| | EPRI-C ※ | エポックリブ<br>Epoch RIB | C | レギュラー刃長<br>Regular | 4 | 0.5～ 3 | |
| | DES-C | 超硬Cコート"リブカット"<br>C Coating Carbide End Mills "RIB-CUT" | C | ロングネック<br>Long Neck | 2 | 0.5～ 6 | |
| | RIB-C | 超硬Cコートエンドミル"リブスター"<br>C Coating Carbide End Mills "RIB STAR" | C | レギュラー刃長<br>Regular | 6 | 0.5～ 3 | |
| | EPQS-CS ※ | エポッククラフィング　ショート刃<br>Epoch Roughing -Short | CS | ショート刃長<br>Short | 4 | 6 ～20 | |
| | EPQM-CS ※ | エポッククラフィング　ミディアム刃<br>Epoch Roughing -Medium | CS | ミディアム刃長<br>Medium | 4 | 6 ～20 | |
| | EPQLS-CS ※ | エポッククラフィング　ロングシャンク<br>Epoch Roughing -Long Shank | CS | ロングシャンク<br>Long Shank | 4 | 6 ～20 | |
| | BHS | CBN小径エンドミル　スクエア刃<br>CBN Miniature End Mills -Square End | | | 2 | 1 ～ 2 | |
| | BHSR | CBN小径エンドミル　コーナR付き<br>CBN Miniature End Mills -Radius End | | | 2 | 1 ～ 2 | |
| | BHB | CBN小径エンドミル　ボール刃<br>CBN Miniature End Mills -Ball End | | | 2 | 1 ～ 2 | |

※:エポックエンドミルです。Epoch End Mill

| 形状 Shape | 対応被削材 Applicable work material | | | | | | | | | 加工用途 Applications | 掲載頁 Page | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | P | | H | | | M | S | N | | | 寸法表 Size list | 切削条件 Cutting conditions |
| | 炭素鋼・合金鋼 Carbon steels, Alloy steels | プリハードン鋼45HRC以下 Pre-harden Steels under 45 HRC | 高硬度45HRC超え55HRC以下 High-hardened over 45HRC to under 55HRC | 高硬度55HRC超え65HRC以下 High-hardened over 55HRC to under 65HRC | 高硬度65HRC超え High-hardened over 65HRC | ステンレス鋼 Stainless steels | チタン合金・耐熱合金 Titanium alloy, Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy | | | |
| | グラファイト用 for Graphite | | | | | | | | | 溝 Slotting, 彫込み Die-sinking, 曲面 Profiling, R Radius, ヘリカル Helical | A445 | A445 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | テーパボール Radius Taper, 細部 Miniature | A446 | A447 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 溝 Slotting, 彫込み Die-sinking, 曲面 Profiling, R Radius, 細部 Miniature | A448 | A448 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | テーパ Taper, 細部 Miniature | A449 | A449 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | テーパ Taper, 細部 Miniature | A450 | A451 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | 側面 Side Cutting, 溝 Slotting, 細部 Miniature | A452 | A452 |
| | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ | テーパ Taper, 細部 Miniature | A453 | A454 |
| | ◎ | ◎ | ○ | | | ◎ | ◎ | ◎ | ◎ | 側面 Side Cutting, 溝 Slotting | A455 | A370 |
| | ◎ | ◎ | ○ | | | ◎ | ◎ | ◎ | ◎ | 側面 Side Cutting, 溝 Slotting | A455 | A370 |
| | ◎ | ◎ | ○ | | | ◎ | ◎ | ◎ | ◎ | 側面 Side Cutting | A455 | A370 |
| | | ○ | ○ | | | | | | | 平面 Planing, 側面 Side Cutting, 溝 Slotting | A456 | |
| | | ○ | ○ | | | | | | | 平面 Planing, 側面 Side Cutting, 曲面 Profiling | A456 | |
| | | ○ | ○ | | | | | | | 彫込み Die-sinking, 曲面 Profiling, R Radius, ヘリカル Helical | A456 | |

Selection criteria table according to carbide end mill shape

Quick dimension reference table by mill diameter

# 外径別寸法早見表

## 超硬エンドミル・ボール　RE0.05 ～ RE0.3　Carbide End Mills -Ball

単位 unit：mm

| 商品コード Item Code | 在庫 Stock | ボール半径 RE | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EPDBEH2001F-0.08-TH3 | ● | 0.05 | 0.08 | 0.08 | 35 | 4 | A63 |
| EPDBEH2001-0.08-TH3 | ● | 0.05 | 0.08 | 0.08 | 45 | 4 | A63 |
| EPSBE2001-0.15-TH | ● | 0.05 | 0.15 | 0.08 | 45 | 4 | A97 |
| EPSBE2001-0.15-H-TH | ● | 0.05 | 0.15 | 0.08 | 45 | 4 | A98 |
| EPDBEH2001F-0.2-TH3 | ● | 0.05 | 0.2 | 0.08 | 35 | 4 | A56 |
| EPDBEH2001-0.2-TH3 | ● | 0.05 | 0.2 | 0.08 | 45 | 4 | A58 |
| EPDBE2001-0.2-ATH | ● | 0.05 | 0.2 | 0.08 | 45 | 4 | A72 |
| EPDBE2001-0.2-PN | ● | 0.05 | 0.2 | 0.08 | 45 | 4 | A75 |
| EPDB2001-0.2 | □ | 0.05 | 0.2 | 0.08 | 45 | 4 | A405 |
| EPDB2001-0.2-TH | □ | 0.05 | 0.2 | 0.08 | 45 | 4 | A405 |
| EPDBEH2001F-0.3-TH3 | ● | 0.05 | 0.3 | 0.08 | 35 | 4 | A56 |
| EPDBEH2001-0.3-TH3 | ● | 0.05 | 0.3 | 0.08 | 45 | 4 | A58 |
| EPDBE2001-0.3-ATH | ● | 0.05 | 0.3 | 0.08 | 45 | 4 | A72 |
| EPDBE2001-0.3-PN | ● | 0.05 | 0.3 | 0.08 | 45 | 4 | A75 |
| EPSBE2001-0.3-TH | ● | 0.05 | 0.3 | 0.08 | 45 | 4 | A97 |
| EPSB2001-0.3-N-TH | ● | 0.05 | 0.3 | 0.08 | 45 | 4 | A155 |
| EPDB2001-0.3 | □ | 0.05 | 0.3 | 0.08 | 45 | 4 | A405 |
| EPDB2001-0.3-TH | □ | 0.05 | 0.3 | 0.08 | 45 | 4 | A405 |
| EPDBEH2001F-0.5-TH3 | ● | 0.05 | 0.5 | 0.08 | 35 | 4 | A56 |
| EPDBEH2001-0.5-TH3 | ● | 0.05 | 0.5 | 0.08 | 45 | 4 | A58 |
| EPDBE2001-0.5-ATH | ● | 0.05 | 0.5 | 0.08 | 45 | 4 | A72 |
| EPDBE2001-0.5-PN | ● | 0.05 | 0.5 | 0.08 | 45 | 4 | A75 |
| EPDB2001-0.5 | □ | 0.05 | 0.5 | 0.08 | 45 | 4 | A405 |
| EPDB2001-0.5-TH | □ | 0.05 | 0.5 | 0.08 | 45 | 4 | A405 |
| EPSBE2001-0.75-TH | ● | 0.05 | 0.75 | 0.08 | 45 | 4 | A97 |
| EPSB2001-H-TH | ● | 0.05 | – | 0.08 | 45 | 4 | A154 |
| EPSB2001-N-TH | ● | 0.05 | – | 0.08 | 45 | 4 | A154 |
| EPDBEH20015F-0.12-TH3 | ● | 0.075 | 0.12 | 0.12 | 35 | 4 | A63 |
| EPDBEH20015-0.12-TH3 | ● | 0.075 | 0.12 | 0.12 | 45 | 4 | A63 |
| EPDBEH20015F-0.3-TH3 | ● | 0.075 | 0.3 | 0.12 | 35 | 4 | A56 |
| EPDBEH20015-0.3-TH3 | ● | 0.075 | 0.3 | 0.12 | 45 | 4 | A58 |
| EPDBEH20015F-0.5-TH3 | ● | 0.075 | 0.5 | 0.12 | 35 | 4 | A56 |
| EPDBEH20015-0.5-TH3 | ● | 0.075 | 0.5 | 0.12 | 45 | 4 | A58 |
| EPDBEH20015F-0.75-TH3 | ● | 0.075 | 0.75 | 0.12 | 35 | 4 | A56 |
| EPDBEH20015-0.75-TH3 | ● | 0.075 | 0.75 | 0.12 | 45 | 4 | A58 |
| EPDBEH20015-1-TH3 | ● | 0.075 | 1 | 0.12 | 45 | 4 | A58 |
| EPDBEH2002F-0.15-TH3 | ● | 0.1 | 0.15 | 0.15 | 35 | 4 | A63 |
| EPDBEH2002-0.15-TH3 | ● | 0.1 | 0.15 | 0.15 | 50 | 4 | A63 |
| EPDBEH2002F-0.3-TH3 | ● | 0.1 | 0.3 | 0.15 | 35 | 4 | A56 |
| EPSBE2002-0.3-TH | ● | 0.1 | 0.3 | 0.15 | 45 | 4 | A97 |
| EPSBE2002-0.3-H-TH | ● | 0.1 | 0.3 | 0.15 | 45 | 4 | A98 |
| EPDBEH2002-0.3-TH3 | ● | 0.1 | 0.3 | 0.15 | 50 | 4 | A58 |
| EPDB2002-0.4-SD | ● | 0.1 | 0.4 | 0.15 | 50 | 4 | A140 |
| CBN-EHB2002-0.5 | ● | 0.1 | 0.5 | 0.12 | 50 | 4 | A147 |
| CBN-EPSB2002-0.5-S | ● | 0.1 | 0.5 | 0.12 | 50 | 4 | A151 |
| CBN-EPSB2002-0.5-F | ● | 0.1 | 0.5 | 0.12 | 50 | 4 | A151 |
| EPDBEH2002F-0.5-TH3 | ● | 0.1 | 0.5 | 0.15 | 35 | 4 | A56 |
| EPDBEH2002-0.5-TH3 | ● | 0.1 | 0.5 | 0.15 | 50 | 4 | A58 |
| EPDBE2002-0.5-ATH | ● | 0.1 | 0.5 | 0.15 | 50 | 4 | A72 |
| EPDBE2002-0.5-PN | ● | 0.1 | 0.5 | 0.15 | 50 | 4 | A75 |
| EPDB2002-0.5 | □ | 0.1 | 0.5 | 0.15 | 50 | 4 | A405 |
| EPDB2002-0.5-TH | □ | 0.1 | 0.5 | 0.15 | 50 | 4 | A405 |
| EPSBE2002-0.6-TH | ● | 0.1 | 0.6 | 0.15 | 45 | 4 | A97 |
| EPSB2002-0.6-N-TH | ● | 0.1 | 0.6 | 0.15 | 45 | 4 | A155 |
| EPDB2002-0.6-SD | ● | 0.1 | 0.6 | 0.15 | 50 | 4 | A140 |
| CBN-EHB2002-0.75 | ● | 0.1 | 0.75 | 0.12 | 50 | 4 | A147 |
| EPDBEH2002F-0.75-TH3 | ● | 0.1 | 0.75 | 0.15 | 35 | 4 | A56 |
| EPDBEH2002-0.75-TH3 | ● | 0.1 | 0.75 | 0.15 | 50 | 4 | A58 |
| EPDBE2002-0.75-ATH | ● | 0.1 | 0.75 | 0.15 | 50 | 4 | A72 |
| EPDBE2002-0.75-PN | ● | 0.1 | 0.75 | 0.15 | 50 | 4 | A75 |
| CBN-EHB2002-1 | ● | 0.1 | 1 | 0.12 | 50 | 4 | A147 |
| CBN-EPSB2002-1-S | ● | 0.1 | 1 | 0.12 | 50 | 4 | A151 |
| CBN-EPSB2002-1-F | ● | 0.1 | 1 | 0.12 | 50 | 4 | A151 |
| EPDBEH2002F-1-TH3 | ● | 0.1 | 1 | 0.15 | 38 | 4 | A56 |
| EPSBE2002-1-TH | ● | 0.1 | 1 | 0.15 | 45 | 4 | A97 |
| EPDBEH2002-1-TH3 | ● | 0.1 | 1 | 0.15 | 50 | 4 | A58 |
| EPDBE2002-1-ATH | ● | 0.1 | 1 | 0.15 | 50 | 4 | A72 |
| EPDBE2002-1-PN | ● | 0.1 | 1 | 0.15 | 50 | 4 | A75 |
| EPDBPE2002-1-04-ATH | ● | 0.1 | 1 | 0.15 | 50 | 4 | A84 |
| EPDBPE2002-1-14-ATH | ● | 0.1 | 1 | 0.15 | 50 | 4 | A84 |
| EPDBPE2002-1-29-ATH | ● | 0.1 | 1 | 0.15 | 50 | 4 | A84 |
| EPDB2002-1-SD | ● | 0.1 | 1 | 0.15 | 50 | 4 | A140 |
| EPDBP2002-1-04-TH | △ | 0.1 | 1 | 0.15 | 50 | 4 | A162 |
| EPDB2002-1 | □ | 0.1 | 1 | 0.15 | 50 | 4 | A405 |
| EPDB2002-1-TH | □ | 0.1 | 1 | 0.15 | 50 | 4 | A405 |
| EPDBEH2002-1.25-TH3 | ● | 0.1 | 1.25 | 0.15 | 50 | 4 | A58 |
| EPDBE2002-1.25-ATH | ● | 0.1 | 1.25 | 0.15 | 50 | 4 | A72 |
| EPDBE2002-1.25-PN | ● | 0.1 | 1.25 | 0.15 | 50 | 4 | A75 |
| CBN-EHB2002-1.5 | ● | 0.1 | 1.5 | 0.12 | 50 | 4 | A147 |
| EPSBE2002-1.5-TH | ● | 0.1 | 1.5 | 0.15 | 45 | 4 | A97 |
| EPDBEH2002-1.5-TH3 | ● | 0.1 | 1.5 | 0.15 | 50 | 4 | A58 |
| EPDBE2002-1.5-ATH | ● | 0.1 | 1.5 | 0.15 | 50 | 4 | A72 |
| EPDBE2002-1.5-PN | ● | 0.1 | 1.5 | 0.15 | 50 | 4 | A75 |
| EPDBPE2002-1.5-04-ATH | ● | 0.1 | 1.5 | 0.15 | 50 | 4 | A84 |
| EPDBP2002-1.5-04-TH | △ | 0.1 | 1.5 | 0.15 | 50 | 4 | A162 |
| EPDB2002-1.5 | □ | 0.1 | 1.5 | 0.15 | 50 | 4 | A405 |
| EPDB2002-1.5-TH | □ | 0.1 | 1.5 | 0.15 | 50 | 4 | A405 |
| CBN-EHB2002-2 | ● | 0.1 | 2 | 0.12 | 50 | 4 | A147 |
| EPSBE2002-2-TH | ● | 0.1 | 2 | 0.15 | 45 | 4 | A97 |
| EPDBEH2002-2-TH3 | ● | 0.1 | 2 | 0.15 | 50 | 4 | A58 |
| EPDBE2002-2-ATH | ● | 0.1 | 2 | 0.15 | 50 | 4 | A72 |
| EPDBE2002-2-PN | ● | 0.1 | 2 | 0.15 | 50 | 4 | A75 |
| EPDBPE2002-2-04-ATH | ● | 0.1 | 2 | 0.15 | 50 | 4 | A84 |
| EPDBPE2002-2-09-ATH | ● | 0.1 | 2 | 0.15 | 50 | 4 | A84 |
| EPDBPE2002-2-14-ATH | ● | 0.1 | 2 | 0.15 | 50 | 4 | A84 |
| EPDBPE2002-2-29-ATH | ● | 0.1 | 2 | 0.15 | 50 | 4 | A84 |
| EPDBP2002-2-09-TH | △ | 0.1 | 2 | 0.15 | 50 | 4 | A162 |
| EPDB2002-2 | □ | 0.1 | 2 | 0.15 | 50 | 4 | A405 |
| EPDB2002-2-TH | □ | 0.1 | 2 | 0.15 | 50 | 4 | A405 |
| EPDBEH2002-2.5-TH3 | ● | 0.1 | 2.5 | 0.15 | 50 | 4 | A58 |
| EPDBE2002-2.5-ATH | ● | 0.1 | 2.5 | 0.15 | 50 | 4 | A72 |
| EPDBE2002-2.5-PN | ● | 0.1 | 2.5 | 0.15 | 50 | 4 | A75 |
| EPDBPE2002-2.5-09-ATH | ● | 0.1 | 2.5 | 0.15 | 50 | 4 | A84 |
| EPDBP2002-2.5-09-TH | △ | 0.1 | 2.5 | 0.15 | 50 | 4 | A162 |
| EPDB2002-2.5 | □ | 0.1 | 2.5 | 0.15 | 50 | 4 | A405 |
| EPDB2002-2.5-TH | □ | 0.1 | 2.5 | 0.15 | 50 | 4 | A405 |
| EPDBEH2002-3-TH3 | ● | 0.1 | 3 | 0.15 | 50 | 4 | A58 |
| EPDBE2002-3-ATH | ● | 0.1 | 3 | 0.15 | 50 | 4 | A72 |
| EPDBE2002-3-PN | ● | 0.1 | 3 | 0.15 | 50 | 4 | A75 |
| EPDBPE2002-3-04-ATH | ● | 0.1 | 3 | 0.15 | 50 | 4 | A84 |
| EPDBPE2002-3-09-ATH | ● | 0.1 | 3 | 0.15 | 50 | 4 | A84 |
| EPDBPE2002-3-14-ATH | ● | 0.1 | 3 | 0.15 | 50 | 4 | A84 |
| EPDBPE2002-3-29-ATH | ● | 0.1 | 3 | 0.15 | 50 | 4 | A84 |
| EPDB2002-3 | □ | 0.1 | 3 | 0.15 | 50 | 4 | A405 |
| EPDB2002-3-TH | □ | 0.1 | 3 | 0.15 | 50 | 4 | A405 |
| EPSB2002-H-TH | ● | 0.1 | – | 0.15 | 45 | 4 | A154 |
| EPSB2002-N-TH | ● | 0.1 | – | 0.15 | 45 | 4 | A154 |
| HYPB2002-C | ● | 0.1 | – | 0.3 | 50 | 6 | A156 |
| EPDBEH2003F-0.25-TH3 | ● | 0.15 | 0.25 | 0.25 | 35 | 4 | A63 |
| EPDBEH2003-0.25-TH3 | ● | 0.15 | 0.25 | 0.25 | 50 | 4 | A63 |
| EPSBE2003-0.45-TH | ● | 0.15 | 0.45 | 0.25 | 45 | 4 | A97 |
| EPSBE2003-0.45-H-TH | ● | 0.15 | 0.45 | 0.25 | 45 | 4 | A98 |
| CBN-EHB2003-0.5 | ● | 0.15 | 0.5 | 0.18 | 50 | 4 | A147 |
| EPDBEH2003F-0.5-TH3 | ● | 0.15 | 0.5 | 0.25 | 35 | 4 | A56 |
| EPDBEH2003-0.5-TH3 | ● | 0.15 | 0.5 | 0.25 | 50 | 4 | A58 |
| EPDBE2003-0.5-ATH | ● | 0.15 | 0.5 | 0.25 | 50 | 4 | A72 |
| EPDBE2003-0.5-PN | ● | 0.15 | 0.5 | 0.25 | 50 | 4 | A75 |
| EPDB2003-0.5-SD | ● | 0.15 | 0.5 | 0.25 | 50 | 4 | A140 |
| CBN-EHB2003-0.75 | ● | 0.15 | 0.75 | 0.18 | 50 | 4 | A147 |
| CBN-EPSB2003-0.75-S | ● | 0.15 | 0.75 | 0.18 | 50 | 4 | A151 |
| CBN-EPSB2003-0.75-F | ● | 0.15 | 0.75 | 0.18 | 50 | 4 | A151 |
| EPDBEH2003F-0.75-TH3 | ● | 0.15 | 0.75 | 0.25 | 35 | 4 | A56 |
| EPDBEH2003-0.75-TH3 | ● | 0.15 | 0.75 | 0.25 | 50 | 4 | A58 |
| EPDBE2003-0.75-ATH | ● | 0.15 | 0.75 | 0.25 | 50 | 4 | A72 |
| EPDBE2003-0.75-PN | ● | 0.15 | 0.75 | 0.25 | 50 | 4 | A75 |
| EPSBE2003-0.9-TH | ● | 0.15 | 0.9 | 0.25 | 45 | 4 | A97 |
| EPSB2003-0.9-N-TH | ● | 0.15 | 0.9 | 0.25 | 45 | 4 | A155 |
| HGOB2003-PN | ● | 0.15 | 0.9 | 0.6 | 50 | 4 | A104 |
| CBN-EHB2003-1 | ● | 0.15 | 1 | 0.18 | 50 | 4 | A147 |
| EPDBEH2003F-1-TH3 | ● | 0.15 | 1 | 0.25 | 35 | 4 | A56 |
| EPDBEH2003-1-TH3 | ● | 0.15 | 1 | 0.25 | 50 | 4 | A58 |
| EPDBE2003-1-ATH | ● | 0.15 | 1 | 0.25 | 50 | 4 | A72 |
| EPDBE2003-1-PN | ● | 0.15 | 1 | 0.25 | 50 | 4 | A75 |
| EPDB2003-1-SD | ● | 0.15 | 1 | 0.25 | 50 | 4 | A140 |
| EPDB2003-1 | □ | 0.15 | 1 | 0.25 | 50 | 4 | A405 |
| EPDB2003-1-TH | □ | 0.15 | 1 | 0.25 | 50 | 4 | A405 |
| EPDBEH2003-1.25-TH3 | ● | 0.15 | 1.25 | 0.25 | 50 | 4 | A58 |
| EPDBE2003-1.25-ATH | ● | 0.15 | 1.25 | 0.25 | 50 | 4 | A72 |
| EPDBE2003-1.25-PN | ● | 0.15 | 1.25 | 0.25 | 50 | 4 | A75 |
| CBN-EHB2003-1.5 | ● | 0.15 | 1.5 | 0.18 | 50 | 4 | A147 |
| CBN-EPSB2003-1.5-S | ● | 0.15 | 1.5 | 0.18 | 50 | 4 | A151 |
| CBN-EPSB2003-1.5-F | ● | 0.15 | 1.5 | 0.18 | 50 | 4 | A151 |
| EPDBEH2003F-1.5-TH3 | ● | 0.15 | 1.5 | 0.25 | 38 | 4 | A56 |
| EPSBE2003-1.5-TH | ● | 0.15 | 1.5 | 0.25 | 45 | 4 | A97 |
| EPDBEH2003-1.5-TH3 | ● | 0.15 | 1.5 | 0.25 | 50 | 4 | A58 |
| EPDBE2003-1.5-ATH | ● | 0.15 | 1.5 | 0.25 | 50 | 4 | A72 |
| EPDBE2003-1.5-PN | ● | 0.15 | 1.5 | 0.25 | 50 | 4 | A75 |
| EPDB2003-1.5-SD | ● | 0.15 | 1.5 | 0.25 | 50 | 4 | A140 |
| EPDB2003-1.5 | □ | 0.15 | 1.5 | 0.25 | 50 | 4 | A405 |
| EPDB2003-1.5-TH | □ | 0.15 | 1.5 | 0.25 | 50 | 4 | A405 |
| CBN-EHB2003-2 | ● | 0.15 | 2 | 0.18 | 50 | 4 | A147 |
| EPSBE2003-2-TH | ● | 0.15 | 2 | 0.25 | 45 | 4 | A97 |
| EPDBEH2003-2-TH3 | ● | 0.15 | 2 | 0.25 | 50 | 4 | A58 |
| EPDBE2003-2-ATH | ● | 0.15 | 2 | 0.25 | 50 | 4 | A72 |
| EPDBE2003-2-PN | ● | 0.15 | 2 | 0.25 | 50 | 4 | A75 |
| EPDBPE2003-2-04-ATH | ● | 0.15 | 2 | 0.25 | 50 | 4 | A84 |
| EPDBP2003-2-04-TH | △ | 0.15 | 2 | 0.25 | 50 | 4 | A162 |
| EPDB2003-2 | □ | 0.15 | 2 | 0.25 | 50 | 4 | A405 |
| EPDB2003-2-TH | □ | 0.15 | 2 | 0.25 | 50 | 4 | A405 |
| EPDBEH2003-2.5-TH3 | ● | 0.15 | 2.5 | 0.25 | 50 | 4 | A58 |
| EPDBE2003-2.5-ATH | ● | 0.15 | 2.5 | 0.25 | 50 | 4 | A72 |
| EPDBE2003-2.5-PN | ● | 0.15 | 2.5 | 0.25 | 50 | 4 | A75 |
| EPDB2003-2.5 | □ | 0.15 | 2.5 | 0.25 | 50 | 4 | A405 |
| EPDB2003-2.5-TH | □ | 0.15 | 2.5 | 0.25 | 50 | 4 | A405 |
| CBN-EHB2003-3 | ● | 0.15 | 3 | 0.18 | 50 | 4 | A147 |
| EPSBE2003-3-TH | ● | 0.15 | 3 | 0.25 | 45 | 4 | A97 |
| EPDBEH2003-3-TH3 | ● | 0.15 | 3 | 0.25 | 50 | 4 | A58 |
| EPDBE2003-3-ATH | ● | 0.15 | 3 | 0.25 | 50 | 4 | A72 |
| EPDBE2003-3-PN | ● | 0.15 | 3 | 0.25 | 50 | 4 | A75 |
| EPDBPE2003-3-04-ATH | ● | 0.15 | 3 | 0.25 | 50 | 4 | A84 |
| EPDBPE2003-3-09-ATH | ● | 0.15 | 3 | 0.25 | 50 | 4 | A84 |
| EPDBP2003-3-09-TH | △ | 0.15 | 3 | 0.25 | 50 | 4 | A162 |
| EPDB2003-3 | □ | 0.15 | 3 | 0.25 | 50 | 4 | A405 |
| EPDB2003-3-TH | □ | 0.15 | 3 | 0.25 | 50 | 4 | A405 |
| EPDBEH2003-3.5-TH3 | ● | 0.15 | 3.5 | 0.25 | 50 | 4 | A58 |
| EPDBEH2003-4-TH3 | ● | 0.15 | 4 | 0.25 | 50 | 4 | A58 |
| EPDBPE2003-4-09-ATH | ● | 0.15 | 4 | 0.25 | 50 | 4 | A84 |
| EPDBP2003-4-09-TH | △ | 0.15 | 4 | 0.25 | 50 | 4 | A162 |
| EPSB2003-H-TH | ● | 0.15 | – | 0.25 | 45 | 4 | A154 |
| EPSB2003-N-TH | ● | 0.15 | – | 0.25 | 45 | 4 | A154 |
| HYPB2003-C | ● | 0.15 | – | 0.4 | 50 | 6 | A156 |
| BESS2003 | □ | 0.15 | – | 0.45 | 50 | 3 | A421 |
| BEK2003 | ● | 0.15 | – | 0.6 | 50 | 3 | A161 |
| BEK2003-C | □ | 0.15 | – | 0.6 | 50 | 3 | A415 |
| EPDBEH2004F-0.3-TH3 | ● | 0.2 | 0.3 | 0.3 | 35 | 4 | A63 |
| EPDBEH2004-0.3-TH3 | ● | 0.2 | 0.3 | 0.3 | 50 | 4 | A63 |
| EPDBEH2004F-0.5-TH3 | ● | 0.2 | 0.5 | 0.3 | 35 | 4 | A56 |
| EPDBEH2004-0.5-TH3 | ● | 0.2 | 0.5 | 0.3 | 50 | 4 | A58 |
| EPSBE2004-0.6-TH | ● | 0.2 | 0.6 | 0.3 | 45 | 4 | A97 |
| EPSBE2004-0.6-H-TH | ● | 0.2 | 0.6 | 0.3 | 45 | 4 | A98 |
| EPDBEH2004F-0.75-TH3 | ● | 0.2 | 0.75 | 0.3 | 35 | 4 | A56 |
| EPDBEH2004-0.75-TH3 | ● | 0.2 | 0.75 | 0.3 | 50 | 4 | A58 |
| EPDBE2004-0.75-ATH | ● | 0.2 | 0.75 | 0.3 | 50 | 4 | A72 |
| EPDBE2004-0.75-PN | ● | 0.2 | 0.75 | 0.3 | 50 | 4 | A75 |
| CBN-EHB2004-0.75 | ● | 0.2 | 0.75 | 0.4 | 50 | 4 | A147 |
| CBN-EPSB2004-1-S | ● | 0.2 | 1 | 0.24 | 50 | 4 | A151 |
| CBN-EPSB2004-1-F | ● | 0.2 | 1 | 0.24 | 50 | 4 | A151 |

●印：標準在庫品です。　●：Stocked Items.　△印:在庫が無くなり次第受注生産品となるものです。△:When the Stock is out, will become to produce on request.

単位 unit：mm

| 商品コード Item Code | 在庫 Stock | ボール半径 RE | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EPDBEH2004F-1-TH3 | ● | 0.2 | 1 | 0.3 | 35 | 4 | A56 |
| EPDBEH2004-1-TH3 | ● | 0.2 | 1 | 0.3 | 50 | 4 | A58 |
| EPDBE2004-1-ATH | ● | 0.2 | 1 | 0.3 | 50 | 4 | A72 |
| EPDBE2004-1-PN | ● | 0.2 | 1 | 0.3 | 50 | 4 | A75 |
| EPDB2004-1-SD | ● | 0.2 | 1 | 0.3 | 50 | 4 | A140 |
| EPDB2004-1 | □ | 0.2 | 1 | 0.3 | 50 | 4 | A405 |
| EPDB2004-1-TH | □ | 0.2 | 1 | 0.3 | 50 | 4 | A405 |
| CBN-EHB2004-1 | ● | 0.2 | 1 | 0.4 | 50 | 4 | A147 |
| HGOB2004-PN | ● | 0.2 | 1.1 | 0.8 | 50 | 4 | A104 |
| EPSBE2004-1.2-TH | ● | 0.2 | 1.2 | 0.3 | 45 | 4 | A97 |
| EPSB2004-1.2-N-TH | ● | 0.2 | 1.2 | 0.3 | 45 | 4 | A155 |
| PCDB0004 | | 0.2 | 1.4 | 0.35 | 40 | 4 | A146 |
| EPDBEH2004F-1.5-TH3 | ● | 0.2 | 1.5 | 0.3 | 38 | 4 | A56 |
| EPDBEH2004-1.5-TH3 | ● | 0.2 | 1.5 | 0.3 | 50 | 4 | A58 |
| EPDBE2004-1.5-ATH | ● | 0.2 | 1.5 | 0.3 | 50 | 4 | A72 |
| EPDBE2004-1.5-PN | ● | 0.2 | 1.5 | 0.3 | 50 | 4 | A75 |
| EPDB2004-1.5-SD | ● | 0.2 | 1.5 | 0.3 | 50 | 4 | A140 |
| EPDB2004-1.5 | □ | 0.2 | 1.5 | 0.3 | 50 | 4 | A405 |
| EPDB2004-1.5-TH | □ | 0.2 | 1.5 | 0.3 | 50 | 4 | A405 |
| CBN-EHB2004-1.5 | ● | 0.2 | 1.5 | 0.4 | 50 | 4 | A147 |
| CBN-EPSB2004-2-S | ● | 0.2 | 2 | 0.24 | 50 | 4 | A151 |
| CBN-EPSB2004-2-F | ● | 0.2 | 2 | 0.24 | 50 | 4 | A151 |
| EPDBEH2004F-2-TH3 | ● | 0.2 | 2 | 0.3 | 38 | 4 | A56 |
| EPSBE2004-2-TH | ● | 0.2 | 2 | 0.3 | 45 | 4 | A97 |
| EPDBEH2004-2-TH3 | ● | 0.2 | 2 | 0.3 | 50 | 4 | A58 |
| EPDBE2004-2-ATH | ● | 0.2 | 2 | 0.3 | 50 | 4 | A72 |
| EPDBE2004-2-PN | ● | 0.2 | 2 | 0.3 | 50 | 4 | A75 |
| EPDBPE2004-2-04-ATH | ● | 0.2 | 2 | 0.3 | 50 | 4 | A84 |
| EPDBPE2004-2-09-ATH | ● | 0.2 | 2 | 0.3 | 50 | 4 | A84 |
| EPDBPE2004-2-14-ATH | ● | 0.2 | 2 | 0.3 | 50 | 4 | A84 |
| EPDBPE2004-2-29-ATH | ● | 0.2 | 2 | 0.3 | 50 | 4 | A84 |
| EPDB2004-2-SD | ● | 0.2 | 2 | 0.3 | 50 | 4 | A140 |
| EPDBP2004-2-04-TH | △ | 0.2 | 2 | 0.3 | 50 | 4 | A162 |
| EPDB2004-2 | □ | 0.2 | 2 | 0.3 | 50 | 4 | A405 |
| EPDB2004-2-TH | □ | 0.2 | 2 | 0.3 | 50 | 4 | A405 |
| CBN-EHB2004-2 | ● | 0.2 | 2 | 0.4 | 50 | 4 | A147 |
| EPDBEH2004F-2.5-TH3 | ● | 0.2 | 2.5 | 0.3 | 38 | 4 | A56 |
| EPDBEH2004-2.5-TH3 | ● | 0.2 | 2.5 | 0.3 | 50 | 4 | A58 |
| EPDBE2004-2.5-ATH | ● | 0.2 | 2.5 | 0.3 | 50 | 4 | A72 |
| EPDBE2004-2.5-PN | ● | 0.2 | 2.5 | 0.3 | 50 | 4 | A75 |
| EPDB2004-2.5 | □ | 0.2 | 2.5 | 0.3 | 50 | 4 | A405 |
| EPDB2004-2.5-TH | □ | 0.2 | 2.5 | 0.3 | 50 | 4 | A405 |
| EPDBEH2004F-3-TH3 | ● | 0.2 | 3 | 0.3 | 38 | 4 | A56 |
| EPSBE2004-3-TH | ● | 0.2 | 3 | 0.3 | 45 | 4 | A97 |
| EPDBEH2004-3-TH3 | ● | 0.2 | 3 | 0.3 | 50 | 4 | A58 |
| EPDBE2004-3-ATH | ● | 0.2 | 3 | 0.3 | 50 | 4 | A72 |
| EPDBE2004-3-PN | ● | 0.2 | 3 | 0.3 | 50 | 4 | A75 |
| EPDBPE2004-3-04-ATH | ● | 0.2 | 3 | 0.3 | 50 | 4 | A84 |
| EPDBP2004-3-04-TH | △ | 0.2 | 3 | 0.3 | 50 | 4 | A162 |
| EPDB2004-3 | □ | 0.2 | 3 | 0.3 | 50 | 4 | A405 |
| EPDB2004-3-TH | □ | 0.2 | 3 | 0.3 | 50 | 4 | A405 |
| CBN-EHB2004-3 | ● | 0.2 | 3 | 0.4 | 50 | 4 | A147 |
| EPSBE2004-3.5-TH | ● | 0.2 | 3.5 | 0.3 | 45 | 4 | A97 |
| EPDBEH2004-3.5-TH3 | ● | 0.2 | 3.5 | 0.3 | 50 | 4 | A58 |
| EPDBE2004-3.5-ATH | ● | 0.2 | 3.5 | 0.3 | 50 | 4 | A72 |
| EPDBE2004-3.5-PN | ● | 0.2 | 3.5 | 0.3 | 50 | 4 | A75 |
| EPDB2004-3.5 | □ | 0.2 | 3.5 | 0.3 | 50 | 4 | A405 |
| EPDB2004-3.5-TH | □ | 0.2 | 3.5 | 0.3 | 50 | 4 | A405 |
| EPDBEH2004F-4-TH3 | ● | 0.2 | 4 | 0.3 | 38 | 4 | A56 |
| EPSBE2004-4-TH | ● | 0.2 | 4 | 0.3 | 45 | 4 | A97 |
| EPDBEH2004-4-TH3 | ● | 0.2 | 4 | 0.3 | 50 | 4 | A58 |
| EPDBE2004-4-ATH | ● | 0.2 | 4 | 0.3 | 50 | 4 | A72 |
| EPDBE2004-4-PN | ● | 0.2 | 4 | 0.3 | 50 | 4 | A75 |
| EPDBPE2004-4-04-ATH | ● | 0.2 | 4 | 0.3 | 50 | 4 | A84 |
| EPDBPE2004-4-09-ATH | ● | 0.2 | 4 | 0.3 | 50 | 4 | A84 |
| EPDBPE2004-4-14-ATH | ● | 0.2 | 4 | 0.3 | 50 | 4 | A84 |
| EPDBPE2004-4-29-ATH | ● | 0.2 | 4 | 0.3 | 50 | 4 | A84 |
| EPDBP2004-4-04-TH | △ | 0.2 | 4 | 0.3 | 50 | 4 | A162 |
| EPDBP2004-4-09-TH | △ | 0.2 | 4 | 0.3 | 50 | 4 | A162 |

| 商品コード Item Code | 在庫 Stock | ボール半径 RE | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EPDB2004-4 | □ | 0.2 | 4 | 0.3 | 50 | 4 | A405 |
| EPDB2004-4-TH | □ | 0.2 | 4 | 0.3 | 50 | 4 | A405 |
| EGDB2004-4-HD | ● | 0.2 | 4 | 0.6 | 60 | 4 | A143 |
| EPDBEH2004-4.5-TH3 | ● | 0.2 | 4.5 | 0.3 | 50 | 4 | A58 |
| EPDBE2004-4.5-ATH | ● | 0.2 | 4.5 | 0.3 | 50 | 4 | A72 |
| EPDBE2004-4.5-PN | ● | 0.2 | 4.5 | 0.3 | 50 | 4 | A75 |
| EPDB2004-4.5 | □ | 0.2 | 4.5 | 0.3 | 50 | 4 | A405 |
| EPDB2004-4.5-TH | □ | 0.2 | 4.5 | 0.3 | 50 | 4 | A405 |
| EPDBEH2004-5-TH3 | ● | 0.2 | 5 | 0.3 | 50 | 4 | A58 |
| EPDBPE2004-5-04-ATH | ● | 0.2 | 5 | 0.3 | 50 | 4 | A84 |
| EPDBPE2004-5-09-ATH | ● | 0.2 | 5 | 0.3 | 50 | 4 | A84 |
| EPDBP2004-5-04-TH | △ | 0.2 | 5 | 0.3 | 50 | 4 | A162 |
| EPDBP2004-5-09-TH | △ | 0.2 | 5 | 0.3 | 50 | 4 | A162 |
| EPDBPE2004-6-04-ATH | ● | 0.2 | 6 | 0.3 | 50 | 4 | A84 |
| EPDBPE2004-6-09-ATH | ● | 0.2 | 6 | 0.3 | 50 | 4 | A84 |
| EPDBPE2004-6-14-ATH | ● | 0.2 | 6 | 0.3 | 50 | 4 | A84 |
| EPDBPE2004-6-29-ATH | ● | 0.2 | 6 | 0.3 | 50 | 4 | A84 |
| EPDBPE2004-8-04-ATH | ● | 0.2 | 8 | 0.3 | 50 | 4 | A84 |
| EGDB2004-8-HD | ● | 0.2 | 8 | 0.6 | 60 | 4 | A143 |
| EGDB2004-12-HD | ● | 0.2 | 12 | 0.6 | 60 | 4 | A143 |
| EPSB2004-N-TH | ● | 0.2 | – | 0.3 | 45 | 4 | A154 |
| EPSB2004-H-TH | ● | 0.2 | – | 0.3 | 45 | 4 | A154 |
| HYPB2004-C | ● | 0.2 | – | 0.5 | 50 | 6 | A156 |
| BESS2004 | □ | 0.2 | – | 0.6 | 50 | 3 | A421 |
| BEK2004 | ● | 0.2 | – | 0.8 | 50 | 3 | A161 |
| BEK2004-C | □ | 0.2 | – | 0.8 | 50 | 3 | A415 |
| EPDBEH2005F-0.35-TH3 | ● | 0.25 | 0.35 | 0.35 | 35 | 4 | A63 |
| EPDBEH2005-0.35-TH3 | ● | 0.25 | 0.35 | 0.35 | 50 | 4 | A63 |
| EPDBEH2005F-0.75-TH3 | ● | 0.25 | 0.75 | 0.35 | 35 | 4 | A56 |
| EPSBE2005-0.75-TH | ● | 0.25 | 0.75 | 0.35 | 45 | 4 | A97 |
| EPSBE2005-0.75-H-TH | ● | 0.25 | 0.75 | 0.35 | 45 | 4 | A98 |
| EPDBEH2005-0.75-TH3 | ● | 0.25 | 0.75 | 0.35 | 50 | 4 | A58 |
| EPDBEH2005F-1-TH3 | ● | 0.25 | 1 | 0.35 | 35 | 4 | A56 |
| EPDBEH2005-1-TH3 | ● | 0.25 | 1 | 0.35 | 50 | 4 | A59 |
| EPDBE2005-1-ATH | ● | 0.25 | 1 | 0.35 | 50 | 4 | A72 |
| EPDBE2005-1-PN | ● | 0.25 | 1 | 0.35 | 50 | 4 | A75 |
| EPDB2005-1 | □ | 0.25 | 1 | 0.35 | 50 | 4 | A405 |
| EPDB2005-1-TH | □ | 0.25 | 1 | 0.35 | 50 | 4 | A405 |
| CBN-EHB2005-1 | ● | 0.25 | 1 | 0.5 | 50 | 4 | A147 |
| HGOB2005-PN | ● | 0.25 | 1.3 | 1 | 50 | 4 | A104 |
| CBN-EPSB2005-1.5-S | ● | 0.25 | 1.5 | 0.3 | 50 | 4 | A151 |
| CBN-EPSB2005-1.5-F | ● | 0.25 | 1.5 | 0.3 | 50 | 4 | A151 |
| EPDBEH2005F-1.5-TH3 | ● | 0.25 | 1.5 | 0.35 | 38 | 4 | A56 |
| EPSBE2005-1.5-TH | ● | 0.25 | 1.5 | 0.35 | 45 | 4 | A97 |
| EPSB2005-1.5-N-TH | ● | 0.25 | 1.5 | 0.35 | 45 | 4 | A155 |
| EPDBEH2005-1.5-TH3 | ● | 0.25 | 1.5 | 0.35 | 50 | 4 | A59 |
| EPDBE2005-1.5-ATH | ● | 0.25 | 1.5 | 0.35 | 50 | 4 | A72 |
| EPDBE2005-1.5-PN | ● | 0.25 | 1.5 | 0.35 | 50 | 4 | A75 |
| CBN-EHB2005-1.5 | ● | 0.25 | 1.5 | 0.5 | 50 | 4 | A147 |
| HYPB2005-C | ● | 0.25 | 1.6 | 0.6 | 50 | 6 | A156 |
| EPDBEH2005F-2-TH3 | ● | 0.25 | 2 | 0.35 | 38 | 4 | A56 |
| EPDBEH2005-2-TH3 | ● | 0.25 | 2 | 0.35 | 50 | 4 | A59 |
| EPDBE2005-2-ATH | ● | 0.25 | 2 | 0.35 | 50 | 4 | A72 |
| EPDBE2005-2-PN | ● | 0.25 | 2 | 0.35 | 50 | 4 | A75 |
| EPDB2005-2-SD | ● | 0.25 | 2 | 0.35 | 50 | 4 | A140 |
| EPDB2005-2 | □ | 0.25 | 2 | 0.35 | 50 | 4 | A405 |
| EPDB2005-2-TH | □ | 0.25 | 2 | 0.35 | 50 | 4 | A405 |
| EPDBEH2005F-2.5-TH3 | ● | 0.25 | 2.5 | 0.35 | 38 | 4 | A56 |
| EPDBEH2005-2.5-TH3 | ● | 0.25 | 2.5 | 0.35 | 50 | 4 | A59 |
| EPDBE2005-2.5-ATH | ● | 0.25 | 2.5 | 0.35 | 50 | 4 | A72 |
| EPDBE2005-2.5-PN | ● | 0.25 | 2.5 | 0.35 | 50 | 4 | A75 |
| CBN-EHB2005-2.5 | ● | 0.25 | 2.5 | 0.5 | 50 | 4 | A147 |
| HPBLN2005-C | ● | 0.25 | 2.5 | 0.6 | 60 | 6 | A157 |
| CBN-EPSB2005-3-S | ● | 0.25 | 3 | 0.3 | 50 | 4 | A151 |
| CBN-EPSB2005-3-F | ● | 0.25 | 3 | 0.3 | 50 | 4 | A151 |
| EPDBEH2005F-3-TH3 | ● | 0.25 | 3 | 0.35 | 38 | 4 | A56 |
| EPSBE2005-3-TH | ● | 0.25 | 3 | 0.35 | 45 | 4 | A97 |
| EPDBEH2005-3-TH3 | ● | 0.25 | 3 | 0.35 | 50 | 4 | A59 |
| EPDBE2005-3-ATH | ● | 0.25 | 3 | 0.35 | 50 | 4 | A72 |

| 商品コード Item Code | 在庫 Stock | ボール半径 RE | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EPDBE2005-3-PN | ● | 0.25 | 3 | 0.35 | 50 | 4 | A75 |
| EPDB2005-3 | □ | 0.25 | 3 | 0.35 | 50 | 4 | A405 |
| EPDB2005-3-TH | □ | 0.25 | 3 | 0.35 | 50 | 4 | A405 |
| CBN-EHB2005-3 | ● | 0.25 | 3 | 0.5 | 50 | 4 | A147 |
| EPDBEH2005F-4-TH3 | ● | 0.25 | 4 | 0.35 | 38 | 4 | A56 |
| EPDBEH2005-4-TH3 | ● | 0.25 | 4 | 0.35 | 50 | 4 | A59 |
| EPDBE2005-4-ATH | ● | 0.25 | 4 | 0.35 | 50 | 4 | A72 |
| EPDBE2005-4-PN | ● | 0.25 | 4 | 0.35 | 50 | 4 | A75 |
| EPDBPE2005-4-04-ATH | ● | 0.25 | 4 | 0.35 | 50 | 4 | A84 |
| EPDB2005-4-SD | ● | 0.25 | 4 | 0.35 | 50 | 4 | A140 |
| EPDBP2005-4-04-TH | △ | 0.25 | 4 | 0.35 | 50 | 4 | A162 |
| EPDB2005-4 | □ | 0.25 | 4 | 0.35 | 50 | 4 | A405 |
| EPDB2005-4-TH | □ | 0.25 | 4 | 0.35 | 50 | 4 | A405 |
| EPDBEH2005F-5-TH3 | ● | 0.25 | 5 | 0.35 | 42 | 4 | A56 |
| EPSBE2005-5-TH | ● | 0.25 | 5 | 0.35 | 45 | 4 | A97 |
| EPDBEH2005-5-TH3 | ● | 0.25 | 5 | 0.35 | 50 | 4 | A59 |
| EPDBE2005-5-ATH | ● | 0.25 | 5 | 0.35 | 50 | 4 | A72 |
| EPDBE2005-5-PN | ● | 0.25 | 5 | 0.35 | 50 | 4 | A75 |
| EPDB2005-5 | □ | 0.25 | 5 | 0.35 | 50 | 4 | A405 |
| EPDB2005-5-TH | □ | 0.25 | 5 | 0.35 | 50 | 4 | A405 |
| EPDBEH2005-5.5-TH3 | ● | 0.25 | 5.5 | 0.35 | 50 | 4 | A59 |
| EPDBE2005-5.5-ATH | ● | 0.25 | 5.5 | 0.35 | 50 | 4 | A72 |
| EPDBE2005-5.5-PN | ● | 0.25 | 5.5 | 0.35 | 50 | 4 | A75 |
| EPDB2005-5.5 | □ | 0.25 | 5.5 | 0.35 | 50 | 4 | A405 |
| EPDB2005-5.5-TH | □ | 0.25 | 5.5 | 0.35 | 50 | 4 | A405 |
| EPDBEH2005-6-TH3 | ● | 0.25 | 6 | 0.35 | 50 | 4 | A59 |
| EPDBE2005-6-ATH | ● | 0.25 | 6 | 0.35 | 50 | 4 | A72 |
| EPDBE2005-6-PN | ● | 0.25 | 6 | 0.35 | 50 | 4 | A75 |
| EPDBPE2005-6-04-ATH | ● | 0.25 | 6 | 0.35 | 50 | 4 | A84 |
| EPDBPE2005-6-09-ATH | ● | 0.25 | 6 | 0.35 | 50 | 4 | A84 |
| EPDB2005-6-SD | ● | 0.25 | 6 | 0.35 | 50 | 4 | A140 |
| EPDB2005-6 | □ | 0.25 | 6 | 0.35 | 50 | 4 | A405 |
| EPDB2005-6-TH | □ | 0.25 | 6 | 0.35 | 50 | 4 | A405 |
| EPDBEH2005-7-TH3 | ● | 0.25 | 7 | 0.35 | 50 | 4 | A59 |
| EPDBEH2005-8-TH3 | ● | 0.25 | 8 | 0.35 | 50 | 4 | A59 |
| EPDBE2005-8-ATH | ● | 0.25 | 8 | 0.35 | 50 | 4 | A72 |
| EPDBE2005-8-PN | ● | 0.25 | 8 | 0.35 | 50 | 4 | A75 |
| EPDBPE2005-8-09-ATH | ● | 0.25 | 8 | 0.35 | 50 | 4 | A84 |
| EPDBP2005-8-09-TH | △ | 0.25 | 8 | 0.35 | 50 | 4 | A162 |
| EPDB2005-8 | □ | 0.25 | 8 | 0.35 | 50 | 4 | A405 |
| EPDB2005-8-TH | □ | 0.25 | 8 | 0.35 | 50 | 4 | A405 |
| EPDBPE2005-12-09-ATH | ● | 0.25 | 12 | 0.35 | 50 | 4 | A84 |
| EPDBP2005-12-09-TH | △ | 0.25 | 12 | 0.35 | 50 | 4 | A162 |
| EPSB2005-H-TH | ● | 0.25 | – | 0.35 | 45 | 4 | A154 |
| EPSB2005-N-TH | ● | 0.25 | – | 0.35 | 45 | 4 | A154 |
| BESS2005 | □ | 0.25 | – | 0.75 | 50 | 3 | A421 |
| BEK2005 | ● | 0.25 | – | 1 | 50 | 3 | A161 |
| BEK2005-C | □ | 0.25 | – | 1 | 50 | 3 | A415 |
| EPDBPE20054-2-04-ATH | ● | 0.27 | 2 | 0.37 | 50 | 4 | A84 |
| EPDBP20054-2-04-TH | △ | 0.27 | 2 | 0.37 | 50 | 4 | A162 |
| EPDBPE20054-4-04-ATH | ● | 0.27 | 4 | 0.37 | 50 | 4 | A84 |
| EPDBP20054-4-04-TH | △ | 0.27 | 4 | 0.37 | 50 | 4 | A162 |
| EPDBPE20054-5-04-ATH | ● | 0.27 | 5 | 0.37 | 50 | 4 | A84 |
| EPDBP20054-5-04-TH | △ | 0.27 | 5 | 0.37 | 50 | 4 | A162 |
| EPDBPE20054-6-04-ATH | ● | 0.27 | 6 | 0.37 | 50 | 4 | A84 |
| EPDBP20054-6-04-TH | △ | 0.27 | 6 | 0.37 | 50 | 4 | A162 |
| EPDBPE20054-6.5-04-ATH | ● | 0.27 | 6.5 | 0.37 | 50 | 4 | A84 |
| EPDBP20054-6.5-04-TH | △ | 0.27 | 6.5 | 0.37 | 50 | 4 | A162 |
| EPDBPE20054-7-04-ATH | ● | 0.27 | 7 | 0.37 | 50 | 4 | A84 |
| EPDBP20054-7-04-TH | △ | 0.27 | 7 | 0.37 | 50 | 4 | A162 |
| EPDBEH2006F-0.4-TH3 | ● | 0.3 | 0.4 | 0.4 | 35 | 4 | A63 |
| EPDBEH2006-0.4-TH3 | ● | 0.3 | 0.4 | 0.4 | 50 | 4 | A63 |
| EPDBEH2006F-0.75-TH3 | ● | 0.3 | 0.75 | 0.4 | 35 | 4 | A56 |
| EPDBEH2006-0.75-TH3 | ● | 0.3 | 0.75 | 0.4 | 50 | 4 | A59 |
| EPSBE2006-0.9-TH | ● | 0.3 | 0.9 | 0.4 | 45 | 4 | A97 |
| EPSBE2006-0.9-H-TH | ● | 0.3 | 0.9 | 0.4 | 45 | 4 | A98 |
| EPDBEH2006F-1-TH3 | ● | 0.3 | 1 | 0.4 | 35 | 4 | A56 |
| EPDBEH2006-1-TH3 | ● | 0.3 | 1 | 0.4 | 50 | 4 | A59 |
| EPDBE2006-1-ATH | ● | 0.3 | 1 | 0.4 | 50 | 4 | A72 |

□印：特定代理店在庫です。弊社営業へお問合せください。□：Stocked by specified distributor. Contact with our sales department. 無印：受注生産品です。No Mark：Manufactured upon request only.

Quick dimension reference table by mill diameter

# 外径別寸法早見表

## 超硬エンドミル・ボール　RE0.3 ～ RE0.5　Carbide End Mills -Ball

単位 unit：mm

| 商品コード Item Code | 在庫 Stock | ボール半径 RE | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EPDBE2006-1-PN | ● | 0.3 | 1 | 0.4 | 50 | 4 | A75 |
| EPDB2006-1 | □ | 0.3 | 1 | 0.4 | 50 | 4 | A405 |
| EPDB2006-1-TH | □ | 0.3 | 1 | 0.4 | 50 | 4 | A405 |
| CBN-EHB2006-1 | ● | 0.3 | 1 | 0.55 | 50 | 4 | A147 |
| CBN-EPSB2006-1.5-S | ● | 0.3 | 1.5 | 0.36 | 50 | 4 | A151 |
| CBN-EPSB2006-1.5-F | ● | 0.3 | 1.5 | 0.36 | 50 | 4 | A151 |
| EPDBEH2006F-1.5-TH3 | ● | 0.3 | 1.5 | 0.4 | 35 | 4 | A56 |
| EPDBEH2006-1.5-TH3 | ● | 0.3 | 1.5 | 0.4 | 50 | 4 | A59 |
| CBN-EHB2006-1.5 | ● | 0.3 | 1.5 | 0.55 | 50 | 4 | A147 |
| HGOB2006-PN | ● | 0.3 | 1.5 | 1.2 | 50 | 4 | A104 |
| HYPB2006-C | ● | 0.3 | 1.7 | 0.7 | 50 | 6 | A156 |
| EPSBE2006-1.8-TH | ● | 0.3 | 1.8 | 0.4 | 45 | 4 | A97 |
| EPSB2006-1.8-N-TH | ● | 0.3 | 1.8 | 0.4 | 45 | 4 | A155 |
| EPDBEH2006F-2-TH3 | ● | 0.3 | 2 | 0.4 | 38 | 4 | A56 |
| EPDBEH2006-2-TH3 | ● | 0.3 | 2 | 0.4 | 50 | 4 | A59 |
| EPDBE2006-2-ATH | ● | 0.3 | 2 | 0.4 | 50 | 4 | A72 |
| EPDBE2006-2-PN | ● | 0.3 | 2 | 0.4 | 50 | 4 | A75 |
| EPDBPE2006-2-04-ATH | ● | 0.3 | 2 | 0.4 | 50 | 4 | A84 |
| EPDB2006-2-SD | ● | 0.3 | 2 | 0.4 | 50 | 4 | A140 |
| EPDBP2006-2-04-TH | △ | 0.3 | 2 | 0.4 | 50 | 4 | A162 |
| EPDB2006-2 | □ | 0.3 | 2 | 0.4 | 50 | 4 | A405 |
| EPDB2006-2-TH | □ | 0.3 | 2 | 0.4 | 50 | 4 | A405 |
| PCDB0006 | | 0.3 | 2.1 | 0.45 | 40 | 4 | A146 |
| EPDBEH2006F-2.5-TH3 | ● | 0.3 | 2.5 | 0.4 | 38 | 4 | A56 |
| EPDBEH2006-2.5-TH3 | ● | 0.3 | 2.5 | 0.4 | 50 | 4 | A59 |
| EPDBE2006-2.5-ATH | ● | 0.3 | 2.5 | 0.4 | 50 | 4 | A72 |
| EPDBE2006-2.5-PN | ● | 0.3 | 2.5 | 0.4 | 50 | 4 | A75 |
| CBN-EPSB2006-3-S | ● | 0.3 | 3 | 0.36 | 50 | 4 | A151 |
| CBN-EPSB2006-3-F | ● | 0.3 | 3 | 0.36 | 50 | 4 | A151 |
| EPDBEH2006F-3-TH3 | ● | 0.3 | 3 | 0.4 | 38 | 4 | A56 |
| EPSBE2006-3-TH | ● | 0.3 | 3 | 0.4 | 45 | 4 | A97 |
| EPDBEH2006-3-TH3 | ● | 0.3 | 3 | 0.4 | 50 | 4 | A59 |
| EPDBE2006-3-ATH | ● | 0.3 | 3 | 0.4 | 50 | 4 | A72 |
| EPDBE2006-3-PN | ● | 0.3 | 3 | 0.4 | 50 | 4 | A75 |
| EPDB2006-3 | □ | 0.3 | 3 | 0.4 | 50 | 4 | A405 |
| EPDB2006-3-TH | □ | 0.3 | 3 | 0.4 | 50 | 4 | A405 |
| CBN-EHB2006-3 | ● | 0.3 | 3 | 0.55 | 50 | 4 | A147 |
| HPBLN2006-C | ● | 0.3 | 3 | 0.7 | 60 | 6 | A157 |
| EPDBEH2006F-3.5-TH3 | ● | 0.3 | 3.5 | 0.4 | 38 | 4 | A56 |
| EPDBEH2006-3.5-TH3 | ● | 0.3 | 3.5 | 0.4 | 50 | 4 | A59 |
| EPDBE2006-3.5-ATH | ● | 0.3 | 3.5 | 0.4 | 50 | 4 | A72 |
| EPDBE2006-3.5-PN | ● | 0.3 | 3.5 | 0.4 | 50 | 4 | A75 |
| EPDBEH2006F-4-TH3 | ● | 0.3 | 4 | 0.4 | 38 | 4 | A56 |
| EPDBEH2006-4-TH3 | ● | 0.3 | 4 | 0.4 | 50 | 4 | A59 |
| EPDBE2006-4-ATH | ● | 0.3 | 4 | 0.4 | 50 | 4 | A72 |
| EPDBE2006-4-PN | ● | 0.3 | 4 | 0.4 | 50 | 4 | A75 |
| EPDBPE2006-4-04-ATH | ● | 0.3 | 4 | 0.4 | 50 | 4 | A84 |
| EPDBPE2006-4-09-ATH | ● | 0.3 | 4 | 0.4 | 50 | 4 | A85 |
| EPDBPE2006-4-14-ATH | ● | 0.3 | 4 | 0.4 | 50 | 4 | A85 |
| EPDB2006-4-SD | ● | 0.3 | 4 | 0.4 | 50 | 4 | A140 |
| EPDBP2006-4-04-TH | △ | 0.3 | 4 | 0.4 | 50 | 4 | A162 |
| EPDB2006-4 | □ | 0.3 | 4 | 0.4 | 50 | 4 | A405 |
| EPDB2006-4-TH | □ | 0.3 | 4 | 0.4 | 50 | 4 | A405 |
| EB4HR0060TN-4-05-ATH | ● | 0.3 | 4 | 3.2 | 50 | 4 | A132 |
| EB4HR0060TN-4-10-ATH | ● | 0.3 | 4 | 3.2 | 50 | 4 | A132 |
| EPDBEH2006-4.5-TH3 | ● | 0.3 | 4.5 | 0.4 | 50 | 4 | A59 |
| EPDBE2006-4.5-ATH | ● | 0.3 | 4.5 | 0.4 | 50 | 4 | A72 |
| EPDBE2006-4.5-PN | ● | 0.3 | 4.5 | 0.4 | 50 | 4 | A75 |
| EPDBEH2006F-5-TH3 | ● | 0.3 | 5 | 0.4 | 42 | 4 | A56 |
| EPSBE2006-5-TH | ● | 0.3 | 5 | 0.4 | 45 | 4 | A97 |
| EPDBEH2006-5-TH3 | ● | 0.3 | 5 | 0.4 | 50 | 4 | A59 |
| EPDBE2006-5-ATH | ● | 0.3 | 5 | 0.4 | 50 | 4 | A72 |
| EPDBE2006-5-PN | ● | 0.3 | 5 | 0.4 | 50 | 4 | A75 |
| EPDBPE2006-5-14-ATH | ● | 0.3 | 5 | 0.4 | 50 | 4 | A85 |
| EPDB2006-5 | □ | 0.3 | 5 | 0.4 | 50 | 4 | A405 |
| EPDB2006-5-TH | □ | 0.3 | 5 | 0.4 | 50 | 4 | A405 |
| EGDB2006-5-HD | ● | 0.3 | 5 | 0.9 | 60 | 4 | A143 |
| EB4HR0060TN-5-05-ATH | ● | 0.3 | 5 | 3.2 | 50 | 4 | A132 |
| EB4HR0060TN-5-10-ATH | ● | 0.3 | 5 | 3.2 | 50 | 4 | A132 |

| 商品コード Item Code | 在庫 Stock | ボール半径 RE | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EPDBEH2006-5.5-TH3 | ● | 0.3 | 5.5 | 0.4 | 50 | 4 | A59 |
| EPDBE2006-5.5-ATH | ● | 0.3 | 5.5 | 0.4 | 50 | 4 | A72 |
| EPDBE2006-5.5-PN | ● | 0.3 | 5.5 | 0.4 | 50 | 4 | A75 |
| EPDBEH2006F-6-TH3 | ● | 0.3 | 6 | 0.4 | 42 | 4 | A56 |
| EPSBE2006-6-TH | ● | 0.3 | 6 | 0.4 | 45 | 4 | A97 |
| EPDBEH2006-6-TH3 | ● | 0.3 | 6 | 0.4 | 50 | 4 | A59 |
| EPDBE2006-6-ATH | ● | 0.3 | 6 | 0.4 | 50 | 4 | A72 |
| EPDBE2006-6-PN | ● | 0.3 | 6 | 0.4 | 50 | 4 | A75 |
| EPDBPE2006-6-04-ATH | ● | 0.3 | 6 | 0.4 | 50 | 4 | A84 |
| EPDBPE2006-6-09-ATH | ● | 0.3 | 6 | 0.4 | 50 | 4 | A85 |
| EPDBPE2006-6-14-ATH | ● | 0.3 | 6 | 0.4 | 50 | 4 | A85 |
| EPDBPE2006-6-29-ATH | ● | 0.3 | 6 | 0.4 | 50 | 4 | A85 |
| EPDB2006-6-SD | ● | 0.3 | 6 | 0.4 | 50 | 4 | A140 |
| EPDBP2006-6-04-TH | △ | 0.3 | 6 | 0.4 | 50 | 4 | A162 |
| EPDBP2006-6-09-TH | △ | 0.3 | 6 | 0.4 | 50 | 4 | A162 |
| EPDB2006-6 | □ | 0.3 | 6 | 0.4 | 50 | 4 | A405 |
| EPDB2006-6-TH | □ | 0.3 | 6 | 0.4 | 50 | 4 | A405 |
| DEB2006-6-C | □ | 0.3 | 6 | 1.2 | 55 | 4 | A448 |
| EB4HR0060TN-6-05-ATH | ● | 0.3 | 6 | 3.2 | 50 | 4 | A132 |
| EB4HR0060TN-6-10-ATH | ● | 0.3 | 6 | 3.2 | 50 | 4 | A132 |
| EPDBEH2006-7-TH3 | ● | 0.3 | 7 | 0.4 | 50 | 4 | A59 |
| EPDBE2006-7-ATH | ● | 0.3 | 7 | 0.4 | 50 | 4 | A72 |
| EPDBE2006-7-PN | ● | 0.3 | 7 | 0.4 | 50 | 4 | A75 |
| EPDB2006-7 | □ | 0.3 | 7 | 0.4 | 50 | 4 | A405 |
| EPDB2006-7-TH | □ | 0.3 | 7 | 0.4 | 50 | 4 | A405 |
| EB4HR0060TN-7-05-ATH | ● | 0.3 | 7 | 3.2 | 50 | 4 | A132 |
| EB4HR0060TN-7-10-ATH | ● | 0.3 | 7 | 3.2 | 50 | 4 | A132 |
| EPDBEH2006-8-TH3 | ● | 0.3 | 8 | 0.4 | 50 | 4 | A59 |
| EPDBE2006-8-ATH | ● | 0.3 | 8 | 0.4 | 50 | 4 | A72 |
| EPDBE2006-8-PN | ● | 0.3 | 8 | 0.4 | 50 | 4 | A75 |
| EPDBPE2006-8-04-ATH | ● | 0.3 | 8 | 0.4 | 50 | 4 | A84 |
| EPDBPE2006-8-09-ATH | ● | 0.3 | 8 | 0.4 | 50 | 4 | A85 |
| EPDBPE2006-8-14-ATH | ● | 0.3 | 8 | 0.4 | 50 | 4 | A85 |
| EPDBPE2006-8-29-ATH | ● | 0.3 | 8 | 0.4 | 50 | 4 | A85 |
| EPDBP2006-8-09-TH | △ | 0.3 | 8 | 0.4 | 50 | 4 | A162 |
| EPDB2006-8 | □ | 0.3 | 8 | 0.4 | 50 | 4 | A405 |
| EPDB2006-8-TH | □ | 0.3 | 8 | 0.4 | 50 | 4 | A405 |
| EB4HR0060TN-8-05-ATH | ● | 0.3 | 8 | 3.2 | 50 | 4 | A132 |
| EB4HR0060TN-8-10-ATH | ● | 0.3 | 8 | 3.2 | 50 | 4 | A132 |
| EPDBEH2006-9-TH3 | ● | 0.3 | 9 | 0.4 | 50 | 4 | A59 |
| EPDBE2006-9-ATH | ● | 0.3 | 9 | 0.4 | 50 | 4 | A72 |
| EPDBE2006-9-PN | ● | 0.3 | 9 | 0.4 | 50 | 4 | A75 |
| EPDB2006-9 | □ | 0.3 | 9 | 0.4 | 50 | 4 | A405 |
| EPDB2006-9-TH | □ | 0.3 | 9 | 0.4 | 50 | 4 | A405 |
| EB4HR0060TN-9-05-ATH | ● | 0.3 | 9 | 3.2 | 50 | 4 | A132 |
| EB4HR0060TN-9-10-ATH | ● | 0.3 | 9 | 3.2 | 50 | 4 | A132 |
| EPDBEH2006-10-TH3 | ● | 0.3 | 10 | 0.4 | 50 | 4 | A59 |
| EPDBE2006-10-ATH | ● | 0.3 | 10 | 0.4 | 50 | 4 | A72 |
| EPDBE2006-10-PN | ● | 0.3 | 10 | 0.4 | 50 | 4 | A75 |
| EPDBPE2006-10-04-ATH | ● | 0.3 | 10 | 0.4 | 50 | 4 | A84 |
| EPDBPE2006-10-09-ATH | ● | 0.3 | 10 | 0.4 | 50 | 4 | A85 |
| EPDBPE2006-10-14-ATH | ● | 0.3 | 10 | 0.4 | 50 | 4 | A85 |
| EPDBP2006-10-04-TH | △ | 0.3 | 10 | 0.4 | 50 | 4 | A162 |
| EPDBP2006-10-09-TH | △ | 0.3 | 10 | 0.4 | 50 | 4 | A162 |
| EPDB2006-10 | □ | 0.3 | 10 | 0.4 | 50 | 4 | A405 |
| EPDB2006-10-TH | □ | 0.3 | 10 | 0.4 | 50 | 4 | A405 |
| EGDB2006-10-HD | ● | 0.3 | 10 | 0.9 | 60 | 4 | A143 |
| EB4HR0060TN-10-05-ATH | ● | 0.3 | 10 | 3.2 | 50 | 4 | A132 |
| EB4HR0060TN-10-10-ATH | ● | 0.3 | 10 | 3.2 | 50 | 4 | A132 |
| EPDBEH2006-12-TH3 | ● | 0.3 | 12 | 0.4 | 50 | 4 | A59 |
| EPDBE2006-12-ATH | ● | 0.3 | 12 | 0.4 | 50 | 4 | A72 |
| EPDBE2006-12-PN | ● | 0.3 | 12 | 0.4 | 50 | 4 | A75 |
| EPDB2006-12 | □ | 0.3 | 12 | 0.4 | 50 | 4 | A405 |
| EPDB2006-12-TH | □ | 0.3 | 12 | 0.4 | 50 | 4 | A405 |
| EPDBPE2006-12-04-ATH | ● | 0.3 | 12 | 0.4 | 55 | 4 | A84 |
| EPDBPE2006-12-09-ATH | ● | 0.3 | 12 | 0.4 | 55 | 4 | A85 |
| EPDBPE2006-12-29-ATH | ● | 0.3 | 12 | 0.4 | 55 | 4 | A85 |
| EPDBP2006-12-09-TH | △ | 0.3 | 12 | 0.4 | 55 | 4 | A162 |
| EPDBPE2006-15-04-ATH | ● | 0.3 | 15 | 0.4 | 55 | 4 | A84 |

| 商品コード Item Code | 在庫 Stock | ボール半径 RE | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EPDBPE2006-15-09-ATH | ● | 0.3 | 15 | 0.4 | 55 | 4 | A85 |
| EPDBP2006-15-04-TH | △ | 0.3 | 15 | 0.4 | 55 | 4 | A162 |
| EPDBP2006-15-09-TH | △ | 0.3 | 15 | 0.4 | 55 | 4 | A162 |
| EGDB2006-15-HD | ● | 0.3 | 15 | 0.9 | 60 | 4 | A143 |
| EPDBPE2006-20-14-ATH | ● | 0.3 | 20 | 0.4 | 60 | 4 | A85 |
| EPDBPE2006-20-29-ATH | ● | 0.3 | 20 | 0.4 | 60 | 4 | A85 |
| EGDB2006-20-HD | ● | 0.3 | 20 | 0.9 | 60 | 4 | A143 |
| EPSB2006-H-TH | ● | 0.3 | – | 0.4 | 45 | 4 | A154 |
| EPSB2006-N-TH | ● | 0.3 | – | 0.4 | 45 | 4 | A154 |
| BESS2006 | □ | 0.3 | – | 0.9 | 50 | 3 | A421 |
| BEK2006 | ● | 0.3 | – | 1.2 | 50 | 3 | A161 |
| BEK2006-C | □ | 0.3 | – | 1.2 | 50 | 3 | A415 |
| EPDBEH2007F-0.45-TH3 | ● | 0.35 | 0.45 | 0.45 | 35 | 4 | A63 |
| EPDBEH2007-0.45-TH3 | ● | 0.35 | 0.45 | 0.45 | 50 | 4 | A63 |
| EPDBEH2007F-2-TH3 | ● | 0.35 | 2 | 0.45 | 38 | 4 | A57 |
| EPDBEH2007-2-TH3 | ● | 0.35 | 2 | 0.45 | 50 | 4 | A59 |
| EPDBE2007-2-ATH | ● | 0.35 | 2 | 0.45 | 50 | 4 | A73 |
| EPDBE2007-2-PN | ● | 0.35 | 2 | 0.45 | 50 | 4 | A76 |
| EPDBEH2007F-4-TH3 | ● | 0.35 | 4 | 0.45 | 38 | 4 | A57 |
| EPDBEH2007-4-TH3 | ● | 0.35 | 4 | 0.45 | 50 | 4 | A59 |
| EPDBE2007-4-ATH | ● | 0.35 | 4 | 0.45 | 50 | 4 | A73 |
| EPDBE2007-4-PN | ● | 0.35 | 4 | 0.45 | 50 | 4 | A76 |
| EB4HR0070TN-4-05-ATH | ● | 0.35 | 4 | 3.2 | 50 | 4 | A132 |
| EB4HR0070TN-4-10-ATH | ● | 0.35 | 4 | 3.2 | 50 | 4 | A132 |
| EB4HR0070TN-5-05-ATH | ● | 0.35 | 5 | 3.2 | 50 | 4 | A132 |
| EB4HR0070TN-5-10-ATH | ● | 0.35 | 5 | 3.2 | 50 | 4 | A132 |
| EPDBEH2007-6-TH3 | ● | 0.35 | 6 | 0.45 | 50 | 4 | A59 |
| EPDBE2007-6-ATH | ● | 0.35 | 6 | 0.45 | 50 | 4 | A73 |
| EPDBE2007-6-PN | ● | 0.35 | 6 | 0.45 | 50 | 4 | A76 |
| EB4HR0070TN-6-05-ATH | ● | 0.35 | 6 | 3.2 | 50 | 4 | A132 |
| EB4HR0070TN-6-10-ATH | ● | 0.35 | 6 | 3.2 | 50 | 4 | A132 |
| EB4HR0070TN-7-05-ATH | ● | 0.35 | 7 | 3.2 | 50 | 4 | A132 |
| EB4HR0070TN-7-10-ATH | ● | 0.35 | 7 | 3.2 | 50 | 4 | A132 |
| EPDBEH2007-8-TH3 | ● | 0.35 | 8 | 0.45 | 50 | 4 | A59 |
| EPDBE2007-8-ATH | ● | 0.35 | 8 | 0.45 | 50 | 4 | A73 |
| EPDBE2007-8-PN | ● | 0.35 | 8 | 0.45 | 50 | 4 | A76 |
| EB4HR0070TN-8-05-ATH | ● | 0.35 | 8 | 3.2 | 50 | 4 | A132 |
| EB4HR0070TN-8-10-ATH | ● | 0.35 | 8 | 3.2 | 50 | 4 | A132 |
| EB4HR0070TN-9-05-ATH | ● | 0.35 | 9 | 3.2 | 50 | 4 | A132 |
| EB4HR0070TN-9-10-ATH | ● | 0.35 | 9 | 3.2 | 50 | 4 | A132 |
| EB4HR0070TN-10-05-ATH | ● | 0.35 | 10 | 3.2 | 50 | 4 | A132 |
| EB4HR0070TN-10-10-ATH | ● | 0.35 | 10 | 3.2 | 50 | 4 | A132 |
| BESS2007 | □ | 0.35 | – | 1 | 50 | 3 | A421 |
| EPDBEH2008F-0.5-TH3 | ● | 0.4 | 0.5 | 0.5 | 35 | 4 | A63 |
| EPDBEH2008-0.5-TH3 | ● | 0.4 | 0.5 | 0.5 | 50 | 4 | A63 |
| EPDBEH2008F-1-TH3 | ● | 0.4 | 1 | 0.5 | 35 | 4 | A57 |
| EPDBEH2008-1-TH3 | ● | 0.4 | 1 | 0.5 | 50 | 4 | A59 |
| EPSBE2008-1.2-TH | ● | 0.4 | 1.2 | 0.5 | 45 | 4 | A97 |
| EPSBE2008-1.2-H-TH | ● | 0.4 | 1.2 | 0.5 | 45 | 4 | A98 |
| EPDBEH2008F-1.5-TH3 | ● | 0.4 | 1.5 | 0.5 | 35 | 4 | A57 |
| EPDBEH2008-1.5-TH3 | ● | 0.4 | 1.5 | 0.5 | 50 | 4 | A59 |
| CBN-EHB2008-1.5 | ● | 0.4 | 1.5 | 0.7 | 50 | 4 | A147 |
| HGOB2008-PN | ● | 0.4 | 1.9 | 1.6 | 50 | 4 | A104 |
| EPDBEH2008F-2-TH3 | ● | 0.4 | 2 | 0.5 | 38 | 4 | A57 |
| EPDBEH2008-2-TH3 | ● | 0.4 | 2 | 0.5 | 50 | 4 | A59 |
| EPDBE2008-2-ATH | ● | 0.4 | 2 | 0.5 | 50 | 4 | A73 |
| EPDBE2008-2-PN | ● | 0.4 | 2 | 0.5 | 50 | 4 | A76 |
| EPDB2008-2 | □ | 0.4 | 2 | 0.5 | 50 | 4 | A405 |
| EPDB2008-2-TH | □ | 0.4 | 2 | 0.5 | 50 | 4 | A405 |
| EPSBE2008-2.4-TH | ● | 0.4 | 2.4 | 0.5 | 45 | 4 | A97 |
| EPSB2008-2.4-N-TH | ● | 0.4 | 2.4 | 0.5 | 45 | 4 | A155 |
| PCDB0008 | | 0.4 | 2.4 | 0.55 | 40 | 4 | A146 |
| CBN-EPSB2008-2.5-S | ● | 0.4 | 2.5 | 0.48 | 50 | 4 | A151 |
| CBN-EPSB2008-2.5-F | ● | 0.4 | 2.5 | 0.48 | 50 | 4 | A151 |
| EPDBEH2008F-2.5-TH3 | ● | 0.4 | 2.5 | 0.5 | 38 | 4 | A57 |
| EPDBEH2008-2.5-TH3 | ● | 0.4 | 2.5 | 0.5 | 50 | 4 | A59 |
| CBN-EHB2008-2.5 | ● | 0.4 | 2.5 | 0.7 | 50 | 4 | A147 |
| HYPB2008-C | ● | 0.4 | 2.5 | 1 | 50 | 6 | A156 |
| EPDBEH2008F-3-TH3 | ● | 0.4 | 3 | 0.5 | 38 | 4 | A57 |

●印：標準在庫品です。　●：Stocked Items.　△印:在庫が無くなり次第受注生産品となるものです。△:When the Stock is out, will become to produce on request.

単位 unit：mm

| 商品コード Item Code | 在庫 Stock | ボール半径 RE | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EPDBEH2008-3-TH3 | ● | 0.4 | 3 | 0.5 | 50 | 4 | A59 |
| EPDBEH2008F-4-TH3 | ● | 0.4 | 4 | 0.5 | 38 | 4 | A57 |
| EPDBEH2008-4-TH3 | ● | 0.4 | 4 | 0.5 | 50 | 4 | A59 |
| EPDBE2008-4-ATH | ● | 0.4 | 4 | 0.5 | 50 | 4 | A73 |
| EPDBE2008-4-PN | ● | 0.4 | 4 | 0.5 | 50 | 4 | A76 |
| EPDBPE2008-4-04-ATH | ● | 0.4 | 4 | 0.5 | 50 | 4 | A85 |
| EPDB2008-4-SD | ● | 0.4 | 4 | 0.5 | 50 | 4 | A140 |
| EPDBP2008-4-04-TH | △ | 0.4 | 4 | 0.5 | 50 | 4 | A162 |
| EPDB2008-4 | □ | 0.4 | 4 | 0.5 | 50 | 4 | A405 |
| EPDB2008-4-TH | □ | 0.4 | 4 | 0.5 | 50 | 4 | A405 |
| CBN-EHB2008-4 | ● | 0.4 | 4 | 0.7 | 50 | 4 | A147 |
| HPBLN2008-C | ● | 0.4 | 4 | 1 | 60 | 6 | A157 |
| EB4HR0080TN-4-05-ATH | ● | 0.4 | 4 | 3.2 | 50 | 4 | A132 |
| EB4HR0080TN-4-10-ATH | ● | 0.4 | 4 | 3.2 | 50 | 4 | A132 |
| CBN-EPSB2008-5-S | ● | 0.4 | 5 | 0.48 | 50 | 4 | A151 |
| CBN-EPSB2008-5-F | ● | 0.4 | 5 | 0.48 | 50 | 4 | A151 |
| EPDBEH2008F-5-TH3 | ● | 0.4 | 5 | 0.5 | 42 | 4 | A57 |
| EPDBEH2008-5-TH3 | ● | 0.4 | 5 | 0.5 | 50 | 4 | A59 |
| EPDBE2008-5-ATH | ● | 0.4 | 5 | 0.5 | 50 | 4 | A73 |
| EPDBE2008-5-PN | ● | 0.4 | 5 | 0.5 | 50 | 4 | A76 |
| EPDB2008-5 | □ | 0.4 | 5 | 0.5 | 50 | 4 | A405 |
| EPDB2008-5-TH | □ | 0.4 | 5 | 0.5 | 50 | 4 | A405 |
| EPDBEH2008F-6-TH3 | ● | 0.4 | 6 | 0.5 | 42 | 4 | A57 |
| EPDBEH2008-6-TH3 | ● | 0.4 | 6 | 0.5 | 50 | 4 | A59 |
| EPDBE2008-6-ATH | ● | 0.4 | 6 | 0.5 | 50 | 4 | A73 |
| EPDBE2008-6-PN | ● | 0.4 | 6 | 0.5 | 50 | 4 | A76 |
| EPDBPE2008-6-04-ATH | ● | 0.4 | 6 | 0.5 | 50 | 4 | A85 |
| EPDB2008-6-SD | ● | 0.4 | 6 | 0.5 | 50 | 4 | A140 |
| EPDBP2008-6-04-TH | △ | 0.4 | 6 | 0.5 | 50 | 4 | A162 |
| EPDB2008-6 | □ | 0.4 | 6 | 0.5 | 50 | 4 | A405 |
| EPDB2008-6-TH | □ | 0.4 | 6 | 0.5 | 50 | 4 | A405 |
| DEB2008-6-C | □ | 0.4 | 6 | 1.2 | 55 | 4 | A448 |
| EB4HR0080TN-6-05-ATH | ● | 0.4 | 6 | 3.2 | 50 | 4 | A132 |
| EB4HR0080TN-6-10-ATH | ● | 0.4 | 6 | 3.2 | 50 | 4 | A132 |
| EPDBEH2008F-8-TH3 | ● | 0.4 | 8 | 0.5 | 42 | 4 | A57 |
| EPDBEH2008-8-TH3 | ● | 0.4 | 8 | 0.5 | 50 | 4 | A59 |
| EPDBE2008-8-ATH | ● | 0.4 | 8 | 0.5 | 50 | 4 | A73 |
| EPDBE2008-8-PN | ● | 0.4 | 8 | 0.5 | 50 | 4 | A76 |
| EPDBPE2008-8-04-ATH | ● | 0.4 | 8 | 0.5 | 50 | 4 | A85 |
| EPDBPE2008-8-09-ATH | ● | 0.4 | 8 | 0.5 | 50 | 4 | A85 |
| EPDB2008-8-SD | ● | 0.4 | 8 | 0.5 | 50 | 4 | A140 |
| EPDBP2008-8-09-TH | △ | 0.4 | 8 | 0.5 | 50 | 4 | A162 |
| EPDB2008-8 | □ | 0.4 | 8 | 0.5 | 50 | 4 | A405 |
| EPDB2008-8-TH | □ | 0.4 | 8 | 0.5 | 50 | 4 | A405 |
| DEB2008-8-C | □ | 0.4 | 8 | 1.2 | 55 | 4 | A448 |
| EB4HR0080TN-8-05-ATH | ● | 0.4 | 8 | 3.2 | 50 | 4 | A132 |
| EB4HR0080TN-8-10-ATH | ● | 0.4 | 8 | 3.2 | 50 | 4 | A132 |
| EPDBEH2008-10-TH3 | ● | 0.4 | 10 | 0.5 | 50 | 4 | A59 |
| EPDBE2008-10-ATH | ● | 0.4 | 10 | 0.5 | 50 | 4 | A73 |
| EPDBE2008-10-PN | ● | 0.4 | 10 | 0.5 | 50 | 4 | A76 |
| EPDB2008-10 | □ | 0.4 | 10 | 0.5 | 50 | 4 | A405 |
| EPDB2008-10-TH | □ | 0.4 | 10 | 0.5 | 50 | 4 | A405 |
| EB4HR0080TN-10-05-ATH | ● | 0.4 | 10 | 3.2 | 50 | 4 | A132 |
| EB4HR0080TN-10-10-ATH | ● | 0.4 | 10 | 3.2 | 50 | 4 | A132 |
| EPDBEH2008-12-TH3 | ● | 0.4 | 12 | 0.5 | 50 | 4 | A59 |
| EPDBPE2008-12-04-ATH | ● | 0.4 | 12 | 0.5 | 55 | 4 | A85 |
| EPDBPE2008-12-09-ATH | ● | 0.4 | 12 | 0.5 | 55 | 4 | A85 |
| EPDBP2008-12-09-TH | △ | 0.4 | 12 | 0.5 | 55 | 4 | A162 |
| EB4HR0080TN-12-05-ATH | ● | 0.4 | 12 | 3.2 | 55 | 4 | A132 |
| EB4HR0080TN-12-10-ATH | ● | 0.4 | 12 | 3.2 | 55 | 4 | A132 |
| EB4HR0080TN-14-05-ATH | ● | 0.4 | 14 | 3.2 | 55 | 4 | A132 |
| EB4HR0080TN-14-10-ATH | ● | 0.4 | 14 | 3.2 | 55 | 4 | A132 |
| EPDBPE2008-16-09-ATH | ● | 0.4 | 16 | 0.5 | 55 | 4 | A85 |
| EPDBPE2008-16-29-ATH | ● | 0.4 | 16 | 0.5 | 55 | 4 | A85 |
| EPDBP2008-16-09-TH | △ | 0.4 | 16 | 0.5 | 55 | 4 | A162 |
| EPDBPE2008-20-29-ATH | ● | 0.4 | 20 | 0.5 | 60 | 4 | A85 |
| EPSB2008-H-TH | ● | 0.4 | – | 0.5 | 45 | 4 | A154 |
| EPSB2008-N-TH | ● | 0.4 | – | 0.5 | 45 | 4 | A154 |
| BESS2008 | □ | 0.4 | – | 1.2 | 50 | 3 | A421 |

| 商品コード Item Code | 在庫 Stock | ボール半径 RE | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| BEK2008 | ● | 0.4 | – | 1.6 | 50 | 3 | A161 |
| BEK2008-C | □ | 0.4 | – | 1.6 | 50 | 3 | A415 |
| ECRB0809-6-PN | ● | 0.4 | – | 6 | 60 | 4 | A137 |
| ECRB0810-6-PN | ● | 0.4 | – | 6 | 60 | 4 | A137 |
| ECRB0809-8-PN | ● | 0.4 | – | 8 | 60 | 4 | A137 |
| ECRB0810-8-PN | ● | 0.4 | – | 8 | 60 | 4 | A137 |
| ECRB0810-10-PN | ● | 0.4 | – | 10 | 60 | 4 | A137 |
| ECRB0809-10-PN | ● | 0.4 | – | 10 | 60 | 4 | A137 |
| ECRB0809-12-PN | ● | 0.4 | – | 12 | 60 | 4 | A137 |
| ECRB0810-12-PN | ● | 0.4 | – | 12 | 60 | 4 | A137 |
| EPDBEH2009F-0.6-TH3 | ● | 0.45 | 0.6 | 0.6 | 35 | 4 | A63 |
| EPDBEH2009-0.6-TH3 | ● | 0.45 | 0.6 | 0.6 | 50 | 4 | A63 |
| EPDBEH2009F-2-TH3 | ● | 0.45 | 2 | 0.6 | 35 | 4 | A57 |
| EPDBEH2009-2-TH3 | ● | 0.45 | 2 | 0.6 | 50 | 4 | A59 |
| EPDBE2009-2-ATH | ● | 0.45 | 2 | 0.6 | 50 | 4 | A73 |
| EPDBE2009-2-PN | ● | 0.45 | 2 | 0.6 | 50 | 4 | A76 |
| EPDBEH2009F-4-TH3 | ● | 0.45 | 4 | 0.6 | 38 | 4 | A57 |
| EPDBEH2009-4-TH3 | ● | 0.45 | 4 | 0.6 | 50 | 4 | A59 |
| EPDBE2009-4-ATH | ● | 0.45 | 4 | 0.6 | 50 | 4 | A73 |
| EPDBE2009-4-PN | ● | 0.45 | 4 | 0.6 | 50 | 4 | A76 |
| EPDBPE2009-4-04-ATH | ● | 0.45 | 4 | 0.6 | 50 | 4 | A85 |
| EPDBP2009-4-04-TH | △ | 0.45 | 4 | 0.6 | 50 | 4 | A163 |
| EB4HR0090TN-4-05-ATH | ● | 0.45 | 4 | 3.2 | 50 | 4 | A132 |
| EB4HR0090TN-4-10-ATH | ● | 0.45 | 4 | 3.2 | 50 | 4 | A132 |
| EPDBEH2009F-6-TH3 | ● | 0.45 | 6 | 0.6 | 42 | 4 | A57 |
| EPDBEH2009-6-TH3 | ● | 0.45 | 6 | 0.6 | 50 | 4 | A59 |
| EPDBE2009-6-ATH | ● | 0.45 | 6 | 0.6 | 50 | 4 | A73 |
| EPDBE2009-6-PN | ● | 0.45 | 6 | 0.6 | 50 | 4 | A76 |
| EB4HR0090TN-6-05-ATH | ● | 0.45 | 6 | 3.2 | 50 | 4 | A132 |
| EB4HR0090TN-6-10-ATH | ● | 0.45 | 6 | 3.2 | 50 | 4 | A132 |
| EPDBEH2009-8-TH3 | ● | 0.45 | 8 | 0.6 | 50 | 4 | A59 |
| EPDBE2009-8-ATH | ● | 0.45 | 8 | 0.6 | 50 | 4 | A73 |
| EPDBE2009-8-PN | ● | 0.45 | 8 | 0.6 | 50 | 4 | A76 |
| EPDBPE2009-8-04-ATH | ● | 0.45 | 8 | 0.6 | 55 | 4 | A85 |
| EPDBP2009-8-04-TH | △ | 0.45 | 8 | 0.6 | 55 | 4 | A163 |
| EB4HR0090TN-8-05-ATH | ● | 0.45 | 8 | 3.2 | 50 | 4 | A132 |
| EB4HR0090TN-8-10-ATH | ● | 0.45 | 8 | 3.2 | 50 | 4 | A132 |
| EB4HR0090TN-10-05-ATH | ● | 0.45 | 10 | 3.2 | 50 | 4 | A132 |
| EB4HR0090TN-10-10-ATH | ● | 0.45 | 10 | 3.2 | 50 | 4 | A132 |
| EPDBPE2009-12-04-ATH | ● | 0.45 | 12 | 0.6 | 55 | 4 | A85 |
| EPDBP2009-12-04-TH | △ | 0.45 | 12 | 0.6 | 55 | 4 | A163 |
| EB4HR0090TN-12-05-ATH | ● | 0.45 | 12 | 3.2 | 55 | 4 | A132 |
| EB4HR0090TN-12-10-ATH | ● | 0.45 | 12 | 3.2 | 55 | 4 | A132 |
| EB4HR0090TN-14-05-ATH | ● | 0.45 | 14 | 3.2 | 55 | 4 | A132 |
| EB4HR0090TN-14-10-ATH | ● | 0.45 | 14 | 3.2 | 55 | 4 | A132 |
| EPDBPE2009-16-04-ATH | ● | 0.45 | 16 | 0.6 | 60 | 4 | A85 |
| EPDBP2009-16-04-TH | △ | 0.45 | 16 | 0.6 | 60 | 4 | A163 |
| EPDBPE2009-18-04-ATH | ● | 0.45 | 18 | 0.6 | 65 | 4 | A85 |
| EPDBP2009-18-04-TH | △ | 0.45 | 18 | 0.6 | 65 | 4 | A163 |
| EPDBPE2009-20-04-ATH | ● | 0.45 | 20 | 0.6 | 65 | 4 | A85 |
| EPDBP2009-20-04-TH | △ | 0.45 | 20 | 0.6 | 65 | 4 | A163 |
| EPDBPE2009-22-04-ATH | ● | 0.45 | 22 | 0.6 | 65 | 4 | A85 |
| EPDBP2009-22-04-TH | △ | 0.45 | 22 | 0.6 | 65 | 4 | A163 |
| EPDBPE2009-24-04-ATH | ● | 0.45 | 24 | 0.6 | 70 | 4 | A85 |
| EPDBP2009-24-04-TH | △ | 0.45 | 24 | 0.6 | 70 | 4 | A163 |
| BESS2009 | □ | 0.45 | – | 1.3 | 50 | 3 | A421 |
| EPDBEH2010F-0.8-TH3 | ● | 0.5 | 0.8 | 0.8 | 35 | 4 | A63 |
| EPDBEH2010-0.8-TH3 | ● | 0.5 | 0.8 | 0.8 | 50 | 4 | A63 |
| EPDBEH2010F-1.5-TH3 | ● | 0.5 | 1.5 | 0.8 | 35 | 4 | A57 |
| EPSBE2010-1.5-TH | ● | 0.5 | 1.5 | 0.8 | 45 | 6 | A97 |
| EPSBE2010-1.5-H-TH | ● | 0.5 | 1.5 | 0.8 | 45 | 6 | A98 |
| EPSB2010-H-TH | ● | 0.5 | 1.5 | 0.8 | 45 | 6 | A154 |
| EPSB2010-N-TH | ● | 0.5 | 1.5 | 0.8 | 45 | 6 | A154 |
| EPDBEH2010-1.5-TH3 | ● | 0.5 | 1.5 | 0.8 | 50 | 4 | A60 |
| CBN-EHB2010-1.5 | ● | 0.5 | 1.5 | 1 | 50 | 4 | A147 |
| EPDBEH2010F-2-TH3 | ● | 0.5 | 2 | 0.8 | 35 | 4 | A57 |
| EPDBEH2010-2-TH3 | ● | 0.5 | 2 | 0.8 | 50 | 4 | A60 |
| EPDBE2010-2-ATH | ● | 0.5 | 2 | 0.8 | 50 | 4 | A73 |
| EPDBE2010-2-PN | ● | 0.5 | 2 | 0.8 | 50 | 4 | A76 |

| 商品コード Item Code | 在庫 Stock | ボール半径 RE | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EPDB2010-2 | □ | 0.5 | 2 | 0.8 | 50 | 4 | A405 |
| EPDB2010-2-TH | □ | 0.5 | 2 | 0.8 | 50 | 4 | A405 |
| EPDBEH2010-2-S6-TH3 | ● | 0.5 | 2 | 0.8 | 50 | 6 | A60 |
| HPBS2010-C | ● | 0.5 | 2 | 1.3 | 50 | 6 | A156 |
| EFB2010 | ● | 0.5 | 2.2 | 1 | 50 | 4 | A153 |
| BHB2010 | □ | 0.5 | 2.5 | 0.5 | 60 | 6 | A456 |
| CBN-EPSB2010-2.5-S | ● | 0.5 | 2.5 | 0.6 | 50 | 4 | A151 |
| CBN-EPSB2010-2.5-F | ● | 0.5 | 2.5 | 0.6 | 50 | 4 | A151 |
| EPDBEH2010F-2.5-TH3 | ● | 0.5 | 2.5 | 0.8 | 38 | 4 | A57 |
| EPDBEH2010-2.5-TH3 | ● | 0.5 | 2.5 | 0.8 | 50 | 4 | A60 |
| ESHB2010-H-TH | ● | 0.5 | 2.5 | 1 | 40 | 4 | A108 |
| ESHB2010-N-TH | ● | 0.5 | 2.5 | 1 | 40 | 4 | A108 |
| CBN-EHB2010-2.5 | ● | 0.5 | 2.5 | 1 | 50 | 4 | A147 |
| EPBT2010 | ● | 0.5 | 2.5 | 1.5 | 50 | 4 | A102 |
| PCDB0010 | | 0.5 | 3 | 0.65 | 40 | 4 | A146 |
| EPDBEH2010F-3-TH3 | ● | 0.5 | 3 | 0.8 | 38 | 4 | A57 |
| EPSBE2010-3-TH | ● | 0.5 | 3 | 0.8 | 45 | 6 | A97 |
| EPSB2010-3-N-TH | ● | 0.5 | 3 | 0.8 | 45 | 6 | A155 |
| EPDBEH2010-3-TH3 | ● | 0.5 | 3 | 0.8 | 50 | 4 | A60 |
| EPDBE2010-3-ATH | ● | 0.5 | 3 | 0.8 | 50 | 4 | A73 |
| EPDBE2010-3-PN | ● | 0.5 | 3 | 0.8 | 50 | 4 | A76 |
| EPDB2010-3 | □ | 0.5 | 3 | 0.8 | 50 | 4 | A405 |
| EPDB2010-3-TH | □ | 0.5 | 3 | 0.8 | 50 | 4 | A405 |
| EPDBEH2010-3-S6-TH3 | ● | 0.5 | 3 | 0.8 | 50 | 6 | A60 |
| EMBE3010-S4-ATH | ● | 0.5 | 3 | 1.5 | 50 | 4 | A110 |
| EHHBE4010-S4-TH3 | ● | 0.5 | 3 | 1.5 | 50 | 4 | A124 |
| EHHB4010-S4-ATH | ● | 0.5 | 3 | 1.5 | 50 | 4 | A127 |
| EMBE3010-S6-ATH | ● | 0.5 | 3 | 1.5 | 50 | 6 | A110 |
| EHHBE4010-S6-TH3 | ● | 0.5 | 3 | 1.5 | 50 | 6 | A124 |
| EHHB4010-S6-ATH | ● | 0.5 | 3 | 1.5 | 50 | 6 | A127 |
| HYPB2010-C | ● | 0.5 | 3.3 | 1.3 | 50 | 6 | A156 |
| HGOB2010-PN | ● | 0.5 | 3.5 | 2.5 | 50 | 4 | A104 |
| EPBC2010 | □ | 0.5 | 3.5 | 2.5 | 50 | 4 | A409 |
| EPDBEH2010F-4-TH3 | ● | 0.5 | 4 | 0.8 | 38 | 4 | A57 |
| EPDBEH2010-4-TH3 | ● | 0.5 | 4 | 0.8 | 50 | 4 | A60 |
| EPDBE2010-4-ATH | ● | 0.5 | 4 | 0.8 | 50 | 4 | A73 |
| EPDBE2010-4-PN | ● | 0.5 | 4 | 0.8 | 50 | 4 | A76 |
| EPDB2010-4-SD | ● | 0.5 | 4 | 0.8 | 50 | 4 | A140 |
| EPDB2010-4 | □ | 0.5 | 4 | 0.8 | 50 | 4 | A405 |
| EPDB2010-4-TH | □ | 0.5 | 4 | 0.8 | 50 | 4 | A405 |
| CBN-EHB2010-4 | ● | 0.5 | 4 | 1 | 50 | 4 | A147 |
| EB4HR0100TN-4-05-ATH | ● | 0.5 | 4 | 4 | 50 | 4 | A133 |
| EB4HR0100TN-4-10-ATH | ● | 0.5 | 4 | 4 | 50 | 4 | A133 |
| CBN-EPSB2010-5-S | ● | 0.5 | 5 | 0.6 | 50 | 4 | A151 |
| CBN-EPSB2010-5-F | ● | 0.5 | 5 | 0.6 | 50 | 4 | A151 |
| EPDBEH2010F-5-TH3 | ● | 0.5 | 5 | 0.8 | 38 | 4 | A57 |
| EPDBEH2010-5-TH3 | ● | 0.5 | 5 | 0.8 | 50 | 4 | A60 |
| EPDBE2010-5-ATH | ● | 0.5 | 5 | 0.8 | 50 | 4 | A73 |
| EPDBE2010-5-PN | ● | 0.5 | 5 | 0.8 | 50 | 4 | A76 |
| EPDB2010-5 | □ | 0.5 | 5 | 0.8 | 50 | 4 | A405 |
| EPDB2010-5-TH | □ | 0.5 | 5 | 0.8 | 50 | 4 | A405 |
| CBN-EHB2010-5 | ● | 0.5 | 5 | 1 | 50 | 4 | A147 |
| HPBLN2010-C | ● | 0.5 | 5 | 1.3 | 60 | 6 | A157 |
| EPDBEH2010F-6-TH3 | ● | 0.5 | 6 | 0.8 | 42 | 4 | A57 |
| EPSBE2010-6-TH | ● | 0.5 | 6 | 0.8 | 45 | 6 | A97 |
| EPDBEH2010-6-TH3 | ● | 0.5 | 6 | 0.8 | 50 | 4 | A60 |
| EPDBE2010-6-ATH | ● | 0.5 | 6 | 0.8 | 50 | 4 | A73 |
| EPDBE2010-6-PN | ● | 0.5 | 6 | 0.8 | 50 | 4 | A76 |
| EPDB2010-6 | □ | 0.5 | 6 | 0.8 | 50 | 4 | A405 |
| EPDB2010-6-TH | □ | 0.5 | 6 | 0.8 | 50 | 4 | A405 |
| EPDBEH2010-6-S6-TH3 | ● | 0.5 | 6 | 0.8 | 50 | 6 | A60 |
| EPDBPE2010-6-04-ATH | ● | 0.5 | 6 | 0.8 | 50 | 6 | A85 |
| EPDBPE2010-6-09-ATH | ● | 0.5 | 6 | 0.8 | 50 | 6 | A85 |
| EPDBPE2010-6-14-ATH | ● | 0.5 | 6 | 0.8 | 50 | 6 | A86 |
| EMBPE3010-6-09-ATH | ● | 0.5 | 6 | 0.8 | 50 | 6 | A111 |
| EPDBP2010-6-04-TH | △ | 0.5 | 6 | 0.8 | 50 | 6 | A163 |
| EB4HR0100TN-6-05-ATH | ● | 0.5 | 6 | 4 | 50 | 4 | A133 |
| EB4HR0100TN-6-10-ATH | ● | 0.5 | 6 | 4 | 50 | 4 | A133 |
| EPDBEH2010F-7-TH3 | ● | 0.5 | 7 | 0.8 | 42 | 4 | A57 |

□印：特定代理店在庫です。弊社営業へお問合せください。□：Stocked by specified distributor. Contact with our sales department. 無印：受注生産品です。No Mark：Manufactured upon request only.

Quick dimension reference table by mill diameter

# 外径別寸法早見表

## 超硬エンドミル・ボール　RE0.5 ～ RE0.75　Carbide End Mills -Ball

単位 unit：mm

| 商品コード Item Code | 在庫 Stock | ボール半径 RE | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EPDBEH2010-7-TH3 | ● | 0.5 | 7 | 0.8 | 50 | 4 | A60 |
| EPDBE2010-7-ATH | ● | 0.5 | 7 | 0.8 | 50 | 4 | A73 |
| EPDBE2010-7-PN | ● | 0.5 | 7 | 0.8 | 50 | 4 | A76 |
| EPDB2010-7 | □ | 0.5 | 7 | 0.8 | 50 | 4 | A405 |
| EPDB2010-7-TH | □ | 0.5 | 7 | 0.8 | 50 | 4 | A405 |
| EPDBEH2010F-8-TH3 | ● | 0.5 | 8 | 0.8 | 42 | 4 | A57 |
| EPSBE2010-8-TH | ● | 0.5 | 8 | 0.8 | 45 | 6 | A97 |
| EPDBEH2010-8-TH3 | ● | 0.5 | 8 | 0.8 | 50 | 4 | A60 |
| EPDBE2010-8-ATH | ● | 0.5 | 8 | 0.8 | 50 | 4 | A73 |
| EPDBE2010-8-PN | ● | 0.5 | 8 | 0.8 | 50 | 4 | A76 |
| EPDB2010-8-SD | ● | 0.5 | 8 | 0.8 | 50 | 4 | A140 |
| EPDB2010-8 | □ | 0.5 | 8 | 0.8 | 50 | 4 | A405 |
| EPDB2010-8-TH | □ | 0.5 | 8 | 0.8 | 50 | 4 | A405 |
| EPDBEH2010-8-S6-TH3 | ● | 0.5 | 8 | 0.8 | 50 | 6 | A60 |
| EPDBPE2010-8-04-ATH | ● | 0.5 | 8 | 0.8 | 55 | 6 | A85 |
| EMBPE3010-8-09-ATH | ● | 0.5 | 8 | 0.8 | 55 | 6 | A111 |
| EPDBP2010-8-04-TH | △ | 0.5 | 8 | 0.8 | 55 | 6 | A163 |
| DEB2010-8-C | □ | 0.5 | 8 | 1.5 | 55 | 4 | A448 |
| EB4HR0100TN-8-05-ATH | ● | 0.5 | 8 | 4 | 50 | 4 | A133 |
| EB4HR0100TN-8-10-ATH | ● | 0.5 | 8 | 4 | 50 | 4 | A133 |
| EPDBEH2010-9-TH3 | ● | 0.5 | 9 | 0.8 | 50 | 4 | A60 |
| EPDBE2010-9-ATH | ● | 0.5 | 9 | 0.8 | 50 | 4 | A73 |
| EPDBE2010-9-PN | ● | 0.5 | 9 | 0.8 | 50 | 4 | A76 |
| EPDB2010-9 | □ | 0.5 | 9 | 0.8 | 50 | 4 | A405 |
| EPDB2010-9-TH | □ | 0.5 | 9 | 0.8 | 50 | 4 | A405 |
| CBN-EPSB2010-10-S | ● | 0.5 | 10 | 0.6 | 50 | 4 | A151 |
| CBN-EPSB2010-10-F | ● | 0.5 | 10 | 0.6 | 50 | 4 | A151 |
| EPDBEH2010F-10-TH3 | ● | 0.5 | 10 | 0.8 | 45 | 4 | A57 |
| EPDBEH2010-10-TH3 | ● | 0.5 | 10 | 0.8 | 50 | 4 | A60 |
| EPDBE2010-10-ATH | ● | 0.5 | 10 | 0.8 | 50 | 4 | A73 |
| EPDBE2010-10-PN | ● | 0.5 | 10 | 0.8 | 50 | 4 | A76 |
| EPDB2010-10 | □ | 0.5 | 10 | 0.8 | 50 | 4 | A405 |
| EPDB2010-10-TH | □ | 0.5 | 10 | 0.8 | 50 | 4 | A405 |
| EPDBEH2010-10-S6-TH3 | ● | 0.5 | 10 | 0.8 | 50 | 6 | A60 |
| EPSBE2010-10-TH | ● | 0.5 | 10 | 0.8 | 50 | 6 | A97 |
| EPDBPE2010-10-04-ATH | ● | 0.5 | 10 | 0.8 | 55 | 6 | A85 |
| EPDBPE2010-10-09-ATH | ● | 0.5 | 10 | 0.8 | 55 | 6 | A85 |
| EPDBPE2010-10-29-ATH | ● | 0.5 | 10 | 0.8 | 55 | 6 | A86 |
| EMBPE3010-10-09-ATH | ● | 0.5 | 10 | 0.8 | 55 | 6 | A111 |
| EPDBP2010-10-04-TH | △ | 0.5 | 10 | 0.8 | 55 | 6 | A163 |
| EPDBP2010-10-09-TH | △ | 0.5 | 10 | 0.8 | 55 | 6 | A163 |
| EGDB2010-10-HD | ● | 0.5 | 10 | 1.5 | 60 | 4 | A143 |
| EB4HR0100TN-10-05-ATH | ● | 0.5 | 10 | 4 | 50 | 4 | A133 |
| EB4HR0100TN-10-10-ATH | ● | 0.5 | 10 | 4 | 50 | 4 | A133 |
| EPDBEH2010F-12-TH3 | ● | 0.5 | 12 | 0.8 | 45 | 4 | A57 |
| EPDBEH2010-12-TH3 | ● | 0.5 | 12 | 0.8 | 55 | 4 | A60 |
| EPDBE2010-12-ATH | ● | 0.5 | 12 | 0.8 | 55 | 4 | A73 |
| EPDBE2010-12-PN | ● | 0.5 | 12 | 0.8 | 55 | 4 | A76 |
| EPDB2010-12-SD | ● | 0.5 | 12 | 0.8 | 55 | 4 | A140 |
| EPDB2010-12 | □ | 0.5 | 12 | 0.8 | 55 | 4 | A405 |
| EPDB2010-12-TH | □ | 0.5 | 12 | 0.8 | 55 | 4 | A405 |
| EPDBPE2010-12-14-ATH | ● | 0.5 | 12 | 0.8 | 60 | 6 | A86 |
| EMBPE3010-12-09-ATH | ● | 0.5 | 12 | 0.8 | 60 | 6 | A111 |
| DEB2010-12-C | □ | 0.5 | 12 | 1.5 | 55 | 4 | A448 |
| EB4HR0100TN-12-05-ATH | ● | 0.5 | 12 | 4 | 55 | 4 | A133 |
| EB4HR0100TN-12-10-ATH | ● | 0.5 | 12 | 4 | 55 | 4 | A133 |
| EPDBEH2010-13-TH3 | ● | 0.5 | 13 | 0.8 | 55 | 4 | A60 |
| EPDBE2010-13-ATH | ● | 0.5 | 13 | 0.8 | 55 | 4 | A73 |
| EPDBE2010-13-PN | ● | 0.5 | 13 | 0.8 | 55 | 4 | A76 |
| EPDBEH2010-14-TH3 | ● | 0.5 | 14 | 0.8 | 55 | 4 | A60 |
| EPDBE2010-14-ATH | ● | 0.5 | 14 | 0.8 | 55 | 4 | A73 |
| EPDBE2010-14-PN | ● | 0.5 | 14 | 0.8 | 55 | 4 | A76 |
| EPDB2010-14 | □ | 0.5 | 14 | 0.8 | 55 | 4 | A405 |
| EPDB2010-14-TH | □ | 0.5 | 14 | 0.8 | 55 | 4 | A405 |
| EMBPE3010-14-09-ATH | ● | 0.5 | 14 | 0.8 | 60 | 6 | A111 |
| EB4HR0100TN-14-05-ATH | ● | 0.5 | 14 | 4 | 55 | 4 | A133 |
| EB4HR0100TN-14-10-ATH | ● | 0.5 | 14 | 4 | 55 | 4 | A133 |
| EPDBPE2010-15-04-ATH | ● | 0.5 | 15 | 0.8 | 60 | 6 | A85 |
| EPDBPE2010-15-09-ATH | ● | 0.5 | 15 | 0.8 | 60 | 6 | A85 |
| EPDBPE2010-15-29-ATH | ● | 0.5 | 15 | 0.8 | 60 | 6 | A86 |
| EPDBP2010-15-09-TH | △ | 0.5 | 15 | 0.8 | 60 | 6 | A163 |
| EPDBEH2010-16-TH3 | ● | 0.5 | 16 | 0.8 | 55 | 4 | A60 |
| EPDBE2010-16-ATH | ● | 0.5 | 16 | 0.8 | 55 | 4 | A73 |
| EPDBE2010-16-PN | ● | 0.5 | 16 | 0.8 | 55 | 4 | A76 |
| EPDB2010-16 | □ | 0.5 | 16 | 0.8 | 55 | 4 | A405 |
| EPDB2010-16-TH | □ | 0.5 | 16 | 0.8 | 55 | 4 | A405 |
| EPDBPE2010-16-09-ATH | ● | 0.5 | 16 | 0.8 | 60 | 6 | A85 |
| EPDBPE2010-16-14-ATH | ● | 0.5 | 16 | 0.8 | 60 | 6 | A86 |
| EMBPE3010-16-09-ATH | ● | 0.5 | 16 | 0.8 | 60 | 6 | A111 |
| EB4HR0100TN-16-05-ATH | ● | 0.5 | 16 | 4 | 55 | 4 | A133 |
| EB4HR0100TN-16-10-ATH | ● | 0.5 | 16 | 4 | 55 | 4 | A133 |
| EPDBEH2010-18-TH3 | ● | 0.5 | 18 | 0.8 | 60 | 4 | A60 |
| EPDBE2010-18-ATH | ● | 0.5 | 18 | 0.8 | 60 | 4 | A73 |
| EPDBE2010-18-PN | ● | 0.5 | 18 | 0.8 | 60 | 4 | A76 |
| EPDB2010-18 | □ | 0.5 | 18 | 0.8 | 60 | 4 | A405 |
| EPDB2010-18-TH | □ | 0.5 | 18 | 0.8 | 60 | 4 | A405 |
| EMBPE3010-18-09-ATH | ● | 0.5 | 18 | 0.8 | 65 | 6 | A111 |
| EB4HR0100TN-18-05-ATH | ● | 0.5 | 18 | 4 | 60 | 4 | A133 |
| EB4HR0100TN-18-10-ATH | ● | 0.5 | 18 | 4 | 60 | 4 | A133 |
| EPDBEH2010-20-TH3 | ● | 0.5 | 20 | 0.8 | 60 | 4 | A60 |
| EPDBE2010-20-ATH | ● | 0.5 | 20 | 0.8 | 60 | 4 | A73 |
| EPDBE2010-20-PN | ● | 0.5 | 20 | 0.8 | 60 | 4 | A76 |
| EPDB2010-20 | □ | 0.5 | 20 | 0.8 | 60 | 4 | A405 |
| EPDB2010-20-TH | □ | 0.5 | 20 | 0.8 | 60 | 4 | A405 |
| EPDBPE2010-20-04-ATH | ● | 0.5 | 20 | 0.8 | 65 | 6 | A85 |
| EPDBPE2010-20-09-ATH | ● | 0.5 | 20 | 0.8 | 65 | 6 | A85 |
| EPDBPE2010-20-14-ATH | ● | 0.5 | 20 | 0.8 | 65 | 6 | A86 |
| EPDBPE2010-20-29-ATH | ● | 0.5 | 20 | 0.8 | 65 | 6 | A86 |
| EPDBPE2010-20-49-ATH | ● | 0.5 | 20 | 0.8 | 65 | 6 | A86 |
| EMBPE3010-20-09-ATH | ● | 0.5 | 20 | 0.8 | 65 | 6 | A111 |
| EPDBP2010-20-04-TH | △ | 0.5 | 20 | 0.8 | 65 | 6 | A163 |
| EPDBP2010-20-09-TH | △ | 0.5 | 20 | 0.8 | 65 | 6 | A163 |
| EGDB2010-20-HD | ● | 0.5 | 20 | 1.5 | 60 | 4 | A143 |
| EPBPN2010-15 | ● | 0.5 | 20 | 2.5 | 60 | 6 | A158 |
| EPBPN2010-50 | ● | 0.5 | 20 | 2.5 | 60 | 6 | A158 |
| EB4HR0100TN-20-05-ATH | ● | 0.5 | 20 | 4 | 60 | 4 | A133 |
| EB4HR0100TN-20-10-ATH | ● | 0.5 | 20 | 4 | 60 | 4 | A133 |
| EPDBPE2010-22-14-ATH | ● | 0.5 | 22 | 0.8 | 70 | 6 | A86 |
| EMBPE3010-22-09-ATH | ● | 0.5 | 22 | 0.8 | 70 | 6 | A111 |
| EMBPE3010-24-09-ATH | ● | 0.5 | 24 | 0.8 | 70 | 6 | A111 |
| EPDBPE2010-25-04-ATH | ● | 0.5 | 25 | 0.8 | 70 | 6 | A85 |
| EPDBPE2010-25-09-ATH | ● | 0.5 | 25 | 0.8 | 70 | 6 | A85 |
| EPDBPE2010-25-14-ATH | ● | 0.5 | 25 | 0.8 | 70 | 6 | A86 |
| EPDBP2010-25-09-TH | △ | 0.5 | 25 | 0.8 | 70 | 6 | A163 |
| EMBPE3010-26-09-ATH | ● | 0.5 | 26 | 0.8 | 70 | 6 | A111 |
| EMBPE3010-28-09-ATH | ● | 0.5 | 28 | 0.8 | 75 | 6 | A111 |
| EPDBPE2010-30-04-ATH | ● | 0.5 | 30 | 0.8 | 75 | 6 | A85 |
| EPDBPE2010-30-09-ATH | ● | 0.5 | 30 | 0.8 | 75 | 6 | A85 |
| EPDBPE2010-30-29-ATH | ● | 0.5 | 30 | 0.8 | 75 | 6 | A86 |
| EMBPE3010-30-09-ATH | ● | 0.5 | 30 | 0.8 | 75 | 6 | A111 |
| EPDBP2010-30-04-TH | △ | 0.5 | 30 | 0.8 | 75 | 6 | A163 |
| EPDBP2010-30-09-TH | △ | 0.5 | 30 | 0.8 | 75 | 6 | A163 |
| EGDB2010-30-HD | ● | 0.5 | 30 | 1.5 | 80 | 4 | A143 |
| EMBPE3010-32-09-ATH | ● | 0.5 | 32 | 0.8 | 80 | 6 | A111 |
| EMBPE3010-34-09-ATH | ● | 0.5 | 34 | 0.8 | 80 | 6 | A111 |
| EPDBPE2010-35-09-ATH | ● | 0.5 | 35 | 0.8 | 80 | 6 | A85 |
| EPDBP2010-35-09-TH | △ | 0.5 | 35 | 0.8 | 80 | 6 | A163 |
| EMBPE3010-36-09-ATH | ● | 0.5 | 36 | 0.8 | 80 | 6 | A111 |
| EPDBPE2010-40-09-ATH | ● | 0.5 | 40 | 0.8 | 85 | 6 | A85 |
| EPDBPE2010-40-29-ATH | ● | 0.5 | 40 | 0.8 | 85 | 6 | A86 |
| EPDBP2010-40-09-TH | △ | 0.5 | 40 | 0.8 | 85 | 6 | A163 |
| EGDB2010-40-HD | ● | 0.5 | 40 | 1.5 | 80 | 4 | A143 |
| EPBPN2010-30 | ● | 0.5 | 40 | 2.5 | 80 | 6 | A158 |
| EPDBPE2010-50-04-ATH | ● | 0.5 | 50 | 0.8 | 95 | 6 | A85 |
| EPDBPE2010-50-09-ATH | ● | 0.5 | 50 | 0.8 | 95 | 6 | A85 |
| EPDBPE2010-50-14-ATH | ● | 0.5 | 50 | 0.8 | 95 | 6 | A86 |
| EPDBP2010-50-09-TH | △ | 0.5 | 50 | 0.8 | 95 | 6 | A163 |
| EPDBPE2010-50-29-ATH | ● | 0.5 | 50 | 0.8 | 130 | 6 | A86 |
| EPDBPE2010-60-09-ATH | ● | 0.5 | 60 | 0.8 | 105 | 6 | A85 |
| EPDBP2010-60-09-TH | △ | 0.5 | 60 | 0.8 | 105 | 6 | A163 |
| EPDBPE2010-70-04-ATH | ● | 0.5 | 70 | 0.8 | 115 | 6 | A85 |
| EPDBPE2010-70-09-ATH | ● | 0.5 | 70 | 0.8 | 115 | 6 | A85 |
| EPDBP2010-70-09-TH | △ | 0.5 | 70 | 0.8 | 115 | 6 | A163 |
| EPBPX2010-05 | ● | 0.5 | 70 | 1.5 | 150 | 6 | A160 |
| EPBPX2010-10 | ● | 0.5 | 70 | 1.5 | 150 | 6 | A160 |
| EPDBPE2010-90-14-ATH | ● | 0.5 | 90 | 0.8 | 135 | 6 | A86 |
| EPBPX2010-15 | ● | 0.5 | 97.47 | 1.5 | 150 | 6 | A160 |
| CEPB2010 | □ | 0.5 | – | 1.5 | 50 | 4 | A411 |
| BESS2010 | □ | 0.5 | – | 1.5 | 50 | 4 | A421 |
| YB2010-CS | □ | 0.5 | – | 1.5 | 50 | 4 | A422 |
| CEPBLS2010 | □ | 0.5 | – | 1.5 | 80 | 4 | A411 |
| BEK2010 | ● | 0.5 | – | 2.5 | 50 | 4 | A161 |
| BEK2010-C | □ | 0.5 | – | 2.5 | 50 | 4 | A415 |
| BES2010-C | □ | 0.5 | – | 2.5 | 50 | 4 | A415 |
| BES2010 | □ | 0.5 | – | 2.5 | 50 | 4 | A421 |
| BES2010M | □ | 0.5 | – | 2.5 | 50 | 4 | A421 |
| BEKLS2010-C | □ | 0.5 | – | 2.5 | 80 | 4 | A415 |
| ECRB1012-6-PN | ● | 0.5 | – | 6 | 60 | 4 | A137 |
| ECRB1012-8-PN | ● | 0.5 | – | 8 | 60 | 4 | A137 |
| ECRB1012-10-PN | ● | 0.5 | – | 10 | 60 | 4 | A137 |
| ECRB1012-12-PN | ● | 0.5 | – | 12 | 60 | 4 | A137 |
| ECRB1012-14-PN | ● | 0.5 | – | 14 | 60 | 4 | A137 |
| ECRB1012-16-PN | ● | 0.5 | – | 16 | 60 | 4 | A137 |
| EPDBEH2011-2-TH3 | ● | 0.55 | 2 | 1 | 50 | 4 | A60 |
| EPDBE2011-2-ATH | ● | 0.55 | 2 | 1 | 50 | 4 | A73 |
| EPDBE2011-2-PN | ● | 0.55 | 2 | 1 | 50 | 4 | A76 |
| EPDBEH2011-4-TH3 | ● | 0.55 | 4 | 1 | 50 | 4 | A60 |
| EPDBE2011-4-ATH | ● | 0.55 | 4 | 1 | 50 | 4 | A73 |
| EPDBE2011-4-PN | ● | 0.55 | 4 | 1 | 50 | 4 | A76 |
| EB4HR0110TN-4-05-ATH | ● | 0.55 | 4 | 4 | 50 | 4 | A133 |
| EB4HR0110TN-4-10-ATH | ● | 0.55 | 4 | 4 | 50 | 4 | A133 |
| EPDBEH2011-6-TH3 | ● | 0.55 | 6 | 1 | 50 | 4 | A60 |
| EPDBE2011-6-ATH | ● | 0.55 | 6 | 1 | 50 | 4 | A73 |
| EPDBE2011-6-PN | ● | 0.55 | 6 | 1 | 50 | 4 | A76 |
| EB4HR0110TN-6-05-ATH | ● | 0.55 | 6 | 4 | 50 | 4 | A133 |
| EB4HR0110TN-6-10-ATH | ● | 0.55 | 6 | 4 | 50 | 4 | A133 |
| EPDBEH2011-8-TH3 | ● | 0.55 | 8 | 1 | 50 | 4 | A60 |
| EPDBE2011-8-ATH | ● | 0.55 | 8 | 1 | 50 | 4 | A73 |
| EPDBE2011-8-PN | ● | 0.55 | 8 | 1 | 50 | 4 | A76 |
| EB4HR0110TN-8-05-ATH | ● | 0.55 | 8 | 4 | 50 | 4 | A133 |
| EB4HR0110TN-8-10-ATH | ● | 0.55 | 8 | 4 | 50 | 4 | A133 |
| EPDBEH2011-10-TH3 | ● | 0.55 | 10 | 1 | 50 | 4 | A60 |
| EPDBE2011-10-ATH | ● | 0.55 | 10 | 1 | 50 | 4 | A73 |
| EPDBE2011-10-PN | ● | 0.55 | 10 | 1 | 50 | 4 | A76 |
| EB4HR0110TN-10-05-ATH | ● | 0.55 | 10 | 4 | 50 | 4 | A133 |
| EB4HR0110TN-10-10-ATH | ● | 0.55 | 10 | 4 | 50 | 4 | A133 |
| EB4HR0110TN-12-05-ATH | ● | 0.55 | 12 | 4 | 55 | 4 | A133 |
| EB4HR0110TN-12-10-ATH | ● | 0.55 | 12 | 4 | 55 | 4 | A133 |
| EB4HR0110TN-14-05-ATH | ● | 0.55 | 14 | 4 | 55 | 4 | A133 |
| EB4HR0110TN-14-10-ATH | ● | 0.55 | 14 | 4 | 55 | 4 | A133 |
| EB4HR0110TN-16-05-ATH | ● | 0.55 | 16 | 4 | 55 | 4 | A133 |
| EB4HR0110TN-16-10-ATH | ● | 0.55 | 16 | 4 | 55 | 4 | A133 |
| EB4HR0110TN-18-05-ATH | ● | 0.55 | 18 | 4 | 60 | 4 | A133 |
| EB4HR0110TN-18-10-ATH | ● | 0.55 | 18 | 4 | 60 | 4 | A133 |
| EB4HR0110TN-20-05-ATH | ● | 0.55 | 20 | 4 | 60 | 4 | A133 |
| EB4HR0110TN-20-10-ATH | ● | 0.55 | 20 | 4 | 60 | 4 | A133 |
| BESS2011 | □ | 0.55 | – | 1.7 | 50 | 4 | A421 |
| EPSBE2012-1.8-TH | ● | 0.6 | 1.8 | 1.1 | 45 | 6 | A97 |
| EPSBE2012-1.8-H-TH | ● | 0.6 | 1.8 | 1.1 | 45 | 6 | A98 |
| EPSB2012-H-TH | ● | 0.6 | 1.8 | 1.1 | 45 | 6 | A154 |
| EPSB2012-N-TH | ● | 0.6 | 1.8 | 1.1 | 45 | 6 | A154 |
| EPDBEH2012-2-TH3 | ● | 0.6 | 2 | 1.1 | 50 | 4 | A60 |
| EPDBEH2012-2-S6-TH3 | ● | 0.6 | 2 | 1.1 | 50 | 6 | A60 |
| EPDBEH2012-3-TH3 | ● | 0.6 | 3 | 1.1 | 50 | 4 | A60 |
| HYPB2012-C | ● | 0.6 | 3.5 | 1.5 | 50 | 6 | A156 |
| EPSBE2012-3.6-TH | ● | 0.6 | 3.6 | 1.1 | 45 | 6 | A97 |
| EPSB2012-3.6-N-TH | ● | 0.6 | 3.6 | 1.1 | 45 | 6 | A155 |

●印：標準在庫品です。　●：Stocked Items.　△印:在庫が無くなり次第受注生産品となるものです。△:When the Stock is out, will become to produce on request.

単位 unit：mm

| 商品コード Item Code | 在庫 Stock | ボール半径 RE | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EPDBEH2012-4-TH3 | ● | 0.6 | 4 | 1.1 | 50 | 4 | A60 |
| EPDBE2012-4-ATH | ● | 0.6 | 4 | 1.1 | 50 | 4 | A73 |
| EPDBE2012-4-PN | ● | 0.6 | 4 | 1.1 | 50 | 4 | A76 |
| EPDBEH2012-4-S6-TH3 | ● | 0.6 | 4 | 1.1 | 50 | 6 | A60 |
| EPDBEH2012-6-TH3 | ● | 0.6 | 6 | 1.1 | 50 | 4 | A60 |
| HPBLN2012-C | ● | 0.6 | 6 | 1.5 | 60 | 6 | A157 |
| EB4HR0120TN-6-05-ATH | ● | 0.6 | 6 | 4.8 | 50 | 4 | A133 |
| EB4HR0120TN-6-10-ATH | ● | 0.6 | 6 | 4.8 | 50 | 4 | A133 |
| EPDBEH2012-8-TH3 | ● | 0.6 | 8 | 1.1 | 50 | 4 | A60 |
| EPDBE2012-8-ATH | ● | 0.6 | 8 | 1.1 | 50 | 4 | A73 |
| EPDBE2012-6-ATH | ● | 0.6 | 8 | 1.1 | 50 | 4 | A73 |
| EPDBE2012-8-PN | ● | 0.6 | 8 | 1.1 | 50 | 4 | A76 |
| EPDBE2012-6-PN | ● | 0.6 | 8 | 1.1 | 50 | 4 | A76 |
| EPDB2012-8 | □ | 0.6 | 8 | 1.1 | 50 | 4 | A405 |
| EPDB2012-8-TH | □ | 0.6 | 8 | 1.1 | 50 | 4 | A405 |
| DEB2012-8-C | □ | 0.6 | 8 | 1.6 | 55 | 4 | A448 |
| EB4HR0120TN-8-05-ATH | ● | 0.6 | 8 | 4.8 | 50 | 4 | A133 |
| EB4HR0120TN-8-10-ATH | ● | 0.6 | 8 | 4.8 | 50 | 4 | A133 |
| EPDBEH2012-10-TH3 | ● | 0.6 | 10 | 1.1 | 50 | 4 | A60 |
| EPDBE2012-10-ATH | ● | 0.6 | 10 | 1.1 | 50 | 4 | A73 |
| EPDBE2012-10-PN | ● | 0.6 | 10 | 1.1 | 50 | 4 | A76 |
| EB4HR0120TN-10-05-ATH | ● | 0.6 | 10 | 4.8 | 50 | 4 | A133 |
| EB4HR0120TN-10-10-ATH | ● | 0.6 | 10 | 4.8 | 50 | 4 | A133 |
| EPDBEH2012-12-TH3 | ● | 0.6 | 12 | 1.1 | 55 | 4 | A60 |
| EPDBE2012-12-ATH | ● | 0.6 | 12 | 1.1 | 55 | 4 | A73 |
| EPDBE2012-12-PN | ● | 0.6 | 12 | 1.1 | 55 | 4 | A76 |
| EPDB2012-12 | □ | 0.6 | 12 | 1.1 | 55 | 4 | A405 |
| EPDB2012-12-TH | □ | 0.6 | 12 | 1.1 | 55 | 4 | A405 |
| DEB2012-12-C | □ | 0.6 | 12 | 1.6 | 55 | 4 | A448 |
| EB4HR0120TN-12-05-ATH | ● | 0.6 | 12 | 4.8 | 55 | 4 | A133 |
| EB4HR0120TN-12-10-ATH | ● | 0.6 | 12 | 4.8 | 55 | 4 | A133 |
| EB4HR0120TN-14-05-ATH | ● | 0.6 | 14 | 4.8 | 55 | 4 | A133 |
| EB4HR0120TN-14-10-ATH | ● | 0.6 | 14 | 4.8 | 55 | 4 | A133 |
| EB4HR0120TN-16-05-ATH | ● | 0.6 | 16 | 4.8 | 55 | 4 | A133 |
| EB4HR0120TN-16-10-ATH | ● | 0.6 | 16 | 4.8 | 55 | 4 | A133 |
| EB4HR0120TN-18-05-ATH | ● | 0.6 | 18 | 4.8 | 60 | 4 | A133 |
| EB4HR0120TN-18-10-ATH | ● | 0.6 | 18 | 4.8 | 60 | 4 | A133 |
| EPDBPE2012-20-29-ATH | ● | 0.6 | 20 | 1.1 | 65 | 6 | A86 |
| EB4HR0120TN-20-05-ATH | ● | 0.6 | 20 | 4.8 | 60 | 4 | A133 |
| EB4HR0120TN-20-10-ATH | ● | 0.6 | 20 | 4.8 | 60 | 4 | A133 |
| EB4HR0120TN-22-05-ATH | ● | 0.6 | 22 | 4.8 | 60 | 4 | A133 |
| EB4HR0120TN-22-10-ATH | ● | 0.6 | 22 | 4.8 | 60 | 4 | A133 |
| EB4HR0120TN-24-05-ATH | ● | 0.6 | 24 | 4.8 | 60 | 4 | A133 |
| EB4HR0120TN-24-10-ATH | ● | 0.6 | 24 | 4.8 | 60 | 4 | A133 |
| EPDBPE2012-35-29-ATH | ● | 0.6 | 35 | 1.1 | 80 | 6 | A86 |
| BESS2012 | □ | 0.6 | – | 1.8 | 50 | 4 | A421 |
| BESS2013 | □ | 0.65 | – | 2 | 50 | 4 | A421 |
| EPDBEH2014-3-TH3 | ● | 0.7 | 3 | 1.3 | 50 | 4 | A60 |
| HYPB2014-C | ● | 0.7 | 3.8 | 1.8 | 50 | 6 | A156 |
| HPBLN2014-C | ● | 0.7 | 7 | 1.8 | 60 | 6 | A157 |
| EPDBEH2014-8-TH3 | ● | 0.7 | 8 | 1.3 | 50 | 4 | A60 |
| EPDBE2014-8-ATH | ● | 0.7 | 8 | 1.3 | 50 | 4 | A73 |
| EPDBE2014-8-PN | ● | 0.7 | 8 | 1.3 | 50 | 4 | A76 |
| EPDB2014-8 | □ | 0.7 | 8 | 1.3 | 50 | 4 | A406 |
| EPDB2014-8-TH | □ | 0.7 | 8 | 1.3 | 50 | 4 | A406 |
| EPDBEH2014-12-TH3 | ● | 0.7 | 12 | 1.3 | 55 | 4 | A60 |
| EPDBE2014-12-ATH | ● | 0.7 | 12 | 1.3 | 55 | 4 | A73 |
| EPDBE2014-12-PN | ● | 0.7 | 12 | 1.3 | 55 | 4 | A76 |
| EPDB2014-12 | □ | 0.7 | 12 | 1.3 | 55 | 4 | A406 |
| EPDB2014-12-TH | □ | 0.7 | 12 | 1.3 | 55 | 4 | A406 |
| DEB2014-12-C | □ | 0.7 | 12 | 1.6 | 55 | 4 | A448 |
| EPDBEH2014-16-TH3 | ● | 0.7 | 16 | 1.3 | 55 | 4 | A60 |
| EPDBE2014-16-ATH | ● | 0.7 | 16 | 1.3 | 55 | 4 | A73 |
| EPDBE2014-16-PN | ● | 0.7 | 16 | 1.3 | 55 | 4 | A76 |
| EPDB2014-16 | □ | 0.7 | 16 | 1.3 | 55 | 4 | A406 |
| EPDB2014-16-TH | □ | 0.7 | 16 | 1.3 | 55 | 4 | A406 |
| BESS2014 | □ | 0.7 | – | 2.1 | 50 | 4 | A421 |
| EPDBEH2015F-2-TH3 | ● | 0.75 | 2 | 1.35 | 35 | 4 | A57 |
| EPDBEH2015-2-TH3 | ● | 0.75 | 2 | 1.35 | 50 | 4 | A60 |
| EPSBE2015-2.25-TH | ● | 0.75 | 2.25 | 1.35 | 45 | 6 | A97 |
| EPSBE2015-2.25-H-TH | ● | 0.75 | 2.25 | 1.35 | 45 | 6 | A98 |
| EPSB2015-H-TH | ● | 0.75 | 2.25 | 1.35 | 45 | 6 | A154 |
| EPSB2015-N-TH | ● | 0.75 | 2.25 | 1.35 | 45 | 6 | A154 |
| BHB2015 | □ | 0.75 | 2.5 | 0.75 | 60 | 6 | A456 |
| EPDBEH2015F-2.5-TH3 | ● | 0.75 | 2.5 | 1.35 | 35 | 4 | A57 |
| EPDBEH2015-2.5-TH3 | ● | 0.75 | 2.5 | 1.35 | 50 | 4 | A60 |
| CBN-EHB2015-2.5 | ● | 0.75 | 2.5 | 1.35 | 50 | 4 | A147 |
| EPDBEH2015F-3-TH3 | ● | 0.75 | 3 | 1.35 | 35 | 4 | A57 |
| EPDBEH2015-3-TH3 | ● | 0.75 | 3 | 1.35 | 50 | 4 | A60 |
| EPDBEH2015-3-S6-TH3 | ● | 0.75 | 3 | 1.35 | 50 | 6 | A61 |
| EFB2015 | ● | 0.75 | 3 | 1.5 | 50 | 4 | A153 |
| EPBT2015 | ● | 0.75 | 3.5 | 2.5 | 50 | 4 | A102 |
| ESHB2015-H-TH | ● | 0.75 | 3.75 | 1.5 | 40 | 4 | A108 |
| ESHB2015-N-TH | ● | 0.75 | 3.75 | 1.5 | 40 | 4 | A108 |
| EPDBEH2015F-4-TH3 | ● | 0.75 | 4 | 1.35 | 38 | 4 | A57 |
| EPDBEH2015-4-TH3 | ● | 0.75 | 4 | 1.35 | 50 | 4 | A60 |
| EPDBE2015-4-ATH | ● | 0.75 | 4 | 1.35 | 50 | 4 | A73 |
| EPDBE2015-4-PN | ● | 0.75 | 4 | 1.35 | 50 | 4 | A76 |
| EPDB2015-4 | □ | 0.75 | 4 | 1.35 | 50 | 4 | A406 |
| EPDB2015-4-TH | □ | 0.75 | 4 | 1.35 | 50 | 4 | A406 |
| EPSBE2015-4.5-TH | ● | 0.75 | 4.5 | 1.35 | 45 | 6 | A97 |
| EPSB2015-4.5-N-TH | ● | 0.75 | 4.5 | 1.35 | 45 | 6 | A155 |
| EMBE3015-S4-ATH | ● | 0.75 | 4.5 | 2.5 | 50 | 4 | A110 |
| EHHBE4015-S4-TH3 | ● | 0.75 | 4.5 | 2.5 | 50 | 4 | A124 |
| EHHB4015-S4-ATH | ● | 0.75 | 4.5 | 2.5 | 50 | 4 | A127 |
| EMBE3015-S6-ATH | ● | 0.75 | 4.5 | 2.5 | 50 | 6 | A110 |
| EHHBE4015-S6-TH3 | ● | 0.75 | 4.5 | 2.5 | 50 | 6 | A124 |
| EHHB4015-S6-ATH | ● | 0.75 | 4.5 | 2.5 | 50 | 6 | A127 |
| HYPB2015-C | ● | 0.75 | 4.9 | 1.9 | 50 | 6 | A156 |
| CBN-EPSB2015-5-S | ● | 0.75 | 5 | 0.9 | 50 | 4 | A151 |
| CBN-EPSB2015-5-F | ● | 0.75 | 5 | 0.9 | 50 | 4 | A151 |
| EPDBEH2015F-5-TH3 | ● | 0.75 | 5 | 1.35 | 38 | 4 | A57 |
| EPDBEH2015-5-TH3 | ● | 0.75 | 5 | 1.35 | 50 | 4 | A60 |
| CBN-EHB2015-5 | ● | 0.75 | 5 | 1.35 | 50 | 4 | A147 |
| EPDBEH2015-5-S6-TH3 | ● | 0.75 | 5 | 1.35 | 50 | 6 | A61 |
| HGOB2015-PN | ● | 0.75 | 5 | 4 | 50 | 4 | A104 |
| EPBC2015 | □ | 0.75 | 5 | 4 | 50 | 4 | A409 |
| EPDBEH2015F-6-TH3 | ● | 0.75 | 6 | 1.35 | 38 | 4 | A57 |
| EPDBEH2015-6-TH3 | ● | 0.75 | 6 | 1.35 | 50 | 4 | A61 |
| EPDBE2015-6-ATH | ● | 0.75 | 6 | 1.35 | 50 | 4 | A73 |
| EPDBE2015-6-PN | ● | 0.75 | 6 | 1.35 | 50 | 4 | A76 |
| EPDB2015-6-SD | ● | 0.75 | 6 | 1.35 | 50 | 4 | A140 |
| EPDB2015-6 | □ | 0.75 | 6 | 1.35 | 50 | 4 | A406 |
| EPDB2015-6-TH | □ | 0.75 | 6 | 1.35 | 50 | 4 | A406 |
| CBN-EHB2015-7.5 | ● | 0.75 | 7.5 | 1.35 | 50 | 4 | A147 |
| HPBLN2015-C | ● | 0.75 | 7.5 | 1.9 | 60 | 6 | A157 |
| EPDBEH2015F-8-TH3 | ● | 0.75 | 8 | 1.35 | 42 | 4 | A57 |
| EPSBE2015-8-TH | ● | 0.75 | 8 | 1.35 | 45 | 6 | A97 |
| EPDBEH2015-8-TH3 | ● | 0.75 | 8 | 1.35 | 50 | 4 | A61 |
| EPDBE2015-8-ATH | ● | 0.75 | 8 | 1.35 | 50 | 4 | A73 |
| EPDBE2015-8-PN | ● | 0.75 | 8 | 1.35 | 50 | 4 | A76 |
| EPDB2015-8 | □ | 0.75 | 8 | 1.35 | 50 | 4 | A406 |
| EPDB2015-8-TH | □ | 0.75 | 8 | 1.35 | 50 | 4 | A406 |
| EPDBEH2015-8-S6-TH3 | ● | 0.75 | 8 | 1.35 | 50 | 6 | A61 |
| EPDBPE2015-8-04-ATH | ● | 0.75 | 8 | 1.35 | 55 | 6 | A86 |
| EMBPE3015-8-09-ATH | ● | 0.75 | 8 | 1.35 | 55 | 6 | A111 |
| EPDBP2015-8-04-TH | △ | 0.75 | 8 | 1.35 | 55 | 6 | A163 |
| DEB2015-8-C | □ | 0.75 | 8 | 1.8 | 55 | 4 | A448 |
| CBN-EPSB2015-10-S | ● | 0.75 | 10 | 0.9 | 50 | 4 | A151 |
| CBN-EPSB2015-10-F | ● | 0.75 | 10 | 0.9 | 50 | 4 | A151 |
| EPDBEH2015F-10-TH3 | ● | 0.75 | 10 | 1.35 | 42 | 4 | A57 |
| EPDBEH2015-10-TH3 | ● | 0.75 | 10 | 1.35 | 50 | 4 | A61 |
| EPDBE2015-10-ATH | ● | 0.75 | 10 | 1.35 | 50 | 4 | A73 |
| EPDBE2015-10-PN | ● | 0.75 | 10 | 1.35 | 50 | 4 | A76 |
| EPDB2015-10 | □ | 0.75 | 10 | 1.35 | 50 | 4 | A406 |
| EPDB2015-10-TH | □ | 0.75 | 10 | 1.35 | 50 | 4 | A406 |
| EPDBPE2015-10-04-ATH | ● | 0.75 | 10 | 1.35 | 55 | 6 | A86 |
| EPDBPE2015-10-09-ATH | ● | 0.75 | 10 | 1.35 | 55 | 6 | A86 |
| EPDBPE2015-10-14-ATH | ● | 0.75 | 10 | 1.35 | 55 | 6 | A86 |
| EMBPE3015-10-09-ATH | ● | 0.75 | 10 | 1.35 | 55 | 6 | A111 |
| EPDBP2015-10-04-TH | △ | 0.75 | 10 | 1.35 | 55 | 6 | A163 |
| EPDBEH2015F-12-TH3 | ● | 0.75 | 12 | 1.35 | 45 | 4 | A57 |
| EPDBEH2015-12-S6-TH3 | ● | 0.75 | 12 | 1.35 | 50 | 6 | A61 |
| EPSBE2015-12-TH | ● | 0.75 | 12 | 1.35 | 50 | 6 | A97 |
| EPDBEH2015-12-TH3 | ● | 0.75 | 12 | 1.35 | 55 | 4 | A61 |
| EPDBE2015-12-ATH | ● | 0.75 | 12 | 1.35 | 55 | 4 | A73 |
| EPDBE2015-12-PN | ● | 0.75 | 12 | 1.35 | 55 | 4 | A76 |
| EPDB2015-12-SD | ● | 0.75 | 12 | 1.35 | 55 | 4 | A140 |
| EPDB2015-12 | □ | 0.75 | 12 | 1.35 | 55 | 4 | A406 |
| EPDB2015-12-TH | □ | 0.75 | 12 | 1.35 | 55 | 4 | A406 |
| EPDBPE2015-12-04-ATH | ● | 0.75 | 12 | 1.35 | 55 | 6 | A86 |
| EPDBP2015-12-04-TH | △ | 0.75 | 12 | 1.35 | 55 | 6 | A163 |
| DEB2015-12-C | □ | 0.75 | 12 | 1.8 | 55 | 4 | A448 |
| EPDBEH2015-14-TH3 | ● | 0.75 | 14 | 1.35 | 55 | 4 | A61 |
| EPDBE2015-14-ATH | ● | 0.75 | 14 | 1.35 | 55 | 4 | A73 |
| EPDBE2015-14-PN | ● | 0.75 | 14 | 1.35 | 55 | 4 | A76 |
| EMBPE3015-14-09-ATH | ● | 0.75 | 14 | 1.35 | 60 | 6 | A111 |
| EPDBPE2015-15-09-ATH | ● | 0.75 | 15 | 1.35 | 60 | 6 | A86 |
| EPDBP2015-15-09-TH | △ | 0.75 | 15 | 1.35 | 60 | 6 | A163 |
| EPDBEH2015-16-TH3 | ● | 0.75 | 16 | 1.35 | 55 | 4 | A61 |
| EPDBE2015-16-ATH | ● | 0.75 | 16 | 1.35 | 55 | 4 | A73 |
| EPDBE2015-16-PN | ● | 0.75 | 16 | 1.35 | 55 | 4 | A76 |
| EPDB2015-16 | □ | 0.75 | 16 | 1.35 | 55 | 4 | A406 |
| EPDB2015-16-TH | □ | 0.75 | 16 | 1.35 | 55 | 4 | A406 |
| EMBPE3015-16-09-ATH | ● | 0.75 | 16 | 1.35 | 60 | 6 | A111 |
| DEB2015-16-C | □ | 0.75 | 16 | 1.8 | 55 | 4 | A448 |
| EPDBEH2015-18-TH3 | ● | 0.75 | 18 | 1.35 | 60 | 4 | A61 |
| EPDBE2015-18-ATH | ● | 0.75 | 18 | 1.35 | 60 | 4 | A73 |
| EPDBE2015-18-PN | ● | 0.75 | 18 | 1.35 | 60 | 4 | A76 |
| EPDB2015-18-SD | ● | 0.75 | 18 | 1.35 | 60 | 4 | A140 |
| EMBPE3015-18-09-ATH | ● | 0.75 | 18 | 1.35 | 65 | 6 | A111 |
| EPDBEH2015-20-TH3 | ● | 0.75 | 20 | 1.35 | 60 | 4 | A61 |
| EPDBE2015-20-ATH | ● | 0.75 | 20 | 1.35 | 60 | 4 | A73 |
| EPDBE2015-20-PN | ● | 0.75 | 20 | 1.35 | 60 | 4 | A76 |
| EPDB2015-20 | □ | 0.75 | 20 | 1.35 | 60 | 4 | A406 |
| EPDB2015-20-TH | □ | 0.75 | 20 | 1.35 | 60 | 4 | A406 |
| EPDBPE2015-20-09-ATH | ● | 0.75 | 20 | 1.35 | 65 | 6 | A86 |
| EPDBPE2015-20-14-ATH | ● | 0.75 | 20 | 1.35 | 65 | 6 | A86 |
| EPDBPE2015-20-29-ATH | ● | 0.75 | 20 | 1.35 | 65 | 6 | A86 |
| EMBPE3015-20-09-ATH | ● | 0.75 | 20 | 1.35 | 65 | 6 | A111 |
| EPDBP2015-20-09-TH | △ | 0.75 | 20 | 1.35 | 65 | 6 | A163 |
| EGDB2015-20-HD | ● | 0.75 | 20 | 2.25 | 60 | 4 | A143 |
| EMBPE3015-22-09-ATH | ● | 0.75 | 22 | 1.35 | 70 | 6 | A111 |
| EMBPE3015-24-09-ATH | ● | 0.75 | 24 | 1.35 | 70 | 6 | A111 |
| EMBPE3015-26-09-ATH | ● | 0.75 | 26 | 1.35 | 70 | 6 | A111 |
| EMBPE3015-28-09-ATH | ● | 0.75 | 28 | 1.35 | 75 | 6 | A111 |
| EPDBPE2015-30-04-ATH | ● | 0.75 | 30 | 1.35 | 75 | 6 | A86 |
| EPDBPE2015-30-09-ATH | ● | 0.75 | 30 | 1.35 | 75 | 6 | A86 |
| EPDBPE2015-30-14-ATH | ● | 0.75 | 30 | 1.35 | 75 | 6 | A86 |
| EMBPE3015-30-09-ATH | ● | 0.75 | 30 | 1.35 | 75 | 6 | A111 |
| EPDBP2015-30-09-TH | △ | 0.75 | 30 | 1.35 | 75 | 6 | A163 |
| EMBPE3015-32-09-ATH | ● | 0.75 | 32 | 1.35 | 80 | 6 | A111 |
| EMBPE3015-34-09-ATH | ● | 0.75 | 34 | 1.35 | 80 | 6 | A111 |
| EMBPE3015-36-09-ATH | ● | 0.75 | 36 | 1.35 | 80 | 6 | A111 |
| EMBPE3015-38-09-ATH | ● | 0.75 | 38 | 1.35 | 85 | 6 | A111 |
| EPDBPE2015-40-14-ATH | ● | 0.75 | 40 | 1.35 | 85 | 6 | A86 |
| EMBPE3015-40-09-ATH | ● | 0.75 | 40 | 1.35 | 85 | 6 | A111 |
| EGDB2015-40-HD | ● | 0.75 | 40 | 2.25 | 80 | 4 | A143 |
| EPDBPE2015-46-29-ATH | ● | 0.75 | 46 | 1.35 | 95 | 6 | A86 |
| EPDBPE2015-50-14-ATH | ● | 0.75 | 50 | 1.35 | 95 | 6 | A86 |
| BESS2015 | □ | 0.75 | – | 2.3 | 50 | 4 | A421 |
| YB2015-CS | □ | 0.75 | – | 2.3 | 50 | 4 | A422 |
| CEPB2015 | □ | 0.75 | – | 2.5 | 50 | 4 | A411 |
| CEPBLS2015 | □ | 0.75 | – | 2.5 | 80 | 4 | A411 |
| BEK2015 | ● | 0.75 | – | 4 | 50 | 4 | A161 |
| BEK2015-C | □ | 0.75 | – | 4 | 50 | 4 | A415 |
| BEKLS2015-C | □ | 0.75 | – | 4 | 80 | 4 | A415 |

□印：特定代理店在庫です。弊社営業へお問合せください。□：Stocked by specified distributor. Contact with our sales department.

Quick dimension reference table by mill diameter

# 外径別寸法早見表

## 超硬エンドミル・ボール　RE0.8 ～ RE1.5　Carbide End Mills -Ball

単位 unit：mm

| 商品コード Item Code | 在庫 Stock | ボール半径 RE | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EPDBEH2016-4-TH3 | ● | 0.8 | 4 | 1.4 | 50 | 4 | A61 |
| HYPB2016-C | ● | 0.8 | 5 | 2 | 50 | 6 | A156 |
| EPDBEH2016-8-TH3 | ● | 0.8 | 8 | 1.4 | 50 | 4 | A61 |
| EPDBE2016-8-ATH | ● | 0.8 | 8 | 1.4 | 50 | 4 | A73 |
| EPDBE2016-8-PN | ● | 0.8 | 8 | 1.4 | 50 | 4 | A76 |
| EPDB2016-8 | □ | 0.8 | 8 | 1.4 | 50 | 4 | A406 |
| EPDB2016-8-TH | □ | 0.8 | 8 | 1.4 | 50 | 4 | A406 |
| HPBLN2016-C | ● | 0.8 | 8 | 2 | 60 | 6 | A157 |
| EPDBEH2016-12-TH3 | ● | 0.8 | 12 | 1.4 | 55 | 4 | A61 |
| EPDBE2016-12-ATH | ● | 0.8 | 12 | 1.4 | 55 | 4 | A73 |
| EPDBE2016-12-PN | ● | 0.8 | 12 | 1.4 | 55 | 4 | A76 |
| EPDB2016-12 | □ | 0.8 | 12 | 1.4 | 55 | 4 | A406 |
| EPDB2016-12-TH | □ | 0.8 | 12 | 1.4 | 55 | 4 | A406 |
| EPDBEH2016-16-TH3 | ● | 0.8 | 16 | 1.4 | 55 | 4 | A61 |
| EPDBE2016-16-ATH | ● | 0.8 | 16 | 1.4 | 55 | 4 | A73 |
| EPDBE2016-16-PN | ● | 0.8 | 16 | 1.4 | 55 | 4 | A76 |
| EPDB2016-16 | □ | 0.8 | 16 | 1.4 | 55 | 4 | A406 |
| EPDB2016-16-TH | □ | 0.8 | 16 | 1.4 | 55 | 4 | A406 |
| DEB2016-16-C | □ | 0.8 | 16 | 1.8 | 55 | 4 | A448 |
| EPDBEH2016-20-TH3 | ● | 0.8 | 20 | 1.4 | 60 | 4 | A61 |
| EPDBE2016-20-ATH | ● | 0.8 | 20 | 1.4 | 60 | 4 | A73 |
| EPDBE2016-20-PN | ● | 0.8 | 20 | 1.4 | 60 | 4 | A76 |
| EPDB2016-20 | □ | 0.8 | 20 | 1.4 | 60 | 4 | A406 |
| EPDB2016-20-TH | □ | 0.8 | 20 | 1.4 | 60 | 4 | A406 |
| BESS2016 | □ | 0.8 | – | 2.4 | 50 | 4 | A421 |
| BESS2017 | □ | 0.85 | – | 2.6 | 50 | 4 | A421 |
| EPDBEH2018-4-TH3 | ● | 0.9 | 4 | 1.6 | 50 | 4 | A61 |
| EPDBPE2018-4-04-ATH | ● | 0.9 | 4 | 1.6 | 50 | 6 | A86 |
| EPDBP2018-4-04-TH | △ | 0.9 | 4 | 1.6 | 50 | 6 | A163 |
| HYPB2018-C | ● | 0.9 | 5.3 | 2.3 | 50 | 6 | A156 |
| EPDBEH2018-8-TH3 | ● | 0.9 | 8 | 1.6 | 50 | 4 | A61 |
| EPDBE2018-8-ATH | ● | 0.9 | 8 | 1.6 | 50 | 4 | A74 |
| EPDBE2018-8-PN | ● | 0.9 | 8 | 1.6 | 50 | 4 | A77 |
| EPDB2018-8 | □ | 0.9 | 8 | 1.6 | 50 | 4 | A406 |
| EPDB2018-8-TH | □ | 0.9 | 8 | 1.6 | 50 | 4 | A406 |
| EPDBPE2018-8-04-ATH | ● | 0.9 | 8 | 1.6 | 50 | 6 | A86 |
| EPDBP2018-8-04-TH | △ | 0.9 | 8 | 1.6 | 50 | 6 | A163 |
| HPBLN2018-C | ● | 0.9 | 9 | 2.3 | 60 | 6 | A157 |
| EPDBEH2018-12-TH3 | ● | 0.9 | 12 | 1.6 | 55 | 4 | A61 |
| EPDBE2018-12-ATH | ● | 0.9 | 12 | 1.6 | 55 | 4 | A74 |
| EPDBE2018-12-PN | ● | 0.9 | 12 | 1.6 | 55 | 4 | A77 |
| EPDB2018-12 | □ | 0.9 | 12 | 1.6 | 55 | 4 | A406 |
| EPDB2018-12-TH | □ | 0.9 | 12 | 1.6 | 55 | 4 | A406 |
| EPDBPE2018-12-04-ATH | ● | 0.9 | 12 | 1.6 | 55 | 6 | A86 |
| EPDBP2018-12-04-TH | △ | 0.9 | 12 | 1.6 | 55 | 6 | A163 |
| EPDBEH2018-16-TH3 | ● | 0.9 | 16 | 1.6 | 55 | 4 | A61 |
| EPDBE2018-16-ATH | ● | 0.9 | 16 | 1.6 | 55 | 4 | A74 |
| EPDBE2018-16-PN | ● | 0.9 | 16 | 1.6 | 55 | 4 | A77 |
| EPDB2018-16 | □ | 0.9 | 16 | 1.6 | 55 | 4 | A406 |
| EPDB2018-16-TH | □ | 0.9 | 16 | 1.6 | 55 | 4 | A406 |
| EPDBPE2018-16-04-ATH | ● | 0.9 | 16 | 1.6 | 60 | 6 | A86 |
| EPDBP2018-16-04-TH | △ | 0.9 | 16 | 1.6 | 60 | 6 | A163 |
| DEB2018-16-C | □ | 0.9 | 16 | 2 | 55 | 4 | A448 |
| EPDBEH2018-20-TH3 | ● | 0.9 | 20 | 1.6 | 60 | 4 | A61 |
| EPDBE2018-20-ATH | ● | 0.9 | 20 | 1.6 | 60 | 4 | A74 |
| EPDBE2018-20-PN | ● | 0.9 | 20 | 1.6 | 60 | 4 | A77 |
| EPDB2018-20 | □ | 0.9 | 20 | 1.6 | 60 | 4 | A406 |
| EPDB2018-20-TH | □ | 0.9 | 20 | 1.6 | 60 | 4 | A406 |
| EPDBPE2018-20-04-ATH | ● | 0.9 | 20 | 1.6 | 65 | 6 | A86 |
| EPDBP2018-20-04-TH | △ | 0.9 | 20 | 1.6 | 65 | 6 | A163 |
| EPDBPE2018-24-04-ATH | ● | 0.9 | 24 | 1.6 | 65 | 6 | A86 |
| EPDBP2018-24-04-TH | △ | 0.9 | 24 | 1.6 | 65 | 6 | A163 |
| EPDBPE2018-28-04-ATH | ● | 0.9 | 28 | 1.6 | 70 | 6 | A86 |
| EPDBP2018-28-04-TH | △ | 0.9 | 28 | 1.6 | 70 | 6 | A163 |
| EPDBPE2018-32-04-ATH | ● | 0.9 | 32 | 1.6 | 70 | 6 | A86 |
| EPDBP2018-32-04-TH | △ | 0.9 | 32 | 1.6 | 70 | 6 | A163 |
| EPDBPE2018-36-04-ATH | ● | 0.9 | 36 | 1.6 | 75 | 6 | A86 |
| EPDBP2018-36-04-TH | △ | 0.9 | 36 | 1.6 | 75 | 6 | A163 |
| EPDBPE2018-38-04-ATH | ● | 0.9 | 38 | 1.6 | 80 | 6 | A86 |
| EPDBP2018-38-04-TH | △ | 0.9 | 38 | 1.6 | 80 | 6 | A163 |
| EPDBPE2018-40-04-ATH | ● | 0.9 | 40 | 1.6 | 80 | 6 | A86 |
| EPDBP2018-40-04-TH | △ | 0.9 | 40 | 1.6 | 80 | 6 | A163 |
| BESS2018 | □ | 0.9 | – | 2.7 | 50 | 4 | A421 |
| BESS2019 | □ | 0.95 | – | 2.9 | 50 | 4 | A421 |
| BHB2020 | □ | 1 | 2.5 | 1 | 60 | 6 | A456 |
| CBN-EHB2020-2.5 | ● | 1 | 2.5 | 1.65 | 50 | 4 | A147 |
| EPDBEH2020F-2.5-TH3 | ● | 1 | 2.5 | 1.7 | 35 | 4 | A57 |
| EPDBEH2020-2.5-TH3 | ● | 1 | 2.5 | 1.7 | 50 | 4 | A61 |
| EPDBEH2020F-3-TH3 | ● | 1 | 3 | 1.7 | 35 | 4 | A57 |
| EPSBE2020-3-TH | ● | 1 | 3 | 1.7 | 45 | 6 | A97 |
| EPSBE2020-3-H-TH | ● | 1 | 3 | 1.7 | 45 | 6 | A98 |
| EPSB2020-H-TH | ● | 1 | 3 | 1.7 | 45 | 6 | A154 |
| EPSB2020-N-TH | ● | 1 | 3 | 1.7 | 45 | 6 | A154 |
| EPDBEH2020-3-TH3 | ● | 1 | 3 | 1.7 | 50 | 4 | A61 |
| EPDBE2020-3-ATH | ● | 1 | 3 | 1.7 | 50 | 4 | A74 |
| EPDBE2020-3-PN | ● | 1 | 3 | 1.7 | 50 | 4 | A77 |
| EPDB2020-3 | □ | 1 | 3 | 1.7 | 50 | 4 | A406 |
| EPDB2020-3-TH | □ | 1 | 3 | 1.7 | 50 | 4 | A406 |
| EPDBEH2020-3-S6-TH3 | ● | 1 | 3 | 1.7 | 50 | 6 | A61 |
| HPBS2020-C | ● | 1 | 3.5 | 2.5 | 50 | 6 | A156 |
| EPDBEH2020F-4-TH3 | ● | 1 | 4 | 1.7 | 35 | 4 | A57 |
| EPDBEH2020-4-TH3 | ● | 1 | 4 | 1.7 | 50 | 4 | A61 |
| EPDBE2020-4-ATH | ● | 1 | 4 | 1.7 | 50 | 4 | A74 |
| EPDBE2020-4-PN | ● | 1 | 4 | 1.7 | 50 | 4 | A77 |
| EPDB2020-4 | □ | 1 | 4 | 1.7 | 50 | 4 | A406 |
| EPDB2020-4-TH | □ | 1 | 4 | 1.7 | 50 | 4 | A406 |
| EFB2020 | ● | 1 | 4 | 2 | 50 | 6 | A153 |
| EPBT2020 | ● | 1 | 4 | 3 | 50 | 6 | A102 |
| EMB3020-TH | △ | 1 | 4 | 3 | 50 | 6 | A168 |
| CBN-EPSB2020-5-S | ● | 1 | 5 | 1.2 | 50 | 4 | A151 |
| CBN-EPSB2020-5-F | ● | 1 | 5 | 1.2 | 50 | 4 | A151 |
| CBN-EHB2020-5 | ● | 1 | 5 | 1.65 | 50 | 4 | A147 |
| EPDBEH2020F-5-TH3 | ● | 1 | 5 | 1.7 | 38 | 4 | A57 |
| EPDBEH2020-5-TH3 | ● | 1 | 5 | 1.7 | 50 | 4 | A61 |
| ESHB2020-H-TH | ● | 1 | 5 | 2 | 45 | 6 | A108 |
| ESHB2020-N-TH | ● | 1 | 5 | 2 | 45 | 6 | A108 |
| HYPB2020-C | ● | 1 | 5.5 | 2.5 | 50 | 6 | A156 |
| EPDBEH2020F-6-TH3 | ● | 1 | 6 | 1.7 | 38 | 4 | A57 |
| EPSBE2020-6-TH | ● | 1 | 6 | 1.7 | 45 | 6 | A97 |
| EPSB2020-6-N-TH | ● | 1 | 6 | 1.7 | 45 | 6 | A155 |
| EPDBEH2020-6-TH3 | ● | 1 | 6 | 1.7 | 50 | 4 | A61 |
| EPDBE2020-6-ATH | ● | 1 | 6 | 1.7 | 50 | 4 | A74 |
| EPDBE2020-6-PN | ● | 1 | 6 | 1.7 | 50 | 4 | A77 |
| EPDB2020-6 | □ | 1 | 6 | 1.7 | 50 | 4 | A406 |
| EPDB2020-6-TH | □ | 1 | 6 | 1.7 | 50 | 4 | A406 |
| EPDBEH2020-6-S6-TH3 | ● | 1 | 6 | 1.7 | 50 | 6 | A61 |
| EMBE3020-S4-ATH | ● | 1 | 6 | 3 | 50 | 4 | A110 |
| EHHBE4020-S4-TH3 | ● | 1 | 6 | 3 | 50 | 4 | A124 |
| EHHB4020-S4-ATH | ● | 1 | 6 | 3 | 50 | 4 | A127 |
| EMBE3020-S6-ATH | ● | 1 | 6 | 3 | 50 | 6 | A110 |
| EHHBE4020-S6-TH3 | ● | 1 | 6 | 3 | 50 | 6 | A124 |
| EHHB4020-S6-ATH | ● | 1 | 6 | 3 | 50 | 6 | A127 |
| HGOB2020-PN | ● | 1 | 6 | 5 | 50 | 6 | A104 |
| EPBC2020 | □ | 1 | 6 | 5 | 50 | 6 | A409 |
| CBN-EHB2020-7.5 | ● | 1 | 7.5 | 1.65 | 50 | 4 | A147 |
| EPDBEH2020F-8-TH3 | ● | 1 | 8 | 1.7 | 42 | 4 | A57 |
| EPSBE2020-8-TH | ● | 1 | 8 | 1.7 | 45 | 6 | A97 |
| EPDBEH2020-8-TH3 | ● | 1 | 8 | 1.7 | 50 | 4 | A61 |
| EPDBE2020-8-ATH | ● | 1 | 8 | 1.7 | 50 | 4 | A74 |
| EPDBE2020-8-PN | ● | 1 | 8 | 1.7 | 50 | 4 | A77 |
| EPDB2020-8-SD | ● | 1 | 8 | 1.7 | 50 | 4 | A140 |
| EPDB2020-8 | □ | 1 | 8 | 1.7 | 50 | 4 | A406 |
| EPDB2020-8-TH | □ | 1 | 8 | 1.7 | 50 | 4 | A406 |
| EPDBEH2020-8-S6-TH3 | ● | 1 | 8 | 1.7 | 50 | 6 | A61 |
| EPDBPE2020-8-04-ATH | ● | 1 | 8 | 1.7 | 50 | 6 | A86 |
| EPDBP2020-8-04-TH | △ | 1 | 8 | 1.7 | 50 | 6 | A164 |
| DEB2020-8-C | □ | 1 | 8 | 2 | 55 | 4 | A448 |
| CBN-EPSB2020-10-S | ● | 1 | 10 | 1.2 | 50 | 4 | A151 |
| CBN-EPSB2020-10-F | ● | 1 | 10 | 1.2 | 50 | 4 | A151 |
| CBN-EHB2020-10 | ● | 1 | 10 | 1.65 | 50 | 4 | A147 |
| EPDBEH2020F-10-TH3 | ● | 1 | 10 | 1.7 | 42 | 4 | A57 |
| EPDBEH2020-10-TH3 | ● | 1 | 10 | 1.7 | 50 | 4 | A61 |
| EPDBE2020-10-ATH | ● | 1 | 10 | 1.7 | 50 | 4 | A74 |
| EPDBE2020-10-PN | ● | 1 | 10 | 1.7 | 50 | 4 | A77 |
| EPDB2020-10 | □ | 1 | 10 | 1.7 | 50 | 4 | A406 |
| EPDB2020-10-TH | □ | 1 | 10 | 1.7 | 50 | 4 | A406 |
| EPDBPE2020-10-14-ATH | ● | 1 | 10 | 1.7 | 55 | 6 | A86 |
| EMBPE3020-10-09-ATH | ● | 1 | 10 | 1.7 | 55 | 6 | A111 |
| HPBLN2020-C | ● | 1 | 10 | 2.5 | 60 | 6 | A157 |
| EPDBEH2020F-12-TH3 | ● | 1 | 12 | 1.7 | 45 | 4 | A57 |
| EPDBEH2020-12-S6-TH3 | ● | 1 | 12 | 1.7 | 50 | 6 | A61 |
| EPSBE2020-12-TH | ● | 1 | 12 | 1.7 | 50 | 6 | A97 |
| EPDBEH2020-12-TH3 | ● | 1 | 12 | 1.7 | 55 | 4 | A61 |
| EPDBE2020-12-ATH | ● | 1 | 12 | 1.7 | 55 | 4 | A74 |
| EPDBE2020-12-PN | ● | 1 | 12 | 1.7 | 55 | 4 | A77 |
| EPDB2020-12 | □ | 1 | 12 | 1.7 | 55 | 4 | A406 |
| EPDB2020-12-TH | □ | 1 | 12 | 1.7 | 55 | 4 | A406 |
| EPDBPE2020-12-04-ATH | ● | 1 | 12 | 1.7 | 55 | 6 | A86 |
| EPDBPE2020-12-09-ATH | ● | 1 | 12 | 1.7 | 55 | 6 | A86 |
| EPDBPE2020-12-29-ATH | ● | 1 | 12 | 1.7 | 55 | 6 | A87 |
| EPDBP2020-12-04-TH | △ | 1 | 12 | 1.7 | 55 | 6 | A164 |
| DEB2020-12-C | □ | 1 | 12 | 2 | 55 | 4 | A448 |
| EPDBEH2020F-13-TH3 | ● | 1 | 13 | 1.7 | 45 | 4 | A57 |
| EPDBEH2020-13-TH3 | ● | 1 | 13 | 1.7 | 55 | 4 | A61 |
| EPDBE2020-13-ATH | ● | 1 | 13 | 1.7 | 55 | 4 | A74 |
| EPDBE2020-13-PN | ● | 1 | 13 | 1.7 | 55 | 4 | A77 |
| EPDBEH2020F-14-TH3 | ● | 1 | 14 | 1.7 | 45 | 4 | A57 |
| EPDBEH2020-14-TH3 | ● | 1 | 14 | 1.7 | 55 | 4 | A61 |
| EPDBE2020-14-ATH | ● | 1 | 14 | 1.7 | 55 | 4 | A74 |
| EPDBE2020-14-PN | ● | 1 | 14 | 1.7 | 55 | 4 | A77 |
| EPDB2020-14 | □ | 1 | 14 | 1.7 | 55 | 4 | A406 |
| EPDB2020-14-TH | □ | 1 | 14 | 1.7 | 55 | 4 | A406 |
| EPDBPE2020-15-29-ATH | ● | 1 | 15 | 1.7 | 60 | 6 | A87 |
| EPDBEH2020F-16-TH3 | ● | 1 | 16 | 1.7 | 50 | 4 | A57 |
| EPDBEH2020-16-S6-TH3 | ● | 1 | 16 | 1.7 | 50 | 6 | A61 |
| EPSBE2020-16-TH | ● | 1 | 16 | 1.7 | 50 | 6 | A97 |
| EPDBEH2020-16-TH3 | ● | 1 | 16 | 1.7 | 55 | 4 | A61 |
| EPDBE2020-16-ATH | ● | 1 | 16 | 1.7 | 55 | 4 | A74 |
| EPDBE2020-16-PN | ● | 1 | 16 | 1.7 | 55 | 4 | A77 |
| EPDB2020-16-SD | ● | 1 | 16 | 1.7 | 55 | 4 | A140 |
| EPDB2020-16 | □ | 1 | 16 | 1.7 | 55 | 4 | A406 |
| EPDB2020-16-TH | □ | 1 | 16 | 1.7 | 55 | 4 | A406 |
| EPDBPE2020-16-04-ATH | ● | 1 | 16 | 1.7 | 60 | 6 | A86 |
| EPDBPE2020-16-09-ATH | ● | 1 | 16 | 1.7 | 60 | 6 | A86 |
| EPDBPE2020-16-14-ATH | ● | 1 | 16 | 1.7 | 60 | 6 | A86 |
| EMBPE3020-16-09-ATH | ● | 1 | 16 | 1.7 | 60 | 6 | A111 |
| EPDBP2020-16-04-TH | △ | 1 | 16 | 1.7 | 60 | 6 | A164 |
| DEB2020-16-C | □ | 1 | 16 | 2 | 55 | 4 | A448 |
| EPDBEH2020-18-TH3 | ● | 1 | 18 | 1.7 | 60 | 4 | A61 |
| EPDBE2020-18-ATH | ● | 1 | 18 | 1.7 | 60 | 4 | A74 |
| EPDBE2020-18-PN | ● | 1 | 18 | 1.7 | 60 | 4 | A77 |
| EPDB2020-18 | □ | 1 | 18 | 1.7 | 60 | 4 | A406 |
| EPDB2020-18-TH | □ | 1 | 18 | 1.7 | 60 | 4 | A406 |
| CBN-EPSB2020-20-S | ● | 1 | 20 | 1.2 | 55 | 4 | A151 |
| CBN-EPSB2020-20-F | ● | 1 | 20 | 1.2 | 55 | 4 | A151 |
| EPDBEH2020F-20-TH3 | ● | 1 | 20 | 1.7 | 55 | 4 | A57 |
| EPSBE2020-20-TH | ● | 1 | 20 | 1.7 | 55 | 6 | A97 |
| EPDBEH2020-20-TH3 | ● | 1 | 20 | 1.7 | 60 | 4 | A61 |
| EPDBE2020-20-ATH | ● | 1 | 20 | 1.7 | 60 | 4 | A74 |
| EPDBE2020-20-PN | ● | 1 | 20 | 1.7 | 60 | 4 | A77 |
| EPDB2020-20 | □ | 1 | 20 | 1.7 | 60 | 4 | A406 |
| EPDB2020-20-TH | □ | 1 | 20 | 1.7 | 60 | 4 | A406 |
| EPDBEH2020-20-S6-TH3 | ● | 1 | 20 | 1.7 | 60 | 6 | A61 |
| EPDBPE2020-20-04-ATH | ● | 1 | 20 | 1.7 | 65 | 6 | A86 |
| EPDBPE2020-20-09-ATH | ● | 1 | 20 | 1.7 | 65 | 6 | A86 |
| EPDBPE2020-20-14-ATH | ● | 1 | 20 | 1.7 | 65 | 6 | A86 |
| EPDBPE2020-20-29-ATH | ● | 1 | 20 | 1.7 | 65 | 6 | A87 |

●印：標準在庫品です。　●：Stocked Items.　△印:在庫が無くなり次第受注生産品となるものです。△:When the Stock is out, will become to produce on request.

単位 unit：mm

| 商品コード Item Code | 在庫 Stock | ボール半径 RE | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EPDBPE2020-20-49-ATH | ● | 1 | 20 | 1.7 | 65 | 6 | A87 |
| EMBPE3020-20-09-ATH | ● | 1 | 20 | 1.7 | 65 | 6 | A111 |
| EPDBP2020-20-04-TH | △ | 1 | 20 | 1.7 | 65 | 6 | A164 |
| EPDBP2020-20-09-TH | △ | 1 | 20 | 1.7 | 65 | 6 | A164 |
| DEB2020-20-C | □ | 1 | 20 | 2 | 55 | 4 | A448 |
| EGDB2020-20-HD | ● | 1 | 20 | 3 | 60 | 4 | A143 |
| EPBPN2020-15 | ● | 1 | 20 | 5 | 60 | 6 | A158 |
| EPBPN2020-50 | ● | 1 | 20 | 5 | 60 | 6 | A158 |
| EPDBEH2020-22-TH3 | ● | 1 | 22 | 1.7 | 60 | 4 | A61 |
| EPDBE2020-22-ATH | ● | 1 | 22 | 1.7 | 60 | 4 | A74 |
| EPDBE2020-22-PN | ● | 1 | 22 | 1.7 | 60 | 4 | A77 |
| EPDB2020-22 | □ | 1 | 22 | 1.7 | 60 | 4 | A406 |
| EPDB2020-22-TH | □ | 1 | 22 | 1.7 | 60 | 4 | A406 |
| EPDBPE2020-22-14-ATH | ● | 1 | 22 | 1.7 | 65 | 6 | A86 |
| EPDB2020-24-SD | ● | 1 | 24 | 1.7 | 60 | 4 | A140 |
| EMBPE3020-24-09-ATH | ● | 1 | 24 | 1.7 | 65 | 6 | A111 |
| EPDBEH2020-25-TH3 | ● | 1 | 25 | 1.7 | 65 | 4 | A61 |
| EPDBE2020-25-ATH | ● | 1 | 25 | 1.7 | 65 | 4 | A74 |
| EPDBE2020-25-PN | ● | 1 | 25 | 1.7 | 65 | 4 | A77 |
| EPDB2020-25 | □ | 1 | 25 | 1.7 | 65 | 4 | A406 |
| EPDB2020-25-TH | □ | 1 | 25 | 1.7 | 65 | 4 | A406 |
| EPDBPE2020-25-04-ATH | ● | 1 | 25 | 1.7 | 65 | 6 | A86 |
| EPDBPE2020-25-09-ATH | ● | 1 | 25 | 1.7 | 65 | 6 | A86 |
| EPDBPE2020-25-14-ATH | ● | 1 | 25 | 1.7 | 65 | 6 | A86 |
| EPDBP2020-25-09-TH | △ | 1 | 25 | 1.7 | 65 | 6 | A164 |
| EPDBEH2020-30-TH3 | ● | 1 | 30 | 1.7 | 70 | 4 | A61 |
| EPDBE2020-30-ATH | ● | 1 | 30 | 1.7 | 70 | 4 | A74 |
| EPDBE2020-30-PN | ● | 1 | 30 | 1.7 | 70 | 4 | A77 |
| EPDB2020-30 | □ | 1 | 30 | 1.7 | 70 | 4 | A406 |
| EPDB2020-30-TH | □ | 1 | 30 | 1.7 | 70 | 4 | A406 |
| EPDBPE2020-30-04-ATH | ● | 1 | 30 | 1.7 | 70 | 6 | A86 |
| EPDBPE2020-30-09-ATH | ● | 1 | 30 | 1.7 | 70 | 6 | A86 |
| EPDBPE2020-30-14-ATH | ● | 1 | 30 | 1.7 | 70 | 6 | A87 |
| EMBPE3020-30-09-ATH | ● | 1 | 30 | 1.7 | 70 | 6 | A111 |
| EPDBP2020-30-04-TH | △ | 1 | 30 | 1.7 | 70 | 6 | A164 |
| EPDBP2020-30-09-TH | △ | 1 | 30 | 1.7 | 70 | 6 | A164 |
| EPDBEH2020-35-TH3 | ● | 1 | 35 | 1.7 | 75 | 4 | A61 |
| EPDBE2020-35-ATH | ● | 1 | 35 | 1.7 | 75 | 4 | A74 |
| EPDBE2020-35-PN | ● | 1 | 35 | 1.7 | 75 | 4 | A77 |
| EPDB2020-35 | □ | 1 | 35 | 1.7 | 75 | 4 | A406 |
| EPDB2020-35-TH | □ | 1 | 35 | 1.7 | 75 | 4 | A406 |
| EPDBPE2020-35-09-ATH | ● | 1 | 35 | 1.7 | 75 | 6 | A86 |
| EPDBP2020-35-09-TH | △ | 1 | 35 | 1.7 | 75 | 6 | A164 |
| EMBPE3020-36-09-ATH | ● | 1 | 36 | 1.7 | 80 | 6 | A111 |
| EPDBEH2020-40-TH3 | ● | 1 | 40 | 1.7 | 80 | 4 | A61 |
| EPDBE2020-40-ATH | ● | 1 | 40 | 1.7 | 80 | 4 | A74 |
| EPDBE2020-40-PN | ● | 1 | 40 | 1.7 | 80 | 4 | A77 |
| EPDB2020-40 | □ | 1 | 40 | 1.7 | 80 | 4 | A406 |
| EPDB2020-40-TH | □ | 1 | 40 | 1.7 | 80 | 4 | A406 |
| EPDBPE2020-40-04-ATH | ● | 1 | 40 | 1.7 | 80 | 6 | A86 |
| EPDBPE2020-40-09-ATH | ● | 1 | 40 | 1.7 | 80 | 6 | A86 |
| EPDBPE2020-40-14-ATH | ● | 1 | 40 | 1.7 | 80 | 6 | A87 |
| EMBPE3020-40-09-ATH | ● | 1 | 40 | 1.7 | 80 | 6 | A111 |
| EPDBP2020-40-04-TH | △ | 1 | 40 | 1.7 | 80 | 6 | A164 |
| EPDBP2020-40-09-TH | △ | 1 | 40 | 1.7 | 80 | 6 | A164 |
| EGDB2020-40-HD | ● | 1 | 40 | 3 | 80 | 4 | A143 |
| EPBPN2020-30 | ● | 1 | 40 | 5 | 80 | 6 | A158 |
| EPDBPE2020-41-29-ATH | ● | 1 | 41 | 1.7 | 130 | 6 | A87 |
| EMBPE3020-46-09-ATH | ● | 1 | 46 | 1.7 | 90 | 6 | A111 |
| EPDBPE2020-50-09-ATH | ● | 1 | 50 | 1.7 | 90 | 6 | A86 |
| EPDBPE2020-50-14-ATH | ● | 1 | 50 | 1.7 | 90 | 6 | A87 |
| EPDBP2020-50-09-TH | △ | 1 | 50 | 1.7 | 90 | 6 | A164 |
| EPDBPE2020-60-09-ATH | ● | 1 | 60 | 1.7 | 100 | 6 | A86 |
| EMBPE3020-60-09-ATH | ● | 1 | 60 | 1.7 | 100 | 6 | A111 |
| EPDBP2020-60-09-TH | △ | 1 | 60 | 1.7 | 100 | 6 | A164 |
| EGDB2020-60-HD | ● | 1 | 60 | 3 | 100 | 4 | A143 |
| EPDBPE2020-70-09-ATH | ● | 1 | 70 | 1.7 | 110 | 6 | A86 |
| EPDBP2020-70-09-TH | △ | 1 | 70 | 1.7 | 110 | 6 | A164 |
| EPDBPE2020-75-09-ATH | ● | 1 | 75 | 1.7 | 115 | 6 | A86 |

| 商品コード Item Code | 在庫 Stock | ボール半径 RE | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EPDBPE2020-75-14-ATH | ● | 1 | 75 | 1.7 | 115 | 6 | A87 |
| EPBPX2020-15 | ● | 1 | 79.88 | 2.5 | 150 | 6 | A160 |
| EPDBPE2020-80-04-ATH | ● | 1 | 80 | 1.7 | 120 | 6 | A86 |
| EPBPX2020-05 | ● | 1 | 80 | 2.5 | 150 | 6 | A160 |
| EPBPX2020-10 | ● | 1 | 80 | 2.5 | 150 | 6 | A160 |
| BESS2020 | □ | 1 | – | 3 | 50 | 4 | A421 |
| CEPB2020 | □ | 1 | – | 3 | 50 | 6 | A411 |
| YB2020-CS | □ | 1 | – | 3 | 60 | 6 | A422 |
| CEPBLS2020 | □ | 1 | – | 3 | 90 | 6 | A411 |
| BES2020M | □ | 1 | – | 5 | 50 | 4 | A421 |
| BEK2020 | ● | 1 | – | 5 | 50 | 6 | A161 |
| BEK2020-C | □ | 1 | – | 5 | 50 | 6 | A415 |
| BES2020-C | □ | 1 | – | 5 | 50 | 6 | A415 |
| BES2020 | □ | 1 | – | 5 | 50 | 6 | A421 |
| BEKLS2020-C | □ | 1 | – | 5 | 90 | 6 | A415 |
| GBS2020 | □ | 1 | – | 10 | 80 | 4 | A426 |
| GBR2020 | □ | 1 | – | 10 | 80 | 6 | A425 |
| GBD2020 | □ | 1 | – | 10 | 100 | 4 | A426 |
| GXB2020 | □ | 1 | – | 10 | 100 | 6 | A426 |
| GBL2020 | □ | 1 | – | 20 | 100 | 6 | A425 |
| BESS2021 | □ | 1.05 | – | 3.2 | 50 | 4 | A421 |
| BESS2022 | □ | 1.1 | – | 3.3 | 50 | 4 | A421 |
| BESS2023 | □ | 1.15 | – | 3.5 | 50 | 4 | A421 |
| BESS2024 | □ | 1.2 | – | 3.6 | 50 | 4 | A421 |
| EFB2025 | ● | 1.25 | 1 | 2.5 | 50 | 6 | A153 |
| EPBT2025 | ● | 1.25 | 5 | 4 | 50 | 6 | A102 |
| EPDBEH2025F-6-TH3 | ● | 1.25 | 6 | 2 | 38 | 4 | A57 |
| EPDBEH2025-6-TH3 | ● | 1.25 | 6 | 2 | 50 | 4 | A62 |
| EPDBE2025-6-ATH | ● | 1.25 | 6 | 2 | 50 | 4 | A74 |
| EPDBE2025-6-PN | ● | 1.25 | 6 | 2 | 50 | 4 | A77 |
| HYPB2025-C | ● | 1.25 | 6 | 3 | 50 | 6 | A156 |
| ESHB2025-H-TH | ● | 1.25 | 6.25 | 2.5 | 45 | 6 | A108 |
| ESHB2025-N-TH | ● | 1.25 | 6.25 | 2.5 | 45 | 6 | A108 |
| EMBE3025-S4-ATH | ● | 1.25 | 7.5 | 4 | 50 | 4 | A110 |
| EHHBE4025-S4-TH3 | ● | 1.25 | 7.5 | 4 | 50 | 4 | A124 |
| EHHB4025-S4-ATH | ● | 1.25 | 7.5 | 4 | 50 | 4 | A127 |
| EMBE3025-S6-ATH | ● | 1.25 | 7.5 | 4 | 50 | 6 | A110 |
| EHHBE4025-S6-TH3 | ● | 1.25 | 7.5 | 4 | 50 | 6 | A124 |
| EHHB4025-S6-ATH | ● | 1.25 | 7.5 | 4 | 50 | 6 | A127 |
| HGOB2025-PN | ● | 1.25 | 8 | 7 | 50 | 6 | A104 |
| EPBC2025 | □ | 1.25 | 8 | 7 | 50 | 6 | A409 |
| EPDBEH2025F-10-TH3 | ● | 1.25 | 10 | 2 | 42 | 4 | A57 |
| EPDBEH2025-10-TH3 | ● | 1.25 | 10 | 2 | 50 | 4 | A62 |
| EPDBE2025-10-ATH | ● | 1.25 | 10 | 2 | 50 | 4 | A74 |
| EPDBE2025-10-PN | ● | 1.25 | 10 | 2 | 50 | 4 | A77 |
| HPBLN2025-C | ● | 1.25 | 12.5 | 3 | 60 | 6 | A157 |
| EPDBEH2025F-15-TH3 | ● | 1.25 | 15 | 2 | 45 | 4 | A57 |
| EPDBEH2025-15-TH3 | ● | 1.25 | 15 | 2 | 55 | 4 | A62 |
| EPDBE2025-15-ATH | ● | 1.25 | 15 | 2 | 55 | 4 | A74 |
| EPDBE2025-15-PN | ● | 1.25 | 15 | 2 | 55 | 4 | A77 |
| EMBPE3025-16-09-ATH | ● | 1.25 | 16 | 2 | 60 | 6 | A111 |
| EPDBEH2025-20-TH3 | ● | 1.25 | 20 | 2 | 60 | 4 | A62 |
| EPDBE2025-20-ATH | ● | 1.25 | 20 | 2 | 60 | 4 | A74 |
| EPDBE2025-20-PN | ● | 1.25 | 20 | 2 | 60 | 4 | A77 |
| EMBPE3025-24-09-ATH | ● | 1.25 | 24 | 2 | 65 | 6 | A111 |
| EPDBEH2025-25-TH3 | ● | 1.25 | 25 | 2 | 65 | 4 | A62 |
| EPDBE2025-25-ATH | ● | 1.25 | 25 | 2 | 65 | 4 | A74 |
| EPDBE2025-25-PN | ● | 1.25 | 25 | 2 | 65 | 4 | A77 |
| EPDBEH2025-30-TH3 | ● | 1.25 | 30 | 2 | 70 | 4 | A62 |
| EPDBE2025-30-ATH | ● | 1.25 | 30 | 2 | 70 | 4 | A74 |
| EPDBE2025-30-PN | ● | 1.25 | 30 | 2 | 70 | 4 | A77 |
| EMBPE3025-30-09-ATH | ● | 1.25 | 30 | 2 | 70 | 6 | A111 |
| EMBPE3025-40-09-ATH | ● | 1.25 | 40 | 2 | 80 | 6 | A111 |
| EMBPE3025-50-09-ATH | ● | 1.25 | 50 | 2 | 90 | 6 | A111 |
| BESS2025 | □ | 1.25 | – | 3.8 | 50 | 4 | A421 |
| CEPB2025 | □ | 1.25 | – | 4 | 50 | 6 | A411 |
| CEPBLS2025 | □ | 1.25 | – | 4 | 90 | 6 | A411 |
| BEK2025 | ● | 1.25 | – | 7 | 50 | 6 | A161 |
| BEK2025-C | □ | 1.25 | – | 7 | 50 | 6 | A415 |

| 商品コード Item Code | 在庫 Stock | ボール半径 RE | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| BEKLS2025-C | □ | 1.25 | – | 7 | 90 | 6 | A415 |
| GBR2025 | □ | 1.25 | – | 10 | 80 | 6 | A425 |
| BESS2026 | □ | 1.3 | – | 3.9 | 55 | 6 | A421 |
| BESS2027 | □ | 1.35 | – | 4.1 | 55 | 6 | A421 |
| BESS2028 | □ | 1.4 | – | 4.2 | 55 | 6 | A421 |
| BESS2029 | □ | 1.45 | – | 4.4 | 55 | 6 | A421 |
| HPBS2030-C | ● | 1.5 | 5 | 4 | 50 | 6 | A156 |
| EPBTS2030-TH | ● | 1.5 | 5.5 | 4.5 | 70 | 6 | A100 |
| EPBT2030 | ● | 1.5 | 5.5 | 4.5 | 70 | 6 | A102 |
| EMB3030-TH | △ | 1.5 | 5.5 | 4.5 | 70 | 6 | A168 |
| EPDBEH2030-6-TH3 | ● | 1.5 | 6 | 2.5 | 50 | 6 | A62 |
| EFB2030 | ● | 1.5 | 6 | 3 | 70 | 6 | A153 |
| ESHB2030-H-TH | ● | 1.5 | 7.5 | 3 | 45 | 6 | A108 |
| ESHB2030-N-TH | ● | 1.5 | 7.5 | 3 | 45 | 6 | A108 |
| EPDBPE2030-8-04-ATH | ● | 1.5 | 8 | 2.5 | 50 | 6 | A87 |
| EPDBP2030-8-04-TH | △ | 1.5 | 8 | 2.5 | 50 | 6 | A164 |
| EPDBEH2030-8-TH3 | ● | 1.5 | 8 | 2.5 | 55 | 6 | A62 |
| EPDBE2030-8-ATH | ● | 1.5 | 8 | 2.5 | 55 | 6 | A74 |
| EPDBE2030-8-PN | ● | 1.5 | 8 | 2.5 | 55 | 6 | A77 |
| EPDB2030-8 | □ | 1.5 | 8 | 2.5 | 55 | 6 | A406 |
| EPDB2030-8-TH | □ | 1.5 | 8 | 2.5 | 55 | 6 | A406 |
| HYPB2030-C | ● | 1.5 | 8 | 4 | 50 | 6 | A156 |
| EMBE3030-S4-ATH | ● | 1.5 | 9 | 4.5 | 70 | 4 | A110 |
| EHHBE4030-S4-TH3 | ● | 1.5 | 9 | 4.5 | 70 | 4 | A124 |
| EHHB4030-S4-ATH | ● | 1.5 | 9 | 4.5 | 70 | 4 | A127 |
| EMBE3030-S6-ATH | ● | 1.5 | 9 | 4.5 | 70 | 6 | A110 |
| EHHBE4030-S6-TH3 | ● | 1.5 | 9 | 4.5 | 70 | 6 | A124 |
| EHHB4030-S6-ATH | ● | 1.5 | 9 | 4.5 | 70 | 6 | A127 |
| HGOB2030-PN | ● | 1.5 | 9 | 8 | 70 | 6 | A104 |
| EPBC2030 | □ | 1.5 | 9 | 8 | 70 | 6 | A409 |
| EPDBEH2030-10-TH3 | ● | 1.5 | 10 | 2.5 | 55 | 6 | A62 |
| EPDBE2030-10-ATH | ● | 1.5 | 10 | 2.5 | 55 | 6 | A74 |
| EPDBE2030-10-PN | ● | 1.5 | 10 | 2.5 | 55 | 6 | A77 |
| EPDB2030-10 | □ | 1.5 | 10 | 2.5 | 55 | 6 | A406 |
| EPDB2030-10-TH | □ | 1.5 | 10 | 2.5 | 55 | 6 | A406 |
| EPDB2030-12-SD | ● | 1.5 | 12 | 2.5 | 55 | 6 | A140 |
| EPDBEH2030-13-TH3 | ● | 1.5 | 13 | 2.5 | 60 | 6 | A62 |
| EPDBE2030-13-ATH | ● | 1.5 | 13 | 2.5 | 60 | 6 | A74 |
| EPDBE2030-13-PN | ● | 1.5 | 13 | 2.5 | 60 | 6 | A77 |
| EPDB2030-13 | □ | 1.5 | 13 | 2.5 | 60 | 6 | A406 |
| EPDB2030-13-TH | □ | 1.5 | 13 | 2.5 | 60 | 6 | A406 |
| EPDBPE2030-15-09-ATH | ● | 1.5 | 15 | 2.5 | 55 | 6 | A87 |
| HPBLN2030-C | ● | 1.5 | 15 | 4 | 80 | 6 | A157 |
| EPDBPE2030-16-04-ATH | ● | 1.5 | 16 | 2.5 | 55 | 6 | A87 |
| EMBPE3030-16-09-ATH | ● | 1.5 | 16 | 2.5 | 55 | 6 | A111 |
| EPDBP2030-16-04-TH | △ | 1.5 | 16 | 2.5 | 55 | 6 | A164 |
| EPDBEH2030-16-TH3 | ● | 1.5 | 16 | 2.5 | 60 | 6 | A62 |
| EPDBE2030-16-ATH | ● | 1.5 | 16 | 2.5 | 60 | 6 | A74 |
| EPDBE2030-16-PN | ● | 1.5 | 16 | 2.5 | 60 | 6 | A77 |
| EPDB2030-16 | □ | 1.5 | 16 | 2.5 | 60 | 6 | A406 |
| EPDB2030-16-TH | □ | 1.5 | 16 | 2.5 | 60 | 6 | A406 |
| EPDBPE2030-20-04-ATH | ● | 1.5 | 20 | 2.5 | 60 | 6 | A87 |
| EPDBPE2030-20-09-ATH | ● | 1.5 | 20 | 2.5 | 60 | 6 | A87 |
| EMBPE3030-20-09-ATH | ● | 1.5 | 20 | 2.5 | 60 | 6 | A111 |
| EPDBP2030-20-04-TH | △ | 1.5 | 20 | 2.5 | 60 | 6 | A164 |
| EPDBEH2030-20-TH3 | ● | 1.5 | 20 | 2.5 | 65 | 6 | A62 |
| EPDBE2030-20-ATH | ● | 1.5 | 20 | 2.5 | 65 | 6 | A74 |
| EPDBE2030-20-PN | ● | 1.5 | 20 | 2.5 | 65 | 6 | A77 |
| EPDB2030-20 | □ | 1.5 | 20 | 2.5 | 65 | 6 | A406 |
| EPDB2030-20-TH | □ | 1.5 | 20 | 2.5 | 65 | 6 | A406 |
| EGDB2030-20-HD | ● | 1.5 | 20 | 4.5 | 60 | 4 | A143 |
| EMBPE3030-24-09-ATH | ● | 1.5 | 24 | 2.5 | 65 | 6 | A111 |
| EPDB2030-24-SD | ● | 1.5 | 24 | 2.5 | 65 | 6 | A140 |
| EPDBEH2030-25-TH3 | ● | 1.5 | 25 | 2.5 | 70 | 6 | A62 |
| EPDBE2030-25-ATH | ● | 1.5 | 25 | 2.5 | 70 | 6 | A74 |
| EPDBE2030-25-PN | ● | 1.5 | 25 | 2.5 | 70 | 6 | A77 |
| EPDB2030-25 | □ | 1.5 | 25 | 2.5 | 70 | 6 | A406 |
| EPDB2030-25-TH | □ | 1.5 | 25 | 2.5 | 70 | 6 | A406 |
| EPDBPE2030-30-04-ATH | ● | 1.5 | 30 | 2.5 | 70 | 6 | A87 |

□印：特定代理店在庫です。弊社営業へお問合せください。□：Stocked by specified distributor. Contact with our sales department.

Quick dimension reference table by mill diameter

# 外径別寸法早見表

## 超硬エンドミル・ボール　RE1.5 ～ RE4　Carbide End Mills -Ball

単位 unit：mm

| 商品コード Item Code | 在庫 Stock | ボール半径 RE | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EPDBPE2030-30-09-ATH | ● | 1.5 | 30 | 2.5 | 70 | 6 | A87 |
| EPDBPE2030-30-14-ATH | ● | 1.5 | 30 | 2.5 | 70 | 6 | A87 |
| EPDBPE2030-30-29-ATH | ● | 1.5 | 30 | 2.5 | 70 | 6 | A87 |
| EMBPE3030-30-09-ATH | ● | 1.5 | 30 | 2.5 | 70 | 6 | A111 |
| EPDBP2030-30-04-TH | △ | 1.5 | 30 | 2.5 | 70 | 6 | A164 |
| EPDBP2030-30-09-TH | △ | 1.5 | 30 | 2.5 | 70 | 6 | A164 |
| EPDBEH2030-30-TH3 | ● | 1.5 | 30 | 2.5 | 75 | 6 | A62 |
| EPDBE2030-30-ATH | ● | 1.5 | 30 | 2.5 | 75 | 6 | A74 |
| EPDBE2030-30-PN | ● | 1.5 | 30 | 2.5 | 75 | 6 | A77 |
| EPDB2030-30 | □ | 1.5 | 30 | 2.5 | 75 | 6 | A406 |
| EPDB2030-30-TH | □ | 1.5 | 30 | 2.5 | 75 | 6 | A406 |
| EPBPN2030-30 | ● | 1.5 | 30 | 8 | 70 | 6 | A158 |
| EPDBPE2030-35-09-ATH | ● | 1.5 | 35 | 2.5 | 75 | 6 | A87 |
| EPDBEH2030-35-TH3 | ● | 1.5 | 35 | 2.5 | 80 | 6 | A62 |
| EPDBE2030-35-ATH | ● | 1.5 | 35 | 2.5 | 80 | 6 | A74 |
| EPDBE2030-35-PN | ● | 1.5 | 35 | 2.5 | 80 | 6 | A77 |
| EPDB2030-35 | □ | 1.5 | 35 | 2.5 | 80 | 6 | A406 |
| EPDB2030-35-TH | □ | 1.5 | 35 | 2.5 | 80 | 6 | A406 |
| BESL2030-C | | 1.5 | 35 | 4 | 100 | 6 | A418 |
| BESL2030-S-C | | 1.5 | 35 | 4 | 100 | 6 | A418 |
| EPDB2030-36-SD | ● | 1.5 | 36 | 2.5 | 80 | 6 | A140 |
| EPDBPE2030-40-04-ATH | ● | 1.5 | 40 | 2.5 | 80 | 6 | A87 |
| EPDBPE2030-40-09-ATH | ● | 1.5 | 40 | 2.5 | 80 | 6 | A87 |
| EPDBPE2030-40-14-ATH | ● | 1.5 | 40 | 2.5 | 80 | 6 | A87 |
| EMBPE3030-40-09-ATH | ● | 1.5 | 40 | 2.5 | 80 | 6 | A111 |
| EPDBP2030-40-04-TH | △ | 1.5 | 40 | 2.5 | 80 | 6 | A164 |
| EPDBP2030-40-09-TH | △ | 1.5 | 40 | 2.5 | 80 | 6 | A164 |
| EGDB2030-40-HD | ● | 1.5 | 40 | 4.5 | 80 | 4 | A143 |
| EPDBPE2030-50-04-ATH | ● | 1.5 | 50 | 2.5 | 90 | 6 | A87 |
| EPDBPE2030-50-09-ATH | ● | 1.5 | 50 | 2.5 | 90 | 6 | A87 |
| EPDBPE2030-50-14-ATH | ● | 1.5 | 50 | 2.5 | 90 | 6 | A87 |
| EMBPE3030-50-09-ATH | ● | 1.5 | 50 | 2.5 | 90 | 6 | A111 |
| EPDBP2030-50-09-TH | △ | 1.5 | 50 | 2.5 | 90 | 6 | A164 |
| EPBPN2030-15 | ● | 1.5 | 50 | 8 | 90 | 6 | A158 |
| EPDBPE2030-60-09-ATH | ● | 1.5 | 60 | 2.5 | 100 | 6 | A87 |
| EMBPE3030-60-09-ATH | ● | 1.5 | 60 | 2.5 | 100 | 6 | A111 |
| EPDBP2030-60-09-TH | △ | 1.5 | 60 | 2.5 | 100 | 6 | A164 |
| EGDB2030-60-HD | ● | 1.5 | 60 | 4.5 | 100 | 4 | A143 |
| EPDBPE2030-66-14-ATH | ● | 1.5 | 66 | 2.5 | 140 | 6 | A87 |
| EPDBPE2030-70-09-ATH | ● | 1.5 | 70 | 2.5 | 110 | 6 | A87 |
| EPDBP2030-70-09-TH | △ | 1.5 | 70 | 2.5 | 110 | 6 | A164 |
| EPDBPE2030-80-04-ATH | ● | 1.5 | 80 | 2.5 | 120 | 6 | A87 |
| EPBPX2030-05 | ● | 1.5 | 87 | 3.5 | 150 | 6 | A160 |
| EPDBPE2030-90-09-ATH | ● | 1.5 | 90 | 2.5 | 130 | 6 | A87 |
| EPBPX2030-10 | ● | 1.5 | 90.43 | 3.5 | 150 | 6 | A160 |
| EPBPX2030-15 | ● | 1.5 | 99.97 | 3.5 | 150 | 8 | A160 |
| BESS2030 | □ | 1.5 | – | 4.5 | 55 | 6 | A421 |
| YB2030-CS | □ | 1.5 | – | 4.5 | 60 | 6 | A422 |
| CEPB2030 | □ | 1.5 | – | 4.5 | 70 | 6 | A411 |
| CEPBLS2030 | □ | 1.5 | – | 4.5 | 100 | 6 | A411 |
| BEK2030 | ● | 1.5 | – | 8 | 70 | 6 | A161 |
| BEK2030-C | □ | 1.5 | – | 8 | 70 | 6 | A415 |
| BES2030-C | □ | 1.5 | – | 8 | 70 | 6 | A415 |
| BES2030 | □ | 1.5 | – | 8 | 70 | 6 | A421 |
| BES2030M | □ | 1.5 | – | 8 | 70 | 6 | A421 |
| BEKLS2030-C | □ | 1.5 | – | 8 | 100 | 6 | A415 |
| GBS2030 | □ | 1.5 | – | 15 | 80 | 4 | A426 |
| GBR2030 | □ | 1.5 | – | 15 | 80 | 6 | A425 |
| GBD2030 | □ | 1.5 | – | 15 | 100 | 4 | A426 |
| GXB2030 | □ | 1.5 | – | 15 | 100 | 6 | A426 |
| GBL2030 | □ | 1.5 | – | 30 | 100 | 6 | A425 |
| HYPB2035-C | ● | 1.75 | 8.5 | 4.5 | 50 | 6 | A156 |
| ESHB2035-H-TH | ● | 1.75 | 8.75 | 3.5 | 45 | 6 | A108 |
| ESHB2035-N-TH | ● | 1.75 | 8.75 | 3.5 | 45 | 6 | A108 |
| EPDBEH2035-10-TH3 | ● | 1.75 | 10 | 2.75 | 55 | 6 | A62 |
| EMBE3035-S4-ATH | ● | 1.75 | 10.5 | 5.3 | 70 | 4 | A110 |
| EMBE3035-S6-ATH | ● | 1.75 | 10.5 | 5.3 | 70 | 6 | A110 |
| EPDBEH2035-15-TH3 | ● | 1.75 | 15 | 2.75 | 60 | 6 | A62 |
| EPDBE2035-15-ATH | ● | 1.75 | 15 | 2.75 | 60 | 6 | A74 |
| EPDBE2035-15-PN | ● | 1.75 | 15 | 2.75 | 60 | 6 | A77 |
| HPBLN2035-C | ● | 1.75 | 17.5 | 4.5 | 80 | 6 | A157 |
| EMBPE3035-20-09-ATH | ● | 1.75 | 20 | 2.75 | 60 | 6 | A112 |
| EPDBEH2035-25-TH3 | ● | 1.75 | 25 | 2.75 | 70 | 6 | A62 |
| EPDBE2035-25-ATH | ● | 1.75 | 25 | 2.75 | 70 | 6 | A74 |
| EPDBE2035-25-PN | ● | 1.75 | 25 | 2.75 | 70 | 6 | A77 |
| EMBPE3035-30-09-ATH | ● | 1.75 | 30 | 2.75 | 70 | 6 | A112 |
| EPDBEH2035-35-TH3 | ● | 1.75 | 35 | 2.75 | 80 | 6 | A62 |
| EPDBE2035-35-ATH | ● | 1.75 | 35 | 2.75 | 80 | 6 | A74 |
| EPDBE2035-35-PN | ● | 1.75 | 35 | 2.75 | 80 | 6 | A77 |
| EMBPE3035-40-09-ATH | ● | 1.75 | 40 | 2.75 | 80 | 6 | A112 |
| EPDBEH2035-45-TH3 | ● | 1.75 | 45 | 2.75 | 90 | 6 | A62 |
| EPDBE2035-45-ATH | ● | 1.75 | 45 | 2.75 | 90 | 6 | A74 |
| EPDBE2035-45-PN | ● | 1.75 | 45 | 2.75 | 90 | 6 | A77 |
| EMBPE3035-50-09-ATH | ● | 1.75 | 50 | 2.75 | 90 | 6 | A112 |
| EMBPE3035-60-09-ATH | ● | 1.75 | 60 | 2.75 | 100 | 6 | A112 |
| HPBS2040-C | ● | 2 | 6 | 5 | 50 | 6 | A156 |
| EPBTS2040-TH | ● | 2 | 7 | 6 | 70 | 6 | A100 |
| EPBT2040 | ● | 2 | 7 | 6 | 70 | 6 | A102 |
| EMB3040-TH | △ | 2 | 7 | 6 | 70 | 6 | A168 |
| EPDBEH2040-8-TH3 | ● | 2 | 8 | 3 | 55 | 6 | A62 |
| EFB2040 | ● | 2 | 8 | 4 | 70 | 6 | A153 |
| HGOB2040-PN | ● | 2 | 9 | 8 | 70 | 6 | A104 |
| EPBC2040 | □ | 2 | 9 | 8 | 70 | 6 | A409 |
| EPDBEH2040-10-TH3 | ● | 2 | 10 | 3 | 55 | 6 | A62 |
| EPDBE2040-10-ATH | ● | 2 | 10 | 3 | 55 | 6 | A74 |
| EPDBE2040-10-PN | ● | 2 | 10 | 3 | 55 | 6 | A77 |
| EPDB2040-10 | □ | 2 | 10 | 3 | 55 | 6 | A406 |
| EPDB2040-10-TH | □ | 2 | 10 | 3 | 55 | 6 | A406 |
| ESHB2040-H-TH | ● | 2 | 10 | 4 | 45 | 6 | A108 |
| ESHB2040-N-TH | ● | 2 | 10 | 4 | 45 | 6 | A108 |
| HYPB2040-C | ● | 2 | 10 | 5 | 50 | 6 | A156 |
| EPDBEH2040-12-TH3 | ● | 2 | 12 | 3 | 60 | 6 | A62 |
| EMBE3040-S4-ATH | ● | 2 | 12 | 6 | 70 | 4 | A110 |
| EHHBE4040-S4-TH3 | ● | 2 | 12 | 6 | 70 | 4 | A124 |
| EHHB4040-S4-ATH | ● | 2 | 12 | 6 | 70 | 4 | A127 |
| EMBE3040-S6-ATH | ● | 2 | 12 | 6 | 70 | 6 | A110 |
| EHHBE4040-S6-TH3 | ● | 2 | 12 | 6 | 70 | 6 | A124 |
| EHHB4040-S6-ATH | ● | 2 | 12 | 6 | 70 | 6 | A127 |
| EPDBEH2040-13-TH3 | ● | 2 | 13 | 3 | 60 | 6 | A62 |
| EPDBE2040-13-ATH | ● | 2 | 13 | 3 | 60 | 6 | A74 |
| EPDBE2040-13-PN | ● | 2 | 13 | 3 | 60 | 6 | A77 |
| EPDB2040-13 | □ | 2 | 13 | 3 | 60 | 6 | A406 |
| EPDB2040-13-TH | □ | 2 | 13 | 3 | 60 | 6 | A406 |
| EPDBEH2040-16-TH3 | ● | 2 | 16 | 3 | 60 | 6 | A62 |
| EPDBE2040-16-ATH | ● | 2 | 16 | 3 | 60 | 6 | A74 |
| EPDBE2040-16-PN | ● | 2 | 16 | 3 | 60 | 6 | A77 |
| EPDB2040-16-SD | ● | 2 | 16 | 3 | 60 | 6 | A140 |
| EPDB2040-16 | □ | 2 | 16 | 3 | 60 | 6 | A406 |
| EPDB2040-16-TH | □ | 2 | 16 | 3 | 60 | 6 | A406 |
| EPDBEH2040-20-TH3 | ● | 2 | 20 | 3 | 65 | 6 | A62 |
| EPDBE2040-20-ATH | ● | 2 | 20 | 3 | 65 | 6 | A74 |
| EPDBE2040-20-PN | ● | 2 | 20 | 3 | 65 | 6 | A77 |
| EPDB2040-20 | □ | 2 | 20 | 3 | 65 | 6 | A406 |
| EPDB2040-20-TH | □ | 2 | 20 | 3 | 65 | 6 | A406 |
| HPBLN2040-C | ● | 2 | 20 | 5 | 80 | 6 | A157 |
| EMBPE3040-20-09-ATH | ● | 2 | 20 | 6 | 70 | 6 | A112 |
| EPDBPE2040-20-09-ATH | ● | 2 | 20 | 8 | 70 | 8 | A87 |
| EPDBP2040-20-10-TH | △ | 2 | 20 | 8 | 70 | 8 | A164 |
| EPDBEH2040-25-TH3 | ● | 2 | 25 | 3 | 70 | 6 | A62 |
| EPDBE2040-25-ATH | ● | 2 | 25 | 3 | 70 | 6 | A74 |
| EPDBE2040-25-PN | ● | 2 | 25 | 3 | 70 | 6 | A77 |
| EPDB2040-25 | □ | 2 | 25 | 3 | 70 | 6 | A406 |
| EPDB2040-25-TH | □ | 2 | 25 | 3 | 70 | 6 | A406 |
| EPDBPE2040-25-29-ATH | ● | 2 | 25 | 8 | 75 | 8 | A87 |
| EPBPN2040-30 | ● | 2 | 29.1 | 8 | 70 | 6 | A158 |
| EPDBEH2040-30-TH3 | ● | 2 | 30 | 3 | 75 | 6 | A62 |
| EPDBE2040-30-ATH | ● | 2 | 30 | 3 | 75 | 6 | A74 |
| EPDBE2040-30-PN | ● | 2 | 30 | 3 | 75 | 6 | A77 |
| EPDB2040-30 | □ | 2 | 30 | 3 | 75 | 6 | A406 |
| EPDB2040-30-TH | □ | 2 | 30 | 3 | 75 | 6 | A406 |
| EMBPE3040-30-09-ATH | ● | 2 | 30 | 6 | 80 | 6 | A112 |
| EMBP3040-30-10-TH | △ | 2 | 30 | 6 | 80 | 6 | A170 |
| EPDBPE2040-30-09-ATH | ● | 2 | 30 | 8 | 80 | 8 | A87 |
| EPDBP2040-30-10-TH | △ | 2 | 30 | 8 | 80 | 8 | A164 |
| EPDB2040-32-SD | ● | 2 | 32 | 3 | 75 | 6 | A140 |
| EPDBEH2040-35-TH3 | ● | 2 | 35 | 3 | 80 | 6 | A62 |
| EPDBE2040-35-ATH | ● | 2 | 35 | 3 | 80 | 6 | A74 |
| EPDBE2040-35-PN | ● | 2 | 35 | 3 | 80 | 6 | A77 |
| EPDB2040-35 | □ | 2 | 35 | 3 | 80 | 6 | A406 |
| EPDB2040-35-TH | □ | 2 | 35 | 3 | 80 | 6 | A406 |
| BESL2040-C | | 2 | 35 | 6 | 100 | 6 | A418 |
| BESL2040-S-C | | 2 | 35 | 6 | 100 | 6 | A418 |
| EPDBPE2040-35-09-ATH | ● | 2 | 35 | 8 | 85 | 8 | A87 |
| EPDBEH2040-40-TH3 | ● | 2 | 40 | 3 | 80 | 6 | A62 |
| EPDBE2040-40-ATH | ● | 2 | 40 | 3 | 80 | 6 | A74 |
| EPDBE2040-40-PN | ● | 2 | 40 | 3 | 80 | 6 | A77 |
| EPDB2040-40 | □ | 2 | 40 | 3 | 80 | 6 | A406 |
| EPDB2040-40-TH | □ | 2 | 40 | 3 | 80 | 6 | A406 |
| EMBPE3040-40-09-ATH | ● | 2 | 40 | 6 | 90 | 6 | A112 |
| EMBP3040-40-10-TH | △ | 2 | 40 | 6 | 90 | 6 | A170 |
| EPDBPE2040-40-09-ATH | ● | 2 | 40 | 8 | 90 | 8 | A87 |
| EPDBP2040-40-10-TH | △ | 2 | 40 | 8 | 90 | 8 | A164 |
| EGB2040-HD | ● | 2 | 40 | 8 | 100 | 4 | A145 |
| EPDBEH2040-45-TH3 | ● | 2 | 45 | 3 | 90 | 6 | A62 |
| EPDBE2040-45-ATH | ● | 2 | 45 | 3 | 90 | 6 | A74 |
| EPDBE2040-45-PN | ● | 2 | 45 | 3 | 90 | 6 | A77 |
| EPDB2040-45 | □ | 2 | 45 | 3 | 90 | 6 | A406 |
| EPDB2040-45-TH | □ | 2 | 45 | 3 | 90 | 6 | A406 |
| EPDBPE2040-45-14-ATH | ● | 2 | 45 | 8 | 95 | 8 | A87 |
| EPDB2040-48-SD | ● | 2 | 48 | 3 | 90 | 6 | A140 |
| EPBPN2040-15 | ● | 2 | 48.2 | 8 | 90 | 6 | A158 |
| EPDBEH2040-50-TH3 | ● | 2 | 50 | 3 | 100 | 6 | A62 |
| EPDBE2040-50-ATH | ● | 2 | 50 | 3 | 100 | 6 | A74 |
| EPDBE2040-50-PN | ● | 2 | 50 | 3 | 100 | 6 | A77 |
| EPDB2040-50 | □ | 2 | 50 | 3 | 100 | 6 | A406 |
| EPDB2040-50-TH | □ | 2 | 50 | 3 | 100 | 6 | A406 |
| EMBPE3040-50-09-ATH | ● | 2 | 50 | 6 | 100 | 6 | A112 |
| EMBP3040-50-10-TH | △ | 2 | 50 | 6 | 100 | 6 | A170 |
| EPDBPE2040-50-09-ATH | ● | 2 | 50 | 8 | 100 | 8 | A87 |
| EPDBP2040-50-10-TH | △ | 2 | 50 | 8 | 100 | 8 | A164 |
| EMBP3040-60-10-TH | △ | 2 | 60 | 6 | 100 | 6 | A170 |
| EMBPE3040-60-09-ATH | ● | 2 | 60 | 6 | 110 | 6 | A112 |
| EPDBPE2040-60-04-ATH | ● | 2 | 60 | 8 | 110 | 8 | A87 |
| EPDBPE2040-60-09-ATH | ● | 2 | 60 | 8 | 110 | 8 | A87 |
| EPDBP2040-60-10-TH | △ | 2 | 60 | 8 | 110 | 8 | A164 |
| EMBPE3040-70-09-ATH | ● | 2 | 70 | 6 | 120 | 8 | A112 |
| EMBPE3040-80-09-ATH | ● | 2 | 80 | 6 | 130 | 8 | A112 |
| EPDBPE2040-80-14-ATH | ● | 2 | 80 | 8 | 130 | 8 | A87 |
| EPBPX2040-15 | ● | 2 | 81.88 | 4.5 | 180 | 8 | A160 |
| EPBPX2040-05 | ● | 2 | 100 | 4.5 | 180 | 8 | A160 |
| EPDBPE2040-100-04-ATH | ● | 2 | 100 | 8 | 150 | 8 | A87 |
| EPDBPE2040-120-09-ATH | ● | 2 | 120 | 8 | 170 | 8 | A87 |
| EPBPX2040-10 | ● | 2 | 120.08 | 4.5 | 180 | 8 | A160 |
| EPBT2040-4 | ● | 2 | – | 6 | 70 | 4 | A102 |
| CEPB2040 | □ | 2 | – | 6 | 70 | 6 | A411 |
| YB2040-CS | □ | 2 | – | 6 | 70 | 6 | A422 |
| CEPBLS2040 | □ | 2 | – | 6 | 100 | 6 | A411 |
| HGOB2040-4-PN | ● | 2 | – | 8 | 70 | 4 | A104 |
| EPBC2040-4 | □ | 2 | – | 8 | 70 | 4 | A409 |
| BEK2040 | ● | 2 | – | 8 | 70 | 6 | A161 |
| BEK2040-C | □ | 2 | – | 8 | 70 | 6 | A415 |
| BEKLS2040-C | □ | 2 | – | 8 | 100 | 6 | A415 |
| BES2040-C | □ | 2 | – | 12 | 70 | 6 | A415 |
| BES2040M | □ | 2 | – | 12 | 70 | 6 | A421 |
| BES2040 | □ | 2 | – | 12 | 70 | 6 | A421 |
| FE604 | □ | 2 | – | 20 | 65 | 4 | A425 |
| GBS2040 | □ | 2 | – | 20 | 80 | 4 | A426 |

●印：標準在庫品です。　●：Stocked Items.　△印:在庫が無くなり次第受注生産品となるものです。△:When the Stock is out, will become to produce on request.

単位 unit：mm

| 商品コード Item Code | 在庫 Stock | ボール半径 RE | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| GBR2040 | □ | 2 | – | 20 | 80 | 6 | A425 |
| GBD2040 | □ | 2 | – | 20 | 100 | 4 | A426 |
| GXB2040 | □ | 2 | – | 20 | 110 | 6 | A426 |
| GBL2040 | □ | 2 | – | 60 | 110 | 6 | A425 |
| GBR2045 | □ | 2.25 | – | 25 | 100 | 6 | A425 |
| HPBS2050-C | ● | 2.5 | 7 | 6 | 50 | 6 | A156 |
| EPBTS2050-TH | ● | 2.5 | 8.5 | 7.5 | 80 | 6 | A100 |
| EPBT2050 | ● | 2.5 | 8.5 | 7.5 | 80 | 6 | A102 |
| EMB3050-TH | △ | 2.5 | 8.5 | 7.5 | 80 | 6 | A168 |
| EPDBEH2050-10-TH3 | ● | 2.5 | 10 | 3.5 | 55 | 6 | A62 |
| EFB2050 | ● | 2.5 | 10 | 5 | 80 | 6 | A153 |
| HYPB2050-C | ● | 2.5 | 11 | 6 | 50 | 6 | A156 |
| HGOB2050-PN | ● | 2.5 | 11 | 10 | 80 | 6 | A104 |
| EPBC2050 | □ | 2.5 | 11 | 10 | 80 | 6 | A409 |
| ESHB2050-H-TH | ● | 2.5 | 12.5 | 5 | 50 | 6 | A108 |
| ESHB2050-N-TH | ● | 2.5 | 12.5 | 5 | 50 | 6 | A108 |
| EMBE3050-ATH | ● | 2.5 | 15 | 7.5 | 80 | 6 | A110 |
| EHHBE4050-TH3 | ● | 2.5 | 15 | 7.5 | 80 | 6 | A124 |
| EHHB4050-ATH | ● | 2.5 | 15 | 7.5 | 80 | 6 | A127 |
| EPDBEH2050-20-TH3 | ● | 2.5 | 20 | 3.5 | 65 | 6 | A62 |
| EPDBE2050-20-ATH | ● | 2.5 | 20 | 3.5 | 65 | 6 | A74 |
| EPDBE2050-20-PN | ● | 2.5 | 20 | 3.5 | 65 | 6 | A77 |
| EPDB2050-20-SD | ● | 2.5 | 20 | 3.5 | 65 | 6 | A140 |
| EPDB2050-20 | □ | 2.5 | 20 | 3.5 | 65 | 6 | A406 |
| EPDB2050-20-TH | □ | 2.5 | 20 | 3.5 | 65 | 6 | A406 |
| EPDBEH2050-25-TH3 | ● | 2.5 | 25 | 3.5 | 70 | 6 | A62 |
| EPDBE2050-25-ATH | ● | 2.5 | 25 | 3.5 | 70 | 6 | A74 |
| EPDBE2050-25-PN | ● | 2.5 | 25 | 3.5 | 70 | 6 | A77 |
| EPDB2050-25 | □ | 2.5 | 25 | 3.5 | 70 | 6 | A406 |
| EPDB2050-25-TH | □ | 2.5 | 25 | 3.5 | 70 | 6 | A406 |
| HPBLN2050-C | ● | 2.5 | 25 | 6 | 80 | 6 | A157 |
| EPDBEH2050-30-TH3 | ● | 2.5 | 30 | 3.5 | 75 | 6 | A62 |
| EPDBE2050-30-ATH | ● | 2.5 | 30 | 3.5 | 75 | 6 | A74 |
| EPDBE2050-30-PN | ● | 2.5 | 30 | 3.5 | 75 | 6 | A77 |
| EPDB2050-30 | □ | 2.5 | 30 | 3.5 | 75 | 6 | A406 |
| EPDB2050-30-TH | □ | 2.5 | 30 | 3.5 | 75 | 6 | A406 |
| EMBPE3050-30-09-ATH | ● | 2.5 | 30 | 7.5 | 80 | 8 | A112 |
| EPDBPE2050-30-09-ATH | ● | 2.5 | 30 | 10 | 80 | 8 | A87 |
| EPDBP2050-30-10-TH | △ | 2.5 | 30 | 10 | 80 | 8 | A164 |
| EPDBEH2050-40-TH3 | ● | 2.5 | 40 | 3.5 | 80 | 6 | A62 |
| EPDBE2050-40-ATH | ● | 2.5 | 40 | 3.5 | 80 | 6 | A74 |
| EPDBE2050-40-PN | ● | 2.5 | 40 | 3.5 | 80 | 6 | A77 |
| EPDB2050-40-SD | ● | 2.5 | 40 | 3.5 | 80 | 6 | A140 |
| EPDB2050-40 | □ | 2.5 | 40 | 3.5 | 80 | 6 | A406 |
| EPDB2050-40-TH | □ | 2.5 | 40 | 3.5 | 80 | 6 | A406 |
| BESL2050-S-C | | 2.5 | 40 | 7 | 115 | 6 | A418 |
| BESL2050-C | | 2.5 | 40 | 7 | 115 | 8 | A418 |
| EMBPE3050-40-09-ATH | ● | 2.5 | 40 | 7.5 | 90 | 8 | A112 |
| EMBP3050-40-10-TH | △ | 2.5 | 40 | 7.5 | 90 | 8 | A170 |
| EPDBPE2050-40-09-ATH | ● | 2.5 | 40 | 10 | 90 | 8 | A87 |
| EPDBPE2050-40-29-ATH | ● | 2.5 | 40 | 10 | 90 | 8 | A87 |
| EPDBP2050-40-10-TH | △ | 2.5 | 40 | 10 | 90 | 8 | A164 |
| EPBPN2050-30 | ● | 2.5 | 40.6 | 10 | 90 | 8 | A158 |
| EMBPE3050-50-09-ATH | ● | 2.5 | 50 | 7.5 | 100 | 8 | A112 |
| EMBPE3050-60-09-ATH | ● | 2.5 | 60 | 7.5 | 110 | 8 | A112 |
| EMBP3050-60-10-TH | △ | 2.5 | 60 | 7.5 | 110 | 8 | A170 |
| EPDBPE2050-60-09-ATH | ● | 2.5 | 60 | 10 | 110 | 8 | A87 |
| EPDBPE2050-60-14-ATH | ● | 2.5 | 60 | 10 | 110 | 8 | A87 |
| EPBPN2050-15 | ● | 2.5 | 60 | 10 | 110 | 8 | A158 |
| EPDBP2050-60-10-TH | △ | 2.5 | 60 | 10 | 110 | 8 | A164 |
| EMBPE3050-70-09-ATH | ● | 2.5 | 70 | 7.5 | 120 | 8 | A112 |
| EPDBPE2050-74-14-ATH | ● | 2.5 | 74 | 10 | 150 | 8 | A87 |
| EMBPE3050-80-09-ATH | ● | 2.5 | 80 | 7.5 | 130 | 8 | A112 |
| EPDBPE2050-90-09-ATH | ● | 2.5 | 90 | 10 | 140 | 8 | A87 |
| EPBPX2050-10 | ● | 2.5 | 92.43 | 5.5 | 180 | 8 | A160 |
| EPDBPE2050-100-04-ATH | ● | 2.5 | 100 | 10 | 150 | 8 | A87 |
| EPBPX2050-15 | ● | 2.5 | 101.97 | 5.5 | 180 | 10 | A160 |
| EPBPX2050-05 | ● | 2.5 | 110 | 5.5 | 180 | 8 | A160 |
| CEPB2050 | □ | 2.5 | – | 7.5 | 80 | 6 | A411 |

| 商品コード Item Code | 在庫 Stock | ボール半径 RE | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| YB2050-CS | □ | 2.5 | – | 7.5 | 80 | 6 | A422 |
| CEPBLS2050 | □ | 2.5 | – | 7.5 | 125 | 6 | A411 |
| BEK2050 | ● | 2.5 | – | 10 | 80 | 6 | A161 |
| BEK2050-C | □ | 2.5 | – | 10 | 80 | 6 | A415 |
| BEKLS2050-C | □ | 2.5 | – | 10 | 125 | 6 | A415 |
| BES2050-C | □ | 2.5 | – | 15 | 80 | 6 | A415 |
| BES2050 | □ | 2.5 | – | 15 | 80 | 6 | A421 |
| BES2050M | □ | 2.5 | – | 15 | 80 | 6 | A421 |
| GBR2050 | □ | 2.5 | – | 25 | 100 | 6 | A425 |
| GXB2050 | □ | 2.5 | – | 25 | 125 | 6 | A426 |
| GBS2050 | □ | 2.5 | – | 30 | 100 | 6 | A426 |
| GBD2050 | □ | 2.5 | – | 30 | 120 | 6 | A426 |
| GBL2050 | □ | 2.5 | – | 70 | 125 | 6 | A425 |
| HPBS2060-C | ● | 3 | 9 | 7.5 | 50 | 6 | A156 |
| EPDBEH2060-12-TH3 | ● | 3 | 12 | 6 | 60 | 6 | A62 |
| EPDBE2060-12-ATH | ● | 3 | 12 | 6 | 60 | 6 | A74 |
| EPDBE2060-12-PN | ● | 3 | 12 | 6 | 60 | 6 | A77 |
| EFB2060 | ● | 3 | 12 | 6 | 90 | 6 | A153 |
| HYPB2060-C | ● | 3 | 12.5 | 7.5 | 50 | 6 | A156 |
| ESHB2060-H-TH | ● | 3 | 15 | 6 | 50 | 6 | A108 |
| ESHB2060-N-TH | ● | 3 | 15 | 6 | 50 | 6 | A108 |
| EPAB2060-SD | ● | 3 | 15 | 6 | 90 | 6 | A142 |
| EMBE3060-ATH | ● | 3 | 18 | 9 | 90 | 6 | A110 |
| EHHBE4060-TH3 | ● | 3 | 18 | 9 | 90 | 6 | A124 |
| EHHB4060-ATH | ● | 3 | 18 | 9 | 90 | 6 | A127 |
| EPDBEH2060-20-TH3 | ● | 3 | 20 | 6 | 65 | 6 | A62 |
| EPDBE2060-20-ATH | ● | 3 | 20 | 6 | 65 | 6 | A74 |
| EPDBE2060-20-PN | ● | 3 | 20 | 6 | 65 | 6 | A77 |
| EPDBEH2060-30-TH3 | ● | 3 | 30 | 6 | 75 | 6 | A62 |
| EPDBE2060-30-ATH | ● | 3 | 30 | 6 | 75 | 6 | A74 |
| EPDBE2060-30-PN | ● | 3 | 30 | 6 | 75 | 6 | A77 |
| EPDB2060-30 | □ | 3 | 30 | 6 | 75 | 6 | A406 |
| EPDB2060-30-TH | □ | 3 | 30 | 6 | 75 | 6 | A406 |
| HPBLN2060-C | ● | 3 | 30 | 7.5 | 80 | 6 | A157 |
| EMBPE3060-30-09-ATH | ● | 3 | 30 | 9 | 80 | 8 | A112 |
| EPDBPE2060-30-09-ATH | ● | 3 | 30 | 12 | 80 | 8 | A87 |
| EPDBP2060-30-10-TH | △ | 3 | 30 | 12 | 80 | 8 | A164 |
| EPDBPE2060-30-29-ATH | ● | 3 | 30 | 12 | 80 | 10 | A87 |
| EPBPN2060-30 | ● | 3 | 33.1 | 12 | 90 | 8 | A158 |
| EMBPE3060-40-09-ATH | ● | 3 | 40 | 9 | 90 | 8 | A112 |
| EPDBPE2060-40-09-ATH | ● | 3 | 40 | 12 | 90 | 8 | A87 |
| EPDBP2060-40-10-TH | △ | 3 | 40 | 12 | 90 | 8 | A164 |
| BESL2060-S-C | | 3 | 45 | 8 | 115 | 6 | A418 |
| JBELS2060 | □ | 3 | 45 | 8 | 115 | 6 | A422 |
| BESL2060-C | | 3 | 45 | 8 | 115 | 8 | A418 |
| HGOBLS2060-45-PN | ● | 3 | 45 | 9 | 115 | 6 | A104 |
| EPDBPE2060-45-09-ATH | ● | 3 | 45 | 12 | 95 | 8 | A87 |
| EPDBEH2060-50-TH3 | ● | 3 | 50 | 6 | 100 | 6 | A62 |
| EPDBE2060-50-ATH | ● | 3 | 50 | 6 | 100 | 6 | A74 |
| EPDBE2060-50-PN | ● | 3 | 50 | 6 | 100 | 6 | A77 |
| EPDB2060-50 | □ | 3 | 50 | 6 | 100 | 6 | A406 |
| EPDB2060-50-TH | □ | 3 | 50 | 6 | 100 | 6 | A406 |
| EMBPE3060-50-09-ATH | ● | 3 | 50 | 9 | 100 | 8 | A112 |
| EMBP3060-50-10-TH | △ | 3 | 50 | 9 | 100 | 8 | A170 |
| EPDBPE2060-50-09-ATH | ● | 3 | 50 | 12 | 100 | 8 | A87 |
| EPDBP2060-50-10-TH | △ | 3 | 50 | 12 | 100 | 8 | A164 |
| EPDBPE2060-50-14-ATH | ● | 3 | 50 | 12 | 100 | 10 | A87 |
| EPBPN2060-15 | ● | 3 | 52.2 | 12 | 110 | 8 | A158 |
| EMBPE3060-60-09-ATH | ● | 3 | 60 | 9 | 110 | 8 | A112 |
| EMBP3060-60-10-TH | △ | 3 | 60 | 9 | 110 | 8 | A170 |
| EPDBPE2060-60-09-ATH | ● | 3 | 60 | 12 | 110 | 10 | A87 |
| EPDBP2060-60-10-TH | △ | 3 | 60 | 12 | 110 | 10 | A164 |
| EGB2060-HD | ● | 3 | 60 | 12 | 120 | 6 | A145 |
| EMBPE3060-70-09-ATH | ● | 3 | 70 | 9 | 120 | 10 | A112 |
| EMBP3060-70-10-TH | △ | 3 | 70 | 9 | 120 | 10 | A170 |
| EPDBPE2060-70-09-ATH | ● | 3 | 70 | 12 | 120 | 10 | A87 |
| EPDBP2060-70-10-TH | △ | 3 | 70 | 12 | 120 | 10 | A164 |
| HGOBLS2060-75-PN | ● | 3 | 75 | 9 | 150 | 6 | A104 |
| EMBPE3060-80-09-ATH | ● | 3 | 80 | 9 | 130 | 10 | A112 |

| 商品コード Item Code | 在庫 Stock | ボール半径 RE | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EMBP3060-80-10-TH | △ | 3 | 80 | 9 | 130 | 10 | A170 |
| EPDBPE2060-80-09-ATH | ● | 3 | 80 | 12 | 130 | 10 | A87 |
| EPDBP2060-80-10-TH | △ | 3 | 80 | 12 | 130 | 10 | A164 |
| EPDBPE2060-96-14-ATH | ● | 3 | 96 | 12 | 200 | 10 | A87 |
| EMBPE3060-100-09-ATH | ● | 3 | 100 | 9 | 150 | 10 | A112 |
| EMBPE3060-120-09-ATH | ● | 3 | 120 | 9 | 200 | 10 | A112 |
| EPDBPE2060-120-04-ATH | ● | 3 | 120 | 12 | 200 | 8 | A87 |
| EPDBPE2060-120-09-ATH | ● | 3 | 120 | 12 | 200 | 10 | A87 |
| EPBPX2060-15 | ● | 3 | 122.07 | 6.5 | 200 | 12 | A160 |
| EPBPX2060-10 | ● | 3 | 122.08 | 6.5 | 200 | 10 | A160 |
| EPBPX2060-05 | ● | 3 | 122.09 | 6.5 | 200 | 8 | A160 |
| EPHB6060-PN | ● | 3 | – | 6 | 90 | 6 | A130 |
| EPBTS2060-TH | ● | 3 | – | 9 | 90 | 6 | A100 |
| EPBT2060 | ● | 3 | – | 9 | 90 | 6 | A102 |
| EMB3060-TH | △ | 3 | – | 9 | 90 | 6 | A168 |
| CEPB2060 | □ | 3 | – | 9 | 90 | 6 | A411 |
| CEPB4060 | | 3 | – | 9 | 90 | 6 | A411 |
| YB2060-CS | □ | 3 | – | 9 | 90 | 6 | A422 |
| JBER2060 | □ | 3 | – | 9 | 90 | 6 | A422 |
| CEPBLS2060 | □ | 3 | – | 9 | 150 | 6 | A411 |
| HGOB2060-PN | ● | 3 | – | 12 | 90 | 6 | A104 |
| BEK2060 | ● | 3 | – | 12 | 90 | 6 | A161 |
| EPBC2060 | □ | 3 | – | 12 | 90 | 6 | A409 |
| BEK2060-C | □ | 3 | – | 12 | 90 | 6 | A415 |
| BEKLS2060-C | □ | 3 | – | 12 | 150 | 6 | A415 |
| BES2060M | □ | 3 | – | 15 | 80 | 6 | A421 |
| BES2060-C | □ | 3 | – | 15 | 90 | 6 | A415 |
| BES2060 | □ | 3 | – | 15 | 90 | 6 | A421 |
| FE606 | □ | 3 | – | 25 | 80 | 6 | A425 |
| GBR2060 | □ | 3 | – | 30 | 100 | 6 | A425 |
| GBS2060 | □ | 3 | – | 30 | 100 | 6 | A426 |
| GXB2060 | □ | 3 | – | 30 | 130 | 6 | A426 |
| GBD2060 | □ | 3 | – | 30 | 150 | 6 | A426 |
| GBL2060 | □ | 3 | – | 80 | 130 | 6 | A425 |
| GBR2065 | □ | 3.25 | – | 35 | 100 | 6 | A425 |
| EPDBPE2070-40-29-ATH | ● | 3.5 | 40 | 14 | 90 | 10 | A87 |
| EPBPN2070-30 | ● | 3.5 | 40 | 14 | 100 | 10 | A158 |
| BESL2070-S-C | △ | 3.5 | 45 | 10 | 125 | 8 | A418 |
| BESL2070-C | △ | 3.5 | 45 | 10 | 125 | 10 | A418 |
| EPDBPE2070-45-09-ATH | ● | 3.5 | 45 | 14 | 95 | 10 | A87 |
| EPDBPE2070-60-14-ATH | ● | 3.5 | 60 | 14 | 110 | 10 | A87 |
| EPBPN2070-15 | ● | 3.5 | 60 | 14 | 120 | 10 | A158 |
| EFB2070 | ● | 3.5 | – | 7 | 90 | 6 | A153 |
| CEPB2070 | □ | 3.5 | – | 11 | 90 | 6 | A411 |
| CEPBLS2070 | □ | 3.5 | – | 11 | 150 | 6 | A411 |
| BEK2070 | ● | 3.5 | – | 14 | 90 | 6 | A161 |
| BEK2070-C | □ | 3.5 | – | 14 | 90 | 6 | A415 |
| BEKLS2070-C | □ | 3.5 | – | 14 | 150 | 6 | A415 |
| BES2070-C | □ | 3.5 | – | 20 | 90 | 6 | A415 |
| BES2070 | □ | 3.5 | – | 20 | 90 | 6 | A421 |
| BES2070M | □ | 3.5 | – | 20 | 90 | 8 | A421 |
| GBS2070 | □ | 3.5 | – | 30 | 100 | 6 | A426 |
| GBD2070 | □ | 3.5 | – | 30 | 150 | 6 | A426 |
| GBR2070 | □ | 3.5 | – | 35 | 100 | 6 | A425 |
| GXB2070 | □ | 3.5 | – | 35 | 140 | 6 | A426 |
| GBL2070 | □ | 3.5 | – | 90 | 140 | 6 | A425 |
| EFB2080 | ● | 4 | 16 | 8 | 100 | 8 | A153 |
| ESHB2080-H-TH | ● | 4 | 20 | 8 | 60 | 8 | A108 |
| ESHB2080-N-TH | ● | 4 | 20 | 8 | 60 | 8 | A108 |
| EPAB2080-SD | ● | 4 | 20 | 8 | 100 | 8 | A142 |
| EPDBEH2080-24-TH3 | ● | 4 | 24 | 12 | 100 | 8 | A62 |
| EMBE3080-ATH | ● | 4 | 24 | 12 | 100 | 8 | A110 |
| EHHBE4080-TH3 | ● | 4 | 24 | 12 | 100 | 8 | A124 |
| EHHB4080-ATH | ● | 4 | 24 | 12 | 100 | 8 | A127 |
| EPDBPE2080-35-29-ATH | ● | 4 | 35 | 14 | 95 | 10 | A88 |
| EPBPN2080-30 | ● | 4 | 35.1 | 14 | 100 | 10 | A158 |
| EMBPE3080-40-09-ATH | ● | 4 | 40 | 12 | 100 | 10 | A112 |
| EMBPE3080-50-09-ATH | ● | 4 | 50 | 12 | 110 | 10 | A112 |
| EPDBPE2080-50-09-ATH | ● | 4 | 50 | 14 | 110 | 10 | A88 |

□印：特定代理店在庫です。弊社営業へお問合せください。□：Stocked by specified distributor. Contact with our sales department. 無印：受注生産品です。No Mark：Manufactured upon request only.

Quick dimension reference table by mill diameter

# 外径別寸法早見表

## 超硬エンドミル・ボール　RE4 ～ RE12.5　Carbide End Mills -Ball

単位 unit：mm

| 商品コード Item Code | 在庫 Stock | ボール半径 RE | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EPDBPE2080-50-14-ATH | ● | 4 | 50 | 14 | 110 | 10 | A88 |
| EPDBP2080-50-10-TH | △ | 4 | 50 | 14 | 110 | 10 | A164 |
| EPBPN2080-15 | ● | 4 | 54.2 | 14 | 120 | 10 | A158 |
| HGOBLS2080-55-PN | ● | 4 | 55 | 12 | 125 | 8 | A104 |
| BESL2080-S-C | | 4 | 55 | 12 | 125 | 8 | A418 |
| JBELS2080 | □ | 4 | 55 | 12 | 125 | 8 | A422 |
| BESL2080-C | | 4 | 55 | 12 | 125 | 10 | A418 |
| EPDBPE2080-55-09-ATH | ● | 4 | 55 | 14 | 115 | 10 | A88 |
| EMBPE3080-60-09-ATH | ● | 4 | 60 | 12 | 120 | 10 | A112 |
| EMBP3080-60-10-TH | △ | 4 | 60 | 12 | 120 | 10 | A170 |
| EPDBPE2080-60-09-ATH | ● | 4 | 60 | 14 | 120 | 10 | A88 |
| EPDBP2080-60-10-TH | △ | 4 | 60 | 14 | 120 | 10 | A164 |
| EMBPE3080-70-09-ATH | ● | 4 | 70 | 12 | 130 | 10 | A112 |
| EMBP3080-70-10-TH | △ | 4 | 70 | 12 | 130 | 10 | A170 |
| EPDBPE2080-70-09-ATH | ● | 4 | 70 | 14 | 130 | 10 | A88 |
| EPDBP2080-70-10-TH | △ | 4 | 70 | 14 | 130 | 10 | A164 |
| EMBPE3080-80-09-ATH | ● | 4 | 80 | 12 | 140 | 12 | A112 |
| EMBP3080-80-10-TH | △ | 4 | 80 | 12 | 140 | 12 | A170 |
| EPDBPE2080-80-09-ATH | ● | 4 | 80 | 14 | 140 | 12 | A88 |
| EPDBP2080-80-10-TH | △ | 4 | 80 | 14 | 140 | 12 | A164 |
| EGB2080-HD | ● | 4 | 80 | 16 | 140 | 8 | A145 |
| EPDBPE2080-98-14-ATH | ● | 4 | 98 | 14 | 200 | 12 | A88 |
| EMBPE3080-100-09-ATH | ● | 4 | 100 | 12 | 160 | 12 | A112 |
| HGOBLS2080-105-PN | ● | 4 | 105 | 12 | 180 | 8 | A104 |
| EMBPE3080-120-09-ATH | ● | 4 | 120 | 12 | 200 | 12 | A112 |
| EPDBPE2080-120-04-ATH | ● | 4 | 120 | 14 | 200 | 10 | A88 |
| EPDBPE2080-120-09-ATH | ● | 4 | 120 | 14 | 200 | 12 | A88 |
| EPBPX2080-15 | ● | 4 | 124.07 | 8.5 | 200 | 14 | A160 |
| EPBPX2080-10 | ● | 4 | 124.08 | 8.5 | 200 | 12 | A160 |
| EPBPX2080-05 | ● | 4 | 124.09 | 8.5 | 200 | 10 | A160 |
| EPHB6080-PN | ● | 4 | – | 8 | 100 | 8 | A130 |
| EPBTS2080-TH | ● | 4 | – | 12 | 100 | 8 | A100 |
| EPBT2080 | ● | 4 | – | 12 | 100 | 8 | A102 |
| EMB3080-TH | △ | 4 | – | 12 | 100 | 8 | A168 |
| CEPB2080 | □ | 4 | – | 12 | 100 | 8 | A411 |
| CEPB4080 | △ | 4 | – | 12 | 100 | 8 | A411 |
| YB2080-CS | □ | 4 | – | 12 | 100 | 8 | A422 |
| JBER2080 | □ | 4 | – | 12 | 100 | 8 | A422 |
| CEPBLS2080 | □ | 4 | – | 12 | 180 | 8 | A411 |
| HGOB2080-PN | ● | 4 | – | 14 | 100 | 8 | A104 |
| BEK2080 | ● | 4 | – | 14 | 100 | 8 | A161 |
| EPBC2080 | □ | 4 | – | 14 | 100 | 8 | A409 |
| BEK2080-C | □ | 4 | – | 14 | 100 | 8 | A415 |
| BEKLS2080-C | □ | 4 | – | 14 | 180 | 8 | A415 |
| BES2080M | □ | 4 | – | 20 | 90 | 8 | A421 |
| BES2080-C | □ | 4 | – | 20 | 100 | 8 | A415 |
| BES2080 | □ | 4 | – | 20 | 100 | 8 | A421 |
| FE608 | □ | 4 | – | 25 | 80 | 8 | A425 |
| GBR2080 | □ | 4 | – | 40 | 110 | 8 | A425 |
| GBS2080 | □ | 4 | – | 40 | 110 | 8 | A426 |
| GXB2080 | □ | 4 | – | 40 | 150 | 8 | A426 |
| GBD2080 | □ | 4 | – | 40 | 150 | 8 | A426 |
| GBL2080 | □ | 4 | – | 100 | 150 | 8 | A425 |
| GBR2085 | □ | 4.25 | – | 45 | 110 | 8 | A425 |
| BEK2090 | ● | 4.5 | – | 18 | 100 | 8 | A161 |
| BEK2090-C | □ | 4.5 | – | 18 | 100 | 8 | A415 |
| GBS2090 | □ | 4.5 | – | 40 | 110 | 8 | A426 |
| GBD2090 | □ | 4.5 | – | 40 | 150 | 8 | A426 |
| GBR2090 | □ | 4.5 | – | 45 | 110 | 8 | A425 |
| GXB2090 | □ | 4.5 | – | 45 | 160 | 8 | A426 |
| GBL2090 | □ | 4.5 | – | 110 | 160 | 8 | A425 |
| EFB2100 | ● | 5 | 20 | 10 | 100 | 10 | A153 |
| ESHB2100-H-TH | ● | 5 | 25 | 10 | 70 | 10 | A108 |
| ESHB2100-N-TH | ● | 5 | 25 | 10 | 70 | 10 | A108 |
| EPAB2100-SD | ● | 5 | 25 | 10 | 100 | 10 | A142 |
| EPDBEH2100-30-TH3 | ● | 5 | 30 | 15 | 100 | 10 | A62 |
| EMBE3100-ATH | ● | 5 | 30 | 15 | 100 | 10 | A110 |
| EHHBE4100-TH3 | ● | 5 | 30 | 15 | 100 | 10 | A124 |
| EHHB4100-ATH | ● | 5 | 30 | 15 | 100 | 10 | A127 |

| 商品コード Item Code | 在庫 Stock | ボール半径 RE | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EPDBPE2100-35-29-ATH | ● | 5 | 35 | 18 | 105 | 12 | A88 |
| EPBPN2100-30 | ● | 5 | 39.1 | 18 | 110 | 12 | A158 |
| EMBPE3100-50-09-ATH | ● | 5 | 50 | 15 | 120 | 12 | A112 |
| EPDBPE2100-55-14-ATH | ● | 5 | 55 | 18 | 125 | 12 | A88 |
| EPBPN2100-15 | ● | 5 | 58.2 | 18 | 130 | 12 | A158 |
| EMBPE3100-60-09-ATH | ● | 5 | 60 | 15 | 130 | 12 | A112 |
| EMBP3100-60-10-TH | △ | 5 | 60 | 15 | 130 | 12 | A170 |
| EPDBPE2100-60-09-ATH | ● | 5 | 60 | 18 | 130 | 12 | A88 |
| EPDBP2100-60-10-TH | △ | 5 | 60 | 18 | 130 | 12 | A164 |
| BESL2100-S-C | | 5 | 65 | 15 | 140 | 10 | A418 |
| JBELS2100 | □ | 5 | 65 | 15 | 140 | 10 | A422 |
| BESL2100-C | | 5 | 65 | 15 | 140 | 12 | A418 |
| EPDBPE2100-65-09-ATH | ● | 5 | 65 | 18 | 135 | 12 | A88 |
| EMBPE3100-75-09-ATH | ● | 5 | 75 | 15 | 140 | 12 | A112 |
| EMBP3100-75-10-TH | △ | 5 | 75 | 15 | 140 | 12 | A170 |
| EPDBPE2100-75-09-ATH | ● | 5 | 75 | 18 | 140 | 12 | A88 |
| EPDBP2100-75-10-TH | △ | 5 | 75 | 18 | 140 | 12 | A164 |
| EMBPE3100-81-09-ATH | ● | 5 | 80 | 15 | 150 | 12 | A112 |
| EPDBPE2100-86-09-ATH | ● | 5 | 86 | 18 | 200 | 12 | A88 |
| EMBPE3100-100-09-ATH | ● | 5 | 100 | 15 | 170 | 16 | A112 |
| EGB2100-HD | ● | 5 | 100 | 20 | 150 | 10 | A145 |
| EMBPE3100-120-09-ATH | ● | 5 | 120 | 15 | 200 | 16 | A112 |
| EPDBPE2100-120-04-ATH | ● | 5 | 120 | 18 | 200 | 12 | A88 |
| EPDBPE2100-120-14-ATH | ● | 5 | 120 | 18 | 200 | 16 | A88 |
| EPBPX2100-15 | ● | 5 | 126.07 | 10.5 | 200 | 16 | A160 |
| EPBPX2100-10 | ● | 5 | 126.08 | 10.5 | 200 | 14 | A160 |
| EPBPX2100-05 | ● | 5 | 126.09 | 10.5 | 200 | 12 | A160 |
| EPHB6100-PN | ● | 5 | – | 10 | 100 | 10 | A130 |
| EPBTS2100-TH | ● | 5 | – | 15 | 100 | 10 | A100 |
| EPBT2100 | ● | 5 | – | 15 | 100 | 10 | A102 |
| EMB3100-TH | △ | 5 | – | 15 | 100 | 10 | A168 |
| CEPB2100 | □ | 5 | – | 15 | 100 | 10 | A411 |
| CEPB4100 | | 5 | – | 15 | 100 | 10 | A411 |
| YB2100-CS | □ | 5 | – | 15 | 100 | 10 | A422 |
| JBER2100 | □ | 5 | – | 15 | 100 | 10 | A422 |
| HGOBLS2100-PN | ● | 5 | – | 15 | 200 | 9 | A104 |
| CEPBLS2100 | □ | 5 | – | 15 | 200 | 10 | A411 |
| HGOB2100-PN | ● | 5 | – | 18 | 100 | 10 | A104 |
| BEK2100 | ● | 5 | – | 18 | 100 | 10 | A161 |
| EPBC2100 | □ | 5 | – | 18 | 100 | 10 | A409 |
| BEK2100-C | □ | 5 | – | 18 | 100 | 10 | A415 |
| BEKLS2100-C | □ | 5 | – | 18 | 200 | 10 | A415 |
| FE610 | □ | 5 | – | 25 | 80 | 10 | A425 |
| BES2100-C | □ | 5 | – | 25 | 100 | 10 | A415 |
| BES2100 | □ | 5 | – | 25 | 100 | 10 | A421 |
| BES2100M | □ | 5 | – | 25 | 100 | 10 | A421 |
| GBR2100 | □ | 5 | – | 50 | 120 | 10 | A425 |
| GBS2100 | □ | 5 | – | 50 | 120 | 10 | A426 |
| GXB2100 | □ | 5 | – | 50 | 170 | 10 | A426 |
| GBD2100 | □ | 5 | – | 50 | 180 | 10 | A426 |
| GBL2100 | □ | 5 | – | 120 | 170 | 10 | A425 |
| GBR2105 | □ | 5.25 | – | 50 | 120 | 10 | A425 |
| BEK2110 | ● | 5.5 | – | 18 | 110 | 10 | A161 |
| BEK2110-C | □ | 5.5 | – | 18 | 110 | 10 | A415 |
| GBR2110 | □ | 5.5 | – | 50 | 120 | 10 | A425 |
| GBS2110 | □ | 5.5 | – | 50 | 120 | 10 | A426 |
| GXB2110 | □ | 5.5 | – | 50 | 170 | 10 | A426 |
| GBD2110 | □ | 5.5 | – | 50 | 180 | 10 | A426 |
| GBL2110 | □ | 5.5 | – | 120 | 170 | 10 | A425 |
| EFB2120 | ● | 6 | 24 | 12 | 110 | 12 | A153 |
| ESHB2120-H-TH | ● | 6 | 30 | 12 | 75 | 12 | A108 |
| ESHB2120-N-TH | ● | 6 | 30 | 12 | 75 | 12 | A108 |
| EPAB2120-SD | ● | 6 | 30 | 12 | 110 | 12 | A142 |
| EPDBEH2120-36-TH3 | ● | 6 | 36 | 18 | 110 | 12 | A62 |
| EMBE3120-ATH | ● | 6 | 36 | 18 | 110 | 12 | A110 |
| EHHBE4120-TH3 | ● | 6 | 36 | 18 | 110 | 12 | A124 |
| EHHB4120-ATH | ● | 6 | 36 | 18 | 110 | 12 | A127 |
| EMBPE3120-60-09-ATH | ● | 6 | 60 | 18 | 140 | 16 | A112 |
| EPDBPE2120-60-29-ATH | ● | 6 | 60 | 22 | 140 | 16 | A88 |

| 商品コード Item Code | 在庫 Stock | ボール半径 RE | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EPBPN2120-30 | ● | 6 | 63.2 | 22 | 140 | 16 | A158 |
| BESL2120-S-C | | 6 | 75 | 18 | 150 | 12 | A418 |
| BESL2120-C | | 6 | 75 | 18 | 150 | 16 | A418 |
| EPDBPE2120-75-09-ATH | ● | 6 | 75 | 22 | 150 | 14 | A88 |
| JBELS2120 | □ | 6 | 80 | 18 | 160 | 12 | A422 |
| EMBPE3120-80-09-ATH | ● | 6 | 80 | 18 | 160 | 16 | A112 |
| EPDBPE2120-80-14-ATH | ● | 6 | 80 | 22 | 160 | 16 | A88 |
| EPBPN2120-15 | ● | 6 | 80 | 22 | 160 | 16 | A158 |
| EMBPE3120-100-09-ATH | ● | 6 | 100 | 18 | 180 | 16 | A112 |
| EPDBPE2120-106-14-ATH | ● | 6 | 106 | 22 | 200 | 16 | A88 |
| EMBPE3120-120-09-ATH | ● | 6 | 120 | 18 | 200 | 16 | A112 |
| EPDBPE2120-120-04-ATH | ● | 6 | 120 | 22 | 200 | 14 | A88 |
| EPDBPE2120-120-09-ATH | ● | 6 | 120 | 22 | 200 | 16 | A88 |
| EPBPX2120-15 | ● | 6 | 128.07 | 12.5 | 200 | 18 | A160 |
| EPBPX2120-10 | ● | 6 | 128.08 | 12.5 | 200 | 16 | A160 |
| EPBPX2120-05 | ● | 6 | 128.09 | 12.5 | 200 | 14 | A160 |
| EPHB6120-PN | ● | 6 | – | 12 | 110 | 12 | A130 |
| EPBTS2120-TH | ● | 6 | – | 18 | 110 | 12 | A100 |
| EPBT2120 | ● | 6 | – | 18 | 110 | 12 | A102 |
| EMB3120-TH | △ | 6 | – | 18 | 110 | 12 | A168 |
| CEPB2120 | □ | 6 | – | 18 | 110 | 12 | A411 |
| CEPB4120 | △ | 6 | – | 18 | 110 | 12 | A411 |
| YB2120-CS | □ | 6 | – | 18 | 110 | 12 | A422 |
| JBER2120 | □ | 6 | – | 18 | 110 | 12 | A422 |
| HGOBLS2120-PN | ● | 6 | – | 18 | 220 | 11 | A104 |
| CEPBLS2120 | □ | 6 | – | 18 | 220 | 12 | A411 |
| HGOB2120-PN | ● | 6 | – | 22 | 110 | 12 | A104 |
| BEK2120 | ● | 6 | – | 22 | 110 | 12 | A161 |
| EPBC2120 | □ | 6 | – | 22 | 110 | 12 | A409 |
| BEK2120-C | □ | 6 | – | 22 | 110 | 12 | A415 |
| BEKLS2120-C | □ | 6 | – | 22 | 220 | 12 | A415 |
| FE612 | □ | 6 | – | 30 | 80 | 12 | A425 |
| BES2120-C | □ | 6 | – | 30 | 110 | 12 | A415 |
| BES2120 | □ | 6 | – | 30 | 110 | 12 | A421 |
| BES2120M | □ | 6 | – | 30 | 110 | 12 | A421 |
| GBR2120 | □ | 6 | – | 55 | 130 | 12 | A425 |
| GBS2120 | □ | 6 | – | 55 | 130 | 12 | A426 |
| GXB2120 | □ | 6 | – | 55 | 190 | 12 | A426 |
| GBD2120 | □ | 6 | – | 55 | 200 | 12 | A426 |
| GBL2120 | □ | 6 | – | 130 | 190 | 12 | A425 |
| GBR2125 | □ | 6.25 | – | 55 | 130 | 12 | A425 |
| BEK2130 | ● | 6.5 | – | 22 | 110 | 12 | A161 |
| BEK2130-C | □ | 6.5 | – | 22 | 110 | 12 | A415 |
| GBR2130 | □ | 6.5 | – | 55 | 130 | 12 | A425 |
| GBS2130 | □ | 6.5 | – | 55 | 130 | 12 | A426 |
| GXB2130 | □ | 6.5 | – | 55 | 190 | 12 | A426 |
| GBD2130 | □ | 6.5 | – | 55 | 200 | 12 | A426 |
| GBL2130 | □ | 6.5 | – | 130 | 190 | 12 | A425 |
| BEK2140 | ● | 7 | – | 26 | 120 | 12 | A161 |
| BEK2140-C | □ | 7 | – | 26 | 120 | 12 | A415 |
| FE614 | □ | 7 | – | 30 | 80 | 14 | A425 |
| BES2140-C | □ | 7 | – | 35 | 120 | 12 | A415 |
| BES2140 | □ | 7 | – | 35 | 120 | 12 | A421 |
| BES2140M | □ | 7 | – | 35 | 120 | 12 | A421 |
| GBR4140 | □ | 7 | – | 60 | 140 | 12 | A425 |
| GXB4140 | □ | 7 | – | 60 | 210 | 12 | A426 |
| GBL4140 | □ | 7 | – | 140 | 210 | 12 | A425 |
| GBR4150 | □ | 7.5 | – | 60 | 140 | 12 | A425 |
| GXB4150 | □ | 7.5 | – | 60 | 210 | 12 | A426 |
| GBL4150 | □ | 7.5 | – | 140 | 210 | 12 | A425 |
| EMBE3160-ATH | ● | 8 | 48 | 24 | 140 | 16 | A110 |
| BESL2160-S-C | △ | 8 | 80 | 24 | 150 | 16 | A418 |
| JBELS2160 | □ | 8 | 115 | 24 | 200 | 16 | A422 |
| EPBT2160 | ● | 8 | – | 24 | 140 | 16 | A102 |
| EMB3160-TH | △ | 8 | – | 24 | 140 | 16 | A168 |
| CEPB2160 | □ | 8 | – | 24 | 140 | 16 | A411 |
| YB2160-CS | □ | 8 | – | 24 | 140 | 16 | A422 |
| JBER2160 | □ | 8 | – | 24 | 140 | 16 | A422 |
| HGOBLS2160-PN | ● | 8 | – | 24 | 250 | 14 | A104 |

●印：標準在庫品です。　●：Stocked Items.　△印:在庫が無くなり次第受注生産品となるものです。△:When the Stock is out, will become to produce on request.

# 超硬エンドミル・ラジアス φ0.2～φ0.6
Carbide End Mills -Radius

単位 unit：mm

| 商品コード Item Code | 在庫 Stock | ボール半径 RE | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| CEPBLS2160 | □ | 8 | – | 24 | 250 | 16 | A411 |
| HGOB2160-PN | ● | 8 | – | 30 | 140 | 16 | A104 |
| BEK2160 | ● | 8 | – | 30 | 140 | 16 | A161 |
| EPBC2160 | □ | 8 | – | 30 | 140 | 16 | A409 |
| BEK2160-C | □ | 8 | – | 30 | 140 | 16 | A415 |
| BEKLS2160-C | □ | 8 | – | 30 | 250 | 16 | A415 |
| FE616 | □ | 8 | – | 35 | 110 | 16 | A425 |
| BES2160M | □ | 8 | – | 40 | 120 | 16 | A421 |
| BES2160-C | □ | 8 | – | 40 | 140 | 16 | A415 |
| BES2160 | □ | 8 | – | 40 | 140 | 16 | A421 |
| GBS4160 | □ | 8 | – | 60 | 150 | 16 | A426 |
| GBD4160 | □ | 8 | – | 60 | 250 | 16 | A426 |
| GBR4160 | □ | 8 | – | 65 | 150 | 16 | A425 |
| GXB4160 | □ | 8 | – | 65 | 230 | 16 | A426 |
| GBL4160 | □ | 8 | – | 150 | 230 | 16 | A425 |
| GBS4170 | □ | 8.5 | – | 60 | 150 | 16 | A426 |
| GBD4170 | □ | 8.5 | – | 60 | 250 | 16 | A426 |
| GBR4170 | □ | 8.5 | – | 65 | 150 | 16 | A425 |
| GXB4170 | □ | 8.5 | – | 65 | 230 | 16 | A426 |
| GBL4170 | □ | 8.5 | – | 150 | 230 | 16 | A425 |
| BEK2180 | ● | 9 | – | 34 | 140 | 16 | A161 |
| BEK2180-C | □ | 9 | – | 34 | 140 | 16 | A415 |
| FE618 | □ | 9 | – | 35 | 110 | 18 | A425 |
| BES2180M | □ | 9 | – | 40 | 130 | 16 | A421 |
| BES2180-C | □ | 9 | – | 40 | 140 | 16 | A415 |
| BES2180 | □ | 9 | – | 40 | 140 | 16 | A421 |
| GBS4180 | □ | 9 | – | 60 | 150 | 20 | A426 |
| GBD4180 | □ | 9 | – | 60 | 250 | 20 | A426 |
| GBR4180 | □ | 9 | – | 65 | 160 | 20 | A425 |
| GXB4180 | □ | 9 | – | 65 | 250 | 16 | A426 |
| GBL4180 | □ | 9 | – | 160 | 250 | 16 | A425 |
| EMBE3200-ATH | ● | 10 | 60 | 30 | 160 | 20 | A110 |
| BESL2200-S-C | | 10 | 90 | 30 | 150 | 20 | A418 |
| JBELS2200 | □ | 10 | 115 | 30 | 200 | 20 | A422 |
| EPBT2200 | ● | 10 | – | 30 | 160 | 20 | A102 |
| EMB3200-TH | △ | 10 | – | 30 | 160 | 20 | A168 |
| CEPB2200 | □ | 10 | – | 30 | 160 | 20 | A411 |
| YB2200-CS | □ | 10 | – | 30 | 160 | 20 | A422 |
| JBER2200 | □ | 10 | – | 30 | 160 | 20 | A422 |
| HGOBLS2200-PN | ● | 10 | – | 30 | 250 | 18 | A104 |
| CEPBLS2200 | □ | 10 | – | 30 | 280 | 20 | A411 |
| FE620 | □ | 10 | – | 35 | 110 | 20 | A425 |
| HGOB2200-PN | ● | 10 | – | 38 | 160 | 20 | A104 |
| BEK2200 | ● | 10 | – | 38 | 160 | 20 | A161 |
| EPBC2200 | □ | 10 | – | 38 | 160 | 20 | A409 |
| BEK2200-C | □ | 10 | – | 38 | 160 | 20 | A415 |
| BEKLS2200-C | □ | 10 | – | 38 | 280 | 20 | A415 |
| BES2200M | □ | 10 | – | 45 | 130 | 20 | A421 |
| BES2200-C | □ | 10 | – | 45 | 160 | 20 | A415 |
| BES2200 | □ | 10 | – | 45 | 160 | 20 | A421 |
| GBS4200 | □ | 10 | – | 60 | 150 | 20 | A426 |
| GBD4200 | □ | 10 | – | 60 | 250 | 20 | A426 |
| GBR4200 | □ | 10 | – | 75 | 160 | 20 | A425 |
| GXB4200 | □ | 10 | – | 75 | 250 | 20 | A426 |
| GBL4200 | □ | 10 | – | 180 | 250 | 20 | A425 |
| GBS4210 | □ | 10.5 | – | 60 | 150 | 20 | A426 |
| GBD4210 | □ | 10.5 | – | 60 | 250 | 20 | A426 |
| GBS4220 | □ | 11 | – | 60 | 150 | 20 | A426 |
| GBD4220 | □ | 11 | – | 60 | 250 | 20 | A426 |
| BESL2250-S-C | | 12.5 | 110 | 37 | 180 | 25 | A418 |
| CEPB2250 | □ | 12.5 | – | 38 | 180 | 25 | A411 |
| CEPBLS2250 | □ | 12.5 | – | 38 | 300 | 25 | A411 |
| BES2250-C | □ | 12.5 | – | 50 | 180 | 25 | A415 |
| BES2250 | □ | 12.5 | – | 50 | 180 | 25 | A421 |
| BEKLS2250-C | □ | 12.5 | – | 50 | 300 | 25 | A415 |
| GBS4250 | □ | 12.5 | – | 60 | 180 | 25 | A426 |
| GBD4250 | □ | 12.5 | – | 60 | 250 | 25 | A426 |

| 商品コード Item Code | 在庫 Stock | コーナ半径 Corner radius | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|---|
| EPDREH2002-0.5-002-TH3 | ● | 0.02 | 0.2 | 0.5 | 0.15 | 50 | 4 | A172 |
| EPDRE2002-0.5-002-ATH | ● | 0.02 | 0.2 | 0.5 | 0.15 | 50 | 4 | A194 |
| EPDREH2002-1-002-TH3 | ● | 0.02 | 0.2 | 1 | 0.15 | 50 | 4 | A172 |
| EPDRE2002-1-002-ATH | ● | 0.02 | 0.2 | 1 | 0.15 | 50 | 4 | A194 |
| EPDRE2002-2-002-ATH | ● | 0.02 | 0.2 | 2 | 0.15 | 50 | 4 | A194 |
| CBN-EPSR2002-0.5-005 | ● | 0.05 | 0.2 | 0.5 | 0.07 | 50 | 4 | A281 |
| EPDREH2002-0.5-005-TH3 | ● | 0.05 | 0.2 | 0.5 | 0.15 | 50 | 4 | A172 |
| EPDRE2002-0.5-005-ATH | ● | 0.05 | 0.2 | 0.5 | 0.15 | 50 | 4 | A194 |
| EPDR2002-0.5-005-TH | △ | 0.05 | 0.2 | 0.5 | 0.15 | 50 | 4 | A283 |
| CBN-EPSR2002-1-005 | ● | 0.05 | 0.2 | 1 | 0.07 | 50 | 4 | A281 |
| EPDREH2002-1-005-TH3 | ● | 0.05 | 0.2 | 1 | 0.15 | 50 | 4 | A172 |
| EPDRE2002-1-005-ATH | ● | 0.05 | 0.2 | 1 | 0.15 | 50 | 4 | A194 |
| EPDR2002-1-005-TH | △ | 0.05 | 0.2 | 1 | 0.15 | 50 | 4 | A283 |
| EPDRE2002-1.5-005-ATH | ● | 0.05 | 0.2 | 1.5 | 0.15 | 50 | 4 | A194 |
| EPDR2002-1.5-005-TH | △ | 0.05 | 0.2 | 1.5 | 0.15 | 50 | 4 | A283 |
| EPDRE2002-2-005-ATH | ● | 0.05 | 0.2 | 2 | 0.15 | 50 | 4 | A194 |
| EPDR2002-2-005-TH | △ | 0.05 | 0.2 | 2 | 0.15 | 50 | 4 | A283 |
| EPDRP2002-2-09005-TH | ● | 0.05 | 0.2 | 2 | 0.15 | 50 | 4 | A210 |
| EPDREH2003-1-002-TH3 | ● | 0.02 | 0.3 | 1 | 0.25 | 50 | 4 | A172 |
| EPDRE2003-1-002-ATH | ● | 0.02 | 0.3 | 1 | 0.25 | 50 | 4 | A194 |
| EPDREH2003-2-002-TH3 | ● | 0.02 | 0.3 | 2 | 0.25 | 50 | 4 | A172 |
| EPDRE2003-2-002-ATH | ● | 0.02 | 0.3 | 2 | 0.25 | 50 | 4 | A194 |
| EPDRE2003-3-002-ATH | ● | 0.02 | 0.3 | 3 | 0.25 | 50 | 4 | A194 |
| CBN-EPSR2003-0.5-005 | ● | 0.05 | 0.3 | 0.5 | 0.11 | 50 | 4 | A281 |
| CBN-EPSR2003-0.75-005 | ● | 0.05 | 0.3 | 0.75 | 0.11 | 50 | 4 | A281 |
| EPDREH2003-1-005-TH3 | ● | 0.05 | 0.3 | 1 | 0.25 | 50 | 4 | A172 |
| EPDRE2003-1-005-ATH | ● | 0.05 | 0.3 | 1 | 0.25 | 50 | 4 | A194 |
| EPDR2003-1-005-TH | △ | 0.05 | 0.3 | 1 | 0.25 | 50 | 4 | A283 |
| CBN-EPSR2003-1.5-005 | ● | 0.05 | 0.3 | 1.5 | 0.11 | 50 | 4 | A281 |
| EPDRE2003-1.5-005-ATH | ● | 0.05 | 0.3 | 1.5 | 0.25 | 50 | 4 | A194 |
| EPDR2003-1.5-005-TH | △ | 0.05 | 0.3 | 1.5 | 0.25 | 50 | 4 | A283 |
| CBN-EPSR2003-2-005 | ● | 0.05 | 0.3 | 2 | 0.11 | 50 | 4 | A281 |
| EPDREH2003-2-005-TH3 | ● | 0.05 | 0.3 | 2 | 0.25 | 50 | 4 | A172 |
| EPDRE2003-2-005-ATH | ● | 0.05 | 0.3 | 2 | 0.25 | 50 | 4 | A194 |
| EPDR2003-2-005-TH | △ | 0.05 | 0.3 | 2 | 0.25 | 50 | 4 | A283 |
| EPDRE2003-2.5-005-ATH | ● | 0.05 | 0.3 | 2.5 | 0.25 | 50 | 4 | A194 |
| EPDR2003-2.5-005-TH | △ | 0.05 | 0.3 | 2.5 | 0.25 | 50 | 4 | A283 |
| EPDRE2003-3-005-ATH | ● | 0.05 | 0.3 | 3 | 0.25 | 50 | 4 | A194 |
| EPDR2003-3-005-TH | △ | 0.05 | 0.3 | 3 | 0.25 | 50 | 4 | A283 |
| EPDREH2004-1-002-TH3 | ● | 0.02 | 0.4 | 1 | 0.3 | 50 | 4 | A172 |
| EPDRE2004-1-002-ATH | ● | 0.02 | 0.4 | 1 | 0.3 | 50 | 4 | A194 |
| EPDREH2004-2-002-TH3 | ● | 0.02 | 0.4 | 2 | 0.3 | 50 | 4 | A172 |
| EPDRE2004-2-002-ATH | ● | 0.02 | 0.4 | 2 | 0.3 | 50 | 4 | A194 |
| EPDRE2004-3-002-ATH | ● | 0.02 | 0.4 | 3 | 0.3 | 50 | 4 | A194 |
| EPDRE2004-4-002-ATH | ● | 0.02 | 0.4 | 4 | 0.3 | 50 | 4 | A194 |
| CBN-EPSR2004-0.5-005 | ● | 0.05 | 0.4 | 0.5 | 0.14 | 50 | 4 | A281 |
| CBN-EPSR2004-1-005 | ● | 0.05 | 0.4 | 1 | 0.14 | 50 | 4 | A281 |
| EPDREH2004-1-005-TH3 | ● | 0.05 | 0.4 | 1 | 0.3 | 50 | 4 | A172 |
| EPDRE2004-1-005-ATH | ● | 0.05 | 0.4 | 1 | 0.3 | 50 | 4 | A194 |
| EPDR2004-1-005-TH | △ | 0.05 | 0.4 | 1 | 0.3 | 50 | 4 | A283 |
| EPDRE2004-1.5-005-ATH | ● | 0.05 | 0.4 | 1.5 | 0.3 | 50 | 4 | A194 |
| EPDR2004-1.5-005-TH | △ | 0.05 | 0.4 | 1.5 | 0.3 | 50 | 4 | A283 |
| CBN-EPSR2004-2-005 | ● | 0.05 | 0.4 | 2 | 0.14 | 50 | 4 | A281 |
| EPDREH2004-2-005-TH3 | ● | 0.05 | 0.4 | 2 | 0.3 | 50 | 4 | A172 |
| EPDRE2004-2-005-ATH | ● | 0.05 | 0.4 | 2 | 0.3 | 50 | 4 | A194 |
| EPDR2004-2-005-TH | △ | 0.05 | 0.4 | 2 | 0.3 | 50 | 4 | A283 |
| EPDRE2004-2.5-005-ATH | ● | 0.05 | 0.4 | 2.5 | 0.3 | 50 | 4 | A194 |
| EPDR2004-2.5-005-TH | △ | 0.05 | 0.4 | 2.5 | 0.3 | 50 | 4 | A283 |
| EPDRE2004-3-005-ATH | ● | 0.05 | 0.4 | 3 | 0.3 | 50 | 4 | A194 |
| EPDR2004-3-005-TH | △ | 0.05 | 0.4 | 3 | 0.3 | 50 | 4 | A283 |
| EPDRE2004-3.5-005-ATH | ● | 0.05 | 0.4 | 3.5 | 0.3 | 50 | 4 | A194 |
| EPDR2004-3.5-005-TH | △ | 0.05 | 0.4 | 3.5 | 0.3 | 50 | 4 | A283 |
| EPDRE2004-4-005-ATH | ● | 0.05 | 0.4 | 4 | 0.3 | 50 | 4 | A194 |
| EPDR2004-4-005-TH | △ | 0.05 | 0.4 | 4 | 0.3 | 50 | 4 | A283 |
| EPDRP2004-4-09005-TH | ● | 0.05 | 0.4 | 4 | 0.3 | 50 | 4 | A210 |
| EPDRP2004-5-09005-TH | ● | 0.05 | 0.4 | 5 | 0.3 | 50 | 4 | A210 |
| EPDREH2004-1-01-TH3 | ● | 0.1 | 0.4 | 1 | 0.3 | 50 | 4 | A172 |
| EPDRE2004-1-01-ATH | ● | 0.1 | 0.4 | 1 | 0.3 | 50 | 4 | A194 |
| EPDREH2004-2-01-TH3 | ● | 0.1 | 0.4 | 2 | 0.3 | 50 | 4 | A172 |

| 商品コード Item Code | 在庫 Stock | コーナ半径 Corner radius | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|---|
| EPDRE2004-2-01-ATH | ● | 0.1 | 0.4 | 2 | 0.3 | 50 | 4 | A194 |
| EPDR2004-2-01-TH | △ | 0.1 | 0.4 | 2 | 0.3 | 50 | 4 | A283 |
| EPDRE2004-3-01-ATH | ● | 0.1 | 0.4 | 3 | 0.3 | 50 | 4 | A194 |
| EPDR2004-3-01-TH | △ | 0.1 | 0.4 | 3 | 0.3 | 50 | 4 | A283 |
| EPDRE2004-4-01-ATH | ● | 0.1 | 0.4 | 4 | 0.3 | 50 | 4 | A194 |
| EPDR2004-4-01-TH | △ | 0.1 | 0.4 | 4 | 0.3 | 50 | 4 | A283 |
| EPDRP2004-4-0901-TH | ● | 0.1 | 0.4 | 4 | 0.3 | 50 | 4 | A210 |
| EPDRP2004-5-0901-TH | ● | 0.1 | 0.4 | 5 | 0.3 | 50 | 4 | A210 |
| EPDREH2005-1-002-TH3 | ● | 0.02 | 0.5 | 1 | 0.35 | 50 | 4 | A172 |
| EPDRE2005-1-002-ATH | ● | 0.02 | 0.5 | 1 | 0.35 | 50 | 4 | A194 |
| EPDREH2005-2-002-TH3 | ● | 0.02 | 0.5 | 2 | 0.35 | 50 | 4 | A172 |
| EPDRE2005-2-002-ATH | ● | 0.02 | 0.5 | 2 | 0.35 | 50 | 4 | A194 |
| EPDREH2005-3-002-TH3 | ● | 0.02 | 0.5 | 3 | 0.35 | 50 | 4 | A172 |
| EPDRE2005-3-002-ATH | ● | 0.02 | 0.5 | 3 | 0.35 | 50 | 4 | A194 |
| EPDRE2005-4-002-ATH | ● | 0.02 | 0.5 | 4 | 0.35 | 50 | 4 | A194 |
| EPDRE2005-6-002-ATH | ● | 0.02 | 0.5 | 6 | 0.35 | 50 | 4 | A194 |
| CBN-EPSR2005-0.5-005 | ● | 0.05 | 0.5 | 0.5 | 0.18 | 50 | 4 | A281 |
| EPDREH2005-1-005-TH3 | ● | 0.05 | 0.5 | 1 | 0.35 | 50 | 4 | A172 |
| EPDRE2005-1-005-ATH | ● | 0.05 | 0.5 | 1 | 0.35 | 50 | 4 | A194 |
| EPDR2005-1-005-TH | △ | 0.05 | 0.5 | 1 | 0.35 | 50 | 4 | A283 |
| CBN-EPSR2005-1.5-005 | ● | 0.05 | 0.5 | 1.5 | 0.18 | 50 | 4 | A281 |
| EPDREH2005-2-005-TH3 | ● | 0.05 | 0.5 | 2 | 0.35 | 50 | 4 | A172 |
| EPDRE2005-2-005-ATH | ● | 0.05 | 0.5 | 2 | 0.35 | 50 | 4 | A194 |
| EPDR2005-2-005-TH | △ | 0.05 | 0.5 | 2 | 0.35 | 50 | 4 | A283 |
| CBN-EPSR2005-3-005 | ● | 0.05 | 0.5 | 3 | 0.18 | 50 | 4 | A281 |
| EPDREH2005-3-005-TH3 | ● | 0.05 | 0.5 | 3 | 0.35 | 50 | 4 | A172 |
| EPDRE2005-3-005-ATH | ● | 0.05 | 0.5 | 3 | 0.35 | 50 | 4 | A194 |
| EPDR2005-3-005-TH | △ | 0.05 | 0.5 | 3 | 0.35 | 50 | 4 | A283 |
| EPDRE2005-4-005-ATH | ● | 0.05 | 0.5 | 4 | 0.35 | 50 | 4 | A194 |
| EPDR2005-4-005-TH | △ | 0.05 | 0.5 | 4 | 0.35 | 50 | 4 | A283 |
| EPDRE2005-5-005-ATH | ● | 0.05 | 0.5 | 5 | 0.35 | 50 | 4 | A194 |
| EPDR2005-5-005-TH | △ | 0.05 | 0.5 | 5 | 0.35 | 50 | 4 | A283 |
| EPDRE2006-6-005-ATH | ● | 0.05 | 0.5 | 6 | 0.35 | 50 | 4 | A194 |
| EPDR2005-6-005-TH | △ | 0.05 | 0.5 | 6 | 0.35 | 50 | 4 | A283 |
| CBN-EPSR2005-0.5-01 | ● | 0.1 | 0.5 | 0.5 | 0.18 | 50 | 4 | A281 |
| EPDREH2005-1-01-TH3 | ● | 0.1 | 0.5 | 1 | 0.35 | 50 | 4 | A172 |
| EPDRE2005-1-01-ATH | ● | 0.1 | 0.5 | 1 | 0.35 | 50 | 4 | A194 |
| EPDR2005-1-01-TH | △ | 0.1 | 0.5 | 1 | 0.35 | 50 | 4 | A283 |
| CBN-EPSR2005-1.5-01 | ● | 0.1 | 0.5 | 1.5 | 0.18 | 50 | 4 | A281 |
| EPDREH2005-2-01-TH3 | ● | 0.1 | 0.5 | 2 | 0.35 | 50 | 4 | A172 |
| EPDRE2005-2-01-ATH | ● | 0.1 | 0.5 | 2 | 0.35 | 50 | 4 | A194 |
| EPDR2005-2-01-TH | △ | 0.1 | 0.5 | 2 | 0.35 | 50 | 4 | A283 |
| CBN-EPSR2005-3-01 | ● | 0.1 | 0.5 | 3 | 0.18 | 50 | 4 | A281 |
| EPDREH2005-3-01-TH3 | ● | 0.1 | 0.5 | 3 | 0.35 | 50 | 4 | A172 |
| EPDRE2005-3-01-ATH | ● | 0.1 | 0.5 | 3 | 0.35 | 50 | 4 | A194 |
| EPDR2005-3-01-TH | △ | 0.1 | 0.5 | 3 | 0.35 | 50 | 4 | A283 |
| EPDRE2005-4-01-ATH | ● | 0.1 | 0.5 | 4 | 0.35 | 50 | 4 | A194 |
| EPDR2005-4-01-TH | △ | 0.1 | 0.5 | 4 | 0.35 | 50 | 4 | A283 |
| EPDRE2005-5-01-ATH | ● | 0.1 | 0.5 | 5 | 0.35 | 50 | 4 | A194 |
| EPDR2005-5-01-TH | △ | 0.1 | 0.5 | 5 | 0.35 | 50 | 4 | A283 |
| EPDRP2005-5-0901-TH | ● | 0.1 | 0.5 | 5 | 0.35 | 50 | 4 | A210 |
| EGDR2005-5-01-HD | ● | 0.1 | 0.5 | 5 | 0.75 | 60 | 4 | A277 |
| EPDRE2005-6-01-ATH | ● | 0.1 | 0.5 | 6 | 0.35 | 50 | 4 | A194 |
| EPDR2005-6-01-TH | △ | 0.1 | 0.5 | 6 | 0.35 | 50 | 4 | A283 |
| EPDRP2005-8-0901-TH | ● | 0.1 | 0.5 | 8 | 0.35 | 50 | 4 | A210 |
| EPDRP2005-10-0901-TH | ● | 0.1 | 0.5 | 10 | 0.35 | 55 | 4 | A210 |
| EGDR2005-10-01-HD | ● | 0.1 | 0.5 | 10 | 0.75 | 60 | 4 | A277 |
| EGDR2005-15-01-HD | ● | 0.1 | 0.5 | 15 | 0.75 | 60 | 4 | A277 |
| EGDR2005-20-01-HD | ● | 0.1 | 0.5 | 20 | 0.75 | 60 | 4 | A277 |
| EPDREH2006-2-002-TH3 | ● | 0.02 | 0.6 | 2 | 0.4 | 50 | 4 | A172 |
| EPDRE2006-2-002-ATH | ● | 0.02 | 0.6 | 2 | 0.4 | 50 | 4 | A194 |
| EPDREH2006-4-002-TH3 | ● | 0.02 | 0.6 | 4 | 0.4 | 50 | 4 | A172 |
| EPDRE2006-4-002-ATH | ● | 0.02 | 0.6 | 4 | 0.4 | 50 | 4 | A194 |
| EPDRE2006-6-002-ATH | ● | 0.02 | 0.6 | 6 | 0.4 | 50 | 4 | A194 |
| EPDREH2006-2-005-TH3 | ● | 0.05 | 0.6 | 2 | 0.4 | 50 | 4 | A172 |
| EPDRE2006-2-005-ATH | ● | 0.05 | 0.6 | 2 | 0.4 | 50 | 4 | A194 |
| EPDREH2006-4-005-TH3 | ● | 0.05 | 0.6 | 4 | 0.4 | 50 | 4 | A172 |
| EPDRE2006-4-005-ATH | ● | 0.05 | 0.6 | 4 | 0.4 | 50 | 4 | A194 |
| EPDRE2006-6-005-ATH | ● | 0.05 | 0.6 | 6 | 0.4 | 50 | 4 | A194 |

□印：特定代理店在庫です。弊社営業へお問合せください。□：Stocked by specified distributor. Contact with our sales department. 無印：受注生産品です。No Mark：Manufactured upon request only.

Quick dimension reference table by mill diameter

# 外径別寸法早見表

## 超硬エンドミル・ラジアス　φ0.6～φ1.75　Carbide End Mills -Radius

単位 unit：mm

| 商品コード Item Code | 在庫 Stock | コーナ半径 Corner radius | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|---|
| EPDRE2006-8-005-ATH | ● | 0.05 | 0.6 | 8 | 0.4 | 50 | 4 | A194 |
| EPDRE2006-10-005-ATH | ● | 0.05 | 0.6 | 10 | 0.4 | 50 | 4 | A194 |
| CBN-EPSR2006-1.5-01 | ● | 0.1 | 0.6 | 1.5 | 0.21 | 50 | 4 | A281 |
| EPDREH2006-2-01-TH3 | ● | 0.1 | 0.6 | 2 | 0.4 | 50 | 4 | A172 |
| EPDRE2006-2-01-ATH | ● | 0.1 | 0.6 | 2 | 0.4 | 50 | 4 | A194 |
| EPDR2006-2-01-TH | △ | 0.1 | 0.6 | 2 | 0.4 | 50 | 4 | A284 |
| CBN-EPSR2006-3-01 | ● | 0.1 | 0.6 | 3 | 0.21 | 50 | 4 | A281 |
| EPDREH2006-4-01-TH3 | ● | 0.1 | 0.6 | 4 | 0.4 | 50 | 4 | A172 |
| EPDRE2006-4-01-ATH | ● | 0.1 | 0.6 | 4 | 0.4 | 50 | 4 | A194 |
| EPDR2006-4-01-TH | △ | 0.1 | 0.6 | 4 | 0.4 | 50 | 4 | A284 |
| EPDRE2006-6-01-ATH | ● | 0.1 | 0.6 | 6 | 0.4 | 50 | 4 | A194 |
| EPDR2006-6-01-TH | △ | 0.1 | 0.6 | 6 | 0.4 | 50 | 4 | A284 |
| EPDRE2006-8-01-ATH | ● | 0.1 | 0.6 | 8 | 0.4 | 50 | 4 | A194 |
| EPDR2006-8-01-TH | △ | 0.1 | 0.6 | 8 | 0.4 | 50 | 4 | A284 |
| EPDRE2006-10-01-ATH | ● | 0.1 | 0.6 | 10 | 0.4 | 50 | 4 | A194 |
| EPDR2006-10-01-TH | △ | 0.1 | 0.6 | 10 | 0.4 | 50 | 4 | A284 |
| EPDRP2006-12-0901-TH | ● | 0.1 | 0.6 | 12 | 0.4 | 55 | 4 | A210 |
| EPDRP2006-15-0901-TH | ● | 0.1 | 0.6 | 15 | 0.4 | 55 | 4 | A210 |
| EPDRE2007-2-005-ATH | ● | 0.05 | 0.7 | 2 | 0.45 | 50 | 4 | A195 |
| EPDRE2007-4-005-ATH | ● | 0.05 | 0.7 | 4 | 0.45 | 50 | 4 | A195 |
| EPDRE2007-6-005-ATH | ● | 0.05 | 0.7 | 6 | 0.45 | 50 | 4 | A195 |
| EPDRE2007-2-01-ATH | ● | 0.1 | 0.7 | 2 | 0.45 | 50 | 4 | A195 |
| EPDRE2007-4-01-ATH | ● | 0.1 | 0.7 | 4 | 0.45 | 50 | 4 | A195 |
| EPDRE2007-6-01-ATH | ● | 0.1 | 0.7 | 6 | 0.45 | 50 | 4 | A195 |
| EPDREH2008-2-002-TH3 | ● | 0.02 | 0.8 | 2 | 0.5 | 50 | 4 | A172 |
| EPDRE2008-2-002-ATH | ● | 0.02 | 0.8 | 2 | 0.5 | 50 | 4 | A195 |
| EPDREH2008-4-002-TH3 | ● | 0.02 | 0.8 | 4 | 0.5 | 50 | 4 | A172 |
| EPDRE2008-4-002-ATH | ● | 0.02 | 0.8 | 4 | 0.5 | 50 | 4 | A195 |
| EPDRE2008-6-002-ATH | ● | 0.02 | 0.8 | 6 | 0.5 | 50 | 4 | A195 |
| EPDREH2008-2-005-TH3 | ● | 0.05 | 0.8 | 2 | 0.5 | 50 | 4 | A172 |
| EPDRE2008-2-005-ATH | ● | 0.05 | 0.8 | 2 | 0.5 | 50 | 4 | A195 |
| EPDREH2008-4-005-TH3 | ● | 0.05 | 0.8 | 4 | 0.5 | 50 | 4 | A172 |
| EPDRE2008-4-005-ATH | ● | 0.05 | 0.8 | 4 | 0.5 | 50 | 4 | A195 |
| EPDRE2008-6-005-ATH | ● | 0.05 | 0.8 | 6 | 0.5 | 50 | 4 | A195 |
| EPDRE2008-8-005-ATH | ● | 0.05 | 0.8 | 8 | 0.5 | 50 | 4 | A195 |
| EPDRE2008-12-005-ATH | ● | 0.05 | 0.8 | 12 | 0.5 | 55 | 4 | A195 |
| EPDREH2008-2-01-TH3 | ● | 0.1 | 0.8 | 2 | 0.5 | 50 | 4 | A172 |
| EPDRE2008-2-01-ATH | ● | 0.1 | 0.8 | 2 | 0.5 | 50 | 4 | A195 |
| CBN-EPSR2008-2.5-01 | ● | 0.1 | 0.8 | 2.5 | 0.28 | 50 | 4 | A281 |
| EPDREH2008-4-01-TH3 | ● | 0.1 | 0.8 | 4 | 0.5 | 50 | 4 | A172 |
| EPDRE2008-4-01-ATH | ● | 0.1 | 0.8 | 4 | 0.5 | 50 | 4 | A195 |
| EPDR2008-4-01-TH | △ | 0.1 | 0.8 | 4 | 0.5 | 50 | 4 | A284 |
| CBN-EPSR2008-5-01 | ● | 0.1 | 0.8 | 5 | 0.28 | 50 | 4 | A281 |
| EPDRE2008-6-01-ATH | ● | 0.1 | 0.8 | 6 | 0.5 | 50 | 4 | A195 |
| EPDR2008-6-01-TH | △ | 0.1 | 0.8 | 6 | 0.5 | 50 | 4 | A284 |
| EPDRE2008-8-01-ATH | ● | 0.1 | 0.8 | 8 | 0.5 | 50 | 4 | A195 |
| EPDR2008-8-01-TH | △ | 0.1 | 0.8 | 8 | 0.5 | 50 | 4 | A284 |
| EPDRE2008-12-01-ATH | ● | 0.1 | 0.8 | 12 | 0.5 | 55 | 4 | A195 |
| EPDR2008-12-01-TH | △ | 0.1 | 0.8 | 12 | 0.5 | 55 | 4 | A284 |
| EPDREH2008-2-02-TH3 | ● | 0.2 | 0.8 | 2 | 0.5 | 50 | 4 | A172 |
| EPDRE2008-2-02-ATH | ● | 0.2 | 0.8 | 2 | 0.5 | 50 | 4 | A195 |
| EPDREH2008-4-02-TH3 | ● | 0.2 | 0.8 | 4 | 0.5 | 50 | 4 | A172 |
| EPDRE2008-4-02-ATH | ● | 0.2 | 0.8 | 4 | 0.5 | 50 | 4 | A195 |
| EPDR2008-4-02-TH | △ | 0.2 | 0.8 | 4 | 0.5 | 50 | 4 | A284 |
| EPDRE2008-6-02-ATH | ● | 0.2 | 0.8 | 6 | 0.5 | 50 | 4 | A195 |
| EPDR2008-6-02-TH | △ | 0.2 | 0.8 | 6 | 0.5 | 50 | 4 | A284 |
| EPDRP2008-6-0402-TH | ● | 0.2 | 0.8 | 6 | 0.5 | 50 | 4 | A210 |
| EPDRE2008-8-02-ATH | ● | 0.2 | 0.8 | 8 | 0.5 | 50 | 4 | A195 |
| EPDRE2008-12-02-ATH | ● | 0.2 | 0.8 | 12 | 0.5 | 55 | 4 | A195 |
| EPDRP2008-12-0902-TH | ● | 0.2 | 0.8 | 12 | 0.5 | 55 | 4 | A210 |
| EPDREH4010-1.5-002-TH3 | ● | 0.02 | 1 | 1.5 | 0.6 | 50 | 4 | A174 |
| EPDREH4010-2-002-TH3 | ● | 0.02 | 1 | 2 | 0.6 | 50 | 4 | A174 |
| EPDREH2010-2-002-TH3 | ● | 0.02 | 1 | 2 | 0.8 | 50 | 4 | A173 |
| EPDRE2010-2-002-ATH | ● | 0.02 | 1 | 2 | 0.8 | 50 | 4 | A195 |
| EPDREH4010-2.5-002-TH3 | ● | 0.02 | 1 | 2.5 | 0.6 | 50 | 4 | A174 |
| EPDREH4010-3-002-TH3 | ● | 0.02 | 1 | 3 | 0.6 | 50 | 4 | A174 |
| EPDREH4010-4-002-TH3 | ● | 0.02 | 1 | 4 | 0.6 | 50 | 4 | A174 |
| EPDREH2010-4-002-TH3 | ● | 0.02 | 1 | 4 | 0.8 | 50 | 4 | A173 |
| EPDRE2010-4-002-ATH | ● | 0.02 | 1 | 4 | 0.8 | 50 | 4 | A195 |

| 商品コード Item Code | 在庫 Stock | コーナ半径 Corner radius | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|---|
| EPDREH4010-5-002-TH3 | ● | 0.02 | 1 | 5 | 0.6 | 50 | 4 | A174 |
| EPDREH4010-6-002-TH3 | ● | 0.02 | 1 | 6 | 0.6 | 50 | 4 | A174 |
| EPDREH2010-6-002-TH3 | ● | 0.02 | 1 | 6 | 0.8 | 50 | 4 | A173 |
| EPDRE2010-6-002-ATH | ● | 0.02 | 1 | 6 | 0.8 | 50 | 4 | A195 |
| EPDREH4010-8-002-TH3 | ● | 0.02 | 1 | 8 | 0.6 | 50 | 4 | A174 |
| EPDREH2010-8-002-TH3 | ● | 0.02 | 1 | 8 | 0.8 | 50 | 4 | A173 |
| EPDRE2010-8-002-ATH | ● | 0.02 | 1 | 8 | 0.8 | 50 | 4 | A195 |
| EPDRE2010-10-002-ATH | ● | 0.02 | 1 | 10 | 0.8 | 50 | 4 | A195 |
| EPDRE2010-12-002-ATH | ● | 0.02 | 1 | 12 | 0.8 | 55 | 4 | A195 |
| CBN-EPSR2010-1-005 | ● | 0.05 | 1 | 1 | 0.35 | 50 | 4 | A281 |
| EPDREH4010-1.5-005-TH3 | ● | 0.05 | 1 | 1.5 | 0.6 | 50 | 4 | A174 |
| EPDREH4010-2-005-TH3 | ● | 0.05 | 1 | 2 | 0.6 | 50 | 4 | A174 |
| EPDREH2010-2-005-TH3 | ● | 0.05 | 1 | 2 | 0.8 | 50 | 4 | A173 |
| EPDRE2010-2-005-ATH | ● | 0.05 | 1 | 2 | 0.8 | 50 | 4 | A195 |
| CBN-EPSR2010-2.5-005 | ● | 0.05 | 1 | 2.5 | 0.35 | 50 | 4 | A281 |
| EPDREH4010-2.5-005-TH3 | ● | 0.05 | 1 | 2.5 | 0.6 | 50 | 4 | A174 |
| EPDREH4010-3-005-TH3 | ● | 0.05 | 1 | 3 | 0.6 | 50 | 4 | A174 |
| EPDRE2010-3-005-ATH | ● | 0.05 | 1 | 3 | 0.8 | 50 | 4 | A195 |
| EPDREH4010-4-005-TH3 | ● | 0.05 | 1 | 4 | 0.6 | 50 | 4 | A174 |
| EPDREH2010-4-005-TH3 | ● | 0.05 | 1 | 4 | 0.8 | 50 | 4 | A173 |
| EPDRE2010-4-005-ATH | ● | 0.05 | 1 | 4 | 0.8 | 50 | 4 | A195 |
| EPDRF4010-4-005-TH | ● | 0.05 | 1 | 4 | 0.8 | 50 | 4 | A216 |
| CBN-EPSR2010-5-005 | ● | 0.05 | 1 | 5 | 0.35 | 50 | 4 | A281 |
| EPDREH4010-5-005-TH3 | ● | 0.05 | 1 | 5 | 0.6 | 50 | 4 | A174 |
| EPDRE2010-5-005-ATH | ● | 0.05 | 1 | 5 | 0.8 | 50 | 4 | A195 |
| EPDREH4010-6-005-TH3 | ● | 0.05 | 1 | 6 | 0.6 | 50 | 4 | A174 |
| EPDREH2010-6-005-TH3 | ● | 0.05 | 1 | 6 | 0.8 | 50 | 4 | A173 |
| EPDRE2010-6-005-ATH | ● | 0.05 | 1 | 6 | 0.8 | 50 | 4 | A195 |
| EPDRF4010-6-005-TH | ● | 0.05 | 1 | 6 | 0.8 | 50 | 4 | A216 |
| EPDREH4010-8-005-TH3 | ● | 0.05 | 1 | 8 | 0.6 | 50 | 4 | A174 |
| EPDREH2010-8-005-TH3 | ● | 0.05 | 1 | 8 | 0.8 | 50 | 4 | A173 |
| EPDRE2010-8-005-ATH | ● | 0.05 | 1 | 8 | 0.8 | 50 | 4 | A195 |
| EPDRF4010-8-005-TH | ● | 0.05 | 1 | 8 | 0.8 | 50 | 4 | A216 |
| EPDRE2010-10-005-ATH | ● | 0.05 | 1 | 10 | 0.8 | 50 | 4 | A195 |
| EPDRF4010-10-005-TH | ● | 0.05 | 1 | 10 | 0.8 | 50 | 4 | A216 |
| EPDRE2010-12-005-ATH | ● | 0.05 | 1 | 12 | 0.8 | 55 | 4 | A195 |
| EPDRF4010-12-005-TH | ● | 0.05 | 1 | 12 | 0.8 | 60 | 4 | A216 |
| EPDRE2010-16-005-ATH | ● | 0.05 | 1 | 16 | 0.8 | 60 | 4 | A195 |
| EPDRF4010-16-005-TH | ● | 0.05 | 1 | 16 | 0.8 | 60 | 4 | A216 |
| EPDRE2010-20-005-ATH | ● | 0.05 | 1 | 20 | 0.8 | 60 | 4 | A195 |
| EPDRF4010-20-005-TH | ● | 0.05 | 1 | 20 | 0.8 | 60 | 4 | A216 |
| CBN-EPSR2010-1-01 | ● | 0.1 | 1 | 1 | 0.35 | 50 | 4 | A281 |
| EPDREH4010-1.5-01-TH3 | ● | 0.1 | 1 | 1.5 | 0.6 | 50 | 4 | A174 |
| EPDREH4010-2-01-TH3 | ● | 0.1 | 1 | 2 | 0.6 | 50 | 4 | A174 |
| EPDREH2010-2-01-TH3 | ● | 0.1 | 1 | 2 | 0.8 | 50 | 4 | A173 |
| EPDRE2010-2-01-ATH | ● | 0.1 | 1 | 2 | 0.8 | 50 | 4 | A195 |
| CBN-EPSR2010-2.5-01 | ● | 0.1 | 1 | 2.5 | 0.35 | 50 | 4 | A281 |
| BHSR2010-0.1 | □ | 0.1 | 1 | 2.5 | 0.5 | 60 | 6 | A456 |
| EPDREH4010-2.5-01-TH3 | ● | 0.1 | 1 | 2.5 | 0.6 | 50 | 4 | A174 |
| EPDREH4010-3-01-TH3 | ● | 0.1 | 1 | 3 | 0.6 | 50 | 4 | A174 |
| EPDRE2010-3-01-ATH | ● | 0.1 | 1 | 3 | 0.8 | 50 | 4 | A195 |
| EHHRE4010-S4-TH3 | ● | 0.1 | 1 | 3 | 1 | 50 | 4 | A263 |
| EHHRE4010-S6-TH3 | ● | 0.1 | 1 | 3 | 1 | 50 | 6 | A263 |
| EPDREH4010-4-01-TH3 | ● | 0.1 | 1 | 4 | 0.6 | 50 | 4 | A174 |
| EPDREH2010-4-01-TH3 | ● | 0.1 | 1 | 4 | 0.8 | 50 | 4 | A173 |
| EPDRE2010-4-01-ATH | ● | 0.1 | 1 | 4 | 0.8 | 50 | 4 | A195 |
| EPDRF4010-4-01-TH | ● | 0.1 | 1 | 4 | 0.8 | 50 | 4 | A216 |
| EPDR2010-4-01-TH | △ | 0.1 | 1 | 4 | 0.8 | 50 | 4 | A284 |
| CBN-EPSR2010-5-01 | ● | 0.1 | 1 | 5 | 0.35 | 50 | 4 | A281 |
| EPDREH4010-5-01-TH3 | ● | 0.1 | 1 | 5 | 0.6 | 50 | 4 | A174 |
| EPDRE2010-5-01-ATH | ● | 0.1 | 1 | 5 | 0.8 | 50 | 4 | A195 |
| EPSM4010-5-R0.1-PN | ● | 0.1 | 1 | 5 | 1.5 | 68 | 6 | A238 |
| EPDREH4010-6-01-TH3 | ● | 0.1 | 1 | 6 | 0.6 | 50 | 4 | A174 |
| EPDREH2010-6-01-TH3 | ● | 0.1 | 1 | 6 | 0.8 | 50 | 4 | A173 |
| EPDRE2010-6-01-ATH | ● | 0.1 | 1 | 6 | 0.8 | 50 | 4 | A195 |
| EPDRF4010-6-01-TH | ● | 0.1 | 1 | 6 | 0.8 | 50 | 4 | A216 |
| EPDR2010-6-01-TH | △ | 0.1 | 1 | 6 | 0.8 | 50 | 4 | A284 |
| EPDREH4010-8-01-TH3 | ● | 0.1 | 1 | 8 | 0.6 | 50 | 4 | A174 |
| EPDREH2010-8-01-TH3 | ● | 0.1 | 1 | 8 | 0.8 | 50 | 4 | A173 |

| 商品コード Item Code | 在庫 Stock | コーナ半径 Corner radius | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|---|
| EPDRE2010-8-01-ATH | ● | 0.1 | 1 | 8 | 0.8 | 50 | 4 | A195 |
| EPDRF4010-8-01-TH | ● | 0.1 | 1 | 8 | 0.8 | 50 | 4 | A216 |
| EPDR2010-8-01-TH | △ | 0.1 | 1 | 8 | 0.8 | 50 | 4 | A284 |
| EPDRE2010-10-01-ATH | ● | 0.1 | 1 | 10 | 0.8 | 50 | 4 | A195 |
| EPDRF4010-10-01-TH | ● | 0.1 | 1 | 10 | 0.8 | 50 | 4 | A216 |
| EPDR2010-10-01-TH | △ | 0.1 | 1 | 10 | 0.8 | 50 | 4 | A284 |
| EPDRE2010-12-01-ATH | ● | 0.1 | 1 | 12 | 0.8 | 55 | 4 | A195 |
| EPDR2010-12-01-TH | △ | 0.1 | 1 | 12 | 0.8 | 55 | 4 | A284 |
| EPDRF4010-12-01-TH | ● | 0.1 | 1 | 12 | 0.8 | 60 | 4 | A216 |
| EPDRE2010-16-01-ATH | ● | 0.1 | 1 | 16 | 0.8 | 60 | 4 | A195 |
| EPDRF4010-16-01-TH | ● | 0.1 | 1 | 16 | 0.8 | 60 | 4 | A216 |
| EPDR2010-16-01-TH | △ | 0.1 | 1 | 16 | 0.8 | 60 | 4 | A284 |
| EPDRE2010-20-01-ATH | ● | 0.1 | 1 | 20 | 0.8 | 60 | 4 | A195 |
| EPDRF4010-20-01-TH | ● | 0.1 | 1 | 20 | 0.8 | 60 | 4 | A216 |
| EPDR2010-20-01-TH | △ | 0.1 | 1 | 20 | 0.8 | 60 | 4 | A284 |
| EPSM4010-R0.1-PN | ● | 0.1 | 1 | – | 2.5 | 56 | 6 | A235 |
| EPDREH4010-1.5-02-TH3 | ● | 0.2 | 1 | 1.5 | 0.6 | 50 | 4 | A174 |
| EPDREH4010-2-02-TH3 | ● | 0.2 | 1 | 2 | 0.6 | 50 | 4 | A174 |
| EPDREH2010-2-02-TH3 | ● | 0.2 | 1 | 2 | 0.8 | 50 | 4 | A173 |
| EPDRE2010-2-02-ATH | ● | 0.2 | 1 | 2 | 0.8 | 50 | 4 | A195 |
| CBN-EPSR2010-2.5-02 | ● | 0.2 | 1 | 2.5 | 0.35 | 50 | 4 | A281 |
| BHSR2010-0.2 | □ | 0.2 | 1 | 2.5 | 0.5 | 60 | 6 | A456 |
| EPDREH4010-2.5-02-TH3 | ● | 0.2 | 1 | 2.5 | 0.6 | 50 | 4 | A174 |
| EPDREH4010-3-02-TH3 | ● | 0.2 | 1 | 3 | 0.6 | 50 | 4 | A174 |
| EPDRE2010-3-02-ATH | ● | 0.2 | 1 | 3 | 0.8 | 50 | 4 | A195 |
| EPDREH4010-4-02-TH3 | ● | 0.2 | 1 | 4 | 0.6 | 50 | 4 | A174 |
| EPDREH2010-4-02-TH3 | ● | 0.2 | 1 | 4 | 0.8 | 50 | 4 | A173 |
| EPDRE2010-4-02-ATH | ● | 0.2 | 1 | 4 | 0.8 | 50 | 4 | A195 |
| EPDR2010-4-02-TH | △ | 0.2 | 1 | 4 | 0.8 | 50 | 4 | A284 |
| CBN-EPSR2010-5-02 | ● | 0.2 | 1 | 5 | 0.35 | 50 | 4 | A281 |
| EPDREH4010-5-02-TH3 | ● | 0.2 | 1 | 5 | 0.6 | 50 | 4 | A174 |
| EPDRE2010-5-02-ATH | ● | 0.2 | 1 | 5 | 0.8 | 50 | 4 | A195 |
| ETR4010-5-02-TH | ● | 0.2 | 1 | 5 | 1 | 50 | 6 | A222 |
| ETRP4010-5-0902-TH | ● | 0.2 | 1 | 5 | 1 | 60 | 6 | A223 |
| EPDREH4010-6-02-TH3 | ● | 0.2 | 1 | 6 | 0.6 | 50 | 4 | A174 |
| EPDREH2010-6-02-TH3 | ● | 0.2 | 1 | 6 | 0.8 | 50 | 4 | A173 |
| EPDRE2010-6-02-ATH | ● | 0.2 | 1 | 6 | 0.8 | 50 | 4 | A195 |
| EPDR2010-6-02-TH | △ | 0.2 | 1 | 6 | 0.8 | 50 | 4 | A284 |
| ETR4010-7.5-02-TH | ● | 0.2 | 1 | 7.5 | 1 | 50 | 6 | A222 |
| ETRP4010-7.5-0902-TH | ● | 0.2 | 1 | 7.5 | 1 | 60 | 6 | A223 |
| EPDREH4010-8-02-TH3 | ● | 0.2 | 1 | 8 | 0.6 | 50 | 4 | A174 |
| EPDREH2010-8-02-TH3 | ● | 0.2 | 1 | 8 | 0.8 | 50 | 4 | A173 |
| EPDRE2010-8-02-ATH | ● | 0.2 | 1 | 8 | 0.8 | 50 | 4 | A195 |
| EPDR2010-8-02-TH | △ | 0.2 | 1 | 8 | 0.8 | 50 | 4 | A284 |
| EPDRP2010-8-0402-TH | ● | 0.2 | 1 | 8 | 0.8 | 55 | 6 | A210 |
| CBN-EPSR2010-10-02 | ● | 0.2 | 1 | 10 | 0.35 | 50 | 4 | A281 |
| EPDRE2010-10-02-ATH | ● | 0.2 | 1 | 10 | 0.8 | 50 | 4 | A195 |
| EPDR2010-10-02-TH | △ | 0.2 | 1 | 10 | 0.8 | 50 | 4 | A284 |
| EPDRP2010-10-0902-TH | ● | 0.2 | 1 | 10 | 0.8 | 55 | 6 | A210 |
| ETR4010-10-02-TH | ● | 0.2 | 1 | 10 | 1 | 50 | 6 | A222 |
| ETRP4010-10-0902-TH | ● | 0.2 | 1 | 10 | 1 | 60 | 6 | A223 |
| EGDR2010-10-02-HD | ● | 0.2 | 1 | 10 | 1.5 | 60 | 4 | A277 |
| EPDRE2010-12-02-ATH | ● | 0.2 | 1 | 12 | 0.8 | 55 | 4 | A195 |
| EPDR2010-12-02-TH | △ | 0.2 | 1 | 12 | 0.8 | 55 | 4 | A284 |
| ETR4010-12.5-02-TH | ● | 0.2 | 1 | 12.5 | 1 | 60 | 6 | A222 |
| EPDRP2010-15-0902-TH | ● | 0.2 | 1 | 15 | 0.8 | 60 | 6 | A210 |
| ETR4010-15-02-TH | ● | 0.2 | 1 | 15 | 1 | 60 | 6 | A222 |
| ETRP4010-15-0902-TH | ● | 0.2 | 1 | 15 | 1 | 60 | 6 | A223 |
| EPDRE2010-16-02-ATH | ● | 0.2 | 1 | 16 | 0.8 | 60 | 4 | A195 |
| EPDR2010-16-02-TH | △ | 0.2 | 1 | 16 | 0.8 | 60 | 4 | A284 |
| ETR4010-17.5-02-TH | ● | 0.2 | 1 | 17.5 | 1 | 60 | 6 | A222 |
| EPDRE2010-20-02-ATH | ● | 0.2 | 1 | 20 | 0.8 | 60 | 4 | A195 |
| EPDR2010-20-02-TH | △ | 0.2 | 1 | 20 | 0.8 | 60 | 4 | A284 |
| EPDRP2010-20-0902-TH | ● | 0.2 | 1 | 20 | 0.8 | 65 | 6 | A210 |
| ETR4010-20-02-TH | ● | 0.2 | 1 | 20 | 1 | 60 | 6 | A222 |
| ETRP4010-20-0902-TH | ● | 0.2 | 1 | 20 | 1 | 70 | 6 | A223 |
| EGDR2010-20-02-HD | ● | 0.2 | 1 | 20 | 1.5 | 60 | 4 | A277 |
| ETR4010-22.5-02-TH | ● | 0.2 | 1 | 22.5 | 1 | 70 | 6 | A222 |
| EPDRP2010-25-0902-TH | ● | 0.2 | 1 | 25 | 0.8 | 70 | 6 | A210 |

●印：標準在庫品です。　●：Stocked Items.　△印:在庫が無くなり次第受注生産品となるものです。△:When the Stock is out, will become to produce on request.

単位 unit：mm

| 商品コード Item Code | 在庫 Stock | コーナ半径 Corner radius | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|---|
| ETR4010-25-02-TH | ● | 0.2 | 1 | 25 | 1 | 70 | 6 | A222 |
| ETRP4010-25-0902-TH | ● | 0.2 | 1 | 25 | 1 | 70 | 6 | A223 |
| ETR4010-27.5-02-TH | ● | 0.2 | 1 | 27.5 | 1 | 70 | 6 | A222 |
| EPDRP2010-30-0902-TH | ● | 0.2 | 1 | 30 | 0.8 | 75 | 6 | A210 |
| ETR4010-30-02-TH | ● | 0.2 | 1 | 30 | 1 | 70 | 6 | A222 |
| ETRP4010-30-0902-TH | ● | 0.2 | 1 | 30 | 1 | 80 | 6 | A223 |
| EGDR2010-30-02-HD | ● | 0.2 | 1 | 30 | 1.5 | 80 | 4 | A277 |
| EPDRP2010-35-0902-TH | ● | 0.2 | 1 | 35 | 0.8 | 80 | 6 | A210 |
| ETRP4010-35-0902-TH | ● | 0.2 | 1 | 35 | 1 | 80 | 6 | A223 |
| ETRP4010-40-0902-TH | ● | 0.2 | 1 | 40 | 1 | 90 | 6 | A223 |
| EGDR2010-40-02-HD | ● | 0.2 | 1 | 40 | 1.5 | 80 | 4 | A277 |
| ETRP4010-45-0902-TH | ● | 0.2 | 1 | 45 | 1 | 90 | 6 | A223 |
| ETRP4010-50-0902-TH | ● | 0.2 | 1 | 50 | 1 | 100 | 6 | A223 |
| EPDREH4010-1.5-03-TH3 | ● | 0.3 | 1 | 1.5 | 0.6 | 50 | 4 | A174 |
| EPDREH4010-2-03-TH3 | ● | 0.3 | 1 | 2 | 0.6 | 50 | 4 | A174 |
| EPDRE2010-2-03-ATH | ● | 0.3 | 1 | 2 | 0.8 | 50 | 4 | A196 |
| BHSR2010-0.3 | □ | 0.3 | 1 | 2.5 | 0.5 | 60 | 6 | A456 |
| EPDREH4010-2.5-03-TH3 | ● | 0.3 | 1 | 2.5 | 0.6 | 50 | 4 | A174 |
| EPDREH4010-3-03-TH3 | ● | 0.3 | 1 | 3 | 0.6 | 50 | 4 | A174 |
| EPDRE2010-3-03-ATH | ● | 0.3 | 1 | 3 | 0.8 | 50 | 4 | A196 |
| EPDREH4010-4-03-TH3 | ● | 0.3 | 1 | 4 | 0.6 | 50 | 4 | A174 |
| EPDRE2010-4-03-ATH | ● | 0.3 | 1 | 4 | 0.8 | 50 | 4 | A196 |
| EPDREH4010-5-03-TH3 | ● | 0.3 | 1 | 5 | 0.6 | 50 | 4 | A174 |
| EPDRE2010-5-03-ATH | ● | 0.3 | 1 | 5 | 0.8 | 50 | 4 | A196 |
| EPDREH4010-6-03-TH3 | ● | 0.3 | 1 | 6 | 0.6 | 50 | 4 | A174 |
| EPDRE2010-6-03-ATH | ● | 0.3 | 1 | 6 | 0.8 | 50 | 4 | A196 |
| EPDR2010-6-03-TH | △ | 0.3 | 1 | 6 | 0.8 | 50 | 4 | A284 |
| EPDREH4010-8-03-TH3 | ● | 0.3 | 1 | 8 | 0.6 | 50 | 4 | A174 |
| EPDRE2010-8-03-ATH | ● | 0.3 | 1 | 8 | 0.8 | 50 | 4 | A196 |
| EPDRP2010-8-0403-TH | ● | 0.3 | 1 | 8 | 0.8 | 55 | 6 | A210 |
| EPDRE2010-10-03-ATH | ● | 0.3 | 1 | 10 | 0.8 | 50 | 4 | A196 |
| EPDR2010-10-03-TH | △ | 0.3 | 1 | 10 | 0.8 | 50 | 4 | A284 |
| EPDRE2010-12-03-ATH | ● | 0.3 | 1 | 12 | 0.8 | 55 | 4 | A196 |
| EPDRP2010-15-0903-TH | ● | 0.3 | 1 | 15 | 0.8 | 60 | 6 | A210 |
| EPDRE2010-16-03-ATH | ● | 0.3 | 1 | 16 | 0.8 | 60 | 4 | A196 |
| EPDR2010-16-03-TH | △ | 0.3 | 1 | 16 | 0.8 | 60 | 4 | A284 |
| EPDRE2010-20-03-ATH | ● | 0.3 | 1 | 20 | 0.8 | 60 | 4 | A196 |
| EPDR2010-20-03-TH | △ | 0.3 | 1 | 20 | 0.8 | 60 | 4 | A284 |
| EPDRP2010-25-0903-TH | ● | 0.3 | 1 | 25 | 0.8 | 70 | 6 | A210 |
| EPDRP2010-30-0903-TH | ● | 0.3 | 1 | 30 | 0.8 | 75 | 6 | A210 |
| EPDRE20125-5-01-ATH | ● | 0.1 | 1.25 | 5 | 1.15 | 50 | 4 | A196 |
| EPDRE20125-10-01-ATH | ● | 0.1 | 1.25 | 10 | 1.15 | 50 | 4 | A196 |
| EPDRE20125-15-01-ATH | ● | 0.1 | 1.25 | 15 | 1.15 | 55 | 4 | A196 |
| EPDRE20125-20-01-ATH | ● | 0.1 | 1.25 | 20 | 1.15 | 60 | 4 | A196 |
| EPDRE20125-5-02-ATH | ● | 0.2 | 1.25 | 5 | 1.15 | 50 | 4 | A196 |
| ETR40125-5-02-TH | ● | 0.2 | 1.25 | 5 | 1.25 | 50 | 6 | A222 |
| EPDRE20125-10-02-ATH | ● | 0.2 | 1.25 | 10 | 1.15 | 50 | 4 | A196 |
| ETR40125-10-02-TH | ● | 0.2 | 1.25 | 10 | 1.25 | 50 | 6 | A222 |
| ETRP40125-10-0902-TH | ● | 0.2 | 1.25 | 10 | 1.25 | 60 | 6 | A223 |
| EPDRE20125-15-02-ATH | ● | 0.2 | 1.25 | 15 | 1.15 | 55 | 4 | A196 |
| ETR40125-15-02-TH | ● | 0.2 | 1.25 | 15 | 1.25 | 60 | 6 | A222 |
| ETRP40125-15-0902-TH | ● | 0.2 | 1.25 | 15 | 1.25 | 60 | 6 | A223 |
| EPDRE20125-20-02-ATH | ● | 0.2 | 1.25 | 20 | 1.15 | 60 | 4 | A196 |
| ETR40125-20-02-TH | ● | 0.2 | 1.25 | 20 | 1.25 | 60 | 6 | A222 |
| ETRP40125-20-0902-TH | ● | 0.2 | 1.25 | 20 | 1.25 | 70 | 6 | A223 |
| ETR40125-25-02-TH | ● | 0.2 | 1.25 | 25 | 1.25 | 70 | 6 | A222 |
| ETR40125-30-02-TH | ● | 0.2 | 1.25 | 30 | 1.25 | 70 | 6 | A222 |
| ETRP40125-30-0902-TH | ● | 0.2 | 1.25 | 30 | 1.25 | 80 | 6 | A223 |
| ETRP40125-40-0902-TH | ● | 0.2 | 1.25 | 40 | 1.25 | 90 | 6 | A223 |
| ETRP40125-50-0902-TH | ● | 0.2 | 1.25 | 50 | 1.25 | 100 | 6 | A223 |
| EPDRE20125-5-03-ATH | ● | 0.3 | 1.25 | 5 | 1.15 | 50 | 4 | A196 |
| EPDRE20125-10-03-ATH | ● | 0.3 | 1.25 | 10 | 1.15 | 50 | 4 | A196 |
| EPDRE20125-15-03-ATH | ● | 0.3 | 1.25 | 15 | 1.15 | 55 | 4 | A196 |
| EPDRE20125-20-03-ATH | ● | 0.3 | 1.25 | 20 | 1.15 | 60 | 4 | A196 |
| EPDREH4015-2-002-TH3 | ● | 0.02 | 1.5 | 2 | 0.9 | 50 | 4 | A175 |
| EPDREH4015-3-002-TH3 | ● | 0.02 | 1.5 | 3 | 0.9 | 50 | 4 | A175 |
| EPDREH4015-4-002-TH3 | ● | 0.02 | 1.5 | 4 | 0.9 | 50 | 4 | A175 |
| EPDREH4015-5-002-TH3 | ● | 0.02 | 1.5 | 5 | 0.9 | 50 | 4 | A175 |
| EPDREH4015-6-002-TH3 | ● | 0.02 | 1.5 | 6 | 0.9 | 50 | 4 | A175 |
| EPDREH4015-8-002-TH3 | ● | 0.02 | 1.5 | 8 | 0.9 | 50 | 4 | A175 |
| EPDREH4015-10-002-TH3 | ● | 0.02 | 1.5 | 10 | 0.9 | 50 | 4 | A175 |
| EPDREH4015-12-002-TH3 | ● | 0.02 | 1.5 | 12 | 0.9 | 50 | 4 | A175 |
| CBN-EPSR2015-2-005 | ● | 0.05 | 1.5 | 2 | 0.53 | 50 | 4 | A281 |
| EPDREH4015-2-005-TH3 | ● | 0.05 | 1.5 | 2 | 0.9 | 50 | 4 | A175 |
| EPDREH4015-3-005-TH3 | ● | 0.05 | 1.5 | 3 | 0.9 | 50 | 4 | A175 |
| EPDREH4015-4-005-TH3 | ● | 0.05 | 1.5 | 4 | 0.9 | 50 | 4 | A175 |
| EPDRF4015-4-005-TH | ● | 0.05 | 1.5 | 4 | 1.35 | 50 | 4 | A216 |
| CBN-EPSR2015-5-005 | ● | 0.05 | 1.5 | 5 | 0.53 | 50 | 4 | A281 |
| EPDREH4015-5-005-TH3 | ● | 0.05 | 1.5 | 5 | 0.9 | 50 | 4 | A175 |
| EPDREH4015-6-005-TH3 | ● | 0.05 | 1.5 | 6 | 0.9 | 50 | 4 | A175 |
| EPDREH4015-8-005-TH3 | ● | 0.05 | 1.5 | 8 | 0.9 | 50 | 4 | A175 |
| EPDRF4015-8-005-TH | ● | 0.05 | 1.5 | 8 | 1.35 | 50 | 4 | A216 |
| EPDREH4015-10-005-TH3 | ● | 0.05 | 1.5 | 10 | 0.9 | 50 | 4 | A175 |
| EPDREH4015-12-005-TH3 | ● | 0.05 | 1.5 | 12 | 0.9 | 50 | 4 | A175 |
| EPDRF4015-12-005-TH | ● | 0.05 | 1.5 | 12 | 1.35 | 60 | 4 | A216 |
| EPDRF4015-15-005-TH | ● | 0.05 | 1.5 | 15 | 1.35 | 60 | 4 | A216 |
| EPDRF4015-20-005-TH | ● | 0.05 | 1.5 | 20 | 1.35 | 60 | 4 | A216 |
| CBN-EPSR2015-2-01 | ● | 0.1 | 1.5 | 2 | 0.53 | 50 | 4 | A281 |
| EPDREH4015-2-01-TH3 | ● | 0.1 | 1.5 | 2 | 0.9 | 50 | 4 | A175 |
| BHSR2015-0.1 | □ | 0.1 | 1.5 | 2.5 | 0.75 | 60 | 6 | A456 |
| EPDREH4015-3-01-TH3 | ● | 0.1 | 1.5 | 3 | 0.9 | 50 | 4 | A175 |
| EPDREH4015-4-01-TH3 | ● | 0.1 | 1.5 | 4 | 0.9 | 50 | 4 | A175 |
| EPDRE2015-4-01-ATH | ● | 0.1 | 1.5 | 4 | 1.35 | 50 | 4 | A196 |
| EPDRF4015-4-01-TH | ● | 0.1 | 1.5 | 4 | 1.35 | 50 | 4 | A216 |
| EPDR2015-4-01-TH | △ | 0.1 | 1.5 | 4 | 1.35 | 50 | 4 | A284 |
| CBN-EPSR2015-5-01 | ● | 0.1 | 1.5 | 5 | 0.53 | 50 | 4 | A281 |
| EPDREH4015-5-01-TH3 | ● | 0.1 | 1.5 | 5 | 0.9 | 50 | 4 | A175 |
| EPDREH4015-6-01-TH3 | ● | 0.1 | 1.5 | 6 | 0.9 | 50 | 4 | A175 |
| EPDRE2015-6-01-ATH | ● | 0.1 | 1.5 | 6 | 1.35 | 50 | 4 | A196 |
| EPDREH4015-8-01-TH3 | ● | 0.1 | 1.5 | 8 | 0.9 | 50 | 4 | A175 |
| EPDRE2015-8-01-ATH | ● | 0.1 | 1.5 | 8 | 1.35 | 50 | 4 | A196 |
| EPDRF4015-8-01-TH | ● | 0.1 | 1.5 | 8 | 1.35 | 50 | 4 | A216 |
| EPDR2015-8-01-TH | △ | 0.1 | 1.5 | 8 | 1.35 | 50 | 4 | A284 |
| EPDREH4015-10-01-TH3 | ● | 0.1 | 1.5 | 10 | 0.9 | 50 | 4 | A175 |
| EPDREH4015-12-01-TH3 | ● | 0.1 | 1.5 | 12 | 0.9 | 50 | 4 | A175 |
| EPDRE2015-12-01-ATH | ● | 0.1 | 1.5 | 12 | 1.35 | 55 | 4 | A196 |
| EPDR2015-12-01-TH | △ | 0.1 | 1.5 | 12 | 1.35 | 55 | 4 | A284 |
| EPDRF4015-12-01-TH | ● | 0.1 | 1.5 | 12 | 1.35 | 60 | 4 | A216 |
| EPDRE2015-15-01-ATH | ● | 0.1 | 1.5 | 15 | 1.35 | 55 | 4 | A196 |
| EPDR2015-15-01-TH | △ | 0.1 | 1.5 | 15 | 1.35 | 55 | 4 | A284 |
| EPDRF4015-15-01-TH | ● | 0.1 | 1.5 | 15 | 1.35 | 60 | 4 | A216 |
| EPDRE2015-20-01-ATH | ● | 0.1 | 1.5 | 20 | 1.35 | 60 | 4 | A196 |
| EPDRF4015-20-01-TH | ● | 0.1 | 1.5 | 20 | 1.35 | 60 | 4 | A216 |
| EPDR2015-20-01-TH | △ | 0.1 | 1.5 | 20 | 1.35 | 60 | 4 | A284 |
| EPDREH4015-2-02-TH3 | ● | 0.2 | 1.5 | 2 | 0.9 | 50 | 4 | A175 |
| BHSR2015-0.2 | □ | 0.2 | 1.5 | 2.5 | 0.75 | 60 | 6 | A456 |
| EPDREH4015-3-02-TH3 | ● | 0.2 | 1.5 | 3 | 0.9 | 50 | 4 | A175 |
| EPDREH4015-4-02-TH3 | ● | 0.2 | 1.5 | 4 | 0.9 | 50 | 4 | A175 |
| EPDRE2015-4-02-ATH | ● | 0.2 | 1.5 | 4 | 1.35 | 50 | 4 | A196 |
| EPDR2015-4-02-TH | △ | 0.2 | 1.5 | 4 | 1.35 | 50 | 4 | A284 |
| CBN-EPSR2015-5-02 | ● | 0.2 | 1.5 | 5 | 0.53 | 50 | 4 | A281 |
| EPDREH4015-5-02-TH3 | ● | 0.2 | 1.5 | 5 | 0.9 | 50 | 4 | A175 |
| EPDREH4015-6-02-TH3 | ● | 0.2 | 1.5 | 6 | 0.9 | 50 | 4 | A175 |
| EPDRE2015-6-02-ATH | ● | 0.2 | 1.5 | 6 | 1.35 | 50 | 4 | A196 |
| EPDREH4015-8-02-TH3 | ● | 0.2 | 1.5 | 8 | 0.9 | 50 | 4 | A175 |
| EPDRE2015-8-02-ATH | ● | 0.2 | 1.5 | 8 | 1.35 | 50 | 4 | A196 |
| EPDR2015-8-02-TH | △ | 0.2 | 1.5 | 8 | 1.35 | 50 | 4 | A284 |
| CBN-EPSR2015-10-02 | ● | 0.2 | 1.5 | 10 | 0.53 | 50 | 4 | A281 |
| EPDREH4015-10-02-TH3 | ● | 0.2 | 1.5 | 10 | 0.9 | 50 | 4 | A175 |
| EPDRP2015-10-0402-TH | ● | 0.2 | 1.5 | 10 | 1.35 | 55 | 6 | A210 |
| EPDREH4015-12-02-TH3 | ● | 0.2 | 1.5 | 12 | 0.9 | 50 | 4 | A175 |
| EPDRE2015-12-02-ATH | ● | 0.2 | 1.5 | 12 | 1.35 | 55 | 4 | A196 |
| EPDR2015-12-02-TH | △ | 0.2 | 1.5 | 12 | 1.35 | 55 | 4 | A284 |
| EPDRE2015-15-02-ATH | ● | 0.2 | 1.5 | 15 | 1.35 | 55 | 4 | A196 |
| EPDR2015-15-02-TH | △ | 0.2 | 1.5 | 15 | 1.35 | 55 | 4 | A284 |
| EPDRP2015-15-0902-TH | ● | 0.2 | 1.5 | 15 | 1.35 | 60 | 6 | A210 |
| EPDRE2015-20-02-ATH | ● | 0.2 | 1.5 | 20 | 1.35 | 60 | 4 | A196 |
| EPDR2015-20-02-TH | △ | 0.2 | 1.5 | 20 | 1.35 | 60 | 4 | A284 |
| EPDRP2015-20-0902-TH | ● | 0.2 | 1.5 | 20 | 1.35 | 65 | 6 | A210 |
| EGDR2015-20-02-HD | ● | 0.2 | 1.5 | 20 | 2.25 | 60 | 4 | A277 |
| EPDRP2015-25-0902-TH | ● | 0.2 | 1.5 | 25 | 1.35 | 70 | 6 | A210 |
| EPDRP2015-30-0902-TH | ● | 0.2 | 1.5 | 30 | 1.35 | 75 | 6 | A210 |
| EGDR2015-40-02-HD | ● | 0.2 | 1.5 | 40 | 2.25 | 80 | 4 | A277 |
| EPDREH4015-2-03-TH3 | ● | 0.3 | 1.5 | 2 | 0.9 | 50 | 4 | A175 |
| BHSR2015-0.3 | □ | 0.3 | 1.5 | 2.5 | 0.75 | 60 | 6 | A456 |
| EPDREH4015-3-03-TH3 | ● | 0.3 | 1.5 | 3 | 0.9 | 50 | 4 | A175 |
| EPDREH4015-4-03-TH3 | ● | 0.3 | 1.5 | 4 | 0.9 | 50 | 4 | A175 |
| EPDRE2015-4-03-ATH | ● | 0.3 | 1.5 | 4 | 1.35 | 50 | 4 | A196 |
| EPDREH4015-5-03-TH3 | ● | 0.3 | 1.5 | 5 | 0.9 | 50 | 4 | A175 |
| ETR4015-5-03-TH | ● | 0.3 | 1.5 | 5 | 1.5 | 50 | 6 | A222 |
| EPDREH4015-6-03-TH3 | ● | 0.3 | 1.5 | 6 | 0.9 | 50 | 4 | A175 |
| EPDRE2015-6-03-ATH | ● | 0.3 | 1.5 | 6 | 1.35 | 50 | 4 | A196 |
| EPDREH4015-8-03-TH3 | ● | 0.3 | 1.5 | 8 | 0.9 | 50 | 4 | A175 |
| EPDRE2015-8-03-ATH | ● | 0.3 | 1.5 | 8 | 1.35 | 50 | 4 | A196 |
| EPDR2015-8-03-TH | △ | 0.3 | 1.5 | 8 | 1.35 | 50 | 4 | A284 |
| EPDREH4015-10-03-TH3 | ● | 0.3 | 1.5 | 10 | 0.9 | 50 | 4 | A175 |
| EPDRP2015-10-0403-TH | ● | 0.3 | 1.5 | 10 | 1.35 | 55 | 6 | A210 |
| ETR4015-10-03-TH | ● | 0.3 | 1.5 | 10 | 1.5 | 50 | 6 | A222 |
| ETRP4015-10-0903-TH | ● | 0.3 | 1.5 | 10 | 1.5 | 60 | 6 | A223 |
| EPDREH4015-12-03-TH3 | ● | 0.3 | 1.5 | 12 | 0.9 | 50 | 4 | A175 |
| EPDRE2015-12-03-ATH | ● | 0.3 | 1.5 | 12 | 1.35 | 55 | 4 | A196 |
| EPDRE2015-15-03-ATH | ● | 0.3 | 1.5 | 15 | 1.35 | 55 | 4 | A196 |
| EPDR2015-15-03-TH | △ | 0.3 | 1.5 | 15 | 1.35 | 55 | 4 | A284 |
| ETR4015-15-03-TH | ● | 0.3 | 1.5 | 15 | 1.5 | 60 | 6 | A222 |
| ETRP4015-15-0903-TH | ● | 0.3 | 1.5 | 15 | 1.5 | 60 | 6 | A223 |
| EPDRE2015-20-03-ATH | ● | 0.3 | 1.5 | 20 | 1.35 | 60 | 4 | A196 |
| EPDR2015-20-03-TH | △ | 0.3 | 1.5 | 20 | 1.35 | 60 | 4 | A284 |
| EPDRP2015-20-0903-TH | ● | 0.3 | 1.5 | 20 | 1.35 | 65 | 6 | A210 |
| ETR4015-20-03-TH | ● | 0.3 | 1.5 | 20 | 1.5 | 60 | 6 | A222 |
| ETRP4015-20-0903-TH | ● | 0.3 | 1.5 | 20 | 1.5 | 70 | 6 | A223 |
| EPDRP2015-25-0903-TH | ● | 0.3 | 1.5 | 25 | 1.35 | 70 | 6 | A210 |
| ETR4015-25-03-TH | ● | 0.3 | 1.5 | 25 | 1.5 | 70 | 6 | A222 |
| EPDRP2015-30-0903-TH | ● | 0.3 | 1.5 | 30 | 1.35 | 75 | 6 | A210 |
| ETR4015-30-03-TH | ● | 0.3 | 1.5 | 30 | 1.5 | 70 | 6 | A222 |
| ETRP4015-30-0903-TH | ● | 0.3 | 1.5 | 30 | 1.5 | 80 | 6 | A223 |
| ETRP4015-40-0903-TH | ● | 0.3 | 1.5 | 40 | 1.5 | 90 | 6 | A223 |
| ETRP4015-50-0903-TH | ● | 0.3 | 1.5 | 50 | 1.5 | 100 | 6 | A223 |
| EPDREH4015-2-05-TH3 | ● | 0.5 | 1.5 | 2 | 0.9 | 50 | 4 | A176 |
| EPDREH4015-3-05-TH3 | ● | 0.5 | 1.5 | 3 | 0.9 | 50 | 4 | A176 |
| EPDREH4015-4-05-TH3 | ● | 0.5 | 1.5 | 4 | 0.9 | 50 | 4 | A176 |
| EPDRE2015-4-05-ATH | ● | 0.5 | 1.5 | 4 | 1.35 | 50 | 4 | A196 |
| EPDREH4015-5-05-TH3 | ● | 0.5 | 1.5 | 5 | 0.9 | 50 | 4 | A176 |
| EPDREH4015-6-05-TH3 | ● | 0.5 | 1.5 | 6 | 0.9 | 50 | 4 | A176 |
| EPDRE2015-6-05-ATH | ● | 0.5 | 1.5 | 6 | 1.35 | 50 | 4 | A196 |
| EPDREH4015-8-05-TH3 | ● | 0.5 | 1.5 | 8 | 0.9 | 50 | 4 | A176 |
| EPDRE2015-8-05-ATH | ● | 0.5 | 1.5 | 8 | 1.35 | 50 | 4 | A196 |
| EPDREH4015-10-05-TH3 | ● | 0.5 | 1.5 | 10 | 0.9 | 50 | 4 | A176 |
| EPDREH4015-12-05-TH3 | ● | 0.5 | 1.5 | 12 | 0.9 | 50 | 4 | A176 |
| EPDRE2015-12-05-ATH | ● | 0.5 | 1.5 | 12 | 1.35 | 55 | 4 | A196 |
| EPDRE2015-15-05-ATH | ● | 0.5 | 1.5 | 15 | 1.35 | 55 | 4 | A196 |
| EPDRE2015-20-05-ATH | ● | 0.5 | 1.5 | 20 | 1.35 | 60 | 4 | A196 |
| EPDRE20175-5-01-ATH | ● | 0.1 | 1.75 | 5 | 1.55 | 50 | 4 | A196 |
| EPDRE20175-10-01-ATH | ● | 0.1 | 1.75 | 10 | 1.55 | 50 | 4 | A196 |
| EPDRE20175-15-01-ATH | ● | 0.1 | 1.75 | 15 | 1.55 | 55 | 4 | A196 |
| EPDRE20175-20-01-ATH | ● | 0.1 | 1.75 | 20 | 1.55 | 60 | 4 | A196 |
| EPDRE20175-5-02-ATH | ● | 0.2 | 1.75 | 5 | 1.55 | 50 | 4 | A196 |
| EPDRE20175-10-02-ATH | ● | 0.2 | 1.75 | 10 | 1.55 | 50 | 4 | A196 |
| EPDRE20175-15-02-ATH | ● | 0.2 | 1.75 | 15 | 1.55 | 55 | 4 | A196 |
| EPDRE20175-20-02-ATH | ● | 0.2 | 1.75 | 20 | 1.55 | 60 | 4 | A196 |
| EPDRE20175-5-03-ATH | ● | 0.3 | 1.75 | 5 | 1.55 | 50 | 4 | A196 |
| EPDRE20175-10-03-ATH | ● | 0.3 | 1.75 | 10 | 1.55 | 50 | 4 | A196 |
| ETR40175-10-03-TH | ● | 0.3 | 1.75 | 10 | 1.75 | 50 | 6 | A222 |
| ETRP40175-10-0903-TH | ● | 0.3 | 1.75 | 10 | 1.75 | 60 | 6 | A223 |
| EPDRE20175-15-03-ATH | ● | 0.3 | 1.75 | 15 | 1.55 | 55 | 4 | A196 |
| ETRP40175-15-0903-TH | ● | 0.3 | 1.75 | 15 | 1.75 | 60 | 6 | A223 |
| EPDRE20175-20-03-ATH | ● | 0.3 | 1.75 | 20 | 1.55 | 60 | 4 | A196 |
| ETR40175-20-03-TH | ● | 0.3 | 1.75 | 20 | 1.75 | 60 | 6 | A222 |

□印：特定代理店在庫です。弊社営業へお問合せください。□：Stocked by specified distributor. Contact with our sales department.

Quick dimension reference table by mill diameter

# 外径別寸法早見表

## 超硬エンドミル・ラジアス　φ1.75～φ4　Carbide End Mills -Radius

単位 unit：mm

| 商品コード Item Code | 在庫 Stock | コーナ半径 Corner radius | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|---|
| ETRP40175-20-0903-TH | ● | 0.3 | 1.75 | 20 | 1.75 | 70 | 6 | A223 |
| ETR40175-30-03-TH | ● | 0.3 | 1.75 | 30 | 1.75 | 70 | 6 | A222 |
| ETRP40175-30-0903-TH | ● | 0.3 | 1.75 | 30 | 1.75 | 80 | 6 | A223 |
| ETR40175-40-03-TH | ● | 0.3 | 1.75 | 40 | 1.75 | 80 | 6 | A222 |
| ETRP40175-40-0903-TH | ● | 0.3 | 1.75 | 40 | 1.75 | 90 | 6 | A223 |
| ETRP40175-50-0903-TH | ● | 0.3 | 1.75 | 50 | 1.75 | 100 | 6 | A223 |
| EPDREH4020-2.5-002-TH3 | ● | 0.02 | 2 | 2.5 | 1.2 | 50 | 4 | A176 |
| EPDREH4020-3-002-TH3 | ● | 0.02 | 2 | 3 | 1.2 | 50 | 4 | A176 |
| EPDREH4020-4-002-TH3 | ● | 0.02 | 2 | 4 | 1.2 | 50 | 4 | A176 |
| EPDREH4020-5-002-TH3 | ● | 0.02 | 2 | 5 | 1.2 | 50 | 4 | A176 |
| EPDREH4020-6-002-TH3 | ● | 0.02 | 2 | 6 | 1.2 | 50 | 4 | A176 |
| EPDREH4020-8-002-TH3 | ● | 0.02 | 2 | 8 | 1.2 | 50 | 4 | A176 |
| EPDREH4020-10-002-TH3 | ● | 0.02 | 2 | 10 | 1.2 | 50 | 4 | A176 |
| EPDREH4020-12-002-TH3 | ● | 0.02 | 2 | 12 | 1.2 | 50 | 4 | A176 |
| EPDREH4020-2.5-005-TH3 | ● | 0.05 | 2 | 2.5 | 1.2 | 50 | 4 | A176 |
| CBN-EPSR2020-3-005 | ● | 0.05 | 2 | 3 | 0.7 | 50 | 4 | A281 |
| EPDREH4020-3-005-TH3 | ● | 0.05 | 2 | 3 | 1.2 | 50 | 4 | A176 |
| EPDREH4020-4-005-TH3 | ● | 0.05 | 2 | 4 | 1.2 | 50 | 4 | A176 |
| EPDRF4020-4-005-TH | ● | 0.05 | 2 | 4 | 1.7 | 50 | 4 | A216 |
| CBN-EPSR2020-5-005 | ● | 0.05 | 2 | 5 | 0.7 | 50 | 4 | A281 |
| EPDREH4020-5-005-TH3 | ● | 0.05 | 2 | 5 | 1.2 | 50 | 4 | A176 |
| EPDREH4020-6-005-TH3 | ● | 0.05 | 2 | 6 | 1.2 | 50 | 4 | A176 |
| EPDRF4020-6-005-TH | ● | 0.05 | 2 | 6 | 1.7 | 50 | 4 | A216 |
| EPDREH4020-8-005-TH3 | ● | 0.05 | 2 | 8 | 1.2 | 50 | 4 | A176 |
| EPDRF4020-8-005-TH | ● | 0.05 | 2 | 8 | 1.7 | 50 | 4 | A216 |
| CBN-EPSR2020-10-005 | ● | 0.05 | 2 | 10 | 0.7 | 50 | 4 | A281 |
| EPDREH4020-10-005-TH3 | ● | 0.05 | 2 | 10 | 1.2 | 50 | 4 | A176 |
| EPDREH4020-12-005-TH3 | ● | 0.05 | 2 | 12 | 1.2 | 50 | 4 | A176 |
| EPDRF4020-12-005-TH | ● | 0.05 | 2 | 12 | 1.7 | 60 | 4 | A216 |
| EPDRF4020-16-005-TH | ● | 0.05 | 2 | 16 | 1.7 | 60 | 4 | A216 |
| EPDRF4020-20-005-TH | ● | 0.05 | 2 | 20 | 1.7 | 60 | 4 | A216 |
| BHSR2020-0.1 | □ | 0.1 | 2 | 2.5 | 1 | 60 | 6 | A456 |
| EPDREH4020-2.5-01-TH3 | ● | 0.1 | 2 | 2.5 | 1.2 | 50 | 4 | A176 |
| CBN-EPSR2020-3-01 | ● | 0.1 | 2 | 3 | 0.7 | 50 | 4 | A281 |
| EPDREH4020-3-01-TH3 | ● | 0.1 | 2 | 3 | 1.2 | 50 | 4 | A176 |
| EPDREH4020-4-01-TH3 | ● | 0.1 | 2 | 4 | 1.2 | 50 | 4 | A176 |
| EPDRE2020-4-01-ATH | ● | 0.1 | 2 | 4 | 1.7 | 50 | 4 | A197 |
| EPDRF4020-4-01-TH | ● | 0.1 | 2 | 4 | 1.7 | 50 | 4 | A216 |
| CBN-EPSR2020-5-01 | ● | 0.1 | 2 | 5 | 0.7 | 50 | 4 | A281 |
| EPDREH4020-5-01-TH3 | ● | 0.1 | 2 | 5 | 1.2 | 50 | 4 | A176 |
| EPDREH4020-6-01-TH3 | ● | 0.1 | 2 | 6 | 1.2 | 50 | 4 | A176 |
| EPDRE2020-6-01-ATH | ● | 0.1 | 2 | 6 | 1.7 | 50 | 4 | A197 |
| EPDRF4020-6-01-TH | ● | 0.1 | 2 | 6 | 1.7 | 50 | 4 | A216 |
| EHHRE4020-S4-TH3 | ● | 0.1 | 2 | 6 | 2 | 50 | 4 | A263 |
| EHHRE4020-S6-TH3 | ● | 0.1 | 2 | 6 | 2 | 50 | 6 | A263 |
| EPDREH4020-8-01-TH3 | ● | 0.1 | 2 | 8 | 1.2 | 50 | 4 | A176 |
| EPDRE2020-8-01-ATH | ● | 0.1 | 2 | 8 | 1.7 | 50 | 4 | A197 |
| EPDRF4020-8-01-TH | ● | 0.1 | 2 | 8 | 1.7 | 50 | 4 | A216 |
| CBN-EPSR2020-10-01 | ● | 0.1 | 2 | 10 | 0.7 | 50 | 4 | A281 |
| EPDREH4020-10-01-TH3 | ● | 0.1 | 2 | 10 | 1.2 | 50 | 4 | A176 |
| EPSM4020-10-R0.1-PN | ● | 0.1 | 2 | 10 | 3 | 68 | 6 | A238 |
| EPDREH4020-12-01-TH3 | ● | 0.1 | 2 | 12 | 1.2 | 50 | 4 | A176 |
| EPDRE2020-12-01-ATH | ● | 0.1 | 2 | 12 | 1.7 | 55 | 4 | A197 |
| EPDRF4020-12-01-TH | ● | 0.1 | 2 | 12 | 1.7 | 60 | 4 | A216 |
| EPDRE2020-16-01-ATH | ● | 0.1 | 2 | 16 | 1.7 | 55 | 4 | A197 |
| EPDRF4020-16-01-TH | ● | 0.1 | 2 | 16 | 1.7 | 60 | 4 | A216 |
| EPDRE2020-20-01-ATH | ● | 0.1 | 2 | 20 | 1.7 | 60 | 4 | A197 |
| EPDRF4020-20-01-TH | ● | 0.1 | 2 | 20 | 1.7 | 60 | 4 | A216 |
| EPDRE2020-25-01-ATH | ● | 0.1 | 2 | 25 | 1.7 | 65 | 4 | A197 |
| EPDRE2020-30-01-ATH | ● | 0.1 | 2 | 30 | 1.7 | 70 | 4 | A197 |
| EPSM4020-R0.1-PN | ● | 0.1 | 2 | – | 5 | 56 | 6 | A235 |
| BHSR2020-0.2 | □ | 0.2 | 2 | 2.5 | 1 | 60 | 6 | A456 |
| EPDREH4020-2.5-02-TH3 | ● | 0.2 | 2 | 2.5 | 1.2 | 50 | 4 | A176 |
| EPDREH4020-3-02-TH3 | ● | 0.2 | 2 | 3 | 1.2 | 50 | 4 | A176 |
| EPDREH4020-4-02-TH3 | ● | 0.2 | 2 | 4 | 1.2 | 50 | 4 | A176 |
| EPDRE2020-4-02-ATH | ● | 0.2 | 2 | 4 | 1.7 | 50 | 4 | A197 |
| EPDRF4020-4-02-TH | ● | 0.2 | 2 | 4 | 1.7 | 50 | 4 | A216 |
| CBN-EPSR2020-5-02 | ● | 0.2 | 2 | 5 | 0.7 | 50 | 4 | A281 |
| EPDREH4020-5-02-TH3 | ● | 0.2 | 2 | 5 | 1.2 | 50 | 4 | A176 |

| 商品コード Item Code | 在庫 Stock | コーナ半径 Corner radius | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|---|
| EPDREH4020-6-02-TH3 | ● | 0.2 | 2 | 6 | 1.2 | 50 | 4 | A176 |
| EPDRE2020-6-02-ATH | ● | 0.2 | 2 | 6 | 1.7 | 50 | 4 | A197 |
| EPDRF4020-6-02-TH | ● | 0.2 | 2 | 6 | 1.7 | 50 | 4 | A216 |
| EPDR2020-6-02-TH | △ | 0.2 | 2 | 6 | 1.7 | 50 | 4 | A285 |
| EPDREH4020-8-02-TH3 | ● | 0.2 | 2 | 8 | 1.2 | 50 | 4 | A176 |
| EPDRE2020-8-02-ATH | ● | 0.2 | 2 | 8 | 1.7 | 50 | 4 | A197 |
| EPDRF4020-8-02-TH | ● | 0.2 | 2 | 8 | 1.7 | 50 | 4 | A216 |
| EPDR2020-8-02-TH | △ | 0.2 | 2 | 8 | 1.7 | 50 | 4 | A285 |
| CBN-EPSR2020-10-02 | ● | 0.2 | 2 | 10 | 0.7 | 50 | 4 | A281 |
| EPDREH4020-10-02-TH3 | ● | 0.2 | 2 | 10 | 1.2 | 50 | 4 | A176 |
| EPSM4020-10-R0.2-PN | ● | 0.2 | 2 | 10 | 3 | 68 | 6 | A238 |
| EPDREH4020-12-02-TH3 | ● | 0.2 | 2 | 12 | 1.2 | 50 | 4 | A176 |
| EPDRE2020-12-02-ATH | ● | 0.2 | 2 | 12 | 1.7 | 55 | 4 | A197 |
| EPDR2020-12-02-TH | △ | 0.2 | 2 | 12 | 1.7 | 55 | 4 | A285 |
| EPDRF4020-12-02-TH | ● | 0.2 | 2 | 12 | 1.7 | 60 | 4 | A216 |
| EPDRE2020-16-02-ATH | ● | 0.2 | 2 | 16 | 1.7 | 55 | 4 | A197 |
| EPDR2020-16-02-TH | △ | 0.2 | 2 | 16 | 1.7 | 55 | 4 | A285 |
| EPDRF4020-16-02-TH | ● | 0.2 | 2 | 16 | 1.7 | 60 | 4 | A216 |
| CBN-EPSR2020-20-02 | ● | 0.2 | 2 | 20 | 0.7 | 55 | 4 | A281 |
| EPDRE2020-20-02-ATH | ● | 0.2 | 2 | 20 | 1.7 | 60 | 4 | A197 |
| EPDRF4020-20-02-TH | ● | 0.2 | 2 | 20 | 1.7 | 60 | 4 | A216 |
| EPDR2020-20-02-TH | △ | 0.2 | 2 | 20 | 1.7 | 60 | 4 | A285 |
| EGDR2020-20-02-HD | ● | 0.2 | 2 | 20 | 3 | 60 | 4 | A277 |
| EPDRE2020-25-02-ATH | ● | 0.2 | 2 | 25 | 1.7 | 65 | 4 | A197 |
| EPDR2020-25-02-TH | △ | 0.2 | 2 | 25 | 1.7 | 65 | 4 | A285 |
| EPDRF4020-25-02-TH | ● | 0.2 | 2 | 25 | 1.7 | 70 | 4 | A216 |
| EPDRE2020-30-02-ATH | ● | 0.2 | 2 | 30 | 1.7 | 70 | 4 | A197 |
| EPDRF4020-30-02-TH | ● | 0.2 | 2 | 30 | 1.7 | 70 | 4 | A216 |
| EPDR2020-30-02-TH | △ | 0.2 | 2 | 30 | 1.7 | 70 | 4 | A285 |
| EPDRP2020-30-0902-TH | ● | 0.2 | 2 | 30 | 1.7 | 70 | 6 | A211 |
| EPDRP2020-40-0902-TH | ● | 0.2 | 2 | 40 | 1.7 | 80 | 6 | A211 |
| EGDR2020-40-02-HD | ● | 0.2 | 2 | 40 | 3 | 80 | 4 | A277 |
| EPDRP2020-50-0902-TH | ● | 0.2 | 2 | 50 | 1.7 | 90 | 6 | A211 |
| EGDR2020-60-02-HD | ● | 0.2 | 2 | 60 | 3 | 100 | 4 | A277 |
| EPSM4020-R0.2-PN | ● | 0.2 | 2 | – | 5 | 56 | 6 | A235 |
| BHSR2020-0.3 | □ | 0.3 | 2 | 2.5 | 1 | 60 | 6 | A456 |
| EPDREH4020-2.5-03-TH3 | ● | 0.3 | 2 | 2.5 | 1.2 | 50 | 4 | A176 |
| EPDREH4020-3-03-TH3 | ● | 0.3 | 2 | 3 | 1.2 | 50 | 4 | A176 |
| EPDREH4020-4-03-TH3 | ● | 0.3 | 2 | 4 | 1.2 | 50 | 4 | A176 |
| EPDRE2020-4-03-ATH | ● | 0.3 | 2 | 4 | 1.7 | 50 | 4 | A197 |
| EPDRF4020-4-03-TH | ● | 0.3 | 2 | 4 | 1.7 | 50 | 4 | A217 |
| EPDREH4020-5-03-TH3 | ● | 0.3 | 2 | 5 | 1.2 | 50 | 4 | A176 |
| EPDREH4020-6-03-TH3 | ● | 0.3 | 2 | 6 | 1.2 | 50 | 4 | A176 |
| EPDRE2020-6-03-ATH | ● | 0.3 | 2 | 6 | 1.7 | 50 | 4 | A197 |
| EPDREH4020-8-03-TH3 | ● | 0.3 | 2 | 8 | 1.2 | 50 | 4 | A176 |
| EPDRE2020-8-03-ATH | ● | 0.3 | 2 | 8 | 1.7 | 50 | 4 | A197 |
| EPDRF4020-8-03-TH | ● | 0.3 | 2 | 8 | 1.7 | 50 | 4 | A217 |
| EPDR2020-8-03-TH | △ | 0.3 | 2 | 8 | 1.7 | 50 | 4 | A285 |
| EPDREH4020-10-03-TH3 | ● | 0.3 | 2 | 10 | 1.2 | 50 | 4 | A176 |
| EPDREH4020-12-03-TH3 | ● | 0.3 | 2 | 12 | 1.2 | 50 | 4 | A176 |
| EPDRE2020-12-03-ATH | ● | 0.3 | 2 | 12 | 1.7 | 55 | 4 | A197 |
| EPDRP2020-12-0403-TH | ● | 0.3 | 2 | 12 | 1.7 | 55 | 6 | A211 |
| EPDRF4020-12-03-TH | ● | 0.3 | 2 | 12 | 1.7 | 60 | 4 | A217 |
| EPDRE2020-16-03-ATH | ● | 0.3 | 2 | 16 | 1.7 | 55 | 4 | A197 |
| EPDR2020-16-03-TH | △ | 0.3 | 2 | 16 | 1.7 | 55 | 4 | A285 |
| EPDRF4020-16-03-TH | ● | 0.3 | 2 | 16 | 1.7 | 60 | 4 | A217 |
| EPDRE2020-20-03-ATH | ● | 0.3 | 2 | 20 | 1.7 | 60 | 4 | A197 |
| EPDRF4020-20-03-TH | ● | 0.3 | 2 | 20 | 1.7 | 60 | 4 | A217 |
| EPDR2020-20-03-TH | △ | 0.3 | 2 | 20 | 1.7 | 60 | 4 | A285 |
| EPDRP2020-20-0903-TH | ● | 0.3 | 2 | 20 | 1.7 | 65 | 6 | A211 |
| EPDRE2020-25-03-ATH | ● | 0.3 | 2 | 25 | 1.7 | 65 | 4 | A197 |
| EPDRE2020-30-03-ATH | ● | 0.3 | 2 | 30 | 1.7 | 70 | 4 | A197 |
| EPDRP2020-30-0903-TH | ● | 0.3 | 2 | 30 | 1.7 | 70 | 6 | A211 |
| EPDRP2020-40-0903-TH | ● | 0.3 | 2 | 40 | 1.7 | 80 | 6 | A211 |
| EPDRP2020-50-0903-TH | ● | 0.3 | 2 | 50 | 1.7 | 90 | 6 | A211 |
| BHSR2020-0.5 | □ | 0.5 | 2 | 2.5 | 1 | 60 | 6 | A456 |
| EPDREH4020-2.5-05-TH3 | ● | 0.5 | 2 | 2.5 | 1.2 | 50 | 4 | A176 |
| EPDREH4020-3-05-TH3 | ● | 0.5 | 2 | 3 | 1.2 | 50 | 4 | A176 |
| EPDREH4020-4-05-TH3 | ● | 0.5 | 2 | 4 | 1.2 | 50 | 4 | A176 |

| 商品コード Item Code | 在庫 Stock | コーナ半径 Corner radius | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|---|
| EPDRF4020-4-05-TH | ● | 0.5 | 2 | 4 | 1.7 | 50 | 4 | A217 |
| EPDREH4020-5-05-TH3 | ● | 0.5 | 2 | 5 | 1.2 | 50 | 4 | A177 |
| HGOF4020-05-TH | ● | 0.5 | 2 | 6 | 1 | 60 | 6 | A232 |
| EPDREH4020-6-05-TH3 | ● | 0.5 | 2 | 6 | 1.2 | 50 | 4 | A177 |
| EPDRE2020-6-05-ATH | ● | 0.5 | 2 | 6 | 1.7 | 50 | 4 | A197 |
| EPDRF4020-6-05-TH | ● | 0.5 | 2 | 6 | 1.7 | 50 | 4 | A217 |
| EPDR2020-6-05-TH | △ | 0.5 | 2 | 6 | 1.7 | 50 | 4 | A285 |
| HGOF2020-05-TH | ● | 0.5 | 2 | 6 | 3 | 60 | 6 | A232 |
| ETM4020-05-TH | ● | 0.5 | 2 | 6 | 4 | 70 | 6 | A226 |
| EPR3020-05 | □ | 0.5 | 2 | 6 | 4 | 70 | 6 | A429 |
| EPDREH4020-8-05-TH3 | ● | 0.5 | 2 | 8 | 1.2 | 50 | 4 | A177 |
| EPDRE2020-8-05-ATH | ● | 0.5 | 2 | 8 | 1.7 | 50 | 4 | A197 |
| EPDRF4020-8-05-TH | ● | 0.5 | 2 | 8 | 1.7 | 50 | 4 | A217 |
| EPDR2020-8-05-TH | △ | 0.5 | 2 | 8 | 1.7 | 50 | 4 | A285 |
| EPDRP2020-8-0405-TH | ● | 0.5 | 2 | 8 | 1.7 | 50 | 6 | A211 |
| EPDREH4020-10-05-TH3 | ● | 0.5 | 2 | 10 | 1.2 | 50 | 4 | A177 |
| ETR4020-10-05-TH | ● | 0.5 | 2 | 10 | 2 | 50 | 6 | A222 |
| EPDREH4020-12-05-TH3 | ● | 0.5 | 2 | 12 | 1.2 | 50 | 4 | A177 |
| EPDRE2020-12-05-ATH | ● | 0.5 | 2 | 12 | 1.7 | 55 | 4 | A197 |
| EPDR2020-12-05-TH | △ | 0.5 | 2 | 12 | 1.7 | 55 | 4 | A285 |
| EPDRP2020-12-0405-TH | ● | 0.5 | 2 | 12 | 1.7 | 55 | 6 | A211 |
| EPDRF4020-12-05-TH | ● | 0.5 | 2 | 12 | 1.7 | 60 | 4 | A217 |
| ETMP4020-12-05-TH | ● | 0.5 | 2 | 12 | 3 | 70 | 6 | A227 |
| EPRPN3020-12-05 | □ | 0.5 | 2 | 12 | 3 | 70 | 6 | A429 |
| ETR4020-15-05-TH | ● | 0.5 | 2 | 15 | 2 | 60 | 6 | A222 |
| ETRP4020-15-0905-TH | ● | 0.5 | 2 | 15 | 2 | 60 | 6 | A223 |
| EPDRE2020-16-05-ATH | ● | 0.5 | 2 | 16 | 1.7 | 55 | 4 | A197 |
| EPDR2020-16-05-TH | △ | 0.5 | 2 | 16 | 1.7 | 55 | 4 | A285 |
| EPDRF4020-16-05-TH | ● | 0.5 | 2 | 16 | 1.7 | 60 | 4 | A217 |
| EPDRP2020-16-0405-TH | ● | 0.5 | 2 | 16 | 1.7 | 60 | 6 | A211 |
| ETMP4020-16-05-TH | ● | 0.5 | 2 | 16 | 3 | 70 | 6 | A227 |
| EPRPN3020-16-05 | □ | 0.5 | 2 | 16 | 3 | 70 | 6 | A429 |
| EPDRE2020-20-05-ATH | ● | 0.5 | 2 | 20 | 1.7 | 60 | 4 | A197 |
| EPDRF4020-20-05-TH | ● | 0.5 | 2 | 20 | 1.7 | 60 | 4 | A217 |
| EPDR2020-20-05-TH | △ | 0.5 | 2 | 20 | 1.7 | 60 | 4 | A285 |
| EPDRP2020-20-0905-TH | ● | 0.5 | 2 | 20 | 1.7 | 65 | 6 | A211 |
| ETR4020-20-05-TH | ● | 0.5 | 2 | 20 | 2 | 60 | 6 | A222 |
| ETRP4020-20-0905-TH | ● | 0.5 | 2 | 20 | 2 | 70 | 6 | A223 |
| ETMP4020-20-05-TH | ● | 0.5 | 2 | 20 | 3 | 70 | 6 | A227 |
| EPRPN3020-20-05 | □ | 0.5 | 2 | 20 | 3 | 70 | 6 | A429 |
| EPDRE2020-25-05-ATH | ● | 0.5 | 2 | 25 | 1.7 | 65 | 4 | A197 |
| EPDR2020-25-05-TH | △ | 0.5 | 2 | 25 | 1.7 | 65 | 4 | A285 |
| EPDRP2020-25-0905-TH | ● | 0.5 | 2 | 25 | 1.7 | 65 | 6 | A211 |
| EPDRF4020-25-05-TH | ● | 0.5 | 2 | 25 | 1.7 | 70 | 4 | A217 |
| ETR4020-25-05-TH | ● | 0.5 | 2 | 25 | 2 | 70 | 6 | A222 |
| ETRP4020-25-0905-TH | ● | 0.5 | 2 | 25 | 2 | 70 | 6 | A223 |
| EPDRE2020-30-05-ATH | ● | 0.5 | 2 | 30 | 1.7 | 70 | 4 | A197 |
| EPDRF4020-30-05-TH | ● | 0.5 | 2 | 30 | 1.7 | 70 | 4 | A217 |
| EPDR2020-30-05-TH | △ | 0.5 | 2 | 30 | 1.7 | 70 | 4 | A285 |
| EPDRP2020-30-0905-TH | ● | 0.5 | 2 | 30 | 1.7 | 70 | 6 | A211 |
| ETR4020-30-05-TH | ● | 0.5 | 2 | 30 | 2 | 70 | 6 | A222 |
| ETRP4020-30-0905-TH | ● | 0.5 | 2 | 30 | 2 | 80 | 6 | A223 |
| ETR4020-35-05-TH | ● | 0.5 | 2 | 35 | 2 | 80 | 6 | A222 |
| ETRP4020-35-0905-TH | ● | 0.5 | 2 | 35 | 2 | 80 | 6 | A223 |
| EPDRP2020-40-0905-TH | ● | 0.5 | 2 | 40 | 1.7 | 80 | 6 | A211 |
| ETR4020-40-05-TH | ● | 0.5 | 2 | 40 | 2 | 80 | 6 | A222 |
| ETRP4020-40-0905-TH | ● | 0.5 | 2 | 40 | 2 | 90 | 6 | A223 |
| ETRP4020-45-0905-TH | ● | 0.5 | 2 | 45 | 2 | 90 | 6 | A223 |
| EPDRP2020-50-0905-TH | ● | 0.5 | 2 | 50 | 1.7 | 90 | 6 | A211 |
| ETRP4020-50-0905-TH | ● | 0.5 | 2 | 50 | 2 | 100 | 6 | A223 |
| ETRP4020-55-0905-TH | ● | 0.5 | 2 | 55 | 2 | 100 | 6 | A223 |
| ETRP4020-60-0905-TH | ● | 0.5 | 2 | 60 | 2 | 110 | 6 | A223 |
| EPDRE2020-6-08-ATH | ● | 0.8 | 2 | 6 | 1.7 | 50 | 4 | A197 |
| EPDRE2020-8-08-ATH | ● | 0.8 | 2 | 8 | 1.7 | 50 | 4 | A197 |
| EPDR2020-8-08-TH | △ | 0.8 | 2 | 8 | 1.7 | 50 | 4 | A285 |
| EPDRE2020-12-08-ATH | ● | 0.8 | 2 | 12 | 1.7 | 55 | 4 | A197 |
| EPDRE2020-16-08-ATH | ● | 0.8 | 2 | 16 | 1.7 | 55 | 4 | A197 |
| EPDR2020-16-08-TH | △ | 0.8 | 2 | 16 | 1.7 | 55 | 4 | A285 |
| EPDRE2020-20-08-ATH | ● | 0.8 | 2 | 20 | 1.7 | 60 | 4 | A197 |

●印：標準在庫品です。　●：Stocked Items.　◎印：メーカー在庫品です。弊社営業へお問合せください。　◎：Manufacturer stocked items Contact with our sales department.

単位 unit：mm

| 商品コード Item Code | 在庫 Stock | コーナ半径 Corner radius | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|---|
| EPDR2020-20-08-TH | △ | 0.8 | 2 | 20 | 1.7 | 60 | 4 | A285 |
| EPDRE2020-25-08-ATH | ● | 0.8 | 2 | 25 | 1.7 | 65 | 4 | A197 |
| EPDRE2020-30-08-ATH | ● | 0.8 | 2 | 30 | 1.7 | 70 | 4 | A197 |
| EPDRF4025-8-01-TH | ● | 0.1 | 2.5 | 8 | 2 | 50 | 4 | A217 |
| EPDRE2025-10-01-ATH | ● | 0.1 | 2.5 | 10 | 2 | 50 | 4 | A197 |
| EPDRF4025-16-01-TH | ● | 0.1 | 2.5 | 16 | 2 | 60 | 4 | A217 |
| EPDRE2025-20-01-ATH | ● | 0.1 | 2.5 | 20 | 2 | 60 | 4 | A197 |
| EPDRF4025-20-01-TH | ● | 0.1 | 2.5 | 20 | 2 | 60 | 4 | A217 |
| EPDRE2025-30-01-ATH | ● | 0.1 | 2.5 | 30 | 2 | 70 | 4 | A197 |
| EPDRF4025-8-02-TH | ● | 0.2 | 2.5 | 8 | 2 | 50 | 4 | A217 |
| EPDRE2025-10-02-ATH | ● | 0.2 | 2.5 | 10 | 2 | 50 | 4 | A197 |
| EPDRF4025-16-02-TH | ● | 0.2 | 2.5 | 16 | 2 | 60 | 4 | A217 |
| EPDRE2025-20-02-ATH | ● | 0.2 | 2.5 | 20 | 2 | 60 | 4 | A197 |
| EPDRF4025-20-02-TH | ● | 0.2 | 2.5 | 20 | 2 | 60 | 4 | A217 |
| EPDRE2025-30-02-ATH | ● | 0.2 | 2.5 | 30 | 2 | 70 | 4 | A197 |
| EPDRE2025-10-03-ATH | ● | 0.3 | 2.5 | 10 | 2 | 50 | 4 | A197 |
| EPDRF4025-12-03-TH | ● | 0.3 | 2.5 | 12 | 2 | 60 | 4 | A217 |
| EPDRE2025-20-03-ATH | ● | 0.3 | 2.5 | 20 | 2 | 60 | 4 | A197 |
| EPDRF4025-20-03-TH | ● | 0.3 | 2.5 | 20 | 2 | 60 | 4 | A217 |
| EPDRE2025-30-03-ATH | ● | 0.3 | 2.5 | 30 | 2 | 70 | 4 | A197 |
| EPDRE2025-10-05-ATH | ● | 0.5 | 2.5 | 10 | 2 | 50 | 4 | A197 |
| ETR4025-10-05-TH | ● | 0.5 | 2.5 | 10 | 2.5 | 50 | 6 | A222 |
| EPDRF4025-12-05-TH | ● | 0.5 | 2.5 | 12 | 2 | 60 | 4 | A217 |
| EPDRE2025-20-05-ATH | ● | 0.5 | 2.5 | 20 | 2 | 60 | 4 | A197 |
| EPDRF4025-20-05-TH | ● | 0.5 | 2.5 | 20 | 2 | 60 | 4 | A217 |
| ETR4025-20-05-TH | ● | 0.5 | 2.5 | 20 | 2.5 | 60 | 6 | A222 |
| ETRP4025-20-0905-TH | ● | 0.5 | 2.5 | 20 | 2.5 | 70 | 6 | A223 |
| EPDRE2025-30-05-ATH | ● | 0.5 | 2.5 | 30 | 2 | 70 | 4 | A197 |
| ETR4025-30-05-TH | ● | 0.5 | 2.5 | 30 | 2.5 | 70 | 6 | A222 |
| ETRP4025-30-0905-TH | ● | 0.5 | 2.5 | 30 | 2.5 | 80 | 6 | A223 |
| ETR4025-40-05-TH | ● | 0.5 | 2.5 | 40 | 2.5 | 80 | 6 | A222 |
| ETRP4025-40-0905-TH | ● | 0.5 | 2.5 | 40 | 2.5 | 90 | 6 | A223 |
| ETR4025-50-05-TH | ● | 0.5 | 2.5 | 50 | 2.5 | 90 | 6 | A222 |
| ETRP4025-50-0905-TH | ● | 0.5 | 2.5 | 50 | 2.5 | 100 | 6 | A223 |
| ETRP4025-60-0905-TH | ● | 0.5 | 2.5 | 60 | 2.5 | 110 | 6 | A223 |
| EPDREH4030-4-005-TH3 | ● | 0.05 | 3 | 4 | 1.8 | 50 | 6 | A177 |
| CBN-EPSR2030-6-005 | ● | 0.05 | 3 | 6 | 1.05 | 50 | 4 | A281 |
| EPDREH4030-6-005-TH3 | ● | 0.05 | 3 | 6 | 1.8 | 50 | 6 | A177 |
| EPDREH4030-8-005-TH3 | ● | 0.05 | 3 | 8 | 1.8 | 55 | 6 | A177 |
| EPDREH4030-10-005-TH3 | ● | 0.05 | 3 | 10 | 1.8 | 55 | 6 | A177 |
| EPDREH4030-12-005-TH3 | ● | 0.05 | 3 | 12 | 1.8 | 60 | 6 | A177 |
| EPDREH4030-14-005-TH3 | ● | 0.05 | 3 | 14 | 1.8 | 60 | 6 | A177 |
| EPDREH4030-16-005-TH3 | ● | 0.05 | 3 | 16 | 1.8 | 60 | 6 | A177 |
| EPDREH4030-18-005-TH3 | ● | 0.05 | 3 | 18 | 1.8 | 65 | 6 | A177 |
| EPDREH4030-20-005-TH3 | ● | 0.05 | 3 | 20 | 1.8 | 65 | 6 | A177 |
| EPDREH4030-4-01-TH3 | ● | 0.1 | 3 | 4 | 1.8 | 50 | 6 | A177 |
| CBN-EPSR2030-6-01 | ● | 0.1 | 3 | 6 | 1.05 | 50 | 4 | A281 |
| EPDREH4030-6-01-TH3 | ● | 0.1 | 3 | 6 | 1.8 | 50 | 6 | A177 |
| EPDRE2030-6-01-ATH | ● | 0.1 | 3 | 6 | 2.5 | 50 | 6 | A197 |
| EPDREH4030-8-01-TH3 | ● | 0.1 | 3 | 8 | 1.8 | 55 | 6 | A177 |
| EPDRE2030-8-01-ATH | ● | 0.1 | 3 | 8 | 2.5 | 55 | 6 | A197 |
| EPDRF4030-8-01-TH | ● | 0.1 | 3 | 8 | 2.5 | 60 | 6 | A217 |
| EPDREH4030-10-01-TH3 | ● | 0.1 | 3 | 10 | 1.8 | 55 | 6 | A177 |
| EPDREH4030-12-01-TH3 | ● | 0.1 | 3 | 12 | 1.8 | 60 | 6 | A177 |
| EPDRE2030-12-01-ATH | ● | 0.1 | 3 | 12 | 2.5 | 60 | 6 | A197 |
| EPDREH4030-14-01-TH3 | ● | 0.1 | 3 | 14 | 1.8 | 60 | 6 | A177 |
| EPDREH4030-16-01-TH3 | ● | 0.1 | 3 | 16 | 1.8 | 60 | 6 | A177 |
| EPDRE2030-16-01-ATH | ● | 0.1 | 3 | 16 | 2.5 | 60 | 6 | A197 |
| EPDRF4030-16-01-TH | ● | 0.1 | 3 | 16 | 2.5 | 60 | 6 | A217 |
| EPDREH4030-18-01-TH3 | ● | 0.1 | 3 | 18 | 1.8 | 65 | 6 | A177 |
| EPDRE2030-18-01-ATH | ● | 0.1 | 3 | 18 | 2.5 | 65 | 6 | A197 |
| EPDREH4030-20-01-TH3 | ● | 0.1 | 3 | 20 | 1.8 | 65 | 6 | A177 |
| EPDRE2030-20-01-ATH | ● | 0.1 | 3 | 20 | 2.5 | 65 | 6 | A197 |
| EPDRF4030-25-01-TH | ● | 0.1 | 3 | 25 | 2.5 | 70 | 6 | A217 |
| EPDRE2030-30-01-ATH | ● | 0.1 | 3 | 30 | 2.5 | 75 | 6 | A197 |
| EPDRF4030-30-01-TH | ● | 0.1 | 3 | 30 | 2.5 | 80 | 6 | A217 |
| EPDRE2030-35-01-ATH | ● | 0.1 | 3 | 35 | 2.5 | 80 | 6 | A197 |
| EPDREH4030-4-02-TH3 | ● | 0.2 | 3 | 4 | 1.8 | 50 | 6 | A177 |
| EPDREH4030-6-02-TH3 | ● | 0.2 | 3 | 6 | 1.8 | 50 | 6 | A177 |

| 商品コード Item Code | 在庫 Stock | コーナ半径 Corner radius | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|---|
| EPDRE2030-6-02-ATH | ● | 0.2 | 3 | 6 | 2.5 | 50 | 6 | A198 |
| EPDREH4030-8-02-TH3 | ● | 0.2 | 3 | 8 | 1.8 | 55 | 6 | A177 |
| EPDRE2030-8-02-ATH | ● | 0.2 | 3 | 8 | 2.5 | 55 | 6 | A198 |
| EPDR2030-8-02-TH | △ | 0.2 | 3 | 8 | 2.5 | 55 | 6 | A285 |
| EPDRF4030-8-02-TH | ● | 0.2 | 3 | 8 | 2.5 | 60 | 6 | A217 |
| EHHRE4030-S4-TH3 | ● | 0.2 | 3 | 9 | 3 | 60 | 4 | A263 |
| EHHRE4030-S6-TH3 | ● | 0.2 | 3 | 9 | 3 | 60 | 6 | A263 |
| EPDREH4030-10-02-TH3 | ● | 0.2 | 3 | 10 | 1.8 | 55 | 6 | A177 |
| EPPLS4030-02 | ● | 0.2 | 3 | 10.5 | 4.5 | 80 | 6 | A250 |
| EPDREH4030-12-02-TH3 | ● | 0.2 | 3 | 12 | 1.8 | 60 | 6 | A177 |
| EPDRE2030-12-02-ATH | ● | 0.2 | 3 | 12 | 2.5 | 60 | 6 | A198 |
| EPDRF4030-12-02-TH | ● | 0.2 | 3 | 12 | 2.5 | 60 | 6 | A217 |
| EPDR2030-12-02-TH | △ | 0.2 | 3 | 12 | 2.5 | 60 | 6 | A285 |
| EPDREH4030-14-02-TH3 | ● | 0.2 | 3 | 14 | 1.8 | 60 | 6 | A177 |
| EPSM4030-15-R0.2-PN | ● | 0.2 | 3 | 15 | 4.5 | 68 | 6 | A238 |
| EPDREH4030-16-02-TH3 | ● | 0.2 | 3 | 16 | 1.8 | 60 | 6 | A177 |
| EPDRE2030-16-02-ATH | ● | 0.2 | 3 | 16 | 2.5 | 60 | 6 | A198 |
| EPDRF4030-16-02-TH | ● | 0.2 | 3 | 16 | 2.5 | 60 | 6 | A217 |
| EPDR2030-16-02-TH | △ | 0.2 | 3 | 16 | 2.5 | 60 | 6 | A285 |
| EPDREH4030-18-02-TH3 | ● | 0.2 | 3 | 18 | 1.8 | 65 | 6 | A177 |
| EPDRE2030-18-02-ATH | ● | 0.2 | 3 | 18 | 2.5 | 65 | 6 | A198 |
| EPDREH4030-20-02-TH3 | ● | 0.2 | 3 | 20 | 1.8 | 65 | 6 | A177 |
| EPDRE2030-20-02-ATH | ● | 0.2 | 3 | 20 | 2.5 | 65 | 6 | A198 |
| EPDR2030-20-02-TH | △ | 0.2 | 3 | 20 | 2.5 | 65 | 6 | A285 |
| EPDRF4030-20-02-TH | ● | 0.2 | 3 | 20 | 2.5 | 70 | 6 | A217 |
| EGDR2030-20-02-HD | ● | 0.2 | 3 | 20 | 4.5 | 60 | 4 | A277 |
| EPDRF4030-25-02-TH | ● | 0.2 | 3 | 25 | 2.5 | 70 | 6 | A217 |
| EPDRE2030-30-02-ATH | ● | 0.2 | 3 | 30 | 2.5 | 75 | 6 | A198 |
| EPDR2030-30-02-TH | △ | 0.2 | 3 | 30 | 2.5 | 75 | 6 | A285 |
| EPDRF4030-30-02-TH | ● | 0.2 | 3 | 30 | 2.5 | 80 | 6 | A217 |
| EPDRE2030-35-02-ATH | ● | 0.2 | 3 | 35 | 2.5 | 80 | 6 | A198 |
| EPDR2030-35-02-TH | △ | 0.2 | 3 | 35 | 2.5 | 80 | 6 | A285 |
| EPDRP2030-40-0902-TH | ● | 0.2 | 3 | 40 | 2.5 | 80 | 6 | A211 |
| EGDR2030-40-02-HD | ● | 0.2 | 3 | 40 | 4.5 | 80 | 4 | A277 |
| EPDRP2030-50-0902-TH | ● | 0.2 | 3 | 50 | 2.5 | 90 | 6 | A211 |
| EPDRP2030-60-0902-TH | ● | 0.2 | 3 | 60 | 2.5 | 100 | 6 | A211 |
| EGDR2030-60-02-HD | ● | 0.2 | 3 | 60 | 4.5 | 100 | 4 | A277 |
| EPSM4030-R0.2-PN | ● | 0.2 | 3 | – | 7.5 | 56 | 6 | A235 |
| EPP4030-02-TH | ● | 0.2 | 3 | – | 8 | 60 | 6 | A247 |
| EPP4030-02 | ● | 0.2 | 3 | – | 8 | 60 | 6 | A249 |
| EPDREH4030-4-03-TH3 | ● | 0.3 | 3 | 4 | 1.8 | 50 | 6 | A177 |
| EPDREH4030-6-03-TH3 | ● | 0.3 | 3 | 6 | 1.8 | 50 | 6 | A177 |
| EPDRE2030-6-03-ATH | ● | 0.3 | 3 | 6 | 2.5 | 50 | 6 | A198 |
| EPDREH4030-8-03-TH3 | ● | 0.3 | 3 | 8 | 1.8 | 55 | 6 | A177 |
| EPDRE2030-8-03-ATH | ● | 0.3 | 3 | 8 | 2.5 | 55 | 6 | A198 |
| EPDR2030-8-03-TH | △ | 0.3 | 3 | 8 | 2.5 | 55 | 6 | A285 |
| EPDRF4030-8-03-TH | ● | 0.3 | 3 | 8 | 2.5 | 60 | 6 | A217 |
| EPDREH4030-10-03-TH3 | ● | 0.3 | 3 | 10 | 1.8 | 55 | 6 | A177 |
| EPDREH4030-12-03-TH3 | ● | 0.3 | 3 | 12 | 1.8 | 60 | 6 | A177 |
| EPDRE2030-12-03-ATH | ● | 0.3 | 3 | 12 | 2.5 | 60 | 6 | A198 |
| EPDREH4030-14-03-TH3 | ● | 0.3 | 3 | 14 | 1.8 | 60 | 6 | A177 |
| EPDREH4030-16-03-TH3 | ● | 0.3 | 3 | 16 | 1.8 | 60 | 6 | A177 |
| EPDRE2030-16-03-ATH | ● | 0.3 | 3 | 16 | 2.5 | 60 | 6 | A198 |
| EPDRF4030-16-03-TH | ● | 0.3 | 3 | 16 | 2.5 | 60 | 6 | A217 |
| EPDR2030-16-03-TH | △ | 0.3 | 3 | 16 | 2.5 | 60 | 6 | A285 |
| EPDREH4030-18-03-TH3 | ● | 0.3 | 3 | 18 | 1.8 | 65 | 6 | A177 |
| EPDRE2030-18-03-ATH | ● | 0.3 | 3 | 18 | 2.5 | 65 | 6 | A198 |
| EPDREH4030-20-03-TH3 | ● | 0.3 | 3 | 20 | 1.8 | 65 | 6 | A177 |
| EPDRE2030-20-03-ATH | ● | 0.3 | 3 | 20 | 2.5 | 65 | 6 | A198 |
| EPDR2030-20-03-TH | △ | 0.3 | 3 | 20 | 2.5 | 65 | 6 | A285 |
| EPDRF4030-20-03-TH | ● | 0.3 | 3 | 20 | 2.5 | 70 | 6 | A217 |
| EPDRF4030-25-03-TH | ● | 0.3 | 3 | 25 | 2.5 | 70 | 6 | A217 |
| EPDRE2030-30-03-ATH | ● | 0.3 | 3 | 30 | 2.5 | 75 | 6 | A198 |
| EPDR2030-30-03-TH | △ | 0.3 | 3 | 30 | 2.5 | 75 | 6 | A285 |
| EPDRF4030-30-03-TH | ● | 0.3 | 3 | 30 | 2.5 | 80 | 6 | A217 |
| EPDRE2030-35-03-ATH | ● | 0.3 | 3 | 35 | 2.5 | 80 | 6 | A198 |
| EPDRP2030-40-0903-TH | ● | 0.3 | 3 | 40 | 2.5 | 80 | 6 | A211 |
| EPDRP2030-50-0903-TH | ● | 0.3 | 3 | 50 | 2.5 | 90 | 6 | A211 |
| EPDRP2030-60-0903-TH | ● | 0.3 | 3 | 60 | 2.5 | 100 | 6 | A211 |

| 商品コード Item Code | 在庫 Stock | コーナ半径 Corner radius | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|---|
| EPDREH4030-4-05-TH3 | ● | 0.5 | 3 | 4 | 1.8 | 50 | 6 | A177 |
| CBN-EPSR2030-6-05 | ● | 0.5 | 3 | 6 | 1.05 | 50 | 4 | A281 |
| EPDREH4030-6-05-TH3 | ● | 0.5 | 3 | 6 | 1.8 | 50 | 6 | A177 |
| EPDREH4030-8-05-TH3 | ● | 0.5 | 3 | 8 | 1.8 | 55 | 6 | A177 |
| EPDRE2030-8-05-ATH | ● | 0.5 | 3 | 8 | 2.5 | 55 | 6 | A198 |
| EPDR2030-8-05-TH | △ | 0.5 | 3 | 8 | 2.5 | 55 | 6 | A285 |
| EPDRF4030-8-05-TH | ● | 0.5 | 3 | 8 | 2.5 | 60 | 6 | A217 |
| EMXA3030-9-05 | ◎ | 0.5 | 3 | 9 | 4.5 | 60 | 6 | A272 |
| EPDREH4030-10-05-TH3 | ● | 0.5 | 3 | 10 | 1.8 | 55 | 6 | A177 |
| EPPLS4030-05 | ● | 0.5 | 3 | 10.5 | 4.5 | 80 | 6 | A250 |
| EPDREH4030-12-05-TH3 | ● | 0.5 | 3 | 12 | 1.8 | 60 | 6 | A177 |
| EPDRE2030-12-05-ATH | ● | 0.5 | 3 | 12 | 2.5 | 60 | 6 | A198 |
| EPDRF4030-12-05-TH | ● | 0.5 | 3 | 12 | 2.5 | 60 | 6 | A217 |
| EPDR2030-12-05-TH | △ | 0.5 | 3 | 12 | 2.5 | 60 | 6 | A285 |
| EPDREH4030-14-05-TH3 | ● | 0.5 | 3 | 14 | 1.8 | 60 | 6 | A177 |
| EPSM4030-15-R0.5-PN | ● | 0.5 | 3 | 15 | 4.5 | 68 | 6 | A238 |
| EPDREH4030-16-05-TH3 | ● | 0.5 | 3 | 16 | 1.8 | 60 | 6 | A177 |
| EPDRE2030-16-05-ATH | ● | 0.5 | 3 | 16 | 2.5 | 60 | 6 | A198 |
| EPDRF4030-16-05-TH | ● | 0.5 | 3 | 16 | 2.5 | 60 | 6 | A217 |
| EPDR2030-16-05-TH | △ | 0.5 | 3 | 16 | 2.5 | 60 | 6 | A285 |
| EPDREH4030-18-05-TH3 | ● | 0.5 | 3 | 18 | 1.8 | 65 | 6 | A177 |
| EPDRE2030-18-05-ATH | ● | 0.5 | 3 | 18 | 2.5 | 65 | 6 | A198 |
| EPDREH4030-20-05-TH3 | ● | 0.5 | 3 | 20 | 1.8 | 65 | 6 | A177 |
| EPDRE2030-20-05-ATH | ● | 0.5 | 3 | 20 | 2.5 | 65 | 6 | A198 |
| EPDR2030-20-05-TH | △ | 0.5 | 3 | 20 | 2.5 | 65 | 6 | A285 |
| EPDRF4030-20-05-TH | ● | 0.5 | 3 | 20 | 2.5 | 70 | 6 | A217 |
| EPDRF4030-25-05-TH | ● | 0.5 | 3 | 25 | 2.5 | 70 | 6 | A217 |
| EPDRE2030-30-05-ATH | ● | 0.5 | 3 | 30 | 2.5 | 75 | 6 | A198 |
| EPDR2030-30-05-TH | △ | 0.5 | 3 | 30 | 2.5 | 75 | 6 | A285 |
| EPDRF4030-30-05-TH | ● | 0.5 | 3 | 30 | 2.5 | 80 | 6 | A217 |
| EPDRE2030-35-05-ATH | ● | 0.5 | 3 | 35 | 2.5 | 80 | 6 | A198 |
| EPDRF4030-35-05-TH | ● | 0.5 | 3 | 35 | 2.5 | 80 | 6 | A217 |
| EPDR2030-35-05-TH | △ | 0.5 | 3 | 35 | 2.5 | 80 | 6 | A285 |
| EPDRP2030-40-0905-TH | ● | 0.5 | 3 | 40 | 2.5 | 80 | 6 | A211 |
| EPDRP2030-50-0905-TH | ● | 0.5 | 3 | 50 | 2.5 | 90 | 6 | A211 |
| EPDRP2030-60-0905-TH | ● | 0.5 | 3 | 60 | 2.5 | 100 | 6 | A211 |
| EPSM4030-R0.5-PN | ● | 0.5 | 3 | – | 7.5 | 56 | 6 | A235 |
| EPP4030-05-TH | ● | 0.5 | 3 | – | 8 | 60 | 6 | A247 |
| EPP4030-05 | ● | 0.5 | 3 | – | 8 | 60 | 6 | A249 |
| HGOF4030-08-TH | ● | 0.8 | 3 | 9 | 1.5 | 60 | 6 | A232 |
| HGOF2030-08-TH | ● | 0.8 | 3 | 9 | 4.5 | 60 | 6 | A232 |
| ETM4030-08-TH | ● | 0.8 | 3 | 9 | 6 | 70 | 6 | A226 |
| EPR3030-08 | □ | 0.8 | 3 | 9 | 6 | 70 | 6 | A429 |
| ETR4030-10-08-TH | ● | 0.8 | 3 | 10 | 3 | 50 | 6 | A222 |
| ETMP4030-18-08-TH | ● | 0.8 | 3 | 18 | 4.5 | 80 | 6 | A227 |
| EPRPN3030-18-08 | □ | 0.8 | 3 | 18 | 4.5 | 80 | 6 | A429 |
| ETR4030-20-08-TH | ● | 0.8 | 3 | 20 | 3 | 60 | 6 | A222 |
| ETRP4030-20-0908-TH | ● | 0.8 | 3 | 20 | 3 | 70 | 6 | A223 |
| ETMP4030-24-08-TH | ● | 0.8 | 3 | 24 | 4.5 | 80 | 6 | A227 |
| EPRPN3030-24-08 | □ | 0.8 | 3 | 24 | 4.5 | 80 | 6 | A429 |
| ETR4030-30-08-TH | ● | 0.8 | 3 | 30 | 3 | 70 | 6 | A222 |
| ETRP4030-30-0908-TH | ● | 0.8 | 3 | 30 | 3 | 80 | 6 | A223 |
| ETMP4030-30-08-TH | ● | 0.8 | 3 | 30 | 4.5 | 80 | 6 | A227 |
| EPRPN3030-30-08 | □ | 0.8 | 3 | 30 | 4.5 | 80 | 6 | A429 |
| ETR4030-40-08-TH | ● | 0.8 | 3 | 40 | 3 | 80 | 6 | A222 |
| ETRP4030-40-0908-TH | ● | 0.8 | 3 | 40 | 3 | 90 | 6 | A223 |
| ETR4030-50-08-TH | ● | 0.8 | 3 | 50 | 3 | 90 | 6 | A222 |
| ETRP4030-50-0908-TH | ● | 0.8 | 3 | 50 | 3 | 100 | 6 | A223 |
| ETRP4030-60-0908-TH | ● | 0.8 | 3 | 60 | 3 | 110 | 6 | A223 |
| EPDRE2030-8-1-ATH | ● | 1 | 3 | 8 | 2.5 | 55 | 6 | A198 |
| EPDRE2030-12-1-ATH | ● | 1 | 3 | 12 | 2.5 | 60 | 6 | A198 |
| EPDRE2030-16-1-ATH | ● | 1 | 3 | 16 | 2.5 | 60 | 6 | A198 |
| EPDRE2030-18-1-ATH | ● | 1 | 3 | 18 | 2.5 | 65 | 6 | A198 |
| EPDRE2030-20-1-ATH | ● | 1 | 3 | 20 | 2.5 | 65 | 6 | A198 |
| EPDRE2030-30-1-ATH | ● | 1 | 3 | 30 | 2.5 | 75 | 6 | A198 |
| EPDRE2030-35-1-ATH | ● | 1 | 3 | 35 | 2.5 | 80 | 6 | A198 |
| EPDRE2040-8-01-ATH | ● | 0.1 | 4 | 8 | 3.5 | 55 | 6 | A198 |
| EPDREH4040-8-01-TH3 | ● | 0.1 | 4 | 8 | 3.5 | 55 | 6 | A178 |
| EPDREH4040-10-01-TH3 | ● | 0.1 | 4 | 10 | 3.5 | 60 | 6 | A178 |

△印:在庫が無くなり次第受注生産品となるものです。△: When the Stock is out, will become to produce on request. □印:特定代理店在庫です。弊社営業へお問合せください。□: Stocked by specified distributor. Contact with our sales department.

# 超硬エンドミル・ラジアス φ4～φ10 Carbide End Mills -Radius

単位 unit：mm

| 商品コード Item Code | 在庫 Stock | コーナ半径 Corner radius | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|---|
| EPDRE2040-12-01-ATH | ● | 0.1 | 4 | 12 | 3.5 | 60 | 6 | A198 |
| EPDREH4040-12-01-TH3 | ● | 0.1 | 4 | 12 | 3.5 | 60 | 6 | A178 |
| EPDRF4040-12-01-TH | ● | 0.1 | 4 | 12 | 4 | 60 | 6 | A218 |
| EPDREH4040-14-01-TH3 | ● | 0.1 | 4 | 14 | 3.5 | 60 | 6 | A178 |
| EPDRE2040-16-01-ATH | ● | 0.1 | 4 | 16 | 3.5 | 60 | 6 | A198 |
| EPDREH4040-16-01-TH3 | ● | 0.1 | 4 | 16 | 3.5 | 60 | 6 | A178 |
| EPDREH4040-18-01-TH3 | ● | 0.1 | 4 | 18 | 3.5 | 60 | 6 | A178 |
| EPDRE2040-20-01-ATH | ● | 0.1 | 4 | 20 | 3.5 | 65 | 6 | A198 |
| EPDREH4040-20-01-TH3 | ● | 0.1 | 4 | 20 | 3.5 | 65 | 6 | A178 |
| EPDRF4040-20-01-TH | ● | 0.1 | 4 | 20 | 4 | 60 | 6 | A218 |
| EPDREH4040-22-01-TH3 | ● | 0.1 | 4 | 22 | 3.5 | 65 | 6 | A178 |
| EPDREH4040-24-01-TH3 | ● | 0.1 | 4 | 24 | 3.5 | 70 | 6 | A178 |
| EPDRE2040-30-01-ATH | ● | 0.1 | 4 | 30 | 3.5 | 75 | 6 | A198 |
| EPDRF4040-30-01-TH | ● | 0.1 | 4 | 30 | 4 | 80 | 6 | A218 |
| EPDRE2040-35-01-ATH | ● | 0.1 | 4 | 35 | 3.5 | 80 | 6 | A198 |
| EPDRF4040-40-01-TH | ● | 0.1 | 4 | 40 | 4 | 80 | 6 | A218 |
| EPDRE2040-45-01-ATH | ● | 0.1 | 4 | 45 | 3.5 | 90 | 6 | A198 |
| EPDRE2040-8-02-ATH | ● | 0.2 | 4 | 8 | 3.5 | 55 | 6 | A198 |
| EPDREH4040-8-02-TH3 | ● | 0.2 | 4 | 8 | 3.5 | 55 | 6 | A178 |
| EPDREH4040-10-02-TH3 | ● | 0.2 | 4 | 10 | 3.5 | 60 | 6 | A178 |
| EPDRE2040-12-02-ATH | ● | 0.2 | 4 | 12 | 3.5 | 60 | 6 | A198 |
| EPDREH4040-12-02-TH3 | ● | 0.2 | 4 | 12 | 3.5 | 60 | 6 | A178 |
| EHHRE6040-S4-TH3 | ● | 0.2 | 4 | 12 | 4 | 60 | 4 | A263 |
| EPDRF4040-12-02-TH | ● | 0.2 | 4 | 12 | 4 | 60 | 6 | A218 |
| EHHRE6040-S6-TH3 | ● | 0.2 | 4 | 12 | 4 | 60 | 6 | A263 |
| EPDREH4040-14-02-TH3 | ● | 0.2 | 4 | 14 | 3.5 | 60 | 6 | A178 |
| EPPLS4040-02 | ● | 0.2 | 4 | 14 | 6 | 80 | 6 | A250 |
| EPDRE2040-16-02-ATH | ● | 0.2 | 4 | 16 | 3.5 | 60 | 6 | A198 |
| EPDREH4040-16-02-TH3 | ● | 0.2 | 4 | 16 | 3.5 | 60 | 6 | A178 |
| EPDREH4040-18-02-TH3 | ● | 0.2 | 4 | 18 | 3.5 | 60 | 6 | A178 |
| EPDRE2040-20-02-ATH | ● | 0.2 | 4 | 20 | 3.5 | 65 | 6 | A198 |
| EPDREH4040-20-02-TH3 | ● | 0.2 | 4 | 20 | 3.5 | 65 | 6 | A178 |
| EPDRF4040-20-02-TH | ● | 0.2 | 4 | 20 | 4 | 60 | 6 | A218 |
| EPSM4040-20-R0.2-PN | ● | 0.2 | 4 | 20 | 6 | 68 | 6 | A238 |
| EPDREH4040-22-02-TH3 | ● | 0.2 | 4 | 22 | 3.5 | 65 | 6 | A178 |
| EPDREH4040-24-02-TH3 | ● | 0.2 | 4 | 24 | 3.5 | 70 | 6 | A178 |
| EPDRE2040-30-02-ATH | ● | 0.2 | 4 | 30 | 3.5 | 75 | 6 | A198 |
| EPDRF4040-30-02-TH | ● | 0.2 | 4 | 30 | 4 | 80 | 6 | A218 |
| EPDRE2040-35-02-ATH | ● | 0.2 | 4 | 35 | 3.5 | 80 | 6 | A198 |
| EPDRF4040-40-02-TH | ● | 0.2 | 4 | 40 | 4 | 80 | 6 | A218 |
| EPDRE2040-45-02-ATH | ● | 0.2 | 4 | 45 | 3.5 | 90 | 6 | A198 |
| EPSM4040-R0.2-PN | ● | 0.2 | 4 | – | 10 | 56 | 6 | A235 |
| EPP4040-02-TH | ● | 0.2 | 4 | – | 11 | 60 | 6 | A247 |
| EPP4040-02 | ● | 0.2 | 4 | – | 11 | 60 | 6 | A249 |
| EPDRE2040-8-03-ATH | ● | 0.3 | 4 | 8 | 3.5 | 55 | 6 | A198 |
| EPDREH4040-8-03-TH3 | ● | 0.3 | 4 | 8 | 3.5 | 55 | 6 | A178 |
| EPDREH4040-10-03-TH3 | ● | 0.3 | 4 | 10 | 3.5 | 60 | 6 | A178 |
| EPDRE2040-12-03-ATH | ● | 0.3 | 4 | 12 | 3.5 | 60 | 6 | A198 |
| EPDREH4040-12-03-TH3 | ● | 0.3 | 4 | 12 | 3.5 | 60 | 6 | A178 |
| EPDRF4040-12-03-TH | ● | 0.3 | 4 | 12 | 4 | 60 | 6 | A218 |
| EPDREH4040-14-03-TH3 | ● | 0.3 | 4 | 14 | 3.5 | 60 | 6 | A178 |
| EPJS2040-03-J | □ | 0.3 | 4 | 14 | 6 | 70 | 4 | A427 |
| EPDRE2040-16-03-ATH | ● | 0.3 | 4 | 16 | 3.5 | 60 | 6 | A198 |
| EPDREH4040-16-03-TH3 | ● | 0.3 | 4 | 16 | 3.5 | 60 | 6 | A178 |
| EPDREH4040-18-03-TH3 | ● | 0.3 | 4 | 18 | 3.5 | 60 | 6 | A178 |
| EPDRE2040-20-03-ATH | ● | 0.3 | 4 | 20 | 3.5 | 65 | 6 | A198 |
| EPDREH4040-20-03-TH3 | ● | 0.3 | 4 | 20 | 3.5 | 65 | 6 | A178 |
| EPDRF4040-20-03-TH | ● | 0.3 | 4 | 20 | 4 | 60 | 6 | A218 |
| EPDREH4040-22-03-TH3 | ● | 0.3 | 4 | 22 | 3.5 | 65 | 6 | A178 |
| EPDREH4040-24-03-TH3 | ● | 0.3 | 4 | 24 | 3.5 | 70 | 6 | A178 |
| EPJSLS2040-03-J | □ | 0.3 | 4 | 24 | 6 | 100 | 4 | A427 |
| EPDRE2040-30-03-ATH | ● | 0.3 | 4 | 30 | 3.5 | 75 | 6 | A198 |
| EPDRF4040-30-03-TH | ● | 0.3 | 4 | 30 | 4 | 80 | 6 | A218 |
| EPDRE2040-35-03-ATH | ● | 0.3 | 4 | 35 | 3.5 | 80 | 6 | A198 |
| EPDRF4040-40-03-TH | ● | 0.3 | 4 | 40 | 4 | 80 | 6 | A218 |
| EPDRE2040-45-03-ATH | ● | 0.3 | 4 | 45 | 3.5 | 90 | 6 | A198 |
| EPDREH4040-8-05-TH3 | ● | 0.5 | 4 | 8 | 3.5 | 55 | 6 | A178 |
| EPDREH4040-10-05-TH3 | ● | 0.5 | 4 | 10 | 3.5 | 60 | 6 | A178 |
| EPDRE2040-12-05-ATH | ● | 0.5 | 4 | 12 | 3.5 | 60 | 6 | A198 |

| 商品コード Item Code | 在庫 Stock | コーナ半径 Corner radius | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|---|
| EPDREH4040-12-05-TH3 | ● | 0.5 | 4 | 12 | 3.5 | 60 | 6 | A178 |
| EPDRF4040-12-05-TH | ● | 0.5 | 4 | 12 | 4 | 60 | 6 | A218 |
| EMXA3040-12-05 | ◎ | 0.5 | 4 | 12 | 6 | 60 | 6 | A272 |
| EPDREH4040-14-05-TH3 | ● | 0.5 | 4 | 14 | 3.5 | 60 | 6 | A178 |
| EPPLS4040-05 | ● | 0.5 | 4 | 14 | 6 | 80 | 6 | A250 |
| EPDRE2040-16-05-ATH | ● | 0.5 | 4 | 16 | 3.5 | 60 | 6 | A198 |
| EPDREH4040-16-05-TH3 | ● | 0.5 | 4 | 16 | 3.5 | 60 | 6 | A178 |
| EPDREH4040-18-05-TH3 | ● | 0.5 | 4 | 18 | 3.5 | 60 | 6 | A178 |
| EPDRE2040-20-05-ATH | ● | 0.5 | 4 | 20 | 3.5 | 65 | 6 | A198 |
| EPDREH4040-20-05-TH3 | ● | 0.5 | 4 | 20 | 3.5 | 65 | 6 | A178 |
| EPDRF4040-20-05-TH | ● | 0.5 | 4 | 20 | 4 | 60 | 6 | A218 |
| EPSM4040-20-R0.5-PN | ● | 0.5 | 4 | 20 | 6 | 68 | 6 | A238 |
| EPDREH4040-22-05-TH3 | ● | 0.5 | 4 | 22 | 3.5 | 65 | 6 | A178 |
| EPDREH4040-24-05-TH3 | ● | 0.5 | 4 | 24 | 3.5 | 70 | 6 | A178 |
| EPDRE2040-30-05-ATH | ● | 0.5 | 4 | 30 | 3.5 | 75 | 6 | A198 |
| EPDRF4040-30-05-TH | ● | 0.5 | 4 | 30 | 4 | 80 | 6 | A218 |
| EPDRE2040-35-05-ATH | ● | 0.5 | 4 | 35 | 3.5 | 80 | 6 | A198 |
| EPDRF4040-40-05-TH | ● | 0.5 | 4 | 40 | 4 | 80 | 6 | A218 |
| EGR2040-05-HD | ● | 0.5 | 4 | 40 | 8 | 100 | 4 | A279 |
| EPDRE2040-45-05-ATH | ● | 0.5 | 4 | 45 | 3.5 | 90 | 6 | A198 |
| EPSM4040-R0.5-PN | ● | 0.5 | 4 | – | 10 | 56 | 6 | A235 |
| EPP4040-05-TH | ● | 0.5 | 4 | – | 11 | 60 | 6 | A247 |
| EPP4040-05 | ● | 0.5 | 4 | – | 11 | 60 | 6 | A249 |
| EPDREH4040-8-10-TH3 | ● | 1 | 4 | 8 | 3.5 | 55 | 6 | A178 |
| EPDREH4040-10-10-TH3 | ● | 1 | 4 | 10 | 3.5 | 60 | 6 | A178 |
| HGOF4040-10-TH | ● | 1 | 4 | 12 | 2 | 60 | 6 | A232 |
| EPDRE2040-12-1-ATH | ● | 1 | 4 | 12 | 3.5 | 60 | 6 | A199 |
| EPDREH4040-12-10-TH3 | ● | 1 | 4 | 12 | 3.5 | 60 | 6 | A178 |
| HGOF2040-10-TH | ● | 1 | 4 | 12 | 6 | 60 | 6 | A232 |
| ETM4040-10-TH | ● | 1 | 4 | 12 | 8 | 70 | 6 | A226 |
| EPR3040-10 | □ | 1 | 4 | 12 | 8 | 70 | 6 | A429 |
| EPDREH4040-14-10-TH3 | ● | 1 | 4 | 14 | 3.5 | 60 | 6 | A178 |
| EPDRE2040-16-1-ATH | ● | 1 | 4 | 16 | 3.5 | 60 | 6 | A199 |
| EPDREH4040-16-10-TH3 | ● | 1 | 4 | 16 | 3.5 | 60 | 6 | A178 |
| EPDREH4040-18-10-TH3 | ● | 1 | 4 | 18 | 3.5 | 60 | 6 | A178 |
| EPDRE2040-20-1-ATH | ● | 1 | 4 | 20 | 3.5 | 65 | 6 | A199 |
| EPDREH4040-20-10-TH3 | ● | 1 | 4 | 20 | 3.5 | 65 | 6 | A178 |
| EPSM4040-20-R1.0-PN | ● | 1 | 4 | 20 | 6 | 68 | 6 | A238 |
| ETMLN4040-20-10-TH | ● | 1 | 4 | 20 | 6 | 70 | 4 | A226 |
| EPDREH4040-22-10-TH3 | ● | 1 | 4 | 22 | 3.5 | 65 | 6 | A178 |
| EPDREH4040-24-10-TH3 | ● | 1 | 4 | 24 | 3.5 | 70 | 6 | A178 |
| ETMP4040-24-10-TH | ● | 1 | 4 | 24 | 6 | 90 | 6 | A227 |
| EPRPN3040-24-10 | □ | 1 | 4 | 24 | 6 | 90 | 6 | A429 |
| ETMLN4040-28-10-TH | ● | 1 | 4 | 28 | 6 | 70 | 4 | A226 |
| EPDRE2040-30-1-ATH | ● | 1 | 4 | 30 | 3.5 | 75 | 6 | A199 |
| ETMP4040-32-10-TH | ● | 1 | 4 | 32 | 6 | 90 | 6 | A227 |
| EPRPN3040-32-10 | □ | 1 | 4 | 32 | 6 | 90 | 6 | A429 |
| EPDRE2040-35-1-ATH | ● | 1 | 4 | 35 | 3.5 | 80 | 6 | A199 |
| ETMP4040-40-10-TH | ● | 1 | 4 | 40 | 6 | 90 | 6 | A227 |
| EPRPN3040-40-10 | □ | 1 | 4 | 40 | 6 | 90 | 6 | A429 |
| EPDRE2040-45-1-ATH | ● | 1 | 4 | 45 | 3.5 | 90 | 6 | A199 |
| EPSM4040-R1.0-PN | ● | 1 | 4 | – | 10 | 56 | 6 | A235 |
| EPP4040-10-TH | ● | 1 | 4 | – | 11 | 60 | 6 | A247 |
| EPP4040-10 | ● | 1 | 4 | – | 11 | 60 | 6 | A249 |
| EPDREH4050-10-01-TH3 | ● | 0.1 | 5 | 10 | 4 | 60 | 6 | A178 |
| EPDREH4050-15-01-TH3 | ● | 0.1 | 5 | 15 | 4 | 60 | 6 | A178 |
| EPDRE2050-20-01-ATH | ● | 0.1 | 5 | 20 | 4 | 65 | 6 | A199 |
| EPDREH4050-20-01-TH3 | ● | 0.1 | 5 | 20 | 4 | 65 | 6 | A178 |
| EPDRF4050-20-01-TH | ● | 0.1 | 5 | 20 | 5 | 70 | 6 | A218 |
| EPDREH4050-25-01-TH3 | ● | 0.1 | 5 | 25 | 4 | 70 | 6 | A178 |
| EPDRE2050-40-01-ATH | ● | 0.1 | 5 | 40 | 4 | 85 | 6 | A199 |
| EPDRF4050-40-01-TH | ● | 0.1 | 5 | 40 | 5 | 90 | 6 | A218 |
| EPDREH4050-10-02-TH3 | ● | 0.2 | 5 | 10 | 4 | 60 | 6 | A178 |
| EPDREH4050-15-02-TH3 | ● | 0.2 | 5 | 15 | 4 | 60 | 6 | A178 |
| EPPLS4050-02 | ● | 0.2 | 5 | 17.5 | 7.5 | 100 | 6 | A250 |
| EPDRE2050-20-02-ATH | ● | 0.2 | 5 | 20 | 4 | 65 | 6 | A199 |
| EPDREH4050-20-02-TH3 | ● | 0.2 | 5 | 20 | 4 | 65 | 6 | A179 |
| EPDRF4050-20-02-TH | ● | 0.2 | 5 | 20 | 5 | 70 | 6 | A218 |
| EPDREH4050-25-02-TH3 | ● | 0.2 | 5 | 25 | 4 | 70 | 6 | A179 |

| 商品コード Item Code | 在庫 Stock | コーナ半径 Corner radius | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|---|
| EPSM4050-25-R0.2-PN | ● | 0.2 | 5 | 25 | 7.5 | 68 | 6 | A238 |
| EPDRE2050-40-02-ATH | ● | 0.2 | 5 | 40 | 4 | 85 | 6 | A199 |
| EPDRF4050-40-02-TH | ● | 0.2 | 5 | 40 | 5 | 90 | 6 | A218 |
| EPSM4050-R0.2-PN | ● | 0.2 | 5 | – | 12.5 | 56 | 6 | A235 |
| EPP4050-02-TH | ● | 0.2 | 5 | – | 13 | 60 | 6 | A247 |
| EPP4050-02 | ● | 0.2 | 5 | – | 13 | 60 | 6 | A249 |
| EPDREH4050-10-03-TH3 | ● | 0.3 | 5 | 10 | 4 | 60 | 6 | A179 |
| EPDREH4050-15-03-TH3 | ● | 0.3 | 5 | 15 | 4 | 60 | 6 | A179 |
| EHHRE6050-TH3 | ● | 0.3 | 5 | 15 | 5 | 60 | 6 | A263 |
| EPDRE2050-20-03-ATH | ● | 0.3 | 5 | 20 | 4 | 65 | 6 | A199 |
| EPDREH4050-20-03-TH3 | ● | 0.3 | 5 | 20 | 4 | 65 | 6 | A179 |
| EPDRF4050-20-03-TH | ● | 0.3 | 5 | 20 | 5 | 70 | 6 | A218 |
| EPDREH4050-25-03-TH3 | ● | 0.3 | 5 | 25 | 4 | 70 | 6 | A179 |
| EPDRE2050-40-03-ATH | ● | 0.3 | 5 | 40 | 4 | 85 | 6 | A199 |
| EPDRF4050-40-03-TH | ● | 0.3 | 5 | 40 | 5 | 90 | 6 | A218 |
| EPDREH4050-10-05-TH3 | ● | 0.5 | 5 | 10 | 4 | 60 | 6 | A179 |
| EPDREH4050-15-05-TH3 | ● | 0.5 | 5 | 15 | 4 | 60 | 6 | A179 |
| EMXA3050-15-05 | ◎ | 0.5 | 5 | 15 | 7.5 | 80 | 6 | A272 |
| EPPLS4050-05 | ● | 0.5 | 5 | 17.5 | 7.5 | 100 | 6 | A250 |
| EPDRE2050-20-05-ATH | ● | 0.5 | 5 | 20 | 4 | 65 | 6 | A199 |
| EPDREH4050-20-05-TH3 | ● | 0.5 | 5 | 20 | 4 | 65 | 6 | A179 |
| EPDRF4050-20-05-TH | ● | 0.5 | 5 | 20 | 5 | 70 | 6 | A218 |
| EPDREH4050-25-05-TH3 | ● | 0.5 | 5 | 25 | 4 | 70 | 6 | A179 |
| EPSM4050-25-R0.5-PN | ● | 0.5 | 5 | 25 | 7.5 | 68 | 6 | A238 |
| EPDRE2050-40-05-ATH | ● | 0.5 | 5 | 40 | 4 | 85 | 6 | A199 |
| EPDRF4050-40-05-TH | ● | 0.5 | 5 | 40 | 5 | 90 | 6 | A218 |
| EPSM4050-R0.5-PN | ● | 0.5 | 5 | – | 12.5 | 56 | 6 | A235 |
| EPP4050-05-TH | ● | 0.5 | 5 | – | 13 | 60 | 6 | A247 |
| EPP4050-05 | ● | 0.5 | 5 | – | 13 | 60 | 6 | A249 |
| EPDREH4050-10-10-TH3 | ● | 1 | 5 | 10 | 4 | 60 | 6 | A179 |
| EPDREH4050-15-10-TH3 | ● | 1 | 5 | 15 | 4 | 60 | 6 | A179 |
| EPDRE2050-20-1-ATH | ● | 1 | 5 | 20 | 4 | 65 | 6 | A199 |
| EPDREH4050-20-10-TH3 | ● | 1 | 5 | 20 | 4 | 65 | 6 | A179 |
| EPDRF4050-20-10-TH | ● | 1 | 5 | 20 | 5 | 70 | 6 | A218 |
| EPDREH4050-25-10-TH3 | ● | 1 | 5 | 25 | 4 | 70 | 6 | A179 |
| EPSM4050-25-R1.0-PN | ● | 1 | 5 | 25 | 7.5 | 68 | 6 | A238 |
| EPDRE2050-40-1-ATH | ● | 1 | 5 | 40 | 4 | 85 | 6 | A199 |
| EPDRF4050-40-10-TH | ● | 1 | 5 | 40 | 5 | 90 | 6 | A218 |
| EPSM4050-R1.0-PN | ● | 1 | 5 | – | 12.5 | 56 | 6 | A235 |
| EPP4050-10-TH | ● | 1 | 5 | – | 13 | 60 | 6 | A247 |
| EPP4050-10 | ● | 1 | 5 | – | 13 | 60 | 6 | A249 |
| HGOF4050-12-TH | ● | 1.2 | 5 | 15 | 2.5 | 60 | 6 | A232 |
| HGOF2050-12-TH | ● | 1.2 | 5 | 15 | 7.5 | 60 | 6 | A232 |
| ETM4050-12-TH | ● | 1.2 | 5 | 15 | 10 | 70 | 6 | A226 |
| EPR3050-12 | □ | 1.2 | 5 | 15 | 10 | 70 | 6 | A429 |
| ETMP4050-30-12-TH | ● | 1.2 | 5 | 30 | 7.5 | 90 | 6 | A227 |
| EPRPN3050-30-12 | □ | 1.2 | 5 | 30 | 7.5 | 90 | 6 | A429 |
| ETMP4050-40-12-TH | ● | 1.2 | 5 | 40 | 7.5 | 100 | 8 | A227 |
| EPRPN3050-40-12 | □ | 1.2 | 5 | 40 | 7.5 | 100 | 8 | A429 |
| ETMP4050-50-12-TH | ● | 1.2 | 5 | 50 | 7.5 | 110 | 8 | A227 |
| EPRPN3050-50-12 | □ | 1.2 | 5 | 50 | 7.5 | 110 | 8 | A429 |
| EPDRE2060-12-01-ATH | ● | 0.1 | 6 | 12 | 5 | 50 | 6 | A199 |
| EPDREH4060-12-01-TH3 | ● | 0.1 | 6 | 12 | 5 | 60 | 6 | A179 |
| EPDRE2060-18-01-ATH | ● | 0.1 | 6 | 18 | 5 | 60 | 6 | A199 |
| EPDREH4060-18-01-TH3 | ● | 0.1 | 6 | 18 | 5 | 60 | 6 | A179 |
| EPDRE2060-24-01-ATH | ● | 0.1 | 6 | 24 | 5 | 70 | 6 | A199 |
| EPDREH4060-24-01-TH3 | ● | 0.1 | 6 | 24 | 5 | 70 | 6 | A179 |
| EPDREH4060-30-01-TH3 | ● | 0.1 | 6 | 30 | 5 | 80 | 6 | A179 |
| EPDRE2060-35-01-ATH | ● | 0.1 | 6 | 35 | 5 | 80 | 6 | A199 |
| EPDRE2060-55-01-ATH | ● | 0.1 | 6 | 55 | 5 | 100 | 6 | A199 |
| EPDRE2060-12-02-ATH | ● | 0.2 | 6 | 12 | 5 | 50 | 6 | A199 |
| EPDREH4060-12-02-TH3 | ● | 0.2 | 6 | 12 | 5 | 60 | 6 | A179 |
| EPDRE2060-18-02-ATH | ● | 0.2 | 6 | 18 | 5 | 60 | 6 | A199 |
| EPDREH4060-18-02-TH3 | ● | 0.2 | 6 | 18 | 5 | 60 | 6 | A179 |
| EPDRE2060-24-02-ATH | ● | 0.2 | 6 | 24 | 5 | 70 | 6 | A199 |
| EPDREH4060-24-02-TH3 | ● | 0.2 | 6 | 24 | 5 | 70 | 6 | A179 |
| EPDREH4060-30-02-TH3 | ● | 0.2 | 6 | 30 | 5 | 80 | 6 | A179 |
| EPDRF4060-30-02-TH | ● | 0.2 | 6 | 30 | 6 | 80 | 6 | A218 |
| EPDRE2060-35-02-ATH | ● | 0.2 | 6 | 35 | 5 | 80 | 6 | A199 |

●印：標準在庫品です。 ●：Stocked Items. ◎印：メーカー在庫品です。弊社営業へお問合せください。 ◎：Manufacturer stocked items Contact with our sales department.

単位 unit：mm

| 商品コード Item Code | 在庫 Stock | コーナ半径 Corner radius | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|---|
| EPDRF4060-54-02-TH | ● | 0.2 | 6 | 54 | 6 | 100 | 6 | A218 |
| EPDRE2060-55-02-ATH | ● | 0.2 | 6 | 55 | 5 | 100 | 6 | A199 |
| EPDRF4060-72-02-TH | ● | 0.2 | 6 | 72 | 6 | 120 | 6 | A218 |
| EPDRE2060-12-03-ATH | ● | 0.3 | 6 | 12 | 5 | 50 | 6 | A199 |
| EPDREH4060-12-03-TH3 | ● | 0.3 | 6 | 12 | 5 | 60 | 6 | A179 |
| EPDRE2060-18-03-ATH | ● | 0.3 | 6 | 18 | 5 | 60 | 6 | A199 |
| EPDREH4060-18-03-TH3 | ● | 0.3 | 6 | 18 | 5 | 60 | 6 | A179 |
| EHHRE6060-TH3 | ● | 0.3 | 6 | 18 | 6 | 60 | 6 | A263 |
| EPDRE2060-24-03-ATH | ● | 0.3 | 6 | 24 | 5 | 70 | 6 | A199 |
| EPDREH4060-24-03-TH3 | ● | 0.3 | 6 | 24 | 5 | 70 | 6 | A179 |
| EPDREH4060-30-03-TH3 | ● | 0.3 | 6 | 30 | 5 | 80 | 6 | A179 |
| EPDRF4060-30-03-TH | ● | 0.3 | 6 | 30 | 6 | 80 | 6 | A218 |
| EPSM4060-30-R0.3-PN | ● | 0.3 | 6 | 30 | 9 | 68 | 6 | A238 |
| EPDRE2060-35-03-ATH | ● | 0.3 | 6 | 35 | 5 | 80 | 6 | A199 |
| EPDRF4060-54-03-TH | ● | 0.3 | 6 | 54 | 6 | 100 | 6 | A218 |
| EPDRE2060-55-03-ATH | ● | 0.3 | 6 | 55 | 5 | 100 | 6 | A199 |
| EPDRF4060-72-03-TH | ● | 0.3 | 6 | 72 | 6 | 120 | 6 | A218 |
| EPPLS4060-03 | ● | 0.3 | 6 | – | 9 | 120 | 5 | A250 |
| EPP4060-03-TH | ● | 0.3 | 6 | – | 13 | 60 | 6 | A247 |
| EPP4060-03 | ● | 0.3 | 6 | – | 13 | 60 | 6 | A249 |
| EPSM4060-R0.3-PN | ● | 0.3 | 6 | – | 15 | 56 | 6 | A235 |
| CEPR6060-03-TH | ● | 0.3 | 6 | – | 15 | 60 | 6 | A265 |
| CEPR6060-03 | ● | 0.3 | 6 | – | 15 | 60 | 6 | A267 |
| EPSML4060-R0.3-PN | □ | 0.3 | 6 | – | 30 | 70 | 6 | A237 |
| EPDREH4060-12-05-TH3 | ● | 0.5 | 6 | 12 | 5 | 60 | 6 | A179 |
| EPDRE2060-18-05-ATH | ● | 0.5 | 6 | 18 | 5 | 60 | 6 | A199 |
| EPDREH4060-18-05-TH3 | ● | 0.5 | 6 | 18 | 5 | 60 | 6 | A179 |
| EMXN4060-18-05-TH | ● | 0.5 | 6 | 18 | 9 | 60 | 6 | A260 |
| EMXA3060-18-05 | ◎ | 0.5 | 6 | 18 | 9 | 80 | 6 | A272 |
| EPJS2060-05-J | □ | 0.5 | 6 | 21 | 9 | 90 | 6 | A427 |
| ER5HS06-PN | ● | 0.5 | 6 | 21 | 18 | 60 | 6 | A257 |
| EPDRE2060-24-05-ATH | ● | 0.5 | 6 | 24 | 5 | 70 | 6 | A199 |
| EPDREH4060-24-05-TH3 | ● | 0.5 | 6 | 24 | 5 | 70 | 6 | A179 |
| EPDREH4060-30-05-TH3 | ● | 0.5 | 6 | 30 | 5 | 80 | 6 | A179 |
| EPDRF4060-30-05-TH | ● | 0.5 | 6 | 30 | 6 | 80 | 6 | A218 |
| EPSM4060-30-R0.5-PN | ● | 0.5 | 6 | 30 | 9 | 68 | 6 | A238 |
| ER5HS06-30-PN | ● | 0.5 | 6 | 30 | 18 | 70 | 6 | A257 |
| EPDRE2060-35-05-ATH | ● | 0.5 | 6 | 35 | 5 | 80 | 6 | A199 |
| EPJSLS2060-05-J | □ | 0.5 | 6 | 36 | 9 | 120 | 6 | A427 |
| EPDRF4060-54-05-TH | ● | 0.5 | 6 | 54 | 6 | 100 | 6 | A218 |
| EPDRE2060-55-05-ATH | ● | 0.5 | 6 | 55 | 5 | 100 | 6 | A199 |
| EGR2060-05-HD | ● | 0.5 | 6 | 60 | 12 | 120 | 6 | A279 |
| EPDRF4060-72-05-TH | ● | 0.5 | 6 | 72 | 6 | 120 | 6 | A218 |
| EPPLS4060-05 | ● | 0.5 | 6 | – | 9 | 120 | 5 | A250 |
| EPP4060-05-TH | ● | 0.5 | 6 | – | 13 | 60 | 6 | A247 |
| EPP4060-05 | ● | 0.5 | 6 | – | 13 | 60 | 6 | A249 |
| EPSM4060-R0.5-PN | ● | 0.5 | 6 | – | 15 | 56 | 6 | A235 |
| CEPR6060-05-TH | ● | 0.5 | 6 | – | 15 | 60 | 6 | A265 |
| CEPR6060-05 | ● | 0.5 | 6 | – | 15 | 60 | 6 | A267 |
| EAP4060-05-TH | ◎ | 0.5 | 6 | – | 15 | 60 | 6 | A269 |
| EAP6060-05-TH | ◎ | 0.5 | 6 | – | 15 | 60 | 6 | A269 |
| EPPL4060-05 | ● | 0.5 | 6 | – | 25 | 70 | 6 | A249 |
| EPSML4060-R0.5-PN | □ | 0.5 | 6 | – | 30 | 70 | 6 | A237 |
| SCE6060-R0.75 | ● | 0.75 | 6 | – | 6 | 60 | 6 | A280 |
| EPDREH4060-12-10-TH3 | ● | 1 | 6 | 12 | 5 | 60 | 6 | A179 |
| EPDRE2060-18-1-ATH | ● | 1 | 6 | 18 | 5 | 60 | 6 | A199 |
| EPDREH4060-18-10-TH3 | ● | 1 | 6 | 18 | 5 | 60 | 6 | A179 |
| ER8WB0600LN-20-R1.0-ATH | ● | 1 | 6 | 20 | 7 | 70 | 6 | A254 |
| EPJS2060-10-J | □ | 1 | 6 | 21 | 9 | 90 | 6 | A427 |
| EPDRE2060-24-1-ATH | ● | 1 | 6 | 24 | 5 | 70 | 6 | A199 |
| EPDREH4060-24-10-TH3 | ● | 1 | 6 | 24 | 5 | 70 | 6 | A179 |
| EPDREH4060-30-10-TH3 | ● | 1 | 6 | 30 | 5 | 80 | 6 | A179 |
| EPDRF4060-30-10-TH | ● | 1 | 6 | 30 | 6 | 80 | 6 | A218 |
| ER8WB0600LN-30-R1.0-ATH | ● | 1 | 6 | 30 | 7 | 80 | 6 | A254 |
| EPSM4060-30-R1.0-PN | ● | 1 | 6 | 30 | 9 | 68 | 6 | A238 |
| EPDRE2060-35-1-ATH | ● | 1 | 6 | 35 | 5 | 80 | 6 | A199 |
| EPJSLS2060-10-J | □ | 1 | 6 | 36 | 9 | 120 | 6 | A427 |
| ER8WB0600LN-40-R1.0-ATH | ● | 1 | 6 | 40 | 7 | 90 | 6 | A254 |
| ER8WB0600LN-50-R1.0-ATH | ● | 1 | 6 | 50 | 7 | 100 | 6 | A254 |

| 商品コード Item Code | 在庫 Stock | コーナ半径 Corner radius | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|---|
| EPDRF4060-54-10-TH | ● | 1 | 6 | 54 | 6 | 100 | 6 | A218 |
| EPDRE2060-55-1-ATH | ● | 1 | 6 | 55 | 5 | 100 | 6 | A199 |
| EPDRF4060-72-10-TH | ● | 1 | 6 | 72 | 6 | 120 | 6 | A218 |
| EPPLS4060-10 | ● | 1 | 6 | – | 9 | 120 | 5 | A250 |
| EPP4060-10-TH | ● | 1 | 6 | – | 13 | 60 | 6 | A247 |
| EPP4060-10 | ● | 1 | 6 | – | 13 | 60 | 6 | A249 |
| EPSM4060-R1.0-PN | ● | 1 | 6 | – | 15 | 56 | 6 | A235 |
| CEPR6060-10-TH | ● | 1 | 6 | – | 15 | 60 | 6 | A265 |
| CEPR6060-10 | ● | 1 | 6 | – | 15 | 60 | 6 | A267 |
| EAP4060-10-TH | ◎ | 1 | 6 | – | 15 | 60 | 6 | A269 |
| EAP6060-10-TH | ◎ | 1 | 6 | – | 15 | 60 | 6 | A269 |
| EPPL4060-10 | ● | 1 | 6 | – | 25 | 70 | 6 | A249 |
| EPSML4060-R1.0-PN | □ | 1 | 6 | – | 30 | 70 | 6 | A237 |
| HGOF4060-15-TH | ● | 1.5 | 6 | 18 | 3 | 60 | 6 | A232 |
| HGOF2060-15-TH | ● | 1.5 | 6 | 18 | 9 | 60 | 6 | A232 |
| EMXR4060-18-15-TH | ● | 1.5 | 6 | 18 | 9 | 60 | 6 | A259 |
| EMXN4060-18-15-TH | ● | 1.5 | 6 | 18 | 9 | 60 | 6 | A260 |
| EPSM4060-30-R1.5-PN | ● | 1.5 | 6 | 30 | 9 | 68 | 6 | A238 |
| ETMLN4060-30-15-TH | ● | 1.5 | 6 | 30 | 9 | 75 | 6 | A226 |
| EMXR4060-30-15-TH | ● | 1.5 | 6 | 30 | 9 | 75 | 6 | A259 |
| EMXN4060-30-15-TH | ● | 1.5 | 6 | 30 | 9 | 75 | 6 | A260 |
| ETMP4060-40-15-TH | ● | 1.5 | 6 | 40 | 9 | 100 | 8 | A227 |
| EPRPN3060-40-15 | □ | 1.5 | 6 | 40 | 9 | 100 | 8 | A429 |
| ETMLN4060-42-15-TH | ● | 1.5 | 6 | 42 | 9 | 90 | 6 | A226 |
| ETMLN4060-54-15-TH | ● | 1.5 | 6 | 54 | 9 | 100 | 6 | A226 |
| ETMP4060-55-15-TH | ● | 1.5 | 6 | 55 | 9 | 110 | 8 | A227 |
| EPRPN3060-55-15 | □ | 1.5 | 6 | 55 | 9 | 110 | 8 | A429 |
| ETMP4060-67-15-TH | ● | 1.5 | 6 | 67 | 9 | 125 | 8 | A227 |
| EPRPN3060-67-15 | □ | 1.5 | 6 | 67 | 9 | 125 | 8 | A429 |
| ETM4060-15-TH | ● | 1.5 | 6 | – | 12 | 90 | 6 | A226 |
| EPR3060-15 | □ | 1.5 | 6 | – | 12 | 90 | 6 | A429 |
| EPP4060-15-TH | ● | 1.5 | 6 | – | 13 | 60 | 6 | A247 |
| EPP4060-15 | ● | 1.5 | 6 | – | 13 | 60 | 6 | A249 |
| EPSM4060-R1.5-PN | ● | 1.5 | 6 | – | 15 | 56 | 6 | A235 |
| EPSML4060-R1.5-PN | □ | 1.5 | 6 | – | 30 | 70 | 6 | A237 |
| EPSM4070-35-R0.3-PN | ● | 0.3 | 7 | 35 | 10.5 | 80 | 8 | A238 |
| EPPLS4070-03 | ● | 0.3 | 7 | – | 9 | 120 | 6 | A250 |
| EPSM4070-R0.3-PN | ● | 0.3 | 7 | – | 17.5 | 63 | 8 | A235 |
| EPSM4070-35-R0.5-PN | ● | 0.5 | 7 | 35 | 10.5 | 80 | 8 | A238 |
| EPPLS4070-05 | ● | 0.5 | 7 | – | 9 | 120 | 6 | A250 |
| EPSM4070-R0.5-PN | ● | 0.5 | 7 | – | 17.5 | 63 | 8 | A235 |
| EPSM4070-35-R1.0-PN | ● | 1 | 7 | 35 | 10.5 | 80 | 8 | A238 |
| EPPLS4070-10 | ● | 1 | 7 | – | 9 | 120 | 6 | A250 |
| EPSM4070-R1.0-PN | ● | 1 | 7 | – | 17.5 | 63 | 8 | A235 |
| ER8WB0700LS-R1.0-ATH | ● | 1 | 7 |  | 8 | 90 | 6 | A254 |
| EPSM4080-40-R0.3-PN | ● | 0.3 | 8 | 40 | 12 | 80 | 8 | A238 |
| EPP4080-03-TH | ● | 0.3 | 8 | – | 19 | 75 | 8 | A247 |
| EPP4080-03 | ● | 0.3 | 8 | – | 19 | 75 | 8 | A249 |
| EPSM4080-R0.3-PN | ● | 0.3 | 8 | – | 20 | 63 | 8 | A235 |
| CEPR6080-03-TH | ● | 0.3 | 8 | – | 20 | 75 | 8 | A265 |
| CEPR6080-03 | ● | 0.3 | 8 | – | 20 | 75 | 8 | A267 |
| EPSML4080-R0.3-PN | □ | 0.3 | 8 | – | 40 | 80 | 8 | A237 |
| EHHRE6080-TH3 | ● | 0.5 | 8 | 24 | 8 | 75 | 8 | A263 |
| EMXN4080-24-05-TH | ● | 0.5 | 8 | 24 | 12 | 75 | 8 | A260 |
| EMXA3080-24-05 | ◎ | 0.5 | 8 | 24 | 12 | 90 | 8 | A272 |
| EPJS2080-05-J | □ | 0.5 | 8 | 28 | 12 | 100 | 8 | A427 |
| EPSM4080-40-R0.5-PN | ● | 0.5 | 8 | 40 | 12 | 80 | 8 | A238 |
| EPJSLS2080-05-J | □ | 0.5 | 8 | 48 | 12 | 135 | 8 | A427 |
| EGR2080-05-HD | ● | 0.5 | 8 | 80 | 16 | 140 | 8 | A279 |
| EPPLS4080-05 | ● | 0.5 | 8 | – | 12 | 135 | 7 | A250 |
| EPP4080-05-TH | ● | 0.5 | 8 | – | 19 | 75 | 8 | A247 |
| EPP4080-05 | ● | 0.5 | 8 | – | 19 | 75 | 8 | A249 |
| EPSM4080-R0.5-PN | ● | 0.5 | 8 | – | 20 | 63 | 8 | A235 |
| CEPR6080-05-TH | ● | 0.5 | 8 | – | 20 | 75 | 8 | A265 |
| CEPR6080-05 | ● | 0.5 | 8 | – | 20 | 75 | 8 | A267 |
| EAP4080-05-TH | ◎ | 0.5 | 8 | – | 20 | 75 | 8 | A269 |
| EAP6080-05-TH | ◎ | 0.5 | 8 | – | 20 | 75 | 8 | A269 |
| EPPL4080-05 | ● | 0.5 | 8 | – | 35 | 90 | 8 | A249 |
| EPSML4080-R0.5-PN | □ | 0.5 | 8 | – | 40 | 80 | 8 | A237 |

| 商品コード Item Code | 在庫 Stock | コーナ半径 Corner radius | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|---|
| EPJS2080-10-J | □ | 1 | 8 | 28 | 12 | 100 | 8 | A427 |
| ER5HS08-PN | ● | 1 | 8 | 28 | 24 | 75 | 8 | A257 |
| ER8WB0800LN-30-R1.0-ATH | ● | 1 | 8 | 30 | 9 | 75 | 8 | A254 |
| ER8WB0800LN-40-R1.0-ATH | ● | 1 | 8 | 40 | 9 | 90 | 8 | A254 |
| EPSM4080-40-R1.0-PN | ● | 1 | 8 | 40 | 12 | 80 | 8 | A238 |
| ER5HS08-40-PN | ● | 1 | 8 | 40 | 24 | 80 | 8 | A257 |
| EPJSLS2080-10-J | □ | 1 | 8 | 48 | 12 | 135 | 8 | A427 |
| ER8WB0800LN-50-R1.0-ATH | ● | 1 | 8 | 50 | 9 | 100 | 8 | A254 |
| ER8WB0800LN-60-R1.0-ATH | ● | 1 | 8 | 60 | 9 | 110 | 8 | A254 |
| SCE6080-R1.00 | ● | 1 | 8 | – | 8 | 70 | 8 | A280 |
| EPPLS4080-10 | ● | 1 | 8 | – | 12 | 135 | 7 | A250 |
| EPP4080-10-TH | ● | 1 | 8 | – | 19 | 75 | 8 | A247 |
| EPP4080-10 | ● | 1 | 8 | – | 19 | 75 | 8 | A249 |
| EPSM4080-R1.0-PN | ● | 1 | 8 | – | 20 | 63 | 8 | A235 |
| CEPR6080-10-TH | ● | 1 | 8 | – | 20 | 75 | 8 | A265 |
| CEPR6080-10 | ● | 1 | 8 | – | 20 | 75 | 8 | A267 |
| EAP4080-10-TH | ◎ | 1 | 8 | – | 20 | 75 | 8 | A269 |
| EAP6080-10-TH | ◎ | 1 | 8 | – | 20 | 75 | 8 | A269 |
| EPPL4080-10 | ● | 1 | 8 | – | 35 | 90 | 8 | A249 |
| EPSML4080-R1.0-PN | □ | 1 | 8 | – | 40 | 80 | 8 | A237 |
| EPSM4080-40-R1.5-PN | ● | 1.5 | 8 | 40 | 12 | 80 | 8 | A238 |
| EPPLS4080-15 | ● | 1.5 | 8 | – | 12 | 135 | 7 | A250 |
| EPP4080-15-TH | ● | 1.5 | 8 | – | 19 | 75 | 8 | A247 |
| EPP4080-15 | ● | 1.5 | 8 | – | 19 | 75 | 8 | A249 |
| EPSM4080-R1.5-PN | ● | 1.5 | 8 | – | 20 | 63 | 8 | A235 |
| CEPR6080-15 | ● | 1.5 | 8 | – | 20 | 75 | 8 | A267 |
| EAP4080-15-TH | ◎ | 1.5 | 8 | – | 20 | 75 | 8 | A269 |
| EAP6080-15-TH | ◎ | 1.5 | 8 | – | 20 | 75 | 8 | A269 |
| EPPL4080-15 | ● | 1.5 | 8 | – | 35 | 90 | 8 | A249 |
| EPSML4080-R1.5-PN | □ | 1.5 | 8 | – | 40 | 80 | 8 | A237 |
| HGOF4080-20-TH | ● | 2 | 8 | 24 | 4 | 75 | 8 | A232 |
| HGOF2080-20-TH | ● | 2 | 8 | 24 | 12 | 75 | 8 | A232 |
| EMXR4080-24-20-TH | ● | 2 | 8 | 24 | 12 | 75 | 8 | A259 |
| EMXN4080-24-20-TH | ● | 2 | 8 | 24 | 12 | 75 | 8 | A260 |
| EPSM4080-40-R2.0-PN | ● | 2 | 8 | 40 | 12 | 80 | 8 | A238 |
| ETMLN4080-40-20-TH | ● | 2 | 8 | 40 | 12 | 85 | 8 | A226 |
| EMXR4080-40-20-TH | ● | 2 | 8 | 40 | 12 | 85 | 8 | A259 |
| EMXN4080-40-20-TH | ● | 2 | 8 | 40 | 12 | 85 | 8 | A260 |
| ETMP4080-55-20-TH | ● | 2 | 8 | 55 | 12 | 110 | 10 | A227 |
| EPRPN3080-55-20 | □ | 2 | 8 | 55 | 12 | 110 | 10 | A429 |
| ETMLN4080-56-20-TH | ● | 2 | 8 | 56 | 12 | 100 | 8 | A226 |
| ETMP4080-70-20-TH | ● | 2 | 8 | 70 | 12 | 130 | 10 | A227 |
| EPRPN3080-70-20 | □ | 2 | 8 | 70 | 12 | 130 | 10 | A429 |
| ETMLN4080-72-20-TH | ● | 2 | 8 | 72 | 12 | 120 | 8 | A226 |
| ETMP4080-90-20-TH | ● | 2 | 8 | 90 | 12 | 145 | 12 | A227 |
| EPRPN3080-90-20 | □ | 2 | 8 | 90 | 12 | 145 | 12 | A429 |
| ETM4080-20-TH | ● | 2 | 8 | – | 16 | 100 | 8 | A226 |
| EPR3080-20 | □ | 2 | 8 | – | 16 | 100 | 8 | A429 |
| EPP4080-20-TH | ● | 2 | 8 | – | 19 | 75 | 8 | A247 |
| EPP4080-20 | ● | 2 | 8 | – | 19 | 75 | 8 | A249 |
| EPSM4080-R2.0-PN | ● | 2 | 8 | – | 20 | 63 | 8 | A235 |
| EPPL4080-20 | ● | 2 | 8 | – | 35 | 90 | 8 | A249 |
| EPSML4080-R2.0-PN | □ | 2 | 8 | – | 40 | 80 | 8 | A237 |
| EPSM4090-45-R0.3-PN | ● | 0.3 | 9 | 45 | 13.5 | 94 | 10 | A238 |
| EPSM4090-R0.3-PN | ● | 0.3 | 9 | – | 22.5 | 74 | 10 | A235 |
| EPSM4090-45-R0.5-PN | ● | 0.5 | 9 | 45 | 13.5 | 94 | 10 | A238 |
| EPPLS4090-05 | ● | 0.5 | 9 | – | 12 | 135 | 8 | A250 |
| EPSM4090-R0.5-PN | ● | 0.5 | 9 | – | 22.5 | 74 | 10 | A235 |
| EPSM4090-45-R1.0-PN | ● | 1 | 9 | 45 | 13.5 | 94 | 10 | A238 |
| EPPLS4090-10 | ● | 1 | 9 | – | 12 | 135 | 8 | A250 |
| EPSM4090-R1.0-PN | ● | 1 | 9 | – | 22.5 | 74 | 10 | A235 |
| ER8WB0900LS-R1.0-ATH | ● | 1 | 9 |  | 10 | 100 | 8 | A254 |
| EPPLS4090-15 | ● | 1.5 | 9 | – | 12 | 135 | 8 | A250 |
| EPSM4100-50-R0.3-PN | ● | 0.3 | 10 | 50 | 15 | 94 | 10 | A238 |
| EPP4100-03-TH | ● | 0.3 | 10 | – | 22 | 80 | 10 | A247 |
| EPP4100-03 | ● | 0.3 | 10 | – | 22 | 80 | 10 | A249 |
| EPSM4100-R0.3-PN | ● | 0.3 | 10 | – | 25 | 74 | 10 | A235 |
| EPSML4100-R0.3-PN | □ | 0.3 | 10 | – | 50 | 100 | 10 | A237 |
| EMXN4100-30-05-TH | ● | 0.5 | 10 | 30 | 15 | 80 | 10 | A260 |

□印：特定代理店在庫です。弊社営業へお問合せください。□：Stocked by specified distributor. Contact with our sales department.

Quick dimension reference table by mill diameter

# 外径別寸法早見表

## 超硬エンドミル・ラジアス　φ10～φ30　Carbide End Mills -Radius

単位 unit：mm

| 商品コード Item Code | 在庫 Stock | コーナ半径 Corner radius | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|---|
| EPJS2100-05-J | □ | 0.5 | 10 | 35 | 15 | 100 | 10 | A427 |
| EPSM4100-50-R0.5-PN | ● | 0.5 | 10 | 50 | 15 | 94 | 10 | A238 |
| EPJSLS2100-05-J | □ | 0.5 | 10 | 60 | 15 | 150 | 10 | A427 |
| EGR2100-05-HD | ● | 0.5 | 10 | 100 | 20 | 150 | 10 | A279 |
| EHHRE6100-TH3 | ● | 0.5 | 10 | 210 | 10 | 80 | 10 | A263 |
| EPPLS4100-05 | ● | 0.5 | 10 | – | 15 | 150 | 9 | A250 |
| EPP4100-05-TH | ● | 0.5 | 10 | – | 22 | 80 | 10 | A247 |
| EPP4100-05 | ● | 0.5 | 10 | – | 22 | 80 | 10 | A249 |
| EPSM4100-R0.5-PN | ● | 0.5 | 10 | – | 25 | 74 | 10 | A235 |
| CEPR6100-05-TH | ● | 0.5 | 10 | – | 25 | 80 | 10 | A265 |
| CEPR6100-05 | ● | 0.5 | 10 | – | 25 | 80 | 10 | A267 |
| EAP4100-05-TH | ◎ | 0.5 | 10 | – | 25 | 80 | 10 | A269 |
| EAP6100-05-TH | ◎ | 0.5 | 10 | – | 25 | 80 | 10 | A269 |
| EPPL4100-05 | ● | 0.5 | 10 | – | 45 | 100 | 10 | A249 |
| EPSML4100-R0.5-PN | □ | 0.5 | 10 | – | 50 | 100 | 10 | A237 |
| EMXA3100-30-10 | ◎ | 1 | 10 | 30 | 15 | 100 | 10 | A272 |
| ER8WB1000LN-35-R1.0-ATH | ● | 1 | 10 | 35 | 11 | 80 | 10 | A254 |
| EPJS2100-10-J | □ | 1 | 10 | 35 | 15 | 100 | 10 | A427 |
| ER5HS10-PN | ● | 1 | 10 | 35 | 30 | 80 | 10 | A257 |
| EMXA2100-45-10 | ◎ | 1 | 10 | 45 | 8 | 80 | 10 | A272 |
| ER8WB1000LN-50-R1.0-ATH | ● | 1 | 10 | 50 | 11 | 100 | 10 | A254 |
| EPSM4100-50-R1.0-PN | ● | 1 | 10 | 50 | 15 | 94 | 10 | A238 |
| ER5HS10-50-PN | ● | 1 | 10 | 50 | 30 | 100 | 10 | A257 |
| ER8WB1000LN-60-R1.0-ATH | ● | 1 | 10 | 60 | 11 | 110 | 10 | A254 |
| EPJSLS2100-10-J | □ | 1 | 10 | 60 | 15 | 150 | 10 | A427 |
| ER8WB1000LN-80-R1.0-ATH | ● | 1 | 10 | 80 | 11 | 130 | 10 | A254 |
| EPPLS4100-10 | ● | 1 | 10 | – | 15 | 150 | 9 | A250 |
| EPP4100-10-TH | ● | 1 | 10 | – | 22 | 80 | 10 | A247 |
| EPP4100-10 | ● | 1 | 10 | – | 22 | 80 | 10 | A249 |
| EPSM4100-R1.0-PN | ● | 1 | 10 | – | 25 | 74 | 10 | A235 |
| CEPR6100-10-TH | ● | 1 | 10 | – | 25 | 80 | 10 | A265 |
| CEPR6100-10 | ● | 1 | 10 | – | 25 | 80 | 10 | A267 |
| EAP4100-10-TH | ◎ | 1 | 10 | – | 25 | 80 | 10 | A269 |
| EAP6100-10-TH | ◎ | 1 | 10 | – | 25 | 80 | 10 | A269 |
| EPPL4100-10 | ● | 1 | 10 | – | 45 | 100 | 10 | A249 |
| EPSML4100-R1.0-PN | □ | 1 | 10 | – | 50 | 100 | 10 | A237 |
| SCE6100-R1.25 | ● | 1.25 | 10 | – | 10 | 80 | 10 | A280 |
| EPSM4100-50-R1.5-PN | ● | 1.5 | 10 | 50 | 15 | 94 | 10 | A238 |
| EPPLS4100-15 | ● | 1.5 | 10 | – | 15 | 150 | 9 | A250 |
| EPP4100-15-TH | ● | 1.5 | 10 | – | 22 | 80 | 10 | A247 |
| EPP4100-15 | ● | 1.5 | 10 | – | 22 | 80 | 10 | A249 |
| EPSM4100-R1.5-PN | ● | 1.5 | 10 | – | 25 | 74 | 10 | A235 |
| CEPR6100-15-TH | ● | 1.5 | 10 | – | 25 | 80 | 10 | A265 |
| CEPR6100-15 | ● | 1.5 | 10 | – | 25 | 80 | 10 | A267 |
| EAP4100-15-TH | ◎ | 1.5 | 10 | – | 25 | 80 | 10 | A269 |
| EAP6100-15-TH | ◎ | 1.5 | 10 | – | 25 | 80 | 10 | A269 |
| EPPL4100-15 | ● | 1.5 | 10 | – | 45 | 100 | 10 | A249 |
| EPSML4100-R1.5-PN | □ | 1.5 | 10 | – | 50 | 100 | 10 | A237 |
| HGOF4100-20-TH | ● | 2 | 10 | 30 | 5 | 80 | 10 | A232 |
| HGOF2100-20-TH | ● | 2 | 10 | 30 | 15 | 80 | 10 | A232 |
| EMXR4100-30-20-TH | ● | 2 | 10 | 30 | 15 | 80 | 10 | A259 |
| EMXN4100-30-20-TH | ● | 2 | 10 | 30 | 15 | 80 | 10 | A260 |
| EPJS2100-20-J | □ | 2 | 10 | 35 | 15 | 100 | 10 | A427 |
| EPSM4100-50-R2.0-PN | ● | 2 | 10 | 50 | 15 | 94 | 10 | A238 |
| ETMLN4100-50-20-TH | ● | 2 | 10 | 50 | 15 | 100 | 10 | A226 |
| EMXR4100-50-20-TH | ● | 2 | 10 | 50 | 15 | 100 | 10 | A259 |
| EMXN4100-50-20-TH | ● | 2 | 10 | 50 | 15 | 100 | 10 | A260 |
| EPJSLS2100-20-J | □ | 2 | 10 | 60 | 15 | 150 | 10 | A427 |
| ETMLN4100-70-20-TH | ● | 2 | 10 | 70 | 15 | 120 | 10 | A226 |
| ETMP4100-73-20-TH | ● | 2 | 10 | 73 | 15 | 135 | 12 | A227 |
| EPRPN3100-73-20 | □ | 2 | 10 | 73 | 15 | 135 | 12 | A429 |
| ETMLN4100-90-20-TH | ● | 2 | 10 | 90 | 15 | 140 | 10 | A226 |
| ETMP4100-95-20-TH | ● | 2 | 10 | 95 | 15 | 150 | 16 | A227 |
| EPRPN3100-95-20 | □ | 2 | 10 | 95 | 15 | 150 | 16 | A429 |
| ETMP4100-115-20-TH | ● | 2 | 10 | 115 | 15 | 170 | 16 | A227 |
| EPRPN3100-115-20 | □ | 2 | 10 | 115 | 15 | 170 | 16 | A429 |
| ETM4100-20-TH | ● | 2 | 10 | – | 20 | 110 | 10 | A226 |
| EPR3100-20 | □ | 2 | 10 | – | 20 | 110 | 10 | A429 |
| EPP4100-20-TH | ● | 2 | 10 | – | 22 | 80 | 10 | A247 |

| 商品コード Item Code | 在庫 Stock | コーナ半径 Corner radius | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|---|
| EPP4100-20 | ● | 2 | 10 | – | 22 | 80 | 10 | A249 |
| EPSM4100-R2.0-PN | ● | 2 | 10 | – | 25 | 74 | 10 | A235 |
| CEPR6100-20-TH | ● | 2 | 10 | – | 25 | 80 | 10 | A265 |
| CEPR6100-20 | ● | 2 | 10 | – | 25 | 80 | 10 | A267 |
| EAP4100-20-TH | ◎ | 2 | 10 | – | 25 | 80 | 10 | A269 |
| EAP6100-20-TH | ◎ | 2 | 10 | – | 25 | 80 | 10 | A269 |
| EPPL4100-20 | ● | 2 | 10 | – | 45 | 100 | 10 | A249 |
| EPSML4100-R2.0-PN | □ | 2 | 10 | – | 50 | 100 | 10 | A237 |
| EPSM4110-55-R0.3-PN | ● | 0.3 | 11 | 55 | 16.5 | 110 | 12 | A238 |
| EPSM4110-R0.3-PN | ● | 0.3 | 11 | – | 27.5 | 86 | 12 | A235 |
| EPSM4110-55-R0.5-PN | ● | 0.5 | 11 | 55 | 16.5 | 110 | 12 | A238 |
| EPPLS4110-05 | ● | 0.5 | 11 | – | 15 | 150 | 10 | A250 |
| EPSM4110-R0.5-PN | ● | 0.5 | 11 | – | 27.5 | 86 | 12 | A235 |
| EPSM4110-55-R1.0-PN | ● | 1 | 11 | 55 | 16.5 | 110 | 12 | A238 |
| EPPLS4110-10 | ● | 1 | 11 | – | 15 | 150 | 10 | A250 |
| EPSM4110-R1.0-PN | ● | 1 | 11 | – | 27.5 | 86 | 12 | A235 |
| ER8WB1100LS-R1.0-ATH | ● | 1 | 11 |  | 12 | 110 | 10 | A254 |
| EPPLS4110-15 | ● | 1.5 | 11 | – | 15 | 150 | 10 | A250 |
| EPSM4120-60-R0.3-PN | ● | 0.3 | 12 | 60 | 18 | 110 | 12 | A238 |
| EPSM4120-R0.3-PN | ● | 0.3 | 12 | – | 30 | 86 | 12 | A235 |
| EPSML4120-R0.3-PN | □ | 0.3 | 12 | – | 60 | 120 | 12 | A237 |
| EHHRE6120-TH3 | ● | 0.5 | 12 | 36 | 12 | 100 | 12 | A263 |
| EMXN4120-36-05-TH | ● | 0.5 | 12 | 36 | 18 | 100 | 12 | A260 |
| EPJS2120-05-J | □ | 0.5 | 12 | 42 | 18 | 110 | 12 | A427 |
| EPSM4120-60-R0.5-PN | ● | 0.5 | 12 | 60 | 18 | 110 | 12 | A238 |
| EPJSLS2120-05-J | □ | 0.5 | 12 | 72 | 18 | 160 | 12 | A427 |
| EHX12-EPP4120-05-TH | ● | 0.5 | 12 | – | 9.6 | 19 | – | A399 |
| EPPLS4120-05 | ● | 0.5 | 12 | – | 18 | 160 | 11 | A250 |
| EPP4120-05-TH | ● | 0.5 | 12 | – | 26 | 100 | 12 | A247 |
| EPP4120-05 | ● | 0.5 | 12 | – | 26 | 100 | 12 | A249 |
| EPSM4120-R0.5-PN | ● | 0.5 | 12 | – | 30 | 86 | 12 | A235 |
| CEPR6120-05-TH | ● | 0.5 | 12 | – | 30 | 100 | 12 | A265 |
| CEPR6120-05 | ● | 0.5 | 12 | – | 30 | 100 | 12 | A267 |
| EAP4120-05-TH | ◎ | 0.5 | 12 | – | 30 | 100 | 12 | A269 |
| EAP6120-05-TH | ◎ | 0.5 | 12 | – | 30 | 100 | 12 | A269 |
| EPPL4120-05 | ● | 0.5 | 12 | – | 55 | 120 | 12 | A249 |
| EPSML4120-R0.5-PN | □ | 0.5 | 12 | – | 60 | 120 | 12 | A237 |
| EMXA3120-36-10 | ◎ | 1 | 12 | 36 | 18 | 120 | 12 | A272 |
| ER8WB1200LN-40-R1.0-ATH | ● | 1 | 12 | 40 | 13 | 90 | 12 | A254 |
| EPJS2120-10-J | □ | 1 | 12 | 42 | 18 | 110 | 12 | A427 |
| ER5HS12-PN | ● | 1 | 12 | 42 | 36 | 100 | 12 | A257 |
| EMXA2120-60-10 | ◎ | 1 | 12 | 60 | 10 | 100 | 12 | A272 |
| ER8WB1200LN-60-R1.0-ATH | ● | 1 | 12 | 60 | 13 | 110 | 12 | A254 |
| EPSM4120-60-R1.0-PN | ● | 1 | 12 | 60 | 18 | 110 | 12 | A238 |
| ER5HS12-60-PN | ● | 1 | 12 | 60 | 36 | 120 | 12 | A257 |
| EPJSLS2120-10-J | □ | 1 | 12 | 72 | 18 | 160 | 12 | A427 |
| ER8WB1200LN-80-R1.0-ATH | ● | 1 | 12 | 80 | 13 | 130 | 12 | A254 |
| ER8WB1200LN-100-R1.0-ATH | ● | 1 | 12 | 100 | 13 | 150 | 12 | A254 |
| EHX12-EPP4120-10-TH | ● | 1 | 12 | – | 9.6 | 19 | – | A399 |
| EPPLS4120-10 | ● | 1 | 12 | – | 18 | 160 | 11 | A250 |
| EPP4120-10-TH | ● | 1 | 12 | – | 26 | 100 | 12 | A247 |
| EPP4120-10 | ● | 1 | 12 | – | 26 | 100 | 12 | A249 |
| EPSM4120-R1.0-PN | ● | 1 | 12 | – | 30 | 86 | 12 | A235 |
| CEPR6120-10-TH | ● | 1 | 12 | – | 30 | 100 | 12 | A265 |
| CEPR6120-10 | ● | 1 | 12 | – | 30 | 100 | 12 | A267 |
| EAP4120-10-TH | ◎ | 1 | 12 | – | 30 | 100 | 12 | A269 |
| EAP6120-10-TH | ◎ | 1 | 12 | – | 30 | 100 | 12 | A269 |
| EPPL4120-10 | ● | 1 | 12 | – | 55 | 120 | 12 | A249 |
| EPSML4120-R1.0-PN | □ | 1 | 12 | – | 60 | 120 | 12 | A237 |
| EPSM4120-60-R1.5-PN | ● | 1.5 | 12 | 60 | 18 | 110 | 12 | A238 |
| EHX12-EPP4120-15-TH | ● | 1.5 | 12 | – | 9.6 | 19 | – | A399 |
| SCE6120-R1.50 | ● | 1.5 | 12 | – | 12 | 80 | 12 | A280 |
| EPPLS4120-15 | ● | 1.5 | 12 | – | 18 | 160 | 11 | A250 |
| EPP4120-15-TH | ● | 1.5 | 12 | – | 26 | 100 | 12 | A247 |
| EPP4120-15 | ● | 1.5 | 12 | – | 26 | 100 | 12 | A249 |
| EPSM4120-R1.5-PN | ● | 1.5 | 12 | – | 30 | 86 | 12 | A235 |
| CEPR6120-15-TH | ● | 1.5 | 12 | – | 30 | 100 | 12 | A265 |
| CEPR6120-15 | ● | 1.5 | 12 | – | 30 | 100 | 12 | A267 |
| EAP4120-15-TH | ◎ | 1.5 | 12 | – | 30 | 100 | 12 | A269 |

| 商品コード Item Code | 在庫 Stock | コーナ半径 Corner radius | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|---|
| EAP6120-15-TH | ◎ | 1.5 | 12 | 30 | – | 100 | 12 | A269 |
| EPPL4120-15 | ● | 1.5 | 12 | 55 | – | 120 | 12 | A249 |
| EPSML4120-R1.5-PN | □ | 1.5 | 12 | 60 | – | 120 | 12 | A237 |
| HGOF4120-20-TH | ● | 2 | 12 | 6 | 36 | 100 | 12 | A232 |
| HGOF2120-20-TH | ● | 2 | 12 | 18 | 36 | 100 | 12 | A232 |
| EMXR4120-36-20-TH | ● | 2 | 12 | 18 | 36 | 100 | 12 | A259 |
| EMXN4120-36-20-TH | ● | 2 | 12 | 18 | 36 | 100 | 12 | A260 |
| EPJS2120-20-J | □ | 2 | 12 | 18 | 42 | 110 | 12 | A427 |
| ETMLN4120-60-20-TH | ● | 2 | 12 | 18 | 60 | 110 | 12 | A226 |
| EPSM4120-60-R2.0-PN | ● | 2 | 12 | 18 | 60 | 110 | 12 | A238 |
| EMXR4120-60-20-TH | ● | 2 | 12 | 18 | 60 | 110 | 12 | A259 |
| EMXN4120-60-20-TH | ● | 2 | 12 | 18 | 60 | 110 | 12 | A260 |
| EPJSLS2120-20-J | □ | 2 | 12 | 18 | 72 | 160 | 12 | A427 |
| ETMP4120-80-20-TH | ● | 2 | 12 | 18 | 80 | 135 | 16 | A227 |
| EPRPN3120-80-20 | □ | 2 | 12 | 18 | 80 | 135 | 16 | A429 |
| ETMLN4120-84-20-TH | ● | 2 | 12 | 18 | 84 | 135 | 12 | A226 |
| ETMP4120-105-20-TH | ● | 2 | 12 | 18 | 105 | 160 | 16 | A227 |
| EPRPN3120-105-20 | □ | 2 | 12 | 18 | 105 | 160 | 16 | A429 |
| ETMLN4120-108-20-TH | ● | 2 | 12 | 18 | 108 | 160 | 12 | A226 |
| EHX12-EPP4120-20-TH | ● | 2 | 12 | 9.6 | – | 19 | – | A399 |
| EHX12-ETM4120-20-TH | ● | 2 | 12 | 12 | – | 19 | – | A398 |
| EHX12H-ETM4120-20-TH | ● | 2 | 12 | 12 | – | 19 | – | A398 |
| EPPLS4120-20 | ● | 2 | 12 | 18 | – | 160 | 11 | A250 |
| ETM4120-20-TH | ● | 2 | 12 | 24 | – | 120 | 12 | A226 |
| EPR3120-20 | □ | 2 | 12 | 24 | – | 120 | 12 | A429 |
| EPP4120-20-TH | ● | 2 | 12 | 26 | – | 100 | 12 | A247 |
| EPP4120-20 | ● | 2 | 12 | 26 | – | 100 | 12 | A249 |
| EPSM4120-R2.0-PN | ● | 2 | 12 | 30 | – | 86 | 12 | A235 |
| CEPR6120-20-TH | ● | 2 | 12 | 30 | – | 100 | 12 | A265 |
| CEPR6120-20 | ● | 2 | 12 | 30 | – | 100 | 12 | A267 |
| EAP4120-20-TH | ◎ | 2 | 12 | 30 | – | 100 | 12 | A269 |
| EAP6120-20-TH | ◎ | 2 | 12 | 30 | – | 100 | 12 | A269 |
| EPPL4120-20 | ● | 2 | 12 | 55 | – | 120 | 12 | A249 |
| EPSML4120-R2.0-PN | □ | 2 | 12 | 60 | – | 120 | 12 | A237 |
| EPSM4120-60-R2.5-PN | ● | 2.5 | 12 | 18 | 60 | 110 | 12 | A238 |
| EPSM4120-R2.5-PN | ● | 2.5 | 12 | 30 | – | 86 | 12 | A235 |
| EPSML4120-R2.5-PN | □ | 2.5 | 12 | 60 | – | 120 | 12 | A237 |
| EPSM4120-60-R3.0-PN | ● | 3 | 12 | 18 | 60 | 110 | 12 | A238 |
| EHX12-EPP4120-30-TH | ● | 3 | 12 | 9.6 | – | 19 | – | A399 |
| EPP4120-30-TH | ● | 3 | 12 | 26 | – | 100 | 12 | A247 |
| EPP4120-30 | ● | 3 | 12 | 26 | – | 100 | 12 | A249 |
| EPSM4120-R3.0-PN | ● | 3 | 12 | 30 | – | 86 | 12 | A235 |
| EPPL4120-30 | ● | 3 | 12 | 55 | – | 120 | 12 | A249 |
| EPSML4120-R3.0-PN | □ | 3 | 12 | 60 | – | 120 | 12 | A237 |
| EPSM4130-65-R0.5-PN | □ | 0.5 | 13 | 19.5 | 65 | 125 | 16 | A239 |
| EPPLS4130-05 | ● | 0.5 | 13 | 18 | – | 160 | 12 | A250 |
| EPSM4130-R0.5-PN | □ | 0.5 | 13 | 32.5 | – | 105 | 16 | A236 |
| EPSM4130-65-R1.0-PN | □ | 1 | 13 | 19.5 | 65 | 125 | 16 | A239 |
| EPPLS4130-10 | ● | 1 | 13 | 18 | – | 160 | 12 | A250 |
| EPSM4130-R1.0-PN | □ | 1 | 13 | 32.5 | – | 105 | 16 | A236 |
| EPSM4130-65-R1.5-PN | □ | 1.5 | 13 | 19.5 | 65 | 125 | 16 | A239 |
| EPPLS4130-15 | ● | 1.5 | 13 | 18 | – | 160 | 12 | A250 |
| EPSM4130-R1.5-PN | □ | 1.5 | 13 | 32.5 | – | 105 | 16 | A236 |
| EPSM4130-65-R2.0-PN | □ | 2 | 13 | 19.5 | 65 | 125 | 16 | A239 |
| EPPLS4130-20 | ● | 2 | 13 | 18 | – | 160 | 12 | A250 |
| EPSM4130-R2.0-PN | □ | 2 | 13 | 32.5 | – | 105 | 16 | A236 |
| EPSM4130-65-R3.0-PN | □ | 3 | 13 | 19.5 | 65 | 125 | 16 | A239 |
| EPSM4130-R3.0-PN | □ | 3 | 13 | 32.5 | – | 105 | 16 | A236 |
| EPSM4140-70-R0.5-PN | □ | 0.5 | 14 | 21 | 70 | 125 | 16 | A239 |
| EPSM4140-R0.5-PN | □ | 0.5 | 14 | 35 | – | 105 | 16 | A236 |
| EPSM4140-70-R1.0-PN | □ | 1 | 14 | 21 | 70 | 125 | 16 | A239 |
| EPSM4140-R1.0-PN | □ | 1 | 14 | 35 | – | 105 | 16 | A236 |
| EPSM4140-70-R1.5-PN | □ | 1.5 | 14 | 21 | 70 | 125 | 16 | A239 |
| EPSM4140-R1.5-PN | □ | 1.5 | 14 | 35 | – | 105 | 16 | A236 |
| EPSM4140-70-R2.0-PN | □ | 2 | 14 | 21 | 70 | 125 | 16 | A239 |
| EPSM4140-R2.0-PN | □ | 2 | 14 | 35 | – | 105 | 16 | A236 |
| EPSM4140-70-R3.0-PN | □ | 3 | 14 | 21 | 70 | 125 | 16 | A239 |
| EPSM4140-R3.0-PN | □ | 3 | 14 | 35 | – | 105 | 16 | A236 |
| EPSM4150-75-R0.5-PN | □ | 0.5 | 15 | 22.5 | 75 | 135 | 16 | A239 |

●印：標準在庫品です。　●：Stocked Items.　◎印：メーカー在庫品です。弊社営業へお問合せください。　◎：Manufacturer stocked items Contact with our sales department.

単位 unit：mm

| 商品コード Item Code | 在庫 Stock | コーナ半径 Corner radius | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|---|
| EPSM4150-R0.5-PN | □ | 0.5 | 15 | 37.5 | – | 110 | 16 | A236 |
| EPSM4150-75-R1.0-PN | □ | 1 | 15 | 22.5 | 75 | 135 | 16 | A239 |
| EPSM4150-R1.0-PN | □ | 1 | 15 | 37.5 | – | 110 | 16 | A236 |
| EPSM4150-75-R1.5-PN | □ | 1.5 | 15 | 22.5 | 75 | 135 | 16 | A239 |
| EPSM4150-R1.5-PN | □ | 1.5 | 15 | 37.5 | – | 110 | 16 | A236 |
| EPSM4150-75-R2.0-PN | □ | 2 | 15 | 22.5 | 75 | 135 | 16 | A239 |
| EPSM4150-R2.0-PN | □ | 2 | 15 | 37.5 | – | 110 | 16 | A236 |
| EPSM4150-75-R3.0-PN | □ | 3 | 15 | 22.5 | 75 | 135 | 16 | A239 |
| EPSM4150-R3.0-PN | □ | 3 | 15 | 37.5 | – | 110 | 16 | A236 |
| EPSM4160-80-R0.5-PN | ● | 0.5 | 16 | 24 | 80 | 135 | 16 | A239 |
| EPSM4160-R0.5-PN | ● | 0.5 | 16 | 40 | – | 110 | 16 | A236 |
| EPSML4160-R0.5-PN | □ | 0.5 | 16 | 80 | – | 135 | 16 | A237 |
| EMXA3160-45-10 | ◎ | 1 | 16 | 19 | 45 | 90 | 16 | A272 |
| ER5HS16-PN | ● | 1 | 16 | 48 | 56 | 110 | 16 | A257 |
| EMXA2160-75-10 | ◎ | 1 | 16 | 13 | 75 | 120 | 16 | A272 |
| EPSM4160-80-R1.0-PN | ● | 1 | 16 | 24 | 80 | 135 | 16 | A239 |
| ER5HS16-80-PN | ● | 1 | 16 | 48 | 80 | 135 | 16 | A257 |
| EHX16-EPP4160-10-TH | ● | 1 | 16 | 12.8 | – | 24 | – | A399 |
| EPPLS4160-10 | ● | 1 | 16 | 24 | – | 180 | 15 | A250 |
| EPP4160-10-TH | ● | 1 | 16 | 32 | – | 110 | 16 | A247 |
| EPP4160-10 | ● | 1 | 16 | 32 | – | 110 | 16 | A249 |
| EPSM4160-R1.0-PN | ● | 1 | 16 | 40 | – | 110 | 16 | A236 |
| CEPR6160-10-TH | ● | 1 | 16 | 40 | – | 110 | 16 | A265 |
| CEPR6160-10 | ● | 1 | 16 | 40 | – | 110 | 16 | A267 |
| EAP4160-10-TH | ◎ | 1 | 16 | 40 | – | 110 | 16 | A269 |
| EAP6160-10-TH | ◎ | 1 | 16 | 40 | – | 110 | 16 | A269 |
| EPPL4160-10 | ● | 1 | 16 | 65 | – | 135 | 16 | A249 |
| EPSML4160-R1.0-PN | □ | 1 | 16 | 80 | – | 135 | 16 | A237 |
| EPSM4160-80-R1.5-PN | ● | 1.5 | 16 | 24 | 80 | 135 | 16 | A239 |
| EHX16-EPP4160-15-TH | ● | 1.5 | 16 | 12.8 | – | 24 | – | A399 |
| EPPLS4160-15 | ● | 1.5 | 16 | 24 | – | 180 | 15 | A250 |
| EPP4160-15-TH | ● | 1.5 | 16 | 32 | – | 110 | 16 | A247 |
| EPP4160-15 | ● | 1.5 | 16 | 32 | – | 110 | 16 | A249 |
| EPSM4160-R1.5-PN | ● | 1.5 | 16 | 40 | – | 110 | 16 | A236 |
| CEPR6160-15 | ● | 1.5 | 16 | 40 | – | 110 | 16 | A267 |
| EAP4160-15-TH | ◎ | 1.5 | 16 | 40 | – | 110 | 16 | A269 |
| EAP6160-15-TH | ◎ | 1.5 | 16 | 40 | – | 110 | 16 | A269 |
| EPPL4160-15 | ● | 1.5 | 16 | 65 | – | 135 | 16 | A249 |
| EPSML4160-R1.5-PN | □ | 1.5 | 16 | 80 | – | 135 | 16 | A237 |
| EPSM4160-80-R2.0-PN | ● | 2 | 16 | 24 | 80 | 135 | 16 | A239 |
| EHX16-EPP4160-20-TH | ● | 2 | 16 | 12.8 | – | 24 | – | A399 |
| EPPLS4160-20 | ● | 2 | 16 | 24 | – | 180 | 15 | A250 |
| EPP4160-20-TH | ● | 2 | 16 | 32 | – | 110 | 16 | A247 |
| EPP4160-20 | ● | 2 | 16 | 32 | – | 110 | 16 | A249 |
| EPSM4160-R2.0-PN | ● | 2 | 16 | 40 | – | 110 | 16 | A236 |
| CEPR6160-20-TH | ● | 2 | 16 | 40 | – | 110 | 16 | A265 |
| CEPR6160-20 | ● | 2 | 16 | 40 | – | 110 | 16 | A267 |
| EAP4160-20-TH | ◎ | 2 | 16 | 40 | – | 110 | 16 | A269 |
| EPPL4160-20 | ● | 2 | 16 | 65 | – | 135 | 16 | A249 |
| EPSML4160-R2.0-PN | □ | 2 | 16 | 80 | – | 135 | 16 | A237 |
| CEPR6160-25 | ● | 2.5 | 16 | 40 | – | 110 | 16 | A267 |
| EPSM4160-80-R3.0-PN | ● | 3 | 16 | 24 | 80 | 135 | 16 | A239 |
| ETMLN4160-80-30-TH | ● | 3 | 16 | 24 | 80 | 140 | 16 | A226 |
| ETMP4160-105-30-TH | ● | 3 | 16 | 24 | 105 | 160 | 20 | A227 |
| EPRPN3160-105-30 | □ | 3 | 16 | 24 | 105 | 160 | 20 | A429 |
| ETMLN4160-120-30-TH | ● | 3 | 16 | 24 | 120 | 175 | 16 | A226 |
| ETMP4160-140-30-TH | ● | 3 | 16 | 24 | 140 | 200 | 20 | A227 |
| EPRPN3160-140-30 | □ | 3 | 16 | 24 | 140 | 200 | 20 | A429 |
| EHX16-EPP4160-30-TH | ● | 3 | 16 | 12.8 | – | 24 | – | A399 |
| EHX16-ETM4160-30-TH | ● | 3 | 16 | 16 | – | 24 | – | A398 |
| EHX16H-ETM4160-30-TH | ● | 3 | 16 | 16 | – | 24 | – | A398 |
| EPP4160-30-TH | ● | 3 | 16 | 32 | – | 110 | 16 | A247 |
| EPP4160-30 | ● | 3 | 16 | 32 | – | 110 | 16 | A249 |
| ETM4160-30-TH | ● | 3 | 16 | 32 | – | 140 | 16 | A226 |
| EPR3160-30 | □ | 3 | 16 | 32 | – | 140 | 16 | A429 |
| EPSM4160-R3.0-PN | ● | 3 | 16 | 40 | – | 110 | 16 | A236 |
| EAP4160-30-TH | ◎ | 3 | 16 | 40 | – | 110 | 16 | A269 |
| EPPL4160-30 | ● | 3 | 16 | 65 | – | 135 | 16 | A249 |
| EPSML4160-R3.0-PN | □ | 3 | 16 | 80 | – | 135 | 16 | A237 |

| 商品コード Item Code | 在庫 Stock | コーナ半径 Corner radius | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|---|
| EPSM4170-85-R0.5-PN | □ | 0.5 | 17 | 25.5 | 85 | 145 | 20 | A239 |
| EPSM4170-R0.5-PN | □ | 0.5 | 17 | 42.5 | – | 120 | 20 | A236 |
| EPSM4170-85-R1.0-PN | □ | 1 | 17 | 25.5 | 85 | 145 | 20 | A239 |
| EPPLS4170-10 | ● | 1 | 17 | 24 | – | 180 | 16 | A250 |
| EPSM4170-R1.0-PN | □ | 1 | 17 | 42.5 | – | 120 | 20 | A236 |
| EPSM4170-85-R1.5-PN | □ | 1.5 | 17 | 25.5 | 85 | 145 | 20 | A239 |
| EPPLS4170-15 | ● | 1.5 | 17 | 24 | – | 180 | 16 | A250 |
| EPSM4170-R1.5-PN | □ | 1.5 | 17 | 42.5 | – | 120 | 20 | A236 |
| EPSM4170-85-R2.0-PN | □ | 2 | 17 | 25.5 | 85 | 145 | 20 | A239 |
| EPPLS4170-20 | ● | 2 | 17 | 24 | – | 180 | 16 | A250 |
| EPSM4170-R2.0-PN | □ | 2 | 17 | 42.5 | – | 120 | 20 | A236 |
| EPSM4170-85-R3.0-PN | □ | 3 | 17 | 25.5 | 85 | 145 | 20 | A239 |
| EPSM4170-R3.0-PN | □ | 3 | 17 | 42.5 | – | 120 | 20 | A236 |
| EPSM4180-90-R0.5-PN | □ | 0.5 | 18 | 27 | 90 | 145 | 20 | A239 |
| EPSM4180-R0.5-PN | □ | 0.5 | 18 | 45 | – | 120 | 20 | A236 |
| EPSM4180-90-R1.0-PN | □ | 1 | 18 | 27 | 90 | 145 | 20 | A239 |
| EPSM4180-R1.0-PN | □ | 1 | 18 | 45 | – | 120 | 20 | A236 |
| EPSM4180-90-R1.5-PN | □ | 1.5 | 18 | 27 | 90 | 145 | 20 | A239 |
| EPSM4180-R1.5-PN | □ | 1.5 | 18 | 45 | – | 120 | 20 | A236 |
| EPSM4180-90-R2.0-PN | □ | 2 | 18 | 27 | 90 | 145 | 20 | A239 |
| EPSM4180-R2.0-PN | □ | 2 | 18 | 45 | – | 120 | 20 | A236 |
| EPSM4180-90-R3.0-PN | □ | 3 | 18 | 27 | 90 | 145 | 20 | A239 |
| EPSM4180-R3.0-PN | □ | 3 | 18 | 45 | – | 120 | 20 | A236 |
| EPSM4190-95-R0.5-PN | □ | 0.5 | 19 | 28.5 | 95 | 155 | 20 | A239 |
| EPSM4190-R0.5-PN | □ | 0.5 | 19 | 47.5 | – | 125 | 20 | A236 |
| EPSM4190-95-R1.0-PN | □ | 1 | 19 | 28.5 | 95 | 155 | 20 | A239 |
| EPSM4190-R1.0-PN | □ | 1 | 19 | 47.5 | – | 125 | 20 | A236 |
| EPSM4190-95-R1.5-PN | □ | 1.5 | 19 | 28.5 | 95 | 155 | 20 | A239 |
| EPSM4190-R1.5-PN | □ | 1.5 | 19 | 47.5 | – | 125 | 20 | A236 |
| EPSM4190-95-R2.0-PN | □ | 2 | 19 | 28.5 | 95 | 155 | 20 | A239 |
| EPSM4190-R2.0-PN | □ | 2 | 19 | 47.5 | – | 125 | 20 | A236 |
| EPSM4190-95-R3.0-PN | □ | 3 | 19 | 28.5 | 95 | 155 | 20 | A239 |
| EPSM4190-R3.0-PN | □ | 3 | 19 | 47.5 | – | 125 | 20 | A236 |
| EPSM4200-100-R0.5-PN | ● | 0.5 | 20 | 30 | 100 | 155 | 20 | A239 |
| EPSM4200-R0.5-PN | ● | 0.5 | 20 | 50 | – | 125 | 20 | A236 |
| EPSML4200-R0.5-PN | □ | 0.5 | 20 | 100 | – | 155 | 20 | A237 |
| ER5HS20-PN | ● | 1 | 20 | 60 | 70 | 125 | 20 | A257 |
| EPSM4200-100-R1.0-PN | ● | 1 | 20 | 30 | 100 | 155 | 20 | A239 |
| ER5HS20-100-PN | ● | 1 | 20 | 60 | 100 | 155 | 20 | A257 |
| EHX20-EPP4200-10-TH | ● | 1 | 20 | 16 | – | 30 | – | A399 |
| EPP4200-10-TH | ● | 1 | 20 | 38 | – | 125 | 20 | A247 |
| EPP4200-10 | ● | 1 | 20 | 38 | – | 125 | 20 | A249 |
| CEPR6200-10-TH | ● | 1 | 20 | 45 | – | 125 | 20 | A265 |
| CEPR6200-10 | ● | 1 | 20 | 45 | – | 125 | 20 | A267 |
| EAP4200-10-TH | ◎ | 1 | 20 | 45 | – | 125 | 20 | A269 |
| EAP6200-10-TH | ◎ | 1 | 20 | 45 | – | 125 | 20 | A269 |
| EPSM4200-R1.0-PN | ● | 1 | 20 | 50 | – | 125 | 20 | A236 |
| EPPL4200-10 | ● | 1 | 20 | 75 | – | 155 | 20 | A249 |
| EPSML4200-R1.0-PN | □ | 1 | 20 | 100 | – | 155 | 20 | A237 |
| EPSM4200-100-R1.5-PN | ● | 1.5 | 20 | 30 | 100 | 155 | 20 | A239 |
| EHX20-EPP4200-15-TH | ● | 1.5 | 20 | 16 | – | 30 | – | A399 |
| EPP4200-15-TH | ● | 1.5 | 20 | 38 | – | 125 | 20 | A247 |
| EPP4200-15 | ● | 1.5 | 20 | 38 | – | 125 | 20 | A249 |
| CEPR6200-15 | ● | 1.5 | 20 | 45 | – | 125 | 20 | A267 |
| EAP4200-15-TH | ◎ | 1.5 | 20 | 45 | – | 125 | 20 | A269 |
| EAP6200-15-TH | ◎ | 1.5 | 20 | 45 | – | 125 | 20 | A269 |
| EPSM4200-R1.5-PN | ● | 1.5 | 20 | 50 | – | 125 | 20 | A236 |
| EPPL4200-15 | ● | 1.5 | 20 | 75 | – | 155 | 20 | A249 |
| EPSML4200-R1.5-PN | □ | 1.5 | 20 | 100 | – | 155 | 20 | A237 |
| EPSM4200-100-R2.0-PN | ● | 2 | 20 | 30 | 100 | 155 | 20 | A239 |
| EHX20-EPP4200-20-TH | ● | 2 | 20 | 16 | – | 30 | – | A399 |
| EPP4200-20-TH | ● | 2 | 20 | 38 | – | 125 | 20 | A247 |
| EPP4200-20 | ● | 2 | 20 | 38 | – | 125 | 20 | A249 |
| CEPR6200-20-TH | ● | 2 | 20 | 45 | – | 125 | 20 | A265 |
| CEPR6200-20 | ● | 2 | 20 | 45 | – | 125 | 20 | A267 |
| EAP4200-20-TH | ◎ | 2 | 20 | 45 | – | 125 | 20 | A269 |
| EPSM4200-R2.0-PN | ● | 2 | 20 | 50 | – | 125 | 20 | A236 |
| EPPL4200-20 | ● | 2 | 20 | 75 | – | 155 | 20 | A249 |
| EPSML4200-R2.0-PN | □ | 2 | 20 | 100 | – | 155 | 20 | A237 |

| 商品コード Item Code | 在庫 Stock | コーナ半径 Corner radius | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|---|
| CEPR6200-25 | ● | 2.5 | 20 | 45 | – | 125 | 20 | A267 |
| EMXA2200-80-30 | ◎ | 3 | 20 | 16 | 80 | 125 | 20 | A272 |
| EPSM4200-100-R3.0-PN | ● | 3 | 20 | 30 | 100 | 155 | 20 | A239 |
| EHX20-EPP4200-30-TH | ● | 3 | 20 | 16 | – | 30 | – | A399 |
| EHX20-ETM4200-30-TH | ● | 3 | 20 | 20 | - | 30 | – | A398 |
| EHX20H-ETM4200-30-TH | ● | 3 | 20 | 20 | - | 30 | – | A398 |
| EPP4200-30-TH | ● | 3 | 20 | 38 | – | 125 | 20 | A247 |
| EPP4200-30 | ● | 3 | 20 | 38 | – | 125 | 20 | A249 |
| ETM4200-30-TH | ● | 3 | 20 | 40 | – | 150 | 20 | A226 |
| EPR3200-30 | □ | 3 | 20 | 40 | – | 150 | 20 | A429 |
| CEPR6200-30-TH | ● | 3 | 20 | 45 | – | 125 | 20 | A265 |
| CEPR6200-30 | ● | 3 | 20 | 45 | – | 125 | 20 | A267 |
| EAP4200-30-TH | ◎ | 3 | 20 | 45 | – | 125 | 20 | A269 |
| EPSM4200-R3.0-PN | ● | 3 | 20 | 50 | – | 125 | 20 | A236 |
| EPPL4200-30 | ● | 3 | 20 | 75 | – | 155 | 20 | A249 |
| EPSML4200-R3.0-PN | □ | 3 | 20 | 100 | – | 155 | 20 | A237 |
| EPSM4200-100-R5.0-PN | ● | 5 | 20 | 30 | 100 | 155 | 20 | A239 |
| EPSM4200-R5.0-PN | ● | 5 | 20 | 50 | – | 125 | 20 | A236 |
| EPSML4200-R5.0-PN | □ | 5 | 20 | 100 | – | 155 | 20 | A237 |
| CEPR8250-10 | □ | 1 | 25 | 50 | – | 140 | 25 | A267 |
| EPP4250-10 | □ | 1 | 25 | 63 | – | 140 | 25 | A249 |
| EPPL4250-10 | □ | 1 | 25 | 100 | – | 200 | 25 | A249 |
| CEPR8250-15 | □ | 1.5 | 25 | 50 | – | 140 | 25 | A267 |
| EPP4250-15 | □ | 1.5 | 25 | 63 | – | 140 | 25 | A249 |
| EPPL4250-15 | □ | 1.5 | 25 | 100 | – | 200 | 25 | A249 |
| CEPR8250-20 | □ | 2 | 25 | 50 | – | 140 | 25 | A267 |
| EPP4250-20 | □ | 2 | 25 | 63 | – | 140 | 25 | A249 |
| EPPL4250-20 | □ | 2 | 25 | 100 | – | 200 | 25 | A249 |
| CEPR8250-25 | □ | 2.5 | 25 | 50 | – | 140 | 25 | A267 |
| EMXA2250-100-30 | ◎ | 3 | 25 | 20 | 100 | 150 | 25 | A272 |
| CEPR8250-30 | □ | 3 | 25 | 50 | – | 140 | 25 | A267 |
| EPP4250-30 | □ | 3 | 25 | 63 | – | 140 | 25 | A249 |
| EPPL4250-30 | □ | 3 | 25 | 100 | – | 200 | 25 | A249 |
| CEPR8300-10 | □ | 1 | 30 | 60 | – | 165 | 32 | A267 |
| CEPR8300-15 | □ | 1.5 | 30 | 60 | – | 165 | 32 | A267 |
| CEPR8300-20 | □ | 2 | 30 | 60 | – | 165 | 32 | A267 |
| CEPR8300-25 | □ | 2.5 | 30 | 60 | – | 165 | 32 | A267 |
| CEPR8300-30 | □ | 3 | 30 | 60 | – | 165 | 32 | A267 |

□印：特定代理店在庫です。弊社営業へお問合せください。□：Stocked by specified distributor. Contact with our sales department.

Quick dimension reference table by mill diameter

# 外径別寸法早見表

## 超硬エンドミル・スクエア φ0.03～φ1.2 Carbide End Mills -Square

単位 unit：mm

| 商品コード Item Code | 在庫 Stock | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EMM20003 | ● | 0.03 | – | 0.045 | 40 | 4 | A384 |
| EMM20003-TH | ● | 0.03 | – | 0.045 | 40 | 4 | A384 |
| EMM20004 | ● | 0.04 | – | 0.06 | 40 | 4 | A384 |
| EMM20004-TH | ● | 0.04 | – | 0.06 | 40 | 4 | A384 |
| EMM20005 | ● | 0.05 | – | 0.075 | 40 | 4 | A384 |
| EMM20005-TH | ● | 0.05 | – | 0.075 | 40 | 4 | A384 |
| EMM20006 | ● | 0.06 | – | 0.09 | 40 | 4 | A384 |
| EMM20006-TH | ● | 0.06 | – | 0.09 | 40 | 4 | A384 |
| EMM20007 | | 0.07 | – | 0.105 | 40 | 4 | A384 |
| EMM20007-TH | | 0.07 | – | 0.105 | 40 | 4 | A384 |
| EMM20008 | ● | 0.08 | – | 0.12 | 40 | 4 | A384 |
| EMM20008-TH | ● | 0.08 | – | 0.12 | 40 | 4 | A384 |
| EMM20009 | | 0.09 | – | 0.135 | 40 | 4 | A384 |
| EMM20009-TH | | 0.09 | – | 0.135 | 40 | 4 | A384 |
| EPDSE2001-0.3-ATH | ● | 0.1 | 0.3 | 0.15 | 45 | 4 | A292 |
| EPDSE2001-0.3-PN | ● | 0.1 | 0.3 | 0.15 | 45 | 4 | A295 |
| EPDS2001-0.3 | □ | 0.1 | 0.3 | 0.15 | 45 | 4 | A430 |
| EPDS2001-0.3-TH | □ | 0.1 | 0.3 | 0.15 | 45 | 4 | A430 |
| EPDSE2001-0.5-ATH | ● | 0.1 | 0.5 | 0.15 | 45 | 4 | A292 |
| EPDSE2001-0.5-PN | ● | 0.1 | 0.5 | 0.15 | 45 | 4 | A295 |
| EPDS2001-0.5 | □ | 0.1 | 0.5 | 0.15 | 45 | 4 | A430 |
| EPDS2001-0.5-TH | □ | 0.1 | 0.5 | 0.15 | 45 | 4 | A430 |
| EPDSE2001-1-ATH | ● | 0.1 | 1 | 0.15 | 45 | 4 | A292 |
| EPDSE2001-1-PN | ● | 0.1 | 1 | 0.15 | 45 | 4 | A295 |
| EPDS2001-1 | □ | 0.1 | 1 | 0.15 | 45 | 4 | A430 |
| EPDS2001-1-TH | □ | 0.1 | 1 | 0.15 | 45 | 4 | A430 |
| EPCDS4001 | ● | 0.1 | 3 | 0.01 | 40 | 4 | A383 |
| EMM20010 | ● | 0.1 | – | 0.15 | 40 | 4 | A384 |
| EMM20010-TH | ● | 0.1 | – | 0.15 | 40 | 4 | A384 |
| HES2001-C | □ | 0.1 | – | 0.2 | 38 | 3 | A387 |
| HES2001 | ● | 0.1 | – | 0.2 | 38 | 3 | A390 |
| EPDSE2002-0.5-ATH | ● | 0.2 | 0.5 | 0.3 | 50 | 4 | A292 |
| EPDSE2002-0.5-PN | ● | 0.2 | 0.5 | 0.3 | 50 | 4 | A295 |
| EPDS2002-0.5 | □ | 0.2 | 0.5 | 0.3 | 50 | 4 | A430 |
| EPDS2002-0.5-TH | □ | 0.2 | 0.5 | 0.3 | 50 | 4 | A430 |
| HGOS2002-PN | ● | 0.2 | 0.6 | 0.4 | 40 | 4 | A304 |
| EPDSE2002-1-ATH | ● | 0.2 | 1 | 0.3 | 50 | 4 | A292 |
| EPDSE2002-1-PN | ● | 0.2 | 1 | 0.3 | 50 | 4 | A295 |
| EPDS2002-1 | □ | 0.2 | 1 | 0.3 | 50 | 4 | A430 |
| EPDS2002-1-TH | □ | 0.2 | 1 | 0.3 | 50 | 4 | A430 |
| EPDSE2002-1.5-ATH | ● | 0.2 | 1.5 | 0.3 | 50 | 4 | A292 |
| EPDSE2002-1.5-PN | ● | 0.2 | 1.5 | 0.3 | 50 | 4 | A295 |
| EPDS2002-1.5 | □ | 0.2 | 1.5 | 0.3 | 50 | 4 | A430 |
| EPDS2002-1.5-TH | □ | 0.2 | 1.5 | 0.3 | 50 | 4 | A430 |
| EPDSE2002-2-ATH | ● | 0.2 | 2 | 0.3 | 50 | 4 | A292 |
| EPDSE2002-2-PN | ● | 0.2 | 2 | 0.3 | 50 | 4 | A295 |
| EPCDS4002 | ● | 0.2 | 3 | 0.02 | 40 | 4 | A383 |
| EPDSE2002-3-ATH | ● | 0.2 | 3 | 0.3 | 50 | 4 | A292 |
| EPDSE2002-3-PN | ● | 0.2 | 3 | 0.3 | 50 | 4 | A295 |
| EMM20020 | ● | 0.2 | – | 0.3 | 40 | 4 | A384 |
| EMM20020-TH | ● | 0.2 | – | 0.3 | 40 | 4 | A384 |
| HYPS2002-C | ● | 0.2 | – | 0.3 | 50 | 6 | A385 |
| HES2002-C | □ | 0.2 | – | 0.4 | 38 | 3 | A387 |
| HES2002 | ● | 0.2 | – | 0.4 | 38 | 3 | A390 |
| YS2002-CS | □ | 0.2 | – | 0.4 | 40 | 4 | A437 |
| HGOS2003-PN | ● | 0.3 | 0.9 | 0.6 | 40 | 4 | A304 |
| EPDSE2003-1-ATH | ● | 0.3 | 1 | 0.45 | 50 | 4 | A292 |
| EPDSE2003-1-PN | ● | 0.3 | 1 | 0.45 | 50 | 4 | A295 |
| EPDS2003-1 | □ | 0.3 | 1 | 0.45 | 50 | 4 | A430 |
| EPDS2003-1-TH | □ | 0.3 | 1 | 0.45 | 50 | 4 | A430 |
| EPDSE2003-1.5-ATH | ● | 0.3 | 1.5 | 0.45 | 50 | 4 | A292 |
| EPDSE2003-1.5-PN | ● | 0.3 | 1.5 | 0.45 | 50 | 4 | A295 |
| EPDS2003-1.5 | □ | 0.3 | 1.5 | 0.45 | 50 | 4 | A430 |
| EPDS2003-1.5-TH | □ | 0.3 | 1.5 | 0.45 | 50 | 4 | A430 |
| EPDSE2003-2-ATH | ● | 0.3 | 2 | 0.45 | 50 | 4 | A292 |
| EPDSE2003-2-PN | ● | 0.3 | 2 | 0.45 | 50 | 4 | A295 |
| EPDS2003-2 | □ | 0.3 | 2 | 0.45 | 50 | 4 | A430 |
| EPDS2003-2-TH | □ | 0.3 | 2 | 0.45 | 50 | 4 | A430 |
| EPDSE2003-2.5-ATH | ● | 0.3 | 2.5 | 0.45 | 50 | 4 | A292 |

| 商品コード Item Code | 在庫 Stock | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EPDSE2003-2.5-PN | ● | 0.3 | 2.5 | 0.45 | 50 | 4 | A295 |
| EPDS2003-2.5 | □ | 0.3 | 2.5 | 0.45 | 50 | 4 | A430 |
| EPDS2003-2.5-TH | □ | 0.3 | 2.5 | 0.45 | 50 | 4 | A430 |
| EPCDS4003 | ● | 0.3 | 3 | 0.04 | 40 | 4 | A383 |
| EPDSE2003-3-ATH | ● | 0.3 | 3 | 0.45 | 50 | 4 | A292 |
| EPDSE2003-3-PN | ● | 0.3 | 3 | 0.45 | 50 | 4 | A295 |
| EPDS2003-3 | □ | 0.3 | 3 | 0.45 | 50 | 4 | A430 |
| EPDS2003-3-TH | □ | 0.3 | 3 | 0.45 | 50 | 4 | A430 |
| HYPS2003-C | ● | 0.3 | – | 0.4 | 50 | 6 | A385 |
| EMM20030 | ● | 0.3 | – | 0.45 | 40 | 4 | A384 |
| EMM20030-TH | ● | 0.3 | – | 0.45 | 40 | 4 | A384 |
| YS2003-CS | □ | 0.3 | – | 0.6 | 40 | 4 | A437 |
| HES2003-C | □ | 0.3 | – | 1 | 38 | 3 | A387 |
| HES2003 | ● | 0.3 | – | 1 | 38 | 3 | A390 |
| EPDSE2004-1-ATH | ● | 0.4 | 1 | 0.6 | 50 | 4 | A292 |
| EPDSE2004-1-PN | ● | 0.4 | 1 | 0.6 | 50 | 4 | A295 |
| EPDS2004-1 | □ | 0.4 | 1 | 0.6 | 50 | 4 | A430 |
| EPDS2004-1-TH | □ | 0.4 | 1 | 0.6 | 50 | 4 | A430 |
| HGOS2004-PN | ● | 0.4 | 1.1 | 0.8 | 40 | 4 | A304 |
| EPDSE2004-1.5-ATH | ● | 0.4 | 1.5 | 0.6 | 50 | 4 | A292 |
| EPDSE2004-1.5-PN | ● | 0.4 | 1.5 | 0.6 | 50 | 4 | A295 |
| EPDS2004-1.5 | □ | 0.4 | 1.5 | 0.6 | 50 | 4 | A430 |
| EPDS2004-1.5-TH | □ | 0.4 | 1.5 | 0.6 | 50 | 4 | A430 |
| EPDSE2004-2-ATH | ● | 0.4 | 2 | 0.6 | 50 | 4 | A292 |
| EPDSE2004-2-PN | ● | 0.4 | 2 | 0.6 | 50 | 4 | A295 |
| EPDS2004-2 | □ | 0.4 | 2 | 0.6 | 50 | 4 | A430 |
| EPDS2004-2-TH | □ | 0.4 | 2 | 0.6 | 50 | 4 | A430 |
| EPDSE2004-2.5-ATH | ● | 0.4 | 2.5 | 0.6 | 50 | 4 | A292 |
| EPDSE2004-2.5-PN | ● | 0.4 | 2.5 | 0.6 | 50 | 4 | A295 |
| EPDS2004-2.5 | □ | 0.4 | 2.5 | 0.6 | 50 | 4 | A430 |
| EPDS2004-2.5-TH | □ | 0.4 | 2.5 | 0.6 | 50 | 4 | A430 |
| EPCDS6004 | ● | 0.4 | 3 | 0.04 | 40 | 6 | A383 |
| EPDSE2004-3-ATH | ● | 0.4 | 3 | 0.6 | 50 | 4 | A292 |
| EPDSE2004-3-PN | ● | 0.4 | 3 | 0.6 | 50 | 4 | A295 |
| EPDS2004-3 | □ | 0.4 | 3 | 0.6 | 50 | 4 | A430 |
| EPDS2004-3-TH | □ | 0.4 | 3 | 0.6 | 50 | 4 | A430 |
| EPDSE2004-3.5-ATH | ● | 0.4 | 3.5 | 0.6 | 50 | 4 | A292 |
| EPDSE2004-3.5-PN | ● | 0.4 | 3.5 | 0.6 | 50 | 4 | A295 |
| EPDS2004-3.5 | □ | 0.4 | 3.5 | 0.6 | 50 | 4 | A430 |
| EPDS2004-3.5-TH | □ | 0.4 | 3.5 | 0.6 | 50 | 4 | A430 |
| EPDSE2004-4-ATH | ● | 0.4 | 4 | 0.6 | 50 | 4 | A292 |
| EPDSE2004-4-PN | ● | 0.4 | 4 | 0.6 | 50 | 4 | A295 |
| EPDS2004-4 | □ | 0.4 | 4 | 0.6 | 50 | 4 | A430 |
| EPDS2004-4-TH | □ | 0.4 | 4 | 0.6 | 50 | 4 | A430 |
| EPDSE2004-5-ATH | ● | 0.4 | 5 | 0.6 | 50 | 4 | A292 |
| EPDSE2004-5-PN | ● | 0.4 | 5 | 0.6 | 50 | 4 | A295 |
| EPDS2004-5 | □ | 0.4 | 5 | 0.6 | 50 | 4 | A430 |
| EPDS2004-5-TH | □ | 0.4 | 5 | 0.6 | 50 | 4 | A430 |
| EPDSE2004-6-ATH | ● | 0.4 | 6 | 0.6 | 50 | 4 | A292 |
| EPDSE2004-6-PN | ● | 0.4 | 6 | 0.6 | 50 | 4 | A295 |
| EPDS2004-6 | □ | 0.4 | 6 | 0.6 | 50 | 4 | A430 |
| EPDS2004-6-TH | □ | 0.4 | 6 | 0.6 | 50 | 4 | A430 |
| EPDSE2004-8-ATH | ● | 0.4 | 8 | 0.6 | 50 | 4 | A292 |
| EPDSE2004-8-PN | ● | 0.4 | 8 | 0.6 | 50 | 4 | A295 |
| EPDSE2004-10-ATH | ● | 0.4 | 10 | 0.6 | 50 | 4 | A292 |
| EPDSE2004-10-PN | ● | 0.4 | 10 | 0.6 | 50 | 4 | A295 |
| HYPS2004-C | ● | 0.4 | – | 0.5 | 50 | 6 | A385 |
| EMM20040 | ● | 0.4 | – | 0.6 | 40 | 4 | A384 |
| EMM20040-TH | ● | 0.4 | – | 0.6 | 40 | 4 | A384 |
| YS2004-CS | □ | 0.4 | – | 0.8 | 40 | 4 | A437 |
| HES2004-C | □ | 0.4 | – | 1 | 38 | 3 | A387 |
| HES2004 | ● | 0.4 | – | 1 | 38 | 3 | A390 |
| EPDSE2005-1-ATH | ● | 0.5 | 1 | 0.75 | 50 | 4 | A292 |
| EPDSE2005-1-PN | ● | 0.5 | 1 | 0.75 | 50 | 4 | A295 |
| EPDS2005-1 | □ | 0.5 | 1 | 0.75 | 50 | 4 | A430 |
| EPDS2005-1-TH | □ | 0.5 | 1 | 0.75 | 50 | 4 | A430 |
| HGOS2005-PN | ● | 0.5 | 1.3 | 1 | 40 | 4 | A304 |
| EPDSE2005-1.5-ATH | ● | 0.5 | 1.5 | 0.75 | 50 | 4 | A292 |
| EPDSE2005-1.5-PN | ● | 0.5 | 1.5 | 0.75 | 50 | 4 | A295 |

| 商品コード Item Code | 在庫 Stock | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EPDS2005-1.5 | □ | 0.5 | 1.5 | 0.75 | 50 | 4 | A430 |
| EPDS2005-1.5-TH | □ | 0.5 | 1.5 | 0.75 | 50 | 4 | A430 |
| HYPS2005-C | ● | 0.5 | 1.6 | 0.6 | 50 | 6 | A385 |
| EPDSE2005-2-ATH | ● | 0.5 | 2 | 0.75 | 50 | 4 | A292 |
| EPDSE2005-2-PN | ● | 0.5 | 2 | 0.75 | 50 | 4 | A295 |
| EPDS2005-2-SD | ● | 0.5 | 2 | 0.75 | 50 | 4 | A378 |
| EPDS2005-2 | □ | 0.5 | 2 | 0.75 | 50 | 4 | A430 |
| EPDS2005-2-TH | □ | 0.5 | 2 | 0.75 | 50 | 4 | A430 |
| DES2005-4-C | □ | 0.5 | 2 | 0.8 | 55 | 4 | A452 |
| HPSLN2005-C | ● | 0.5 | 2.5 | 0.6 | 60 | 6 | A385 |
| EPDSE2005-2.5-ATH | ● | 0.5 | 2.5 | 0.75 | 50 | 4 | A292 |
| EPDSE2005-2.5-PN | ● | 0.5 | 2.5 | 0.75 | 50 | 4 | A295 |
| EPDS2005-2.5 | □ | 0.5 | 2.5 | 0.75 | 50 | 4 | A430 |
| EPDS2005-2.5-TH | □ | 0.5 | 2.5 | 0.75 | 50 | 4 | A430 |
| EPCDS6005 | ● | 0.5 | 3 | 0.05 | 40 | 6 | A383 |
| EPDSE2005-3-ATH | ● | 0.5 | 3 | 0.75 | 50 | 4 | A292 |
| EPDSE2005-3-PN | ● | 0.5 | 3 | 0.75 | 50 | 4 | A295 |
| EPDS2005-3 | □ | 0.5 | 3 | 0.75 | 50 | 4 | A430 |
| EPDS2005-3-TH | □ | 0.5 | 3 | 0.75 | 50 | 4 | A430 |
| DES2005-7-C | □ | 0.5 | 3.5 | 0.8 | 55 | 4 | A452 |
| EPDSE2005-4-ATH | ● | 0.5 | 4 | 0.75 | 50 | 4 | A292 |
| EPDSE2005-4-PN | ● | 0.5 | 4 | 0.75 | 50 | 4 | A295 |
| EPDS2005-4-SD | ● | 0.5 | 4 | 0.75 | 50 | 4 | A378 |
| EPDS2005-4 | □ | 0.5 | 4 | 0.75 | 50 | 4 | A430 |
| EPDS2005-4-TH | □ | 0.5 | 4 | 0.75 | 50 | 4 | A430 |
| EPDSE2005-5-ATH | ● | 0.5 | 5 | 0.75 | 50 | 4 | A292 |
| EPDSE2005-5-PN | ● | 0.5 | 5 | 0.75 | 50 | 4 | A295 |
| EPDS2005-5 | □ | 0.5 | 5 | 0.75 | 50 | 4 | A430 |
| EPDS2005-5-TH | □ | 0.5 | 5 | 0.75 | 50 | 4 | A430 |
| DES2005-10-C | □ | 0.5 | 5 | 0.8 | 55 | 4 | A452 |
| EPDSE2005-6-ATH | ● | 0.5 | 6 | 0.75 | 50 | 4 | A292 |
| EPDSE2005-6-PN | ● | 0.5 | 6 | 0.75 | 50 | 4 | A295 |
| EPDS2005-6-SD | ● | 0.5 | 6 | 0.75 | 50 | 4 | A378 |
| EPDS2005-6 | □ | 0.5 | 6 | 0.75 | 50 | 4 | A430 |
| EPDS2005-6-TH | □ | 0.5 | 6 | 0.75 | 50 | 4 | A430 |
| EPDSE2005-8-ATH | ● | 0.5 | 8 | 0.75 | 50 | 4 | A292 |
| EPDSE2005-8-PN | ● | 0.5 | 8 | 0.75 | 50 | 4 | A295 |
| EPDS2005-8 | □ | 0.5 | 8 | 0.75 | 50 | 4 | A430 |
| EPDS2005-8-TH | □ | 0.5 | 8 | 0.75 | 50 | 4 | A430 |
| EPDSE2005-10-ATH | ● | 0.5 | 10 | 0.75 | 50 | 4 | A292 |
| EPDSE2005-10-PN | ● | 0.5 | 10 | 0.75 | 50 | 4 | A295 |
| EMM20050 | ● | 0.5 | – | 0.75 | 40 | 4 | A384 |
| EMM20050-TH | ● | 0.5 | – | 0.75 | 40 | 4 | A384 |
| YS2005-CS | □ | 0.5 | – | 1 | 40 | 4 | A437 |
| HES2005-C | □ | 0.5 | – | 1.5 | 38 | 3 | A387 |
| HES2005 | ● | 0.5 | – | 1.5 | 38 | 3 | A390 |
| HGOS2006-PN | ● | 0.6 | 1.5 | 1.2 | 40 | 4 | A304 |
| HYPS2006-C | ● | 0.6 | 1.7 | 0.7 | 50 | 6 | A385 |
| EPDSE2006-2-ATH | ● | 0.6 | 2 | 0.9 | 50 | 4 | A292 |
| EPDSE2006-2-PN | ● | 0.6 | 2 | 0.9 | 50 | 4 | A295 |
| EPDS2006-2-SD | ● | 0.6 | 2 | 0.9 | 50 | 4 | A378 |
| EPDS2006-2 | □ | 0.6 | 2 | 0.9 | 50 | 4 | A430 |
| EPDS2006-2-TH | □ | 0.6 | 2 | 0.9 | 50 | 4 | A430 |
| DES2006-4-C | □ | 0.6 | 2.4 | 1 | 55 | 4 | A452 |
| EPCDS6006 | ● | 0.6 | 3 | 0.07 | 40 | 6 | A383 |
| HPSLN2006-C | ● | 0.6 | 3 | 0.7 | 60 | 6 | A385 |
| EPDSE2006-3-ATH | ● | 0.6 | 3 | 0.9 | 50 | 4 | A292 |
| EPDSE2006-3-PN | ● | 0.6 | 3 | 0.9 | 50 | 4 | A295 |
| EPDSE2006-4-ATH | ● | 0.6 | 4 | 0.9 | 50 | 4 | A292 |
| EPDSE2006-4-PN | ● | 0.6 | 4 | 0.9 | 50 | 4 | A295 |
| EPDS2006-4-SD | ● | 0.6 | 4 | 0.9 | 50 | 4 | A378 |
| EPDS2006-4 | □ | 0.6 | 4 | 0.9 | 50 | 4 | A430 |
| EPDS2006-4-TH | □ | 0.6 | 4 | 0.9 | 50 | 4 | A430 |
| DES2006-7-C | □ | 0.6 | 4.2 | 1 | 55 | 4 | A452 |
| EPDSE2006-5-ATH | ● | 0.6 | 5 | 0.9 | 50 | 4 | A292 |
| EPDSE2006-5-PN | ● | 0.6 | 5 | 0.9 | 50 | 4 | A295 |
| EPDSE2006-6-ATH | ● | 0.6 | 6 | 0.9 | 50 | 4 | A292 |
| EPDSE2006-6-PN | ● | 0.6 | 6 | 0.9 | 50 | 4 | A295 |
| EPDS2006-6-SD | ● | 0.6 | 6 | 0.9 | 50 | 4 | A378 |

●印：標準在庫品です。 ●：Stocked Items. 無印：受注生産品です。No Mark：Manufactured upon request only.

単位 unit：mm

| 商品コード Item Code | 在庫 Stock | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EPDS2006-6 | □ | 0.6 | 6 | 0.9 | 50 | 4 | A430 |
| EPDS2006-6-TH | □ | 0.6 | 6 | 0.9 | 50 | 4 | A430 |
| DES2006-10-C | □ | 0.6 | 6 | 1 | 55 | 4 | A452 |
| EPDSE2006-7-ATH | ● | 0.6 | 7 | 0.9 | 50 | 4 | A292 |
| EPDSE2006-7-PN | ● | 0.6 | 7 | 0.9 | 50 | 4 | A295 |
| EPDSE2006-8-ATH | ● | 0.6 | 8 | 0.9 | 50 | 4 | A292 |
| EPDSE2006-8-PN | ● | 0.6 | 8 | 0.9 | 50 | 4 | A295 |
| EPDS2006-8 | □ | 0.6 | 8 | 0.9 | 50 | 4 | A430 |
| EPDS2006-8-TH | □ | 0.6 | 8 | 0.9 | 50 | 4 | A430 |
| EPDSE2006-9-ATH | ● | 0.6 | 9 | 0.9 | 50 | 4 | A292 |
| EPDSE2006-9-PN | ● | 0.6 | 9 | 0.9 | 50 | 4 | A295 |
| EPDSE2006-10-ATH | ● | 0.6 | 10 | 0.9 | 50 | 4 | A292 |
| EPDSE2006-10-PN | ● | 0.6 | 10 | 0.9 | 50 | 4 | A295 |
| EPDS2006-10 | □ | 0.6 | 10 | 0.9 | 50 | 4 | A430 |
| EPDS2006-10-TH | □ | 0.6 | 10 | 0.9 | 50 | 4 | A430 |
| YS2006-CS | □ | 0.6 | – | 1.2 | 40 | 4 | A437 |
| HES2006-C | □ | 0.6 | – | 1.5 | 38 | 3 | A387 |
| HES2006 | ● | 0.6 | – | 1.5 | 38 | 3 | A390 |
| HGOS2007-PN | ● | 0.7 | 1.7 | 1.4 | 40 | 4 | A304 |
| EPDSE2007-2-ATH | ● | 0.7 | 2 | 1.05 | 50 | 4 | A292 |
| EPDSE2007-2-PN | ● | 0.7 | 2 | 1.05 | 50 | 4 | A295 |
| EPDS2007-2 | □ | 0.7 | 2 | 1.05 | 50 | 4 | A430 |
| EPDS2007-2-TH | □ | 0.7 | 2 | 1.05 | 50 | 4 | A430 |
| DES2007-4-C | □ | 0.7 | 2.8 | 1.1 | 55 | 4 | A452 |
| EPDSE2007-4-ATH | ● | 0.7 | 4 | 1.05 | 50 | 4 | A292 |
| EPDSE2007-4-PN | ● | 0.7 | 4 | 1.05 | 50 | 4 | A295 |
| EPDS2007-4 | □ | 0.7 | 4 | 1.05 | 50 | 4 | A430 |
| EPDS2007-4-TH | □ | 0.7 | 4 | 1.05 | 50 | 4 | A430 |
| DES2007-7-C | □ | 0.7 | 4.9 | 1.1 | 55 | 4 | A452 |
| EPDSE2007-6-ATH | ● | 0.7 | 6 | 1.05 | 50 | 4 | A292 |
| EPDSE2007-6-PN | ● | 0.7 | 6 | 1.05 | 50 | 4 | A295 |
| EPDS2007-6 | □ | 0.7 | 6 | 1.05 | 50 | 4 | A430 |
| EPDS2007-6-TH | □ | 0.7 | 6 | 1.05 | 50 | 4 | A430 |
| DES2007-10-C | □ | 0.7 | 7 | 1.1 | 55 | 4 | A452 |
| EPDSE2007-8-ATH | ● | 0.7 | 8 | 1.05 | 50 | 4 | A292 |
| EPDSE2007-8-PN | ● | 0.7 | 8 | 1.05 | 50 | 4 | A295 |
| EPDS2007-8 | □ | 0.7 | 8 | 1.05 | 50 | 4 | A430 |
| EPDS2007-8-TH | □ | 0.7 | 8 | 1.05 | 50 | 4 | A430 |
| EPDSE2007-10-ATH | ● | 0.7 | 10 | 1.05 | 50 | 4 | A292 |
| EPDSE2007-10-PN | ● | 0.7 | 10 | 1.05 | 50 | 4 | A295 |
| EPDS2007-10 | □ | 0.7 | 10 | 1.05 | 50 | 4 | A430 |
| EPDS2007-10-TH | □ | 0.7 | 10 | 1.05 | 50 | 4 | A430 |
| YS2007-CS | □ | 0.7 | – | 1.4 | 40 | 4 | A437 |
| HES2007-C | □ | 0.7 | – | 1.5 | 38 | 3 | A387 |
| HES2007 | ● | 0.7 | – | 1.5 | 38 | 3 | A390 |
| HGOS2008-PN | ● | 0.8 | 1.9 | 1.6 | 40 | 4 | A304 |
| EPDSE2008-2-ATH | ● | 0.8 | 2 | 1.2 | 50 | 4 | A293 |
| EPDSE2008-2-PN | ● | 0.8 | 2 | 1.2 | 50 | 4 | A296 |
| HYPS2008-C | ● | 0.8 | 2.5 | 1 | 50 | 6 | A385 |
| EPCDS6008 | ● | 0.8 | 3 | 0.1 | 40 | 6 | A383 |
| HPSLN2008-C | ● | 0.8 | 4 | 1 | 60 | 6 | A385 |
| EPDSE2008-4-ATH | ● | 0.8 | 4 | 1.2 | 50 | 4 | A293 |
| EPDSE2008-4-PN | ● | 0.8 | 4 | 1.2 | 50 | 4 | A296 |
| EPDS2008-4-SD | ● | 0.8 | 4 | 1.2 | 50 | 4 | A378 |
| EPDS2008-4 | □ | 0.8 | 4 | 1.2 | 50 | 4 | A430 |
| EPDS2008-4-TH | □ | 0.8 | 4 | 1.2 | 50 | 4 | A430 |
| DES2008-5-C | □ | 0.8 | 4 | 1.3 | 55 | 4 | A452 |
| DES2008-6-C | □ | 0.8 | 4.8 | 1.3 | 55 | 4 | A452 |
| DES2008-7-C | □ | 0.8 | 5.6 | 1.3 | 55 | 4 | A452 |
| EPDSE2008-6-ATH | ● | 0.8 | 6 | 1.2 | 50 | 4 | A293 |
| EPDSE2008-6-PN | ● | 0.8 | 6 | 1.2 | 50 | 4 | A296 |
| EPDS2008-6-SD | ● | 0.8 | 6 | 1.2 | 50 | 4 | A378 |
| EPDS2008-6 | □ | 0.8 | 6 | 1.2 | 50 | 4 | A430 |
| EPDS2008-6-TH | □ | 0.8 | 6 | 1.2 | 50 | 4 | A430 |
| DES2008-8.5-C | □ | 0.8 | 6.8 | 1.3 | 65 | 4 | A452 |
| EPDSE2008-8-ATH | ● | 0.8 | 8 | 1.2 | 50 | 4 | A293 |
| EPDSE2008-8-PN | ● | 0.8 | 8 | 1.2 | 50 | 4 | A296 |
| EPDS2008-8-SD | ● | 0.8 | 8 | 1.2 | 50 | 4 | A378 |
| EPDS2008-8 | □ | 0.8 | 8 | 1.2 | 50 | 4 | A430 |

| 商品コード Item Code | 在庫 Stock | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EPDS2008-8-TH | □ | 0.8 | 8 | 1.2 | 50 | 4 | A430 |
| DES2008-10-C | □ | 0.8 | 8 | 1.3 | 65 | 4 | A452 |
| EPDSE2008-10-ATH | ● | 0.8 | 10 | 1.2 | 50 | 4 | A293 |
| EPDSE2008-10-PN | ● | 0.8 | 10 | 1.2 | 50 | 4 | A296 |
| EPDS2008-10 | □ | 0.8 | 10 | 1.2 | 50 | 4 | A430 |
| EPDS2008-10-TH | □ | 0.8 | 10 | 1.2 | 50 | 4 | A430 |
| EPDSE2008-12-ATH | ● | 0.8 | 12 | 1.2 | 55 | 4 | A293 |
| EPDSE2008-12-PN | ● | 0.8 | 12 | 1.2 | 55 | 4 | A296 |
| EPDS2008-12 | □ | 0.8 | 12 | 1.2 | 55 | 4 | A430 |
| EPDS2008-12-TH | □ | 0.8 | 12 | 1.2 | 55 | 4 | A430 |
| YS2008-CS | □ | 0.8 | – | 1.6 | 40 | 4 | A437 |
| HES2008-C | □ | 0.8 | – | 2 | 38 | 3 | A387 |
| HES2008 | ● | 0.8 | – | 2 | 38 | 3 | A390 |
| EPDSE2009-2-ATH | ● | 0.9 | 2 | 1.35 | 50 | 4 | A293 |
| EPDSE2009-2-PN | ● | 0.9 | 2 | 1.35 | 50 | 4 | A296 |
| HGOS2009-PN | ● | 0.9 | 2.1 | 1.8 | 40 | 4 | A304 |
| EPDSE2009-4-ATH | ● | 0.9 | 4 | 1.35 | 50 | 4 | A293 |
| EPDSE2009-4-PN | ● | 0.9 | 4 | 1.35 | 50 | 4 | A296 |
| EPDSE2009-6-ATH | ● | 0.9 | 6 | 1.35 | 50 | 4 | A293 |
| EPDSE2009-6-PN | ● | 0.9 | 6 | 1.35 | 50 | 4 | A296 |
| EPDS2009-6 | □ | 0.9 | 6 | 1.35 | 50 | 4 | A430 |
| EPDS2009-6-TH | □ | 0.9 | 6 | 1.35 | 50 | 4 | A430 |
| DES2009-7-C | □ | 0.9 | 6.3 | 1.4 | 55 | 4 | A452 |
| DES2009-8.5-C | □ | 0.9 | 7.7 | 1.4 | 55 | 4 | A452 |
| EPDSE2009-8-ATH | ● | 0.9 | 8 | 1.35 | 50 | 4 | A293 |
| EPDSE2009-8-PN | ● | 0.9 | 8 | 1.35 | 50 | 4 | A296 |
| EPDS2009-8 | □ | 0.9 | 8 | 1.35 | 50 | 4 | A430 |
| EPDS2009-8-TH | □ | 0.9 | 8 | 1.35 | 50 | 4 | A430 |
| DES2009-10-C | □ | 0.9 | 9 | 1.4 | 55 | 4 | A452 |
| EPDSE2009-10-ATH | ● | 0.9 | 10 | 1.35 | 50 | 4 | A293 |
| EPDSE2009-10-PN | ● | 0.9 | 10 | 1.35 | 50 | 4 | A296 |
| EPDS2009-10 | □ | 0.9 | 10 | 1.35 | 50 | 4 | A430 |
| EPDS2009-10-TH | □ | 0.9 | 10 | 1.35 | 50 | 4 | A430 |
| EPDSE2009-12-ATH | ● | 0.9 | 12 | 1.35 | 55 | 4 | A293 |
| EPDSE2009-12-PN | ● | 0.9 | 12 | 1.35 | 55 | 4 | A296 |
| EPDS2009-12 | □ | 0.9 | 12 | 1.35 | 55 | 4 | A430 |
| EPDS2009-12-TH | □ | 0.9 | 12 | 1.35 | 55 | 4 | A430 |
| YS2009-CS | □ | 0.9 | – | 1.8 | 40 | 4 | A437 |
| HES2009-C | □ | 0.9 | – | 2 | 38 | 3 | A387 |
| HES2009 | ● | 0.9 | – | 2 | 38 | 3 | A390 |
| EPDSE2010-2-ATH | ● | 1 | 2 | 1.5 | 50 | 4 | A293 |
| EPDSE2010-2-PN | ● | 1 | 2 | 1.5 | 50 | 4 | A296 |
| EPDS2010-2 | □ | 1 | 2 | 1.5 | 50 | 4 | A430 |
| EPDS2010-2-TH | □ | 1 | 2 | 1.5 | 50 | 4 | A430 |
| BHS2010 | □ | 1 | 2.5 | 0.5 | 60 | 6 | A456 |
| HGOS2010-PN | ● | 1 | 2.5 | 2 | 40 | 4 | A304 |
| EPCDS6010 | ● | 1 | 3 | 0.1 | 40 | 6 | A383 |
| EPDSE2010-3-ATH | ● | 1 | 3 | 1.5 | 50 | 4 | A293 |
| EPDSE2010-3-PN | ● | 1 | 3 | 1.5 | 50 | 4 | A296 |
| EPSM4010-3-PN | ● | 1 | 3 | 1.5 | 56 | 6 | A317 |
| HGOS4010-PN | ● | 1 | 3 | 2.5 | 40 | 4 | A305 |
| HYPS2010-C | ● | 1 | 3.3 | 1.3 | 50 | 6 | A385 |
| EPDSE2010-4-ATH | ● | 1 | 4 | 1.5 | 50 | 4 | A293 |
| EPDSE2010-4-PN | ● | 1 | 4 | 1.5 | 50 | 4 | A296 |
| EPDS2010-4-SD | ● | 1 | 4 | 1.5 | 50 | 4 | A378 |
| EPDS2010-4 | □ | 1 | 4 | 1.5 | 50 | 4 | A430 |
| EPDS2010-4-TH | □ | 1 | 4 | 1.5 | 50 | 4 | A430 |
| HPSLN2010-C | ● | 1 | 5 | 1.3 | 60 | 6 | A385 |
| EPDSE2010-5-ATH | ● | 1 | 5 | 1.5 | 50 | 4 | A293 |
| EPDSE2010-5-PN | ● | 1 | 5 | 1.5 | 50 | 4 | A296 |
| EPSM4010-5-PN | ● | 1 | 5 | 1.5 | 68 | 6 | A318 |
| DES2010-5-C | □ | 1 | 5 | 1.6 | 55 | 4 | A452 |
| EPDSE2010-6-ATH | ● | 1 | 6 | 1.5 | 50 | 4 | A293 |
| EPDSE2010-6-PN | ● | 1 | 6 | 1.5 | 50 | 4 | A296 |
| EPDS2010-6 | □ | 1 | 6 | 1.5 | 50 | 4 | A430 |
| EPDS2010-6-TH | □ | 1 | 6 | 1.5 | 50 | 4 | A430 |
| DES2010-6-C | □ | 1 | 6 | 1.6 | 55 | 4 | A452 |
| EPDSE2010-7-ATH | ● | 1 | 7 | 1.5 | 50 | 4 | A293 |
| EPDSE2010-7-PN | ● | 1 | 7 | 1.5 | 50 | 4 | A296 |

| 商品コード Item Code | 在庫 Stock | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| DES2010-7-C | □ | 1 | 7 | 1.6 | 55 | 4 | A452 |
| EPDSE2010-8-ATH | ● | 1 | 8 | 1.5 | 50 | 4 | A293 |
| EPDSE2010-8-PN | ● | 1 | 8 | 1.5 | 50 | 4 | A296 |
| EPDS2010-8-SD | ● | 1 | 8 | 1.5 | 50 | 4 | A378 |
| EPDS2010-8 | □ | 1 | 8 | 1.5 | 50 | 4 | A430 |
| EPDS2010-8-TH | □ | 1 | 8 | 1.5 | 50 | 4 | A430 |
| DES2010-8.5-C | □ | 1 | 8.5 | 1.6 | 65 | 4 | A452 |
| EPDSE2010-9-ATH | ● | 1 | 9 | 1.5 | 50 | 4 | A293 |
| EPDSE2010-9-PN | ● | 1 | 9 | 1.5 | 50 | 4 | A296 |
| EPDSE2010-10-ATH | ● | 1 | 10 | 1.5 | 50 | 4 | A293 |
| EPDSE2010-10-PN | ● | 1 | 10 | 1.5 | 50 | 4 | A296 |
| EPDS2010-10 | □ | 1 | 10 | 1.5 | 50 | 4 | A430 |
| EPDS2010-10-TH | □ | 1 | 10 | 1.5 | 50 | 4 | A430 |
| DES2010-10-C | □ | 1 | 10 | 1.6 | 65 | 4 | A452 |
| EPDSE2010-12-ATH | ● | 1 | 12 | 1.5 | 55 | 4 | A293 |
| EPDSE2010-12-PN | ● | 1 | 12 | 1.5 | 55 | 4 | A296 |
| EPDS2010-12-SD | ● | 1 | 12 | 1.5 | 55 | 4 | A378 |
| EPDS2010-12 | □ | 1 | 12 | 1.5 | 55 | 4 | A430 |
| EPDS2010-12-TH | □ | 1 | 12 | 1.5 | 55 | 4 | A430 |
| EPDSE2010-14-ATH | ● | 1 | 14 | 1.5 | 55 | 4 | A293 |
| EPDSE2010-14-PN | ● | 1 | 14 | 1.5 | 55 | 4 | A296 |
| EPDS2010-14 | □ | 1 | 14 | 1.5 | 55 | 4 | A430 |
| EPDS2010-14-TH | □ | 1 | 14 | 1.5 | 55 | 4 | A430 |
| EPDSE2010-16-ATH | ● | 1 | 16 | 1.5 | 55 | 4 | A293 |
| EPDSE2010-16-PN | ● | 1 | 16 | 1.5 | 55 | 4 | A296 |
| EPDS2010-16 | □ | 1 | 16 | 1.5 | 60 | 4 | A430 |
| EPDS2010-16-TH | □ | 1 | 16 | 1.5 | 60 | 4 | A430 |
| EPDSE2010-20-ATH | ● | 1 | 20 | 1.5 | 60 | 4 | A293 |
| EPDSE2010-20-PN | ● | 1 | 20 | 1.5 | 60 | 4 | A296 |
| EPDSE2010-25-ATH | ● | 1 | 25 | 1.5 | 65 | 4 | A293 |
| EPDSE2010-25-PN | ● | 1 | 25 | 1.5 | 65 | 4 | A296 |
| EPPS4010-P-CS | ● | 1 | – | 1.5 | 50 | 6 | A332 |
| EPSMS4010-PN | □ | 1 | – | 1.5 | 56 | 6 | A311 |
| EPPS4010 | □ | 1 | – | 1.5 | 60 | 6 | A336 |
| PESS2010-C | □ | 1 | – | 2 | 40 | 4 | A434 |
| PESS2010 | □ | 1 | – | 2 | 40 | 4 | A435 |
| YS2010-CS | □ | 1 | – | 2 | 40 | 4 | A437 |
| CEPS4010-TH | ● | 1 | – | 2 | 60 | 6 | A352 |
| AES2010 | ● | 1 | – | 2.5 | 40 | 4 | A386 |
| HES2010-C | ● | 1 | – | 2.5 | 40 | 4 | A387 |
| HES2010 | ● | 1 | – | 2.5 | 40 | 4 | A390 |
| PESR2010-C | □ | 1 | – | 2.5 | 40 | 4 | A434 |
| PESR2010 | □ | 1 | – | 2.5 | 40 | 4 | A435 |
| YR4010-CS | □ | 1 | – | 2.5 | 40 | 4 | A437 |
| EPSM4010-PN | ● | 1 | – | 2.5 | 56 | 6 | A313 |
| EPP4010-P-CS | ● | 1 | – | 2.5 | 60 | 6 | A332 |
| CEPR4010-TH | ● | 1 | – | 3.5 | 60 | 6 | A352 |
| CEPR4010 | ● | 1 | – | 3.5 | 60 | 6 | A355 |
| HESL2010-C | ● | 1 | – | 6 | 50 | 4 | A388 |
| HESL2010 | ● | 1 | – | 6 | 50 | 4 | A391 |
| EPSM40105-PN | □ | 1.05 | – | 2.8 | 56 | 6 | A313 |
| EPSMS4011-PN | □ | 1.1 | – | 1.7 | 56 | 6 | A311 |
| EPPS4011 | □ | 1.1 | – | 1.7 | 60 | 6 | A336 |
| EPSM4011-PN | □ | 1.1 | – | 2.8 | 56 | 6 | A313 |
| HES2011-C | □ | 1.1 | – | 3 | 40 | 4 | A387 |
| HES2011 | ● | 1.1 | – | 3 | 40 | 4 | A390 |
| EPSM40115-PN | □ | 1.15 | – | 3 | 56 | 6 | A313 |
| HYPS2012-C | ● | 1.2 | 3.5 | 1.5 | 50 | 6 | A385 |
| EPDSE2012-4-ATH | ● | 1.2 | 4 | 1.8 | 50 | 4 | A293 |
| EPDSE2012-4-PN | ● | 1.2 | 4 | 1.8 | 50 | 4 | A296 |
| HPSLN2012-C | ● | 1.2 | 6 | 1.5 | 60 | 6 | A385 |
| EPDSE2012-6-ATH | ● | 1.2 | 6 | 1.8 | 50 | 4 | A293 |
| EPDSE2012-6-PN | ● | 1.2 | 6 | 1.8 | 50 | 4 | A296 |
| EPDS2012-6 | □ | 1.2 | 6 | 1.8 | 50 | 4 | A430 |
| EPDS2012-6-TH | □ | 1.2 | 6 | 1.8 | 50 | 4 | A430 |
| DES2012-5-C | □ | 1.2 | 6 | 1.9 | 55 | 4 | A452 |
| DES2012-6-C | □ | 1.2 | 7.2 | 1.9 | 55 | 4 | A452 |
| EPDSE2012-8-ATH | ● | 1.2 | 8 | 1.8 | 50 | 4 | A293 |
| EPDSE2012-8-PN | ● | 1.2 | 8 | 1.8 | 50 | 4 | A296 |

□印：特定代理店在庫です。弊社営業へお問合せください。□：Stocked by specified distributor. Contact with our sales department.

Quick dimension reference table by mill diameter

# 外径別寸法早見表

## 超硬エンドミル・スクエア φ1.2～φ2.8 Carbide End Mills -Square

単位 unit：mm

| 商品コード Item Code | 在庫 Stock | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EPDS2012-8 | □ | 1.2 | 8 | 1.8 | 50 | 4 | A430 |
| EPDS2012-8-TH | □ | 1.2 | 8 | 1.8 | 50 | 4 | A430 |
| DES2012-7-C | □ | 1.2 | 8.4 | 1.9 | 55 | 4 | A452 |
| EPDSE2012-10-ATH | ● | 1.2 | 10 | 1.8 | 50 | 4 | A293 |
| EPDSE2012-10-PN | ● | 1.2 | 10 | 1.8 | 50 | 4 | A296 |
| EPDS2012-10 | □ | 1.2 | 10 | 1.8 | 50 | 4 | A430 |
| EPDS2012-10-TH | □ | 1.2 | 10 | 1.8 | 50 | 4 | A430 |
| DES2012-8.5-C | □ | 1.2 | 10.2 | 1.9 | 65 | 4 | A452 |
| EPDSE2012-12-ATH | ● | 1.2 | 12 | 1.8 | 55 | 4 | A293 |
| EPDSE2012-12-PN | ● | 1.2 | 12 | 1.8 | 55 | 4 | A296 |
| EPDS2012-12 | □ | 1.2 | 12 | 1.8 | 55 | 4 | A430 |
| EPDS2012-12-TH | □ | 1.2 | 12 | 1.8 | 55 | 4 | A430 |
| DES2012-10-C | □ | 1.2 | 12 | 1.9 | 65 | 4 | A452 |
| EPDSE2012-16-ATH | ● | 1.2 | 16 | 1.8 | 55 | 4 | A293 |
| EPDSE2012-16-PN | ● | 1.2 | 16 | 1.8 | 55 | 4 | A296 |
| EPDS2012-16 | □ | 1.2 | 16 | 1.8 | 55 | 4 | A430 |
| EPDS2012-16-TH | □ | 1.2 | 16 | 1.8 | 55 | 4 | A430 |
| EPSMS4012-PN | □ | 1.2 | – | 1.8 | 56 | 6 | A311 |
| EPPS4012 | □ | 1.2 | – | 1.8 | 60 | 6 | A336 |
| HES2012-C | □ | 1.2 | – | 3 | 40 | 4 | A387 |
| HES2012 | ● | 1.2 | – | 3 | 40 | 4 | A390 |
| EPSM4012-PN | □ | 1.2 | – | 3 | 56 | 6 | A313 |
| EPSM40125-PN | □ | 1.25 | – | 3.3 | 56 | 6 | A313 |
| EPSMS4013-PN | □ | 1.3 | – | 2 | 56 | 6 | A311 |
| EPPS4013 | □ | 1.3 | – | 2 | 60 | 6 | A336 |
| EPSM4013-PN | □ | 1.3 | – | 3.3 | 56 | 6 | A313 |
| HES2013-C | □ | 1.3 | – | 4 | 40 | 4 | A387 |
| HES2013 | ● | 1.3 | – | 4 | 40 | 4 | A390 |
| EPSM40135-PN | □ | 1.35 | – | 3.5 | 56 | 6 | A313 |
| HYPS2014-C | ● | 1.4 | 3.8 | 1.8 | 50 | 6 | A385 |
| EPDSE2014-6-ATH | ● | 1.4 | 6 | 2.1 | 50 | 4 | A293 |
| EPDSE2014-6-PN | ● | 1.4 | 6 | 2.1 | 50 | 4 | A296 |
| EPDS2014-6 | □ | 1.4 | 6 | 2.1 | 50 | 4 | A431 |
| EPDS2014-6-TH | □ | 1.4 | 6 | 2.1 | 50 | 4 | A431 |
| HPSLN2014-C | ● | 1.4 | 7 | 1.8 | 60 | 6 | A385 |
| DES2014-5-C | □ | 1.4 | 7 | 2.2 | 55 | 4 | A452 |
| EPDS2014-8 | □ | 1.4 | 8 | 2.1 | 50 | 4 | A431 |
| EPDS2014-8-TH | □ | 1.4 | 8 | 2.1 | 50 | 4 | A431 |
| DES2014-6-C | □ | 1.4 | 8.4 | 2.2 | 55 | 4 | A452 |
| DES2014-7-C | □ | 1.4 | 9.8 | 2.2 | 55 | 4 | A452 |
| EPDS2014-10 | □ | 1.4 | 10 | 2.1 | 50 | 4 | A431 |
| EPDS2014-10-TH | □ | 1.4 | 10 | 2.1 | 50 | 4 | A431 |
| DES2014-8.5-C | □ | 1.4 | 11.9 | 2.2 | 65 | 4 | A452 |
| EPDSE2014-12-ATH | ● | 1.4 | 12 | 2.1 | 55 | 4 | A293 |
| EPDSE2014-12-PN | ● | 1.4 | 12 | 2.1 | 55 | 4 | A296 |
| EPDS2014-12 | □ | 1.4 | 12 | 2.1 | 55 | 4 | A431 |
| EPDS2014-12-TH | □ | 1.4 | 12 | 2.1 | 55 | 4 | A431 |
| EPDS2014-14 | □ | 1.4 | 14 | 2.1 | 55 | 4 | A431 |
| EPDS2014-14-TH | □ | 1.4 | 14 | 2.1 | 55 | 4 | A431 |
| DES2014-10-C | □ | 1.4 | 14 | 2.2 | 65 | 4 | A452 |
| EPDS2014-16 | □ | 1.4 | 16 | 2.1 | 55 | 4 | A431 |
| EPDS2014-16-TH | □ | 1.4 | 16 | 2.1 | 55 | 4 | A431 |
| EPSMS4014-PN | □ | 1.4 | – | 2.1 | 56 | 6 | A311 |
| EPPS4014 | □ | 1.4 | – | 2.1 | 60 | 6 | A336 |
| EPSM4014-PN | □ | 1.4 | – | 3.5 | 56 | 6 | A313 |
| HES2014-C | □ | 1.4 | – | 4 | 40 | 4 | A387 |
| HES2014 | ● | 1.4 | – | 4 | 40 | 4 | A390 |
| EPSM40145-PN | □ | 1.45 | – | 3.8 | 56 | 6 | A313 |
| BHS2015 | □ | 1.5 | 2.5 | 0.75 | 60 | 6 | A456 |
| HGOS2015-PN | ● | 1.5 | 3.5 | 3 | 40 | 4 | A304 |
| EPDSE2015-4-ATH | ● | 1.5 | 4 | 2.25 | 50 | 4 | A293 |
| EPDSE2015-4-PN | ● | 1.5 | 4 | 2.25 | 50 | 4 | A296 |
| EPDS2015-4 | □ | 1.5 | 4 | 2.25 | 50 | 4 | A431 |
| EPDS2015-4-TH | □ | 1.5 | 4 | 2.25 | 50 | 4 | A431 |
| EPSM4015-4.5-PN | □ | 1.5 | 4.5 | 2.3 | 56 | 6 | A317 |
| HGOS4015-PN | ● | 1.5 | 4.5 | 4 | 40 | 4 | A305 |
| HYPS2015-C | ● | 1.5 | 4.9 | 1.9 | 50 | 6 | A385 |
| EPDSE2015-6-ATH | ● | 1.5 | 6 | 2.25 | 50 | 4 | A293 |
| EPDSE2015-6-PN | ● | 1.5 | 6 | 2.25 | 50 | 4 | A296 |

| 商品コード Item Code | 在庫 Stock | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EPDS2015-6-SD | ● | 1.5 | 6 | 2.25 | 50 | 4 | A378 |
| EPDS2015-6 | □ | 1.5 | 6 | 2.25 | 50 | 4 | A431 |
| EPDS2015-6-TH | □ | 1.5 | 6 | 2.25 | 50 | 4 | A431 |
| HPSLN2015-C | ● | 1.5 | 7.5 | 1.9 | 60 | 6 | A385 |
| EPSM4015-7.5-PN | □ | 1.5 | 7.5 | 2.3 | 68 | 6 | A318 |
| DES2015-5-C | □ | 1.5 | 7.5 | 2.4 | 55 | 4 | A452 |
| EPDSE2015-8-ATH | ● | 1.5 | 8 | 2.25 | 50 | 4 | A293 |
| EPDSE2015-8-PN | ● | 1.5 | 8 | 2.25 | 50 | 4 | A296 |
| EPDS2015-8 | □ | 1.5 | 8 | 2.25 | 50 | 4 | A431 |
| EPDS2015-8-TH | □ | 1.5 | 8 | 2.25 | 50 | 4 | A431 |
| DES2015-6-C | □ | 1.5 | 9 | 2.4 | 55 | 4 | A452 |
| EPDSE2015-10-ATH | ● | 1.5 | 10 | 2.25 | 50 | 4 | A293 |
| EPDSE2015-10-PN | ● | 1.5 | 10 | 2.25 | 50 | 4 | A296 |
| EPDS2015-10 | □ | 1.5 | 10 | 2.25 | 50 | 4 | A431 |
| EPDS2015-10-TH | □ | 1.5 | 10 | 2.25 | 50 | 4 | A431 |
| DES2015-7-C | □ | 1.5 | 10.5 | 2.4 | 55 | 4 | A452 |
| EPDSE2015-12-ATH | ● | 1.5 | 12 | 2.25 | 55 | 4 | A293 |
| EPDSE2015-12-PN | ● | 1.5 | 12 | 2.25 | 55 | 4 | A296 |
| EPDS2015-12-SD | ● | 1.5 | 12 | 2.25 | 55 | 4 | A378 |
| EPDS2015-12 | □ | 1.5 | 12 | 2.25 | 55 | 4 | A431 |
| EPDS2015-12-TH | □ | 1.5 | 12 | 2.25 | 55 | 4 | A431 |
| DES2015-8.5-C | □ | 1.5 | 12.75 | 2.4 | 65 | 4 | A452 |
| EPDSE2015-14-ATH | ● | 1.5 | 14 | 2.25 | 55 | 4 | A293 |
| EPDSE2015-14-PN | ● | 1.5 | 14 | 2.25 | 55 | 4 | A296 |
| EPDS2015-14 | □ | 1.5 | 14 | 2.25 | 55 | 4 | A431 |
| EPDS2015-14-TH | □ | 1.5 | 14 | 2.25 | 55 | 4 | A431 |
| DES2015-10-C | □ | 1.5 | 15 | 2.4 | 65 | 4 | A452 |
| EPDSE2015-16-ATH | ● | 1.5 | 16 | 2.25 | 55 | 4 | A293 |
| EPDSE2015-16-PN | ● | 1.5 | 16 | 2.25 | 55 | 4 | A296 |
| EPDS2015-16 | □ | 1.5 | 16 | 2.25 | 55 | 4 | A431 |
| EPDS2015-16-TH | □ | 1.5 | 16 | 2.25 | 55 | 4 | A431 |
| EPDSE2015-18-ATH | ● | 1.5 | 18 | 2.25 | 60 | 4 | A293 |
| EPDSE2015-18-PN | ● | 1.5 | 18 | 2.25 | 60 | 4 | A296 |
| EPDS2015-18-SD | ● | 1.5 | 18 | 2.25 | 60 | 4 | A378 |
| EPDS2015-18 | □ | 1.5 | 18 | 2.25 | 60 | 4 | A431 |
| EPDS2015-18-TH | □ | 1.5 | 18 | 2.25 | 60 | 4 | A431 |
| EPDSE2015-20-ATH | ● | 1.5 | 20 | 2.25 | 60 | 4 | A293 |
| EPDSE2015-20-PN | ● | 1.5 | 20 | 2.25 | 60 | 4 | A296 |
| EPDS2015-20 | □ | 1.5 | 20 | 2.25 | 60 | 4 | A431 |
| EPDS2015-20-TH | □ | 1.5 | 20 | 2.25 | 60 | 4 | A431 |
| EPDSE2015-25-ATH | ● | 1.5 | 25 | 2.25 | 65 | 4 | A293 |
| EPDSE2015-25-PN | ● | 1.5 | 25 | 2.25 | 65 | 4 | A296 |
| EPDS2015-25 | □ | 1.5 | 25 | 2.25 | 65 | 4 | A431 |
| EPDS2015-25-TH | □ | 1.5 | 25 | 2.25 | 65 | 4 | A431 |
| EPDSE2015-30-ATH | ● | 1.5 | 30 | 2.25 | 70 | 4 | A293 |
| EPDSE2015-30-PN | ● | 1.5 | 30 | 2.25 | 70 | 4 | A296 |
| EPDSE2015-35-ATH | ● | 1.5 | 35 | 2.25 | 75 | 4 | A293 |
| EPDSE2015-35-PN | ● | 1.5 | 35 | 2.25 | 75 | 4 | A296 |
| EPDSE2015-40-ATH | ● | 1.5 | 40 | 2.25 | 80 | 4 | A293 |
| EPDSE2015-40-PN | ● | 1.5 | 40 | 2.25 | 80 | 4 | A296 |
| EPPS4015-P-CS | ● | 1.5 | – | 2.3 | 50 | 6 | A332 |
| EPSMS4015-PN | □ | 1.5 | – | 2.3 | 56 | 6 | A311 |
| EPPS4015 | □ | 1.5 | – | 2.3 | 60 | 6 | A336 |
| PESS2015-C | □ | 1.5 | – | 3 | 40 | 4 | A434 |
| PESS2015 | □ | 1.5 | – | 3 | 40 | 4 | A435 |
| YS2015-CS | □ | 1.5 | – | 3 | 40 | 4 | A437 |
| CEPS4015-TH | ● | 1.5 | – | 3 | 60 | 6 | A352 |
| EPSM4015-PN | □ | 1.5 | – | 3.8 | 56 | 6 | A313 |
| HES2015-C | ● | 1.5 | – | 4 | 40 | 4 | A387 |
| HES2015 | ● | 1.5 | – | 4 | 40 | 4 | A390 |
| PESR2015-C | □ | 1.5 | – | 4 | 40 | 4 | A434 |
| PESR2015 | □ | 1.5 | – | 4 | 40 | 4 | A435 |
| YR4015-CS | □ | 1.5 | – | 4 | 40 | 4 | A437 |
| EPP4015-P-CS | ● | 1.5 | – | 4 | 60 | 6 | A332 |
| CEPR4015-TH | ● | 1.5 | – | 5 | 60 | 6 | A352 |
| CEPR4015 | ● | 1.5 | – | 5 | 60 | 6 | A355 |
| HESL2015-C | ● | 1.5 | – | 8 | 50 | 4 | A388 |
| HESL2015 | ● | 1.5 | – | 8 | 50 | 4 | A391 |
| EPSM40155-PN | □ | 1.55 | – | 4 | 56 | 6 | A313 |

| 商品コード Item Code | 在庫 Stock | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| HYPS2016-C | ● | 1.6 | 5 | 2 | 50 | 6 | A385 |
| EPDSE2016-6-ATH | ● | 1.6 | 6 | 2.4 | 50 | 4 | A293 |
| EPDSE2016-6-PN | ● | 1.6 | 6 | 2.4 | 50 | 4 | A296 |
| EPDS2016-6 | □ | 1.6 | 6 | 2.4 | 50 | 4 | A431 |
| EPDS2016-6-TH | □ | 1.6 | 6 | 2.4 | 50 | 4 | A431 |
| HPSLN2016-C | ● | 1.6 | 8 | 2 | 60 | 6 | A385 |
| EPDSE2016-8-ATH | ● | 1.6 | 8 | 2.4 | 50 | 4 | A293 |
| EPDSE2016-8-PN | ● | 1.6 | 8 | 2.4 | 50 | 4 | A296 |
| EPDS2016-8 | □ | 1.6 | 8 | 2.4 | 50 | 4 | A431 |
| EPDS2016-8-TH | □ | 1.6 | 8 | 2.4 | 50 | 4 | A431 |
| DES2016-5-C | □ | 1.6 | 8 | 2.6 | 55 | 4 | A452 |
| DES2016-6-C | □ | 1.6 | 9.6 | 2.6 | 55 | 4 | A452 |
| EPDS2016-10 | □ | 1.6 | 10 | 2.4 | 50 | 4 | A431 |
| EPDS2016-10-TH | □ | 1.6 | 10 | 2.4 | 50 | 4 | A431 |
| DES2016-7-C | □ | 1.6 | 11.2 | 2.6 | 55 | 4 | A452 |
| EPDS2016-12 | □ | 1.6 | 12 | 2.4 | 55 | 4 | A431 |
| EPDS2016-12-TH | □ | 1.6 | 12 | 2.4 | 55 | 4 | A431 |
| DES2016-8.5-C | □ | 1.6 | 13.6 | 2.6 | 65 | 4 | A452 |
| EPDS2016-14 | □ | 1.6 | 14 | 2.4 | 55 | 4 | A431 |
| EPDS2016-14-TH | □ | 1.6 | 14 | 2.4 | 55 | 4 | A431 |
| EPDS2016-16 | □ | 1.6 | 16 | 2.4 | 55 | 4 | A431 |
| EPDS2016-16-TH | □ | 1.6 | 16 | 2.4 | 55 | 4 | A431 |
| DES2016-10-C | □ | 1.6 | 16 | 2.6 | 65 | 4 | A452 |
| EPDS2016-18 | □ | 1.6 | 18 | 2.4 | 60 | 4 | A431 |
| EPDS2016-18-TH | □ | 1.6 | 18 | 2.4 | 60 | 4 | A431 |
| EPDS2016-20 | □ | 1.6 | 20 | 2.4 | 60 | 4 | A431 |
| EPDS2016-20-TH | □ | 1.6 | 20 | 2.4 | 60 | 4 | A431 |
| EPSMS4016-PN | □ | 1.6 | – | 2.4 | 56 | 6 | A311 |
| EPPS4016 | □ | 1.6 | – | 2.4 | 60 | 6 | A336 |
| EPSM4016-PN | □ | 1.6 | – | 4 | 56 | 6 | A313 |
| HES2016-C | □ | 1.6 | – | 5 | 40 | 4 | A387 |
| HES2016 | ● | 1.6 | – | 5 | 40 | 4 | A390 |
| EPSM40165-PN | □ | 1.65 | – | 4.3 | 56 | 6 | A313 |
| EPSMS4017-PN | □ | 1.7 | – | 2.6 | 56 | 6 | A311 |
| EPPS4017 | □ | 1.7 | – | 2.6 | 60 | 6 | A336 |
| EPSM4017-PN | □ | 1.7 | – | 4.3 | 56 | 6 | A313 |
| HES2017-C | □ | 1.7 | – | 5 | 40 | 4 | A387 |
| HES2017 | ● | 1.7 | – | 5 | 40 | 4 | A390 |
| EPSM40175-PN | □ | 1.75 | – | 4.5 | 56 | 6 | A313 |
| HYPS2018-C | ● | 1.8 | 5.3 | 2.3 | 50 | 6 | A385 |
| EPDSE2018-6-ATH | ● | 1.8 | 6 | 2.7 | 50 | 4 | A293 |
| EPDSE2018-6-PN | ● | 1.8 | 6 | 2.7 | 50 | 4 | A296 |
| EPDS2018-6 | □ | 1.8 | 6 | 2.7 | 50 | 4 | A431 |
| EPDS2018-6-TH | □ | 1.8 | 6 | 2.7 | 50 | 4 | A431 |
| EPDSE2018-8-ATH | ● | 1.8 | 8 | 2.7 | 50 | 4 | A293 |
| EPDSE2018-8-PN | ● | 1.8 | 8 | 2.7 | 50 | 4 | A296 |
| EPDS2018-8 | □ | 1.8 | 8 | 2.7 | 50 | 4 | A431 |
| EPDS2018-8-TH | □ | 1.8 | 8 | 2.7 | 50 | 4 | A431 |
| HPSLN2018-C | ● | 1.8 | 9 | 2.3 | 60 | 6 | A385 |
| DES2018-5-C | □ | 1.8 | 9 | 2.9 | 55 | 4 | A452 |
| EPDS2018-10 | □ | 1.8 | 10 | 2.7 | 50 | 4 | A431 |
| EPDS2018-10-TH | □ | 1.8 | 10 | 2.7 | 50 | 4 | A431 |
| DES2018-6-C | □ | 1.8 | 10.8 | 2.9 | 55 | 4 | A452 |
| EPDS2018-12 | □ | 1.8 | 12 | 2.7 | 55 | 4 | A431 |
| EPDS2018-12-TH | □ | 1.8 | 12 | 2.7 | 55 | 4 | A431 |
| DES2018-7-C | □ | 1.8 | 12.6 | 2.9 | 55 | 4 | A452 |
| EPDS2018-14 | □ | 1.8 | 14 | 2.7 | 55 | 4 | A431 |
| EPDS2018-14-TH | □ | 1.8 | 14 | 2.7 | 55 | 4 | A431 |
| DES2018-8.5-C | □ | 1.8 | 15.3 | 2.9 | 65 | 4 | A452 |
| EPDS2018-16 | □ | 1.8 | 16 | 2.7 | 55 | 4 | A431 |
| EPDS2018-16-TH | □ | 1.8 | 16 | 2.7 | 55 | 4 | A431 |
| EPDS2018-18 | □ | 1.8 | 18 | 2.7 | 60 | 4 | A431 |
| EPDS2018-18-TH | □ | 1.8 | 18 | 2.7 | 60 | 4 | A431 |
| DES2018-10-C | □ | 1.8 | 18 | 2.9 | 65 | 4 | A452 |
| EPDS2018-20 | □ | 1.8 | 20 | 2.7 | 60 | 4 | A431 |
| EPDS2018-20-TH | □ | 1.8 | 20 | 2.7 | 60 | 4 | A431 |
| EPSMS4018-PN | □ | 1.8 | – | 2.7 | 56 | 6 | A311 |
| EPPS4018 | □ | 1.8 | – | 2.7 | 60 | 6 | A336 |
| EPSM4018-PN | □ | 1.8 | – | 4.5 | 56 | 6 | A313 |

●印：標準在庫品です。 ● : Stocked Items.

単位 unit：mm

| 商品コード Item Code | 在庫 Stock | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| HES2018-C | □ | 1.8 | – | 5 | 40 | 4 | A387 |
| HES2018 | ● | 1.8 | – | 5 | 40 | 4 | A390 |
| EPSM40185-PN | □ | 1.85 | – | 4.8 | 56 | 6 | A313 |
| EPSMS4019-PN | □ | 1.9 | – | 2.9 | 56 | 6 | A311 |
| EPPS4019 | □ | 1.9 | – | 2.9 | 60 | 6 | A336 |
| EPSM4019-PN | □ | 1.9 | – | 4.8 | 56 | 6 | A313 |
| HES2019-C | □ | 1.9 | – | 6 | 40 | 4 | A387 |
| HES2019 | ● | 1.9 | – | 6 | 40 | 4 | A390 |
| EPSM40195-PN | □ | 1.95 | – | 5 | 56 | 6 | A313 |
| BHS2020 | □ | 2 | 2.5 | 1 | 60 | 6 | A456 |
| EPDSE2020-4-ATH | ● | 2 | 4 | 3 | 50 | 4 | A294 |
| EPDSE2020-4-PN | ● | 2 | 4 | 3 | 50 | 4 | A297 |
| EPDS2020-4 | □ | 2 | 4 | 3 | 50 | 4 | A431 |
| EPDS2020-4-TH | □ | 2 | 4 | 3 | 50 | 4 | A431 |
| HYPS2020-C | ● | 2 | 5.5 | 2.5 | 50 | 6 | A385 |
| EPDSE2020-6-ATH | ● | 2 | 6 | 3 | 50 | 4 | A294 |
| EPDSE2020-6-PN | ● | 2 | 6 | 3 | 50 | 4 | A297 |
| EPDS2020-6 | □ | 2 | 6 | 3 | 50 | 4 | A431 |
| EPDS2020-6-TH | □ | 2 | 6 | 3 | 50 | 4 | A431 |
| EPSM4020-6-PN | ● | 2 | 6 | 3 | 56 | 6 | A317 |
| DES2020-3-C | □ | 2 | 6 | 3.2 | 55 | 4 | A452 |
| HGOS2020-PN | ● | 2 | 7 | 6 | 40 | 4 | A304 |
| HGOS4020-PN | ● | 2 | 7 | 6 | 40 | 4 | A305 |
| EPDSE2020-8-ATH | ● | 2 | 8 | 3 | 50 | 4 | A294 |
| EPDSE2020-8-PN | ● | 2 | 8 | 3 | 50 | 4 | A297 |
| EPDS2020-8-SD | ● | 2 | 8 | 3 | 50 | 4 | A378 |
| EPDS2020-8 | □ | 2 | 8 | 3 | 50 | 4 | A431 |
| EPDS2020-8-TH | □ | 2 | 8 | 3 | 50 | 4 | A431 |
| DES2020-4-C | □ | 2 | 8 | 3.2 | 55 | 4 | A452 |
| HPSLN2020-C | ● | 2 | 10 | 2.5 | 60 | 6 | A385 |
| EPDSE2020-10-ATH | ● | 2 | 10 | 3 | 50 | 4 | A294 |
| EPDSE2020-10-PN | ● | 2 | 10 | 3 | 50 | 4 | A297 |
| EPDS2020-10 | □ | 2 | 10 | 3 | 50 | 4 | A431 |
| EPDS2020-10-TH | □ | 2 | 10 | 3 | 50 | 4 | A431 |
| EPSM4020-10-PN | ● | 2 | 10 | 3 | 68 | 6 | A318 |
| DES2020-5-C | □ | 2 | 10 | 3.2 | 55 | 4 | A452 |
| EPDSE2020-12-ATH | ● | 2 | 12 | 3 | 55 | 4 | A294 |
| EPDSE2020-12-PN | ● | 2 | 12 | 3 | 55 | 4 | A297 |
| EPDS2020-12 | □ | 2 | 12 | 3 | 55 | 4 | A431 |
| EPDS2020-12-TH | □ | 2 | 12 | 3 | 55 | 4 | A431 |
| DES2020-6-C | □ | 2 | 12 | 3.2 | 55 | 4 | A452 |
| EPDSE2020-14-ATH | ● | 2 | 14 | 3 | 55 | 4 | A294 |
| EPDSE2020-14-PN | ● | 2 | 14 | 3 | 55 | 4 | A297 |
| EPDS2020-14 | □ | 2 | 14 | 3 | 55 | 4 | A431 |
| EPDS2020-14-TH | □ | 2 | 14 | 3 | 55 | 4 | A431 |
| DES2020-7-C | □ | 2 | 14 | 3.2 | 55 | 4 | A452 |
| EPDSE2020-16-ATH | ● | 2 | 16 | 3 | 55 | 4 | A294 |
| EPDSE2020-16-PN | ● | 2 | 16 | 3 | 55 | 4 | A297 |
| EPDS2020-16-SD | ● | 2 | 16 | 3 | 55 | 4 | A378 |
| EPDS2020-16 | □ | 2 | 16 | 3 | 55 | 4 | A431 |
| EPDS2020-16-TH | □ | 2 | 16 | 3 | 55 | 4 | A431 |
| DES2020-8.5-C | □ | 2 | 17 | 3.2 | 65 | 4 | A452 |
| EPDSE2020-18-ATH | ● | 2 | 18 | 3 | 60 | 4 | A294 |
| EPDSE2020-18-PN | ● | 2 | 18 | 3 | 60 | 4 | A297 |
| EPDS2020-18 | □ | 2 | 18 | 3 | 60 | 4 | A431 |
| EPDS2020-18-TH | □ | 2 | 18 | 3 | 60 | 4 | A431 |
| EPDSE2020-20-ATH | ● | 2 | 20 | 3 | 60 | 4 | A294 |
| EPDSE2020-20-PN | ● | 2 | 20 | 3 | 60 | 4 | A297 |
| EPDS2020-20 | □ | 2 | 20 | 3 | 60 | 4 | A431 |
| EPDS2020-20-TH | □ | 2 | 20 | 3 | 60 | 4 | A431 |
| DES2020-10-C | □ | 2 | 20 | 3.2 | 65 | 4 | A452 |
| EPDS2020-24-SD | ● | 2 | 24 | 3 | 60 | 4 | A378 |
| EPDSE2020-25-ATH | ● | 2 | 25 | 3 | 65 | 4 | A294 |
| EPDSE2020-25-PN | ● | 2 | 25 | 3 | 65 | 4 | A297 |
| EPDS2020-25 | □ | 2 | 25 | 3 | 65 | 4 | A431 |
| EPDS2020-25-TH | □ | 2 | 25 | 3 | 65 | 4 | A431 |
| EPDSE2020-30-ATH | ● | 2 | 30 | 3 | 70 | 4 | A294 |
| EPDSE2020-30-PN | ● | 2 | 30 | 3 | 70 | 4 | A297 |
| EPDS2020-30 | □ | 2 | 30 | 3 | 70 | 4 | A431 |
| EPDS2020-30-TH | □ | 2 | 30 | 3 | 70 | 4 | A431 |
| EPDSE2020-35-ATH | ● | 2 | 35 | 3 | 75 | 4 | A294 |
| EPDSE2020-35-PN | ● | 2 | 35 | 3 | 75 | 4 | A297 |
| EPDSE2020-40-ATH | ● | 2 | 40 | 3 | 80 | 4 | A294 |
| EPDSE2020-40-PN | ● | 2 | 40 | 3 | 80 | 4 | A297 |
| EPDSE2020-50-ATH | ● | 2 | 50 | 3 | 90 | 4 | A294 |
| EPDSE2020-50-PN | ● | 2 | 50 | 3 | 90 | 4 | A297 |
| TES2020 | □ | 2 | – | 3 | 40 | 4 | A440 |
| EPPS4020-P-CS | ● | 2 | – | 3 | 50 | 6 | A332 |
| KES2020 | □ | 2 | – | 3 | 50 | 6 | A440 |
| KESU2020 | □ | 2 | – | 3 | 50 | 6 | A440 |
| EPSMS4020-PN | □ | 2 | – | 3 | 56 | 6 | A311 |
| EPPS4020 | □ | 2 | – | 3 | 60 | 6 | A336 |
| PESS2020-C | □ | 2 | – | 4 | 40 | 4 | A434 |
| PESS2020 | □ | 2 | – | 4 | 40 | 4 | A435 |
| SES2020 | □ | 2 | – | 4 | 40 | 4 | A439 |
| SES2020-C | □ | 2 | – | 4 | 40 | 4 | A439 |
| CEPS4020-TH | ● | 2 | – | 4 | 60 | 6 | A352 |
| EPSM4020-PN | ● | 2 | – | 5 | 56 | 6 | A313 |
| AES2020 | ● | 2 | – | 6 | 40 | 4 | A386 |
| HES2020-C | ● | 2 | – | 6 | 40 | 4 | A387 |
| HES2020 | ● | 2 | – | 6 | 40 | 4 | A390 |
| HES4020-C | ● | 2 | – | 6 | 40 | 4 | A394 |
| HES4020 | ● | 2 | – | 6 | 40 | 4 | A396 |
| PESR2020-C | □ | 2 | – | 6 | 40 | 4 | A434 |
| PESR4020-C | □ | 2 | – | 6 | 40 | 4 | A434 |
| PESR2020 | □ | 2 | – | 6 | 40 | 4 | A435 |
| PESR4020 | □ | 2 | – | 6 | 40 | 4 | A435 |
| YR4020-CS | □ | 2 | – | 6 | 40 | 4 | A437 |
| YS2020-CS | □ | 2 | – | 6 | 40 | 4 | A437 |
| EPP3020-CS | □ | 2 | – | 6 | 60 | 6 | A308 |
| EPP4020-P-CS | ● | 2 | – | 6 | 60 | 6 | A332 |
| EPP4020 | □ | 2 | – | 6 | 60 | 6 | A337 |
| CEPR4020-TH | ● | 2 | – | 7 | 60 | 6 | A352 |
| CEPR4020 | ● | 2 | – | 7 | 60 | 6 | A355 |
| GSE4020 | □ | 2 | – | 10 | 80 | 4 | A432 |
| GSR2020 | □ | 2 | – | 10 | 80 | 6 | A441 |
| GSD4020 | □ | 2 | – | 10 | 100 | 4 | A432 |
| GXR2020 | □ | 2 | – | 10 | 100 | 6 | A441 |
| HESL2020-C | ● | 2 | – | 14 | 50 | 4 | A388 |
| HESL2020 | ● | 2 | – | 14 | 50 | 4 | A391 |
| GSL2020 | □ | 2 | – | 20 | 100 | 6 | A441 |
| EPSM40205-PN | □ | 2.05 | – | 5.3 | 56 | 6 | A313 |
| EPSMS4021-PN | □ | 2.1 | – | 3.2 | 56 | 6 | A311 |
| EPPS4021 | □ | 2.1 | – | 3.2 | 60 | 6 | A336 |
| EPSM4021-PN | □ | 2.1 | – | 5.3 | 56 | 6 | A313 |
| HES2021-C | □ | 2.1 | – | 8 | 40 | 4 | A387 |
| HES2021 | ● | 2.1 | – | 8 | 40 | 4 | A390 |
| EPSM40215-PN | □ | 2.15 | – | 5.5 | 56 | 6 | A313 |
| EPSMS4022-PN | □ | 2.2 | – | 3.3 | 56 | 6 | A311 |
| EPPS4022 | □ | 2.2 | – | 3.3 | 60 | 6 | A336 |
| EPSM4022-PN | □ | 2.2 | – | 5.5 | 56 | 6 | A313 |
| HES2022-C | □ | 2.2 | – | 8 | 40 | 4 | A387 |
| HES2022 | ● | 2.2 | – | 8 | 40 | 4 | A390 |
| EPSM40225-PN | □ | 2.25 | – | 5.8 | 56 | 6 | A313 |
| EPSMS4023-PN | □ | 2.3 | – | 3.5 | 56 | 6 | A311 |
| EPPS4023 | □ | 2.3 | – | 3.5 | 60 | 6 | A336 |
| EPSM4023-PN | □ | 2.3 | – | 5.8 | 56 | 6 | A313 |
| HES2023-C | □ | 2.3 | – | 8 | 40 | 4 | A387 |
| HES2023 | ● | 2.3 | – | 8 | 40 | 4 | A390 |
| EPSM40235-PN | □ | 2.35 | – | 6 | 56 | 6 | A313 |
| EPSMS4024-PN | □ | 2.4 | – | 3.6 | 56 | 6 | A311 |
| EPPS4024 | □ | 2.4 | – | 3.6 | 60 | 6 | A336 |
| EPSM4024-PN | □ | 2.4 | – | 6 | 56 | 6 | A313 |
| HES2024-C | □ | 2.4 | – | 8 | 40 | 4 | A387 |
| HES2024 | ● | 2.4 | – | 8 | 40 | 4 | A390 |
| EPSM40245-PN | □ | 2.45 | – | 6.3 | 56 | 6 | A313 |
| HYPS2025-C | ● | 2.5 | 6 | 3 | 50 | 6 | A385 |
| EPSM4025-7.5-PN | □ | 2.5 | 7.5 | 3.8 | 56 | 6 | A317 |
| DES2025-3-C | □ | 2.5 | 7.5 | 4 | 55 | 4 | A452 |
| EPDSE2025-8-ATH | ● | 2.5 | 8 | 3.75 | 50 | 4 | A294 |
| EPDSE2025-8-PN | ● | 2.5 | 8 | 3.75 | 50 | 4 | A297 |
| EPDS2025-8 | □ | 2.5 | 8 | 3.75 | 50 | 4 | A431 |
| EPDS2025-8-TH | □ | 2.5 | 8 | 3.75 | 50 | 4 | A431 |
| HGOS2025-PN | ● | 2.5 | 9 | 8 | 40 | 4 | A304 |
| HGOS4025-PN | ● | 2.5 | 9 | 8 | 40 | 4 | A305 |
| EPDSE2025-12-ATH | ● | 2.5 | 12 | 3.75 | 55 | 4 | A294 |
| EPDSE2025-12-PN | ● | 2.5 | 12 | 3.75 | 55 | 4 | A297 |
| EPDS2025-12 | □ | 2.5 | 12 | 3.75 | 55 | 4 | A431 |
| EPDS2025-12-TH | □ | 2.5 | 12 | 3.75 | 55 | 4 | A431 |
| HPSLN2025-C | ● | 2.5 | 12.5 | 3 | 60 | 6 | A385 |
| EPSM4025-12.5-PN | □ | 2.5 | 12.5 | 3.8 | 68 | 6 | A318 |
| DES2025-5-C | □ | 2.5 | 12.5 | 4 | 55 | 4 | A452 |
| DES2025-6-C | □ | 2.5 | 15 | 4 | 55 | 4 | A452 |
| EPDSE2025-16-ATH | ● | 2.5 | 16 | 3.75 | 55 | 4 | A294 |
| EPDSE2025-16-PN | ● | 2.5 | 16 | 3.75 | 55 | 4 | A297 |
| EPDS2025-16 | □ | 2.5 | 16 | 3.75 | 55 | 4 | A431 |
| EPDS2025-16-TH | □ | 2.5 | 16 | 3.75 | 55 | 4 | A431 |
| DES2025-7-C | □ | 2.5 | 17.5 | 4 | 55 | 4 | A452 |
| EPDSE2025-20-ATH | ● | 2.5 | 20 | 3.75 | 60 | 4 | A294 |
| EPDSE2025-20-PN | ● | 2.5 | 20 | 3.75 | 60 | 4 | A297 |
| EPDS2025-20 | □ | 2.5 | 20 | 3.75 | 60 | 4 | A431 |
| EPDS2025-20-TH | □ | 2.5 | 20 | 3.75 | 60 | 4 | A431 |
| DES2025-8.5-C | □ | 2.5 | 21.3 | 4 | 55 | 4 | A452 |
| EPDSE2025-30-ATH | ● | 2.5 | 30 | 3.75 | 70 | 4 | A294 |
| EPDSE2025-30-PN | ● | 2.5 | 30 | 3.75 | 70 | 4 | A297 |
| EPDSE2025-40-ATH | ● | 2.5 | 40 | 3.75 | 80 | 4 | A294 |
| EPDSE2025-40-PN | ● | 2.5 | 40 | 3.75 | 80 | 4 | A297 |
| EPDSE2025-50-ATH | ● | 2.5 | 50 | 3.75 | 90 | 4 | A294 |
| EPDSE2025-50-PN | ● | 2.5 | 50 | 3.75 | 90 | 4 | A297 |
| EPPS4025-P-CS | ● | 2.5 | – | 3.8 | 50 | 6 | A332 |
| EPSMS4025-PN | □ | 2.5 | – | 3.8 | 56 | 6 | A311 |
| EPPS4025 | □ | 2.5 | – | 3.8 | 60 | 6 | A336 |
| PESS2025-C | □ | 2.5 | – | 5 | 40 | 4 | A434 |
| PESS2025 | □ | 2.5 | – | 5 | 40 | 4 | A435 |
| CEPS4025-TH | ● | 2.5 | – | 5 | 60 | 6 | A352 |
| EPSM4025-PN | □ | 2.5 | – | 6.3 | 56 | 6 | A313 |
| HES2025-C | ● | 2.5 | – | 8 | 40 | 4 | A387 |
| HES2025 | ● | 2.5 | – | 8 | 40 | 4 | A390 |
| HES4025-C | ● | 2.5 | – | 8 | 40 | 4 | A394 |
| HES4025 | ● | 2.5 | – | 8 | 40 | 4 | A396 |
| PESR2025-C | □ | 2.5 | – | 8 | 40 | 4 | A434 |
| PESR4025-C | □ | 2.5 | – | 8 | 40 | 4 | A434 |
| PESR2025 | □ | 2.5 | – | 8 | 40 | 4 | A435 |
| PESR4025 | □ | 2.5 | – | 8 | 40 | 4 | A435 |
| YR4025-CS | □ | 2.5 | – | 8 | 40 | 4 | A437 |
| YS2025-CS | □ | 2.5 | – | 8 | 40 | 4 | A437 |
| EPP3025-CS | □ | 2.5 | – | 8 | 60 | 6 | A308 |
| EPP4025-P-CS | ● | 2.5 | – | 8 | 60 | 6 | A332 |
| EPP4025 | □ | 2.5 | – | 8 | 60 | 6 | A337 |
| CEPR4025-TH | ● | 2.5 | – | 8 | 60 | 6 | A352 |
| CEPR4025 | ● | 2.5 | – | 8 | 60 | 6 | A355 |
| HESL2025-C | ● | 2.5 | – | 16 | 50 | 4 | A388 |
| HESL2025 | ● | 2.5 | – | 16 | 50 | 4 | A391 |
| EPSM40255-PN | □ | 2.55 | – | 6.5 | 56 | 6 | A313 |
| EPSMS4026-PN | □ | 2.6 | – | 3.9 | 56 | 6 | A311 |
| EPPS4026 | □ | 2.6 | – | 3.9 | 60 | 6 | A336 |
| EPSM4026-PN | □ | 2.6 | – | 6.5 | 56 | 6 | A313 |
| HES2026-C | □ | 2.6 | – | 10 | 45 | 6 | A387 |
| HES2026 | ● | 2.6 | – | 10 | 45 | 6 | A390 |
| EPSM40265-PN | □ | 2.65 | – | 6.8 | 56 | 6 | A313 |
| EPSMS4027-PN | □ | 2.7 | – | 4.1 | 56 | 6 | A311 |
| EPPS4027 | □ | 2.7 | – | 4.1 | 60 | 6 | A336 |
| EPSM4027-PN | □ | 2.7 | – | 6.8 | 56 | 6 | A313 |
| HES2027-C | □ | 2.7 | – | 10 | 45 | 6 | A387 |
| HES2027 | ● | 2.7 | – | 10 | 45 | 6 | A390 |
| EPSM40275-PN | □ | 2.75 | – | 7 | 56 | 6 | A313 |
| EPSMS4028-PN | □ | 2.8 | – | 4.2 | 56 | 6 | A311 |

□印：特定代理店在庫です。弊社営業へお問合せください。□：Stocked by specified distributor. Contact with our sales department.

Quick dimension reference table by mill diameter

# 外径別寸法早見表

## 超硬エンドミル・スクエア　φ2.8～φ5　Carbide End Mills -Square

単位 unit：mm

| 商品コード Item Code | 在庫 Stock | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EPPS4028 | □ | 2.8 | – | 4.2 | 60 | 6 | A336 |
| EPSM4028-PN | □ | 2.8 | – | 7 | 56 | 6 | A313 |
| HES2028-C | □ | 2.8 | – | 10 | 45 | 6 | A387 |
| HES2028 | ● | 2.8 | – | 10 | 45 | 6 | A390 |
| EPSM40285-PN | □ | 2.85 | – | 7.3 | 56 | 6 | A313 |
| EPSMS4029-PN | □ | 2.9 | – | 4.4 | 56 | 6 | A311 |
| EPPS4029 | □ | 2.9 | – | 4.4 | 60 | 6 | A336 |
| EPSM4029-PN | □ | 2.9 | – | 7.3 | 56 | 6 | A313 |
| HES2029-C | □ | 2.9 | – | 10 | 45 | 6 | A387 |
| HES2029 | ● | 2.9 | – | 10 | 45 | 6 | A390 |
| EPSM40295-PN | □ | 2.95 | – | 7.5 | 56 | 6 | A313 |
| HYPS2030-C | ● | 3 | 8 | 4 | 50 | 6 | A385 |
| EPDSE2030-8-ATH | ● | 3 | 8 | 4.5 | 55 | 6 | A294 |
| EPDSE2030-8-PN | ● | 3 | 8 | 4.5 | 55 | 6 | A297 |
| EPDS2030-8 | □ | 3 | 8 | 4.5 | 55 | 6 | A431 |
| EPDS2030-8-TH | □ | 3 | 8 | 4.5 | 55 | 6 | A431 |
| EPSM4030-9-PN | ● | 3 | 9 | 4.5 | 56 | 6 | A317 |
| EMXA3030-9 | ◎ | 3 | 9 | 4.5 | 60 | 6 | A374 |
| DES2030-3-C | □ | 3 | 9 | 4.8 | 80 | 6 | A452 |
| HGOS2030-PN | ● | 3 | 9 | 8 | 45 | 6 | A304 |
| EPSMLS4030-PN | ● | 3 | 10.5 | 4.5 | 80 | 6 | A316 |
| EPPLS4030 | ● | 3 | 10.5 | 4.5 | 80 | 6 | A338 |
| HGOS4030-PN | ● | 3 | 11 | 10 | 45 | 6 | A305 |
| EPDSE2030-12-ATH | ● | 3 | 12 | 4.5 | 60 | 6 | A294 |
| EPDSE2030-12-PN | ● | 3 | 12 | 4.5 | 60 | 6 | A297 |
| EPDS2030-12-SD | ● | 3 | 12 | 4.5 | 60 | 6 | A378 |
| EPDS2030-12 | □ | 3 | 12 | 4.5 | 60 | 6 | A431 |
| EPDS2030-12-TH | □ | 3 | 12 | 4.5 | 60 | 6 | A431 |
| DES2030-4-C | □ | 3 | 12 | 4.8 | 80 | 6 | A452 |
| HPSLN2030-C | ● | 3 | 15 | 4 | 80 | 6 | A385 |
| EPSM4030-15-PN | ● | 3 | 15 | 4.5 | 68 | 6 | A318 |
| DES2030-5-C | □ | 3 | 15 | 4.8 | 80 | 6 | A452 |
| EPDSE2030-16-ATH | ● | 3 | 16 | 4.5 | 60 | 6 | A294 |
| EPDSE2030-16-PN | ● | 3 | 16 | 4.5 | 60 | 6 | A297 |
| EPDS2030-16 | □ | 3 | 16 | 4.5 | 60 | 6 | A431 |
| EPDS2030-16-TH | □ | 3 | 16 | 4.5 | 60 | 6 | A431 |
| DES2030-6-C | □ | 3 | 18 | 4.8 | 80 | 6 | A452 |
| EPDSE2030-20-ATH | ● | 3 | 20 | 4.5 | 65 | 6 | A294 |
| EPDSE2030-20-PN | ● | 3 | 20 | 4.5 | 65 | 6 | A297 |
| EPDS2030-20 | □ | 3 | 20 | 4.5 | 65 | 6 | A431 |
| EPDS2030-20-TH | □ | 3 | 20 | 4.5 | 65 | 6 | A431 |
| DES2030-7-C | □ | 3 | 21 | 4.8 | 80 | 6 | A452 |
| EPDS2030-24-SD | ● | 3 | 24 | 4.5 | 65 | 6 | A378 |
| EPDSE2030-25-ATH | ● | 3 | 25 | 4.5 | 70 | 6 | A294 |
| EPDSE2030-25-PN | ● | 3 | 25 | 4.5 | 70 | 6 | A297 |
| EPDS2030-25 | □ | 3 | 25 | 4.5 | 70 | 6 | A431 |
| EPDS2030-25-TH | □ | 3 | 25 | 4.5 | 70 | 6 | A431 |
| DES2030-8.5-C | □ | 3 | 25.5 | 4.8 | 80 | 6 | A452 |
| EPDSE2030-30-ATH | ● | 3 | 30 | 4.5 | 75 | 6 | A294 |
| EPDSE2030-30-PN | ● | 3 | 30 | 4.5 | 75 | 6 | A297 |
| EPDS2030-30 | □ | 3 | 30 | 4.5 | 75 | 6 | A431 |
| EPDS2030-30-TH | □ | 3 | 30 | 4.5 | 75 | 6 | A431 |
| EPDS2030-36-SD | ● | 3 | 36 | 4.5 | 80 | 6 | A378 |
| EPDSE2030-40-ATH | ● | 3 | 40 | 4.5 | 90 | 6 | A294 |
| EPDSE2030-40-PN | ● | 3 | 40 | 4.5 | 90 | 6 | A297 |
| EPDS2030-40 | □ | 3 | 40 | 4.5 | 90 | 6 | A431 |
| EPDS2030-40-TH | □ | 3 | 40 | 4.5 | 90 | 6 | A431 |
| EPDSE2030-50-ATH | ● | 3 | 50 | 4.5 | 100 | 6 | A294 |
| EPDSE2030-50-PN | ● | 3 | 50 | 4.5 | 100 | 6 | A297 |
| EPPS4030-P-CS | ● | 3 | – | 4.5 | 50 | 6 | A332 |
| KES2030 | □ | 3 | – | 4.5 | 50 | 6 | A440 |
| KESU2030 | □ | 3 | – | 4.5 | 50 | 6 | A440 |
| EPSMS4030-PN | □ | 3 | – | 4.5 | 56 | 6 | A311 |
| EPPS4030-TH | ● | 3 | – | 4.5 | 60 | 6 | A328 |
| EPPS4030 | ● | 3 | – | 4.5 | 60 | 6 | A336 |
| TES2030 | □ | 3 | – | 5 | 45 | 6 | A440 |
| SES2030 | □ | 3 | – | 6 | 45 | 6 | A439 |
| SES2030-C | □ | 3 | – | 6 | 45 | 6 | A439 |
| CEPS4030-TH | ● | 3 | – | 6 | 60 | 6 | A352 |

| 商品コード Item Code | 在庫 Stock | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| CEPH4030 | ● | 3 | – | 6 | 60 | 6 | A356 |
| PESS2030-C | □ | 3 | – | 7 | 45 | 6 | A434 |
| PESS2030 | □ | 3 | – | 7 | 45 | 6 | A435 |
| EPSF4030-PN | ● | 3 | – | 7.5 | 56 | 6 | A310 |
| EPSM4030-PN | ● | 3 | – | 7.5 | 56 | 6 | A313 |
| AES2030 | ● | 3 | – | 8 | 45 | 6 | A386 |
| YS2030-CS | □ | 3 | – | 8 | 45 | 6 | A437 |
| EPP3030-CS | ● | 3 | – | 8 | 60 | 6 | A308 |
| EPP4030-TH | ● | 3 | – | 8 | 60 | 6 | A328 |
| EPP4030-CS | ● | 3 | – | 8 | 60 | 6 | A332 |
| EPP4030-P-CS | ● | 3 | – | 8 | 60 | 6 | A332 |
| EPP4030 | ● | 3 | – | 8 | 60 | 6 | A337 |
| EPAS2030-SD | ● | 3 | – | 8 | 60 | 6 | A380 |
| HES2030-C | ● | 3 | – | 10 | 45 | 6 | A387 |
| HES2030 | ● | 3 | – | 10 | 45 | 6 | A390 |
| HES4030-C | ● | 3 | – | 10 | 45 | 6 | A394 |
| HES4030 | ● | 3 | – | 10 | 45 | 6 | A396 |
| PESR2030-C | □ | 3 | – | 10 | 45 | 6 | A434 |
| PESR4030-C | □ | 3 | – | 10 | 45 | 6 | A434 |
| PESR2030 | □ | 3 | – | 10 | 45 | 6 | A435 |
| PESR4030 | □ | 3 | – | 10 | 45 | 6 | A435 |
| YR4030-CS | □ | 3 | – | 10 | 45 | 6 | A437 |
| CEPR4030-TH | ● | 3 | – | 10 | 60 | 6 | A352 |
| CEPR4030 | ● | 3 | – | 10 | 60 | 6 | A355 |
| EPSFM4030-PN | ● | 3 | – | 12 | 56 | 6 | A310 |
| EPSMM4030-PN | ● | 3 | – | 12 | 56 | 6 | A315 |
| HESM2030-C | ● | 3 | – | 15 | 50 | 6 | A388 |
| HESM2030 | ● | 3 | – | 15 | 50 | 6 | A391 |
| HESM4030-C | ● | 3 | – | 15 | 50 | 6 | A394 |
| HESM4030 | ● | 3 | – | 15 | 50 | 6 | A396 |
| EPSFL4030-PN | ● | 3 | – | 15 | 56 | 6 | A310 |
| EPPM4030-TH | ● | 3 | – | 15 | 60 | 6 | A328 |
| EPPM4030 | ● | 3 | – | 15 | 60 | 6 | A338 |
| CEPL4030-TH | ● | 3 | – | 15 | 60 | 6 | A352 |
| CEPL4030 | ● | 3 | – | 15 | 60 | 6 | A355 |
| GSE4030 | □ | 3 | – | 15 | 80 | 4 | A432 |
| GSR2030 | □ | 3 | – | 15 | 80 | 6 | A441 |
| GSD4030 | □ | 3 | – | 15 | 100 | 4 | A432 |
| GXR2030 | □ | 3 | – | 15 | 100 | 6 | A441 |
| EPPL4030 | □ | 3 | – | 18 | 65 | 6 | A338 |
| HESL2030-C | ● | 3 | – | 20 | 55 | 6 | A388 |
| HESL2030 | ● | 3 | – | 20 | 55 | 6 | A391 |
| HESL4030-C | ● | 3 | – | 20 | 55 | 6 | A394 |
| HESL4030 | ● | 3 | – | 20 | 55 | 6 | A396 |
| GSL2030 | □ | 3 | – | 30 | 100 | 6 | A441 |
| EPSM40305-PN | □ | 3.05 | – | 7.8 | 56 | 6 | A313 |
| EPSMS4031-PN | □ | 3.1 | – | 4.7 | 56 | 6 | A311 |
| EPPS4031 | □ | 3.1 | – | 4.7 | 60 | 6 | A336 |
| EPSM4031-PN | □ | 3.1 | – | 7.8 | 56 | 6 | A313 |
| HES2031-C | □ | 3.1 | – | 11 | 45 | 6 | A387 |
| HES2031 | ● | 3.1 | – | 11 | 45 | 6 | A390 |
| EPSM40315-PN | □ | 3.15 | – | 8 | 56 | 6 | A313 |
| EPSMS4032-PN | □ | 3.2 | – | 4.8 | 56 | 6 | A311 |
| EPPS4032 | □ | 3.2 | – | 4.8 | 60 | 6 | A336 |
| EPSM4032-PN | □ | 3.2 | – | 8 | 56 | 6 | A313 |
| HES2032-C | □ | 3.2 | – | 11 | 45 | 6 | A387 |
| HES2032 | ● | 3.2 | – | 11 | 45 | 6 | A390 |
| EPSM40325-PN | □ | 3.25 | – | 8.3 | 56 | 6 | A313 |
| EPSMS4033-PN | □ | 3.3 | – | 5 | 56 | 6 | A311 |
| EPPS4033 | □ | 3.3 | – | 5 | 60 | 6 | A336 |
| EPSM4033-PN | □ | 3.3 | – | 8.3 | 56 | 6 | A313 |
| HES2033-C | □ | 3.3 | – | 11 | 45 | 6 | A387 |
| HES2033 | ● | 3.3 | – | 11 | 45 | 6 | A390 |
| EPSM40335-PN | □ | 3.35 | – | 8.5 | 56 | 6 | A313 |
| EPSMS4034-PN | □ | 3.4 | – | 5.1 | 56 | 6 | A311 |
| EPPS4034 | □ | 3.4 | – | 5.1 | 60 | 6 | A336 |
| EPSM4034-PN | □ | 3.4 | – | 8.5 | 56 | 6 | A313 |
| HES2034-C | □ | 3.4 | – | 11 | 45 | 6 | A387 |
| HES2034 | ● | 3.4 | – | 11 | 45 | 6 | A390 |

| 商品コード Item Code | 在庫 Stock | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EPSM40345-PN | □ | 3.45 | – | 8.8 | 56 | 6 | A313 |
| HYPS2035-C | ● | 3.5 | 8.5 | 4.5 | 50 | 6 | A385 |
| EPSM4035-10.5-PN | □ | 3.5 | 10.5 | 5.3 | 56 | 6 | A317 |
| DES2035-3-C | □ | 3.5 | 10.5 | 5.6 | 80 | 6 | A452 |
| HGOS2035-PN | ● | 3.5 | 11 | 10 | 45 | 6 | A304 |
| HPSLN2035-C | ● | 3.5 | 17.5 | 4.5 | 80 | 6 | A385 |
| EPSM4035-17.5-PN | □ | 3.5 | 17.5 | 5.3 | 68 | 6 | A318 |
| DES2035-5-C | □ | 3.5 | 17.5 | 5.6 | 80 | 6 | A452 |
| DES2035-6-C | □ | 3.5 | 21 | 5.6 | 80 | 6 | A452 |
| DES2035-7-C | □ | 3.5 | 24.5 | 5.6 | 80 | 6 | A452 |
| DES2035-8.5-C | □ | 3.5 | 29.8 | 5.6 | 80 | 6 | A452 |
| EPPS4035-P-CS | ● | 3.5 | – | 5.3 | 50 | 6 | A332 |
| EPSMS4035-PN | □ | 3.5 | – | 5.3 | 56 | 6 | A311 |
| EPPS4035-TH | ● | 3.5 | – | 5.3 | 60 | 6 | A328 |
| EPPS4035 | ● | 3.5 | – | 5.3 | 60 | 6 | A336 |
| PESS2035-C | □ | 3.5 | – | 8 | 45 | 6 | A434 |
| PESS2035 | □ | 3.5 | – | 8 | 45 | 6 | A435 |
| EPSF4035-PN | ● | 3.5 | – | 8.8 | 56 | 6 | A310 |
| EPSM4035-PN | □ | 3.5 | – | 8.8 | 56 | 6 | A313 |
| YS2035-CS | □ | 3.5 | – | 10 | 45 | 6 | A437 |
| EPP3035-CS | □ | 3.5 | – | 10 | 60 | 6 | A308 |
| EPP4035 | □ | 3.5 | – | 10 | 60 | 6 | A337 |
| HES2035-C | ● | 3.5 | – | 11 | 45 | 6 | A387 |
| HES2035 | ● | 3.5 | – | 11 | 45 | 6 | A390 |
| HES4035-C | ● | 3.5 | – | 11 | 45 | 6 | A394 |
| HES4035 | ● | 3.5 | – | 11 | 45 | 6 | A396 |
| PESR2035-C | □ | 3.5 | – | 11 | 45 | 6 | A434 |
| PESR4035-C | □ | 3.5 | – | 11 | 45 | 6 | A434 |
| PESR2035 | □ | 3.5 | – | 11 | 45 | 6 | A435 |
| PESR4035 | □ | 3.5 | – | 11 | 45 | 6 | A435 |
| CEPR4035-TH | ● | 3.5 | – | 12 | 60 | 6 | A352 |
| CEPR4035 | ● | 3.5 | – | 12 | 60 | 6 | A355 |
| EPSFM4035-PN | ● | 3.5 | – | 14 | 56 | 6 | A310 |
| EPSM40355-PN | □ | 3.55 | – | 9 | 56 | 6 | A313 |
| EPSMS4036-PN | □ | 3.6 | – | 5.4 | 56 | 6 | A311 |
| EPPS4036 | □ | 3.6 | – | 5.4 | 60 | 6 | A336 |
| EPSM4036-PN | □ | 3.6 | – | 9 | 56 | 6 | A313 |
| HES2036-C | □ | 3.6 | – | 12 | 45 | 6 | A387 |
| HES2036 | ● | 3.6 | – | 12 | 45 | 6 | A390 |
| EPSM40365-PN | □ | 3.65 | – | 9.3 | 56 | 6 | A313 |
| EPSMS4037-PN | □ | 3.7 | – | 5.6 | 56 | 6 | A311 |
| EPPS4037 | □ | 3.7 | – | 5.6 | 60 | 6 | A336 |
| EPSM4037-PN | □ | 3.7 | – | 9.3 | 56 | 6 | A313 |
| HES2037-C | □ | 3.7 | – | 12 | 45 | 6 | A387 |
| HES2037 | ● | 3.7 | – | 12 | 45 | 6 | A390 |
| EPSM40375-PN | □ | 3.75 | – | 9.5 | 56 | 6 | A313 |
| EPSMS4038-PN | □ | 3.8 | – | 5.7 | 56 | 6 | A311 |
| EPPS4038 | □ | 3.8 | – | 5.7 | 60 | 6 | A336 |
| EPSM4038-PN | □ | 3.8 | – | 9.5 | 56 | 6 | A313 |
| HES2038-C | □ | 3.8 | – | 12 | 45 | 6 | A387 |
| HES2038 | ● | 3.8 | – | 12 | 45 | 6 | A390 |
| EPSM40385-PN | □ | 3.85 | – | 9.8 | 56 | 6 | A313 |
| EPSMS4039-PN | □ | 3.9 | – | 5.9 | 56 | 6 | A311 |
| EPPS4039 | □ | 3.9 | – | 5.9 | 60 | 6 | A336 |
| EPSM4039-PN | □ | 3.9 | – | 9.8 | 56 | 6 | A313 |
| HES2039-C | □ | 3.9 | – | 12 | 45 | 6 | A387 |
| HES2039 | ● | 3.9 | – | 12 | 45 | 6 | A390 |
| EPSM40395-PN | □ | 3.95 | – | 10 | 56 | 6 | A313 |
| HYPS2040-C | ● | 4 | 10 | 5 | 50 | 6 | A385 |
| EPSM4040-12-PN | ● | 4 | 12 | 6 | 56 | 6 | A317 |
| EPSW3040-12-PN | ● | 4 | 12 | 6 | 56 | 6 | A363 |
| EPDSE2040-12-ATH | ● | 4 | 12 | 6 | 60 | 6 | A294 |
| EPDSE2040-12-PN | ● | 4 | 12 | 6 | 60 | 6 | A297 |
| EMXA3040-12 | ◎ | 4 | 12 | 6 | 60 | 6 | A374 |
| EPDS2040-12 | □ | 4 | 12 | 6 | 60 | 6 | A431 |
| EPDS2040-12-TH | □ | 4 | 12 | 6 | 60 | 6 | A431 |
| DES2040-3-C | □ | 4 | 12 | 6.4 | 80 | 6 | A452 |
| HGOS2040-PN | ● | 4 | 12 | 11 | 45 | 6 | A304 |
| HGOS4040-PN | ● | 4 | 13 | 12 | 45 | 6 | A305 |

●印：標準在庫品です。　●：Stocked Items.　◎印：メーカー在庫品です。弊社営業へお問合せください。　◎：Manufacturer stocked items Contact with our sales department.

単位 unit：mm

| 商品コード Item Code | 在庫 Stock | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EPSMLS4040-PN | ● | 4 | 14 | 6 | 80 | 6 | A316 |
| EPPLS4040 | ● | 4 | 14 | 6 | 80 | 6 | A338 |
| EPDSE2040-16-ATH | ● | 4 | 16 | 6 | 60 | 6 | A294 |
| EPDSE2040-16-PN | ● | 4 | 16 | 6 | 60 | 6 | A297 |
| EPDS2040-16-SD | ● | 4 | 16 | 6 | 60 | 6 | A378 |
| EPDS2040-16 | □ | 4 | 16 | 6 | 60 | 6 | A431 |
| EPDS2040-16-TH | □ | 4 | 16 | 6 | 60 | 6 | A431 |
| DES2040-4-C | □ | 4 | 16 | 6.4 | 80 | 6 | A452 |
| HPSLN2040-C | ● | 4 | 20 | 5 | 80 | 6 | A385 |
| EPSM4040-20-PN | ● | 4 | 20 | 6 | 68 | 6 | A318 |
| EPSW3040-20-PN | ● | 4 | 20 | 6 | 68 | 6 | A363 |
| EPDSE2040-20-ATH | ● | 4 | 20 | 6 | 70 | 6 | A294 |
| EPDSE2040-20-PN | ● | 4 | 20 | 6 | 70 | 6 | A297 |
| EPDS2040-20 | □ | 4 | 20 | 6 | 70 | 6 | A431 |
| EPDS2040-20-TH | □ | 4 | 20 | 6 | 70 | 6 | A431 |
| DES2040-5-C | □ | 4 | 20 | 6.4 | 80 | 6 | A452 |
| DES2040-6-C | □ | 4 | 24 | 6.4 | 80 | 6 | A452 |
| EPDSE2040-25-ATH | ● | 4 | 25 | 6 | 70 | 6 | A294 |
| EPDSE2040-25-PN | ● | 4 | 25 | 6 | 70 | 6 | A297 |
| EPDS2040-25 | □ | 4 | 25 | 6 | 70 | 6 | A431 |
| EPDS2040-25-TH | □ | 4 | 25 | 6 | 70 | 6 | A431 |
| DES2040-7-C | □ | 4 | 28 | 6.4 | 80 | 6 | A452 |
| EPDSE2040-30-ATH | ● | 4 | 30 | 6 | 80 | 6 | A294 |
| EPDSE2040-30-PN | ● | 4 | 30 | 6 | 80 | 6 | A297 |
| EPDS2040-30 | □ | 4 | 30 | 6 | 80 | 6 | A431 |
| EPDS2040-30-TH | □ | 4 | 30 | 6 | 80 | 6 | A431 |
| EPDS2040-32-SD | ● | 4 | 32 | 6 | 80 | 6 | A378 |
| DES2040-8.5-C | □ | 4 | 34 | 6.4 | 80 | 6 | A452 |
| EPDSE2040-35-ATH | ● | 4 | 35 | 6 | 80 | 6 | A294 |
| EPDSE2040-35-PN | ● | 4 | 35 | 6 | 80 | 6 | A297 |
| EPDS2040-35 | □ | 4 | 35 | 6 | 80 | 6 | A431 |
| EPDS2040-35-TH | □ | 4 | 35 | 6 | 80 | 6 | A431 |
| EPDSE2040-40-ATH | ● | 4 | 40 | 6 | 90 | 6 | A294 |
| EPDSE2040-40-PN | ● | 4 | 40 | 6 | 90 | 6 | A297 |
| EPDS2040-40 | □ | 4 | 40 | 6 | 90 | 6 | A431 |
| EPDS2040-40-TH | □ | 4 | 40 | 6 | 90 | 6 | A431 |
| EPDS2040-48-SD | ● | 4 | 48 | 6 | 90 | 6 | A378 |
| EPDSE2040-50-ATH | ● | 4 | 50 | 6 | 100 | 6 | A294 |
| EPDSE2040-50-PN | ● | 4 | 50 | 6 | 100 | 6 | A297 |
| EPPS4040-P-CS | ● | 4 | – | 6 | 50 | 6 | A332 |
| KES2040 | □ | 4 | – | 6 | 55 | 8 | A440 |
| KESU2040 | □ | 4 | – | 6 | 55 | 8 | A440 |
| EPSMS4040-PN | □ | 4 | – | 6 | 56 | 6 | A311 |
| EPPS4040-TH | ● | 4 | – | 6 | 60 | 6 | A328 |
| EPPS4040 | ● | 4 | – | 6 | 60 | 6 | A336 |
| TES2040 | □ | 4 | – | 7 | 45 | 6 | A440 |
| PESS2040-C | □ | 4 | – | 8 | 45 | 6 | A434 |
| PESS2040 | □ | 4 | – | 8 | 45 | 6 | A435 |
| SES2040 | □ | 4 | – | 8 | 45 | 6 | A439 |
| SES2040-C | □ | 4 | – | 8 | 45 | 6 | A439 |
| CEPS4040-TH | ● | 4 | – | 8 | 60 | 6 | A352 |
| CEPH4040 | ● | 4 | – | 8 | 60 | 6 | A356 |
| EPSF4040-PN | ● | 4 | – | 10 | 56 | 6 | A310 |
| EPSM4040-PN | ● | 4 | – | 10 | 56 | 6 | A313 |
| EPSW3040-PN | ● | 4 | – | 10 | 56 | 6 | A361 |
| AES2040 | ● | 4 | – | 11 | 45 | 6 | A386 |
| YS2040-CS | □ | 4 | – | 11 | 45 | 6 | A437 |
| EPP3040-CS | ● | 4 | – | 11 | 60 | 6 | A308 |
| EPP4040-TH | ● | 4 | – | 11 | 60 | 6 | A328 |
| EPP4040-CS | ● | 4 | – | 11 | 60 | 6 | A332 |
| EPP4040-P-CS | ● | 4 | – | 11 | 60 | 6 | A332 |
| EPP4040 | ● | 4 | – | 11 | 60 | 6 | A337 |
| EPAS2040-SD | ● | 4 | – | 11 | 60 | 6 | A380 |
| HES2040-C | ● | 4 | – | 12 | 45 | 6 | A387 |
| HES2040 | ● | 4 | – | 12 | 45 | 6 | A390 |
| HES4040-C | ● | 4 | – | 12 | 45 | 6 | A394 |
| HES4040 | ● | 4 | – | 12 | 45 | 6 | A396 |
| PESR2040-C | □ | 4 | – | 12 | 45 | 6 | A434 |
| PESR4040-C | □ | 4 | – | 12 | 45 | 6 | A434 |

| 商品コード Item Code | 在庫 Stock | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| PESR2040 | □ | 4 | – | 12 | 45 | 6 | A435 |
| PESR4040 | □ | 4 | – | 12 | 45 | 6 | A435 |
| YR4040-CS | □ | 4 | – | 12 | 45 | 6 | A437 |
| CEPR4040-TH | ● | 4 | – | 12 | 60 | 6 | A352 |
| CEPR4040 | ● | 4 | – | 12 | 60 | 6 | A355 |
| CEPU4040 | ● | 4 | – | 12 | 60 | 6 | A356 |
| EPSFM4040-PN | ● | 4 | – | 16 | 56 | 6 | A310 |
| EPSMM4040-PN | ● | 4 | – | 16 | 56 | 6 | A315 |
| HESM2040-C | ● | 4 | – | 17 | 50 | 6 | A388 |
| HESM2040 | ● | 4 | – | 17 | 50 | 6 | A391 |
| HESM4040-C | ● | 4 | – | 17 | 50 | 6 | A394 |
| HESM4040 | ● | 4 | – | 17 | 50 | 6 | A396 |
| EPPM4040-TH | ● | 4 | – | 17 | 60 | 6 | A328 |
| EPPM4040 | ● | 4 | – | 17 | 60 | 6 | A338 |
| FE704 | □ | 4 | – | 20 | 65 | 4 | A440 |
| EPPL4040 | □ | 4 | – | 20 | 65 | 6 | A338 |
| CEPL4040-TH | ● | 4 | – | 20 | 65 | 6 | A352 |
| CEPL4040 | ● | 4 | – | 20 | 65 | 6 | A355 |
| EPSFL4040-PN | ● | 4 | – | 20 | 70 | 6 | A310 |
| GSE4040 | □ | 4 | – | 20 | 80 | 4 | A432 |
| GSR2040 | □ | 4 | – | 20 | 80 | 6 | A441 |
| GSD4040 | □ | 4 | – | 20 | 100 | 4 | A432 |
| GXR2040 | □ | 4 | – | 20 | 110 | 6 | A441 |
| HESL2040-C | ● | 4 | – | 24 | 57 | 6 | A388 |
| HESL2040 | ● | 4 | – | 24 | 57 | 6 | A391 |
| HESL4040-C | ● | 4 | – | 24 | 57 | 6 | A394 |
| HESL4040 | ● | 4 | – | 24 | 57 | 6 | A396 |
| GSL2040 | □ | 4 | – | 60 | 110 | 6 | A441 |
| EPSM40405-PN | □ | 4.05 | – | 10.3 | 56 | 6 | A313 |
| EPSMS4041-PN | □ | 4.1 | – | 6.2 | 56 | 6 | A311 |
| EPPS4041 | □ | 4.1 | – | 6.2 | 60 | 6 | A336 |
| EPSM4041-PN | □ | 4.1 | – | 10.3 | 56 | 6 | A313 |
| HES2041-C | □ | 4.1 | – | 14 | 45 | 6 | A387 |
| HES2041 | ● | 4.1 | – | 14 | 45 | 6 | A390 |
| EPSM40415-PN | □ | 4.15 | – | 10.5 | 56 | 6 | A313 |
| EPSMS4042-PN | □ | 4.2 | – | 6.3 | 56 | 6 | A311 |
| EPPS4042 | □ | 4.2 | – | 6.3 | 60 | 6 | A336 |
| EPSM4042-PN | □ | 4.2 | – | 10.5 | 56 | 6 | A313 |
| HES2042-C | □ | 4.2 | – | 14 | 45 | 6 | A387 |
| HES2042 | ● | 4.2 | – | 14 | 45 | 6 | A390 |
| EPSM40425-PN | □ | 4.25 | – | 10.8 | 56 | 6 | A313 |
| EPSMS4043-PN | □ | 4.3 | – | 6.5 | 56 | 6 | A311 |
| EPPS4043 | □ | 4.3 | – | 6.5 | 60 | 6 | A336 |
| EPSM4043-PN | □ | 4.3 | – | 10.8 | 56 | 6 | A313 |
| HES2043-C | □ | 4.3 | – | 14 | 45 | 6 | A387 |
| HES2043 | ● | 4.3 | – | 14 | 45 | 6 | A390 |
| EPSM40435-PN | □ | 4.35 | – | 11 | 56 | 6 | A313 |
| EPSMS4044-PN | □ | 4.4 | – | 6.6 | 56 | 6 | A311 |
| EPPS4044 | □ | 4.4 | – | 6.6 | 60 | 6 | A336 |
| EPSM4044-PN | □ | 4.4 | – | 11 | 56 | 6 | A313 |
| HES2044-C | □ | 4.4 | – | 14 | 45 | 6 | A387 |
| HES2044 | ● | 4.4 | – | 14 | 45 | 6 | A390 |
| EPSM40445-PN | □ | 4.45 | – | 11.3 | 56 | 6 | A313 |
| HGOS2045-PN | ● | 4.5 | 12 | 11 | 45 | 6 | A304 |
| EPSM4045-13.5-PN | □ | 4.5 | 13.5 | 6.8 | 56 | 6 | A317 |
| EPSM4045-22.5-PN | □ | 4.5 | 22.5 | 6.8 | 68 | 6 | A318 |
| DES2045-7-C | □ | 4.5 | 31.5 | 7.2 | 80 | 6 | A452 |
| EPPS4045-P-CS | ● | 4.5 | – | 6.8 | 50 | 6 | A332 |
| EPSMS4045-PN | □ | 4.5 | – | 6.8 | 56 | 6 | A311 |
| EPPS4045-TH | ● | 4.5 | – | 6.8 | 60 | 6 | A328 |
| EPPS4045 | ● | 4.5 | – | 6.8 | 60 | 6 | A336 |
| PESS2045-C | □ | 4.5 | – | 10 | 45 | 6 | A434 |
| PESS2045 | □ | 4.5 | – | 10 | 45 | 6 | A435 |
| YS2045-CS | □ | 4.5 | – | 11 | 45 | 6 | A437 |
| EPP3045-CS | □ | 4.5 | – | 11 | 60 | 6 | A308 |
| EPP4045 | □ | 4.5 | – | 11 | 60 | 6 | A337 |
| EPSF4045-PN | ● | 4.5 | – | 11.3 | 56 | 6 | A310 |
| EPSM4045-PN | □ | 4.5 | – | 11.3 | 56 | 6 | A313 |
| EPSW3045-PN | □ | 4.5 | – | 11.3 | 56 | 6 | A361 |

| 商品コード Item Code | 在庫 Stock | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| HES2045-C | ● | 4.5 | – | 14 | 45 | 6 | A387 |
| HES2045 | ● | 4.5 | – | 14 | 45 | 6 | A390 |
| HES4045-C | ● | 4.5 | – | 14 | 45 | 6 | A394 |
| HES4045 | ● | 4.5 | – | 14 | 45 | 6 | A396 |
| PESR2045-C | □ | 4.5 | – | 14 | 45 | 6 | A434 |
| PESR4045-C | □ | 4.5 | – | 14 | 45 | 6 | A434 |
| PESR2045 | □ | 4.5 | – | 14 | 45 | 6 | A435 |
| PESR4045 | □ | 4.5 | – | 14 | 45 | 6 | A435 |
| CEPR4045-TH | ● | 4.5 | – | 15 | 60 | 6 | A352 |
| CEPR4045 | ● | 4.5 | – | 15 | 60 | 6 | A355 |
| EPSFM4045-PN | ● | 4.5 | – | 18 | 70 | 6 | A310 |
| EPSM40455-PN | □ | 4.55 | – | 11.5 | 56 | 6 | A313 |
| EPSMS4046-PN | □ | 4.6 | – | 6.9 | 56 | 6 | A311 |
| EPPS4046 | □ | 4.6 | – | 6.9 | 60 | 6 | A336 |
| EPSM4046-PN | □ | 4.6 | – | 11.5 | 56 | 6 | A313 |
| HES2046-C | □ | 4.6 | – | 15 | 50 | 6 | A387 |
| HES2046 | ● | 4.6 | – | 15 | 50 | 6 | A390 |
| EPSM40465-PN | □ | 4.65 | – | 11.8 | 56 | 6 | A313 |
| EPSMS4047-PN | □ | 4.7 | – | 7.1 | 56 | 6 | A311 |
| EPPS4047 | □ | 4.7 | – | 7.1 | 60 | 6 | A336 |
| EPSM4047-PN | □ | 4.7 | – | 11.8 | 56 | 6 | A313 |
| HES2047-C | □ | 4.7 | – | 15 | 50 | 6 | A387 |
| HES2047 | ● | 4.7 | – | 15 | 50 | 6 | A390 |
| EPSM40475-PN | □ | 4.75 | – | 12 | 56 | 6 | A313 |
| EPSMS4048-PN | □ | 4.8 | – | 7.2 | 56 | 6 | A311 |
| EPPS4048 | □ | 4.8 | – | 7.2 | 60 | 6 | A336 |
| EPSM4048-PN | □ | 4.8 | – | 12 | 56 | 6 | A313 |
| HES2048-C | □ | 4.8 | – | 15 | 50 | 6 | A387 |
| HES2048 | ● | 4.8 | – | 15 | 50 | 6 | A390 |
| EPSM40485-PN | □ | 4.85 | – | 12.3 | 56 | 6 | A313 |
| EPSMS4049-PN | □ | 4.9 | – | 7.4 | 56 | 6 | A311 |
| EPPS4049 | □ | 4.9 | – | 7.4 | 60 | 6 | A336 |
| EPSM4049-PN | □ | 4.9 | – | 12.3 | 56 | 6 | A313 |
| HES2049-C | □ | 4.9 | – | 15 | 50 | 6 | A387 |
| HES2049 | ● | 4.9 | – | 15 | 50 | 6 | A390 |
| EPSM40495-PN | □ | 4.95 | – | 12.5 | 56 | 6 | A313 |
| HYPS2050-C | ● | 5 | 11 | 6 | 50 | 6 | A385 |
| HGOS2050-PN | ● | 5 | 14 | 13 | 60 | 6 | A304 |
| EPSM4050-15-PN | ● | 5 | 15 | 7.5 | 56 | 6 | A317 |
| EPSW3050-15-PN | ● | 5 | 15 | 7.5 | 56 | 6 | A363 |
| EMXA3050-15 | ◎ | 5 | 15 | 7.5 | 80 | 6 | A374 |
| DES2050-3-C | □ | 5 | 15 | 8 | 80 | 6 | A452 |
| HGOS4050-PN | ● | 5 | 16 | 15 | 60 | 6 | A305 |
| EPSMLS4050-PN | ● | 5 | 17.5 | 7.5 | 100 | 6 | A316 |
| EPPLS4050 | ● | 5 | 17.5 | 7.5 | 100 | 6 | A338 |
| EPDSE2050-20-ATH | ● | 5 | 20 | 7.5 | 70 | 6 | A294 |
| EPDSE2050-20-PN | ● | 5 | 20 | 7.5 | 70 | 6 | A297 |
| DES2050-4-C | □ | 5 | 20 | 8 | 90 | 6 | A452 |
| HPSLN2050-C | ● | 5 | 25 | 6 | 80 | 6 | A385 |
| EPSM4050-25-PN | ● | 5 | 25 | 7.5 | 68 | 6 | A318 |
| EPSW3050-25-PN | ● | 5 | 25 | 7.5 | 68 | 6 | A363 |
| EPDSE2050-25-ATH | ● | 5 | 25 | 7.5 | 70 | 6 | A294 |
| EPDSE2050-25-PN | ● | 5 | 25 | 7.5 | 70 | 6 | A297 |
| DES2050-5-C | □ | 5 | 25 | 8 | 90 | 6 | A452 |
| EPDSE2050-30-ATH | ● | 5 | 30 | 7.5 | 80 | 6 | A294 |
| EPDSE2050-30-PN | ● | 5 | 30 | 7.5 | 80 | 6 | A297 |
| DES2050-6-C | □ | 5 | 30 | 8 | 90 | 6 | A452 |
| DES2050-7-C | □ | 5 | 35 | 8 | 90 | 6 | A452 |
| EPDSE2050-40-ATH | ● | 5 | 40 | 7.5 | 90 | 6 | A294 |
| EPDSE2050-40-PN | ● | 5 | 40 | 7.5 | 90 | 6 | A297 |
| DES2050-8.5-C | □ | 5 | 42.5 | 8 | 90 | 6 | A452 |
| EPDSE2050-50-ATH | ● | 5 | 50 | 7.5 | 100 | 6 | A294 |
| EPDSE2050-50-PN | ● | 5 | 50 | 7.5 | 100 | 6 | A297 |
| EPPS4050-P-CS | ● | 5 | – | 7.5 | 50 | 6 | A332 |
| KES2050 | □ | 5 | – | 7.5 | 55 | 8 | A440 |
| KESU2050 | □ | 5 | – | 7.5 | 55 | 8 | A440 |
| EPSMS4050-PN | □ | 5 | – | 7.5 | 56 | 6 | A311 |
| EPPS4050-TH | ● | 5 | – | 7.5 | 60 | 6 | A328 |
| EPPS4050 | ● | 5 | – | 7.5 | 60 | 6 | A336 |

□印：特定代理店在庫です。弊社営業へお問合せください。□：Stocked by specified distributor. Contact with our sales department.

Quick dimension reference table by mill diameter

# 外径別寸法早見表

## 超硬エンドミル・スクエア　φ5～φ7.6　Carbide End Mills -Square

単位 unit：mm

| 商品コード Item Code | 在庫 Stock | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| TES2050 | □ | 5 | – | 9 | 50 | 6 | A440 |
| PESS2050-C | □ | 5 | – | 10 | 50 | 6 | A434 |
| PESS2050 | □ | 5 | – | 10 | 50 | 6 | A435 |
| SES2050 | □ | 5 | – | 10 | 50 | 6 | A439 |
| SES2050-C | □ | 5 | – | 10 | 50 | 6 | A439 |
| CEPS4050-TH | ● | 5 | – | 10 | 60 | 6 | A352 |
| CEPH4050 | ● | 5 | – | 10 | 60 | 6 | A356 |
| EPSF4050-PN | ● | 5 | – | 12.5 | 56 | 6 | A310 |
| EPSM4050-PN | ● | 5 | – | 12.5 | 56 | 6 | A313 |
| EPSW3050-PN | ● | 5 | – | 12.5 | 56 | 6 | A361 |
| AES2050 | ● | 5 | – | 13 | 50 | 6 | A386 |
| YS2050-CS | □ | 5 | – | 13 | 50 | 6 | A437 |
| EPP3050-CS | ● | 5 | – | 13 | 60 | 6 | A308 |
| EPP4050-TH | ● | 5 | – | 13 | 60 | 6 | A328 |
| EPP4050-CS | ● | 5 | – | 13 | 60 | 6 | A332 |
| EPP4050-P-CS | ● | 5 | – | 13 | 60 | 6 | A332 |
| EPP4050 | ● | 5 | – | 13 | 60 | 6 | A337 |
| EPAS2050-SD | ● | 5 | – | 13 | 60 | 6 | A380 |
| HES2050-C | ● | 5 | – | 15 | 50 | 6 | A387 |
| HES2050 | ● | 5 | – | 15 | 50 | 6 | A390 |
| HES4050-C | ● | 5 | – | 15 | 50 | 6 | A394 |
| HES4050 | ● | 5 | – | 15 | 50 | 6 | A396 |
| PESR2050-C | □ | 5 | – | 15 | 50 | 6 | A434 |
| PESR4050-C | □ | 5 | – | 15 | 50 | 6 | A434 |
| PESR2050 | □ | 5 | – | 15 | 50 | 6 | A435 |
| PESR4050 | □ | 5 | – | 15 | 50 | 6 | A435 |
| YR4050-CS | □ | 5 | – | 15 | 50 | 6 | A437 |
| CEPR4050-TH | ● | 5 | – | 15 | 60 | 6 | A352 |
| CEPR4050 | ● | 5 | – | 15 | 60 | 6 | A355 |
| HESM2050-C | ● | 5 | – | 20 | 53 | 6 | A388 |
| HESM2050 | ● | 5 | – | 20 | 53 | 6 | A391 |
| HESM4050-C | ● | 5 | – | 20 | 53 | 6 | A394 |
| HESM4050 | ● | 5 | – | 20 | 53 | 6 | A396 |
| EPPM4050-TH | ● | 5 | – | 20 | 60 | 6 | A328 |
| EPPM4050 | ● | 5 | – | 20 | 60 | 6 | A338 |
| EPSFM4050-PN | ● | 5 | – | 20 | 70 | 6 | A310 |
| EPSMM4050-PN | ● | 5 | – | 20 | 70 | 6 | A315 |
| EPSFL4050-PN | ● | 5 | – | 25 | 70 | 6 | A310 |
| EPPL4050 | □ | 5 | – | 25 | 70 | 6 | A338 |
| CEPL4050-TH | ● | 5 | – | 25 | 70 | 6 | A352 |
| CEPL4050 | ● | 5 | – | 25 | 70 | 6 | A355 |
| GSR2050 | □ | 5 | – | 25 | 100 | 6 | A441 |
| GXR2050 | □ | 5 | – | 25 | 125 | 6 | A441 |
| HESL2050-C | ● | 5 | – | 30 | 65 | 6 | A388 |
| HESL2050 | ● | 5 | – | 30 | 65 | 6 | A391 |
| HESL4050-C | ● | 5 | – | 30 | 65 | 6 | A394 |
| HESL4050 | ● | 5 | – | 30 | 65 | 6 | A396 |
| GSE4050 | □ | 5 | – | 30 | 100 | 6 | A432 |
| GSD4050 | □ | 5 | – | 30 | 120 | 6 | A432 |
| GSL2050 | □ | 5 | – | 70 | 125 | 6 | A441 |
| EPSM40505-PN | □ | 5.05 | – | 12.8 | 56 | 6 | A313 |
| EPSMS4051-PN | □ | 5.1 | – | 7.7 | 56 | 6 | A311 |
| EPPS4051 | □ | 5.1 | – | 7.7 | 60 | 6 | A336 |
| EPSM4051-PN | □ | 5.1 | – | 12.8 | 56 | 6 | A313 |
| HES2051-C | □ | 5.1 | – | 15 | 50 | 6 | A387 |
| HES2051 | ● | 5.1 | – | 15 | 50 | 6 | A390 |
| EPSM40515-PN | □ | 5.15 | – | 13 | 56 | 6 | A313 |
| EPSMS4052-PN | □ | 5.2 | – | 7.8 | 56 | 6 | A311 |
| EPPS4052 | □ | 5.2 | – | 7.8 | 60 | 6 | A336 |
| EPSM4052-PN | □ | 5.2 | – | 13 | 56 | 6 | A313 |
| HES2052-C | □ | 5.2 | – | 15 | 50 | 6 | A387 |
| HES2052 | ● | 5.2 | – | 15 | 50 | 6 | A390 |
| EPSM40525-PN | □ | 5.25 | – | 13.3 | 56 | 6 | A313 |
| EPSMS4053-PN | □ | 5.3 | – | 8 | 56 | 6 | A311 |
| EPPS4053 | □ | 5.3 | – | 8 | 60 | 6 | A336 |
| EPSM4053-PN | □ | 5.3 | – | 13.3 | 56 | 6 | A313 |
| HES2053-C | □ | 5.3 | – | 15 | 50 | 6 | A387 |
| HES2053 | ● | 5.3 | – | 15 | 50 | 6 | A390 |
| EPSM40535-PN | □ | 5.35 | – | 13.5 | 56 | 6 | A313 |
| EPSMS4054-PN | □ | 5.4 | – | 8.1 | 56 | 6 | A311 |
| EPPS4054 | □ | 5.4 | – | 8.1 | 60 | 6 | A336 |
| EPSM4054-PN | □ | 5.4 | – | 13.5 | 56 | 6 | A313 |
| HES2054-C | □ | 5.4 | – | 15 | 50 | 6 | A387 |
| HES2054 | ● | 5.4 | – | 15 | 50 | 6 | A390 |
| EPSM40545-PN | □ | 5.45 | – | 13.8 | 56 | 6 | A313 |
| HGOS2055-PN | ● | 5.5 | 14 | 13 | 60 | 6 | A304 |
| EPSM4055-16.5-PN | □ | 5.5 | 16.5 | 8.3 | 56 | 6 | A317 |
| EPSM4055-27.5-PN | □ | 5.5 | 27.5 | 8.3 | 68 | 6 | A318 |
| DES2055-7-C | □ | 5.5 | 38.5 | 8.8 | 90 | 6 | A452 |
| EPSMS4055-PN | □ | 5.5 | – | 8.3 | 56 | 6 | A311 |
| EPPS4055-TH | ● | 5.5 | – | 8.3 | 60 | 6 | A328 |
| EPPS4055 | ● | 5.5 | – | 8.3 | 60 | 6 | A336 |
| PESS2055-C | □ | 5.5 | – | 12 | 50 | 6 | A434 |
| PESS2055 | □ | 5.5 | – | 12 | 50 | 6 | A435 |
| YS2055-CS | □ | 5.5 | – | 13 | 50 | 6 | A437 |
| EPP3055-CS | □ | 5.5 | – | 13 | 60 | 6 | A308 |
| EPP4055 | □ | 5.5 | – | 13 | 60 | 6 | A337 |
| EPSF4055-PN | ● | 5.5 | – | 13.8 | 56 | 6 | A310 |
| EPSM4055-PN | □ | 5.5 | – | 13.8 | 56 | 6 | A313 |
| EPSW3055-PN | □ | 5.5 | – | 13.8 | 56 | 6 | A361 |
| HES2055-C | ● | 5.5 | – | 15 | 50 | 6 | A387 |
| HES2055 | ● | 5.5 | – | 15 | 50 | 6 | A390 |
| HES4055-C | ● | 5.5 | – | 15 | 50 | 6 | A394 |
| HES4055 | ● | 5.5 | – | 15 | 50 | 6 | A396 |
| PESR2055-C | □ | 5.5 | – | 15 | 50 | 6 | A434 |
| PESR4055-C | □ | 5.5 | – | 15 | 50 | 6 | A434 |
| PESR2055 | □ | 5.5 | – | 15 | 50 | 6 | A435 |
| PESR4055 | □ | 5.5 | – | 15 | 50 | 6 | A435 |
| CEPR4055-TH | ● | 5.5 | – | 15 | 60 | 6 | A352 |
| CEPR4055 | ● | 5.5 | – | 15 | 60 | 6 | A355 |
| EPSFM4055-PN | ● | 5.5 | – | 22 | 70 | 6 | A310 |
| EPSM40555-PN | □ | 5.55 | – | 14 | 56 | 6 | A313 |
| EPSMS4056-PN | □ | 5.6 | – | 8.4 | 56 | 6 | A311 |
| EPPS4056 | □ | 5.6 | – | 8.4 | 60 | 6 | A336 |
| EPSM4056-PN | □ | 5.6 | – | 14 | 56 | 6 | A313 |
| HES2056-C | □ | 5.6 | – | 15 | 50 | 6 | A387 |
| HES2056 | ● | 5.6 | – | 15 | 50 | 6 | A390 |
| EPSM40565-PN | □ | 5.65 | – | 14.3 | 56 | 6 | A313 |
| EPSMS4057-PN | □ | 5.7 | – | 8.6 | 56 | 6 | A311 |
| EPPS4057 | □ | 5.7 | – | 8.6 | 60 | 6 | A336 |
| EPSM4057-PN | □ | 5.7 | – | 14.3 | 56 | 6 | A313 |
| HES2057-C | □ | 5.7 | – | 15 | 50 | 6 | A387 |
| HES2057 | ● | 5.7 | – | 15 | 50 | 6 | A390 |
| EPSM40575-PN | □ | 5.75 | – | 14.5 | 56 | 6 | A313 |
| EPSMS4058-PN | □ | 5.8 | – | 8.7 | 56 | 6 | A311 |
| EPPS4058 | □ | 5.8 | – | 8.7 | 60 | 6 | A336 |
| EPSM4058-PN | □ | 5.8 | – | 14.5 | 56 | 6 | A313 |
| HES2058-C | □ | 5.8 | – | 15 | 50 | 6 | A387 |
| HES2058 | ● | 5.8 | – | 15 | 50 | 6 | A390 |
| EPSM40585-PN | □ | 5.85 | – | 14.8 | 56 | 6 | A313 |
| EPSMS4059-PN | □ | 5.9 | – | 8.9 | 56 | 6 | A311 |
| EPPS4059 | □ | 5.9 | – | 8.9 | 60 | 6 | A336 |
| EPSM4059-PN | □ | 5.9 | – | 14.8 | 56 | 6 | A313 |
| HES2059-C | □ | 5.9 | – | 15 | 50 | 6 | A387 |
| HES2059 | ● | 5.9 | – | 15 | 50 | 6 | A390 |
| EPSM40595-PN | □ | 5.95 | – | 15 | 56 | 6 | A313 |
| HYPS2060-C | ● | 6 | 12.5 | 7.5 | 50 | 6 | A385 |
| EPSM4060-18-PN | ● | 6 | 18 | 9 | 56 | 6 | A317 |
| EPSW4060-18-PN | ● | 6 | 18 | 9 | 56 | 6 | A363 |
| EMXA3060-18 | ◎ | 6 | 18 | 9 | 80 | 6 | A374 |
| ES8WB0600LN-20-ATH | ● | 6 | 20 | 6 | 70 | 6 | A344 |
| EPDSE2060-20-ATH | ● | 6 | 20 | 9 | 70 | 6 | A294 |
| EPDSE2060-20-PN | ● | 6 | 20 | 9 | 70 | 6 | A297 |
| ES8WB0600LN-30-ATH | ● | 6 | 30 | 6 | 80 | 6 | A344 |
| HPSLN2060-C | ● | 6 | 30 | 7.5 | 80 | 6 | A385 |
| EPSM4060-30-PN | ● | 6 | 30 | 9 | 68 | 6 | A318 |
| EPSW4060-30-PN | ● | 6 | 30 | 9 | 68 | 6 | A363 |
| EPDSE2060-30-ATH | ● | 6 | 30 | 9 | 80 | 6 | A294 |
| EPDSE2060-30-PN | ● | 6 | 30 | 9 | 80 | 6 | A297 |
| ES8WB0600LN-40-ATH | ● | 6 | 40 | 6 | 90 | 6 | A344 |
| EPDSE2060-40-ATH | ● | 6 | 40 | 9 | 90 | 6 | A294 |
| EPDSE2060-40-PN | ● | 6 | 40 | 9 | 90 | 6 | A297 |
| DES2060-7-C | □ | 6 | 42 | 9.6 | 90 | 6 | A452 |
| ES8WB0600LN-50-ATH | ● | 6 | 50 | 6 | 100 | 6 | A344 |
| EPDSE2060-50-ATH | ● | 6 | 50 | 9 | 100 | 6 | A294 |
| EPDSE2060-50-PN | ● | 6 | 50 | 9 | 100 | 6 | A297 |
| EPPS4060-P-CS | ● | 6 | – | 9 | 50 | 6 | A332 |
| KES2060 | □ | 6 | – | 9 | 55 | 8 | A440 |
| KESU2060 | □ | 6 | – | 9 | 55 | 8 | A440 |
| EPSMS4060-PN | □ | 6 | – | 9 | 56 | 6 | A311 |
| EPPS4060-TH | ● | 6 | – | 9 | 60 | 6 | A328 |
| EPPS4060 | ● | 6 | – | 9 | 60 | 6 | A336 |
| EMXR4060-TH | ● | 6 | – | 9 | 60 | 6 | A346 |
| EMXN4060-TH | ● | 6 | – | 9 | 60 | 6 | A347 |
| EPSMLS4060-PN | ● | 6 | – | 9 | 120 | 5 | A316 |
| EPPLS4060 | ● | 6 | – | 9 | 120 | 5 | A338 |
| EPQLS4060-CS | □ | 6 | – | 9 | 120 | 5 | A455 |
| TES2060 | □ | 6 | – | 10 | 50 | 6 | A440 |
| PESS2060-C | □ | 6 | – | 12 | 50 | 6 | A434 |
| PESS2060 | □ | 6 | – | 12 | 50 | 6 | A435 |
| SES3060 | □ | 6 | – | 12 | 50 | 6 | A439 |
| SES3060-C | □ | 6 | – | 12 | 50 | 6 | A439 |
| EPQS4060-CS | □ | 6 | – | 12 | 50 | 6 | A455 |
| CEPS6060-TH | ● | 6 | – | 12 | 60 | 6 | A352 |
| CEPH6060 | ● | 6 | – | 12 | 60 | 6 | A356 |
| CEPLS6060 | ● | 6 | – | 12 | 70 | 6 | A356 |
| AES2060 | ● | 6 | – | 13 | 50 | 6 | A386 |
| YS2060-CS | □ | 6 | – | 13 | 50 | 6 | A437 |
| HGOS2060-PN | ● | 6 | – | 13 | 60 | 6 | A304 |
| EPP3060-CS | ● | 6 | – | 13 | 60 | 6 | A308 |
| EPP4060-TH | ● | 6 | – | 13 | 60 | 6 | A328 |
| EPP4060-CS | ● | 6 | – | 13 | 60 | 6 | A332 |
| EPP4060-P-CS | ● | 6 | – | 13 | 60 | 6 | A332 |
| EPP4060 | ● | 6 | – | 13 | 60 | 6 | A337 |
| EPAS2060-SD | ● | 6 | – | 13 | 70 | 6 | A380 |
| HES2060-C | ● | 6 | – | 15 | 50 | 6 | A387 |
| HES2060 | ● | 6 | – | 15 | 50 | 6 | A390 |
| HES4060-C | ● | 6 | – | 15 | 50 | 6 | A394 |
| HES4060 | ● | 6 | – | 15 | 50 | 6 | A396 |
| PESR2060-C | □ | 6 | – | 15 | 50 | 6 | A434 |
| PESR4060-C | □ | 6 | – | 15 | 50 | 6 | A434 |
| PESR2060 | □ | 6 | – | 15 | 50 | 6 | A435 |
| PESR4060 | □ | 6 | – | 15 | 50 | 6 | A435 |
| YR4060-CS | □ | 6 | – | 15 | 50 | 6 | A437 |
| EPQR4060-CS | ● | 6 | – | 15 | 55 | 6 | A369 |
| EPSF4060-PN | ● | 6 | – | 15 | 56 | 6 | A310 |
| EPSM4060-PN | ● | 6 | – | 15 | 56 | 6 | A313 |
| EPSW4060-PN | ● | 6 | – | 15 | 56 | 6 | A361 |
| HGOS4060-PN | ● | 6 | – | 15 | 60 | 6 | A305 |
| CEPR6060-TH | ● | 6 | – | 15 | 60 | 6 | A352 |
| CEPR6060 | ● | 6 | – | 15 | 60 | 6 | A355 |
| CEPU4060 | ● | 6 | – | 15 | 60 | 6 | A356 |
| EAP4060-TH | ◎ | 6 | – | 15 | 60 | 6 | A371 |
| EAP6060-TH | ◎ | 6 | – | 15 | 60 | 6 | A371 |
| ECH4060-SD | ● | 6 | – | 15 | 70 | 6 | A381 |
| ECX3060-SD | ● | 6 | – | 15 | 70 | 6 | A381 |
| ECN08060-HD | ◎ | 6 | – | 18 | 75 | 6 | A382 |
| ECW09060-HD | ◎ | 6 | – | 18 | 75 | 6 | A382 |
| EPPM4060-TH | ● | 6 | – | 20 | 60 | 6 | A328 |
| EPPM4060 | ● | 6 | – | 20 | 60 | 6 | A338 |
| HESM2060-C | ● | 6 | – | 20 | 60 | 6 | A388 |
| HESM2060 | ● | 6 | – | 20 | 60 | 6 | A391 |
| HESM4060-C | ● | 6 | – | 20 | 60 | 6 | A394 |
| HESM4060 | ● | 6 | – | 20 | 60 | 6 | A396 |
| EPQM4060-CS | □ | 6 | – | 20 | 60 | 6 | A455 |
| EPSFM4060-PN | ● | 6 | – | 24 | 70 | 6 | A310 |
| EPSMM4060-PN | ● | 6 | – | 24 | 70 | 6 | A315 |

●印：標準在庫品です。　●：Stocked Items.　◎印：メーカー在庫品です。弊社営業へお問合せください。　◎：Manufacturer stocked items Contact with our sales department.

単位 unit：mm

| 商品コード Item Code | 在庫 Stock | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EPPL4060-TH | ● | 6 | – | 25 | 70 | 6 | A328 |
| EPPL4060 | ● | 6 | – | 25 | 70 | 6 | A338 |
| CEPL6060-TH | ● | 6 | – | 25 | 70 | 6 | A352 |
| CEPL6060 | ● | 6 | – | 25 | 70 | 6 | A355 |
| FE706 | □ | 6 | – | 25 | 80 | 6 | A440 |
| HESL2060-C | ● | 6 | – | 30 | 65 | 6 | A388 |
| HESL2060 | ● | 6 | – | 30 | 65 | 6 | A391 |
| HESL4060-C | ● | 6 | – | 30 | 65 | 6 | A394 |
| HESL4060 | ● | 6 | – | 30 | 65 | 6 | A396 |
| EPSFL4060-PN | ● | 6 | – | 30 | 70 | 6 | A310 |
| EPSML4060-PN | ● | 6 | – | 30 | 70 | 6 | A315 |
| EPSWL4060-PN | ● | 6 | – | 30 | 70 | 6 | A362 |
| EPQL4060-CS | ● | 6 | – | 30 | 70 | 6 | A369 |
| GSR2060 | □ | 6 | – | 30 | 100 | 6 | A441 |
| GSE4060 | □ | 6 | – | 30 | 100 | 6 | A432 |
| GXR2060 | □ | 6 | – | 30 | 130 | 6 | A441 |
| GSD4060 | □ | 6 | – | 30 | 150 | 6 | A432 |
| GSL2060 | □ | 6 | – | 80 | 130 | 6 | A441 |
| EPSM40605-PN | □ | 6.05 | – | 15.3 | 63 | 8 | A313 |
| EPPS4061 | □ | 6.1 | – | 9.2 | 60 | 6 | A336 |
| EPSMS4061-PN | □ | 6.1 | – | 9.2 | 63 | 8 | A311 |
| HES2061-C | □ | 6.1 | – | 15 | 50 | 6 | A387 |
| HES2061 | ● | 6.1 | – | 15 | 50 | 6 | A390 |
| EPSM4061-PN | □ | 6.1 | – | 15.3 | 63 | 8 | A313 |
| EPSM40615-PN | □ | 6.15 | – | 15.5 | 63 | 8 | A313 |
| EPPS4062 | □ | 6.2 | – | 9.3 | 60 | 6 | A336 |
| EPSMS4062-PN | □ | 6.2 | – | 9.3 | 63 | 8 | A311 |
| HES2062-C | □ | 6.2 | – | 15 | 50 | 6 | A387 |
| HES2062 | ● | 6.2 | – | 15 | 50 | 6 | A390 |
| EPSM4062-PN | □ | 6.2 | – | 15.5 | 63 | 8 | A313 |
| EPSM40625-PN | □ | 6.25 | – | 15.8 | 63 | 8 | A313 |
| EPPS4063 | □ | 6.3 | – | 9.5 | 60 | 6 | A336 |
| EPSMS4063-PN | □ | 6.3 | – | 9.5 | 63 | 8 | A311 |
| HES2063-C | □ | 6.3 | – | 15 | 50 | 6 | A387 |
| HES2063 | ● | 6.3 | – | 15 | 50 | 6 | A390 |
| EPSM4063-PN | □ | 6.3 | – | 15.8 | 63 | 8 | A313 |
| EPSM40635-PN | □ | 6.35 | – | 16 | 63 | 8 | A313 |
| ECN080635-HD | ◎ | 6.35 | – | 18 | 75 | 6.35 | A382 |
| ECW090635-HD | ◎ | 6.35 | – | 18 | 75 | 6.35 | A382 |
| EPPS4064 | □ | 6.4 | – | 9.6 | 60 | 6 | A336 |
| EPSMS4064-PN | □ | 6.4 | – | 9.6 | 63 | 8 | A311 |
| HES2064-C | □ | 6.4 | – | 15 | 50 | 6 | A387 |
| HES2064 | ● | 6.4 | – | 15 | 50 | 6 | A390 |
| EPSM4064-PN | □ | 6.4 | – | 16 | 63 | 8 | A313 |
| EPSM40645-PN | □ | 6.45 | – | 16.3 | 63 | 8 | A313 |
| EPSM4065-19.5-PN | □ | 6.5 | 19.5 | 9.8 | 63 | 8 | A317 |
| EPSM4065-32.5-PN | □ | 6.5 | 32.5 | 9.8 | 80 | 8 | A318 |
| EPSMS4065-PN | □ | 6.5 | – | 9.8 | 63 | 8 | A311 |
| EPPS4065-TH | ● | 6.5 | – | 9.8 | 70 | 8 | A328 |
| EPPS4065 | ● | 6.5 | – | 9.8 | 70 | 8 | A336 |
| PESS2065-C | □ | 6.5 | – | 14 | 50 | 6 | A434 |
| PESS2065 | □ | 6.5 | – | 14 | 50 | 6 | A435 |
| HES2065-C | ● | 6.5 | – | 15 | 50 | 6 | A387 |
| HES2065 | ● | 6.5 | – | 15 | 50 | 6 | A390 |
| HES4065-C | ● | 6.5 | – | 15 | 50 | 6 | A394 |
| HES4065 | ● | 6.5 | – | 15 | 50 | 6 | A396 |
| PESR2065-C | □ | 6.5 | – | 15 | 50 | 6 | A434 |
| PESR4065-C | □ | 6.5 | – | 15 | 50 | 6 | A434 |
| PESR2065 | □ | 6.5 | – | 15 | 50 | 6 | A435 |
| PESR4065 | □ | 6.5 | – | 15 | 50 | 6 | A435 |
| EPP3065-CS | □ | 6.5 | – | 16 | 70 | 8 | A308 |
| EPP4065 | □ | 6.5 | – | 16 | 70 | 8 | A337 |
| EPSM4065-PN | □ | 6.5 | – | 16.3 | 63 | 8 | A314 |
| EPSW4065-PN | □ | 6.5 | – | 16.3 | 63 | 8 | A361 |
| CEPR6065-TH | ● | 6.5 | – | 20 | 75 | 8 | A352 |
| CEPR6065 | ● | 6.5 | – | 20 | 75 | 8 | A355 |
| EPSM40655-PN | □ | 6.55 | – | 16.5 | 63 | 8 | A314 |
| EPSMS4066-PN | □ | 6.6 | – | 9.9 | 63 | 8 | A311 |
| EPPS4066 | □ | 6.6 | – | 9.9 | 70 | 8 | A336 |
| EPSM4066-PN | □ | 6.6 | – | 16.5 | 63 | 8 | A314 |
| HES2066-C | □ | 6.6 | – | 20 | 60 | 8 | A387 |
| HES2066 | ● | 6.6 | – | 20 | 60 | 8 | A390 |
| EPSM40665-PN | □ | 6.65 | – | 16.8 | 63 | 8 | A314 |
| EPSMS4067-PN | □ | 6.7 | – | 10.1 | 63 | 8 | A311 |
| EPPS4067 | □ | 6.7 | – | 10.1 | 70 | 8 | A336 |
| EPSM4067-PN | □ | 6.7 | – | 16.8 | 63 | 8 | A314 |
| HES2067-C | □ | 6.7 | – | 20 | 60 | 8 | A387 |
| HES2067 | ● | 6.7 | – | 20 | 60 | 8 | A390 |
| EPSM40675-PN | □ | 6.75 | – | 17 | 63 | 8 | A314 |
| EPSMS4068-PN | □ | 6.8 | – | 10.2 | 63 | 8 | A311 |
| EPPS4068 | □ | 6.8 | – | 10.2 | 70 | 8 | A336 |
| EPSM4068-PN | □ | 6.8 | – | 17 | 63 | 8 | A314 |
| HES2068-C | □ | 6.8 | – | 20 | 60 | 8 | A387 |
| HES2068 | ● | 6.8 | – | 20 | 60 | 8 | A390 |
| EPSM40685-PN | □ | 6.85 | – | 17.3 | 63 | 8 | A314 |
| EPSMS4069-PN | □ | 6.9 | – | 10.4 | 63 | 8 | A311 |
| EPPS4069 | □ | 6.9 | – | 10.4 | 70 | 8 | A336 |
| EPSM4069-PN | □ | 6.9 | – | 17.3 | 63 | 8 | A314 |
| HES2069-C | □ | 6.9 | – | 20 | 60 | 8 | A387 |
| HES2069 | ● | 6.9 | – | 20 | 60 | 8 | A390 |
| EPSM40695-PN | □ | 6.95 | – | 17.5 | 63 | 8 | A314 |
| HGOS2070-PN | ● | 7 | 17 | 16 | 70 | 8 | A304 |
| EPSM4070-21-PN | ● | 7 | 21 | 10.5 | 63 | 8 | A317 |
| EPSW4070-21-PN | ● | 7 | 21 | 10.5 | 63 | 8 | A363 |
| EPSM4070-35-PN | ● | 7 | 35 | 10.5 | 80 | 8 | A318 |
| EPSW4070-35-PN | ● | 7 | 35 | 10.5 | 80 | 8 | A363 |
| EMXR4070-SR-TH | ● | 7 | – | 9 | 90 | 6 | A346 |
| EMXN4070-SR-TH | ● | 7 | – | 9 | 90 | 6 | A347 |
| EPPLS4070 | ● | 7 | – | 9 | 120 | 6 | A338 |
| EPQLS4070-CS | □ | 7 | – | 9 | 120 | 6 | A455 |
| EPPS4070-P-CS | ● | 7 | – | 10.5 | 60 | 8 | A332 |
| KES2070 | □ | 7 | – | 10.5 | 60 | 10 | A440 |
| KESU2070 | □ | 7 | – | 10.5 | 60 | 10 | A440 |
| EPSMS4070-PN | □ | 7 | – | 10.5 | 63 | 8 | A311 |
| EPPS4070-TH | ● | 7 | – | 10.5 | 70 | 8 | A328 |
| EPPS4070 | ● | 7 | – | 10.5 | 70 | 8 | A336 |
| EPSMLS4070-PN | ● | 7 | – | 10.5 | 120 | 6 | A316 |
| TES2070 | □ | 7 | – | 12 | 60 | 8 | A440 |
| PESS2070-C | □ | 7 | – | 14 | 60 | 8 | A434 |
| PESS2070 | □ | 7 | – | 14 | 60 | 8 | A435 |
| SES3070 | □ | 7 | – | 14 | 60 | 8 | A439 |
| SES3070-C | □ | 7 | – | 14 | 60 | 8 | A439 |
| YS2070-CS | □ | 7 | – | 16 | 60 | 8 | A437 |
| EPP3070-CS | □ | 7 | – | 16 | 70 | 8 | A308 |
| EPP4070-TH | ● | 7 | – | 16 | 70 | 8 | A328 |
| EPP4070 | ● | 7 | – | 16 | 70 | 8 | A337 |
| EPSF4070-PN | ● | 7 | – | 17.5 | 63 | 8 | A310 |
| EPSM4070-PN | ● | 7 | – | 17.5 | 63 | 8 | A314 |
| EPSW4070-PN | ● | 7 | – | 17.5 | 63 | 8 | A361 |
| AES2070 | ● | 7 | – | 20 | 60 | 8 | A386 |
| HES2070-C | ● | 7 | – | 20 | 60 | 8 | A387 |
| HES2070 | ● | 7 | – | 20 | 60 | 8 | A390 |
| HES4070-C | ● | 7 | – | 20 | 60 | 8 | A394 |
| HES4070 | ● | 7 | – | 20 | 60 | 8 | A396 |
| PESR2070-C | □ | 7 | – | 20 | 60 | 8 | A434 |
| PESR4070-C | □ | 7 | – | 20 | 60 | 8 | A434 |
| PESR2070 | □ | 7 | – | 20 | 60 | 8 | A435 |
| PESR4070 | □ | 7 | – | 20 | 60 | 8 | A435 |
| EPQR4070-CS | ● | 7 | – | 20 | 65 | 8 | A369 |
| EPAS2070-SD | ● | 7 | – | 20 | 70 | 8 | A380 |
| CEPR6070-TH | ● | 7 | – | 20 | 75 | 8 | A352 |
| CEPR6070 | ● | 7 | – | 20 | 75 | 8 | A355 |
| EPPM4070 | □ | 7 | – | 23 | 75 | 8 | A338 |
| HESM2070-C | ● | 7 | – | 25 | 63 | 8 | A388 |
| HESM2070 | ● | 7 | – | 25 | 63 | 8 | A391 |
| HESM4070-C | ● | 7 | – | 25 | 63 | 8 | A394 |
| HESM4070 | ● | 7 | – | 25 | 63 | 8 | A396 |
| EPSFM4070-PN | ● | 7 | – | 28 | 75 | 8 | A310 |
| EPSMM4070-PN | ● | 7 | – | 28 | 75 | 8 | A315 |
| EPQM4070-CS | □ | 7 | – | 30 | 80 | 8 | A455 |
| GSE4070 | □ | 7 | – | 30 | 100 | 6 | A432 |
| GSD4070 | □ | 7 | – | 30 | 150 | 6 | A432 |
| EPSFL4070-PN | ● | 7 | – | 35 | 80 | 8 | A310 |
| EPSML4070-PN | □ | 7 | – | 35 | 80 | 8 | A315 |
| EPSWL4070-PN | □ | 7 | – | 35 | 80 | 8 | A362 |
| EPPL4070 | □ | 7 | – | 35 | 90 | 8 | A338 |
| CEPL6070-TH | ● | 7 | – | 35 | 90 | 8 | A352 |
| CEPL6070 | ● | 7 | – | 35 | 90 | 8 | A355 |
| GSR2070 | □ | 7 | – | 35 | 100 | 6 | A441 |
| GXR2070 | □ | 7 | – | 35 | 140 | 6 | A441 |
| EPQL4070-CS | □ | 7 | – | 40 | 80 | 8 | A369 |
| HESL2070-C | ● | 7 | – | 40 | 80 | 8 | A388 |
| HESL2070 | ● | 7 | – | 40 | 80 | 8 | A391 |
| HESL4070-C | ● | 7 | – | 40 | 80 | 8 | A394 |
| HESL4070 | ● | 7 | – | 40 | 80 | 8 | A396 |
| GSL2070 | □ | 7 | – | 90 | 140 | 6 | A441 |
| ES8WB0700LS-ATH | ● | 7 | | 7 | 90 | 6 | A344 |
| EPSM40705-PN | □ | 7.05 | – | 17.8 | 63 | 8 | A314 |
| EPSMS4071-PN | □ | 7.1 | – | 10.7 | 63 | 8 | A311 |
| EPPS4071 | □ | 7.1 | – | 10.7 | 70 | 8 | A336 |
| EPSM4071-PN | □ | 7.1 | – | 17.8 | 63 | 8 | A314 |
| HES2071-C | □ | 7.1 | – | 20 | 60 | 8 | A387 |
| HES2071 | □ | 7.1 | – | 20 | 60 | 8 | A390 |
| EPSM40715-PN | □ | 7.15 | – | 18 | 63 | 8 | A314 |
| EPSMS4072-PN | □ | 7.2 | – | 10.8 | 63 | 8 | A311 |
| EPPS4072 | □ | 7.2 | – | 10.8 | 70 | 8 | A336 |
| EPSM4072-PN | □ | 7.2 | – | 18 | 63 | 8 | A314 |
| HES2072-C | □ | 7.2 | – | 20 | 60 | 8 | A387 |
| HES2072 | □ | 7.2 | – | 20 | 60 | 8 | A390 |
| EPSM40725-PN | □ | 7.25 | – | 18.3 | 63 | 8 | A314 |
| EPSMS4073-PN | □ | 7.3 | – | 11 | 63 | 8 | A311 |
| EPPS4073 | □ | 7.3 | – | 11 | 70 | 8 | A336 |
| EPSM4073-PN | □ | 7.3 | – | 18.3 | 63 | 8 | A314 |
| HES2073-C | □ | 7.3 | – | 20 | 60 | 8 | A387 |
| HES2073 | □ | 7.3 | – | 20 | 60 | 8 | A390 |
| EPSM40735-PN | □ | 7.35 | – | 18.5 | 63 | 8 | A314 |
| EPSMS4074-PN | □ | 7.4 | – | 11.1 | 63 | 8 | A311 |
| EPPS4074 | □ | 7.4 | – | 11.1 | 70 | 8 | A336 |
| EPSM4074-PN | □ | 7.4 | – | 18.5 | 63 | 8 | A314 |
| HES2074-C | □ | 7.4 | – | 20 | 60 | 8 | A387 |
| HES2074 | □ | 7.4 | – | 20 | 60 | 8 | A390 |
| EPSM40745-PN | □ | 7.45 | – | 18.8 | 63 | 8 | A314 |
| EPSM4075-22.5-PN | □ | 7.5 | 22.5 | 11.3 | 63 | 8 | A317 |
| EPSM4075-37.5-PN | □ | 7.5 | 37.5 | 11.3 | 80 | 8 | A318 |
| EPSMS4075-PN | □ | 7.5 | – | 11.3 | 63 | 8 | A311 |
| EPPS4075-TH | ● | 7.5 | – | 11.3 | 75 | 8 | A328 |
| EPPS4075 | ● | 7.5 | – | 11.3 | 75 | 8 | A336 |
| PESS2075-C | □ | 7.5 | – | 14 | 60 | 8 | A434 |
| PESS2075 | □ | 7.5 | – | 14 | 60 | 8 | A435 |
| EPP3075-CS | □ | 7.5 | – | 16 | 70 | 8 | A308 |
| EPP4075 | □ | 7.5 | – | 16 | 70 | 8 | A337 |
| EPSM4075-PN | □ | 7.5 | – | 18.8 | 63 | 8 | A314 |
| EPSW4075-PN | □ | 7.5 | – | 18.8 | 63 | 8 | A361 |
| HES2075-C | ● | 7.5 | – | 20 | 60 | 8 | A387 |
| HES2075 | ● | 7.5 | – | 20 | 60 | 8 | A390 |
| HES4075-C | ● | 7.5 | – | 20 | 60 | 8 | A394 |
| HES4075 | ● | 7.5 | – | 20 | 60 | 8 | A396 |
| PESR2075-C | □ | 7.5 | – | 20 | 60 | 8 | A434 |
| PESR4075-C | □ | 7.5 | – | 20 | 60 | 8 | A434 |
| PESR2075 | □ | 7.5 | – | 20 | 60 | 8 | A435 |
| PESR4075 | □ | 7.5 | – | 20 | 60 | 8 | A435 |
| CEPR6075-TH | ● | 7.5 | – | 20 | 75 | 8 | A352 |
| CEPR6075 | ● | 7.5 | – | 20 | 75 | 8 | A355 |
| EPSM40755-PN | □ | 7.55 | – | 19 | 63 | 8 | A314 |
| EPSMS4076-PN | □ | 7.6 | – | 11.4 | 63 | 8 | A311 |
| EPPS4076 | □ | 7.6 | – | 11.4 | 75 | 8 | A336 |
| EPSM4076-PN | □ | 7.6 | – | 19 | 63 | 8 | A314 |

□印：特定代理店在庫です。弊社営業へお問合せください。□：Stocked by specified distributor. Contact with our sales department.

Quick dimension reference table by mill diameter

# 外径別寸法早見表

## 超硬エンドミル・スクエア　φ7.6～φ10.5　Carbide End Mills -Square

単位 unit：mm

| 商品コード Item Code | 在庫 Stock | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| HES2076-C | □ | 7.6 | – | 20 | 60 | 8 | A387 |
| HES2076 | □ | 7.6 | – | 20 | 60 | 8 | A390 |
| EPSM40765-PN | □ | 7.65 | – | 19.3 | 63 | 8 | A314 |
| EPSMS4077-PN | □ | 7.7 | – | 11.6 | 63 | 8 | A311 |
| EPPS4077 | □ | 7.7 | – | 11.6 | 75 | 8 | A336 |
| EPSM4077-PN | □ | 7.7 | – | 19.3 | 63 | 8 | A314 |
| HES2077-C | □ | 7.7 | – | 20 | 60 | 8 | A387 |
| HES2077 | □ | 7.7 | – | 20 | 60 | 8 | A390 |
| EPSM40775-PN | □ | 7.75 | – | 19.5 | 63 | 8 | A314 |
| EPSMS4078-PN | □ | 7.8 | – | 11.7 | 63 | 8 | A311 |
| EPPS4078 | □ | 7.8 | – | 11.7 | 75 | 8 | A336 |
| EPSM4078-PN | □ | 7.8 | – | 19.5 | 63 | 8 | A314 |
| HES2078-C | □ | 7.8 | – | 20 | 60 | 8 | A387 |
| HES2078 | □ | 7.8 | – | 20 | 60 | 8 | A390 |
| EPSM40785-PN | □ | 7.85 | – | 19.8 | 63 | 8 | A314 |
| EPSMS4079-PN | □ | 7.9 | – | 11.9 | 63 | 8 | A311 |
| EPPS4079 | □ | 7.9 | – | 11.9 | 75 | 8 | A336 |
| EPSM4079-PN | □ | 7.9 | – | 19.8 | 63 | 8 | A314 |
| HES2079-C | □ | 7.9 | – | 20 | 60 | 8 | A387 |
| HES2079 | □ | 7.9 | – | 20 | 60 | 8 | A390 |
| EPSM40795-PN | □ | 7.95 | – | 20 | 63 | 8 | A314 |
| EPSM4080-24-PN | ● | 8 | 24 | 12 | 63 | 8 | A317 |
| EPSW4080-24-PN | ● | 8 | 24 | 12 | 63 | 8 | A363 |
| EMXA3080-24 | ◎ | 8 | 24 | 12 | 90 | 8 | A374 |
| ES8WB0800LN-30-ATH | ● | 8 | 30 | 8 | 75 | 8 | A344 |
| ES8WB0800LN-40-ATH | ● | 8 | 40 | 8 | 90 | 8 | A344 |
| EPSM4080-40-PN | ● | 8 | 40 | 12 | 80 | 8 | A318 |
| EPSW4080-40-PN | ● | 8 | 40 | 12 | 80 | 8 | A363 |
| ES8WB0800LN-50-ATH | ● | 8 | 50 | 8 | 100 | 8 | A344 |
| ES8WB0800LN-60-ATH | ● | 8 | 60 | 8 | 110 | 8 | A344 |
| EPPS4080-P-CS | ● | 8 | – | 12 | 60 | 8 | A332 |
| KES2080 | □ | 8 | – | 12 | 60 | 10 | A440 |
| KESU2080 | □ | 8 | – | 12 | 60 | 10 | A440 |
| EPSMS4080-PN | □ | 8 | – | 12 | 63 | 8 | A311 |
| EPPS4080-TH | ● | 8 | – | 12 | 75 | 8 | A328 |
| EPPS4080 | ● | 8 | – | 12 | 75 | 8 | A336 |
| EMXR4080-TH | ● | 8 | – | 12 | 75 | 8 | A346 |
| EMXN4080-TH | ● | 8 | – | 12 | 75 | 8 | A347 |
| EPSMLS4080-PN | ● | 8 | – | 12 | 135 | 7 | A316 |
| EPPLS4080 | ● | 8 | – | 12 | 135 | 7 | A338 |
| EPQLS4080-CS | □ | 8 | – | 12 | 135 | 7 | A455 |
| TES2080 | □ | 8 | – | 14 | 60 | 8 | A440 |
| PESS2080-C | □ | 8 | – | 16 | 60 | 8 | A434 |
| PESS2080 | □ | 8 | – | 16 | 60 | 8 | A435 |
| SES3080 | □ | 8 | – | 16 | 60 | 8 | A439 |
| SES3080-C | □ | 8 | – | 16 | 60 | 8 | A439 |
| EPQS4080-CS | □ | 8 | – | 16 | 60 | 8 | A455 |
| CEPH6080 | ● | 8 | – | 16 | 75 | 8 | A356 |
| CEPLS6080 | ● | 8 | – | 16 | 90 | 8 | A356 |
| YS2080-CS | □ | 8 | – | 19 | 60 | 8 | A437 |
| HGOS2080-PN | ● | 8 | – | 19 | 75 | 8 | A304 |
| EPP3080-CS | ● | 8 | – | 19 | 75 | 8 | A308 |
| EPP4080-TH | ● | 8 | – | 19 | 75 | 8 | A328 |
| EPP4080-CS | ● | 8 | – | 19 | 75 | 8 | A332 |
| EPP4080-P-CS | ● | 8 | – | 19 | 75 | 8 | A332 |
| EPP4080 | ● | 8 | – | 19 | 75 | 8 | A337 |
| AES2080 | ● | 8 | – | 20 | 60 | 8 | A386 |
| HES2080-C | ● | 8 | – | 20 | 60 | 8 | A387 |
| HES2080 | ● | 8 | – | 20 | 60 | 8 | A390 |
| HES4080-C | ● | 8 | – | 20 | 60 | 8 | A394 |
| HES4080 | ● | 8 | – | 20 | 60 | 8 | A396 |
| PESR2080-C | □ | 8 | – | 20 | 60 | 8 | A434 |
| PESR4080-C | □ | 8 | – | 20 | 60 | 8 | A434 |
| PESR2080 | □ | 8 | – | 20 | 60 | 8 | A435 |
| PESR4080 | □ | 8 | – | 20 | 60 | 8 | A435 |
| YR4080-CS | □ | 8 | – | 20 | 60 | 8 | A437 |
| EPSF4080-PN | ● | 8 | – | 20 | 63 | 8 | A310 |
| EPSM4080-PN | ● | 8 | – | 20 | 63 | 8 | A314 |
| EPSW4080-PN | ● | 8 | – | 20 | 63 | 8 | A361 |

| 商品コード Item Code | 在庫 Stock | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EPQR4080-CS | ● | 8 | – | 20 | 70 | 8 | A369 |
| HGOS4080-PN | ● | 8 | – | 20 | 75 | 8 | A305 |
| CEPR6080-TH | ● | 8 | – | 20 | 75 | 8 | A352 |
| CEPR6080 | ● | 8 | – | 20 | 75 | 8 | A355 |
| CEPU4080 | ● | 8 | – | 20 | 75 | 8 | A356 |
| EAP4080-TH | ◎ | 8 | – | 20 | 75 | 8 | A371 |
| EAP6080-TH | ◎ | 8 | – | 20 | 75 | 8 | A371 |
| EPAS2080-SD | ● | 8 | – | 20 | 75 | 8 | A380 |
| ECH4080-SD | ● | 8 | – | 20 | 75 | 8 | A381 |
| ECX3080-SD | ● | 8 | – | 20 | 75 | 8 | A381 |
| ECN10080-HD | ◎ | 8 | – | 24 | 90 | 8 | A382 |
| ECW11080-HD | ◎ | 8 | – | 24 | 90 | 8 | A382 |
| EPPM4080-TH | ● | 8 | – | 25 | 75 | 8 | A328 |
| EPPM4080 | ● | 8 | – | 25 | 75 | 8 | A338 |
| HESM2080-C | ● | 8 | – | 25 | 75 | 8 | A388 |
| HESM2080 | ● | 8 | – | 25 | 75 | 8 | A391 |
| HESM4080-C | ● | 8 | – | 25 | 75 | 8 | A394 |
| HESM4080 | ● | 8 | – | 25 | 75 | 8 | A396 |
| FE708 | □ | 8 | – | 25 | 80 | 8 | A440 |
| EPQM4080-CS | □ | 8 | – | 30 | 80 | 8 | A455 |
| EPSFM4080-PN | ● | 8 | – | 32 | 80 | 8 | A310 |
| EPSMM4080-PN | ● | 8 | – | 32 | 80 | 8 | A315 |
| EPPL4080-TH | ● | 8 | – | 35 | 90 | 8 | A328 |
| EPPL4080 | ● | 8 | – | 35 | 90 | 8 | A338 |
| CEPL6080-TH | ● | 8 | – | 35 | 90 | 8 | A352 |
| CEPL6080 | ● | 8 | – | 35 | 90 | 8 | A355 |
| EPSFL4080-PN | ● | 8 | – | 40 | 80 | 8 | A310 |
| EPSML4080-PN | ● | 8 | – | 40 | 80 | 8 | A315 |
| EPSWL4080-PN | ● | 8 | – | 40 | 80 | 8 | A362 |
| EPQL4080-CS | ● | 8 | – | 40 | 80 | 8 | A369 |
| HESL2080-C | ● | 8 | – | 40 | 80 | 8 | A388 |
| HESL2080 | ● | 8 | – | 40 | 80 | 8 | A391 |
| HESL4080-C | ● | 8 | – | 40 | 80 | 8 | A394 |
| HESL4080 | ● | 8 | – | 40 | 80 | 8 | A396 |
| GSR2080 | □ | 8 | – | 40 | 110 | 8 | A441 |
| GSE4080 | □ | 8 | – | 40 | 110 | 8 | A432 |
| GXR2080 | □ | 8 | – | 40 | 150 | 8 | A441 |
| GSD4080 | □ | 8 | – | 40 | 150 | 8 | A432 |
| GSL2080 | □ | 8 | – | 100 | 150 | 8 | A441 |
| EPSM40805-PN | □ | 8.05 | – | 20.3 | 74 | 10 | A314 |
| EPSMS4081-PN | □ | 8.1 | – | 12.2 | 74 | 10 | A311 |
| EPPS4081 | □ | 8.1 | – | 12.2 | 75 | 8 | A336 |
| HES2081-C | □ | 8.1 | – | 20 | 60 | 8 | A387 |
| HES2081 | □ | 8.1 | – | 20 | 60 | 8 | A390 |
| EPSM4081-PN | □ | 8.1 | – | 20.3 | 74 | 10 | A314 |
| EPSM40815-PN | □ | 8.15 | – | 20.5 | 74 | 10 | A314 |
| EPSMS4082-PN | □ | 8.2 | – | 12.3 | 74 | 10 | A311 |
| EPPS4082 | □ | 8.2 | – | 12.3 | 75 | 8 | A336 |
| HES2082-C | □ | 8.2 | – | 20 | 60 | 8 | A387 |
| HES2082 | □ | 8.2 | – | 20 | 60 | 8 | A390 |
| EPSM4082-PN | □ | 8.2 | – | 20.5 | 74 | 10 | A314 |
| EPSM40825-PN | □ | 8.25 | – | 20.8 | 74 | 10 | A314 |
| EPSMS4083-PN | □ | 8.3 | – | 12.5 | 74 | 10 | A311 |
| EPPS4083 | □ | 8.3 | – | 12.5 | 75 | 8 | A336 |
| HES2083-C | □ | 8.3 | – | 20 | 60 | 8 | A387 |
| HES2083 | □ | 8.3 | – | 20 | 60 | 8 | A390 |
| EPSM4083-PN | □ | 8.3 | – | 20.8 | 74 | 10 | A314 |
| EPSM40835-PN | □ | 8.35 | – | 21 | 74 | 10 | A314 |
| EPSMS4084-PN | □ | 8.4 | – | 12.6 | 74 | 10 | A311 |
| EPPS4084 | □ | 8.4 | – | 12.6 | 75 | 8 | A336 |
| HES2084-C | □ | 8.4 | – | 20 | 60 | 8 | A387 |
| HES2084 | □ | 8.4 | – | 20 | 60 | 8 | A390 |
| EPSM4084-PN | □ | 8.4 | – | 21 | 74 | 10 | A314 |
| EPSM40845-PN | □ | 8.45 | – | 21.3 | 74 | 10 | A314 |
| EPSM4085-25.5-PN | □ | 8.5 | 25.5 | 12.8 | 74 | 10 | A317 |
| EPSM4085-42.5-PN | □ | 8.5 | 42.5 | 12.8 | 94 | 10 | A318 |
| EPSMS4085-PN | □ | 8.5 | – | 12.8 | 74 | 10 | A311 |
| EPPS4085-TH | ● | 8.5 | – | 12.8 | 80 | 10 | A328 |
| EPPS4085 | ● | 8.5 | – | 12.8 | 80 | 10 | A336 |

| 商品コード Item Code | 在庫 Stock | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| PESS2085-C | □ | 8.5 | – | 16 | 60 | 8 | A434 |
| PESS2085 | □ | 8.5 | – | 16 | 60 | 8 | A435 |
| EPP3085-CS | □ | 8.5 | – | 19 | 80 | 10 | A308 |
| EPP4085 | □ | 8.5 | – | 19 | 80 | 10 | A337 |
| HES2085-C | ● | 8.5 | – | 20 | 60 | 8 | A387 |
| HES2085 | ● | 8.5 | – | 20 | 60 | 8 | A390 |
| HES4085-C | ● | 8.5 | – | 20 | 60 | 8 | A394 |
| HES4085 | ● | 8.5 | – | 20 | 60 | 8 | A396 |
| PESR2085-C | □ | 8.5 | – | 20 | 60 | 8 | A434 |
| PESR4085-C | □ | 8.5 | – | 20 | 60 | 8 | A434 |
| PESR2085 | □ | 8.5 | – | 20 | 60 | 8 | A435 |
| PESR4085 | □ | 8.5 | – | 20 | 60 | 8 | A435 |
| EPSM4085-PN | □ | 8.5 | – | 21.3 | 74 | 10 | A314 |
| EPSW4085-PN | □ | 8.5 | – | 21.3 | 74 | 10 | A361 |
| CEPR6085-TH | ● | 8.5 | – | 25 | 80 | 10 | A352 |
| CEPR6085 | ● | 8.5 | – | 25 | 80 | 10 | A355 |
| EPSM40855-PN | □ | 8.55 | – | 21.5 | 74 | 10 | A314 |
| EPSMS4086-PN | □ | 8.6 | – | 12.9 | 74 | 10 | A311 |
| EPPS4086 | □ | 8.6 | – | 12.9 | 80 | 10 | A336 |
| HES2086-C | □ | 8.6 | – | 20 | 65 | 10 | A387 |
| HES2086 | □ | 8.6 | – | 20 | 65 | 10 | A390 |
| EPSM4086-PN | □ | 8.6 | – | 21.5 | 74 | 10 | A314 |
| EPSM40865-PN | □ | 8.65 | – | 21.8 | 74 | 10 | A314 |
| EPSMS4087-PN | □ | 8.7 | – | 13.1 | 74 | 10 | A311 |
| EPPS4087 | □ | 8.7 | – | 13.1 | 80 | 10 | A336 |
| HES2087-C | □ | 8.7 | – | 20 | 65 | 10 | A387 |
| HES2087 | □ | 8.7 | – | 20 | 65 | 10 | A390 |
| EPSM4087-PN | □ | 8.7 | – | 21.8 | 74 | 10 | A314 |
| EPSM40875-PN | □ | 8.75 | – | 22 | 74 | 10 | A314 |
| EPSMS4088-PN | □ | 8.8 | – | 13.2 | 74 | 10 | A311 |
| EPPS4088 | □ | 8.8 | – | 13.2 | 80 | 10 | A336 |
| HES2088-C | □ | 8.8 | – | 20 | 65 | 10 | A387 |
| HES2088 | □ | 8.8 | – | 20 | 65 | 10 | A390 |
| EPSM4088-PN | □ | 8.8 | – | 22 | 74 | 10 | A314 |
| EPSM40885-PN | □ | 8.85 | – | 22.3 | 74 | 10 | A314 |
| EPSMS4089-PN | □ | 8.9 | – | 13.4 | 74 | 10 | A311 |
| EPPS4089 | □ | 8.9 | – | 13.4 | 80 | 10 | A336 |
| HES2089-C | □ | 8.9 | – | 20 | 65 | 10 | A387 |
| HES2089 | □ | 8.9 | – | 20 | 65 | 10 | A390 |
| EPSM4089-PN | □ | 8.9 | – | 22.3 | 74 | 10 | A314 |
| EPSM40895-PN | □ | 8.95 | – | 22.5 | 74 | 10 | A314 |
| HGOS2090-PN | ● | 9 | 20 | 19 | 80 | 10 | A304 |
| EPSM4090-27-PN | ● | 9 | 27 | 13.5 | 74 | 10 | A317 |
| EPSW4090-27-PN | ● | 9 | 27 | 13.5 | 74 | 10 | A363 |
| EPSM4090-45-PN | ● | 9 | 45 | 13.5 | 94 | 10 | A318 |
| EPSW4090-45-PN | ● | 9 | 45 | 13.5 | 94 | 10 | A363 |
| EMXR4090-SR-TH | ● | 9 | – | 12 | 100 | 8 | A346 |
| EMXN4090-SR-TH | ● | 9 | – | 12 | 100 | 8 | A347 |
| EPPLS4090 | ● | 9 | – | 12 | 135 | 8 | A338 |
| EPQLS4090-CS | □ | 9 | – | 12 | 135 | 8 | A455 |
| EPPS4090-P-CS | ● | 9 | – | 13.5 | 65 | 10 | A332 |
| KES2090 | □ | 9 | – | 13.5 | 65 | 12 | A440 |
| KESU2090 | □ | 9 | – | 13.5 | 65 | 12 | A440 |
| EPSMS4090-PN | □ | 9 | – | 13.5 | 74 | 10 | A312 |
| EPPS4090-TH | ● | 9 | – | 13.5 | 80 | 10 | A328 |
| EPPS4090 | ● | 9 | – | 13.5 | 80 | 10 | A336 |
| EPSMLS4090-PN | ● | 9 | – | 13.5 | 135 | 8 | A316 |
| TES2090 | □ | 9 | – | 16 | 65 | 10 | A440 |
| PESS2090-C | □ | 9 | – | 18 | 65 | 10 | A434 |
| PESS2090 | □ | 9 | – | 18 | 65 | 10 | A435 |
| YS2090-CS | □ | 9 | – | 19 | 70 | 10 | A437 |
| EPP3090-CS | □ | 9 | – | 19 | 80 | 10 | A308 |
| EPP4090-TH | ● | 9 | – | 19 | 80 | 10 | A328 |
| EPP4090 | ● | 9 | – | 19 | 80 | 10 | A337 |
| AES2090 | ● | 9 | – | 20 | 65 | 10 | A386 |
| HES2090-C | ● | 9 | – | 20 | 65 | 10 | A387 |
| HES2090 | ● | 9 | – | 20 | 65 | 10 | A390 |
| HES4090-C | ● | 9 | – | 20 | 65 | 10 | A394 |
| HES4090 | ● | 9 | – | 20 | 65 | 10 | A396 |

●印：標準在庫品です。　●：Stocked Items.　◎印：メーカー在庫品です。弊社営業へお問合せください。　◎：Manufacturer stocked items Contact with our sales department.

単位 unit：mm

| 商品コード Item Code | 在庫 Stock | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| PESR2090-C | □ | 9 | – | 20 | 65 | 10 | A434 |
| PESR4090-C | □ | 9 | – | 20 | 65 | 10 | A434 |
| PESR2090 | □ | 9 | – | 20 | 65 | 10 | A435 |
| PESR4090 | □ | 9 | – | 20 | 65 | 10 | A435 |
| SES3090 | □ | 9 | – | 20 | 65 | 10 | A439 |
| EPAS2090-SD | ● | 9 | – | 20 | 80 | 10 | A380 |
| EPSF4090-PN | ● | 9 | – | 22.5 | 74 | 10 | A310 |
| EPSM4090-PN | ● | 9 | – | 22.5 | 74 | 10 | A314 |
| EPSW4090-PN | ● | 9 | – | 22.5 | 74 | 10 | A361 |
| EPQR4090-CS | ● | 9 | – | 25 | 75 | 10 | A369 |
| CEPR6090-TH | ● | 9 | – | 25 | 80 | 10 | A352 |
| CEPR6090 | ● | 9 | – | 25 | 80 | 10 | A355 |
| HESM2090 | □ | 9 | – | 28 | 75 | 10 | A391 |
| HESM4090-C | ● | 9 | – | 28 | 75 | 10 | A394 |
| HESM4090 | ● | 9 | – | 28 | 75 | 10 | A396 |
| EPPM4090 | □ | 9 | – | 30 | 80 | 10 | A338 |
| EPQM4090-CS | □ | 9 | – | 35 | 90 | 10 | A455 |
| EPSFM4090-PN | ● | 9 | – | 36 | 100 | 10 | A310 |
| EPSMM4090-PN | ● | 9 | – | 36 | 100 | 10 | A315 |
| HESL2090-C | ● | 9 | – | 40 | 85 | 10 | A388 |
| HESL2090 | ● | 9 | – | 40 | 85 | 10 | A391 |
| HESL4090-C | ● | 9 | – | 40 | 85 | 10 | A394 |
| HESL4090 | ● | 9 | – | 40 | 85 | 10 | A396 |
| GSE4090 | □ | 9 | – | 40 | 110 | 8 | A432 |
| GSD4090 | □ | 9 | – | 40 | 150 | 8 | A432 |
| EPSFL4090-PN | ● | 9 | – | 45 | 100 | 10 | A310 |
| EPSML4090-PN | □ | 9 | – | 45 | 100 | 10 | A315 |
| EPPL4090 | □ | 9 | – | 45 | 100 | 10 | A338 |
| CEPL6090-TH | ● | 9 | – | 45 | 100 | 10 | A352 |
| CEPL6090 | ● | 9 | – | 45 | 100 | 10 | A355 |
| EPSWL4090-PN | □ | 9 | – | 45 | 100 | 10 | A362 |
| GSR2090 | □ | 9 | – | 45 | 110 | 8 | A441 |
| GXR2090 | □ | 9 | – | 45 | 160 | 8 | A441 |
| EPQL4090-CS | □ | 9 | – | 50 | 100 | 10 | A369 |
| GSL2090 | □ | 9 | – | 110 | 160 | 8 | A441 |
| ES8WB0900LS-ATH | ● | 9 | | 9 | 100 | 8 | A344 |
| EPSM40905-PN | □ | 9.05 | – | 22.8 | 74 | 10 | A314 |
| EPSMS4091-PN | □ | 9.1 | – | 13.7 | 74 | 10 | A312 |
| EPPS4091 | □ | 9.1 | – | 13.7 | 80 | 10 | A336 |
| HES2091-C | □ | 9.1 | – | 20 | 65 | 10 | A387 |
| HES2091 | □ | 9.1 | – | 20 | 65 | 10 | A390 |
| EPSM4091-PN | □ | 9.1 | – | 22.8 | 74 | 10 | A314 |
| EPSM40915-PN | □ | 9.15 | – | 23 | 74 | 10 | A314 |
| EPSMS4092-PN | □ | 9.2 | – | 13.8 | 74 | 10 | A312 |
| EPPS4092 | □ | 9.2 | – | 13.8 | 80 | 10 | A336 |
| HES2092-C | □ | 9.2 | – | 20 | 65 | 10 | A387 |
| HES2092 | □ | 9.2 | – | 20 | 65 | 10 | A390 |
| EPSM4092-PN | □ | 9.2 | – | 23 | 74 | 10 | A314 |
| EPSM40925-PN | □ | 9.25 | – | 23.3 | 74 | 10 | A314 |
| EPSMS4093-PN | □ | 9.3 | – | 14 | 74 | 10 | A312 |
| EPPS4093 | □ | 9.3 | – | 14 | 80 | 10 | A336 |
| HES2093-C | □ | 9.3 | – | 20 | 65 | 10 | A387 |
| HES2093 | □ | 9.3 | – | 20 | 65 | 10 | A390 |
| EPSM4093-PN | □ | 9.3 | – | 23.3 | 74 | 10 | A314 |
| EPSM40935-PN | □ | 9.35 | – | 23.5 | 74 | 10 | A314 |
| EPSMS4094-PN | □ | 9.4 | – | 14.1 | 74 | 10 | A312 |
| EPPS4094 | □ | 9.4 | – | 14.1 | 80 | 10 | A336 |
| HES2094-C | □ | 9.4 | – | 20 | 65 | 10 | A387 |
| HES2094 | □ | 9.4 | – | 20 | 65 | 10 | A390 |
| EPSM4094-PN | □ | 9.4 | – | 23.5 | 74 | 10 | A314 |
| EPSM40945-PN | □ | 9.45 | – | 23.8 | 74 | 10 | A314 |
| EPSM4095-28.5-PN | □ | 9.5 | 28.5 | 14.3 | 74 | 10 | A317 |
| EPSM4095-47.5-PN | □ | 9.5 | 47.5 | 14.3 | 94 | 10 | A318 |
| EPSMS4095-PN | □ | 9.5 | – | 14.3 | 74 | 10 | A312 |
| EPPS4095-TH | ● | 9.5 | – | 14.3 | 80 | 10 | A328 |
| EPPS4095 | ● | 9.5 | – | 14.3 | 80 | 10 | A336 |
| PESS2095-C | □ | 9.5 | – | 18 | 65 | 10 | A434 |
| PESS2095 | □ | 9.5 | – | 18 | 65 | 10 | A435 |
| EPP3095-CS | □ | 9.5 | – | 19 | 80 | 10 | A308 |
| EPP4095 | □ | 9.5 | – | 19 | 80 | 10 | A337 |
| HES2095-C | ● | 9.5 | – | 20 | 65 | 10 | A387 |
| HES2095 | ● | 9.5 | – | 20 | 65 | 10 | A390 |
| HES4095-C | ● | 9.5 | – | 20 | 65 | 10 | A394 |
| HES4095 | ● | 9.5 | – | 20 | 65 | 10 | A396 |
| PESR2095-C | □ | 9.5 | – | 20 | 65 | 10 | A434 |
| PESR4095-C | □ | 9.5 | – | 20 | 65 | 10 | A434 |
| PESR2095 | □ | 9.5 | – | 20 | 65 | 10 | A435 |
| PESR4095 | □ | 9.5 | – | 20 | 65 | 10 | A435 |
| EPSM4095-PN | □ | 9.5 | – | 23.8 | 74 | 10 | A314 |
| EPSW4095-PN | □ | 9.5 | – | 23.8 | 74 | 10 | A361 |
| CEPR6095-TH | ● | 9.5 | – | 25 | 80 | 10 | A352 |
| CEPR6095 | ● | 9.5 | – | 25 | 80 | 10 | A355 |
| EPSM40955-PN | □ | 9.55 | – | 24 | 74 | 10 | A314 |
| EPSMS4096-PN | □ | 9.6 | – | 14.4 | 74 | 10 | A312 |
| EPPS4096 | □ | 9.6 | – | 14.4 | 80 | 10 | A336 |
| EPSM4096-PN | □ | 9.6 | – | 24 | 74 | 10 | A314 |
| HES2096-C | □ | 9.6 | – | 25 | 70 | 10 | A387 |
| HES2096 | □ | 9.6 | – | 25 | 70 | 10 | A390 |
| EPSM40965-PN | □ | 9.65 | – | 24.3 | 74 | 10 | A314 |
| EPSMS4097-PN | □ | 9.7 | – | 14.6 | 74 | 10 | A312 |
| EPPS4097 | □ | 9.7 | – | 14.6 | 80 | 10 | A336 |
| EPSM4097-PN | □ | 9.7 | – | 24.3 | 74 | 10 | A314 |
| HES2097-C | □ | 9.7 | – | 25 | 70 | 10 | A387 |
| HES2097 | □ | 9.7 | – | 25 | 70 | 10 | A390 |
| EPSM40975-PN | □ | 9.75 | – | 24.5 | 74 | 10 | A314 |
| EPSMS4098-PN | □ | 9.8 | – | 14.7 | 74 | 10 | A312 |
| EPPS4098 | □ | 9.8 | – | 14.7 | 80 | 10 | A336 |
| EPSM4098-PN | □ | 9.8 | – | 24.5 | 74 | 10 | A314 |
| HES2098-C | □ | 9.8 | – | 25 | 70 | 10 | A387 |
| HES2098 | □ | 9.8 | – | 25 | 70 | 10 | A390 |
| EPSM40985-PN | □ | 9.85 | – | 24.8 | 74 | 10 | A314 |
| EPSMS4099-PN | □ | 9.9 | – | 14.9 | 74 | 10 | A312 |
| EPPS4099 | □ | 9.9 | – | 14.9 | 80 | 10 | A336 |
| EPSM4099-PN | □ | 9.9 | – | 24.8 | 74 | 10 | A314 |
| HES2099-C | □ | 9.9 | – | 25 | 70 | 10 | A387 |
| HES2099 | □ | 9.9 | – | 25 | 70 | 10 | A390 |
| EPSM40995-PN | □ | 9.95 | – | 25 | 74 | 10 | A314 |
| EPSM4100-30-PN | ● | 10 | 30 | 15 | 74 | 10 | A317 |
| EPSW4100-30-PN | ● | 10 | 30 | 15 | 74 | 10 | A363 |
| EMXA3100-30 | ◎ | 10 | 30 | 15 | 100 | 10 | A374 |
| ES8WB1000LN-35-ATH | ● | 10 | 35 | 10 | 80 | 10 | A344 |
| ES8WB1000LN-50-ATH | ● | 10 | 50 | 10 | 100 | 10 | A344 |
| EPSM4100-50-PN | ● | 10 | 50 | 15 | 94 | 10 | A318 |
| EPSW4100-50-PN | ● | 10 | 50 | 15 | 94 | 10 | A363 |
| ES8WB1000LN-60-ATH | ● | 10 | 60 | 10 | 110 | 10 | A344 |
| ES8WB1000LN-80-ATH | ● | 10 | 80 | 10 | 130 | 10 | A344 |
| KES2100 | □ | 10 | – | 15 | 65 | 12 | A440 |
| KESU2100 | □ | 10 | – | 15 | 65 | 12 | A440 |
| EPPS4100-P-CS | ● | 10 | – | 15 | 70 | 10 | A332 |
| EPSMS4100-PN | □ | 10 | – | 15 | 74 | 10 | A312 |
| EPPS4100-TH | ● | 10 | – | 15 | 80 | 10 | A328 |
| EPPS4100 | ● | 10 | – | 15 | 80 | 10 | A336 |
| EMXR4100-TH | ● | 10 | – | 15 | 80 | 10 | A346 |
| EMXN4100-TH | ● | 10 | – | 15 | 80 | 10 | A347 |
| EPSMLS4100-PN | ● | 10 | – | 15 | 150 | 9 | A316 |
| EPPLS4100 | ● | 10 | – | 15 | 150 | 9 | A338 |
| EPQLS4100-CS | □ | 10 | – | 15 | 150 | 9 | A455 |
| PESS2100-C | □ | 10 | – | 18 | 70 | 10 | A434 |
| PESS2100 | □ | 10 | – | 18 | 70 | 10 | A435 |
| TES2100 | □ | 10 | – | 18 | 70 | 10 | A440 |
| EPQS4100-CS | □ | 10 | – | 18 | 70 | 10 | A455 |
| CEPH6100 | ● | 10 | – | 20 | 80 | 10 | A356 |
| CEPLS6100 | ● | 10 | – | 20 | 100 | 10 | A356 |
| YS2100-CS | □ | 10 | – | 22 | 70 | 10 | A437 |
| HGOS2100-PN | ● | 10 | – | 22 | 80 | 10 | A304 |
| EPP3100-CS | ● | 10 | – | 22 | 80 | 10 | A308 |
| EPP4100-TH | ● | 10 | – | 22 | 80 | 10 | A328 |
| EPP4100-CS | ● | 10 | – | 22 | 80 | 10 | A332 |
| EPP4100-P-CS | ● | 10 | – | 22 | 80 | 10 | A332 |
| EPP4100 | ● | 10 | – | 22 | 80 | 10 | A337 |
| AES2100 | ● | 10 | – | 25 | 70 | 10 | A386 |
| HES2100-C | ● | 10 | – | 25 | 70 | 10 | A387 |
| HES2100 | ● | 10 | – | 25 | 70 | 10 | A390 |
| HES4100-C | ● | 10 | – | 25 | 70 | 10 | A394 |
| HES4100 | ● | 10 | – | 25 | 70 | 10 | A396 |
| PESR2100-C | □ | 10 | – | 25 | 70 | 10 | A434 |
| PESR4100-C | □ | 10 | – | 25 | 70 | 10 | A434 |
| PESR2100 | □ | 10 | – | 25 | 70 | 10 | A435 |
| PESR4100 | □ | 10 | – | 25 | 70 | 10 | A435 |
| YR4100-CS | □ | 10 | – | 25 | 70 | 10 | A437 |
| SES3100 | □ | 10 | – | 25 | 70 | 10 | A439 |
| SES3100-C | □ | 10 | – | 25 | 70 | 10 | A439 |
| EPSF4100-PN | ● | 10 | – | 25 | 74 | 10 | A310 |
| EPSM4100-PN | ● | 10 | – | 25 | 74 | 10 | A314 |
| EPSW4100-PN | ● | 10 | – | 25 | 74 | 10 | A361 |
| HGOS4100-PN | ● | 10 | – | 25 | 80 | 10 | A305 |
| CEPR6100-TH | ● | 10 | – | 25 | 80 | 10 | A352 |
| CEPR6100 | ● | 10 | – | 25 | 80 | 10 | A355 |
| CEPU4100 | ● | 10 | – | 25 | 80 | 10 | A356 |
| EPQR4100-CS | ● | 10 | – | 25 | 80 | 10 | A369 |
| EAP4100-TH | ◎ | 10 | – | 25 | 80 | 10 | A371 |
| EAP6100-TH | ◎ | 10 | – | 25 | 80 | 10 | A371 |
| EPAS2100-SD | ● | 10 | – | 25 | 80 | 10 | A380 |
| ECH4100-SD | ● | 10 | – | 25 | 100 | 10 | A381 |
| ECX3100-SD | ● | 10 | – | 25 | 100 | 10 | A381 |
| FE710 | □ | 10 | – | 30 | 80 | 10 | A440 |
| ECN12100-HD | ◎ | 10 | – | 30 | 100 | 10 | A382 |
| ECW13100-HD | ◎ | 10 | – | 30 | 100 | 10 | A382 |
| EPPM4100-TH | ● | 10 | – | 33 | 80 | 10 | A328 |
| EPPM4100 | ● | 10 | – | 33 | 80 | 10 | A338 |
| HESM2100-C | ● | 10 | – | 33 | 80 | 10 | A388 |
| HESM2100 | ● | 10 | – | 33 | 80 | 10 | A391 |
| HESM4100-C | ● | 10 | – | 33 | 80 | 10 | A394 |
| HESM4100 | ● | 10 | – | 33 | 80 | 10 | A396 |
| EPQM4100-CS | □ | 10 | – | 35 | 90 | 10 | A455 |
| EPSFM4100-PN | ● | 10 | – | 40 | 100 | 10 | A310 |
| EPSMM4100-PN | ● | 10 | – | 40 | 100 | 10 | A315 |
| EPPL4100-TH | ● | 10 | – | 45 | 100 | 10 | A328 |
| EPPL4100 | ● | 10 | – | 45 | 100 | 10 | A338 |
| CEPL6100-TH | ● | 10 | – | 45 | 100 | 10 | A352 |
| CEPL6100 | ● | 10 | – | 45 | 100 | 10 | A355 |
| HESL2100-C | ● | 10 | – | 50 | 95 | 10 | A388 |
| HESL2100 | ● | 10 | – | 50 | 95 | 10 | A391 |
| HESL4100-C | ● | 10 | – | 50 | 95 | 10 | A394 |
| HESL4100 | ● | 10 | – | 50 | 95 | 10 | A396 |
| EPSFL4100-PN | ● | 10 | – | 50 | 100 | 10 | A310 |
| EPSML4100-PN | ● | 10 | – | 50 | 100 | 10 | A315 |
| EPSWL4100-PN | ● | 10 | – | 50 | 100 | 10 | A362 |
| EPQL4100-CS | ● | 10 | – | 50 | 100 | 10 | A369 |
| GSR2100 | □ | 10 | – | 50 | 120 | 10 | A441 |
| GSE4100 | □ | 10 | – | 50 | 120 | 10 | A432 |
| GXR2100 | □ | 10 | – | 50 | 170 | 10 | A441 |
| GSD4100 | □ | 10 | – | 50 | 180 | 10 | A432 |
| GSL2100 | □ | 10 | – | 120 | 170 | 10 | A441 |
| EPSMS4101-PN | □ | 10.1 | – | 15.2 | 86 | 12 | A312 |
| HES2101 | □ | 10.1 | – | 25 | 70 | 10 | A390 |
| EPSM4101-PN | □ | 10.1 | – | 25.3 | 86 | 12 | A314 |
| EPSMS4102-PN | □ | 10.2 | – | 15.3 | 86 | 12 | A312 |
| HES2102 | □ | 10.2 | – | 25 | 70 | 10 | A390 |
| EPSM4102-PN | □ | 10.2 | – | 25.5 | 86 | 12 | A314 |
| EPSMS4103-PN | □ | 10.3 | – | 15.5 | 86 | 12 | A312 |
| HES2103 | □ | 10.3 | – | 25 | 70 | 10 | A390 |
| EPSM4103-PN | □ | 10.3 | – | 25.8 | 86 | 12 | A314 |
| EPSMS4104-PN | □ | 10.4 | – | 15.6 | 86 | 12 | A312 |
| HES2104 | □ | 10.4 | – | 25 | 70 | 10 | A390 |
| EPSM4104-PN | □ | 10.4 | – | 26 | 86 | 12 | A314 |
| EPSM4105-31.5-PN | □ | 10.5 | 31.5 | 15.8 | 86 | 12 | A317 |

□印：特定代理店在庫です。弊社営業へお問合せください。□：Stocked by specified distributor. Contact with our sales department.

Quick dimension reference table by mill diameter

# 外径別寸法早見表

## 超硬エンドミル・スクエア　φ10.5～φ16　Carbide End Mills -Square

単位 unit：mm

| 商品コード Item Code | 在庫 Stock | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EPSM4105-52.5-PN | □ | 10.5 | 52.5 | 15.8 | 110 | 12 | A318 |
| EPSMS4105-PN | □ | 10.5 | – | 15.8 | 86 | 12 | A312 |
| EPPS4105 | □ | 10.5 | – | 15.8 | 100 | 12 | A336 |
| PESS2105 | □ | 10.5 | – | 22 | 70 | 10 | A435 |
| HES2105-C | ● | 10.5 | – | 25 | 70 | 10 | A387 |
| HES2105 | ● | 10.5 | – | 25 | 70 | 10 | A390 |
| HES4105 | □ | 10.5 | – | 25 | 70 | 10 | A396 |
| PESR2105 | □ | 10.5 | – | 25 | 70 | 10 | A435 |
| PESR4105 | □ | 10.5 | – | 25 | 70 | 10 | A435 |
| EPSM4105-PN | □ | 10.5 | – | 26.3 | 86 | 12 | A314 |
| EPSW4105-PN | □ | 10.5 | – | 26.3 | 86 | 12 | A361 |
| CEPR6105-TH | ● | 10.5 | – | 30 | 100 | 12 | A352 |
| CEPR6105 | ● | 10.5 | – | 30 | 100 | 12 | A355 |
| EPSMS4106-PN | □ | 10.6 | – | 15.9 | 86 | 12 | A312 |
| HES2106 | □ | 10.6 | – | 25 | 75 | 12 | A390 |
| EPSM4106-PN | □ | 10.6 | – | 26.5 | 86 | 12 | A314 |
| EPSMS4107-PN | □ | 10.7 | – | 16.1 | 86 | 12 | A312 |
| HES2107 | □ | 10.7 | – | 25 | 75 | 12 | A390 |
| EPSM4107-PN | □ | 10.7 | – | 26.8 | 86 | 12 | A314 |
| EPSMS4108-PN | □ | 10.8 | – | 16.2 | 86 | 12 | A312 |
| HES2108 | □ | 10.8 | – | 25 | 75 | 12 | A390 |
| EPSM4108-PN | □ | 10.8 | – | 27 | 86 | 12 | A314 |
| EPSMS4109-PN | □ | 10.9 | – | 16.4 | 86 | 12 | A312 |
| HES2109 | □ | 10.9 | – | 25 | 75 | 12 | A390 |
| EPSM4109-PN | □ | 10.9 | – | 27.3 | 86 | 12 | A314 |
| EPSM4110-33-PN | ● | 11 | 33 | 16.5 | 86 | 12 | A317 |
| EPSW4110-33-PN | ● | 11 | 33 | 16.5 | 86 | 12 | A363 |
| EPSM4110-55-PN | ● | 11 | 55 | 16.5 | 110 | 12 | A318 |
| EPSW4110-55-PN | ● | 11 | 55 | 16.5 | 110 | 12 | A363 |
| EMXR4110-SR-TH | ● | 11 | – | 15 | 110 | 10 | A346 |
| EMXN4110-SR-TH | ● | 11 | – | 15 | 110 | 10 | A347 |
| EPPLS4110 | ● | 11 | – | 15 | 150 | 10 | A338 |
| EPQLS4110-CS | □ | 11 | – | 15 | 150 | 10 | A455 |
| KES2110 | □ | 11 | – | 16.5 | 65 | 12 | A440 |
| KESU2110 | □ | 11 | – | 16.5 | 65 | 12 | A440 |
| EPPS4110-P-CS | ● | 11 | – | 16.5 | 75 | 12 | A332 |
| EPSMS4110-PN | □ | 11 | – | 16.5 | 86 | 12 | A312 |
| EPPS4110 | □ | 11 | – | 16.5 | 100 | 12 | A336 |
| EPSMLS4110-PN | ● | 11 | – | 16.5 | 150 | 10 | A316 |
| TES2110 | □ | 11 | – | 20 | 75 | 12 | A440 |
| PESS2110-C | □ | 11 | – | 22 | 75 | 12 | A434 |
| PESS2110 | □ | 11 | – | 22 | 75 | 12 | A435 |
| EPP3110-CS | □ | 11 | – | 22 | 100 | 12 | A308 |
| EPP4110-TH | ● | 11 | – | 22 | 100 | 12 | A328 |
| EPP4110 | ● | 11 | – | 22 | 100 | 12 | A337 |
| AES2110 | ● | 11 | – | 25 | 75 | 12 | A386 |
| HES2110-C | ● | 11 | – | 25 | 75 | 12 | A387 |
| HES2110 | ● | 11 | – | 25 | 75 | 12 | A390 |
| HES4110-C | ● | 11 | – | 25 | 75 | 12 | A394 |
| HES4110 | ● | 11 | – | 25 | 75 | 12 | A396 |
| PESR2110-C | □ | 11 | – | 25 | 75 | 12 | A434 |
| PESR4110-C | □ | 11 | – | 25 | 75 | 12 | A434 |
| PESR2110 | □ | 11 | – | 25 | 75 | 12 | A435 |
| PESR4110 | □ | 11 | – | 25 | 75 | 12 | A435 |
| SES3110 | □ | 11 | – | 25 | 75 | 12 | A439 |
| EPAS2110-SD | ● | 11 | – | 25 | 100 | 12 | A380 |
| EPSF4110-PN | ● | 11 | – | 27.5 | 86 | 12 | A310 |
| EPSM4110-PN | ● | 11 | – | 27.5 | 86 | 12 | A314 |
| EPSW4110-PN | ● | 11 | – | 27.5 | 86 | 12 | A361 |
| EPQR4110-CS | ● | 11 | – | 30 | 85 | 12 | A369 |
| CEPR6110-TH | ● | 11 | – | 30 | 100 | 12 | A352 |
| CEPR6110 | ● | 11 | – | 30 | 100 | 12 | A355 |
| HESM2110 | □ | 11 | – | 33 | 90 | 12 | A391 |
| HESM4110 | □ | 11 | – | 33 | 90 | 12 | A396 |
| EPPM4110 | □ | 11 | – | 33 | 100 | 12 | A338 |
| EPSFM4110-PN | ● | 11 | – | 44 | 120 | 12 | A310 |
| EPSMM4110-PN | ● | 11 | – | 44 | 120 | 12 | A315 |
| EPQM4110-CS | □ | 11 | – | 45 | 110 | 12 | A455 |
| HESL2110 | □ | 11 | – | 50 | 95 | 12 | A391 |

| 商品コード Item Code | 在庫 Stock | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| HESL4110 | □ | 11 | – | 50 | 100 | 12 | A396 |
| GSR2110 | □ | 11 | – | 50 | 120 | 10 | A441 |
| GSE4110 | □ | 11 | – | 50 | 120 | 10 | A432 |
| GXR2110 | □ | 11 | – | 50 | 170 | 10 | A441 |
| GSD4110 | □ | 11 | – | 50 | 180 | 10 | A432 |
| EPSFL4110-PN | ● | 11 | – | 55 | 120 | 12 | A310 |
| EPSML4110-PN | □ | 11 | – | 55 | 120 | 12 | A315 |
| EPPL4110 | □ | 11 | – | 55 | 120 | 12 | A338 |
| CEPL6110-TH | ● | 11 | – | 55 | 120 | 12 | A352 |
| CEPL6110 | ● | 11 | – | 55 | 120 | 12 | A355 |
| EPSWL4110-PN | □ | 11 | – | 55 | 120 | 12 | A362 |
| EPQL4110-CS | □ | 11 | – | 60 | 120 | 12 | A369 |
| GSL2110 | □ | 11 | – | 120 | 170 | 10 | A441 |
| ES8WB1100LS-ATH | ● | 11 | | 11 | 110 | 10 | A344 |
| EPSMS4111-PN | □ | 11.1 | – | 16.7 | 86 | 12 | A312 |
| HES2111 | □ | 11.1 | – | 25 | 75 | 12 | A390 |
| EPSM4111-PN | □ | 11.1 | – | 27.8 | 86 | 12 | A314 |
| EPSMS4112-PN | □ | 11.2 | – | 16.8 | 86 | 12 | A312 |
| HES2112 | □ | 11.2 | – | 25 | 75 | 12 | A390 |
| EPSM4112-PN | □ | 11.2 | – | 28 | 86 | 12 | A314 |
| EPSMS4113-PN | □ | 11.3 | – | 17 | 86 | 12 | A312 |
| HES2113 | □ | 11.3 | – | 25 | 75 | 12 | A390 |
| EPSM4113-PN | □ | 11.3 | – | 28.3 | 86 | 12 | A314 |
| EPSMS4114-PN | □ | 11.4 | – | 17.1 | 86 | 12 | A312 |
| HES2114 | □ | 11.4 | – | 25 | 75 | 12 | A390 |
| EPSM4114-PN | □ | 11.4 | – | 28.5 | 86 | 12 | A314 |
| EPSM4115-34.5-PN | □ | 11.5 | 34.5 | 17.3 | 86 | 12 | A317 |
| EPSM4115-57.5-PN | □ | 11.5 | 57.5 | 17.3 | 110 | 12 | A318 |
| EPSMS4115-PN | □ | 11.5 | – | 17.3 | 86 | 12 | A312 |
| EPPS4115 | □ | 11.5 | – | 17.3 | 100 | 12 | A336 |
| PESS2115 | □ | 11.5 | – | 22 | 75 | 12 | A435 |
| HES2115 | □ | 11.5 | – | 25 | 75 | 12 | A390 |
| HES4115 | □ | 11.5 | – | 25 | 75 | 12 | A396 |
| PESR2115 | □ | 11.5 | – | 25 | 75 | 12 | A435 |
| PESR4115 | □ | 11.5 | – | 25 | 75 | 12 | A435 |
| EPSM4115-PN | □ | 11.5 | – | 28.8 | 86 | 12 | A314 |
| EPSW4115-PN | □ | 11.5 | – | 28.8 | 86 | 12 | A361 |
| CEPR6115-TH | ● | 11.5 | – | 30 | 100 | 12 | A352 |
| CEPR6115 | ● | 11.5 | – | 30 | 100 | 12 | A355 |
| EPSMS4116-PN | □ | 11.6 | – | 17.4 | 86 | 12 | A312 |
| HES2116 | □ | 11.6 | – | 25 | 75 | 12 | A390 |
| EPSM4116-PN | □ | 11.6 | – | 29 | 86 | 12 | A314 |
| EPSMS4117-PN | □ | 11.7 | – | 17.6 | 86 | 12 | A312 |
| HES2117 | □ | 11.7 | – | 25 | 75 | 12 | A390 |
| EPSM4117-PN | □ | 11.7 | – | 29.3 | 86 | 12 | A314 |
| EPSMS4118-PN | □ | 11.8 | – | 17.7 | 86 | 12 | A312 |
| HES2118 | □ | 11.8 | – | 25 | 75 | 12 | A390 |
| EPSM4118-PN | □ | 11.8 | – | 29.5 | 86 | 12 | A314 |
| EPSMS4119-PN | □ | 11.9 | – | 17.9 | 86 | 12 | A312 |
| HES2119 | □ | 11.9 | – | 25 | 75 | 12 | A390 |
| EPSM4119-PN | □ | 11.9 | – | 29.8 | 86 | 12 | A314 |
| EPSM4120-36-PN | ● | 12 | 36 | 18 | 86 | 12 | A317 |
| EPSW4120-36-PN | ● | 12 | 36 | 18 | 86 | 12 | A363 |
| EMXA3120-36 | ◎ | 12 | 36 | 18 | 120 | 12 | A374 |
| ES8WB1200LN-40-ATH | ● | 12 | 40 | 12 | 90 | 12 | A344 |
| ES8WB1200LN-60-ATH | ● | 12 | 60 | 12 | 110 | 12 | A344 |
| EPSM4120-60-PN | ● | 12 | 60 | 18 | 110 | 12 | A318 |
| EPSW4120-60-PN | ● | 12 | 60 | 18 | 110 | 12 | A363 |
| ES8WB1200LN-80-ATH | ● | 12 | 80 | 12 | 130 | 12 | A344 |
| ES8WB1200LN-100-ATH | ● | 12 | 100 | 12 | 150 | 12 | A344 |
| EHX12-EPP4120-TH | ● | 12 | – | 9.6 | 19 | – | A399 |
| EHX12-CEPR6120-TH | ● | 12 | – | 12 | 19 | – | A398 |
| KES2120 | □ | 12 | – | 18 | 65 | 12 | A440 |
| KESU2120 | □ | 12 | – | 18 | 65 | 12 | A440 |
| EPPS4120-P-CS | ● | 12 | – | 18 | 75 | 12 | A332 |
| EPSMS4120-PN | □ | 12 | – | 18 | 86 | 12 | A312 |
| EPPS4120-TH | ● | 12 | – | 18 | 100 | 12 | A328 |
| EPPS4120 | ● | 12 | – | 18 | 100 | 12 | A337 |
| EMXR4120-TH | ● | 12 | – | 18 | 100 | 12 | A346 |

| 商品コード Item Code | 在庫 Stock | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EMXN4120-TH | ● | 12 | – | 18 | 100 | 12 | A347 |
| EPSMLS4120-PN | ● | 12 | – | 18 | 160 | 11 | A316 |
| EPPLS4120 | ● | 12 | – | 18 | 160 | 11 | A338 |
| EPQLS4120-CS | □ | 12 | – | 18 | 160 | 11 | A455 |
| PESS2120-C | □ | 12 | – | 22 | 75 | 12 | A434 |
| PESS2120 | □ | 12 | – | 22 | 75 | 12 | A435 |
| TES2120 | □ | 12 | – | 22 | 75 | 12 | A440 |
| EPQS4120-CS | □ | 12 | – | 22 | 75 | 12 | A455 |
| CEPH6120 | ● | 12 | – | 24 | 100 | 12 | A356 |
| CEPLS6120-10 | ● | 12 | – | 24 | 120 | 10 | A356 |
| CEPLS6120 | ● | 12 | – | 24 | 120 | 12 | A356 |
| AES2120 | ● | 12 | – | 25 | 75 | 12 | A386 |
| HES2120-C | ● | 12 | – | 25 | 75 | 12 | A387 |
| HES2120 | ● | 12 | – | 25 | 75 | 12 | A390 |
| HES4120-C | ● | 12 | – | 25 | 75 | 12 | A394 |
| HES4120 | ● | 12 | – | 25 | 75 | 12 | A396 |
| PESR2120-C | □ | 12 | – | 25 | 75 | 12 | A434 |
| PESR4120-C | □ | 12 | – | 25 | 75 | 12 | A434 |
| PESR2120 | □ | 12 | – | 25 | 75 | 12 | A435 |
| PESR4120 | □ | 12 | – | 25 | 75 | 12 | A435 |
| SES3120 | □ | 12 | – | 25 | 75 | 12 | A439 |
| SES3120-C | □ | 12 | – | 25 | 75 | 12 | A439 |
| EPAS2120-SD | ● | 12 | – | 25 | 100 | 12 | A380 |
| YS2120-CS | □ | 12 | – | 26 | 75 | 12 | A437 |
| HGOS2120-PN | ● | 12 | – | 26 | 100 | 12 | A304 |
| EPP3120-CS | ● | 12 | – | 26 | 100 | 12 | A308 |
| EPP4120-TH | ● | 12 | – | 26 | 100 | 12 | A328 |
| EPP4120-CS | ● | 12 | – | 26 | 100 | 12 | A332 |
| EPP4120-P-CS | ● | 12 | – | 26 | 100 | 12 | A332 |
| EPP4120 | ● | 12 | – | 26 | 100 | 12 | A337 |
| YR4120-CS | □ | 12 | – | 30 | 75 | 12 | A437 |
| FE712 | □ | 12 | – | 30 | 80 | 12 | A440 |
| EPSF4120-PN | ● | 12 | – | 30 | 86 | 12 | A310 |
| EPSM4120-PN | ● | 12 | – | 30 | 86 | 12 | A314 |
| EPSW4120-PN | ● | 12 | – | 30 | 86 | 12 | A361 |
| EPQR4120-CS | ● | 12 | – | 30 | 90 | 12 | A369 |
| HGOS4120-PN | ● | 12 | – | 30 | 100 | 12 | A305 |
| CEPR6120-TH | ● | 12 | – | 30 | 100 | 12 | A352 |
| CEPR6120 | ● | 12 | – | 30 | 100 | 12 | A355 |
| CEPU4120 | ● | 12 | – | 30 | 100 | 12 | A356 |
| EAP4120-TH | ◎ | 12 | – | 30 | 100 | 12 | A371 |
| EAP6120-TH | ◎ | 12 | – | 30 | 100 | 12 | A371 |
| ECH4120-SD | ● | 12 | – | 30 | 110 | 12 | A381 |
| ECX3120-SD | ● | 12 | – | 30 | 110 | 12 | A381 |
| ECN12120-HD | ◎ | 12 | – | 36 | 110 | 12 | A382 |
| ECW13120-HD | ◎ | 12 | – | 36 | 110 | 12 | A382 |
| HESM2120-C | ● | 12 | – | 37 | 90 | 12 | A388 |
| HESM2120 | ● | 12 | – | 37 | 90 | 12 | A391 |
| HESM4120-C | ● | 12 | – | 37 | 90 | 12 | A394 |
| HESM4120 | ● | 12 | – | 37 | 90 | 12 | A396 |
| EPPM4120-TH | ● | 12 | – | 37 | 100 | 12 | A328 |
| EPPM4120 | ● | 12 | – | 37 | 100 | 12 | A338 |
| EPQM4120-CS | □ | 12 | – | 45 | 110 | 12 | A455 |
| EPSFM4120-PN | ● | 12 | – | 48 | 120 | 12 | A310 |
| EPSMM4120-PN | ● | 12 | – | 48 | 120 | 12 | A315 |
| HESL2120-C | ● | 12 | – | 50 | 100 | 12 | A388 |
| HESL2120 | ● | 12 | – | 50 | 100 | 12 | A391 |
| HESL4120-C | ● | 12 | – | 50 | 100 | 12 | A394 |
| HESL4120 | ● | 12 | – | 50 | 100 | 12 | A396 |
| EPPL4120-TH | ● | 12 | – | 55 | 120 | 12 | A328 |
| EPPL4120 | ● | 12 | – | 55 | 120 | 12 | A338 |
| CEPL6120-TH | ● | 12 | – | 55 | 120 | 12 | A352 |
| CEPL6120 | ● | 12 | – | 55 | 120 | 12 | A355 |
| GSR2120 | □ | 12 | – | 55 | 130 | 12 | A441 |
| GSE4120 | □ | 12 | – | 55 | 130 | 12 | A432 |
| GXR2120 | □ | 12 | – | 55 | 190 | 12 | A441 |
| GSD4120 | □ | 12 | – | 55 | 200 | 12 | A432 |
| EPSFL4120-PN | ● | 12 | – | 60 | 120 | 12 | A310 |
| EPSML4120-PN | ● | 12 | – | 60 | 120 | 12 | A315 |

●印：標準在庫品です。　●：Stocked Items.　◎印：メーカー在庫品です。弊社営業へお問合せください。　◎：Manufacturer stocked items Contact with our sales department.

単位 unit：mm

| 商品コード Item Code | 在庫 Stock | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EPSWL4120-PN | ● | 12 | – | 60 | 120 | 12 | A362 |
| EPQL4120-CS | ● | 12 | – | 60 | 120 | 12 | A369 |
| GSL2120 | □ | 12 | – | 130 | 190 | 12 | A441 |
| EPPS4125 | □ | 12.5 | – | 18.8 | 100 | 12 | A337 |
| EPSMS4125-PN | □ | 12.5 | – | 18.8 | 100 | 16 | A312 |
| EPSM4125-PN | □ | 12.5 | – | 31.3 | 105 | 16 | A314 |
| EPSM4130-39-PN | □ | 13 | 39 | 19.5 | 105 | 16 | A317 |
| EPSM4130-65-PN | □ | 13 | 65 | 19.5 | 125 | 16 | A318 |
| EMXR4130-SR-TH | ● | 13 | – | 18 | 120 | 12 | A346 |
| EMXN4130-SR-TH | ● | 13 | – | 18 | 120 | 12 | A347 |
| EPPLS4130 | ● | 13 | – | 18 | 160 | 12 | A338 |
| EPQLS4130-CS | □ | 13 | – | 18 | 160 | 12 | A455 |
| KES2130 | □ | 13 | – | 19.5 | 70 | 16 | A440 |
| KESU2130 | □ | 13 | – | 19.5 | 70 | 16 | A440 |
| EPPS4130 | □ | 13 | – | 19.5 | 100 | 12 | A337 |
| EPSMS4130-PN | □ | 13 | – | 19.5 | 100 | 16 | A312 |
| EPSMLS4130-PN | ● | 13 | – | 19.5 | 160 | 12 | A316 |
| PESS2130-C | □ | 13 | – | 22 | 75 | 12 | A434 |
| PESS2130 | □ | 13 | – | 22 | 75 | 12 | A435 |
| AES2130 | ● | 13 | – | 25 | 75 | 12 | A386 |
| HES2130-C | ● | 13 | – | 25 | 75 | 12 | A387 |
| HES2130 | ● | 13 | – | 25 | 75 | 12 | A390 |
| HES4130-C | ● | 13 | – | 25 | 75 | 12 | A394 |
| HES4130 | ● | 13 | – | 25 | 75 | 12 | A396 |
| PESR2130-C | □ | 13 | – | 25 | 75 | 12 | A434 |
| PESR4130-C | □ | 13 | – | 25 | 75 | 12 | A434 |
| SES3130 | □ | 13 | – | 25 | 75 | 12 | A439 |
| EPP3130-CS | □ | 13 | – | 26 | 100 | 12 | A308 |
| EPP4130-TH | ● | 13 | – | 26 | 100 | 12 | A328 |
| EPP4130 | ● | 13 | – | 26 | 100 | 12 | A337 |
| EPSM4130-PN | □ | 13 | – | 32.5 | 105 | 16 | A314 |
| EPSW4130-PN | □ | 13 | – | 32.5 | 105 | 16 | A361 |
| EPQR4130-CS | □ | 13 | – | 35 | 100 | 16 | A369 |
| CEPR6130-TH | ● | 13 | – | 35 | 105 | 16 | A352 |
| CEPR6130 | ● | 13 | – | 35 | 105 | 16 | A355 |
| HESM2130 | □ | 13 | – | 37 | 100 | 12 | A391 |
| HESM4130-C | □ | 13 | – | 37 | 100 | 12 | A394 |
| HESM4130 | □ | 13 | – | 37 | 100 | 12 | A396 |
| EPPM4130 | □ | 13 | – | 43 | 100 | 12 | A338 |
| HESL2130 | □ | 13 | – | 50 | 100 | 12 | A391 |
| HESL4130-C | □ | 13 | – | 50 | 100 | 12 | A394 |
| HESL4130 | □ | 13 | – | 50 | 100 | 12 | A396 |
| EPQM4130-CS | □ | 13 | – | 50 | 120 | 16 | A455 |
| EPPL4130 | □ | 13 | – | 55 | 120 | 12 | A338 |
| CEPL6130 | □ | 13 | – | 55 | 125 | 16 | A355 |
| GSR2130 | □ | 13 | – | 55 | 130 | 12 | A441 |
| GSE4130 | □ | 13 | – | 55 | 130 | 12 | A432 |
| GXR2130 | □ | 13 | – | 55 | 190 | 12 | A441 |
| GSD4130 | □ | 13 | – | 55 | 200 | 12 | A432 |
| EPSML4130-PN | □ | 13 | – | 65 | 130 | 16 | A315 |
| EPSWL4130-PN | □ | 13 | – | 65 | 130 | 16 | A362 |
| EPQL4130-CS | □ | 13 | – | 70 | 130 | 16 | A369 |
| GSL2130 | □ | 13 | – | 130 | 190 | 12 | A441 |
| EPPS4135 | □ | 13.5 | – | 20.3 | 100 | 12 | A337 |
| EPSMS4135-PN | □ | 13.5 | – | 20.3 | 100 | 16 | A312 |
| EPSM4135-PN | □ | 13.5 | – | 33.8 | 105 | 16 | A314 |
| EPSM4140-42-PN | □ | 14 | 42 | 21 | 105 | 16 | A317 |
| EPSM4140-70-PN | □ | 14 | 70 | 21 | 125 | 16 | A318 |
| EPPLS4140 | □ | 14 | – | 18 | 160 | 13 | A338 |
| EPQLS4140-CS | □ | 14 | – | 18 | 160 | 13 | A455 |
| KES2140 | □ | 14 | – | 21 | 70 | 16 | A440 |
| KESU2140 | □ | 14 | – | 21 | 70 | 16 | A440 |
| EPPS4140 | □ | 14 | – | 21 | 100 | 12 | A337 |
| EPSMS4140-PN | □ | 14 | – | 21 | 100 | 16 | A312 |
| EPP3140-CS | □ | 14 | – | 26 | 110 | 16 | A308 |
| EPP4140-TH | ● | 14 | – | 26 | 110 | 16 | A328 |
| EPP4140 | ● | 14 | – | 26 | 110 | 16 | A337 |
| PESS2140-C | □ | 14 | – | 27 | 90 | 16 | A434 |
| PESS2140 | □ | 14 | – | 27 | 90 | 16 | A435 |

| 商品コード Item Code | 在庫 Stock | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| FE714 | □ | 14 | – | 35 | 80 | 14 | A440 |
| AES2140 | ● | 14 | – | 35 | 90 | 12 | A386 |
| HES2140-C | ● | 14 | – | 35 | 90 | 16 | A387 |
| HES2140 | ● | 14 | – | 35 | 90 | 16 | A390 |
| HES4140-C | ● | 14 | – | 35 | 90 | 16 | A394 |
| HES4140 | ● | 14 | – | 35 | 90 | 16 | A396 |
| PESR2140-C | □ | 14 | – | 35 | 90 | 16 | A434 |
| PESR4140-C | □ | 14 | – | 35 | 90 | 16 | A434 |
| SES3140 | □ | 14 | – | 35 | 90 | 16 | A439 |
| SES3140-C | □ | 14 | – | 35 | 90 | 16 | A439 |
| EPQR4140-CS | □ | 14 | – | 35 | 100 | 16 | A369 |
| EPSM4140-PN | □ | 14 | – | 35 | 105 | 16 | A314 |
| CEPR6140-TH | ● | 14 | – | 35 | 105 | 16 | A352 |
| CEPR6140 | ● | 14 | – | 35 | 105 | 16 | A355 |
| EPSW4140-PN | □ | 14 | – | 35 | 105 | 16 | A361 |
| HESM2140-C | □ | 14 | – | 42 | 100 | 16 | A388 |
| HESM2140 | □ | 14 | – | 42 | 100 | 16 | A391 |
| HESM4140-C | □ | 14 | – | 42 | 100 | 16 | A394 |
| HESM4140 | □ | 14 | – | 42 | 100 | 16 | A396 |
| EPPM4140 | □ | 14 | – | 43 | 110 | 16 | A338 |
| EPQM4140-CS | □ | 14 | – | 50 | 120 | 16 | A455 |
| EPPL4140 | □ | 14 | – | 55 | 125 | 16 | A338 |
| CEPL6140-TH | ● | 14 | – | 55 | 125 | 16 | A352 |
| CEPL6140 | ● | 14 | – | 55 | 125 | 16 | A355 |
| GSR4140 | □ | 14 | – | 60 | 140 | 12 | A441 |
| GXR4140 | □ | 14 | – | 60 | 210 | 12 | A441 |
| HESL2140-C | □ | 14 | – | 70 | 125 | 16 | A388 |
| HESL2140 | □ | 14 | – | 70 | 125 | 16 | A391 |
| HESL4140-C | □ | 14 | – | 70 | 125 | 16 | A394 |
| HESL4140 | □ | 14 | – | 70 | 125 | 16 | A396 |
| EPSML4140-PN | □ | 14 | – | 70 | 130 | 16 | A315 |
| EPSWL4140-PN | □ | 14 | – | 70 | 130 | 16 | A362 |
| EPQL4140-CS | □ | 14 | – | 70 | 130 | 16 | A369 |
| GSL4140 | □ | 14 | – | 140 | 210 | 12 | A441 |
| EPSMS4145-PN | □ | 14.5 | – | 21.8 | 100 | 16 | A312 |
| EPPS4145 | □ | 14.5 | – | 21.8 | 110 | 16 | A337 |
| EPSM4145-PN | □ | 14.5 | – | 36.3 | 110 | 16 | A314 |
| EPSM4150-45-PN | □ | 15 | 45 | 22.5 | 110 | 16 | A317 |
| EPSM4150-75-PN | □ | 15 | 75 | 22.5 | 135 | 16 | A318 |
| EPPLS4150 | □ | 15 | – | 22 | 180 | 14 | A338 |
| EPQLS4150-CS | □ | 15 | – | 22 | 180 | 14 | A455 |
| KES2150 | □ | 15 | – | 22.5 | 70 | 16 | A440 |
| KESU2150 | □ | 15 | – | 22.5 | 70 | 16 | A440 |
| EPSMS4150-PN | □ | 15 | – | 22.5 | 100 | 16 | A312 |
| EPPS4150 | □ | 15 | – | 22.5 | 110 | 16 | A337 |
| EPP3150-CS | □ | 15 | – | 26 | 110 | 16 | A308 |
| EPP4150-TH | ● | 15 | – | 26 | 110 | 16 | A328 |
| EPP4150 | ● | 15 | – | 26 | 110 | 16 | A337 |
| PESS2150-C | □ | 15 | – | 27 | 90 | 16 | A434 |
| PESS2150 | □ | 15 | – | 27 | 90 | 16 | A435 |
| AES2150 | ● | 15 | – | 35 | 90 | 16 | A386 |
| HES2150-C | ● | 15 | – | 35 | 90 | 16 | A387 |
| HES2150 | ● | 15 | – | 35 | 90 | 16 | A390 |
| HES4150-C | ● | 15 | – | 35 | 90 | 16 | A394 |
| HES4150 | ● | 15 | – | 35 | 90 | 16 | A396 |
| PESR2150-C | □ | 15 | – | 35 | 90 | 16 | A434 |
| PESR4150-C | □ | 15 | – | 35 | 90 | 16 | A434 |
| SES3150 | □ | 15 | – | 35 | 90 | 16 | A439 |
| SES3150-C | □ | 15 | – | 35 | 90 | 16 | A439 |
| EPQR4150-CS | □ | 15 | – | 35 | 100 | 16 | A369 |
| EPSM4150-PN | □ | 15 | – | 37.5 | 110 | 16 | A314 |
| EPSW4150-PN | □ | 15 | – | 37.5 | 110 | 16 | A361 |
| CEPR6150-TH | ● | 15 | – | 40 | 110 | 16 | A352 |
| CEPR6150 | ● | 15 | – | 40 | 110 | 16 | A355 |
| HESM2150-C | □ | 15 | – | 42 | 110 | 16 | A388 |
| HESM2150 | □ | 15 | – | 42 | 110 | 16 | A391 |
| HESM4150-C | □ | 15 | – | 42 | 110 | 16 | A394 |
| HESM4150 | □ | 15 | – | 42 | 110 | 16 | A396 |
| EPPM4150 | □ | 15 | – | 47 | 110 | 16 | A338 |

| 商品コード Item Code | 在庫 Stock | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EPQM4150-CS | □ | 15 | – | 50 | 120 | 16 | A455 |
| GSR4150 | □ | 15 | – | 60 | 140 | 12 | A441 |
| GXR4150 | □ | 15 | – | 60 | 210 | 12 | A441 |
| EPPL4150 | □ | 15 | – | 65 | 135 | 16 | A338 |
| CEPL6150 | ● | 15 | – | 65 | 135 | 16 | A355 |
| HESL2150-C | □ | 15 | – | 70 | 125 | 16 | A388 |
| HESL2150 | □ | 15 | – | 70 | 125 | 16 | A391 |
| HESL4150-C | □ | 15 | – | 70 | 125 | 16 | A394 |
| HESL4150 | □ | 15 | – | 70 | 125 | 16 | A396 |
| EPQL4150-CS | □ | 15 | – | 70 | 130 | 16 | A369 |
| EPSML4150-PN | □ | 15 | – | 75 | 130 | 16 | A315 |
| EPSWL4150-PN | □ | 15 | – | 75 | 130 | 16 | A362 |
| GSL4150 | □ | 15 | – | 140 | 210 | 12 | A441 |
| EPSMS4155-PN | □ | 15.5 | – | 23.3 | 100 | 16 | A312 |
| EPPS4155 | □ | 15.5 | – | 23.3 | 110 | 16 | A337 |
| EPSM4155-PN | □ | 15.5 | – | 38.8 | 110 | 16 | A314 |
| EMXA3160-45 | ◎ | 16 | 45 | 19 | 90 | 16 | A374 |
| EPSM4160-48-PN | ● | 16 | 48 | 24 | 110 | 16 | A317 |
| EPSW4160-48-PN | ● | 16 | 48 | 24 | 110 | 16 | A363 |
| EPSM4160-80-PN | ● | 16 | 80 | 24 | 135 | 16 | A318 |
| EPSW4160-80-PN | ● | 16 | 80 | 24 | 135 | 16 | A363 |
| EHX16-EPP4160-TH | ● | 16 | – | 12.8 | 24 | – | A399 |
| EHX16-CEPR6160-TH | ● | 16 | – | 16 | 24 | – | A398 |
| KES2160 | □ | 16 | – | 24 | 70 | 16 | A440 |
| KESU2160 | □ | 16 | – | 24 | 70 | 16 | A440 |
| EPSMS4160-PN | □ | 16 | – | 24 | 100 | 16 | A312 |
| EPPS4160-TH | ● | 16 | – | 24 | 110 | 16 | A328 |
| EPPS4160 | ● | 16 | – | 24 | 110 | 16 | A337 |
| EMXR4160-TH | ● | 16 | – | 24 | 110 | 16 | A346 |
| EMXN4160-TH | ● | 16 | – | 24 | 110 | 16 | A347 |
| EPSMLS4160-PN | ● | 16 | – | 24 | 180 | 15 | A316 |
| EPPLS4160 | ● | 16 | – | 24 | 180 | 15 | A338 |
| EPQLS4160-CS | □ | 16 | – | 24 | 180 | 15 | A455 |
| PESS2160-C | □ | 16 | – | 27 | 90 | 16 | A434 |
| PESS2160 | □ | 16 | – | 27 | 90 | 16 | A435 |
| EPQS4160-CS | □ | 16 | – | 27 | 90 | 16 | A455 |
| EPP3160-CS | ● | 16 | – | 32 | 110 | 16 | A308 |
| EPP4160-TH | ● | 16 | – | 32 | 110 | 16 | A328 |
| EPP4160-CS | ● | 16 | – | 32 | 110 | 16 | A332 |
| EPP4160-P-CS | ● | 16 | – | 32 | 110 | 16 | A332 |
| EPP4160 | ● | 16 | – | 32 | 110 | 16 | A337 |
| CEPH6160 | ● | 16 | – | 32 | 110 | 16 | A356 |
| CEPLS6160-12 | ● | 16 | – | 32 | 135 | 12 | A356 |
| CEPLS6160 | ● | 16 | – | 32 | 135 | 16 | A356 |
| AES2160 | ● | 16 | – | 35 | 90 | 16 | A386 |
| HES2160-C | ● | 16 | – | 35 | 90 | 16 | A387 |
| HES2160 | ● | 16 | – | 35 | 90 | 16 | A390 |
| HES4160-C | ● | 16 | – | 35 | 90 | 16 | A394 |
| HES4160 | ● | 16 | – | 35 | 90 | 16 | A396 |
| PESR2160-C | □ | 16 | – | 35 | 90 | 16 | A434 |
| PESR4160-C | □ | 16 | – | 35 | 90 | 16 | A434 |
| YR4160-CS | □ | 16 | – | 35 | 90 | 16 | A437 |
| YS2160-CS | □ | 16 | – | 35 | 90 | 16 | A437 |
| SES3160 | □ | 16 | – | 35 | 90 | 16 | A439 |
| SES3160-C | □ | 16 | – | 35 | 90 | 16 | A439 |
| HGOS2160-PN | ● | 16 | – | 35 | 110 | 16 | A304 |
| HGOS4160-PN | ● | 16 | – | 35 | 110 | 16 | A305 |
| FE716 | □ | 16 | – | 35 | 110 | 16 | A440 |
| EPSM4160-PN | ● | 16 | – | 40 | 110 | 16 | A314 |
| CEPR6160-TH | ● | 16 | – | 40 | 110 | 16 | A352 |
| CEPR6160 | ● | 16 | – | 40 | 110 | 16 | A355 |
| CEPU4160 | ● | 16 | – | 40 | 110 | 16 | A356 |
| EPSW4160-PN | ● | 16 | – | 40 | 110 | 16 | A361 |
| EPQR4160-CS | ● | 16 | – | 40 | 110 | 16 | A369 |
| EAP4160-TH | ◎ | 16 | – | 40 | 110 | 16 | A371 |
| EAP6160-TH | ◎ | 16 | – | 40 | 110 | 16 | A371 |
| EPPM4160-TH | ● | 16 | – | 47 | 110 | 16 | A328 |
| EPPM4160 | ● | 16 | – | 47 | 110 | 16 | A338 |
| HESM2160-C | ● | 16 | – | 47 | 110 | 16 | A388 |

□印：特定代理店在庫です。弊社営業へお問合せください。□：Stocked by specified distributor. Contact with our sales department.

Quick dimension reference table by mill diameter

# 外径別寸法早見表

## 超硬エンドミル・スクエア　φ16～φ32　Carbide End Mills -Square

単位 unit：mm

| 商品コード Item Code | 在庫 Stock | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| HESM2160 | ● | 16 | – | 47 | 110 | 16 | A391 |
| HESM4160-C | ● | 16 | – | 47 | 110 | 16 | A394 |
| HESM4160 | ● | 16 | – | 47 | 110 | 16 | A396 |
| EPQM4160-CS | □ | 16 | – | 55 | 125 | 16 | A455 |
| GSE4160 | □ | 16 | – | 60 | 150 | 16 | A432 |
| GSD4160 | □ | 16 | – | 60 | 250 | 16 | A432 |
| EPSMM4160-PN | ● | 16 | – | 64 | 135 | 16 | A315 |
| EPPL4160-TH | ● | 16 | – | 65 | 135 | 16 | A328 |
| EPPL4160 | ● | 16 | – | 65 | 135 | 16 | A338 |
| CEPL6160-TH | ● | 16 | – | 65 | 135 | 16 | A352 |
| CEPL6160 | ● | 16 | – | 65 | 135 | 16 | A355 |
| GSR4160 | □ | 16 | – | 65 | 150 | 16 | A441 |
| GXR4160 | □ | 16 | – | 65 | 230 | 16 | A441 |
| HESL2160-C | ● | 16 | – | 70 | 125 | 16 | A388 |
| HESL2160 | ● | 16 | – | 70 | 125 | 16 | A391 |
| HESL4160-C | ● | 16 | – | 70 | 125 | 16 | A394 |
| HESL4160 | ● | 16 | – | 70 | 125 | 16 | A396 |
| EPQL4160-CS | ● | 16 | – | 75 | 135 | 16 | A369 |
| EPSML4160-PN | ● | 16 | – | 80 | 135 | 16 | A315 |
| EPSWL4160-PN | ● | 16 | – | 80 | 135 | 16 | A362 |
| GSL4160 | □ | 16 | – | 150 | 230 | 16 | A441 |
| EPSMS4165-PN | □ | 16.5 | – | 24.8 | 110 | 20 | A312 |
| EPSM4165-PN | □ | 16.5 | – | 41.3 | 120 | 20 | A314 |
| EPSM4170-51-PN | □ | 17 | 51 | 25.5 | 120 | 20 | A317 |
| EPSM4170-85-PN | □ | 17 | 85 | 25.5 | 145 | 20 | A318 |
| EPPLS4170 | ● | 17 | – | 24 | 180 | 16 | A338 |
| EPQLS4170-CS | □ | 17 | – | 24 | 180 | 16 | A455 |
| EPPS4170 | □ | 17 | – | 25.5 | 110 | 16 | A337 |
| EPSMS4170-PN | □ | 17 | – | 25.5 | 110 | 20 | A312 |
| EPSMLS4170-PN | ● | 17 | – | 25.5 | 180 | 16 | A316 |
| PESS2170 | □ | 17 | – | 30 | 90 | 16 | A435 |
| EPP3170-CS | □ | 17 | – | 32 | 110 | 16 | A308 |
| EPP4170-TH | ● | 17 | – | 32 | 110 | 16 | A328 |
| EPP4170 | ● | 17 | – | 32 | 110 | 16 | A337 |
| HES2170-C | □ | 17 | – | 35 | 90 | 16 | A387 |
| HES2170 | □ | 17 | – | 35 | 90 | 16 | A390 |
| HES4170 | □ | 17 | – | 35 | 90 | 16 | A396 |
| EPQR4170-CS | □ | 17 | – | 40 | 110 | 20 | A369 |
| CEPR6170-TH | ● | 17 | – | 40 | 120 | 20 | A352 |
| CEPR6170 | ● | 17 | – | 40 | 120 | 20 | A355 |
| EPSM4170-PN | □ | 17 | – | 42.5 | 120 | 20 | A314 |
| EPSW4170-PN | □ | 17 | – | 42.5 | 120 | 20 | A361 |
| EPPM4170 | □ | 17 | – | 47 | 110 | 16 | A338 |
| HESM2170 | □ | 17 | – | 47 | 110 | 16 | A391 |
| HESM4170 | □ | 17 | – | 47 | 110 | 16 | A396 |
| EPQM4170-CS | □ | 17 | – | 55 | 125 | 20 | A455 |
| EPPL4170 | □ | 17 | – | 65 | 145 | 20 | A338 |
| CEPL6170 | □ | 17 | – | 65 | 145 | 20 | A355 |
| GSR4170 | □ | 17 | – | 65 | 150 | 16 | A441 |
| GXR4170 | □ | 17 | – | 65 | 230 | 16 | A441 |
| HESL2170 | □ | 17 | – | 70 | 135 | 16 | A391 |
| HESL4170 | □ | 17 | – | 70 | 135 | 16 | A396 |
| EPQL4170-CS | □ | 17 | – | 75 | 135 | 20 | A369 |
| EPSML4170-PN | □ | 17 | – | 85 | 135 | 20 | A315 |
| EPSWL4170-PN | □ | 17 | – | 85 | 135 | 20 | A362 |
| GSL4170 | □ | 17 | – | 150 | 230 | 16 | A441 |
| EPSMS4175-PN | □ | 17.5 | – | 26.3 | 110 | 20 | A312 |
| EPSM4175-PN | □ | 17.5 | – | 43.8 | 120 | 20 | A314 |
| EPSM4180-54-PN | □ | 18 | 54 | 27 | 120 | 20 | A317 |
| EPSM4180-90-PN | □ | 18 | 90 | 27 | 145 | 20 | A318 |
| EPPS4180 | □ | 18 | – | 27 | 110 | 16 | A337 |
| EPSMS4180-PN | □ | 18 | – | 27 | 110 | 20 | A312 |
| EPPLS4180 | □ | 18 | – | 27 | 180 | 16 | A338 |
| EPQLS4180-CS | □ | 18 | – | 27 | 180 | 16 | A455 |
| PESS2180-C | □ | 18 | – | 30 | 105 | 20 | A434 |
| PESS2180 | □ | 18 | – | 30 | 105 | 20 | A435 |
| EPP3180-CS | □ | 18 | – | 32 | 125 | 20 | A308 |
| EPP4180-TH | ● | 18 | – | 32 | 125 | 20 | A328 |
| EPP4180 | ● | 18 | – | 32 | 125 | 20 | A337 |

| 商品コード Item Code | 在庫 Stock | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| CEPLS6180 | ● | 18 | – | 36 | 145 | 16 | A356 |
| AES2180 | ● | 18 | – | 40 | 105 | 16 | A386 |
| HES2180-C | ● | 18 | – | 40 | 105 | 20 | A387 |
| HES2180 | ● | 18 | – | 40 | 105 | 20 | A390 |
| HES4180-C | ● | 18 | – | 40 | 105 | 20 | A394 |
| HES4180 | ● | 18 | – | 40 | 105 | 20 | A396 |
| PESR2180-C | □ | 18 | – | 40 | 105 | 20 | A434 |
| PESR4180-C | □ | 18 | – | 40 | 105 | 20 | A434 |
| SES3180 | □ | 18 | – | 40 | 105 | 20 | A439 |
| FE718 | □ | 18 | – | 40 | 110 | 18 | A440 |
| CEPR6180-TH | ● | 18 | – | 40 | 120 | 20 | A352 |
| CEPR6180 | ● | 18 | – | 40 | 120 | 20 | A355 |
| EPSM4180-PN | □ | 18 | – | 45 | 120 | 20 | A314 |
| EPSW4180-PN | □ | 18 | – | 45 | 120 | 20 | A361 |
| EPQR4180-CS | □ | 18 | – | 45 | 120 | 20 | A369 |
| HESM2180-C | □ | 18 | – | 50 | 120 | 20 | A388 |
| HESM2180 | □ | 18 | – | 50 | 120 | 20 | A391 |
| HESM4180-C | □ | 18 | – | 50 | 120 | 20 | A394 |
| HESM4180 | □ | 18 | – | 50 | 120 | 20 | A396 |
| EPPM4180 | □ | 18 | – | 55 | 125 | 20 | A338 |
| EPQM4180-CS | □ | 18 | – | 65 | 135 | 20 | A455 |
| EPPL4180 | □ | 18 | – | 65 | 145 | 20 | A338 |
| CEPL6180-TH | ● | 18 | – | 65 | 145 | 20 | A352 |
| CEPL6180 | ● | 18 | – | 65 | 145 | 20 | A355 |
| GSR4180 | □ | 18 | – | 65 | 160 | 16 | A441 |
| GXR4180 | □ | 18 | – | 65 | 250 | 16 | A441 |
| HESL2180-C | □ | 18 | – | 75 | 135 | 20 | A388 |
| HESL2180 | □ | 18 | – | 75 | 135 | 20 | A391 |
| HESL4180-C | □ | 18 | – | 75 | 135 | 20 | A394 |
| HESL4180 | □ | 18 | – | 75 | 135 | 20 | A396 |
| EPQL4180-CS | □ | 18 | – | 80 | 145 | 20 | A369 |
| EPSML4180-PN | □ | 18 | – | 90 | 145 | 20 | A315 |
| EPSWL4180-PN | □ | 18 | – | 90 | 145 | 20 | A362 |
| GSL4180 | □ | 18 | – | 160 | 250 | 16 | A441 |
| EPSMS4185-PN | □ | 18.5 | – | 27.8 | 110 | 20 | A312 |
| EPSM4185-PN | □ | 18.5 | – | 46.3 | 125 | 20 | A314 |
| EPSM4190-57-PN | □ | 19 | 57 | 28.5 | 125 | 20 | A317 |
| EPSM4190-95-PN | □ | 19 | 95 | 28.5 | 155 | 20 | A318 |
| EPSMS4190-PN | □ | 19 | – | 28.5 | 110 | 20 | A312 |
| EPPS4190 | □ | 19 | – | 28.5 | 125 | 20 | A337 |
| PESS2190 | □ | 19 | – | 30 | 105 | 20 | A435 |
| EPPLS4190 | □ | 19 | – | 30 | 200 | 18 | A338 |
| EPQLS4190-CS | □ | 19 | – | 30 | 200 | 18 | A455 |
| EPP3190-CS | □ | 19 | – | 32 | 125 | 20 | A308 |
| EPP4190-TH | ● | 19 | – | 32 | 125 | 20 | A328 |
| EPP4190 | ● | 19 | – | 32 | 125 | 20 | A337 |
| HES2190-C | □ | 19 | – | 40 | 105 | 20 | A387 |
| HES2190 | □ | 19 | – | 40 | 105 | 20 | A390 |
| HES4190 | □ | 19 | – | 40 | 105 | 20 | A396 |
| EPQR4190-CS | □ | 19 | – | 45 | 120 | 20 | A369 |
| CEPR6190-TH | ● | 19 | – | 45 | 125 | 20 | A352 |
| CEPR6190 | ● | 19 | – | 45 | 125 | 20 | A355 |
| EPSM4190-PN | □ | 19 | – | 47.5 | 125 | 20 | A314 |
| EPSW4190-PN | □ | 19 | – | 47.5 | 125 | 20 | A361 |
| HESM2190 | □ | 19 | – | 50 | 120 | 20 | A391 |
| HESM4190-C | □ | 19 | – | 50 | 120 | 20 | A394 |
| HESM4190 | □ | 19 | – | 50 | 120 | 20 | A396 |
| EPPM4190 | □ | 19 | – | 55 | 125 | 20 | A338 |
| EPQM4190-CS | □ | 19 | – | 65 | 135 | 20 | A455 |
| HESL2190 | □ | 19 | – | 75 | 140 | 20 | A391 |
| HESL4190 | □ | 19 | – | 75 | 140 | 20 | A396 |
| EPPL4190 | □ | 19 | – | 75 | 155 | 20 | A338 |
| CEPL6190 | □ | 19 | – | 75 | 155 | 20 | A355 |
| EPQL4190-CS | □ | 19 | – | 80 | 145 | 20 | A369 |
| EPSML4190-PN | □ | 19 | – | 95 | 145 | 20 | A315 |
| EPSWL4190-PN | □ | 19 | – | 95 | 145 | 20 | A362 |
| EPSMS4195-PN | □ | 19.5 | – | 29.3 | 110 | 20 | A312 |
| EPSM4195-PN | □ | 19.5 | – | 48.8 | 125 | 20 | A314 |
| EPSM4200-60-PN | ● | 20 | 60 | 30 | 125 | 20 | A317 |

| 商品コード Item Code | 在庫 Stock | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EPSW4200-60-PN | ● | 20 | 60 | 30 | 125 | 20 | A363 |
| EPSM4200-100-PN | ● | 20 | 100 | 30 | 155 | 20 | A318 |
| EPSW4200-100-PN | ● | 20 | 100 | 30 | 155 | 20 | A363 |
| EHX20-EPP4200-TH | ● | 20 | – | 16 | 30 | – | A399 |
| EHX20-CEPR6200-TH | ● | 20 | – | 20 | 30 | – | A398 |
| EPSMS4200-PN | □ | 20 | – | 30 | 110 | 20 | A312 |
| EPPS4200-TH | ● | 20 | – | 30 | 125 | 20 | A328 |
| EPPS4200 | ● | 20 | – | 30 | 125 | 20 | A337 |
| EMXR4200-TH | ● | 20 | – | 30 | 125 | 20 | A346 |
| EMXN4200-TH | ● | 20 | – | 30 | 125 | 20 | A347 |
| EPQLS4200-CS | □ | 20 | – | 30 | 200 | 18 | A455 |
| EPPLS4200 | □ | 20 | – | 30 | 200 | 20 | A338 |
| EPQS4200-CS | □ | 20 | – | 35 | 100 | 20 | A455 |
| PESS2200-C | □ | 20 | – | 35 | 105 | 20 | A434 |
| PESS2200 | □ | 20 | – | 35 | 105 | 20 | A435 |
| EPP3200-CS | ● | 20 | – | 38 | 125 | 20 | A308 |
| EPP4200-TH | ● | 20 | – | 38 | 125 | 20 | A328 |
| EPP4200-CS | ● | 20 | – | 38 | 125 | 20 | A332 |
| EPP4200-P-CS | ● | 20 | – | 38 | 125 | 20 | A332 |
| EPP4200 | ● | 20 | – | 38 | 125 | 20 | A337 |
| AES2200 | ● | 20 | – | 40 | 105 | 20 | A386 |
| HES2200-C | ● | 20 | – | 40 | 105 | 20 | A387 |
| HES2200 | ● | 20 | – | 40 | 105 | 20 | A390 |
| HES4200-C | ● | 20 | – | 40 | 105 | 20 | A394 |
| HES4200 | ● | 20 | – | 40 | 105 | 20 | A396 |
| PESR2200-C | □ | 20 | – | 40 | 105 | 20 | A434 |
| PESR4200-C | □ | 20 | – | 40 | 105 | 20 | A434 |
| YR4200-CS | □ | 20 | – | 40 | 105 | 20 | A437 |
| YS2200-CS | □ | 20 | – | 40 | 105 | 20 | A437 |
| FE720 | □ | 20 | – | 40 | 110 | 20 | A440 |
| HGOS2200-PN | ● | 20 | – | 40 | 125 | 20 | A304 |
| HGOS4200-PN | ● | 20 | – | 40 | 125 | 20 | A305 |
| CEPH6200 | ● | 20 | – | 40 | 125 | 20 | A356 |
| CEPLS6200-16 | ● | 20 | – | 40 | 155 | 16 | A356 |
| CEPLS6200 | ● | 20 | – | 40 | 155 | 20 | A356 |
| SES3200 | □ | 20 | – | 45 | 110 | 20 | A439 |
| SES3200-C | □ | 20 | – | 45 | 110 | 20 | A439 |
| CEPR6200-TH | ● | 20 | – | 45 | 125 | 20 | A352 |
| CEPR6200 | ● | 20 | – | 45 | 125 | 20 | A355 |
| CEPU4200 | ● | 20 | – | 45 | 125 | 20 | A356 |
| EAP4200-TH | ◎ | 20 | – | 45 | 125 | 20 | A371 |
| EAP6200-TH | ◎ | 20 | – | 45 | 125 | 20 | A371 |
| EPSM4200-PN | ● | 20 | – | 50 | 125 | 20 | A314 |
| EPSW4200-PN | ● | 20 | – | 50 | 125 | 20 | A361 |
| EPQR4200-CS | ● | 20 | – | 50 | 125 | 20 | A369 |
| HESM2200-C | ● | 20 | – | 55 | 120 | 20 | A388 |
| HESM2200 | ● | 20 | – | 55 | 120 | 20 | A391 |
| HESM4200-C | ● | 20 | – | 55 | 120 | 20 | A394 |
| HESM4200 | ● | 20 | – | 55 | 120 | 20 | A396 |
| EPPM4200-TH | ● | 20 | – | 55 | 125 | 20 | A328 |
| EPPM4200 | ● | 20 | – | 55 | 125 | 20 | A338 |
| GSE4200 | □ | 20 | – | 60 | 150 | 20 | A432 |
| GSD4200 | □ | 20 | – | 60 | 250 | 20 | A432 |
| EPQM4200-CS | □ | 20 | – | 70 | 145 | 20 | A455 |
| HESL2200-C | ● | 20 | – | 75 | 140 | 20 | A388 |
| HESL2200 | ● | 20 | – | 75 | 140 | 20 | A391 |
| HESL4200-C | ● | 20 | – | 75 | 140 | 20 | A394 |
| HESL4200 | ● | 20 | – | 75 | 140 | 20 | A396 |
| EPPL4200-TH | ● | 20 | – | 75 | 155 | 20 | A328 |
| EPPL4200 | ● | 20 | – | 75 | 155 | 20 | A338 |
| CEPL6200-TH | ● | 20 | – | 75 | 155 | 20 | A352 |
| CEPL6200 | ● | 20 | – | 75 | 155 | 20 | A355 |
| GSR4200 | □ | 20 | – | 75 | 160 | 20 | A441 |
| GXR4200 | □ | 20 | – | 75 | 250 | 20 | A441 |
| EPSMM4200-PN | ● | 20 | – | 80 | 155 | 20 | A315 |
| EPQL4200-CS | ● | 20 | – | 90 | 155 | 20 | A369 |
| EPSML4200-PN | ● | 20 | – | 100 | 155 | 20 | A315 |
| EPSWL4200-PN | ● | 20 | – | 100 | 155 | 20 | A362 |
| GSL4200 | □ | 20 | – | 180 | 250 | 20 | A441 |

●印：標準在庫品です。　●：Stocked Items.　◎印：メーカー在庫品です。弊社営業へお問合せください。　◎：Manufacturer stocked items Contact with our sales department.

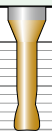
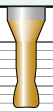
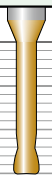
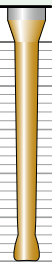
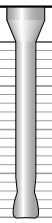
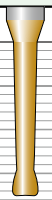
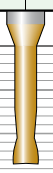
単位 unit：mm

| 商品コード Item Code | 在庫 Stock | 外径 Tool dia. | 首下長 Under neck length | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | ページ Page |
|---|---|---|---|---|---|---|---|
| EPPS4210 | □ | 21 | – | 31.5 | 125 | 20 | A337 |
| EPP3210-CS | □ | 21 | – | 38 | 125 | 20 | A308 |
| EPP4210 | □ | 21 | – | 38 | 125 | 20 | A337 |
| HES2210 | □ | 21 | – | 40 | 105 | 20 | A390 |
| HES4210 | □ | 21 | – | 40 | 105 | 20 | A396 |
| HESM2210 | □ | 21 | – | 55 | 130 | 20 | A391 |
| HESM4210 | □ | 21 | – | 55 | 130 | 20 | A396 |
| GSE4210 | □ | 21 | – | 60 | 150 | 20 | A432 |
| GSD4210 | □ | 21 | – | 60 | 250 | 20 | A432 |
| HESL2210 | □ | 21 | – | 75 | 140 | 20 | A391 |
| EPPS4220 | □ | 22 | – | 33 | 125 | 20 | A337 |
| EPP3220-CS | □ | 22 | – | 38 | 125 | 20 | A308 |
| EPP4220 | □ | 22 | – | 38 | 125 | 20 | A337 |
| HES2220-C | ● | 22 | – | 45 | 115 | 20 | A387 |
| HES2220 | ● | 22 | – | 45 | 115 | 20 | A390 |
| HES4220 | □ | 22 | – | 45 | 115 | 20 | A396 |
| CEPR6220-TH | ● | 22 | – | 45 | 135 | 20 | A352 |
| CEPR6220 | ● | 22 | – | 45 | 135 | 20 | A355 |
| CEPLS6220 | ● | 22 | – | 45 | 165 | 20 | A356 |
| HESM2220 | □ | 22 | – | 60 | 130 | 20 | A391 |
| HESM4220 | □ | 22 | – | 60 | 130 | 20 | A396 |
| CEPL6220-TH | ● | 22 | – | 75 | 165 | 20 | A352 |
| CEPL6220 | ● | 22 | – | 75 | 165 | 20 | A355 |
| HESL2220 | □ | 22 | – | 80 | 150 | 20 | A391 |
| EPPS4230 | □ | 23 | – | 34.5 | 130 | 25 | A337 |
| HES2230 | □ | 23 | – | 45 | 115 | 20 | A390 |
| HES4230 | □ | 23 | – | 45 | 115 | 20 | A396 |
| EPP3230-CS | □ | 23 | – | 45 | 140 | 25 | A308 |
| EPP4230 | □ | 23 | – | 45 | 140 | 25 | A337 |
| HESM2230 | □ | 23 | – | 60 | 130 | 20 | A391 |
| HESM4230 | □ | 23 | – | 60 | 130 | 20 | A396 |
| HESL2230 | □ | 23 | – | 80 | 150 | 20 | A391 |
| EPPS4240 | □ | 24 | – | 36 | 130 | 25 | A337 |
| EPP3240-CS | □ | 24 | – | 45 | 140 | 25 | A308 |
| EPP4240 | □ | 24 | – | 45 | 140 | 25 | A337 |
| HES2240 | □ | 24 | – | 50 | 120 | 20 | A390 |
| HES4240 | □ | 24 | – | 50 | 120 | 20 | A396 |
| CEPR6240-TH | ● | 24 | – | 50 | 140 | 25 | A352 |
| CEPR6240 | ● | 24 | – | 50 | 140 | 25 | A355 |
| HESM2240 | □ | 24 | – | 65 | 140 | 20 | A391 |
| HESM4240 | □ | 24 | – | 65 | 140 | 20 | A396 |
| HESL2240 | □ | 24 | – | 80 | 150 | 20 | A391 |
| CEPL6240 | □ | 24 | – | 90 | 180 | 25 | A355 |
| EPPS4250 | □ | 25 | – | 37.5 | 130 | 25 | A337 |
| CEPLS8250-20 | ● | 25 | – | 45 | 180 | 20 | A356 |
| CEPLS8250 | ● | 25 | – | 45 | 180 | 25 | A356 |
| HES2250-C | ● | 25 | – | 50 | 120 | 25 | A387 |
| HES2250 | ● | 25 | – | 50 | 120 | 25 | A390 |
| HES4250-C | ● | 25 | – | 50 | 120 | 25 | A394 |
| HES4250 | ● | 25 | – | 50 | 120 | 25 | A396 |
| SES4250 | □ | 25 | – | 50 | 120 | 25 | A439 |
| CEPR8250-TH | ● | 25 | – | 50 | 140 | 25 | A352 |
| CEPR8250 | ● | 25 | – | 50 | 140 | 25 | A355 |
| GSE4250 | □ | 25 | – | 60 | 180 | 25 | A432 |
| GSD4250 | □ | 25 | – | 60 | 250 | 25 | A432 |
| EPP3250-CS | □ | 25 | – | 63 | 140 | 25 | A308 |
| EPP4250 | □ | 25 | – | 63 | 140 | 25 | A337 |
| HESM2250-C | □ | 25 | – | 65 | 140 | 25 | A388 |
| HESM2250 | □ | 25 | – | 65 | 140 | 25 | A391 |
| HESM4250-C | □ | 25 | – | 65 | 140 | 25 | A394 |
| HESM4250 | □ | 25 | – | 65 | 140 | 25 | A396 |
| HESL2250-C | □ | 25 | – | 80 | 150 | 25 | A388 |
| HESL2250 | □ | 25 | – | 80 | 150 | 25 | A391 |
| HESL4250-C | □ | 25 | – | 80 | 150 | 25 | A394 |
| HESL4250 | □ | 25 | – | 80 | 150 | 25 | A396 |
| CEPL8250-TH | ● | 25 | – | 90 | 180 | 25 | A352 |
| CEPL8250 | ● | 25 | – | 90 | 180 | 25 | A355 |
| HES2260 | □ | 26 | – | 50 | 120 | 25 | A390 |
| HES4260 | □ | 26 | – | 50 | 120 | 25 | A396 |
| CEPR8260-TH | ● | 26 | – | 50 | 140 | 25 | A352 |
| CEPR8260 | ● | 26 | – | 50 | 140 | 25 | A355 |
| HESM2260 | □ | 26 | – | 65 | 140 | 25 | A391 |
| HESM4260 | □ | 26 | – | 65 | 140 | 25 | A396 |
| CEPL8260 | □ | 26 | – | 90 | 180 | 25 | A355 |
| HES2270 | □ | 27 | – | 55 | 130 | 25 | A390 |
| HES4270 | □ | 27 | – | 55 | 130 | 25 | A396 |
| HESM2270 | □ | 27 | – | 70 | 145 | 25 | A391 |
| HESM4270 | □ | 27 | – | 70 | 145 | 25 | A396 |
| CEPLS8280 | □ | 28 | – | 50 | 180 | 25 | A356 |
| HES2280 | □ | 28 | – | 55 | 130 | 25 | A390 |
| HES4280 | □ | 28 | – | 55 | 130 | 25 | A396 |
| CEPR8280-TH | ● | 28 | – | 55 | 145 | 25 | A352 |
| CEPR8280 | ● | 28 | – | 55 | 145 | 25 | A355 |
| HESM2280 | □ | 28 | – | 70 | 145 | 25 | A391 |
| HESM4280 | □ | 28 | – | 70 | 145 | 25 | A396 |
| CEPL8280 | ● | 28 | – | 90 | 180 | 25 | A355 |
| HES2290 | □ | 29 | – | 55 | 130 | 25 | A390 |
| HES4290 | □ | 29 | – | 55 | 130 | 25 | A396 |
| HESM2290 | □ | 29 | – | 70 | 145 | 25 | A391 |
| HESM4290 | □ | 29 | – | 70 | 145 | 25 | A396 |
| CEPLS8300 | □ | 30 | – | 50 | 195 | 25 | A356 |
| HES2300-C | □ | 30 | – | 55 | 130 | 32 | A387 |
| HES2300 | □ | 30 | – | 55 | 130 | 32 | A390 |
| HES4300-C | □ | 30 | – | 55 | 130 | 32 | A394 |
| HES4300 | □ | 30 | – | 55 | 130 | 32 | A396 |
| SES4300 | □ | 30 | – | 55 | 130 | 32 | A439 |
| CEPR8300-TH | ● | 30 | – | 60 | 165 | 32 | A352 |
| CEPR8300 | ● | 30 | – | 60 | 165 | 32 | A355 |
| GSE4300 | □ | 30 | – | 60 | 200 | 32 | A432 |
| GSD4300 | □ | 30 | – | 60 | 250 | 32 | A432 |
| HESM2300 | □ | 30 | – | 70 | 145 | 32 | A391 |
| HESM4300-C | □ | 30 | – | 70 | 145 | 32 | A394 |
| HESM4300 | □ | 30 | – | 70 | 145 | 32 | A396 |
| CEPL8300 | ● | 30 | – | 90 | 195 | 32 | A355 |
| CEPLS8320-25 | □ | 32 | – | 55 | 195 | 25 | A356 |
| CEPLS8320 | □ | 32 | – | 55 | 195 | 32 | A356 |
| CEPR8320-TH | ● | 32 | – | 70 | 175 | 32 | A352 |
| CEPR8320 | ● | 32 | – | 70 | 175 | 32 | A355 |
| CEPL8320 | □ | 32 | – | 95 | 195 | 32 | A355 |

□印：特定代理店在庫です。弊社営業へお問合せください。□：Stocked by specified distributor. Contact with our sales department.

## Deep series line up
# ディープシリーズラインナップ

| 工具仕様 Tool specifications | 刃形 Geometry | ボール Ball nose | | | | | | | コーナラジアス Corner radius | |
|---|---|---|---|---|---|---|---|---|---|---|
| | アイテム Items | EPDBEH-TH3 | EPDBE | EPDBPE | EPDB-SD | EGDB-HD | CBN-EHB | CBN-EPSB | EPDREH-TH3 | |
| | | エポックディープボール エボリューションハード -TH3 Epoch Deep Ball Evolution Hard-TH3 | エポック ディープボール エボリューション Epoch Deep Ball Evolution | エポックペンシル ディープボール エボリューション Epoch Pencil Deep Ball Evolution | エポック SD(S-DLC) ディープボール Epoch SD(S-DLC) Deep Ball | エポック HDコーティング ディープボール Epoch HD Coating Deep Ball | エポック CBN ハイプレシジョン ボールエンドミル Epoch CBN High Precision Ball End Mill | エポック CBN スーパーボール エンドミル Epoch CBN Super Ball End Mill | エポックディープラジアス エボリューションハード -TH3 Epoch Deep Radius Evolution Hard-TH3 | |
| | Page 掲載頁 | A56 | A72 | A84 | A140 | A143 | A147 | A151 | A172 | |
| | 首形状 Neck shape | ストレート Straight | ストレート Straight | ペンシル Pencil | ストレート Straight | ストレート Straight | ストレート Straight | ストレート Straight | ストレート Straight | |
| | 首角度 Neck angle | – | – | 0.4°, 0.9°, 1.4°, 2.9°, 4.9° | – | – | – | – | – | |
| | コーティング Coating | TH3 | PN / RTH | RTH | SD | HD | – | – | TH3 | |
| | アイテム数 No. of items | 331 | 164 / 164 | 261 | 26 | 19 | 37 | 40 | 53 / 266 | |
| | 工具径 Tool dia. | φ0.1～12 | φ0.1～6 | φ0.2～12 | φ0.2～5 | φ0.4～3 | φ0.2～2 | φ0.2～2 | φ0.2～1 / φ1～6 | |
| | コーナ R Corner Radius | – | – | – | – | – | – | – | RE0.02~0.2 / RE0.02~1 | |
| | 刃 数 No. of flutes | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 / 4 | |
| | バックドラフト Backdraft | ○ | – | ○ | – | – | – | – | ○ / – | |
| | RE精度(mm) RE accuracy | ±0.003(RE≦0.25) ±0.005(0.25<RE) | ±0.003(RE≦0.25) ±0.005(0.25<RE) | ±0.003(RE≦0.25) ±0.005(0.25<RE≦3) ±0.01 (3<RE) | ±0.003(RE≦0.25) ±0.005(0.25<RE) | – | ±0.003(RE≦0.3) ±0.005(0.3<RE) | ±0.005 | ±0.005 (中心基準) (Central axis) | |
| | シャンク径公差 Tolerance on shank | h4 (φ4) h5 (φ6～φ12) | h5 | h5 | h5 | h5 | h4 | h4 | h4 / h4(φ4) h5(φ6) | |
| 用途 Application | 荒加工 Roughing | ■ | ■ | ■ | ■ | ■ | | | ■ | |
| | 中仕上げ加工 Semi-finishing | ■ | ■ | ■ | ■ | ■ | ▒ | ▒ | ■ | |
| | 仕上げ加工 Finishing | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | |
| 被削材 Work material | 炭素鋼・合金鋼 Carbon steels,Alloy steels | ○ | ◎ / ○ | ○ | | グラファイト・FRP 高Si-アルミニウム合金など for Graphite, FRP, High Si aluminum alloy, etc | | | ○ | |
| | プリハードン鋼 45HRC以下 or less | ○ | ◎ / ◎ | ◎ | | | | | ○ | |
| | 高硬度材 45～55HRC | ◎ | ◎ / ◎ | ◎ | | | ○ | ○ | ◎ | |
| | 高硬度材 55～65HRC | ◎ | ○ / ◎ | ◎ | | | ◎ | ◎ | ◎ | |
| | 高硬度材 65HRC超 more than | ◎ | / ○ | ○ | | | ◎ | ◎ | ◎ | |
| | ステンレス鋼 Stainless steels | ○ | ◎ / ○ | ○ | | | | | ○ | |
| | チタン合金・耐熱合金 Ti alloy, Heat-resistant alloy | ◎ | ◎ / ◎ | ◎ | | | | | ◎ | |
| | 銅合金 Copper alloy | ○ | ◎ / ○ | ○ | ◎ | | | | ○ | |
| | アルミ合金 Aluminium alloy | ○ | ◎ / ○ | ○ | ◎ | | | | ○ | |
| 最大深さ対応 Maximum depth capability | 首下長 Under neck length | 20DC | 20DC | 90DC | 12DC | 40DC | 10DC | 10DC | 8DC | |

| | コーナラジアス Corner radius | | | | | | | スクエア Square | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | CBN | | | |
| | **EPDRE** エポック ディープラジアス エボリューション Epoch Deep Radius Evolution **A194** | **EPDRF** エポック ディープラジアス F Epoch Deep Radius F **A216** | **ETR** エポック ターボリブ Epoch Turbo Rib **A222** | **ETRP** エポック ターボリブ (ペンシルネック) Epoch Turbo Rib (Pencil neck) **A223** | **EGDR-HD** エポック HDコーティング ディープラジアス Epoch HD Coating Deep Radius **A277** | **CBN-EPSR** エポックCBN スーパーラジアス エンドミル Epoch CBN Super Radius End Mill **A281** | **EPDRP** エポック ペンシルディープ ラジアス Epoch Pencil Deep Radius **A210** | **EPDSE** エポック ディープスクエア エボリューション Epoch Deep Square Evolution **A292** | **EPDS-SD** エポック SD(S-DLC) ディープスクエア Epoch SD(S-DLC) Deep Square **A378** |
| | ストレート Straight | ストレート Straight | ストレート Straight | ペンシル Pencil | ストレート Straight | ストレート Straight | ペンシル Pencil | ストレート Straight | ストレート Straight |
| | – | – | – | 0.9° | – | – | 0.4°, 0.9° | – | – |
| | ATH | TH | TH | TH | HD | – | TH | PN / ATH | SD |
| | 332 | 127 | 44 | 49 | 16 | 46 | 57 | 145 / 145 | 24 |
| | φ0.2～6 | φ1～6 | φ1～3 | φ1～3 | φ0.5～3 | φ0.2～3 | φ0.2～3 | φ0.1～6 | φ0.5～4 |
| | RE0.02～1 | RE0.05～1 | RE0.2～0.8 | – | RE0.1～0.2 | – | RE0.05～0.5 | – | – |
| | 2 | 4 | 4 | 4 | 2 | 2 | 2 | 2 | 2 |
| | ○ | ○ | – | – | ○ | – | ○ | – | – |
| | ±0.005 (中心基準) (Central axis) | ±0.005 (中心基準) (Central axis) | ±0.01 | ±0.01 | – | ±0.005 (中心基準) (Central axis) | ±0.005 | – | – |
| | h5 | h5 | h5 | h5 | h5 | h4 | h5 | h5 | h5 |
| | | | | | | | | | |
| | ◎ | ◎ | ◎ | ◎ | グラファイト・FRP 高Si-アルミニウム合金など for Graphite, FRP, High Si aluminum alloy, etc | | ○ | ◎ / ◎ | |
| | ◎ | ◎ | ◎ | ◎ | | | ◎ | ◎ / ◎ | |
| | ◎ | ◎ | ◎ | ◎ | | ○ | ◎ | ◎ / ◎ | |
| | ◎ | ◎ | ○ | ○ | | ◎ | ◎ | ○ / ◎ | |
| | ○ | ○ | | | | ◎ | ○ | / ○ | |
| | ○ | ○ | ○ | ○ | | | ○ | ◎ / ○ | |
| | ◎ | ◎ | ◎ | ◎ | | | ◎ | ◎ / ◎ | |
| | ○ | ○ | ○ | ○ | | | ○ | ◎ / ○ | ◎ |
| | ○ | ○ | ○ | ○ | | | ○ | ◎ / ○ | ◎ |
| |  |  |  |  |  | |  |  | |
| | 20DC | 15DC | 30DC | 50DC | 40DC | 10DC | 35DC | 27DC | 12DC |

# Epoch Deep Ball Evolution Hard-TH3
# エポックディープボールエボリューションハード-TH3

YouTube 動画公開中

## ショートシャンクタイプ Short shank type

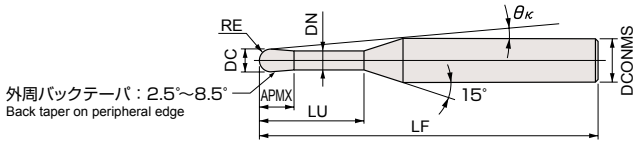
溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / 細部 Miniature / 中仕上 Semi Finishing / 仕上 Finishing / リブ・細部 Rib Miniature

RE公差 RE tolerance
RE≦0.25：±0.003
0.25＜RE：±0.005
h4
(mm)

新開発した次世代ハードコーティングTH3を採用!
高硬度鋼の加工において優れた耐摩耗性を発揮
Applies newly developed next-generation hard coating "TH3".
Excellent wear resistance when machining hardened steel.

2枚刃
2 Flutes

外径実測値付き Includes actual measured mill diameter value.



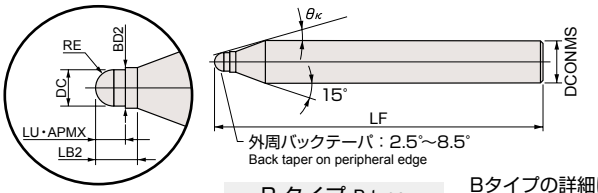

Aタイプ A type

# EPDBEH2○○○F-○○.○○-TH3

超硬 Carbide / TH3 / ねじれ角 30° Helix angle / 切削条件表 A64 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | タイプ Type | 干渉角度 Interference angle (°) θκ | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDBEH2001F-0.08-TH3 | ● | 0.05 | 0.1 | 0.08 | 0.08 | – | 35 | 4 | B | 20.93 | – | – | – | – | – | 16,290 |
| EPDBEH2001F-0.2-TH3 | ● | | | 0.2 | 0.08 | 0.08 | 35 | 4 | A | 14.64 | 0.24 | 0.25 | 0.25 | 0.26 | 0.28 | 16,290 |
| EPDBEH2001F-0.3-TH3 | ● | | | 0.3 | 0.08 | 0.08 | 35 | 4 | A | 14.46 | 0.34 | 0.35 | 0.36 | 0.38 | 0.40 | 16,720 |
| EPDBEH2001F-0.5-TH3 | ● | | | 0.5 | 0.08 | 0.08 | 35 | 4 | A | 14.10 | 0.55 | 0.57 | 0.59 | 0.61 | 0.65 | 18,110 |
| EPDBEH20015F-0.12-TH3 | ● | 0.075 | 0.15 | 0.12 | 0.12 | – | 35 | 4 | B | 15.25 | – | – | – | – | – | 16,720 |
| EPDBEH20015F-0.3-TH3 | ● | | | 0.3 | 0.12 | 0.13 | 35 | 4 | A | 14.50 | 0.34 | 0.35 | 0.36 | 0.37 | 0.40 | 16,720 |
| EPDBEH20015F-0.5-TH3 | ● | | | 0.5 | 0.12 | 0.13 | 35 | 4 | A | 14.14 | 0.55 | 0.56 | 0.58 | 0.60 | 0.65 | 18,110 |
| EPDBEH20015F-0.75-TH3 | ● | | | 0.75 | 0.12 | 0.13 | 35 | 4 | A | 13.71 | 0.81 | 0.83 | 0.86 | 0.89 | 0.96 | 19,710 |
| EPDBEH2002F-0.15-TH3 | ● | 0.1 | 0.2 | 0.15 | 0.15 | – | 35 | 4 | B | 20.23 | – | – | – | – | – | 11,680 |
| EPDBEH2002F-0.3-TH3 | ● | | | 0.3 | 0.15 | 0.18 | 35 | 4 | A | 14.54 | 0.34 | 0.35 | 0.36 | 0.37 | 0.39 | 11,680 |
| EPDBEH2002F-0.5-TH3 | ● | | | 0.5 | 0.15 | 0.18 | 35 | 4 | A | 14.17 | 0.55 | 0.56 | 0.58 | 0.60 | 0.64 | 11,680 |
| EPDBEH2002F-0.75-TH3 | ● | | | 0.75 | 0.15 | 0.18 | 35 | 4 | A | 13.73 | 0.81 | 0.83 | 0.86 | 0.89 | 0.95 | 11,680 |
| EPDBEH2002F-1-TH3 | ● | | | 1 | 0.15 | 0.18 | 38 | 4 | A | 13.32 | 1.06 | 1.10 | 1.13 | 1.17 | 1.26 | 11,680 |
| EPDBEH2003F-0.25-TH3 | ● | 0.15 | 0.3 | 0.25 | 0.25 | – | 35 | 4 | B | 14.45 | – | – | – | – | – | 11,470 |
| EPDBEH2003F-0.5-TH3 | ● | | | 0.5 | 0.25 | 0.27 | 35 | 4 | A | 14.21 | 0.56 | 0.58 | 0.60 | 0.61 | 0.65 | 11,470 |
| EPDBEH2003F-0.75-TH3 | ● | | | 0.75 | 0.25 | 0.27 | 35 | 4 | A | 13.76 | 0.82 | 0.85 | 0.87 | 0.90 | 0.96 | 11,470 |
| EPDBEH2003F-1-TH3 | ● | | | 1 | 0.25 | 0.27 | 35 | 4 | A | 13.33 | 1.08 | 1.11 | 1.15 | 1.19 | 1.27 | 11,470 |
| EPDBEH2003F-1.5-TH3 | ● | | | 1.5 | 0.25 | 0.27 | 38 | 4 | A | 12.56 | 1.60 | 1.65 | 1.70 | 1.76 | 1.89 | 12,220 |
| EPDBEH2004F-0.3-TH3 | ● | 0.2 | 0.4 | 0.3 | 0.3 | – | 35 | 4 | B | 14.53 | – | – | – | – | – | 7,810 |
| EPDBEH2004F-0.5-TH3 | ● | | | 0.5 | 0.3 | 0.37 | 35 | 4 | A | 14.28 | 0.56 | 0.58 | 0.59 | 0.60 | 0.64 | 7,810 |
| EPDBEH2004F-0.75-TH3 | ● | | | 0.75 | 0.3 | 0.37 | 35 | 4 | A | 13.81 | 0.82 | 0.84 | 0.87 | 0.89 | 0.95 | 7,810 |
| EPDBEH2004F-1-TH3 | ● | | | 1 | 0.3 | 0.37 | 35 | 4 | A | 13.37 | 1.08 | 1.11 | 1.14 | 1.18 | 1.26 | 7,810 |
| EPDBEH2004F-1.5-TH3 | ● | | | 1.5 | 0.3 | 0.37 | 38 | 4 | A | 12.57 | 1.60 | 1.65 | 1.70 | 1.75 | 1.88 | 7,940 |
| EPDBEH2004F-2-TH3 | ● | | | 2 | 0.3 | 0.37 | 38 | 4 | A | 11.86 | 2.11 | 2.18 | 2.25 | 2.33 | 2.50 | 8,230 |
| EPDBEH2004F-2.5-TH3 | ● | | | 2.5 | 0.3 | 0.37 | 38 | 4 | A | 11.23 | 2.63 | 2.72 | 2.81 | 2.90 | 3.13 | 8,500 |
| EPDBEH2004F-3-TH3 | ● | | | 3 | 0.3 | 0.37 | 38 | 4 | A | 10.65 | 3.15 | 3.25 | 3.36 | 3.48 | 3.75 | 9,060 |
| EPDBEH2004F-4-TH3 | ● | | | 4 | 0.3 | 0.37 | 38 | 4 | A | 9.67 | 4.18 | 4.32 | 4.47 | 4.63 | 4.99 | 9,760 |
| EPDBEH2005F-0.35-TH3 | ● | 0.25 | 0.5 | 0.35 | 0.35 | – | 35 | 4 | B | 14.10 | – | – | – | – | – | 7,810 |
| EPDBEH2005F-0.75-TH3 | ● | | | 0.75 | 0.35 | 0.47 | 35 | 4 | A | 13.88 | 0.82 | 0.84 | 0.86 | 0.88 | 0.94 | 7,810 |
| EPDBEH2005F-1-TH3 | ● | | | 1 | 0.35 | 0.47 | 35 | 4 | A | 13.42 | 1.08 | 1.11 | 1.14 | 1.17 | 1.25 | 7,810 |
| EPDBEH2005F-1.5-TH3 | ● | | | 1.5 | 0.35 | 0.47 | 38 | 4 | A | 12.59 | 1.59 | 1.64 | 1.69 | 1.75 | 1.87 | 7,810 |
| EPDBEH2005F-2-TH3 | ● | | | 2 | 0.35 | 0.47 | 38 | 4 | A | 11.86 | 2.11 | 2.18 | 2.25 | 2.32 | 2.49 | 7,810 |
| EPDBEH2005F-2.5-TH3 | ● | | | 2.5 | 0.35 | 0.47 | 38 | 4 | A | 11.21 | 2.63 | 2.71 | 2.80 | 2.90 | 3.11 | 7,810 |
| EPDBEH2005F-3-TH3 | ● | | | 3 | 0.35 | 0.47 | 38 | 4 | A | 10.62 | 3.15 | 3.25 | 3.36 | 3.47 | 3.73 | 7,810 |
| EPDBEH2005F-4-TH3 | ● | | | 4 | 0.35 | 0.47 | 38 | 4 | A | 9.61 | 4.18 | 4.32 | 4.46 | 4.62 | 4.98 | 7,810 |
| EPDBEH2005F-5-TH3 | ● | | | 5 | 0.35 | 0.47 | 42 | 4 | A | 8.78 | 5.21 | 5.39 | 5.57 | 5.77 | 6.22 | 7,940 |
| EPDBEH2006F-0.4-TH3 | ● | 0.3 | 0.6 | 0.4 | 0.4 | – | 35 | 4 | B | 14.16 | – | – | – | – | – | 6,740 |
| EPDBEH2006F-0.75-TH3 | ● | | | 0.75 | 0.4 | 0.57 | 35 | 4 | A | 13.94 | 0.82 | 0.84 | 0.86 | 0.88 | 0.93 | 6,740 |
| EPDBEH2006F-1-TH3 | ● | | | 1 | 0.4 | 0.57 | 35 | 4 | A | 13.47 | 1.08 | 1.10 | 1.13 | 1.17 | 1.24 | 6,740 |
| EPDBEH2006F-1.5-TH3 | ● | | | 1.5 | 0.4 | 0.57 | 35 | 4 | A | 12.61 | 1.59 | 1.64 | 1.69 | 1.74 | 1.86 | 6,000 |
| EPDBEH2006F-2-TH3 | ● | | | 2 | 0.4 | 0.57 | 38 | 4 | A | 11.86 | 2.11 | 2.17 | 2.24 | 2.31 | 2.48 | 6,000 |
| EPDBEH2006F-2.5-TH3 | ● | | | 2.5 | 0.4 | 0.57 | 38 | 4 | A | 11.19 | 2.63 | 2.71 | 2.80 | 2.89 | 3.10 | 6,140 |
| EPDBEH2006F-3-TH3 | ● | | | 3 | 0.4 | 0.57 | 38 | 4 | A | 10.59 | 3.14 | 3.24 | 3.35 | 3.46 | 3.72 | 6,140 |
| EPDBEH2006F-3.5-TH3 | ● | | | 3.5 | 0.4 | 0.57 | 38 | 4 | A | 10.05 | 3.66 | 3.78 | 3.90 | 4.04 | 4.34 | 6,410 |
| EPDBEH2006F-4-TH3 | ● | | | 4 | 0.4 | 0.57 | 38 | 4 | A | 9.56 | 4.18 | 4.31 | 4.46 | 4.61 | 4.97 | 6,410 |
| EPDBEH2006F-5-TH3 | ● | | | 5 | 0.4 | 0.57 | 42 | 4 | A | 8.71 | 5.21 | 5.38 | 5.57 | 5.76 | 6.21 | 6,410 |
| EPDBEH2006F-6-TH3 | ● | | | 6 | 0.4 | 0.57 | 42 | 4 | A | 8.00 | 6.24 | 6.45 | 6.67 | 6.91 | 7.45 | 6,410 |

●：標準在庫品です。●：Stocked items.




B タイプ B type

Bタイプの詳細はA63をご確認ください
For details of B type, refer to page A63.

# EPDBEH2○○○F-○○.○○-TH3

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | タイプ Type | 干渉角度 Interference angle (°) θκ | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格 (円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDBEH2007F-0.45-TH3 | ● | 0.35 | 0.7 | 0.45 | 0.45 | – | 35 | 4 | B | 14.13 | – | – | – | – | – | 6,000 |
| EPDBEH2007F-2-TH3 | ● | | | 2 | 0.45 | 0.67 | 38 | 4 | A | 11.85 | 2.11 | 2.17 | 2.24 | 2.31 | 2.47 | 6,000 |
| EPDBEH2007F-4-TH3 | ● | | | 4 | 0.45 | 0.67 | 38 | 4 | A | 9.50 | 4.18 | 4.31 | 4.45 | 4.61 | 4.95 | 6,410 |
| EPDBEH2008F-0.5-TH3 | ● | 0.4 | 0.8 | 0.5 | 0.5 | – | 35 | 4 | B | 14.20 | – | – | – | – | – | 6,000 |
| EPDBEH2008F-1-TH3 | ● | | | 1 | 0.5 | 0.77 | 35 | 4 | A | 13.58 | 1.07 | 1.10 | 1.12 | 1.15 | 1.21 | 6,000 |
| EPDBEH2008F-1.5-TH3 | ● | | | 1.5 | 0.5 | 0.77 | 35 | 4 | A | 12.66 | 1.59 | 1.63 | 1.68 | 1.73 | 1.83 | 6,000 |
| EPDBEH2008F-2-TH3 | ● | | | 2 | 0.5 | 0.77 | 38 | 4 | A | 11.85 | 2.11 | 2.17 | 2.23 | 2.30 | 2.46 | 6,000 |
| EPDBEH2008F-2.5-TH3 | ● | | | 2.5 | 0.5 | 0.77 | 38 | 4 | A | 11.14 | 2.62 | 2.70 | 2.79 | 2.88 | 3.08 | 6,220 |
| EPDBEH2008F-3-TH3 | ● | | | 3 | 0.5 | 0.77 | 38 | 4 | A | 10.51 | 3.14 | 3.24 | 3.34 | 3.45 | 3.70 | 6,410 |
| EPDBEH2008F-4-TH3 | ● | | | 4 | 0.5 | 0.77 | 38 | 4 | A | 9.44 | 4.17 | 4.31 | 4.45 | 4.60 | 4.94 | 6,410 |
| EPDBEH2008F-5-TH3 | ● | | | 5 | 0.5 | 0.77 | 42 | 4 | A | 8.57 | 5.21 | 5.38 | 5.56 | 5.75 | 6.19 | 6,410 |
| EPDBEH2008F-6-TH3 | ● | | | 6 | 0.5 | 0.77 | 42 | 4 | A | 7.84 | 6.24 | 6.45 | 6.66 | 6.90 | 7.43 | 6,410 |
| EPDBEH2008F-8-TH3 | ● | | | 8 | 0.5 | 0.77 | 42 | 4 | A | 6.70 | 8.31 | 8.58 | 8.88 | 9.20 | 9.92 | 6,410 |
| EPDBEH2009F-0.6-TH3 | ● | 0.45 | 0.9 | 0.6 | 0.6 | – | 35 | 4 | B | 13.84 | – | – | – | – | – | 6,000 |
| EPDBEH2009F-2-TH3 | ● | | | 2 | 0.6 | 0.87 | 35 | 4 | A | 11.85 | 2.11 | 2.16 | 2.23 | 2.29 | 2.44 | 6,000 |
| EPDBEH2009F-4-TH3 | ● | | | 4 | 0.6 | 0.87 | 38 | 4 | A | 9.38 | 4.17 | 4.30 | 4.44 | 4.59 | 4.93 | 6,410 |
| EPDBEH2009F-6-TH3 | ● | | | 6 | 0.6 | 0.87 | 42 | 4 | A | 7.75 | 6.24 | 6.44 | 6.66 | 6.89 | 7.42 | 6,410 |
| EPDBEH2010F-0.8-TH3 | ● | 0.5 | 1 | 0.8 | 0.8 | – | 35 | 4 | B | 13.47 | – | – | – | – | – | 5,020 |
| EPDBEH2010F-1.5-TH3 | ● | | | 1.5 | 0.8 | 0.96 | 35 | 4 | A | 12.67 | 1.61 | 1.64 | 1.69 | 1.73 | 1.83 | 5,020 |
| EPDBEH2010F-2-TH3 | ● | | | 2 | 0.8 | 0.96 | 35 | 4 | A | 11.82 | 2.12 | 2.18 | 2.24 | 2.31 | 2.46 | 5,020 |
| EPDBEH2010F-2.5-TH3 | ● | | | 2.5 | 0.8 | 0.96 | 38 | 4 | A | 11.07 | 2.64 | 2.71 | 2.80 | 2.88 | 3.08 | 5,020 |
| EPDBEH2010F-3-TH3 | ● | | | 3 | 0.8 | 0.96 | 38 | 4 | A | 10.41 | 3.16 | 3.25 | 3.35 | 3.46 | 3.70 | 5,020 |
| EPDBEH2010F-4-TH3 | ● | | | 4 | 0.8 | 0.96 | 38 | 4 | A | 9.29 | 4.19 | 4.32 | 4.46 | 4.61 | 4.94 | 5,720 |
| EPDBEH2010F-5-TH3 | ● | | | 5 | 0.8 | 0.96 | 38 | 4 | A | 8.39 | 5.22 | 5.39 | 5.57 | 5.76 | 6.19 | 5,720 |
| EPDBEH2010F-6-TH3 | ● | | | 6 | 0.8 | 0.96 | 42 | 4 | A | 7.65 | 6.26 | 6.46 | 6.67 | 6.91 | 7.43 | 6,140 |
| EPDBEH2010F-7-TH3 | ● | | | 7 | 0.8 | 0.96 | 42 | 4 | A | 7.03 | 7.29 | 7.53 | 7.78 | 8.06 | 8.67 | 6,140 |
| EPDBEH2010F-8-TH3 | ● | | | 8 | 0.8 | 0.96 | 42 | 4 | A | 6.50 | 8.32 | 8.60 | 8.89 | 9.21 | 9.91 | 6,140 |
| EPDBEH2010F-10-TH3 | ● | | | 10 | 0.8 | 0.96 | 45 | 4 | A | 5.65 | 10.39 | 10.74 | 11.11 | 11.51 | 12.40 | 6,140 |
| EPDBEH2010F-12-TH3 | ● | | | 12 | 0.8 | 0.96 | 45 | 4 | A | 5.00 | 12.46 | 12.88 | 13.32 | 13.81 | 14.89 | 6,140 |
| EPDBEH2015F-2-TH3 | ● | 0.75 | 1.5 | 2 | 1.35 | 1.45 | 35 | 4 | A | 11.76 | 2.13 | 2.18 | 2.23 | 2.29 | 2.42 | 5,850 |
| EPDBEH2015F-2.5-TH3 | ● | | | 2.5 | 1.35 | 1.45 | 35 | 4 | A | 10.88 | 2.65 | 2.72 | 2.79 | 2.87 | 3.04 | 5,850 |
| EPDBEH2015F-3-TH3 | ● | | | 3 | 1.35 | 1.45 | 35 | 4 | A | 10.12 | 3.17 | 3.25 | 3.34 | 3.44 | 3.66 | 5,850 |
| EPDBEH2015F-4-TH3 | ● | | | 4 | 1.35 | 1.45 | 38 | 4 | A | 8.88 | 4.20 | 4.32 | 4.45 | 4.59 | 4.91 | 5,850 |
| EPDBEH2015F-5-TH3 | ● | | | 5 | 1.35 | 1.45 | 38 | 4 | A | 7.90 | 5.23 | 5.39 | 5.56 | 5.74 | 6.15 | 5,850 |
| EPDBEH2015F-6-TH3 | ● | | | 6 | 1.35 | 1.45 | 38 | 4 | A | 7.12 | 6.27 | 6.46 | 6.67 | 6.89 | 7.39 | 5,850 |
| EPDBEH2015F-8-TH3 | ● | | | 8 | 1.35 | 1.45 | 42 | 4 | A | 5.95 | 8.34 | 8.60 | 8.88 | 9.19 | 9.88 | 6,140 |
| EPDBEH2015F-10-TH3 | ● | | | 10 | 1.35 | 1.45 | 42 | 4 | A | 5.10 | 10.40 | 10.74 | 11.10 | 11.49 | 12.36 | 6,690 |
| EPDBEH2015F-12-TH3 | ● | | | 12 | 1.35 | 1.45 | 45 | 4 | A | 4.47 | 12.47 | 12.88 | 13.32 | 13.79 | 14.85 | 7,250 |
| EPDBEH2020F-2.5-TH3 | ● | 1 | 2 | 2.5 | 1.7 | 1.94 | 35 | 4 | A | 10.60 | 2.66 | 2.72 | 2.78 | 2.85 | 3.01 | 5,020 |
| EPDBEH2020F-3-TH3 | ● | | | 3 | 1.7 | 1.94 | 35 | 4 | A | 9.72 | 3.18 | 3.25 | 3.34 | 3.43 | 3.63 | 5,020 |
| EPDBEH2020F-4-TH3 | ● | | | 4 | 1.7 | 1.94 | 35 | 4 | A | 8.32 | 4.21 | 4.32 | 4.45 | 4.58 | 4.87 | 5,020 |
| EPDBEH2020F-5-TH3 | ● | | | 5 | 1.7 | 1.94 | 38 | 4 | A | 7.27 | 5.25 | 5.39 | 5.55 | 5.73 | 6.11 | 5,720 |
| EPDBEH2020F-6-TH3 | ● | | | 6 | 1.7 | 1.94 | 38 | 4 | A | 6.46 | 6.28 | 6.46 | 6.66 | 6.88 | 7.36 | 5,720 |
| EPDBEH2020F-8-TH3 | ● | | | 8 | 1.7 | 1.94 | 42 | 4 | A | 5.27 | 8.35 | 8.60 | 8.88 | 9.18 | 9.84 | 6,140 |
| EPDBEH2020F-10-TH3 | ● | | | 10 | 1.7 | 1.94 | 42 | 4 | A | 4.46 | 10.41 | 10.74 | 11.10 | 11.48 | 12.33 | 6,140 |
| EPDBEH2020F-12-TH3 | ● | | | 12 | 1.7 | 1.94 | 45 | 4 | A | 3.86 | 12.48 | 12.88 | 13.31 | 13.77 | 14.82 | 6,140 |
| EPDBEH2020F-13-TH3 | ● | | | 13 | 1.7 | 1.94 | 45 | 4 | A | 3.62 | 13.51 | 13.95 | 14.42 | 14.92 | 16.06 | 6,140 |
| EPDBEH2020F-14-TH3 | ● | | | 14 | 1.7 | 1.94 | 45 | 4 | A | 3.40 | 14.55 | 15.02 | 15.53 | 16.07 | 17.30 | 6,140 |
| EPDBEH2020F-16-TH3 | ● | | | 16 | 1.7 | 1.94 | 50 | 4 | A | 3.04 | 16.62 | 17.16 | 17.75 | 18.37 | 19.79 | 6,140 |
| EPDBEH2020F-20-TH3 | ● | | | 20 | 1.7 | 1.94 | 55 | 4 | A | 2.51 | 20.75 | 21.44 | 22.18 | 22.97 | 干渉なし | 6,140 |
| EPDBEH2025F-6-TH3 | ● | 1.25 | 2.5 | 6 | 2 | 2.4 | 38 | 4 | A | 5.54 | 6.35 | 6.53 | 6.72 | 6.92 | 7.39 | 7,720 |
| EPDBEH2025F-10-TH3 | ● | | | 10 | 2 | 2.4 | 42 | 4 | A | 3.66 | 10.48 | 10.81 | 11.15 | 11.52 | 12.36 | 8,230 |
| EPDBEH2025F-15-TH3 | ● | | | 15 | 2 | 2.4 | 45 | 4 | A | 2.57 | 15.65 | 16.15 | 16.69 | 17.27 | 干渉なし | 8,380 |

# Epoch Deep Ball Evolution Hard-TH3
# エポックディープボールエボリューションハード-TH3

YouTube 動画公開中

## レギュラーシャンクタイプ Regular shank type

溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / 細部 Miniature / 中仕上 Semi Finishing / 仕上 Finishing / リブ・細部 Rib Miniature

RE公差 RE tolerance
RE≦0.25：±0.003
0.25＜RE：±0.005

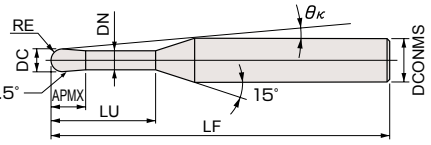
h4 φ4 / h5 φ6～12

(mm)

新開発した次世代ハードコーティングTH3を採用!
高硬度鋼の加工において優れた耐摩耗性を発揮
Applies newly developed next-generation hard coating "TH3".
Excellent wear resistance when machining hardened steel.

2枚刃
2 Flutes

【注意】RE 2mm以上はバックドラフト形状ではありません。
【Note】RE 2mm or larger does not have backdraft shape.




外周バックテーパ：2.5°～8.5°
Back taper on peripheral edge

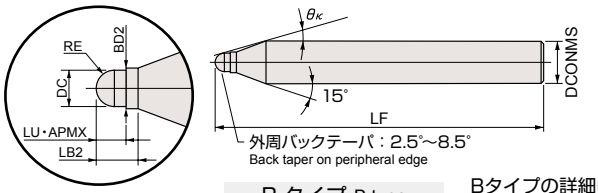
Aタイプ A type

## EPDBEH2○○○-○○.○○-(S6)-TH3

超硬 Carbide / TH3 / ねじれ30° Helix angle / 切削条件表 A64 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | タイプ Type | 干渉角度 Interference angle (°) θκ | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDBEH2001-0.08-TH3 | ● | 0.05 | 0.1 | 0.08 | 0.08 | – | 45 | 4 | B | 20.93 | – | – | – | – | – | 16,290 |
| EPDBEH2001-0.2-TH3 | ● | | | 0.2 | 0.08 | 0.08 | 45 | 4 | A | 14.64 | 0.24 | 0.25 | 0.25 | 0.26 | 0.28 | 16,290 |
| EPDBEH2001-0.3-TH3 | ● | | | 0.3 | 0.08 | 0.08 | 45 | 4 | A | 14.46 | 0.34 | 0.35 | 0.36 | 0.38 | 0.40 | 16,720 |
| EPDBEH2001-0.5-TH3 | ● | | | 0.5 | 0.08 | 0.08 | 45 | 4 | A | 14.10 | 0.55 | 0.57 | 0.59 | 0.61 | 0.65 | 18,110 |
| EPDBEH20015-0.12-TH3 | ● | 0.075 | 0.15 | 0.12 | 0.12 | – | 45 | 4 | B | 15.25 | – | – | – | – | – | 16,720 |
| EPDBEH20015-0.3-TH3 | ● | | | 0.3 | 0.12 | 0.13 | 45 | 4 | A | 14.50 | 0.34 | 0.35 | 0.36 | 0.37 | 0.40 | 16,720 |
| EPDBEH20015-0.5-TH3 | ● | | | 0.5 | 0.12 | 0.13 | 45 | 4 | A | 14.14 | 0.55 | 0.56 | 0.58 | 0.60 | 0.65 | 18,110 |
| EPDBEH20015-0.75-TH3 | ● | | | 0.75 | 0.12 | 0.13 | 45 | 4 | A | 13.71 | 0.81 | 0.83 | 0.86 | 0.89 | 0.96 | 19,710 |
| EPDBEH20015-1-TH3 | ● | | | 1 | 0.12 | 0.13 | 45 | 4 | A | 13.30 | 1.06 | 1.10 | 1.14 | 1.18 | 1.27 | 19,710 |
| EPDBEH2002-0.15-TH3 | ● | 0.1 | 0.2 | 0.15 | 0.15 | – | 50 | 4 | B | 20.23 | – | – | – | – | – | 11,680 |
| EPDBEH2002-0.3-TH3 | ● | | | 0.3 | 0.15 | 0.18 | 50 | 4 | A | 14.54 | 0.34 | 0.35 | 0.36 | 0.37 | 0.39 | 11,680 |
| EPDBEH2002-0.5-TH3 | ● | | | 0.5 | 0.15 | 0.18 | 50 | 4 | A | 14.17 | 0.55 | 0.56 | 0.58 | 0.60 | 0.64 | 11,680 |
| EPDBEH2002-0.75-TH3 | ● | | | 0.75 | 0.15 | 0.18 | 50 | 4 | A | 13.73 | 0.81 | 0.83 | 0.86 | 0.89 | 0.95 | 11,680 |
| EPDBEH2002-1-TH3 | ● | | | 1 | 0.15 | 0.18 | 50 | 4 | A | 13.32 | 1.06 | 1.10 | 1.13 | 1.17 | 1.26 | 11,680 |
| EPDBEH2002-1.25-TH3 | ● | | | 1.25 | 0.15 | 0.18 | 50 | 4 | A | 12.93 | 1.32 | 1.37 | 1.41 | 1.46 | 1.57 | 12,650 |
| EPDBEH2002-1.5-TH3 | ● | | | 1.5 | 0.15 | 0.18 | 50 | 4 | A | 12.56 | 1.58 | 1.63 | 1.69 | 1.75 | 1.88 | 12,650 |
| EPDBEH2002-2-TH3 | ● | | | 2 | 0.15 | 0.18 | 50 | 4 | A | 11.89 | 2.10 | 2.17 | 2.24 | 2.32 | 2.50 | 13,930 |
| EPDBEH2002-2.5-TH3 | ● | | | 2.5 | 0.15 | 0.18 | 50 | 4 | A | 11.28 | 2.61 | 2.70 | 2.80 | 2.90 | 3.13 | 15,220 |
| EPDBEH2002-3-TH3 | ● | | | 3 | 0.15 | 0.18 | 50 | 4 | A | 10.73 | 3.13 | 3.24 | 3.35 | 3.47 | 3.75 | 16,290 |
| EPDBEH2003-0.25-TH3 | ● | 0.15 | 0.3 | 0.25 | 0.25 | – | 50 | 4 | B | 14.45 | – | – | – | – | – | 11,470 |
| EPDBEH2003-0.5-TH3 | ● | | | 0.5 | 0.25 | 0.27 | 50 | 4 | A | 14.21 | 0.56 | 0.58 | 0.60 | 0.61 | 0.65 | 11,470 |
| EPDBEH2003-0.75-TH3 | ● | | | 0.75 | 0.25 | 0.27 | 50 | 4 | A | 13.76 | 0.82 | 0.85 | 0.87 | 0.90 | 0.96 | 11,470 |
| EPDBEH2003-1-TH3 | ● | | | 1 | 0.25 | 0.27 | 50 | 4 | A | 13.33 | 1.08 | 1.11 | 1.15 | 1.19 | 1.27 | 11,470 |
| EPDBEH2003-1.25-TH3 | ● | | | 1.25 | 0.25 | 0.27 | 50 | 4 | A | 12.93 | 1.34 | 1.38 | 1.43 | 1.47 | 1.58 | 12,220 |
| EPDBEH2003-1.5-TH3 | ● | | | 1.5 | 0.25 | 0.27 | 50 | 4 | A | 12.56 | 1.60 | 1.65 | 1.70 | 1.76 | 1.89 | 12,220 |
| EPDBEH2003-2-TH3 | ● | | | 2 | 0.25 | 0.27 | 50 | 4 | A | 11.86 | 2.12 | 2.18 | 2.26 | 2.34 | 2.52 | 12,220 |
| EPDBEH2003-2.5-TH3 | ● | | | 2.5 | 0.25 | 0.27 | 50 | 4 | A | 11.24 | 2.63 | 2.72 | 2.81 | 2.91 | 3.14 | 12,650 |
| EPDBEH2003-3-TH3 | ● | | | 3 | 0.25 | 0.27 | 50 | 4 | A | 10.68 | 3.15 | 3.25 | 3.37 | 3.49 | 3.76 | 12,650 |
| EPDBEH2003-3.5-TH3 | ● | | | 3.5 | 0.25 | 0.27 | 50 | 4 | A | 10.18 | 3.67 | 3.79 | 3.92 | 4.06 | 4.38 | 12,650 |
| EPDBEH2003-4-TH3 | ● | | | 4 | 0.25 | 0.27 | 50 | 4 | A | 9.72 | 4.18 | 4.32 | 4.47 | 4.64 | 5.00 | 12,860 |
| EPDBEH2004-0.3-TH3 | ● | 0.2 | 0.4 | 0.3 | 0.3 | – | 50 | 4 | B | 14.53 | – | – | – | – | – | 7,810 |
| EPDBEH2004-0.5-TH3 | ● | | | 0.5 | 0.3 | 0.37 | 50 | 4 | A | 14.28 | 0.56 | 0.58 | 0.59 | 0.60 | 0.64 | 7,810 |
| EPDBEH2004-0.75-TH3 | ● | | | 0.75 | 0.3 | 0.37 | 50 | 4 | A | 13.81 | 0.82 | 0.84 | 0.87 | 0.89 | 0.95 | 7,810 |
| EPDBEH2004-1-TH3 | ● | | | 1 | 0.3 | 0.37 | 50 | 4 | A | 13.37 | 1.08 | 1.11 | 1.14 | 1.18 | 1.26 | 7,810 |
| EPDBEH2004-1.5-TH3 | ● | | | 1.5 | 0.3 | 0.37 | 50 | 4 | A | 12.57 | 1.60 | 1.65 | 1.70 | 1.75 | 1.88 | 7,940 |
| EPDBEH2004-2-TH3 | ● | | | 2 | 0.3 | 0.37 | 50 | 4 | A | 11.86 | 2.11 | 2.18 | 2.25 | 2.33 | 2.50 | 8,230 |
| EPDBEH2004-2.5-TH3 | ● | | | 2.5 | 0.3 | 0.37 | 50 | 4 | A | 11.23 | 2.63 | 2.72 | 2.81 | 2.90 | 3.13 | 8,500 |
| EPDBEH2004-3-TH3 | ● | | | 3 | 0.3 | 0.37 | 50 | 4 | A | 10.65 | 3.15 | 3.25 | 3.36 | 3.48 | 3.75 | 9,060 |
| EPDBEH2004-3.5-TH3 | ● | | | 3.5 | 0.3 | 0.37 | 50 | 4 | A | 10.14 | 3.66 | 3.78 | 3.91 | 4.05 | 4.37 | 9,760 |
| EPDBEH2004-4-TH3 | ● | | | 4 | 0.3 | 0.37 | 50 | 4 | A | 9.67 | 4.18 | 4.32 | 4.47 | 4.63 | 4.99 | 9,760 |
| EPDBEH2004-4.5-TH3 | ● | | | 4.5 | 0.3 | 0.37 | 50 | 4 | A | 9.24 | 4.70 | 4.85 | 5.02 | 5.20 | 5.61 | 10,320 |
| EPDBEH2004-5-TH3 | ● | | | 5 | 0.3 | 0.37 | 50 | 4 | A | 8.85 | 5.21 | 5.39 | 5.58 | 5.78 | 6.23 | 10,320 |
| EPDBEH2005-0.35-TH3 | ● | 0.25 | 0.5 | 0.35 | 0.35 | – | 50 | 4 | B | 14.10 | – | – | – | – | – | 7,810 |
| EPDBEH2005-0.75-TH3 | ● | | | 0.75 | 0.35 | 0.47 | 50 | 4 | A | 13.88 | 0.82 | 0.84 | 0.86 | 0.88 | 0.94 | 7,810 |

●：標準在庫品です。●：Stocked items.




B タイプ B type

Bタイプの詳細はA63をご確認ください
For details of B type, refer to page A63.

# EPDBEH2○○○-○○.○○-(S6)-TH3

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | タイプ Type | 干渉角度 Interference angle (°) θκ | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格（円）Suggested retail price（¥） |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDBEH2005-1-TH3 | ● | 0.25 | 0.5 | 1 | 0.35 | 0.47 | 50 | 4 | A | 13.42 | 1.08 | 1.11 | 1.14 | 1.17 | 1.25 | 7,810 |
| EPDBEH2005-1.5-TH3 | ● | | | 1.5 | 0.35 | 0.47 | 50 | 4 | A | 12.59 | 1.59 | 1.64 | 1.69 | 1.75 | 1.87 | 7,810 |
| EPDBEH2005-2-TH3 | ● | | | 2 | 0.35 | 0.47 | 50 | 4 | A | 11.86 | 2.11 | 2.18 | 2.25 | 2.32 | 2.49 | 7,810 |
| EPDBEH2005-2.5-TH3 | ● | | | 2.5 | 0.35 | 0.47 | 50 | 4 | A | 11.21 | 2.63 | 2.71 | 2.80 | 2.90 | 3.11 | 7,810 |
| EPDBEH2005-3-TH3 | ● | | | 3 | 0.35 | 0.47 | 50 | 4 | A | 10.62 | 3.15 | 3.25 | 3.36 | 3.47 | 3.73 | 7,810 |
| EPDBEH2005-4-TH3 | ● | | | 4 | 0.35 | 0.47 | 50 | 4 | A | 9.61 | 4.18 | 4.32 | 4.46 | 4.62 | 4.98 | 7,810 |
| EPDBEH2005-5-TH3 | ● | | | 5 | 0.35 | 0.47 | 50 | 4 | A | 8.78 | 5.21 | 5.39 | 5.57 | 5.77 | 6.22 | 7,940 |
| EPDBEH2005-5.5-TH3 | ● | | | 5.5 | 0.35 | 0.47 | 50 | 4 | A | 8.41 | 5.73 | 5.92 | 6.13 | 6.35 | 6.84 | 8,230 |
| EPDBEH2005-6-TH3 | ● | | | 6 | 0.35 | 0.47 | 50 | 4 | A | 8.08 | 6.25 | 6.46 | 6.68 | 6.92 | 7.46 | 8,230 |
| EPDBEH2005-7-TH3 | ● | | | 7 | 0.35 | 0.47 | 50 | 4 | A | 7.48 | 7.28 | 7.53 | 7.79 | 8.07 | 8.71 | 9,760 |
| EPDBEH2005-8-TH3 | ● | | | 8 | 0.35 | 0.47 | 50 | 4 | A | 6.96 | 8.31 | 8.60 | 8.90 | 9.22 | 9.95 | 9,760 |
| EPDBEH2006-0.4-TH3 | ● | 0.3 | 0.6 | 0.4 | 0.4 | – | 50 | 4 | B | 14.16 | – | – | – | – | – | 6,740 |
| EPDBEH2006-0.75-TH3 | ● | | | 0.75 | 0.4 | 0.57 | 50 | 4 | A | 13.94 | 0.82 | 0.84 | 0.86 | 0.88 | 0.93 | 6,740 |
| EPDBEH2006-1-TH3 | ● | | | 1 | 0.4 | 0.57 | 50 | 4 | A | 13.47 | 1.08 | 1.10 | 1.13 | 1.17 | 1.24 | 6,740 |
| EPDBEH2006-1.5-TH3 | ● | | | 1.5 | 0.4 | 0.57 | 50 | 4 | A | 12.61 | 1.59 | 1.64 | 1.69 | 1.74 | 1.86 | 6,000 |
| EPDBEH2006-2-TH3 | ● | | | 2 | 0.4 | 0.57 | 50 | 4 | A | 11.86 | 2.11 | 2.17 | 2.24 | 2.31 | 2.48 | 6,000 |
| EPDBEH2006-2.5-TH3 | ● | | | 2.5 | 0.4 | 0.57 | 50 | 4 | A | 11.19 | 2.63 | 2.71 | 2.80 | 2.89 | 3.10 | 6,140 |
| EPDBEH2006-3-TH3 | ● | | | 3 | 0.4 | 0.57 | 50 | 4 | A | 10.59 | 3.14 | 3.24 | 3.35 | 3.46 | 3.72 | 6,140 |
| EPDBEH2006-3.5-TH3 | ● | | | 3.5 | 0.4 | 0.57 | 50 | 4 | A | 10.05 | 3.66 | 3.78 | 3.90 | 4.04 | 4.34 | 6,410 |
| EPDBEH2006-4-TH3 | ● | | | 4 | 0.4 | 0.57 | 50 | 4 | A | 9.56 | 4.18 | 4.31 | 4.46 | 4.61 | 4.97 | 6,410 |
| EPDBEH2006-4.5-TH3 | ● | | | 4.5 | 0.4 | 0.57 | 50 | 4 | A | 9.12 | 4.69 | 4.85 | 5.01 | 5.19 | 5.59 | 6,410 |
| EPDBEH2006-5-TH3 | ● | | | 5 | 0.4 | 0.57 | 50 | 4 | A | 8.71 | 5.21 | 5.38 | 5.57 | 5.76 | 6.21 | 6,410 |
| EPDBEH2006-5.5-TH3 | ● | | | 5.5 | 0.4 | 0.57 | 50 | 4 | A | 8.34 | 5.73 | 5.92 | 6.12 | 6.34 | 6.83 | 6,410 |
| EPDBEH2006-6-TH3 | ● | | | 6 | 0.4 | 0.57 | 50 | 4 | A | 8.00 | 6.24 | 6.45 | 6.67 | 6.91 | 7.45 | 6,410 |
| EPDBEH2006-7-TH3 | ● | | | 7 | 0.4 | 0.57 | 50 | 4 | A | 7.40 | 7.28 | 7.52 | 7.78 | 8.06 | 8.70 | 7,250 |
| EPDBEH2006-8-TH3 | ● | | | 8 | 0.4 | 0.57 | 50 | 4 | A | 6.88 | 8.31 | 8.59 | 8.89 | 9.21 | 9.94 | 8,500 |
| EPDBEH2006-9-TH3 | ● | | | 9 | 0.4 | 0.57 | 50 | 4 | A | 6.43 | 9.35 | 9.66 | 10.00 | 10.36 | 11.18 | 9,060 |
| EPDBEH2006-10-TH3 | ● | | | 10 | 0.4 | 0.57 | 50 | 4 | A | 6.03 | 10.38 | 10.73 | 11.11 | 11.51 | 12.43 | 8,650 |
| EPDBEH2006-12-TH3 | ● | | | 12 | 0.4 | 0.57 | 50 | 4 | A | 5.37 | 12.45 | 12.87 | 13.32 | 13.81 | 14.91 | 9,760 |
| EPDBEH2007-0.45-TH3 | ● | 0.35 | 0.7 | 0.45 | 0.45 | – | 50 | 4 | B | 14.13 | – | – | – | – | – | 6,000 |
| EPDBEH2007-2-TH3 | ● | | | 2 | 0.45 | 0.67 | 50 | 4 | A | 11.85 | 2.11 | 2.17 | 2.24 | 2.31 | 2.47 | 6,000 |
| EPDBEH2007-4-TH3 | ● | | | 4 | 0.45 | 0.67 | 50 | 4 | A | 9.50 | 4.18 | 4.31 | 4.45 | 4.61 | 4.95 | 6,410 |
| EPDBEH2007-6-TH3 | ● | | | 6 | 0.45 | 0.67 | 50 | 4 | A | 7.92 | 6.24 | 6.45 | 6.67 | 6.91 | 7.44 | 6,410 |
| EPDBEH2007-8-TH3 | ● | | | 8 | 0.45 | 0.67 | 50 | 4 | A | 6.79 | 8.31 | 8.59 | 8.89 | 9.21 | 9.93 | 6,410 |
| EPDBEH2008-0.5-TH3 | ● | 0.4 | 0.8 | 0.5 | 0.5 | – | 50 | 4 | B | 14.20 | – | – | – | – | – | 6,000 |
| EPDBEH2008-1-TH3 | ● | | | 1 | 0.5 | 0.77 | 50 | 4 | A | 13.58 | 1.07 | 1.10 | 1.12 | 1.15 | 1.21 | 6,000 |
| EPDBEH2008-1.5-TH3 | ● | | | 1.5 | 0.5 | 0.77 | 50 | 4 | A | 12.66 | 1.59 | 1.63 | 1.68 | 1.73 | 1.83 | 6,000 |
| EPDBEH2008-2-TH3 | ● | | | 2 | 0.5 | 0.77 | 50 | 4 | A | 11.85 | 2.11 | 2.17 | 2.23 | 2.30 | 2.46 | 6,000 |
| EPDBEH2008-2.5-TH3 | ● | | | 2.5 | 0.5 | 0.77 | 50 | 4 | A | 11.14 | 2.62 | 2.70 | 2.79 | 2.88 | 3.08 | 6,220 |
| EPDBEH2008-3-TH3 | ● | | | 3 | 0.5 | 0.77 | 50 | 4 | A | 10.51 | 3.14 | 3.24 | 3.34 | 3.45 | 3.70 | 6,410 |
| EPDBEH2008-4-TH3 | ● | | | 4 | 0.5 | 0.77 | 50 | 4 | A | 9.44 | 4.17 | 4.31 | 4.45 | 4.60 | 4.94 | 6,410 |
| EPDBEH2008-5-TH3 | ● | | | 5 | 0.5 | 0.77 | 50 | 4 | A | 8.57 | 5.21 | 5.38 | 5.56 | 5.75 | 6.19 | 6,410 |
| EPDBEH2008-6-TH3 | ● | | | 6 | 0.5 | 0.77 | 50 | 4 | A | 7.84 | 6.24 | 6.45 | 6.66 | 6.90 | 7.43 | 6,410 |
| EPDBEH2008-8-TH3 | ● | | | 8 | 0.5 | 0.77 | 50 | 4 | A | 6.70 | 8.31 | 8.58 | 8.88 | 9.20 | 9.92 | 6,410 |
| EPDBEH2008-10-TH3 | ● | | | 10 | 0.5 | 0.77 | 50 | 4 | A | 5.85 | 10.38 | 10.72 | 11.10 | 11.50 | 12.40 | 8,500 |
| EPDBEH2008-12-TH3 | ● | | | 12 | 0.5 | 0.77 | 50 | 4 | A | 5.19 | 12.44 | 12.86 | 13.31 | 13.80 | 14.89 | 10,450 |
| EPDBEH2009-0.6-TH3 | ● | 0.45 | 0.9 | 0.6 | 0.6 | – | 50 | 4 | B | 13.84 | – | – | – | – | – | 6,000 |
| EPDBEH2009-2-TH3 | ● | | | 2 | 0.6 | 0.87 | 50 | 4 | A | 11.85 | 2.11 | 2.16 | 2.23 | 2.29 | 2.44 | 6,000 |
| EPDBEH2009-4-TH3 | ● | | | 4 | 0.6 | 0.87 | 50 | 4 | A | 9.38 | 4.17 | 4.30 | 4.44 | 4.59 | 4.93 | 6,410 |
| EPDBEH2009-6-TH3 | ● | | | 6 | 0.6 | 0.87 | 50 | 4 | A | 7.75 | 6.24 | 6.44 | 6.66 | 6.89 | 7.42 | 6,410 |
| EPDBEH2009-8-TH3 | ● | | | 8 | 0.6 | 0.87 | 50 | 4 | A | 6.61 | 8.31 | 8.58 | 8.88 | 9.19 | 9.90 | 6,410 |

# EPDBEH2○○○-○○.○○-(S6)-TH3

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | タイプ Type | 干渉角度 Interference angle (°) θK | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格（円） Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDBEH2010-0.8-TH3 | ● | | | 0.8 | 0.8 | – | 50 | 4 | B | 13.47 | – | – | – | – | – | 5,020 |
| EPDBEH2010-1.5-TH3 | ● | | | 1.5 | 0.8 | 0.96 | 50 | 4 | A | 12.67 | 1.61 | 1.64 | 1.69 | 1.73 | 1.83 | 5,020 |
| EPDBEH2010-2-TH3 | ● | | | 2 | 0.8 | 0.96 | 50 | 4 | A | 11.82 | 2.12 | 2.18 | 2.24 | 2.31 | 2.46 | 5,020 |
| EPDBEH2010-2.5-TH3 | ● | | | 2.5 | 0.8 | 0.96 | 50 | 4 | A | 11.07 | 2.64 | 2.71 | 2.80 | 2.88 | 3.08 | 5,020 |
| EPDBEH2010-3-TH3 | ● | | | 3 | 0.8 | 0.96 | 50 | 4 | A | 10.41 | 3.16 | 3.25 | 3.35 | 3.46 | 3.70 | 5,020 |
| EPDBEH2010-4-TH3 | ● | | | 4 | 0.8 | 0.96 | 50 | 4 | A | 9.29 | 4.19 | 4.32 | 4.46 | 4.61 | 4.94 | 5,720 |
| EPDBEH2010-5-TH3 | ● | | | 5 | 0.8 | 0.96 | 50 | 4 | A | 8.39 | 5.22 | 5.39 | 5.57 | 5.76 | 6.19 | 5,720 |
| EPDBEH2010-6-TH3 | ● | | | 6 | 0.8 | 0.96 | 50 | 4 | A | 7.65 | 6.26 | 6.46 | 6.67 | 6.91 | 7.43 | 6,140 |
| EPDBEH2010-7-TH3 | ● | | | 7 | 0.8 | 0.96 | 50 | 4 | A | 7.03 | 7.29 | 7.53 | 7.78 | 8.06 | 8.67 | 6,140 |
| EPDBEH2010-8-TH3 | ● | | | 8 | 0.8 | 0.96 | 50 | 4 | A | 6.50 | 8.32 | 8.60 | 8.89 | 9.21 | 9.91 | 6,140 |
| EPDBEH2010-9-TH3 | ● | | | 9 | 0.8 | 0.96 | 50 | 4 | A | 6.05 | 9.36 | 9.67 | 10.00 | 10.36 | 11.16 | 6,140 |
| EPDBEH2010-10-TH3 | ● | 0.5 | 1 | 10 | 0.8 | 0.96 | 50 | 4 | A | 5.65 | 10.39 | 10.74 | 11.11 | 11.51 | 12.40 | 6,140 |
| EPDBEH2010-12-TH3 | ● | | | 12 | 0.8 | 0.96 | 55 | 4 | A | 5.00 | 12.46 | 12.88 | 13.32 | 13.81 | 14.89 | 6,140 |
| EPDBEH2010-13-TH3 | ● | | | 13 | 0.8 | 0.96 | 55 | 4 | A | 4.72 | 13.49 | 13.95 | 14.43 | 14.96 | 16.13 | 7,250 |
| EPDBEH2010-14-TH3 | ● | | | 14 | 0.8 | 0.96 | 55 | 4 | A | 4.48 | 14.53 | 15.02 | 15.54 | 16.11 | 17.37 | 7,250 |
| EPDBEH2010-16-TH3 | ● | | | 16 | 0.8 | 0.96 | 55 | 4 | A | 4.06 | 16.59 | 17.16 | 17.76 | 18.40 | 19.86 | 8,500 |
| EPDBEH2010-18-TH3 | ● | | | 18 | 0.8 | 0.96 | 60 | 4 | A | 3.71 | 18.66 | 19.29 | 19.97 | 20.70 | 22.35 | 8,500 |
| EPDBEH2010-20-TH3 | ● | | | 20 | 0.8 | 0.96 | 60 | 4 | A | 3.42 | 20.73 | 21.43 | 22.19 | 23.00 | 24.83 | 10,320 |
| EPDBEH2010-2-S6-TH3 | ● | | | 2 | 0.8 | 0.96 | 50 | 6 | A | 12.92 | 2.12 | 2.18 | 2.24 | 2.31 | 2.46 | 7,530 |
| EPDBEH2010-3-S6-TH3 | ● | | | 3 | 0.8 | 0.96 | 50 | 6 | A | 11.86 | 3.16 | 3.25 | 3.35 | 3.46 | 3.70 | 7,530 |
| EPDBEH2010-6-S6-TH3 | ● | | | 6 | 0.8 | 0.96 | 50 | 6 | A | 9.53 | 6.26 | 6.46 | 6.67 | 6.91 | 7.43 | 9,200 |
| EPDBEH2010-8-S6-TH3 | ● | | | 8 | 0.8 | 0.96 | 50 | 6 | A | 8.42 | 8.32 | 8.60 | 8.89 | 9.21 | 9.91 | 9,200 |
| EPDBEH2010-10-S6-TH3 | ● | | | 10 | 0.8 | 0.96 | 50 | 6 | A | 7.54 | 10.39 | 10.74 | 11.11 | 11.51 | 12.40 | 9,200 |
| EPDBEH2011-2-TH3 | ● | | | 2 | 1 | 1.05 | 50 | 4 | A | 11.78 | 2.14 | 2.20 | 2.26 | 2.32 | 2.47 | 6,740 |
| EPDBEH2011-4-TH3 | ● | | | 4 | 1 | 1.05 | 50 | 4 | A | 9.20 | 4.21 | 4.34 | 4.47 | 4.62 | 4.95 | 7,670 |
| EPDBEH2011-6-TH3 | ● | 0.55 | 1.1 | 6 | 1 | 1.05 | 50 | 4 | A | 7.54 | 6.28 | 6.47 | 6.69 | 6.92 | 7.44 | 8,360 |
| EPDBEH2011-8-TH3 | ● | | | 8 | 1 | 1.05 | 50 | 4 | A | 6.39 | 8.34 | 8.61 | 8.91 | 9.22 | 9.93 | 8,360 |
| EPDBEH2011-10-TH3 | ● | | | 10 | 1 | 1.05 | 50 | 4 | A | 5.54 | 10.41 | 10.75 | 11.12 | 11.52 | 12.41 | 8,360 |
| EPDBEH2012-2-TH3 | ● | | | 2 | 1.1 | 1.15 | 50 | 4 | A | 11.78 | 2.14 | 2.19 | 2.25 | 2.31 | 2.46 | 7,670 |
| EPDBEH2012-3-TH3 | ● | | | 3 | 1.1 | 1.15 | 50 | 4 | A | 10.29 | 3.17 | 3.26 | 3.36 | 3.46 | 3.70 | 7,670 |
| EPDBEH2012-4-TH3 | ● | | | 4 | 1.1 | 1.15 | 50 | 4 | A | 9.13 | 4.21 | 4.33 | 4.47 | 4.61 | 4.94 | 7,670 |
| EPDBEH2012-6-TH3 | ● | | | 6 | 1.1 | 1.15 | 50 | 4 | A | 7.45 | 6.27 | 6.47 | 6.68 | 6.91 | 7.43 | 8,360 |
| EPDBEH2012-8-TH3 | ● | 0.6 | 1.2 | 8 | 1.1 | 1.15 | 50 | 4 | A | 6.29 | 8.34 | 8.61 | 8.90 | 9.21 | 9.91 | 8,360 |
| EPDBEH2012-10-TH3 | ● | | | 10 | 1.1 | 1.15 | 50 | 4 | A | 5.44 | 10.41 | 10.75 | 11.12 | 11.51 | 12.40 | 8,360 |
| EPDBEH2012-12-TH3 | ● | | | 12 | 1.1 | 1.15 | 55 | 4 | A | 4.79 | 12.48 | 12.89 | 13.33 | 13.81 | 14.89 | 8,360 |
| EPDBEH2012-2-S6-TH3 | ● | | | 2 | 1.1 | 1.15 | 50 | 6 | A | 12.94 | 2.14 | 2.19 | 2.25 | 2.31 | 2.46 | 11,470 |
| EPDBEH2012-4-S6-TH3 | ● | | | 4 | 1.1 | 1.15 | 50 | 6 | A | 10.92 | 4.21 | 4.33 | 4.47 | 4.61 | 4.94 | 11,470 |
| EPDBEH2014-3-TH3 | ● | | | 3 | 1.3 | 1.34 | 50 | 4 | A | 10.15 | 3.19 | 3.28 | 3.37 | 3.47 | 3.70 | 7,250 |
| EPDBEH2014-8-TH3 | ● | 0.7 | 1.4 | 8 | 1.3 | 1.34 | 50 | 4 | A | 6.06 | 8.36 | 8.62 | 8.91 | 9.22 | 9.91 | 7,250 |
| EPDBEH2014-12-TH3 | ● | | | 12 | 1.3 | 1.34 | 55 | 4 | A | 4.58 | 12.49 | 12.90 | 13.34 | 13.82 | 14.89 | 7,250 |
| EPDBEH2014-16-TH3 | ● | | | 16 | 1.3 | 1.34 | 55 | 4 | A | 3.68 | 16.63 | 17.18 | 17.78 | 18.42 | 19.86 | 7,250 |
| EPDBEH2015-2-TH3 | ● | | | 2 | 1.35 | 1.45 | 50 | 4 | A | 11.76 | 2.13 | 2.18 | 2.23 | 2.29 | 2.42 | 5,850 |
| EPDBEH2015-2.5-TH3 | ● | | | 2.5 | 1.35 | 1.45 | 50 | 4 | A | 10.88 | 2.65 | 2.72 | 2.79 | 2.87 | 3.04 | 5,850 |
| EPDBEH2015-3-TH3 | ● | 0.75 | 1.5 | 3 | 1.35 | 1.45 | 50 | 4 | A | 10.12 | 3.17 | 3.25 | 3.34 | 3.44 | 3.66 | 5,850 |
| EPDBEH2015-4-TH3 | ● | | | 4 | 1.35 | 1.45 | 50 | 4 | A | 8.88 | 4.20 | 4.32 | 4.45 | 4.59 | 4.91 | 5,850 |
| EPDBEH2015-5-TH3 | ● | | | 5 | 1.35 | 1.45 | 50 | 4 | A | 7.90 | 5.23 | 5.39 | 5.56 | 5.74 | 6.15 | 5,850 |

●：標準在庫品です。●：Stocked items.　干渉なし：No interference.

# EPDBEH2○○○-○○.○○-(S6)-TH3

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | タイプ Type | 干渉角度 Interference angle (°) θK | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDBEH2015-6-TH3 | ● | 0.75 | 1.5 | 6 | 1.35 | 1.45 | 50 | 4 | A | 7.12 | 6.27 | 6.46 | 6.67 | 6.89 | 7.39 | 5,850 |
| EPDBEH2015-8-TH3 | ● | | | 8 | 1.35 | 1.45 | 50 | 4 | A | 5.95 | 8.34 | 8.60 | 8.88 | 9.19 | 9.88 | 6,140 |
| EPDBEH2015-10-TH3 | ● | | | 10 | 1.35 | 1.45 | 50 | 4 | A | 5.10 | 10.40 | 10.74 | 11.10 | 11.49 | 12.36 | 6,690 |
| EPDBEH2015-12-TH3 | ● | | | 12 | 1.35 | 1.45 | 55 | 4 | A | 4.47 | 12.47 | 12.88 | 13.32 | 13.79 | 14.85 | 7,250 |
| EPDBEH2015-14-TH3 | ● | | | 14 | 1.35 | 1.45 | 55 | 4 | A | 3.98 | 14.54 | 15.02 | 15.53 | 16.09 | 17.34 | 7,250 |
| EPDBEH2015-16-TH3 | ● | | | 16 | 1.35 | 1.45 | 55 | 4 | A | 3.58 | 16.60 | 17.16 | 17.75 | 18.39 | 19.82 | 7,250 |
| EPDBEH2015-18-TH3 | ● | | | 18 | 1.35 | 1.45 | 60 | 4 | A | 3.26 | 18.67 | 19.30 | 19.97 | 20.69 | 22.31 | 7,250 |
| EPDBEH2015-20-TH3 | ● | | | 20 | 1.35 | 1.45 | 60 | 4 | A | 2.99 | 20.74 | 21.44 | 22.18 | 22.99 | 干渉なし | 7,250 |
| EPDBEH2015-3-S6-TH3 | ● | | | 3 | 1.35 | 1.45 | 50 | 6 | A | 11.84 | 3.17 | 3.25 | 3.34 | 3.44 | 3.66 | 8,780 |
| EPDBEH2015-5-S6-TH3 | ● | | | 5 | 1.35 | 1.45 | 50 | 6 | A | 10.02 | 5.23 | 5.39 | 5.56 | 5.74 | 6.15 | 8,780 |
| EPDBEH2015-8-S6-TH3 | ● | | | 8 | 1.35 | 1.45 | 50 | 6 | A | 8.14 | 8.34 | 8.60 | 8.88 | 9.19 | 9.88 | 9,200 |
| EPDBEH2015-12-S6-TH3 | ● | | | 12 | 1.35 | 1.45 | 50 | 6 | A | 6.51 | 12.47 | 12.88 | 13.32 | 13.79 | 14.85 | 10,830 |
| EPDBEH2016-4-TH3 | ● | 0.8 | 1.6 | 4 | 1.4 | 1.54 | 50 | 4 | A | 8.76 | 4.22 | 4.34 | 4.47 | 4.61 | 4.92 | 8,360 |
| EPDBEH2016-8-TH3 | ● | | | 8 | 1.4 | 1.54 | 50 | 4 | A | 5.82 | 8.35 | 8.62 | 8.90 | 9.20 | 9.89 | 8,360 |
| EPDBEH2016-12-TH3 | ● | | | 12 | 1.4 | 1.54 | 55 | 4 | A | 4.35 | 12.49 | 12.90 | 13.33 | 13.80 | 14.86 | 8,360 |
| EPDBEH2016-16-TH3 | ● | | | 16 | 1.4 | 1.54 | 55 | 4 | A | 3.47 | 16.62 | 17.17 | 17.77 | 18.40 | 19.84 | 8,360 |
| EPDBEH2016-20-TH3 | ● | | | 20 | 1.4 | 1.54 | 60 | 4 | A | 2.89 | 20.76 | 21.45 | 22.20 | 23.00 | 干渉なし | 8,360 |
| EPDBEH2018-4-TH3 | ● | 0.9 | 1.8 | 4 | 1.6 | 1.73 | 50 | 4 | A | 8.53 | 4.23 | 4.35 | 4.48 | 4.61 | 4.92 | 7,250 |
| EPDBEH2018-8-TH3 | ● | | | 8 | 1.6 | 1.73 | 50 | 4 | A | 5.55 | 8.37 | 8.63 | 8.91 | 9.21 | 9.89 | 7,250 |
| EPDBEH2018-12-TH3 | ● | | | 12 | 1.6 | 1.73 | 55 | 4 | A | 4.11 | 12.50 | 12.91 | 13.34 | 13.81 | 14.86 | 7,250 |
| EPDBEH2018-16-TH3 | ● | | | 16 | 1.6 | 1.73 | 55 | 4 | A | 3.26 | 16.64 | 17.19 | 17.78 | 18.41 | 19.83 | 7,250 |
| EPDBEH2018-20-TH3 | ● | | | 20 | 1.6 | 1.73 | 60 | 4 | A | 2.70 | 20.77 | 21.47 | 22.21 | 23.01 | 干渉なし | 7,250 |
| EPDBEH2020-2.5-TH3 | ● | 1 | 2 | 2.5 | 1.7 | 1.94 | 50 | 4 | A | 10.60 | 2.66 | 2.72 | 2.78 | 2.85 | 3.01 | 5,020 |
| EPDBEH2020-3-TH3 | ● | | | 3 | 1.7 | 1.94 | 50 | 4 | A | 9.72 | 3.18 | 3.25 | 3.34 | 3.43 | 3.63 | 5,020 |
| EPDBEH2020-4-TH3 | ● | | | 4 | 1.7 | 1.94 | 50 | 4 | A | 8.32 | 4.21 | 4.32 | 4.45 | 4.58 | 4.87 | 5,020 |
| EPDBEH2020-5-TH3 | ● | | | 5 | 1.7 | 1.94 | 50 | 4 | A | 7.27 | 5.25 | 5.39 | 5.55 | 5.73 | 6.11 | 5,720 |
| EPDBEH2020-6-TH3 | ● | | | 6 | 1.7 | 1.94 | 50 | 4 | A | 6.46 | 6.28 | 6.46 | 6.66 | 6.88 | 7.36 | 5,720 |
| EPDBEH2020-8-TH3 | ● | | | 8 | 1.7 | 1.94 | 50 | 4 | A | 5.27 | 8.35 | 8.60 | 8.88 | 9.18 | 9.84 | 6,140 |
| EPDBEH2020-10-TH3 | ● | | | 10 | 1.7 | 1.94 | 50 | 4 | A | 4.46 | 10.41 | 10.74 | 11.10 | 11.48 | 12.33 | 6,140 |
| EPDBEH2020-12-TH3 | ● | | | 12 | 1.7 | 1.94 | 55 | 4 | A | 3.86 | 12.48 | 12.88 | 13.31 | 13.77 | 14.82 | 6,140 |
| EPDBEH2020-13-TH3 | ● | | | 13 | 1.7 | 1.94 | 55 | 4 | A | 3.62 | 13.51 | 13.95 | 14.42 | 14.92 | 16.06 | 6,140 |
| EPDBEH2020-14-TH3 | ● | | | 14 | 1.7 | 1.94 | 55 | 4 | A | 3.40 | 14.55 | 15.02 | 15.53 | 16.07 | 17.30 | 6,140 |
| EPDBEH2020-16-TH3 | ● | | | 16 | 1.7 | 1.94 | 55 | 4 | A | 3.04 | 16.62 | 17.16 | 17.75 | 18.37 | 19.79 | 6,140 |
| EPDBEH2020-18-TH3 | ● | | | 18 | 1.7 | 1.94 | 60 | 4 | A | 2.75 | 18.68 | 19.30 | 19.96 | 20.67 | 干渉なし | 6,140 |
| EPDBEH2020-20-TH3 | ● | | | 20 | 1.7 | 1.94 | 60 | 4 | A | 2.51 | 20.75 | 21.44 | 22.18 | 22.97 | 干渉なし | 6,140 |
| EPDBEH2020-22-TH3 | ● | | | 22 | 1.7 | 1.94 | 60 | 4 | A | 2.31 | 22.82 | 23.58 | 24.40 | 25.27 | 干渉なし | 8,500 |
| EPDBEH2020-25-TH3 | ● | | | 25 | 1.7 | 1.94 | 65 | 4 | A | 2.06 | 25.92 | 26.79 | 27.72 | 28.72 | 干渉なし | 8,650 |
| EPDBEH2020-30-TH3 | ● | | | 30 | 1.7 | 1.94 | 70 | 4 | A | 1.75 | 31.09 | 32.14 | 33.26 | 干渉なし | 干渉なし | 9,900 |
| EPDBEH2020-35-TH3 | ● | | | 35 | 1.7 | 1.94 | 75 | 4 | A | 1.52 | 36.26 | 37.48 | 38.80 | 干渉なし | 干渉なし | 13,390 |
| EPDBEH2020-40-TH3 | ● | | | 40 | 1.7 | 1.94 | 80 | 4 | A | 1.34 | 41.42 | 42.83 | 干渉なし | 干渉なし | 干渉なし | 13,390 |
| EPDBEH2020-3-S6-TH3 | ● | | | 3 | 1.7 | 1.94 | 50 | 6 | A | 11.80 | 3.18 | 3.25 | 3.34 | 3.43 | 3.63 | 7,530 |
| EPDBEH2020-6-S6-TH3 | ● | | | 6 | 1.7 | 1.94 | 50 | 6 | A | 9.04 | 6.28 | 6.46 | 6.66 | 6.88 | 7.36 | 8,570 |
| EPDBEH2020-8-S6-TH3 | ● | | | 8 | 1.7 | 1.94 | 50 | 6 | A | 7.82 | 8.35 | 8.60 | 8.88 | 9.18 | 9.84 | 9,200 |
| EPDBEH2020-12-S6-TH3 | ● | | | 12 | 1.7 | 1.94 | 50 | 6 | A | 6.15 | 12.48 | 12.88 | 13.31 | 13.77 | 14.82 | 9,200 |
| EPDBEH2020-16-S6-TH3 | ● | | | 16 | 1.7 | 1.94 | 50 | 6 | A | 5.07 | 16.62 | 17.16 | 17.75 | 18.37 | 19.79 | 9,200 |
| EPDBEH2020-20-S6-TH3 | ● | | | 20 | 1.7 | 1.94 | 60 | 6 | A | 4.31 | 20.75 | 21.44 | 22.18 | 22.97 | 24.76 | 9,200 |

# エポックディープボールエボリューションハード-TH3



## EPDBEH2○○○-○○.○○-(S6)-TH3

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | タイプ Type | 干渉角度 Interference angle (°) θK | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格（円） Suggested retail price（¥） |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDBEH2025-6-TH3 | ● | 1.25 | 2.5 | 6 | 2 | 2.4 | 50 | 4 | A | 5.54 | 6.35 | 6.53 | 6.72 | 6.92 | 7.39 | 7,720 |
| EPDBEH2025-10-TH3 | ● | | | 10 | 2 | 2.4 | 50 | 4 | A | 3.66 | 10.48 | 10.81 | 11.15 | 11.52 | 12.36 | 8,230 |
| EPDBEH2025-15-TH3 | ● | | | 15 | 2 | 2.4 | 55 | 4 | A | 2.57 | 15.65 | 16.15 | 16.69 | 17.27 | 干渉なし | 8,380 |
| EPDBEH2025-20-TH3 | ● | | | 20 | 2 | 2.4 | 60 | 4 | A | 1.98 | 20.82 | 21.50 | 22.23 | 干渉なし | 干渉なし | 9,830 |
| EPDBEH2025-25-TH3 | ● | | | 25 | 2 | 2.4 | 65 | 4 | A | 1.61 | 25.99 | 26.85 | 27.78 | 干渉なし | 干渉なし | 10,460 |
| EPDBEH2025-30-TH3 | ● | | | 30 | 2 | 2.4 | 70 | 4 | A | 1.36 | 31.16 | 32.20 | 干渉なし | 干渉なし | 干渉なし | 12,110 |
| EPDBEH2030-6-TH3 | ● | 1.5 | 3 | 6 | 2.5 | 2.88 | 50 | 6 | A | 8.27 | 6.38 | 6.55 | 6.73 | 6.93 | 7.38 | 6,270 |
| EPDBEH2030-8-TH3 | ● | | | 8 | 2.5 | 2.88 | 55 | 6 | A | 6.95 | 8.45 | 8.69 | 8.95 | 9.23 | 9.86 | 6,270 |
| EPDBEH2030-10-TH3 | ● | | | 10 | 2.5 | 2.88 | 55 | 6 | A | 5.98 | 10.51 | 10.83 | 11.17 | 11.53 | 12.35 | 7,250 |
| EPDBEH2030-13-TH3 | ● | | | 13 | 2.5 | 2.88 | 60 | 6 | A | 4.95 | 13.61 | 14.04 | 14.49 | 14.98 | 16.08 | 8,290 |
| EPDBEH2030-16-TH3 | ● | | | 16 | 2.5 | 2.88 | 60 | 6 | A | 4.23 | 16.71 | 17.25 | 17.82 | 18.43 | 19.81 | 8,380 |
| EPDBEH2030-20-TH3 | ● | | | 20 | 2.5 | 2.88 | 65 | 6 | A | 3.53 | 20.85 | 21.52 | 22.25 | 23.03 | 24.78 | 8,060 |
| EPDBEH2030-25-TH3 | ● | | | 25 | 2.5 | 2.88 | 70 | 6 | A | 2.93 | 26.02 | 26.87 | 27.79 | 28.78 | 干渉なし | 8,060 |
| EPDBEH2030-30-TH3 | ● | | | 30 | 2.5 | 2.88 | 75 | 6 | A | 2.51 | 31.19 | 32.22 | 33.33 | 34.53 | 干渉なし | 9,190 |
| EPDBEH2030-35-TH3 | ● | | | 35 | 2.5 | 2.88 | 80 | 6 | A | 2.19 | 36.35 | 37.57 | 38.87 | 40.28 | 干渉なし | 11,580 |
| EPDBEH2035-10-TH3 | ● | 1.75 | 3.5 | 10 | 2.75 | 3.35 | 55 | 6 | A | 5.42 | 10.56 | 10.87 | 11.20 | 11.56 | 12.36 | 10,280 |
| EPDBEH2035-15-TH3 | ● | | | 15 | 2.75 | 3.35 | 60 | 6 | A | 3.94 | 15.73 | 16.22 | 16.74 | 17.31 | 18.58 | 10,630 |
| EPDBEH2035-25-TH3 | ● | | | 25 | 2.75 | 3.35 | 70 | 6 | A | 2.54 | 26.07 | 26.92 | 27.83 | 28.81 | 干渉なし | 11,250 |
| EPDBEH2035-35-TH3 | ● | | | 35 | 2.75 | 3.35 | 80 | 6 | A | 1.88 | 36.40 | 37.61 | 38.91 | 干渉なし | 干渉なし | 14,460 |
| EPDBEH2035-45-TH3 | ● | | | 45 | 2.75 | 3.35 | 90 | 6 | A | 1.49 | 46.74 | 48.31 | 干渉なし | 干渉なし | 干渉なし | 17,680 |
| EPDBEH2040-8-TH3 | ● | 2 | 4 | 8 | 3 | 3.85 | 55 | 6 | A | 5.71 | 8.49 | 8.71 | 8.96 | 9.22 | 9.81 | 6,450 |
| EPDBEH2040-10-TH3 | ● | | | 10 | 3 | 3.85 | 55 | 6 | A | 4.76 | 10.55 | 10.85 | 11.17 | 11.52 | 12.30 | 6,450 |
| EPDBEH2040-12-TH3 | ● | | | 12 | 3 | 3.85 | 60 | 6 | A | 4.09 | 12.62 | 12.99 | 13.39 | 13.82 | 14.79 | 8,380 |
| EPDBEH2040-13-TH3 | ● | | | 13 | 3 | 3.85 | 60 | 6 | A | 3.82 | 13.65 | 14.06 | 14.50 | 14.97 | 16.03 | 8,380 |
| EPDBEH2040-16-TH3 | ● | | | 16 | 3 | 3.85 | 60 | 6 | A | 3.18 | 16.76 | 17.27 | 17.82 | 18.42 | 19.76 | 8,380 |
| EPDBEH2040-20-TH3 | ● | | | 20 | 3 | 3.85 | 65 | 6 | A | 2.61 | 20.89 | 21.55 | 22.26 | 23.02 | 干渉なし | 8,380 |
| EPDBEH2040-25-TH3 | ● | | | 25 | 3 | 3.85 | 70 | 6 | A | 2.13 | 26.06 | 26.90 | 27.80 | 28.77 | 干渉なし | 8,380 |
| EPDBEH2040-30-TH3 | ● | | | 30 | 3 | 3.85 | 75 | 6 | A | 1.79 | 31.23 | 32.25 | 33.34 | 干渉なし | 干渉なし | 8,380 |
| EPDBEH2040-35-TH3 | ● | | | 35 | 3 | 3.85 | 80 | 6 | A | 1.55 | 36.40 | 37.60 | 38.88 | 干渉なし | 干渉なし | 9,660 |
| EPDBEH2040-40-TH3 | ● | | | 40 | 3 | 3.85 | 80 | 6 | A | 1.37 | 41.56 | 42.94 | 干渉なし | 干渉なし | 干渉なし | 10,830 |
| EPDBEH2040-45-TH3 | ● | | | 45 | 3 | 3.85 | 90 | 6 | A | 1.22 | 46.73 | 48.29 | 干渉なし | 干渉なし | 干渉なし | 14,040 |
| EPDBEH2040-50-TH3 | ● | | | 50 | 3 | 3.85 | 100 | 6 | A | 1.11 | 51.90 | 53.64 | 干渉なし | 干渉なし | 干渉なし | 15,320 |
| EPDBEH2050-10-TH3 | ● | 2.5 | 5 | 10 | 3.5 | 4.85 | 55 | 6 | A | 2.97 | 10.54 | 10.82 | 11.12 | 11.45 | 干渉なし | 13,250 |
| EPDBEH2050-20-TH3 | ● | | | 20 | 3.5 | 4.85 | 65 | 6 | A | 1.46 | 20.87 | 21.52 | 干渉なし | 干渉なし | 干渉なし | 14,710 |
| EPDBEH2050-25-TH3 | ● | | | 25 | 3.5 | 4.85 | 70 | 6 | A | 1.17 | 26.04 | 26.86 | 干渉なし | 干渉なし | 干渉なし | 14,710 |
| EPDBEH2050-30-TH3 | ● | | | 30 | 3.5 | 4.85 | 75 | 6 | A | 0.97 | 31.21 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 15,710 |
| EPDBEH2050-40-TH3 | ● | | | 40 | 3.5 | 4.85 | 80 | 6 | A | 0.73 | 41.55 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 19,530 |
| EPDBEH2060-12-TH3 | ● | 3 | 6 | 12 | 6 | 5.85 | 60 | 6 | A | 0 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 10,960 |
| EPDBEH2060-20-TH3 | ● | | | 20 | 6 | 5.85 | 65 | 6 | A | 0 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 10,960 |
| EPDBEH2060-30-TH3 | ● | | | 30 | 6 | 5.85 | 75 | 6 | A | 0 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 11,350 |
| EPDBEH2060-50-TH3 | ● | | | 50 | 6 | 5.85 | 100 | 6 | A | 0 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 13,360 |
| EPDBEH2080-24-TH3 | ● | 4 | 8 | 24 | 12 | 7.6 | 100 | 8 | A | 0 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 16,050 |
| EPDBEH2100-30-TH3 | ● | 5 | 10 | 30 | 15 | 9.5 | 100 | 10 | A | 0 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 19,980 |
| EPDBEH2120-36-TH3 | ● | 6 | 12 | 36 | 18 | 11.5 | 110 | 12 | A | 0 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 25,930 |

●印：標準在庫品です。　●：Stocked items.　干渉なし：No interference

## ストロングネックタイプ×ショートシャンクタイプ Strong neck type × Short shank type

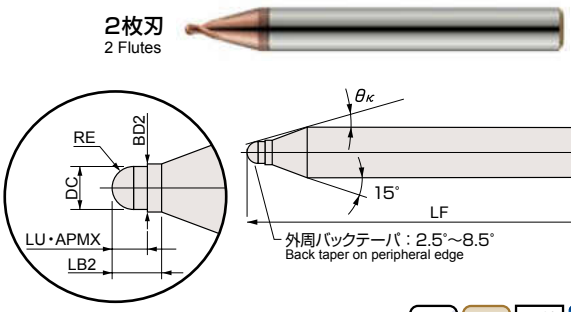
溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / 細部 Miniature / 中仕上 Semi Finishing / 仕上 Finishing / リブ・細部 Rib Miniature

RE公差 RE tolerance
RE≦0.25：±0.003
0.25＜RE：±0.005

h4

(mm)

2枚刃 2 Flutes




# EPDBEH2○○○F-○○.○○-TH3

超硬 Carbide / TH3 / ねじれ30° Helix angle / 切削条件表 A64 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 首下長 Under neck length LU | 刃長 Flute length APMX | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首寸法 Neck size LB2 | BD2 | 干渉角度 Interference angle (°) θK | 希望小売価格（円） Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDBEH2001F-0.08-TH3 | ● | 0.05 | 0.1 | 0.08 | 0.08 | 35 | 4 | 0.2 | 0.13 | 20.93 | 16,290 |
| EPDBEH20015F-0.12-TH3 | ● | 0.075 | 0.15 | 0.12 | 0.12 | 35 | 4 | 0.3 | 0.18 | 15.25 | 16,720 |
| EPDBEH2002F-0.15-TH3 | ● | 0.1 | 0.2 | 0.15 | 0.15 | 35 | 4 | 0.3 | 0.25 | 20.23 | 11,680 |
| EPDBEH2003F-0.25-TH3 | ● | 0.15 | 0.3 | 0.25 | 0.25 | 35 | 4 | 0.5 | 0.35 | 14.45 | 11,470 |
| EPDBEH2004F-0.3-TH3 | ● | 0.2 | 0.4 | 0.3 | 0.3 | 35 | 4 | 0.5 | 0.45 | 14.53 | 7,810 |
| EPDBEH2005F-0.35-TH3 | ● | 0.25 | 0.5 | 0.35 | 0.35 | 35 | 4 | 0.75 | 0.55 | 14.10 | 7,810 |
| EPDBEH2006F-0.4-TH3 | ● | 0.3 | 0.6 | 0.4 | 0.4 | 35 | 4 | 0.75 | 0.65 | 14.16 | 6,740 |
| EPDBEH2007F-0.45-TH3 | ● | 0.35 | 0.7 | 0.45 | 0.45 | 35 | 4 | 0.8 | 0.75 | 14.13 | 6,000 |
| EPDBEH2008F-0.5-TH3 | ● | 0.4 | 0.8 | 0.5 | 0.5 | 35 | 4 | 0.8 | 0.85 | 14.20 | 6,000 |
| EPDBEH2009F-0.6-TH3 | ● | 0.45 | 0.9 | 0.6 | 0.6 | 35 | 4 | 1 | 0.95 | 13.84 | 6,000 |
| EPDBEH2010F-0.8-TH3 | ● | 0.5 | 1 | 0.8 | 0.8 | 35 | 4 | 1.2 | 1.05 | 13.47 | 5,020 |

## ストロングネックタイプ Strong neck type

溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / 細部 Miniature / 中仕上 Semi Finishing / 仕上 Finishing / リブ・細部 Rib Miniature

RE公差 RE tolerance
RE≦0.25：±0.003
0.25＜RE：±0.005

h4

(mm)

2枚刃 2 Flutes

# EPDBEH2○○○-○○.○○-TH3

超硬 Carbide / TH3 / ねじれ30° Helix angle / 切削条件表 A64 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 首下長 Under neck length LU | 刃長 Flute length APMX | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首寸法 Neck size LB2 | BD2 | 干渉角度 Interference angle (°) θK | 希望小売価格（円） Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDBEH2001-0.08-TH3 | ● | 0.05 | 0.1 | 0.08 | 0.08 | 45 | 4 | 0.2 | 0.13 | 20.93 | 16,290 |
| EPDBEH20015-0.12-TH3 | ● | 0.075 | 0.15 | 0.12 | 0.12 | 45 | 4 | 0.3 | 0.18 | 15.25 | 16,720 |
| EPDBEH2002-0.15-TH3 | ● | 0.1 | 0.2 | 0.15 | 0.15 | 50 | 4 | 0.3 | 0.25 | 20.23 | 11,680 |
| EPDBEH2003-0.25-TH3 | ● | 0.15 | 0.3 | 0.25 | 0.25 | 50 | 4 | 0.5 | 0.35 | 14.45 | 11,470 |
| EPDBEH2004-0.3-TH3 | ● | 0.2 | 0.4 | 0.3 | 0.3 | 50 | 4 | 0.5 | 0.45 | 14.53 | 7,810 |
| EPDBEH2005-0.35-TH3 | ● | 0.25 | 0.5 | 0.35 | 0.35 | 50 | 4 | 0.75 | 0.55 | 14.10 | 7,810 |
| EPDBEH2006-0.4-TH3 | ● | 0.3 | 0.6 | 0.4 | 0.4 | 50 | 4 | 0.75 | 0.65 | 14.16 | 6,740 |
| EPDBEH2007-0.45-TH3 | ● | 0.35 | 0.7 | 0.45 | 0.45 | 50 | 4 | 0.8 | 0.75 | 14.13 | 6,000 |
| EPDBEH2008-0.5-TH3 | ● | 0.4 | 0.8 | 0.5 | 0.5 | 50 | 4 | 0.8 | 0.85 | 14.20 | 6,000 |
| EPDBEH2009-0.6-TH3 | ● | 0.45 | 0.9 | 0.6 | 0.6 | 50 | 4 | 1 | 0.95 | 13.84 | 6,000 |
| EPDBEH2010-0.8-TH3 | ● | 0.5 | 1 | 0.8 | 0.8 | 50 | 4 | 1.2 | 1.05 | 13.47 | 5,020 |

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦45HRC | 高硬度 Hardened steel >45HRC ≦55HRC | 高硬度 Hardened steel >55HRC ≦65HRC | 高硬度 Hardened steel >65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ○ | ○ | ◎ | ◎ | ◎ | ○ | ◎ | ○ | ○ |

## 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPDBEH-TH3 | × (N/A) | 4～12 |

【注意】首下長／外径が10DCを超える工具の再研磨可否については、弊社営業にお問い合わせください。
【Note】Contact our sales office regarding whether or not regrinding is possible for tools where under neck length/tool diameter more than 10DC

# Epoch Deep Ball Evolution Hard-TH3
# エポックディープボールエボリューションハード-TH3

## 標準切削条件表
Recommended cutting conditions

高能率切削条件 High efficiency cuttiing conditions

高精度切削条件 High accuracy cuttiing conditions

## EPDBEH-TH3

高精度切削条件はA68ページを参照してください。Please refer to P.A68 about high accuracy cutting conditions

| 被削材 Work material | | | | 1 プリハードン鋼 Pre-hardened steels (35~45HRC) | | 2 焼入れ鋼 Hardened steels (45~55HRC) | | 3 焼入れ鋼 Hardened steels (55~65HRC) | | 4 焼入れ鋼 Hardened steels (65~68HRC) | | 5 焼入れ鋼 Hardened steels (68~72HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 100% | | 85% | | 80% | | 65% | | 55% | |
| ボール半径RE Ball radius (mm) | 外径DC Tool dia. (mm) | 首下長LU Under neck length (mm) | $a_p$ (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 0.05 | 0.1 | 0.08 | 0.006 | 50,000 | 230 | 50,000 | 200 | 50,000 | 190 | 45,000 | 170 | 42,500 | 130 |
| | | 0.2 | 0.006 | 50,000 | 230 | 50,000 | 200 | 50,000 | 190 | 45,000 | 170 | 42,500 | 130 |
| | | 0.3 | 0.005 | 50,000 | 230 | 50,000 | 200 | 50,000 | 190 | 45,000 | 170 | 42,500 | 130 |
| | | 0.5 | 0.003 | 50,000 | 230 | 50,000 | 200 | 50,000 | 190 | 45,000 | 170 | 42,500 | 130 |
| 0.075 | 0.15 | 0.12 | 0.009 | 50,000 | 280 | 46,000 | 230 | 42,000 | 180 | 37,500 | 160 | 35,500 | 120 |
| | | 0.3 | 0.009 | 50,000 | 280 | 46,000 | 230 | 42,000 | 180 | 37,500 | 160 | 35,500 | 120 |
| | | 0.5 | 0.008 | 50,000 | 280 | 46,000 | 230 | 42,000 | 180 | 37,500 | 160 | 35,500 | 120 |
| | | 0.75 | 0.007 | 50,000 | 280 | 46,000 | 230 | 42,000 | 180 | 37,500 | 160 | 35,500 | 120 |
| | | 1 | 0.005 | 46,000 | 230 | 41,400 | 190 | 37,800 | 150 | 33,750 | 130 | 31,950 | 100 |
| 0.1 | 0.2 | 0.15 | 0.016 | 50,000 | 330 | 45,500 | 270 | 42,000 | 210 | 37,800 | 190 | 35,700 | 150 |
| | | 0.3 | 0.016 | 50,000 | 330 | 45,500 | 270 | 42,000 | 210 | 37,800 | 190 | 35,700 | 150 |
| | | 0.5 | 0.016 | 50,000 | 330 | 45,500 | 270 | 42,000 | 210 | 37,800 | 190 | 35,700 | 150 |
| | | 0.75 | 0.014 | 50,000 | 330 | 45,500 | 270 | 42,000 | 210 | 37,800 | 190 | 35,700 | 150 |
| | | 1 | 0.011 | 50,000 | 330 | 45,500 | 270 | 42,000 | 210 | 37,800 | 190 | 35,700 | 150 |
| | | 1.25 | 0.009 | 45,900 | 270 | 40,500 | 220 | 37,800 | 170 | 34,020 | 150 | 32,130 | 120 |
| | | 1.5 | 0.006 | 45,900 | 270 | 40,500 | 220 | 37,800 | 170 | 34,020 | 150 | 32,130 | 120 |
| | | 2 | 0.006 | 45,900 | 270 | 40,500 | 220 | 37,800 | 170 | 34,020 | 150 | 32,130 | 120 |
| | | 2.5 | 0.005 | 40,800 | 210 | 36,000 | 170 | 33,600 | 130 | 30,240 | 120 | 28,560 | 90 |
| | | 3 | 0.003 | 40,800 | 210 | 36,000 | 170 | 33,600 | 130 | 30,240 | 120 | 28,560 | 90 |
| 0.15 | 0.3 | 0.25 | 0.022 | 50,000 | 450 | 45,000 | 380 | 42,000 | 340 | 37,800 | 300 | 35,700 | 240 |
| | | 0.5 | 0.022 | 50,000 | 450 | 45,000 | 380 | 42,000 | 340 | 37,800 | 300 | 35,700 | 240 |
| | | 0.75 | 0.019 | 50,000 | 450 | 45,000 | 380 | 42,000 | 340 | 37,800 | 300 | 35,700 | 240 |
| | | 1 | 0.017 | 50,000 | 450 | 45,000 | 380 | 42,000 | 340 | 37,800 | 300 | 35,700 | 240 |
| | | 1.25 | 0.015 | 50,000 | 450 | 45,000 | 380 | 42,000 | 340 | 37,800 | 300 | 35,700 | 240 |
| | | 1.5 | 0.013 | 50,000 | 450 | 45,000 | 380 | 42,000 | 340 | 37,800 | 300 | 35,700 | 240 |
| | | 2 | 0.01 | 45,900 | 370 | 40,500 | 310 | 37,800 | 270 | 34,020 | 250 | 32,130 | 190 |
| | | 2.5 | 0.008 | 45,900 | 370 | 40,500 | 310 | 37,800 | 270 | 34,020 | 250 | 32,130 | 190 |
| | | 3 | 0.006 | 45,900 | 370 | 40,500 | 310 | 37,800 | 270 | 34,020 | 250 | 32,130 | 190 |
| | | 3.5 | 0.004 | 36,720 | 260 | 29,400 | 210 | 26,400 | 180 | 23,760 | 160 | 22,440 | 130 |
| | | 4 | 0.003 | 36,720 | 260 | 29,400 | 210 | 26,400 | 180 | 23,760 | 160 | 22,440 | 130 |
| 0.2 | 0.4 | 0.3 | 0.034 | 50,000 | 770 | 46,800 | 660 | 43,680 | 610 | 39,310 | 550 | 37,130 | 430 |
| | | 0.5 | 0.034 | 50,000 | 770 | 46,800 | 660 | 43,680 | 610 | 39,310 | 550 | 37,130 | 430 |
| | | 0.75 | 0.034 | 50,000 | 770 | 46,800 | 660 | 43,680 | 610 | 39,310 | 550 | 37,130 | 430 |
| | | 1 | 0.032 | 50,000 | 770 | 46,800 | 660 | 43,680 | 610 | 39,310 | 550 | 37,130 | 430 |
| | | 1.5 | 0.027 | 50,000 | 660 | 46,800 | 470 | 43,680 | 440 | 39,310 | 390 | 37,130 | 310 |
| | | 2 | 0.022 | 50,000 | 550 | 46,800 | 470 | 43,680 | 440 | 39,310 | 390 | 37,130 | 310 |
| | | 2.5 | 0.018 | 36,720 | 360 | 32,400 | 290 | 36,290 | 270 | 32,660 | 250 | 30,850 | 190 |
| | | 3 | 0.013 | 36,720 | 360 | 32,400 | 290 | 36,290 | 270 | 32,660 | 250 | 30,850 | 190 |
| | | 3.5 | 0.01 | 36,720 | 360 | 32,400 | 290 | 36,290 | 270 | 32,660 | 250 | 30,850 | 190 |
| | | 4 | 0.008 | 36,720 | 360 | 32,400 | 290 | 36,290 | 270 | 32,660 | 250 | 30,850 | 190 |
| | | 4.5 | 0.006 | 32,640 | 310 | 28,800 | 250 | 26,880 | 230 | 24,190 | 210 | 22,850 | 160 |
| | | 5 | 0.004 | 32,640 | 310 | 28,800 | 250 | 26,880 | 230 | 24,190 | 210 | 22,850 | 160 |
| 0.25 | 0.5 | 0.35 | 0.036 | 50,000 | 1,190 | 47,130 | 1,050 | 43,930 | 740 | 39,820 | 670 | 37,560 | 520 |
| | | 0.75 | 0.036 | 50,000 | 1,190 | 47,130 | 1,050 | 43,930 | 740 | 39,820 | 670 | 37,560 | 520 |
| | | 1 | 0.036 | 50,000 | 1,190 | 47,130 | 1,050 | 43,930 | 740 | 39,820 | 670 | 37,560 | 520 |
| | | 1.5 | 0.032 | 50,000 | 1,190 | 47,130 | 1,050 | 43,930 | 680 | 39,820 | 610 | 37,560 | 480 |
| | | 2 | 0.028 | 50,000 | 960 | 47,130 | 840 | 43,930 | 680 | 39,820 | 610 | 37,560 | 480 |
| | | 2.5 | 0.026 | 45,450 | 650 | 42,840 | 570 | 39,940 | 500 | 36,220 | 450 | 34,180 | 350 |
| | | 3 | 0.024 | 45,450 | 650 | 42,840 | 570 | 39,940 | 390 | 36,220 | 350 | 34,180 | 270 |
| | | 4 | 0.016 | 34,970 | 500 | 32,950 | 520 | 30,730 | 390 | 28,540 | 350 | 26,290 | 270 |
| | | 5 | 0.014 | 34,970 | 500 | 32,950 | 520 | 30,730 | 390 | 28,540 | 350 | 26,290 | 270 |
| | | 5.5 | 0.012 | 31,080 | 420 | 29,300 | 370 | 27,310 | 320 | 24,770 | 290 | 23,370 | 230 |
| | | 6 | 0.01 | 31,080 | 420 | 29,300 | 370 | 27,310 | 320 | 24,770 | 290 | 23,370 | 230 |
| | | 7 | 0.008 | 31,080 | 420 | 29,300 | 370 | 27,310 | 320 | 24,770 | 290 | 23,370 | 230 |
| | | 8 | 0.006 | 31,080 | 420 | 29,300 | 370 | 27,310 | 320 | 24,770 | 290 | 23,370 | 230 |
| 0.3 | 0.6 | 0.4 | 0.06 | 50,000 | 1,950 | 48,000 | 1,730 | 44,800 | 1,340 | 40,320 | 1,210 | 38,080 | 940 |
| | | 0.75 | 0.06 | 50,000 | 1,950 | 48,000 | 1,730 | 44,800 | 1,340 | 40,320 | 1,210 | 38,080 | 940 |

| 被削材 Work material | | | | 1 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 2 焼入れ鋼 Hardened steels (45～55HRC) | | 3 焼入れ鋼 Hardened steels (55～65HRC) | | 4 焼入れ鋼 Hardened steels (65～68HRC) | | 5 焼入れ鋼 Hardened steels (68～72HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 100% | | 85% | | 80% | | 65% | | 55% | |
| ボール半径RE Ball radius (mm) | 外径DC Tool dia. (mm) | 首下長LU Under neck length (mm) | $a_p$ (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 0.3 | 0.6 | **1** | 0.06 | 50,000 | 1,950 | 48,000 | 1,730 | 44,800 | 1,340 | 40,320 | 1,210 | 38,080 | 940 |
| | | **1.5** | 0.055 | 50,000 | 1,950 | 48,000 | 1,730 | 44,800 | 1,340 | 40,320 | 1,210 | 38,080 | 940 |
| | | **2** | 0.05 | 50,000 | 1,950 | 48,000 | 1,730 | 44,800 | 1,340 | 40,320 | 1,210 | 38,080 | 940 |
| | | **2.5** | 0.036 | 50,000 | 1,560 | 48,000 | 1,380 | 44,800 | 990 | 40,320 | 890 | 38,080 | 690 |
| | | **3** | 0.033 | 50,000 | 1,560 | 48,000 | 1,380 | 44,800 | 990 | 40,320 | 890 | 38,080 | 690 |
| | | **3.5** | 0.028 | 48,960 | 1,450 | 43,200 | 1,180 | 40,320 | 840 | 36,290 | 760 | 34,270 | 590 |
| | | **4** | 0.021 | 48,960 | 1,450 | 43,200 | 1,180 | 40,320 | 770 | 36,290 | 690 | 34,270 | 540 |
| | | **4.5** | 0.018 | 45,900 | 1,070 | 40,500 | 880 | 37,800 | 680 | 34,020 | 610 | 32,130 | 480 |
| | | **5** | 0.016 | 39,780 | 930 | 35,100 | 760 | 32,760 | 590 | 29,480 | 530 | 27,850 | 410 |
| | | **5.5** | 0.014 | 39,780 | 930 | 35,100 | 760 | 32,760 | 590 | 29,480 | 530 | 27,850 | 410 |
| | | **6** | 0.012 | 39,780 | 930 | 35,100 | 760 | 32,760 | 590 | 29,480 | 530 | 27,850 | 410 |
| | | **7** | 0.012 | 27,200 | 600 | 24,000 | 490 | 22,400 | 420 | 20,160 | 370 | 19,040 | 290 |
| | | **8** | 0.012 | 27,200 | 600 | 24,000 | 490 | 22,400 | 380 | 20,160 | 340 | 19,040 | 270 |
| | | **9** | 0.01 | 27,200 | 600 | 24,000 | 490 | 22,400 | 380 | 20,160 | 340 | 19,040 | 270 |
| | | **10** | 0.007 | 23,800 | 530 | 21,000 | 430 | 19,600 | 330 | 17,640 | 300 | 16,660 | 230 |
| | | **12** | 0.006 | 20,400 | 420 | 18,000 | 350 | 16,800 | 270 | 15,120 | 240 | 14,280 | 190 |
| 0.35 | 0.7 | **0.45** | 0.073 | 50,000 | 2,160 | 48,000 | 1,930 | 44,800 | 1,190 | 40,320 | 1,070 | 38,080 | 830 |
| | | **2** | 0.073 | 50,000 | 2,160 | 48,000 | 1,930 | 44,800 | 1,190 | 40,320 | 1,070 | 38,080 | 830 |
| | | **4** | 0.033 | 48,960 | 1,600 | 43,200 | 1,320 | 43,870 | 850 | 39,480 | 760 | 37,370 | 590 |
| | | **6** | 0.022 | 39,780 | 1,030 | 35,100 | 850 | 35,650 | 640 | 32,080 | 580 | 30,370 | 450 |
| | | **8** | 0.016 | 27,200 | 630 | 24,000 | 520 | 24,370 | 420 | 21,940 | 380 | 20,760 | 300 |
| 0.4 | 0.8 | **0.5** | 0.12 | 50,000 | 2,400 | 48,000 | 2,590 | 44,800 | 1,880 | 40,320 | 1,690 | 38,080 | 1,320 |
| | | **1** | 0.12 | 50,000 | 2,400 | 48,000 | 2,590 | 44,800 | 1,880 | 40,320 | 1,690 | 38,080 | 1,320 |
| | | **1.5** | 0.12 | 50,000 | 2,400 | 48,000 | 2,590 | 44,800 | 1,880 | 40,320 | 1,690 | 38,080 | 1,320 |
| | | **2** | 0.096 | 50,000 | 2,400 | 48,000 | 2,590 | 44,800 | 1,880 | 40,320 | 1,690 | 38,080 | 1,320 |
| | | **2.5** | 0.088 | 50,000 | 2,400 | 48,000 | 2,590 | 44,800 | 1,880 | 40,320 | 1,690 | 38,080 | 1,320 |
| | | **3** | 0.08 | 50,000 | 2,400 | 48,000 | 2,590 | 44,800 | 1,880 | 40,320 | 1,690 | 38,080 | 1,320 |
| | | **4** | 0.063 | 50,000 | 2,400 | 48,000 | 2,590 | 44,800 | 1,880 | 40,320 | 1,690 | 38,080 | 1,320 |
| | | **5** | 0.047 | 48,960 | 2,110 | 43,200 | 2,120 | 40,320 | 1,520 | 36,290 | 1,370 | 34,270 | 1,070 |
| | | **6** | 0.033 | 42,840 | 1,730 | 37,800 | 1,430 | 35,280 | 1,250 | 31,750 | 1,120 | 29,990 | 870 |
| | | **8** | 0.016 | 35,360 | 1,020 | 31,200 | 840 | 29,120 | 730 | 26,210 | 660 | 24,750 | 510 |
| | | **10** | 0.016 | 27,200 | 740 | 24,000 | 610 | 22,400 | 530 | 20,160 | 480 | 19,040 | 370 |
| | | **12** | 0.01 | 27,200 | 740 | 24,000 | 610 | 22,400 | 530 | 20,160 | 480 | 19,040 | 370 |
| 0.45 | 0.9 | **0.6** | 0.108 | 50,000 | 2,820 | 45,600 | 2,410 | 42,560 | 2,140 | 38,300 | 1,930 | 36,180 | 1,500 |
| | | **2** | 0.108 | 50,000 | 2,820 | 45,600 | 2,410 | 42,560 | 2,140 | 38,300 | 1,930 | 36,180 | 1,500 |
| | | **4** | 0.065 | 48,450 | 2,370 | 42,750 | 1,960 | 39,900 | 1,740 | 35,910 | 1,560 | 33,920 | 1,220 |
| | | **6** | 0.044 | 40,700 | 1,520 | 35,910 | 1,250 | 33,520 | 1,110 | 30,160 | 1,000 | 28,490 | 780 |
| | | **8** | 0.029 | 31,010 | 1,050 | 27,360 | 870 | 25,540 | 770 | 22,980 | 690 | 21,710 | 540 |
| 0.5 | 1 | **0.8** | 0.18 | 45,900 | 3,100 | 43,200 | 2,720 | 37,800 | 2,270 | 34,020 | 2,040 | 32,130 | 1,590 |
| | | **1.5** | 0.18 | 45,900 | 3,100 | 43,200 | 2,720 | 37,800 | 2,270 | 34,020 | 2,040 | 32,130 | 1,590 |
| | | **2** | 0.16 | 45,900 | 3,100 | 43,200 | 2,720 | 37,800 | 2,270 | 34,020 | 2,040 | 32,130 | 1,590 |
| | | **2.5** | 0.16 | 45,900 | 3,100 | 43,200 | 2,720 | 37,800 | 2,270 | 34,020 | 2,040 | 32,130 | 1,590 |
| | | **3** | 0.16 | 45,900 | 3,100 | 43,200 | 2,720 | 37,800 | 2,270 | 34,020 | 2,040 | 32,130 | 1,590 |
| | | **4** | 0.112 | 45,900 | 3,100 | 43,200 | 2,720 | 37,800 | 2,270 | 34,020 | 2,040 | 32,130 | 1,590 |
| | | **5** | 0.072 | 39,780 | 2,600 | 43,200 | 2,540 | 32,760 | 1,840 | 29,480 | 1,650 | 27,850 | 1,280 |
| | | **6** | 0.048 | 38,560 | 2,320 | 38,880 | 2,350 | 29,480 | 1,380 | 26,540 | 1,240 | 25,060 | 970 |
| | | **7** | 0.048 | 33,050 | 1,340 | 31,590 | 1,320 | 27,220 | 1,060 | 24,490 | 960 | 23,130 | 740 |
| | | **8** | 0.048 | 33,050 | 1,340 | 31,590 | 1,320 | 27,220 | 980 | 24,490 | 880 | 23,130 | 690 |
| | | **9** | 0.036 | 33,050 | 1,340 | 31,590 | 1,320 | 27,220 | 980 | 24,490 | 880 | 23,130 | 690 |
| | | **10** | 0.03 | 33,050 | 1,340 | 31,590 | 1,320 | 27,220 | 980 | 24,490 | 880 | 23,130 | 690 |
| | | **12** | 0.02 | 24,480 | 940 | 21,600 | 770 | 20,160 | 690 | 18,140 | 620 | 17,140 | 480 |
| | | **13** | 0.018 | 24,480 | 940 | 21,600 | 770 | 20,160 | 690 | 18,140 | 620 | 17,140 | 480 |
| | | **14** | 0.016 | 24,480 | 940 | 21,600 | 770 | 20,160 | 690 | 18,140 | 620 | 17,140 | 480 |
| | | **16** | 0.012 | 24,480 | 940 | 21,600 | 770 | 20,160 | 690 | 18,140 | 620 | 17,140 | 480 |
| | | **18** | 0.01 | 21,420 | 770 | 18,900 | 640 | 17,640 | 560 | 15,880 | 510 | 14,990 | 400 |
| | | **20** | 0.008 | 18,360 | 660 | 16,200 | 540 | 15,120 | 480 | 13,610 | 440 | 12,850 | 340 |

【注意】ご使用にあたっては、A67ページの表下の項目と注意を参照してください。【Note】Upon usage, please refer to comments and notes below table on page A67.

# エポックディープボールエボリューションハード-TH3



## EPDBEH-TH3

**高能率切削条件** High efficiency cuttiing condition

高精度切削条件 High accuracy cuttiing condition

高精度切削条件はA68ページを参照してください。
Please refer to P.A68 about high accuracy cutting conditions

| 被削材 Work material | | | | 1 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 2 焼入れ鋼 Hardened steels (45～55HRC) | | 3 焼入れ鋼 Hardened steels (55～65HRC) | | 4 焼入れ鋼 Hardened steels (65～68HRC) | | 5 焼入れ鋼 Hardened steels (68～72HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 100% | | 85% | | 80% | | 65% | | 55% | |
| ボール半径RE Ball radius (mm) | 外径DC Tool dia. (mm) | 首下長LU Under neck length (mm) | $a_p$ (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 0.55 | 1.1 | 2 | 0.16 | 42,840 | 2,930 | 37,800 | 2,450 | 35,280 | 2,180 | 31,750 | 1,960 | 29,990 | 1,520 |
| | | 4 | 0.112 | 42,840 | 2,930 | 37,800 | 2,450 | 35,280 | 2,180 | 31,750 | 1,960 | 29,990 | 1,520 |
| | | 6 | 0.048 | 33,810 | 1,710 | 29,840 | 1,430 | 27,850 | 1,270 | 25,060 | 1,140 | 23,670 | 890 |
| | | 8 | 0.048 | 31,210 | 1,310 | 27,540 | 1,100 | 25,700 | 980 | 23,130 | 880 | 21,850 | 680 |
| | | 10 | 0.03 | 31,210 | 1,310 | 27,540 | 1,100 | 25,700 | 980 | 23,130 | 880 | 21,850 | 680 |
| 0.6 | 1.2 | 2 | 0.154 | 39,230 | 2,720 | 36,920 | 2,560 | 32,310 | 1,860 | 29,080 | 1,670 | 27,460 | 1,300 |
| | | 3 | 0.154 | 39,230 | 2,720 | 36,920 | 2,560 | 32,310 | 1,860 | 29,080 | 1,670 | 27,460 | 1,300 |
| | | 4 | 0.128 | 39,230 | 2,720 | 36,920 | 2,560 | 32,310 | 1,860 | 29,080 | 1,670 | 27,460 | 1,300 |
| | | 6 | 0.088 | 39,230 | 2,720 | 36,920 | 2,560 | 32,310 | 1,860 | 29,080 | 1,670 | 27,460 | 1,300 |
| | | 8 | 0.048 | 31,820 | 2,070 | 30,240 | 2,060 | 26,210 | 1,050 | 23,590 | 940 | 22,280 | 730 |
| | | 10 | 0.042 | 29,380 | 1,320 | 27,000 | 1,070 | 24,190 | 870 | 21,770 | 780 | 20,560 | 610 |
| | | 12 | 0.036 | 29,380 | 1,320 | 25,920 | 1,030 | 24,190 | 870 | 21,770 | 780 | 20,560 | 610 |
| 0.7 | 1.4 | 3 | 0.158 | 33,420 | 2,350 | 29,480 | 1,990 | 27,520 | 1,790 | 24,770 | 1,610 | 23,390 | 1,250 |
| | | 8 | 0.088 | 27,850 | 1,810 | 24,570 | 1,530 | 22,930 | 1,380 | 20,640 | 1,240 | 19,490 | 960 |
| | | 12 | 0.042 | 25,700 | 1,250 | 22,680 | 1,060 | 21,170 | 950 | 19,050 | 860 | 17,990 | 670 |
| | | 16 | 0.028 | 19,040 | 870 | 16,800 | 740 | 15,680 | 670 | 14,110 | 600 | 13,330 | 470 |
| 0.75 | 1.5 | 2 | 0.192 | 35,700 | 3,210 | 31,500 | 2,550 | 29,400 | 2,210 | 26,460 | 1,990 | 24,990 | 1,540 |
| | | 2.5 | 0.192 | 35,700 | 3,210 | 31,500 | 2,550 | 29,400 | 2,210 | 26,460 | 1,990 | 24,990 | 1,540 |
| | | 3 | 0.192 | 35,700 | 3,210 | 31,500 | 2,550 | 29,400 | 2,210 | 26,460 | 1,990 | 24,990 | 1,540 |
| | | 4 | 0.16 | 35,700 | 3,210 | 31,500 | 2,550 | 29,400 | 2,210 | 26,460 | 1,990 | 24,990 | 1,540 |
| | | 5 | 0.16 | 35,700 | 3,210 | 31,500 | 2,550 | 29,400 | 2,210 | 26,460 | 1,990 | 24,990 | 1,540 |
| | | 6 | 0.16 | 35,700 | 3,210 | 31,500 | 2,550 | 29,400 | 2,210 | 26,460 | 1,990 | 24,990 | 1,540 |
| | | 8 | 0.072 | 27,850 | 1,810 | 24,570 | 1,430 | 22,930 | 1,240 | 20,640 | 1,120 | 19,490 | 870 |
| | | 10 | 0.072 | 25,700 | 1,670 | 22,680 | 1,320 | 21,170 | 1,140 | 19,050 | 1,030 | 17,990 | 800 |
| | | 12 | 0.072 | 25,700 | 1,390 | 22,680 | 1,100 | 21,170 | 950 | 19,050 | 860 | 17,990 | 670 |
| | | 14 | 0.06 | 22,850 | 1,170 | 20,160 | 930 | 18,820 | 800 | 16,930 | 720 | 15,990 | 560 |
| | | 16 | 0.03 | 19,040 | 970 | 16,800 | 770 | 15,680 | 670 | 14,110 | 600 | 13,330 | 470 |
| | | 18 | 0.03 | 19,040 | 970 | 16,800 | 770 | 15,680 | 670 | 14,110 | 600 | 13,330 | 470 |
| | | 20 | 0.03 | 19,040 | 970 | 16,800 | 770 | 15,680 | 670 | 14,110 | 600 | 13,330 | 470 |
| 0.8 | 1.6 | 4 | 0.23 | 33,110 | 3,340 | 29,210 | 2,850 | 25,320 | 2,130 | 22,780 | 1,920 | 21,520 | 1,490 |
| | | 8 | 0.176 | 30,940 | 2,490 | 27,300 | 2,130 | 23,660 | 1,590 | 21,290 | 1,430 | 20,110 | 1,110 |
| | | 12 | 0.078 | 27,850 | 2,180 | 24,570 | 1,860 | 21,290 | 1,290 | 19,170 | 1,160 | 18,100 | 900 |
| | | 16 | 0.048 | 23,870 | 1,330 | 21,060 | 1,140 | 19,660 | 990 | 17,690 | 890 | 16,710 | 690 |
| | | 20 | 0.032 | 17,680 | 930 | 15,600 | 800 | 14,560 | 690 | 13,100 | 620 | 12,380 | 490 |
| 0.9 | 1.8 | 4 | 0.29 | 28,730 | 2,410 | 25,350 | 2,010 | 23,660 | 1,700 | 21,290 | 1,530 | 20,110 | 1,190 |
| | | 8 | 0.208 | 28,730 | 2,410 | 25,350 | 2,010 | 23,660 | 1,700 | 21,290 | 1,530 | 20,110 | 1,190 |
| | | 12 | 0.084 | 23,870 | 1,500 | 21,060 | 1,250 | 19,660 | 1,060 | 17,690 | 960 | 16,710 | 740 |
| | | 16 | 0.054 | 23,870 | 1,500 | 21,060 | 1,250 | 19,660 | 1,060 | 17,690 | 960 | 16,710 | 740 |
| | | 20 | 0.036 | 17,680 | 1,050 | 15,600 | 880 | 14,560 | 740 | 13,100 | 670 | 12,380 | 520 |
| 1 | 2 | 2.5 | 0.32 | 26,780 | 3,620 | 23,630 | 3,050 | 22,050 | 2,650 | 19,850 | 2,380 | 18,740 | 1,850 |
| | | 3 | 0.32 | 26,780 | 3,620 | 23,630 | 3,050 | 22,050 | 2,650 | 19,850 | 2,380 | 18,740 | 1,850 |
| | | 4 | 0.32 | 26,780 | 3,620 | 23,630 | 3,050 | 22,050 | 2,650 | 19,850 | 2,380 | 18,740 | 1,850 |
| | | 5 | 0.32 | 26,780 | 3,620 | 23,630 | 3,050 | 22,050 | 2,650 | 19,850 | 2,380 | 18,740 | 1,850 |
| | | 6 | 0.32 | 26,780 | 3,210 | 23,630 | 2,690 | 22,050 | 2,380 | 19,850 | 2,140 | 18,740 | 1,670 |
| | | 8 | 0.224 | 26,780 | 3,210 | 23,630 | 2,690 | 22,050 | 2,380 | 19,850 | 2,140 | 18,740 | 1,670 |
| | | 10 | 0.168 | 24,990 | 2,700 | 22,050 | 2,250 | 19,110 | 1,470 | 17,200 | 1,320 | 16,240 | 1,030 |
| | | 12 | 0.096 | 22,490 | 2,430 | 19,850 | 2,050 | 17,200 | 1,320 | 15,480 | 1,190 | 14,620 | 930 |
| | | 13 | 0.096 | 22,490 | 2,430 | 19,850 | 2,020 | 15,880 | 1,020 | 14,290 | 920 | 13,500 | 710 |
| | | 14 | 0.096 | 22,490 | 2,110 | 18,430 | 1,630 | 15,880 | 1,020 | 14,290 | 920 | 13,500 | 710 |
| | | 16 | 0.096 | 20,890 | 1,350 | 18,430 | 1,470 | 15,880 | 910 | 14,290 | 820 | 13,500 | 640 |
| | | 18 | 0.072 | 19,280 | 1,250 | 18,430 | 1,350 | 15,880 | 910 | 14,290 | 820 | 13,500 | 640 |
| | | 20 | 0.06 | 19,280 | 1,250 | 18,430 | 1,130 | 15,880 | 910 | 14,290 | 820 | 13,500 | 640 |
| | | 22 | 0.04 | 15,170 | 930 | 13,390 | 770 | 14,990 | 820 | 13,500 | 730 | 12,750 | 570 |
| | | 25 | 0.04 | 14,280 | 870 | 12,600 | 730 | 14,110 | 770 | 12,700 | 690 | 12,000 | 540 |
| | | 30 | 0.024 | 14,280 | 870 | 12,600 | 730 | 14,110 | 770 | 12,700 | 690 | 12,000 | 540 |
| | | 35 | 0.02 | 12,500 | 720 | 11,030 | 600 | 10,290 | 530 | 9,260 | 470 | 8,750 | 370 |
| | | 40 | 0.018 | 10,710 | 620 | 9,450 | 510 | 8,820 | 450 | 7,940 | 410 | 7,500 | 320 |

| 被削材 Work material | | | | 1 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 2 焼入れ鋼 Hardened steels (45～55HRC) | | 3 焼入れ鋼 Hardened steels (55～65HRC) | | 4 焼入れ鋼 Hardened steels (65～68HRC) | | 5 焼入れ鋼 Hardened steels (68～72HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 100% | | 85% | | 80% | | 65% | | 55% | |
| ボール半径RE Ball radius (mm) | 外径DC Tool dia. (mm) | 首下長LU Under neck length (mm) | $a_p$ (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 1.25 | 2.5 | 6 | 0.4 | 23,590 | 3,800 | 20,810 | 3,090 | 19,430 | 2,530 | 17,480 | 2,280 | 16,610 | 1,820 |
| | | 10 | 0.272 | 23,590 | 3,800 | 20,810 | 3,090 | 19,430 | 2,530 | 17,480 | 2,280 | 16,610 | 1,820 |
| | | 15 | 0.12 | 18,400 | 2,130 | 16,230 | 2,020 | 15,150 | 1,420 | 13,640 | 1,280 | 12,950 | 1,020 |
| | | 20 | 0.096 | 16,980 | 1,640 | 16,230 | 1,450 | 13,990 | 1,090 | 12,590 | 980 | 11,960 | 790 |
| | | 25 | 0.078 | 16,980 | 1,480 | 14,990 | 1,200 | 13,990 | 980 | 12,590 | 880 | 11,960 | 710 |
| | | 30 | 0.044 | 12,580 | 1,150 | 11,100 | 930 | 10,360 | 770 | 9,320 | 690 | 8,860 | 550 |
| 1.5 | 3 | 6 | 0.48 | 20,400 | 4,100 | 18,000 | 3,400 | 16,800 | 3,020 | 15,120 | 2,720 | 14,360 | 2,180 |
| | | 8 | 0.48 | 20,400 | 4,100 | 18,000 | 3,400 | 16,800 | 3,020 | 15,120 | 2,720 | 14,360 | 2,180 |
| | | 10 | 0.336 | 20,400 | 4,100 | 18,000 | 3,400 | 16,800 | 3,020 | 15,120 | 2,720 | 14,360 | 2,180 |
| | | 13 | 0.252 | 19,040 | 3,060 | 16,800 | 2,540 | 15,680 | 2,260 | 14,110 | 2,030 | 13,410 | 1,630 |
| | | 16 | 0.252 | 19,040 | 2,760 | 16,800 | 2,290 | 14,560 | 1,890 | 13,100 | 1,700 | 12,450 | 1,360 |
| | | 20 | 0.144 | 15,910 | 1,920 | 14,040 | 1,590 | 12,100 | 1,310 | 10,890 | 1,180 | 10,340 | 940 |
| | | 25 | 0.096 | 15,910 | 1,920 | 14,040 | 1,590 | 12,100 | 1,310 | 10,890 | 1,180 | 10,340 | 940 |
| | | 30 | 0.096 | 14,690 | 1,770 | 12,960 | 1,470 | 12,100 | 1,310 | 10,890 | 1,180 | 10,340 | 940 |
| | | 35 | 0.064 | 10,880 | 1,240 | 9,600 | 1,030 | 10,750 | 1,100 | 9,680 | 990 | 9,190 | 790 |
| 1.75 | 3.5 | 10 | 0.328 | 15,190 | 2,750 | 13,410 | 2,240 | 12,510 | 1,830 | 11,260 | 1,650 | 10,700 | 1,320 |
| | | 15 | 0.288 | 15,190 | 2,750 | 13,410 | 2,240 | 12,510 | 1,830 | 11,260 | 1,650 | 10,700 | 1,320 |
| | | 25 | 0.168 | 12,620 | 1,710 | 11,140 | 1,390 | 10,400 | 1,140 | 9,360 | 1,030 | 8,890 | 820 |
| | | 35 | 0.072 | 12,620 | 1,710 | 11,140 | 1,390 | 10,400 | 1,140 | 9,360 | 1,030 | 8,890 | 820 |
| | | 45 | 0.072 | 9,350 | 1,200 | 8,250 | 980 | 7,700 | 800 | 6,930 | 720 | 6,580 | 580 |
| 2 | 4 | 8 | 0.48 | 14,660 | 3,960 | 12,940 | 3,300 | 12,080 | 2,900 | 10,870 | 2,610 | 10,320 | 2,090 |
| | | 10 | 0.48 | 14,660 | 3,960 | 12,940 | 3,300 | 12,080 | 2,900 | 10,870 | 2,610 | 10,320 | 2,090 |
| | | 12 | 0.384 | 14,660 | 3,960 | 12,940 | 3,300 | 12,080 | 2,900 | 10,870 | 2,610 | 10,320 | 2,090 |
| | | 13 | 0.384 | 14,660 | 3,960 | 12,940 | 3,300 | 12,080 | 2,900 | 10,870 | 2,610 | 10,320 | 2,090 |
| | | 16 | 0.336 | 14,660 | 3,960 | 12,940 | 3,300 | 12,080 | 2,900 | 10,870 | 2,610 | 10,320 | 2,090 |
| | | 20 | 0.336 | 12,710 | 2,750 | 11,210 | 2,290 | 10,470 | 2,010 | 9,420 | 1,810 | 8,950 | 1,450 |
| | | 25 | 0.192 | 11,440 | 2,220 | 10,090 | 2,160 | 9,420 | 1,630 | 8,480 | 1,460 | 8,050 | 1,170 |
| | | 30 | 0.128 | 10,560 | 1,710 | 9,320 | 1,430 | 8,690 | 1,250 | 7,820 | 1,130 | 7,430 | 900 |
| | | 35 | 0.08 | 10,560 | 1,710 | 9,320 | 1,430 | 8,690 | 1,250 | 7,820 | 1,130 | 7,430 | 900 |
| | | 40 | 0.08 | 10,560 | 1,710 | 9,320 | 1,430 | 8,690 | 1,250 | 7,820 | 1,130 | 7,430 | 900 |
| | | 45 | 0.08 | 7,820 | 1,200 | 6,900 | 1,000 | 6,440 | 880 | 5,800 | 790 | 5,510 | 630 |
| | | 50 | 0.08 | 7,820 | 1,200 | 6,900 | 1,000 | 6,440 | 880 | 5,800 | 790 | 5,510 | 630 |
| 2.5 | 5 | 10 | 0.584 | 10,710 | 3,210 | 9,450 | 2,840 | 8,820 | 2,380 | 7,940 | 2,140 | 7,540 | 1,710 |
| | | 20 | 0.42 | 10,710 | 3,210 | 9,450 | 2,840 | 8,820 | 2,380 | 7,940 | 2,140 | 7,540 | 1,710 |
| | | 25 | 0.42 | 9,950 | 2,980 | 8,780 | 2,630 | 8,190 | 2,210 | 7,370 | 1,990 | 7,000 | 1,590 |
| | | 30 | 0.24 | 8,950 | 2,690 | 7,900 | 2,370 | 7,370 | 1,990 | 6,630 | 1,790 | 6,300 | 1,430 |
| | | 40 | 0.16 | 8,260 | 1,490 | 7,290 | 1,310 | 6,800 | 1,100 | 6,120 | 990 | 5,820 | 790 |
| 3 | 6 | 12 | 0.48 | 11,480 | 4,250 | 10,130 | 3,460 | 9,450 | 2,840 | 8,510 | 2,550 | 8,080 | 2,040 |
| | | 20 | 0.4 | 10,840 | 3,730 | 9,560 | 3,030 | 8,930 | 2,490 | 8,030 | 2,240 | 7,630 | 1,790 |
| | | 30 | 0.336 | 8,840 | 2,120 | 7,800 | 2,030 | 7,280 | 1,570 | 6,550 | 1,410 | 6,220 | 1,130 |
| | | 50 | 0.12 | 7,340 | 1,590 | 6,480 | 1,400 | 6,050 | 1,180 | 5,440 | 1,060 | 5,170 | 850 |
| 4 | 8 | 24 | 0.5 | 8,750 | 3,420 | 7,550 | 2,600 | 7,100 | 2,450 | 6,390 | 1,850 | 5,750 | 1,270 |
| 5 | 10 | 30 | 0.6 | 7,000 | 3,000 | 6,050 | 2,250 | 5,680 | 2,130 | 5,110 | 1,610 | 4,600 | 1,030 |
| 6 | 12 | 36 | 0.8 | 5,850 | 2,600 | 5,050 | 1,980 | 4,720 | 1,840 | 4,250 | 1,440 | 3,820 | 880 |

※(1)$a_p$は被削材グループ1での目安を示しています。その他のグループの場合は、上表の切込み比率を目安に調整してください。
※(2)リブ加工や止まり溝など、切りくずがつまりやすい切削の場合、切込み設定は基本切込みに切込み比率をかけて算出した切込み量を、さらにその80%まで小さくして使用してください。
※(3)$a_e$の設定は$a_p$×切込み比率×3～5倍を目安に調整してください。仕上げ加工を行う場合、理論カスプハイトを計算し設定してください。

※(1) $a_p$ is shown as the criteria for Group 1 workpieces. For other groups, adjust the cutting depth according to the cutting depth factors in the above table.
※(2) When performing cutting where cutting chips may cause clogging, such as for rib cutting, blind grooves, etc., cutting depth setting should be set by multiplying a cutting depth factor to calculate the cutting depth amount, and this amount should then be reduced to 80% of the calculated value.
※(3) Adjust by setting $a_e$ to (3 to 5)×($a_p$)×(cutting depth ratio). When performing finishing processing, calculate the theoretical cusp height and set accordingly.

【切込み設定例】 EPDBEH2020-10-TH3の工具で焼入れ鋼(50HRC)をリブ溝等高線切削する場合、
切込み=0.168($a_p$)×0.85(焼入れ鋼グループ2の切込み比率)×0.8(閉鎖域の切削)=0.11mm

Cutting depth setting example: When cutting rib groove contours in hardened steel (50HRC) using an EPDBEH2020-10-TH3 tool:
Cutting depth = 0.168 ($a_p$) × 0.85 (cutting depth factor for Group 2 hardened steel) × 0.8 (for closed-area cutting) = 0.11mm

【注意】 ①基本的にはDry(エアーブロー)切削を推奨しますが、被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

【Note】 ① Although basically dry (air blow) cutting is recommended, please use appropriate coolant according to the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
③ If the rpm of the machine is low, lower the feed rate also to put the rpm and feed rate in the same ratio.

## 標準切削条件表
Recommended cutting conditions

高能率切削条件 High efficiency cuttiing condition

**高精度切削条件** High accuracy cuttiing condition

### EPDBEH-TH3

高能率切削条件はA64ページを参照してください。Please refer to P.A64 about high efficiency cutting conditions

| 被削材 Work material | | | | 1 プリハードン鋼 Pre-hardened steels (35~45HRC) | | 2 焼入れ鋼 Hardened steels (45~55HRC) | | 3 焼入れ鋼 Hardened steels (55~65HRC) | | 4 焼入れ鋼 Hardened steels (65~68HRC) | | 5 焼入れ鋼 Hardened steels (68~72HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 100% | | 85% | | 80% | | 65% | | 55% | |
| ボール半径RE Ball radius (mm) | 外径DC Tool dia. (mm) | 首下長LU Under neck length (mm) | $a_p$ (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 0.05 | 0.1 | 0.08 | 0.003 | 50,000 | 230 | 50,000 | 200 | 50,000 | 190 | 45,000 | 170 | 42,500 | 130 |
| | | 0.2 | 0.003 | 50,000 | 230 | 50,000 | 200 | 50,000 | 190 | 45,000 | 170 | 42,500 | 130 |
| | | 0.3 | 0.002 | 50,000 | 230 | 50,000 | 200 | 50,000 | 190 | 45,000 | 170 | 42,500 | 130 |
| | | 0.5 | 0.002 | 50,000 | 230 | 50,000 | 200 | 50,000 | 190 | 45,000 | 170 | 42,500 | 130 |
| 0.075 | 0.15 | 0.12 | 0.007 | 50,000 | 280 | 46,000 | 230 | 42,000 | 180 | 37,500 | 160 | 35,500 | 120 |
| | | 0.3 | 0.007 | 50,000 | 280 | 46,000 | 230 | 42,000 | 180 | 37,500 | 160 | 35,500 | 120 |
| | | 0.5 | 0.006 | 50,000 | 280 | 46,000 | 230 | 42,000 | 180 | 37,500 | 160 | 35,500 | 120 |
| | | 0.75 | 0.005 | 50,000 | 280 | 46,000 | 230 | 42,000 | 180 | 37,500 | 160 | 35,500 | 120 |
| | | 1 | 0.003 | 46,000 | 230 | 41,400 | 190 | 37,800 | 150 | 33,750 | 130 | 31,950 | 100 |
| 0.1 | 0.2 | 0.15 | 0.012 | 50,000 | 330 | 45,500 | 270 | 42,000 | 210 | 37,800 | 190 | 35,700 | 150 |
| | | 0.3 | 0.012 | 50,000 | 330 | 45,500 | 270 | 42,000 | 210 | 37,800 | 190 | 35,700 | 150 |
| | | 0.5 | 0.012 | 50,000 | 330 | 45,500 | 270 | 42,000 | 210 | 37,800 | 190 | 35,700 | 150 |
| | | 0.75 | 0.01 | 50,000 | 330 | 45,500 | 270 | 42,000 | 210 | 37,800 | 190 | 35,700 | 150 |
| | | 1 | 0.009 | 50,000 | 330 | 45,500 | 270 | 42,000 | 210 | 37,800 | 190 | 35,700 | 150 |
| | | 1.25 | 0.006 | 45,900 | 270 | 40,500 | 220 | 37,800 | 170 | 34,020 | 150 | 32,130 | 120 |
| | | 1.5 | 0.006 | 45,900 | 270 | 40,500 | 220 | 37,800 | 170 | 34,020 | 150 | 32,130 | 120 |
| | | 2 | 0.005 | 45,900 | 270 | 40,500 | 220 | 37,800 | 170 | 34,020 | 150 | 32,130 | 120 |
| | | 2.5 | 0.004 | 40,800 | 210 | 36,000 | 170 | 33,600 | 130 | 30,240 | 120 | 28,560 | 90 |
| | | 3 | 0.002 | 40,800 | 210 | 36,000 | 170 | 33,600 | 130 | 30,240 | 120 | 28,560 | 90 |
| 0.15 | 0.3 | 0.25 | 0.016 | 50,000 | 450 | 45,000 | 380 | 42,000 | 340 | 37,800 | 300 | 35,700 | 240 |
| | | 0.5 | 0.016 | 50,000 | 450 | 45,000 | 380 | 42,000 | 340 | 37,800 | 300 | 35,700 | 240 |
| | | 0.75 | 0.014 | 50,000 | 450 | 45,000 | 380 | 42,000 | 340 | 37,800 | 300 | 35,700 | 240 |
| | | 1 | 0.013 | 50,000 | 450 | 45,000 | 380 | 42,000 | 340 | 37,800 | 300 | 35,700 | 240 |
| | | 1.25 | 0.011 | 50,000 | 450 | 45,000 | 380 | 42,000 | 340 | 37,800 | 300 | 35,700 | 240 |
| | | 1.5 | 0.01 | 50,000 | 450 | 45,000 | 380 | 42,000 | 340 | 37,800 | 300 | 35,700 | 240 |
| | | 2 | 0.007 | 45,900 | 370 | 40,500 | 310 | 37,800 | 270 | 34,020 | 250 | 32,130 | 190 |
| | | 2.5 | 0.006 | 45,900 | 370 | 40,500 | 310 | 37,800 | 270 | 34,020 | 250 | 32,130 | 190 |
| | | 3 | 0.005 | 45,900 | 370 | 40,500 | 310 | 37,800 | 270 | 34,020 | 250 | 32,130 | 190 |
| | | 3.5 | 0.003 | 36,720 | 260 | 29,400 | 210 | 26,400 | 180 | 23,760 | 160 | 22,440 | 130 |
| | | 4 | 0.002 | 36,720 | 260 | 29,400 | 210 | 26,400 | 180 | 23,760 | 160 | 22,440 | 130 |
| 0.2 | 0.4 | 0.3 | 0.034 | 40,800 | 450 | 36,000 | 360 | 33,600 | 340 | 30,240 | 300 | 28,560 | 240 |
| | | 0.5 | 0.034 | 40,800 | 450 | 36,000 | 360 | 33,600 | 340 | 30,240 | 300 | 28,560 | 240 |
| | | 0.75 | 0.034 | 40,800 | 450 | 36,000 | 360 | 33,600 | 340 | 30,240 | 300 | 28,560 | 240 |
| | | 1 | 0.032 | 40,800 | 450 | 36,000 | 360 | 33,600 | 340 | 30,240 | 300 | 28,560 | 240 |
| | | 1.5 | 0.027 | 40,800 | 450 | 36,000 | 360 | 33,600 | 340 | 30,240 | 300 | 28,560 | 240 |
| | | 2 | 0.022 | 40,800 | 450 | 36,000 | 360 | 33,600 | 340 | 30,240 | 300 | 28,560 | 240 |
| | | 2.5 | 0.013 | 36,720 | 360 | 32,400 | 290 | 30,240 | 270 | 27,220 | 250 | 25,700 | 190 |
| | | 3 | 0.009 | 36,720 | 360 | 32,400 | 290 | 30,240 | 270 | 27,220 | 250 | 25,700 | 190 |
| | | 3.5 | 0.006 | 36,720 | 360 | 32,400 | 290 | 30,240 | 270 | 27,220 | 250 | 25,700 | 190 |
| | | 4 | 0.004 | 36,720 | 360 | 32,400 | 290 | 30,240 | 270 | 27,220 | 250 | 25,700 | 190 |
| | | 4.5 | 0.003 | 32,640 | 310 | 28,800 | 250 | 26,880 | 230 | 24,190 | 210 | 22,850 | 160 |
| | | 5 | 0.002 | 32,640 | 310 | 28,800 | 250 | 26,880 | 230 | 24,190 | 210 | 22,850 | 160 |
| 0.25 | 0.5 | 0.35 | 0.036 | 34,000 | 610 | 30,000 | 540 | 28,000 | 480 | 25,200 | 430 | 23,800 | 330 |
| | | 0.75 | 0.036 | 34,000 | 610 | 30,000 | 540 | 28,000 | 480 | 25,200 | 430 | 23,800 | 330 |
| | | 1 | 0.036 | 34,000 | 610 | 30,000 | 540 | 28,000 | 480 | 25,200 | 430 | 23,800 | 330 |
| | | 1.5 | 0.032 | 34,000 | 610 | 30,000 | 540 | 28,000 | 480 | 25,200 | 430 | 23,800 | 330 |
| | | 2 | 0.028 | 34,000 | 610 | 30,000 | 540 | 28,000 | 480 | 25,200 | 430 | 23,800 | 330 |
| | | 2.5 | 0.026 | 30,600 | 500 | 27,000 | 440 | 25,200 | 390 | 22,680 | 350 | 21,420 | 270 |
| | | 3 | 0.024 | 30,600 | 500 | 27,000 | 440 | 25,200 | 390 | 22,680 | 350 | 21,420 | 270 |
| | | 4 | 0.016 | 30,600 | 500 | 27,000 | 440 | 25,200 | 390 | 22,680 | 350 | 21,420 | 270 |
| | | 5 | 0.014 | 30,600 | 500 | 27,000 | 440 | 25,200 | 390 | 22,680 | 350 | 21,420 | 270 |
| | | 5.5 | 0.006 | 27,200 | 420 | 24,000 | 370 | 22,400 | 320 | 20,160 | 290 | 19,040 | 230 |
| | | 6 | 0.005 | 27,200 | 420 | 24,000 | 370 | 22,400 | 320 | 20,160 | 290 | 19,040 | 230 |
| | | 7 | 0.004 | 27,200 | 420 | 24,000 | 370 | 22,400 | 320 | 20,160 | 290 | 19,040 | 230 |
| | | 8 | 0.003 | 27,200 | 420 | 24,000 | 370 | 22,400 | 320 | 20,160 | 290 | 19,040 | 230 |
| 0.3 | 0.6 | 0.4 | 0.04 | 34,000 | 880 | 30,000 | 720 | 28,000 | 560 | 25,200 | 500 | 23,800 | 390 |
| | | 0.75 | 0.04 | 34,000 | 880 | 30,000 | 720 | 28,000 | 560 | 25,200 | 500 | 23,800 | 390 |

| 被削材 Work material | | | | 1 プリハードン鋼 Pre-hardened steels (35~45HRC) | | 2 焼入れ鋼 Hardened steels (45~55HRC) | | 3 焼入れ鋼 Hardened steels (55~65HRC) | | 4 焼入れ鋼 Hardened steels (65~68HRC) | | 5 焼入れ鋼 Hardened steels (68~72HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 100% | | 85% | | 80% | | 65% | | 55% | |
| ボール半径RE Ball radius (mm) | 外径DC Tool dia. (mm) | 首下長LU Under neck length (mm) | $a_p$ (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 0.3 | 0.6 | 1 | 0.04 | 34,000 | 880 | 30,000 | 720 | 28,000 | 560 | 25,200 | 500 | 23,800 | 390 |
| | | 1.5 | 0.038 | 34,000 | 880 | 30,000 | 720 | 28,000 | 560 | 25,200 | 500 | 23,800 | 390 |
| | | 2 | 0.034 | 34,000 | 880 | 30,000 | 720 | 28,000 | 560 | 25,200 | 500 | 23,800 | 390 |
| | | 2.5 | 0.03 | 34,000 | 880 | 30,000 | 720 | 28,000 | 560 | 25,200 | 500 | 23,800 | 390 |
| | | 3 | 0.027 | 34,000 | 880 | 30,000 | 720 | 28,000 | 560 | 25,200 | 500 | 23,800 | 390 |
| | | 3.5 | 0.023 | 30,600 | 760 | 27,000 | 620 | 25,200 | 480 | 22,680 | 430 | 21,420 | 340 |
| | | 4 | 0.019 | 30,600 | 760 | 27,000 | 620 | 25,200 | 480 | 22,680 | 430 | 21,420 | 340 |
| | | 4.5 | 0.018 | 30,600 | 720 | 27,000 | 580 | 25,200 | 450 | 22,680 | 410 | 21,420 | 320 |
| | | 5 | 0.016 | 30,600 | 720 | 27,000 | 580 | 25,200 | 450 | 22,680 | 410 | 21,420 | 320 |
| | | 5.5 | 0.014 | 30,600 | 720 | 27,000 | 580 | 25,200 | 450 | 22,680 | 410 | 21,420 | 320 |
| | | 6 | 0.012 | 30,600 | 720 | 27,000 | 580 | 25,200 | 450 | 22,680 | 410 | 21,420 | 320 |
| | | 7 | 0.006 | 27,200 | 600 | 24,000 | 490 | 22,400 | 380 | 20,160 | 340 | 19,040 | 270 |
| | | 8 | 0.006 | 27,200 | 600 | 24,000 | 490 | 22,400 | 380 | 20,160 | 340 | 19,040 | 270 |
| | | 9 | 0.005 | 27,200 | 600 | 24,000 | 490 | 22,400 | 380 | 20,160 | 340 | 19,040 | 270 |
| | | 10 | 0.004 | 23,800 | 530 | 21,000 | 430 | 19,600 | 330 | 17,640 | 300 | 16,660 | 230 |
| | | 12 | 0.003 | 20,400 | 420 | 18,000 | 350 | 16,800 | 270 | 15,120 | 240 | 14,280 | 190 |
| 0.35 | 0.7 | 0.45 | 0.049 | 34,000 | 980 | 30,000 | 810 | 28,000 | 660 | 25,200 | 590 | 23,800 | 460 |
| | | 2 | 0.049 | 34,000 | 980 | 30,000 | 810 | 28,000 | 660 | 25,200 | 590 | 23,800 | 460 |
| | | 4 | 0.027 | 30,600 | 840 | 27,000 | 690 | 25,200 | 560 | 22,680 | 510 | 21,420 | 400 |
| | | 6 | 0.022 | 30,600 | 790 | 27,000 | 650 | 25,200 | 540 | 22,680 | 480 | 21,420 | 370 |
| | | 8 | 0.008 | 27,200 | 630 | 24,000 | 520 | 22,400 | 420 | 20,160 | 380 | 19,040 | 300 |
| 0.4 | 0.8 | 0.5 | 0.08 | 34,000 | 1,090 | 30,000 | 900 | 28,000 | 780 | 25,200 | 710 | 23,800 | 550 |
| | | 1 | 0.08 | 34,000 | 1,090 | 30,000 | 900 | 28,000 | 780 | 25,200 | 710 | 23,800 | 550 |
| | | 1.5 | 0.08 | 34,000 | 1,090 | 30,000 | 900 | 28,000 | 780 | 25,200 | 710 | 23,800 | 550 |
| | | 2 | 0.064 | 34,000 | 1,090 | 30,000 | 900 | 28,000 | 780 | 25,200 | 710 | 23,800 | 550 |
| | | 2.5 | 0.06 | 34,000 | 1,090 | 30,000 | 900 | 28,000 | 780 | 25,200 | 710 | 23,800 | 550 |
| | | 3 | 0.055 | 34,000 | 1,090 | 30,000 | 900 | 28,000 | 780 | 25,200 | 710 | 23,800 | 550 |
| | | 4 | 0.045 | 34,000 | 1,090 | 30,000 | 900 | 28,000 | 780 | 25,200 | 710 | 23,800 | 550 |
| | | 5 | 0.036 | 30,600 | 880 | 27,000 | 730 | 25,200 | 640 | 22,680 | 570 | 21,420 | 450 |
| | | 6 | 0.026 | 30,600 | 880 | 27,000 | 730 | 25,200 | 640 | 22,680 | 570 | 21,420 | 450 |
| | | 8 | 0.016 | 27,200 | 780 | 24,000 | 650 | 22,400 | 560 | 20,160 | 510 | 19,040 | 400 |
| | | 10 | 0.008 | 27,200 | 740 | 24,000 | 610 | 22,400 | 530 | 20,160 | 480 | 19,040 | 370 |
| | | 12 | 0.006 | 27,200 | 740 | 24,000 | 610 | 22,400 | 530 | 20,160 | 480 | 19,040 | 370 |
| 0.45 | 0.9 | 0.6 | 0.072 | 32,300 | 1,220 | 28,500 | 1,000 | 26,600 | 890 | 23,940 | 800 | 22,610 | 620 |
| | | 2 | 0.072 | 32,300 | 1,220 | 28,500 | 1,000 | 26,600 | 890 | 23,940 | 800 | 22,610 | 620 |
| | | 4 | 0.046 | 32,300 | 1,220 | 28,500 | 1,000 | 26,600 | 890 | 23,940 | 800 | 22,610 | 620 |
| | | 6 | 0.034 | 29,070 | 980 | 25,650 | 810 | 23,940 | 720 | 21,550 | 650 | 20,350 | 510 |
| | | 8 | 0.024 | 25,840 | 880 | 22,800 | 720 | 21,280 | 640 | 19,150 | 580 | 18,090 | 450 |
| 0.5 | 1 | 0.8 | 0.09 | 30,600 | 1,380 | 27,000 | 1,130 | 25,200 | 1,010 | 22,680 | 910 | 21,420 | 710 |
| | | 1.5 | 0.09 | 30,600 | 1,380 | 27,000 | 1,130 | 25,200 | 1,010 | 22,680 | 910 | 21,420 | 710 |
| | | 2 | 0.08 | 30,600 | 1,380 | 27,000 | 1,130 | 25,200 | 1,010 | 22,680 | 910 | 21,420 | 710 |
| | | 2.5 | 0.08 | 30,600 | 1,380 | 27,000 | 1,130 | 25,200 | 1,010 | 22,680 | 910 | 21,420 | 710 |
| | | 3 | 0.08 | 30,600 | 1,380 | 27,000 | 1,130 | 25,200 | 1,010 | 22,680 | 910 | 21,420 | 710 |
| | | 4 | 0.056 | 30,600 | 1,380 | 27,000 | 1,130 | 25,200 | 1,010 | 22,680 | 910 | 21,420 | 710 |
| | | 5 | 0.048 | 30,600 | 1,380 | 27,000 | 1,130 | 25,200 | 1,010 | 22,680 | 910 | 21,420 | 710 |
| | | 6 | 0.032 | 27,540 | 1,120 | 24,300 | 920 | 22,680 | 820 | 20,410 | 730 | 19,280 | 570 |
| | | 7 | 0.032 | 27,540 | 1,120 | 24,300 | 920 | 22,680 | 820 | 20,410 | 730 | 19,280 | 570 |
| | | 8 | 0.032 | 27,540 | 1,120 | 24,300 | 920 | 22,680 | 820 | 20,410 | 730 | 19,280 | 570 |
| | | 9 | 0.024 | 27,540 | 1,120 | 24,300 | 920 | 22,680 | 820 | 20,410 | 730 | 19,280 | 570 |
| | | 10 | 0.02 | 27,540 | 1,120 | 24,300 | 920 | 22,680 | 820 | 20,410 | 730 | 19,280 | 570 |
| | | 12 | 0.01 | 24,480 | 940 | 21,600 | 770 | 20,160 | 690 | 18,140 | 620 | 17,140 | 480 |
| | | 13 | 0.009 | 24,480 | 940 | 21,600 | 770 | 20,160 | 690 | 18,140 | 620 | 17,140 | 480 |
| | | 14 | 0.008 | 24,480 | 940 | 21,600 | 770 | 20,160 | 690 | 18,140 | 620 | 17,140 | 480 |
| | | 16 | 0.006 | 24,480 | 940 | 21,600 | 770 | 20,160 | 690 | 18,140 | 620 | 17,140 | 480 |
| | | 18 | 0.005 | 21,420 | 770 | 18,900 | 640 | 17,640 | 560 | 15,880 | 510 | 14,990 | 400 |
| | | 20 | 0.004 | 18,360 | 660 | 16,200 | 540 | 15,120 | 480 | 13,610 | 440 | 12,850 | 340 |

【注意】ご使用にあたっては、A71ページの表下の項目と注意を参照してください。【Note】Upon usage, please refer to comments and notes below table on page A71.

# エポックディープボールエボリューションハード-TH3



## EPDBEH-TH3

高能率切削条件 High efficiency cuttiing condition

**高精度切削条件** High accuracy cuttiing condition

高能率切削条件はA64ページを参照してください。
Please refer to P.A64 about high efficiency cutting conditions

| 被削材 Work material | | | | 1 プリハードン鋼 Pre-hardened steels (35~45HRC) | | 2 焼入れ鋼 Hardened steels (45~55HRC) | | 3 焼入れ鋼 Hardened steels (55~65HRC) | | 4 焼入れ鋼 Hardened steels (65~68HRC) | | 5 焼入れ鋼 Hardened steels (68~72HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 100% | | 85% | | 80% | | 65% | | 55% | |
| ボール半径RE Ball radius (mm) | 外径DC Tool dia. (mm) | 首下長LU Under neck length (mm) | $a_p$ (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 0.55 | 1.1 | 2 | 0.08 | 28,560 | 1,300 | 25,200 | 1,090 | 23,520 | 970 | 21,170 | 870 | 19,990 | 680 |
| | | 4 | 0.056 | 28,560 | 1,300 | 25,200 | 1,090 | 23,520 | 970 | 21,170 | 870 | 19,990 | 680 |
| | | 6 | 0.032 | 26,010 | 1,090 | 22,950 | 920 | 21,420 | 810 | 19,280 | 730 | 18,210 | 570 |
| | | 8 | 0.032 | 26,010 | 1,090 | 22,950 | 920 | 21,420 | 810 | 19,280 | 730 | 18,210 | 570 |
| | | 10 | 0.02 | 26,010 | 1,090 | 22,950 | 920 | 21,420 | 810 | 19,280 | 730 | 18,210 | 570 |
| 0.6 | 1.2 | 2 | 0.077 | 26,150 | 1,210 | 23,080 | 1,000 | 21,540 | 890 | 19,380 | 800 | 18,310 | 620 |
| | | 3 | 0.077 | 26,150 | 1,210 | 23,080 | 1,000 | 21,540 | 890 | 19,380 | 800 | 18,310 | 620 |
| | | 4 | 0.064 | 26,150 | 1,210 | 23,080 | 1,000 | 21,540 | 890 | 19,380 | 800 | 18,310 | 620 |
| | | 6 | 0.048 | 26,150 | 1,210 | 23,080 | 1,000 | 21,540 | 890 | 19,380 | 800 | 18,310 | 620 |
| | | 8 | 0.032 | 24,480 | 1,130 | 21,600 | 950 | 20,160 | 810 | 18,140 | 730 | 17,140 | 560 |
| | | 10 | 0.028 | 24,480 | 1,100 | 21,600 | 860 | 20,160 | 730 | 18,140 | 650 | 17,140 | 510 |
| | | 12 | 0.024 | 24,480 | 1,100 | 21,600 | 860 | 20,160 | 730 | 18,140 | 650 | 17,140 | 510 |
| 0.7 | 1.4 | 3 | 0.088 | 21,420 | 1,160 | 18,900 | 980 | 17,640 | 880 | 15,880 | 790 | 14,990 | 620 |
| | | 8 | 0.044 | 21,420 | 1,160 | 18,900 | 980 | 17,640 | 880 | 15,880 | 790 | 14,990 | 620 |
| | | 12 | 0.028 | 21,420 | 1,040 | 18,900 | 890 | 17,640 | 790 | 15,880 | 720 | 14,990 | 560 |
| | | 16 | 0.014 | 19,040 | 870 | 16,800 | 740 | 15,680 | 670 | 14,110 | 600 | 13,330 | 470 |
| 0.75 | 1.5 | 2 | 0.096 | 23,800 | 1,430 | 21,000 | 1,130 | 19,600 | 980 | 17,640 | 880 | 16,660 | 690 |
| | | 2.5 | 0.096 | 23,800 | 1,430 | 21,000 | 1,130 | 19,600 | 980 | 17,640 | 880 | 16,660 | 690 |
| | | 3 | 0.096 | 23,800 | 1,430 | 21,000 | 1,130 | 19,600 | 980 | 17,640 | 880 | 16,660 | 690 |
| | | 4 | 0.08 | 23,800 | 1,430 | 21,000 | 1,130 | 19,600 | 980 | 17,640 | 880 | 16,660 | 690 |
| | | 5 | 0.08 | 23,800 | 1,430 | 21,000 | 1,130 | 19,600 | 980 | 17,640 | 880 | 16,660 | 690 |
| | | 6 | 0.08 | 23,800 | 1,430 | 21,000 | 1,130 | 19,600 | 980 | 17,640 | 880 | 16,660 | 690 |
| | | 8 | 0.048 | 21,420 | 1,160 | 18,900 | 920 | 17,640 | 790 | 15,880 | 720 | 14,990 | 560 |
| | | 10 | 0.048 | 21,420 | 1,160 | 18,900 | 920 | 17,640 | 790 | 15,880 | 720 | 14,990 | 560 |
| | | 12 | 0.048 | 21,420 | 1,160 | 18,900 | 920 | 17,640 | 790 | 15,880 | 720 | 14,990 | 560 |
| | | 14 | 0.04 | 19,040 | 970 | 16,800 | 770 | 15,680 | 670 | 14,110 | 600 | 13,330 | 470 |
| | | 16 | 0.015 | 19,040 | 970 | 16,800 | 770 | 15,680 | 670 | 14,110 | 600 | 13,330 | 470 |
| | | 18 | 0.015 | 19,040 | 970 | 16,800 | 770 | 15,680 | 670 | 14,110 | 600 | 13,330 | 470 |
| | | 20 | 0.015 | 19,040 | 970 | 16,800 | 770 | 15,680 | 670 | 14,110 | 600 | 13,330 | 470 |
| 0.8 | 1.6 | 4 | 0.11 | 22,100 | 1,370 | 19,500 | 1,170 | 18,200 | 1,020 | 16,380 | 920 | 15,470 | 710 |
| | | 8 | 0.088 | 22,100 | 1,370 | 19,500 | 1,170 | 18,200 | 1,020 | 16,380 | 920 | 15,470 | 710 |
| | | 12 | 0.052 | 19,890 | 1,110 | 17,550 | 950 | 16,380 | 830 | 14,740 | 740 | 13,920 | 580 |
| | | 16 | 0.032 | 19,890 | 1,110 | 17,550 | 950 | 16,380 | 830 | 14,740 | 740 | 13,920 | 580 |
| | | 20 | 0.016 | 17,680 | 930 | 15,600 | 800 | 14,560 | 690 | 13,100 | 620 | 12,380 | 490 |
| 0.9 | 1.8 | 4 | 0.147 | 22,100 | 1,550 | 19,500 | 1,290 | 18,200 | 1,090 | 16,380 | 980 | 15,470 | 760 |
| | | 8 | 0.104 | 22,100 | 1,550 | 19,500 | 1,290 | 18,200 | 1,090 | 16,380 | 980 | 15,470 | 760 |
| | | 12 | 0.056 | 19,890 | 1,250 | 17,550 | 1,040 | 16,380 | 890 | 14,740 | 800 | 13,920 | 620 |
| | | 16 | 0.036 | 19,890 | 1,250 | 17,550 | 1,040 | 16,380 | 890 | 14,740 | 800 | 13,920 | 620 |
| | | 20 | 0.018 | 17,680 | 1,050 | 15,600 | 880 | 14,560 | 740 | 13,100 | 670 | 12,380 | 520 |
| 1 | 2 | 2.5 | 0.16 | 17,850 | 1,610 | 15,750 | 1,360 | 14,700 | 1,180 | 13,230 | 1,060 | 12,500 | 820 |
| | | 3 | 0.16 | 17,850 | 1,610 | 15,750 | 1,360 | 14,700 | 1,180 | 13,230 | 1,060 | 12,500 | 820 |
| | | 4 | 0.16 | 17,850 | 1,610 | 15,750 | 1,360 | 14,700 | 1,180 | 13,230 | 1,060 | 12,500 | 820 |
| | | 5 | 0.16 | 17,850 | 1,610 | 15,750 | 1,360 | 14,700 | 1,180 | 13,230 | 1,060 | 12,500 | 820 |
| | | 6 | 0.16 | 17,850 | 1,430 | 15,750 | 1,200 | 14,700 | 1,060 | 13,230 | 950 | 12,500 | 740 |
| | | 8 | 0.112 | 17,850 | 1,430 | 15,750 | 1,200 | 14,700 | 1,060 | 13,230 | 950 | 12,500 | 740 |
| | | 10 | 0.112 | 17,850 | 1,290 | 15,750 | 1,070 | 14,700 | 940 | 13,230 | 850 | 12,500 | 660 |
| | | 12 | 0.064 | 16,070 | 1,160 | 14,180 | 960 | 13,230 | 850 | 11,910 | 760 | 11,250 | 590 |
| | | 13 | 0.064 | 16,070 | 1,160 | 14,180 | 960 | 13,230 | 850 | 11,910 | 760 | 11,250 | 590 |
| | | 14 | 0.064 | 16,070 | 1,160 | 14,180 | 960 | 13,230 | 850 | 11,910 | 760 | 11,250 | 590 |
| | | 16 | 0.064 | 16,070 | 1,040 | 14,180 | 870 | 13,230 | 760 | 11,910 | 690 | 11,250 | 530 |
| | | 18 | 0.048 | 16,070 | 1,040 | 14,180 | 870 | 13,230 | 760 | 11,910 | 690 | 11,250 | 530 |
| | | 20 | 0.04 | 16,070 | 1,040 | 14,180 | 870 | 13,230 | 760 | 11,910 | 690 | 11,250 | 530 |
| | | 22 | 0.034 | 15,170 | 930 | 13,390 | 770 | 12,500 | 680 | 11,250 | 610 | 10,620 | 480 |
| | | 25 | 0.028 | 14,280 | 870 | 12,600 | 730 | 11,760 | 640 | 10,580 | 580 | 10,000 | 450 |
| | | 30 | 0.012 | 14,280 | 870 | 12,600 | 730 | 11,760 | 640 | 10,580 | 580 | 10,000 | 450 |
| | | 35 | 0.01 | 12,500 | 720 | 11,030 | 600 | 10,290 | 530 | 9,260 | 470 | 8,750 | 370 |
| | | 40 | 0.008 | 10,710 | 620 | 9,450 | 510 | 8,820 | 450 | 7,940 | 410 | 7,500 | 320 |

| 被削材 Work material | | | | 1 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 2 焼入れ鋼 Hardened steels (45～55HRC) | | 3 焼入れ鋼 Hardened steels (55～65HRC) | | 4 焼入れ鋼 Hardened steels (65～68HRC) | | 5 焼入れ鋼 Hardened steels (68～72HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 100% | | 85% | | 80% | | 65% | | 55% | |
| ボール半径RE Ball radius (mm) | 外径DC Tool dia. (mm) | 首下長LU Under neck length (mm) | $a_p$ (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 1.25 | 2.5 | 6 | 0.2 | 15,730 | 1,690 | 13,880 | 1,370 | 12,950 | 1,130 | 11,660 | 1,010 | 11,070 | 810 |
| | | 10 | 0.136 | 15,730 | 1,690 | 13,880 | 1,370 | 12,950 | 1,130 | 11,660 | 1,010 | 11,070 | 810 |
| | | 15 | 0.08 | 14,150 | 1,370 | 12,490 | 1,110 | 11,660 | 910 | 10,490 | 820 | 9,970 | 660 |
| | | 20 | 0.064 | 14,150 | 1,370 | 12,490 | 1,110 | 11,660 | 910 | 10,490 | 820 | 9,970 | 660 |
| | | 25 | 0.052 | 14,150 | 1,230 | 12,490 | 1,000 | 11,660 | 820 | 10,490 | 740 | 9,970 | 590 |
| | | 30 | 0.035 | 12,580 | 1,150 | 11,100 | 930 | 10,360 | 770 | 9,320 | 690 | 8,860 | 550 |
| 1.5 | 3 | 6 | 0.24 | 13,600 | 1,820 | 12,000 | 1,510 | 11,200 | 1,340 | 10,080 | 1,210 | 9,580 | 970 |
| | | 8 | 0.24 | 13,600 | 1,820 | 12,000 | 1,510 | 11,200 | 1,340 | 10,080 | 1,210 | 9,580 | 970 |
| | | 10 | 0.168 | 13,600 | 1,820 | 12,000 | 1,510 | 11,200 | 1,340 | 10,080 | 1,210 | 9,580 | 970 |
| | | 13 | 0.168 | 13,600 | 1,820 | 12,000 | 1,510 | 11,200 | 1,340 | 10,080 | 1,210 | 9,580 | 970 |
| | | 16 | 0.168 | 13,600 | 1,640 | 12,000 | 1,360 | 11,200 | 1,210 | 10,080 | 1,090 | 9,580 | 870 |
| | | 20 | 0.096 | 12,240 | 1,480 | 10,800 | 1,230 | 10,080 | 1,090 | 9,070 | 980 | 8,620 | 780 |
| | | 25 | 0.064 | 12,240 | 1,480 | 10,800 | 1,230 | 10,080 | 1,090 | 9,070 | 980 | 8,620 | 780 |
| | | 30 | 0.064 | 12,240 | 1,480 | 10,800 | 1,230 | 10,080 | 1,090 | 9,070 | 980 | 8,620 | 780 |
| | | 35 | 0.051 | 10,880 | 1,240 | 9,600 | 1,030 | 8,960 | 910 | 8,060 | 820 | 7,660 | 660 |
| 1.75 | 3.5 | 10 | 0.216 | 11,690 | 1,760 | 10,310 | 1,430 | 9,630 | 1,180 | 8,660 | 1,060 | 8,230 | 850 |
| | | 15 | 0.192 | 11,690 | 1,760 | 10,310 | 1,430 | 9,630 | 1,180 | 8,660 | 1,060 | 8,230 | 850 |
| | | 25 | 0.112 | 10,520 | 1,430 | 9,280 | 1,160 | 8,660 | 950 | 7,800 | 860 | 7,410 | 680 |
| | | 35 | 0.072 | 10,520 | 1,430 | 9,280 | 1,160 | 8,660 | 950 | 7,800 | 860 | 7,410 | 680 |
| | | 45 | 0.058 | 9,350 | 1,200 | 8,250 | 980 | 7,700 | 800 | 6,930 | 720 | 6,580 | 580 |
| 2 | 4 | 8 | 0.32 | 9,780 | 1,760 | 8,630 | 1,470 | 8,050 | 1,290 | 7,250 | 1,160 | 6,880 | 930 |
| | | 10 | 0.32 | 9,780 | 1,760 | 8,630 | 1,470 | 8,050 | 1,290 | 7,250 | 1,160 | 6,880 | 930 |
| | | 12 | 0.256 | 9,780 | 1,760 | 8,630 | 1,470 | 8,050 | 1,290 | 7,250 | 1,160 | 6,880 | 930 |
| | | 13 | 0.256 | 9,780 | 1,760 | 8,630 | 1,470 | 8,050 | 1,290 | 7,250 | 1,160 | 6,880 | 930 |
| | | 16 | 0.224 | 9,780 | 1,760 | 8,630 | 1,470 | 8,050 | 1,290 | 7,250 | 1,160 | 6,880 | 930 |
| | | 20 | 0.224 | 9,780 | 1,760 | 8,630 | 1,470 | 8,050 | 1,290 | 7,250 | 1,160 | 6,880 | 930 |
| | | 25 | 0.128 | 8,800 | 1,430 | 7,760 | 1,190 | 7,250 | 1,040 | 6,520 | 940 | 6,190 | 750 |
| | | 30 | 0.128 | 8,800 | 1,430 | 7,760 | 1,190 | 7,250 | 1,040 | 6,520 | 940 | 6,190 | 750 |
| | | 35 | 0.08 | 8,800 | 1,430 | 7,760 | 1,190 | 7,250 | 1,040 | 6,520 | 940 | 6,190 | 750 |
| | | 40 | 0.08 | 8,800 | 1,430 | 7,760 | 1,190 | 7,250 | 1,040 | 6,520 | 940 | 6,190 | 750 |
| | | 45 | 0.064 | 7,820 | 1,200 | 6,900 | 1,000 | 6,440 | 880 | 5,800 | 790 | 5,510 | 630 |
| | | 50 | 0.056 | 7,820 | 1,200 | 6,900 | 1,000 | 6,440 | 880 | 5,800 | 790 | 5,510 | 630 |
| 2.5 | 5 | 10 | 0.392 | 7,650 | 1,530 | 6,750 | 1,350 | 6,300 | 1,130 | 5,670 | 1,020 | 5,390 | 820 |
| | | 20 | 0.28 | 7,650 | 1,530 | 6,750 | 1,350 | 6,300 | 1,130 | 5,670 | 1,020 | 5,390 | 820 |
| | | 25 | 0.28 | 7,650 | 1,530 | 6,750 | 1,350 | 6,300 | 1,130 | 5,670 | 1,020 | 5,390 | 820 |
| | | 30 | 0.16 | 6,890 | 1,380 | 6,080 | 1,220 | 5,670 | 1,020 | 5,100 | 920 | 4,850 | 740 |
| | | 40 | 0.16 | 6,890 | 1,240 | 6,080 | 1,090 | 5,670 | 920 | 5,100 | 830 | 4,850 | 660 |
| 3 | 6 | 12 | 0.48 | 7,650 | 1,890 | 6,750 | 1,540 | 6,300 | 1,260 | 5,670 | 1,130 | 5,390 | 910 |
| | | 20 | 0.4 | 7,230 | 1,660 | 6,380 | 1,350 | 5,950 | 1,110 | 5,360 | 990 | 5,090 | 800 |
| | | 30 | 0.336 | 6,800 | 1,360 | 6,000 | 1,200 | 5,600 | 1,010 | 5,040 | 910 | 4,790 | 730 |
| | | 50 | 0.12 | 6,120 | 1,100 | 5,400 | 970 | 5,040 | 820 | 4,540 | 730 | 4,310 | 590 |
| 4 | 8 | 24 | 0.5 | 6,400 | 1,690 | 5,720 | 1,320 | 4,180 | 1,170 | 3,960 | 870 | 3,760 | 700 |
| 5 | 10 | 30 | 0.6 | 5,100 | 1,460 | 4,510 | 1,130 | 3,520 | 1,000 | 3,190 | 770 | 3,030 | 620 |
| 6 | 12 | 36 | 0.8 | 4,200 | 1,240 | 3,850 | 1,000 | 2,640 | 880 | 2,640 | 660 | 2,510 | 530 |

※(1)$a_p$は被削材グループ1での目安を示しています。その他のグループの場合は、上表の切込み比率を目安に調整してください。
※(2)リブ加工や止まり溝など、切りくずがつまりやすい切削の場合、切込み設定は基本切込みに切込み比率をかけて算出した切込み量を、さらにその80%まで小さくして使用してください。
※(3)$a_e$の設定は$a_p$×切込み比率×3～5倍を目安に調整してください。仕上げ加工を行う場合、理論カスプハイトを計算し設定してください。

※(1) $a_p$ is shown as the criteria for Group 1 workpieces. For other groups, adjust the cutting depth according to the cutting depth factors in the above table.
※(2) When performing cutting where cutting chips may cause clogging, such as for rib cutting, blind grooves, etc., cutting depth setting should be set by multiplying a cutting depth factor to calculate the cutting depth amount, and this amount should then be reduced to 80% of the calculated value.
※(3) Adjust by setting $a_e$ to (3 to 5)×($a_p$)×(cutting depth ratio). When performing finishing processing, calculate the theoretical cusp height and set accordingly.

【切込み設定例】 EPDBEH2020-10-TH3の工具で焼入れ鋼(50HRC)をリブ溝等高線切削する場合、
切込み=0.112($a_p$)×0.85(焼入れ鋼グループ2の切込み比率)×0.8(閉鎖域の切削)=0.076mm

Cutting depth setting example: When cutting rib groove contours in hardened steel (50HRC) using an EPDBEH2020-10-TH3 tool:
Cutting depth = 0.112 ($a_p$) × 0.85 (cutting depth factor for Group 2 hardened steel) × 0.8 (for closed-area cutting) = 0.076mm

【注意】 ①基本的にはDry(エアーブロー)切削を推奨しますが、被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

【Note】 ① Although basically dry (air blow) cutting is recommended, please use appropriate coolant according to the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
③ If the rpm of the machine is low, lower the feed rate also to put the rpm and feed rate in the same ratio.

## Epoch Deep Ball Evolution

# エポックディープボールエボリューション ATHCoating

**ストレートネック** | Straight Neck

溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / 細部 Miniature / 中仕上 Semi Finishing / 仕上 Finishing / リブ・細部 Rib Miniature

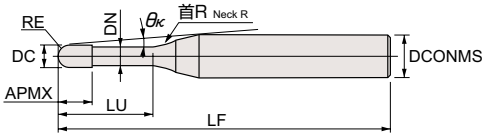
RE公差 RE tolerance
RE≦0.25：±0.003
0.25＜RE：±0.005

h5

(mm)

刃先と首形状の改良によりタオレを抑制し高精度加工を実現。
ATH&PNコーティングの採用で更なる長寿命加工。
Improved flute tip shape and neck shape suppresses warping to enable high-accuracy cutting. Use of ATH and PN coatings further extends tool life.

2枚刃
2 Flutes




切削条件表 A78
Cutting Conditions

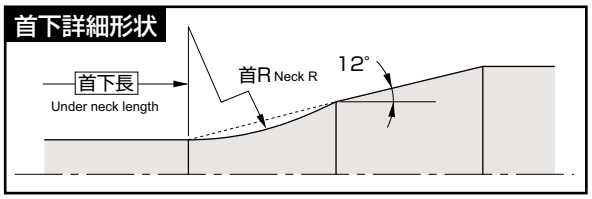
超硬 Carbide / ATH / ねじれ30° Helix angle

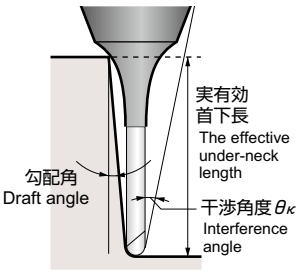
## EPDBE2○○○-○○.○○-ATH

| 商品コード Item code | 在庫 Stock ATH | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 首下長 Under Neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度 Interference angle θκ | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格（円）Suggested retail price（¥） |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDBE2001-0.2-ATH | ● | 0.05 | 0.1 | 0.2 | 0.08 | 0.08 | 45 | 4 | 1 | 11.76 | 0.35 | 0.37 | 0.39 | 0.41 | 0.44 | 16,290 |
| EPDBE2001-0.3-ATH | ● | | | 0.3 | 0.08 | 0.08 | 45 | 4 | 1 | 11.64 | 0.46 | 0.48 | 0.50 | 0.52 | 0.57 | 16,720 |
| EPDBE2001-0.5-ATH | ● | | | 0.5 | 0.08 | 0.08 | 45 | 4 | 1 | 11.40 | 0.67 | 0.70 | 0.73 | 0.76 | 0.81 | 18,110 |
| EPDBE2002-0.5-ATH | ● | 0.1 | 0.2 | 0.5 | 0.15 | 0.17 | 50 | 4 | 1 | 11.42 | 0.70 | 0.72 | 0.75 | 0.77 | 0.82 | 11,680 |
| EPDBE2002-0.75-ATH | ● | | | 0.75 | 0.15 | 0.17 | 50 | 4 | 1 | 11.13 | 0.96 | 0.99 | 1.02 | 1.05 | 1.11 | 11,680 |
| EPDBE2002-1-ATH | ● | | | 1 | 0.15 | 0.17 | 50 | 4 | 1 | 10.86 | 1.22 | 1.26 | 1.30 | 1.33 | 1.39 | 11,680 |
| EPDBE2002-1.25-ATH | ● | | | 1.25 | 0.15 | 0.17 | 50 | 4 | 1 | 10.60 | 1.48 | 1.52 | 1.57 | 1.61 | 1.72 | 12,650 |
| EPDBE2002-1.5-ATH | ● | | | 1.5 | 0.15 | 0.17 | 50 | 4 | 1 | 10.35 | 1.74 | 1.79 | 1.84 | 1.88 | 2.05 | 12,650 |
| EPDBE2002-2-ATH | ● | | | 2 | 0.15 | 0.17 | 50 | 4 | 1 | 9.88 | 2.25 | 2.32 | 2.37 | 2.45 | 2.71 | 13,930 |
| EPDBE2002-2.5-ATH | ● | | | 2.5 | 0.15 | 0.17 | 50 | 4 | 1 | 9.46 | 2.77 | 2.84 | 2.91 | 3.05 | 3.37 | 15,220 |
| EPDBE2002-3-ATH | ● | | | 3 | 0.15 | 0.17 | 50 | 4 | 1 | 9.07 | 3.28 | 3.37 | 3.48 | 3.65 | 4.04 | 16,290 |
| EPDBE2003-0.5-ATH | ● | 0.15 | 0.3 | 0.5 | 0.25 | 0.27 | 50 | 4 | 2 | 11.47 | 0.78 | 0.82 | 0.86 | 0.90 | 0.98 | 11,470 |
| EPDBE2003-0.75-ATH | ● | | | 0.75 | 0.25 | 0.27 | 50 | 4 | 2 | 11.17 | 1.05 | 1.10 | 1.15 | 1.20 | 1.29 | 11,470 |
| EPDBE2003-1-ATH | ● | | | 1 | 0.25 | 0.27 | 50 | 4 | 2 | 10.89 | 1.31 | 1.38 | 1.43 | 1.49 | 1.59 | 11,470 |
| EPDBE2003-1.25-ATH | ● | | | 1.25 | 0.25 | 0.27 | 50 | 4 | 2 | 10.62 | 1.58 | 1.65 | 1.72 | 1.78 | 1.89 | 12,220 |
| EPDBE2003-1.5-ATH | ● | | | 1.5 | 0.25 | 0.27 | 50 | 4 | 2 | 10.36 | 1.84 | 1.92 | 1.99 | 2.06 | 2.18 | 12,220 |
| EPDBE2003-2-ATH | ● | | | 2 | 0.25 | 0.27 | 50 | 4 | 2 | 9.88 | 2.36 | 2.46 | 2.55 | 2.62 | 2.76 | 12,220 |
| EPDBE2003-2.5-ATH | ● | | | 2.5 | 0.25 | 0.27 | 50 | 4 | 2 | 9.45 | 2.89 | 3.00 | 3.10 | 3.18 | 3.36 | 12,650 |
| EPDBE2003-3-ATH | ● | | | 3 | 0.25 | 0.27 | 50 | 4 | 2 | 9.05 | 3.41 | 3.53 | 3.64 | 3.73 | 4.02 | 12,650 |
| EPDBE2004-0.75-ATH | ● | 0.2 | 0.4 | 0.75 | 0.3 | 0.37 | 50 | 4 | 2 | 11.21 | 1.04 | 1.09 | 1.14 | 1.19 | 1.28 | 7,810 |
| EPDBE2004-1-ATH | ● | | | 1 | 0.3 | 0.37 | 50 | 4 | 2 | 10.91 | 1.31 | 1.37 | 1.43 | 1.48 | 1.58 | 7,810 |
| EPDBE2004-1.5-ATH | ● | | | 1.5 | 0.3 | 0.37 | 50 | 4 | 2 | 10.37 | 1.84 | 1.92 | 1.99 | 2.06 | 2.17 | 7,940 |
| EPDBE2004-2-ATH | ● | | | 2 | 0.3 | 0.37 | 50 | 4 | 2 | 9.88 | 2.36 | 2.46 | 2.54 | 2.62 | 2.75 | 8,230 |
| EPDBE2004-2.5-ATH | ● | | | 2.5 | 0.3 | 0.37 | 50 | 4 | 2 | 9.43 | 2.89 | 3.00 | 3.09 | 3.18 | 3.34 | 8,500 |
| EPDBE2004-3-ATH | ● | | | 3 | 0.3 | 0.37 | 50 | 4 | 2 | 9.03 | 3.41 | 3.53 | 3.63 | 3.73 | 4.01 | 9,060 |
| EPDBE2004-3.5-ATH | ● | | | 3.5 | 0.3 | 0.37 | 50 | 4 | 2 | 8.65 | 3.93 | 4.06 | 4.18 | 4.27 | 4.67 | 9,760 |
| EPDBE2004-4-ATH | ● | | | 4 | 0.3 | 0.37 | 50 | 4 | 2 | 8.30 | 4.45 | 4.59 | 4.71 | 4.83 | 5.33 | 9,760 |
| EPDBE2004-4.5-ATH | ● | | | 4.5 | 0.3 | 0.37 | 50 | 4 | 2 | 7.99 | 4.97 | 5.12 | 5.25 | 5.43 | 6.00 | 10,320 |
| EPDBE2005-1-ATH | ● | 0.25 | 0.5 | 1 | 0.35 | 0.47 | 50 | 4 | 2 | 10.94 | 1.31 | 1.37 | 1.42 | 1.47 | 1.57 | 7,810 |
| EPDBE2005-1.5-ATH | ● | | | 1.5 | 0.35 | 0.47 | 50 | 4 | 2 | 10.39 | 1.83 | 1.91 | 1.98 | 2.05 | 2.17 | 7,810 |
| EPDBE2005-2-ATH | ● | | | 2 | 0.35 | 0.47 | 50 | 4 | 2 | 9.88 | 2.36 | 2.45 | 2.54 | 2.61 | 2.75 | 7,810 |
| EPDBE2005-2.5-ATH | ● | | | 2.5 | 0.35 | 0.47 | 50 | 4 | 2 | 9.42 | 2.88 | 2.99 | 3.09 | 3.17 | 3.33 | 7,810 |
| EPDBE2005-3-ATH | ● | | | 3 | 0.35 | 0.47 | 50 | 4 | 2 | 9.00 | 3.41 | 3.53 | 3.63 | 3.72 | 3.99 | 7,810 |
| EPDBE2005-4-ATH | ● | | | 4 | 0.35 | 0.47 | 50 | 4 | 2 | 8.27 | 4.45 | 4.59 | 4.71 | 4.82 | 5.32 | 7,810 |
| EPDBE2005-5-ATH | ● | | | 5 | 0.35 | 0.47 | 50 | 4 | 2 | 7.64 | 5.48 | 5.65 | 5.78 | 6.01 | 6.65 | 7,940 |
| EPDBE2005-5.5-ATH | ● | | | 5.5 | 0.35 | 0.47 | 50 | 4 | 2 | 7.36 | 6.00 | 6.17 | 6.31 | 6.61 | 7.31 | 8,230 |
| EPDBE2005-6-ATH | ● | | | 6 | 0.35 | 0.47 | 50 | 4 | 2 | 7.10 | 6.52 | 6.70 | 6.88 | 7.21 | 7.97 | 8,230 |
| EPDBE2005-8-ATH | ● | | | 8 | 0.35 | 0.47 | 50 | 4 | 2 | 6.23 | 8.58 | 8.79 | 9.16 | 9.60 | 10.63 | 9,760 |
| EPDBE2006-1-ATH | ● | 0.3 | 0.6 | 1 | 0.4 | 0.57 | 50 | 4 | 4 | 10.98 | 1.44 | 1.54 | 1.63 | 1.71 | 1.88 | 6,740 |
| EPDBE2006-2-ATH | ● | | | 2 | 0.4 | 0.57 | 50 | 4 | 4 | 9.88 | 2.52 | 2.66 | 2.79 | 2.91 | 3.13 | 6,000 |
| EPDBE2006-2.5-ATH | ● | | | 2.5 | 0.4 | 0.57 | 50 | 4 | 4 | 9.41 | 3.05 | 3.22 | 3.36 | 3.49 | 3.73 | 6,140 |
| EPDBE2006-3-ATH | ● | | | 3 | 0.4 | 0.57 | 50 | 4 | 4 | 8.98 | 3.58 | 3.77 | 3.93 | 4.07 | 4.32 | 6,140 |
| EPDBE2006-3.5-ATH | ● | | | 3.5 | 0.4 | 0.57 | 50 | 4 | 4 | 8.58 | 4.12 | 4.32 | 4.49 | 4.64 | 4.91 | 6,410 |
| EPDBE2006-4-ATH | ● | | | 4 | 0.4 | 0.57 | 50 | 4 | 4 | 8.22 | 4.64 | 4.86 | 5.04 | 5.20 | 5.48 | 6,410 |
| EPDBE2006-4.5-ATH | ● | | | 4.5 | 0.4 | 0.57 | 50 | 4 | 4 | 7.89 | 5.17 | 5.40 | 5.59 | 5.76 | 6.06 | 6,410 |
| EPDBE2006-5-ATH | ● | | | 5 | 0.4 | 0.57 | 50 | 4 | 4 | 7.59 | 5.70 | 5.94 | 6.14 | 6.32 | 6.63 | 6,410 |
| EPDBE2006-5.5-ATH | ● | | | 5.5 | 0.4 | 0.57 | 50 | 4 | 4 | 7.31 | 6.22 | 6.48 | 6.69 | 6.87 | 7.29 | 6,410 |
| EPDBE2006-6-ATH | ● | | | 6 | 0.4 | 0.57 | 50 | 4 | 4 | 7.04 | 6.75 | 7.02 | 7.23 | 7.42 | 7.96 | 6,410 |
| EPDBE2006-7-ATH | ● | | | 7 | 0.4 | 0.57 | 50 | 4 | 4 | 6.57 | 7.79 | 8.08 | 8.32 | 8.52 | 9.28 | 7,250 |
| EPDBE2006-8-ATH | ● | | | 8 | 0.4 | 0.57 | 50 | 4 | 4 | 6.16 | 8.84 | 9.15 | 9.40 | 9.61 | 10.61 | 8,500 |
| EPDBE2006-9-ATH | ● | | | 9 | 0.4 | 0.57 | 50 | 4 | 4 | 5.79 | 9.88 | 10.21 | 10.47 | 10.79 | 11.94 | 9,060 |
| EPDBE2006-10-ATH | ● | | | 10 | 0.4 | 0.57 | 50 | 4 | 4 | 5.47 | 10.92 | 11.26 | 11.54 | 11.99 | 13.27 | 8,650 |
| EPDBE2006-12-ATH | ● | | | 12 | 0.4 | 0.57 | 50 | 4 | 4 | 4.92 | 12.99 | 13.37 | 13.72 | 14.38 | 15.92 | 9,760 |

●：標準在庫品です。●：Stocked items.　干渉なし：No interference

**首下詳細形状**




**【注意】**
**エポックディープボールEPDBとは有効首下長が異なります。再度ご確認お願いいたします。**

**【Note】**
The effective under-neck length is different from Epoch Deep Ball EPDB. Please recheck the interference region.

# EPDBE2○○○-○○.○○-ATH

| 商品コード Item code | 在庫 Stock ATH | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 首下長 Under Neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度 Interference angle θκ | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格 (円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDBE2007-2-ATH | ● | 0.35 | 0.7 | 2 | 0.45 | 0.67 | 50 | 4 | 4 | 9.88 | 2.52 | 2.66 | 2.79 | 2.90 | 3.12 | 6,000 |
| EPDBE2007-4-ATH | ● | | | 4 | 0.45 | 0.67 | 50 | 4 | 4 | 8.18 | 4.64 | 4.86 | 5.04 | 5.20 | 5.48 | 6,410 |
| EPDBE2007-6-ATH | ● | | | 6 | 0.45 | 0.67 | 50 | 4 | 4 | 6.98 | 6.74 | 7.01 | 7.23 | 7.42 | 7.94 | 6,410 |
| EPDBE2007-8-ATH | ● | | | 8 | 0.45 | 0.67 | 50 | 4 | 4 | 6.09 | 8.83 | 9.14 | 9.39 | 9.61 | 10.60 | 6,410 |
| EPDBE2008-2-ATH | ● | 0.4 | 0.8 | 2 | 0.5 | 0.77 | 50 | 4 | 4 | 9.87 | 2.51 | 2.65 | 2.78 | 2.89 | 3.11 | 6,000 |
| EPDBE2008-4-ATH | ● | | | 4 | 0.5 | 0.77 | 50 | 4 | 4 | 8.14 | 4.64 | 4.85 | 5.03 | 5.19 | 5.47 | 6,410 |
| EPDBE2008-5-ATH | ● | | | 5 | 0.5 | 0.77 | 50 | 4 | 4 | 7.48 | 5.69 | 5.93 | 6.13 | 6.31 | 6.61 | 6,410 |
| EPDBE2008-6-ATH | ● | | | 6 | 0.5 | 0.77 | 50 | 4 | 4 | 6.92 | 6.74 | 7.01 | 7.23 | 7.41 | 7.92 | 6,410 |
| EPDBE2008-8-ATH | ● | | | 8 | 0.5 | 0.77 | 50 | 4 | 4 | 6.01 | 8.83 | 9.14 | 9.39 | 9.60 | 10.58 | 6,410 |
| EPDBE2008-10-ATH | ● | | | 10 | 0.5 | 0.77 | 50 | 4 | 4 | 5.32 | 10.91 | 11.26 | 11.53 | 11.97 | 13.23 | 8,500 |
| EPDBE2009-2-ATH | ● | 0.45 | 0.9 | 2 | 0.6 | 0.87 | 50 | 4 | 4 | 9.87 | 2.51 | 2.65 | 2.77 | 2.89 | 3.10 | 6,000 |
| EPDBE2009-4-ATH | ● | | | 4 | 0.6 | 0.87 | 50 | 4 | 4 | 8.09 | 4.64 | 4.85 | 5.03 | 5.18 | 5.46 | 6,410 |
| EPDBE2009-6-ATH | ● | | | 6 | 0.6 | 0.87 | 50 | 4 | 4 | 6.85 | 6.74 | 7.00 | 7.22 | 7.41 | 7.91 | 6,410 |
| EPDBE2009-8-ATH | ● | | | 8 | 0.6 | 0.87 | 50 | 4 | 4 | 5.94 | 8.83 | 9.14 | 9.38 | 9.60 | 10.56 | 6,410 |
| EPDBE2010-2-ATH | ● | 0.5 | 1 | 2 | 0.8 | 0.96 | 50 | 4 | 4 | 9.84 | 2.54 | 2.67 | 2.79 | 2.90 | 3.11 | 5,020 |
| EPDBE2010-3-ATH | ● | | | 3 | 0.8 | 0.96 | 50 | 4 | 4 | 8.84 | 3.61 | 3.78 | 3.93 | 4.06 | 4.30 | 5,020 |
| EPDBE2010-4-ATH | ● | | | 4 | 0.8 | 0.96 | 50 | 4 | 4 | 8.02 | 4.66 | 4.87 | 5.04 | 5.20 | 5.47 | 5,720 |
| EPDBE2010-5-ATH | ● | | | 5 | 0.8 | 0.96 | 50 | 4 | 4 | 7.34 | 5.72 | 5.95 | 6.14 | 6.31 | 6.61 | 5,720 |
| EPDBE2010-6-ATH | ● | | | 6 | 0.8 | 0.96 | 50 | 4 | 4 | 6.77 | 6.76 | 7.02 | 7.23 | 7.42 | 7.92 | 6,140 |
| EPDBE2010-7-ATH | ● | | | 7 | 0.8 | 0.96 | 50 | 4 | 4 | 6.28 | 7.81 | 8.09 | 8.32 | 8.52 | 9.25 | 6,140 |
| EPDBE2010-8-ATH | ● | | | 8 | 0.8 | 0.96 | 50 | 4 | 4 | 5.85 | 8.85 | 9.15 | 9.40 | 9.61 | 10.58 | 6,140 |
| EPDBE2010-9-ATH | ● | | | 9 | 0.8 | 0.96 | 50 | 4 | 4 | 5.48 | 9.89 | 10.21 | 10.47 | 10.78 | 11.91 | 6,140 |
| EPDBE2010-10-ATH | ● | | | 10 | 0.8 | 0.96 | 50 | 4 | 4 | 5.15 | 10.93 | 11.27 | 11.54 | 11.98 | 13.23 | 6,140 |
| EPDBE2010-12-ATH | ● | | | 12 | 0.8 | 0.96 | 55 | 4 | 4 | 4.60 | 13.00 | 13.37 | 13.72 | 14.37 | 15.89 | 6,140 |
| EPDBE2010-13-ATH | ● | | | 13 | 0.8 | 0.96 | 55 | 4 | 4 | 4.37 | 14.04 | 14.42 | 14.86 | 15.57 | 17.21 | 7,250 |
| EPDBE2010-14-ATH | ● | | | 14 | 0.8 | 0.96 | 55 | 4 | 4 | 4.16 | 15.07 | 15.47 | 16.00 | 16.76 | 18.54 | 7,250 |
| EPDBE2010-16-ATH | ● | | | 16 | 0.8 | 0.96 | 55 | 4 | 4 | 3.79 | 17.13 | 17.56 | 18.28 | 19.16 | 21.20 | 8,500 |
| EPDBE2010-18-ATH | ● | | | 18 | 0.8 | 0.96 | 60 | 4 | 4 | 3.49 | 19.19 | 19.66 | 20.56 | 21.55 | 23.85 | 8,500 |
| EPDBE2010-20-ATH | ● | | | 20 | 0.8 | 0.96 | 60 | 4 | 4 | 3.23 | 21.25 | 21.84 | 22.84 | 23.94 | 26.51 | 10,320 |
| EPDBE2011-2-ATH | ● | 0.55 | 1.1 | 2 | 1 | 1.05 | 50 | 4 | 4 | 9.81 | 2.58 | 2.70 | 2.81 | 2.92 | 3.12 | 6,740 |
| EPDBE2011-4-ATH | ● | | | 4 | 1 | 1.05 | 50 | 4 | 4 | 7.95 | 4.69 | 4.89 | 5.06 | 5.21 | 5.48 | 7,670 |
| EPDBE2011-6-ATH | ● | | | 6 | 1 | 1.05 | 50 | 4 | 4 | 6.68 | 6.79 | 7.04 | 7.25 | 7.43 | 7.94 | 8,360 |
| EPDBE2011-8-ATH | ● | | | 8 | 1 | 1.05 | 50 | 4 | 4 | 5.76 | 8.87 | 9.17 | 9.41 | 9.61 | 10.59 | 8,360 |
| EPDBE2011-10-ATH | ● | | | 10 | 1 | 1.05 | 50 | 4 | 4 | 5.06 | 10.95 | 11.28 | 11.55 | 12.00 | 13.25 | 8,360 |
| EPDBE2012-4-ATH | ● | 0.6 | 1.2 | 4 | 1.1 | 1.15 | 50 | 4 | 4 | 7.89 | 4.69 | 4.88 | 5.05 | 5.20 | 5.47 | 7,670 |
| EPDBE2012-6-ATH | ● | | | 6 | 1.1 | 1.15 | 50 | 4 | 4 | 6.60 | 6.79 | 7.03 | 7.24 | 7.42 | 7.92 | 8,360 |
| EPDBE2012-8-ATH | ● | | | 8 | 1.1 | 1.15 | 50 | 4 | 4 | 5.67 | 8.87 | 9.16 | 9.40 | 9.61 | 10.58 | 8,360 |
| EPDBE2012-10-ATH | ● | | | 10 | 1.1 | 1.15 | 50 | 4 | 4 | 4.97 | 10.95 | 11.28 | 11.54 | 11.99 | 13.23 | 8,360 |
| EPDBE2012-12-ATH | ● | | | 12 | 1.1 | 1.15 | 55 | 4 | 4 | 4.43 | 13.02 | 13.38 | 13.73 | 14.38 | 15.89 | 8,360 |
| EPDBE2014-8-ATH | ● | 0.7 | 1.4 | 8 | 1.3 | 1.34 | 50 | 4 | 4 | 5.48 | 8.89 | 9.18 | 9.41 | 9.61 | 10.58 | 7,250 |
| EPDBE2014-12-ATH | ● | | | 12 | 1.3 | 1.34 | 55 | 4 | 4 | 4.24 | 13.04 | 13.39 | 13.74 | 14.39 | 15.89 | 7,250 |
| EPDBE2014-16-ATH | ● | | | 16 | 1.3 | 1.34 | 55 | 4 | 4 | 3.46 | 17.16 | 17.57 | 18.31 | 19.17 | 21.20 | 7,250 |
| EPDBE2015-4-ATH | ● | 0.75 | 1.5 | 4 | 1.35 | 1.44 | 50 | 4 | 4 | 7.68 | 4.71 | 4.89 | 5.06 | 5.20 | 5.46 | 5,850 |
| EPDBE2015-6-ATH | ● | | | 6 | 1.35 | 1.44 | 50 | 4 | 4 | 6.33 | 6.81 | 7.04 | 7.25 | 7.42 | 7.91 | 5,850 |
| EPDBE2015-8-ATH | ● | | | 8 | 1.35 | 1.44 | 50 | 4 | 4 | 5.39 | 8.89 | 9.17 | 9.41 | 9.61 | 10.56 | 6,140 |
| EPDBE2015-10-ATH | ● | | | 10 | 1.35 | 1.44 | 50 | 4 | 4 | 4.68 | 10.96 | 11.29 | 11.55 | 11.98 | 13.22 | 6,690 |
| EPDBE2015-12-ATH | ● | | | 12 | 1.35 | 1.44 | 55 | 4 | 4 | 4.14 | 13.03 | 13.39 | 13.74 | 14.38 | 15.87 | 7,250 |
| EPDBE2015-14-ATH | ● | | | 14 | 1.35 | 1.44 | 55 | 4 | 4 | 3.72 | 15.10 | 15.48 | 16.02 | 16.77 | 18.52 | 7,250 |
| EPDBE2015-16-ATH | ● | | | 16 | 1.35 | 1.44 | 55 | 4 | 4 | 3.77 | 17.16 | 17.57 | 18.30 | 19.16 | 21.18 | 7,250 |
| EPDBE2015-18-ATH | ● | | | 18 | 1.35 | 1.44 | 60 | 4 | 4 | 3.08 | 19.22 | 19.69 | 20.58 | 21.56 | 23.83 | 7,250 |
| EPDBE2015-20-ATH | ● | | | 20 | 1.35 | 1.44 | 60 | 4 | 4 | 2.84 | 21.27 | 21.87 | 22.86 | 23.95 | 干渉なし | 7,250 |
| EPDBE2016-8-ATH | ● | 0.8 | 1.6 | 8 | 1.4 | 1.54 | 50 | 4 | 4 | 5.28 | 8.89 | 9.17 | 9.40 | 9.60 | 10.55 | 8,360 |
| EPDBE2016-12-ATH | ● | | | 12 | 1.4 | 1.54 | 55 | 4 | 4 | 4.05 | 13.03 | 13.39 | 13.73 | 14.37 | 15.85 | 8,360 |
| EPDBE2016-16-ATH | ● | | | 16 | 1.4 | 1.54 | 55 | 4 | 4 | 3.28 | 17.16 | 17.57 | 18.29 | 19.15 | 21.16 | 8,360 |
| EPDBE2016-20-ATH | ● | | | 20 | 1.4 | 1.54 | 60 | 4 | 4 | 2.75 | 21.27 | 21.87 | 22.86 | 23.94 | 干渉なし | 8,360 |

Epoch Deep Ball Evolution

# エポックディープボールエボリューション ATHCoating

## EPDBE2○○○-○○.○○-ATH

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) | | | | | | | | 干渉角度 Interference angle | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle | | | | | 希望小売価格（円） Suggested retail price（¥） |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ATH | ボール半径 Ball radius | 外径 Tool dia. | 首下長 Under Neck length | 刃長 Flute length | 首径 Neck dia. | 全長 Overall length | シャンク径 Shank dia. | 首R Neck R | | | | | | | |
| | | RE | DC | LU | APMX | DN | LF | DCONMS | R | θK | 0.5° | 1° | 1.5° | 2° | 3° | |
| EPDBE2018-8-ATH | ● | 0.9 | 1.8 | 8 | 1.6 | 1.73 | 50 | 4 | 4 | 5.06 | 8.91 | 9.18 | 9.41 | 9.61 | 10.54 | 7,250 |
| EPDBE2018-12-ATH | ● | | | 12 | 1.6 | 1.73 | 55 | 4 | 4 | 3.83 | 13.05 | 13.40 | 13.74 | 14.38 | 15.85 | 7,250 |
| EPDBE2018-16-ATH | ● | | | 16 | 1.6 | 1.73 | 55 | 4 | 4 | 3.09 | 17.17 | 17.58 | 18.31 | 19.16 | 21.16 | 7,250 |
| EPDBE2018-20-ATH | ● | | | 20 | 1.6 | 1.73 | 60 | 4 | 4 | 2.58 | 21.28 | 21.88 | 22.87 | 23.95 | 干渉なし | 7,250 |
| EPDBE2020-3-ATH | ● | 1 | 2 | 3 | 1.7 | 1.92 | 50 | 4 | 4 | 8.26 | 3.71 | 3.84 | 3.96 | 4.07 | 4.29 | 5,020 |
| EPDBE2020-4-ATH | ● | | | 4 | 1.7 | 1.92 | 50 | 4 | 4 | 7.23 | 4.75 | 4.92 | 5.07 | 5.21 | 5.45 | 5,020 |
| EPDBE2020-6-ATH | ● | | | 6 | 1.7 | 1.92 | 50 | 4 | 4 | 5.78 | 6.84 | 7.07 | 7.26 | 7.43 | 7.89 | 5,720 |
| EPDBE2020-8-ATH | ● | | | 8 | 1.7 | 1.92 | 50 | 4 | 4 | 4.81 | 8.92 | 9.19 | 9.42 | 9.61 | 10.54 | 6,140 |
| EPDBE2020-10-ATH | ● | | | 10 | 1.7 | 1.92 | 50 | 4 | 4 | 4.12 | 11.00 | 11.30 | 11.56 | 11.99 | 13.20 | 6,140 |
| EPDBE2020-12-ATH | ● | | | 12 | 1.7 | 1.92 | 55 | 4 | 4 | 3.61 | 13.06 | 13.41 | 13.76 | 14.39 | 15.85 | 6,140 |
| EPDBE2020-13-ATH | ● | | | 13 | 1.7 | 1.92 | 55 | 4 | 4 | 3.39 | 14.10 | 14.45 | 14.90 | 15.58 | 17.18 | 6,140 |
| EPDBE2020-14-ATH | ● | | | 14 | 1.7 | 1.92 | 55 | 4 | 4 | 3.20 | 15.13 | 15.50 | 16.04 | 16.78 | 18.51 | 6,140 |
| EPDBE2020-16-ATH | ● | | | 16 | 1.7 | 1.92 | 55 | 4 | 4 | 2.88 | 17.19 | 17.59 | 18.32 | 19.17 | 干渉なし | 6,140 |
| EPDBE2020-18-ATH | ● | | | 18 | 1.7 | 1.92 | 60 | 4 | 4 | 2.62 | 19.24 | 19.72 | 20.60 | 21.57 | 干渉なし | 6,140 |
| EPDBE2020-20-ATH | ● | | | 20 | 1.7 | 1.92 | 60 | 4 | 4 | 2.40 | 21.30 | 21.90 | 22.88 | 23.96 | 干渉なし | 6,140 |
| EPDBE2020-22-ATH | ● | | | 22 | 1.7 | 1.92 | 60 | 4 | 4 | 2.22 | 23.35 | 24.08 | 25.16 | 26.35 | 干渉なし | 8,500 |
| EPDBE2020-25-ATH | ● | | | 25 | 1.7 | 1.92 | 65 | 4 | 4 | 1.99 | 26.42 | 27.35 | 28.58 | 干渉なし | 干渉なし | 8,650 |
| EPDBE2020-30-ATH | ● | | | 30 | 1.7 | 1.92 | 70 | 4 | 4 | 1.70 | 31.53 | 32.80 | 34.29 | 干渉なし | 干渉なし | 9,900 |
| EPDBE2020-35-ATH | ● | | | 35 | 1.7 | 1.92 | 75 | 4 | 4 | 1.48 | 36.65 | 38.24 | 干渉なし | 干渉なし | 干渉なし | 13,390 |
| EPDBE2020-40-ATH | ● | | | 40 | 1.7 | 1.92 | 80 | 4 | 4 | 1.31 | 41.86 | 43.69 | 干渉なし | 干渉なし | 干渉なし | 13,390 |
| EPDBE2025-6-ATH | ● | 1.25 | 2.5 | 6 | 2 | 2.4 | 50 | 4 | 4 | 5.04 | 6.88 | 7.09 | 7.27 | 7.43 | 7.87 | 6,690 |
| EPDBE2025-10-ATH | ● | | | 10 | 2 | 2.4 | 50 | 4 | 4 | 3.43 | 11.03 | 11.32 | 11.56 | 12.00 | 13.18 | 7,050 |
| EPDBE2025-15-ATH | ● | | | 15 | 2 | 2.4 | 55 | 4 | 4 | 2.46 | 16.18 | 16.56 | 17.20 | 17.98 | 干渉なし | 8,360 |
| EPDBE2025-20-ATH | ● | | | 20 | 2 | 2.4 | 60 | 4 | 4 | 1.91 | 21.32 | 21.93 | 22.90 | 干渉なし | 干渉なし | 9,760 |
| EPDBE2025-25-ATH | ● | | | 25 | 2 | 2.4 | 65 | 4 | 4 | 1.57 | 26.44 | 27.38 | 28.60 | 干渉なし | 干渉なし | 10,450 |
| EPDBE2025-30-ATH | ● | | | 30 | 2 | 2.4 | 70 | 4 | 4 | 1.33 | 31.55 | 32.82 | 干渉なし | 干渉なし | 干渉なし | 10,450 |
| EPDBE2030-8-ATH | ● | 1.5 | 3 | 8 | 2.5 | 2.88 | 55 | 6 | 4 | 6.19 | 8.99 | 9.23 | 9.44 | 9.62 | 10.51 | 6,270 |
| EPDBE2030-10-ATH | ● | | | 10 | 2.5 | 2.88 | 55 | 6 | 4 | 5.41 | 11.06 | 11.34 | 11.57 | 12.01 | 13.16 | 7,110 |
| EPDBE2030-13-ATH | ● | | | 13 | 2.5 | 2.88 | 60 | 6 | 4 | 4.56 | 14.15 | 14.48 | 14.94 | 15.60 | 17.15 | 8,360 |
| EPDBE2030-16-ATH | ● | | | 16 | 2.5 | 2.88 | 60 | 6 | 4 | 3.93 | 17.24 | 17.61 | 18.36 | 19.19 | 21.13 | 8,360 |
| EPDBE2030-20-ATH | ● | | | 20 | 2.5 | 2.88 | 65 | 6 | 4 | 3.33 | 21.34 | 21.96 | 22.92 | 23.97 | 26.44 | 8,090 |
| EPDBE2030-25-ATH | ● | | | 25 | 2.5 | 2.88 | 70 | 6 | 4 | 2.79 | 26.46 | 27.41 | 28.62 | 29.96 | 干渉なし | 8,090 |
| EPDBE2030-30-ATH | ● | | | 30 | 2.5 | 2.88 | 75 | 6 | 4 | 2.40 | 31.57 | 32.85 | 34.32 | 35.94 | 干渉なし | 9,200 |
| EPDBE2030-35-ATH | ● | | | 35 | 2.5 | 2.88 | 80 | 6 | 4 | 2.11 | 36.72 | 38.30 | 40.03 | 41.92 | 干渉なし | 11,680 |
| EPDBE2035-15-ATH | ● | 1.75 | 3.5 | 15 | 2.75 | 3.35 | 60 | 6 | 4 | 3.68 | 16.25 | 16.60 | 17.26 | 18.03 | 19.81 | 9,200 |
| EPDBE2035-25-ATH | ● | | | 25 | 2.75 | 3.35 | 70 | 6 | 4 | 2.43 | 26.49 | 27.46 | 28.67 | 29.99 | 干渉なし | 9,760 |
| EPDBE2035-35-ATH | ● | | | 35 | 2.75 | 3.35 | 80 | 6 | 4 | 1.82 | 36.79 | 38.36 | 40.07 | 干渉なし | 干渉なし | 12,540 |
| EPDBE2035-45-ATH | ● | | | 45 | 2.75 | 3.35 | 90 | 6 | 4 | 1.45 | 47.22 | 49.25 | 干渉なし | 干渉なし | 干渉なし | 15,320 |
| EPDBE2040-10-ATH | ● | 2 | 4 | 10 | 3 | 3.85 | 55 | 6 | 4 | 4.38 | 11.10 | 11.36 | 11.58 | 12.00 | 13.10 | 6,410 |
| EPDBE2040-13-ATH | ● | | | 13 | 3 | 3.85 | 60 | 6 | 4 | 3.57 | 14.19 | 14.50 | 14.95 | 15.59 | 17.08 | 8,360 |
| EPDBE2040-16-ATH | ● | | | 16 | 3 | 3.85 | 60 | 6 | 4 | 3.01 | 17.27 | 17.63 | 18.37 | 19.18 | 干渉なし | 8,360 |
| EPDBE2040-20-ATH | ● | | | 20 | 3 | 3.85 | 65 | 6 | 4 | 2.49 | 21.37 | 21.99 | 22.93 | 23.96 | 干渉なし | 8,360 |
| EPDBE2040-25-ATH | ● | | | 25 | 3 | 3.85 | 70 | 6 | 4 | 2.05 | 26.49 | 27.44 | 28.63 | 29.95 | 干渉なし | 8,360 |
| EPDBE2040-30-ATH | ● | | | 30 | 3 | 3.85 | 75 | 6 | 4 | 1.74 | 31.59 | 32.89 | 34.34 | 干渉なし | 干渉なし | 8,360 |
| EPDBE2040-35-ATH | ● | | | 35 | 3 | 3.85 | 80 | 6 | 4 | 1.51 | 36.78 | 38.33 | 40.04 | 干渉なし | 干渉なし | 9,610 |
| EPDBE2040-40-ATH | ● | | | 40 | 3 | 3.85 | 80 | 6 | 4 | 1.34 | 41.99 | 43.78 | 干渉なし | 干渉なし | 干渉なし | 10,830 |
| EPDBE2040-45-ATH | ● | | | 45 | 3 | 3.85 | 90 | 6 | 4 | 1.20 | 47.20 | 49.23 | 干渉なし | 干渉なし | 干渉なし | 13,930 |
| EPDBE2040-50-ATH | ● | | | 50 | 3 | 3.85 | 100 | 6 | 4 | 1.08 | 52.42 | 54.68 | 干渉なし | 干渉なし | 干渉なし | 14,890 |
| EPDBE2050-20-ATH | ● | 2.5 | 5 | 20 | 3.5 | 4.85 | 65 | 6 | 4 | 1.42 | 21.36 | 21.95 | 干渉なし | 干渉なし | 干渉なし | 14,590 |
| EPDBE2050-25-ATH | ● | | | 25 | 3.5 | 4.85 | 70 | 6 | 4 | 1.14 | 26.48 | 27.39 | 干渉なし | 干渉なし | 干渉なし | 14,590 |
| EPDBE2050-30-ATH | ● | | | 30 | 3.5 | 4.85 | 75 | 6 | 4 | 0.95 | 31.58 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 15,600 |
| EPDBE2050-40-ATH | ● | | | 40 | 3.5 | 4.85 | 80 | 6 | 4 | 0.72 | 41.97 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 19,760 |
| EPDBE2060-12-ATH | ● | 3 | 6 | 12 | 6 | 5.85 | 60 | 6 | - | 0 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 10,950 |
| EPDBE2060-20-ATH | ● | | | 20 | 6 | 5.85 | 65 | 6 | - | 0 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 10,950 |
| EPDBE2060-30-ATH | ● | | | 30 | 6 | 5.85 | 75 | 6 | - | 0 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 11,220 |
| EPDBE2060-50-ATH | ● | | | 50 | 6 | 5.85 | 100 | 6 | - | 0 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 13,470 |

### 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel | | | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| | | > 45HRC ≦ 55HRC | > 55HRC ≦ 65HRC | > 65HRC | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ |

### 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPDBE-ATH | × (N/A) | 1 ～ 6 |

【注意】首下長／外径が10DCを超える工具の再研磨可否については、弊社営業にお問い合わせください。
【Note】Contact our sales office regarding whether or not regrinding is possible for tools where under neck length/tool diameter more than 10DC

●：標準在庫品です。●：Stocked items.　干渉なし：No interference

## Epoch Deep Ball Evolution

# エポックディープボールエボリューション PN Coating

**ストレートネック** | Straight Neck

溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / 細部 Miniature / 中仕上 Semi Finishing / 仕上 Finishing / リブ・細部 Rib Miniature

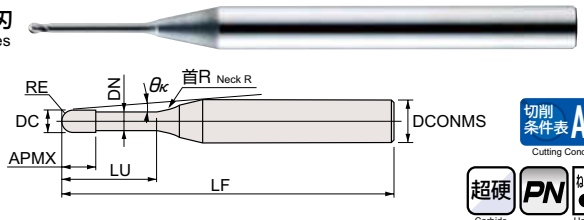
RE公差 RE tolerance
RE≦0.25：±0.003
0.25＜RE：±0.005

h5

(mm)

刃先と首形状の改良によりタオレを抑制し高精度加工を実現。
ATH&PNコーティングの採用で更なる長寿命加工。
Improved flute tip shape and neck shape suppresses warping to enable high-accuracy cutting. Use of ATH and PN coatings further extends tool life.

2枚刃 2 Flutes




切削条件表 A78 Cutting Conditions

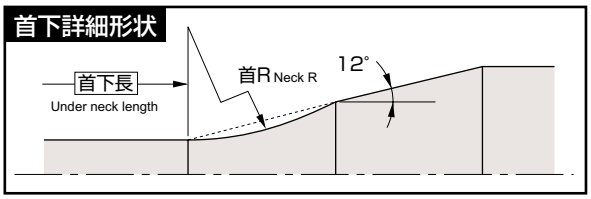
超硬 Carbide / PN / ねじれ30° Helix angle

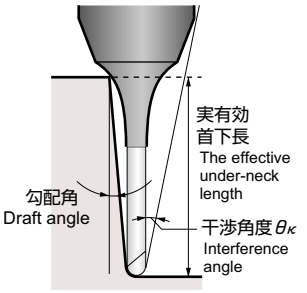
## EPDBE2○○○-○○.○○-PN

| 商品コード Item code | 在庫 Stock PN | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 首下長 Under Neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度 Interference angle θκ | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格（円） Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDBE2001-0.2-PN | ● | 0.05 | 0.1 | 0.2 | 0.08 | 0.08 | 45 | 4 | 1 | 11.76 | 0.35 | 0.37 | 0.39 | 0.41 | 0.44 | 13,820 |
| EPDBE2001-0.3-PN | ● | | | 0.3 | 0.08 | 0.08 | 45 | 4 | 1 | 11.64 | 0.46 | 0.48 | 0.50 | 0.52 | 0.57 | 14,150 |
| EPDBE2001-0.5-PN | ● | | | 0.5 | 0.08 | 0.08 | 45 | 4 | 1 | 11.40 | 0.67 | 0.70 | 0.73 | 0.76 | 0.81 | 15,320 |
| EPDBE2002-0.5-PN | ● | 0.1 | 0.2 | 0.5 | 0.15 | 0.17 | 50 | 4 | 1 | 11.42 | 0.70 | 0.72 | 0.75 | 0.77 | 0.82 | 9,910 |
| EPDBE2002-0.75-PN | ● | | | 0.75 | 0.15 | 0.17 | 50 | 4 | 1 | 11.13 | 0.96 | 0.99 | 1.02 | 1.05 | 1.11 | 9,910 |
| EPDBE2002-1-PN | ● | | | 1 | 0.15 | 0.17 | 50 | 4 | 1 | 10.86 | 1.22 | 1.26 | 1.30 | 1.33 | 1.39 | 9,910 |
| EPDBE2002-1.25-PN | ● | | | 1.25 | 0.15 | 0.17 | 50 | 4 | 1 | 10.60 | 1.48 | 1.52 | 1.57 | 1.61 | 1.72 | 10,710 |
| EPDBE2002-1.5-PN | ● | | | 1.5 | 0.15 | 0.17 | 50 | 4 | 1 | 10.35 | 1.74 | 1.79 | 1.84 | 1.88 | 2.05 | 10,710 |
| EPDBE2002-2-PN | ● | | | 2 | 0.15 | 0.17 | 50 | 4 | 1 | 9.88 | 2.25 | 2.32 | 2.37 | 2.45 | 2.71 | 11,790 |
| EPDBE2002-2.5-PN | ● | | | 2.5 | 0.15 | 0.17 | 50 | 4 | 1 | 9.46 | 2.77 | 2.84 | 2.91 | 3.05 | 3.37 | 12,860 |
| EPDBE2002-3-PN | ● | | | 3 | 0.15 | 0.17 | 50 | 4 | 1 | 9.07 | 3.28 | 3.37 | 3.48 | 3.65 | 4.04 | 13,820 |
| EPDBE2003-0.5-PN | ● | 0.15 | 0.3 | 0.5 | 0.25 | 0.27 | 50 | 4 | 2 | 11.47 | 0.78 | 0.82 | 0.86 | 0.90 | 0.98 | 9,680 |
| EPDBE2003-0.75-PN | ● | | | 0.75 | 0.25 | 0.27 | 50 | 4 | 2 | 11.17 | 1.05 | 1.10 | 1.15 | 1.20 | 1.29 | 9,680 |
| EPDBE2003-1-PN | ● | | | 1 | 0.25 | 0.27 | 50 | 4 | 2 | 10.89 | 1.31 | 1.38 | 1.43 | 1.49 | 1.59 | 9,680 |
| EPDBE2003-1.25-PN | ● | | | 1.25 | 0.25 | 0.27 | 50 | 4 | 2 | 10.62 | 1.58 | 1.65 | 1.72 | 1.78 | 1.89 | 10,380 |
| EPDBE2003-1.5-PN | ● | | | 1.5 | 0.25 | 0.27 | 50 | 4 | 2 | 10.36 | 1.84 | 1.92 | 1.99 | 2.06 | 2.18 | 10,380 |
| EPDBE2003-2-PN | ● | | | 2 | 0.25 | 0.27 | 50 | 4 | 2 | 9.88 | 2.36 | 2.46 | 2.55 | 2.62 | 2.76 | 10,380 |
| EPDBE2003-2.5-PN | ● | | | 2.5 | 0.25 | 0.27 | 50 | 4 | 2 | 9.45 | 2.89 | 3.00 | 3.10 | 3.18 | 3.36 | 10,710 |
| EPDBE2003-3-PN | ● | | | 3 | 0.25 | 0.27 | 50 | 4 | 2 | 9.05 | 3.41 | 3.53 | 3.64 | 3.73 | 4.02 | 10,710 |
| EPDBE2004-0.75-PN | ● | 0.2 | 0.4 | 0.75 | 0.3 | 0.37 | 50 | 4 | 2 | 11.21 | 1.04 | 1.09 | 1.14 | 1.19 | 1.28 | 6,610 |
| EPDBE2004-1-PN | ● | | | 1 | 0.3 | 0.37 | 50 | 4 | 2 | 10.91 | 1.31 | 1.37 | 1.43 | 1.48 | 1.58 | 6,610 |
| EPDBE2004-1.5-PN | ● | | | 1.5 | 0.3 | 0.37 | 50 | 4 | 2 | 10.37 | 1.84 | 1.92 | 1.99 | 2.06 | 2.17 | 6,720 |
| EPDBE2004-2-PN | ● | | | 2 | 0.3 | 0.37 | 50 | 4 | 2 | 9.88 | 2.36 | 2.46 | 2.54 | 2.62 | 2.75 | 6,960 |
| EPDBE2004-2.5-PN | ● | | | 2.5 | 0.3 | 0.37 | 50 | 4 | 2 | 9.43 | 2.89 | 3.00 | 3.09 | 3.18 | 3.34 | 7,200 |
| EPDBE2004-3-PN | ● | | | 3 | 0.3 | 0.37 | 50 | 4 | 2 | 9.03 | 3.41 | 3.53 | 3.63 | 3.73 | 4.01 | 7,670 |
| EPDBE2004-3.5-PN | ● | | | 3.5 | 0.3 | 0.37 | 50 | 4 | 2 | 8.65 | 3.93 | 4.06 | 4.18 | 4.27 | 4.67 | 8,260 |
| EPDBE2004-4-PN | ● | | | 4 | 0.3 | 0.37 | 50 | 4 | 2 | 8.30 | 4.45 | 4.59 | 4.71 | 4.83 | 5.33 | 8,260 |
| EPDBE2004-4.5-PN | ● | | | 4.5 | 0.3 | 0.37 | 50 | 4 | 2 | 7.99 | 4.97 | 5.12 | 5.25 | 5.43 | 6.00 | 8,730 |
| EPDBE2005-1-PN | ● | 0.25 | 0.5 | 1 | 0.35 | 0.47 | 50 | 4 | 2 | 10.94 | 1.31 | 1.37 | 1.42 | 1.47 | 1.57 | 6,610 |
| EPDBE2005-1.5-PN | ● | | | 1.5 | 0.35 | 0.47 | 50 | 4 | 2 | 10.39 | 1.83 | 1.91 | 1.98 | 2.05 | 2.17 | 6,610 |
| EPDBE2005-2-PN | ● | | | 2 | 0.35 | 0.47 | 50 | 4 | 2 | 9.88 | 2.36 | 2.45 | 2.54 | 2.61 | 2.75 | 6,610 |
| EPDBE2005-2.5-PN | ● | | | 2.5 | 0.35 | 0.47 | 50 | 4 | 2 | 9.42 | 2.88 | 2.99 | 3.09 | 3.17 | 3.33 | 6,610 |
| EPDBE2005-3-PN | ● | | | 3 | 0.35 | 0.47 | 50 | 4 | 2 | 9.00 | 3.41 | 3.53 | 3.63 | 3.72 | 3.99 | 6,610 |
| EPDBE2005-4-PN | ● | | | 4 | 0.35 | 0.47 | 50 | 4 | 2 | 8.27 | 4.45 | 4.59 | 4.71 | 4.82 | 5.32 | 6,610 |
| EPDBE2005-5-PN | ● | | | 5 | 0.35 | 0.47 | 50 | 4 | 2 | 7.64 | 5.48 | 5.65 | 5.78 | 6.01 | 6.65 | 6,720 |
| EPDBE2005-5.5-PN | ● | | | 5.5 | 0.35 | 0.47 | 50 | 4 | 2 | 7.36 | 6.00 | 6.17 | 6.31 | 6.61 | 7.31 | 6,960 |
| EPDBE2005-6-PN | ● | | | 6 | 0.35 | 0.47 | 50 | 4 | 2 | 7.10 | 6.52 | 6.70 | 6.88 | 7.21 | 7.97 | 6,960 |
| EPDBE2005-8-PN | ● | | | 8 | 0.35 | 0.47 | 50 | 4 | 2 | 6.23 | 8.58 | 8.79 | 9.16 | 9.60 | 10.63 | 8,260 |
| EPDBE2006-1-PN | ● | 0.3 | 0.6 | 1 | 0.4 | 0.57 | 50 | 4 | 4 | 10.98 | 1.44 | 1.54 | 1.63 | 1.71 | 1.88 | 5,700 |
| EPDBE2006-2-PN | ● | | | 2 | 0.4 | 0.57 | 50 | 4 | 4 | 9.88 | 2.52 | 2.66 | 2.79 | 2.91 | 3.13 | 5,080 |
| EPDBE2006-2.5-PN | ● | | | 2.5 | 0.4 | 0.57 | 50 | 4 | 4 | 9.41 | 3.05 | 3.22 | 3.36 | 3.49 | 3.73 | 5,190 |
| EPDBE2006-3-PN | ● | | | 3 | 0.4 | 0.57 | 50 | 4 | 4 | 8.98 | 3.58 | 3.77 | 3.93 | 4.07 | 4.32 | 5,190 |
| EPDBE2006-3.5-PN | ● | | | 3.5 | 0.4 | 0.57 | 50 | 4 | 4 | 8.58 | 4.12 | 4.32 | 4.49 | 4.64 | 4.91 | 5,430 |
| EPDBE2006-4-PN | ● | | | 4 | 0.4 | 0.57 | 50 | 4 | 4 | 8.22 | 4.64 | 4.86 | 5.04 | 5.20 | 5.48 | 5,430 |
| EPDBE2006-4.5-PN | ● | | | 4.5 | 0.4 | 0.57 | 50 | 4 | 4 | 7.89 | 5.17 | 5.40 | 5.59 | 5.76 | 6.06 | 5,430 |
| EPDBE2006-5-PN | ● | | | 5 | 0.4 | 0.57 | 50 | 4 | 4 | 7.59 | 5.70 | 5.94 | 6.14 | 6.32 | 6.63 | 5,430 |
| EPDBE2006-5.5-PN | ● | | | 5.5 | 0.4 | 0.57 | 50 | 4 | 4 | 7.31 | 6.22 | 6.48 | 6.69 | 6.87 | 7.29 | 5,430 |
| EPDBE2006-6-PN | ● | | | 6 | 0.4 | 0.57 | 50 | 4 | 4 | 7.04 | 6.75 | 7.02 | 7.23 | 7.42 | 7.96 | 5,430 |
| EPDBE2006-7-PN | ● | | | 7 | 0.4 | 0.57 | 50 | 4 | 4 | 6.57 | 7.79 | 8.08 | 8.32 | 8.52 | 9.28 | 6,140 |
| EPDBE2006-8-PN | ● | | | 8 | 0.4 | 0.57 | 50 | 4 | 4 | 6.16 | 8.84 | 9.15 | 9.40 | 9.61 | 10.61 | 7,200 |
| EPDBE2006-9-PN | ● | | | 9 | 0.4 | 0.57 | 50 | 4 | 4 | 5.79 | 9.88 | 10.21 | 10.47 | 10.79 | 11.94 | 7,670 |
| EPDBE2006-10-PN | ● | | | 10 | 0.4 | 0.57 | 50 | 4 | 4 | 5.47 | 10.92 | 11.26 | 11.54 | 11.99 | 13.27 | 7,310 |
| EPDBE2006-12-PN | ● | | | 12 | 0.4 | 0.57 | 50 | 4 | 4 | 4.92 | 12.99 | 13.37 | 13.72 | 14.38 | 15.92 | 8,260 |

## Epoch Deep Ball Evolution
# エポックディープボールエボリューション PN Coating

首下詳細形状




【注意】
エポックディープボールEPDBとは有効首下長が異なります。再度ご確認お願いいたします。

【Note】
The effective under-neck length is different from Epoch Deep Ball EPDB. Please recheck the interference region.

## EPDBE2○○○-○○.○○-PN

| 商品コード Item code | 在庫 Stock PN | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 首下長 Under Neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度 Interference angle θκ | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDBE2007-2-PN | ● | 0.35 | 0.7 | 2 | 0.45 | 0.67 | 50 | 4 | 4 | 9.88 | 2.52 | 2.66 | 2.79 | 2.90 | 3.12 | 5,080 |
| EPDBE2007-4-PN | ● | | | 4 | 0.45 | 0.67 | 50 | 4 | 4 | 8.18 | 4.64 | 4.86 | 5.04 | 5.20 | 5.48 | 5,430 |
| EPDBE2007-6-PN | ● | | | 6 | 0.45 | 0.67 | 50 | 4 | 4 | 6.98 | 6.74 | 7.01 | 7.23 | 7.42 | 7.94 | 5,430 |
| EPDBE2007-8-PN | ● | | | 8 | 0.45 | 0.67 | 50 | 4 | 4 | 6.09 | 8.83 | 9.14 | 9.39 | 9.61 | 10.60 | 5,430 |
| EPDBE2008-2-PN | ● | 0.4 | 0.8 | 2 | 0.5 | 0.77 | 50 | 4 | 4 | 9.87 | 2.51 | 2.65 | 2.78 | 2.89 | 3.11 | 5,080 |
| EPDBE2008-4-PN | ● | | | 4 | 0.5 | 0.77 | 50 | 4 | 4 | 8.14 | 4.64 | 4.85 | 5.03 | 5.19 | 5.47 | 5,430 |
| EPDBE2008-5-PN | ● | | | 5 | 0.5 | 0.77 | 50 | 4 | 4 | 7.48 | 5.69 | 5.93 | 6.13 | 6.31 | 6.61 | 5,430 |
| EPDBE2008-6-PN | ● | | | 6 | 0.5 | 0.77 | 50 | 4 | 4 | 6.92 | 6.74 | 7.01 | 7.23 | 7.41 | 7.92 | 5,430 |
| EPDBE2008-8-PN | ● | | | 8 | 0.5 | 0.77 | 50 | 4 | 4 | 6.01 | 8.83 | 9.14 | 9.39 | 9.60 | 10.58 | 5,430 |
| EPDBE2008-10-PN | ● | | | 10 | 0.5 | 0.77 | 50 | 4 | 4 | 5.32 | 10.91 | 11.26 | 11.53 | 11.97 | 13.23 | 7,200 |
| EPDBE2009-2-PN | ● | 0.45 | 0.9 | 2 | 0.6 | 0.87 | 50 | 4 | 4 | 9.87 | 2.51 | 2.65 | 2.77 | 2.89 | 3.10 | 5,080 |
| EPDBE2009-4-PN | ● | | | 4 | 0.6 | 0.87 | 50 | 4 | 4 | 8.09 | 4.64 | 4.85 | 5.03 | 5.18 | 5.46 | 5,430 |
| EPDBE2009-6-PN | ● | | | 6 | 0.6 | 0.87 | 50 | 4 | 4 | 6.85 | 6.74 | 7.00 | 7.22 | 7.41 | 7.91 | 5,430 |
| EPDBE2009-8-PN | ● | | | 8 | 0.6 | 0.87 | 50 | 4 | 4 | 5.94 | 8.83 | 9.14 | 9.38 | 9.60 | 10.56 | 5,430 |
| EPDBE2010-2-PN | ● | 0.5 | 1 | 2 | 0.8 | 0.96 | 50 | 4 | 4 | 9.84 | 2.54 | 2.67 | 2.79 | 2.90 | 3.11 | 4,250 |
| EPDBE2010-3-PN | ● | | | 3 | 0.8 | 0.96 | 50 | 4 | 4 | 8.84 | 3.61 | 3.78 | 3.93 | 4.06 | 4.30 | 4,250 |
| EPDBE2010-4-PN | ● | | | 4 | 0.8 | 0.96 | 50 | 4 | 4 | 8.02 | 4.66 | 4.87 | 5.04 | 5.20 | 5.47 | 4,850 |
| EPDBE2010-5-PN | ● | | | 5 | 0.8 | 0.96 | 50 | 4 | 4 | 7.34 | 5.72 | 5.95 | 6.14 | 6.31 | 6.61 | 4,850 |
| EPDBE2010-6-PN | ● | | | 6 | 0.8 | 0.96 | 50 | 4 | 4 | 6.77 | 6.76 | 7.02 | 7.23 | 7.42 | 7.92 | 5,190 |
| EPDBE2010-7-PN | ● | | | 7 | 0.8 | 0.96 | 50 | 4 | 4 | 6.28 | 7.81 | 8.09 | 8.32 | 8.52 | 9.25 | 5,190 |
| EPDBE2010-8-PN | ● | | | 8 | 0.8 | 0.96 | 50 | 4 | 4 | 5.85 | 8.85 | 9.15 | 9.40 | 9.61 | 10.58 | 5,190 |
| EPDBE2010-9-PN | ● | | | 9 | 0.8 | 0.96 | 50 | 4 | 4 | 5.48 | 9.89 | 10.21 | 10.47 | 10.78 | 11.91 | 5,190 |
| EPDBE2010-10-PN | ● | | | 10 | 0.8 | 0.96 | 50 | 4 | 4 | 5.15 | 10.93 | 11.27 | 11.54 | 11.98 | 13.23 | 5,190 |
| EPDBE2010-12-PN | ● | | | 12 | 0.8 | 0.96 | 55 | 4 | 4 | 4.60 | 13.00 | 13.37 | 13.72 | 14.37 | 15.89 | 5,190 |
| EPDBE2010-13-PN | ● | | | 13 | 0.8 | 0.96 | 55 | 4 | 4 | 4.37 | 14.04 | 14.42 | 14.86 | 15.57 | 17.21 | 6,140 |
| EPDBE2010-14-PN | ● | | | 14 | 0.8 | 0.96 | 55 | 4 | 4 | 4.16 | 15.07 | 15.47 | 16.00 | 16.76 | 18.54 | 6,140 |
| EPDBE2010-16-PN | ● | | | 16 | 0.8 | 0.96 | 55 | 4 | 4 | 3.79 | 17.13 | 17.56 | 18.28 | 19.16 | 21.20 | 7,200 |
| EPDBE2010-18-PN | ● | | | 18 | 0.8 | 0.96 | 60 | 4 | 4 | 3.49 | 19.19 | 19.66 | 20.56 | 21.55 | 23.85 | 7,200 |
| EPDBE2010-20-PN | ● | | | 20 | 0.8 | 0.96 | 60 | 4 | 4 | 3.23 | 21.25 | 21.84 | 22.84 | 23.94 | 26.51 | 8,730 |
| EPDBE2011-2-PN | ● | 0.55 | 1.1 | 2 | 1 | 1.05 | 50 | 4 | 4 | 9.81 | 2.58 | 2.70 | 2.81 | 2.92 | 3.12 | 5,700 |
| EPDBE2011-4-PN | ● | | | 4 | 1 | 1.05 | 50 | 4 | 4 | 7.95 | 4.69 | 4.89 | 5.06 | 5.21 | 5.48 | 6,490 |
| EPDBE2011-6-PN | ● | | | 6 | 1 | 1.05 | 50 | 4 | 4 | 6.68 | 6.79 | 7.04 | 7.25 | 7.43 | 7.94 | 7,080 |
| EPDBE2011-8-PN | ● | | | 8 | 1 | 1.05 | 50 | 4 | 4 | 5.76 | 8.87 | 9.17 | 9.41 | 9.61 | 10.59 | 7,080 |
| EPDBE2011-10-PN | ● | | | 10 | 1 | 1.05 | 50 | 4 | 4 | 5.06 | 10.95 | 11.28 | 11.55 | 12.00 | 13.25 | 7,080 |
| EPDBE2012-4-PN | ● | 0.6 | 1.2 | 4 | 1.1 | 1.15 | 50 | 4 | 4 | 7.89 | 4.69 | 4.88 | 5.05 | 5.20 | 5.47 | 6,490 |
| EPDBE2012-6-PN | ● | | | 6 | 1.1 | 1.15 | 50 | 4 | 4 | 6.60 | 6.79 | 7.03 | 7.24 | 7.42 | 7.92 | 7,080 |
| EPDBE2012-8-PN | ● | | | 8 | 1.1 | 1.15 | 50 | 4 | 4 | 5.67 | 8.87 | 9.16 | 9.40 | 9.61 | 10.58 | 7,080 |
| EPDBE2012-10-PN | ● | | | 10 | 1.1 | 1.15 | 50 | 4 | 4 | 4.97 | 10.95 | 11.28 | 11.54 | 11.99 | 13.23 | 7,080 |
| EPDBE2012-12-PN | ● | | | 12 | 1.1 | 1.15 | 55 | 4 | 4 | 4.43 | 13.02 | 13.38 | 13.73 | 14.38 | 15.89 | 7,080 |
| EPDBE2014-8-PN | ● | 0.7 | 1.4 | 8 | 1.3 | 1.34 | 50 | 4 | 4 | 5.48 | 8.89 | 9.18 | 9.41 | 9.61 | 10.58 | 6,140 |
| EPDBE2014-12-PN | ● | | | 12 | 1.3 | 1.34 | 55 | 4 | 4 | 4.24 | 13.04 | 13.39 | 13.74 | 14.39 | 15.89 | 6,140 |
| EPDBE2014-16-PN | ● | | | 16 | 1.3 | 1.34 | 55 | 4 | 4 | 3.46 | 17.16 | 17.57 | 18.31 | 19.17 | 21.20 | 6,140 |
| EPDBE2015-4-PN | ● | 0.75 | 1.5 | 4 | 1.35 | 1.44 | 50 | 4 | 4 | 7.68 | 4.71 | 4.89 | 5.06 | 5.20 | 5.46 | 4,960 |
| EPDBE2015-6-PN | ● | | | 6 | 1.35 | 1.44 | 50 | 4 | 4 | 6.33 | 6.81 | 7.04 | 7.25 | 7.42 | 7.91 | 4,960 |
| EPDBE2015-8-PN | ● | | | 8 | 1.35 | 1.44 | 50 | 4 | 4 | 5.39 | 8.89 | 9.17 | 9.41 | 9.61 | 10.56 | 5,190 |
| EPDBE2015-10-PN | ● | | | 10 | 1.35 | 1.44 | 50 | 4 | 4 | 4.68 | 10.96 | 11.29 | 11.55 | 11.98 | 13.22 | 5,660 |
| EPDBE2015-12-PN | ● | | | 12 | 1.35 | 1.44 | 55 | 4 | 4 | 4.14 | 13.03 | 13.39 | 13.74 | 14.38 | 15.87 | 6,140 |
| EPDBE2015-14-PN | ● | | | 14 | 1.35 | 1.44 | 55 | 4 | 4 | 3.72 | 15.10 | 15.48 | 16.02 | 16.77 | 18.52 | 6,140 |
| EPDBE2015-16-PN | ● | | | 16 | 1.35 | 1.44 | 55 | 4 | 4 | 3.77 | 17.16 | 17.57 | 18.30 | 19.16 | 21.18 | 6,140 |
| EPDBE2015-18-PN | ● | | | 18 | 1.35 | 1.44 | 60 | 4 | 4 | 3.08 | 19.22 | 19.69 | 20.58 | 21.56 | 23.83 | 6,140 |
| EPDBE2015-20-PN | ● | | | 20 | 1.35 | 1.44 | 60 | 4 | 4 | 2.84 | 21.27 | 21.87 | 22.86 | 23.95 | 干渉なし | 6,140 |
| EPDBE2016-8-PN | ● | 0.8 | 1.6 | 8 | 1.4 | 1.54 | 50 | 4 | 4 | 5.28 | 8.89 | 9.17 | 9.40 | 9.60 | 10.55 | 7,080 |
| EPDBE2016-12-PN | ● | | | 12 | 1.4 | 1.54 | 55 | 4 | 4 | 4.05 | 13.03 | 13.39 | 13.73 | 14.37 | 15.85 | 7,080 |
| EPDBE2016-16-PN | ● | | | 16 | 1.4 | 1.54 | 55 | 4 | 4 | 3.28 | 17.16 | 17.57 | 18.29 | 19.15 | 21.16 | 7,080 |
| EPDBE2016-20-PN | ● | | | 20 | 1.4 | 1.54 | 60 | 4 | 4 | 2.75 | 21.27 | 21.87 | 22.86 | 23.94 | 干渉なし | 7,080 |

●：標準在庫品です。●：Stocked items.　干渉なし：No interference

# EPDBE2○○○-○○.○○-PN

| 商品コード Item code | 在庫 Stock PN | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 首下長 Under Neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度 Interference angle θK | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDBE2018-8-PN | ● | 0.9 | 1.8 | 8 | 1.6 | 1.73 | 50 | 4 | 4 | 5.06 | 8.91 | 9.18 | 9.41 | 9.61 | 10.54 | 6,140 |
| EPDBE2018-12-PN | ● | | | 12 | 1.6 | 1.73 | 55 | 4 | 4 | 3.83 | 13.05 | 13.40 | 13.74 | 14.38 | 15.85 | 6,140 |
| EPDBE2018-16-PN | ● | | | 16 | 1.6 | 1.73 | 55 | 4 | 4 | 3.09 | 17.17 | 17.58 | 18.31 | 19.16 | 21.16 | 6,140 |
| EPDBE2018-20-PN | ● | | | 20 | 1.6 | 1.73 | 60 | 4 | 4 | 2.58 | 21.28 | 21.88 | 22.87 | 23.95 | 干渉なし | 6,140 |
| EPDBE2020-3-PN | ● | 1 | 2 | 3 | 1.7 | 1.92 | 50 | 4 | 4 | 8.26 | 3.71 | 3.84 | 3.96 | 4.07 | 4.29 | 4,250 |
| EPDBE2020-4-PN | ● | | | 4 | 1.7 | 1.92 | 50 | 4 | 4 | 7.23 | 4.75 | 4.92 | 5.07 | 5.21 | 5.45 | 4,250 |
| EPDBE2020-6-PN | ● | | | 6 | 1.7 | 1.92 | 50 | 4 | 4 | 5.78 | 6.84 | 7.07 | 7.26 | 7.43 | 7.89 | 4,850 |
| EPDBE2020-8-PN | ● | | | 8 | 1.7 | 1.92 | 50 | 4 | 4 | 4.81 | 8.92 | 9.19 | 9.42 | 9.61 | 10.54 | 5,190 |
| EPDBE2020-10-PN | ● | | | 10 | 1.7 | 1.92 | 50 | 4 | 4 | 4.12 | 11.00 | 11.30 | 11.56 | 11.99 | 13.20 | 5,190 |
| EPDBE2020-12-PN | ● | | | 12 | 1.7 | 1.92 | 55 | 4 | 4 | 3.61 | 13.06 | 13.41 | 13.76 | 14.39 | 15.85 | 5,190 |
| EPDBE2020-13-PN | ● | | | 13 | 1.7 | 1.92 | 55 | 4 | 4 | 3.39 | 14.10 | 14.45 | 14.90 | 15.58 | 17.18 | 5,190 |
| EPDBE2020-14-PN | ● | | | 14 | 1.7 | 1.92 | 55 | 4 | 4 | 3.20 | 15.13 | 15.50 | 16.04 | 16.78 | 18.51 | 5,190 |
| EPDBE2020-16-PN | ● | | | 16 | 1.7 | 1.92 | 55 | 4 | 4 | 2.88 | 17.19 | 17.59 | 18.32 | 19.17 | 干渉なし | 5,190 |
| EPDBE2020-18-PN | ● | | | 18 | 1.7 | 1.92 | 60 | 4 | 4 | 2.62 | 19.24 | 19.72 | 20.60 | 21.57 | 干渉なし | 5,190 |
| EPDBE2020-20-PN | ● | | | 20 | 1.7 | 1.92 | 60 | 4 | 4 | 2.40 | 21.30 | 21.90 | 22.88 | 23.96 | 干渉なし | 5,190 |
| EPDBE2020-22-PN | ● | | | 22 | 1.7 | 1.92 | 60 | 4 | 4 | 2.22 | 23.35 | 24.08 | 25.16 | 26.35 | 干渉なし | 7,200 |
| EPDBE2020-25-PN | ● | | | 25 | 1.7 | 1.92 | 65 | 4 | 4 | 1.99 | 26.42 | 27.35 | 28.58 | 干渉なし | 干渉なし | 7,310 |
| EPDBE2020-30-PN | ● | | | 30 | 1.7 | 1.92 | 70 | 4 | 4 | 1.70 | 31.53 | 32.80 | 34.29 | 干渉なし | 干渉なし | 8,370 |
| EPDBE2020-35-PN | ● | | | 35 | 1.7 | 1.92 | 75 | 4 | 4 | 1.48 | 36.65 | 38.24 | 干渉なし | 干渉なし | 干渉なし | 11,370 |
| EPDBE2020-40-PN | ● | | | 40 | 1.7 | 1.92 | 80 | 4 | 4 | 1.31 | 41.86 | 43.69 | 干渉なし | 干渉なし | 干渉なし | 11,370 |
| EPDBE2025-6-PN | ● | 1.25 | 2.5 | 6 | 2 | 2.4 | 50 | 4 | 4 | 5.04 | 6.88 | 7.09 | 7.27 | 7.43 | 7.87 | 5,660 |
| EPDBE2025-10-PN | ● | | | 10 | 2 | 2.4 | 50 | 4 | 4 | 3.43 | 11.03 | 11.32 | 11.56 | 12.00 | 13.18 | 5,970 |
| EPDBE2025-15-PN | ● | | | 15 | 2 | 2.4 | 55 | 4 | 4 | 2.46 | 16.18 | 16.56 | 17.20 | 17.98 | 干渉なし | 7,080 |
| EPDBE2025-20-PN | ● | | | 20 | 2 | 2.4 | 60 | 4 | 4 | 1.91 | 21.32 | 21.93 | 22.90 | 干渉なし | 干渉なし | 8,260 |
| EPDBE2025-25-PN | ● | | | 25 | 2 | 2.4 | 65 | 4 | 4 | 1.57 | 26.44 | 27.38 | 28.60 | 干渉なし | 干渉なし | 8,850 |
| EPDBE2025-30-PN | ● | | | 30 | 2 | 2.4 | 70 | 4 | 4 | 1.33 | 31.55 | 32.82 | 干渉なし | 干渉なし | 干渉なし | 8,850 |
| EPDBE2030-8-PN | ● | 1.5 | 3 | 8 | 2.5 | 2.88 | 55 | 6 | 4 | 6.19 | 8.99 | 9.23 | 9.44 | 9.62 | 10.51 | 5,310 |
| EPDBE2030-10-PN | ● | | | 10 | 2.5 | 2.88 | 55 | 6 | 4 | 5.41 | 11.06 | 11.34 | 11.57 | 12.01 | 13.16 | 6,020 |
| EPDBE2030-13-PN | ● | | | 13 | 2.5 | 2.88 | 60 | 6 | 4 | 4.56 | 14.15 | 14.48 | 14.94 | 15.60 | 17.15 | 7,080 |
| EPDBE2030-16-PN | ● | | | 16 | 2.5 | 2.88 | 60 | 6 | 4 | 3.93 | 17.24 | 17.61 | 18.36 | 19.19 | 21.13 | 7,080 |
| EPDBE2030-20-PN | ● | | | 20 | 2.5 | 2.88 | 65 | 6 | 4 | 3.33 | 21.34 | 21.96 | 22.92 | 23.97 | 26.44 | 6,840 |
| EPDBE2030-25-PN | ● | | | 25 | 2.5 | 2.88 | 70 | 6 | 4 | 2.79 | 26.46 | 27.41 | 28.62 | 29.96 | 干渉なし | 6,840 |
| EPDBE2030-30-PN | ● | | | 30 | 2.5 | 2.88 | 75 | 6 | 4 | 2.40 | 31.57 | 32.85 | 34.32 | 35.94 | 干渉なし | 7,790 |
| EPDBE2030-35-PN | ● | | | 35 | 2.5 | 2.88 | 80 | 6 | 4 | 2.11 | 36.72 | 38.30 | 40.03 | 41.92 | 干渉なし | 9,910 |
| EPDBE2035-15-PN | ● | 1.75 | 3.5 | 15 | 2.75 | 3.35 | 60 | 6 | 4 | 3.68 | 16.25 | 16.60 | 17.26 | 18.03 | 19.81 | 7,790 |
| EPDBE2035-25-PN | ● | | | 25 | 2.75 | 3.35 | 70 | 6 | 4 | 2.43 | 26.49 | 27.46 | 28.67 | 29.99 | 干渉なし | 8,260 |
| EPDBE2035-35-PN | ● | | | 35 | 2.75 | 3.35 | 80 | 6 | 4 | 1.82 | 36.79 | 38.36 | 40.07 | 干渉なし | 干渉なし | 10,610 |
| EPDBE2035-45-PN | ● | | | 45 | 2.75 | 3.35 | 90 | 6 | 4 | 1.45 | 47.22 | 49.25 | 干渉なし | 干渉なし | 干渉なし | 12,970 |
| EPDBE2040-10-PN | ● | 2 | 4 | 10 | 3 | 3.85 | 55 | 6 | 4 | 4.38 | 11.10 | 11.36 | 11.58 | 12.00 | 13.10 | 5,430 |
| EPDBE2040-13-PN | ● | | | 13 | 3 | 3.85 | 60 | 6 | 4 | 3.57 | 14.19 | 14.50 | 14.95 | 15.59 | 17.08 | 7,080 |
| EPDBE2040-16-PN | ● | | | 16 | 3 | 3.85 | 60 | 6 | 4 | 3.01 | 17.27 | 17.63 | 18.37 | 19.18 | 干渉なし | 7,080 |
| EPDBE2040-20-PN | ● | | | 20 | 3 | 3.85 | 65 | 6 | 4 | 2.49 | 21.37 | 21.99 | 22.93 | 23.96 | 干渉なし | 7,080 |
| EPDBE2040-25-PN | ● | | | 25 | 3 | 3.85 | 70 | 6 | 4 | 2.05 | 26.49 | 27.44 | 28.63 | 29.95 | 干渉なし | 7,080 |
| EPDBE2040-30-PN | ● | | | 30 | 3 | 3.85 | 75 | 6 | 4 | 1.74 | 31.59 | 32.89 | 34.34 | 干渉なし | 干渉なし | 7,080 |
| EPDBE2040-35-PN | ● | | | 35 | 3 | 3.85 | 80 | 6 | 4 | 1.51 | 36.78 | 38.33 | 40.04 | 干渉なし | 干渉なし | 8,140 |
| EPDBE2040-40-PN | ● | | | 40 | 3 | 3.85 | 80 | 6 | 4 | 1.34 | 41.99 | 43.78 | 干渉なし | 干渉なし | 干渉なし | 9,200 |
| EPDBE2040-45-PN | ● | | | 45 | 3 | 3.85 | 90 | 6 | 4 | 1.20 | 47.20 | 49.23 | 干渉なし | 干渉なし | 干渉なし | 11,790 |
| EPDBE2040-50-PN | ● | | | 50 | 3 | 3.85 | 100 | 6 | 4 | 1.08 | 52.42 | 54.68 | 干渉なし | 干渉なし | 干渉なし | 12,650 |
| EPDBE2050-20-PN | ● | 2.5 | 5 | 20 | 3.5 | 4.85 | 65 | 6 | 4 | 1.42 | 21.36 | 21.95 | 干渉なし | 干渉なし | 干渉なし | 12,350 |
| EPDBE2050-25-PN | ● | | | 25 | 3.5 | 4.85 | 70 | 6 | 4 | 1.14 | 26.48 | 27.39 | 干渉なし | 干渉なし | 干渉なし | 12,350 |
| EPDBE2050-30-PN | ● | | | 30 | 3.5 | 4.85 | 75 | 6 | 4 | 0.95 | 31.58 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 13,250 |
| EPDBE2050-40-PN | ● | | | 40 | 3.5 | 4.85 | 80 | 6 | 4 | 0.72 | 41.97 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 16,720 |
| EPDBE2060-12-PN | ● | 3 | 6 | 12 | 6 | 5.85 | 60 | 6 | - | 0 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 9,270 |
| EPDBE2060-20-PN | ● | | | 20 | 6 | 5.85 | 65 | 6 | - | 0 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 9,270 |
| EPDBE2060-30-PN | ● | | | 30 | 6 | 5.85 | 75 | 6 | - | 0 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 9,510 |
| EPDBE2060-50-PN | ● | | | 50 | 6 | 5.85 | 100 | 6 | - | 0 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 11,350 |

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ○ | | ◎ | ◎ | ◎ | ◎ |

## 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPDBE-PN | × (N/A) | 1 ～ 6 |

【注意】首下長／外径が10DCを超える工具の再研磨可否については、弊社営業にお問い合わせください。
【Note】Contact our sales office regarding whether or not regrinding is possible for tools where under neck length/tool diameter more than 10DC

## 標準切削条件表
Recommended cutting conditions

高能率切削条件 High efficiency cuttiing conditions
高精度切削条件 High accuracy cuttiing conditions

## EPDBE-ATH EPDBE-PN

高精度切削条件はA81ページを参照してください。
Please refer to P.A81 about high accuracy cutting conditions

| 推奨領域 Recommended range | | | | PNシリーズ PN series / ATHシリーズ ATH series | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 被削材 Work material | | | | 1 銅 Copper | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180~250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25~35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35~45HRC) | | 5 焼入れ鋼 Hardened steels (45~55HRC) | | 6 焼入れ鋼 Hardened steels (55~65HRC) | |
| 切込み比率 Ratio to standard depth of cut | | | | 120% | | 100% | | 90% | | 80% | | 65% | | 60% | |
| ボール半径RE Ball radius (mm) | 外径DC Tool dia. (mm) | 首下長LU Under neck length (mm) | ap (mm) | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 0.05 | 0.1 | 0.2 | 0.008 | 50,000 | 300 | 50,000 | 250 | 50,000 | 250 | 50,000 | 225 | 50,000 | 200 | 50,000 | 188 |
| | | 0.3 | 0.006 | 50,000 | 300 | 50,000 | 250 | 50,000 | 250 | 50,000 | 225 | 50,000 | 200 | 50,000 | 188 |
| | | 0.5 | 0.004 | 50,000 | 300 | 50,000 | 250 | 50,000 | 250 | 50,000 | 225 | 50,000 | 200 | 50,000 | 188 |
| 0.1 | 0.2 | 0.5 | 0.02 | 50,000 | 420 | 50,000 | 350 | 50,000 | 350 | 50,000 | 325 | 45,500 | 273 | 42,000 | 210 |
| | | 0.75 | 0.017 | 50,000 | 420 | 50,000 | 350 | 50,000 | 350 | 50,000 | 325 | 45,500 | 273 | 42,000 | 210 |
| | | 1 | 0.014 | 50,000 | 420 | 50,000 | 350 | 50,000 | 350 | 50,000 | 325 | 45,500 | 273 | 42,000 | 210 |
| | | 1.25 | 0.011 | 50,000 | 378 | 50,000 | 315 | 48,600 | 306 | 45,900 | 269 | 40,500 | 219 | 37,800 | 170 |
| | | 1.5 | 0.008 | 50,000 | 378 | 50,000 | 315 | 48,600 | 306 | 45,900 | 269 | 40,500 | 219 | 37,800 | 170 |
| | | 2 | 0.008 | 50,000 | 378 | 50,000 | 315 | 48,600 | 306 | 45,900 | 269 | 40,500 | 219 | 37,800 | 170 |
| | | 2.5 | 0.006 | 48,000 | 323 | 48,000 | 269 | 43,200 | 242 | 40,800 | 212 | 36,000 | 173 | 33,600 | 134 |
| | | 3 | 0.004 | 48,000 | 323 | 48,000 | 269 | 43,200 | 242 | 40,800 | 212 | 36,000 | 173 | 33,600 | 134 |
| 0.15 | 0.3 | 0.5 | 0.027 | 50,000 | 600 | 50,000 | 500 | 50,000 | 500 | 50,000 | 450 | 45,000 | 383 | 42,000 | 336 |
| | | 0.75 | 0.024 | 50,000 | 600 | 50,000 | 500 | 50,000 | 500 | 50,000 | 450 | 45,000 | 383 | 42,000 | 336 |
| | | 1 | 0.021 | 50,000 | 600 | 50,000 | 500 | 50,000 | 500 | 50,000 | 450 | 45,000 | 383 | 42,000 | 336 |
| | | 1.25 | 0.019 | 50,000 | 600 | 50,000 | 500 | 50,000 | 500 | 50,000 | 450 | 45,000 | 383 | 42,000 | 336 |
| | | 1.5 | 0.016 | 50,000 | 600 | 50,000 | 500 | 50,000 | 500 | 50,000 | 450 | 45,000 | 383 | 42,000 | 336 |
| | | 2 | 0.012 | 50,000 | 540 | 50,000 | 450 | 48,600 | 437 | 45,900 | 372 | 40,500 | 310 | 37,800 | 272 |
| | | 2.5 | 0.01 | 50,000 | 540 | 50,000 | 450 | 48,600 | 437 | 45,900 | 372 | 40,500 | 310 | 37,800 | 272 |
| | | 3 | 0.008 | 50,000 | 540 | 50,000 | 450 | 48,600 | 437 | 45,900 | 372 | 40,500 | 310 | 37,800 | 272 |
| 0.2 | 0.4 | 0.75 | 0.043 | 50,000 | 967 | 50,000 | 840 | 50,000 | 839 | 50,000 | 770 | 46,800 | 655 | 43,680 | 612 |
| | | 1 | 0.04 | 50,000 | 967 | 50,000 | 840 | 50,000 | 839 | 50,000 | 770 | 46,800 | 655 | 43,680 | 612 |
| | | 1.5 | 0.034 | 50,000 | 829 | 50,000 | 720 | 50,000 | 719 | 50,000 | 660 | 46,800 | 468 | 43,680 | 437 |
| | | 2 | 0.028 | 50,000 | 691 | 50,000 | 600 | 50,000 | 600 | 50,000 | 550 | 46,800 | 468 | 43,680 | 437 |
| | | 2.5 | 0.022 | 50,000 | 560 | 43,200 | 467 | 38,880 | 420 | 36,720 | 364 | 32,400 | 292 | 36,288 | 272 |
| | | 3 | 0.016 | 50,000 | 560 | 43,200 | 467 | 38,880 | 420 | 36,720 | 364 | 32,400 | 292 | 36,288 | 272 |
| | | 3.5 | 0.012 | 50,000 | 560 | 43,200 | 467 | 38,880 | 420 | 36,720 | 364 | 32,400 | 292 | 36,288 | 272 |
| | | 4 | 0.01 | 50,000 | 560 | 43,200 | 467 | 38,880 | 420 | 36,720 | 364 | 32,400 | 292 | 36,288 | 272 |
| | | 4.5 | 0.008 | 46,080 | 470 | 38,400 | 392 | 34,560 | 353 | 32,640 | 305 | 28,800 | 245 | 26,880 | 228 |
| 0.25 | 0.5 | 1 | 0.045 | 50,000 | 1,500 | 50,000 | 1,500 | 46,800 | 1,404 | 44,200 | 1,193 | 39,000 | 1,053 | 36,400 | 743 |
| | | 1.5 | 0.04 | 50,000 | 1,500 | 50,000 | 1,500 | 46,800 | 1,404 | 44,200 | 1,193 | 39,000 | 1,053 | 36,400 | 681 |
| | | 2 | 0.035 | 50,000 | 1,200 | 50,000 | 1,200 | 46,800 | 1,123 | 44,200 | 955 | 39,000 | 842 | 36,400 | 681 |
| | | 2.5 | 0.033 | 50,000 | 1,081 | 50,000 | 1,000 | 42,120 | 758 | 39,780 | 645 | 35,100 | 568 | 32,760 | 502 |
| | | 3 | 0.03 | 50,000 | 900 | 46,800 | 842 | 42,120 | 758 | 39,780 | 645 | 35,100 | 568 | 25,200 | 386 |
| | | 4 | 0.02 | 43,200 | 778 | 36,000 | 648 | 32,400 | 583 | 30,600 | 496 | 32,400 | 524 | 25,200 | 386 |
| | | 5 | 0.018 | 43,200 | 778 | 36,000 | 648 | 32,400 | 583 | 30,600 | 496 | 32,400 | 524 | 25,200 | 386 |
| | | 5.5 | 0.015 | 38,400 | 653 | 32,000 | 544 | 28,800 | 490 | 27,200 | 416 | 24,000 | 367 | 22,400 | 324 |
| | | 6 | 0.013 | 38,400 | 653 | 32,000 | 544 | 28,800 | 490 | 27,200 | 416 | 24,000 | 367 | 22,400 | 324 |
| | | 8 | 0.008 | 38,400 | 653 | 32,000 | 544 | 28,800 | 490 | 27,200 | 416 | 24,000 | 367 | 22,400 | 324 |
| 0.3 | 0.6 | 1 | 0.075 | 50,000 | 2,250 | 50,000 | 2,250 | 50,000 | 2,250 | 50,000 | 1,950 | 48,000 | 1,728 | 44,800 | 1,344 |
| | | 2 | 0.063 | 50,000 | 2,250 | 50,000 | 2,250 | 50,000 | 2,250 | 50,000 | 1,950 | 48,000 | 1,728 | 44,800 | 1,344 |
| | | 2.5 | 0.046 | 50,000 | 1,800 | 50,000 | 1,800 | 50,000 | 1,800 | 50,000 | 1,560 | 48,000 | 1,382 | 44,800 | 986 |
| | | 3 | 0.041 | 50,000 | 1,800 | 50,000 | 1,800 | 50,000 | 1,800 | 50,000 | 1,560 | 48,000 | 1,382 | 44,800 | 986 |
| | | 3.5 | 0.035 | 50,000 | 1,710 | 50,000 | 1,710 | 50,000 | 1,709 | 48,960 | 1,452 | 43,200 | 1,183 | 40,320 | 843 |
| | | 4 | 0.026 | 50,000 | 1,710 | 50,000 | 1,710 | 50,000 | 1,709 | 48,960 | 1,452 | 43,200 | 1,183 | 40,320 | 766 |
| | | 4.5 | 0.022 | 50,000 | 1,350 | 50,000 | 1,350 | 48,600 | 1,313 | 45,900 | 1,074 | 40,500 | 875 | 37,800 | 681 |
| | | 5 | 0.02 | 50,000 | 1,350 | 46,800 | 1,264 | 42,120 | 1,138 | 39,780 | 931 | 35,100 | 758 | 32,760 | 590 |
| | | 5.5 | 0.017 | 50,000 | 1,350 | 46,800 | 1,264 | 42,120 | 1,138 | 39,780 | 931 | 35,100 | 758 | 32,760 | 590 |
| | | 6 | 0.015 | 50,000 | 1,350 | 46,800 | 1,264 | 42,120 | 1,138 | 39,780 | 931 | 35,100 | 758 | 32,760 | 590 |
| | | 7 | 0.015 | 38,400 | 979 | 32,000 | 816 | 28,800 | 881 | 27,200 | 601 | 24,000 | 490 | 22,400 | 495 |
| | | 8 | 0.015 | 38,400 | 979 | 32,000 | 816 | 28,800 | 734 | 27,200 | 601 | 24,000 | 490 | 22,400 | 381 |
| | | 9 | 0.012 | 38,400 | 979 | 32,000 | 816 | 28,800 | 734 | 27,200 | 601 | 24,000 | 490 | 22,400 | 381 |
| | | 10 | 0.009 | 33,600 | 857 | 28,000 | 714 | 25,200 | 643 | 23,800 | 526 | 21,000 | 428 | 19,600 | 333 |
| | | 12 | 0.007 | 28,800 | 691 | 24,000 | 576 | 21,600 | 518 | 20,400 | 424 | 18,000 | 346 | 16,800 | 269 |
| 0.35 | 0.7 | 2 | 0.092 | 50,000 | 2,475 | 50,000 | 2,475 | 50,000 | 2,475 | 50,000 | 2,155 | 48,000 | 1,932 | 42,000 | 1,188 |
| | | 4 | 0.041 | 50,000 | 1,880 | 50,000 | 1,880 | 50,000 | 1,880 | 48,960 | 1,603 | 43,200 | 1,321 | 37,800 | 846 |
| | | 6 | 0.027 | 50,000 | 1,485 | 46,800 | 1,390 | 42,120 | 1,251 | 39,780 | 1,028 | 35,100 | 848 | 30,240 | 641 |
| | | 8 | 0.02 | 38,400 | 1,013 | 32,000 | 844 | 28,800 | 760 | 27,200 | 625 | 24,000 | 515 | 22,400 | 422 |

| 推奨領域 Recommended range | | | | PNシリーズ PN series / ATHシリーズ ATH series | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 被削材 Work material | | | | 1 銅 Copper | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼入れ鋼 Hardened steels (45～55HRC) | | 6 焼入れ鋼 Hardened steels (55～65HRC) | |
| 切込み比率 Ratio to standard depth of cut | | | | 120% | | 100% | | 90% | | 80% | | 65% | | 60% | |
| ボール半径RE Ball radius (mm) | 外径DC Tool dia. (mm) | 首下長LU Under neck length (mm) | ap (mm) | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 0.4 | 0.8 | 2 | 0.12 | 50,000 | 2,700 | 50,000 | 2,700 | 50,000 | 2,700 | 50,000 | 2,400 | 48,000 | 2,592 | 44,800 | 1,882 |
| | | 4 | 0.078 | 50,000 | 2,700 | 50,000 | 2,700 | 50,000 | 2,700 | 50,000 | 2,400 | 48,000 | 2,592 | 44,800 | 1,882 |
| | | 5 | 0.059 | 50,000 | 2,431 | 50,000 | 2,429 | 50,000 | 2,431 | 48,960 | 2,114 | 43,200 | 2,123 | 40,320 | 1,524 |
| | | 6 | 0.042 | 50,000 | 2,269 | 50,000 | 2,267 | 45,360 | 2,058 | 42,840 | 1,727 | 37,800 | 1,429 | 35,280 | 1,245 |
| | | 8 | 0.02 | 49,920 | 1,617 | 41,600 | 1,348 | 37,440 | 1,213 | 35,360 | 1,018 | 31,200 | 842 | 29,120 | 733 |
| | | 10 | 0.02 | 38,400 | 1,175 | 32,000 | 979 | 28,800 | 881 | 27,200 | 740 | 24,000 | 612 | 22,400 | 533 |
| 0.45 | 0.9 | 2 | 0.135 | 50,000 | 3,197 | 50,000 | 3,197 | 50,000 | 3,197 | 50,000 | 2,821 | 45,600 | 2,411 | 42,560 | 2,138 |
| | | 4 | 0.081 | 50,000 | 2,771 | 50,000 | 2,771 | 50,000 | 2,771 | 48,450 | 2,369 | 42,750 | 1,959 | 39,900 | 1,737 |
| | | 6 | 0.05 | 50,000 | 2,302 | 47,880 | 2,020 | 43,092 | 1,818 | 40,698 | 1,515 | 35,910 | 1,253 | 33,516 | 1,111 |
| | | 8 | 0.036 | 43,776 | 1,679 | 36,480 | 1,399 | 32,832 | 1,259 | 31,008 | 1,049 | 27,360 | 868 | 25,536 | 770 |
| 0.5 | 1 | 2 | 0.2 | 50,000 | 3,750 | 50,000 | 3,750 | 48,600 | 3,645 | 45,900 | 3,098 | 43,200 | 2,722 | 37,800 | 2,268 |
| | | 3 | 0.2 | 50,000 | 3,750 | 50,000 | 3,750 | 48,600 | 3,645 | 45,900 | 3,098 | 43,200 | 2,722 | 37,800 | 2,268 |
| | | 4 | 0.14 | 50,000 | 3,750 | 50,000 | 3,750 | 48,600 | 3,645 | 45,900 | 3,098 | 43,200 | 2,722 | 37,800 | 2,268 |
| | | 5 | 0.09 | 50,000 | 3,500 | 46,800 | 3,276 | 42,120 | 2,948 | 39,780 | 2,596 | 43,200 | 2,540 | 32,760 | 1,835 |
| | | 6 | 0.06 | 50,000 | 3,151 | 42,120 | 2,654 | 40,824 | 2,558 | 38,556 | 2,319 | 38,880 | 2,353 | 29,484 | 1,379 |
| | | 7 | 0.06 | 46,656 | 2,100 | 38,880 | 1,750 | 34,992 | 1,574 | 33,048 | 1,338 | 31,590 | 1,323 | 27,216 | 1,061 |
| | | 8 | 0.06 | 46,656 | 2,100 | 38,880 | 1,750 | 34,992 | 1,574 | 33,048 | 1,338 | 31,590 | 1,323 | 27,216 | 979 |
| | | 9 | 0.045 | 46,656 | 2,100 | 38,880 | 1,750 | 34,992 | 1,574 | 33,048 | 1,338 | 31,590 | 1,323 | 27,216 | 979 |
| | | 10 | 0.038 | 46,656 | 2,100 | 38,880 | 1,750 | 34,992 | 1,574 | 33,048 | 1,338 | 31,590 | 1,323 | 27,216 | 979 |
| | | 12 | 0.025 | 34,560 | 1,469 | 28,800 | 1,224 | 25,920 | 1,102 | 24,480 | 936 | 21,600 | 771 | 20,160 | 685 |
| | | 13 | 0.023 | 34,560 | 1,469 | 28,800 | 1,224 | 25,920 | 1,102 | 24,480 | 936 | 21,600 | 771 | 20,160 | 685 |
| | | 14 | 0.02 | 34,560 | 1,469 | 28,800 | 1,224 | 25,920 | 1,102 | 24,480 | 936 | 21,600 | 771 | 20,160 | 685 |
| | | 16 | 0.015 | 34,560 | 1,469 | 28,800 | 1,224 | 25,920 | 1,102 | 24,480 | 936 | 21,600 | 771 | 20,160 | 685 |
| | | 18 | 0.012 | 30,240 | 1,210 | 25,200 | 1,008 | 22,680 | 907 | 21,420 | 771 | 18,900 | 635 | 17,640 | 564 |
| | | 20 | 0.01 | 25,920 | 1,037 | 21,600 | 864 | 19,440 | 778 | 18,360 | 661 | 16,200 | 544 | 15,120 | 484 |
| 0.55 | 1.1 | 2 | 0.2 | 50,000 | 3,924 | 50,000 | 3,924 | 45,360 | 3,560 | 42,840 | 2,927 | 37,800 | 2,452 | 35,280 | 2,176 |
| | | 4 | 0.14 | 50,000 | 3,924 | 50,000 | 3,924 | 45,360 | 3,560 | 42,840 | 2,927 | 37,800 | 2,452 | 35,280 | 2,176 |
| | | 6 | 0.06 | 47,736 | 2,767 | 39,780 | 2,306 | 35,802 | 2,075 | 33,813 | 1,706 | 29,835 | 1,430 | 27,846 | 1,268 |
| | | 8 | 0.06 | 47,736 | 2,306 | 39,780 | 2,306 | 35,802 | 1,729 | 31,212 | 1,312 | 27,540 | 1,100 | 25,704 | 975 |
| | | 10 | 0.038 | 47,736 | 2,306 | 39,780 | 1,774 | 35,802 | 1,729 | 31,212 | 1,312 | 27,540 | 1,100 | 25,704 | 975 |
| 0.6 | 1.2 | 4 | 0.16 | 50,000 | 3,924 | 46,154 | 3,743 | 41,538 | 3,260 | 39,230 | 2,717 | 36,923 | 2,555 | 32,307 | 1,860 |
| | | 6 | 0.11 | 44,928 | 2,570 | 37,440 | 2,142 | 33,696 | 2,103 | 31,824 | 2,069 | 30,240 | 2,062 | 26,208 | 1,048 |
| | | 8 | 0.06 | 44,928 | 2,570 | 37,440 | 2,142 | 33,696 | 2,103 | 31,824 | 2,069 | 30,240 | 2,062 | 26,208 | 1,048 |
| | | 10 | 0.053 | 41,472 | 1,940 | 34,560 | 1,708 | 31,104 | 1,456 | 29,376 | 1,322 | 27,000 | 1,069 | 24,192 | 871 |
| | | 12 | 0.045 | 41,472 | 1,940 | 34,560 | 1,618 | 31,104 | 1,456 | 29,376 | 1,322 | 25,920 | 1,026 | 24,192 | 871 |
| 0.7 | 1.4 | 8 | 0.11 | 39,312 | 2,830 | 32,760 | 2,359 | 29,484 | 2,123 | 27,846 | 1,805 | 24,570 | 1,533 | 22,932 | 1,376 |
| | | 12 | 0.053 | 36,288 | 1,960 | 30,240 | 1,633 | 27,216 | 1,470 | 25,704 | 1,249 | 22,680 | 1,062 | 21,168 | 953 |
| | | 16 | 0.035 | 26,880 | 1,371 | 22,400 | 1,142 | 20,160 | 1,028 | 19,040 | 874 | 16,800 | 743 | 15,680 | 666 |
| 0.75 | 1.5 | 4 | 0.2 | 50,000 | 4,951 | 42,000 | 4,158 | 37,800 | 3,742 | 35,700 | 3,213 | 31,500 | 2,552 | 29,400 | 2,205 |
| | | 6 | 0.2 | 50,000 | 4,951 | 42,000 | 4,158 | 37,800 | 3,742 | 35,700 | 3,213 | 31,500 | 2,552 | 29,400 | 2,205 |
| | | 8 | 0.09 | 39,312 | 2,802 | 32,760 | 2,627 | 29,484 | 2,101 | 27,846 | 1,805 | 24,570 | 1,434 | 22,932 | 1,239 |
| | | 10 | 0.09 | 36,288 | 2,586 | 30,240 | 2,156 | 27,216 | 1,940 | 25,704 | 1,666 | 22,680 | 1,323 | 21,168 | 1,143 |
| | | 12 | 0.09 | 36,288 | 2,155 | 30,240 | 1,796 | 27,216 | 1,616 | 25,704 | 1,388 | 22,680 | 1,103 | 21,168 | 953 |
| | | 14 | 0.075 | 32,256 | 1,810 | 30,240 | 1,796 | 24,192 | 1,357 | 22,848 | 1,165 | 20,160 | 925 | 18,816 | 799 |
| | | 16 | 0.038 | 26,880 | 1,508 | 22,400 | 1,257 | 20,160 | 1,131 | 19,040 | 971 | 16,800 | 771 | 15,680 | 666 |
| | | 18 | 0.038 | 26,880 | 1,508 | 22,400 | 1,257 | 20,160 | 1,131 | 19,040 | 971 | 16,800 | 771 | 15,680 | 666 |
| | | 20 | 0.038 | 26,880 | 1,508 | 22,400 | 1,257 | 20,160 | 1,131 | 19,040 | 971 | 16,800 | 771 | 15,680 | 666 |
| 0.8 | 1.6 | 8 | 0.22 | 43,680 | 3,669 | 36,400 | 3,058 | 32,760 | 2,752 | 30,940 | 2,493 | 27,300 | 2,129 | 23,660 | 1,590 |
| | | 12 | 0.098 | 39,312 | 3,467 | 32,760 | 2,889 | 29,484 | 2,601 | 27,846 | 2,176 | 24,570 | 1,858 | 21,294 | 1,289 |
| | | 16 | 0.06 | 33,696 | 2,123 | 28,080 | 1,769 | 25,272 | 1,592 | 23,868 | 1,332 | 21,060 | 1,138 | 19,656 | 991 |
| | | 20 | 0.04 | 24,960 | 1,485 | 20,800 | 1,238 | 18,720 | 1,114 | 17,680 | 932 | 15,600 | 796 | 14,560 | 693 |
| 0.9 | 1.8 | 8 | 0.26 | 40,560 | 3,894 | 33,800 | 3,245 | 30,420 | 2,920 | 28,730 | 2,413 | 25,350 | 2,008 | 23,660 | 1,704 |
| | | 12 | 0.105 | 33,696 | 2,426 | 28,080 | 2,022 | 25,272 | 1,819 | 23,868 | 1,504 | 21,060 | 1,250 | 19,656 | 1,062 |
| | | 16 | 0.068 | 33,696 | 2,426 | 28,080 | 2,022 | 25,272 | 1,819 | 23,868 | 1,504 | 21,060 | 1,250 | 19,656 | 1,062 |
| | | 20 | 0.045 | 24,960 | 1,697 | 20,800 | 1,414 | 18,720 | 1,273 | 17,680 | 1,052 | 15,600 | 875 | 14,560 | 743 |
| 1 | 2 | 3 | 0.4 | 37,800 | 5,670 | 31,500 | 4,725 | 28,350 | 4,253 | 26,775 | 3,616 | 23,625 | 3,049 | 22,050 | 2,646 |
| | | 4 | 0.4 | 37,800 | 5,670 | 31,500 | 4,725 | 28,350 | 4,253 | 26,775 | 3,616 | 23,625 | 3,049 | 22,050 | 2,646 |
| | | 6 | 0.4 | 37,800 | 5,103 | 31,500 | 4,253 | 28,350 | 3,827 | 26,775 | 3,213 | 23,625 | 2,693 | 22,050 | 2,381 |
| | | 8 | 0.28 | 37,800 | 5,103 | 31,500 | 4,253 | 28,350 | 3,827 | 26,775 | 3,213 | 23,625 | 2,693 | 22,050 | 2,381 |
| | | 10 | 0.21 | 35,280 | 4,234 | 29,400 | 3,528 | 26,460 | 3,175 | 24,990 | 2,699 | 22,050 | 2,249 | 19,110 | 1,468 |

【注意】ご使用にあたっては、A80ページの表下の項目と注意を参照してください。【Note】Upon usage, please refer to comments and notes below table on page A80.

# Epoch Deep Ball Evolution
# エポックディープボールエボリューション

**EPDBE-ATH** **EPDBE-PN**

**高能率切削条件** High efficiency cuttiing conditions

高精度切削条件 High accuracy cutting conditions

高精度切削条件はA81ページを参照してください。
Please refer to P.A81 about high accuracy cutting conditions

| 推奨領域 Recommended range | | | | PNシリーズ PN series / ATHシリーズ ATH series | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 被削材 Work material | | | | 1 銅 Copper | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼入れ鋼 Hardened steels (45～55HRC) | | 6 焼入れ鋼 Hardened steels (55～65HRC) | |
| 切込み比率 Ratio to standard depth of cut | | | | 120% | | 100% | | 90% | | 80% | | 65% | | 60% | |
| ボール半径RE Ball radius (mm) | 外径DC Tool dia. (mm) | 首下長LU Under neck length (mm) | $a_p$ (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $Vf$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $Vf$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $Vf$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $Vf$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $Vf$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $Vf$ mm/min |
| 1 | 2 | 12 | 0.12 | 31,752 | 3,809 | 26,460 | 3,175 | 23,814 | 2,858 | 22,491 | 2,430 | 19,845 | 2,051 | 17,199 | 1,321 |
| | | 13 | 0.12 | 31,752 | 3,809 | 26,460 | 3,175 | 23,814 | 2,858 | 22,491 | 2,430 | 19,845 | 2,024 | 15,876 | 1,016 |
| | | 14 | 0.12 | 31,752 | 3,301 | 26,460 | 2,752 | 23,814 | 2,477 | 22,491 | 2,106 | 18,428 | 1,629 | 15,876 | 1,016 |
| | | 16 | 0.12 | 29,484 | 2,123 | 24,570 | 1,769 | 22,113 | 1,593 | 20,885 | 1,353 | 18,428 | 1,467 | 15,876 | 914 |
| | | 18 | 0.09 | 27,216 | 1,960 | 22,680 | 1,633 | 20,412 | 1,470 | 19,278 | 1,249 | 18,428 | 1,354 | 15,876 | 914 |
| | | 20 | 0.075 | 27,216 | 1,960 | 22,680 | 1,633 | 20,412 | 1,470 | 19,278 | 1,249 | 18,428 | 1,128 | 15,876 | 914 |
| | | 22 | 0.05 | 21,420 | 1,457 | 17,850 | 1,214 | 16,065 | 1,092 | 15,173 | 929 | 13,388 | 774 | 14,994 | 816 |
| | | 25 | 0.05 | 20,160 | 1,371 | 16,800 | 1,142 | 15,120 | 1,028 | 14,280 | 874 | 12,600 | 728 | 14,112 | 768 |
| | | 30 | 0.03 | 20,160 | 1,371 | 16,800 | 1,142 | 15,120 | 1,028 | 14,280 | 874 | 12,600 | 728 | 14,112 | 768 |
| | | 35 | 0.025 | 17,640 | 1,129 | 14,700 | 941 | 13,230 | 847 | 12,495 | 720 | 11,025 | 600 | 10,290 | 527 |
| | | 40 | 0.022 | 15,120 | 968 | 12,600 | 806 | 11,340 | 726 | 10,710 | 617 | 9,450 | 514 | 8,820 | 452 |
| 1.25 | 2.5 | 6 | 0.5 | 33,300 | 6,075 | 27,750 | 5,063 | 24,975 | 4,556 | 23,588 | 3,797 | 20,813 | 3,088 | 19,425 | 2,531 |
| | | 10 | 0.34 | 33,300 | 6,075 | 27,750 | 5,063 | 24,975 | 4,556 | 23,588 | 3,797 | 20,813 | 3,088 | 19,425 | 2,531 |
| | | 15 | 0.15 | 25,974 | 3,411 | 21,645 | 2,842 | 19,481 | 2,558 | 18,398 | 2,132 | 16,234 | 2,023 | 15,152 | 1,421 |
| | | 20 | 0.12 | 23,976 | 2,624 | 19,980 | 2,186 | 17,982 | 1,968 | 16,983 | 1,640 | 16,234 | 1,445 | 13,986 | 1,093 |
| | | 25 | 0.098 | 23,976 | 2,360 | 19,980 | 1,967 | 17,982 | 1,770 | 16,983 | 1,475 | 14,985 | 1,200 | 13,986 | 983 |
| | | 30 | 0.055 | 17,760 | 1,836 | 14,800 | 1,530 | 13,320 | 1,377 | 12,580 | 1,148 | 11,100 | 933 | 10,360 | 765 |
| 1.5 | 3 | 8 | 0.6 | 28,800 | 6,480 | 24,000 | 5,400 | 21,600 | 4,860 | 20,400 | 4,100 | 18,000 | 3,402 | 16,800 | 3,024 |
| | | 10 | 0.42 | 28,800 | 6,480 | 24,000 | 5,400 | 21,600 | 4,860 | 20,400 | 4,100 | 18,000 | 3,402 | 16,800 | 3,024 |
| | | 13 | 0.315 | 26,880 | 4,838 | 22,400 | 4,032 | 20,160 | 3,629 | 19,040 | 3,061 | 16,800 | 2,540 | 15,680 | 2,258 |
| | | 16 | 0.315 | 26,880 | 4,355 | 22,400 | 3,629 | 20,160 | 3,266 | 19,040 | 2,755 | 16,800 | 2,286 | 14,560 | 1,888 |
| | | 20 | 0.18 | 22,464 | 3,033 | 18,720 | 2,527 | 16,848 | 2,275 | 15,912 | 1,919 | 14,040 | 1,593 | 12,096 | 1,307 |
| | | 25 | 0.12 | 22,464 | 3,033 | 18,720 | 2,527 | 16,848 | 2,275 | 15,912 | 1,919 | 14,040 | 1,593 | 12,096 | 1,307 |
| | | 30 | 0.12 | 20,736 | 2,800 | 17,280 | 2,333 | 15,552 | 2,100 | 14,688 | 1,771 | 12,960 | 1,470 | 12,096 | 1,307 |
| | | 35 | 0.08 | 15,360 | 1,958 | 12,800 | 1,632 | 11,520 | 1,469 | 10,880 | 1,239 | 9,600 | 1,028 | 10,752 | 1,097 |
| 1.75 | 3.5 | 15 | 0.36 | 21,450 | 4,399 | 17,875 | 3,666 | 16,088 | 3,299 | 15,194 | 2,750 | 13,406 | 2,236 | 12,513 | 1,833 |
| | | 25 | 0.21 | 17,820 | 2,736 | 14,850 | 2,280 | 13,365 | 2,052 | 12,623 | 1,710 | 11,138 | 1,391 | 10,395 | 1,140 |
| | | 35 | 0.09 | 17,820 | 2,736 | 14,850 | 2,280 | 13,365 | 2,052 | 12,623 | 1,710 | 11,138 | 1,391 | 10,395 | 1,140 |
| | | 45 | 0.09 | 13,200 | 1,918 | 11,000 | 1,598 | 9,900 | 1,438 | 9,350 | 1,199 | 8,250 | 975 | 7,700 | 799 |
| 2 | 4 | 10 | 0.6 | 20,700 | 6,210 | 17,250 | 5,175 | 15,525 | 4,658 | 14,663 | 3,960 | 12,938 | 3,299 | 12,075 | 2,898 |
| | | 13 | 0.48 | 20,700 | 6,210 | 17,250 | 5,175 | 15,525 | 4,658 | 14,663 | 3,960 | 12,938 | 3,299 | 12,075 | 2,898 |
| | | 16 | 0.42 | 20,700 | 6,210 | 17,250 | 5,175 | 15,525 | 4,658 | 14,663 | 3,960 | 12,938 | 3,299 | 12,075 | 2,898 |
| | | 20 | 0.42 | 17,940 | 4,306 | 14,950 | 3,588 | 13,455 | 3,229 | 12,708 | 2,746 | 11,213 | 2,287 | 10,465 | 2,009 |
| | | 25 | 0.24 | 16,146 | 3,488 | 13,455 | 2,906 | 12,110 | 2,616 | 11,437 | 2,223 | 10,092 | 2,162 | 9,419 | 1,627 |
| | | 30 | 0.16 | 14,904 | 2,683 | 12,420 | 2,236 | 11,178 | 2,012 | 10,558 | 1,710 | 9,316 | 1,426 | 8,694 | 1,252 |
| | | 35 | 0.1 | 14,904 | 2,683 | 12,420 | 2,236 | 11,178 | 2,012 | 10,558 | 1,710 | 9,316 | 1,426 | 8,694 | 1,252 |
| | | 40 | 0.1 | 14,904 | 2,683 | 12,420 | 2,236 | 11,178 | 2,012 | 10,558 | 1,710 | 9,316 | 1,426 | 8,694 | 1,252 |
| | | 45 | 0.1 | 11,040 | 1,877 | 9,200 | 1,564 | 8,280 | 1,408 | 7,820 | 1,196 | 6,900 | 997 | 6,440 | 876 |
| | | 50 | 0.1 | 11,040 | 1,877 | 9,200 | 1,564 | 8,280 | 1,408 | 7,820 | 1,196 | 6,900 | 997 | 6,440 | 876 |
| 2.5 | 5 | 20 | 0.525 | 15,120 | 5,443 | 12,600 | 4,536 | 11,340 | 4,082 | 10,710 | 3,213 | 9,450 | 2,835 | 8,820 | 2,381 |
| | | 25 | 0.525 | 14,040 | 5,054 | 11,700 | 3,650 | 10,530 | 3,791 | 9,945 | 2,984 | 8,775 | 2,633 | 8,190 | 2,211 |
| | | 30 | 0.3 | 12,636 | 4,549 | 10,530 | 2,780 | 9,477 | 3,413 | 8,951 | 2,685 | 7,898 | 2,369 | 7,371 | 1,991 |
| | | 40 | 0.2 | 11,664 | 2,520 | 9,720 | 2,100 | 8,748 | 1,890 | 8,262 | 1,487 | 7,290 | 1,313 | 6,804 | 1,103 |
| 3 | 6 | 12 | 0.6 | 16,200 | 6,804 | 13,500 | 5,670 | 12,150 | 5,103 | 11,475 | 4,253 | 10,125 | 3,459 | 9,450 | 2,835 |
| | | 20 | 0.5 | 15,300 | 5,967 | 12,750 | 4,973 | 11,475 | 4,475 | 10,838 | 3,729 | 9,563 | 3,033 | 8,925 | 2,486 |
| | | 30 | 0.42 | 12,480 | 3,594 | 10,400 | 2,995 | 9,360 | 2,696 | 8,840 | 2,122 | 7,800 | 2,028 | 7,280 | 1,572 |
| | | 50 | 0.15 | 10,368 | 2,687 | 8,640 | 2,239 | 7,776 | 2,016 | 7,344 | 1,587 | 6,480 | 1,400 | 6,048 | 1,175 |

※(1)$a_p$は被削材グループ2での目安を示しています。その他のグループの場合は、上表の切込み比率を目安に調整してください。
※(2)リブ加工や止まり溝など、切りくずがつまりやすい切削の場合、切込み設定は基本切込みに切込み比率をかけて算出した切込み量を、さらにその80%まで小さくして使用してください。
※(3)$a_e$の設定は$a_p$×切込み比率×3～5倍を目安に調整してください。仕上げ加工を行う場合、理論カスプハイトを計算し設定してください。

※(1) $a_p$ is shown as the criteria for Group 2 workpieces. For other groups, adjust the cutting depth according to the cutting depth factors in the above table.
※(2) When performing cutting where cutting chips may cause clogging, such as for rib cutting, blind grooves, etc., cutting depth setting should be set by multiplying a cutting depth factor to calculate the cutting depth amount, and this amount should then be reduced to 80% of the calculated value.
※(3) Adjust by setting $a_e$ to (3 to 5)×($a_p$)×(cutting depth ratio). When performing finishing processing, calculate the theoretical cusp height and set accordingly.

【切込み設定例】 EPDBE2020-10-ATHの工具で焼き入れ鋼(50HRC)をリブ溝等高線切削する場合、
切込み=0.21($a_p$)×0.65(焼入れ鋼グループ5の切込み比率)×0.8(閉鎖域の切削)=0.11mm

Cutting depth setting example: When cutting rib groove contours in hardened steel (50HRC) using an EPDBE2020-10-ATH tool:
Cutting depth = 0.21 ($a_p$) × 0.65 (cutting depth factor for Group 5 hardened steel) × 0.8 (for closed-area cutting) = 0.11mm

【注意】
①PNコーティングはその性質上、通電性が微小です。従って、通電方式の工具長測定装置をご使用の際にはご注意ください。
②被削材、加工形状に合わせて、適切なクーラントを使用してください。
③この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

【Note】
① PN coating is less electro conductive. Therefore, electric transmitted measuring systems may not work.
②Use the appropriate coolant for the work material and machining shape.
③ These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
④ If the rpm of the machine is low, lower the feed rate also to put the rpm and feed rate in the same ratio.

# 標準切削条件表
Recommended cutting conditions

高能率切削条件 High efficiency cuttiing condition
**高精度切削条件** High accuracy cuttiing condition

## EPDBE-ATH　EPDBE-PN

高能率切削条件はA78ページを参照してください。
Please refer to P.A78 about high efficiency cutting conditions

| 推奨領域 Recommended range | | | | PNシリーズ PN series / ATHシリーズ ATH series | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 被削材 Work material | | | | 1 銅 Copper | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼入れ鋼 Hardened steels (45～55HRC) | | 6 焼入れ鋼 Hardened steels (55～65HRC) | |
| 切込み比率 Ratio to standard depth of cut | | | | 120% | | 100% | | 90% | | 80% | | 65% | | 60% | |
| ボール半径RE Ball radius (mm) | 外径DC Tool dia. (mm) | 首下長LU Under neck length (mm) | ap (mm) | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 0.05 | 0.1 | 0.2 | 0.004 | 50,000 | 300 | 50,000 | 250 | 50,000 | 250 | 50,000 | 225 | 50,000 | 200 | 50,000 | 188 |
| | | 0.3 | 0.003 | 50,000 | 300 | 50,000 | 250 | 50,000 | 250 | 50,000 | 225 | 50,000 | 200 | 50,000 | 188 |
| | | 0.5 | 0.002 | 50,000 | 300 | 50,000 | 250 | 50,000 | 250 | 50,000 | 225 | 50,000 | 200 | 50,000 | 188 |
| 0.1 | 0.2 | 0.5 | 0.015 | 50,000 | 420 | 50,000 | 350 | 50,000 | 350 | 50,000 | 325 | 45,500 | 273 | 42,000 | 210 |
| | | 0.75 | 0.013 | 50,000 | 420 | 50,000 | 350 | 50,000 | 350 | 50,000 | 325 | 45,500 | 273 | 42,000 | 210 |
| | | 1 | 0.011 | 50,000 | 420 | 50,000 | 350 | 50,000 | 350 | 50,000 | 325 | 45,500 | 273 | 42,000 | 210 |
| | | 1.25 | 0.008 | 50,000 | 378 | 50,000 | 315 | 48,600 | 306 | 45,900 | 269 | 40,500 | 219 | 37,800 | 170 |
| | | 1.5 | 0.007 | 50,000 | 378 | 50,000 | 315 | 48,600 | 306 | 45,900 | 269 | 40,500 | 219 | 37,800 | 170 |
| | | 2 | 0.006 | 50,000 | 378 | 50,000 | 315 | 48,600 | 306 | 45,900 | 269 | 40,500 | 219 | 37,800 | 170 |
| | | 2.5 | 0.005 | 48,000 | 323 | 48,000 | 269 | 43,200 | 242 | 40,800 | 212 | 36,000 | 173 | 33,600 | 134 |
| | | 3 | 0.003 | 48,000 | 323 | 48,000 | 269 | 43,200 | 242 | 40,800 | 212 | 36,000 | 173 | 33,600 | 134 |
| 0.15 | 0.3 | 0.5 | 0.02 | 50,000 | 600 | 50,000 | 500 | 50,000 | 500 | 50,000 | 450 | 45,000 | 383 | 42,000 | 336 |
| | | 0.75 | 0.018 | 50,000 | 600 | 50,000 | 500 | 50,000 | 500 | 50,000 | 450 | 45,000 | 383 | 42,000 | 336 |
| | | 1 | 0.016 | 50,000 | 600 | 50,000 | 500 | 50,000 | 500 | 50,000 | 450 | 45,000 | 383 | 42,000 | 336 |
| | | 1.25 | 0.014 | 50,000 | 600 | 50,000 | 500 | 50,000 | 500 | 50,000 | 450 | 45,000 | 383 | 42,000 | 336 |
| | | 1.5 | 0.012 | 50,000 | 600 | 50,000 | 500 | 50,000 | 500 | 50,000 | 450 | 45,000 | 383 | 42,000 | 336 |
| | | 2 | 0.009 | 50,000 | 540 | 50,000 | 450 | 48,600 | 437 | 45,900 | 372 | 40,500 | 310 | 37,800 | 272 |
| | | 2.5 | 0.008 | 50,000 | 540 | 50,000 | 450 | 48,600 | 437 | 45,900 | 372 | 40,500 | 310 | 37,800 | 272 |
| | | 3 | 0.006 | 50,000 | 540 | 50,000 | 450 | 48,600 | 437 | 45,900 | 372 | 40,500 | 310 | 37,800 | 272 |
| 0.2 | 0.4 | 0.75 | 0.043 | 50,000 | 691 | 48,000 | 576 | 43,200 | 518 | 40,800 | 449 | 36,000 | 360 | 33,600 | 336 |
| | | 1 | 0.04 | 50,000 | 691 | 48,000 | 576 | 43,200 | 518 | 40,800 | 449 | 36,000 | 360 | 33,600 | 336 |
| | | 1.5 | 0.034 | 50,000 | 691 | 48,000 | 576 | 43,200 | 518 | 40,800 | 449 | 36,000 | 360 | 33,600 | 336 |
| | | 2 | 0.028 | 50,000 | 691 | 48,000 | 576 | 43,200 | 518 | 40,800 | 449 | 36,000 | 360 | 33,600 | 336 |
| | | 2.5 | 0.016 | 50,000 | 560 | 43,200 | 467 | 38,880 | 420 | 36,720 | 364 | 32,400 | 292 | 30,240 | 272 |
| | | 3 | 0.011 | 50,000 | 560 | 43,200 | 467 | 38,880 | 420 | 36,720 | 364 | 32,400 | 292 | 30,240 | 272 |
| | | 3.5 | 0.008 | 50,000 | 560 | 43,200 | 467 | 38,880 | 420 | 36,720 | 364 | 32,400 | 292 | 30,240 | 272 |
| | | 4 | 0.005 | 50,000 | 560 | 43,200 | 467 | 38,880 | 420 | 36,720 | 364 | 32,400 | 292 | 30,240 | 272 |
| | | 4.5 | 0.004 | 46,080 | 470 | 38,400 | 392 | 34,560 | 353 | 32,640 | 305 | 28,800 | 245 | 26,880 | 228 |
| 0.25 | 0.5 | 1 | 0.045 | 48,000 | 960 | 40,000 | 800 | 36,000 | 720 | 34,000 | 612 | 30,000 | 540 | 28,000 | 476 |
| | | 1.5 | 0.04 | 48,000 | 960 | 40,000 | 800 | 36,000 | 720 | 34,000 | 612 | 30,000 | 540 | 28,000 | 476 |
| | | 2 | 0.035 | 48,000 | 960 | 40,000 | 800 | 36,000 | 720 | 34,000 | 612 | 30,000 | 540 | 28,000 | 476 |
| | | 2.5 | 0.033 | 43,200 | 778 | 40,000 | 800 | 32,400 | 583 | 30,600 | 496 | 27,000 | 437 | 25,200 | 386 |
| | | 3 | 0.03 | 43,200 | 778 | 36,000 | 648 | 32,400 | 583 | 30,600 | 496 | 27,000 | 437 | 25,200 | 386 |
| | | 4 | 0.02 | 43,200 | 778 | 36,000 | 648 | 32,400 | 583 | 30,600 | 496 | 27,000 | 437 | 25,200 | 386 |
| | | 5 | 0.018 | 43,200 | 778 | 36,000 | 648 | 32,400 | 583 | 30,600 | 496 | 27,000 | 437 | 25,200 | 386 |
| | | 5.5 | 0.008 | 38,400 | 653 | 32,000 | 544 | 28,800 | 490 | 27,200 | 416 | 24,000 | 367 | 22,400 | 324 |
| | | 6 | 0.007 | 38,400 | 653 | 32,000 | 544 | 28,800 | 490 | 27,200 | 416 | 24,000 | 367 | 22,400 | 324 |
| | | 8 | 0.004 | 38,400 | 653 | 32,000 | 544 | 28,800 | 490 | 27,200 | 416 | 24,000 | 367 | 22,400 | 324 |
| 0.3 | 0.6 | 1 | 0.05 | 48,000 | 1,440 | 40,000 | 1,200 | 36,000 | 1,080 | 34,000 | 884 | 30,000 | 720 | 28,000 | 560 |
| | | 2 | 0.042 | 48,000 | 1,440 | 40,000 | 1,200 | 36,000 | 1,080 | 34,000 | 884 | 30,000 | 720 | 28,000 | 560 |
| | | 2.5 | 0.038 | 48,000 | 1,440 | 40,000 | 1,200 | 36,000 | 1,080 | 34,000 | 884 | 30,000 | 720 | 28,000 | 560 |
| | | 3 | 0.034 | 48,000 | 1,440 | 40,000 | 1,200 | 36,000 | 1,080 | 34,000 | 884 | 30,000 | 720 | 28,000 | 560 |
| | | 3.5 | 0.029 | 43,200 | 1,231 | 36,000 | 1,026 | 32,400 | 923 | 30,600 | 756 | 27,000 | 616 | 25,200 | 479 |
| | | 4 | 0.024 | 43,200 | 1,231 | 36,000 | 1,026 | 32,400 | 923 | 30,600 | 756 | 27,000 | 616 | 25,200 | 479 |
| | | 4.5 | 0.022 | 43,200 | 1,166 | 36,000 | 972 | 32,400 | 875 | 30,600 | 716 | 27,000 | 583 | 25,200 | 454 |
| | | 5 | 0.02 | 43,200 | 1,166 | 36,000 | 972 | 32,400 | 875 | 30,600 | 716 | 27,000 | 583 | 25,200 | 454 |
| | | 5.5 | 0.017 | 43,200 | 1,166 | 36,000 | 972 | 32,400 | 875 | 30,600 | 716 | 27,000 | 583 | 25,200 | 454 |
| | | 6 | 0.015 | 43,200 | 1,166 | 36,000 | 972 | 32,400 | 875 | 30,600 | 716 | 27,000 | 583 | 25,200 | 454 |
| | | 7 | 0.008 | 38,400 | 979 | 32,000 | 816 | 28,800 | 734 | 27,200 | 601 | 24,000 | 490 | 22,400 | 381 |
| | | 8 | 0.008 | 38,400 | 979 | 32,000 | 816 | 28,800 | 734 | 27,200 | 601 | 24,000 | 490 | 22,400 | 381 |
| | | 9 | 0.006 | 38,400 | 979 | 32,000 | 816 | 28,800 | 734 | 27,200 | 601 | 24,000 | 490 | 22,400 | 381 |
| | | 10 | 0.005 | 33,600 | 857 | 28,000 | 714 | 25,200 | 643 | 23,800 | 526 | 21,000 | 428 | 19,600 | 333 |
| | | 12 | 0.004 | 28,800 | 691 | 24,000 | 576 | 21,600 | 518 | 20,400 | 424 | 18,000 | 346 | 16,800 | 269 |
| 0.35 | 0.7 | 2 | 0.061 | 48,000 | 1,584 | 40,000 | 1,320 | 36,000 | 1,188 | 34,000 | 977 | 30,000 | 805 | 28,000 | 660 |
| | | 4 | 0.034 | 43,200 | 1,354 | 36,000 | 1,128 | 32,400 | 1,015 | 30,600 | 835 | 27,000 | 688 | 25,200 | 564 |
| | | 6 | 0.027 | 43,200 | 1,283 | 36,000 | 1,069 | 32,400 | 962 | 30,600 | 791 | 27,000 | 652 | 25,200 | 535 |
| | | 8 | 0.01 | 38,400 | 1,013 | 32,000 | 844 | 28,800 | 760 | 27,200 | 625 | 24,000 | 515 | 22,400 | 422 |

【注意】ご使用にあたっては、A83ページの表下の項目と注意を参照してください。【Note】Upon usage, please refer to comments and notes below table on page A83.

Epoch Deep Ball Evolution

# エポックディープボールエボリューション

**EPDBE-ATH** **EPDBE-PN**

高能率切削条件 High efficiency cuttiing condition

**高精度切削条件** High accuracy cuttiing condition

高能率切削条件はA78ページを参照してください。
Please refer to P.A78 about high efficiency cutting conditions

| 推奨領域 Recommended range | | | | PNシリーズ PN series / ATHシリーズ ATH series | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 被削材 Work material | | | | 1 銅 Copper | | 2 炭素鋼・合金鋼 Carbon Steels, Alloy Steels (180~250HB) | | 3 ステンレス鋼・工具鋼 Stainless Steels, Tool Steels (25~35HRC) | | 4 プリハードン鋼 Pre-hardened Steels (35~45HRC) | | 5 焼入れ鋼 Hardened Steels (45~55HRC) | | 6 焼入れ鋼 Hardened Steels (55~65HRC) | |
| 切込み比率 Ratio to standard depth of cut | | | | 120% | | 100% | | 90% | | 80% | | 65% | | 60% | |
| ボール半径RE Ball radius (mm) | 外径DC Tool dia. (mm) | 首下長LU Under neck length (mm) | ap (mm) | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min |
| 0.4 | 0.8 | 2 | 0.08 | 48,000 | 1,728 | 40,000 | 1,440 | 36,000 | 1,296 | 34,000 | 1,088 | 30,000 | 900 | 28,000 | 784 |
| | | 4 | 0.056 | 48,000 | 1,728 | 40,000 | 1,440 | 36,000 | 1,296 | 34,000 | 1,088 | 30,000 | 900 | 28,000 | 784 |
| | | 5 | 0.045 | 43,200 | 1,400 | 36,000 | 1,166 | 32,400 | 1,050 | 30,600 | 881 | 27,000 | 729 | 25,200 | 635 |
| | | 6 | 0.032 | 43,200 | 1,400 | 36,000 | 1,166 | 32,400 | 1,050 | 30,600 | 881 | 27,000 | 729 | 25,200 | 635 |
| | | 8 | 0.02 | 38,400 | 1,244 | 32,000 | 1,037 | 28,800 | 933 | 27,200 | 783 | 24,000 | 648 | 22,400 | 564 |
| | | 10 | 0.01 | 38,400 | 1,175 | 32,000 | 979 | 28,800 | 881 | 27,200 | 740 | 24,000 | 612 | 22,400 | 533 |
| 0.45 | 0.9 | 2 | 0.09 | 45,600 | 1,944 | 38,000 | 1,620 | 34,200 | 1,458 | 32,300 | 1,215 | 28,500 | 1,004 | 26,600 | 891 |
| | | 4 | 0.058 | 45,600 | 1,944 | 38,000 | 1,620 | 34,200 | 1,458 | 32,300 | 1,215 | 28,500 | 1,004 | 26,600 | 891 |
| | | 6 | 0.042 | 41,040 | 1,574 | 34,200 | 1,312 | 30,780 | 1,181 | 29,070 | 984 | 25,650 | 813 | 23,940 | 722 |
| | | 8 | 0.03 | 36,480 | 1,399 | 30,400 | 1,166 | 27,360 | 1,049 | 25,840 | 875 | 22,800 | 723 | 21,280 | 641 |
| 0.5 | 1 | 2 | 0.1 | 43,200 | 2,160 | 36,000 | 1,800 | 32,400 | 1,620 | 30,600 | 1,377 | 27,000 | 1,134 | 25,200 | 1,008 |
| | | 3 | 0.1 | 43,200 | 2,160 | 36,000 | 1,800 | 32,400 | 1,620 | 30,600 | 1,377 | 27,000 | 1,134 | 25,200 | 1,008 |
| | | 4 | 0.07 | 43,200 | 2,160 | 36,000 | 1,800 | 32,400 | 1,620 | 30,600 | 1,377 | 27,000 | 1,134 | 25,200 | 1,008 |
| | | 5 | 0.06 | 43,200 | 2,160 | 36,000 | 1,800 | 32,400 | 1,620 | 30,600 | 1,377 | 27,000 | 1,134 | 25,200 | 1,008 |
| | | 6 | 0.04 | 38,880 | 1,750 | 32,400 | 1,458 | 29,160 | 1,312 | 27,540 | 1,115 | 24,300 | 919 | 22,680 | 816 |
| | | 7 | 0.04 | 38,880 | 1,750 | 32,400 | 1,458 | 29,160 | 1,312 | 27,540 | 1,115 | 24,300 | 919 | 22,680 | 816 |
| | | 8 | 0.04 | 38,880 | 1,750 | 32,400 | 1,458 | 29,160 | 1,312 | 27,540 | 1,115 | 24,300 | 919 | 22,680 | 816 |
| | | 9 | 0.03 | 38,880 | 1,750 | 32,400 | 1,458 | 29,160 | 1,312 | 27,540 | 1,115 | 24,300 | 919 | 22,680 | 816 |
| | | 10 | 0.025 | 38,880 | 1,750 | 32,400 | 1,458 | 29,160 | 1,312 | 27,540 | 1,115 | 24,300 | 919 | 22,680 | 816 |
| | | 12 | 0.013 | 34,560 | 1,469 | 28,800 | 1,224 | 25,920 | 1,102 | 24,480 | 936 | 21,600 | 771 | 20,160 | 685 |
| | | 13 | 0.011 | 34,560 | 1,469 | 28,800 | 1,224 | 25,920 | 1,102 | 24,480 | 936 | 21,600 | 771 | 20,160 | 685 |
| | | 14 | 0.01 | 34,560 | 1,469 | 28,800 | 1,224 | 25,920 | 1,102 | 24,480 | 936 | 21,600 | 771 | 20,160 | 685 |
| | | 16 | 0.008 | 34,560 | 1,469 | 28,800 | 1,224 | 25,920 | 1,102 | 24,480 | 936 | 21,600 | 771 | 20,160 | 685 |
| | | 18 | 0.006 | 30,240 | 1,210 | 25,200 | 1,008 | 22,680 | 907 | 21,420 | 771 | 18,900 | 635 | 17,640 | 564 |
| | | 20 | 0.005 | 25,920 | 1,037 | 21,600 | 864 | 19,440 | 778 | 18,360 | 661 | 16,200 | 544 | 15,120 | 484 |
| 0.55 | 1.1 | 2 | 0.1 | 40,320 | 2,110 | 33,600 | 1,758 | 30,240 | 1,582 | 28,560 | 1,301 | 25,200 | 1,090 | 23,520 | 967 |
| | | 4 | 0.07 | 40,320 | 2,110 | 33,600 | 1,758 | 30,240 | 1,582 | 28,560 | 1,301 | 25,200 | 1,090 | 23,520 | 967 |
| | | 6 | 0.04 | 36,720 | 1,774 | 30,600 | 1,478 | 27,540 | 1,330 | 26,010 | 1,094 | 22,950 | 916 | 21,420 | 813 |
| | | 8 | 0.04 | 36,720 | 1,774 | 30,600 | 1,478 | 27,540 | 1,330 | 26,010 | 1,094 | 22,950 | 916 | 21,420 | 813 |
| | | 10 | 0.025 | 36,720 | 1,774 | 30,600 | 1,478 | 27,540 | 1,330 | 26,010 | 1,094 | 22,950 | 916 | 21,420 | 813 |
| 0.6 | 1.2 | 4 | 0.08 | 36,923 | 1,932 | 30,769 | 1,610 | 27,692 | 1,449 | 26,154 | 1,208 | 23,077 | 998 | 21,538 | 886 |
| | | 6 | 0.06 | 34,560 | 1,797 | 28,800 | 1,498 | 25,920 | 1,348 | 24,480 | 1,102 | 21,600 | 950 | 20,160 | 806 |
| | | 8 | 0.04 | 34,560 | 1,797 | 28,800 | 1,498 | 25,920 | 1,348 | 24,480 | 1,102 | 21,600 | 950 | 20,160 | 806 |
| | | 10 | 0.035 | 34,560 | 1,617 | 28,800 | 1,423 | 25,920 | 1,213 | 24,480 | 1,102 | 21,600 | 855 | 20,160 | 726 |
| | | 12 | 0.03 | 34,560 | 1,617 | 28,800 | 1,348 | 25,920 | 1,213 | 24,480 | 1,102 | 21,600 | 855 | 20,160 | 726 |
| 0.7 | 1.4 | 8 | 0.055 | 30,240 | 1,814 | 25,200 | 1,512 | 22,680 | 1,361 | 21,420 | 1,157 | 18,900 | 983 | 17,640 | 882 |
| | | 12 | 0.035 | 30,240 | 1,633 | 25,200 | 1,361 | 22,680 | 1,225 | 21,420 | 1,041 | 18,900 | 885 | 17,640 | 794 |
| | | 16 | 0.017 | 26,880 | 1,371 | 22,400 | 1,142 | 20,160 | 1,028 | 19,040 | 874 | 16,800 | 743 | 15,680 | 666 |
| 0.75 | 1.5 | 4 | 0.1 | 33,600 | 2,218 | 28,000 | 1,848 | 25,200 | 1,663 | 23,800 | 1,428 | 21,000 | 1,134 | 19,600 | 980 |
| | | 6 | 0.1 | 33,600 | 2,218 | 28,000 | 1,848 | 25,200 | 1,663 | 23,800 | 1,428 | 21,000 | 1,134 | 19,600 | 980 |
| | | 8 | 0.06 | 30,240 | 1,796 | 25,200 | 1,497 | 22,680 | 1,347 | 21,420 | 1,157 | 18,900 | 919 | 17,640 | 794 |
| | | 10 | 0.06 | 30,240 | 1,796 | 25,200 | 1,497 | 22,680 | 1,347 | 21,420 | 1,157 | 18,900 | 919 | 17,640 | 794 |
| | | 12 | 0.06 | 30,240 | 1,796 | 25,200 | 1,497 | 22,680 | 1,347 | 21,420 | 1,157 | 18,900 | 919 | 17,640 | 794 |
| | | 14 | 0.05 | 26,880 | 1,508 | 25,200 | 1,497 | 20,160 | 1,131 | 19,040 | 971 | 16,800 | 771 | 15,680 | 666 |
| | | 16 | 0.019 | 26,880 | 1,508 | 22,400 | 1,257 | 20,160 | 1,131 | 19,040 | 971 | 16,800 | 771 | 15,680 | 666 |
| | | 18 | 0.019 | 26,880 | 1,508 | 22,400 | 1,257 | 20,160 | 1,131 | 19,040 | 971 | 16,800 | 771 | 15,680 | 666 |
| | | 20 | 0.019 | 26,880 | 1,508 | 22,400 | 1,257 | 20,160 | 1,131 | 19,040 | 971 | 16,800 | 771 | 15,680 | 666 |
| 0.8 | 1.6 | 8 | 0.11 | 31,200 | 2,184 | 26,000 | 1,820 | 23,400 | 1,638 | 22,100 | 1,370 | 19,500 | 1,170 | 18,200 | 1,019 |
| | | 12 | 0.065 | 28,080 | 1,769 | 23,400 | 1,474 | 21,060 | 1,327 | 19,890 | 1,110 | 17,550 | 948 | 16,380 | 826 |
| | | 16 | 0.04 | 28,080 | 1,769 | 23,400 | 1,474 | 21,060 | 1,327 | 19,890 | 1,110 | 17,550 | 948 | 16,380 | 826 |
| | | 20 | 0.02 | 24,960 | 1,485 | 20,800 | 1,238 | 18,720 | 1,114 | 17,680 | 932 | 15,600 | 796 | 14,560 | 693 |
| 0.9 | 1.8 | 8 | 0.13 | 31,200 | 2,496 | 26,000 | 2,080 | 23,400 | 1,872 | 22,100 | 1,547 | 19,500 | 1,287 | 18,200 | 1,092 |
| | | 12 | 0.07 | 28,080 | 2,022 | 23,400 | 1,685 | 21,060 | 1,516 | 19,890 | 1,253 | 17,550 | 1,042 | 16,380 | 885 |
| | | 16 | 0.045 | 28,080 | 2,022 | 23,400 | 1,685 | 21,060 | 1,516 | 19,890 | 1,253 | 17,550 | 1,042 | 16,380 | 885 |
| | | 20 | 0.022 | 24,960 | 1,697 | 20,800 | 1,414 | 18,720 | 1,273 | 17,680 | 1,052 | 15,600 | 875 | 14,560 | 743 |
| 1 | 2 | 3 | 0.2 | 25,200 | 2,520 | 21,000 | 2,100 | 18,900 | 1,890 | 17,850 | 1,607 | 15,750 | 1,355 | 14,700 | 1,176 |
| | | 4 | 0.2 | 25,200 | 2,520 | 21,000 | 2,100 | 18,900 | 1,890 | 17,850 | 1,607 | 15,750 | 1,355 | 14,700 | 1,176 |
| | | 6 | 0.2 | 25,200 | 2,268 | 21,000 | 1,890 | 18,900 | 1,701 | 17,850 | 1,428 | 15,750 | 1,197 | 14,700 | 1,058 |
| | | 8 | 0.14 | 25,200 | 2,268 | 21,000 | 1,890 | 18,900 | 1,701 | 17,850 | 1,428 | 15,750 | 1,197 | 14,700 | 1,058 |
| | | 10 | 0.14 | 25,200 | 2,016 | 21,000 | 1,680 | 18,900 | 1,512 | 17,850 | 1,285 | 15,750 | 1,071 | 14,700 | 941 |

| 推奨領域 Recommended range | | | | PNシリーズ PN series / ATHシリーズ ATH series | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 被削材 Work material | | | | 1 銅 Copper | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼入れ鋼 Hardened steels (45～55HRC) | | 6 焼入れ鋼 Hardened steels (55～65HRC) | |
| 切込み比率 Ratio to standard depth of cut | | | | 120% | | 100% | | 90% | | 80% | | 65% | | 60% | |
| ボール半径RE Ball radius (mm) | 外径DC Tool dia. (mm) | 首下長LU Under neck length (mm) | ap (mm) | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 1 | 2 | 12 | 0.08 | 22,680 | 1,814 | 18,900 | 1,512 | 17,010 | 1,361 | 16,065 | 1,157 | 14,175 | 964 | 13,230 | 847 |
| | | 13 | 0.08 | 22,680 | 1,814 | 18,900 | 1,512 | 17,010 | 1,361 | 16,065 | 1,157 | 14,175 | 964 | 13,230 | 847 |
| | | 14 | 0.08 | 22,680 | 1,814 | 18,900 | 1,512 | 17,010 | 1,361 | 16,065 | 1,157 | 14,175 | 964 | 13,230 | 847 |
| | | 16 | 0.08 | 22,680 | 1,633 | 18,900 | 1,361 | 17,010 | 1,225 | 16,065 | 1,041 | 14,175 | 868 | 13,230 | 762 |
| | | 18 | 0.06 | 22,680 | 1,633 | 18,900 | 1,361 | 17,010 | 1,225 | 16,065 | 1,041 | 14,175 | 868 | 13,230 | 762 |
| | | 20 | 0.05 | 22,680 | 1,633 | 18,900 | 1,361 | 17,010 | 1,225 | 16,065 | 1,041 | 14,175 | 868 | 13,230 | 762 |
| | | 22 | 0.042 | 21,420 | 1,457 | 17,850 | 1,214 | 16,065 | 1,092 | 15,173 | 929 | 13,388 | 774 | 12,495 | 680 |
| | | 25 | 0.035 | 20,160 | 1,371 | 16,800 | 1,142 | 15,120 | 1,028 | 14,280 | 874 | 12,600 | 728 | 11,760 | 640 |
| | | 30 | 0.015 | 20,160 | 1,371 | 16,800 | 1,142 | 15,120 | 1,028 | 14,280 | 874 | 12,600 | 728 | 11,760 | 640 |
| | | 35 | 0.012 | 17,640 | 1,129 | 14,700 | 941 | 13,230 | 847 | 12,495 | 720 | 11,025 | 600 | 10,290 | 527 |
| | | 40 | 0.01 | 15,120 | 968 | 12,600 | 806 | 11,340 | 726 | 10,710 | 617 | 9,450 | 514 | 8,820 | 452 |
| 1.25 | 2.5 | 6 | 0.25 | 22,200 | 2,700 | 18,500 | 2,250 | 16,650 | 2,025 | 15,725 | 1,688 | 13,875 | 1,373 | 12,950 | 1,125 |
| | | 10 | 0.17 | 22,200 | 2,700 | 18,500 | 2,250 | 16,650 | 2,025 | 15,725 | 1,688 | 13,875 | 1,373 | 12,950 | 1,125 |
| | | 15 | 0.1 | 19,980 | 2,186 | 16,650 | 1,822 | 14,985 | 1,640 | 14,153 | 1,367 | 12,488 | 1,111 | 11,655 | 911 |
| | | 20 | 0.08 | 19,980 | 2,186 | 16,650 | 1,822 | 14,985 | 1,640 | 14,153 | 1,367 | 12,488 | 1,111 | 11,655 | 911 |
| | | 25 | 0.065 | 19,980 | 1,967 | 16,650 | 1,639 | 14,985 | 1,475 | 14,153 | 1,229 | 12,488 | 1,000 | 11,655 | 820 |
| | | 30 | 0.044 | 17,760 | 1,836 | 14,800 | 1,530 | 13,320 | 1,377 | 12,580 | 1,148 | 11,100 | 933 | 10,360 | 765 |
| 1.5 | 3 | 8 | 0.3 | 19,200 | 2,880 | 16,000 | 2,400 | 14,400 | 2,160 | 13,600 | 1,822 | 12,000 | 1,512 | 11,200 | 1,344 |
| | | 10 | 0.21 | 19,200 | 2,880 | 16,000 | 2,400 | 14,400 | 2,160 | 13,600 | 1,822 | 12,000 | 1,512 | 11,200 | 1,344 |
| | | 13 | 0.21 | 19,200 | 2,880 | 16,000 | 2,400 | 14,400 | 2,160 | 13,600 | 1,822 | 12,000 | 1,512 | 11,200 | 1,344 |
| | | 16 | 0.21 | 19,200 | 2,592 | 16,000 | 2,160 | 14,400 | 1,944 | 13,600 | 1,640 | 12,000 | 1,361 | 11,200 | 1,210 |
| | | 20 | 0.12 | 17,280 | 2,333 | 14,400 | 1,944 | 12,960 | 1,750 | 12,240 | 1,476 | 10,800 | 1,225 | 10,080 | 1,089 |
| | | 25 | 0.08 | 17,280 | 2,333 | 14,400 | 1,944 | 12,960 | 1,750 | 12,240 | 1,476 | 10,800 | 1,225 | 10,080 | 1,089 |
| | | 30 | 0.08 | 17,280 | 2,333 | 14,400 | 1,944 | 12,960 | 1,750 | 12,240 | 1,476 | 10,800 | 1,225 | 10,080 | 1,089 |
| | | 35 | 0.064 | 15,360 | 1,958 | 12,800 | 1,632 | 11,520 | 1,469 | 10,880 | 1,239 | 9,600 | 1,028 | 8,960 | 914 |
| 1.75 | 3.5 | 15 | 0.24 | 16,500 | 2,820 | 13,750 | 2,350 | 12,375 | 2,115 | 11,688 | 1,763 | 10,313 | 1,434 | 9,625 | 1,175 |
| | | 25 | 0.14 | 14,850 | 2,280 | 12,375 | 1,900 | 11,138 | 1,710 | 10,519 | 1,425 | 9,281 | 1,159 | 8,663 | 950 |
| | | 35 | 0.09 | 14,850 | 2,280 | 12,375 | 1,900 | 11,138 | 1,710 | 10,519 | 1,425 | 9,281 | 1,159 | 8,663 | 950 |
| | | 45 | 0.072 | 13,200 | 1,918 | 11,000 | 1,598 | 9,900 | 1,438 | 9,350 | 1,199 | 8,250 | 975 | 7,700 | 799 |
| 2 | 4 | 10 | 0.4 | 13,800 | 2,760 | 11,500 | 2,300 | 10,350 | 2,070 | 9,775 | 1,760 | 8,625 | 1,466 | 8,050 | 1,288 |
| | | 13 | 0.32 | 13,800 | 2,760 | 11,500 | 2,300 | 10,350 | 2,070 | 9,775 | 1,760 | 8,625 | 1,466 | 8,050 | 1,288 |
| | | 16 | 0.28 | 13,800 | 2,760 | 11,500 | 2,300 | 10,350 | 2,070 | 9,775 | 1,760 | 8,625 | 1,466 | 8,050 | 1,288 |
| | | 20 | 0.28 | 13,800 | 2,760 | 11,500 | 2,300 | 10,350 | 2,070 | 9,775 | 1,760 | 8,625 | 1,466 | 8,050 | 1,288 |
| | | 25 | 0.16 | 12,420 | 2,236 | 10,350 | 1,863 | 9,315 | 1,677 | 8,798 | 1,425 | 7,763 | 1,188 | 7,245 | 1,043 |
| | | 30 | 0.16 | 12,420 | 2,236 | 10,350 | 1,863 | 9,315 | 1,677 | 8,798 | 1,425 | 7,763 | 1,188 | 7,245 | 1,043 |
| | | 35 | 0.1 | 12,420 | 2,236 | 10,350 | 1,863 | 9,315 | 1,677 | 8,798 | 1,425 | 7,763 | 1,188 | 7,245 | 1,043 |
| | | 40 | 0.1 | 12,420 | 2,236 | 10,350 | 1,863 | 9,315 | 1,677 | 8,798 | 1,425 | 7,763 | 1,188 | 7,245 | 1,043 |
| | | 45 | 0.08 | 11,040 | 1,877 | 9,200 | 1,564 | 8,280 | 1,408 | 7,820 | 1,196 | 6,900 | 997 | 6,440 | 876 |
| | | 50 | 0.07 | 11,040 | 1,877 | 9,200 | 1,564 | 8,280 | 1,408 | 7,820 | 1,196 | 6,900 | 997 | 6,440 | 876 |
| 2.5 | 5 | 20 | 0.35 | 10,800 | 2,592 | 9,000 | 2,160 | 8,100 | 1,944 | 7,650 | 1,530 | 6,750 | 1,350 | 6,300 | 1,134 |
| | | 25 | 0.35 | 10,800 | 2,592 | 9,000 | 2,160 | 8,100 | 1,944 | 7,650 | 1,530 | 6,750 | 1,350 | 6,300 | 1,134 |
| | | 30 | 0.2 | 9,720 | 2,333 | 8,100 | 1,944 | 7,290 | 1,750 | 6,885 | 1,377 | 6,075 | 1,215 | 5,670 | 1,021 |
| | | 40 | 0.2 | 9,720 | 2,100 | 8,100 | 1,750 | 7,290 | 1,575 | 6,885 | 1,239 | 6,075 | 1,094 | 5,670 | 919 |
| 3 | 6 | 12 | 0.6 | 10,800 | 3,024 | 9,000 | 2,520 | 8,100 | 2,268 | 7,650 | 1,890 | 6,750 | 1,537 | 6,300 | 1,260 |
| | | 20 | 0.5 | 10,200 | 2,652 | 8,500 | 2,210 | 7,650 | 1,989 | 7,225 | 1,658 | 6,375 | 1,348 | 5,950 | 1,105 |
| | | 30 | 0.42 | 9,600 | 2,304 | 8,000 | 1,920 | 7,200 | 1,728 | 6,800 | 1,360 | 6,000 | 1,200 | 5,600 | 1,008 |
| | | 50 | 0.15 | 8,640 | 1,866 | 7,200 | 1,555 | 6,480 | 1,400 | 6,120 | 1,102 | 5,400 | 972 | 5,040 | 816 |

※(1)apは被削材グループ2での目安を示しています。その他のグループの場合は、上表の切込み比率を目安に調整してください。
※(2)リブ加工や止まり溝など、切りくずがつまりやすい切削の場合、切込み設定は基本切込みに切込み比率をかけて算出した切込み量を、さらにその80%まで小さくして使用してください。
※(3)aeの設定はap×切込み比率×3～5倍を目安に調整してください。仕上げ加工を行う場合、理論カスプハイトを計算し設定してください。

※(1) $a_p$ is shown as the criteria for Group 2 workpieces. For other groups, adjust the cutting depth according to the cutting depth factors in the above table.
※(2) When performing cutting where cutting chips may cause clogging, such as for rib cutting, blind grooves, etc., cutting depth setting should be set by multiplying a cutting depth factor to calculate the cutting depth amount, and this amount should then be reduced to 80% of the calculated value.
※(3) Adjust by setting $a_e$ to (3 to 5)×($a_p$)×(cutting depth ratio). When performing finishing processing, calculate the theoretical cusp height and set accordingly.

【切込み設定例】 EPDBE2020-10-ATHの工具で焼き入れ鋼(50HRC)をリブ溝等高線切削する場合、
切込み=0.14($a_p$)×0.65(焼入れ鋼グループ5の切込み比率)×0.8(閉鎖域の切削)=0.073mm

Cutting depth setting example: When cutting rib groove contours in hardened steel (50HRC) using an EPDBE2020-10-ATH tool:
Cutting depth = 0.14 ($a_p$) × 0.65 (cutting depth factor for Group 5 hardened steel) × 0.8 (for closed-area cutting) = 0.073mm

【注意】 ①PNコーティングはその性質上、通電性が微小です。従って、通電方式の工具長測定装置をご使用の際にはご注意ください。
②被削材、加工形状に合わせて、適切なクーラントを使用してください。
③この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

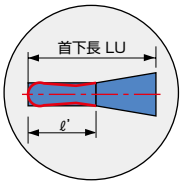
【Note】 ① PN coating is less electro conductive. Therefore, electric transmitted measuring systems may not work.
② Use the appropriate coolant for the work material and machining shape.
③ These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
④ If the rpm of the machine is low, lower the feed rate also to put the rpm and feed rate in the same ratio.

# Epoch Pencil Deep Ball Evolution
# エポックペンシルディープボールエボリューション

## ペンシルネック　Pencil neck

彫込み Die-sinking / 曲面 Profiling / R Radius / 取りのこし Rest Material Machining / 玉プチ Corner Recessing / 細部 Miniature / 中仕上 Semi Finishing / 仕上 Finishing / リブ・細部 Rib Miniature

首角度、首下長さのバリエーションを増やし、あらゆる深リブ加工へ対応。
Wider range of neck angle and under-neck length variations to handle all kinds of deep rib cutting.

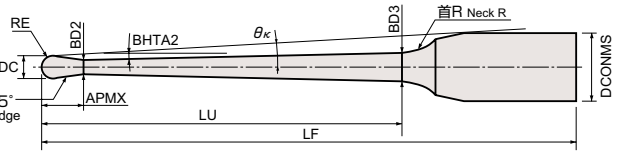



RE公差 RE tolerance
RE≦0.25：±0.003
0.25<RE≦3：±0.005
3<RE：±0.01※1
h5 ※2
(mm)

※1 RE4～RE5、および首下長80を超えるものは±0.015です。RE6はすべて±0.015です。
±0.015 for RE4 to RE5 types or types with under neck lengths of more than 80. ±0.015 for all RE6 types.
※2 全長140mm以上のものはシャンク径公差h6です。
The shank tolerance is h6 when the overall length is 140 mm or more.

【注意】RE 2mm以上はバックドラフト形状ではありません。
【Note】RE 2mm or higher does not have backdraft shape.

外周バックテーパ：3～5°
Back taper on peripheral edge




## EPDBPE2○○○○-○○○.○-○○-ATH

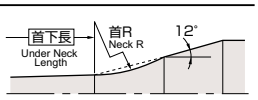
超硬 Carbide / ATH / ねじれ30° Helix angle / 切削条件表 A89 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 首部テーパ半角 Neck angle BHTA2 | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. BD2 | 首元径 Under neck dia. BD3 | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 首形状 Neck shape | 仮想首長 Approx neck length ℓ' | 干渉角度 Interference angle (°) θκ | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDBPE2002-1-04-ATH | ● | 0.1 | 0.2 | 0.4 | 1 | 0.15 | 0.17 | 0.182 | 50 | 4 | 7 | A | 1.35 | 10.89 | 1.55 | 1.72 | 1.88 | 2.03 | 2.31 | 10,610 |
| EPDBPE2002-1.5-04-ATH | ● | | | | 1.5 | 0.15 | 0.17 | 0.189 | 50 | 4 | 7 | A | 1.77 | 10.39 | 2.06 | 2.28 | 2.47 | 2.64 | 2.97 | 11,370 |
| EPDBPE2002-2-04-ATH | ● | | | | 2 | 0.15 | 0.17 | 0.196 | 50 | 4 | 10 | A | 2.20 | 9.94 | 2.70 | 3.03 | 3.30 | 3.56 | 4.02 | 11,900 |
| EPDBPE2002-3-04-ATH | ● | | | | 3 | 0.15 | 0.17 | 0.210 | 50 | 4 | 10 | A | 2.29 | 9.14 | 3.73 | 4.14 | 4.47 | 4.77 | 5.29 | 14,040 |
| EPDBPE2002-2-09-ATH | ● | | | 0.9 | 2 | 0.15 | 0.17 | 0.228 | 50 | 4 | 10 | A | 1.10 | 10.01 | 2.32 | 2.81 | 3.14 | 3.42 | 3.92 | 11,900 |
| EPDBPE2002-2.5-09-ATH | ● | | | | 2.5 | 0.15 | 0.17 | 0.244 | 50 | 4 | 10 | A | 1.10 | 9.60 | 2.36 | 3.32 | 3.70 | 4.01 | 4.54 | 12,970 |
| EPDBPE2002-3-09-ATH | ● | | | | 3 | 0.15 | 0.17 | 0.260 | 50 | 4 | 10 | A | 1.10 | 9.23 | 2.36 | 3.84 | 4.25 | 4.58 | 5.15 | 14,040 |
| EPDBPE2002-1-14-ATH | ● | | | 1.4 | 1 | 0.15 | 0.17 | 0.212 | 50 | 4 | 7 | A | 0.76 | 10.96 | 1.24 | 1.51 | 1.71 | 1.88 | 2.20 | 10,610 |
| EPDBPE2002-2-14-ATH | ● | | | | 2 | 0.15 | 0.17 | 0.260 | 50 | 4 | 10 | A | 0.76 | 10.08 | 1.13 | 2.47 | 2.93 | 3.26 | 3.80 | 11,900 |
| EPDBPE2002-3-14-ATH | ● | | | | 3 | 0.15 | 0.17 | 0.309 | 50 | 4 | 10 | A | 0.76 | 9.32 | 1.13 | 2.42 | 3.96 | 4.37 | 5.00 | 14,040 |
| EPDBPE2002-1-29-ATH | ● | | | 2.9 | 1 | 0.15 | 0.17 | 0.256 | 50 | 4 | 7 | A | 0.44 | 11.08 | 0.51 | 0.62 | 0.81 | 1.57 | 1.99 | 10,610 |
| EPDBPE2002-2-29-ATH | ● | | | | 2 | 0.15 | 0.17 | 0.357 | 50 | 4 | 10 | A | 0.44 | 10.29 | 0.51 | 0.62 | 0.81 | 1.21 | 3.35 | 11,900 |
| EPDBPE2002-3-29-ATH | ● | | | | 3 | 0.15 | 0.17 | 0.459 | 50 | 4 | 10 | A | 0.44 | 9.61 | 0.51 | 0.62 | 0.81 | 1.21 | 4.37 | 14,040 |
| EPDBPE2003-2-04-ATH | ● | 0.15 | 0.3 | 0.4 | 2 | 0.25 | 0.27 | 0.294 | 50 | 4 | 7 | A | 2.19 | 9.94 | 2.57 | 2.83 | 3.04 | 3.24 | 3.59 | 11,370 |
| EPDBPE2003-3-04-ATH | ● | | | | 3 | 0.25 | 0.27 | 0.308 | 50 | 4 | 10 | A | 2.39 | 9.12 | 3.73 | 4.14 | 4.47 | 4.76 | 5.28 | 11,900 |
| EPDBPE2003-3-09-ATH | ● | | | 0.9 | 3 | 0.25 | 0.27 | 0.356 | 50 | 4 | 10 | A | 1.20 | 9.21 | 2.52 | 3.85 | 4.25 | 4.58 | 5.15 | 11,900 |
| EPDBPE2003-4-09-ATH | ● | | | | 4 | 0.25 | 0.27 | 0.388 | 50 | 4 | 10 | A | 1.20 | 8.53 | 2.52 | 4.87 | 5.35 | 5.73 | 6.35 | 12,220 |
| EPDBPE2004-2-04-ATH | ● | 0.2 | 0.4 | 0.4 | 2 | 0.3 | 0.37 | 0.394 | 50 | 4 | 7 | A | 2.20 | 9.93 | 2.57 | 2.82 | 3.03 | 3.23 | 3.57 | 8,730 |
| EPDBPE2004-3-04-ATH | ● | | | | 3 | 0.3 | 0.37 | 0.408 | 50 | 4 | 7 | A | 2.44 | 9.10 | 3.60 | 3.92 | 4.18 | 4.40 | 4.80 | 8,730 |
| EPDBPE2004-4-04-ATH | ● | | | | 4 | 0.3 | 0.37 | 0.422 | 50 | 4 | 10 | A | 2.44 | 8.39 | 4.76 | 5.23 | 5.61 | 5.93 | 6.51 | 8,730 |
| EPDBPE2004-5-04-ATH | ● | | | | 5 | 0.3 | 0.37 | 0.436 | 50 | 4 | 10 | A | 2.44 | 7.78 | 5.78 | 6.33 | 6.74 | 7.10 | 7.71 | 9,070 |
| EPDBPE2004-6-04-ATH | ● | | | | 6 | 0.3 | 0.37 | 0.450 | 50 | 4 | 10 | A | 2.44 | 7.25 | 6.81 | 7.41 | 7.86 | 8.25 | 8.90 | 9,350 |
| EPDBPE2004-8-04-ATH | ● | | | | 8 | 0.3 | 0.37 | 0.478 | 50 | 4 | 10 | A | 2.44 | 6.39 | 8.85 | 9.57 | 10.08 | 10.51 | 11.24 | 9,890 |
| EPDBPE2004-2-09-ATH | ● | | | 0.9 | 2 | 0.3 | 0.37 | 0.423 | 50 | 4 | 7 | A | 1.25 | 10.00 | 2.30 | 2.66 | 2.90 | 3.12 | 3.49 | 8,730 |
| EPDBPE2004-4-09-ATH | ● | | | | 4 | 0.3 | 0.37 | 0.486 | 50 | 4 | 10 | A | 1.25 | 8.49 | 2.57 | 4.87 | 5.35 | 5.72 | 6.34 | 8,730 |
| EPDBPE2004-5-09-ATH | ● | | | | 5 | 0.3 | 0.37 | 0.518 | 50 | 4 | 10 | A | 1.25 | 7.89 | 2.57 | 5.90 | 6.44 | 6.85 | 7.53 | 9,070 |
| EPDBPE2004-6-09-ATH | ● | | | | 6 | 0.3 | 0.37 | 0.549 | 50 | 4 | 10 | A | 1.25 | 7.37 | 2.57 | 6.92 | 7.52 | 7.97 | 8.69 | 9,350 |
| EPDBPE2004-2-14-ATH | ● | | | 1.4 | 2 | 0.3 | 0.37 | 0.453 | 50 | 4 | 7 | A | 0.91 | 10.07 | 1.31 | 2.41 | 2.75 | 2.99 | 3.40 | 8,730 |
| EPDBPE2004-4-14-ATH | ● | | | | 4 | 0.3 | 0.37 | 0.551 | 50 | 4 | 10 | A | 0.91 | 8.60 | 1.31 | 2.70 | 5.00 | 5.47 | 6.16 | 8,730 |
| EPDBPE2004-6-14-ATH | ● | | | | 6 | 0.3 | 0.37 | 0.649 | 50 | 4 | 10 | A | 0.91 | 7.50 | 1.31 | 2.70 | 7.04 | 7.64 | 8.46 | 9,350 |
| EPDBPE2004-2-29-ATH | ● | | | 2.9 | 2 | 0.3 | 0.37 | 0.542 | 50 | 4 | 7 | A | 0.59 | 10.28 | 0.67 | 0.80 | 1.02 | 1.48 | 3.04 | 8,730 |
| EPDBPE2004-4-29-ATH | ● | | | | 4 | 0.3 | 0.37 | 0.745 | 50 | 4 | 10 | A | 0.59 | 8.93 | 0.67 | 0.80 | 1.02 | 1.48 | 5.42 | 8,730 |
| EPDBPE2004-6-29-ATH | ● | | | | 6 | 0.3 | 0.37 | 0.947 | 50 | 4 | 10 | A | 0.59 | 7.90 | 0.67 | 0.80 | 1.02 | 1.48 | 7.45 | 9,350 |
| EPDBPE2005-4-04-ATH | ● | 0.25 | 0.5 | 0.4 | 4 | 0.35 | 0.47 | 0.521 | 50 | 4 | 7 | A | 2.49 | 8.35 | 4.62 | 5.00 | 5.30 | 5.55 | 5.99 | 8,220 |
| EPDBPE2005-6-04-ATH | ● | | | | 6 | 0.35 | 0.47 | 0.549 | 50 | 4 | 10 | A | 2.49 | 7.20 | 6.80 | 7.41 | 7.86 | 8.24 | 8.89 | 8,690 |
| EPDBPE2005-6-09-ATH | ● | | | 0.9 | 6 | 0.35 | 0.47 | 0.648 | 50 | 4 | 10 | A | 1.30 | 7.32 | 2.62 | 6.92 | 7.52 | 7.97 | 8.69 | 8,690 |
| EPDBPE2005-8-09-ATH | ● | | | | 8 | 0.35 | 0.47 | 0.710 | 50 | 4 | 10 | A | 1.30 | 6.45 | 2.62 | 8.96 | 9.67 | 10.18 | 10.99 | 8,690 |
| EPDBPE2005-12-09-ATH | ● | | | | 12 | 0.35 | 0.47 | 0.836 | 50 | 4 | 10 | A | 1.30 | 5.21 | 2.62 | 13.05 | 13.94 | 14.55 | 15.49 | 9,700 |
| EPDBPE20054-2-04-ATH | ● | 0.27 | 0.54 | 0.4 | 2 | 0.37 | 0.52 | 0.543 | 50 | 4 | 4 | A | 1.80 | 9.95 | 2.36 | 2.55 | 2.70 | 2.83 | 3.06 | 10,020 |
| EPDBPE20054-4-04-ATH | ● | | | | 4 | 0.37 | 0.52 | 0.571 | 50 | 4 | 7 | A | 1.80 | 8.35 | 4.55 | 4.96 | 5.26 | 5.52 | 5.97 | 10,020 |
| EPDBPE20054-5-04-ATH | ● | | | | 5 | 0.37 | 0.52 | 0.585 | 50 | 4 | 7 | A | 1.80 | 7.72 | 5.57 | 6.04 | 6.38 | 6.66 | 7.15 | 10,020 |
| EPDBPE20054-6-04-ATH | ● | | | | 6 | 0.37 | 0.52 | 0.599 | 50 | 4 | 10 | A | 1.80 | 7.19 | 6.73 | 7.37 | 7.82 | 8.21 | 8.87 | 11,040 |
| EPDBPE20054-6.5-04-ATH | ● | | | | 6.5 | 0.37 | 0.52 | 0.606 | 50 | 4 | 10 | A | 1.80 | 6.94 | 7.24 | 7.91 | 8.38 | 8.78 | 9.46 | 11,040 |
| EPDBPE20054-7-04-ATH | ● | | | | 7 | 0.37 | 0.52 | 0.613 | 50 | 4 | 10 | A | 1.80 | 6.72 | 7.76 | 8.45 | 8.94 | 9.35 | 10.05 | 11,040 |
| EPDBPE2006-2-04-ATH | ● | 0.3 | 0.6 | 0.4 | 2 | 0.4 | 0.57 | 0.592 | 50 | 4 | 4 | A | 2.17 | 9.93 | 2.42 | 2.59 | 2.73 | 2.85 | 3.08 | 7,500 |
| EPDBPE2006-4-04-ATH | ● | | | | 4 | 0.4 | 0.57 | 0.620 | 50 | 4 | 7 | A | 2.54 | 8.31 | 4.62 | 5.00 | 5.29 | 5.54 | 5.98 | 7,790 |
| EPDBPE2006-6-04-ATH | ● | | | | 6 | 0.4 | 0.57 | 0.648 | 50 | 4 | 10 | A | 2.54 | 7.14 | 6.80 | 7.41 | 7.85 | 8.23 | 8.88 | 8,140 |
| EPDBPE2006-8-04-ATH | ● | | | | 8 | 0.4 | 0.57 | 0.676 | 50 | 4 | 10 | A | 2.54 | 6.26 | 8.85 | 9.56 | 10.07 | 10.50 | 11.22 | 8,370 |
| EPDBPE2006-10-04-ATH | ● | | | | 10 | 0.4 | 0.57 | 0.704 | 50 | 4 | 10 | A | 2.54 | 5.57 | 10.89 | 11.70 | 12.27 | 12.73 | 13.52 | 8,450 |
| EPDBPE2006-12-04-ATH | ● | | | | 12 | 0.4 | 0.57 | 0.732 | 55 | 4 | 10 | A | 2.54 | 5.02 | 12.94 | 13.83 | 14.44 | 14.95 | 15.79 | 9,150 |
| EPDBPE2006-15-04-ATH | ● | | | | 15 | 0.4 | 0.57 | 0.774 | 55 | 4 | 10 | A | 2.54 | 4.37 | 15.99 | 17.01 | 17.68 | 18.24 | 19.27 | 9,150 |

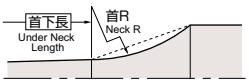
●：標準在庫品です。●：Stocked items.　干渉なし：No interference

## ■首形状詳細 Detail of neck shape

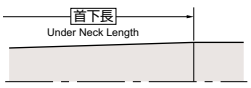
**首形状 Neck shape A**
複合首形状
Compound neck shape



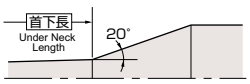

**首形状 Neck shape B**
テーパなし
Without taper

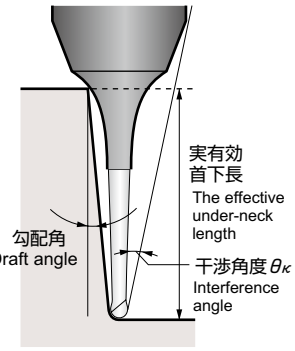



**首形状 Neck shape C**




**首形状 Neck shape D**
テーパ 20°
Taper 20°




# EPDBPE2○○○○-○○○.○-○○-ATH

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 首部テーパ半角 Neck angle BHTA2 | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. BD2 | 首元径 Under neck dia. BD3 | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 首形状 Neck shape | 仮想首長 Approx neck length ℓ' | 干渉角度 Interference angle (°) θκ | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格 (円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDBPE2006-4-09-ATH | ● | 0.3 | 0.6 | 0.9 | 4 | 0.4 | 0.57 | 0.683 | 50 | 4 | 7 | A | 1.35 | 8.41 | 2.67 | 4.70 | 5.07 | 5.37 | 5.85 | 7,790 |
| EPDBPE2006-6-09-ATH | ● | | | | 6 | 0.4 | 0.57 | 0.746 | 50 | 4 | 10 | A | 1.35 | 7.26 | 2.67 | 6.92 | 7.51 | 7.96 | 8.68 | 8,140 |
| EPDBPE2006-8-09-ATH | ● | | | | 8 | 0.4 | 0.57 | 0.809 | 50 | 4 | 10 | A | 1.35 | 6.38 | 2.67 | 8.96 | 9.67 | 10.18 | 10.98 | 8,370 |
| EPDBPE2006-10-09-ATH | ● | | | | 10 | 0.4 | 0.57 | 0.872 | 50 | 4 | 10 | A | 1.35 | 5.70 | 2.67 | 11.01 | 11.81 | 12.37 | 13.25 | 8,450 |
| EPDBPE2006-12-09-ATH | ● | | | | 12 | 0.4 | 0.57 | 0.934 | 55 | 4 | 10 | A | 1.35 | 5.14 | 2.67 | 13.05 | 13.94 | 14.54 | 15.49 | 9,150 |
| EPDBPE2006-15-09-ATH | ● | | | | 15 | 0.4 | 0.57 | 1.029 | 55 | 4 | 10 | A | 1.35 | 4.49 | 2.67 | 16.10 | 17.11 | 17.78 | 18.81 | 9,150 |
| EPDBPE2006-4-14-ATH | ● | | | 1.4 | 4 | 0.4 | 0.57 | 0.746 | 50 | 4 | 7 | A | 1.01 | 8.52 | 1.41 | 2.80 | 4.78 | 5.16 | 5.70 | 7,790 |
| EPDBPE2006-5-14-ATH | ● | | | | 5 | 0.4 | 0.57 | 0.795 | 50 | 4 | 7 | A | 1.01 | 7.91 | 1.41 | 2.80 | 5.80 | 6.23 | 6.83 | 8,140 |
| EPDBPE2006-6-14-ATH | ● | | | | 6 | 0.4 | 0.57 | 0.844 | 50 | 4 | 10 | A | 1.01 | 7.39 | 1.41 | 2.80 | 7.04 | 7.63 | 8.45 | 8,140 |
| EPDBPE2006-8-14-ATH | ● | | | | 8 | 0.4 | 0.57 | 0.941 | 50 | 4 | 10 | A | 1.01 | 6.52 | 1.41 | 2.80 | 9.08 | 9.78 | 10.71 | 8,370 |
| EPDBPE2006-10-14-ATH | ● | | | | 10 | 0.4 | 0.57 | 1.039 | 50 | 4 | 10 | A | 1.01 | 5.83 | 1.41 | 2.80 | 11.13 | 11.92 | 12.94 | 8,450 |
| EPDBPE2006-20-14-ATH | ● | | | | 20 | 0.4 | 0.57 | 1.528 | 60 | 4 | 10 | A | 1.01 | 3.82 | 1.41 | 2.80 | 21.31 | 22.47 | 23.84 | 10,150 |
| EPDBPE2006-6-29-ATH | ● | | | 2.9 | 6 | 0.4 | 0.57 | 1.137 | 50 | 4 | 10 | A | 0.69 | 7.79 | 0.77 | 0.90 | 1.12 | 1.58 | 7.45 | 8,140 |
| EPDBPE2006-8-29-ATH | ● | | | | 8 | 0.4 | 0.57 | 1.340 | 50 | 4 | 10 | A | 0.69 | 6.95 | 0.77 | 0.90 | 1.12 | 1.58 | 9.49 | 8,370 |
| EPDBPE2006-12-29-ATH | ● | | | | 12 | 0.4 | 0.57 | 1.745 | 55 | 4 | 10 | A | 0.69 | 5.71 | 0.77 | 0.90 | 1.12 | 1.58 | 13.56 | 9,150 |
| EPDBPE2006-20-29-ATH | ● | | | | 20 | 0.4 | 0.57 | 2.556 | 60 | 4 | 10 | B | 0.69 | 4.15 | 0.77 | 0.90 | 1.12 | 1.58 | 21.68 | 10,150 |
| EPDBPE2008-4-04-ATH | ● | 0.4 | 0.8 | 0.4 | 4 | 0.5 | 0.77 | 0.819 | 50 | 4 | 7 | A | 2.64 | 8.22 | 4.61 | 4.99 | 5.28 | 5.53 | 5.97 | 8,520 |
| EPDBPE2008-6-04-ATH | ● | | | | 6 | 0.5 | 0.77 | 0.847 | 50 | 4 | 7 | A | 2.64 | 7.01 | 6.66 | 7.14 | 7.50 | 7.79 | 8.30 | 8,730 |
| EPDBPE2008-8-04-ATH | ● | | | | 8 | 0.5 | 0.77 | 0.875 | 50 | 4 | 10 | A | 2.64 | 6.11 | 8.85 | 9.56 | 10.06 | 10.49 | 11.21 | 8,730 |
| EPDBPE2008-12-04-ATH | ● | | | | 12 | 0.5 | 0.77 | 0.931 | 55 | 4 | 10 | A | 2.64 | 4.86 | 12.93 | 13.83 | 14.44 | 14.94 | 15.77 | 9,200 |
| EPDBPE2008-8-09-ATH | ● | | | 0.9 | 8 | 0.5 | 0.77 | 1.006 | 50 | 4 | 10 | A | 1.45 | 6.24 | 2.77 | 8.96 | 9.66 | 10.17 | 10.97 | 8,730 |
| EPDBPE2008-12-09-ATH | ● | | | | 12 | 0.5 | 0.77 | 1.131 | 55 | 4 | 10 | A | 1.45 | 4.99 | 2.77 | 13.04 | 13.93 | 14.54 | 15.48 | 9,200 |
| EPDBPE2008-16-09-ATH | ● | | | | 16 | 0.5 | 0.77 | 1.257 | 55 | 4 | 10 | A | 1.45 | 4.15 | 2.77 | 17.12 | 18.16 | 18.85 | 19.90 | 9,530 |
| EPDBPE2008-16-29-ATH | ● | | | 2.9 | 16 | 0.5 | 0.77 | 2.340 | 55 | 4 | 10 | B | 0.79 | 4.67 | 0.87 | 1.00 | 1.22 | 1.69 | 17.62 | 9,530 |
| EPDBPE2008-20-29-ATH | ● | | | | 20 | 0.5 | 0.77 | 2.746 | 60 | 4 | 10 | B | 0.79 | 3.97 | 0.87 | 1.00 | 1.22 | 1.69 | 21.68 | 10,120 |
| EPDBPE2009-4-04-ATH | ● | 0.45 | 0.9 | 0.4 | 4 | 0.6 | 0.86 | 0.907 | 50 | 4 | 4 | A | 3.46 | 8.15 | 4.50 | 4.75 | 4.94 | 5.11 | 5.41 | 8,100 |
| EPDBPE2009-8-04-ATH | ● | | | | 8 | 0.6 | 0.86 | 0.963 | 55 | 4 | 7 | A | 3.46 | 6.03 | 8.75 | 9.30 | 9.70 | 10.03 | 10.60 | 8,100 |
| EPDBPE2009-12-04-ATH | ● | | | | 12 | 0.6 | 0.86 | 1.019 | 55 | 4 | 10 | A | 3.46 | 4.78 | 12.99 | 13.86 | 14.46 | 14.95 | 15.78 | 8,370 |
| EPDBPE2009-16-04-ATH | ● | | | | 16 | 0.6 | 0.86 | 1.075 | 60 | 4 | 10 | A | 3.46 | 3.96 | 17.07 | 18.08 | 18.77 | 19.33 | 20.54 | 10,020 |
| EPDBPE2009-18-04-ATH | ● | | | | 18 | 0.6 | 0.86 | 1.103 | 65 | 4 | 10 | A | 3.46 | 3.65 | 19.10 | 20.19 | 20.91 | 21.50 | 23.11 | 11,680 |
| EPDBPE2009-20-04-ATH | ● | | | | 20 | 0.6 | 0.86 | 1.131 | 65 | 4 | 10 | A | 3.46 | 3.38 | 21.13 | 22.29 | 23.05 | 23.66 | 25.68 | 11,680 |
| EPDBPE2009-22-04-ATH | ● | | | | 22 | 0.6 | 0.86 | 1.159 | 65 | 4 | 10 | A | 3.46 | 3.15 | 23.17 | 24.38 | 25.17 | 25.81 | 28.24 | 11,680 |
| EPDBPE2009-24-04-ATH | ● | | | | 24 | 0.6 | 0.86 | 1.187 | 70 | 4 | 10 | A | 3.46 | 2.95 | 25.20 | 26.47 | 27.29 | 27.96 | 干渉なし | 12,220 |
| EPDBPE2010-6-04-ATH | ● | 0.5 | 1 | 0.4 | 6 | 0.8 | 0.94 | 1.013 | 50 | 6 | 7 | A | 5.09 | 8.26 | 6.82 | 7.24 | 7.57 | 7.85 | 8.34 | 6,140 |
| EPDBPE2010-8-04-ATH | ● | | | | 8 | 0.8 | 0.94 | 1.041 | 55 | 6 | 7 | A | 5.09 | 7.44 | 8.85 | 9.36 | 9.74 | 10.07 | 10.62 | 6,720 |
| EPDBPE2010-10-04-ATH | ● | | | | 10 | 0.8 | 0.94 | 1.068 | 55 | 6 | 10 | A | 5.09 | 6.76 | 11.07 | 11.79 | 12.33 | 12.78 | 13.54 | 7,430 |
| EPDBPE2010-15-04-ATH | ● | | | | 15 | 0.8 | 0.94 | 1.138 | 60 | 6 | 10 | A | 5.09 | 5.51 | 16.16 | 17.08 | 17.73 | 18.27 | 19.31 | 7,790 |
| EPDBPE2010-20-04-ATH | ● | | | | 20 | 0.8 | 0.94 | 1.208 | 65 | 6 | 10 | A | 5.09 | 4.65 | 21.23 | 22.33 | 23.08 | 23.69 | 25.73 | 9,430 |
| EPDBPE2010-25-04-ATH | ● | | | | 25 | 0.8 | 0.94 | 1.278 | 70 | 6 | 10 | A | 5.09 | 4.02 | 26.31 | 27.56 | 28.38 | 29.05 | 32.15 | 10,020 |
| EPDBPE2010-30-04-ATH | ● | | | | 30 | 0.8 | 0.94 | 1.348 | 75 | 6 | 10 | A | 5.09 | 3.54 | 31.37 | 32.76 | 33.66 | 34.82 | 38.57 | 10,310 |
| EPDBPE2010-50-04-ATH | ● | | | | 50 | 0.8 | 0.94 | 1.627 | 95 | 6 | 10 | A | 5.09 | 2.40 | 51.62 | 53.44 | 55.27 | 57.96 | 干渉なし | 11,900 |
| EPDBPE2010-70-04-ATH | ● | | | | 70 | 0.8 | 0.94 | 1.906 | 115 | 6 | 10 | A | 5.09 | 1.81 | 71.83 | 73.98 | 77.33 | 干渉なし | 干渉なし | 13,390 |
| EPDBPE2010-6-09-ATH | ● | | | 0.9 | 6 | 0.8 | 0.94 | 1.103 | 50 | 6 | 7 | A | 2.70 | 8.36 | 5.47 | 6.91 | 7.32 | 7.65 | 8.19 | 6,140 |
| EPDBPE2010-10-09-ATH | ● | | | | 10 | 0.8 | 0.94 | 1.229 | 55 | 6 | 10 | A | 2.70 | 6.88 | 5.47 | 11.20 | 11.91 | 12.44 | 13.28 | 7,430 |
| EPDBPE2010-15-09-ATH | ● | | | | 15 | 0.8 | 0.94 | 1.386 | 60 | 6 | 10 | A | 2.70 | 5.64 | 5.47 | 16.28 | 17.19 | 17.84 | 18.84 | 7,790 |
| EPDBPE2010-16-09-ATH | ● | | | | 16 | 0.8 | 0.94 | 1.418 | 60 | 6 | 10 | A | 2.70 | 5.44 | 5.47 | 17.29 | 18.24 | 18.91 | 19.94 | 7,790 |
| EPDBPE2010-20-09-ATH | ● | | | | 20 | 0.8 | 0.94 | 1.543 | 65 | 6 | 10 | A | 2.70 | 4.77 | 5.47 | 21.35 | 22.44 | 23.18 | 24.68 | 9,430 |
| EPDBPE2010-25-09-ATH | ● | | | | 25 | 0.8 | 0.94 | 1.700 | 70 | 6 | 10 | A | 2.70 | 4.14 | 5.47 | 26.42 | 27.66 | 28.48 | 30.83 | 10,020 |
| EPDBPE2010-30-09-ATH | ● | | | | 30 | 0.8 | 0.94 | 1.857 | 75 | 6 | 10 | A | 2.70 | 3.65 | 5.47 | 31.49 | 32.86 | 33.75 | 36.98 | 10,310 |
| EPDBPE2010-35-09-ATH | ● | | | | 35 | 0.8 | 0.94 | 2.015 | 80 | 6 | 10 | A | 2.70 | 3.27 | 5.47 | 36.55 | 38.04 | 39.00 | 43.12 | 10,940 |
| EPDBPE2010-40-09-ATH | ● | | | | 40 | 0.8 | 0.94 | 2.172 | 85 | 6 | 10 | A | 2.70 | 2.96 | 5.47 | 41.61 | 43.22 | 44.46 | 干渉なし | 11,150 |
| EPDBPE2010-50-09-ATH | ● | | | | 50 | 0.8 | 0.94 | 2.486 | 95 | 6 | 10 | A | 2.70 | 2.48 | 5.47 | 51.73 | 53.53 | 55.55 | 干渉なし | 11,900 |
| EPDBPE2010-60-09-ATH | ● | | | | 60 | 0.8 | 0.94 | 2.800 | 105 | 6 | 10 | A | 2.70 | 2.14 | 5.47 | 61.84 | 63.81 | 66.63 | 干渉なし | 12,650 |
| EPDBPE2010-70-09-ATH | ● | | | | 70 | 0.8 | 0.94 | 3.114 | 115 | 6 | 10 | A | 2.70 | 1.88 | 5.47 | 71.94 | 74.09 | 干渉なし | 干渉なし | 13,390 |

Epoch Pencil Deep Ball Evolution

# エポックペンシルディープボールエボリューション

## EPDBPE2○○○-○○○.○-○○-ATH

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 首部テーパ半角 Neck angle BHTA2 | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. BD2 | 首元径 Under neck dia. BD3 | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 首形状 Neck shape | 仮想首長 Approx neck length ℓ' | 干渉角度 Interference angle (°) θK | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDBPE2010-6-14-ATH | ● | 0.5 | 1 | 1.4 | 6 | 0.8 | 0.94 | 1.194 | 50 | 6 | 7 | A | 2.02 | 8.47 | 2.87 | 5.85 | 7.01 | 7.41 | 8.01 | 6,140 |
| EPDBPE2010-12-14-ATH | ● | | | | 12 | 0.8 | 0.94 | 1.487 | 60 | 6 | 10 | A | 2.02 | 6.45 | 2.87 | 5.85 | 13.36 | 14.14 | 15.20 | 7,430 |
| EPDBPE2010-16-14-ATH | ● | | | | 16 | 0.8 | 0.94 | 1.683 | 60 | 6 | 10 | A | 2.02 | 5.57 | 2.87 | 5.85 | 17.42 | 18.36 | 19.56 | 7,790 |
| EPDBPE2010-20-14-ATH | ● | | | | 20 | 0.8 | 0.94 | 1.878 | 65 | 6 | 10 | A | 2.02 | 4.90 | 2.87 | 5.85 | 21.48 | 22.55 | 23.88 | 9,430 |
| EPDBPE2010-22-14-ATH | ● | | | | 22 | 0.8 | 0.94 | 1.976 | 70 | 6 | 10 | A | 2.02 | 4.62 | 2.87 | 5.85 | 23.50 | 24.64 | 26.03 | 9,680 |
| EPDBPE2010-25-14-ATH | ● | | | | 25 | 0.8 | 0.94 | 2.123 | 70 | 6 | 10 | A | 2.02 | 4.26 | 2.87 | 5.85 | 26.55 | 27.76 | 29.51 | 10,020 |
| EPDBPE2010-50-14-ATH | ● | | | | 50 | 0.8 | 0.94 | 3.345 | 95 | 6 | 10 | A | 2.02 | 2.57 | 2.87 | 5.85 | 51.84 | 53.63 | 干渉なし | 11,900 |
| EPDBPE2010-90-14-ATH | ● | | | | 90 | 0.8 | 0.94 | 5.300 | 135 | 6 | 10 | B | 2.02 | 1.56 | 2.87 | 5.85 | 92.23 | 干渉なし | 干渉なし | 18,000 |
| EPDBPE2010-10-29-ATH | ● | | | 2.9 | 10 | 0.8 | 0.94 | 1.872 | 55 | 6 | 10 | A | 1.39 | 7.42 | 1.57 | 1.86 | 2.35 | 3.39 | 11.74 | 7,430 |
| EPDBPE2010-15-29-ATH | ● | | | | 15 | 0.8 | 0.94 | 2.379 | 60 | 6 | 10 | A | 1.39 | 6.20 | 1.57 | 1.86 | 2.35 | 3.39 | 16.81 | 7,790 |
| EPDBPE2010-20-29-ATH | ● | | | | 20 | 0.8 | 0.94 | 2.885 | 65 | 6 | 10 | A | 1.39 | 5.33 | 1.57 | 1.86 | 2.35 | 3.39 | 21.88 | 9,430 |
| EPDBPE2010-30-29-ATH | ● | | | | 30 | 0.8 | 0.94 | 3.898 | 75 | 6 | 10 | A | 1.39 | 4.16 | 1.57 | 1.86 | 2.35 | 3.39 | 32.00 | 10,310 |
| EPDBPE2010-40-29-ATH | ● | | | | 40 | 0.8 | 0.94 | 4.912 | 85 | 6 | 10 | B | 1.39 | 3.35 | 1.57 | 1.86 | 2.35 | 3.39 | 42.11 | 11,150 |
| EPDBPE2010-50-29-ATH | ● | | | | 50 | 0.8 | 0.94 | 6.000 | 130 | 6 | - | C | 1.39 | 2.89 | 1.57 | 1.86 | 2.35 | 3.39 | 干渉なし | 15,220 |
| EPDBPE2010-20-49-ATH | ● | | | 4.9 | 20 | 0.8 | 0.94 | 4.232 | 65 | 6 | 10 | B | 1.14 | 6.04 | 1.22 | 1.31 | 1.43 | 1.60 | 2.19 | 11,470 |
| EPDBPE2012-20-29-ATH | ● | 0.6 | 1.2 | 2.9 | 20 | 1.1 | 1.13 | 3.045 | 65 | 6 | 10 | A | 1.79 | 5.21 | 2.03 | 2.41 | 3.07 | 4.45 | 21.98 | 11,470 |
| EPDBPE2012-35-29-ATH | ● | | | | 35 | 1.1 | 1.13 | 4.565 | 80 | 6 | 10 | B | 1.79 | 3.61 | 2.03 | 2.41 | 3.07 | 4.45 | 37.15 | 12,540 |
| EPDBPE2015-8-04-ATH | ● | 0.75 | 1.5 | 0.4 | 8 | 1.35 | 1.42 | 1.513 | 55 | 6 | 7 | A | 7.07 | 7.21 | 8.95 | 9.41 | 9.78 | 10.09 | 10.62 | 7,490 |
| EPDBPE2015-10-04-ATH | ● | | | | 10 | 1.35 | 1.42 | 1.541 | 55 | 6 | 7 | A | 7.07 | 6.51 | 10.97 | 11.52 | 11.93 | 12.28 | 12.90 | 7,790 |
| EPDBPE2015-12-04-ATH | ● | | | | 12 | 1.35 | 1.42 | 1.569 | 55 | 6 | 7 | A | 7.07 | 5.93 | 13.00 | 13.62 | 14.07 | 14.45 | 15.47 | 7,790 |
| EPDBPE2015-30-04-ATH | ● | | | | 30 | 1.35 | 1.42 | 1.820 | 75 | 6 | 10 | A | 7.07 | 3.30 | 31.46 | 32.79 | 33.68 | 34.85 | 38.57 | 11,900 |
| EPDBPE2015-10-09-ATH | ● | | | 0.9 | 10 | 1.35 | 1.42 | 1.692 | 55 | 6 | 7 | A | 3.89 | 6.63 | 7.83 | 11.08 | 11.61 | 12.02 | 12.67 | 7,790 |
| EPDBPE2015-15-09-ATH | ● | | | | 15 | 1.35 | 1.42 | 1.849 | 60 | 6 | 10 | A | 3.89 | 5.36 | 7.83 | 16.40 | 17.25 | 17.88 | 18.86 | 8,490 |
| EPDBPE2015-20-09-ATH | ● | | | | 20 | 1.35 | 1.42 | 2.006 | 65 | 6 | 10 | A | 3.89 | 4.50 | 7.83 | 21.47 | 22.49 | 23.21 | 24.72 | 9,430 |
| EPDBPE2015-30-09-ATH | ● | | | | 30 | 1.35 | 1.42 | 2.320 | 75 | 6 | 10 | A | 3.89 | 3.40 | 7.83 | 31.59 | 32.90 | 33.78 | 37.01 | 11,900 |
| EPDBPE2015-10-14-ATH | ● | | | 1.4 | 10 | 1.35 | 1.42 | 1.843 | 55 | 6 | 7 | A | 2.98 | 6.75 | 4.23 | 8.59 | 11.19 | 11.70 | 12.45 | 7,790 |
| EPDBPE2015-20-14-ATH | ● | | | | 20 | 1.35 | 1.42 | 2.332 | 65 | 6 | 10 | A | 2.98 | 4.62 | 4.23 | 8.59 | 21.61 | 22.61 | 23.91 | 9,430 |
| EPDBPE2015-30-14-ATH | ● | | | | 30 | 1.35 | 1.42 | 2.820 | 75 | 6 | 10 | A | 2.98 | 3.51 | 4.23 | 8.59 | 31.73 | 33.02 | 35.45 | 11,900 |
| EPDBPE2015-40-14-ATH | ● | | | | 40 | 1.35 | 1.42 | 3.309 | 85 | 6 | 10 | A | 2.98 | 2.83 | 4.23 | 8.59 | 41.84 | 43.36 | 干渉なし | 12,750 |
| EPDBPE2015-50-14-ATH | ● | | | | 50 | 1.35 | 1.42 | 3.798 | 95 | 6 | 10 | A | 2.98 | 2.37 | 4.23 | 8.59 | 51.95 | 53.67 | 干渉なし | 13,390 |
| EPDBPE2015-20-29-ATH | ● | | | 2.9 | 20 | 1.35 | 1.42 | 3.310 | 65 | 6 | 10 | A | 2.13 | 5.03 | 2.42 | 2.87 | 3.63 | 5.25 | 22.05 | 10,380 |
| EPDBPE2015-46-29-ATH | ● | | | | 46 | 1.35 | 1.42 | 6.000 | 95 | 6 | - | C | 2.13 | 2.84 | 2.42 | 2.87 | 3.63 | 5.25 | 干渉なし | 13,290 |
| EPDBPE2018-4-04-ATH | ● | 0.9 | 1.8 | 0.4 | 4 | 1.6 | 1.73 | 1.764 | 50 | 6 | 4 | A | 4.38 | 9.14 | 4.63 | 4.82 | 4.99 | 5.14 | 5.40 | 8,860 |
| EPDBPE2018-8-04-ATH | ● | | | | 8 | 1.6 | 1.73 | 1.819 | 50 | 6 | 4 | A | 6.61 | 7.07 | 8.68 | 9.01 | 9.27 | 9.49 | 10.27 | 8,860 |
| EPDBPE2018-12-04-ATH | ● | | | | 12 | 1.6 | 1.73 | 1.875 | 55 | 6 | 7 | A | 6.61 | 5.77 | 12.97 | 13.59 | 14.05 | 14.43 | 15.40 | 8,860 |
| EPDBPE2018-16-04-ATH | ● | | | | 16 | 1.6 | 1.73 | 1.931 | 60 | 6 | 7 | A | 6.61 | 4.87 | 17.02 | 17.77 | 18.30 | 18.73 | 20.53 | 8,860 |
| EPDBPE2018-20-04-ATH | ● | | | | 20 | 1.6 | 1.73 | 1.987 | 65 | 6 | 10 | A | 6.61 | 4.21 | 21.29 | 22.35 | 23.08 | 23.68 | 25.67 | 8,860 |
| EPDBPE2018-24-04-ATH | ● | | | | 24 | 1.6 | 1.73 | 2.043 | 65 | 6 | 10 | A | 6.61 | 3.71 | 25.35 | 26.53 | 27.33 | 27.97 | 30.80 | 10,120 |
| EPDBPE2018-28-04-ATH | ● | | | | 28 | 1.6 | 1.73 | 2.099 | 70 | 6 | 10 | A | 6.61 | 3.32 | 29.40 | 30.69 | 31.55 | 32.49 | 35.94 | 12,010 |
| EPDBPE2018-32-04-ATH | ● | | | | 32 | 1.6 | 1.73 | 2.154 | 70 | 6 | 10 | A | 6.61 | 3.00 | 33.45 | 34.85 | 35.76 | 37.11 | 干渉なし | 12,010 |
| EPDBPE2018-36-04-ATH | ● | | | | 36 | 1.6 | 1.73 | 2.210 | 75 | 6 | 10 | A | 6.61 | 2.74 | 37.50 | 38.99 | 39.96 | 41.74 | 干渉なし | 12,010 |
| EPDBPE2018-38-04-ATH | ● | | | | 38 | 1.6 | 1.73 | 2.238 | 80 | 6 | 10 | A | 6.61 | 2.62 | 39.53 | 41.06 | 42.05 | 44.06 | 干渉なし | 12,860 |
| EPDBPE2018-40-04-ATH | ● | | | | 40 | 1.6 | 1.73 | 2.266 | 80 | 6 | 10 | A | 6.61 | 2.52 | 41.55 | 43.13 | 44.24 | 46.37 | 干渉なし | 12,860 |
| EPDBPE2020-8-04-ATH | ● | 1 | 2 | 0.4 | 8 | 1.7 | 1.92 | 2.008 | 50 | 6 | 4 | A | 7.42 | 6.96 | 8.70 | 9.03 | 9.28 | 9.50 | 10.27 | 6,560 |
| EPDBPE2020-12-04-ATH | ● | | | | 12 | 1.7 | 1.92 | 2.064 | 55 | 6 | 7 | A | 7.42 | 5.64 | 13.00 | 13.61 | 14.06 | 14.43 | 15.40 | 6,840 |
| EPDBPE2020-16-04-ATH | ● | | | | 16 | 1.7 | 1.92 | 2.120 | 60 | 6 | 7 | A | 7.42 | 4.74 | 17.05 | 17.79 | 18.31 | 18.74 | 20.54 | 7,080 |
| EPDBPE2020-20-04-ATH | ● | | | | 20 | 1.7 | 1.92 | 2.176 | 65 | 6 | 10 | A | 7.42 | 4.09 | 21.33 | 22.37 | 23.09 | 23.68 | 25.67 | 8,490 |
| EPDBPE2020-25-04-ATH | ● | | | | 25 | 1.7 | 1.92 | 2.245 | 65 | 6 | 10 | A | 7.42 | 3.49 | 26.40 | 27.59 | 28.39 | 29.05 | 32.09 | 9,430 |
| EPDBPE2020-30-04-ATH | ● | | | | 30 | 1.7 | 1.92 | 2.315 | 70 | 6 | 10 | A | 7.42 | 3.04 | 31.46 | 32.79 | 33.67 | 34.81 | 38.51 | 10,380 |
| EPDBPE2020-40-04-ATH | ● | | | | 40 | 1.7 | 1.92 | 2.455 | 80 | 6 | 10 | A | 7.42 | 2.42 | 41.58 | 43.14 | 44.26 | 46.39 | 干渉なし | 12,220 |
| EPDBPE2020-80-04-ATH | ● | | | | 80 | 1.7 | 1.92 | 3.013 | 120 | 6 | 10 | A | 7.42 | 1.34 | 81.99 | 84.47 | 干渉なし | 干渉なし | 干渉なし | 16,720 |
| EPDBPE2020-12-09-ATH | ● | | | 0.9 | 12 | 1.7 | 1.92 | 2.244 | 55 | 6 | 7 | A | 4.24 | 5.76 | 8.30 | 13.11 | 13.70 | 14.14 | 14.84 | 6,840 |
| EPDBPE2020-16-09-ATH | ● | | | | 16 | 1.7 | 1.92 | 2.369 | 60 | 6 | 7 | A | 4.24 | 4.86 | 8.30 | 17.16 | 17.88 | 18.39 | 19.76 | 7,080 |
| EPDBPE2020-20-09-ATH | ● | | | | 20 | 1.7 | 1.92 | 2.495 | 65 | 6 | 10 | A | 4.24 | 4.20 | 8.30 | 21.48 | 22.49 | 23.20 | 24.68 | 8,490 |
| EPDBPE2020-25-09-ATH | ● | | | | 25 | 1.7 | 1.92 | 2.652 | 65 | 6 | 10 | A | 4.24 | 3.60 | 8.30 | 26.54 | 27.70 | 28.50 | 30.82 | 9,430 |
| EPDBPE2020-30-09-ATH | ● | | | | 30 | 1.7 | 1.92 | 2.809 | 70 | 6 | 10 | A | 4.24 | 3.14 | 8.30 | 31.60 | 32.90 | 33.77 | 36.97 | 10,380 |
| EPDBPE2020-35-09-ATH | ● | | | | 35 | 1.7 | 1.92 | 2.966 | 75 | 6 | 10 | A | 4.24 | 2.79 | 8.30 | 36.66 | 38.08 | 39.02 | 干渉なし | 13,390 |
| EPDBPE2020-40-09-ATH | ● | | | | 40 | 1.7 | 1.92 | 3.123 | 80 | 6 | 10 | A | 4.24 | 2.51 | 8.30 | 41.72 | 43.25 | 44.50 | 干渉なし | 14,150 |
| EPDBPE2020-50-09-ATH | ● | | | | 50 | 1.7 | 1.92 | 3.438 | 90 | 6 | 10 | A | 4.24 | 2.09 | 8.30 | 51.82 | 53.56 | 55.58 | 干渉なし | 15,530 |
| EPDBPE2020-60-09-ATH | ● | | | | 60 | 1.7 | 1.92 | 3.752 | 100 | 6 | 10 | A | 4.24 | 1.79 | 8.30 | 61.92 | 63.84 | 干渉なし | 干渉なし | 16,290 |
| EPDBPE2020-70-09-ATH | ● | | | | 70 | 1.7 | 1.92 | 4.066 | 110 | 6 | 10 | A | 4.24 | 1.56 | 8.30 | 72.02 | 74.15 | 干渉なし | 干渉なし | 17,260 |
| EPDBPE2020-75-09-ATH | ● | | | | 75 | 1.7 | 1.92 | 4.223 | 115 | 6 | 10 | B | 4.24 | 1.47 | 8.30 | 77.06 | 干渉なし | 干渉なし | 干渉なし | 18,000 |
| EPDBPE2020-10-14-ATH | ● | | | 1.4 | 10 | 1.7 | 1.92 | 2.326 | 55 | 6 | 7 | A | 3.33 | 6.47 | 4.63 | 9.19 | 11.20 | 11.70 | 12.43 | 6,800 |
| EPDBPE2020-16-14-ATH | ● | | | | 16 | 1.7 | 1.92 | 2.619 | 60 | 6 | 7 | A | 3.33 | 4.98 | 4.63 | 9.19 | 17.27 | 17.97 | 18.98 | 7,080 |
| EPDBPE2020-20-14-ATH | ● | | | | 20 | 1.7 | 1.92 | 2.814 | 65 | 6 | 10 | A | 3.33 | 4.32 | 4.63 | 9.19 | 21.62 | 22.61 | 23.90 | 8,490 |
| EPDBPE2020-22-14-ATH | ● | | | | 22 | 1.7 | 1.92 | 2.912 | 65 | 6 | 10 | A | 3.33 | 4.05 | 4.63 | 9.19 | 23.65 | 24.70 | 26.05 | 8,490 |
| EPDBPE2020-25-14-ATH | ● | | | | 25 | 1.7 | 1.92 | 3.059 | 65 | 6 | 10 | A | 3.33 | 3.71 | 4.63 | 9.19 | 26.68 | 27.82 | 29.55 | 9,430 |

●：標準在庫品です。●：Stocked items.　干渉なし：No interference

# EPDBPE2○○○○-○○○.○-○○-ATH

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 首部テーパ半角 Neck angle BHTA2 | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. BD2 | 首元径 Under neck dia. BD3 | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 首形状 Neck shape | 仮想首長 Approx neck length ℓ' | 干渉角度 Interference angle (°) θK | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDBPE2020-30-14-ATH | ● | 1 | 2 | 1.4 | 30 | 1.7 | 1.92 | 3.303 | 70 | 6 | 10 | A | 3.33 | 3.24 | 4.63 | 9.19 | 31.74 | 33.02 | 35.42 | 12,220 |
| EPDBPE2020-40-14-ATH | ● | | | | 40 | 1.7 | 1.92 | 3.792 | 80 | 6 | 10 | A | 3.33 | 2.60 | 4.63 | 9.19 | 41.85 | 43.36 | 干渉なし | 14,150 |
| EPDBPE2020-50-14-ATH | ● | | | | 50 | 1.7 | 1.92 | 4.281 | 90 | 6 | 10 | B | 3.33 | 2.16 | 4.63 | 9.19 | 51.96 | 53.67 | 干渉なし | 15,530 |
| EPDBPE2020-75-14-ATH | ● | | | | 75 | 1.7 | 1.92 | 5.503 | 115 | 6 | 10 | B | 3.33 | 1.51 | 4.63 | 9.19 | 77.19 | 干渉なし | 干渉なし | 18,000 |
| EPDBPE2020-12-29-ATH | ● | | | 2.9 | 12 | 1.7 | 1.92 | 2.964 | 55 | 6 | 7 | A | 2.48 | 6.30 | 2.80 | 3.27 | 4.09 | 5.83 | 13.57 | 6,840 |
| EPDBPE2020-15-29-ATH | ● | | | | 15 | 1.7 | 1.92 | 3.267 | 60 | 6 | 7 | A | 2.48 | 5.60 | 2.80 | 3.27 | 4.09 | 5.83 | 16.59 | 7,080 |
| EPDBPE2020-20-29-ATH | ● | | | | 20 | 1.7 | 1.92 | 3.774 | 65 | 6 | 10 | A | 2.48 | 4.72 | 2.80 | 3.27 | 4.09 | 5.83 | 22.08 | 9,430 |
| EPDBPE2020-41-29-ATH | ● | | | | 41 | 1.7 | 1.92 | 6.000 | 130 | 6 | - | C | 2.48 | 2.85 | 2.8 | 3.27 | 4.09 | 5.83 | 干渉なし | 14,680 |
| EPDBPE2020-20-49-ATH | ● | | | 4.9 | 20 | 1.7 | 1.92 | 5.058 | 65 | 6 | 10 | B | 2.16 | 5.19 | 2.29 | 2.46 | 2.68 | 2.98 | 4.04 | 12,970 |
| EPDBPE2030-8-04-ATH | ● | 1.5 | 3 | 0.4 | 8 | 2.5 | 2.86 | 2.937 | 50 | 6 | 4 | A | 8.50 | 6.25 | 8.87 | 9.13 | 9.35 | 9.55 | 10.33 | 8,490 |
| EPDBPE2030-16-04-ATH | ● | | | | 16 | 2.5 | 2.86 | 3.048 | 55 | 6 | 7 | A | 12.52 | 4.01 | 17.25 | 17.89 | 18.38 | 18.79 | 20.60 | 9,430 |
| EPDBPE2030-20-04-ATH | ● | | | | 20 | 2.5 | 2.86 | 3.104 | 60 | 6 | 7 | A | 12.52 | 3.40 | 21.29 | 22.04 | 22.60 | 23.34 | 25.74 | 10,020 |
| EPDBPE2030-30-04-ATH | ● | | | | 30 | 2.5 | 2.86 | 3.244 | 70 | 6 | 10 | A | 12.52 | 2.46 | 31.67 | 32.88 | 33.73 | 34.92 | 干渉なし | 11,680 |
| EPDBPE2030-40-04-ATH | ● | | | | 40 | 2.5 | 2.86 | 3.384 | 80 | 6 | 10 | A | 12.52 | 1.93 | 41.78 | 43.23 | 44.38 | 干渉なし | 干渉なし | 12,970 |
| EPDBPE2030-50-04-ATH | ● | | | | 50 | 2.5 | 2.86 | 3.523 | 90 | 6 | 10 | A | 12.52 | 1.59 | 51.87 | 53.53 | 55.41 | 干渉なし | 干渉なし | 15,000 |
| EPDBPE2030-80-04-ATH | ● | | | | 80 | 2.5 | 2.86 | 3.942 | 120 | 6 | 10 | A | 12.52 | 1.04 | 82.14 | 84.60 | 干渉なし | 干渉なし | 干渉なし | 19,280 |
| EPDBPE2030-15-09-ATH | ● | | | 0.9 | 15 | 2.5 | 2.86 | 3.253 | 55 | 6 | 7 | A | 6.95 | 4.30 | 13.78 | 16.35 | 16.95 | 17.41 | 18.64 | 9,430 |
| EPDBPE2030-20-09-ATH | ● | | | | 20 | 2.5 | 2.86 | 3.410 | 60 | 6 | 7 | A | 6.95 | 3.50 | 13.78 | 21.40 | 22.14 | 22.68 | 24.78 | 10,020 |
| EPDBPE2030-30-09-ATH | ● | | | | 30 | 2.5 | 2.86 | 3.724 | 70 | 6 | 10 | A | 6.95 | 2.54 | 13.78 | 31.82 | 33.00 | 33.84 | 干渉なし | 11,680 |
| EPDBPE2030-35-09-ATH | ● | | | | 35 | 2.5 | 2.86 | 3.881 | 75 | 6 | 10 | A | 6.95 | 2.24 | 13.78 | 36.87 | 38.18 | 39.11 | 干渉なし | 12,320 |
| EPDBPE2030-40-09-ATH | ● | | | | 40 | 2.5 | 2.86 | 4.038 | 80 | 6 | 10 | A | 6.95 | 2.00 | 13.78 | 41.92 | 43.34 | 干渉なし | 干渉なし | 12,970 |
| EPDBPE2030-50-09-ATH | ● | | | | 50 | 2.5 | 2.86 | 4.352 | 90 | 6 | 10 | B | 6.95 | 1.64 | 13.78 | 52.01 | 53.64 | 干渉なし | 干渉なし | 15,000 |
| EPDBPE2030-60-09-ATH | ● | | | | 60 | 2.5 | 2.86 | 4.667 | 100 | 6 | 10 | B | 6.95 | 1.39 | 13.78 | 62.10 | 干渉なし | 干渉なし | 干渉なし | 16,500 |
| EPDBPE2030-70-09-ATH | ● | | | | 70 | 2.5 | 2.86 | 4.981 | 110 | 6 | 10 | B | 6.95 | 1.20 | 13.78 | 72.19 | 干渉なし | 干渉なし | 干渉なし | 18,540 |
| EPDBPE2030-90-09-ATH | ● | | | | 90 | 2.5 | 2.86 | 5.609 | 130 | 6 | 10 | B | 6.95 | 0.95 | 13.78 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 21,650 |
| EPDBPE2030-30-14-ATH | ● | | | 1.4 | 30 | 2.5 | 2.86 | 4.204 | 70 | 6 | 10 | B | 5.36 | 2.63 | 7.51 | 15.05 | 31.97 | 33.13 | 干渉なし | 11,680 |
| EPDBPE2030-40-14-ATH | ● | | | | 40 | 2.5 | 2.86 | 4.693 | 80 | 6 | 10 | B | 5.36 | 2.05 | 7.51 | 15.05 | 42.06 | 43.46 | 干渉なし | 12,970 |
| EPDBPE2030-50-14-ATH | ● | | | | 50 | 2.5 | 2.86 | 5.182 | 90 | 6 | 10 | B | 5.36 | 1.68 | 7.51 | 15.05 | 52.16 | 干渉なし | 干渉なし | 15,000 |
| EPDBPE2030-66-14-ATH | ● | | | | 66 | 2.5 | 2.86 | 6.000 | 140 | 6 | - | C | 5.36 | 1.34 | 7.51 | 15.05 | 干渉なし | 干渉なし | 干渉なし | 16,500 |
| EPDBPE2030-30-29-ATH | ● | | | 2.9 | 30 | 2.5 | 2.86 | 5.646 | 70 | 6 | 10 | B | 3.88 | 2.83 | 4.37 | 5.14 | 6.45 | 9.22 | 干渉なし | 13,610 |
| EPDBPE2040-60-04-ATH | ● | 2 | 4 | 0.4 | 60 | 8 | 3.86 | 4.586 | 110 | 8 | 10 | A | 18.02 | 1.74 | 62.14 | 63.88 | 66.58 | 干渉なし | 干渉なし | 18,860 |
| EPDBPE2040-100-04-ATH | ● | | | | 100 | 8 | 3.86 | 5.145 | 150 | 8 | 10 | B | 18.02 | 1.10 | 102.44 | 105.83 | 干渉なし | 干渉なし | 干渉なし | 25,390 |
| EPDBPE2040-20-09-ATH | ● | | | 0.9 | 20 | 8 | 3.86 | 4.237 | 70 | 8 | 7 | A | 12.45 | 4.26 | 20.79 | 21.76 | 22.37 | 22.87 | 25.16 | 11,370 |
| EPDBPE2040-30-09-ATH | ● | | | | 30 | 8 | 3.86 | 4.551 | 80 | 8 | 7 | A | 12.45 | 3.17 | 25.53 | 31.83 | 32.66 | 33.95 | 37.45 | 11,370 |
| EPDBPE2040-35-09-ATH | ● | | | | 35 | 8 | 3.86 | 4.708 | 85 | 8 | 7 | A | 12.45 | 2.82 | 25.53 | 36.87 | 37.79 | 39.50 | 干渉なし | 12,320 |
| EPDBPE2040-40-09-ATH | ● | | | | 40 | 8 | 3.86 | 4.865 | 90 | 8 | 10 | B | 12.45 | 2.53 | 25.53 | 42.31 | 43.56 | 45.04 | 干渉なし | 14,460 |
| EPDBPE2040-50-09-ATH | ● | | | | 50 | 8 | 3.86 | 5.180 | 100 | 8 | 10 | B | 12.45 | 2.10 | 25.53 | 52.39 | 53.84 | 56.12 | 干渉なし | 17,040 |
| EPDBPE2040-60-09-ATH | ● | | | | 60 | 8 | 3.86 | 5.494 | 110 | 8 | 10 | B | 12.45 | 1.80 | 25.53 | 62.46 | 64.14 | 干渉なし | 干渉なし | 18,640 |
| EPDBPE2040-120-09-ATH | ● | | | | 120 | 8 | 3.86 | 7.379 | 170 | 8 | - | D | 12.45 | 0.97 | 25.53 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 38,780 |
| EPDBPE2040-45-14-ATH | ● | | | 1.4 | 45 | 8 | 3.86 | 5.669 | 95 | 8 | 10 | B | 10.86 | 2.37 | 15.79 | 33.06 | 47.66 | 48.93 | 干渉なし | 15,000 |
| EPDBPE2040-80-14-ATH | ● | | | | 80 | 8 | 3.86 | 7.379 | 130 | 8 | 10 | B | 10.86 | 1.43 | 15.79 | 33.06 | 干渉なし | 干渉なし | 干渉なし | 23,360 |
| EPDBPE2040-25-29-ATH | ● | | | 2.9 | 25 | 8 | 3.86 | 5.582 | 75 | 8 | 7 | B | 9.38 | 3.99 | 10.91 | 13.27 | 17.30 | 25.73 | 27.74 | 11,370 |
| EPDBPE2050-100-04-ATH | ● | 2.5 | 5 | 0.4 | 100 | 10 | 4.86 | 6.117 | 150 | 8 | 10 | B | 20.02 | 0.85 | 102.48 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 26,370 |
| EPDBPE2050-30-09-ATH | ● | | | 0.9 | 30 | 10 | 4.86 | 5.488 | 80 | 8 | 7 | B | 14.45 | 2.58 | 29.41 | 31.92 | 32.71 | 34.04 | 干渉なし | 17,850 |
| EPDBPE2050-40-09-ATH | ● | | | | 40 | 10 | 4.86 | 5.803 | 90 | 8 | 7 | B | 14.45 | 2.02 | 29.41 | 41.98 | 43.12 | 45.12 | 干渉なし | 18,300 |
| EPDBPE2050-60-09-ATH | ● | | | | 60 | 10 | 4.86 | 6.431 | 110 | 8 | 10 | B | 14.45 | 1.40 | 29.41 | 62.56 | 干渉なし | 干渉なし | 干渉なし | 19,870 |
| EPDBPE2050-90-09-ATH | ● | | | | 90 | 10 | 4.86 | 7.373 | 140 | 8 | 10 | B | 14.45 | 0.96 | 29.41 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 25,370 |
| EPDBPE2050-60-14-ATH | ● | | | 1.4 | 60 | 10 | 4.86 | 7.304 | 110 | 8 | 10 | B | 12.86 | 1.43 | 18.62 | 38.82 | 干渉なし | 干渉なし | 干渉なし | 19,870 |
| EPDBPE2050-74-14-ATH | ● | | | | 74 | 10 | 4.86 | 8.000 | 150 | 8 | - | C | 12.86 | 1.21 | 18.62 | 38.82 | 干渉なし | 干渉なし | 干渉なし | 24,020 |
| EPDBPE2050-40-29-ATH | ● | | | 2.9 | 40 | 10 | 4.86 | 8.000 | 90 | 8 | - | C | 11.38 | 2.28 | 13.23 | 16.06 | 20.92 | 31.18 | 干渉なし | 18,300 |
| EPDBPE2060-120-04-ATH | ● | 3 | 6 | 0.4 | 120 | 12 | 5.86 | 7.368 | 200 | 8 | - | D | 22.02 | 0.49 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 42,080 |
| EPDBPE2060-30-09-ATH | ● | | | 0.9 | 30 | 12 | 5.86 | 6.426 | 80 | 8 | 7 | B | 16.45 | 1.87 | 30.63 | 32.00 | 32.76 | 干渉なし | 干渉なし | 17,850 |
| EPDBPE2060-40-09-ATH | ● | | | | 40 | 12 | 5.86 | 6.740 | 90 | 8 | 7 | B | 16.45 | 1.44 | 33.29 | 42.06 | 干渉なし | 干渉なし | 干渉なし | 19,080 |
| EPDBPE2060-45-09-ATH | ● | | | | 45 | 12 | 5.86 | 6.897 | 95 | 8 | 7 | B | 16.45 | 1.29 | 33.29 | 47.09 | 干渉なし | 干渉なし | 干渉なし | 20,540 |
| EPDBPE2060-50-09-ATH | ● | | | | 50 | 12 | 5.86 | 7.054 | 100 | 8 | 7 | B | 16.45 | 1.16 | 33.29 | 52.12 | 干渉なし | 干渉なし | 干渉なし | 20,880 |
| EPDBPE2060-60-09-ATH | ● | | | | 60 | 12 | 5.86 | 7.368 | 110 | 10 | 10 | B | 16.45 | 1.82 | 33.29 | 62.65 | 64.34 | 干渉なし | 干渉なし | 29,630 |
| EPDBPE2060-70-09-ATH | ● | | | | 70 | 12 | 5.86 | 7.682 | 120 | 10 | 10 | B | 16.45 | 1.59 | 33.29 | 72.71 | 74.90 | 干渉なし | 干渉なし | 31,420 |
| EPDBPE2060-80-09-ATH | ● | | | | 80 | 12 | 5.86 | 7.996 | 130 | 10 | 10 | B | 16.45 | 1.41 | 33.29 | 82.78 | 干渉なし | 干渉なし | 干渉なし | 33,220 |
| EPDBPE2060-120-09-ATH | ● | | | | 120 | 12 | 5.86 | 9.253 | 200 | 10 | - | D | 16.45 | 0.98 | 33.29 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 43,760 |
| EPDBPE2060-50-14-ATH | ● | | | 1.4 | 50 | 12 | 5.86 | 7.717 | 100 | 10 | 7 | B | 14.86 | 2.19 | 21.46 | 44.58 | 52.43 | 54.41 | 干渉なし | 20,880 |
| EPDBPE2060-96-14-ATH | ● | | | | 96 | 12 | 5.86 | 10.000 | 200 | 10 | - | C | 14.86 | 1.24 | 21.46 | 44.58 | 干渉なし | 干渉なし | 干渉なし | 43,760 |
| EPDBPE2060-30-29-ATH | ● | | | 2.9 | 30 | 12 | 5.86 | 7.684 | 80 | 10 | 7 | B | 13.38 | 3.53 | 15.54 | 18.85 | 24.53 | 31.45 | 33.60 | 19,640 |
| EPDBPE2070-45-09-ATH | ● | 3.5 | 7 | 0.9 | 45 | 14 | 6.86 | 7.834 | 95 | 10 | 7 | B | 18.45 | 1.85 | 37.16 | 47.17 | 48.59 | 干渉なし | 干渉なし | 23,010 |
| EPDBPE2070-60-14-ATH | ● | | | 1.4 | 60 | 14 | 6.86 | 9.108 | 110 | 10 | 7 | B | 16.86 | 1.46 | 24.29 | 50.33 | 干渉なし | 干渉なし | 干渉なし | 25,700 |
| EPDBPE2070-40-29-ATH | ● | | | 2.9 | 40 | 14 | 6.86 | 9.494 | 90 | 10 | 7 | B | 15.38 | 2.24 | 17.85 | 21.64 | 28.14 | 40.93 | 干渉なし | 22,220 |

## Epoch Pencil Deep Ball Evolution
# エポックペンシルディープボールエボリューション

## EPDBPE2○○○-○○○.○-○○-ATH

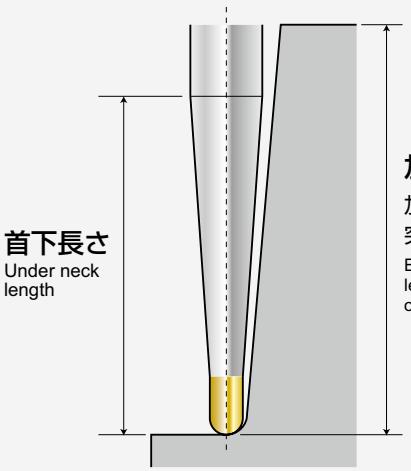
| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 首部テーパ半角 Neck angle BHTA2 | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. BD2 | 首元径 Under neck dia. BD3 | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 首形状 Neck shape | 仮想首長 Approx neck length ℓ' | 干渉角度 Interference angle (°) θK | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDBPE2080-120-04-ATH | ● | 4 | 8 | 0.4 | 120 | 14 | 7.86 | 9.340 | 200 | 10 | - | D | 24.02 | 0.50 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 43,760 |
| EPDBPE2080-50-09-ATH | ● | | | 0.9 | 50 | 14 | 7.86 | 8.991 | 110 | 10 | 7 | B | 18.45 | 1.18 | 36.54 | 52.17 | 干渉なし | 干渉なし | 干渉なし | 25,140 |
| EPDBPE2080-55-09-ATH | ● | | | | 55 | 14 | 7.86 | 9.148 | 115 | 10 | 7 | B | 18.45 | 1.08 | 36.54 | 57.20 | 干渉なし | 干渉なし | 干渉なし | 25,930 |
| EPDBPE2080-60-09-ATH | ● | | | | 60 | 14 | 7.86 | 9.305 | 120 | 10 | 7 | B | 18.45 | 0.99 | 36.54 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 26,710 |
| EPDBPE2080-70-09-ATH | ● | | | | 70 | 14 | 7.86 | 9.619 | 130 | 10 | 7 | B | 18.45 | 0.85 | 36.54 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 28,290 |
| EPDBPE2080-80-09-ATH | ● | | | | 80 | 14 | 7.86 | 9.934 | 140 | 12 | 10 | B | 18.45 | 1.42 | 36.54 | 82.83 | 干渉なし | 干渉なし | 干渉なし | 34,910 |
| EPDBPE2080-120-09-ATH | ● | | | | 120 | 14 | 7.86 | 11.190 | 200 | 12 | - | D | 18.45 | 0.98 | 36.54 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 47,130 |
| EPDBPE2080-50-14-ATH | ● | | | 1.4 | 50 | 14 | 7.86 | 9.620 | 110 | 10 | 7 | B | 16.86 | 1.21 | 24.01 | 49.10 | 干渉なし | 干渉なし | 干渉なし | 25,140 |
| EPDBPE2080-98-14-ATH | ● | | | | 98 | 14 | 7.86 | 12.000 | 200 | 12 | - | C | 16.86 | 1.22 | 24.01 | 49.10 | 干渉なし | 干渉なし | 干渉なし | 47,130 |
| EPDBPE2080-35-29-ATH | ● | | | 2.9 | 35 | 14 | 7.86 | 10.000 | 95 | 10 | - | C | 15.38 | 1.85 | 17.75 | 21.38 | 27.61 | 干渉なし | 干渉なし | 20,200 |
| EPDBPE2100-120-04-ATH | ● | 5 | 10 | 0.4 | 120 | 18 | 9.86 | 11.284 | 200 | 12 | - | D | 28.02 | 0.50 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 51,180 |
| EPDBPE2100-60-09-ATH | ● | | | 0.9 | 60 | 18 | 9.86 | 11.180 | 130 | 12 | 7 | B | 22.45 | 1.00 | 44.30 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 32,990 |
| EPDBPE2100-65-09-ATH | ● | | | | 65 | 18 | 9.86 | 11.337 | 135 | 12 | 7 | B | 22.45 | 0.93 | 44.30 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 33,900 |
| EPDBPE2100-75-09-ATH | ● | | | | 75 | 18 | 9.86 | 11.651 | 140 | 12 | 7 | B | 22.45 | 0.81 | 44.30 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 34,910 |
| EPDBPE2100-86-09-ATH | ● | | | | 86 | 18 | 9.86 | 12.000 | 200 | 12 | - | C | 22.45 | 0.71 | 44.30 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 51,180 |
| EPDBPE2100-55-14-ATH | ● | | | 1.4 | 55 | 18 | 9.86 | 11.669 | 125 | 12 | 7 | B | 20.86 | 1.12 | 29.68 | 55.87 | 干渉なし | 干渉なし | 干渉なし | 31,420 |
| EPDBPE2100-120-14-ATH | ● | | | | 120 | 18 | 9.86 | 14.846 | 200 | 16 | - | D | 20.86 | 1.48 | 29.68 | 60.62 | 干渉なし | 干渉なし | 干渉なし | 58,240 |
| EPDBPE2100-35-29-ATH | ● | | | 2.9 | 35 | 18 | 9.86 | 11.582 | 105 | 12 | 4 | B | 19.38 | 1.84 | 22.37 | 26.96 | 34.84 | 干渉なし | 干渉なし | 27,830 |
| EPDBPE2120-120-04-ATH | ● | 6 | 12 | 0.4 | 120 | 22 | 11.86 | 13.228 | 200 | 14 | - | D | 32.02 | 0.50 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 57,570 |
| EPDBPE2120-75-09-ATH | ● | | | 0.9 | 75 | 22 | 11.86 | 13.525 | 150 | 14 | - | D | 26.45 | 0.83 | 52.05 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 45,120 |
| EPDBPE2120-120-09-ATH | ● | | | | 120 | 22 | 11.86 | 14.939 | 200 | 16 | - | D | 26.45 | 1.00 | 52.05 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 61,380 |
| EPDBPE2120-80-14-ATH | ● | | | 1.4 | 80 | 22 | 11.86 | 14.695 | 160 | 16 | - | D | 24.86 | 1.52 | 35.35 | 72.13 | 81.75 | 干渉なし | 干渉なし | 51,740 |
| EPDBPE2120-106-14-ATH | ● | | | | 106 | 22 | 11.86 | 16.000 | 200 | 16 | - | C | 24.86 | 1.15 | 35.35 | 72.13 | 干渉なし | 干渉なし | 干渉なし | 61,380 |
| EPDBPE2120-60-29-ATH | ● | | | 2.9 | 60 | 22 | 11.86 | 15.710 | 140 | 16 | - | D | 23.38 | 2.11 | 27.00 | 32.54 | 42.06 | 60.10 | 干渉なし | 47,130 |

## ■ 首形状Cの商品の突き出し長さについて
Regarding over-hang length for products with neck shape C

首形状Cの商品は首部テーパ部が直接シャンクにつながっており、首下長よりも長い突出しでもご使用いただけます。
また突出し長さを首下長よりも長くしてご使用される場合は、切削条件を調整してください。

Products with neck shape C have a neck taper section that runs directly into the shank, and can be used with over-hang lengths longer than the under-neck length.
Further, when using over-hang lengths longer than the under-neck length, the cutting conditions should be adjusted accordingly.

| 対象の商品コード Item code |
|---|
| EPDBPE2010-50-29-ATH |
| EPDBPE2015-46-29-ATH |
| EPDBPE2020-41-29-ATH |
| EPDBPE2030-66-14-ATH |
| EPDBPE2050-74-14-ATH |
| EPDBPE2050-40-29-ATH |
| EPDBPE2060-96-14-ATH |
| EPDBPE2080-98-14-ATH |
| EPDBPE2080-35-29-ATH |
| EPDBPE2100-86-09-ATH |
| EPDBPE2120-106-14-ATH |




加工深さが首下長さ以上に深い場合でも、
突出し長さを調整することにより加工可能です。

Even if the processing depth is longer than the under-neck length, cutting can be performed by adjusting the over-hang length.

## ○ 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ○ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ |

## ○ 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPDBPE-ATH | × (N/A) | 4 ～ 12 |

【注意】首下長／外径が10DCを超える工具の再研磨可否については、弊社営業にお問い合わせください。
【Note】Contact our sales office regarding whether or not regrinding is possible for tools where under neck length/tool diameter more than 10DC

●：標準在庫品です。●：Stocked items.　干渉なし：No interference

# 標準切削条件表
Recommended cutting conditions

高能率切削条件
High efficiency cuttiing conditions

高精度切削条件
High accuracy cuttiing conditions

## EPDBPE-ATH

高精度切削条件はA93ページを参照してください。Please refer to P.A93 about high accuracy cutting conditions

| 被削材 Work material | | | | | 1 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 2 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 3 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 4 焼入れ鋼 Hardened steels (45～55HRC) | | 5 焼入れ鋼 Hardened steels (55～65HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | | 100% | | 90% | | 80% | | 65% | | 60% | |
| ボール半径RE Ball radius (mm) | 外径DC Tool dia. (mm) | 首部テーパ半角 BHTA2 Neck angle (°) | 首下長LU Under neck length (mm) | ap (mm) | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 0.1 | 0.2 | 0.4 | 1 | 0.017 | 40,000 | 800 | 34,000 | 680 | 28,000 | 504 | 26,000 | 416 | 26,000 | 364 |
| | | | 1.5 | 0.009 | 40,000 | 800 | 34,000 | 680 | 28,000 | 504 | 26,000 | 416 | 26,000 | 364 |
| | | | 2 | 0.006 | 32,000 | 461 | 27,200 | 392 | 22,400 | 323 | 20,800 | 266 | 20,800 | 233 |
| | | | 3 | 0.003 | 21,000 | 235 | 17,850 | 200 | 14,640 | 164 | 13,200 | 147 | 13,200 | 132 |
| | | 0.9 | 2 | 0.007 | 32,000 | 461 | 27,200 | 392 | 22,400 | 323 | 20,800 | 266 | 20,800 | 233 |
| | | | 2.5 | 0.004 | 26,000 | 333 | 22,100 | 283 | 18,200 | 204 | 16,900 | 189 | 16,900 | 162 |
| | | | 3 | 0.004 | 21,000 | 235 | 17,850 | 200 | 14,640 | 164 | 13,200 | 147 | 13,200 | 132 |
| | | 1.4 | 1 | 0.020 | 40,000 | 800 | 34,000 | 680 | 28,000 | 504 | 26,000 | 416 | 26,000 | 364 |
| | | | 2 | 0.008 | 32,000 | 461 | 27,200 | 392 | 22,400 | 323 | 20,800 | 266 | 20,800 | 233 |
| | | | 3 | 0.005 | 21,000 | 235 | 17,850 | 200 | 14,640 | 164 | 13,200 | 147 | 13,200 | 132 |
| | | 2.9 | 1 | 0.022 | 40,000 | 800 | 34,000 | 680 | 28,000 | 504 | 26,000 | 416 | 26,000 | 364 |
| | | | 2 | 0.009 | 32,000 | 461 | 27,200 | 392 | 22,400 | 323 | 20,800 | 266 | 20,800 | 233 |
| | | | 3 | 0.006 | 21,000 | 235 | 17,850 | 200 | 14,640 | 164 | 13,200 | 147 | 13,200 | 132 |
| 0.15 | 0.3 | 0.4 | 2 | 0.025 | 40,000 | 1,200 | 34,000 | 1,020 | 28,000 | 756 | 26,000 | 624 | 26,000 | 546 |
| | | | 3 | 0.012 | 32,000 | 691 | 27,200 | 588 | 22,400 | 484 | 20,800 | 399 | 20,800 | 349 |
| | | 0.9 | 3 | 0.013 | 32,000 | 691 | 27,200 | 588 | 22,400 | 484 | 20,800 | 399 | 20,800 | 349 |
| | | | 4 | 0.006 | 26,000 | 499 | 22,100 | 424 | 18,200 | 306 | 16,900 | 284 | 16,900 | 243 |
| 0.2 | 0.4 | 0.4 | 2 | 0.035 | 40,000 | 1,600 | 34,000 | 1,360 | 28,000 | 1,008 | 26,000 | 832 | 26,000 | 728 |
| | | | 3 | 0.020 | 40,000 | 1,600 | 34,000 | 1,360 | 28,000 | 1,008 | 26,000 | 832 | 26,000 | 728 |
| | | | 4 | 0.007 | 32,000 | 922 | 27,200 | 783 | 22,400 | 645 | 20,800 | 532 | 20,800 | 466 |
| | | | 5 | 0.006 | 26,000 | 666 | 22,100 | 566 | 18,200 | 408 | 16,900 | 379 | 16,900 | 324 |
| | | | 6 | 0.004 | 21,000 | 471 | 17,850 | 400 | 14,640 | 295 | 13,200 | 266 | 13,200 | 239 |
| | | | 8 | 0.002 | 17,000 | 272 | 14,450 | 231 | 11,850 | 189 | 10,700 | 153 | 10,700 | 137 |
| | | 0.9 | 2 | 0.038 | 40,000 | 1,600 | 34,000 | 1,360 | 28,000 | 1,008 | 26,000 | 832 | 26,000 | 728 |
| | | | 4 | 0.009 | 32,000 | 922 | 27,200 | 783 | 22,400 | 645 | 20,800 | 532 | 20,800 | 466 |
| | | | 5 | 0.007 | 26,000 | 666 | 22,100 | 566 | 18,200 | 408 | 16,900 | 379 | 16,900 | 324 |
| | | | 6 | 0.005 | 21,000 | 471 | 17,850 | 400 | 14,640 | 328 | 13,200 | 266 | 13,200 | 239 |
| | | 1.4 | 2 | 0.042 | 40,000 | 1,600 | 34,000 | 1,360 | 28,000 | 1,008 | 26,000 | 832 | 26,000 | 728 |
| | | | 4 | 0.010 | 32,000 | 922 | 27,200 | 783 | 22,400 | 645 | 20,800 | 532 | 20,800 | 466 |
| | | | 6 | 0.006 | 21,000 | 471 | 17,850 | 400 | 14,640 | 328 | 13,200 | 266 | 13,200 | 239 |
| | | 2.9 | 2 | 0.045 | 40,000 | 1,600 | 34,000 | 1,360 | 28,000 | 1,008 | 26,000 | 832 | 26,000 | 728 |
| | | | 4 | 0.011 | 32,000 | 922 | 27,200 | 783 | 22,400 | 645 | 20,800 | 532 | 20,800 | 466 |
| | | | 6 | 0.007 | 21,000 | 471 | 17,850 | 400 | 14,640 | 328 | 13,200 | 266 | 13,200 | 239 |
| 0.25 | 0.5 | 0.4 | 4 | 0.026 | 40,000 | 2,000 | 34,000 | 1,700 | 28,000 | 1,260 | 26,000 | 1,040 | 26,000 | 910 |
| | | | 6 | 0.020 | 26,000 | 1,040 | 22,100 | 884 | 18,200 | 728 | 16,900 | 608 | 16,900 | 547 |
| | | 0.9 | 6 | 0.022 | 26,000 | 1,040 | 22,100 | 884 | 18,200 | 728 | 16,900 | 608 | 16,900 | 547 |
| | | | 8 | 0.010 | 26,000 | 728 | 22,100 | 619 | 18,200 | 446 | 16,900 | 414 | 16,900 | 355 |
| | | | 12 | 0.005 | 22,400 | 627 | 19,040 | 533 | 15,680 | 384 | 14,560 | 357 | 14,560 | 306 |
| 0.27 | 0.54 | 0.4 | 2 | 0.050 | 40,000 | 2,160 | 34,000 | 1,836 | 28,000 | 1,361 | 26,000 | 1,123 | 26,000 | 983 |
| | | | 4 | 0.037 | 40,000 | 2,160 | 34,000 | 1,836 | 28,000 | 1,361 | 26,000 | 1,123 | 26,000 | 983 |
| | | | 5 | 0.031 | 40,000 | 1,512 | 34,000 | 1,428 | 28,000 | 1,176 | 26,000 | 1,040 | 26,000 | 832 |
| | | | 6 | 0.025 | 26,000 | 1,244 | 22,100 | 1,058 | 18,200 | 871 | 16,900 | 676 | 16,900 | 629 |
| | | | 6.5 | 0.020 | 26,000 | 1,011 | 22,100 | 859 | 18,200 | 619 | 16,900 | 575 | 16,900 | 493 |
| | | | 7 | 0.015 | 26,000 | 899 | 22,100 | 812 | 18,200 | 585 | 16,900 | 543 | 16,900 | 465 |
| 0.3 | 0.6 | 0.4 | 2 | 0.055 | 40,000 | 2,400 | 34,000 | 2,040 | 28,000 | 1,512 | 26,000 | 1,248 | 26,000 | 1,092 |
| | | | 4 | 0.035 | 40,000 | 2,400 | 34,000 | 2,040 | 28,000 | 1,512 | 26,000 | 1,248 | 26,000 | 1,092 |
| | | | 6 | 0.018 | 32,000 | 1,382 | 27,200 | 1,175 | 22,400 | 968 | 20,800 | 799 | 20,800 | 699 |
| | | | 8 | 0.015 | 26,000 | 998 | 22,100 | 848 | 18,200 | 698 | 16,900 | 583 | 16,900 | 524 |
| | | | 10 | 0.013 | 26,000 | 874 | 22,100 | 743 | 18,200 | 535 | 16,900 | 497 | 16,900 | 426 |
| | | | 12 | 0.008 | 26,000 | 874 | 22,100 | 743 | 18,200 | 535 | 16,900 | 497 | 16,900 | 426 |
| | | | 15 | 0.005 | 22,400 | 753 | 19,040 | 640 | 15,680 | 461 | 14,560 | 367 | 14,560 | 311 |
| | | 0.9 | 4 | 0.038 | 40,000 | 2,400 | 34,000 | 2,040 | 28,000 | 1,512 | 26,000 | 1,248 | 26,000 | 1,092 |
| | | | 6 | 0.020 | 32,000 | 1,382 | 27,200 | 1,175 | 22,400 | 968 | 20,800 | 799 | 20,800 | 699 |
| | | | 8 | 0.018 | 26,000 | 998 | 22,100 | 849 | 18,200 | 612 | 16,900 | 568 | 16,900 | 487 |
| | | | 10 | 0.015 | 26,000 | 874 | 22,100 | 743 | 18,200 | 535 | 16,900 | 497 | 16,900 | 426 |
| | | | 12 | 0.010 | 26,000 | 874 | 22,100 | 743 | 18,200 | 535 | 16,900 | 497 | 16,900 | 426 |
| | | | 15 | 0.006 | 22,400 | 753 | 19,040 | 640 | 15,680 | 461 | 14,560 | 367 | 14,560 | 311 |
| | | 1.4 | 4 | 0.042 | 40,000 | 2,400 | 34,000 | 2,040 | 28,000 | 1,512 | 26,000 | 1,248 | 26,000 | 1,092 |
| | | | 5 | 0.029 | 36,000 | 1,800 | 30,600 | 1,530 | 25,090 | 1,254 | 22,580 | 1,015 | 20,320 | 822 |
| | | | 6 | 0.022 | 32,000 | 1,382 | 27,200 | 1,175 | 22,400 | 968 | 20,800 | 799 | 20,800 | 699 |
| | | | 8 | 0.020 | 26,000 | 998 | 22,100 | 849 | 18,200 | 612 | 16,900 | 568 | 16,900 | 487 |
| | | | 10 | 0.016 | 26,000 | 874 | 22,100 | 743 | 18,200 | 535 | 16,900 | 497 | 16,900 | 426 |
| | | | 20 | 0.005 | 19,300 | 583 | 16,410 | 495 | 13,460 | 406 | 12,110 | 328 | 12,110 | 295 |
| | | 2.9 | 6 | 0.023 | 32,000 | 1,382 | 27,200 | 1,175 | 22,400 | 968 | 20,800 | 799 | 20,800 | 699 |
| | | | 8 | 0.022 | 26,000 | 998 | 22,100 | 849 | 18,200 | 612 | 16,900 | 568 | 16,900 | 487 |
| | | | 12 | 0.011 | 26,000 | 874 | 22,100 | 743 | 18,200 | 535 | 16,900 | 497 | 16,900 | 426 |
| | | | 20 | 0.006 | 19,300 | 583 | 16,410 | 495 | 13,460 | 406 | 12,110 | 328 | 12,110 | 295 |
| 0.4 | 0.8 | 0.4 | 4 | 0.062 | 32,000 | 2,560 | 27,200 | 2,176 | 22,400 | 1,613 | 20,800 | 1,331 | 20,800 | 1,165 |
| | | | 6 | 0.045 | 32,000 | 2,560 | 27,200 | 2,176 | 22,400 | 1,613 | 20,800 | 1,331 | 20,800 | 1,165 |
| | | | 8 | 0.023 | 25,600 | 1,475 | 21,760 | 1,253 | 17,920 | 1,032 | 16,640 | 852 | 16,640 | 745 |
| | | | 12 | 0.018 | 20,800 | 1,065 | 17,680 | 905 | 14,560 | 699 | 13,520 | 606 | 13,520 | 519 |

【注意】ご使用にあたっては、A92ページの表下の項目と注意を参照してください。 【Note】Upon usage, please refer to comments and notes below table on page A92.

## EPDBPE-ATH

**高能率切削条件** High efficiency cuttiing conditions　高精度切削条件 High accuracy cuttiing conditions

高精度切削条件はA93 ページを参照してください。
Please refer to P.A93 about high accuracy cutting conditions

| 被削材 Work material | | | | | 1 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 2 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 3 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 4 焼入れ鋼 Hardened steels (45～55HRC) | | 5 焼入れ鋼 Hardened steels (55～65HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | | 100% | | 90% | | 80% | | 65% | | 60% | |
| ボール半径RE Ball radius (mm) | 外径DC Tool dia. (mm) | 首部テーパ半角 BHTA2 Neck angle (°) | 首下長LU Under neck length (mm) | ap (mm) | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min |
| 0.4 | 0.8 | 0.9 | 8 | 0.026 | 25,600 | 1,475 | 21,760 | 1,253 | 17,920 | 1,032 | 16,640 | 852 | 16,640 | 745 |
| | | | 12 | 0.020 | 20,800 | 1,065 | 17,680 | 905 | 14,560 | 699 | 13,520 | 606 | 13,520 | 519 |
| | | | 16 | 0.018 | 20,800 | 932 | 17,680 | 792 | 14,560 | 612 | 13,520 | 530 | 13,520 | 454 |
| | | 2.9 | 16 | 0.020 | 20,800 | 932 | 17,680 | 792 | 14,560 | 612 | 13,520 | 530 | 13,520 | 454 |
| | | | 20 | 0.016 | 19,300 | 733 | 16,410 | 623 | 13,460 | 511 | 12,110 | 413 | 12,110 | 371 |
| 0.45 | 0.9 | 0.4 | 4 | 0.063 | 28,300 | 2,547 | 24,060 | 2,164 | 19,730 | 1,774 | 17,760 | 1,437 | 17,760 | 1,293 |
| | | | 8 | 0.050 | 28,300 | 2,547 | 24,060 | 2,164 | 19,730 | 1,774 | 17,760 | 1,437 | 17,760 | 1,293 |
| | | | 12 | 0.037 | 18,400 | 1,325 | 15,640 | 1,126 | 12,820 | 922 | 11,540 | 746 | 11,540 | 671 |
| | | | 16 | 0.024 | 18,400 | 1,325 | 15,640 | 1,126 | 12,820 | 922 | 11,540 | 746 | 11,540 | 671 |
| | | | 18 | 0.018 | 18,400 | 1,325 | 15,640 | 1,126 | 12,820 | 922 | 11,540 | 746 | 11,540 | 671 |
| | | | 20 | 0.015 | 15,850 | 1,141 | 13,470 | 969 | 11,050 | 794 | 9,950 | 643 | 9,950 | 578 |
| | | | 22 | 0.012 | 15,850 | 1,141 | 13,470 | 969 | 11,050 | 794 | 9,950 | 643 | 9,950 | 578 |
| | | | 24 | 0.009 | 14,150 | 1,009 | 12,030 | 856 | 9,860 | 699 | 8,870 | 564 | 8,870 | 479 |
| 0.5 | 1 | 0.4 | 6 | 0.055 | 25,600 | 2,560 | 21,760 | 2,176 | 17,920 | 1,613 | 16,640 | 1,331 | 16,640 | 1,165 |
| | | | 8 | 0.055 | 25,600 | 2,560 | 21,760 | 2,176 | 17,920 | 1,613 | 16,640 | 1,331 | 16,640 | 1,165 |
| | | | 10 | 0.032 | 20,800 | 1,872 | 17,680 | 1,591 | 14,560 | 1,310 | 13,520 | 1,082 | 13,520 | 946 |
| | | | 15 | 0.027 | 16,640 | 1,331 | 14,140 | 1,132 | 11,650 | 874 | 10,820 | 757 | 10,820 | 649 |
| | | | 20 | 0.018 | 16,640 | 1,331 | 14,140 | 1,132 | 11,650 | 874 | 10,820 | 757 | 10,820 | 649 |
| | | | 25 | 0.017 | 14,560 | 1,165 | 12,380 | 990 | 10,190 | 764 | 9,460 | 662 | 9,460 | 568 |
| | | | 30 | 0.015 | 12,480 | 874 | 10,610 | 743 | 8,740 | 568 | 8,110 | 487 | 8,110 | 406 |
| | | | 50 | 0.006 | 9,500 | 665 | 8,080 | 565 | 6,650 | 432 | 6,180 | 371 | 6,180 | 309 |
| | | | 70 | 0.002 | 8,500 | 595 | 7,230 | 505 | 5,950 | 387 | 5,530 | 332 | 5,530 | 276 |
| | | 0.9 | 6 | 0.063 | 25,600 | 2,560 | 21,760 | 2,176 | 17,920 | 1,613 | 16,640 | 1,331 | 16,640 | 1,165 |
| | | | 10 | 0.035 | 20,800 | 1,872 | 17,680 | 1,591 | 14,560 | 1,310 | 13,520 | 1,082 | 13,520 | 946 |
| | | | 15 | 0.028 | 16,640 | 1,331 | 14,140 | 1,132 | 11,650 | 874 | 10,820 | 757 | 10,820 | 649 |
| | | | 16 | 0.028 | 16,640 | 1,331 | 14,140 | 1,132 | 11,650 | 874 | 10,820 | 757 | 10,820 | 649 |
| | | | 20 | 0.020 | 16,640 | 1,331 | 14,140 | 1,132 | 11,650 | 874 | 10,820 | 757 | 10,820 | 649 |
| | | | 25 | 0.017 | 14,560 | 1,165 | 12,380 | 990 | 10,190 | 764 | 9,460 | 662 | 9,460 | 568 |
| | | | 30 | 0.017 | 12,480 | 874 | 10,610 | 743 | 8,740 | 568 | 8,110 | 487 | 8,110 | 406 |
| | | | 35 | 0.010 | 10,400 | 728 | 8,840 | 619 | 7,280 | 473 | 6,760 | 406 | 6,760 | 338 |
| | | | 40 | 0.009 | 10,000 | 700 | 8,500 | 595 | 7,000 | 455 | 6,500 | 390 | 6,500 | 325 |
| | | | 50 | 0.007 | 9,500 | 665 | 8,080 | 565 | 6,650 | 432 | 6,180 | 371 | 6,180 | 309 |
| | | | 60 | 0.005 | 9,000 | 630 | 7,650 | 536 | 6,300 | 410 | 5,850 | 351 | 5,850 | 293 |
| | | | 70 | 0.003 | 8,500 | 595 | 7,230 | 506 | 5,950 | 387 | 5,530 | 332 | 5,530 | 276 |
| | | 1.4 | 6 | 0.068 | 25,600 | 2,560 | 21,760 | 2,176 | 17,920 | 1,613 | 16,640 | 1,331 | 16,640 | 1,165 |
| | | | 12 | 0.040 | 20,800 | 1,872 | 17,680 | 1,591 | 14,560 | 1,310 | 13,520 | 1,082 | 13,520 | 946 |
| | | | 16 | 0.033 | 16,640 | 1,331 | 14,140 | 1,132 | 11,650 | 874 | 10,820 | 757 | 10,820 | 649 |
| | | | 20 | 0.022 | 16,640 | 1,331 | 14,140 | 1,132 | 11,650 | 874 | 10,820 | 757 | 10,820 | 649 |
| | | | 22 | 0.022 | 16,640 | 1,331 | 14,140 | 1,132 | 11,650 | 874 | 10,820 | 757 | 10,820 | 649 |
| | | | 25 | 0.021 | 14,560 | 1,165 | 12,380 | 990 | 10,190 | 764 | 9,460 | 662 | 9,460 | 568 |
| | | | 50 | 0.008 | 9,500 | 665 | 8,080 | 565 | 6,650 | 432 | 6,180 | 371 | 6,180 | 309 |
| | | | 90 | 0.002 | 8,500 | 595 | 7,230 | 506 | 5,950 | 387 | 5,530 | 332 | 5,530 | 276 |
| | | 2.9 | 10 | 0.043 | 20,800 | 1,872 | 17,680 | 1,591 | 14,560 | 1,310 | 13,520 | 1,082 | 13,520 | 946 |
| | | | 15 | 0.036 | 16,640 | 1,331 | 14,140 | 1,132 | 11,650 | 874 | 10,820 | 757 | 10,820 | 649 |
| | | | 20 | 0.024 | 16,640 | 1,331 | 14,140 | 1,132 | 11,650 | 874 | 10,820 | 757 | 10,820 | 649 |
| | | | 30 | 0.020 | 12,480 | 874 | 10,610 | 743 | 8,740 | 568 | 8,110 | 487 | 8,110 | 406 |
| | | | 40 | 0.011 | 10,000 | 700 | 8,500 | 595 | 7,000 | 455 | 6,500 | 390 | 6,500 | 325 |
| | | | 50 | 0.009 | 9,500 | 665 | 8,080 | 565 | 6,650 | 432 | 6,180 | 371 | 6,180 | 309 |
| | | 4.9 | 20 | 0.026 | 16,640 | 1,331 | 14,140 | 1,132 | 11,650 | 874 | 10,820 | 757 | 10,820 | 649 |
| 0.6 | 1.2 | 2.9 | 20 | 0.026 | 16,640 | 1,331 | 14,140 | 1,132 | 11,650 | 874 | 10,820 | 757 | 10,820 | 649 |
| | | | 35 | 0.014 | 10,000 | 700 | 8,500 | 595 | 7,000 | 455 | 6,500 | 390 | 6,500 | 325 |
| 0.75 | 1.5 | 0.4 | 8 | 0.070 | 16,960 | 2,544 | 14,420 | 2,162 | 11,870 | 1,603 | 11,020 | 1,323 | 11,020 | 1,158 |
| | | | 10 | 0.070 | 16,960 | 2,544 | 14,420 | 2,162 | 11,870 | 1,603 | 11,020 | 1,323 | 11,020 | 1,158 |
| | | | 12 | 0.070 | 16,960 | 2,544 | 14,420 | 2,162 | 11,870 | 1,603 | 11,020 | 1,323 | 11,020 | 1,158 |
| | | | 30 | 0.024 | 11,020 | 1,323 | 9,370 | 1,124 | 7,720 | 810 | 7,170 | 752 | 7,170 | 645 |
| | | 0.9 | 10 | 0.080 | 16,960 | 2,544 | 14,420 | 2,162 | 11,870 | 1,603 | 11,020 | 1,323 | 11,020 | 1,158 |
| | | | 15 | 0.045 | 13,570 | 1,832 | 11,530 | 1,557 | 9,500 | 1,282 | 8,820 | 1,058 | 8,820 | 926 |
| | | | 20 | 0.040 | 11,020 | 1,323 | 9,370 | 1,124 | 7,720 | 810 | 7,170 | 752 | 7,170 | 645 |
| | | | 30 | 0.028 | 11,020 | 1,323 | 9,370 | 1,124 | 7,720 | 810 | 7,170 | 752 | 7,170 | 645 |
| | | 1.4 | 10 | 0.090 | 16,960 | 2,544 | 14,420 | 2,162 | 11,870 | 1,603 | 11,020 | 1,323 | 11,020 | 1,158 |
| | | | 20 | 0.045 | 11,020 | 1,323 | 9,370 | 1,124 | 7,720 | 810 | 7,170 | 752 | 7,170 | 645 |
| | | | 30 | 0.030 | 11,020 | 1,323 | 9,370 | 1,124 | 7,720 | 810 | 7,170 | 752 | 7,170 | 645 |
| | | | 40 | 0.015 | 9,500 | 1,045 | 8,080 | 888 | 6,630 | 728 | 5,970 | 589 | 5,970 | 530 |
| | | | 50 | 0.011 | 9,500 | 950 | 8,080 | 807 | 6,630 | 662 | 5,970 | 536 | 5,970 | 482 |
| | | 2.9 | 20 | 0.048 | 11,020 | 1,323 | 9,370 | 1,124 | 7,720 | 810 | 7,170 | 752 | 7,170 | 645 |
| | | | 46 | 0.013 | 9,500 | 950 | 8,080 | 807 | 6,630 | 662 | 5,970 | 536 | 5,970 | 482 |
| 0.9 | 1.8 | 0.4 | 4 | 0.120 | 14,200 | 2,556 | 12,070 | 2,173 | 9,940 | 1,610 | 9,230 | 1,329 | 9,230 | 1,163 |
| | | | 8 | 0.100 | 14,200 | 2,556 | 12,070 | 2,173 | 9,940 | 1,610 | 9,230 | 1,329 | 9,230 | 1,163 |
| | | | 12 | 0.080 | 14,200 | 2,556 | 12,070 | 2,173 | 9,940 | 1,610 | 9,230 | 1,329 | 9,230 | 1,163 |
| | | | 16 | 0.071 | 14,200 | 2,556 | 12,070 | 2,173 | 9,940 | 1,610 | 9,230 | 1,329 | 9,230 | 1,163 |
| | | | 20 | 0.062 | 9,230 | 1,329 | 7,850 | 1,130 | 6,460 | 814 | 6,000 | 756 | 6,000 | 648 |

| 被削材 Work material | | | | | 1 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 2 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 3 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 4 焼入れ鋼 Hardened steels (45～55HRC) | | 5 焼入れ鋼 Hardened steels (55～65HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | | 100% | | 90% | | 80% | | 65% | | 60% | |
| ボール半径RE Ball radius (mm) | 外径DC Tool dia. (mm) | 首部テーパ半角 BHTA2 Neck angle (°) | 首下長LU Under neck length (mm) | ap (mm) | 回転数 n min⁻¹ | 送り速度 $v_f$ mm/min | 回転数 n min⁻¹ | 送り速度 $v_f$ mm/min | 回転数 n min⁻¹ | 送り速度 $v_f$ mm/min | 回転数 n min⁻¹ | 送り速度 $v_f$ mm/min | 回転数 n min⁻¹ | 送り速度 $v_f$ mm/min |
| 0.9 | 1.8 | 0.4 | 24 | 0.053 | 9,230 | 1,329 | 7,850 | 1,130 | 6,460 | 814 | 6,000 | 756 | 6,000 | 648 |
| | | | 28 | 0.044 | 9,230 | 1,329 | 7,850 | 1,130 | 6,460 | 814 | 6,000 | 756 | 6,000 | 648 |
| | | | 32 | 0.036 | 9,230 | 1,329 | 7,850 | 1,130 | 6,460 | 814 | 6,000 | 756 | 6,000 | 648 |
| | | | 36 | 0.028 | 9,230 | 1,329 | 7,850 | 1,130 | 6,460 | 814 | 6,000 | 756 | 6,000 | 648 |
| | | | 38 | 0.020 | 8,000 | 1,152 | 6,800 | 979 | 5,600 | 706 | 5,200 | 655 | 5,200 | 562 |
| | | | 40 | 0.015 | 8,000 | 1,152 | 6,800 | 979 | 5,600 | 706 | 5,200 | 655 | 5,200 | 562 |
| 1 | 2 | 0.4 | 8 | 0.150 | 15,200 | 3,040 | 12,920 | 2,584 | 10,640 | 1,915 | 9,880 | 1,581 | 9,880 | 1,383 |
| | | | 12 | 0.090 | 15,200 | 3,040 | 12,920 | 2,584 | 10,640 | 1,915 | 9,880 | 1,581 | 9,880 | 1,383 |
| | | | 16 | 0.090 | 15,200 | 3,040 | 12,920 | 2,584 | 10,640 | 1,915 | 9,880 | 1,581 | 9,880 | 1,383 |
| | | | 20 | 0.060 | 12,160 | 2,189 | 10,340 | 1,860 | 8,510 | 1,532 | 7,900 | 1,265 | 7,900 | 1,107 |
| | | | 25 | 0.050 | 9,880 | 1,581 | 8,400 | 1,344 | 6,916 | 968 | 6,420 | 899 | 6,420 | 771 |
| | | | 30 | 0.040 | 9,880 | 1,581 | 8,400 | 1,344 | 6,920 | 968 | 6,420 | 899 | 6,420 | 771 |
| | | | 40 | 0.030 | 9,880 | 1,581 | 8,400 | 1,344 | 6,920 | 968 | 6,420 | 899 | 6,420 | 771 |
| | | | 80 | 0.004 | 6,150 | 861 | 5,230 | 731 | 4,305 | 560 | 4,000 | 480 | 4,000 | 400 |
| | | 0.9 | 12 | 0.100 | 15,200 | 3,040 | 12,920 | 2,584 | 10,640 | 1,915 | 9,880 | 1,581 | 9,880 | 1,383 |
| | | | 16 | 0.100 | 15,200 | 3,040 | 12,920 | 2,584 | 10,640 | 1,915 | 9,880 | 1,581 | 9,880 | 1,383 |
| | | | 20 | 0.070 | 12,160 | 2,189 | 10,340 | 1,860 | 8,512 | 1,532 | 7,900 | 1,265 | 7,900 | 1,107 |
| | | | 25 | 0.070 | 9,880 | 1,581 | 8,400 | 1,344 | 6,916 | 968 | 6,420 | 899 | 6,420 | 771 |
| | | | 30 | 0.045 | 9,880 | 1,581 | 8,400 | 1,344 | 6,916 | 968 | 6,420 | 899 | 6,420 | 771 |
| | | | 35 | 0.045 | 9,880 | 1,581 | 8,400 | 1,344 | 6,916 | 968 | 6,420 | 899 | 6,420 | 771 |
| | | | 40 | 0.035 | 9,880 | 1,581 | 8,400 | 1,344 | 6,916 | 968 | 6,420 | 899 | 6,420 | 771 |
| | | | 50 | 0.017 | 8,510 | 1,192 | 7,240 | 1,013 | 5,958 | 775 | 5,530 | 664 | 5,530 | 553 |
| | | | 60 | 0.009 | 7,240 | 1,013 | 6,150 | 861 | 5,065 | 658 | 4,700 | 564 | 4,700 | 470 |
| | | | 70 | 0.005 | 6,150 | 861 | 5,230 | 731 | 4,305 | 560 | 4,000 | 480 | 4,000 | 400 |
| | | | 75 | 0.005 | 6,150 | 861 | 5,230 | 731 | 4,305 | 560 | 4,000 | 480 | 4,000 | 400 |
| | | 1.4 | 10 | 0.110 | 15,200 | 3,040 | 12,920 | 2,584 | 10,640 | 1,915 | 9,880 | 1,581 | 9,880 | 1,383 |
| | | | 16 | 0.110 | 15,200 | 3,040 | 12,920 | 2,584 | 10,640 | 1,915 | 9,880 | 1,581 | 9,880 | 1,383 |
| | | | 20 | 0.075 | 12,160 | 2,189 | 10,340 | 1,860 | 8,512 | 1,532 | 7,900 | 1,265 | 7,900 | 1,107 |
| | | | 22 | 0.075 | 12,160 | 2,189 | 10,340 | 1,860 | 8,512 | 1,532 | 7,900 | 1,265 | 7,900 | 1,107 |
| | | | 25 | 0.062 | 9,880 | 1,581 | 8,400 | 1,344 | 6,916 | 968 | 6,420 | 899 | 6,420 | 771 |
| | | | 30 | 0.050 | 9,880 | 1,581 | 8,400 | 1,344 | 6,916 | 968 | 6,420 | 899 | 6,420 | 771 |
| | | | 40 | 0.037 | 9,880 | 1,581 | 8,400 | 1,344 | 6,916 | 968 | 6,420 | 899 | 6,420 | 771 |
| | | | 50 | 0.019 | 8,510 | 1,192 | 7,240 | 1,013 | 5,958 | 775 | 5,530 | 664 | 5,530 | 553 |
| | | | 75 | 0.006 | 6,150 | 861 | 5,230 | 731 | 4,305 | 560 | 4,000 | 480 | 4,000 | 400 |
| | | 2.9 | 12 | 0.120 | 15,200 | 3,040 | 12,920 | 2,584 | 10,640 | 1,915 | 9,880 | 1,581 | 9,880 | 1,383 |
| | | | 15 | 0.120 | 15,200 | 3,040 | 12,920 | 2,584 | 10,640 | 1,915 | 9,880 | 1,581 | 9,880 | 1,383 |
| | | | 20 | 0.080 | 12,160 | 2,189 | 10,340 | 1,860 | 8,512 | 1,532 | 7,900 | 1,265 | 7,900 | 1,107 |
| | | | 41 | 0.040 | 9,880 | 1,581 | 8,400 | 1,344 | 6,916 | 968 | 6,420 | 899 | 6,420 | 771 |
| | | 4.9 | 20 | 0.087 | 12,160 | 2,189 | 10,340 | 1,860 | 8,512 | 1,532 | 7,900 | 1,265 | 7,900 | 1,107 |
| 1.5 | 3 | 0.4 | 8 | 0.320 | 12,720 | 3,816 | 10,810 | 3,244 | 8,904 | 2,404 | 8,270 | 1,984 | 8,270 | 1,736 |
| | | | 16 | 0.220 | 12,720 | 3,816 | 10,810 | 3,244 | 8,904 | 2,404 | 8,270 | 1,984 | 8,270 | 1,736 |
| | | | 20 | 0.150 | 12,720 | 3,434 | 10,810 | 2,919 | 8,904 | 2,137 | 8,270 | 1,736 | 8,270 | 1,488 |
| | | | 30 | 0.080 | 10,176 | 2,748 | 8,650 | 2,335 | 7,123 | 1,496 | 6,610 | 1,389 | 6,610 | 1,191 |
| | | | 40 | 0.060 | 8,270 | 1,984 | 7,030 | 1,687 | 5,788 | 1,215 | 5,370 | 1,129 | 5,370 | 967 |
| | | | 50 | 0.043 | 8,270 | 1,984 | 7,030 | 1,687 | 5,788 | 1,215 | 5,370 | 1,129 | 5,370 | 967 |
| | | | 80 | 0.016 | 6,230 | 1,371 | 5,300 | 1,165 | 4,363 | 896 | 4,050 | 748 | 4,050 | 673 |
| | | 0.9 | 15 | 0.250 | 12,720 | 3,816 | 10,810 | 3,244 | 8,904 | 2,404 | 8,270 | 1,984 | 8,270 | 1,736 |
| | | | 20 | 0.170 | 12,720 | 3,434 | 10,810 | 2,919 | 8,904 | 2,137 | 8,270 | 1,736 | 8,270 | 1,488 |
| | | | 30 | 0.090 | 10,180 | 2,748 | 8,650 | 2,335 | 7,123 | 1,496 | 6,610 | 1,389 | 6,610 | 1,191 |
| | | | 35 | 0.080 | 10,180 | 2,748 | 8,650 | 2,335 | 7,123 | 1,496 | 6,610 | 1,389 | 6,610 | 1,191 |
| | | | 40 | 0.070 | 8,270 | 1,984 | 7,030 | 1,687 | 5,788 | 1,215 | 5,370 | 1,129 | 5,370 | 967 |
| | | | 50 | 0.050 | 8,270 | 1,984 | 7,030 | 1,687 | 5,788 | 1,215 | 5,370 | 1,129 | 5,370 | 967 |
| | | | 60 | 0.030 | 7,120 | 1,710 | 6,060 | 1,453 | 4,986 | 1,047 | 4,630 | 972 | 4,630 | 833 |
| | | | 70 | 0.020 | 6,230 | 1,496 | 5,300 | 1,271 | 4,363 | 916 | 4,050 | 851 | 4,050 | 729 |
| | | | 90 | 0.013 | 6,230 | 1,371 | 5,300 | 1,165 | 4,363 | 896 | 4,050 | 748 | 4,050 | 673 |
| | | 1.4 | 30 | 0.100 | 10,180 | 2,748 | 8,650 | 2,335 | 7,123 | 1,496 | 6,610 | 1,389 | 6,610 | 1,191 |
| | | | 40 | 0.075 | 8,270 | 1,984 | 7,030 | 1,687 | 5,788 | 1,215 | 5,370 | 1,129 | 5,370 | 967 |
| | | | 50 | 0.053 | 8,270 | 1,984 | 7,030 | 1,687 | 5,788 | 1,215 | 5,370 | 1,129 | 5,370 | 967 |
| | | | 66 | 0.022 | 6,230 | 1,496 | 5,300 | 1,165 | 4,363 | 916 | 4,050 | 748 | 4,050 | 673 |
| | | 2.9 | 30 | 0.110 | 10,180 | 2,748 | 8,650 | 2,335 | 7,123 | 1,496 | 6,610 | 1,389 | 6,610 | 1,191 |
| 2 | 4 | 0.4 | 60 | 0.060 | 7,800 | 1,590 | 6,600 | 1,350 | 5,800 | 1,120 | 5,000 | 920 | 5,000 | 870 |
| | | | 100 | 0.030 | 6,230 | 1,246 | 5,300 | 1,059 | 4,350 | 869 | 3,920 | 704 | 3,920 | 633 |
| | | 0.9 | 20 | 0.320 | 11,900 | 2,860 | 10,100 | 2,420 | 9,000 | 2,050 | 7,800 | 1,680 | 7,800 | 1,590 |
| | | | 30 | 0.230 | 11,900 | 2,570 | 10,100 | 2,180 | 9,000 | 1,850 | 7,800 | 1,520 | 7,800 | 1,430 |
| | | | 35 | 0.200 | 11,900 | 2,570 | 10,100 | 2,180 | 9,000 | 1,850 | 7,800 | 1,520 | 7,800 | 1,430 |
| | | | 40 | 0.140 | 9,500 | 1,940 | 8,100 | 1,650 | 7,200 | 1,400 | 6,200 | 1,140 | 6,200 | 1,080 |
| | | | 50 | 0.110 | 7,800 | 1,590 | 6,600 | 1,350 | 5,800 | 1,120 | 5,000 | 920 | 5,000 | 870 |
| | | | 60 | 0.070 | 7,800 | 1,590 | 6,600 | 1,350 | 5,800 | 1,120 | 5,000 | 920 | 5,000 | 870 |
| | | | 120 | 0.030 | 6,230 | 1,246 | 5,300 | 1,059 | 4,350 | 869 | 3,920 | 704 | 3,920 | 633 |

【注意】ご使用にあたっては、A92ページの表下の項目と注意を参照してください。 【Note】Upon usage, please refer to comments and notes below table on page A92.

## EPDBPE-ATH

**高能率切削条件** High efficiency cutting conditions　高精度切削条件 High accuracy cutting conditions

高精度切削条件はA93ページを参照してください。
Please refer to P.A93 about high accuracy cutting conditions

| 被削材 Work material | | | | | 1 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 2 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 3 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 4 焼入れ鋼 Hardened steels (45～55HRC) | | 5 焼入れ鋼 Hardened steels (55～65HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | | 100% | | 90% | | 80% | | 65% | | 60% | |
| ボール半径RE Ball radius (mm) | 外径DC Tool dia. (mm) | 首部テーパ半角 BHTA2 Neck angle (°) | 首下長LU Under neck length (mm) | ap (mm) | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min |
| 2 | 4 | 1.4 | 45 | 0.120 | 7,800 | 1,590 | 6,600 | 1,350 | 5,800 | 1,120 | 5,000 | 920 | 5,000 | 870 |
| | | | 80 | 0.060 | 6,230 | 1,246 | 5,300 | 1,059 | 4,350 | 869 | 3,920 | 704 | 3,920 | 633 |
| | | 2.9 | 25 | 0.250 | 11,900 | 2,570 | 10,100 | 2,180 | 9,000 | 1,850 | 7,800 | 1,520 | 7,800 | 1,430 |
| 2.5 | 5 | 0.4 | 100 | 0.055 | 4,050 | 850 | 3,440 | 722 | 2,820 | 591 | 2,540 | 479 | 2,540 | 431 |
| | | 0.9 | 30 | 0.340 | 9,500 | 2,140 | 8,100 | 1,820 | 7,200 | 1,540 | 6,200 | 1,260 | 6,200 | 1,190 |
| | | | 40 | 0.250 | 9,500 | 2,140 | 8,100 | 1,820 | 7,200 | 1,540 | 6,200 | 1,260 | 6,200 | 1,190 |
| | | | 60 | 0.150 | 6,200 | 1,320 | 5,300 | 1,130 | 4,700 | 950 | 4,000 | 770 | 4,000 | 720 |
| | | | 90 | 0.080 | 4,050 | 850 | 3,440 | 722 | 2,820 | 591 | 2,540 | 479 | 2,540 | 431 |
| | | 1.4 | 60 | 0.165 | 6,200 | 1,320 | 5,300 | 1,130 | 4,700 | 950 | 4,000 | 770 | 4,000 | 720 |
| | | | 74 | 0.160 | 6,200 | 1,320 | 5,300 | 1,130 | 4,700 | 950 | 4,000 | 770 | 4,000 | 720 |
| | | 2.9 | 40 | 0.300 | 9,500 | 2,140 | 8,100 | 1,820 | 7,200 | 1,540 | 6,200 | 1,260 | 6,200 | 1,190 |
| 3 | 6 | 0.4 | 120 | 0.060 | 4,200 | 840 | 3,570 | 714 | 2,930 | 586 | 2,900 | 522 | 2,900 | 469 |
| | | 0.9 | 30 | 0.450 | 8,000 | 2,000 | 6,800 | 1,700 | 6,000 | 1,430 | 5,200 | 1,170 | 5,200 | 1,110 |
| | | | 40 | 0.400 | 8,000 | 1,800 | 6,800 | 1,530 | 6,000 | 1,280 | 5,200 | 1,050 | 5,200 | 990 |
| | | | 45 | 0.370 | 8,000 | 1,800 | 6,800 | 1,530 | 6,000 | 1,280 | 5,200 | 1,050 | 5,200 | 990 |
| | | | 50 | 0.320 | 8,000 | 1,800 | 6,800 | 1,530 | 6,000 | 1,280 | 5,200 | 1,050 | 5,200 | 990 |
| | | | 60 | 0.220 | 6,400 | 1,360 | 5,400 | 1,150 | 4,800 | 970 | 4,100 | 780 | 4,100 | 740 |
| | | | 70 | 0.180 | 5,200 | 1,110 | 4,400 | 940 | 3,900 | 790 | 3,400 | 650 | 3,400 | 610 |
| | | | 80 | 0.140 | 5,200 | 1,110 | 4,400 | 940 | 3,900 | 790 | 3,400 | 650 | 3,400 | 610 |
| | | | 120 | 0.072 | 4,200 | 840 | 3,570 | 714 | 2,930 | 586 | 2,640 | 475 | 2,640 | 427 |
| | | 1.4 | 50 | 0.350 | 8,000 | 1,800 | 6,800 | 1,530 | 6,000 | 1,280 | 5,200 | 1,050 | 5,200 | 990 |
| | | | 96 | 0.170 | 4,620 | 925 | 3,930 | 786 | 3,220 | 644 | 2,900 | 522 | 2,900 | 469 |
| | | 2.9 | 30 | 0.540 | 8,000 | 2,000 | 6,800 | 1,700 | 6,000 | 1,430 | 5,200 | 1,170 | 5,200 | 1,110 |
| 3.5 | 7 | 0.9 | 45 | 0.370 | 8,000 | 1,800 | 6,800 | 1,530 | 6,000 | 1,280 | 5,200 | 1,050 | 5,200 | 990 |
| | | 1.4 | 60 | 0.350 | 6,400 | 1,360 | 5,400 | 1,150 | 4,800 | 970 | 4,100 | 780 | 4,100 | 740 |
| | | 2.9 | 40 | 0.500 | 8,000 | 1,800 | 6,800 | 1,530 | 6,000 | 1,280 | 5,200 | 1,050 | 5,200 | 990 |
| 4 | 8 | 0.4 | 120 | 0.170 | 3,840 | 805 | 3,260 | 684 | 2,670 | 560 | 2,400 | 453 | 2,400 | 407 |
| | | 0.9 | 50 | 0.500 | 6,000 | 1,460 | 5,100 | 1,240 | 4,500 | 1,040 | 3,900 | 850 | 3,900 | 810 |
| | | | 55 | 0.470 | 6,000 | 1,460 | 5,100 | 1,240 | 4,500 | 1,040 | 3,900 | 850 | 3,900 | 810 |
| | | | 60 | 0.430 | 6,000 | 1,460 | 5,100 | 1,240 | 4,500 | 1,040 | 3,900 | 850 | 3,900 | 810 |
| | | | 70 | 0.330 | 6,000 | 1,460 | 5,100 | 1,240 | 4,500 | 1,040 | 3,900 | 850 | 3,900 | 810 |
| | | | 80 | 0.250 | 4,800 | 1,100 | 4,080 | 935 | 3,350 | 767 | 3,020 | 622 | 3,020 | 559 |
| | | | 120 | 0.190 | 3,840 | 805 | 3,260 | 684 | 2,670 | 560 | 2,400 | 453 | 2,400 | 407 |
| | | 1.4 | 50 | 0.550 | 6,000 | 1,460 | 5,100 | 1,240 | 4,500 | 1,040 | 3,900 | 850 | 3,900 | 810 |
| | | | 98 | 0.250 | 3,840 | 805 | 3,260 | 684 | 2,670 | 560 | 2,400 | 453 | 2,400 | 407 |
| | | 2.9 | 35 | 0.700 | 6,000 | 1,460 | 5,100 | 1,240 | 4,500 | 1,040 | 3,900 | 850 | 3,900 | 810 |
| 5 | 10 | 0.4 | 120 | 0.250 | 3,120 | 780 | 2,650 | 663 | 2,170 | 542 | 1,950 | 438 | 1,950 | 394 |
| | | 0.9 | 60 | 0.700 | 4,800 | 1,300 | 4,100 | 1,110 | 3,600 | 920 | 3,100 | 750 | 3,100 | 710 |
| | | | 65 | 0.600 | 4,800 | 1,300 | 4,100 | 1,110 | 3,600 | 920 | 3,100 | 750 | 3,100 | 710 |
| | | | 75 | 0.500 | 4,800 | 1,300 | 4,100 | 1,110 | 3,600 | 920 | 3,100 | 750 | 3,100 | 710 |
| | | | 86 | 0.400 | 3,840 | 1,000 | 3,260 | 850 | 2,670 | 696 | 2,400 | 563 | 2,400 | 506 |
| | | 1.4 | 55 | 0.800 | 4,800 | 1,300 | 4,100 | 1,110 | 3,600 | 920 | 3,100 | 750 | 3,100 | 710 |
| | | | 120 | 0.270 | 3,120 | 780 | 2,650 | 663 | 2,170 | 542 | 1,950 | 438 | 1,950 | 394 |
| | | 2.9 | 35 | 0.900 | 5,280 | 1,480 | 4,490 | 1,258 | 3,680 | 1,031 | 3,310 | 834 | 3,310 | 750 |
| 6 | 12 | 0.4 | 120 | 0.380 | 2,500 | 750 | 2,130 | 637 | 1,810 | 541 | 1,630 | 438 | 1,630 | 394 |
| | | 0.9 | 75 | 0.720 | 3,840 | 1,250 | 3,260 | 1,062 | 2,770 | 902 | 2,490 | 729 | 2,490 | 656 |
| | | | 120 | 0.400 | 2,500 | 750 | 2,130 | 637 | 1,810 | 541 | 1,630 | 438 | 1,630 | 394 |
| | | 1.4 | 80 | 0.790 | 3,840 | 1,250 | 3,260 | 1,062 | 2,770 | 902 | 2,490 | 729 | 2,490 | 656 |
| | | | 106 | 0.450 | 2,500 | 750 | 2,130 | 637 | 1,810 | 541 | 1,630 | 438 | 1,630 | 394 |
| | | 2.9 | 60 | 0.900 | 3,840 | 1,250 | 3,260 | 1,062 | 2,770 | 902 | 2,490 | 729 | 2,490 | 656 |

※(1) 基本切込みは被削材グループ1での目安を示しています。その他のグループの場合は、上表の切込み比率を目安に調整して下さい。
※(2) リブ加工や止まり溝など、切りくずがつまりやすい切削の場合、切込み設定は基本切込みに切込み比率をかけて算出した切込み量を、さらにその80%まで小さくして使用してください。

※(1) Standard cutting depth is shown as the criteria for Group 1 workpieces. For other groups, adjust the cutting depth according to the cutting depth factors in the above table.
※(2) When performing cutting where cutting chips may cause clogging, such as for rib cutting, blind grooves, etc., cutting depth setting should be set by multiplying a cutting depth factor to calculate the cutting depth amount, and this amount should then be reduced to 80% of the calculated value.

【切込み設定例】 EPDBPE2020-25-09-ATHの工具で焼き入れ鋼(50HRC) をリブ溝等高線切削する場合、
切込み=0.07(基本切込み)×0.65(焼き入れ鋼グループ4の切込み比率)×0.8(閉鎖域の切削)=0.036

Cutting depth setting example: When cutting rib groove contours in pre-harden steel (50HRC) using an EPDBPE2020-25-09-ATH tool:
Cutting depth = 0.07 (standard cutting depth) × 0.65 (cutting depth factor for Group 4 pre-harden steel) × 0.8 (for closed-area cutting) = 0.036mm

【注意】 ①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

【Note】 ① Use the appropriate coolant for the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
③ If the rpm of the machine is low, lower the feed rate also to put the rpm and feed rate in the same ratio.

# 標準切削条件表
Recommended cutting conditions

高能率切削条件 High efficiency cuttiing condition

**高精度切削条件** High accuracy cuttiing condition

## EPDBPE-ATH

高能率切削条件はA89ページを参照してください。Please refer to P.A89 about high efficiency cutting conditions

| 被削材 Work material | | | | | 1 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 2 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 3 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 4 焼入れ鋼 Hardened steels (45～55HRC) | | 5 焼入れ鋼 Hardened steels (55～65HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | | 100% | | 90% | | 80% | | 65% | | 60% | |
| ボール半径RE Ball radius (mm) | 外径DC Tool dia. (mm) | 首部テーパ半角 BHTA2 Neck angle (°) | 首下長LU Under neck length (mm) | ap (mm) | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 0.1 | 0.2 | 0.4 | 1 | 0.012 | 40,000 | 560 | 34,000 | 476 | 28,000 | 353 | 26,000 | 291 | 26,000 | 255 |
| | | | 1.5 | 0.006 | 40,000 | 560 | 34,000 | 476 | 28,000 | 353 | 26,000 | 291 | 26,000 | 255 |
| | | | 2 | 0.004 | 32,000 | 323 | 27,200 | 274 | 22,400 | 226 | 20,800 | 186 | 20,800 | 163 |
| | | | 3 | 0.003 | 21,000 | 165 | 17,850 | 140 | 14,640 | 115 | 13,200 | 103 | 13,200 | 92 |
| | | 0.9 | 2 | 0.005 | 32,000 | 323 | 27,200 | 274 | 22,400 | 226 | 20,800 | 186 | 20,800 | 163 |
| | | | 2.5 | 0.003 | 26,000 | 233 | 22,100 | 198 | 18,200 | 143 | 16,900 | 132 | 16,900 | 113 |
| | | | 3 | 0.003 | 21,000 | 165 | 17,850 | 140 | 14,640 | 115 | 13,200 | 103 | 13,200 | 92 |
| | | 1.4 | 1 | 0.014 | 40,000 | 560 | 34,000 | 476 | 28,000 | 353 | 26,000 | 291 | 26,000 | 255 |
| | | | 2 | 0.006 | 32,000 | 323 | 27,200 | 274 | 22,400 | 226 | 20,800 | 186 | 20,800 | 163 |
| | | | 3 | 0.004 | 21,000 | 165 | 17,850 | 140 | 14,640 | 115 | 13,200 | 103 | 13,200 | 92 |
| | | 2.9 | 1 | 0.015 | 40,000 | 560 | 34,000 | 476 | 28,000 | 353 | 26,000 | 291 | 26,000 | 255 |
| | | | 2 | 0.006 | 32,000 | 323 | 27,200 | 274 | 22,400 | 226 | 20,800 | 186 | 20,800 | 163 |
| | | | 3 | 0.005 | 21,000 | 165 | 17,850 | 140 | 14,640 | 115 | 13,200 | 103 | 13,200 | 92 |
| 0.15 | 0.3 | 0.4 | 2 | 0.018 | 40,000 | 840 | 34,000 | 714 | 28,000 | 529 | 26,000 | 437 | 26,000 | 382 |
| | | | 3 | 0.008 | 32,000 | 484 | 27,200 | 412 | 22,400 | 339 | 20,800 | 279 | 20,800 | 244 |
| | | 0.9 | 3 | 0.009 | 32,000 | 484 | 27,200 | 412 | 22,400 | 339 | 20,800 | 279 | 20,800 | 244 |
| | | | 4 | 0.005 | 26,000 | 349 | 22,100 | 297 | 18,200 | 214 | 16,900 | 199 | 16,900 | 170 |
| 0.2 | 0.4 | 0.4 | 2 | 0.025 | 40,000 | 1,120 | 34,000 | 952 | 28,000 | 706 | 26,000 | 582 | 26,000 | 510 |
| | | | 3 | 0.014 | 40,000 | 1,120 | 34,000 | 952 | 28,000 | 706 | 26,000 | 582 | 26,000 | 510 |
| | | | 4 | 0.005 | 32,000 | 645 | 27,200 | 548 | 22,400 | 452 | 20,800 | 372 | 20,800 | 326 |
| | | | 5 | 0.004 | 26,000 | 466 | 22,100 | 396 | 18,200 | 286 | 16,900 | 265 | 16,900 | 227 |
| | | | 6 | 0.003 | 21,000 | 330 | 17,850 | 280 | 14,640 | 230 | 13,200 | 186 | 13,200 | 167 |
| | | | 8 | 0.002 | 17,000 | 190 | 14,450 | 162 | 11,850 | 132 | 10,700 | 107 | 10,700 | 96 |
| | | 0.9 | 2 | 0.027 | 40,000 | 1,120 | 34,000 | 952 | 28,000 | 706 | 26,000 | 582 | 26,000 | 510 |
| | | | 4 | 0.006 | 32,000 | 645 | 27,200 | 548 | 22,400 | 452 | 20,800 | 372 | 20,800 | 326 |
| | | | 5 | 0.005 | 26,000 | 466 | 22,100 | 396 | 18,200 | 286 | 16,900 | 265 | 16,900 | 227 |
| | | | 6 | 0.004 | 21,000 | 330 | 17,850 | 280 | 14,640 | 230 | 13,200 | 186 | 13,200 | 167 |
| | | 1.4 | 2 | 0.029 | 40,000 | 1,120 | 34,000 | 952 | 28,000 | 706 | 26,000 | 582 | 26,000 | 510 |
| | | | 4 | 0.007 | 32,000 | 645 | 27,200 | 548 | 22,400 | 452 | 20,800 | 372 | 20,800 | 326 |
| | | | 6 | 0.005 | 21,000 | 330 | 17,850 | 280 | 14,640 | 230 | 13,200 | 186 | 13,200 | 167 |
| | | 2.9 | 2 | 0.032 | 40,000 | 1,120 | 34,000 | 952 | 28,000 | 706 | 26,000 | 582 | 26,000 | 510 |
| | | | 4 | 0.008 | 32,000 | 645 | 27,200 | 548 | 22,400 | 452 | 20,800 | 372 | 20,800 | 326 |
| | | | 6 | 0.006 | 21,000 | 330 | 17,850 | 280 | 14,640 | 230 | 13,200 | 186 | 13,200 | 167 |
| 0.25 | 0.5 | 0.4 | 4 | 0.018 | 40,000 | 1,400 | 34,000 | 1,190 | 28,000 | 882 | 26,000 | 728 | 26,000 | 637 |
| | | | 6 | 0.010 | 26,000 | 728 | 22,100 | 619 | 18,200 | 510 | 16,900 | 426 | 16,900 | 383 |
| | | 0.9 | 6 | 0.012 | 26,000 | 728 | 22,100 | 619 | 18,200 | 510 | 16,900 | 426 | 16,900 | 383 |
| | | | 8 | 0.009 | 26,000 | 510 | 22,100 | 433 | 18,200 | 312 | 16,900 | 290 | 16,900 | 249 |
| | | | 12 | 0.004 | 22,400 | 502 | 19,040 | 426 | 15,680 | 307 | 14,560 | 286 | 14,560 | 245 |
| 0.27 | 0.54 | 0.4 | 2 | 0.034 | 40,000 | 1,512 | 34,000 | 1,285 | 28,000 | 953 | 26,000 | 786 | 26,000 | 688 |
| | | | 4 | 0.024 | 40,000 | 1,512 | 34,000 | 1,285 | 28,000 | 953 | 26,000 | 786 | 26,000 | 688 |
| | | | 5 | 0.018 | 40,000 | 1,058 | 34,000 | 1,000 | 28,000 | 823 | 26,000 | 728 | 26,000 | 582 |
| | | | 6 | 0.014 | 26,000 | 871 | 22,100 | 741 | 18,200 | 610 | 16,900 | 473 | 16,900 | 440 |
| | | | 6.5 | 0.013 | 26,000 | 708 | 22,100 | 601 | 18,200 | 433 | 16,900 | 403 | 16,900 | 345 |
| | | | 7 | 0.012 | 26,000 | 629 | 22,100 | 568 | 18,200 | 410 | 16,900 | 380 | 16,900 | 326 |
| 0.3 | 0.6 | 0.4 | 2 | 0.039 | 40,000 | 1,680 | 34,000 | 1,428 | 28,000 | 1,058 | 26,000 | 874 | 26,000 | 764 |
| | | | 4 | 0.025 | 40,000 | 1,680 | 34,000 | 1,428 | 28,000 | 1,058 | 26,000 | 874 | 26,000 | 764 |
| | | | 6 | 0.013 | 32,000 | 967 | 27,200 | 823 | 22,400 | 678 | 20,800 | 559 | 20,800 | 489 |
| | | | 8 | 0.012 | 26,000 | 699 | 22,100 | 594 | 18,200 | 489 | 16,900 | 408 | 16,900 | 367 |
| | | | 10 | 0.011 | 26,000 | 612 | 22,100 | 520 | 18,200 | 375 | 16,900 | 348 | 16,900 | 298 |
| | | | 12 | 0.007 | 26,000 | 612 | 22,100 | 520 | 18,200 | 375 | 16,900 | 348 | 16,900 | 298 |
| | | | 15 | 0.004 | 22,400 | 602 | 19,040 | 512 | 15,680 | 369 | 14,560 | 294 | 14,560 | 249 |
| | | 0.9 | 4 | 0.027 | 40,000 | 1,680 | 34,000 | 1,428 | 28,000 | 1,058 | 26,000 | 874 | 26,000 | 764 |
| | | | 6 | 0.015 | 32,000 | 967 | 27,200 | 823 | 22,400 | 678 | 20,800 | 559 | 20,800 | 489 |
| | | | 8 | 0.014 | 26,000 | 699 | 22,100 | 594 | 18,200 | 428 | 16,900 | 398 | 16,900 | 341 |
| | | | 10 | 0.013 | 26,000 | 612 | 22,100 | 520 | 18,200 | 375 | 16,900 | 348 | 16,900 | 298 |
| | | | 12 | 0.009 | 26,000 | 612 | 22,100 | 520 | 18,200 | 375 | 16,900 | 348 | 16,900 | 298 |
| | | | 15 | 0.005 | 22,400 | 602 | 19,040 | 512 | 15,680 | 369 | 14,560 | 294 | 14,560 | 249 |
| | | 1.4 | 4 | 0.029 | 40,000 | 1,680 | 34,000 | 1,428 | 28,000 | 1,058 | 26,000 | 874 | 26,000 | 764 |
| | | | 5 | 0.020 | 36,000 | 1,260 | 30,600 | 1,071 | 25,090 | 878 | 22,580 | 711 | 20,320 | 575 |
| | | | 6 | 0.017 | 32,000 | 967 | 27,200 | 823 | 22,400 | 678 | 20,800 | 559 | 20,800 | 489 |
| | | | 8 | 0.015 | 26,000 | 699 | 22,100 | 594 | 18,200 | 428 | 16,900 | 398 | 16,900 | 341 |
| | | | 10 | 0.014 | 26,000 | 612 | 22,100 | 520 | 18,200 | 375 | 16,900 | 348 | 16,900 | 298 |
| | | | 20 | 0.004 | 19,300 | 466 | 16,410 | 396 | 13,460 | 325 | 12,110 | 262 | 12,110 | 236 |
| | | 2.9 | 6 | 0.016 | 32,000 | 967 | 27,200 | 823 | 22,400 | 678 | 20,800 | 559 | 20,800 | 489 |
| | | | 8 | 0.015 | 26,000 | 699 | 22,100 | 594 | 18,200 | 428 | 16,900 | 398 | 16,900 | 341 |
| | | | 12 | 0.009 | 26,000 | 612 | 22,100 | 520 | 18,200 | 375 | 16,900 | 348 | 16,900 | 298 |
| | | | 20 | 0.005 | 19,300 | 466 | 16,410 | 396 | 13,460 | 325 | 12,110 | 262 | 12,110 | 236 |
| 0.4 | 0.8 | 0.4 | 4 | 0.043 | 32,000 | 1,792 | 27,200 | 1,523 | 22,400 | 1,129 | 20,800 | 932 | 20,800 | 816 |
| | | | 6 | 0.032 | 32,000 | 1,792 | 27,200 | 1,523 | 22,400 | 1,129 | 20,800 | 932 | 20,800 | 816 |
| | | | 8 | 0.016 | 25,600 | 1,033 | 21,760 | 877 | 17,920 | 722 | 16,640 | 596 | 16,640 | 522 |
| | | | 12 | 0.015 | 20,800 | 746 | 17,680 | 634 | 14,560 | 489 | 13,520 | 424 | 13,520 | 363 |

【注意】ご使用にあたっては、A96ページの表下の項目と注意を参照してください。 【Note】Upon usage, please refer to comments and notes below table on page A96.

## EPDBPE-ATH

高能率切削条件
High efficiency cuttiing condition

**高精度切削条件**
**High accuracy cuttiing condition**

高能率切削条件はA89ページを参照してください。
Please refer to P.A89 about high efficiency cutting conditions

| 被削材 Work material | | | | | 1 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 2 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 3 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 4 焼入れ鋼 Hardened steels (45～55HRC) | | 5 焼入れ鋼 Hardened steels (55～65HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | | 100% | | 90% | | 80% | | 65% | | 60% | |
| ボール半径RE Ball radius (mm) | 外径DC Tool dia. (mm) | 首部テーパ半角 BHTA2 Neck angle (°) | 首下長LU Under neck length (mm) | ap (mm) | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 0.4 | 0.8 | 0.9 | 8 | 0.018 | 25,600 | 1,033 | 21,760 | 877 | 17,920 | 722 | 16,640 | 596 | 16,640 | 522 |
| | | | 12 | 0.017 | 20,800 | 746 | 17,680 | 634 | 14,560 | 489 | 13,520 | 424 | 13,520 | 363 |
| | | | 16 | 0.015 | 20,800 | 652 | 17,680 | 554 | 14,560 | 428 | 13,520 | 371 | 13,520 | 318 |
| | | 2.9 | 16 | 0.017 | 20,800 | 652 | 17,680 | 554 | 14,560 | 428 | 13,520 | 371 | 13,520 | 318 |
| | | | 20 | 0.015 | 19,300 | 586 | 16,410 | 498 | 13,460 | 409 | 12,110 | 330 | 12,110 | 297 |
| 0.45 | 0.9 | 0.4 | 4 | 0.044 | 28,300 | 1,783 | 24,060 | 1,515 | 19,730 | 1,242 | 17,760 | 1,006 | 17,760 | 905 |
| | | | 8 | 0.035 | 28,300 | 1,783 | 24,060 | 1,515 | 19,730 | 1,242 | 17,760 | 1,006 | 17,760 | 905 |
| | | | 12 | 0.031 | 18,400 | 928 | 15,640 | 788 | 12,820 | 645 | 11,540 | 522 | 11,540 | 470 |
| | | | 16 | 0.020 | 18,400 | 928 | 15,640 | 788 | 12,820 | 645 | 11,540 | 522 | 11,540 | 470 |
| | | | 18 | 0.015 | 18,400 | 928 | 15,640 | 788 | 12,820 | 645 | 11,540 | 522 | 11,540 | 470 |
| | | | 20 | 0.015 | 15,850 | 913 | 13,470 | 775 | 11,050 | 635 | 9,950 | 514 | 9,950 | 462 |
| | | | 22 | 0.012 | 15,850 | 913 | 13,470 | 775 | 11,050 | 635 | 9,950 | 514 | 9,950 | 462 |
| | | | 24 | 0.009 | 14,150 | 807 | 12,030 | 685 | 9,860 | 559 | 8,870 | 451 | 8,870 | 383 |
| 0.5 | 1 | 0.4 | 6 | 0.039 | 25,600 | 1,792 | 21,760 | 1,523 | 17,920 | 1,129 | 16,640 | 932 | 16,640 | 816 |
| | | | 8 | 0.039 | 25,600 | 1,792 | 21,760 | 1,523 | 17,920 | 1,129 | 16,640 | 932 | 16,640 | 816 |
| | | | 10 | 0.023 | 20,800 | 1,310 | 17,680 | 1,114 | 14,560 | 917 | 13,520 | 757 | 13,520 | 662 |
| | | | 15 | 0.022 | 16,640 | 932 | 14,140 | 792 | 11,650 | 612 | 10,820 | 530 | 10,820 | 454 |
| | | | 20 | 0.015 | 16,640 | 932 | 14,140 | 792 | 11,650 | 612 | 10,820 | 530 | 10,820 | 454 |
| | | | 25 | 0.014 | 14,560 | 816 | 12,380 | 693 | 10,190 | 535 | 9,460 | 463 | 9,460 | 397 |
| | | | 30 | 0.013 | 12,480 | 699 | 10,610 | 594 | 8,740 | 454 | 8,110 | 390 | 8,110 | 325 |
| | | | 50 | 0.006 | 9,500 | 532 | 8,080 | 452 | 6,650 | 346 | 6,180 | 297 | 6,180 | 247 |
| | | | 70 | 0.002 | 8,500 | 476 | 7,230 | 404 | 5,950 | 310 | 5,530 | 266 | 5,530 | 221 |
| | | 0.9 | 6 | 0.044 | 25,600 | 1,792 | 21,760 | 1,523 | 17,920 | 1,129 | 16,640 | 932 | 16,640 | 816 |
| | | | 10 | 0.025 | 20,800 | 1,310 | 17,680 | 1,114 | 14,560 | 917 | 13,520 | 757 | 13,520 | 662 |
| | | | 15 | 0.024 | 16,640 | 932 | 14,140 | 792 | 11,650 | 612 | 10,820 | 530 | 10,820 | 454 |
| | | | 16 | 0.024 | 16,640 | 932 | 14,140 | 792 | 11,650 | 612 | 10,820 | 530 | 10,820 | 454 |
| | | | 20 | 0.017 | 16,640 | 932 | 14,140 | 792 | 11,650 | 612 | 10,820 | 530 | 10,820 | 454 |
| | | | 25 | 0.016 | 14,560 | 816 | 12,380 | 693 | 10,190 | 535 | 9,460 | 463 | 9,460 | 397 |
| | | | 30 | 0.015 | 12,480 | 699 | 10,610 | 594 | 8,740 | 454 | 8,110 | 390 | 8,110 | 325 |
| | | | 35 | 0.010 | 10,400 | 582 | 8,840 | 495 | 7,280 | 378 | 6,760 | 325 | 6,760 | 270 |
| | | | 40 | 0.009 | 10,000 | 560 | 8,500 | 476 | 7,000 | 364 | 6,500 | 312 | 6,500 | 260 |
| | | | 50 | 0.007 | 9,500 | 532 | 8,080 | 452 | 6,650 | 346 | 6,180 | 297 | 6,180 | 247 |
| | | | 60 | 0.005 | 9,000 | 504 | 7,650 | 429 | 6,300 | 328 | 5,850 | 281 | 5,850 | 234 |
| | | | 70 | 0.003 | 8,500 | 476 | 7,230 | 405 | 5,950 | 310 | 5,530 | 266 | 5,530 | 221 |
| | | 1.4 | 6 | 0.048 | 25,600 | 1,792 | 21,760 | 1,523 | 17,920 | 1,129 | 16,640 | 932 | 16,640 | 816 |
| | | | 12 | 0.034 | 20,800 | 1,310 | 17,680 | 1,114 | 14,560 | 917 | 13,520 | 757 | 13,520 | 662 |
| | | | 16 | 0.028 | 16,640 | 932 | 14,140 | 792 | 11,650 | 612 | 10,820 | 530 | 10,820 | 454 |
| | | | 20 | 0.020 | 16,640 | 932 | 14,140 | 792 | 11,650 | 612 | 10,820 | 530 | 10,820 | 454 |
| | | | 22 | 0.018 | 16,640 | 932 | 14,140 | 792 | 11,650 | 612 | 10,820 | 530 | 10,820 | 454 |
| | | | 25 | 0.017 | 14,560 | 816 | 12,380 | 693 | 10,190 | 535 | 9,460 | 463 | 9,460 | 397 |
| | | | 50 | 0.008 | 9,500 | 532 | 8,080 | 452 | 6,650 | 346 | 6,180 | 297 | 6,180 | 247 |
| | | | 90 | 0.002 | 8,500 | 476 | 7,230 | 405 | 5,950 | 310 | 5,530 | 266 | 5,530 | 221 |
| | | 2.9 | 10 | 0.032 | 20,800 | 1,310 | 17,680 | 1,114 | 14,560 | 917 | 13,520 | 757 | 13,520 | 662 |
| | | | 15 | 0.030 | 16,640 | 932 | 14,140 | 792 | 11,650 | 612 | 10,820 | 530 | 10,820 | 454 |
| | | | 20 | 0.020 | 16,640 | 932 | 14,140 | 792 | 11,650 | 612 | 10,820 | 530 | 10,820 | 454 |
| | | | 30 | 0.018 | 12,480 | 699 | 10,610 | 594 | 8,740 | 454 | 8,110 | 390 | 8,110 | 325 |
| | | | 40 | 0.011 | 10,000 | 560 | 8,500 | 476 | 7,000 | 364 | 6,500 | 312 | 6,500 | 260 |
| | | | 50 | 0.009 | 9,500 | 532 | 8,080 | 452 | 6,650 | 346 | 6,180 | 297 | 6,180 | 247 |
| | | 4.9 | 20 | 0.022 | 16,640 | 932 | 14,140 | 792 | 11,650 | 612 | 10,820 | 530 | 10,820 | 454 |
| 0.6 | 1.2 | 2.9 | 20 | 0.022 | 16,640 | 932 | 14,140 | 792 | 11,650 | 612 | 10,820 | 530 | 10,820 | 454 |
| | | | 35 | 0.013 | 10,000 | 560 | 8,500 | 476 | 7,000 | 364 | 6,500 | 312 | 6,500 | 260 |
| 0.75 | 1.5 | 0.4 | 8 | 0.049 | 16,960 | 1,781 | 14,420 | 1,513 | 11,870 | 1,122 | 11,020 | 926 | 11,020 | 811 |
| | | | 10 | 0.049 | 16,960 | 1,781 | 14,420 | 1,513 | 11,870 | 1,122 | 11,020 | 926 | 11,020 | 811 |
| | | | 12 | 0.049 | 16,960 | 1,781 | 14,420 | 1,513 | 11,870 | 1,122 | 11,020 | 926 | 11,020 | 811 |
| | | | 30 | 0.020 | 11,020 | 926 | 9,370 | 787 | 7,720 | 567 | 7,170 | 526 | 7,170 | 452 |
| | | 0.9 | 10 | 0.056 | 16,960 | 1,781 | 14,420 | 1,513 | 11,870 | 1,122 | 11,020 | 926 | 11,020 | 811 |
| | | | 15 | 0.034 | 13,570 | 1,282 | 11,530 | 1,090 | 9,500 | 897 | 8,820 | 741 | 8,820 | 648 |
| | | | 20 | 0.032 | 11,020 | 926 | 9,370 | 787 | 7,720 | 567 | 7,170 | 526 | 7,170 | 452 |
| | | | 30 | 0.024 | 11,020 | 926 | 9,370 | 787 | 7,720 | 567 | 7,170 | 526 | 7,170 | 452 |
| | | 1.4 | 10 | 0.063 | 16,960 | 1,781 | 14,420 | 1,513 | 11,870 | 1,122 | 11,020 | 926 | 11,020 | 811 |
| | | | 20 | 0.038 | 11,020 | 926 | 9,370 | 787 | 7,720 | 567 | 7,170 | 526 | 7,170 | 452 |
| | | | 30 | 0.026 | 11,020 | 926 | 9,370 | 787 | 7,720 | 567 | 7,170 | 526 | 7,170 | 452 |
| | | | 40 | 0.015 | 9,500 | 836 | 8,080 | 710 | 6,630 | 582 | 5,970 | 471 | 5,970 | 424 |
| | | | 50 | 0.011 | 9,500 | 760 | 8,080 | 646 | 6,630 | 530 | 5,970 | 429 | 5,970 | 386 |
| | | 2.9 | 20 | 0.041 | 11,020 | 926 | 9,370 | 787 | 7,720 | 567 | 7,170 | 526 | 7,170 | 452 |
| | | | 46 | 0.013 | 9,500 | 760 | 8,080 | 646 | 6,630 | 530 | 5,970 | 429 | 5,970 | 386 |
| 0.9 | 1.8 | 0.4 | 4 | 0.084 | 14,200 | 1,789 | 12,070 | 1,521 | 9,940 | 1,127 | 9,230 | 930 | 9,230 | 814 |
| | | | 8 | 0.070 | 14,200 | 1,789 | 12,070 | 1,521 | 9,940 | 1,127 | 9,230 | 930 | 9,230 | 814 |
| | | | 12 | 0.056 | 14,200 | 1,789 | 12,070 | 1,521 | 9,940 | 1,127 | 9,230 | 930 | 9,230 | 814 |
| | | | 16 | 0.053 | 14,200 | 1,789 | 12,070 | 1,521 | 9,940 | 1,127 | 9,230 | 930 | 9,230 | 814 |
| | | | 20 | 0.050 | 9,230 | 930 | 7,850 | 791 | 6,460 | 570 | 6,000 | 529 | 6,000 | 454 |

| 被削材 Work material | | | | | 1 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 2 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 3 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 4 焼入れ鋼 Hardened steels (45～55HRC) | | 5 焼入れ鋼 Hardened steels (55～65HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | | 100% | | 90% | | 80% | | 65% | | 60% | |
| ボール半径RE Ball radius (mm) | 外径DC Tool dia. (mm) | 首部テーパ半角 BHTA2 Neck angle (°) | 首下長LU Under neck length (mm) | ap (mm) | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min |
| 0.9 | 1.8 | 0.4 | 24 | 0.045 | 9,230 | 930 | 7,850 | 791 | 6,460 | 570 | 6,000 | 529 | 6,000 | 454 |
| | | | 28 | 0.037 | 9,230 | 930 | 7,850 | 791 | 6,460 | 570 | 6,000 | 529 | 6,000 | 454 |
| | | | 32 | 0.031 | 9,230 | 930 | 7,850 | 791 | 6,460 | 570 | 6,000 | 529 | 6,000 | 454 |
| | | | 36 | 0.024 | 9,230 | 930 | 7,850 | 791 | 6,460 | 570 | 6,000 | 529 | 6,000 | 454 |
| | | | 38 | 0.020 | 8,000 | 922 | 6,800 | 783 | 5,600 | 565 | 5,200 | 524 | 5,200 | 450 |
| | | | 40 | 0.015 | 8,000 | 922 | 6,800 | 783 | 5,600 | 565 | 5,200 | 524 | 5,200 | 450 |
| 1 | 2 | 0.4 | 8 | 0.105 | 15,200 | 2,128 | 12,920 | 1,809 | 10,640 | 1,341 | 9,880 | 1,107 | 9,880 | 968 |
| | | | 12 | 0.063 | 15,200 | 2,128 | 12,920 | 1,809 | 10,640 | 1,341 | 9,880 | 1,107 | 9,880 | 968 |
| | | | 16 | 0.063 | 15,200 | 2,128 | 12,920 | 1,809 | 10,640 | 1,341 | 9,880 | 1,107 | 9,880 | 968 |
| | | | 20 | 0.043 | 12,160 | 1,532 | 10,340 | 1,302 | 8,510 | 1,072 | 7,900 | 886 | 7,900 | 775 |
| | | | 25 | 0.042 | 9,880 | 1,107 | 8,400 | 941 | 6,916 | 678 | 6,420 | 629 | 6,420 | 540 |
| | | | 30 | 0.034 | 9,880 | 1,107 | 8,400 | 941 | 6,920 | 678 | 6,420 | 629 | 6,420 | 540 |
| | | | 40 | 0.026 | 9,880 | 1,107 | 8,400 | 941 | 6,920 | 678 | 6,420 | 629 | 6,420 | 540 |
| | | | 80 | 0.004 | 6,150 | 689 | 5,230 | 585 | 4,305 | 448 | 4,000 | 384 | 4,000 | 320 |
| | | 0.9 | 12 | 0.070 | 15,200 | 2,128 | 12,920 | 1,809 | 10,640 | 1,341 | 9,880 | 1,107 | 9,880 | 968 |
| | | | 16 | 0.070 | 15,200 | 2,128 | 12,920 | 1,809 | 10,640 | 1,341 | 9,880 | 1,107 | 9,880 | 968 |
| | | | 20 | 0.049 | 12,160 | 1,532 | 10,340 | 1,302 | 8,512 | 1,072 | 7,900 | 886 | 7,900 | 775 |
| | | | 25 | 0.040 | 9,880 | 1,107 | 8,400 | 941 | 6,916 | 678 | 6,420 | 629 | 6,420 | 540 |
| | | | 30 | 0.038 | 9,880 | 1,107 | 8,400 | 941 | 6,916 | 678 | 6,420 | 629 | 6,420 | 540 |
| | | | 35 | 0.038 | 9,880 | 1,107 | 8,400 | 941 | 6,916 | 678 | 6,420 | 629 | 6,420 | 540 |
| | | | 40 | 0.030 | 9,880 | 1,107 | 8,400 | 941 | 6,916 | 678 | 6,420 | 629 | 6,420 | 540 |
| | | | 50 | 0.017 | 8,510 | 954 | 7,240 | 810 | 5,958 | 620 | 5,530 | 531 | 5,530 | 442 |
| | | | 60 | 0.009 | 7,240 | 810 | 6,150 | 689 | 5,065 | 526 | 4,700 | 451 | 4,700 | 376 |
| | | | 70 | 0.005 | 6,150 | 689 | 5,230 | 585 | 4,305 | 448 | 4,000 | 384 | 4,000 | 320 |
| | | | 75 | 0.005 | 6,150 | 689 | 5,230 | 585 | 4,305 | 448 | 4,000 | 384 | 4,000 | 320 |
| | | 1.4 | 10 | 0.077 | 15,200 | 2,128 | 12,920 | 1,809 | 10,640 | 1,341 | 9,880 | 1,107 | 9,880 | 968 |
| | | | 16 | 0.077 | 15,200 | 2,128 | 12,920 | 1,809 | 10,640 | 1,341 | 9,880 | 1,107 | 9,880 | 968 |
| | | | 20 | 0.064 | 12,160 | 1,532 | 10,340 | 1,302 | 8,512 | 1,072 | 7,900 | 886 | 7,900 | 775 |
| | | | 22 | 0.064 | 12,160 | 1,532 | 10,340 | 1,302 | 8,512 | 1,072 | 7,900 | 886 | 7,900 | 775 |
| | | | 25 | 0.053 | 9,880 | 1,107 | 8,400 | 941 | 6,916 | 678 | 6,420 | 629 | 6,420 | 540 |
| | | | 30 | 0.043 | 9,880 | 1,107 | 8,400 | 941 | 6,916 | 678 | 6,420 | 629 | 6,420 | 540 |
| | | | 40 | 0.031 | 9,880 | 1,107 | 8,400 | 941 | 6,916 | 678 | 6,420 | 629 | 6,420 | 540 |
| | | | 50 | 0.019 | 8,510 | 954 | 7,240 | 810 | 5,958 | 620 | 5,530 | 531 | 5,530 | 442 |
| | | | 75 | 0.006 | 6,150 | 689 | 5,230 | 585 | 4,305 | 448 | 4,000 | 384 | 4,000 | 320 |
| | | 2.9 | 12 | 0.084 | 15,200 | 2,128 | 12,920 | 1,809 | 10,640 | 1,341 | 9,880 | 1,107 | 9,880 | 968 |
| | | | 15 | 0.084 | 15,200 | 2,128 | 12,920 | 1,809 | 10,640 | 1,341 | 9,880 | 1,107 | 9,880 | 968 |
| | | | 20 | 0.056 | 12,160 | 1,532 | 10,340 | 1,302 | 8,512 | 1,072 | 7,900 | 886 | 7,900 | 775 |
| | | | 41 | 0.040 | 9,880 | 1,265 | 8,400 | 1,075 | 6,916 | 774 | 6,420 | 719 | 6,420 | 617 |
| | | 4.9 | 20 | 0.061 | 12,160 | 1,532 | 10,340 | 1,302 | 8,512 | 1,072 | 7,900 | 886 | 7,900 | 775 |
| 1.5 | 3 | 0.4 | 8 | 0.224 | 12,720 | 2,671 | 10,810 | 2,271 | 8,904 | 1,683 | 8,270 | 1,389 | 8,270 | 1,215 |
| | | | 16 | 0.154 | 12,720 | 2,671 | 10,810 | 2,271 | 8,904 | 1,683 | 8,270 | 1,389 | 8,270 | 1,215 |
| | | | 20 | 0.105 | 12,720 | 2,404 | 10,810 | 2,043 | 8,904 | 1,496 | 8,270 | 1,215 | 8,270 | 1,042 |
| | | | 30 | 0.056 | 10,176 | 1,924 | 8,650 | 1,635 | 7,123 | 1,047 | 6,610 | 972 | 6,610 | 834 |
| | | | 40 | 0.051 | 8,270 | 1,389 | 7,030 | 1,181 | 5,788 | 851 | 5,370 | 790 | 5,370 | 677 |
| | | | 50 | 0.037 | 8,270 | 1,389 | 7,030 | 1,181 | 5,788 | 851 | 5,370 | 790 | 5,370 | 677 |
| | | | 80 | 0.016 | 6,230 | 994 | 5,300 | 846 | 4,363 | 609 | 4,050 | 566 | 4,050 | 485 |
| | | 0.9 | 15 | 0.175 | 12,720 | 2,671 | 10,810 | 2,271 | 8,904 | 1,683 | 8,270 | 1,389 | 8,270 | 1,215 |
| | | | 20 | 0.119 | 12,720 | 2,404 | 10,810 | 2,043 | 8,904 | 1,496 | 8,270 | 1,215 | 8,270 | 1,042 |
| | | | 30 | 0.063 | 10,180 | 1,924 | 8,650 | 1,635 | 7,123 | 1,047 | 6,610 | 972 | 6,610 | 834 |
| | | | 35 | 0.060 | 10,180 | 1,924 | 8,650 | 1,635 | 7,123 | 1,047 | 6,610 | 972 | 6,610 | 834 |
| | | | 40 | 0.060 | 8,270 | 1,389 | 7,030 | 1,181 | 5,788 | 851 | 5,370 | 790 | 5,370 | 677 |
| | | | 50 | 0.043 | 8,270 | 1,389 | 7,030 | 1,181 | 5,788 | 851 | 5,370 | 790 | 5,370 | 677 |
| | | | 60 | 0.026 | 7,120 | 1,197 | 6,060 | 1,017 | 4,986 | 733 | 4,630 | 680 | 4,630 | 583 |
| | | | 70 | 0.020 | 6,230 | 994 | 5,300 | 846 | 4,363 | 609 | 4,050 | 566 | 4,050 | 485 |
| | | | 90 | 0.013 | 6,230 | 994 | 5,300 | 846 | 4,363 | 609 | 4,050 | 566 | 4,050 | 485 |
| | | 1.4 | 30 | 0.070 | 10,180 | 1,924 | 8,650 | 1,635 | 7,123 | 1,047 | 6,610 | 972 | 6,610 | 834 |
| | | | 40 | 0.064 | 8,270 | 1,389 | 7,030 | 1,181 | 5,788 | 851 | 5,370 | 790 | 5,370 | 677 |
| | | | 50 | 0.045 | 8,270 | 1,389 | 7,030 | 1,181 | 5,788 | 851 | 5,370 | 790 | 5,370 | 677 |
| | | | 66 | 0.022 | 6,230 | 994 | 5,300 | 846 | 4,363 | 609 | 4,050 | 566 | 4,050 | 485 |
| | | 2.9 | 30 | 0.077 | 10,180 | 1,924 | 8,650 | 1,635 | 7,123 | 1,047 | 6,610 | 972 | 6,610 | 834 |
| 2 | 4 | 0.4 | 60 | 0.051 | 7,800 | 1,113 | 6,600 | 945 | 5,800 | 784 | 5,000 | 644 | 5,000 | 609 |
| | | | 100 | 0.030 | 6,230 | 997 | 5,300 | 847 | 4,350 | 695 | 3,920 | 563 | 3,920 | 506 |
| | | 0.9 | 20 | 0.224 | 11,900 | 2,002 | 10,100 | 1,694 | 9,000 | 1,435 | 7,800 | 1,176 | 7,800 | 1,113 |
| | | | 30 | 0.161 | 11,900 | 1,799 | 10,100 | 1,526 | 9,000 | 1,295 | 7,800 | 1,064 | 7,800 | 1,001 |
| | | | 35 | 0.140 | 11,900 | 1,799 | 10,100 | 1,526 | 9,000 | 1,295 | 7,800 | 1,064 | 7,800 | 1,001 |
| | | | 40 | 0.098 | 9,500 | 1,358 | 8,100 | 1,155 | 7,200 | 980 | 6,200 | 798 | 6,200 | 756 |
| | | | 50 | 0.094 | 7,800 | 1,113 | 6,600 | 945 | 5,800 | 784 | 5,000 | 644 | 5,000 | 609 |
| | | | 60 | 0.060 | 7,800 | 1,113 | 6,600 | 945 | 5,800 | 784 | 5,000 | 644 | 5,000 | 609 |
| | | | 120 | 0.025 | 6,230 | 997 | 5,300 | 847 | 4,350 | 695 | 3,920 | 563 | 3,920 | 506 |

【注意】ご使用にあたっては、A96ページの表下の項目と注意を参照してください。 【Note】Upon usage, please refer to comments and notes below table on page A96.

# Epoch Pencil Deep Ball Evolution
# エポックペンシルディープボールエボリューション

## EPDBPE-ATH

高能率切削条件 High efficiency cutting condition

**高精度切削条件** High accuracy cuttiing condition

高能率切削条件はA89ページを参照してください。
Please refer to P.A89 about high efficiency cutting conditions

| 被削材 Work material | | | | | 1 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 2 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 3 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 4 焼入れ鋼 Hardened steels (45～55HRC) | | 5 焼入れ鋼 Hardened steels (55～65HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | | 100% | | 90% | | 80% | | 65% | | 60% | |
| ボール半径RE Ball radius (mm) | 外径DC Tool dia. (mm) | 首部テーパ半角 BHTA2 Neck angle (°) | 首下長LU Under neck length (mm) | ap (mm) | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 2 | 4 | 1.4 | 45 | 0.102 | 7,800 | 1,113 | 6,600 | 945 | 5,800 | 784 | 5,000 | 644 | 5,000 | 609 |
| | | | 80 | 0.051 | 6,230 | 872 | 5,300 | 741 | 4,350 | 608 | 3,920 | 493 | 3,920 | 443 |
| | | 2.9 | 25 | 0.175 | 11,900 | 1,799 | 10,100 | 1,526 | 9,000 | 1,295 | 7,800 | 1,064 | 7,800 | 1,001 |
| 2.5 | 5 | 0.4 | 100 | 0.047 | 4,050 | 595 | 3,440 | 505 | 2,820 | 414 | 2,540 | 335 | 2,540 | 302 |
| | | 0.9 | 30 | 0.238 | 9,500 | 1,498 | 8,100 | 1,274 | 7,200 | 1,078 | 6,200 | 882 | 6,200 | 833 |
| | | | 40 | 0.175 | 9,500 | 1,498 | 8,100 | 1,274 | 7,200 | 1,078 | 6,200 | 882 | 6,200 | 833 |
| | | | 60 | 0.128 | 6,200 | 924 | 5,300 | 791 | 4,700 | 665 | 4,000 | 539 | 4,000 | 504 |
| | | | 90 | 0.068 | 4,050 | 595 | 3,440 | 505 | 2,820 | 414 | 2,540 | 335 | 2,540 | 302 |
| | | 1.4 | 60 | 0.140 | 6,200 | 924 | 5,300 | 791 | 4,700 | 665 | 4,000 | 539 | 4,000 | 504 |
| | | | 74 | 0.136 | 6,200 | 924 | 5,300 | 791 | 4,700 | 665 | 4,000 | 539 | 4,000 | 504 |
| | | 2.9 | 40 | 0.210 | 9,500 | 1,498 | 8,100 | 1,274 | 7,200 | 1,078 | 6,200 | 882 | 6,200 | 833 |
| 3 | 6 | 0.4 | 120 | 0.051 | 4,200 | 588 | 3,570 | 500 | 2,930 | 410 | 2,900 | 365 | 2,900 | 328 |
| | | 0.9 | 30 | 0.315 | 8,000 | 1,400 | 6,800 | 1,190 | 6,000 | 1,001 | 5,200 | 819 | 5,200 | 777 |
| | | | 40 | 0.280 | 8,000 | 1,260 | 6,800 | 1,071 | 6,000 | 896 | 5,200 | 735 | 5,200 | 693 |
| | | | 45 | 0.259 | 8,000 | 1,260 | 6,800 | 1,071 | 6,000 | 896 | 5,200 | 735 | 5,200 | 693 |
| | | | 50 | 0.224 | 8,000 | 1,260 | 6,800 | 1,071 | 6,000 | 896 | 5,200 | 735 | 5,200 | 693 |
| | | | 60 | 0.154 | 6,400 | 952 | 5,400 | 805 | 4,800 | 679 | 4,100 | 546 | 4,100 | 518 |
| | | | 70 | 0.153 | 5,200 | 777 | 4,400 | 658 | 3,900 | 553 | 3,400 | 455 | 3,400 | 427 |
| | | | 80 | 0.119 | 5,200 | 777 | 4,400 | 658 | 3,900 | 553 | 3,400 | 455 | 3,400 | 427 |
| | | | 120 | 0.061 | 4,200 | 588 | 3,570 | 500 | 2,930 | 410 | 2,640 | 333 | 2,640 | 299 |
| | | 1.4 | 50 | 0.245 | 8,000 | 1,260 | 6,800 | 1,071 | 6,000 | 896 | 5,200 | 735 | 5,200 | 693 |
| | | | 96 | 0.145 | 4,620 | 648 | 3,930 | 550 | 3,220 | 451 | 2,900 | 365 | 2,900 | 328 |
| | | 2.9 | 30 | 0.378 | 8,000 | 1,400 | 6,800 | 1,190 | 6,000 | 1,001 | 5,200 | 819 | 5,200 | 777 |
| 3.5 | 7 | 0.9 | 45 | 0.259 | 8,000 | 1,260 | 6,800 | 1,071 | 6,000 | 896 | 5,200 | 735 | 5,200 | 693 |
| | | 1.4 | 60 | 0.245 | 6,400 | 952 | 5,400 | 805 | 4,800 | 679 | 4,100 | 546 | 4,100 | 518 |
| | | 2.9 | 40 | 0.350 | 8,000 | 1,260 | 6,800 | 1,071 | 6,000 | 896 | 5,200 | 735 | 5,200 | 693 |
| 4 | 8 | 0.4 | 120 | 0.145 | 3,840 | 564 | 3,260 | 479 | 2,670 | 392 | 2,400 | 317 | 2,400 | 285 |
| | | 0.9 | 50 | 0.350 | 6,000 | 1,022 | 5,100 | 868 | 4,500 | 728 | 3,900 | 595 | 3,900 | 567 |
| | | | 55 | 0.329 | 6,000 | 1,022 | 5,100 | 868 | 4,500 | 728 | 3,900 | 595 | 3,900 | 567 |
| | | | 60 | 0.301 | 6,000 | 1,022 | 5,100 | 868 | 4,500 | 728 | 3,900 | 595 | 3,900 | 567 |
| | | | 70 | 0.231 | 6,000 | 1,022 | 5,100 | 868 | 4,500 | 728 | 3,900 | 595 | 3,900 | 567 |
| | | | 80 | 0.175 | 4,800 | 770 | 4,080 | 655 | 3,350 | 537 | 3,020 | 435 | 3,020 | 391 |
| | | | 120 | 0.162 | 3,840 | 564 | 3,260 | 479 | 2,670 | 392 | 2,400 | 317 | 2,400 | 285 |
| | | 1.4 | 50 | 0.385 | 6,000 | 1,022 | 5,100 | 868 | 4,500 | 728 | 3,900 | 595 | 3,900 | 567 |
| | | | 98 | 0.213 | 3,840 | 564 | 3,260 | 479 | 2,670 | 392 | 2,400 | 317 | 2,400 | 285 |
| | | 2.9 | 35 | 0.490 | 6,000 | 1,022 | 5,100 | 868 | 4,500 | 728 | 3,900 | 595 | 3,900 | 567 |
| 5 | 10 | 0.4 | 120 | 0.213 | 3,120 | 546 | 2,650 | 464 | 2,170 | 379 | 1,950 | 307 | 1,950 | 276 |
| | | 0.9 | 60 | 0.490 | 4,800 | 910 | 4,100 | 777 | 3,600 | 644 | 3,100 | 525 | 3,100 | 497 |
| | | | 65 | 0.420 | 4,800 | 910 | 4,100 | 777 | 3,600 | 644 | 3,100 | 525 | 3,100 | 497 |
| | | | 75 | 0.350 | 4,800 | 910 | 4,100 | 777 | 3,600 | 644 | 3,100 | 525 | 3,100 | 497 |
| | | | 86 | 0.280 | 3,840 | 700 | 3,260 | 595 | 2,670 | 487 | 2,400 | 394 | 2,400 | 354 |
| | | 1.4 | 55 | 0.560 | 4,800 | 910 | 4,100 | 777 | 3,600 | 644 | 3,100 | 525 | 3,100 | 497 |
| | | | 120 | 0.230 | 3,120 | 546 | 2,650 | 464 | 2,170 | 379 | 1,950 | 307 | 1,950 | 276 |
| | | 2.9 | 35 | 0.630 | 5,280 | 1,036 | 4,490 | 881 | 3,680 | 722 | 3,310 | 584 | 3,310 | 525 |
| 6 | 12 | 0.4 | 120 | 0.266 | 2,500 | 525 | 2,130 | 446 | 1,810 | 379 | 1,630 | 307 | 1,630 | 276 |
| | | 0.9 | 75 | 0.504 | 3,840 | 875 | 3,260 | 743 | 2,770 | 631 | 2,490 | 510 | 2,490 | 459 |
| | | | 120 | 0.280 | 2,500 | 525 | 2,130 | 446 | 1,810 | 379 | 1,630 | 307 | 1,630 | 276 |
| | | 1.4 | 80 | 0.553 | 3,840 | 875 | 3,260 | 743 | 2,770 | 631 | 2,490 | 510 | 2,490 | 459 |
| | | | 106 | 0.315 | 2,500 | 525 | 2,130 | 446 | 1,810 | 379 | 1,630 | 307 | 1,630 | 276 |
| | | 2.9 | 60 | 0.630 | 3,840 | 875 | 3,260 | 743 | 2,770 | 631 | 2,490 | 510 | 2,490 | 459 |

※(1) 基本切込みは被削材グループ1での目安を示しています。その他のグループの場合は、上表の切込み比率を目安に調整して下さい。
※(2) リブ加工や止まり溝など、切りくずがつまりやすい切削の場合、切込み設定は基本切込みに切込み比率をかけて算出した切込み量を、さらにその80%まで小さくして使用してください。

※(1) Standard cutting depth is shown as the criteria for Group 1 workpieces. For other groups, adjust the cutting depth according to the cutting depth factors in the above table.
※(2) When performing cutting where cutting chips may cause clogging, such as for rib cutting, blind grooves, etc., cutting depth setting should be set by multiplying a cutting depth factor to calculate the cutting depth amount, and this amount should then be reduced to 80% of the calculated value.

【切込み設定例】 EPDBPE2020-25-09-ATHの工具で焼き入れ鋼(50HRC) をリブ溝等高線切削する場合、
切込み=0.04(基本切込み)×0.65(焼き入れ鋼グループ4の切込み比率)×0.8(閉鎖域の切削)=0.020

Cutting depth setting example: When cutting rib groove contours in pre-harden steel (50HRC) using an EPDBP2020-25-09-TH tool:
Cutting depth = 0.04 (standard cutting depth) × 0.65 (cutting depth factor for Group 4 pre-harden steel) × 0.8 (for closed-area cutting) = 0.020mm

【注意】 ①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

【Note】 ① Use the appropriate coolant for the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
③ If the rpm of the machine is low, lower the feed rate also to put the rpm and feed rate in the same ratio.

# Epoch Super Hard Ball Evolution
# エポックスーパーハードボール エボリューション

**標準規格品** Standard rating product

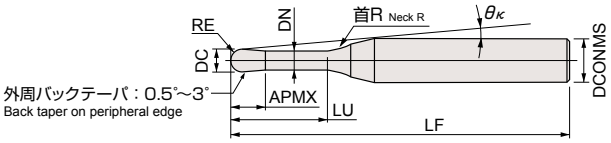
溝 Slotting | 彫込み Die-sinking | 曲面 Profiling | R Radius | 細部 Miniature | 中仕上 Semi Finishing | 仕上 Finishing | リブ・細部 Rib Miniature

RE公差 RE tolerance　+0.003～−0.007　h4

(mm)

高硬度材加工用。THコーティング採用。50HRC以上に適しています。
For machining of high-hardness materials. Ideal for materials with hardnesses of 50HRC and higher.

2枚刃
2Flutes




## EPSBE2○○○-○○.○○-TH

標準規格品 Standard rating product　RE精度公差 RE accuracy +0.003～−0.007

超硬 Carbide | ATH | ねじれ角 30° Helix angle | 切削条件表 A99 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 刃長 Flute length APMX | 首径 Neck dia. DN | 首下長 Under neck length LU | 全長 L Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度 Interference angle (°) θκ | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格 (円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPSBE2001-0.15-TH | ● | 0.05 | 0.1 | 0.08 | 0.08 | 0.15 | 45 | 4 | 1 | 11.82 | 0.30 | 0.32 | 0.33 | 0.35 | 0.38 | 18,110 |
| EPSBE2001-0.3-TH | ● | | | 0.08 | 0.08 | 0.3 | 45 | 4 | 1 | 11.64 | 0.46 | 0.48 | 0.50 | 0.52 | 0.57 | 18,110 |
| EPSBE2001-0.75-TH | ● | | | 0.08 | 0.08 | 0.75 | 45 | 4 | 1 | 11.12 | 0.93 | 0.97 | 1.01 | 1.04 | 1.10 | 19,070 |
| EPSBE2002-0.3-TH | ● | 0.1 | 0.2 | 0.15 | 0.17 | 0.3 | 45 | 4 | 1 | 11.66 | 0.49 | 0.50 | 0.52 | 0.54 | 0.58 | 15,650 |
| EPSBE2002-0.6-TH | ● | | | 0.15 | 0.17 | 0.6 | 45 | 4 | 1 | 11.30 | 0.80 | 0.83 | 0.86 | 0.88 | 0.93 | 15,650 |
| EPSBE2002-1-TH | ● | | | 0.15 | 0.17 | 1 | 45 | 4 | 1 | 10.86 | 1.22 | 1.26 | 1.30 | 1.33 | 1.39 | 15,650 |
| EPSBE2002-1.5-TH | ● | | | 0.15 | 0.17 | 1.5 | 45 | 4 | 1 | 10.35 | 1.74 | 1.79 | 1.84 | 1.88 | 2.05 | 16,290 |
| EPSBE2002-2-TH | ● | | | 0.15 | 0.17 | 2 | 45 | 4 | 1 | 9.88 | 2.25 | 2.32 | 2.37 | 2.45 | 2.71 | 16,290 |
| EPSBE2003-0.45-TH | ● | 0.15 | 0.3 | 0.25 | 0.27 | 0.45 | 45 | 4 | 2 | 11.53 | 0.73 | 0.77 | 0.80 | 0.84 | 0.91 | 14,790 |
| EPSBE2003-0.9-TH | ● | | | 0.25 | 0.27 | 0.9 | 45 | 4 | 2 | 11.00 | 1.21 | 1.27 | 1.32 | 1.37 | 1.47 | 14,790 |
| EPSBE2003-1.5-TH | ● | | | 0.25 | 0.27 | 1.5 | 45 | 4 | 2 | 10.36 | 1.84 | 1.92 | 1.99 | 2.06 | 2.18 | 15,110 |
| EPSBE2003-2-TH | ● | | | 0.25 | 0.27 | 2 | 45 | 4 | 2 | 9.88 | 2.36 | 2.46 | 2.55 | 2.62 | 2.76 | 15,110 |
| EPSBE2003-3-TH | ● | | | 0.25 | 0.27 | 3 | 45 | 4 | 2 | 9.05 | 3.41 | 3.53 | 3.64 | 3.73 | 4.02 | 15,650 |
| EPSBE2004-0.6-TH | ● | 0.2 | 0.4 | 0.3 | 0.37 | 0.6 | 45 | 4 | 2 | 11.39 | 0.88 | 0.93 | 0.97 | 1.01 | 1.09 | 14,790 |
| EPSBE2004-1.2-TH | ● | | | 0.3 | 0.37 | 1.2 | 45 | 4 | 2 | 10.69 | 1.52 | 1.59 | 1.65 | 1.71 | 1.82 | 14,790 |
| EPSBE2004-2-TH | ● | | | 0.3 | 0.37 | 2 | 45 | 4 | 2 | 9.88 | 2.36 | 2.46 | 2.54 | 2.62 | 2.75 | 14,790 |
| EPSBE2004-3-TH | ● | | | 0.3 | 0.37 | 3 | 45 | 4 | 2 | 9.03 | 3.41 | 3.53 | 3.63 | 3.73 | 4.01 | 15,110 |
| EPSBE2004-3.5-TH | ● | | | 0.3 | 0.37 | 3.5 | 45 | 4 | 2 | 8.65 | 3.93 | 4.06 | 4.18 | 4.27 | 4.67 | 15,110 |
| EPSBE2004-4-TH | ● | | | 0.3 | 0.37 | 4 | 45 | 4 | 2 | 8.30 | 4.45 | 4.59 | 4.71 | 4.83 | 5.33 | 15,650 |
| EPSBE2005-0.75-TH | ● | 0.25 | 0.5 | 0.35 | 0.47 | 0.75 | 45 | 4 | 2 | 11.25 | 1.04 | 1.09 | 1.13 | 1.18 | 1.27 | 14,040 |
| EPSBE2005-1.5-TH | ● | | | 0.35 | 0.47 | 1.5 | 45 | 4 | 2 | 10.39 | 1.83 | 1.91 | 1.98 | 2.05 | 2.17 | 14,040 |
| EPSBE2005-3-TH | ● | | | 0.35 | 0.47 | 3 | 45 | 4 | 2 | 9.00 | 3.41 | 3.53 | 3.63 | 3.72 | 3.99 | 14,790 |
| EPSBE2005-5-TH | ● | | | 0.35 | 0.47 | 5 | 45 | 4 | 2 | 7.64 | 5.48 | 5.65 | 5.78 | 6.01 | 6.65 | 15,000 |
| EPSBE2006-0.9-TH | ● | 0.3 | 0.6 | 0.4 | 0.57 | 0.9 | 45 | 4 | 4 | 11.10 | 1.33 | 1.42 | 1.51 | 1.59 | 1.75 | 14,040 |
| EPSBE2006-1.8-TH | ● | | | 0.4 | 0.57 | 1.8 | 45 | 4 | 4 | 10.08 | 2.30 | 2.44 | 2.56 | 2.68 | 2.88 | 14,040 |
| EPSBE2006-3-TH | ● | | | 0.4 | 0.57 | 3 | 45 | 4 | 4 | 8.98 | 3.58 | 3.77 | 3.93 | 4.07 | 4.32 | 14,790 |
| EPSBE2006-5-TH | ● | | | 0.4 | 0.57 | 5 | 45 | 4 | 4 | 7.59 | 5.70 | 5.94 | 6.14 | 6.32 | 6.63 | 15,110 |
| EPSBE2006-6-TH | ● | | | 0.4 | 0.57 | 6 | 45 | 4 | 4 | 7.04 | 6.75 | 7.02 | 7.23 | 7.42 | 7.96 | 15,110 |
| EPSBE2008-1.2-TH | ● | 0.4 | 0.8 | 0.5 | 0.77 | 1.2 | 45 | 4 | 4 | 10.79 | 1.65 | 1.75 | 1.84 | 1.93 | 2.11 | 13,290 |
| EPSBE2008-2.4-TH | ● | | | 0.5 | 0.77 | 2.4 | 45 | 4 | 4 | 9.47 | 2.94 | 3.10 | 3.24 | 3.36 | 3.59 | 13,290 |
| EPSBE2010-1.5-TH | ● | 0.5 | 1 | 0.8 | 0.96 | 1.5 | 45 | 6 | 4 | 11.01 | 2.01 | 2.12 | 2.21 | 2.31 | 2.49 | 12,440 |
| EPSBE2010-3-TH | ● | | | 0.8 | 0.96 | 3 | 45 | 6 | 4 | 9.88 | 3.61 | 3.78 | 3.93 | 4.06 | 4.30 | 12,440 |
| EPSBE2010-6-TH | ● | | | 0.8 | 0.96 | 6 | 45 | 6 | 4 | 8.20 | 6.76 | 7.02 | 7.23 | 7.42 | 7.92 | 12,860 |
| EPSBE2010-8-TH | ● | | | 0.8 | 0.96 | 8 | 45 | 6 | 4 | 7.36 | 8.85 | 9.15 | 9.40 | 9.61 | 10.58 | 13,390 |
| EPSBE2010-10-TH | ● | | | 0.8 | 0.96 | 10 | 50 | 6 | 4 | 6.68 | 10.93 | 11.27 | 11.54 | 11.98 | 13.23 | 13,820 |
| EPSBE2012-1.8-TH | ● | 0.6 | 1.2 | 1.1 | 1.15 | 1.8 | 45 | 6 | 4 | 10.78 | 2.36 | 2.47 | 2.58 | 2.68 | 2.86 | 12,440 |
| EPSBE2012-3.6-TH | ● | | | 1.1 | 1.15 | 3.6 | 45 | 6 | 4 | 9.46 | 4.27 | 4.45 | 4.61 | 4.75 | 5.01 | 12,440 |
| EPSBE2015-2.25-TH | ● | 0.75 | 1.5 | 1.35 | 1.44 | 2.25 | 45 | 6 | 4 | 10.43 | 2.87 | 2.99 | 3.10 | 3.20 | 3.40 | 13,080 |
| EPSBE2015-4.5-TH | ● | | | 1.35 | 1.44 | 4.5 | 45 | 6 | 4 | 8.84 | 5.24 | 5.43 | 5.61 | 5.76 | 6.03 | 13,080 |
| EPSBE2015-8-TH | ● | | | 1.35 | 1.44 | 8 | 45 | 6 | 4 | 7.14 | 8.89 | 9.17 | 9.41 | 9.61 | 10.56 | 14,040 |
| EPSBE2015-12-TH | ● | | | 1.35 | 1.44 | 12 | 50 | 6 | 4 | 5.85 | 13.03 | 13.39 | 13.74 | 14.38 | 15.87 | 14,580 |
| EPSBE2020-3-TH | ● | 1 | 2 | 1.7 | 1.92 | 3 | 45 | 6 | 4 | 9.79 | 3.71 | 3.84 | 3.96 | 4.07 | 4.29 | 13,080 |
| EPSBE2020-6-TH | ● | | | 1.7 | 1.92 | 6 | 45 | 6 | 4 | 7.81 | 6.84 | 7.07 | 7.26 | 7.43 | 7.89 | 13,080 |
| EPSBE2020-8-TH | ● | | | 1.7 | 1.92 | 8 | 45 | 6 | 4 | 6.88 | 8.92 | 9.19 | 9.42 | 9.61 | 10.54 | 14,040 |
| EPSBE2020-12-TH | ● | | | 1.7 | 1.92 | 12 | 50 | 6 | 4 | 5.55 | 13.06 | 13.41 | 13.76 | 14.39 | 15.85 | 14,580 |
| EPSBE2020-16-TH | ● | | | 1.7 | 1.92 | 16 | 50 | 6 | 4 | 4.65 | 17.19 | 17.59 | 18.32 | 19.17 | 21.16 | 14,890 |
| EPSBE2020-20-TH | ● | | | 1.7 | 1.92 | 20 | 55 | 6 | 4 | 4.01 | 21.30 | 21.90 | 22.88 | 23.96 | 26.47 | 15,000 |

●印：標準在庫品です。　●印：Stocked Items.

# Epoch Super Hard Ball Evolution
# エポックスーパーハードボール エボリューション

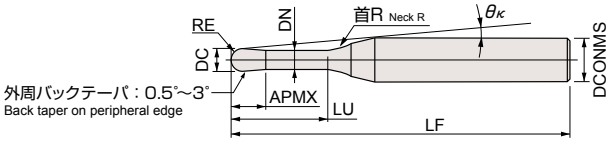
**高精度規格品** | High-accuracy rating product

溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / 細部 Miniature / 中仕上 Semi Finishing / 仕上 Finishing / リブ・細部 Rib Miniature

RE公差 RE tolerance　+0.001～−0.005　h4　(mm)

高硬度材加工用。THコーティング採用。50HRC以上に適しています。
高精度規格品。
For machining of high-hardness materials. Ideal for materials with hardnesses of 50HRC and higher. High-accuracy rating product.

2枚刃
2Flutes



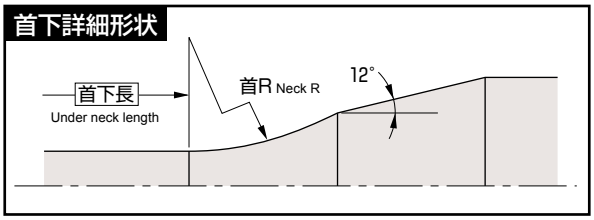

切削条件表 A99 Cutting Conditions

## EPSBE2○○○-○.○○-H-TH

高精度規格品 High-accuracy rating product　RE精度公差 RE accuracy +0.001～−0.005　検査票付き Inspection certificate included　超硬 Carbide　ATH　ねじれ30° Helix angle

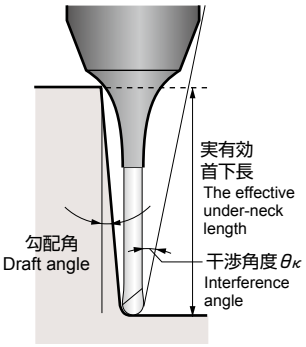
| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 刃長 Flute length APMX | 首径 Neck dia. DN | 首下長 Under neck length LU | 全長L Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度 Interference angle (°) θκ | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格 (円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPSBE2001-0.15-H-TH | ● | 0.05 | 0.1 | 0.08 | 0.08 | 0.15 | 45 | 4 | 1 | 11.82 | 0.30 | 0.32 | 0.33 | 0.35 | 0.38 | 21,000 |
| EPSBE2002-0.3-H-TH | ● | 0.1 | 0.2 | 0.15 | 0.17 | 0.3 | 45 | 4 | 1 | 11.66 | 0.49 | 0.50 | 0.52 | 0.54 | 0.58 | 18,330 |
| EPSBE2003-0.45-H-TH | ● | 0.15 | 0.3 | 0.25 | 0.27 | 0.45 | 45 | 4 | 2 | 11.53 | 0.73 | 0.77 | 0.80 | 0.84 | 0.91 | 17,360 |
| EPSBE2004-0.6-H-TH | ● | 0.2 | 0.4 | 0.3 | 0.37 | 0.6 | 45 | 4 | 2 | 11.39 | 0.88 | 0.93 | 0.97 | 1.01 | 1.09 | 17,360 |
| EPSBE2005-0.75-H-TH | ● | 0.25 | 0.5 | 0.35 | 0.47 | 0.75 | 45 | 4 | 2 | 11.25 | 1.04 | 1.09 | 1.13 | 1.18 | 1.27 | 16,610 |
| EPSBE2006-0.9-H-TH | ● | 0.3 | 0.6 | 0.4 | 0.57 | 0.9 | 45 | 4 | 4 | 11.10 | 1.33 | 1.42 | 1.51 | 1.59 | 1.75 | 16,610 |
| EPSBE2008-1.2-H-TH | ● | 0.4 | 0.8 | 0.5 | 0.77 | 1.2 | 45 | 4 | 4 | 10.79 | 1.65 | 1.75 | 1.84 | 1.93 | 2.11 | 15,750 |
| EPSBE2010-1.5-H-TH | ● | 0.5 | 1 | 0.8 | 0.96 | 1.5 | 45 | 6 | 4 | 11.01 | 2.01 | 2.12 | 2.21 | 2.31 | 2.49 | 14,790 |
| EPSBE2012-1.8-H-TH | ● | 0.6 | 1.2 | 1.1 | 1.15 | 1.8 | 45 | 6 | 4 | 10.78 | 2.36 | 2.47 | 2.58 | 2.68 | 2.86 | 14,790 |
| EPSBE2015-2.25-H-TH | ● | 0.75 | 1.5 | 1.35 | 1.44 | 2.25 | 45 | 6 | 4 | 10.43 | 2.87 | 2.99 | 3.10 | 3.20 | 3.40 | 15,530 |
| EPSBE2020-3-H-TH | ● | 1 | 2 | 1.7 | 1.92 | 3 | 45 | 6 | 4 | 9.79 | 3.71 | 3.84 | 3.96 | 4.07 | 4.29 | 15,530 |

### 首下詳細形状




【注意】
加工物に勾配がついている場合、干渉領域は、首下長さよりも長くなります。それぞれの勾配角に対する実有効首下長をご参照ください。
また、工具が加工物に干渉する角度を干渉角度θκで表示していますので合わせてご参照ください。

【Note】
If the workpiece has draft angle, the interference length will be longer than the under-neck length.Please refer to the effective under-neck length for the various draft angles.
In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle θκ", and should also be referred to.




### 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| | ○ | ◎ | ◎ | ◎ | ○ | ◎ | ○ | ○ |

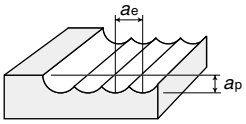
### 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPSBE-TH | × (N/A) | × (N/A) |
| EPSBE-H-TH | × (N/A) | × (N/A) |

# 標準切削条件表 Recommended cutting conditions

**EPSBE-TH** 標準規格品 Standard rating product

**EPSBE-H-TH** 高精度規格品 High accuracy rating product




| 被削材 Work material | | | | | 1 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 2 焼入れ鋼 Hardened steels (45～55HRC) | | 3 焼入れ鋼 Hardened steels (55～65HRC) | | 4 焼入れ鋼 Hardened steels (65～68HRC) | | 5 焼入れ鋼 Hardened steels (68～72HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | | 100% | | 85% | | 80% | | 65% | | 55% | |
| ボール半径RE Ball radius (mm) | 外径DC Tool dia. (mm) | 首下長LU Under neck length (mm) | 基本切込み量 Standard depth of cut ap (mm) | 基本切込み量 Standard depth of cut ae (mm) | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 0.05 | 0.1 | 0.15 | 0.006 | 0.018 | 59,500 | 360 | 54,100 | 320 | 51,400 | 280 | 46,000 | 250 | 43,300 | 190 |
| | | 0.3 | 0.005 | 0.015 | 59,500 | 360 | 50,000 | 320 | 51,400 | 280 | 46,000 | 250 | 43,300 | 190 |
| | | 0.75 | 0.003 | 0.009 | 35,700 | 210 | 32,500 | 200 | 30,800 | 170 | 27,600 | 150 | 26,000 | 120 |
| 0.1 | 0.2 | 0.3 | 0.016 | 0.048 | 55,400 | 660 | 50,400 | 600 | 47,900 | 520 | 42,800 | 460 | 40,300 | 360 |
| | | 0.6 | 0.014 | 0.042 | 55,400 | 660 | 50,400 | 600 | 47,900 | 520 | 42,800 | 460 | 40,300 | 360 |
| | | 1 | 0.012 | 0.036 | 41,600 | 500 | 37,800 | 450 | 35,900 | 390 | 32,100 | 350 | 30,200 | 270 |
| | | 1.5 | 0.007 | 0.021 | 33,300 | 400 | 30,200 | 360 | 28,700 | 310 | 25,700 | 280 | 24,200 | 220 |
| | | 2 | 0.006 | 0.018 | 33,300 | 350 | 30,200 | 310 | 28,700 | 270 | 25,700 | 240 | 24,200 | 190 |
| 0.15 | 0.3 | 0.45 | 0.017 | 0.051 | 50,600 | 910 | 46,000 | 830 | 43,700 | 710 | 39,100 | 630 | 36,800 | 500 |
| | | 0.9 | 0.017 | 0.051 | 50,600 | 910 | 46,000 | 830 | 43,700 | 710 | 39,100 | 630 | 36,800 | 500 |
| | | 1.5 | 0.013 | 0.039 | 37,900 | 610 | 34,500 | 560 | 32,800 | 480 | 29,300 | 430 | 27,600 | 340 |
| | | 2 | 0.01 | 0.03 | 30,300 | 470 | 27,600 | 430 | 26,200 | 370 | 23,400 | 330 | 22,100 | 260 |
| | | 3 | 0.007 | 0.021 | 30,300 | 440 | 27,600 | 400 | 26,200 | 340 | 23,400 | 300 | 22,100 | 240 |
| 0.2 | 0.4 | 0.6 | 0.035 | 0.105 | 43,800 | 1,050 | 39,800 | 960 | 37,800 | 820 | 33,800 | 730 | 31,800 | 570 |
| | | 1.2 | 0.032 | 0.096 | 43,800 | 1,050 | 39,800 | 960 | 37,800 | 820 | 33,800 | 730 | 31,800 | 570 |
| | | 2 | 0.022 | 0.066 | 35,000 | 840 | 31,800 | 760 | 30,200 | 650 | 27,100 | 590 | 25,500 | 460 |
| | | 3 | 0.013 | 0.039 | 28,000 | 630 | 25,500 | 570 | 24,200 | 490 | 21,600 | 440 | 20,400 | 340 |
| | | 3.5 | 0.01 | 0.03 | 28,000 | 630 | 25,500 | 570 | 24,200 | 490 | 21,600 | 440 | 20,400 | 340 |
| | | 4 | 0.008 | 0.024 | 28,000 | 540 | 25,500 | 490 | 24,200 | 420 | 21,600 | 370 | 20,400 | 290 |
| 0.25 | 0.5 | 0.75 | 0.036 | 0.108 | 37,300 | 1,190 | 34,000 | 1,090 | 32,300 | 930 | 28,900 | 830 | 27,200 | 650 |
| | | 1.5 | 0.036 | 0.108 | 37,300 | 1,190 | 34,000 | 1,090 | 32,300 | 930 | 28,900 | 830 | 27,200 | 650 |
| | | 3 | 0.024 | 0.072 | 28,000 | 840 | 25,500 | 770 | 24,200 | 650 | 21,600 | 580 | 20,400 | 460 |
| | | 5 | 0.016 | 0.048 | 23,100 | 650 | 21,000 | 590 | 20,000 | 500 | 17,900 | 450 | 16,800 | 350 |
| 0.3 | 0.6 | 0.9 | 0.04 | 0.12 | 35,000 | 1,430 | 31,800 | 1,300 | 30,200 | 1,110 | 27,100 | 1,000 | 25,500 | 780 |
| | | 1.8 | 0.036 | 0.108 | 35,000 | 1,430 | 31,800 | 1,300 | 30,200 | 1,110 | 27,100 | 1,000 | 25,500 | 780 |
| | | 3 | 0.028 | 0.084 | 27,000 | 1,100 | 24,500 | 1,000 | 23,300 | 860 | 20,900 | 770 | 19,600 | 600 |
| | | 5 | 0.018 | 0.054 | 22,200 | 910 | 20,200 | 820 | 19,200 | 710 | 17,100 | 630 | 16,100 | 490 |
| | | 6 | 0.013 | 0.039 | 22,200 | 830 | 20,200 | 750 | 19,200 | 640 | 17,100 | 570 | 16,100 | 450 |
| 0.4 | 0.8 | 1.2 | 0.065 | 0.195 | 29,200 | 1,680 | 26,500 | 1,530 | 25,200 | 1,310 | 22,500 | 1,170 | 21,200 | 920 |
| | | 2.4 | 0.065 | 0.195 | 29,200 | 1,680 | 26,500 | 1,530 | 25,200 | 1,310 | 22,500 | 1,170 | 21,200 | 920 |
| 0.5 | 1 | 1.5 | 0.08 | 0.24 | 28,600 | 2,060 | 26,000 | 1,870 | 24,700 | 1,600 | 22,100 | 1,430 | 20,800 | 1,120 |
| | | 3 | 0.08 | 0.24 | 28,600 | 2,060 | 26,000 | 1,870 | 24,700 | 1,600 | 22,100 | 1,430 | 20,800 | 1,120 |
| | | 6 | 0.035 | 0.105 | 22,300 | 1,610 | 20,300 | 1,460 | 19,300 | 1,250 | 17,200 | 1,110 | 16,200 | 870 |
| | | 8 | 0.035 | 0.105 | 19,300 | 1,350 | 17,500 | 1,230 | 16,600 | 1,050 | 14,900 | 940 | 14,000 | 740 |
| | | 10 | 0.022 | 0.066 | 19,300 | 1,270 | 17,500 | 1,160 | 16,600 | 990 | 14,900 | 890 | 14,000 | 690 |
| 0.6 | 1.2 | 1.8 | 0.08 | 0.24 | 25,300 | 2,190 | 23,000 | 1,990 | 21,800 | 1,700 | 19,500 | 1,520 | 18,400 | 1,190 |
| | | 3.6 | 0.08 | 0.24 | 25,300 | 2,190 | 23,000 | 1,990 | 21,800 | 1,700 | 19,500 | 1,520 | 18,400 | 1,190 |
| 0.75 | 1.5 | 2.25 | 0.085 | 0.255 | 21,400 | 2,310 | 19,500 | 2,110 | 18,500 | 1,800 | 16,500 | 1,600 | 15,600 | 1,260 |
| | | 4.5 | 0.08 | 0.24 | 21,400 | 2,310 | 19,500 | 2,110 | 18,500 | 1,800 | 16,500 | 1,600 | 15,600 | 1,260 |
| | | 8 | 0.05 | 0.15 | 18,300 | 1,870 | 16,700 | 1,700 | 15,800 | 1,450 | 14,200 | 1,300 | 13,300 | 1,020 |
| | | 12 | 0.05 | 0.15 | 16,600 | 1,590 | 15,100 | 1,450 | 14,400 | 1,240 | 12,900 | 1,110 | 12,100 | 870 |
| 1 | 2 | 3 | 0.16 | 0.48 | 18,400 | 2,650 | 16,700 | 2,400 | 15,900 | 2,060 | 14,200 | 1,840 | 13,400 | 1,450 |
| | | 6 | 0.16 | 0.48 | 18,400 | 2,650 | 16,700 | 2,400 | 15,900 | 2,060 | 14,200 | 1,840 | 13,400 | 1,450 |
| | | 8 | 0.13 | 0.39 | 18,400 | 2,650 | 16,700 | 2,400 | 15,900 | 2,060 | 14,200 | 1,840 | 13,400 | 1,450 |
| | | 12 | 0.07 | 0.21 | 15,300 | 1,960 | 13,900 | 1,780 | 13,200 | 1,520 | 11,800 | 1,360 | 11,100 | 1,070 |
| | | 16 | 0.07 | 0.21 | 14,600 | 1,750 | 13,300 | 1,600 | 12,600 | 1,360 | 11,300 | 1,220 | 10,600 | 950 |
| | | 20 | 0.045 | 0.135 | 13,500 | 1,620 | 12,300 | 1,480 | 11,600 | 1,250 | 10,400 | 1,120 | 9,800 | 880 |

※基本切込みは被削材グループ1での目安を示しています。その他のグループの場合は、上表の切込み比率を目安に調整してください。
※Standard cutting depth is shown as the criteria for Group 1 workpieces. For other groups, adjust the cutting depth according to the cutting depth factors in the above table.

【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。

【Note】①Use the appropriate coolant for the work material and machining shape.
②These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.

## Epoch TH Hard Ball Strong
# エポックTHハードボール ストロング

彫込み Die-sinking　曲面 Profiling　R Radius　ヘリカル Helical　中仕上 Semi Finishing　仕上 Finishing

RE公差 RE tolerance　±0.005　h5

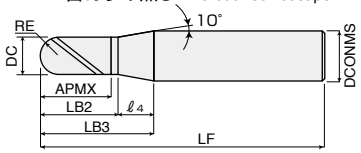
(mm)

高硬度材加工用。THコーティング採用。50HRC以上に適しています。
For machining of high-hardness materials. Ideal for materials with hardnesses of 50HRC and higher.

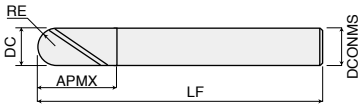
2枚刃
2Flutes

Aタイプ
A type

※首ぬすみ無し Without neck escape




Bタイプ
B type




## EPBTS2○○○-TH

超硬 Carbide　ATH　ねじれ角 30° Helix angle　切削条件表 A101 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 刃長 Flute length APMX | 首下長 Under neck length LB2 | LB3 | ℓ4 | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 形状 Shape | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EPBTS2030-TH | ● | 1.5 | 3 | 4.5 | 5.5 | 14.0 | 8.5 | 70 | 6 | A | 13,820 |
| EPBTS2040-TH | ● | 2 | 4 | 6 | 7.0 | 12.7 | 5.7 | 70 | 6 | A | 13,820 |
| EPBTS2050-TH | ● | 2.5 | 5 | 7.5 | 8.5 | 11.3 | 2.8 | 80 | 6 | A | 15,600 |
| EPBTS2060-TH | ● | 3 | 6 | 9 | – | – | – | 90 | 6 | B | 16,500 |
| EPBTS2080-TH | ● | 4 | 8 | 12 | – | – | – | 100 | 8 | B | 21,550 |
| EPBTS2100-TH | ● | 5 | 10 | 15 | – | – | – | 100 | 10 | B | 27,490 |
| EPBTS2120-TH | ● | 6 | 12 | 18 | – | – | – | 110 | 12 | B | 35,690 |

### 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ○ | ◎ | ◎ | ◎ | ◎ | ○ | ◎ | ○ | ○ |

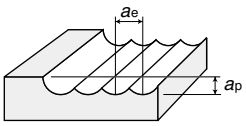
### 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPBTS-TH | × (N/A) | 3～12 |

●：標準在庫品です。●：Stocked items.

# 標準切削条件表 Recommended cutting conditions

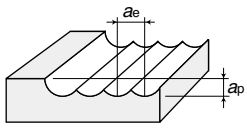
## EPBTS-TH




### <荒切削> Roughing

| | 被削材 Work material | プリハードン鋼 Pre-hardened steels (35～45HRC) CENA1,NAK80 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61,SKT4 | | 焼入れ鋼 Hardened steels (55～65HRC) SKD11,SKH51 | | 焼入れ鋼 Hardened steels (65～72HRC) SKH,HAP | |
|---|---|---|---|---|---|---|---|---|---|
| 高速切削 High speed | 切込み Depth of cut (mm) | $a_p$=0.12DC $a_e$=0.36DC | | $a_p$=0.1DC $a_e$=0.3DC | | $a_p$=0.06DC $a_e$=0.18DC | | $a_p$=0.05DC $a_e$=0.15DC | |
| | ボール半径RE×外径DC RE×Tool dia.(mm) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) |
| | **RE1.5×3** | 37,700 | 3,620 | 27,500 | 2,810 | 22,400 | 2,280 | 13,200 | 1,110 |
| | **RE2×4** | 28,300 | 3,620 | 20,600 | 2,800 | 16,800 | 2,280 | 9,900 | 1,110 |
| | **RE2.5×5** | 22,800 | 3,650 | 16,700 | 2,840 | 13,600 | 2,310 | 8,000 | 1,120 |
| | **RE3×6** | 19,200 | 3,690 | 14,000 | 2,860 | 11,400 | 2,330 | 6,800 | 1,140 |
| | **RE4×8** | 14,700 | 3,760 | 10,700 | 2,910 | 8,800 | 2,390 | 5,200 | 1,160 |
| | **RE5×10** | 11,800 | 3,780 | 8,600 | 2,920 | 7,000 | 2,380 | 4,100 | 1,150 |
| | **RE6×12** | 9,800 | 3,650 | 7,200 | 2,850 | 5,800 | 2,300 | 3,400 | 1,110 |
| 汎用切削 General | 切込み Depth of cut (mm) | $a_p$=0.12DC $a_e$=0.36DC | | $a_p$=0.1DC $a_e$=0.3DC | | $a_p$=0.08DC $a_e$=0.24DC | | $a_p$=0.07DC $a_e$=0.21DC | |
| | ボール半径RE×外径DC RE×Tool dia.(mm) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) |
| | **RE1.5×3** | 17,300 | 1,560 | 14,300 | 1,030 | 12,200 | 730 | 7,100 | 340 |
| | **RE2×4** | 13,000 | 1,560 | 10,700 | 1,030 | 9,200 | 740 | 5,300 | 340 |
| | **RE2.5×5** | 10,500 | 1,580 | 8,600 | 1,030 | 7,400 | 740 | 4,300 | 340 |
| | **RE3×6** | 8,800 | 1,580 | 7,300 | 1,050 | 6,200 | 740 | 3,600 | 350 |
| | **RE4×8** | 6,800 | 1,630 | 5,600 | 1,080 | 4,800 | 770 | 2,800 | 360 |
| | **RE5×10** | 5,400 | 1,620 | 4,500 | 1,080 | 3,800 | 760 | 2,200 | 350 |
| | **RE6×12** | 4,500 | 1,570 | 3,700 | 1,030 | 3,200 | 740 | 1,900 | 350 |

### <仕上げ切削> Finishing




$a_p$:仕上げ代 Finishing cut amount
$a_e$:ピックフィード Pick feed

| | 被削材 Work material | プリハードン鋼 Pre-hardened steels (35～45HRC) CENA1,NAK80 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61,SKT4 | | 焼入れ鋼 Hardened steels (55～65HRC) SKD11,SKH51 | | 焼入れ鋼 Hardened steels (65～72HRC) SKH,HAP | |
|---|---|---|---|---|---|---|---|---|---|
| 高速切削 High speed | 切込み Depth of cut (mm) | $a_p$=0.05～0.1 $a_e$=0.02DC | | $a_p$=0.05～0.1 $a_e$=0.02DC | | $a_p$=0.05～0.1 $a_e$=0.02DC | | $a_p$=0.05～0.1 $a_e$=0.02DC | |
| | ボール半径RE×外径DC RE×Tool dia.(mm) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) |
| | **RE1.5×3** | 27,500 | 3,890 | 26,400 | 3,200 | 23,100 | 2,800 | 17,600 | 2,130 |
| | **RE2×4** | 24,200 | 4,150 | 22,000 | 3,550 | 17,600 | 2,660 | 13,200 | 2,000 |
| | **RE2.5×5** | 20,900 | 4,020 | 18,150 | 3,310 | 14,850 | 2,550 | 11,000 | 1,910 |
| | **RE3×6** | 17,600 | 3,910 | 14,300 | 3,030 | 12,100 | 2,440 | 8,800 | 1,780 |
| | **RE4×8** | 13,200 | 3,200 | 11,000 | 2,550 | 8,800 | 1,680 | 6,600 | 1,470 |
| | **RE5×10** | 11,000 | 2,890 | 8,800 | 2,220 | 7,040 | 1,640 | 5,280 | 1,280 |
| | **RE6×12** | 8,800 | 2,400 | 7,260 | 1,910 | 5,830 | 1,490 | 4,400 | 1,110 |
| 汎用切削 General | 切込み Depth of cut (mm) | $a_p$=0.05～0.1 $a_e$=0.02DC | | $a_p$=0.05～0.1 $a_e$=0.02DC | | $a_p$=0.05～0.1 $a_e$=0.02DC | | $a_p$=0.05～0.1 $a_e$=0.02DC | |
| | ボール半径RE×外径DC RE×Tool dia.(mm) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) |
| | **RE1.5×3** | 17,000 | 2,620 | 15,400 | 1,850 | 14,300 | 1,720 | 11,000 | 1,320 |
| | **RE2×4** | 13,000 | 2,430 | 11,000 | 1,760 | 10,560 | 1,580 | 7,920 | 1,190 |
| | **RE2.5×5** | 10,500 | 2,260 | 9,130 | 1,670 | 7,040 | 1,440 | 6,490 | 1,100 |
| | **RE3×6** | 8,500 | 2,060 | 7,590 | 1,600 | 5,280 | 1,410 | 5,280 | 1,060 |
| | **RE4×8** | 6,400 | 1,690 | 5,720 | 1,320 | 4,180 | 1,170 | 3,960 | 870 |
| | **RE5×10** | 5,100 | 1,460 | 4,510 | 1,130 | 3,520 | 1,000 | 3,190 | 770 |
| | **RE6×12** | 4,200 | 1,240 | 3,850 | 1,000 | 2,640 | 880 | 2,640 | 660 |

【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。

【Note】①Use the appropriate coolant for the work material and machining shape.
②These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.

# Epoch TH Hard Ball
# エポックTHハードボール

彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical / 中仕上 Semi Finishing / 仕上 Finishing

RE公差 RE tolerance
RE0.5～RE6：±0.005
RE8～RE10：±0.01

h5

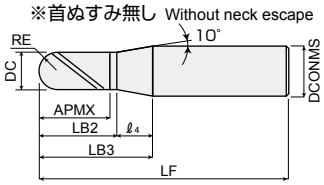
(mm)

高硬度材用（40HRC以上の被削材に適しています）。
For high-hardness materials (Ideal for materials with hardnesses of 40HRC or higher)

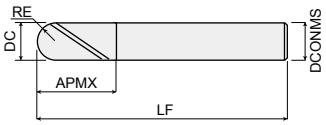
2枚刃
2Flutes

Aタイプ
A type

※首ぬすみ無し Without neck escape




Bタイプ
B type




## EPBT2○○○(-○)

超硬 Carbide / TH / ねじれ30° Helix angle / 切削条件表 A103 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 刃長 Flute length APMX | LB2 | LB3 | ℓ4 | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 形状 Type | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EPBT2010 | ● | 0.5 | 1 | 1.5 | 2.5 | 11 | 8.5 | 50 | 4 | A | 12,440 |
| EPBT2015 | ● | 0.75 | 1.5 | 2.5 | 3.5 | 10.6 | 7.1 | 50 | 4 | A | 13,080 |
| EPBT2020 | ● | 1 | 2 | 3 | 4 | 15.3 | 11.3 | 50 | 6 | A | 13,080 |
| EPBT2025 | ● | 1.25 | 2.5 | 4 | 5 | 14.9 | 9.9 | 50 | 6 | A | 13,820 |
| EPBT2030 | ● | 1.5 | 3 | 4.5 | 5.5 | 14 | 8.5 | 70 | 6 | A | 13,820 |
| EPBT2040-4 | ● | 2 | 4 | 6 | – | – | – | 70 | 4 | B | 13,820 |
| EPBT2040 | ● | 2 | 4 | 6 | 7 | 12.7 | 5.7 | 70 | 6 | A | 13,820 |
| EPBT2050 | ● | 2.5 | 5 | 7.5 | 8.5 | 11.3 | 2.8 | 80 | 6 | A | 15,600 |
| EPBT2060 | ● | 3 | 6 | 9 | – | – | – | 90 | 6 | B | 16,500 |
| EPBT2080 | ● | 4 | 8 | 12 | – | – | – | 100 | 8 | B | 21,550 |
| EPBT2100 | ● | 5 | 10 | 15 | – | – | – | 100 | 10 | B | 27,490 |
| EPBT2120 | ● | 6 | 12 | 18 | – | – | – | 110 | 12 | B | 35,690 |
| EPBT2160 | ● | 8 | 16 | 24 | – | – | – | 140 | 16 | B | 79,770 |
| EPBT2200 | ● | 10 | 20 | 30 | – | – | – | 160 | 20 | B | 124,340 |

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ○ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ |

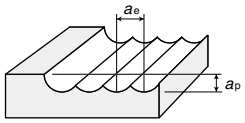
## 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPBT-TH | × (N/A) | 1 ～ 20 |

●：標準在庫品です。●：Stocked items.

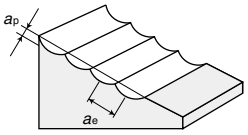
# 標準切削条件表 Recommended cutting conditions

## EPBT




### <荒加工> Roughing

| 被削材 Work material | 工具鋼 Tool steels (25～35HRC) SKD | | | | プリハードン鋼 Pre-hardened steels (35～45HRC) CENA1,NAK80 | | | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61,SKT4 | | | | 焼入れ鋼 Hardened steels (55～65HRC) SKD11,SKH51 | | | | 焼入れ鋼 Hardened steels (65～70HRC) SKH,HAP | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 条件域 Cutting range | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | |
| 切込み Depth of cut (mm) | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.08DC ae=0.24DC | | ap=0.1DC ae=0.3DC | | ap=0.05DC ae=0.15DC | | ap=0.07DC ae=0.21DC | | ap=0.05DC ae=0.15DC | | ap=0.07DC ae=0.21DC | |
| ボール半径RE ×外径DC Tool dia.(mm) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| **RE0.5×1** | 50,000 | 1,800 | 20,000 | 720 | 50,000 | 1,600 | 20,000 | 640 | 50,000 | 1,500 | 20,000 | 540 | 50,000 | 1,300 | 20,000 | 470 | 38,000 | 990 | 16,000 | 370 |
| **RE1×2** | 48,000 | 3,170 | 20,000 | 1,320 | 48,000 | 2,780 | 20,000 | 1,160 | 38,000 | 1,980 | 16,000 | 750 | 29,000 | 1,390 | 13,000 | 560 | 19,000 | 910 | 8,000 | 350 |
| **RE1.5×3** | 32,000 | 3,260 | 16,000 | 1,630 | 32,000 | 2,880 | 16,000 | 1,440 | 25,000 | 2,100 | 11,000 | 830 | 19,000 | 1,440 | 8,500 | 580 | 13,000 | 990 | 5,300 | 360 |
| **RE2×4** | 24,000 | 3,360 | 12,000 | 1,680 | 24,000 | 2,930 | 12,000 | 1,460 | 19,000 | 2,170 | 8,000 | 820 | 14,000 | 1,460 | 6,400 | 600 | 10,000 | 1,040 | 4,000 | 370 |
| **RE3×6** | 16,000 | 3,360 | 8,000 | 1,680 | 16,000 | 2,940 | 8,000 | 1,470 | 13,000 | 2,240 | 5,300 | 820 | 9,600 | 1,500 | 4,200 | 590 | 6,400 | 1,000 | 2,700 | 380 |
| **RE4×8** | 12,000 | 3,600 | 6,000 | 1,800 | 12,000 | 3,020 | 6,000 | 1,510 | 10,000 | 2,320 | 4,000 | 840 | 7,200 | 1,510 | 3,200 | 600 | 4,800 | 1,010 | 2,000 | 380 |
| **RE5×10** | 10,000 | 3,600 | 4,800 | 1,730 | 10,000 | 3,120 | 4,800 | 1,500 | 7,600 | 2,170 | 3,200 | 820 | 5,700 | 1,480 | 2,500 | 590 | 3,800 | 990 | 1,600 | 370 |
| **RE6×12** | 8,000 | 3,100 | 4,000 | 1,550 | 8,000 | 2,690 | 4,000 | 1,340 | 6,400 | 1,970 | 2,700 | 750 | 4,800 | 1,340 | 2,100 | 530 | 3,200 | 900 | 1,300 | 330 |
| **RE8×16** | 6,000 | 2,580 | 3,000 | 1,290 | 6,000 | 2,220 | 3,000 | 1,110 | 4,800 | 1,630 | 2,000 | 610 | 3,600 | 1,110 | 1,600 | 440 | 2,400 | 740 | 1,000 | 280 |
| **RE10×20** | 4,800 | 2,060 | 2,400 | 1,030 | 4,800 | 1,780 | 2,400 | 890 | 3,800 | 1,290 | 1,600 | 490 | 2,900 | 890 | 1,300 | 360 | 1,900 | 590 | 800 | 220 |




### <仕上げ加工> Finishing

| 被削材 Work material | 工具鋼 Tool steels (25～35HRC) SKD | | | | プリハードン鋼 Pre-hardened steels (35～45HRC) CENA1,NAK80 | | | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61,SKT4 | | | | 焼入れ鋼 Hardened steels (55～65HRC) SKD11,SKH51 | | | | 焼入れ鋼 Hardened steels (65～70HRC) SKH,HAP | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 条件域 Cutting range | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | |
| 切込み Depth of cut (mm) | ap=0.05～0.1 ae=0.02DC | | ap=0.05～0.1 ae=0.02DC | | ap=0.05～0.1 ae=0.02DC | | ap=0.05～0.1 ae=0.02DC | | ap=0.05～0.1 ae=0.02DC | | ap=0.05～0.1 ae=0.02DC | | ap=0.05～0.1 ae=0.02DC | | ap=0.05～0.1 ae=0.02DC | | ap=0.05～0.1 ae=0.02DC | | ap=0.05～0.1 ae=0.02DC | |
| ボール半径RE ×外径DC Tool dia.(mm) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| **RE0.5×1** | 50,000 | 5,000 | 20,000 | 2,000 | 50,000 | 5,000 | 20,000 | 2,000 | 50,000 | 4,000 | 20,000 | 1,600 | 50,000 | 2,500 | 15,000 | 750 | 48,000 | 2,400 | 15,000 | 750 |
| **RE1×2** | 32,000 | 3,840 | 20,000 | 2,400 | 32,000 | 3,840 | 20,000 | 2,400 | 32,000 | 3,200 | 20,000 | 2,000 | 32,000 | 2,880 | 15,000 | 1,350 | 24,000 | 2,160 | 14,000 | 1,260 |
| **RE1.5×3** | 25,000 | 3,500 | 17,000 | 2,380 | 25,000 | 3,500 | 17,000 | 2,380 | 24,000 | 2,880 | 14,000 | 1,680 | 21,000 | 2,520 | 13,000 | 1,560 | 16,000 | 1,920 | 10,000 | 1,200 |
| **RE2×4** | 22,000 | 3,740 | 13,000 | 2,210 | 22,000 | 3,740 | 13,000 | 2,210 | 20,000 | 3,200 | 10,000 | 1,600 | 16,000 | 2,400 | 9,600 | 1,440 | 12,000 | 1,800 | 7,200 | 1,080 |
| **RE3×6** | 16,000 | 3,520 | 8,500 | 1,870 | 16,000 | 3,520 | 8,500 | 1,870 | 13,000 | 2,730 | 6,900 | 1,450 | 11,000 | 2,200 | 6,400 | 1,280 | 8,000 | 1,600 | 4,800 | 960 |
| **RE4×8** | 12,000 | 2,880 | 6,400 | 1,540 | 12,000 | 2,880 | 6,400 | 1,540 | 10,000 | 2,300 | 5,200 | 1,200 | 8,000 | 1,760 | 4,800 | 1,060 | 6,000 | 1,320 | 3,600 | 790 |
| **RE5×10** | 10,000 | 2,600 | 5,100 | 1,330 | 10,000 | 2,600 | 5,100 | 1,330 | 8,000 | 2,000 | 4,100 | 1,030 | 6,400 | 1,540 | 3,800 | 910 | 4,800 | 1,150 | 2,900 | 700 |
| **RE6×12** | 8,000 | 2,160 | 4,200 | 1,130 | 8,000 | 2,160 | 4,200 | 1,130 | 6,600 | 1,720 | 3,500 | 910 | 5,300 | 1,330 | 3,200 | 800 | 4,000 | 1,000 | 2,400 | 600 |
| **RE8×16** | 6,000 | 1,680 | 3,200 | 900 | 6,000 | 1,680 | 3,200 | 900 | 5,000 | 1,350 | 2,600 | 700 | 4,000 | 1,040 | 2,400 | 620 | 3,000 | 780 | 1,800 | 470 |
| **RE10×20** | 4,800 | 1,340 | 2,500 | 700 | 4,800 | 1,340 | 2,500 | 700 | 4,000 | 1,080 | 2,100 | 570 | 3,200 | 830 | 1,900 | 490 | 2,400 | 620 | 1,400 | 360 |

【注意】 ①できるだけ高剛性、高精度の機械をご使用ください。
②上表のae(ピックフィード)は目安です。実際にはA131頁のカスプハイトを参考に選定してくだい。
③被削材、加工形状に合わせて、適切なクーラントを使用してください。
④この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
⑤機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。

【Note】 ① Use a highly rigid and accurate machine as possible.
② "ae" (pick feed) figures in the above table are for general guidance. When making an actual selection, please refer to the cusp height table on A131.
③ Use the appropriate coolant for the work material and machining shape.
④ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
⑤ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

# Epoch Panacea Ball
# エポックパナシアボール

高切り込み荒加工～良好な仕上げ加工面。幅広い被削材の加工が可能。
Provides good machined surface finish for rough machining with high cutting depth.
Enables machining of a wide variety of subject materials.

## レギュラー　Regular

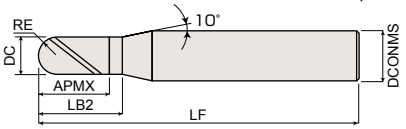
平面 Planing / 曲面 Profiling / R Radius / 取りのこし Rest Material Machining / 荒 Roughing / 中仕上 Semi Finishing / 仕上 Finishing

RE公差 RE tolerance
RE0.15～RE6：±0.005
RE8～RE10　：±0.01
h5
(mm)

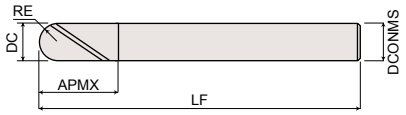
2枚刃 2Flutes

※首ぬすみ無し Without neck escape

Aタイプ A type




Bタイプ B type




## HGOB2○○○(-○)-PN

超硬 Carbide / PN / 切削条件表 A105 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 刃長 Flute length APMX | 首下長 Under neck length LB2 | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 刃数 No. of flutes | 形状 Shape | 希望小売価格（円） Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|---|
| HGOB2003-PN | ● | 0.15 | 0.3 | 0.6 | 0.9 | 50 | 4 | 2 | A | 13,390 |
| HGOB2004-PN | ● | 0.2 | 0.4 | 0.8 | 1.1 | 50 | 4 | 2 | A | 13,390 |
| HGOB2005-PN | ● | 0.25 | 0.5 | 1 | 1.3 | 50 | 4 | 2 | A | 12,750 |
| HGOB2006-PN | ● | 0.3 | 0.6 | 1.2 | 1.5 | 50 | 4 | 2 | A | 12,750 |
| HGOB2008-PN | ● | 0.4 | 0.8 | 1.6 | 1.9 | 50 | 4 | 2 | A | 12,010 |
| HGOB2010-PN | ● | 0.5 | 1 | 2.5 | 3.5 | 50 | 4 | 2 | A | 11,250 |
| HGOB2015-PN | ● | 0.75 | 1.5 | 4 | 5 | 50 | 4 | 2 | A | 11,790 |
| HGOB2020-PN | ● | 1 | 2 | 5 | 6 | 50 | 6 | 2 | A | 11,790 |
| HGOB2025-PN | ● | 1.25 | 2.5 | 7 | 8 | 50 | 6 | 2 | A | 12,650 |
| HGOB2030-PN | ● | 1.5 | 3 | 8 | 9 | 70 | 6 | 2 | A | 12,650 |
| HGOB2040-4-PN | ● | 2 | 4 | 8 | – | 70 | 4 | 2 | B | 12,650 |
| HGOB2040-PN | ● | | | 8 | 9 | 70 | 6 | 2 | A | 12,650 |
| HGOB2050-PN | ● | 2.5 | 5 | 10 | 11 | 80 | 6 | 2 | A | 14,150 |
| HGOB2060-PN | ● | 3 | 6 | 12 | – | 90 | 6 | 2 | B | 14,930 |
| HGOB2080-PN | ● | 4 | 8 | 14 | – | 100 | 8 | 2 | B | 19,530 |
| HGOB2100-PN | ● | 5 | 10 | 18 | – | 100 | 10 | 2 | B | 25,030 |
| HGOB2120-PN | ● | 6 | 12 | 22 | – | 110 | 12 | 2 | B | 32,210 |
| HGOB2160-PN | ● | 8 | 16 | 30 | – | 140 | 16 | 2 | B | 73,900 |
| HGOB2200-PN | ● | 10 | 20 | 38 | – | 160 | 20 | 2 | B | 115,090 |

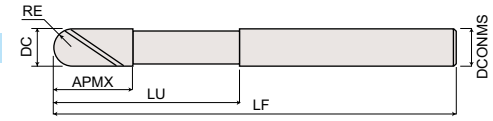
## ロングシャンク　Long shank

平面 Planing / 曲面 Profiling / R Radius / 取りのこし Rest Material Machining / 玉ブチ Corner Recessing / 荒 Roughing / 中仕上 Semi Finishing / 仕上 Finishing

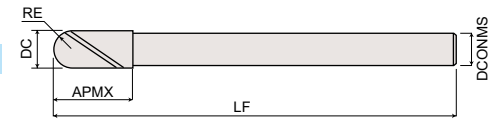
RE公差 RE tolerance
RE3～RE6　：±0.015
RE8～RE10：±0.02
h6
(mm)

2枚刃 2Flutes

Aタイプ A type




Bタイプ B type




## HGOBLS2○○○(-○○○)-PN

超硬 Carbide / PN / 切削条件表 A107 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 刃長 Flute length APMX | 首下長 Under neck length LU | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 刃数 No. of flutes | 形状 Shape | 希望小売価格（円） Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|---|
| HGOBLS2060-45-PN | ● | 3 | 6 | 9 | 45 | 115 | 6 | 2 | A | 21,550 |
| HGOBLS2060-75-PN | ● | | | 9 | 75 | 150 | 6 | 2 | A | 23,910 |
| HGOBLS2080-55-PN | ● | 4 | 8 | 12 | 55 | 125 | 8 | 2 | A | 27,940 |
| HGOBLS2080-105-PN | ● | | | 12 | 105 | 180 | 8 | 2 | A | 32,430 |
| HGOBLS2100-PN | ● | 5 | 10 | 15 | – | 200 | 9 | 2 | B | 39,400 |
| HGOBLS2120-PN | ● | 6 | 12 | 18 | – | 220 | 11 | 2 | B | 51,400 |
| HGOBLS2160-PN | ● | 8 | 16 | 24 | – | 250 | 14 | 2 | B | 98,080 |
| HGOBLS2200-PN | ● | 10 | 20 | 30 | – | 250 | 18 | 2 | B | 153,670 |

## HGOB-PN、HGOBLS-PNの対応被削材

Applicable work material of HGOB-PN, HGOBLS-PN

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ○ | | ○ | | ◎ | ◎ |

●：標準在庫品です。●：Stocked items.

## 再研磨対応外径範囲

Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| HGOB-PN | × (N/A) | 1 ～ 20 |
| HGOBLS-PN | × (N/A) | 6 ～ 20 |

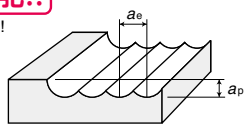
【注意】首下長／外径が10DCを超える工具の再研磨可否については、弊社営業にお問い合わせください。
【Note】Contact our sales office regarding whether or not regrinding is possible for tools where under neck length/tool diameter more than 10DC

## 標準切削条件表 Recommended cutting conditions

# エポックパナシアボール レギュラー
**Epoch Panacea Ball Regular**

※弊社従来品対比 Compared to conventional product.

**切込み量2倍で高能率加工が可能!!**
Twice the cutting depth enables high-efficiency cutting!




## HGOB-PN

| 切削区分 | ボール半径 RE Ball radius (mm) | 外径 DC Tool dia. (mm) | 刃長 APMX Flute length (mm) | 銅合金・アルミ合金 Copper alloy, Aluminum alloy | | | | 鋳鉄・炭素鋼 Cast irons, Carbon steels(150～200HB) FC250,S50C,S55C | | | | ステンレス鋼 Stainless steels(25～35HRC) SUS304,SUS316 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 回転数 $min^{-1}$ | 送り速度 mm/min | ap mm | ae mm | 回転数 $min^{-1}$ | 送り速度 mm/min | ap mm | ae mm | 回転数 $min^{-1}$ | 送り速度 mm/min | ap mm | ae mm |
| 荒加工 Roughing | 0.15 | 0.3 | 0.6 | 35,032 | 2,102 | 0.039 | 0.117 | 31,847 | 1,911 | 0.039 | 0.117 | 28,662 | 1,720 | 0.038 | 0.112 |
| | 0.2 | 0.4 | 0.8 | 35,032 | 2,102 | 0.052 | 0.156 | 31,847 | 1,911 | 0.052 | 0.156 | 28,662 | 1,720 | 0.050 | 0.150 |
| | 0.25 | 0.5 | 1 | 35,032 | 2,102 | 0.065 | 0.195 | 31,847 | 1,911 | 0.065 | 0.195 | 28,662 | 1,720 | 0.063 | 0.187 |
| | 0.3 | 0.6 | 1.2 | 29,193 | 2,335 | 0.078 | 0.234 | 26,539 | 2,123 | 0.078 | 0.234 | 23,885 | 1,911 | 0.075 | 0.225 |
| | 0.4 | 0.8 | 1.6 | 26,274 | 2,102 | 0.104 | 0.312 | 23,885 | 1,911 | 0.104 | 0.312 | 21,497 | 1,720 | 0.100 | 0.300 |
| | 0.5 | 1 | 2.5 | 28,025 | 2,803 | 0.130 | 0.390 | 25,478 | 2,548 | 0.130 | 0.390 | 22,930 | 2,293 | 0.125 | 0.375 |
| | 0.75 | 1.5 | 4 | 25,690 | 3,083 | 0.195 | 0.585 | 23,355 | 2,803 | 0.195 | 0.585 | 21,019 | 2,522 | 0.188 | 0.562 |
| | 1 | 2 | 5 | 24,522 | 3,433 | 0.260 | 0.780 | 22,293 | 3,121 | 0.260 | 0.780 | 20,064 | 2,809 | 0.250 | 0.750 |
| | 1.25 | 2.5 | 7 | 22,420 | 3,587 | 0.325 | 0.975 | 20,382 | 3,261 | 0.325 | 0.975 | 18,344 | 2,935 | 0.313 | 0.937 |
| | 1.5 | 3 | 8 | 21,019 | 3,783 | 0.390 | 1.170 | 19,108 | 3,439 | 0.390 | 1.170 | 17,197 | 3,096 | 0.375 | 1.125 |
| | 2 | 4 | 8 | 20,143 | 4,029 | 0.520 | 1.560 | 18,312 | 3,662 | 0.520 | 1.560 | 16,481 | 3,296 | 0.500 | 1.500 |
| | | | 8 | 20,143 | 4,834 | 0.520 | 1.560 | 18,312 | 4,395 | 0.520 | 1.560 | 16,481 | 3,955 | 0.500 | 1.500 |
| | 2.5 | 5 | 10 | 18,217 | 5,101 | 0.650 | 1.950 | 16,561 | 4,637 | 0.650 | 1.950 | 14,904 | 4,173 | 0.625 | 1.875 |
| | 3 | 6 | 12 | 15,764 | 5,045 | 0.780 | 2.340 | 14,331 | 4,586 | 0.780 | 2.340 | 12,898 | 4,127 | 0.750 | 2.250 |
| | 4 | 8 | 14 | 12,699 | 4,572 | 1.040 | 3.120 | 11,545 | 4,156 | 1.040 | 3.120 | 10,390 | 3,740 | 1.000 | 3.000 |
| | 5 | 10 | 18 | 10,860 | 4,344 | 1.300 | 3.900 | 9,873 | 3,949 | 1.300 | 3.900 | 8,885 | 3,554 | 1.250 | 3.750 |
| | 6 | 12 | 22 | 9,634 | 4,239 | 1.560 | 4.680 | 8,758 | 3,854 | 1.560 | 4.680 | 7,882 | 3,468 | 1.500 | 4.500 |
| | 8 | 16 | 30 | 7,444 | 3,573 | 2.080 | 6.240 | 6,768 | 3,248 | 2.080 | 6.240 | 6,091 | 2,924 | 2.000 | 6.000 |
| | 10 | 20 | 38 | 5,955 | 3,097 | 2.600 | 7.800 | 5,414 | 2,815 | 2.600 | 7.800 | 4,873 | 2,534 | 2.500 | 7.500 |
| 仕上げ加工 Finishing | 0.15 | 0.3 | 0.6 | 44,586 | 1,783 | 0.015 | 0.015 | 37,155 | 1,486 | 0.015 | 0.015 | 33,439 | 1,204 | 0.015 | 0.015 |
| | 0.2 | 0.4 | 0.8 | 42,994 | 1,720 | 0.020 | 0.020 | 35,828 | 1,433 | 0.020 | 0.020 | 32,245 | 1,161 | 0.020 | 0.020 |
| | 0.25 | 0.5 | 1 | 42,038 | 1,682 | 0.025 | 0.025 | 35,032 | 1,401 | 0.025 | 0.025 | 31,529 | 1,135 | 0.025 | 0.025 |
| | 0.3 | 0.6 | 1.2 | 35,032 | 2,102 | 0.030 | 0.030 | 29,193 | 1,752 | 0.030 | 0.030 | 26,274 | 1,419 | 0.030 | 0.030 |
| | 0.4 | 0.8 | 1.6 | 31,051 | 1,863 | 0.040 | 0.040 | 25,876 | 1,553 | 0.040 | 0.040 | 23,288 | 1,258 | 0.040 | 0.040 |
| | 0.5 | 1 | 2.5 | 30,573 | 1,834 | 0.050 | 0.050 | 25,478 | 1,529 | 0.050 | 0.050 | 22,930 | 1,238 | 0.050 | 0.050 |
| | 0.75 | 1.5 | 4 | 29,299 | 1,758 | 0.075 | 0.075 | 24,416 | 1,465 | 0.075 | 0.075 | 21,975 | 1,187 | 0.075 | 0.075 |
| | 1 | 2 | 5 | 29,618 | 2,369 | 0.100 | 0.100 | 24,682 | 1,975 | 0.100 | 0.100 | 22,213 | 1,599 | 0.100 | 0.100 |
| | 1.25 | 2.5 | 7 | 28,280 | 2,262 | 0.125 | 0.125 | 23,567 | 1,885 | 0.125 | 0.125 | 21,210 | 1,527 | 0.125 | 0.125 |
| | 1.5 | 3 | 8 | 26,115 | 2,089 | 0.150 | 0.150 | 21,762 | 1,741 | 0.150 | 0.150 | 19,586 | 1,410 | 0.150 | 0.150 |
| | 2 | 4 | 8 | 24,363 | 1,949 | 0.200 | 0.200 | 20,303 | 1,624 | 0.200 | 0.200 | 18,272 | 1,316 | 0.200 | 0.200 |
| | | | 8 | 24,363 | 2,436 | 0.200 | 0.200 | 20,303 | 2,030 | 0.200 | 0.200 | 18,272 | 1,645 | 0.200 | 0.200 |
| | 2.5 | 5 | 10 | 22,548 | 2,255 | 0.250 | 0.250 | 18,790 | 1,879 | 0.250 | 0.250 | 16,911 | 1,522 | 0.250 | 0.250 |
| | 3 | 6 | 12 | 19,427 | 2,331 | 0.300 | 0.300 | 16,189 | 1,943 | 0.300 | 0.300 | 14,570 | 1,574 | 0.300 | 0.300 |
| | 4 | 8 | 14 | 16,003 | 1,920 | 0.400 | 0.400 | 13,336 | 1,600 | 0.400 | 0.400 | 12,002 | 1,296 | 0.400 | 0.400 |
| | 5 | 10 | 18 | 14,713 | 2,060 | 0.500 | 0.500 | 12,261 | 1,717 | 0.500 | 0.500 | 11,035 | 1,390 | 0.500 | 0.500 |
| | 6 | 12 | 22 | 13,535 | 2,436 | 0.600 | 0.600 | 11,279 | 2,030 | 0.600 | 0.600 | 10,151 | 1,645 | 0.600 | 0.600 |
| | 8 | 16 | 30 | 10,868 | 2,174 | 0.800 | 0.800 | 9,057 | 1,811 | 0.800 | 0.800 | 8,151 | 1,467 | 0.800 | 0.800 |
| | 10 | 20 | 38 | 7,739 | 1,548 | 1.000 | 1.000 | 6,449 | 1,290 | 1.000 | 1.000 | 5,804 | 1,045 | 1.000 | 1.000 |

【注意】①本工具のPNコーティングはその性質上、通電性が微小です。従って通電方式の工具長測定装置をご使用の際にはご注意ください。
②被削材、加工形状に合わせて、適切なクーラントを使用してください。
③できるだけ高剛性、高精度の機械をご使用ください。
④上表のピックフィード($a_e$)は目安です。実際にはA131頁のカスプハイト表を参考に選定してくだい。
⑤この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
⑥機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。

【Note】① PN coating is less electro conductive. Therefore, electric transmitted measuring systems may not work.
② Use the appropriate coolant for the work material and machining shape.
③ Use a highly rigid and accurate machine as possible.
④ The pick feed in the table is a general condition; please select the $a_e$ according to the cusp height requested (page A131) .
⑤ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
⑥ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

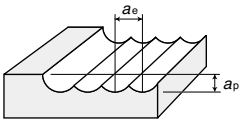
Epoch Panacea Ball

# エポックパナシアボール

## エポックパナシアボール レギュラー

Epoch Panacea Ball Regular

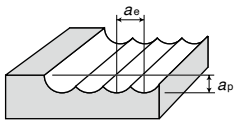
**HGOB-PN**




| 切削区分 | ボール半径 RE Ball radius (mm) | 外径 DC Tool dia. (mm) | 刃長 APMX Flute length (mm) | 合金鋼・工具鋼 Alloy steels(25～35HRC) HPM7,SKD61Ⓐ,SKT4 | | | | プリハードン鋼 Pre-hardened steels(35～45HRC) HPM-MAGIC,CENA1,NAK80 | | | | 焼入れ鋼 Hardened steels(45～52HRC) SKD61Ⓗ,HPM38,DAC-MAGIC | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 回転数 $min^{-1}$ | 送り速度 mm/min | ap mm | ae mm | 回転数 $min^{-1}$ | 送り速度 mm/min | ap mm | ae mm | 回転数 $min^{-1}$ | 送り速度 mm/min | ap mm | ae mm |
| 荒加工 Roughing | 0.15 | 0.3 | 0.6 | 28,662 | 1,634 | 0.036 | 0.108 | 25,796 | 1,393 | 0.035 | 0.103 | 22,930 | 1,176 | 0.033 | 0.099 |
| | 0.2 | 0.4 | 0.8 | 28,662 | 1,634 | 0.048 | 0.144 | 25,796 | 1,393 | 0.046 | 0.138 | 22,930 | 1,176 | 0.044 | 0.132 |
| | 0.25 | 0.5 | 1 | 28,662 | 1,634 | 0.060 | 0.180 | 25,796 | 1,393 | 0.058 | 0.172 | 22,930 | 1,176 | 0.055 | 0.165 |
| | 0.3 | 0.6 | 1.2 | 23,885 | 1,815 | 0.072 | 0.216 | 21,497 | 1,548 | 0.069 | 0.207 | 19,108 | 1,307 | 0.066 | 0.198 |
| | 0.4 | 0.8 | 1.6 | 21,497 | 1,634 | 0.096 | 0.288 | 19,347 | 1,393 | 0.092 | 0.276 | 17,197 | 1,176 | 0.088 | 0.264 |
| | 0.5 | 1 | 2.5 | 22,930 | 2,178 | 0.120 | 0.360 | 20,637 | 1,857 | 0.115 | 0.345 | 18,344 | 1,568 | 0.110 | 0.330 |
| | 0.75 | 1.5 | 4 | 21,019 | 2,396 | 0.180 | 0.540 | 18,917 | 2,043 | 0.173 | 0.517 | 16,815 | 1,725 | 0.165 | 0.495 |
| | 1 | 2 | 5 | 20,064 | 2,668 | 0.240 | 0.720 | 18,057 | 2,275 | 0.230 | 0.690 | 16,051 | 1,921 | 0.220 | 0.660 |
| | 1.25 | 2.5 | 7 | 18,344 | 2,788 | 0.300 | 0.900 | 16,510 | 2,377 | 0.288 | 0.862 | 14,675 | 2,008 | 0.275 | 0.825 |
| | 1.5 | 3 | 8 | 17,197 | 2,941 | 0.360 | 1.080 | 15,478 | 2,507 | 0.345 | 1.035 | 13,758 | 2,117 | 0.330 | 0.990 |
| | 2 | 4 | 8 | 16,481 | 3,131 | 0.480 | 1.440 | 14,833 | 2,670 | 0.460 | 1.380 | 13,185 | 2,255 | 0.440 | 1.320 |
| | | | 8 | 16,481 | 3,758 | 0.480 | 1.440 | 14,833 | 3,204 | 0.460 | 1.380 | 13,185 | 2,706 | 0.440 | 1.320 |
| | 2.5 | 5 | 10 | 14,904 | 3,965 | 0.600 | 1.800 | 13,414 | 3,380 | 0.575 | 1.725 | 11,924 | 2,855 | 0.550 | 1.650 |
| | 3 | 6 | 12 | 12,898 | 3,921 | 0.720 | 2.160 | 11,608 | 3,343 | 0.690 | 2.070 | 10,318 | 2,823 | 0.660 | 1.980 |
| | 4 | 8 | 14 | 10,390 | 3,553 | 0.960 | 2.880 | 9,351 | 3,030 | 0.920 | 2.760 | 8,312 | 2,558 | 0.880 | 2.640 |
| | 5 | 10 | 18 | 8,885 | 3,376 | 1.200 | 3.600 | 7,997 | 2,879 | 1.150 | 3.450 | 7,108 | 2,431 | 1.100 | 3.300 |
| | 6 | 12 | 22 | 7,882 | 3,295 | 1.440 | 4.320 | 7,094 | 2,809 | 1.380 | 4.140 | 6,306 | 2,372 | 1.320 | 3.960 |
| | 8 | 16 | 30 | 6,091 | 2,777 | 1.920 | 5.760 | 5,482 | 2,368 | 1.840 | 5.520 | 4,873 | 2,000 | 1.760 | 5.280 |
| | 10 | 20 | 38 | 4,873 | 2,407 | 2.400 | 7.200 | 4,385 | 2,052 | 2.300 | 6.900 | 3,898 | 1,733 | 2.200 | 6.600 |
| 仕上げ加工 Finishing | 0.15 | 0.3 | 0.6 | 33,439 | 1,204 | 0.012 | 0.012 | 30,096 | 975 | 0.009 | 0.009 | 26,752 | 770 | 0.009 | 0.009 |
| | 0.2 | 0.4 | 0.8 | 32,245 | 1,161 | 0.016 | 0.016 | 29,021 | 940 | 0.012 | 0.012 | 25,796 | 743 | 0.012 | 0.012 |
| | 0.25 | 0.5 | 1 | 31,529 | 1,135 | 0.020 | 0.020 | 28,376 | 919 | 0.015 | 0.015 | 25,223 | 726 | 0.015 | 0.015 |
| | 0.3 | 0.6 | 1.2 | 26,274 | 1,419 | 0.024 | 0.024 | 23,646 | 1,149 | 0.018 | 0.018 | 21,019 | 908 | 0.018 | 0.018 |
| | 0.4 | 0.8 | 1.6 | 23,288 | 1,258 | 0.032 | 0.032 | 20,959 | 1,019 | 0.024 | 0.024 | 18,631 | 805 | 0.024 | 0.024 |
| | 0.5 | 1 | 2.5 | 22,930 | 1,238 | 0.040 | 0.040 | 20,637 | 1,003 | 0.030 | 0.030 | 18,344 | 792 | 0.030 | 0.030 |
| | 0.75 | 1.5 | 4 | 21,975 | 1,187 | 0.060 | 0.060 | 19,777 | 961 | 0.045 | 0.045 | 17,580 | 759 | 0.045 | 0.045 |
| | 1 | 2 | 5 | 22,213 | 1,599 | 0.080 | 0.080 | 19,992 | 1,295 | 0.060 | 0.060 | 17,771 | 1,024 | 0.060 | 0.060 |
| | 1.25 | 2.5 | 7 | 21,210 | 1,527 | 0.100 | 0.100 | 19,089 | 1,237 | 0.075 | 0.075 | 16,968 | 977 | 0.075 | 0.075 |
| | 1.5 | 3 | 8 | 19,586 | 1,410 | 0.120 | 0.120 | 17,627 | 1,142 | 0.090 | 0.090 | 15,669 | 903 | 0.090 | 0.090 |
| | 2 | 4 | 8 | 18,272 | 1,316 | 0.160 | 0.160 | 16,445 | 1,066 | 0.120 | 0.120 | 14,618 | 842 | 0.120 | 0.120 |
| | | | 8 | 18,272 | 1,645 | 0.160 | 0.160 | 16,445 | 1,332 | 0.120 | 0.120 | 14,618 | 1,052 | 0.120 | 0.120 |
| | 2.5 | 5 | 10 | 16,911 | 1,522 | 0.200 | 0.200 | 15,220 | 1,233 | 0.150 | 0.150 | 13,529 | 974 | 0.150 | 0.150 |
| | 3 | 6 | 12 | 14,570 | 1,574 | 0.240 | 0.240 | 13,113 | 1,275 | 0.180 | 0.180 | 11,656 | 1,007 | 0.180 | 0.180 |
| | 4 | 8 | 14 | 12,002 | 1,296 | 0.320 | 0.320 | 10,802 | 1,050 | 0.240 | 0.240 | 9,602 | 830 | 0.240 | 0.240 |
| | 5 | 10 | 18 | 11,035 | 1,390 | 0.400 | 0.400 | 9,932 | 1,126 | 0.300 | 0.300 | 8,828 | 890 | 0.300 | 0.300 |
| | 6 | 12 | 22 | 10,151 | 1,645 | 0.480 | 0.480 | 9,136 | 1,332 | 0.360 | 0.360 | 8,121 | 1,052 | 0.360 | 0.360 |
| | 8 | 16 | 30 | 8,151 | 1,467 | 0.640 | 0.640 | 7,336 | 1,188 | 0.480 | 0.480 | 6,521 | 939 | 0.480 | 0.480 |
| | 10 | 20 | 38 | 5,804 | 1,045 | 0.800 | 0.800 | 5,224 | 846 | 0.600 | 0.600 | 4,643 | 669 | 0.600 | 0.600 |

# エポックパナシアボール ロングシャンク
**Epoch Panacea Ball Long shank**

## HGOBLS-PN




| 切削区分 | ボール半径 RE Ball radius (mm) | 外径 DC Tool dia. (mm) | 刃長 APMX Flute length (mm) | 首下長 LU Under neck length (mm) | 被削材 Work material / 切込み比率 Ratio to standard depth of cut / 基本切込み Standard depth of cut ap mm | 銅合金 アルミ合金 Copper alloy Aluminum alloy 120% | | 鋳鉄 炭素鋼 Cast irons Carbon steels (150～220HB) FC250 S50C,S55C 100% | | ステンレス鋼 Stainless steels (25～35HRC) SUS304 SUS316 90% | | 合金鋼 工具鋼 Alloy steels (25～35HRC) HPM7 SKD61Ⓐ,SKT4 80% | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM-MAGIC CENA1,NAK80 70% | | 焼入れ鋼 Hardened steels (45～52HRC) SKD61Ⓗ,HPM38 DAC-MAGIC 50% | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 回転数 min-1 | 送り速度 mm/min | 回転数 min-1 | 送り速度 mm/min | 回転数 min-1 | 送り速度 mm/min | 回転数 min-1 | 送り速度 mm/min | 回転数 min-1 | 送り速度 mm/min | 回転数 min-1 | 送り速度 mm/min |
| 荒加工 Roughing | 3 | 6 | 9 | 45 | 0.42 | 9,550 | 2,670 | 7,960 | 2,230 | 6,630 | 1,860 | 6,630 | 1,860 | 6,630 | 1,190 | 5,300 | 950 |
| | | | 9 | 75 | 0.25 | 8,350 | 2,320 | 6,960 | 1,940 | 5,630 | 1,570 | 5,630 | 1,570 | 5,630 | 1,010 | 4,300 | 770 |
| | 4 | 8 | 12 | 55 | 0.64 | 7,160 | 2,290 | 5,970 | 1,910 | 4,980 | 1,590 | 4,980 | 1,590 | 4,980 | 1,100 | 3,980 | 880 |
| | | | 12 | 105 | 0.35 | 5,960 | 1,900 | 4,970 | 1,590 | 3,980 | 1,270 | 3,980 | 1,270 | 3,980 | 880 | 2,980 | 650 |
| | 5 | 10 | 15 | – | 1 | 5,720 | 2,060 | 4,770 | 1,720 | 3,980 | 1,430 | 3,980 | 1,430 | 3,980 | 1,030 | 3,180 | 830 |
| | 6 | 12 | 18 | – | 1.2 | 4,770 | 1,900 | 3,980 | 1,590 | 3,320 | 1,330 | 3,320 | 1,330 | 3,320 | 1,000 | 2,650 | 800 |
| | 8 | 16 | 24 | – | 1.6 | 3,570 | 1,600 | 2,980 | 1,340 | 2,490 | 1,120 | 2,490 | 1,120 | 2,490 | 850 | 1,990 | 680 |
| | 10 | 20 | 30 | – | 2 | 2,860 | 1,280 | 2,390 | 1,070 | 1,990 | 900 | 1,990 | 900 | 1,990 | 680 | 1,590 | 540 |
| 仕上げ加工 Finishing | 3 | 6 | 9 | 45 | 0.05～0.1 | 9,550 | 1,865 | 7,960 | 1,554 | 7,960 | 1,102 | 7,960 | 1,102 | 7,960 | 638 | 6,630 | 504 |
| | | | 9 | 75 | 0.05～0.1 | 8,350 | 1,678 | 6,960 | 1,398 | 6,960 | 991 | 6,960 | 991 | 6,960 | 574 | 5,630 | 453 |
| | 4 | 8 | 12 | 55 | 0.05～0.1 | 7,160 | 1,536 | 5,970 | 1,280 | 5,970 | 907 | 5,970 | 907 | 5,970 | 563 | 4,980 | 415 |
| | | | 12 | 105 | 0.05～0.1 | 5,960 | 1,382 | 4,970 | 1,152 | 4,970 | 816 | 4,970 | 816 | 4,970 | 507 | 3,980 | 374 |
| | 5 | 10 | 15 | – | 0.05～0.15 | 5,720 | 1,648 | 4,770 | 1,374 | 4,770 | 973 | 4,770 | 973 | 4,770 | 563 | 3,980 | 445 |
| | 6 | 12 | 18 | – | 0.05～0.15 | 4,770 | 1,900 | 3,980 | 1,590 | 3,980 | 1,152 | 3,980 | 1,152 | 3,980 | 666 | 3,320 | 526 |
| | 8 | 16 | 24 | – | 0.05～0.2 | 3,570 | 1,600 | 2,980 | 1,340 | 2,980 | 1,027 | 2,980 | 1,027 | 2,980 | 594 | 2,490 | 470 |
| | 10 | 20 | 30 | – | 0.05～0.2 | 2,860 | 1,238 | 2,390 | 1,032 | 2,390 | 732 | 2,390 | 732 | 2,390 | 423 | 1,990 | 335 |

## ボール・ロングシャンクの切込みについて Regarding cutting depth for ball nose, long-shank products

### ap 【荒加工】Roughing

| 工具突き出し比率 Over-hang ratio | |
|---|---|
| 5DC 以下 or less | 基本切り込み × 切込み比率<br>Standard depth of cut × Ratio to standard depth of cut |
| 6DC | 0.9× 基本切込み × 切込み比率<br>0.9 × Standard depth of cut × Ratio to standard depth of cut |
| 7DC | 0.8× 基本切込み × 切込み比率<br>0.8 × Standard depth of cut × Ratio to standard depth of cut |
| 8DC | 0.7× 基本切込み × 切込み比率<br>0.7 × Standard depth of cut × Ratio to standard depth of cut |
| 9DC | 0.6× 基本切込み × 切込み比率<br>0.6 × Standard depth of cut × Ratio to standard depth of cut |
| 10DC | 0.5× 基本切込み × 切込み比率<br>0.5 × Standard depth of cut × Ratio to standard depth of cut |

【仕上げ加工】Finishing

表内の数値を参照ください Refer to the values in the table.

### ae 【荒加工】Roughing

apの3倍が目安です。
3 times the ap as general criteria

【仕上げ加工】Finishing

理論カスプハイトより、ご所望の値を選定ください
Select the desired value according the theoretical cusp height.

【注意】
①本工具のPNコーティングはその性質上、通電性が微小です。従って通電方式の工具長測定装置をご使用の際にはご注意ください。
②被削材、加工形状に合わせて、適切なクーラントを使用してください。
③できるだけ高剛性、高精度の機械をご使用ください。
④上表のピックフィード(ae)は目安です。実際にはA131頁のカスプハイト表を参考に選定してください。
⑤この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
⑥機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。

【Note】
① PN coating is less electro conductive. Therefore, electric transmitted measuring systems may not work.
② Use the appropriate coolant for the work material and machining shape.
③ Use a highly rigid and accurate machine as possible.
④ The pick feed in the table is a general condition; please select the ae according to the cusp height requested (page A131).
⑤ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
⑥ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

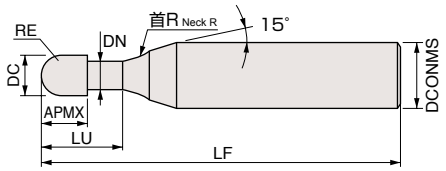
# Epoch Shrink Master Ball
# エポックシュリンクマスターボール

## 高精度規格品 High accuracy rating product

彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical / 中仕上 Semi Finishing / 仕上 Finishing

RE公差 RE tolerance　+0.001～−0.003　h4　(mm)

焼きばめホルダーに適しています。高精度規格品。
Ideal for press-fit holders. High-accuracy rating product.




2枚刃
2Flutes

## ESHB2○○○-H-TH 高精度規格品 High-accuracy rating product　検査票付き Inspection certificate included

超硬 Carbide　TH　ねじれ角30° Helix angle　切削条件表 A109 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 刃長 Flute length APMX | 首径 Neck dia. DN | 首下長 Under neck length LU | 首R Neck R | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 干渉角度 Interference angle (°) θκ | 有効長さ（ワーク傾斜角に対する有効長） Effective length (Effective length for work angle) 0° | 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ESHB2010-H-TH | ● | 0.5 | 1 | 1 | 0.95 | 2.5 | 4 | 40 | 4 | 11.04 | 2.94 | 3.11 | 3.26 | 3.39 | 3.51 | 3.73 | 14,150 |
| ESHB2015-H-TH | ● | 0.75 | 1.5 | 1.5 | 1.45 | 3.75 | 4 | 40 | 4 | 9.16 | 4.19 | 4.42 | 4.60 | 4.76 | 4.90 | 5.16 | 14,790 |
| ESHB2020-H-TH | ● | 1 | 2 | 2 | 1.95 | 5 | 4 | 45 | 6 | 9.82 | 5.44 | 5.72 | 5.93 | 6.11 | 6.27 | 6.56 | 14,790 |
| ESHB2025-H-TH | ● | 1.25 | 2.5 | 2.5 | 2.45 | 6.25 | 4 | 45 | 6 | 8.57 | 6.69 | 7.02 | 7.26 | 7.46 | 7.63 | 7.94 | 15,530 |
| ESHB2030-H-TH | ● | 1.5 | 3 | 3 | 2.9 | 7.5 | 4 | 45 | 6 | 7.26 | 8.13 | 8.43 | 8.67 | 8.87 | 9.05 | 9.37 | 15,530 |
| ESHB2035-H-TH | ● | 1.75 | 3.5 | 3.5 | 3.4 | 8.75 | 4 | 45 | 6 | 6.03 | 9.38 | 9.72 | 9.98 | 10.19 | 10.39 | 10.72 | 15,530 |
| ESHB2040-H-TH | ● | 2 | 4 | 4 | 3.9 | 10 | 4 | 45 | 6 | 4.80 | 10.63 | 11.00 | 11.28 | 11.51 | 11.72 | 12.18 | 15,530 |
| ESHB2050-H-TH | ● | 2.5 | 5 | 5 | 4.9 | 12.5 | 4 | 50 | 6 | 2.38 | 13.13 | 13.57 | 13.88 | 14.14 | 14.37 | – | 17,070 |
| ESHB2060-H-TH | ● | 3 | 6 | 6 | 5.9 | 15 | – | 50 | 6 | – | 15.00 | – | – | – | – | – | 17,850 |
| ESHB2080-H-TH | ● | 4 | 8 | 8 | 7.9 | 20 | – | 60 | 8 | – | 20.00 | – | – | – | – | – | 22,790 |
| ESHB2100-H-TH | ● | 5 | 10 | 10 | 9.9 | 25 | – | 70 | 10 | – | 25.00 | – | – | – | – | – | 28,400 |
| ESHB2120-H-TH | ● | 6 | 12 | 12 | 11.9 | 30 | – | 75 | 12 | – | 30.00 | – | – | – | – | – | 37,030 |

## 標準規格品 Standard rating product

RE公差 RE tolerance　±0.005　h4　(mm)

焼きばめホルダーに適しています。標準規格品。
Ideal for press-fit holders. Standard rating product

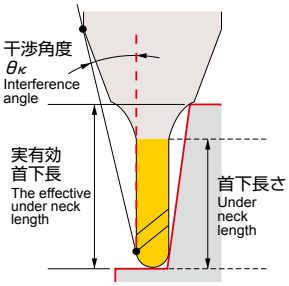
## ESHB2○○○-N-TH 標準規格品 Standard rating product

超硬 Carbide　TH　ねじれ角30° Helix angle　切削条件表 A109 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 刃長 Flute length APMX | 首径 Neck dia. DN | 首下長 Under neck length LU | 首R Neck R | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 干渉角度 Interference angle (°) θκ | 有効長さ（ワーク傾斜角に対する有効長） Effective length (Effective length for work angle) 0° | 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ESHB2010-N-TH | ● | 0.5 | 1 | 1 | 0.95 | 2.5 | 4 | 40 | 4 | 11.04 | 2.94 | 3.11 | 3.26 | 3.39 | 3.51 | 3.73 | 11,900 |
| ESHB2015-N-TH | ● | 0.75 | 1.5 | 1.5 | 1.45 | 3.75 | 4 | 40 | 4 | 9.16 | 4.19 | 4.42 | 4.60 | 4.76 | 4.90 | 5.16 | 12,440 |
| ESHB2020-N-TH | ● | 1 | 2 | 2 | 1.95 | 5 | 4 | 45 | 6 | 9.82 | 5.44 | 5.72 | 5.93 | 6.11 | 6.27 | 6.56 | 12,440 |
| ESHB2025-N-TH | ● | 1.25 | 2.5 | 2.5 | 2.45 | 6.25 | 4 | 45 | 6 | 8.57 | 6.69 | 7.02 | 7.26 | 7.46 | 7.63 | 7.94 | 13,180 |
| ESHB2030-N-TH | ● | 1.5 | 3 | 3 | 2.9 | 7.5 | 4 | 45 | 6 | 7.26 | 8.13 | 8.43 | 8.67 | 8.87 | 9.05 | 9.37 | 13,180 |
| ESHB2035-N-TH | ● | 1.75 | 3.5 | 3.5 | 3.4 | 8.75 | 4 | 45 | 6 | 6.03 | 9.38 | 9.72 | 9.98 | 10.19 | 10.39 | 10.72 | 13,180 |
| ESHB2040-N-TH | ● | 2 | 4 | 4 | 3.9 | 10 | 4 | 45 | 6 | 4.80 | 10.63 | 11.00 | 11.28 | 11.51 | 11.72 | 12.18 | 13,180 |
| ESHB2050-N-TH | ● | 2.5 | 5 | 5 | 4.9 | 12.5 | 4 | 50 | 6 | 2.38 | 13.13 | 13.57 | 13.88 | 14.14 | 14.37 | – | 14,480 |
| ESHB2060-N-TH | ● | 3 | 6 | 6 | 5.9 | 15 | – | 50 | 6 | – | 15.00 | – | – | – | – | – | 15,150 |
| ESHB2080-N-TH | ● | 4 | 8 | 8 | 7.9 | 20 | – | 60 | 8 | – | 20.00 | – | – | – | – | – | 19,640 |
| ESHB2100-N-TH | ● | 5 | 10 | 10 | 9.9 | 25 | – | 70 | 10 | – | 25.00 | – | – | – | – | – | 24,810 |
| ESHB2120-N-TH | ● | 6 | 12 | 12 | 11.9 | 30 | – | 75 | 12 | – | 30.00 | – | – | – | – | – | 32,660 |

【注意】
加工物に勾配がついている場合、干渉領域は、首下長さよりも長くなります。それぞれの勾配角に対する実有効首下長をご参照ください。また、工具が加工物に干渉する角度を干渉角度θκで表示していますので合わせてご参照ください。

【Note】
If the workpiece has draft angle, the interference length will be longer than the under-neck length. Please refer to the effective under-neck length for the variousdraft angles.
In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle θκ", and should also be referred to.




### ESHB-H-TH、ESHB-N-TH の対応被削材
Applicable work material of ESHB-H-TH, ESHB-N-TH

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ |

### 再研磨対応外径範囲 Re-grinding compatibility range

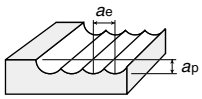
| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| ESHB-H-TH | × (N/A) | × (N/A) |
| ESHB-N-TH | × (N/A) | 1 ～ 12 |

●印：標準在庫品です。 ● : Stocked items.

# 標準切削条件表 Recommended cutting conditions

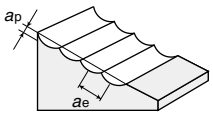
**ESHB-H-TH**
高精度規格品
High accuracy rating product

**ESHB-N-TH**
標準規格品
Standard rating product




## <荒加工> Roughing

| 被削材 Work material | 工具鋼 Tool steels (25～35HRC) SKD | | | | プリハードン鋼 Pre-hardened steels (35～45HRC) CENA1,NAK80 | | | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61,SKT4 | | | | 焼入れ鋼 Hardened steels (55～65HRC) SKD11,SKH51 | | | | 焼入れ鋼 Hardened steels (65～70HRC) SKH,HAP | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 条件域 Cutting range | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | |
| 切込み Depth of cut (mm) | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.08DC ae=0.24DC | | ap=0.1DC ae=0.3DC | | ap=0.05DC ae=0.15DC | | ap=0.07DC ae=0.21DC | | ap=0.05DC ae=0.15DC | | ap=0.07DC ae=0.21DC | |
| ボール半径RE×外径DC Tool dia.(mm) | 回転数 n (min-1) | 送り速度 vf (mm/min) | 回転数 n (min-1) | 送り速度 vf (mm/min) | 回転数 n (min-1) | 送り速度 vf (mm/min) | 回転数 n (min-1) | 送り速度 vf (mm/min) | 回転数 n (min-1) | 送り速度 vf (mm/min) | 回転数 n (min-1) | 送り速度 vf (mm/min) | 回転数 n (min-1) | 送り速度 vf (mm/min) | 回転数 n (min-1) | 送り速度 vf (mm/min) | 回転数 n (min-1) | 送り速度 vf (mm/min) | 回転数 n (min-1) | 送り速度 vf (mm/min) |
| **RE0.5×1** | 50,000 | 1,800 | 20,000 | 720 | 50,000 | 1,600 | 20,000 | 640 | 50,000 | 1,500 | 20,000 | 540 | 50,000 | 1,300 | 20,000 | 470 | 38,000 | 990 | 16,000 | 370 |
| **RE1×2** | 48,000 | 3,170 | 20,000 | 1,320 | 48,000 | 2,780 | 20,000 | 1,160 | 38,000 | 1,980 | 16,000 | 750 | 29,000 | 1,390 | 13,000 | 560 | 19,000 | 910 | 8,000 | 350 |
| **RE1.5×3** | 32,000 | 3,260 | 16,000 | 1,630 | 32,000 | 2,880 | 16,000 | 1,440 | 25,000 | 2,100 | 11,000 | 830 | 19,000 | 1,440 | 8,500 | 580 | 13,000 | 990 | 5,300 | 360 |
| **RE2×4** | 24,000 | 3,360 | 12,000 | 1,680 | 24,000 | 2,930 | 12,000 | 1,460 | 19,000 | 2,170 | 8,000 | 820 | 14,000 | 1,460 | 6,400 | 600 | 10,000 | 1,040 | 4,000 | 370 |
| **RE3×6** | 16,000 | 3,360 | 8,000 | 1,680 | 16,000 | 2,940 | 8,000 | 1,470 | 13,000 | 2,240 | 5,300 | 820 | 9,600 | 1,500 | 4,200 | 590 | 6,400 | 1,000 | 2,700 | 380 |
| **RE4×8** | 12,000 | 3,600 | 6,000 | 1,800 | 12,000 | 3,020 | 6,000 | 1,510 | 10,000 | 2,320 | 4,000 | 840 | 7,200 | 1,510 | 3,200 | 600 | 4,800 | 1,010 | 2,000 | 380 |
| **RE5×10** | 10,000 | 3,600 | 4,800 | 1,730 | 10,000 | 3,120 | 4,800 | 1,500 | 7,600 | 2,170 | 3,200 | 820 | 5,700 | 1,480 | 2,500 | 590 | 3,800 | 990 | 1,600 | 370 |
| **RE6×12** | 8,000 | 3,100 | 4,000 | 1,550 | 8,000 | 2,690 | 4,000 | 1,340 | 6,400 | 1,970 | 2,700 | 750 | 4,800 | 1,340 | 2,100 | 530 | 3,200 | 900 | 1,300 | 330 |




ap: 仕上げ代 Finishing cut amount
ae: ピックフィード Pick feed

## <仕上げ加工> Finishing

| 被削材 Work material | 工具鋼 Tool steels (25～35HRC) SKD | | | | プリハードン鋼 Pre-hardened steels (35～45HRC) CENA1,NAK80 | | | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61,SKT4 | | | | 焼入れ鋼 Hardened steels (55～65HRC) SKD11,SKH51 | | | | 焼入れ鋼 Hardened steels (65～70HRC) SKH,HAP | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 条件域 Cutting range | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | |
| 切込み Depth of cut (mm) | ap=0.05～0.1 ae=0.02DC | | ap=0.05～0.1 ae=0.02DC | | ap=0.05～0.1 ae=0.02DC | | ap=0.05～0.1 ae=0.02DC | | ap=0.05～0.1 ae=0.02DC | | ap=0.05～0.1 ae=0.02DC | | ap=0.05～0.1 ae=0.02DC | | ap=0.05～0.1 ae=0.02DC | | ap=0.05～0.1 ae=0.02DC | | ap=0.05～0.1 ae=0.02DC | |
| ボール半径RE×外径DC Tool dia.(mm) | 回転数 n (min-1) | 送り速度 vf (mm/min) | 回転数 n (min-1) | 送り速度 vf (mm/min) | 回転数 n (min-1) | 送り速度 vf (mm/min) | 回転数 n (min-1) | 送り速度 vf (mm/min) | 回転数 n (min-1) | 送り速度 vf (mm/min) | 回転数 n (min-1) | 送り速度 vf (mm/min) | 回転数 n (min-1) | 送り速度 vf (mm/min) | 回転数 n (min-1) | 送り速度 vf (mm/min) | 回転数 n (min-1) | 送り速度 vf (mm/min) | 回転数 n (min-1) | 送り速度 vf (mm/min) |
| **RE0.5×1** | 50,000 | 5,000 | 20,000 | 2,000 | 50,000 | 5,000 | 20,000 | 2,000 | 50,000 | 4,000 | 20,000 | 1,600 | 50,000 | 2,500 | 15,000 | 750 | 48,000 | 2,400 | 15,000 | 750 |
| **RE1×2** | 32,000 | 3,840 | 20,000 | 2,400 | 32,000 | 3,840 | 20,000 | 2,400 | 32,000 | 3,200 | 20,000 | 2,000 | 32,000 | 2,880 | 15,000 | 1,350 | 24,000 | 2,160 | 14,000 | 1,260 |
| **RE1.5×3** | 25,000 | 3,500 | 17,000 | 2,380 | 25,000 | 3,500 | 17,000 | 2,380 | 24,000 | 2,880 | 14,000 | 1,680 | 21,000 | 2,520 | 13,000 | 1,560 | 16,000 | 1,920 | 10,000 | 1,200 |
| **RE2×4** | 22,000 | 3,740 | 13,000 | 2,210 | 22,000 | 3,740 | 13,000 | 2,210 | 20,000 | 3,200 | 10,000 | 1,600 | 16,000 | 2,400 | 9,600 | 1,440 | 12,000 | 1,800 | 7,200 | 1,080 |
| **RE3×6** | 16,000 | 3,520 | 8,500 | 1,870 | 16,000 | 3,520 | 8,500 | 1,870 | 13,000 | 2,730 | 6,900 | 1,450 | 11,000 | 2,200 | 6,400 | 1,280 | 8,000 | 1,600 | 4,800 | 960 |
| **RE4×8** | 12,000 | 2,880 | 6,400 | 1,540 | 12,000 | 2,880 | 6,400 | 1,540 | 10,000 | 2,300 | 5,200 | 1,200 | 8,000 | 1,760 | 4,800 | 1,060 | 6,000 | 1,320 | 3,600 | 790 |
| **RE5×10** | 10,000 | 2,600 | 5,100 | 1,330 | 10,000 | 2,600 | 5,100 | 1,330 | 8,000 | 2,000 | 4,100 | 1,030 | 6,400 | 1,540 | 3,800 | 910 | 4,800 | 1,150 | 2,900 | 700 |
| **RE6×12** | 8,000 | 2,160 | 4,200 | 1,130 | 8,000 | 2,160 | 4,200 | 1,130 | 6,600 | 1,720 | 3,500 | 910 | 5,300 | 1,330 | 3,200 | 800 | 4,000 | 1,000 | 2,400 | 600 |

【注意】
①できるだけ高剛性、高精度の機械をご使用ください。
②上表の$a_e$(ピックフィード)は目安です。実際にはA131頁のカスプハイト表を参考に選定してください。
③被削材、加工形状に合わせて、適切なクーラントを使用してください。
④この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
⑤機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。

【Note】
① Use a highly rigid and accurate machine as possible.
② "$a_e$" (pick feed) figures in the above table are for general guidance. When making an actual selection, please refer to the cusp height table on A131.
③ Use the appropriate coolant for the work material and machining shape.
④ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
⑤ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

# Epoch Mega Feed Ball Evolution
# エポックメガフィードボール エボリューション

**ストレートタイプ** | Straight Type

Adaptive milling | Die-sinking | Profiling | Radius | Roughing | Semi Finishing | Finishing

強ねじれボール刃形の採用により、
切削抵抗の低減と切りくず排出性向上を実現!
High helix ball flute shape that reduces cutting force and improves chip removal.

RE tolerance
RE0.5～RE1.75 : ±0.005
RE2～RE3 : ±0.007
RE4～RE6 : ±0.010
RE8～RE10 : ±0.015

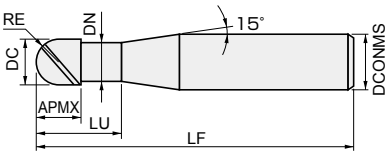
Dia. tolerance
RE0.5～RE1.75 : 0～−0.010
RE2～RE3 : 0～−0.014
RE4～RE6 : 0～−0.020
RE8～RE10 : 0～−0.030

h5

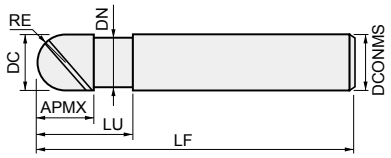
(mm)

3枚刃
3Flutes

Aタイプ
A type




Bタイプ
B type




## EMBE3○○○(-S○)-ATH

超硬 Carbide | ATH | ねじれ40° Helix angle | 不等分割 Unequal pitch | 切削条件表 A113 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 刃長 Flute length APMX | 首下長 Under neck length LU | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 形状 Shape | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|
| EMBE3010-S4-ATH | ● | 0.5 | 1 | 1.5 | 3 | 0.95 | 50 | 4 | A | 15,650 |
| EMBE3010-S6-ATH | ● | | | 1.5 | 3 | 0.95 | 50 | 6 | A | 15,650 |
| EMBE3015-S4-ATH | ● | 0.75 | 1.5 | 2.5 | 4.5 | 1.43 | 50 | 4 | A | 15,650 |
| EMBE3015-S6-ATH | ● | | | 2.5 | 4.5 | 1.43 | 50 | 6 | A | 15,650 |
| EMBE3020-S4-ATH | ● | 1 | 2 | 3 | 6 | 1.9 | 50 | 4 | A | 15,650 |
| EMBE3020-S6-ATH | ● | | | 3 | 6 | 1.9 | 50 | 6 | A | 15,650 |
| EMBE3025-S4-ATH | ● | 1.25 | 2.5 | 4 | 7.5 | 2.38 | 50 | 4 | A | 16,610 |
| EMBE3025-S6-ATH | ● | | | 4 | 7.5 | 2.38 | 50 | 6 | A | 16,610 |
| EMBE3030-S4-ATH | ● | 1.5 | 3 | 4.5 | 9 | 2.9 | 70 | 4 | A | 16,610 |
| EMBE3030-S6-ATH | ● | | | 4.5 | 9 | 2.9 | 70 | 6 | A | 16,610 |
| EMBE3035-S4-ATH | ● | 1.75 | 3.5 | 5.5 | 10.5 | 3.4 | 70 | 4 | A | 16,610 |
| EMBE3035-S6-ATH | ● | | | 5.5 | 10.5 | 3.4 | 70 | 6 | A | 16,610 |
| EMBE3040-S4-ATH | ● | 2 | 4 | 6 | 12 | 3.9 | 70 | 4 | B | 16,610 |
| EMBE3040-S6-ATH | ● | | | 6 | 12 | 3.9 | 70 | 6 | A | 16,610 |
| EMBE3050-ATH | ● | 2.5 | 5 | 7.5 | 15 | 4.7 | 80 | 6 | A | 18,640 |
| EMBE3060-ATH | ● | 3 | 6 | 9 | 18 | 5.7 | 90 | 6 | B | 19,760 |
| EMBE3080-ATH | ● | 4 | 8 | 12 | 24 | 7.6 | 100 | 8 | B | 25,930 |
| EMBE3100-ATH | ● | 5 | 10 | 15 | 30 | 9.5 | 100 | 10 | B | 32,990 |
| EMBE3120-ATH | ● | 6 | 12 | 18 | 36 | 11.5 | 110 | 12 | B | 42,870 |
| EMBE3160-ATH | ● | 8 | 16 | 24 | 48 | 15 | 140 | 16 | B | 87,750 |
| EMBE3200-ATH | ● | 10 | 20 | 30 | 60 | 19 | 160 | 20 | B | 137,250 |

### 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ |

### 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EMBE-ATH | 6～20 | 4～20 |

●：標準在庫品です。●：Stocked items.　干渉なし：No interference

## ペンシルネック　Pencil Neck

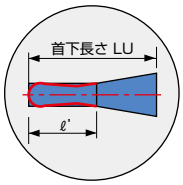
彫込み Die-sinking　曲面 Profiling　R Radius　取りのこし Rest Material Machining　玉プチ Corner Recessing　細部 Miniature　荒 Roughing　中仕上 Semi Finishing　仕上 Finishing　リブ・細部 Rib Miniature

RE公差 RE tolerance
RE0.5～RE1.75 : ±0.005
RE2～RE3 : ±0.007
RE4～RE6 : ±0.010

h5

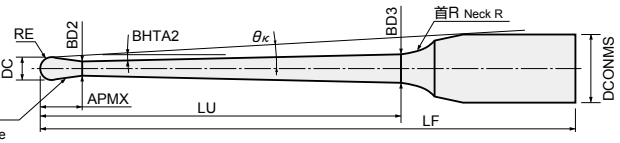
(mm)

強ねじれボール刃形の採用により、
切削抵抗の低減と切りくず排出性向上を実現!
High helix ball flute shape that reduces cutting force and improves chip removal.




3枚刃
3Flutes

【注意】RE 2mm以上はバックドラフト形状ではありません。
【Note】RE 2mm or higher does not have backdraft shape.




超硬 Carbide　ATH　ねじれ40° Helix angle　不等分割 Unequal pitch　切削条件表 A116 Cutting Conditions

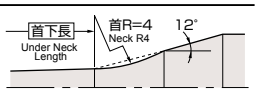
# EMBPE3○○○-○○○-○○-ATH

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 首部テーパ半角 Neck angle BHTA2 | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. BD2 | 首元径 Under neck dia. BD3 | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首形状 Neck shape | 仮想首長 Approx neck length ℓ' | 干渉角度 Interference angle (°) θκ | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.75° | 1° | 1.5° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EMBPE3010-6-09-ATH | ● | 0.5 | 1 | 0.9 | 6 | 0.8 | 0.94 | 1.103 | 50 | 6 | A | 2.70 | 8.36 | 6.45 | 6.66 | 6.96 | 7.19 | 7.56 | 10,690 |
| EMBPE3010-8-09-ATH | ● | | | 0.9 | 8 | 0.8 | 0.94 | 1.166 | 55 | 6 | A | 2.70 | 7.55 | 8.4 | 8.68 | 9.05 | 9.32 | 9.93 | 10,830 |
| EMBPE3010-10-09-ATH | ● | | | 0.9 | 10 | 0.8 | 0.94 | 1.229 | 55 | 6 | A | 2.70 | 6.88 | 10.33 | 10.71 | 11.13 | 11.43 | 12.39 | 10,830 |
| EMBPE3010-12-09-ATH | ● | | | 0.9 | 12 | 0.8 | 0.94 | 1.291 | 60 | 6 | A | 2.70 | 6.32 | 12.25 | 12.73 | 13.2 | 13.54 | 14.85 | 10,940 |
| EMBPE3010-14-09-ATH | ● | | | 0.9 | 14 | 0.8 | 0.94 | 1.354 | 60 | 6 | A | 2.70 | 5.85 | 13.77 | 14.75 | 15.27 | 15.65 | 17.31 | 10,940 |
| EMBPE3010-16-09-ATH | ● | | | 0.9 | 16 | 0.8 | 0.94 | 1.417 | 60 | 6 | A | 2.70 | 5.44 | 13.77 | 16.77 | 17.34 | 17.87 | 19.77 | 10,940 |
| EMBPE3010-18-09-ATH | ● | | | 0.9 | 18 | 0.8 | 0.94 | 1.480 | 65 | 6 | A | 2.70 | 5.08 | 13.77 | 18.79 | 19.4 | 20.08 | 22.23 | 11,370 |
| EMBPE3010-20-09-ATH | ● | | | 0.9 | 20 | 0.8 | 0.94 | 1.543 | 65 | 6 | A | 2.70 | 4.77 | 13.77 | 20.81 | 21.46 | 22.3 | 24.68 | 11,370 |
| EMBPE3010-22-09-ATH | ● | | | 0.9 | 22 | 0.8 | 0.94 | 1.606 | 70 | 6 | A | 2.70 | 4.5 | 13.77 | 22.82 | 23.51 | 24.52 | 27.14 | 11,580 |
| EMBPE3010-24-09-ATH | ● | | | 0.9 | 24 | 0.8 | 0.94 | 1.668 | 70 | 6 | A | 2.70 | 4.25 | 13.77 | 24.84 | 25.57 | 26.73 | 29.6 | 12,010 |
| EMBPE3010-26-09-ATH | ● | | | 0.9 | 26 | 0.8 | 0.94 | 1.731 | 70 | 6 | A | 2.70 | 4.03 | 13.77 | 26.86 | 27.62 | 28.95 | 32.06 | 12,110 |
| EMBPE3010-28-09-ATH | ● | | | 0.9 | 28 | 0.8 | 0.94 | 1.794 | 75 | 6 | A | 2.70 | 3.83 | 13.77 | 28.88 | 29.73 | 31.17 | 34.52 | 12,320 |
| EMBPE3010-30-09-ATH | ● | | | 0.9 | 30 | 0.8 | 0.94 | 1.857 | 75 | 6 | A | 2.70 | 3.65 | 13.77 | 30.89 | 31.84 | 33.38 | 36.98 | 12,320 |
| EMBPE3010-32-09-ATH | ● | | | 0.9 | 32 | 0.8 | 0.94 | 1.920 | 80 | 6 | A | 2.70 | 3.49 | 13.77 | 32.91 | 33.95 | 35.6 | 39.43 | 13,080 |
| EMBPE3010-34-09-ATH | ● | | | 0.9 | 34 | 0.8 | 0.94 | 1.983 | 80 | 6 | A | 2.70 | 3.34 | 13.77 | 34.92 | 36.07 | 37.82 | 41.89 | 13,080 |
| EMBPE3010-36-09-ATH | ● | | | 0.9 | 36 | 0.8 | 0.94 | 2.045 | 80 | 6 | A | 2.70 | 3.2 | 13.77 | 36.94 | 38.18 | 40.03 | 44.35 | 13,080 |
| EMBPE3015-8-09-ATH | ● | 0.75 | 1.5 | 0.9 | 8 | 1.35 | 1.42 | 1.628 | 55 | 6 | A | 3.89 | 7.32 | 8.54 | 8.77 | 9.1 | 9.35 | 9.97 | 10,830 |
| EMBPE3015-10-09-ATH | ● | | | 0.9 | 10 | 1.35 | 1.42 | 1.691 | 55 | 6 | A | 3.89 | 6.63 | 10.5 | 10.79 | 11.17 | 11.46 | 12.43 | 10,830 |
| EMBPE3015-14-09-ATH | ● | | | 0.9 | 14 | 1.35 | 1.42 | 1.817 | 60 | 6 | A | 3.89 | 5.57 | 14.39 | 14.83 | 15.31 | 15.71 | 17.35 | 10,940 |
| EMBPE3015-16-09-ATH | ● | | | 0.9 | 16 | 1.35 | 1.42 | 1.880 | 60 | 6 | A | 3.89 | 5.16 | 16.33 | 16.84 | 17.37 | 17.93 | 19.8 | 10,940 |
| EMBPE3015-18-09-ATH | ● | | | 0.9 | 18 | 1.35 | 1.42 | 1.943 | 65 | 6 | A | 3.89 | 4.81 | 18.24 | 18.86 | 19.43 | 20.14 | 22.26 | 10,940 |
| EMBPE3015-20-09-ATH | ● | | | 0.9 | 20 | 1.35 | 1.42 | 2.005 | 65 | 6 | A | 3.89 | 4.5 | 19.64 | 20.88 | 21.49 | 22.36 | 24.72 | 11,370 |
| EMBPE3015-22-09-ATH | ● | | | 0.9 | 22 | 1.35 | 1.42 | 2.068 | 70 | 6 | A | 3.89 | 4.22 | 19.64 | 22.89 | 23.55 | 24.57 | 27.18 | 12,110 |
| EMBPE3015-24-09-ATH | ● | | | 0.9 | 24 | 1.35 | 1.42 | 2.131 | 70 | 6 | A | 3.89 | 3.98 | 19.64 | 24.91 | 25.6 | 26.79 | 29.64 | 12,220 |
| EMBPE3015-26-09-ATH | ● | | | 0.9 | 26 | 1.35 | 1.42 | 2.194 | 70 | 6 | A | 3.89 | 3.77 | 19.64 | 26.93 | 27.68 | 29.01 | 32.1 | 13,390 |
| EMBPE3015-28-09-ATH | ● | | | 0.9 | 28 | 1.35 | 1.42 | 2.257 | 75 | 6 | A | 3.89 | 3.58 | 19.64 | 28.94 | 29.79 | 31.22 | 34.55 | 13,610 |
| EMBPE3015-30-09-ATH | ● | | | 0.9 | 30 | 1.35 | 1.42 | 2.320 | 75 | 6 | A | 3.89 | 3.4 | 19.64 | 30.96 | 31.91 | 33.44 | 37.01 | 14,250 |
| EMBPE3015-32-09-ATH | ● | | | 0.9 | 32 | 1.35 | 1.42 | 2.382 | 80 | 6 | A | 3.89 | 3.24 | 19.64 | 32.97 | 34.02 | 35.66 | 39.47 | 14,680 |
| EMBPE3015-34-09-ATH | ● | | | 0.9 | 34 | 1.35 | 1.42 | 2.445 | 80 | 6 | A | 3.89 | 3.1 | 19.64 | 34.99 | 36.13 | 37.87 | 41.93 | 14,790 |
| EMBPE3015-36-09-ATH | ● | | | 0.9 | 36 | 1.35 | 1.42 | 2.508 | 80 | 6 | A | 3.89 | 2.97 | 19.64 | 37 | 38.24 | 40.09 | 干渉なし | 14,890 |
| EMBPE3015-38-09-ATH | ● | | | 0.9 | 38 | 1.35 | 1.42 | 2.571 | 85 | 6 | A | 3.89 | 2.85 | 19.64 | 39.02 | 40.36 | 42.3 | 干渉なし | 15,110 |
| EMBPE3015-40-09-ATH | ● | | | 0.9 | 40 | 1.35 | 1.42 | 2.634 | 85 | 6 | A | 3.89 | 2.74 | 19.64 | 41.03 | 42.47 | 44.52 | 干渉なし | 15,320 |
| EMBPE3020-10-09-ATH | ● | 1 | 2 | 0.9 | 10 | 1.7 | 1.92 | 2.180 | 55 | 6 | A | 4.24 | 6.35 | 10.52 | 10.8 | 11.17 | 11.45 | 12.38 | 10,830 |
| EMBPE3020-16-09-ATH | ● | | | 0.9 | 16 | 1.7 | 1.92 | 2.369 | 60 | 6 | A | 4.24 | 4.86 | 16.36 | 16.85 | 17.37 | 17.91 | 19.76 | 10,940 |
| EMBPE3020-20-09-ATH | ● | | | 0.9 | 20 | 1.7 | 1.92 | 2.494 | 65 | 6 | A | 4.24 | 4.2 | 20.16 | 20.88 | 21.49 | 22.34 | 24.68 | 11,040 |
| EMBPE3020-24-09-ATH | ● | | | 0.9 | 24 | 1.7 | 1.92 | 2.620 | 65 | 6 | A | 4.24 | 3.7 | 20.5 | 24.92 | 25.6 | 26.77 | 29.59 | 11,680 |
| EMBPE3020-30-09-ATH | ● | | | 0.9 | 30 | 1.7 | 1.92 | 2.809 | 70 | 6 | A | 4.24 | 3.14 | 20.5 | 30.96 | 31.9 | 33.42 | 36.97 | 12,440 |
| EMBPE3020-36-09-ATH | ● | | | 0.9 | 36 | 1.7 | 1.92 | 2.997 | 80 | 6 | A | 4.24 | 2.73 | 20.5 | 37.01 | 38.24 | 40.07 | 干渉なし | 16,070 |
| EMBPE3020-40-09-ATH | ● | | | 0.9 | 40 | 1.7 | 1.92 | 3.123 | 80 | 6 | A | 4.24 | 2.51 | 20.5 | 41.03 | 42.46 | 44.5 | 干渉なし | 16,500 |
| EMBPE3020-46-09-ATH | ● | | | 0.9 | 46 | 1.7 | 1.92 | 3.311 | 90 | 6 | A | 4.24 | 2.24 | 20.5 | 47.08 | 48.8 | 51.15 | 干渉なし | 18,640 |
| EMBPE3020-60-09-ATH | ● | | | 0.9 | 60 | 1.7 | 1.92 | 3.751 | 100 | 6 | A | 4.24 | 1.79 | 20.5 | 61.16 | 63.59 | 干渉なし | 干渉なし | 19,500 |
| EMBPE3025-16-09-ATH | ● | 1.25 | 2.5 | 0.9 | 16 | 2 | 2.4 | 2.839 | 60 | 6 | A | 5.18 | 4.52 | 16.48 | 16.9 | 17.4 | 17.94 | 19.77 | 11,370 |
| EMBPE3025-24-09-ATH | ● | | | 0.9 | 24 | 2 | 2.4 | 3.091 | 65 | 6 | A | 5.18 | 3.39 | 24.19 | 24.96 | 25.62 | 26.81 | 29.6 | 12,750 |
| EMBPE3025-30-09-ATH | ● | | | 0.9 | 30 | 2 | 2.4 | 3.279 | 70 | 6 | A | 5.18 | 2.86 | 24.88 | 31.01 | 31.94 | 33.46 | 干渉なし | 14,040 |
| EMBPE3025-40-09-ATH | ● | | | 0.9 | 40 | 2 | 2.4 | 3.593 | 80 | 6 | A | 5.18 | 2.26 | 24.88 | 41.07 | 42.51 | 44.54 | 干渉なし | 15,530 |
| EMBPE3025-50-09-ATH | ● | | | 0.9 | 50 | 2 | 2.4 | 3.908 | 90 | 6 | A | 5.18 | 1.87 | 24.88 | 51.14 | 53.07 | 干渉なし | 干渉なし | 18,000 |
| EMBPE3030-16-09-ATH | ● | 1.5 | 3 | 0.9 | 16 | 2.5 | 2.86 | 3.284 | 55 | 6 | A | 6.95 | 4.11 | 16.67 | 17 | 17.46 | 18.05 | 19.87 | 11,370 |
| EMBPE3030-20-09-ATH | ● | | | 0.9 | 20 | 2.5 | 2.86 | 3.409 | 60 | 6 | A | 6.95 | 3.5 | 20.59 | 21.03 | 21.57 | 22.48 | 24.78 | 13,390 |
| EMBPE3030-24-09-ATH | ● | | | 0.9 | 24 | 2.5 | 2.86 | 3.535 | 65 | 6 | A | 6.95 | 3.04 | 24.51 | 25.06 | 25.72 | 26.92 | 29.7 | 13,510 |
| EMBPE3030-30-09-ATH | ● | | | 0.9 | 30 | 2.5 | 2.86 | 3.724 | 70 | 6 | A | 6.95 | 2.54 | 30.35 | 31.1 | 32.06 | 33.56 | 干渉なし | 14,040 |
| EMBPE3030-40-09-ATH | ● | | | 0.9 | 40 | 2.5 | 2.86 | 4.038 | 80 | 6 | A | 6.95 | 2 | 34.28 | 41.16 | 42.62 | 干渉なし | 干渉なし | 15,530 |
| EMBPE3030-50-09-ATH | ● | | | 0.9 | 50 | 2.5 | 2.86 | 4.352 | 90 | 6 | A | 6.95 | 1.65 | 34.28 | 51.22 | 53.18 | 干渉なし | 干渉なし | 18,000 |
| EMBPE3030-60-09-ATH | ● | | | 0.9 | 60 | 2.5 | 2.86 | 4.666 | 100 | 6 | A | 6.95 | 1.4 | 34.28 | 61.28 | 干渉なし | 干渉なし | 干渉なし | 19,820 |

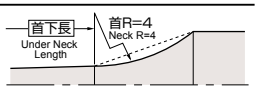
# Epoch Mega Feed Ball Evolution
# エポックメガフィードボール エボリューション

## ■首形状詳細 Detail of neck shape

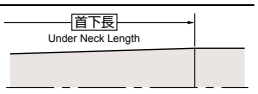
**首形状 Neck shape A**
複合首形状
Compound neck shape



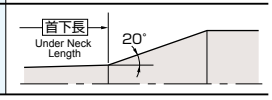

**首形状 Neck shape B**
テーパなし
Without taper

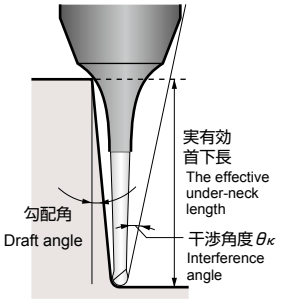



**首形状 Neck shape C**




**首形状 Neck shape D**
テーパ 20°
Taper 20°




## EMBPE3○○○-○○○-○○-ATH

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 首部テーパ半角 Neck angle BHTA2 | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. BD2 | 首元径 Under neck dia. BD3 | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首形状 Neck shape | 仮想首長 Approx neck length ℓ' | 干渉角度 Interference angle (°) θκ | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.75° | 1° | 1.5° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EMBPE3035-20-09-ATH | ● | 1.75 | 3.5 | 0.9 | 20 | 2.75 | 3.36 | 3.901 | 60 | 6 | A | 7.20 | 3.09 | 20.6 | 21.03 | 21.56 | 22.46 | 24.73 | 13,610 |
| EMBPE3035-30-09-ATH | ● | | | 0.9 | 30 | 2.75 | 3.36 | 4.216 | 70 | 6 | A | 7.20 | 2.21 | 30.36 | 31.1 | 32.05 | 33.54 | 干渉なし | 13,610 |
| EMBPE3035-40-09-ATH | ● | | | 0.9 | 40 | 2.75 | 3.36 | 4.530 | 80 | 6 | A | 7.20 | 1.72 | 34.53 | 41.16 | 42.61 | 干渉なし | 干渉なし | 17,360 |
| EMBPE3035-50-09-ATH | ● | | | 0.9 | 50 | 2.75 | 3.36 | 4.844 | 90 | 6 | A | 7.20 | 1.41 | 34.53 | 51.22 | 干渉なし | 干渉なし | 干渉なし | 20,470 |
| EMBPE3035-60-09-ATH | ● | | | 0.9 | 60 | 2.75 | 3.36 | 5.158 | 100 | 6 | B | 7.20 | 1.19 | 34.53 | 61.27 | 干渉なし | 干渉なし | 干渉なし | 22,390 |
| EMBPE3040-20-09-ATH | ● | 2 | 4 | 0.9 | 20 | 6 | 3.9 | 4.339 | 70 | 6 | A | — | 2.62 | 20.77 | 21.13 | 21.62 | 22.58 | 干渉なし | 13,610 |
| EMBPE3040-30-09-ATH | ● | | | 0.9 | 30 | 6 | 3.9 | 4.654 | 80 | 6 | A | — | 1.84 | 30.61 | 31.19 | 32.18 | 干渉なし | 干渉なし | 13,720 |
| EMBPE3040-40-09-ATH | ● | | | 0.9 | 40 | 6 | 3.9 | 4.968 | 90 | 6 | B | — | 1.42 | 40.38 | 41.25 | 干渉なし | 干渉なし | 干渉なし | 17,360 |
| EMBPE3040-50-09-ATH | ● | | | 0.9 | 50 | 6 | 3.9 | 5.282 | 100 | 6 | B | — | 1.16 | 45.15 | 51.3 | 干渉なし | 干渉なし | 干渉なし | 19,820 |
| EMBPE3040-60-09-ATH | ● | | | 0.9 | 60 | 6 | 3.9 | 5.596 | 110 | 6 | B | — | 0.97 | 45.15 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 19,820 |
| EMBPE3040-70-09-ATH | ● | | | 0.9 | 70 | 6 | 3.9 | 5.910 | 120 | 8 | A | — | 1.58 | 45.15 | 71.4 | 74.43 | 干渉なし | 干渉なし | 24,860 |
| EMBPE3040-80-09-ATH | ● | | | 0.9 | 80 | 6 | 3.9 | 6.224 | 130 | 8 | A | — | 1.4 | 45.15 | 81.45 | 干渉なし | 干渉なし | 干渉なし | 24,860 |
| EMBPE3050-30-09-ATH | ● | 2.5 | 5 | 0.9 | 30 | 7.5 | 4.9 | 5.606 | 80 | 8 | A | — | 2.6 | 30.72 | 31.24 | 32.24 | 33.7 | 干渉なし | 21,440 |
| EMBPE3050-40-09-ATH | ● | | | 0.9 | 40 | 7.5 | 4.9 | 5.921 | 90 | 8 | A | — | 2.03 | 40.54 | 41.29 | 42.8 | 44.78 | 干渉なし | 22,000 |
| EMBPE3050-50-09-ATH | ● | | | 0.9 | 50 | 7.5 | 4.9 | 6.235 | 100 | 8 | A | — | 1.67 | 50.24 | 51.35 | 53.36 | 干渉なし | 干渉なし | 23,570 |
| EMBPE3050-60-09-ATH | ● | | | 0.9 | 60 | 7.5 | 4.9 | 6.549 | 110 | 8 | A | — | 1.42 | 51.67 | 61.4 | 干渉なし | 干渉なし | 干渉なし | 23,800 |
| EMBPE3050-70-09-ATH | ● | | | 0.9 | 70 | 7.5 | 4.9 | 6.863 | 120 | 8 | A | — | 1.23 | 51.67 | 71.45 | 干渉なし | 干渉なし | 干渉なし | 27,270 |
| EMBPE3050-80-09-ATH | ● | | | 0.9 | 80 | 7.5 | 4.9 | 7.177 | 130 | 8 | B | — | 1.09 | 51.67 | 81.49 | 干渉なし | 干渉なし | 干渉なし | 30,300 |
| EMBPE3060-30-09-ATH | ● | 3 | 6 | 0.9 | 30 | 9 | 5.9 | 6.559 | 80 | 8 | A | — | 1.89 | 30.81 | 31.29 | 32.29 | 干渉なし | 干渉なし | 21,440 |
| EMBPE3060-40-09-ATH | ● | | | 0.9 | 40 | 9 | 5.9 | 6.873 | 90 | 8 | B | — | 1.45 | 40.66 | 41.34 | 干渉なし | 干渉なし | 干渉なし | 22,900 |
| EMBPE3060-50-09-ATH | ● | | | 0.9 | 50 | 9 | 5.9 | 7.188 | 100 | 8 | B | — | 1.18 | 50.46 | 51.39 | 干渉なし | 干渉なし | 干渉なし | 25,030 |
| EMBPE3060-60-09-ATH | ● | | | 0.9 | 60 | 9 | 5.9 | 7.502 | 110 | 8 | B | — | 0.99 | 58.18 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 28,510 |
| EMBPE3060-70-09-ATH | ● | | | 0.9 | 70 | 9 | 5.9 | 7.816 | 120 | 10 | A | — | 1.59 | 58.18 | 71.48 | 74.54 | 干渉なし | 干渉なし | 36,590 |
| EMBPE3060-80-09-ATH | ● | | | 0.9 | 80 | 9 | 5.9 | 8.130 | 130 | 10 | A | — | 1.41 | 58.18 | 81.53 | 干渉なし | 干渉なし | 干渉なし | 38,040 |
| EMBPE3060-100-09-ATH | ● | | | 0.9 | 100 | 9 | 5.9 | 8.759 | 150 | 10 | A | — | 1.15 | 58.18 | 101.61 | 干渉なし | 干渉なし | 干渉なし | 44,320 |
| EMBPE3060-120-09-ATH | ● | | | 0.9 | 120 | 9 | 5.9 | 9.387 | 200 | 10 | B | — | 0.97 | 58.18 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 52,520 |
| EMBPE3080-40-09-ATH | ● | 4 | 8 | 0.9 | 40 | 12 | 7.9 | 8.779 | 100 | 10 | A | — | 1.48 | 40.85 | 41.42 | 干渉なし | 干渉なし | 干渉なし | 28,400 |
| EMBPE3080-50-09-ATH | ● | | | 0.9 | 50 | 12 | 7.9 | 9.093 | 110 | 10 | B | — | 1.2 | 50.71 | 51.47 | 干渉なし | 干渉なし | 干渉なし | 30,190 |
| EMBPE3080-60-09-ATH | ● | | | 0.9 | 60 | 12 | 7.9 | 9.408 | 120 | 10 | B | — | 1 | 60.53 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 32,100 |
| EMBPE3080-70-09-ATH | ● | | | 0.9 | 70 | 12 | 7.9 | 9.722 | 130 | 10 | B | — | 0.86 | 70.22 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 33,900 |
| EMBPE3080-80-09-ATH | ● | | | 0.9 | 80 | 12 | 7.9 | 10.036 | 140 | 12 | A | — | 1.43 | 71.21 | 81.6 | 干渉なし | 干渉なし | 干渉なし | 41,860 |
| EMBPE3080-100-09-ATH | ● | | | 0.9 | 100 | 12 | 7.9 | 10.664 | 160 | 12 | A | — | 1.16 | 71.21 | 101.76 | 干渉なし | 干渉なし | 干渉なし | 48,930 |
| EMBPE3080-120-09-ATH | ● | | | 0.9 | 120 | 12 | 7.9 | 11.293 | 200 | 12 | B | — | 0.98 | 71.21 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 48,930 |
| EMBPE3100-50-09-ATH | ● | 5 | 10 | 0.9 | 50 | 15 | 9.9 | 10.999 | 120 | 12 | B | — | 1.21 | 50.89 | 51.55 | 干渉なし | 干渉なし | 干渉なし | 37,710 |
| EMBPE3100-60-09-ATH | ● | | | 0.9 | 60 | 15 | 9.9 | 11.313 | 130 | 12 | B | — | 1.02 | 60.76 | 61.59 | 干渉なし | 干渉なし | 干渉なし | 39,620 |
| EMBPE3100-75-09-ATH | ● | | | 0.9 | 75 | 15 | 9.9 | 11.785 | 140 | 12 | B | — | 0.81 | 75.49 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 41,860 |
| EMBPE3100-81-09-ATH | ● | | | 0.9 | 81 | 15 | 9.9 | 12.000 | 150 | 12 | C | — | 0.76 | 81.04 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 51,180 |
| EMBPE3100-100-09-ATH | ● | | | 0.9 | 100 | 15 | 9.9 | 12.570 | 170 | 16 | D | — | 1.73 | 84.25 | 101.07 | 103.56 | 干渉なし | 干渉なし | 65,760 |
| EMBPE3100-120-09-ATH | ● | | | 0.9 | 120 | 15 | 9.9 | 13.198 | 200 | 16 | D | — | 1.45 | 84.25 | 121.17 | 干渉なし | 干渉なし | 干渉なし | 71,480 |
| EMBPE3120-60-09-ATH | ● | 6 | 12 | 0.9 | 60 | 18 | 11.9 | 13.219 | 140 | 16 | D | — | 1.99 | 60.27 | 60.96 | 62.38 | 干渉なし | 干渉なし | 57,010 |
| EMBPE3120-80-09-ATH | ● | | | 0.9 | 80 | 18 | 11.9 | 13.847 | 160 | 16 | D | — | 1.49 | 80.12 | 81.06 | 干渉なし | 干渉なし | 干渉なし | 62,620 |
| EMBPE3120-100-09-ATH | ● | | | 0.9 | 100 | 18 | 11.9 | 14.476 | 180 | 16 | D | — | 1.2 | 97.28 | 101.16 | 干渉なし | 干渉なし | 干渉なし | 68,230 |
| EMBPE3120-120-09-ATH | ● | | | 0.9 | 120 | 18 | 11.9 | 15.104 | 200 | 16 | D | — | 1 | 97.28 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 73,620 |

## ○ 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ |

●：標準在庫品です。●：Stocked items.　干渉なし：No interference

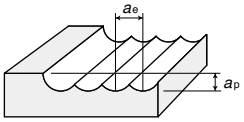
## ○ 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EMBPE-ATH | × (N/A) | 4～12 |

【注意】EMBPE-ATH は特殊刃型のため首下長さが10DC以上の工具の再研磨はできませんのでご了承ください。
【Note】EMBPE-ATH has a special flute shape. Because of this, regrinding is not possible for tools with a under neck length of more than 10DC

# 標準切削条件表 Recommended cutting conditions

## EMBE-ATH
ストレートタイプ
Straight type




### 〈荒加工〉 Roughing

| 被削材 Work material | | 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) S50C, S55C | | | | 工具鋼 Tool steels (25～40HRC) HPM7, SCM440, SKD61, SKT4 | | | | プリハードン鋼・焼入れ鋼 Pre-hardened steels, Hardened steels (40～50HRC) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | 快削材料 Free-cutting materials SKD61, CENA1, HPM-MAGIC, NAK80 | | | | 高靭性材料 High-toughness materials DAC-MAGIC, DAC55, DH31 | | | |
| ボール半径 RE Ball radius (mm) | 外径 DC Tool dia. (mm) | 回転数 n min-1 | 送り速度 vf mm/min | ap mm | ae mm | 回転数 n min-1 | 送り速度 vf mm/min | ap mm | ae mm | 回転数 n min-1 | 送り速度 vf mm/min | ap mm | ae mm | 回転数 n min-1 | 送り速度 vf mm/min | ap mm | ae mm |
| 0.5 | 1 | 50,000 | 2,360 | 0.100 | 0.300 | 50,000 | 2,360 | 0.100 | 0.300 | 50,000 | 2,230 | 0.100 | 0.300 | 28,700 | 1,160 | 0.060 | 0.180 |
| 0.75 | 1.5 | 46,700 | 3,530 | 0.150 | 0.450 | 42,500 | 3,210 | 0.150 | 0.450 | 38,200 | 2,720 | 0.150 | 0.450 | 19,100 | 1,240 | 0.090 | 0.270 |
| 1 | 2 | 35,000 | 3,750 | 0.200 | 0.600 | 31,800 | 3,410 | 0.200 | 0.600 | 28,700 | 2,900 | 0.200 | 0.600 | 14,300 | 1,310 | 0.120 | 0.360 |
| 1.25 | 2.5 | 28,000 | 3,810 | 0.250 | 0.750 | 25,500 | 3,470 | 0.250 | 0.750 | 22,900 | 2,940 | 0.250 | 0.750 | 11,500 | 1,340 | 0.150 | 0.450 |
| 1.5 | 3 | 23,400 | 3,890 | 0.300 | 0.900 | 21,200 | 3,530 | 0.300 | 0.900 | 19,100 | 3,000 | 0.300 | 0.900 | 9,600 | 1,370 | 0.180 | 0.540 |
| 1.75 | 3.5 | 20,000 | 4,010 | 0.350 | 1.050 | 18,200 | 3,650 | 0.350 | 1.050 | 16,400 | 3,100 | 0.350 | 1.050 | 8,200 | 1,410 | 0.210 | 0.630 |
| 2 | 4 | 17,500 | 4,100 | 0.400 | 1.200 | 15,900 | 3,730 | 0.400 | 1.200 | 14,300 | 3,160 | 0.400 | 1.200 | 7,200 | 1,450 | 0.240 | 0.720 |
| 2.5 | 5 | 14,000 | 4,280 | 0.500 | 1.500 | 12,700 | 3,880 | 0.500 | 1.500 | 11,500 | 3,310 | 0.500 | 1.500 | 5,700 | 1,490 | 0.300 | 0.900 |
| 3 | 6 | 11,700 | 4,420 | 0.600 | 1.800 | 10,600 | 4,010 | 0.600 | 1.800 | 9,600 | 3,420 | 0.600 | 1.800 | 4,800 | 1,560 | 0.360 | 1.080 |
| 4 | 8 | 8,800 | 4,660 | 0.800 | 2.400 | 8,000 | 4,230 | 0.800 | 2.400 | 7,200 | 3,590 | 0.800 | 2.400 | 3,600 | 1,630 | 0.480 | 1.440 |
| 5 | 10 | 7,000 | 4,850 | 1.000 | 3.000 | 6,400 | 4,440 | 1.000 | 3.000 | 5,700 | 3,720 | 1.000 | 3.000 | 2,900 | 1,720 | 0.600 | 1.800 |
| 6 | 12 | 5,800 | 4,600 | 1.200 | 3.600 | 5,300 | 4,210 | 1.200 | 3.600 | 4,800 | 3,590 | 1.200 | 3.600 | 2,400 | 1,630 | 0.720 | 2.160 |
| 8 | 16 | 4,400 | 4,440 | 1.600 | 4.800 | 4,000 | 4,030 | 1.600 | 4.800 | 3,600 | 3,420 | 1.600 | 4.800 | 1,800 | 1,560 | 0.960 | 2.880 |
| 10 | 20 | 3,500 | 3,880 | 2.000 | 6.000 | 3,200 | 3,550 | 2.000 | 6.000 | 2,900 | 3,030 | 2.000 | 6.000 | 1,400 | 1,330 | 1.200 | 3.600 |

| 被削材 Work material | | 焼入れ鋼 Hardened steels (50～55HRC) HPM38, SKD61 | | | | 焼入れ鋼 Hardened steels (55～65HRC) SKD11, YXR3, YXR33 | | | |
|---|---|---|---|---|---|---|---|---|---|
| ボール半径 RE Ball radius (mm) | 外径 DC Tool dia. (mm) | 回転数 n min-1 | 送り速度 vf mm/min | ap mm | ae mm | 回転数 n min-1 | 送り速度 vf mm/min | ap mm | ae mm |
| 0.5 | 1 | 50,000 | 1,870 | 0.070 | 0.210 | 44,600 | 1,250 | 0.050 | 0.150 |
| 0.75 | 1.5 | 34,000 | 2,030 | 0.105 | 0.315 | 29,700 | 1,340 | 0.075 | 0.225 |
| 1 | 2 | 25,500 | 2,160 | 0.140 | 0.420 | 22,300 | 1,420 | 0.100 | 0.300 |
| 1.25 | 2.5 | 20,400 | 2,200 | 0.175 | 0.525 | 17,800 | 1,440 | 0.125 | 0.375 |
| 1.5 | 3 | 17,000 | 2,240 | 0.210 | 0.630 | 14,900 | 1,480 | 0.150 | 0.450 |
| 1.75 | 3.5 | 14,600 | 2,320 | 0.245 | 0.735 | 12,700 | 1,520 | 0.175 | 0.525 |
| 2 | 4 | 12,700 | 2,350 | 0.280 | 0.840 | 11,100 | 1,550 | 0.200 | 0.600 |
| 2.5 | 5 | 10,200 | 2,460 | 0.350 | 1.050 | 8,900 | 1,620 | 0.250 | 0.750 |
| 3 | 6 | 8,500 | 2,540 | 0.420 | 1.260 | 7,400 | 1,670 | 0.300 | 0.900 |
| 4 | 8 | 6,400 | 2,680 | 0.560 | 1.680 | 5,600 | 1,760 | 0.400 | 1.200 |
| 5 | 10 | 5,100 | 2,790 | 0.700 | 2.100 | 4,500 | 1,860 | 0.500 | 1.500 |
| 6 | 12 | 4,200 | 2,640 | 0.840 | 2.520 | 3,700 | 1,750 | 0.600 | 1.800 |
| 8 | 16 | 3,200 | 2,550 | 1.120 | 3.360 | 2,800 | 1,680 | 0.800 | 2.400 |
| 10 | 20 | 2,500 | 2,190 | 1.400 | 4.200 | 2,200 | 1,450 | 1.000 | 3.000 |

【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②できるだけ高剛性、高精度の機械をご使用ください。
③この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。

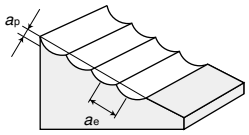
【Note】① Use the appropriate coolant for the work material and machining shape.
② Use as highly rigid and accurate machine as possible.
③ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

Epoch Mega Feed Ball Evolution

# エポックメガフィードボール エボリューション

## EMBE-ATH

ストレートタイプ
Straight type

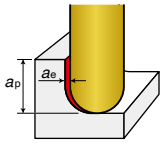



〈仕上げ加工〉 Finishing

| 被削材 Work material | | 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) S50C, S55C | | | | 工具鋼 Tool steels (25～40HRC) HPM7, SCM440, SKD61, SKT4 | | | | プリハードン鋼・焼入れ鋼 Pre-hardened steels, Hardened steels (40～50HRC) SKD61, CENA1, HPM-MAGIC, NAK80 DAC-MAGIC, DAC55, DH31 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ボール半径 RE Ball radius (mm) | 外径 DC Tool dia. (mm) | 回転数 n min-1 | 送り速度 Vf mm/min | ap mm | ae mm | 回転数 n min-1 | 送り速度 Vf mm/min | ap mm | ae mm | 回転数 n min-1 | 送り速度 Vf mm/min | ap mm | ae mm |
| 0.5 | 1 | 50,000 | 1,640 | 0.02～0.05 | 0.02 | 50,000 | 1,640 | 0.02～0.05 | 0.02 | 50,000 | 1,550 | 0.02～0.05 | 0.02 |
| 0.75 | 1.5 | 50,000 | 2,630 | 0.02～0.07 | 0.03 | 50,000 | 2,630 | 0.02～0.07 | 0.03 | 50,000 | 2,480 | 0.02～0.07 | 0.03 |
| 1 | 2 | 47,800 | 3,560 | 0.02～0.10 | 0.04 | 44,600 | 3,320 | 0.02～0.10 | 0.04 | 41,400 | 2,910 | 0.02～0.10 | 0.04 |
| 1.25 | 2.5 | 38,200 | 3,680 | 0.05～0.12 | 0.05 | 35,700 | 3,440 | 0.05～0.12 | 0.05 | 33,100 | 3,010 | 0.05～0.12 | 0.05 |
| 1.5 | 3 | 31,800 | 3,840 | 0.05～0.15 | 0.06 | 29,700 | 3,590 | 0.05～0.15 | 0.06 | 27,600 | 3,150 | 0.05～0.15 | 0.06 |
| 1.75 | 3.5 | 27,300 | 3,890 | 0.05～0.15 | 0.07 | 25,500 | 3,640 | 0.05～0.15 | 0.07 | 23,700 | 3,190 | 0.05～0.15 | 0.07 |
| 2 | 4 | 23,900 | 3,940 | 0.05～0.20 | 0.08 | 22,300 | 3,670 | 0.05～0.20 | 0.08 | 20,700 | 3,220 | 0.05～0.20 | 0.08 |
| 2.5 | 5 | 19,100 | 4,060 | 0.05～0.25 | 0.1 | 17,800 | 3,780 | 0.05～0.25 | 0.1 | 16,600 | 3,330 | 0.05～0.25 | 0.1 |
| 3 | 6 | 15,900 | 4,180 | 0.05～0.3 | 0.12 | 14,900 | 3,920 | 0.05～0.3 | 0.12 | 13,800 | 3,430 | 0.05～0.3 | 0.12 |
| 4 | 8 | 11,900 | 4,380 | 0.05～0.4 | 0.16 | 11,100 | 4,080 | 0.05～0.4 | 0.16 | 10,400 | 3,620 | 0.05～0.4 | 0.16 |
| 5 | 10 | 9,600 | 4,330 | 0.05～0.5 | 0.2 | 8,900 | 4,020 | 0.05～0.5 | 0.2 | 8,300 | 3,540 | 0.05～0.5 | 0.2 |
| 6 | 12 | 8,000 | 4,290 | 0.05～0.6 | 0.24 | 7,400 | 3,970 | 0.05～0.6 | 0.24 | 6,900 | 3,500 | 0.05～0.6 | 0.24 |
| 8 | 16 | 6,000 | 3,990 | 0.05～0.8 | 0.32 | 5,600 | 3,730 | 0.05～0.8 | 0.32 | 5,200 | 3,270 | 0.05～0.8 | 0.32 |
| 10 | 20 | 4,800 | 3,700 | 0.05～1.0 | 0.4 | 4,500 | 3,470 | 0.05～1.0 | 0.4 | 4,100 | 2,990 | 0.05～1.0 | 0.4 |

| 被削材 Work material | | 焼入れ鋼 Hardened steels (50～55HRC) HPM38, SKD61 | | | | 焼入れ鋼 Hardened steels (55～65HRC) SKD11, YXR3, YXR33 | | | |
|---|---|---|---|---|---|---|---|---|---|
| ボール半径 RE Ball radius (mm) | 外径 DC Tool dia. (mm) | 回転数 n min-1 | 送り速度 Vf mm/min | ap mm | ae mm | 回転数 n min-1 | 送り速度 Vf mm/min | ap mm | ae mm |
| 0.5 | 1 | 50,000 | 1,320 | 0.02～0.05 | 0.02 | 50,000 | 990 | 0.02～0.05 | 0.02 |
| 0.75 | 1.5 | 44,600 | 1,880 | 0.02～0.07 | 0.03 | 38,200 | 1,210 | 0.02～0.07 | 0.03 |
| 1 | 2 | 33,400 | 1,990 | 0.02～0.10 | 0.04 | 28,700 | 1,290 | 0.02～0.10 | 0.04 |
| 1.25 | 2.5 | 26,800 | 2,070 | 0.05～0.12 | 0.05 | 22,900 | 1,330 | 0.05～0.12 | 0.05 |
| 1.5 | 3 | 22,300 | 2,160 | 0.05～0.15 | 0.06 | 19,100 | 1,390 | 0.05～0.15 | 0.06 |
| 1.75 | 3.5 | 19,100 | 2,180 | 0.05～0.15 | 0.07 | 16,400 | 1,410 | 0.05～0.15 | 0.07 |
| 2 | 4 | 16,700 | 2,200 | 0.05～0.20 | 0.08 | 14,300 | 1,420 | 0.05～0.20 | 0.08 |
| 2.5 | 5 | 13,400 | 2,280 | 0.05～0.25 | 0.1 | 11,500 | 1,470 | 0.05～0.25 | 0.1 |
| 3 | 6 | 11,100 | 2,340 | 0.05～0.3 | 0.12 | 9,600 | 1,520 | 0.05～0.3 | 0.12 |
| 4 | 8 | 8,400 | 2,480 | 0.05～0.4 | 0.16 | 7,200 | 1,600 | 0.05～0.4 | 0.16 |
| 5 | 10 | 6,700 | 2,420 | 0.05～0.5 | 0.2 | 5,700 | 1,550 | 0.05～0.5 | 0.2 |
| 6 | 12 | 5,600 | 2,410 | 0.05～0.6 | 0.24 | 4,800 | 1,550 | 0.05～0.6 | 0.24 |
| 8 | 16 | 4,200 | 2,240 | 0.05～0.8 | 0.32 | 3,600 | 1,440 | 0.05～0.8 | 0.32 |
| 10 | 20 | 3,300 | 2,040 | 0.05～1.0 | 0.4 | 2,900 | 1,350 | 0.05～1.0 | 0.4 |

## EMBE-ATH
ストレートタイプ
Straight type




### 〈側面加工〉 Side cutting

| 被削材 Work material | | 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) S50C, S55C | | | | 工具鋼 Tool steels (25～40HRC) HPM7, SCM440, SKD61, SKT4 | | | | プリハードン鋼・焼入れ鋼 Pre-hardened steels, Hardened steels (40～50HRC) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | 快削材 Free-cutting materials SKD61, CENA1, HPM-MAGIC, NAK80 | | | | 高靭性材料 High-toughness materials DAC-MAGIC, DAC55, DH31 | | | |
| ボール半径 RE Ball radius (mm) | 外径 DC Tool dia. (mm) | 回転数 n min-1 | 送り速度 Vf mm/min | ap mm | ae mm | 回転数 n min-1 | 送り速度 Vf mm/min | ap mm | ae mm | 回転数 n min-1 | 送り速度 Vf mm/min | ap mm | ae mm | 回転数 n min-1 | 送り速度 Vf mm/min | ap mm | ae mm |
| 0.5 | 1 | 50,000 | 2,700 | 1.0 | 0.100 | 50,000 | 2,480 | 1.0 | 0.075 | 50,000 | 2,230 | 1.0 | 0.050 | 28,700 | 1,160 | 1.0 | 0.050 |
| 0.75 | 1.5 | 38,200 | 3,300 | 1.5 | 0.150 | 38,200 | 3,030 | 1.5 | 0.113 | 38,200 | 2,720 | 1.5 | 0.075 | 19,100 | 1,240 | 1.5 | 0.075 |
| 1 | 2 | 28,700 | 3,510 | 2.0 | 0.200 | 28,700 | 3,220 | 2.0 | 0.150 | 28,700 | 2,900 | 2.0 | 0.100 | 14,300 | 1,310 | 2.0 | 0.100 |
| 1.25 | 2.5 | 22,900 | 3,570 | 2.5 | 0.250 | 22,900 | 3,270 | 2.5 | 0.188 | 22,900 | 2,940 | 2.5 | 0.125 | 11,500 | 1,340 | 2.5 | 0.125 |
| 1.5 | 3 | 19,100 | 3,630 | 3.0 | 0.300 | 19,100 | 3,330 | 3.0 | 0.225 | 19,100 | 3,000 | 3.0 | 0.150 | 9,600 | 1,370 | 3.0 | 0.150 |
| 1.75 | 3.5 | 16,400 | 3,760 | 3.5 | 0.350 | 16,400 | 3,450 | 3.5 | 0.263 | 16,400 | 3,100 | 3.5 | 0.175 | 8,200 | 1,410 | 3.5 | 0.175 |
| 2 | 4 | 14,300 | 3,830 | 4.0 | 0.400 | 14,300 | 3,510 | 4.0 | 0.300 | 14,300 | 3,160 | 4.0 | 0.200 | 7,200 | 1,450 | 4.0 | 0.200 |
| 2.5 | 5 | 11,500 | 4,020 | 5.0 | 0.500 | 11,500 | 3,680 | 5.0 | 0.375 | 11,500 | 3,310 | 5.0 | 0.250 | 5,700 | 1,490 | 5.0 | 0.250 |
| 3 | 6 | 9,600 | 4,150 | 6.0 | 0.600 | 9,600 | 3,800 | 6.0 | 0.450 | 9,600 | 3,420 | 6.0 | 0.300 | 4,800 | 1,560 | 6.0 | 0.300 |
| 4 | 8 | 7,200 | 4,350 | 8.0 | 0.800 | 7,200 | 3,990 | 8.0 | 0.600 | 7,200 | 3,590 | 8.0 | 0.400 | 3,600 | 1,630 | 8.0 | 0.400 |
| 5 | 10 | 5,700 | 4,510 | 10.0 | 1.000 | 5,700 | 4,140 | 10.0 | 0.750 | 5,700 | 3,720 | 10.0 | 0.500 | 2,900 | 1,720 | 10.0 | 0.500 |
| 6 | 12 | 4,800 | 4,350 | 12.0 | 1.200 | 4,800 | 3,990 | 12.0 | 0.900 | 4,800 | 3,590 | 12.0 | 0.600 | 2,400 | 1,630 | 12.0 | 0.600 |
| 8 | 16 | 3,600 | 4,150 | 16.0 | 1.600 | 3,600 | 3,800 | 16.0 | 1.200 | 3,600 | 3,420 | 16.0 | 0.800 | 1,800 | 1,560 | 16.0 | 0.800 |
| 10 | 20 | 2,900 | 3,670 | 20.0 | 2.000 | 2,900 | 3,370 | 20.0 | 1.500 | 2,900 | 3,030 | 20.0 | 1.000 | 1,400 | 1,330 | 20.0 | 1.000 |

| 被削材 Work material | | 焼入れ鋼 Hardened steels (50～55HRC) HPM38, SKD61 | | | | 焼入れ鋼 Hardened steels (55～65HRC) SKD11, YXR3, YXR33 | | | |
|---|---|---|---|---|---|---|---|---|---|
| ボール半径 RE Ball radius (mm) | 外径 DC Tool dia. (mm) | 回転数 n min-1 | 送り速度 Vf mm/min | ap mm | ae mm | 回転数 n min-1 | 送り速度 Vf mm/min | ap mm | ae mm |
| 0.5 | 1 | 50,000 | 1,870 | 1.0 | 0.050 | 44,600 | 1,210 | 1.0 | 0.02 |
| 0.75 | 1.5 | 34,000 | 2,030 | 1.5 | 0.075 | 29,700 | 1,290 | 1.5 | 0.03 |
| 1 | 2 | 25,500 | 2,160 | 2.0 | 0.100 | 22,300 | 1,380 | 2.0 | 0.04 |
| 1.25 | 2.5 | 20,400 | 2,200 | 2.5 | 0.125 | 17,800 | 1,400 | 2.5 | 0.05 |
| 1.5 | 3 | 17,000 | 2,240 | 3.0 | 0.150 | 14,900 | 1,430 | 3.0 | 0.06 |
| 1.75 | 3.5 | 14,600 | 2,320 | 3.5 | 0.175 | 12,700 | 1,470 | 3.5 | 0.07 |
| 2 | 4 | 12,700 | 2,350 | 4.0 | 0.200 | 11,100 | 1,500 | 4.0 | 0.08 |
| 2.5 | 5 | 10,200 | 2,460 | 5.0 | 0.250 | 8,900 | 1,570 | 5.0 | 0.10 |
| 3 | 6 | 8,500 | 2,540 | 6.0 | 0.300 | 7,400 | 1,610 | 6.0 | 0.12 |
| 4 | 8 | 6,400 | 2,680 | 8.0 | 0.400 | 5,600 | 1,710 | 8.0 | 0.16 |
| 5 | 10 | 5,100 | 2,790 | 10.0 | 0.500 | 4,500 | 1,800 | 10.0 | 0.20 |
| 6 | 12 | 4,200 | 2,640 | 12.0 | 0.600 | 3,700 | 1,690 | 12.0 | 0.24 |
| 8 | 16 | 3,200 | 2,550 | 16.0 | 0.800 | 2,800 | 1,630 | 16.0 | 0.32 |
| 10 | 20 | 2,500 | 2,190 | 20.0 | 1.000 | 2,200 | 1,410 | 20.0 | 0.40 |

| | ～62HRC | 62～65HRC |
|---|---|---|
| ヘリカル穴加工時の傾斜角 Slant angle for helical boring | 1° | 0.5° |
| ヘリカル穴加工時の送り速度 Feed rate for helical boring | 側面加工条件の 70% 70% of side cutting conditions | |

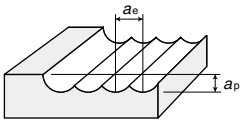
※ヘリカル穴加工時の穴径は、工具径の1.6倍以上2.0倍未満に設定ください。
※ヘリカル穴加工時の最大深さは工具径以下（1DC以下）に設定ください。
※Set the hole diameter for helical boring to between 1.6 and 2.0 times the tool diameter.
※Set the maximum depth for helical boring to the tool diameter or smaller (≤ 1DC).

【注意】 ①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②できるだけ高剛性、高精度の機械をご使用ください。
③この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。

【Note】 ① Use the appropriate coolant for the work material and machining shape.
② Use as highly rigid and accurate machine as possible.
③ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

## EMBPE-ATH

ペンシルタイプ
Pencil type




〈荒加工〉 Roughing

| 被削材 Work material | | | 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) S50C, S55C | | | | 工具鋼 Tool steels (25～40HRC) HPM7, SCM440, SKD61, SKT4 | | | | プリハードン鋼・焼入れ鋼 Pre-hardened steels, Hardened steels (40～50HRC) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | 快削材料 Free-cutting materials SKD61, CENA1, HPM-MAGIC, NAK80 | | | | 高靭性材料 High-toughness materials DAC-MAGIC, DAC55, DH31 | | | |
| ボール半径 RE Ball radius (mm) | 外径 DC Tool dia. (mm) | 首下長 LU Under neck length (mm) | 回転数 n min-1 | 送り速度 Vf mm/min | ap mm | ae mm | 回転数 n min-1 | 送り速度 Vf mm/min | ap mm | ae mm | 回転数 n min-1 | 送り速度 Vf mm/min | ap mm | ae mm | 回転数 n min-1 | 送り速度 Vf mm/min | ap mm | ae mm |
| 0.5 | 1 | 6 | 50,000 | 2,160 | 0.090 | 0.270 | 50,000 | 2,160 | 0.090 | 0.270 | 48,000 | 1,940 | 0.090 | 0.270 | 26,700 | 1,080 | 0.081 | 0.243 |
| | | 8 | 50,000 | 2,160 | 0.090 | 0.270 | 50,000 | 2,160 | 0.090 | 0.270 | 48,000 | 1,940 | 0.090 | 0.270 | 26,700 | 1,080 | 0.081 | 0.243 |
| | | 10 | 50,000 | 2,160 | 0.080 | 0.240 | 48,700 | 2,100 | 0.080 | 0.240 | 43,900 | 1,780 | 0.080 | 0.240 | 24,400 | 990 | 0.072 | 0.216 |
| | | 12 | 49,700 | 1,910 | 0.070 | 0.210 | 44,700 | 1,720 | 0.070 | 0.210 | 40,200 | 1,450 | 0.070 | 0.210 | 22,400 | 810 | 0.063 | 0.189 |
| | | 14 | 44,600 | 1,710 | 0.060 | 0.180 | 40,100 | 1,540 | 0.060 | 0.180 | 36,100 | 1,300 | 0.060 | 0.180 | 20,100 | 720 | 0.054 | 0.162 |
| | | 16 | 44,600 | 1,710 | 0.060 | 0.180 | 40,100 | 1,540 | 0.060 | 0.180 | 36,100 | 1,300 | 0.060 | 0.180 | 20,100 | 720 | 0.054 | 0.162 |
| | | 18 | 40,100 | 1,540 | 0.050 | 0.150 | 36,100 | 1,390 | 0.050 | 0.150 | 32,500 | 1,170 | 0.050 | 0.150 | 18,100 | 650 | 0.045 | 0.135 |
| | | 20 | 40,100 | 1,540 | 0.050 | 0.150 | 36,100 | 1,390 | 0.050 | 0.150 | 32,500 | 1,170 | 0.050 | 0.150 | 18,100 | 650 | 0.045 | 0.135 |
| | | 22 | 35,000 | 1,340 | 0.040 | 0.120 | 31,500 | 1,210 | 0.040 | 0.120 | 28,400 | 1,020 | 0.040 | 0.120 | 15,800 | 570 | 0.036 | 0.108 |
| | | 24 | 30,600 | 1,180 | 0.030 | 0.090 | 27,500 | 1,060 | 0.030 | 0.090 | 24,800 | 890 | 0.030 | 0.090 | 13,800 | 500 | 0.027 | 0.081 |
| | | 26 | 30,600 | 1,180 | 0.030 | 0.090 | 27,500 | 1,060 | 0.030 | 0.090 | 24,800 | 890 | 0.030 | 0.090 | 13,800 | 500 | 0.027 | 0.081 |
| | | 28 | 25,500 | 860 | 0.020 | 0.060 | 22,900 | 770 | 0.020 | 0.060 | 20,600 | 650 | 0.020 | 0.060 | 11,500 | 360 | 0.018 | 0.054 |
| | | 30 | 25,500 | 860 | 0.020 | 0.060 | 22,900 | 770 | 0.020 | 0.060 | 20,600 | 650 | 0.020 | 0.060 | 11,500 | 360 | 0.018 | 0.054 |
| | | 32 | 21,000 | 710 | 0.010 | 0.030 | 18,900 | 640 | 0.010 | 0.030 | 17,000 | 540 | 0.010 | 0.030 | 9,500 | 300 | 0.009 | 0.027 |
| | | 34 | 15,900 | 530 | 0.005 | 0.015 | 14,300 | 480 | 0.005 | 0.015 | 12,900 | 410 | 0.005 | 0.015 | 7,200 | 230 | 0.005 | 0.014 |
| | | 36 | 15,900 | 530 | 0.005 | 0.015 | 14,300 | 480 | 0.005 | 0.015 | 12,900 | 410 | 0.005 | 0.015 | 7,200 | 230 | 0.005 | 0.014 |
| 0.75 | 1.5 | 8 | 39,500 | 2,670 | 0.135 | 0.405 | 35,500 | 2,400 | 0.135 | 0.405 | 32,000 | 2,070 | 0.135 | 0.405 | 17,800 | 1,150 | 0.122 | 0.365 |
| | | 10 | 39,500 | 2,670 | 0.135 | 0.405 | 35,500 | 2,400 | 0.135 | 0.405 | 32,000 | 2,070 | 0.135 | 0.405 | 17,800 | 1,150 | 0.122 | 0.365 |
| | | 14 | 36,100 | 2,440 | 0.120 | 0.360 | 32,500 | 2,190 | 0.120 | 0.360 | 29,200 | 1,890 | 0.120 | 0.360 | 16,200 | 1,050 | 0.108 | 0.324 |
| | | 16 | 33,100 | 1,990 | 0.105 | 0.315 | 29,800 | 1,790 | 0.105 | 0.315 | 26,800 | 1,540 | 0.105 | 0.315 | 14,900 | 860 | 0.095 | 0.284 |
| | | 18 | 33,100 | 1,990 | 0.105 | 0.315 | 29,800 | 1,790 | 0.105 | 0.315 | 26,800 | 1,540 | 0.105 | 0.315 | 14,900 | 860 | 0.095 | 0.284 |
| | | 20 | 29,700 | 1,780 | 0.090 | 0.270 | 26,800 | 1,610 | 0.090 | 0.270 | 24,100 | 1,390 | 0.090 | 0.270 | 13,400 | 770 | 0.081 | 0.243 |
| | | 22 | 29,700 | 1,780 | 0.090 | 0.270 | 26,800 | 1,610 | 0.090 | 0.270 | 24,100 | 1,390 | 0.090 | 0.270 | 13,400 | 770 | 0.081 | 0.243 |
| | | 24 | 29,700 | 1,780 | 0.090 | 0.270 | 26,800 | 1,610 | 0.090 | 0.270 | 24,100 | 1,390 | 0.090 | 0.270 | 13,400 | 770 | 0.081 | 0.243 |
| | | 26 | 26,800 | 1,610 | 0.075 | 0.225 | 24,100 | 1,450 | 0.075 | 0.225 | 21,700 | 1,250 | 0.075 | 0.225 | 12,000 | 690 | 0.068 | 0.203 |
| | | 28 | 26,800 | 1,610 | 0.075 | 0.225 | 24,100 | 1,450 | 0.075 | 0.225 | 21,700 | 1,250 | 0.075 | 0.225 | 12,000 | 690 | 0.068 | 0.203 |
| | | 30 | 26,800 | 1,610 | 0.075 | 0.225 | 24,100 | 1,450 | 0.075 | 0.225 | 21,700 | 1,250 | 0.075 | 0.225 | 12,000 | 690 | 0.068 | 0.203 |
| | | 32 | 23,400 | 1,400 | 0.060 | 0.180 | 21,000 | 1,260 | 0.060 | 0.180 | 18,900 | 1,090 | 0.060 | 0.180 | 10,500 | 600 | 0.054 | 0.162 |
| | | 34 | 23,400 | 1,400 | 0.060 | 0.180 | 21,000 | 1,260 | 0.060 | 0.180 | 18,900 | 1,090 | 0.060 | 0.180 | 10,500 | 600 | 0.054 | 0.162 |
| | | 36 | 20,400 | 1,220 | 0.045 | 0.135 | 18,300 | 1,100 | 0.045 | 0.135 | 16,500 | 950 | 0.045 | 0.135 | 9,200 | 530 | 0.041 | 0.122 |
| | | 38 | 20,400 | 1,220 | 0.045 | 0.135 | 18,300 | 1,100 | 0.045 | 0.135 | 16,500 | 950 | 0.045 | 0.135 | 9,200 | 530 | 0.041 | 0.122 |
| | | 40 | 17,000 | 890 | 0.030 | 0.090 | 15,300 | 800 | 0.030 | 0.090 | 13,800 | 700 | 0.030 | 0.090 | 7,600 | 380 | 0.027 | 0.081 |
| 1 | 2 | 10 | 31,800 | 3,430 | 0.200 | 0.600 | 28,700 | 3,100 | 0.200 | 0.600 | 25,800 | 2,630 | 0.200 | 0.600 | 14,300 | 1,460 | 0.180 | 0.540 |
| | | 16 | 29,600 | 2,880 | 0.180 | 0.540 | 26,700 | 2,600 | 0.180 | 0.540 | 24,000 | 2,200 | 0.180 | 0.540 | 13,300 | 1,220 | 0.162 | 0.486 |
| | | 20 | 27,100 | 2,630 | 0.120 | 0.360 | 24,400 | 2,370 | 0.120 | 0.360 | 21,900 | 2,010 | 0.120 | 0.360 | 12,200 | 1,120 | 0.108 | 0.324 |
| | | 24 | 24,800 | 2,140 | 0.110 | 0.330 | 22,400 | 1,940 | 0.110 | 0.330 | 20,100 | 1,640 | 0.110 | 0.330 | 11,200 | 910 | 0.099 | 0.297 |
| | | 30 | 22,300 | 1,930 | 0.100 | 0.300 | 20,100 | 1,740 | 0.100 | 0.300 | 18,100 | 1,480 | 0.100 | 0.300 | 10,000 | 820 | 0.090 | 0.270 |
| | | 36 | 20,100 | 1,740 | 0.080 | 0.240 | 18,100 | 1,560 | 0.080 | 0.240 | 16,300 | 1,330 | 0.080 | 0.240 | 9,000 | 730 | 0.072 | 0.216 |
| | | 40 | 20,100 | 1,740 | 0.080 | 0.240 | 18,100 | 1,560 | 0.080 | 0.240 | 16,300 | 1,330 | 0.080 | 0.240 | 9,000 | 730 | 0.072 | 0.216 |
| | | 46 | 17,500 | 1,510 | 0.060 | 0.180 | 15,800 | 1,370 | 0.060 | 0.180 | 14,200 | 1,160 | 0.060 | 0.180 | 7,900 | 640 | 0.054 | 0.162 |
| | | 60 | 12,700 | 960 | 0.044 | 0.132 | 11,500 | 870 | 0.044 | 0.132 | 10,300 | 740 | 0.044 | 0.132 | 5,700 | 410 | 0.040 | 0.119 |
| 1.25 | 2.5 | 16 | 23,700 | 2,880 | 0.225 | 0.675 | 21,300 | 2,590 | 0.225 | 0.675 | 19,200 | 2,230 | 0.225 | 0.675 | 10,700 | 1,240 | 0.203 | 0.608 |
| | | 24 | 21,700 | 2,640 | 0.150 | 0.450 | 19,500 | 2,370 | 0.150 | 0.450 | 17,500 | 2,030 | 0.150 | 0.450 | 9,700 | 1,130 | 0.135 | 0.405 |
| | | 30 | 19,900 | 2,150 | 0.138 | 0.413 | 17,900 | 1,930 | 0.138 | 0.413 | 16,100 | 1,660 | 0.138 | 0.413 | 8,900 | 920 | 0.124 | 0.371 |
| | | 40 | 17,800 | 1,920 | 0.125 | 0.375 | 16,100 | 1,740 | 0.125 | 0.375 | 14,400 | 1,490 | 0.125 | 0.375 | 8,000 | 830 | 0.113 | 0.338 |
| | | 50 | 16,100 | 1,740 | 0.100 | 0.300 | 14,400 | 1,560 | 0.100 | 0.300 | 13,000 | 1,340 | 0.100 | 0.300 | 7,200 | 740 | 0.090 | 0.270 |
| 1.5 | 3 | 16 | 19,700 | 2,930 | 0.270 | 0.810 | 17,800 | 2,640 | 0.270 | 0.810 | 16,000 | 2,250 | 0.270 | 0.810 | 8,900 | 1,250 | 0.243 | 0.729 |
| | | 20 | 19,700 | 2,930 | 0.270 | 0.810 | 17,800 | 2,640 | 0.270 | 0.810 | 16,000 | 2,250 | 0.270 | 0.810 | 8,900 | 1,250 | 0.243 | 0.729 |
| | | 24 | 19,700 | 2,930 | 0.270 | 0.810 | 17,800 | 2,640 | 0.270 | 0.810 | 16,000 | 2,250 | 0.270 | 0.810 | 8,900 | 1,250 | 0.243 | 0.729 |
| | | 30 | 18,000 | 2,670 | 0.180 | 0.540 | 16,200 | 2,410 | 0.180 | 0.540 | 14,600 | 2,050 | 0.180 | 0.540 | 8,100 | 1,140 | 0.162 | 0.486 |
| | | 40 | 14,900 | 1,970 | 0.150 | 0.450 | 13,400 | 1,770 | 0.150 | 0.450 | 12,000 | 1,500 | 0.150 | 0.450 | 6,700 | 840 | 0.135 | 0.405 |
| | | 50 | 13,400 | 1,770 | 0.120 | 0.360 | 12,000 | 1,580 | 0.120 | 0.360 | 10,800 | 1,350 | 0.120 | 0.360 | 6,000 | 750 | 0.108 | 0.324 |
| | | 60 | 13,400 | 1,770 | 0.120 | 0.360 | 12,000 | 1,580 | 0.120 | 0.360 | 10,800 | 1,350 | 0.120 | 0.360 | 6,000 | 750 | 0.108 | 0.324 |

| 焼入れ鋼 Hardened steels (50～55HRC) HPM38, SKD61 | | | | 焼入れ鋼 Hardened steels (55～65HRC) SKD11, YXR3, YXR33 | | | | 被削材 Work material | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | $a_p$ mm | $a_e$ mm | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | $a_p$ mm | $a_e$ mm | 首下長 LU Under neck length (mm) | 外径 DC Tool dia. (mm) | ボール半径 RE Ball radius (mm) |
| 42,600 | 1,380 | 0.063 | 0.189 | 37,300 | 910 | 0.045 | 0.135 | 6 | 1 | 0.5 |
| 42,600 | 1,380 | 0.063 | 0.189 | 37,300 | 910 | 0.045 | 0.135 | 8 | | |
| 39,000 | 1,260 | 0.056 | 0.168 | 34,100 | 830 | 0.040 | 0.120 | 10 | | |
| 35,800 | 1,030 | 0.049 | 0.147 | 31,300 | 680 | 0.035 | 0.105 | 12 | | |
| 32,100 | 920 | 0.042 | 0.126 | 28,100 | 610 | 0.030 | 0.090 | 14 | | |
| 32,100 | 920 | 0.042 | 0.126 | 28,100 | 610 | 0.030 | 0.090 | 16 | | |
| 28,900 | 830 | 0.035 | 0.105 | 25,300 | 550 | 0.025 | 0.075 | 18 | | |
| 28,900 | 830 | 0.035 | 0.105 | 25,300 | 550 | 0.025 | 0.075 | 20 | | |
| 25,200 | 730 | 0.028 | 0.084 | 22,100 | 480 | 0.020 | 0.060 | 22 | | |
| 22,000 | 630 | 0.021 | 0.063 | 19,300 | 420 | 0.015 | 0.045 | 24 | | |
| 22,000 | 630 | 0.021 | 0.063 | 19,300 | 420 | 0.015 | 0.045 | 26 | | |
| 18,300 | 460 | 0.014 | 0.042 | 16,100 | 300 | 0.010 | 0.030 | 28 | | |
| 18,300 | 460 | 0.014 | 0.042 | 16,100 | 300 | 0.010 | 0.030 | 30 | | |
| 15,100 | 380 | 0.007 | 0.021 | 13,200 | 250 | 0.005 | 0.015 | 32 | | |
| 11,500 | 290 | 0.004 | 0.011 | 10,000 | 190 | 0.003 | 0.008 | 34 | | |
| 11,500 | 290 | 0.004 | 0.011 | 10,000 | 190 | 0.003 | 0.008 | 36 | | |
| 28,400 | 1,530 | 0.095 | 0.284 | 24,900 | 1,010 | 0.068 | 0.203 | 8 | 1.5 | 0.75 |
| 28,400 | 1,530 | 0.095 | 0.284 | 24,900 | 1,010 | 0.068 | 0.203 | 10 | | |
| 26,000 | 1,400 | 0.084 | 0.252 | 22,700 | 920 | 0.060 | 0.180 | 14 | | |
| 23,800 | 1,140 | 0.074 | 0.221 | 20,900 | 750 | 0.053 | 0.158 | 16 | | |
| 23,800 | 1,140 | 0.074 | 0.221 | 20,900 | 750 | 0.053 | 0.158 | 18 | | |
| 21,400 | 1,030 | 0.063 | 0.189 | 18,700 | 670 | 0.045 | 0.135 | 20 | | |
| 21,400 | 1,030 | 0.063 | 0.189 | 18,700 | 670 | 0.045 | 0.135 | 22 | | |
| 21,400 | 1,030 | 0.063 | 0.189 | 18,700 | 670 | 0.045 | 0.135 | 24 | | |
| 19,300 | 930 | 0.053 | 0.158 | 16,900 | 610 | 0.038 | 0.113 | 26 | | |
| 19,300 | 930 | 0.053 | 0.158 | 16,900 | 610 | 0.038 | 0.113 | 28 | | |
| 19,300 | 930 | 0.053 | 0.158 | 16,900 | 610 | 0.038 | 0.113 | 30 | | |
| 16,800 | 810 | 0.042 | 0.126 | 14,700 | 530 | 0.030 | 0.090 | 32 | | |
| 16,800 | 810 | 0.042 | 0.126 | 14,700 | 530 | 0.030 | 0.090 | 34 | | |
| 14,700 | 710 | 0.032 | 0.095 | 12,800 | 460 | 0.023 | 0.068 | 36 | | |
| 14,700 | 710 | 0.032 | 0.095 | 12,800 | 460 | 0.023 | 0.068 | 38 | | |
| 12,200 | 510 | 0.021 | 0.063 | 10,700 | 340 | 0.015 | 0.045 | 40 | | |
| 22,900 | 1,920 | 0.140 | 0.420 | 20,100 | 1,270 | 0.100 | 0.300 | 10 | 2 | 1 |
| 21,300 | 1,610 | 0.126 | 0.378 | 18,700 | 1,060 | 0.090 | 0.270 | 16 | | |
| 19,500 | 1,470 | 0.084 | 0.252 | 17,100 | 970 | 0.060 | 0.180 | 20 | | |
| 17,900 | 1,200 | 0.077 | 0.231 | 15,600 | 790 | 0.055 | 0.165 | 24 | | |
| 16,100 | 1,080 | 0.070 | 0.210 | 14,000 | 710 | 0.050 | 0.150 | 30 | | |
| 14,400 | 970 | 0.056 | 0.168 | 12,600 | 640 | 0.040 | 0.120 | 36 | | |
| 14,400 | 970 | 0.056 | 0.168 | 12,600 | 640 | 0.040 | 0.120 | 40 | | |
| 12,600 | 850 | 0.042 | 0.126 | 11,000 | 550 | 0.030 | 0.090 | 46 | | |
| 9,200 | 540 | 0.031 | 0.092 | 8,000 | 350 | 0.022 | 0.066 | 60 | | |
| 17,100 | 1,660 | 0.158 | 0.473 | 14,900 | 1,090 | 0.113 | 0.338 | 16 | 2.5 | 1.25 |
| 15,600 | 1,520 | 0.105 | 0.315 | 13,600 | 990 | 0.075 | 0.225 | 24 | | |
| 14,300 | 1,240 | 0.096 | 0.289 | 12,500 | 810 | 0.069 | 0.206 | 30 | | |
| 12,800 | 1,110 | 0.088 | 0.263 | 11,200 | 730 | 0.063 | 0.188 | 40 | | |
| 11,600 | 1,000 | 0.070 | 0.210 | 10,100 | 650 | 0.050 | 0.150 | 50 | | |
| 14,200 | 1,690 | 0.189 | 0.567 | 12,400 | 1,100 | 0.135 | 0.405 | 16 | 3 | 1.5 |
| 14,200 | 1,690 | 0.189 | 0.567 | 12,400 | 1,100 | 0.135 | 0.405 | 20 | | |
| 14,200 | 1,690 | 0.189 | 0.567 | 12,400 | 1,100 | 0.135 | 0.405 | 24 | | |
| 13,000 | 1,540 | 0.126 | 0.378 | 11,400 | 1,020 | 0.090 | 0.270 | 30 | | |
| 10,700 | 1,130 | 0.105 | 0.315 | 9,400 | 740 | 0.075 | 0.225 | 40 | | |
| 9,600 | 1,010 | 0.084 | 0.252 | 8,400 | 670 | 0.060 | 0.180 | 50 | | |
| 9,600 | 1,010 | 0.084 | 0.252 | 8,400 | 670 | 0.060 | 0.180 | 60 | | |

**【注意】**

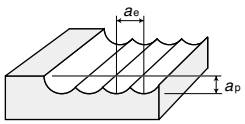
ご使用にあたっては、A118ページの表下の項目と注意を参照してください。

**【Note】**

Upon usage, please refer to comments and notes below table on page A118.

# Epoch Mega Feed Ball Evolution
# エポックメガフィードボール エボリューション

## EMBPE-ATH
ペンシルタイプ
Pencil type




〈荒加工〉 Roughing

| 被削材 Work material | | | 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) S50C, S55C | | | | 工具鋼 Tool steels (25～40HRC) HPM7, SCM440, SKD61, SKT4 | | | | プリハードン鋼・焼入れ鋼 Pre-hardened steels, Hardened steels (40～50HRC) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | 快削材料 Free-cutting materials SKD61, CENA1, HPM-MAGIC, NAK80 | | | | 高靭性材料 High-toughness materials DAC-MAGIC, DAC55, DH31 | | | |
| ボール半径 RE Ball radius (mm) | 外径 DC Tool dia. (mm) | 首下長 LU Under neck length (mm) | 回転数 n min-1 | 送り速度 Vf mm/min | ap mm | ae mm | 回転数 n min-1 | 送り速度 Vf mm/min | ap mm | ae mm | 回転数 n min-1 | 送り速度 Vf mm/min | ap mm | ae mm | 回転数 n min-1 | 送り速度 Vf mm/min | ap mm | ae mm |
| 1.75 | 3.5 | 20 | 16,900 | 3,060 | 0.315 | 0.945 | 15,200 | 2,750 | 0.315 | 0.945 | 13,700 | 2,330 | 0.315 | 0.945 | 7,600 | 1,290 | 0.284 | 0.851 |
| | | 30 | 15,500 | 2,800 | 0.210 | 0.630 | 13,900 | 2,510 | 0.210 | 0.630 | 12,500 | 2,130 | 0.210 | 0.630 | 7,000 | 1,190 | 0.189 | 0.567 |
| | | 40 | 14,200 | 2,280 | 0.193 | 0.578 | 12,800 | 2,060 | 0.193 | 0.578 | 11,500 | 1,740 | 0.193 | 0.578 | 6,400 | 970 | 0.173 | 0.520 |
| | | 50 | 12,700 | 2,040 | 0.175 | 0.525 | 11,500 | 1,850 | 0.175 | 0.525 | 10,300 | 1,560 | 0.175 | 0.525 | 5,700 | 860 | 0.158 | 0.473 |
| | | 60 | 11,500 | 1,850 | 0.140 | 0.420 | 10,300 | 1,660 | 0.140 | 0.420 | 9,300 | 1,410 | 0.140 | 0.420 | 5,200 | 790 | 0.126 | 0.378 |
| 2 | 4 | 20 | 15,900 | 3,720 | 0.400 | 1.200 | 14,300 | 3,350 | 0.400 | 1.200 | 12,900 | 2,860 | 0.400 | 1.200 | 7,200 | 1,600 | 0.360 | 1.080 |
| | | 30 | 14,800 | 3,120 | 0.300 | 0.900 | 13,300 | 2,800 | 0.300 | 0.900 | 12,000 | 2,400 | 0.300 | 0.900 | 6,700 | 1,340 | 0.270 | 0.810 |
| | | 40 | 13,500 | 2,840 | 0.260 | 0.780 | 12,200 | 2,570 | 0.260 | 0.780 | 11,000 | 2,200 | 0.260 | 0.780 | 6,100 | 1,220 | 0.234 | 0.702 |
| | | 50 | 12,400 | 2,320 | 0.180 | 0.540 | 11,200 | 2,100 | 0.180 | 0.540 | 10,100 | 1,790 | 0.180 | 0.540 | 5,600 | 990 | 0.162 | 0.486 |
| | | 60 | 11,100 | 2,080 | 0.120 | 0.360 | 10,000 | 1,870 | 0.120 | 0.360 | 9,000 | 1,600 | 0.120 | 0.360 | 5,000 | 890 | 0.108 | 0.324 |
| | | 70 | 10,000 | 1,870 | 0.100 | 0.300 | 9,000 | 1,680 | 0.100 | 0.300 | 8,100 | 1,440 | 0.100 | 0.300 | 4,500 | 800 | 0.090 | 0.270 |
| | | 80 | 10,000 | 1,870 | 0.100 | 0.300 | 9,000 | 1,680 | 0.100 | 0.300 | 8,100 | 1,440 | 0.100 | 0.300 | 4,500 | 800 | 0.090 | 0.270 |
| 2.5 | 5 | 30 | 11,800 | 3,250 | 0.375 | 1.125 | 10,700 | 2,950 | 0.375 | 1.125 | 9,600 | 2,490 | 0.375 | 1.125 | 5,300 | 1,370 | 0.338 | 1.013 |
| | | 40 | 11,800 | 3,250 | 0.375 | 1.125 | 10,700 | 2,950 | 0.375 | 1.125 | 9,600 | 2,490 | 0.375 | 1.125 | 5,300 | 1,370 | 0.338 | 1.013 |
| | | 50 | 10,800 | 2,970 | 0.325 | 0.975 | 9,700 | 2,670 | 0.325 | 0.975 | 8,800 | 2,280 | 0.325 | 0.975 | 4,900 | 1,270 | 0.293 | 0.878 |
| | | 60 | 9,900 | 2,420 | 0.225 | 0.675 | 8,900 | 2,180 | 0.225 | 0.675 | 8,000 | 1,840 | 0.225 | 0.675 | 4,500 | 1,040 | 0.203 | 0.608 |
| | | 70 | 8,900 | 2,180 | 0.150 | 0.450 | 8,000 | 1,960 | 0.150 | 0.450 | 7,200 | 1,660 | 0.150 | 0.450 | 4,000 | 920 | 0.135 | 0.405 |
| | | 80 | 8,900 | 2,180 | 0.150 | 0.450 | 8,000 | 1,960 | 0.150 | 0.450 | 7,200 | 1,660 | 0.150 | 0.450 | 4,000 | 920 | 0.135 | 0.405 |
| 3 | 6 | 30 | 10,600 | 4,010 | 0.600 | 1.800 | 9,600 | 3,630 | 0.600 | 1.800 | 8,600 | 3,070 | 0.600 | 1.800 | 4,800 | 1,710 | 0.540 | 1.620 |
| | | 40 | 9,900 | 3,370 | 0.420 | 1.260 | 8,900 | 3,030 | 0.420 | 1.260 | 8,000 | 2,570 | 0.420 | 1.260 | 4,400 | 1,410 | 0.378 | 1.134 |
| | | 50 | 9,000 | 3,060 | 0.300 | 0.900 | 8,100 | 2,760 | 0.300 | 0.900 | 7,300 | 2,350 | 0.300 | 0.900 | 4,100 | 1,320 | 0.270 | 0.810 |
| | | 60 | 9,000 | 3,060 | 0.300 | 0.900 | 8,100 | 2,760 | 0.300 | 0.900 | 7,300 | 2,350 | 0.300 | 0.900 | 4,100 | 1,320 | 0.270 | 0.810 |
| | | 70 | 8,300 | 2,510 | 0.240 | 0.720 | 7,500 | 2,270 | 0.240 | 0.720 | 6,700 | 1,910 | 0.240 | 0.720 | 3,700 | 1,060 | 0.216 | 0.648 |
| | | 80 | 7,400 | 2,240 | 0.180 | 0.540 | 6,700 | 2,030 | 0.180 | 0.540 | 6,000 | 1,710 | 0.180 | 0.540 | 3,300 | 940 | 0.162 | 0.486 |
| | | 100 | 6,700 | 2,030 | 0.120 | 0.360 | 6,000 | 1,810 | 0.120 | 0.360 | 5,400 | 1,540 | 0.120 | 0.360 | 3,000 | 860 | 0.108 | 0.324 |
| | | 120 | 6,700 | 2,030 | 0.120 | 0.360 | 6,000 | 1,810 | 0.120 | 0.360 | 5,400 | 1,540 | 0.120 | 0.360 | 3,000 | 860 | 0.108 | 0.324 |
| 4 | 8 | 40 | 8,000 | 4,220 | 0.800 | 2.400 | 7,200 | 3,800 | 0.800 | 2.400 | 6,400 | 3,190 | 0.800 | 2.400 | 3,600 | 1,790 | 0.720 | 2.160 |
| | | 50 | 7,400 | 3,520 | 0.560 | 1.680 | 6,700 | 3,180 | 0.560 | 1.680 | 6,000 | 2,690 | 0.560 | 1.680 | 3,300 | 1,480 | 0.504 | 1.512 |
| | | 60 | 7,400 | 3,520 | 0.560 | 1.680 | 6,700 | 3,180 | 0.560 | 1.680 | 6,000 | 2,690 | 0.560 | 1.680 | 3,300 | 1,480 | 0.504 | 1.512 |
| | | 70 | 6,800 | 3,230 | 0.400 | 1.200 | 6,100 | 2,900 | 0.400 | 1.200 | 5,500 | 2,470 | 0.400 | 1.200 | 3,000 | 1,340 | 0.360 | 1.080 |
| | | 80 | 6,800 | 3,230 | 0.400 | 1.200 | 6,100 | 2,900 | 0.400 | 1.200 | 5,500 | 2,470 | 0.400 | 1.200 | 3,000 | 1,340 | 0.360 | 1.080 |
| | | 100 | 6,200 | 2,620 | 0.320 | 0.960 | 5,600 | 2,370 | 0.320 | 0.960 | 5,000 | 1,990 | 0.320 | 0.960 | 2,800 | 1,120 | 0.288 | 0.864 |
| | | 120 | 5,600 | 2,370 | 0.240 | 0.720 | 5,000 | 2,110 | 0.240 | 0.720 | 4,500 | 1,790 | 0.240 | 0.720 | 2,500 | 1,000 | 0.216 | 0.648 |
| 5 | 10 | 50 | 6,400 | 4,440 | 1.000 | 3.000 | 5,700 | 3,950 | 1.000 | 3.000 | 5,200 | 3,400 | 1.000 | 3.000 | 3,200 | 2,090 | 0.900 | 2.700 |
| | | 60 | 5,900 | 3,680 | 0.700 | 2.100 | 5,300 | 3,310 | 0.700 | 2.100 | 4,800 | 2,830 | 0.700 | 2.100 | 3,000 | 1,770 | 0.630 | 1.890 |
| | | 75 | 5,900 | 3,680 | 0.700 | 2.100 | 5,300 | 3,310 | 0.700 | 2.100 | 4,800 | 2,830 | 0.700 | 2.100 | 3,000 | 1,770 | 0.630 | 1.890 |
| | | 80 | 5,400 | 3,370 | 0.500 | 1.500 | 4,900 | 3,060 | 0.500 | 1.500 | 4,400 | 2,590 | 0.500 | 1.500 | 2,700 | 1,590 | 0.450 | 1.350 |
| | | 100 | 5,400 | 3,370 | 0.500 | 1.500 | 4,900 | 3,060 | 0.500 | 1.500 | 4,400 | 2,590 | 0.500 | 1.500 | 2,700 | 1,590 | 0.450 | 1.350 |
| | | 120 | 5,000 | 2,770 | 0.400 | 1.200 | 4,500 | 2,490 | 0.400 | 1.200 | 4,000 | 2,090 | 0.400 | 1.200 | 2,500 | 1,310 | 0.360 | 1.080 |
| 6 | 12 | 60 | 5,300 | 4,210 | 1.200 | 3.600 | 4,800 | 3,820 | 1.200 | 3.600 | 4,300 | 3,210 | 1.200 | 3.600 | 2,700 | 2,020 | 1.080 | 3.240 |
| | | 80 | 4,900 | 3,510 | 0.840 | 2.520 | 4,400 | 3,150 | 0.840 | 2.520 | 4,000 | 2,690 | 0.840 | 2.520 | 2,500 | 1,680 | 0.756 | 2.268 |
| | | 100 | 4,500 | 3,220 | 0.600 | 1.800 | 4,100 | 2,930 | 0.600 | 1.800 | 3,700 | 2,490 | 0.600 | 1.800 | 2,300 | 1,550 | 0.540 | 1.620 |
| | | 120 | 4,500 | 3,220 | 0.600 | 1.800 | 4,100 | 2,930 | 0.600 | 1.800 | 3,700 | 2,490 | 0.600 | 1.800 | 2,300 | 1,550 | 0.540 | 1.620 |

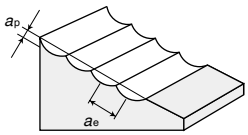
【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②できるだけ高剛性、高精度の機械をご使用ください。
③この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。

【Note】① Use the appropriate coolant for the work material and machining shape.
② Use as highly rigid and accurate machine as possible.
③ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

| 焼入れ鋼 Hardened steels (50～55HRC) HPM38, SKD61 | | | | 焼入れ鋼 Hardened steels (55～65HRC) SKD11, YXR3, YXR33 | | | | 被削材 Work material | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | $a_p$ mm | $a_e$ mm | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | $a_p$ mm | $a_e$ mm | 首下長 LU Under neck length (mm) | 外径 DC Tool dia. (mm) | ボール半径 RE Ball radius (mm) |
| 12,200 | 1,750 | 0.221 | 0.662 | 10,700 | 1,160 | 0.158 | 0.473 | 20 | 3.5 | 1.75 |
| 11,100 | 1,590 | 0.147 | 0.441 | 9,700 | 1,050 | 0.105 | 0.315 | 30 | | |
| 10,200 | 1,300 | 0.135 | 0.404 | 8,900 | 850 | 0.096 | 0.289 | 40 | | |
| 9,200 | 1,170 | 0.123 | 0.368 | 8,000 | 770 | 0.088 | 0.263 | 50 | | |
| 8,300 | 1,060 | 0.098 | 0.294 | 7,200 | 690 | 0.070 | 0.210 | 60 | | |
| 11,500 | 2,140 | 0.280 | 0.840 | 10,000 | 1,410 | 0.200 | 0.600 | 20 | 4 | 2 |
| 10,700 | 1,790 | 0.210 | 0.630 | 9,300 | 1,180 | 0.150 | 0.450 | 30 | | |
| 9,700 | 1,620 | 0.182 | 0.546 | 8,500 | 1,080 | 0.130 | 0.390 | 40 | | |
| 8,900 | 1,320 | 0.126 | 0.378 | 7,800 | 880 | 0.090 | 0.270 | 50 | | |
| 8,000 | 1,190 | 0.084 | 0.252 | 7,000 | 790 | 0.060 | 0.180 | 60 | | |
| 7,200 | 1,070 | 0.070 | 0.210 | 6,300 | 710 | 0.050 | 0.150 | 70 | | |
| 7,200 | 1,070 | 0.070 | 0.210 | 6,300 | 710 | 0.050 | 0.150 | 80 | | |
| 8,500 | 1,860 | 0.263 | 0.788 | 7,500 | 1,240 | 0.188 | 0.563 | 30 | 5 | 2.5 |
| 8,500 | 1,860 | 0.263 | 0.788 | 7,500 | 1,240 | 0.188 | 0.563 | 40 | | |
| 7,800 | 1,710 | 0.228 | 0.683 | 6,800 | 1,120 | 0.163 | 0.488 | 50 | | |
| 7,200 | 1,400 | 0.158 | 0.473 | 6,300 | 920 | 0.113 | 0.338 | 60 | | |
| 6,400 | 1,240 | 0.105 | 0.315 | 5,600 | 820 | 0.075 | 0.225 | 70 | | |
| 6,400 | 1,240 | 0.105 | 0.315 | 5,600 | 820 | 0.075 | 0.225 | 80 | | |
| 7,600 | 2,280 | 0.420 | 1.260 | 6,700 | 1,510 | 0.300 | 0.900 | 30 | 6 | 3 |
| 7,100 | 1,920 | 0.294 | 0.882 | 6,200 | 1,260 | 0.210 | 0.630 | 40 | | |
| 6,500 | 1,760 | 0.210 | 0.630 | 5,700 | 1,150 | 0.150 | 0.450 | 50 | | |
| 6,500 | 1,760 | 0.210 | 0.630 | 5,700 | 1,150 | 0.150 | 0.450 | 60 | | |
| 6,000 | 1,440 | 0.168 | 0.504 | 5,200 | 940 | 0.120 | 0.360 | 70 | | |
| 5,400 | 1,300 | 0.126 | 0.378 | 4,700 | 850 | 0.090 | 0.270 | 80 | | |
| 4,800 | 1,150 | 0.084 | 0.252 | 4,200 | 760 | 0.060 | 0.180 | 100 | | |
| 4,800 | 1,150 | 0.084 | 0.252 | 4,200 | 760 | 0.060 | 0.180 | 120 | | |
| 5,700 | 2,380 | 0.560 | 1.680 | 5,000 | 1,580 | 0.400 | 1.200 | 40 | 8 | 4 |
| 5,300 | 1,990 | 0.392 | 1.176 | 4,700 | 1,330 | 0.280 | 0.840 | 50 | | |
| 5,300 | 1,990 | 0.392 | 1.176 | 4,700 | 1,330 | 0.280 | 0.840 | 60 | | |
| 4,900 | 1,840 | 0.280 | 0.840 | 4,300 | 1,220 | 0.200 | 0.600 | 70 | | |
| 4,900 | 1,840 | 0.280 | 0.840 | 4,300 | 1,220 | 0.200 | 0.600 | 80 | | |
| 4,500 | 1,500 | 0.224 | 0.672 | 3,900 | 980 | 0.160 | 0.480 | 100 | | |
| 4,000 | 1,330 | 0.168 | 0.504 | 3,500 | 880 | 0.120 | 0.360 | 120 | | |
| 4,600 | 2,530 | 0.700 | 2.100 | 4,000 | 1,660 | 0.500 | 1.500 | 50 | 10 | 5 |
| 4,300 | 2,120 | 0.490 | 1.470 | 3,700 | 1,380 | 0.350 | 1.050 | 60 | | |
| 4,300 | 2,120 | 0.490 | 1.470 | 3,700 | 1,380 | 0.350 | 1.050 | 75 | | |
| 3,900 | 1,930 | 0.350 | 1.050 | 3,400 | 1,270 | 0.250 | 0.750 | 80 | | |
| 3,900 | 1,930 | 0.350 | 1.050 | 3,400 | 1,270 | 0.250 | 0.750 | 100 | | |
| 3,600 | 1,580 | 0.280 | 0.840 | 3,100 | 1,030 | 0.200 | 0.600 | 120 | | |
| 3,800 | 2,380 | 0.840 | 2.520 | 3,300 | 1,560 | 0.600 | 1.800 | 60 | 12 | 6 |
| 3,600 | 2,030 | 0.588 | 1.764 | 3,100 | 1,320 | 0.420 | 1.260 | 80 | | |
| 3,200 | 1,810 | 0.420 | 1.260 | 2,800 | 1,190 | 0.300 | 0.900 | 100 | | |
| 3,200 | 1,810 | 0.420 | 1.260 | 2,800 | 1,190 | 0.300 | 0.900 | 120 | | |

# Epoch Mega Feed Ball Evolution
# エポックメガフィードボール エボリューション

## EMBPE-ATH
ペンシルタイプ
Pencil type




〈仕上げ加工〉 Finishing

| 被削材 Work material | | | 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) S50C, S55C | | | | 工具鋼 Tool steels (25～40HRC) HPM7, SCM440, SKD61, SKT4 | | | | プリハードン鋼・焼入れ鋼 Pre-hardened steels, Hardened steels (40～50HRC) SKD61, CENA1, HPM-MAGIC, NAK80, DAC-MAGIC, DAC55, DH31 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ボール半径 RE Ball radius (mm) | 外径 DC Tool dia. (mm) | 首下長 LU Under neck length (mm) | 回転数 n min-1 | 送り速度 vf mm/min | ap mm | ae mm | 回転数 n min-1 | 送り速度 vf mm/min | ap mm | ae mm | 回転数 n min-1 | 送り速度 vf mm/min | ap mm | ae mm |
| 0.5 | 1 | 6 | 50,000 | 1,760 | 0.02～0.05 | 0.02 | 50,000 | 1,760 | 0.02～0.05 | 0.02 | 50,000 | 1,620 | 0.02～0.05 | 0.02 |
| | | 8 | 50,000 | 1,760 | 0.02～0.05 | 0.02 | 50,000 | 1,760 | 0.02～0.05 | 0.02 | 50,000 | 1,620 | 0.02～0.05 | 0.02 |
| | | 10 | 50,000 | 1,760 | 0.02～0.05 | 0.02 | 50,000 | 1,760 | 0.02～0.05 | 0.02 | 48,700 | 1,580 | 0.02～0.05 | 0.02 |
| | | 12 | 50,000 | 1,560 | 0.02～0.05 | 0.02 | 49,700 | 1,550 | 0.02～0.05 | 0.02 | 44,700 | 1,290 | 0.02～0.05 | 0.02 |
| | | 14 | 49,000 | 1,530 | 0.02～0.05 | 0.02 | 44,600 | 1,390 | 0.02～0.05 | 0.02 | 40,100 | 1,150 | 0.02～0.05 | 0.02 |
| | | 16 | 49,000 | 1,530 | 0.02～0.05 | 0.02 | 44,600 | 1,390 | 0.02～0.05 | 0.02 | 40,100 | 1,150 | 0.02～0.05 | 0.02 |
| | | 18 | 44,100 | 1,380 | 0.02～0.05 | 0.02 | 40,100 | 1,250 | 0.02～0.05 | 0.02 | 36,100 | 1,040 | 0.02～0.05 | 0.02 |
| | | 20 | 44,100 | 1,380 | 0.02～0.05 | 0.02 | 40,100 | 1,250 | 0.02～0.05 | 0.02 | 36,100 | 1,040 | 0.02～0.05 | 0.02 |
| | | 22 | 38,500 | 1,200 | 0.02～0.05 | 0.02 | 35,000 | 1,090 | 0.02～0.05 | 0.02 | 31,500 | 910 | 0.02～0.05 | 0.02 |
| | | 24 | 33,600 | 1,050 | 0.02～0.05 | 0.02 | 30,600 | 950 | 0.02～0.05 | 0.02 | 27,500 | 790 | 0.02～0.05 | 0.02 |
| | | 26 | 33,600 | 1,050 | 0.02～0.05 | 0.02 | 30,600 | 950 | 0.02～0.05 | 0.02 | 27,500 | 790 | 0.02～0.05 | 0.02 |
| | | 28 | 28,000 | 760 | 0.02～0.05 | 0.02 | 25,500 | 700 | 0.02～0.05 | 0.02 | 22,900 | 580 | 0.02～0.05 | 0.02 |
| | | 30 | 28,000 | 760 | 0.02～0.05 | 0.02 | 25,500 | 700 | 0.02～0.05 | 0.02 | 22,900 | 580 | 0.02～0.05 | 0.02 |
| | | 32 | 23,100 | 630 | 0.02～0.05 | 0.02 | 21,000 | 570 | 0.02～0.05 | 0.02 | 18,900 | 480 | 0.02～0.05 | 0.02 |
| | | 34 | 17,500 | 480 | 0.02～0.05 | 0.02 | 15,900 | 430 | 0.02～0.05 | 0.02 | 14,300 | 360 | 0.02～0.05 | 0.02 |
| | | 36 | 17,500 | 480 | 0.02～0.05 | 0.02 | 15,900 | 430 | 0.02～0.05 | 0.02 | 14,300 | 360 | 0.02～0.05 | 0.02 |
| 0.75 | 1.5 | 8 | 43,400 | 2,340 | 0.02～0.07 | 0.03 | 39,500 | 2,130 | 0.02～0.07 | 0.03 | 35,500 | 1,820 | 0.02～0.07 | 0.03 |
| | | 10 | 43,400 | 2,340 | 0.02～0.07 | 0.03 | 39,500 | 2,130 | 0.02～0.07 | 0.03 | 35,500 | 1,820 | 0.02～0.07 | 0.03 |
| | | 14 | 39,700 | 2,140 | 0.02～0.07 | 0.03 | 36,100 | 1,950 | 0.02～0.07 | 0.03 | 32,500 | 1,670 | 0.02～0.07 | 0.03 |
| | | 16 | 36,400 | 1,750 | 0.02～0.07 | 0.03 | 33,100 | 1,590 | 0.02～0.07 | 0.03 | 29,800 | 1,360 | 0.02～0.07 | 0.03 |
| | | 18 | 36,400 | 1,750 | 0.02～0.07 | 0.03 | 33,100 | 1,590 | 0.02～0.07 | 0.03 | 29,800 | 1,360 | 0.02～0.07 | 0.03 |
| | | 20 | 32,700 | 1,570 | 0.02～0.07 | 0.03 | 29,700 | 1,430 | 0.02～0.07 | 0.03 | 26,800 | 1,220 | 0.02～0.07 | 0.03 |
| | | 22 | 32,700 | 1,570 | 0.02～0.07 | 0.03 | 29,700 | 1,430 | 0.02～0.07 | 0.03 | 26,800 | 1,220 | 0.02～0.07 | 0.03 |
| | | 24 | 32,700 | 1,570 | 0.02～0.07 | 0.03 | 29,700 | 1,430 | 0.02～0.07 | 0.03 | 26,800 | 1,220 | 0.02～0.07 | 0.03 |
| | | 26 | 29,400 | 1,410 | 0.02～0.07 | 0.03 | 26,800 | 1,290 | 0.02～0.07 | 0.03 | 24,100 | 1,100 | 0.02～0.07 | 0.03 |
| | | 28 | 29,400 | 1,410 | 0.02～0.07 | 0.03 | 26,800 | 1,290 | 0.02～0.07 | 0.03 | 24,100 | 1,100 | 0.02～0.07 | 0.03 |
| | | 30 | 29,400 | 1,410 | 0.02～0.07 | 0.03 | 26,800 | 1,290 | 0.02～0.07 | 0.03 | 24,100 | 1,100 | 0.02～0.07 | 0.03 |
| | | 32 | 25,700 | 1,230 | 0.02～0.07 | 0.03 | 23,400 | 1,120 | 0.02～0.07 | 0.03 | 21,000 | 960 | 0.02～0.07 | 0.03 |
| | | 34 | 25,700 | 1,230 | 0.02～0.07 | 0.03 | 23,400 | 1,120 | 0.02～0.07 | 0.03 | 21,000 | 960 | 0.02～0.07 | 0.03 |
| | | 36 | 22,400 | 1,080 | 0.02～0.07 | 0.03 | 20,400 | 980 | 0.02～0.07 | 0.03 | 18,300 | 830 | 0.02～0.07 | 0.03 |
| | | 38 | 22,400 | 1,080 | 0.02～0.07 | 0.03 | 20,400 | 980 | 0.02～0.07 | 0.03 | 18,300 | 830 | 0.02～0.07 | 0.03 |
| | | 40 | 18,700 | 790 | 0.02～0.07 | 0.03 | 17,000 | 710 | 0.02～0.07 | 0.03 | 15,300 | 610 | 0.02～0.07 | 0.03 |
| 1 | 2 | 10 | 35,000 | 3,050 | 0.02～0.10 | 0.04 | 31,800 | 2,770 | 0.02～0.10 | 0.04 | 28,700 | 2,320 | 0.02～0.10 | 0.04 |
| | | 16 | 32,600 | 2,550 | 0.02～0.10 | 0.04 | 29,600 | 2,320 | 0.02～0.10 | 0.04 | 26,700 | 1,950 | 0.02～0.10 | 0.04 |
| | | 20 | 29,800 | 2,330 | 0.02～0.10 | 0.04 | 27,100 | 2,120 | 0.02～0.10 | 0.04 | 24,400 | 1,780 | 0.02～0.10 | 0.04 |
| | | 24 | 27,300 | 1,900 | 0.02～0.10 | 0.04 | 24,800 | 1,730 | 0.02～0.10 | 0.04 | 22,400 | 1,450 | 0.02～0.10 | 0.04 |
| | | 30 | 24,500 | 1,710 | 0.02～0.10 | 0.04 | 22,300 | 1,550 | 0.02～0.10 | 0.04 | 20,100 | 1,300 | 0.02～0.10 | 0.04 |
| | | 36 | 22,100 | 1,540 | 0.02～0.10 | 0.04 | 20,100 | 1,400 | 0.02～0.10 | 0.04 | 18,100 | 1,170 | 0.02～0.10 | 0.04 |
| | | 40 | 22,100 | 1,540 | 0.02～0.10 | 0.04 | 20,100 | 1,400 | 0.02～0.10 | 0.04 | 18,100 | 1,170 | 0.02～0.10 | 0.04 |
| | | 46 | 19,300 | 1,340 | 0.02～0.10 | 0.04 | 17,500 | 1,220 | 0.02～0.10 | 0.04 | 15,800 | 1,020 | 0.02～0.10 | 0.04 |
| | | 60 | 14,000 | 850 | 0.02～0.10 | 0.04 | 12,700 | 770 | 0.02～0.10 | 0.04 | 11,500 | 650 | 0.02～0.10 | 0.04 |
| 1.25 | 2.5 | 16 | 26,100 | 2,540 | 0.05～0.12 | 0.05 | 23,700 | 2,300 | 0.05～0.12 | 0.05 | 21,300 | 1,960 | 0.05～0.12 | 0.05 |
| | | 24 | 23,800 | 2,310 | 0.05～0.12 | 0.05 | 21,700 | 2,110 | 0.05～0.12 | 0.05 | 19,500 | 1,790 | 0.05～0.12 | 0.05 |
| | | 30 | 21,900 | 1,890 | 0.05～0.12 | 0.05 | 19,900 | 1,720 | 0.05～0.12 | 0.05 | 17,900 | 1,460 | 0.05～0.12 | 0.05 |
| | | 40 | 19,600 | 1,690 | 0.05～0.12 | 0.05 | 17,800 | 1,540 | 0.05～0.12 | 0.05 | 16,100 | 1,310 | 0.05～0.12 | 0.05 |
| | | 50 | 17,700 | 1,530 | 0.05～0.12 | 0.05 | 16,100 | 1,390 | 0.05～0.12 | 0.05 | 14,400 | 1,180 | 0.05～0.12 | 0.05 |
| 1.5 | 3 | 16 | 21,700 | 2,580 | 0.05～0.15 | 0.06 | 19,700 | 2,340 | 0.05～0.15 | 0.06 | 17,800 | 2,020 | 0.05～0.15 | 0.06 |
| | | 20 | 21,700 | 2,580 | 0.05～0.15 | 0.06 | 19,700 | 2,340 | 0.05～0.15 | 0.06 | 17,800 | 2,020 | 0.05～0.15 | 0.06 |
| | | 24 | 21,700 | 2,580 | 0.05～0.15 | 0.06 | 19,700 | 2,340 | 0.05～0.15 | 0.06 | 17,800 | 2,020 | 0.05～0.15 | 0.06 |
| | | 30 | 19,900 | 2,360 | 0.05～0.15 | 0.06 | 18,000 | 2,140 | 0.05～0.15 | 0.06 | 16,200 | 1,840 | 0.05～0.15 | 0.06 |
| | | 40 | 16,300 | 1,720 | 0.05～0.15 | 0.06 | 14,900 | 1,570 | 0.05～0.15 | 0.06 | 13,400 | 1,350 | 0.05～0.15 | 0.06 |
| | | 50 | 14,700 | 1,550 | 0.05～0.15 | 0.06 | 13,400 | 1,420 | 0.05～0.15 | 0.06 | 12,000 | 1,210 | 0.05～0.15 | 0.06 |
| | | 60 | 14,700 | 1,550 | 0.05～0.15 | 0.06 | 13,400 | 1,420 | 0.05～0.15 | 0.06 | 12,000 | 1,210 | 0.05～0.15 | 0.06 |

| 焼入れ鋼 Hardened steels (50～55HRC) HPM38, SKD61 | | | | 焼入れ鋼 Hardened steels (55～65HRC) SKD11, YXR3, YXR33 | | | | 被削材 Work material | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 回転数 $n$ $min^{-1}$ | 送り速度 $v_f$ mm/min | $a_p$ mm | $a_e$ mm | 回転数 $n$ $min^{-1}$ | 送り速度 $v_f$ mm/min | $a_p$ mm | $a_e$ mm | 首下長 LU Under neck length (mm) | 外径 DC Tool dia. (mm) | ボール半径 RE Ball radius (mm) |
| 47,400 | 1,280 | 0.02～0.05 | 0.02 | 41,500 | 810 | 0.02～0.05 | 0.02 | 6 | 1 | 0.5 |
| 47,400 | 1,280 | 0.02～0.05 | 0.02 | 41,500 | 810 | 0.02～0.05 | 0.02 | 8 | | |
| 43,300 | 1,170 | 0.02～0.05 | 0.02 | 37,900 | 740 | 0.02～0.05 | 0.02 | 10 | | |
| 39,700 | 950 | 0.02～0.05 | 0.02 | 34,800 | 600 | 0.02～0.05 | 0.02 | 12 | | |
| 35,700 | 860 | 0.02～0.05 | 0.02 | 31,200 | 540 | 0.02～0.05 | 0.02 | 14 | | |
| 35,700 | 860 | 0.02～0.05 | 0.02 | 31,200 | 540 | 0.02～0.05 | 0.02 | 16 | | |
| 32,100 | 770 | 0.02～0.05 | 0.02 | 28,100 | 490 | 0.02～0.05 | 0.02 | 18 | | |
| 32,100 | 770 | 0.02～0.05 | 0.02 | 28,100 | 490 | 0.02～0.05 | 0.02 | 20 | | |
| 28,000 | 670 | 0.02～0.05 | 0.02 | 24,500 | 420 | 0.02～0.05 | 0.02 | 22 | | |
| 24,500 | 590 | 0.02～0.05 | 0.02 | 21,400 | 370 | 0.02～0.05 | 0.02 | 24 | | |
| 24,500 | 590 | 0.02～0.05 | 0.02 | 21,400 | 370 | 0.02～0.05 | 0.02 | 26 | | |
| 20,400 | 430 | 0.02～0.05 | 0.02 | 17,800 | 270 | 0.02～0.05 | 0.02 | 28 | | |
| 20,400 | 430 | 0.02～0.05 | 0.02 | 17,800 | 270 | 0.02～0.05 | 0.02 | 30 | | |
| 16,800 | 350 | 0.02～0.05 | 0.02 | 14,700 | 220 | 0.02～0.05 | 0.02 | 32 | | |
| 12,700 | 270 | 0.02～0.05 | 0.02 | 11,100 | 170 | 0.02～0.05 | 0.02 | 34 | | |
| 12,700 | 270 | 0.02～0.05 | 0.02 | 11,100 | 170 | 0.02～0.05 | 0.02 | 36 | | |
| 31,600 | 1,370 | 0.02～0.07 | 0.03 | 27,600 | 890 | 0.02～0.07 | 0.03 | 8 | 1.5 | 0.75 |
| 31,600 | 1,370 | 0.02～0.07 | 0.03 | 27,600 | 890 | 0.02～0.07 | 0.03 | 10 | | |
| 28,900 | 1,250 | 0.02～0.07 | 0.03 | 25,300 | 820 | 0.02～0.07 | 0.03 | 14 | | |
| 26,500 | 1,020 | 0.02～0.07 | 0.03 | 23,200 | 670 | 0.02～0.07 | 0.03 | 16 | | |
| 26,500 | 1,020 | 0.02～0.07 | 0.03 | 23,200 | 670 | 0.02～0.07 | 0.03 | 18 | | |
| 23,800 | 910 | 0.02～0.07 | 0.03 | 20,800 | 600 | 0.02～0.07 | 0.03 | 20 | | |
| 23,800 | 910 | 0.02～0.07 | 0.03 | 20,800 | 600 | 0.02～0.07 | 0.03 | 22 | | |
| 23,800 | 910 | 0.02～0.07 | 0.03 | 20,800 | 600 | 0.02～0.07 | 0.03 | 24 | | |
| 21,400 | 820 | 0.02～0.07 | 0.03 | 18,700 | 540 | 0.02～0.07 | 0.03 | 26 | | |
| 21,400 | 820 | 0.02～0.07 | 0.03 | 18,700 | 540 | 0.02～0.07 | 0.03 | 28 | | |
| 21,400 | 820 | 0.02～0.07 | 0.03 | 18,700 | 540 | 0.02～0.07 | 0.03 | 30 | | |
| 18,700 | 720 | 0.02～0.07 | 0.03 | 16,300 | 470 | 0.02～0.07 | 0.03 | 32 | | |
| 18,700 | 720 | 0.02～0.07 | 0.03 | 16,300 | 470 | 0.02～0.07 | 0.03 | 34 | | |
| 16,300 | 630 | 0.02～0.07 | 0.03 | 14,300 | 410 | 0.02～0.07 | 0.03 | 36 | | |
| 16,300 | 630 | 0.02～0.07 | 0.03 | 14,300 | 410 | 0.02～0.07 | 0.03 | 38 | | |
| 13,600 | 460 | 0.02～0.07 | 0.03 | 11,900 | 300 | 0.02～0.07 | 0.03 | 40 | | |
| 25,500 | 1,680 | 0.02～0.10 | 0.04 | 22,300 | 1,140 | 0.02～0.10 | 0.04 | 10 | 2 | 1 |
| 23,700 | 1,410 | 0.02～0.10 | 0.04 | 20,700 | 950 | 0.02～0.10 | 0.04 | 16 | | |
| 21,700 | 1,290 | 0.02～0.10 | 0.04 | 18,900 | 870 | 0.02～0.10 | 0.04 | 20 | | |
| 19,900 | 1,050 | 0.02～0.10 | 0.04 | 17,400 | 710 | 0.02～0.10 | 0.04 | 24 | | |
| 17,800 | 940 | 0.02～0.10 | 0.04 | 15,600 | 640 | 0.02～0.10 | 0.04 | 30 | | |
| 16,100 | 850 | 0.02～0.10 | 0.04 | 14,000 | 570 | 0.02～0.10 | 0.04 | 36 | | |
| 16,100 | 850 | 0.02～0.10 | 0.04 | 14,000 | 570 | 0.02～0.10 | 0.04 | 40 | | |
| 14,000 | 740 | 0.02～0.10 | 0.04 | 12,300 | 500 | 0.02～0.10 | 0.04 | 46 | | |
| 10,200 | 470 | 0.02～0.10 | 0.04 | 8,900 | 320 | 0.02～0.10 | 0.04 | 60 | | |
| 19,000 | 1,490 | 0.05～0.12 | 0.05 | 16,600 | 990 | 0.05～0.12 | 0.05 | 16 | 2.5 | 1.25 |
| 17,300 | 1,350 | 0.05～0.12 | 0.05 | 15,200 | 900 | 0.05～0.12 | 0.05 | 24 | | |
| 15,900 | 1,110 | 0.05～0.12 | 0.05 | 13,900 | 730 | 0.05～0.12 | 0.05 | 30 | | |
| 14,300 | 1,000 | 0.05～0.12 | 0.05 | 12,500 | 660 | 0.05～0.12 | 0.05 | 40 | | |
| 12,800 | 890 | 0.05～0.12 | 0.05 | 11,200 | 590 | 0.05～0.12 | 0.05 | 50 | | |
| 15,800 | 1,490 | 0.05～0.15 | 0.06 | 13,800 | 970 | 0.05～0.15 | 0.06 | 16 | 3 | 1.5 |
| 15,800 | 1,490 | 0.05～0.15 | 0.06 | 13,800 | 970 | 0.05～0.15 | 0.06 | 20 | | |
| 15,800 | 1,490 | 0.05～0.15 | 0.06 | 13,800 | 970 | 0.05～0.15 | 0.06 | 24 | | |
| 14,400 | 1,360 | 0.05～0.15 | 0.06 | 12,600 | 880 | 0.05～0.15 | 0.06 | 30 | | |
| 11,900 | 1,000 | 0.05～0.15 | 0.06 | 10,400 | 650 | 0.05～0.15 | 0.06 | 40 | | |
| 10,700 | 900 | 0.05～0.15 | 0.06 | 9,400 | 590 | 0.05～0.15 | 0.06 | 50 | | |
| 10,700 | 900 | 0.05～0.15 | 0.06 | 9,400 | 590 | 0.05～0.15 | 0.06 | 60 | | |

**【注意】**

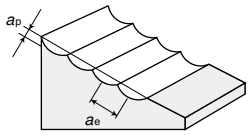
ご使用にあたっては、A122ページの表下の項目と注意を参照してください。

**【Note】**

Upon usage, please refer to comments and notes below table on page A122.

# Epoch Mega Feed Ball Evolution
# エポックメガフィードボール エボリューション

## EMBPE-ATH
ペンシルタイプ
Pencil type




〈仕上げ加工〉 Finishing

| 被削材 Work material | | | 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) S50C, S55C | | | | 工具鋼 Tool steels (25～40HRC) HPM7, SCM440, SKD61, SKT4 | | | | プリハードン鋼・焼入れ鋼 Pre-hardened steels, Hardened steels (40～50HRC) SKD61, CENA1, HPM-MAGIC, NAK80, DAC-MAGIC, DAC55, DH31 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ボール半径 RE Ball radius (mm) | 外径 DC Tool dia. (mm) | 首下長 LU Under neck length (mm) | 回転数 n min-1 | 送り速度 vf mm/min | ap mm | ae mm | 回転数 n min-1 | 送り速度 vf mm/min | ap mm | ae mm | 回転数 n min-1 | 送り速度 vf mm/min | ap mm | ae mm |
| 1.75 | 3.5 | 20 | 18,600 | 2,710 | 0.05～0.15 | 0.07 | 16,900 | 2,460 | 0.05～0.15 | 0.07 | 15,200 | 2,050 | 0.05～0.15 | 0.07 |
| | | 30 | 17,000 | 2,480 | 0.05～0.15 | 0.07 | 15,500 | 2,260 | 0.05～0.15 | 0.07 | 13,900 | 1,880 | 0.05～0.15 | 0.07 |
| | | 40 | 15,600 | 2,020 | 0.05～0.15 | 0.07 | 14,200 | 1,840 | 0.05～0.15 | 0.07 | 12,800 | 1,540 | 0.05～0.15 | 0.07 |
| | | 50 | 14,000 | 1,810 | 0.05～0.15 | 0.07 | 12,700 | 1,650 | 0.05～0.15 | 0.07 | 11,500 | 1,380 | 0.05～0.15 | 0.07 |
| | | 60 | 12,600 | 1,630 | 0.05～0.15 | 0.07 | 11,500 | 1,490 | 0.05～0.15 | 0.07 | 10,300 | 1,240 | 0.05～0.15 | 0.07 |
| 2 | 4 | 20 | 17,500 | 3,260 | 0.05～0.20 | 0.08 | 15,900 | 2,960 | 0.05～0.20 | 0.08 | 14,300 | 2,530 | 0.05～0.20 | 0.08 |
| | | 30 | 16,300 | 2,730 | 0.05～0.20 | 0.08 | 14,800 | 2,480 | 0.05～0.20 | 0.08 | 13,300 | 2,120 | 0.05～0.20 | 0.08 |
| | | 40 | 14,900 | 2,490 | 0.05～0.20 | 0.08 | 13,500 | 2,260 | 0.05～0.20 | 0.08 | 12,200 | 1,940 | 0.05～0.20 | 0.08 |
| | | 50 | 13,700 | 2,040 | 0.05～0.20 | 0.08 | 12,400 | 1,850 | 0.05～0.20 | 0.08 | 11,200 | 1,590 | 0.05～0.20 | 0.08 |
| | | 60 | 12,300 | 1,830 | 0.05～0.20 | 0.08 | 11,100 | 1,650 | 0.05～0.20 | 0.08 | 10,000 | 1,420 | 0.05～0.20 | 0.08 |
| | | 70 | 11,000 | 1,640 | 0.05～0.20 | 0.08 | 10,000 | 1,490 | 0.05～0.20 | 0.08 | 9,000 | 1,270 | 0.05～0.20 | 0.08 |
| | | 80 | 11,000 | 1,640 | 0.05～0.20 | 0.08 | 10,000 | 1,490 | 0.05～0.20 | 0.08 | 9,000 | 1,270 | 0.05～0.20 | 0.08 |
| 2.5 | 5 | 30 | 13,000 | 2,880 | 0.05～0.25 | 0.1 | 11,800 | 2,610 | 0.05～0.25 | 0.1 | 10,700 | 2,220 | 0.05～0.25 | 0.1 |
| | | 40 | 13,000 | 2,880 | 0.05～0.25 | 0.1 | 11,800 | 2,610 | 0.05～0.25 | 0.1 | 10,700 | 2,220 | 0.05～0.25 | 0.1 |
| | | 50 | 11,900 | 2,630 | 0.05～0.25 | 0.1 | 10,800 | 2,390 | 0.05～0.25 | 0.1 | 9,700 | 2,020 | 0.05～0.25 | 0.1 |
| | | 60 | 10,900 | 2,150 | 0.05～0.25 | 0.1 | 9,900 | 1,950 | 0.05～0.25 | 0.1 | 8,900 | 1,640 | 0.05～0.25 | 0.1 |
| | | 70 | 9,800 | 1,930 | 0.05～0.25 | 0.1 | 8,900 | 1,750 | 0.05～0.25 | 0.1 | 8,000 | 1,480 | 0.05～0.25 | 0.1 |
| | | 80 | 9,800 | 1,930 | 0.05～0.25 | 0.1 | 8,900 | 1,750 | 0.05～0.25 | 0.1 | 8,000 | 1,480 | 0.05～0.25 | 0.1 |
| 3 | 6 | 30 | 11,700 | 3,550 | 0.05～0.3 | 0.12 | 10,600 | 3,210 | 0.05～0.3 | 0.12 | 9,600 | 2,740 | 0.05～0.3 | 0.12 |
| | | 40 | 10,900 | 2,970 | 0.05～0.3 | 0.12 | 9,900 | 2,700 | 0.05～0.3 | 0.12 | 8,900 | 2,280 | 0.05～0.3 | 0.12 |
| | | 50 | 9,900 | 2,700 | 0.05～0.3 | 0.12 | 9,000 | 2,450 | 0.05～0.3 | 0.12 | 8,100 | 2,080 | 0.05～0.3 | 0.12 |
| | | 60 | 9,900 | 2,700 | 0.05～0.3 | 0.12 | 9,000 | 2,450 | 0.05～0.3 | 0.12 | 8,100 | 2,080 | 0.05～0.3 | 0.12 |
| | | 70 | 9,100 | 2,210 | 0.05～0.3 | 0.12 | 8,300 | 2,010 | 0.05～0.3 | 0.12 | 7,500 | 1,710 | 0.05～0.3 | 0.12 |
| | | 80 | 8,200 | 1,990 | 0.05～0.3 | 0.12 | 7,400 | 1,790 | 0.05～0.3 | 0.12 | 6,700 | 1,530 | 0.05～0.3 | 0.12 |
| | | 100 | 7,400 | 1,790 | 0.05～0.3 | 0.12 | 6,700 | 1,620 | 0.05～0.3 | 0.12 | 6,000 | 1,370 | 0.05～0.3 | 0.12 |
| | | 120 | 7,400 | 1,790 | 0.05～0.3 | 0.12 | 6,700 | 1,620 | 0.05～0.3 | 0.12 | 6,000 | 1,370 | 0.05～0.3 | 0.12 |
| 4 | 8 | 40 | 8,800 | 3,720 | 0.05～0.4 | 0.16 | 8,000 | 3,380 | 0.05～0.4 | 0.16 | 7,200 | 2,870 | 0.05～0.4 | 0.16 |
| | | 50 | 8,100 | 3,080 | 0.05～0.4 | 0.16 | 7,400 | 2,820 | 0.05～0.4 | 0.16 | 6,700 | 2,410 | 0.05～0.4 | 0.16 |
| | | 60 | 8,100 | 3,080 | 0.05～0.4 | 0.16 | 7,400 | 2,820 | 0.05～0.4 | 0.16 | 6,700 | 2,410 | 0.05～0.4 | 0.16 |
| | | 70 | 7,400 | 2,820 | 0.05～0.4 | 0.16 | 6,800 | 2,590 | 0.05～0.4 | 0.16 | 6,100 | 2,190 | 0.05～0.4 | 0.16 |
| | | 80 | 7,400 | 2,820 | 0.05～0.4 | 0.16 | 6,800 | 2,590 | 0.05～0.4 | 0.16 | 6,100 | 2,190 | 0.05～0.4 | 0.16 |
| | | 100 | 6,800 | 2,300 | 0.05～0.4 | 0.16 | 6,200 | 2,100 | 0.05～0.4 | 0.16 | 5,600 | 1,790 | 0.05～0.4 | 0.16 |
| | | 120 | 6,100 | 2,060 | 0.05～0.4 | 0.16 | 5,600 | 1,900 | 0.05～0.4 | 0.16 | 5,000 | 1,600 | 0.05～0.4 | 0.16 |
| 5 | 10 | 50 | 7,000 | 3,890 | 0.05～0.5 | 0.2 | 6,400 | 3,550 | 0.05～0.5 | 0.2 | 5,700 | 2,980 | 0.05～0.5 | 0.2 |
| | | 60 | 6,500 | 3,250 | 0.05～0.5 | 0.2 | 5,900 | 2,950 | 0.05～0.5 | 0.2 | 5,300 | 2,490 | 0.05～0.5 | 0.2 |
| | | 75 | 6,500 | 3,250 | 0.05～0.5 | 0.2 | 5,900 | 2,950 | 0.05～0.5 | 0.2 | 5,300 | 2,490 | 0.05～0.5 | 0.2 |
| | | 80 | 6,000 | 3,000 | 0.05～0.5 | 0.2 | 5,400 | 2,700 | 0.05～0.5 | 0.2 | 4,900 | 2,300 | 0.05～0.5 | 0.2 |
| | | 100 | 6,000 | 3,000 | 0.05～0.5 | 0.2 | 5,400 | 2,700 | 0.05～0.5 | 0.2 | 4,900 | 2,300 | 0.05～0.5 | 0.2 |
| | | 120 | 5,500 | 2,440 | 0.05～0.5 | 0.2 | 5,000 | 2,220 | 0.05～0.5 | 0.2 | 4,500 | 1,880 | 0.05～0.5 | 0.2 |
| 6 | 12 | 60 | 5,800 | 3,690 | 0.05～0.6 | 0.24 | 5,300 | 3,370 | 0.05～0.6 | 0.24 | 4,800 | 2,870 | 0.05～0.6 | 0.24 |
| | | 80 | 5,400 | 3,090 | 0.05～0.6 | 0.24 | 4,900 | 2,800 | 0.05～0.6 | 0.24 | 4,400 | 2,360 | 0.05～0.6 | 0.24 |
| | | 100 | 5,000 | 2,860 | 0.05～0.6 | 0.24 | 4,500 | 2,580 | 0.05～0.6 | 0.24 | 4,100 | 2,200 | 0.05～0.6 | 0.24 |
| | | 120 | 5,000 | 2,860 | 0.05～0.6 | 0.24 | 4,500 | 2,580 | 0.05～0.6 | 0.24 | 4,100 | 2,200 | 0.05～0.6 | 0.24 |

【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②できるだけ高剛性、高精度の機械をご使用ください。
③この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。

【Note】① Use the appropriate coolant for the work material and machining shape.
② Use as highly rigid and accurate machine as possible.
③ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

| 焼入れ鋼 Hardened steels (50～55HRC) HPM38, SKD61 | | | | 焼入れ鋼 Hardened steels (55～65HRC) SKD11, YXR3, YXR33 | | | | 被削材 Work material | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | $a_p$ mm | $a_e$ mm | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | $a_p$ mm | $a_e$ mm | 首下長 LU Under neck length (mm) | 外径 DC Tool dia. (mm) | ボール半径 RE Ball radius (mm) |
| 13,500 | 1,530 | 0.05～0.15 | 0.07 | 11,800 | 1,020 | 0.05～0.15 | 0.07 | 20 | 3.5 | 1.75 |
| 12,400 | 1,410 | 0.05～0.15 | 0.07 | 10,800 | 930 | 0.05～0.15 | 0.07 | 30 | | |
| 11,400 | 1,150 | 0.05～0.15 | 0.07 | 9,900 | 760 | 0.05～0.15 | 0.07 | 40 | | |
| 10,200 | 1,030 | 0.05～0.15 | 0.07 | 8,900 | 680 | 0.05～0.15 | 0.07 | 50 | | |
| 9,200 | 930 | 0.05～0.15 | 0.07 | 8,000 | 610 | 0.05～0.15 | 0.07 | 60 | | |
| 12,700 | 1,910 | 0.05～0.20 | 0.08 | 11,100 | 1,270 | 0.05～0.20 | 0.08 | 20 | 4 | 2 |
| 11,800 | 1,590 | 0.05～0.20 | 0.08 | 10,400 | 1,070 | 0.05～0.20 | 0.08 | 30 | | |
| 10,800 | 1,460 | 0.05～0.20 | 0.08 | 9,500 | 970 | 0.05～0.20 | 0.08 | 40 | | |
| 9,900 | 1,190 | 0.05～0.20 | 0.08 | 8,700 | 790 | 0.05～0.20 | 0.08 | 50 | | |
| 8,900 | 1,070 | 0.05～0.20 | 0.08 | 7,800 | 710 | 0.05～0.20 | 0.08 | 60 | | |
| 8,000 | 960 | 0.05～0.20 | 0.08 | 7,000 | 640 | 0.05～0.20 | 0.08 | 70 | | |
| 8,000 | 960 | 0.05～0.20 | 0.08 | 7,000 | 640 | 0.05～0.20 | 0.08 | 80 | | |
| 9,500 | 1,670 | 0.05～0.25 | 0.1 | 8,300 | 1,100 | 0.05～0.25 | 0.1 | 30 | 5 | 2.5 |
| 9,500 | 1,670 | 0.05～0.25 | 0.1 | 8,300 | 1,100 | 0.05～0.25 | 0.1 | 40 | | |
| 8,700 | 1,530 | 0.05～0.25 | 0.1 | 7,600 | 1,010 | 0.05～0.25 | 0.1 | 50 | | |
| 7,900 | 1,230 | 0.05～0.25 | 0.1 | 7,000 | 820 | 0.05～0.25 | 0.1 | 60 | | |
| 7,100 | 1,110 | 0.05～0.25 | 0.1 | 6,200 | 730 | 0.05～0.25 | 0.1 | 70 | | |
| 7,100 | 1,110 | 0.05～0.25 | 0.1 | 6,200 | 730 | 0.05～0.25 | 0.1 | 80 | | |
| 8,500 | 2,040 | 0.05～0.3 | 0.12 | 7,400 | 1,330 | 0.05～0.3 | 0.12 | 30 | 6 | 3 |
| 7,900 | 1,710 | 0.05～0.3 | 0.12 | 6,900 | 1,120 | 0.05～0.3 | 0.12 | 40 | | |
| 7,200 | 1,560 | 0.05～0.3 | 0.12 | 6,300 | 1,020 | 0.05～0.3 | 0.12 | 50 | | |
| 7,200 | 1,560 | 0.05～0.3 | 0.12 | 6,300 | 1,020 | 0.05～0.3 | 0.12 | 60 | | |
| 6,600 | 1,270 | 0.05～0.3 | 0.12 | 5,800 | 840 | 0.05～0.3 | 0.12 | 70 | | |
| 5,900 | 1,130 | 0.05～0.3 | 0.12 | 5,200 | 750 | 0.05～0.3 | 0.12 | 80 | | |
| 5,400 | 1,040 | 0.05～0.3 | 0.12 | 4,700 | 680 | 0.05～0.3 | 0.12 | 100 | | |
| 5,400 | 1,040 | 0.05～0.3 | 0.12 | 4,700 | 680 | 0.05～0.3 | 0.12 | 120 | | |
| 6,400 | 2,130 | 0.05～0.4 | 0.16 | 5,600 | 1,410 | 0.05～0.4 | 0.16 | 40 | 8 | 4 |
| 5,900 | 1,770 | 0.05～0.4 | 0.16 | 5,200 | 1,180 | 0.05～0.4 | 0.16 | 50 | | |
| 5,900 | 1,770 | 0.05～0.4 | 0.16 | 5,200 | 1,180 | 0.05～0.4 | 0.16 | 60 | | |
| 5,400 | 1,620 | 0.05～0.4 | 0.16 | 4,700 | 1,070 | 0.05～0.4 | 0.16 | 70 | | |
| 5,400 | 1,620 | 0.05～0.4 | 0.16 | 4,700 | 1,070 | 0.05～0.4 | 0.16 | 80 | | |
| 5,000 | 1,330 | 0.05～0.4 | 0.16 | 4,300 | 870 | 0.05～0.4 | 0.16 | 100 | | |
| 4,500 | 1,200 | 0.05～0.4 | 0.16 | 3,900 | 790 | 0.05～0.4 | 0.16 | 120 | | |
| 5,100 | 2,230 | 0.05～0.5 | 0.2 | 4,500 | 1,490 | 0.05～0.5 | 0.2 | 50 | 10 | 5 |
| 4,700 | 1,850 | 0.05～0.5 | 0.2 | 4,100 | 1,220 | 0.05～0.5 | 0.2 | 60 | | |
| 4,700 | 1,850 | 0.05～0.5 | 0.2 | 4,100 | 1,220 | 0.05～0.5 | 0.2 | 75 | | |
| 4,300 | 1,700 | 0.05～0.5 | 0.2 | 3,800 | 1,130 | 0.05～0.5 | 0.2 | 80 | | |
| 4,300 | 1,700 | 0.05～0.5 | 0.2 | 3,800 | 1,130 | 0.05～0.5 | 0.2 | 100 | | |
| 4,000 | 1,400 | 0.05～0.5 | 0.2 | 3,500 | 920 | 0.05～0.5 | 0.2 | 120 | | |
| 4,200 | 2,100 | 0.05～0.6 | 0.24 | 3,700 | 1,400 | 0.05～0.6 | 0.24 | 60 | 12 | 6 |
| 3,900 | 1,760 | 0.05～0.6 | 0.24 | 3,500 | 1,190 | 0.05～0.6 | 0.24 | 80 | | |
| 3,600 | 1,620 | 0.05～0.6 | 0.24 | 3,200 | 1,090 | 0.05～0.6 | 0.24 | 100 | | |
| 3,600 | 1,620 | 0.05～0.6 | 0.24 | 3,200 | 1,090 | 0.05～0.6 | 0.24 | 120 | | |

# Epoch High Hard Ball-TH3
# エポック ハイハードボール -TH3

RE公差 RE tolerance
RE0.5～RE1.5 : ±0.005
RE2～RE3 : ±0.007
RE4～RE6 : ±0.010

外径公差 Dia. tolerance
RE0.5～RE1.5 : 0～−0.010
RE2～RE3 : 0～−0.014
RE4～RE6 : 0～−0.020

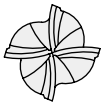
h5

(mm)

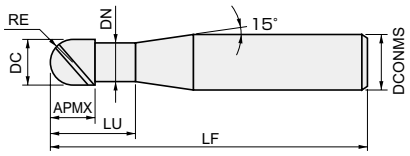
高硬度鋼加工用4枚刃ボールエンドミルに
TH3コーティングを適用し進化
高硬度鋼の加工で更なる長寿命な加工を実現

Evolved by addopting a TH3 coating on 4-flute ball end mill for high hardened steel processing. On high-hardened steel processing, to achieve even longer tool life.

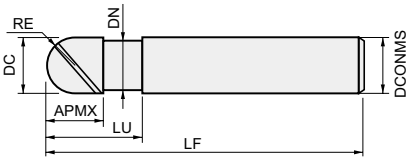
4枚刃
4Flutes



Aタイプ
A type




Bタイプ
B type




## EHHBE4○○○(-S○)-TH3

超硬 Carbide / TH3 / ねじれ40° Helix angle / 不等分割 Unequal pitch / 切削条件表 A125 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 刃長 Flute length APMX | 首下長 Under neck length LU | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 刃数 No. of flutes | タイプ Type | 希望小売価格（円） Suggested retail price(￥) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EHHBE4010-S4-TH3 | ● | 0.5 | 1 | 1.5 | 3 | 0.95 | 50 | 4 | 4 | A | 11,250 |
| EHHBE4010-S6-TH3 | ● | | | 1.5 | 3 | 0.95 | 50 | 6 | 4 | A | 12,440 |
| EHHBE4015-S4-TH3 | ● | 0.75 | 1.5 | 2.5 | 4.5 | 1.43 | 50 | 4 | 4 | A | 11,900 |
| EHHBE4015-S6-TH3 | ● | | | 2.5 | 4.5 | 1.43 | 50 | 6 | 4 | A | 13,080 |
| EHHBE4020-S4-TH3 | ● | 1 | 2 | 3 | 6 | 1.9 | 50 | 4 | 4 | A | 11,900 |
| EHHBE4020-S6-TH3 | ● | | | 3 | 6 | 1.9 | 50 | 6 | 4 | A | 13,080 |
| EHHBE4025-S4-TH3 | ● | 1.25 | 2.5 | 4 | 7.5 | 2.38 | 50 | 4 | 4 | A | 12,540 |
| EHHBE4025-S6-TH3 | ● | | | 4 | 7.5 | 2.38 | 50 | 6 | 4 | A | 13,820 |
| EHHBE4030-S4-TH3 | ● | 1.5 | 3 | 4.5 | 9 | 2.9 | 70 | 4 | 4 | A | 12,540 |
| EHHBE4030-S6-TH3 | ● | | | 4.5 | 9 | 2.9 | 70 | 6 | 4 | A | 13,820 |
| EHHBE4040-S4-TH3 | ● | 2 | 4 | 6 | 12 | 3.9 | 70 | 4 | 4 | B | 12,540 |
| EHHBE4040-S6-TH3 | ● | | | 6 | 12 | 3.9 | 70 | 6 | 4 | A | 13,820 |
| EHHBE4050-TH3 | ● | 2.5 | 5 | 7.5 | 15 | 4.7 | 80 | 6 | 4 | A | 15,600 |
| EHHBE4060-TH3 | ● | 3 | 6 | 9 | 18 | 5.7 | 90 | 6 | 4 | B | 16,500 |
| EHHBE4080-TH3 | ● | 4 | 8 | 12 | 24 | 7.6 | 100 | 8 | 4 | B | 21,550 |
| EHHBE4100-TH3 | ● | 5 | 10 | 15 | 30 | 9.5 | 100 | 10 | 4 | B | 27,490 |
| EHHBE4120-TH3 | ● | 6 | 12 | 18 | 36 | 11.5 | 110 | 12 | 4 | B | 35,690 |

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ○ | ◎ | ◎ | ◎ | ◎ | | | | |

## 再研磨対応外径範囲 Re-grinding compatibility range

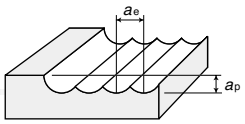
| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EHHBE-TH3 | 4～12 | 4～12 |

●：標準在庫品です。●：Stocked items.

# 標準切削条件表 Recommended cutting conditions EHHBE-TH3

## 荒加工 Roughing

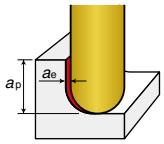
55HRC未満の被削材に関しましては、弊社2枚刃、3枚刃シリーズを推奨致します。
For work materials with hardnesses up to 55HRC, we recommend our company's 2-flute or 3-flute tool series.




| 被削材 Work material | | 焼入れ鋼 Hardened steels (55～62HRC) SKD11, YXR3 | | | | 焼入れ鋼 Hardened steels (62～66HRC) HAP40, YXR7, SKH51 | | | | 焼入れ鋼 Hardened steels (66～72HRC) HAP72 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ボール半径 RE Ball radius (mm) | 外径 DC Tool dia. (mm) | 切削速度 $v_c$=110m/min | | | | 切削速度 $v_c$=90m/min | | | | 切削速度 $v_c$=70m/min | | | |
| | | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | $a_p$ mm | $a_e$ mm | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | $a_p$ mm | $a_e$ mm | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | $a_p$ mm | $a_e$ mm |
| 0.5 | 1 | 35,000 | 1,930 | 0.08 | 0.23 | 28,700 | 1,340 | 0.06 | 0.18 | 22,300 | 860 | 0.05 | 0.14 |
| 0.75 | 1.5 | 23,400 | 1,760 | 0.11 | 0.34 | 19,100 | 1,220 | 0.09 | 0.27 | 14,900 | 780 | 0.07 | 0.20 |
| 1 | 2 | 17,500 | 1,750 | 0.15 | 0.45 | 14,300 | 1,220 | 0.12 | 0.36 | 11,100 | 780 | 0.09 | 0.27 |
| 1.25 | 2.5 | 14,000 | 1,650 | 0.19 | 0.56 | 11,500 | 1,150 | 0.15 | 0.45 | 8,900 | 730 | 0.11 | 0.34 |
| 1.5 | 3 | 11,700 | 1,650 | 0.23 | 0.68 | 9,600 | 1,150 | 0.18 | 0.54 | 7,400 | 730 | 0.14 | 0.41 |
| 2 | 4 | 8,800 | 1,670 | 0.30 | 0.90 | 7,200 | 1,160 | 0.24 | 0.72 | 5,600 | 740 | 0.18 | 0.54 |
| 2.5 | 5 | 7,000 | 1,700 | 0.38 | 1.13 | 5,700 | 1,170 | 0.30 | 0.90 | 4,500 | 760 | 0.23 | 0.68 |
| 3 | 6 | 5,800 | 1,690 | 0.45 | 1.35 | 4,800 | 1,190 | 0.36 | 1.08 | 3,700 | 750 | 0.27 | 0.81 |
| 4 | 8 | 4,400 | 1,760 | 0.60 | 1.80 | 3,600 | 1,220 | 0.48 | 1.44 | 2,800 | 780 | 0.36 | 1.08 |
| 5 | 10 | 3,500 | 1,750 | 0.75 | 2.25 | 2,900 | 1,230 | 0.60 | 1.80 | 2,200 | 770 | 0.45 | 1.35 |
| 6 | 12 | 2,900 | 1,650 | 0.90 | 2.70 | 2,400 | 1,160 | 0.72 | 2.16 | 1,900 | 760 | 0.54 | 1.62 |

## 側面加工 Side Cutting

55HRC未満の被削材に関しましては、弊社2枚刃、3枚刃シリーズを推奨致します。
For work materials with hardnesses up to 55HRC, we recommend our company's 2-flute or 3-flute tool series.




| 被削材 Work material | | 焼入れ鋼 Hardened steels (55～62HRC) SKD11, YXR3 | | | | 焼入れ鋼 Hardened steels (62～66HRC) HAP40, YXR7, SKH51 | | | | 焼入れ鋼 Hardened steels (66～72HRC) HAP72 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ボール半径 RE Ball radius (mm) | 外径 DC Tool dia. (mm) | 切削速度 $v_c$=150m/min | | | | 切削速度 $v_c$=125m/min | | | | 切削速度 $v_c$=100m/min | | | |
| | | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | $a_p$ mm | $a_e$ mm | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | $a_p$ mm | $a_e$ mm | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | $a_p$ mm | $a_e$ mm |
| 0.5 | 1 | 47,800 | 2,630 | 1.00 | 0.02 | 39,800 | 1,750 | 1.00 | 0.02 | 31,800 | 1,050 | 1.00 | 0.01 |
| 0.75 | 1.5 | 31,800 | 2,390 | 1.50 | 0.03 | 26,500 | 1,590 | 1.50 | 0.02 | 21,200 | 950 | 1.50 | 0.02 |
| 1 | 2 | 23,900 | 2,390 | 2.00 | 0.04 | 19,900 | 1,590 | 2.00 | 0.03 | 15,900 | 950 | 2.00 | 0.02 |
| 1.25 | 2.5 | 19,100 | 2,240 | 2.50 | 0.05 | 15,900 | 1,490 | 2.50 | 0.04 | 12,700 | 900 | 2.50 | 0.03 |
| 1.5 | 3 | 15,900 | 2,240 | 3.00 | 0.06 | 13,300 | 1,500 | 3.00 | 0.05 | 10,600 | 900 | 3.00 | 0.03 |
| 2 | 4 | 11,900 | 2,260 | 4.00 | 0.08 | 10,000 | 1,520 | 4.00 | 0.06 | 8,000 | 910 | 4.00 | 0.04 |
| 2.5 | 5 | 9,600 | 2,330 | 5.00 | 0.10 | 8,000 | 1,550 | 5.00 | 0.08 | 6,400 | 930 | 5.00 | 0.05 |
| 3 | 6 | 8,000 | 2,330 | 6.00 | 0.12 | 6,600 | 1,540 | 6.00 | 0.09 | 5,300 | 930 | 6.00 | 0.06 |
| 4 | 8 | 6,000 | 2,400 | 8.00 | 0.16 | 5,000 | 1,600 | 8.00 | 0.12 | 4,000 | 960 | 8.00 | 0.08 |
| 5 | 10 | 4,800 | 2,400 | 10.00 | 0.20 | 4,000 | 1,600 | 10.00 | 0.15 | 3,200 | 960 | 10.00 | 0.10 |
| 6 | 12 | 4,000 | 2,280 | 12.00 | 0.24 | 3,300 | 1,500 | 12.00 | 0.18 | 2,700 | 920 | 12.00 | 0.12 |

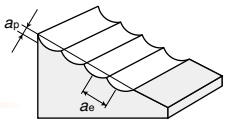
| | 55～62HRC | 62～66HRC | 66～72HRC |
|---|---|---|---|
| ヘリカル穴加工時の傾斜角 Slant angle for helical boring | 1° | 0.5° | 0.2° |
| ヘリカル穴加工時の送り速度 Feed rate for helical boring | 側面加工条件の 70% 70% of side cutting conditions | | |

※ヘリカル穴加工時の穴径は、工具径の1.6倍以上2.0倍未満に設定ください。
※ヘリカル穴加工時の最大深さは工具径以下(1DC以下)に設定ください。
※Set the hole diameter for helical boring to between 1.6 and 2.0 times the tool diameter.
※Set the maximum depth for helical boring to the tool diameter or smaller (≤ 1DC).

【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②できるだけ高剛性、高精度の機械をご使用ください。
③この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。

【Note】① Use the appropriate coolant for the work material and machining shape.
② Use as highly rigid and accurate machine as possible.
③ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

# Epoch High Hard Ball-TH3
# エポック ハイハードボール -TH3




## 仕上げ加工 Finishing

| 被削材 Work material | | 工具鋼 Tool steels (25～35HRC) HPM7, SCM440 | | | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM-MAGIC, CENA1 | | | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61, HPM38, DAC-MAGIC | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ボール半径 RE Ball radius (mm) | 外径 DC Tool dia. (mm) | 切削速度 vc=280m/min | | | | 切削速度 vc=250m/min | | | | 切削速度 vc=210m/min | | | |
| | | 回転数 n min-1 | 送り速度 vf mm/min | ap mm | ae mm | 回転数 n min-1 | 送り速度 vf mm/min | ap mm | ae mm | 回転数 n min-1 | 送り速度 vf mm/min | ap mm | ae mm |
| 0.5 | 1 | 60,000 | 3,240 | 0.02～0.05 | 0.02 | 60,000 | 2,970 | 0.02～0.05 | 0.02 | 60,000 | 2,700 | 0.02～0.05 | 0.02 |
| 0.75 | 1.5 | 60,000 | 4,860 | 0.02～0.07 | 0.03 | 53,100 | 3,940 | 0.02～0.07 | 0.03 | 44,600 | 3,010 | 0.02～0.07 | 0.03 |
| 1 | 2 | 44,600 | 4,820 | 0.02～0.10 | 0.04 | 39,800 | 3,940 | 0.02～0.10 | 0.04 | 33,400 | 3,010 | 0.02～0.10 | 0.04 |
| 1.25 | 2.5 | 35,700 | 5,030 | 0.05～0.12 | 0.05 | 31,800 | 4,110 | 0.05～0.12 | 0.05 | 26,800 | 3,150 | 0.05～0.12 | 0.05 |
| 1.5 | 3 | 29,700 | 5,030 | 0.05～0.15 | 0.06 | 26,500 | 4,110 | 0.05～0.15 | 0.06 | 22,300 | 3,140 | 0.05～0.15 | 0.06 |
| 2 | 4 | 22,300 | 5,080 | 0.05～0.20 | 0.08 | 19,900 | 4,160 | 0.05～0.20 | 0.08 | 16,700 | 3,170 | 0.05～0.20 | 0.08 |
| 2.5 | 5 | 17,800 | 5,180 | 0.05～0.25 | 0.1 | 15,900 | 4,240 | 0.05～0.25 | 0.1 | 13,400 | 3,250 | 0.05～0.25 | 0.10 |
| 3 | 6 | 14,900 | 5,200 | 0.05～0.3 | 0.12 | 13,300 | 4,260 | 0.05～0.3 | 0.12 | 11,100 | 3,230 | 0.05～0.3 | 0.12 |
| 4 | 8 | 11,100 | 5,330 | 0.05～0.4 | 0.16 | 10,000 | 4,400 | 0.05～0.4 | 0.16 | 8,400 | 3,360 | 0.05～0.4 | 0.16 |
| 5 | 10 | 8,900 | 5,340 | 0.05～0.5 | 0.2 | 8,000 | 4,400 | 0.05～0.5 | 0.2 | 6,700 | 3,350 | 0.05～0.5 | 0.20 |
| 6 | 12 | 7,400 | 5,060 | 0.05～0.6 | 0.24 | 6,600 | 4,140 | 0.05～0.6 | 0.24 | 5,600 | 3,190 | 0.05～0.6 | 0.24 |

| 被削材 Work material | | 焼入れ鋼 Hardened steels (55～62HRC) SKD11, YXR3 | | | | 焼入れ鋼 Hardened steels (62～66HRC) HAP40, YXR7, SKH51 | | | | 焼入れ鋼 Hardened steels (66～72HRC) HAP72 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ボール半径 RE Ball radius (mm) | 外径 DC Tool dia. (mm) | 切削速度 vc=160m/min | | | | 切削速度 vc=140m/min | | | | 切削速度 vc=120m/min | | | |
| | | 回転数 n min-1 | 送り速度 vf mm/min | ap mm | ae mm | 回転数 n min-1 | 送り速度 vf mm/min | ap mm | ae mm | 回転数 n min-1 | 送り速度 vf mm/min | ap mm | ae mm |
| 0.5 | 1 | 51,000 | 1,840 | 0.02～0.05 | 0.02 | 44,600 | 1,300 | 0.02～0.05 | 0.02 | 38,200 | 950 | 0.02～0.05 | 0.02 |
| 0.75 | 1.5 | 34,000 | 1,840 | 0.02～0.07 | 0.03 | 29,700 | 1,300 | 0.02～0.07 | 0.03 | 25,500 | 950 | 0.02～0.07 | 0.03 |
| 1 | 2 | 25,500 | 1,840 | 0.02～0.10 | 0.04 | 22,300 | 1,300 | 0.02～0.10 | 0.04 | 19,100 | 950 | 0.02～0.10 | 0.04 |
| 1.25 | 2.5 | 20,400 | 1,920 | 0.05～0.12 | 0.05 | 17,800 | 1,360 | 0.05～0.12 | 0.05 | 15,300 | 990 | 0.05～0.12 | 0.05 |
| 1.5 | 3 | 17,000 | 1,920 | 0.05～0.15 | 0.06 | 14,900 | 1,370 | 0.05～0.15 | 0.06 | 12,700 | 980 | 0.05～0.15 | 0.06 |
| 2 | 4 | 12,700 | 1,930 | 0.05～0.20 | 0.08 | 11,100 | 1,370 | 0.05～0.20 | 0.08 | 9,600 | 1,000 | 0.05～0.20 | 0.08 |
| 2.5 | 5 | 10,200 | 1,980 | 0.05～0.25 | 0.10 | 8,900 | 1,400 | 0.05～0.25 | 0.10 | 7,600 | 1,010 | 0.05～0.25 | 0.10 |
| 3 | 6 | 8,500 | 1,980 | 0.05～0.3 | 0.12 | 7,400 | 1,400 | 0.05～0.3 | 0.12 | 6,400 | 1,020 | 0.05～0.3 | 0.12 |
| 4 | 8 | 6,400 | 2,050 | 0.05～0.4 | 0.16 | 5,600 | 1,460 | 0.05～0.4 | 0.16 | 4,800 | 1,060 | 0.05～0.4 | 0.16 |
| 5 | 10 | 5,100 | 2,040 | 0.05～0.5 | 0.20 | 4,500 | 1,460 | 0.05～0.5 | 0.20 | 3,800 | 1,050 | 0.05～0.5 | 0.20 |
| 6 | 12 | 4,200 | 1,920 | 0.05～0.6 | 0.24 | 3,700 | 1,370 | 0.05～0.6 | 0.24 | 3,200 | 1,000 | 0.05～0.6 | 0.24 |

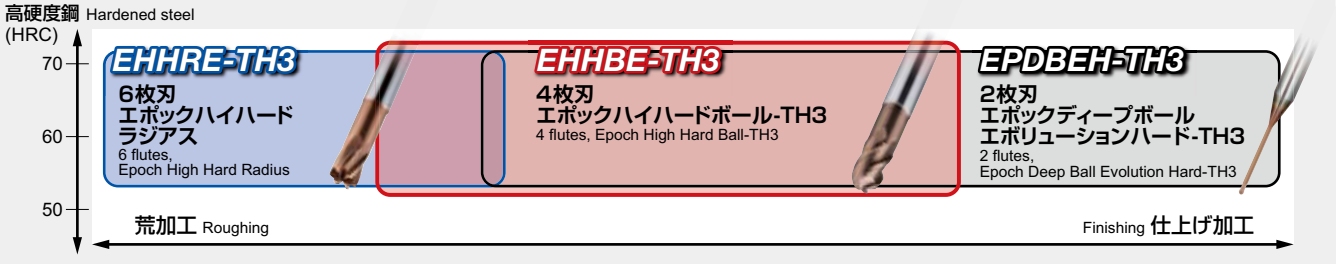
【注意】
①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②できるだけ高剛性、高精度の機械をご使用ください。
③この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。

【Note】
① Use the appropriate coolant for the work material and machining shape.
② Use as highly rigid and accurate machine as possible.
③ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

## 性能・位置づけ Performance and positioning

EHHBE-TH3は高硬度鋼(55HRC～)の荒加工～中仕上げ加工領域で性能を発揮

EHHBE-TH3 exhibits the performance during roughing to semi-finishing of high hardened steel (55HRC～).



# Epoch High Hard Ball
# エポック ハイハードボール

RE公差 RE tolerance
RE0.5～RE1.5 : ±0.005
RE2～RE3 : ±0.007
RE4～RE6 : ±0.010

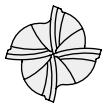
外径公差 Dia. tolerance
RE0.5～RE1.5 : 0～−0.010
RE2～RE3 : 0～−0.014
RE4～RE6 : 0～−0.020

h5

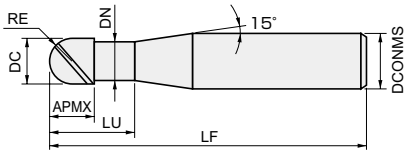
(mm)

4枚刃でさらなる高能率加工を!
新刃形の採用により、高硬度鋼で威力を発揮!
4 flutes provide cutting with even higher performance.
New flute shape shows its power on hardened steels.

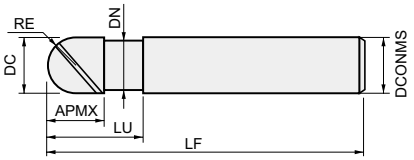
4枚刃
4Flutes



Aタイプ
A type




Bタイプ
B type




## EHHB4○○○(-S○)-ATH

超硬 Carbide | ATH | ねじれ40° Helix angle | 不等分割 Unequal pitch | 切削条件表A128 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 刃長 Flute length APMX | 首下長 Under neck length LU | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 刃数 No. of flutes | タイプ Type | 希望小売価格（円） Suggested retail price(￥) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EHHB4010-S4-ATH | ● | 0.5 | 1 | 1.5 | 3 | 0.95 | 50 | 4 | 4 | A | 11,250 |
| EHHB4010-S6-ATH | ● | | | 1.5 | 3 | 0.95 | 50 | 6 | 4 | A | 12,440 |
| EHHB4015-S4-ATH | ● | 0.75 | 1.5 | 2.5 | 4.5 | 1.43 | 50 | 4 | 4 | A | 11,900 |
| EHHB4015-S6-ATH | ● | | | 2.5 | 4.5 | 1.43 | 50 | 6 | 4 | A | 13,080 |
| EHHB4020-S4-ATH | ● | 1 | 2 | 3 | 6 | 1.9 | 50 | 4 | 4 | A | 11,900 |
| EHHB4020-S6-ATH | ● | | | 3 | 6 | 1.9 | 50 | 6 | 4 | A | 13,080 |
| EHHB4025-S4-ATH | ● | 1.25 | 2.5 | 4 | 7.5 | 2.38 | 50 | 4 | 4 | A | 12,540 |
| EHHB4025-S6-ATH | ● | | | 4 | 7.5 | 2.38 | 50 | 6 | 4 | A | 13,820 |
| EHHB4030-S4-ATH | ● | 1.5 | 3 | 4.5 | 9 | 2.9 | 70 | 4 | 4 | A | 12,540 |
| EHHB4030-S6-ATH | ● | | | 4.5 | 9 | 2.9 | 70 | 6 | 4 | A | 13,820 |
| EHHB4040-S4-ATH | ● | 2 | 4 | 6 | 12 | 3.9 | 70 | 4 | 4 | B | 12,540 |
| EHHB4040-S6-ATH | ● | | | 6 | 12 | 3.9 | 70 | 6 | 4 | A | 13,820 |
| EHHB4050-ATH | ● | 2.5 | 5 | 7.5 | 15 | 4.7 | 80 | 6 | 4 | A | 15,600 |
| EHHB4060-ATH | ● | 3 | 6 | 9 | 18 | 5.7 | 90 | 6 | 4 | B | 16,500 |
| EHHB4080-ATH | ● | 4 | 8 | 12 | 24 | 7.6 | 100 | 8 | 4 | B | 21,550 |
| EHHB4100-ATH | ● | 5 | 10 | 15 | 30 | 9.5 | 100 | 10 | 4 | B | 27,490 |
| EHHB4120-ATH | ● | 6 | 12 | 18 | 36 | 11.5 | 110 | 12 | 4 | B | 35,690 |

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ○ | ◎ | ◎ | ◎ | ◎ | | | | |

## 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EHHB-ATH | 4～12 | 4～12 |

●：標準在庫品です。●：Stocked items.

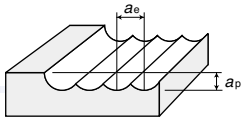
Epoch High Hard Ball

# エポック ハイハードボール

## 標準切削条件表 Recommended cutting conditions EHHB-ATH

### 荒加工 Roughing

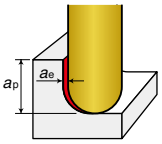
55HRC未満の被削材に関しましては、弊社2枚刃、3枚刃シリーズを推奨致します。
For work materials with hardnesses up to 55HRC, we recommend our company's 2-flute or 3-flute tool series.




| 被削材 Work material | | 焼入れ鋼 Hardened steels (55～62HRC) SKD11, YXR3 | | | | 焼入れ鋼 Hardened steels (62～66HRC) HAP40, YXR7, SKH51 | | | | 焼入れ鋼 Hardened steels (66～72HRC) HAP72 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ボール半径 RE Ball radius (mm) | 外径 DC Tool dia. (mm) | 切削速度 $v_c$=110m/min | | | | 切削速度 $v_c$=90m/min | | | | 切削速度 $v_c$=70m/min | | | |
| | | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | $a_p$ mm | $a_e$ mm | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | $a_p$ mm | $a_e$ mm | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | $a_p$ mm | $a_e$ mm |
| 0.5 | 1 | 35,000 | 1,930 | 0.08 | 0.23 | 28,700 | 1,340 | 0.06 | 0.18 | 22,300 | 860 | 0.05 | 0.14 |
| 0.75 | 1.5 | 23,400 | 1,760 | 0.11 | 0.34 | 19,100 | 1,220 | 0.09 | 0.27 | 14,900 | 780 | 0.07 | 0.20 |
| 1 | 2 | 17,500 | 1,750 | 0.15 | 0.45 | 14,300 | 1,220 | 0.12 | 0.36 | 11,100 | 780 | 0.09 | 0.27 |
| 1.25 | 2.5 | 14,000 | 1,650 | 0.19 | 0.56 | 11,500 | 1,150 | 0.15 | 0.45 | 8,900 | 730 | 0.11 | 0.34 |
| 1.5 | 3 | 11,700 | 1,650 | 0.23 | 0.68 | 9,600 | 1,150 | 0.18 | 0.54 | 7,400 | 730 | 0.14 | 0.41 |
| 2 | 4 | 8,800 | 1,670 | 0.30 | 0.90 | 7,200 | 1,160 | 0.24 | 0.72 | 5,600 | 740 | 0.18 | 0.54 |
| 2.5 | 5 | 7,000 | 1,700 | 0.38 | 1.13 | 5,700 | 1,170 | 0.30 | 0.90 | 4,500 | 760 | 0.23 | 0.68 |
| 3 | 6 | 5,800 | 1,690 | 0.45 | 1.35 | 4,800 | 1,190 | 0.36 | 1.08 | 3,700 | 750 | 0.27 | 0.81 |
| 4 | 8 | 4,400 | 1,760 | 0.60 | 1.80 | 3,600 | 1,220 | 0.48 | 1.44 | 2,800 | 780 | 0.36 | 1.08 |
| 5 | 10 | 3,500 | 1,750 | 0.75 | 2.25 | 2,900 | 1,230 | 0.60 | 1.80 | 2,200 | 770 | 0.45 | 1.35 |
| 6 | 12 | 2,900 | 1,650 | 0.90 | 2.70 | 2,400 | 1,160 | 0.72 | 2.16 | 1,900 | 760 | 0.54 | 1.62 |

### 側面加工 Side Cutting

55HRC未満の被削材に関しましては、弊社2枚刃、3枚刃シリーズを推奨致します。
For work materials with hardnesses up to 55HRC, we recommend our company's 2-flute or 3-flute tool series.




| 被削材 Work material | | 焼入れ鋼 Hardened steels (55～62HRC) SKD11, YXR3 | | | | 焼入れ鋼 Hardened steels (62～66HRC) HAP40, YXR7, SKH51 | | | | 焼入れ鋼 Hardened steels (66～72HRC) HAP72 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ボール半径 RE Ball radius (mm) | 外径 DC Tool dia. (mm) | 切削速度 $v_c$=150m/min | | | | 切削速度 $v_c$=125m/min | | | | 切削速度 $v_c$=100m/min | | | |
| | | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | $a_p$ mm | $a_e$ mm | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | $a_p$ mm | $a_e$ mm | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | $a_p$ mm | $a_e$ mm |
| 0.5 | 1 | 47,800 | 2,630 | 1.00 | 0.02 | 39,800 | 1,750 | 1.00 | 0.02 | 31,800 | 1,050 | 1.00 | 0.01 |
| 0.75 | 1.5 | 31,800 | 2,390 | 1.50 | 0.03 | 26,500 | 1,590 | 1.50 | 0.02 | 21,200 | 950 | 1.50 | 0.02 |
| 1 | 2 | 23,900 | 2,390 | 2.00 | 0.04 | 19,900 | 1,590 | 2.00 | 0.03 | 15,900 | 950 | 2.00 | 0.02 |
| 1.25 | 2.5 | 19,100 | 2,240 | 2.50 | 0.05 | 15,900 | 1,490 | 2.50 | 0.04 | 12,700 | 900 | 2.50 | 0.03 |
| 1.5 | 3 | 15,900 | 2,240 | 3.00 | 0.06 | 13,300 | 1,500 | 3.00 | 0.05 | 10,600 | 900 | 3.00 | 0.03 |
| 2 | 4 | 11,900 | 2,260 | 4.00 | 0.08 | 10,000 | 1,520 | 4.00 | 0.06 | 8,000 | 910 | 4.00 | 0.04 |
| 2.5 | 5 | 9,600 | 2,330 | 5.00 | 0.10 | 8,000 | 1,550 | 5.00 | 0.08 | 6,400 | 930 | 5.00 | 0.05 |
| 3 | 6 | 8,000 | 2,330 | 6.00 | 0.12 | 6,600 | 1,540 | 6.00 | 0.09 | 5,300 | 930 | 6.00 | 0.06 |
| 4 | 8 | 6,000 | 2,400 | 8.00 | 0.16 | 5,000 | 1,600 | 8.00 | 0.12 | 4,000 | 960 | 8.00 | 0.08 |
| 5 | 10 | 4,800 | 2,400 | 10.00 | 0.20 | 4,000 | 1,600 | 10.00 | 0.15 | 3,200 | 960 | 10.00 | 0.10 |
| 6 | 12 | 4,000 | 2,280 | 12.00 | 0.24 | 3,300 | 1,500 | 12.00 | 0.18 | 2,700 | 920 | 12.00 | 0.12 |

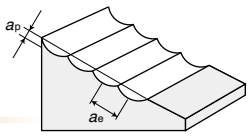
| | 55～62HRC | 62～66HRC | 66～72HRC |
|---|---|---|---|
| ヘリカル穴加工時の傾斜角 Slant angle for helical boring | 1° | 0.5° | 0.2° |
| ヘリカル穴加工時の送り速度 Feed rate for helical boring | 側面加工条件の 70% 70% of side cutting conditions | | |

※ヘリカル穴加工時の穴径は、工具径の1.6倍以上2.0倍未満に設定ください。
※ヘリカル穴加工時の最大深さは工具径以下(1DC以下)に設定ください。
※Set the hole diameter for helical boring to between 1.6 and 2.0 times the tool diameter.
※Set the maximum depth for helical boring to the tool diameter or smaller (≤ 1DC).

【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②できるだけ高剛性、高精度の機械をご使用ください。
③この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。

【Note】① Use the appropriate coolant for the work material and machining shape.
② Use as highly rigid and accurate machine as possible.
③ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

# 仕上げ加工 Finishing




| 被削材 Work material | | 工具鋼 Tool steels (25～35HRC) HPM7, SCM440 | | | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM-MAGIC, CENA1 | | | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61, HPM38, DAC-MAGIC | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ボール半径 RE Ball radius (mm) | 外径 DC Tool dia. (mm) | 切削速度 $v_c$=280m/min | | | | 切削速度 $v_c$=250m/min | | | | 切削速度 $v_c$=210m/min | | | |
| | | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | $a_p$ mm | $a_e$ mm | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | $a_p$ mm | $a_e$ mm | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | $a_p$ mm | $a_e$ mm |
| 0.5 | 1 | 60,000 | 3,240 | 0.02～0.05 | 0.02 | 60,000 | 2,970 | 0.02～0.05 | 0.02 | 60,000 | 2,700 | 0.02～0.05 | 0.02 |
| 0.75 | 1.5 | 60,000 | 4,860 | 0.02～0.07 | 0.03 | 53,100 | 3,940 | 0.02～0.07 | 0.03 | 44,600 | 3,010 | 0.02～0.07 | 0.03 |
| 1 | 2 | 44,600 | 4,820 | 0.02～0.10 | 0.04 | 39,800 | 3,940 | 0.02～0.10 | 0.04 | 33,400 | 3,010 | 0.02～0.10 | 0.04 |
| 1.25 | 2.5 | 35,700 | 5,030 | 0.05～0.12 | 0.05 | 31,800 | 4,110 | 0.05～0.12 | 0.05 | 26,800 | 3,150 | 0.05～0.12 | 0.05 |
| 1.5 | 3 | 29,700 | 5,030 | 0.05～0.15 | 0.06 | 26,500 | 4,110 | 0.05～0.15 | 0.06 | 22,300 | 3,140 | 0.05～0.15 | 0.06 |
| 2 | 4 | 22,300 | 5,080 | 0.05～0.20 | 0.08 | 19,900 | 4,160 | 0.05～0.20 | 0.08 | 16,700 | 3,170 | 0.05～0.20 | 0.08 |
| 2.5 | 5 | 17,800 | 5,180 | 0.05～0.25 | 0.1 | 15,900 | 4,240 | 0.05～0.25 | 0.1 | 13,400 | 3,250 | 0.05～0.25 | 0.10 |
| 3 | 6 | 14,900 | 5,200 | 0.05～0.3 | 0.12 | 13,300 | 4,260 | 0.05～0.3 | 0.12 | 11,100 | 3,230 | 0.05～0.3 | 0.12 |
| 4 | 8 | 11,100 | 5,330 | 0.05～0.4 | 0.16 | 10,000 | 4,400 | 0.05～0.4 | 0.16 | 8,400 | 3,360 | 0.05～0.4 | 0.16 |
| 5 | 10 | 8,900 | 5,340 | 0.05～0.5 | 0.2 | 8,000 | 4,400 | 0.05～0.5 | 0.2 | 6,700 | 3,350 | 0.05～0.5 | 0.20 |
| 6 | 12 | 7,400 | 5,060 | 0.05～0.6 | 0.24 | 6,600 | 4,140 | 0.05～0.6 | 0.24 | 5,600 | 3,190 | 0.05～0.6 | 0.24 |

| 被削材 Work material | | 焼入れ鋼 Hardened steels (55～62HRC) SKD11, YXR3 | | | | 焼入れ鋼 Hardened steels (62～66HRC) HAP40, YXR7, SKH51 | | | | 焼入れ鋼 Hardened steels (66～72HRC) HAP72 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ボール半径 RE Ball radius (mm) | 外径 DC Tool dia. (mm) | 切削速度 $v_c$=160m/min | | | | 切削速度 $v_c$=140m/min | | | | 切削速度 $v_c$=120m/min | | | |
| | | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | $a_p$ mm | $a_e$ mm | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | $a_p$ mm | $a_e$ mm | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | $a_p$ mm | $a_e$ mm |
| 0.5 | 1 | 51,000 | 1,840 | 0.02～0.05 | 0.02 | 44,600 | 1,300 | 0.02～0.05 | 0.02 | 38,200 | 950 | 0.02～0.05 | 0.02 |
| 0.75 | 1.5 | 34,000 | 1,840 | 0.02～0.07 | 0.03 | 29,700 | 1,300 | 0.02～0.07 | 0.03 | 25,500 | 950 | 0.02～0.07 | 0.03 |
| 1 | 2 | 25,500 | 1,840 | 0.02～0.10 | 0.04 | 22,300 | 1,300 | 0.02～0.10 | 0.04 | 19,100 | 950 | 0.02～0.10 | 0.04 |
| 1.25 | 2.5 | 20,400 | 1,920 | 0.05～0.12 | 0.05 | 17,800 | 1,360 | 0.05～0.12 | 0.05 | 15,300 | 990 | 0.05～0.12 | 0.05 |
| 1.5 | 3 | 17,000 | 1,920 | 0.05～0.15 | 0.06 | 14,900 | 1,370 | 0.05～0.15 | 0.06 | 12,700 | 980 | 0.05～0.15 | 0.06 |
| 2 | 4 | 12,700 | 1,930 | 0.05～0.20 | 0.08 | 11,100 | 1,370 | 0.05～0.20 | 0.08 | 9,600 | 1,000 | 0.05～0.20 | 0.08 |
| 2.5 | 5 | 10,200 | 1,980 | 0.05～0.25 | 0.10 | 8,900 | 1,400 | 0.05～0.25 | 0.10 | 7,600 | 1,010 | 0.05～0.25 | 0.10 |
| 3 | 6 | 8,500 | 1,980 | 0.05～0.3 | 0.12 | 7,400 | 1,400 | 0.05～0.3 | 0.12 | 6,400 | 1,020 | 0.05～0.3 | 0.12 |
| 4 | 8 | 6,400 | 2,050 | 0.05～0.4 | 0.16 | 5,600 | 1,460 | 0.05～0.4 | 0.16 | 4,800 | 1,060 | 0.05～0.4 | 0.16 |
| 5 | 10 | 5,100 | 2,040 | 0.05～0.5 | 0.20 | 4,500 | 1,460 | 0.05～0.5 | 0.20 | 3,800 | 1,050 | 0.05～0.5 | 0.20 |
| 6 | 12 | 4,200 | 1,920 | 0.05～0.6 | 0.24 | 3,700 | 1,370 | 0.05～0.6 | 0.24 | 3,200 | 1,000 | 0.05～0.6 | 0.24 |

【注意】
①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②できるだけ高剛性、高精度の機械をご使用ください。
③この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。

【Note】
① Use the appropriate coolant for the work material and machining shape.
② Use as highly rigid and accurate machine as possible.
③ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

## 6 Flutes Ball End Mill for High-efficiency Finishing

# 高能率仕上げ用6枚刃ボールエンドミル

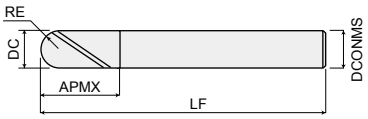
YouTube 動画公開中

曲面 Profiling / R Radius / 取りのこし Rest Material Machining / 中仕上 Semi Finishing / 仕上 Finishing

RE公差 RE tolerance ±0.01　h5　(mm)

6枚刃仕様で送り速度20m/min 以上の仕上げ加工に対応!!
6 flutes specification enables finishing at feed rate of 20m/min.

6枚刃
6 flutes




## EPHB6○○○-PN

超硬 Carbide　PN　切削条件表 A131 Cutting Conditions

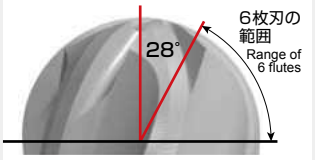
| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 刃長 Flute length APMX | 全長 Overall Length LF | シャンク径 Shank dia. DCONMS | 刃数 No. of flutes | 希望小売価格 (円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|
| EPHB6060-PN | ● | 3 | 6 | 6 | 90 | 6 | 6 | 19,760 |
| EPHB6080-PN | ● | 4 | 8 | 8 | 100 | 8 | 6 | 25,810 |
| EPHB6100-PN | ● | 5 | 10 | 10 | 100 | 10 | 6 | 32,990 |
| EPHB6120-PN | ● | 6 | 12 | 12 | 110 | 12 | 6 | 42,870 |

## ボール半径別の6枚刃使用可能範囲 6 flutes usable range by ball radius

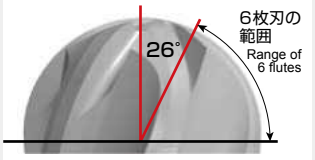
ボール刃中心は2枚刃となりますが切れ刃は設けていますので3軸機でもご使用できます。5軸機等を用いて下記の6枚刃の範囲をご使用いただくことでEPHB-PNのポテンシャルが発揮されます。

It is usable with 3-axis MC since tool center has cutting edges even 2 flutes.
EPHB-PN could performe at its true potential by using the following 6 flutes range with 5-axis machine,etc..

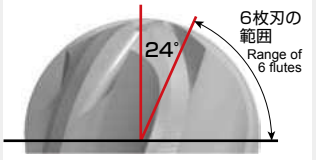
RE3　EPHB6060-PN



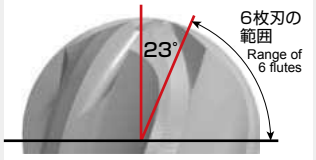

RE4　EPHB6080-PN




RE5　EPHB6100-PN




RE6　EPHB6120-PN




※表記角度は6枚刃ではない範囲を示します。主軸を傾けて使用される場合は、切り込み量等を考慮して角度設定を行ってください。
Angle represents non-6 flutes part. When machining with spindle tilted, please set the angle of spindle considering $a_p$ etc.

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | | | | ◎ | | | |

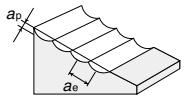
## 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPHB6-PN | × (N/A) | 6～12 |

●：標準在庫品です。●：Stocked items.

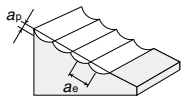
# 標準切削条件表 Recommended cutting conditions

## EPHB-PN




### 標準切削条件（仕上げ加工） Standard cutting conditions (Finishing)

| 被削材 Work material | | 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | | | ステンレス鋼・工具鋼 Stainles steels, Tool steels (25～35HRC) | | | | プリハードン鋼 Pre-hardened steels (35～45HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ボール半径 Ball radius (mm) RE | 外径 Tool dia. (mm) DC | 切削速度 Cutting speed $v_c$=200m/min | | | | 切削速度 Cutting speed $v_c$=180m/min | | | | 切削速度 Cutting speed $v_c$=160m/min | | | |
| | | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | $a_p$ (mm) | $a_e$ (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | $a_p$ (mm) | $a_e$ (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | $a_p$ (mm) | $a_e$ (mm) |
| RE3 | 6 | 10,600 | 5,720 | ≦0.2 | ≦0.2 | 9,500 | 5,130 | ≦0.2 | ≦0.2 | 8,500 | 4,590 | ≦0.2 | ≦0.2 |
| RE4 | 8 | 8,000 | 5,760 | ≦0.3 | ≦0.3 | 7,200 | 5,180 | ≦0.2 | ≦0.2 | 6,400 | 4,610 | ≦0.2 | ≦0.2 |
| RE5 | 10 | 6,400 | 5,760 | ≦0.3 | ≦0.3 | 5,700 | 5,130 | ≦0.3 | ≦0.3 | 5,100 | 4,590 | ≦0.2 | ≦0.2 |
| RE6 | 12 | 5,300 | 5,720 | ≦0.3 | ≦0.3 | 4,800 | 5,180 | ≦0.3 | ≦0.3 | 4,200 | 4,540 | ≦0.3 | ≦0.3 |




### 高速条件（仕上げ加工） High speed cutting conditions (Finishing)

| 被削材 Work material | | 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | | | ステンレス鋼・工具鋼 Stainles steels, Tool steels (25～35HRC) | | | | プリハードン鋼 Pre-hardened steels (35～45HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ボール半径 Ball radius (mm) RE | 外径 Tool dia. (mm) DC | 切削速度 Cutting speed $v_c$=375m/min | | | | 切削速度 Cutting speed $v_c$=340m/min | | | | 切削速度 Cutting speed $v_c$=300m/min | | | |
| | | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | $a_p$ (mm) | $a_e$ (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | $a_p$ (mm) | $a_e$ (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | $a_p$ (mm) | $a_e$ (mm) |
| RE3 | 6 | 19,900 | 21,490 | ≦0.1 | ≦0.1 | 17,900 | 19,330 | ≦0.1 | ≦0.1 | 15,900 | 15,450 | ≦0.1 | ≦0.1 |
| RE4 | 8 | 14,900 | 21,460 | ≦0.1 | ≦0.1 | 13,400 | 19,300 | ≦0.1 | ≦0.1 | 11,900 | 15,420 | ≦0.1 | ≦0.1 |
| RE5 | 10 | 11,900 | 21,420 | ≦0.2 | ≦0.2 | 10,700 | 19,260 | ≦0.2 | ≦0.2 | 9,500 | 15,390 | ≦0.1 | ≦0.1 |
| RE6 | 12 | 9,900 | 21,380 | ≦0.2 | ≦0.2 | 9,000 | 19,440 | ≦0.2 | ≦0.2 | 8,000 | 15,550 | ≦0.2 | ≦0.2 |

【注意】
①3DC以下の突き出し長で、高性能マシニングセンターにより高送りに追従できる加工形状であれば高速条件が適応可能です。
②先端まで切れ刃は設計しているため3軸加工でも使用可能ですが、6枚刃を機能させるためには30°以上傾けてご使用ください。
③ボール刃中心部付近（2枚刃の範囲）で加工する場合は、送り速度を1/3程度にしてください。
④$a_e$（切り込み）は参考値となります。カスプハイト等を参考に決定ください。
⑤被削材、加工形状に合わせて、適切なクーラントを使用してください。
⑥できるだけ高剛性、高精度の機械をご使用ください。
⑦この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
⑧機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

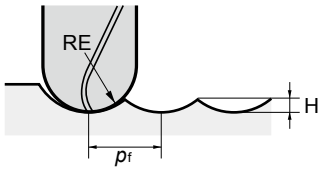
【Note】
① High speed cutting conditions are applicable as long as projection length of 3DC or less and work shape that can be followed by high performance MC.
② Since cutting edge is designed even to the tip, it can be used for 3-axis machining. However, in order to allow the 6 flutes to function, please use it by tilting more than 30°.
③ When machining near the center of the ball-nosed end cutting edge, please adjust the feed speed to about one third.
④ $a_e$ is a reference value. Please refer to cusp height etc. and set it.
⑤ Use the appropriate coolant for the work material and machining shape.
⑥ Use a highly rigid and accurate machine as possible.
⑦ These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
⑧ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

# ボールエンドミルのピックフィードと理論カスプハイト表（μm） Ball end mill pick feed and theoretical cusp height table (μm)

| | | ピックフィード量：$p_f$(mm) Pick Feed | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 0.05 | 0.075 | 0.1 | 0.15 | 0.2 | 0.3 | 0.4 | 0.5 |
| ボール半径RE Ball Radius (mm) | 0.5 | 0.63 | 1.41 | 2.51 | 5.66 | 10.10 | 23.03 | 41.74 | 66.99 |
| | 1.0 | 0.31 | 0.70 | 1.25 | 2.82 | 5.01 | 11.31 | 20.20 | 31.75 |
| | 2.0 | 0.16 | 0.35 | 0.63 | 1.41 | 2.50 | 5.63 | 10.03 | 15.69 |
| | 3.0 | 0.10 | 0.23 | 0.42 | 0.94 | 1.67 | 3.75 | 6.67 | 10.43 |
| | 4.0 | 0.08 | 0.18 | 0.31 | 0.70 | 1.25 | 2.81 | 5.00 | 7.82 |
| | 5.0 | 0.06 | 0.14 | 0.25 | 0.56 | 1.00 | 2.25 | 4.00 | 6.25 |
| | 6.0 | 0.05 | 0.12 | 0.21 | 0.47 | 0.83 | 1.88 | 3.33 | 5.21 |
| | 8.0 | 0.04 | 0.09 | 0.16 | 0.35 | 0.63 | 1.41 | 2.50 | 3.91 |
| | 10.0 | 0.03 | 0.07 | 0.13 | 0.28 | 0.50 | 1.13 | 2.00 | 3.13 |

ピックフィードとカスプハイト
Pick Feed and Cusp Height

$H=RE-\sqrt{RE^2-p_f^2/4} \fallingdotseq p_f^2/8RE$



# Taper Ball End Mill for High Accuracy Rib Slotting
# エポック リブ溝加工用テーパーボールエンドミル

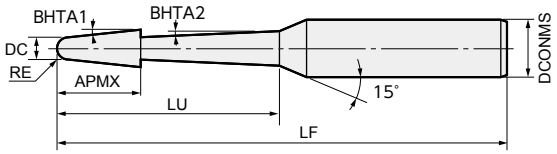
YouTube 動画公開中

テーパボール Radius Taper　リブ・細部 Rib Miniature

RE公差 RE tolerance ±0.02　h5　(mm)

リブ溝加工の新提案、放電加工から直彫加工へ
New proposal for machining rib groove. From electric discharge machining to direct milling.

先端2枚刃
外周4枚刃
Tip : 2 flutes
Periphery : 4 flutes



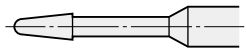
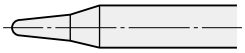

## EB4HR◯◯◯◯TN-◯◯-◯◯-ATH

超硬 Carbide　ATH　ねじれ40° Helix angle　切削条件表A134 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 刃部テーパ半角 Taper angle on side BHTA1 | 首下長 Under Neck length LU | 刃長 Flute length APMX | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首形状 Neck shape | 首部テーパ半角 Neck angle (°) BHTA2 | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EB4HR0060TN-4-05-ATH | ● | 0.3 | 0.6 | 0.5 | 4 | 3.2 | 50 | 4 | A | - | 18,210 |
| EB4HR0060TN-5-05-ATH | ● | 0.3 | 0.6 | 0.5 | 5 | 3.2 | 50 | 4 | A | - | 18,210 |
| EB4HR0060TN-6-05-ATH | ● | 0.3 | 0.6 | 0.5 | 6 | 3.2 | 50 | 4 | A | - | 18,330 |
| EB4HR0060TN-7-05-ATH | ● | 0.3 | 0.6 | 0.5 | 7 | 3.2 | 50 | 4 | B | 0.5 | 18,330 |
| EB4HR0060TN-8-05-ATH | ● | 0.3 | 0.6 | 0.5 | 8 | 3.2 | 50 | 4 | B | 0.5 | 18,330 |
| EB4HR0060TN-9-05-ATH | ● | 0.3 | 0.6 | 0.5 | 9 | 3.2 | 50 | 4 | B | 0.5 | 18,430 |
| EB4HR0060TN-10-05-ATH | ● | 0.3 | 0.6 | 0.5 | 10 | 3.2 | 50 | 4 | B | 0.5 | 18,430 |
| EB4HR0060TN-4-10-ATH | ● | 0.3 | 0.6 | 1 | 4 | 3.2 | 50 | 4 | A | - | 18,210 |
| EB4HR0060TN-5-10-ATH | ● | 0.3 | 0.6 | 1 | 5 | 3.2 | 50 | 4 | A | - | 18,210 |
| EB4HR0060TN-6-10-ATH | ● | 0.3 | 0.6 | 1 | 6 | 3.2 | 50 | 4 | A | - | 18,330 |
| EB4HR0060TN-7-10-ATH | ● | 0.3 | 0.6 | 1 | 7 | 3.2 | 50 | 4 | B | 1 | 18,330 |
| EB4HR0060TN-8-10-ATH | ● | 0.3 | 0.6 | 1 | 8 | 3.2 | 50 | 4 | B | 1 | 18,330 |
| EB4HR0060TN-9-10-ATH | ● | 0.3 | 0.6 | 1 | 9 | 3.2 | 50 | 4 | B | 1 | 18,430 |
| EB4HR0060TN-10-10-ATH | ● | 0.3 | 0.6 | 1 | 10 | 3.2 | 50 | 4 | B | 1 | 18,430 |
| EB4HR0070TN-4-05-ATH | ● | 0.35 | 0.7 | 0.5 | 4 | 3.2 | 50 | 4 | A | - | 17,140 |
| EB4HR0070TN-5-05-ATH | ● | 0.35 | 0.7 | 0.5 | 5 | 3.2 | 50 | 4 | A | - | 17,140 |
| EB4HR0070TN-6-05-ATH | ● | 0.35 | 0.7 | 0.5 | 6 | 3.2 | 50 | 4 | A | - | 17,260 |
| EB4HR0070TN-7-05-ATH | ● | 0.35 | 0.7 | 0.5 | 7 | 3.2 | 50 | 4 | B | 0.5 | 17,260 |
| EB4HR0070TN-8-05-ATH | ● | 0.35 | 0.7 | 0.5 | 8 | 3.2 | 50 | 4 | B | 0.5 | 17,360 |
| EB4HR0070TN-9-05-ATH | ● | 0.35 | 0.7 | 0.5 | 9 | 3.2 | 50 | 4 | B | 0.5 | 17,360 |
| EB4HR0070TN-10-05-ATH | ● | 0.35 | 0.7 | 0.5 | 10 | 3.2 | 50 | 4 | B | 0.5 | 17,360 |
| EB4HR0070TN-4-10-ATH | ● | 0.35 | 0.7 | 1 | 4 | 3.2 | 50 | 4 | A | - | 17,140 |
| EB4HR0070TN-5-10-ATH | ● | 0.35 | 0.7 | 1 | 5 | 3.2 | 50 | 4 | A | - | 17,140 |
| EB4HR0070TN-6-10-ATH | ● | 0.35 | 0.7 | 1 | 6 | 3.2 | 50 | 4 | A | - | 17,260 |
| EB4HR0070TN-7-10-ATH | ● | 0.35 | 0.7 | 1 | 7 | 3.2 | 50 | 4 | B | 1 | 17,260 |
| EB4HR0070TN-8-10-ATH | ● | 0.35 | 0.7 | 1 | 8 | 3.2 | 50 | 4 | B | 1 | 17,360 |
| EB4HR0070TN-9-10-ATH | ● | 0.35 | 0.7 | 1 | 9 | 3.2 | 50 | 4 | B | 1 | 17,360 |
| EB4HR0070TN-10-10-ATH | ● | 0.35 | 0.7 | 1 | 10 | 3.2 | 50 | 4 | B | 1 | 17,360 |
| EB4HR0080TN-4-05-ATH | ● | 0.4 | 0.8 | 0.5 | 4 | 3.2 | 50 | 4 | A | - | 16,190 |
| EB4HR0080TN-6-05-ATH | ● | 0.4 | 0.8 | 0.5 | 6 | 3.2 | 50 | 4 | A | - | 16,290 |
| EB4HR0080TN-8-05-ATH | ● | 0.4 | 0.8 | 0.5 | 8 | 3.2 | 50 | 4 | B | 0.5 | 16,290 |
| EB4HR0080TN-10-05-ATH | ● | 0.4 | 0.8 | 0.5 | 10 | 3.2 | 50 | 4 | B | 0.5 | 16,400 |
| EB4HR0080TN-12-05-ATH | ● | 0.4 | 0.8 | 0.5 | 12 | 3.2 | 55 | 4 | B | 0.5 | 16,500 |
| EB4HR0080TN-14-05-ATH | ● | 0.4 | 0.8 | 0.5 | 14 | 3.2 | 55 | 4 | B | 0.5 | 16,610 |
| EB4HR0080TN-4-10-ATH | ● | 0.4 | 0.8 | 1 | 4 | 3.2 | 50 | 4 | A | - | 16,190 |
| EB4HR0080TN-6-10-ATH | ● | 0.4 | 0.8 | 1 | 6 | 3.2 | 50 | 4 | A | - | 16,290 |
| EB4HR0080TN-8-10-ATH | ● | 0.4 | 0.8 | 1 | 8 | 3.2 | 50 | 4 | B | 1 | 16,290 |
| EB4HR0080TN-10-10-ATH | ● | 0.4 | 0.8 | 1 | 10 | 3.2 | 50 | 4 | B | 1 | 16,400 |
| EB4HR0080TN-12-10-ATH | ● | 0.4 | 0.8 | 1 | 12 | 3.2 | 55 | 4 | B | 1 | 16,500 |
| EB4HR0080TN-14-10-ATH | ● | 0.4 | 0.8 | 1 | 14 | 3.2 | 55 | 4 | B | 1 | 16,610 |
| EB4HR0090TN-4-05-ATH | ● | 0.45 | 0.9 | 0.5 | 4 | 3.2 | 50 | 4 | A | - | 16,070 |
| EB4HR0090TN-6-05-ATH | ● | 0.45 | 0.9 | 0.5 | 6 | 3.2 | 50 | 4 | A | - | 16,190 |
| EB4HR0090TN-8-05-ATH | ● | 0.45 | 0.9 | 0.5 | 8 | 3.2 | 50 | 4 | B | 0.5 | 16,290 |
| EB4HR0090TN-10-05-ATH | ● | 0.45 | 0.9 | 0.5 | 10 | 3.2 | 50 | 4 | B | 0.5 | 16,400 |
| EB4HR0090TN-12-05-ATH | ● | 0.45 | 0.9 | 0.5 | 12 | 3.2 | 55 | 4 | B | 0.5 | 16,500 |
| EB4HR0090TN-14-05-ATH | ● | 0.45 | 0.9 | 0.5 | 14 | 3.2 | 55 | 4 | B | 0.5 | 16,500 |
| EB4HR0090TN-4-10-ATH | ● | 0.45 | 0.9 | 1 | 4 | 3.2 | 50 | 4 | A | - | 16,070 |
| EB4HR0090TN-6-10-ATH | ● | 0.45 | 0.9 | 1 | 6 | 3.2 | 50 | 4 | A | - | 16,190 |
| EB4HR0090TN-8-10-ATH | ● | 0.45 | 0.9 | 1 | 8 | 3.2 | 50 | 4 | B | 1 | 16,290 |
| EB4HR0090TN-10-10-ATH | ● | 0.45 | 0.9 | 1 | 10 | 3.2 | 50 | 4 | B | 1 | 16,400 |
| EB4HR0090TN-12-10-ATH | ● | 0.45 | 0.9 | 1 | 12 | 3.2 | 55 | 4 | B | 1 | 16,500 |
| EB4HR0090TN-14-10-ATH | ● | 0.45 | 0.9 | 1 | 14 | 3.2 | 55 | 4 | B | 1 | 16,500 |

●：標準在庫品です。●：Stocked items.

## ■首形状詳細 Detail of neck shape

| 首形状 A<br>Neck shape<br>ストレートネック<br>Straight neck |  | 首形状 B<br>Neck shape<br>テーパネック<br>Taper neck | | 首形状 C<br>Neck shape<br>ネックなし<br>Without neck |  |
|---|---|---|---|---|---|

# EB4HR○○○○TN-○○-○○-ATH

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 刃部テーパ半角 Taper angle on side BHTA1 | 首下長 Under Neck length LU | 刃長 Flute length APMX | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首形状 Neck shape | 首部テーパ半角 Neck angle (°) BHTA2 | 希望小売価格 (円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EB4HR0100TN-4-05-ATH | ● | 0.5 | 1 | 0.5 | 4 | 4 | 50 | 4 | C | - | 13,930 |
| EB4HR0100TN-6-05-ATH | ● | 0.5 | 1 | 0.5 | 6 | 4 | 50 | 4 | A | - | 13,930 |
| EB4HR0100TN-8-05-ATH | ● | 0.5 | 1 | 0.5 | 8 | 4 | 50 | 4 | B | 0.5 | 14,040 |
| EB4HR0100TN-10-05-ATH | ● | 0.5 | 1 | 0.5 | 10 | 4 | 50 | 4 | B | 0.5 | 14,150 |
| EB4HR0100TN-12-05-ATH | ● | 0.5 | 1 | 0.5 | 12 | 4 | 55 | 4 | B | 0.5 | 14,250 |
| EB4HR0100TN-14-05-ATH | ● | 0.5 | 1 | 0.5 | 14 | 4 | 55 | 4 | B | 0.5 | 14,250 |
| EB4HR0100TN-16-05-ATH | ● | 0.5 | 1 | 0.5 | 16 | 4 | 55 | 4 | B | 0.5 | 14,360 |
| EB4HR0100TN-18-05-ATH | ● | 0.5 | 1 | 0.5 | 18 | 4 | 60 | 4 | B | 0.5 | 14,580 |
| EB4HR0100TN-20-05-ATH | ● | 0.5 | 1 | 0.5 | 20 | 4 | 60 | 4 | B | 0.5 | 14,580 |
| EB4HR0100TN-4-10-ATH | ● | 0.5 | 1 | 1 | 4 | 4 | 50 | 4 | C | - | 13,930 |
| EB4HR0100TN-6-10-ATH | ● | 0.5 | 1 | 1 | 6 | 4 | 50 | 4 | A | - | 13,930 |
| EB4HR0100TN-8-10-ATH | ● | 0.5 | 1 | 1 | 8 | 4 | 50 | 4 | B | 1 | 14,040 |
| EB4HR0100TN-10-10-ATH | ● | 0.5 | 1 | 1 | 10 | 4 | 50 | 4 | B | 1 | 14,150 |
| EB4HR0100TN-12-10-ATH | ● | 0.5 | 1 | 1 | 12 | 4 | 55 | 4 | B | 1 | 14,250 |
| EB4HR0100TN-14-10-ATH | ● | 0.5 | 1 | 1 | 14 | 4 | 55 | 4 | B | 1 | 14,250 |
| EB4HR0100TN-16-10-ATH | ● | 0.5 | 1 | 1 | 16 | 4 | 55 | 4 | B | 1 | 14,360 |
| EB4HR0100TN-18-10-ATH | ● | 0.5 | 1 | 1 | 18 | 4 | 60 | 4 | B | 1 | 14,580 |
| EB4HR0100TN-20-10-ATH | ● | 0.5 | 1 | 1 | 20 | 4 | 60 | 4 | B | 1 | 14,580 |
| EB4HR0110TN-4-05-ATH | ● | 0.55 | 1.1 | 0.5 | 4 | 4 | 50 | 4 | C | - | 13,720 |
| EB4HR0110TN-6-05-ATH | ● | 0.55 | 1.1 | 0.5 | 6 | 4 | 50 | 4 | A | - | 13,820 |
| EB4HR0110TN-8-05-ATH | ● | 0.55 | 1.1 | 0.5 | 8 | 4 | 50 | 4 | B | 0.5 | 13,930 |
| EB4HR0110TN-10-05-ATH | ● | 0.55 | 1.1 | 0.5 | 10 | 4 | 50 | 4 | B | 0.5 | 14,040 |
| EB4HR0110TN-12-05-ATH | ● | 0.55 | 1.1 | 0.5 | 12 | 4 | 55 | 4 | B | 0.5 | 14,150 |
| EB4HR0110TN-14-05-ATH | ● | 0.55 | 1.1 | 0.5 | 14 | 4 | 55 | 4 | B | 0.5 | 14,150 |
| EB4HR0110TN-16-05-ATH | ● | 0.55 | 1.1 | 0.5 | 16 | 4 | 55 | 4 | B | 0.5 | 14,250 |
| EB4HR0110TN-18-05-ATH | ● | 0.55 | 1.1 | 0.5 | 18 | 4 | 60 | 4 | B | 0.5 | 14,360 |
| EB4HR0110TN-20-05-ATH | ● | 0.55 | 1.1 | 0.5 | 20 | 4 | 60 | 4 | B | 0.5 | 14,460 |
| EB4HR0110TN-4-10-ATH | ● | 0.55 | 1.1 | 1 | 4 | 4 | 50 | 4 | C | - | 13,720 |
| EB4HR0110TN-6-10-ATH | ● | 0.55 | 1.1 | 1 | 6 | 4 | 50 | 4 | A | - | 13,820 |
| EB4HR0110TN-8-10-ATH | ● | 0.55 | 1.1 | 1 | 8 | 4 | 50 | 4 | B | 1 | 13,930 |
| EB4HR0110TN-10-10-ATH | ● | 0.55 | 1.1 | 1 | 10 | 4 | 50 | 4 | B | 1 | 14,040 |
| EB4HR0110TN-12-10-ATH | ● | 0.55 | 1.1 | 1 | 12 | 4 | 55 | 4 | B | 1 | 14,150 |
| EB4HR0110TN-14-10-ATH | ● | 0.55 | 1.1 | 1 | 14 | 4 | 55 | 4 | B | 1 | 14,150 |
| EB4HR0110TN-16-10-ATH | ● | 0.55 | 1.1 | 1 | 16 | 4 | 55 | 4 | B | 1 | 14,250 |
| EB4HR0110TN-18-10-ATH | ● | 0.55 | 1.1 | 1 | 18 | 4 | 60 | 4 | B | 1 | 14,360 |
| EB4HR0110TN-20-10-ATH | ● | 0.55 | 1.1 | 1 | 20 | 4 | 60 | 4 | B | 1 | 14,460 |
| EB4HR0120TN-6-05-ATH | ● | 0.6 | 1.2 | 0.5 | 6 | 4.8 | 50 | 4 | A | - | 13,720 |
| EB4HR0120TN-8-05-ATH | ● | 0.6 | 1.2 | 0.5 | 8 | 4.8 | 50 | 4 | B | 0.5 | 13,820 |
| EB4HR0120TN-10-05-ATH | ● | 0.6 | 1.2 | 0.5 | 10 | 4.8 | 50 | 4 | B | 0.5 | 13,820 |
| EB4HR0120TN-12-05-ATH | ● | 0.6 | 1.2 | 0.5 | 12 | 4.8 | 55 | 4 | B | 0.5 | 14,040 |
| EB4HR0120TN-14-05-ATH | ● | 0.6 | 1.2 | 0.5 | 14 | 4.8 | 55 | 4 | B | 0.5 | 14,040 |
| EB4HR0120TN-16-05-ATH | ● | 0.6 | 1.2 | 0.5 | 16 | 4.8 | 55 | 4 | B | 0.5 | 14,150 |
| EB4HR0120TN-18-05-ATH | ● | 0.6 | 1.2 | 0.5 | 18 | 4.8 | 60 | 4 | B | 0.5 | 14,250 |
| EB4HR0120TN-20-05-ATH | ● | 0.6 | 1.2 | 0.5 | 20 | 4.8 | 60 | 4 | B | 0.5 | 14,360 |
| EB4HR0120TN-22-05-ATH | ● | 0.6 | 1.2 | 0.5 | 22 | 4.8 | 60 | 4 | B | 0.5 | 14,360 |
| EB4HR0120TN-24-05-ATH | ● | 0.6 | 1.2 | 0.5 | 24 | 4.8 | 60 | 4 | B | 0.5 | 14,460 |
| EB4HR0120TN-6-10-ATH | ● | 0.6 | 1.2 | 1 | 6 | 4.8 | 50 | 4 | A | - | 13,720 |
| EB4HR0120TN-8-10-ATH | ● | 0.6 | 1.2 | 1 | 8 | 4.8 | 50 | 4 | B | 1 | 13,820 |
| EB4HR0120TN-10-10-ATH | ● | 0.6 | 1.2 | 1 | 10 | 4.8 | 50 | 4 | B | 1 | 13,820 |
| EB4HR0120TN-12-10-ATH | ● | 0.6 | 1.2 | 1 | 12 | 4.8 | 55 | 4 | B | 1 | 14,040 |
| EB4HR0120TN-14-10-ATH | ● | 0.6 | 1.2 | 1 | 14 | 4.8 | 55 | 4 | B | 1 | 14,040 |
| EB4HR0120TN-16-10-ATH | ● | 0.6 | 1.2 | 1 | 16 | 4.8 | 55 | 4 | B | 1 | 14,150 |
| EB4HR0120TN-18-10-ATH | ● | 0.6 | 1.2 | 1 | 18 | 4.8 | 60 | 4 | B | 1 | 14,250 |
| EB4HR0120TN-20-10-ATH | ● | 0.6 | 1.2 | 1 | 20 | 4.8 | 60 | 4 | B | 1 | 14,360 |
| EB4HR0120TN-22-10-ATH | ● | 0.6 | 1.2 | 1 | 22 | 4.8 | 60 | 4 | B | 1 | 14,360 |
| EB4HR0120TN-24-10-ATH | ● | 0.6 | 1.2 | 1 | 24 | 4.8 | 60 | 4 | B | 1 | 14,460 |

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | | | | | | |

## 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EB4HR-ATH | × (N/A) | × (N/A) |

# Taper Ball End Mill for High Accuracy Rib Slotting
# エポックリブ溝加工用テーパーボールエンドミル

## 標準切削条件表[荒加工条件] Recommended cutting condistions [Roughing conditions]

| 被削材 Work material | | | | 1 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 2 工具鋼 Tool steels (25～35HRC) | | 3 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 4 焼入れ鋼 Hardened steels (45～55HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 100% | | 90% | | 80% | | 65% | |
| ボール半径RE Ball radius (mm) | 外径DC Tool dia. (mm) | 首下長LU Under neck length (mm) | $a_p$ (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 0.3 | 0.6 | 4 | 0.024 | 36,000 | 1,030 | 32,400 | 920 | 30,600 | 760 | 27,000 | 610 |
| | 0.6 | 5 | 0.020 | 36,000 | 970 | 32,400 | 880 | 30,600 | 720 | 27,000 | 580 |
| | 0.6 | 6 | 0.015 | 36,000 | 970 | 32,400 | 880 | 30,600 | 720 | 27,000 | 580 |
| | 0.6 | 7 | 0.008 | 32,000 | 820 | 28,800 | 730 | 27,200 | 600 | 24,000 | 490 |
| | 0.6 | 8 | 0.008 | 32,000 | 820 | 28,800 | 730 | 27,200 | 600 | 24,000 | 490 |
| | 0.6 | 9 | 0.006 | 32,000 | 820 | 28,800 | 730 | 27,200 | 600 | 24,000 | 490 |
| | 0.6 | 10 | 0.005 | 28,000 | 710 | 25,200 | 640 | 23,800 | 530 | 21,000 | 430 |
| 0.35 | 0.7 | 4 | 0.034 | 36,000 | 1,130 | 32,400 | 1,020 | 30,600 | 840 | 27,000 | 690 |
| | 0.7 | 5 | 0.030 | 36,000 | 1,130 | 32,400 | 1,020 | 30,600 | 840 | 27,000 | 690 |
| | 0.7 | 6 | 0.027 | 36,000 | 1,070 | 32,400 | 960 | 30,600 | 800 | 27,000 | 650 |
| | 0.7 | 7 | 0.020 | 32,000 | 840 | 28,800 | 760 | 27,200 | 630 | 24,000 | 520 |
| | 0.7 | 8 | 0.010 | 32,000 | 840 | 28,800 | 760 | 27,200 | 630 | 24,000 | 520 |
| | 0.7 | 9 | 0.008 | 32,000 | 840 | 28,800 | 760 | 27,200 | 630 | 24,000 | 520 |
| | 0.7 | 10 | 0.005 | 28,000 | 740 | 25,200 | 670 | 23,800 | 550 | 21,000 | 460 |
| 0.4 | 0.8 | 4 | 0.035 | 40,000 | 1,440 | 36,000 | 1,300 | 34,000 | 1,090 | 30,000 | 900 |
| | 0.8 | 6 | 0.032 | 36,000 | 1,170 | 32,400 | 1,050 | 30,600 | 880 | 27,000 | 730 |
| | 0.8 | 8 | 0.020 | 32,000 | 1,040 | 28,800 | 930 | 27,200 | 780 | 24,000 | 650 |
| | 0.8 | 10 | 0.010 | 32,000 | 980 | 28,800 | 880 | 27,200 | 740 | 24,000 | 610 |
| | 0.8 | 12 | 0.008 | 32,000 | 980 | 28,800 | 880 | 27,200 | 740 | 24,000 | 610 |
| | 0.8 | 14 | 0.005 | 28,000 | 860 | 25,200 | 770 | 23,816 | 650 | 21,000 | 530 |
| 0.45 | 0.9 | 4 | 0.045 | 38,000 | 1,620 | 34,200 | 1,460 | 32,300 | 1,200 | 28,500 | 1,000 |
| | 0.9 | 6 | 0.042 | 34,200 | 1,310 | 30,800 | 1,180 | 29,100 | 980 | 25,700 | 810 |
| | 0.9 | 8 | 0.030 | 30,400 | 1,170 | 27,400 | 1,050 | 25,800 | 880 | 22,800 | 720 |
| | 0.9 | 10 | 0.020 | 30,400 | 1,170 | 27,400 | 1,050 | 25,800 | 880 | 22,800 | 720 |
| | 0.9 | 12 | 0.010 | 30,400 | 1,170 | 27,400 | 1,050 | 25,800 | 880 | 22,800 | 720 |
| | 0.9 | 14 | 0.008 | 26,000 | 1,000 | 23,500 | 900 | 22,100 | 750 | 19,500 | 620 |
| 0.5 | 1 | 4 | 0.040 | 32,400 | 1,460 | 29,200 | 1,310 | 27,500 | 1,120 | 24,300 | 920 |
| | 1 | 6 | 0.040 | 32,400 | 1,460 | 29,200 | 1,310 | 27,500 | 1,120 | 24,300 | 920 |
| | 1 | 8 | 0.040 | 32,400 | 1,460 | 29,200 | 1,310 | 27,500 | 1,120 | 24,300 | 920 |
| | 1 | 10 | 0.025 | 32,400 | 1,460 | 29,200 | 1,310 | 27,500 | 1,120 | 24,300 | 920 |
| | 1 | 12 | 0.013 | 28,800 | 1,220 | 25,900 | 1,100 | 24,500 | 940 | 21,600 | 770 |
| | 1 | 14 | 0.010 | 28,800 | 1,220 | 25,900 | 1,100 | 24,500 | 940 | 21,600 | 770 |
| | 1 | 16 | 0.008 | 28,800 | 1,220 | 25,900 | 1,100 | 24,500 | 940 | 21,600 | 770 |
| | 1 | 18 | 0.006 | 25,200 | 1,010 | 22,700 | 910 | 21,400 | 770 | 18,900 | 640 |
| | 1 | 20 | 0.005 | 21,600 | 860 | 19,400 | 780 | 18,400 | 660 | 16,200 | 540 |
| 0.55 | 1.1 | 4 | 0.040 | 30,600 | 1,480 | 27,500 | 1,330 | 26,000 | 1,090 | 23,000 | 920 |
| | 1.1 | 6 | 0.040 | 30,600 | 1,480 | 27,500 | 1,330 | 26,000 | 1,090 | 23,000 | 920 |
| | 1.1 | 8 | 0.040 | 30,600 | 1,480 | 27,500 | 1,330 | 26,000 | 1,090 | 23,000 | 920 |
| | 1.1 | 10 | 0.025 | 30,600 | 1,480 | 27,500 | 1,330 | 26,000 | 1,090 | 23,000 | 920 |
| | 1.1 | 12 | 0.020 | 27,200 | 1,240 | 24,500 | 1,110 | 23,100 | 920 | 20,400 | 770 |
| | 1.1 | 14 | 0.015 | 27,200 | 1,240 | 24,500 | 1,110 | 23,100 | 920 | 20,400 | 770 |
| | 1.1 | 16 | 0.010 | 27,200 | 1,240 | 24,500 | 1,110 | 23,100 | 920 | 20,400 | 770 |
| | 1.1 | 18 | 0.008 | 23,800 | 1,020 | 21,400 | 910 | 20,200 | 750 | 17,800 | 630 |
| | 1.1 | 20 | 0.005 | 20,400 | 870 | 18,300 | 780 | 17,300 | 640 | 15,200 | 540 |
| 0.6 | 1.2 | 6 | 0.060 | 28,800 | 1,500 | 25,900 | 1,350 | 24,500 | 1,100 | 21,600 | 950 |
| | 1.2 | 8 | 0.040 | 28,800 | 1,500 | 25,900 | 1,350 | 24,500 | 1,100 | 21,600 | 950 |
| | 1.2 | 10 | 0.035 | 28,800 | 1,420 | 25,900 | 1,210 | 24,500 | 1,100 | 21,600 | 860 |
| | 1.2 | 12 | 0.030 | 28,800 | 1,350 | 25,900 | 1,210 | 24,500 | 1,100 | 21,600 | 860 |
| | 1.2 | 14 | 0.025 | 24,600 | 1,150 | 22,200 | 1,040 | 21,000 | 940 | 18,500 | 730 |
| | 1.2 | 16 | 0.020 | 24,600 | 1,150 | 22,200 | 1,040 | 21,000 | 940 | 18,500 | 730 |
| | 1.2 | 18 | 0.015 | 24,600 | 1,150 | 22,200 | 1,040 | 21,000 | 940 | 18,500 | 730 |
| | 1.2 | 20 | 0.010 | 21,000 | 990 | 19,000 | 890 | 18,000 | 810 | 15,900 | 630 |
| | 1.2 | 22 | 0.010 | 21,000 | 990 | 19,000 | 890 | 18,000 | 810 | 15,900 | 630 |
| | 1.2 | 24 | 0.008 | 21,000 | 990 | 19,000 | 890 | 18,000 | 810 | 15,900 | 630 |

【注意】①$a_p$は被削材グループ1での目安を示しています。その他のグループの場合は、上表の切込み比率を目安に調整してください。
②$a_e$の設定は$a_p$×切込み比率×3～5倍を目安に調整してください。仕上げ加工を行う場合、理論カスプハイトを計算し設定してください。

【切り込み設定例】EB4HR0100TN-10-05-ATH の仕上げ加工条件でプリハードン鋼を切削する場合
切り込み =0.032($a_p$)×0.8(プリハードン鋼グループ3の切り込み比率)=0.0256mm

③被削材、加工形状に合わせて、水溶性および油性のクーラントを使用してください。
④この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
⑤機械の回転数が合わない場合は、回転数と送り速度を同じ比率で調整してください。

# 標準切削条件表[仕上げ加工条件] Recommended cutting condistions [Finishing conditions]

| 被削材 Work material | | | | 1 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 2 工具鋼 Tool steels (25～35HRC) | | 3 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 4 焼入れ鋼 Hardened steels (45～55HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 100% | | 90% | | 80% | | 65% | |
| ボール半径RE Ball radius (mm) | 外径DC Tool dia. (mm) | 首下長LU Under neck length (mm) | $a_p$ (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 0.3 | 0.6 | 4 | 0.023 | 18,000 | 1,030 | 16,200 | 920 | 15,300 | 760 | 13,500 | 620 |
| | 0.6 | 5 | 0.023 | 18,000 | 970 | 16,200 | 880 | 15,300 | 720 | 13,500 | 580 |
| | 0.6 | 6 | 0.020 | 18,000 | 970 | 16,200 | 880 | 15,300 | 720 | 13,500 | 580 |
| | 0.6 | 7 | 0.020 | 16,000 | 820 | 14,400 | 730 | 13,600 | 600 | 12,000 | 490 |
| | 0.6 | 8 | 0.020 | 16,000 | 820 | 14,400 | 730 | 13,600 | 600 | 12,000 | 490 |
| | 0.6 | 9 | 0.020 | 16,000 | 820 | 14,400 | 730 | 13,600 | 600 | 12,000 | 490 |
| | 0.6 | 10 | 0.020 | 14,000 | 710 | 12,600 | 640 | 11,900 | 530 | 10,500 | 430 |
| 0.35 | 0.7 | 4 | 0.023 | 18,000 | 1,130 | 16,200 | 1,020 | 15,300 | 840 | 13,500 | 690 |
| | 0.7 | 5 | 0.023 | 18,000 | 1,130 | 16,200 | 1,020 | 15,300 | 840 | 13,500 | 690 |
| | 0.7 | 6 | 0.020 | 18,000 | 1,070 | 16,200 | 960 | 15,300 | 790 | 13,500 | 650 |
| | 0.7 | 7 | 0.020 | 16,000 | 840 | 14,400 | 760 | 13,600 | 630 | 12,000 | 520 |
| | 0.7 | 8 | 0.020 | 16,000 | 840 | 14,400 | 760 | 13,600 | 630 | 12,000 | 520 |
| | 0.7 | 9 | 0.020 | 16,000 | 840 | 14,400 | 760 | 13,600 | 630 | 12,000 | 520 |
| | 0.7 | 10 | 0.020 | 14,000 | 740 | 12,600 | 670 | 11,900 | 550 | 10,500 | 460 |
| 0.4 | 0.8 | 4 | 0.028 | 20,000 | 1,440 | 18,000 | 1,300 | 17,000 | 1,090 | 15,000 | 900 |
| | 0.8 | 6 | 0.028 | 18,000 | 1,170 | 16,200 | 1,050 | 15,300 | 880 | 13,500 | 730 |
| | 0.8 | 8 | 0.025 | 16,000 | 1,040 | 14,400 | 930 | 13,600 | 780 | 12,000 | 650 |
| | 0.8 | 10 | 0.025 | 16,000 | 980 | 14,400 | 880 | 13,600 | 740 | 12,000 | 610 |
| | 0.8 | 12 | 0.025 | 16,000 | 980 | 14,400 | 880 | 13,600 | 740 | 12,000 | 610 |
| | 0.8 | 14 | 0.025 | 14,000 | 860 | 12,600 | 770 | 11,900 | 650 | 10,500 | 530 |
| 0.45 | 0.9 | 4 | 0.028 | 19,000 | 1,620 | 17,100 | 1,460 | 16,200 | 1,220 | 14,300 | 1,000 |
| | 0.9 | 6 | 0.028 | 17,100 | 1,310 | 15,400 | 1,180 | 14,600 | 980 | 12,900 | 810 |
| | 0.9 | 8 | 0.025 | 15,200 | 1,170 | 13,700 | 1,050 | 12,900 | 880 | 11,400 | 720 |
| | 0.9 | 10 | 0.025 | 15,200 | 1,170 | 13,700 | 1,050 | 12,900 | 880 | 11,400 | 720 |
| | 0.9 | 12 | 0.025 | 15,200 | 1,170 | 13,700 | 1,050 | 12,900 | 880 | 11,400 | 720 |
| | 0.9 | 14 | 0.025 | 13,000 | 1,000 | 11,800 | 900 | 11,100 | 750 | 9,800 | 620 |
| 0.5 | 1 | 4 | 0.035 | 16,200 | 1,460 | 14,600 | 1,310 | 13,800 | 1,120 | 12,200 | 920 |
| | 1 | 6 | 0.035 | 16,200 | 1,460 | 14,600 | 1,310 | 13,800 | 1,120 | 12,200 | 920 |
| | 1 | 8 | 0.035 | 16,200 | 1,460 | 14,600 | 1,310 | 13,800 | 1,120 | 12,200 | 920 |
| | 1 | 10 | 0.032 | 16,200 | 1,460 | 14,600 | 1,310 | 13,800 | 1,120 | 12,200 | 920 |
| | 1 | 12 | 0.032 | 14,400 | 1,220 | 13,000 | 1,100 | 12,300 | 940 | 10,800 | 770 |
| | 1 | 14 | 0.032 | 14,400 | 1,220 | 13,000 | 1,100 | 12,300 | 940 | 10,800 | 770 |
| | 1 | 16 | 0.032 | 14,400 | 1,220 | 13,000 | 1,100 | 12,300 | 940 | 10,800 | 770 |
| | 1 | 18 | 0.030 | 12,600 | 1,010 | 11,400 | 900 | 10,700 | 770 | 9,500 | 640 |
| | 1 | 20 | 0.030 | 10,800 | 860 | 9,700 | 780 | 9,200 | 660 | 8,100 | 540 |
| 0.55 | 1.1 | 4 | 0.035 | 15,300 | 1,480 | 13,800 | 1,330 | 13,000 | 1,090 | 11,500 | 920 |
| | 1.1 | 6 | 0.035 | 15,300 | 1,480 | 13,800 | 1,330 | 13,000 | 1,090 | 11,500 | 920 |
| | 1.1 | 8 | 0.035 | 15,300 | 1,480 | 13,800 | 1,330 | 13,000 | 1,090 | 11,500 | 920 |
| | 1.1 | 10 | 0.032 | 15,300 | 1,480 | 13,800 | 1,330 | 13,000 | 1,090 | 11,500 | 920 |
| | 1.1 | 12 | 0.032 | 13,600 | 1,240 | 12,300 | 1,110 | 11,600 | 920 | 10,200 | 770 |
| | 1.1 | 14 | 0.032 | 13,600 | 1,240 | 12,300 | 1,110 | 11,600 | 920 | 10,200 | 770 |
| | 1.1 | 16 | 0.032 | 13,600 | 1,240 | 12,300 | 1,110 | 11,600 | 920 | 10,200 | 770 |
| | 1.1 | 18 | 0.030 | 11,900 | 1,020 | 10,700 | 910 | 10,100 | 750 | 8,900 | 630 |
| | 1.1 | 20 | 0.030 | 10,200 | 870 | 9,200 | 780 | 8,700 | 640 | 7,600 | 540 |
| 0.6 | 1.2 | 6 | 0.043 | 14,400 | 1,500 | 13,000 | 1,350 | 12,300 | 1,100 | 10,800 | 950 |
| | 1.2 | 8 | 0.043 | 14,400 | 1,500 | 13,000 | 1,350 | 12,300 | 1,100 | 10,800 | 950 |
| | 1.2 | 10 | 0.043 | 14,400 | 1,400 | 13,000 | 1,210 | 12,300 | 1,100 | 10,800 | 860 |
| | 1.2 | 12 | 0.040 | 14,400 | 1,350 | 13,000 | 1,210 | 12,300 | 1,100 | 10,800 | 860 |
| | 1.2 | 14 | 0.040 | 12,300 | 1,150 | 11,100 | 1,040 | 10,500 | 940 | 9,300 | 730 |
| | 1.2 | 16 | 0.040 | 12,300 | 1,150 | 11,100 | 1,040 | 10,500 | 940 | 9,300 | 730 |
| | 1.2 | 18 | 0.040 | 12,300 | 1,150 | 11,100 | 1,040 | 10,500 | 940 | 9,300 | 730 |
| | 1.2 | 20 | 0.037 | 10,500 | 990 | 9,500 | 890 | 9,000 | 810 | 8,000 | 630 |
| | 1.2 | 22 | 0.037 | 10,500 | 990 | 9,500 | 890 | 9,000 | 810 | 8,000 | 630 |
| | 1.2 | 24 | 0.037 | 10,500 | 990 | 9,500 | 890 | 9,000 | 810 | 8,000 | 630 |

【Note】 ①$a_p$ is shown as the criteria for Group 1 workpieces. For other groups, adjust the cutting depth according to the cutting depth factors in the above table.
②Adjust by setting $a_e$ to (3 to 5)×($a_p$)×(cutting depth ratio). When performing finishing processing, calculate the theoretical cusp height and set accordingly.

Cutting depth setting example : When finishing in pre-hardened steel with EB4HR0100TN-10-05-ATH.
Cutting depth = 0.032($a_p$)×0.8(Cutting depth factor for group 3 pre-hardened steel) = 0.0256mm

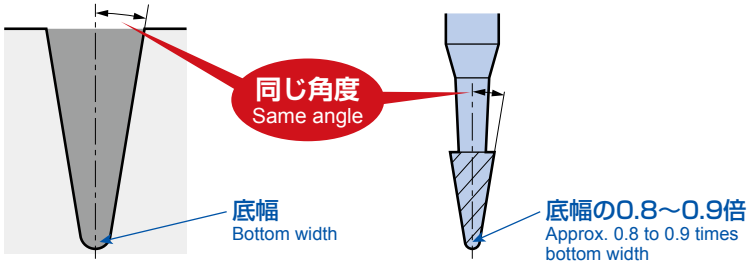
③Use the water or oil based coolant for the work material and machining shape.
④These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
②If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

# Taper Ball End Mill for High Accuracy Rib Slotting
# エポックリブ溝加工用テーパーボールエンドミル

## ご使用方法 Method of use

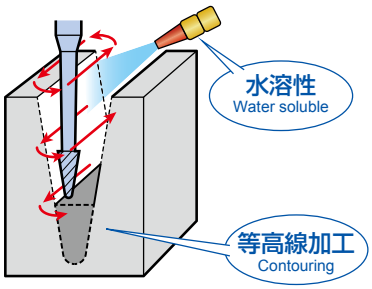
### 1 工具の選定

リブ溝の勾配角と同じテーパー半角と、リブ溝の底幅に対し0.8～0.9倍程度の工具径を選定してください。
等高線加工でご使用いただくことで、外周刃がリブ溝の勾配面に作用します。また、切りくず排出性を向上させるため、水溶性の切削液を推奨します。




### Tool Selection

Select a tool with the same taper angle as the draft angle of the rib groove and a tool diameter corresponding to approximately 0.8 to 0.9 times the bottom width of the rib groove.
When used for contouring, the peripheral cutting edge acts on the inclined face of the rib groove.
We recommend water-soluble cutting fluid to improve chip discharge.



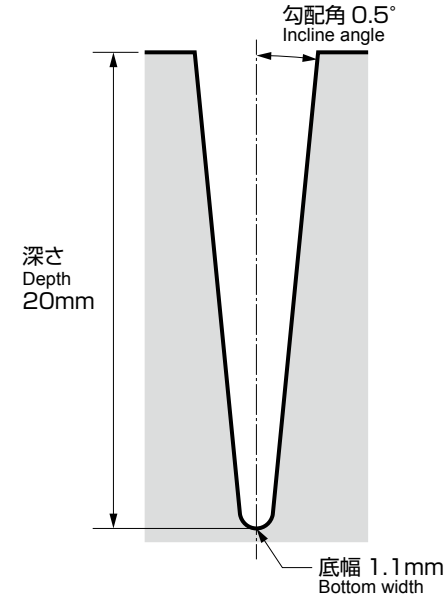

### 2 荒工程の例

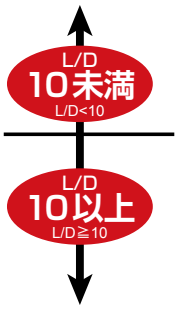
指定加工深さまでの最短首下長のアイテムを選定し、最終加工深さまで工具交換を行いながら等高線加工を行ってください。
※L/D：工具の首下長Lと工具径DCの比率

### Roughing example

Select a tool with a minimum under neck length not exceeding the specified cutting depth. Perform contouring down to the final cutting depth while swapping tools.
* L/D: The ratio between the tool under neck length L and tool diameter DC

リブ溝形状 Rib groove profile




等高線荒加工の工程表例 Example contour roughing process chart

(mm)

| L/D | 商品コード Item code | 工具径 Tool dia. | 首下長 Under neck length |
|---|---|---|---|
| 6 | EB4HR0100TN-6-05-ATH | 1 | 6 |
| 12 | EB4HR0100TN-12-05-ATH | 1 | 12 |
| 16 | EB4HR0100TN-16-05-ATH | 1 | 16 |
| 20 | EB4HR0100TN-20-05-ATH | 1 | 20 |

・L/D=10未満は、加工時間を考慮しながら加工深さに対して最短首下長のアイテムを選定してください。
・L/D=10以上は、剛性が低くたわみ易いため、出来る限り細かく分割して工程を組んでください。

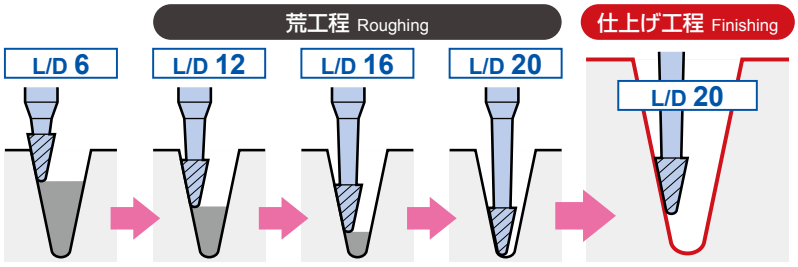
・If L/D is less than 10, select a tool with the minimum under neck length for the cutting depth, taking cutting time into account.
・If L/D is 10 or greater, rigidity will be lower and there will be a greater tendency for deflection. Try to machine in the smallest possible steps.

### 3 仕上げ工程の例

仕上げ工程にEB4HRを使用することで、加工面や精度が更に向上いたします。

### Finishing example

Using the EB4HR for finishing further improves the finished surface and accuracy.




※荒工程のみでも、加工面や精度を満たしている場合がございます。
※荒工程でロングネックエンドミルを使用後に、仕上げ工程でEB4HRを使用しても、段差を除去できる場合がございます。

*Satisfactory machined surface and accuracy may be achieved with roughing alone.
*In some cases, using the EB4HR for finishing after using a long-necked end mill for roughing also removes level differences.

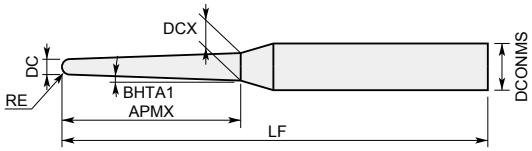
# Epoch Combination Rib Ball
# エポックコンビネーションリブボール

YouTube 動画公開中

テーパボール Radius Taper　リブ・細部 Rib Miniature

外径公差 Dia. tolerance ±0.02　h5　(mm)

先端2枚刃
外周4枚刃
Tip 2 flutes
Peripheral 4 flutes




## ECRB○○○○-○○-PN

超硬 Carbide　PN　ねじれ25° Helix angle　切削条件表 A138 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 大端径 Large edge dia. DCX | 刃長 Flute length APMX | シャンク径 Shank dia. DCONMS | 全長 Overall length LF | 刃部テーパ半角 Taper angle on side BHTA1 | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|
| ECRB0809-6-PN | ● | 0.4 | **0.8** | **0.9** | 6 | 4 | 60 | (0.51) | **13,390** |
| ECRB0809-8-PN | ● | 0.4 | **0.8** | **0.9** | 8 | 4 | 60 | (0.38) | **14,250** |
| ECRB0809-10-PN | ● | 0.4 | **0.8** | **0.9** | 10 | 4 | 60 | (0.30) | **15,110** |
| ECRB0809-12-PN | ● | 0.4 | **0.8** | **0.9** | 12 | 4 | 60 | (0.25) | **15,960** |
| ECRB0810-6-PN | ● | 0.4 | **0.8** | **1.0** | 6 | 4 | 60 | (1.02) | **13,390** |
| ECRB0810-8-PN | ● | 0.4 | **0.8** | **1.0** | 8 | 4 | 60 | (0.75) | **14,250** |
| ECRB0810-10-PN | ● | 0.4 | **0.8** | **1.0** | 10 | 4 | 60 | (0.60) | **15,110** |
| ECRB0810-12-PN | ● | 0.4 | **0.8** | **1.0** | 12 | 4 | 60 | (0.49) | **15,960** |
| ECRB1012-6-PN | ● | 0.5 | **1** | **1.2** | 6 | 4 | 60 | (1.04) | **12,650** |
| ECRB1012-8-PN | ● | 0.5 | **1** | **1.2** | 8 | 4 | 60 | (0.76) | **13,610** |
| ECRB1012-10-PN | ● | 0.5 | **1** | **1.2** | 10 | 4 | 60 | (0.60) | **14,580** |
| ECRB1012-12-PN | ● | 0.5 | **1** | **1.2** | 12 | 4 | 60 | (0.50) | **15,430** |
| ECRB1012-14-PN | ● | 0.5 | **1** | **1.2** | 14 | 4 | 60 | (0.42) | **16,610** |
| ECRB1012-16-PN | ● | 0.5 | **1** | **1.2** | 16 | 4 | 60 | (0.37) | **17,570** |

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | | | | | | |

## 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| ECRB-PN | × (N/A) | × (N/A) |

●：標準在庫品です。●：Stocked items.

# Epoch Combination Rib Ball
# エポックコンビネーションリブボール

## 標準切削条件表 Recommended cutting conditions ECRB-PN

・増速スピンドル等で回転数が固定される場合は、下記の回転数より近い回転数の条件をご使用ください。
・マシニングセンタ等で回転数が自由に選択可能な場合は、20,000min$^{-1}$を基準条件としてご使用ください。
• When using a multi-speed spindle, etc. with fixed rotation speeds, select the condition which is closer to the rotation speeds listed below.
• When using a machining center, etc. where the rotation speed can be freely set, use 20,000 rpm as the standard condition.

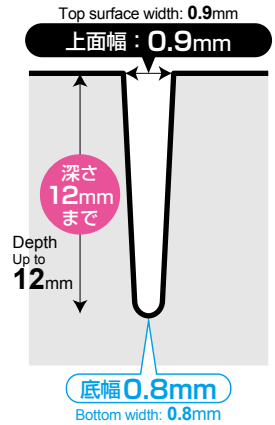
| 回転数 Revolution (min$^{-1}$) | | | 切り込み比率 Depth of cut ratio | 炭素鋼 Carbon steels (180～250HB) | 合金鋼 Alloy steels (25～35HRC) | プリハードン Pre-hardened steels (35～45HRC) |
|---|---|---|---|---|---|---|
| | | | | 送り速度 Feed rate (mm/min) | 送り速度 Feed rate (mm/min) | 送り速度 Feed rate (mm/min) |
| 15,000 | | | 100% | 1,200 | 960 | 770 |
| 基準条件 20,000 Standard condition | | | 100% | 1,600 | 1,280 | 1,020 |
| 25,000 | | | 80% | 2,000 | 1,600 | 1,280 |
| 30,000 | | | 60% | 2,400 | 1,920 | 1,540 |
| ボール半径 RE Ball radius (mm) | 外径 DC Tool dia. (mm) | 大端径 Large edge dia. (mm) | 刃長 Flute length (mm) | 切り込み Depth of cut (mm) | 切り込み Depth of cut (mm) | 切り込み Depth of cut (mm) |
| 0.4 | **0.8** | **0.9** | 6 | 0.024 | 0.02 | 0.016 |
| 0.4 | **0.8** | **0.9** | 8 | 0.018 | 0.015 | 0.012 |
| 0.4 | **0.8** | **0.9** | 10 | 0.014 | 0.012 | 0.01 |
| 0.4 | **0.8** | **0.9** | 12 | 0.012 | 0.01 | 0.008 |
| 0.4 | **0.8** | **1** | 6 | 0.024 | 0.02 | 0.016 |
| 0.4 | **0.8** | **1** | 8 | 0.018 | 0.015 | 0.012 |
| 0.4 | **0.8** | **1** | 10 | 0.014 | 0.012 | 0.01 |
| 0.4 | **0.8** | **1** | 12 | 0.012 | 0.01 | 0.008 |
| 0.5 | **1** | **1.2** | 6 | 0.03 | 0.025 | 0.02 |
| 0.5 | **1** | **1.2** | 8 | 0.023 | 0.019 | 0.015 |
| 0.5 | **1** | **1.2** | 10 | 0.018 | 0.015 | 0.012 |
| 0.5 | **1** | **1.2** | 12 | 0.015 | 0.013 | 0.01 |
| 0.5 | **1** | **1.2** | 14 | 0.013 | 0.011 | 0.009 |
| 0.5 | **1** | **1.2** | 16 | 0.011 | 0.009 | 0.007 |

**【注意】**
①切り込みは、切り込み比率を参考に調整してください。
②被削材、加工形状に合わせて、適切なクーラントを使用してください。
③この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が合わない場合は、回転数と送り速度を同じ比率で調整してください。
⑤5°を超える傾斜面を加工する場合は、切り込みを下げる等の調整を行ってください。

**【Note】**
①Adjust the cutting depth referring to the depth of cut ratio.
②Use the appropriate coolant for the work material and machining shape.
③These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
④If the rotation speed of the machine does not match the values in the table, adjust the rotation speed and feed rate using the same ratio.
⑤When machining a tapered surface of greater than 5°, make adjustments such as reducing the cutting depth, etc.

## ご使用方法 Method of use

### 1




リブ溝の上面幅とエンドミルの大端径･リブ溝の底幅とエンドミルの外径が同じものを刃長別に短いものから順にご使用ください。
左記の**上面幅0.9mm・底幅0.8mm**のリブ溝は下記4アイテムをご使用ください。

Use end mills having the same large edge diameter as the rib groove's top surface width and the same tool diameter as the rib groove's bottom in sequence starting with the shortest flute length. For making the rib groove shown at right with a **top surface width of 0.9 mm and bottom width of 0.8 mm**, the following four items should be used.

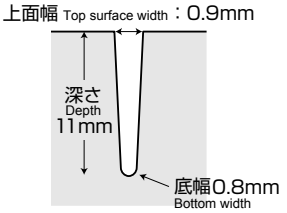
Order of use 使用順

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 大端径 Large edge dia. DCX | 刃長 Flute length APMX | シャンク径 Shank dia. DCONMS | 全長 Overall length LF | 刃部テーパ半角 Taper angle on side BHTA1 |
|---|---|---|---|---|---|---|---|---|
| **ECRB0809-6-PN** | ● | 0.4 | **0.8** | **0.9** | 6 | 4 | 60 | (0.51) |
| **ECRB0809-8-PN** | ● | 0.4 | **0.8** | **0.9** | 8 | 4 | 60 | (0.38) |
| **ECRB0809-10-PN** | ● | 0.4 | **0.8** | **0.9** | 10 | 4 | 60 | (0.30) |
| **ECRB0809-12-PN** | ● | 0.4 | **0.8** | **0.9** | 12 | 4 | 60 | (0.25) |

## 上面幅を加工する工程と底幅を加工する工程を組み合わせるコンビネーションリブ加工!!

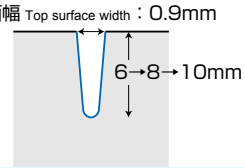
**Combination rib machining can combine the process for machining the top surface width and the process for machining the bottom width.**

**【例】加工形状**
【Ex.】Shape to be machined



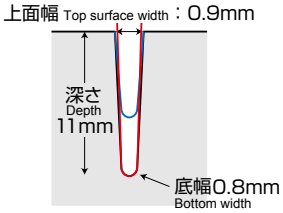

上面幅0.9㎜・底幅0.8㎜・深さ11㎜のリブ溝の場合。
For a rib groove with an top surface width of 0.9 mm, a bottom width of 0.8 mm, and a depth of 11 m

**工程 Process 1**



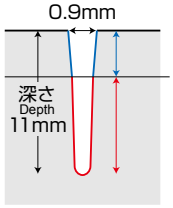

上記アイテムの刃長の短い順に6㎜⇒8㎜⇒10㎜を用いて往復切削にて加工を行う。加工深さ=刃長としてください。大端径は全て0.9㎜のため、リブ溝の上面幅の0.9㎜が加工できます。
Perform machining by reciprocating cutting using the above items in order starting with the shortest flute length: 6 mm => 8 mm => 10 mm. Set machining depth = Flute length. Since all of the items have a large edge diameter of 0.9 mm, the 0.9 mm width of the top surface of the rib groove can be machined.

**工程 Process 2**




上記アイテムの刃長12㎜を用いて、深さ11㎜まで往復切削を行う。ボール半径が0.4㎜のため、底幅0.8㎜が加工できます。
Using the item above with a flute length of 12 mm, perform reciprocating cutting to the depth of 11 mm. Since the ball radius is 0.4 mm, the bottom width of 0.8 mm can be machined.

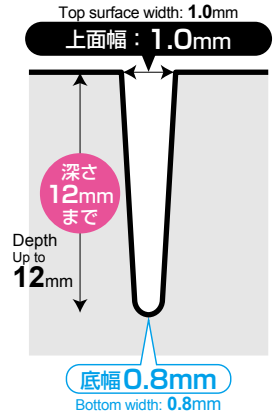
**完成! Completed**




上面幅･底幅･深さが高精度に加工できているため、ヒケやショートショットも生じにくいリブ溝が完成。抜け方向の勾配もしっかりついています。
Since it is possible to machine the top surface width, bottom width, and depth with high accuracy, rib grooves with sinks or short shots are unlikely to occur can be completed. The taper in the release direction is also firmly maintained.

※完成したリブ溝の勾配面には、わずかな角度差が生じます。事前に問題ないかご確認お願いします。
※Slight differences in the angle of the taper surface of completed rib grooves may occur. Whether or not they will be a problem should be checked beforehand.

### 2



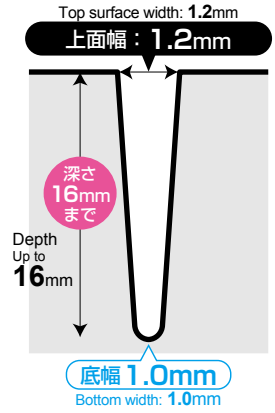

左記の**上面幅1.0mm・底幅0.8mm**のリブ溝は下記4アイテムをご使用ください。

For making the rib groove shown at right with a **top surface width of 1.0 mm and bottom width of 0.8 mm**, the following four items should be used.

Order of use 使用順

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 大端径 Large edge dia. DCX | 刃長 Flute length APMX | シャンク径 Shank dia. DCONMS | 全長 Overall length LF | 刃部テーパ半角 Taper angle on side BHTA1 |
|---|---|---|---|---|---|---|---|---|
| **ECRB0810-6-PN** | ● | 0.4 | **0.8** | **1.0** | 6 | 4 | 60 | (1.02) |
| **ECRB0810-8-PN** | ● | 0.4 | **0.8** | **1.0** | 8 | 4 | 60 | (0.75) |
| **ECRB0810-10-PN** | ● | 0.4 | **0.8** | **1.0** | 10 | 4 | 60 | (0.60) |
| **ECRB0810-12-PN** | ● | 0.4 | **0.8** | **1.0** | 12 | 4 | 60 | (0.49) |

### 3




左記の**上面幅1.2mm・底幅1.0mm**のリブ溝は下記6アイテムをご使用ください。

For making the rib groove shown at right with a **top surface width of 1.2 mm and bottom width of 1.0 mm**, the following 6 items should be used.

Order of use 使用順

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 大端径 Large edge dia. DCX | 刃長 Flute length APMX | シャンク径 Shank dia. DCONMS | 全長 Overall length LF | 刃部テーパ半角 Taper angle on side BHTA1 |
|---|---|---|---|---|---|---|---|---|
| **ECRB1012-6-PN** | ● | 0.5 | **1** | **1.2** | 6 | 4 | 60 | (1.04) |
| **ECRB1012-8-PN** | ● | 0.5 | **1** | **1.2** | 8 | 4 | 60 | (0.76) |
| **ECRB1012-10-PN** | ● | 0.5 | **1** | **1.2** | 10 | 4 | 60 | (0.60) |
| **ECRB1012-12-PN** | ● | 0.5 | **1** | **1.2** | 12 | 4 | 60 | (0.50) |
| **ECRB1012-14-PN** | ● | 0.5 | **1** | **1.2** | 14 | 4 | 60 | (0.42) |
| **ECRB1012-16-PN** | ● | 0.5 | **1** | **1.2** | 16 | 4 | 60 | (0.37) |

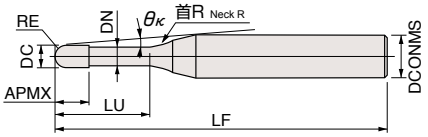
# Epoch SD(S-DLC) Deep Ball
# エポック SD(S-DLC) ディープボール

溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / 細部 Miniature / 中仕上 Semi Finishing / 仕上 Finishing / リブ・細部 Rib Miniature

高い耐溶着性、アルミ合金・銅の加工に適しています。DLCコーティング。
High welding resistance makes it ideal for machining aluminum alloys and copper. DLC Coating.

RE公差 RE tolerance
RE≦0.25：±0.003
0.25＜RE：±0.005
h5
(mm)

2枚刃
2Flutes

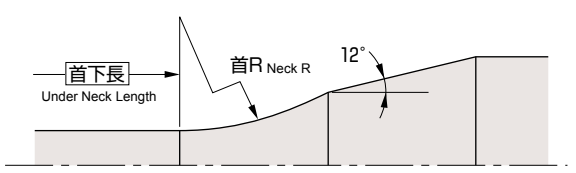



超硬 Carbide / SD / ねじれ30° Helix angle / 切削条件表 A141 Cutting Conditions

## EPDB2○○○-○○-SD

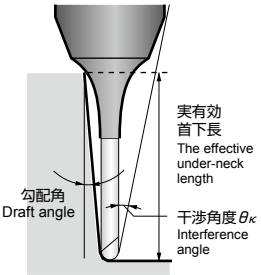
| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度 Interference angle (°) θκ | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDB2002-0.4-SD | ● | 0.1 | 0.2 | 0.4 | 0.15 | 0.17 | 50 | 4 | 1 | 11.54 | 0.59 | 0.61 | 0.63 | 0.66 | 0.7 | 19,820 |
| EPDB2002-0.6-SD | ● | | | 0.6 | 0.15 | 0.17 | 50 | 4 | 1 | 11.3 | 0.8 | 0.83 | 0.86 | 0.88 | 0.93 | 19,820 |
| EPDB2002-1-SD | ● | | | 1 | 0.15 | 0.17 | 50 | 4 | 1 | 10.86 | 1.22 | 1.26 | 1.3 | 1.33 | 1.39 | 19,820 |
| EPDB2003-0.5-SD | ● | 0.15 | 0.3 | 0.5 | 0.25 | 0.27 | 50 | 4 | 2 | 11.47 | 0.78 | 0.82 | 0.86 | 0.9 | 0.98 | 19,820 |
| EPDB2003-1-SD | ● | | | 1 | 0.25 | 0.27 | 50 | 4 | 2 | 10.89 | 1.31 | 1.38 | 1.43 | 1.49 | 1.59 | 19,820 |
| EPDB2003-1.5-SD | ● | | | 1.5 | 0.25 | 0.27 | 50 | 4 | 2 | 10.36 | 1.84 | 1.92 | 1.99 | 2.06 | 2.18 | 21,420 |
| EPDB2004-1-SD | ● | 0.2 | 0.4 | 1 | 0.3 | 0.37 | 50 | 4 | 2 | 10.91 | 1.31 | 1.37 | 1.43 | 1.48 | 1.58 | 13,510 |
| EPDB2004-1.5-SD | ● | | | 1.5 | 0.3 | 0.37 | 50 | 4 | 2 | 10.37 | 1.84 | 1.92 | 1.99 | 2.06 | 2.17 | 13,720 |
| EPDB2004-2-SD | ● | | | 2 | 0.3 | 0.37 | 50 | 4 | 2 | 9.88 | 2.36 | 2.46 | 2.54 | 2.62 | 2.75 | 14,250 |
| EPDB2005-2-SD | ● | 0.25 | 0.5 | 2 | 0.35 | 0.47 | 50 | 4 | 10 | 9.88 | 2.86 | 3.14 | 3.39 | 3.62 | 4.06 | 13,510 |
| EPDB2005-4-SD | ● | | | 4 | 0.35 | 0.47 | 50 | 4 | 10 | 8.27 | 5.06 | 5.45 | 5.78 | 6.08 | 6.61 | 13,510 |
| EPDB2005-6-SD | ● | | | 6 | 0.35 | 0.47 | 50 | 4 | 10 | 7.1 | 7.23 | 7.69 | 8.08 | 8.43 | 9.05 | 14,250 |
| EPDB2006-2-SD | ● | 0.3 | 0.6 | 2 | 0.4 | 0.57 | 50 | 4 | 10 | 9.88 | 2.86 | 3.13 | 3.38 | 3.61 | 4.04 | 10,320 |
| EPDB2006-4-SD | ● | | | 4 | 0.4 | 0.57 | 50 | 4 | 10 | 8.22 | 5.06 | 5.44 | 5.77 | 6.07 | 6.6 | 11,150 |
| EPDB2006-6-SD | ● | | | 6 | 0.4 | 0.57 | 50 | 4 | 10 | 7.04 | 7.22 | 7.69 | 8.08 | 8.42 | 9.04 | 11,150 |
| EPDB2008-4-SD | ● | 0.4 | 0.8 | 4 | 0.5 | 0.77 | 50 | 4 | 10 | 8.14 | 5.05 | 5.43 | 5.75 | 6.05 | 6.58 | 11,150 |
| EPDB2008-6-SD | ● | | | 6 | 0.5 | 0.77 | 50 | 4 | 10 | 6.92 | 7.21 | 7.68 | 8.06 | 8.41 | 9.02 | 11,150 |
| EPDB2008-8-SD | ● | | | 8 | 0.5 | 0.77 | 50 | 4 | 10 | 6.01 | 9.36 | 9.89 | 10.33 | 10.71 | 11.38 | 11,150 |
| EPDB2010-4-SD | ● | 0.5 | 1 | 4 | 0.8 | 0.96 | 50 | 4 | 10 | 8.02 | 5.09 | 5.45 | 5.77 | 6.06 | 6.58 | 9,830 |
| EPDB2010-8-SD | ● | | | 8 | 0.8 | 0.96 | 50 | 4 | 10 | 5.85 | 9.39 | 9.91 | 10.34 | 10.72 | 11.38 | 10,640 |
| EPDB2010-12-SD | ● | | | 12 | 0.8 | 0.96 | 55 | 4 | 10 | 4.6 | 13.63 | 14.26 | 14.78 | 15.22 | 15.99 | 10,640 |
| EPDB2015-6-SD | ● | 0.75 | 1.5 | 6 | 1.35 | 1.44 | 50 | 4 | 10 | 6.33 | 7.31 | 7.73 | 8.09 | 8.42 | 9.01 | 10,120 |
| EPDB2015-12-SD | ● | | | 12 | 1.35 | 1.44 | 55 | 4 | 10 | 4.14 | 13.68 | 14.29 | 14.79 | 15.23 | 15.98 | 12,650 |
| EPDB2015-18-SD | ● | | | 18 | 1.35 | 1.44 | 60 | 4 | 10 | 3.08 | 19.97 | 20.72 | 21.32 | 21.84 | 23.83 | 12,650 |
| EPDB2020-8-SD | ● | 1 | 2 | 8 | 1.7 | 1.92 | 50 | 4 | 10 | 4.81 | 9.5 | 9.97 | 10.37 | 10.73 | 11.37 | 10,640 |
| EPDB2020-16-SD | ● | | | 16 | 1.7 | 1.92 | 55 | 4 | 10 | 2.88 | 17.92 | 18.61 | 19.17 | 19.65 | 干渉なし | 10,640 |
| EPDB2020-24-SD | ● | | | 24 | 1.7 | 1.92 | 60 | 4 | 10 | 2.06 | 26.26 | 27.11 | 27.77 | 28.75 | 干渉なし | 14,250 |
| EPDB2030-12-SD | ● | 1.5 | 3 | 12 | 2.5 | 2.88 | 55 | 6 | 10 | 4.81 | 13.82 | 14.36 | 14.83 | 15.24 | 15.96 | 13,820 |
| EPDB2030-24-SD | ● | | | 24 | 2.5 | 2.88 | 65 | 6 | 10 | 2.88 | 26.33 | 27.14 | 27.79 | 28.76 | 干渉なし | 13,820 |
| EPDB2030-36-SD | ● | | | 36 | 2.5 | 2.88 | 80 | 6 | 10 | 2.06 | 38.74 | 39.74 | 41.17 | 43.12 | 干渉なし | 17,570 |
| EPDB2040-16-SD | ● | 2 | 4 | 16 | 3 | 3.9 | 60 | 6 | 10 | 3.03 | 17.93 | 18.58 | 19.11 | 19.58 | 20.91 | 12,220 |
| EPDB2040-32-SD | ● | | | 32 | 3 | 3.9 | 75 | 6 | 10 | 1.64 | 34.56 | 35.5 | 36.48 | 干渉なし | 干渉なし | 15,860 |
| EPDB2040-48-SD | ● | | | 48 | 3 | 3.9 | 90 | 6 | 10 | 1.13 | 51.05 | 52.37 | 干渉なし | 干渉なし | 干渉なし | 20,680 |
| EPDB2050-20-SD | ● | 2.5 | 5 | 20 | 3.5 | 4.9 | 65 | 6 | 10 | 1.38 | 22.09 | 22.81 | 干渉なし | 干渉なし | 干渉なし | 20,760 |
| EPDB2050-40-SD | ● | | | 40 | 3.5 | 4.9 | 80 | 6 | 10 | 0.71 | 42.8 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 22,330 |

### 首下詳細形状 Detail of Under Neck




【注意】加工物に勾配がついている場合、干渉領域は、首下長さよりも長くなります。それぞれの勾配角に対する実有効首下長をご参照ください。
また、工具が加工物に干渉する角度を干渉角度θκで表示していますので合わせてご参照ください。

【Note】If the workpiece has draft angle, the interference length will be longer than the under-neck length.Please refer to the effective under-neck length for the various draft angles.
In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle θκ", and should also be referred to.




### 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦45HRC | 高硬度 Hardened steel >45HRC ≦55HRC | >55HRC ≦65HRC | >65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | ◎ | ◎ |

●：標準在庫品です。●：Stocked items.　干渉なし：No interference

### 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPDB-SD | × (N/A) | 1～5 |

【注意】首下長／外径が10DCを超える工具の再研磨可否については、弊社営業にお問い合わせください。
【Note】Contact our sales office regarding whether or not regrinding is possible for tools where under neck length/tool diameter more than 10DC

# 標準切削条件表 Recommended cutting conditions

## EPDB-SD

### ＜溝切削＞ Slotting

| 商品コード Item code | ボール半径 RE Ball radius (mm) | 外径DC Tool dia. (mm) | 首下長LU Under neck length (mm) | 軸方向切り込み量 Axial direction cutting depth (mm) | 被削材 Work material 1 アルミニウム合金展伸材 A5052,A7075等, etc. Expanded aluminum alloy material 回転数 n min-1 | 送り速度 Vf mm/min | 2 アルミニウム合金鋳物 AC4A,ADC12等, etc. Cast aluminum alloy material 回転数 n min-1 | 送り速度 Vf mm/min | 3 銅合金 C1100等, etc. Pure copper 回転数 n min-1 | 送り速度 Vf mm/min | 4 樹脂 アクリル等 Resin, Acrylic, etc. 回転数 n min-1 | 送り速度 Vf mm/min |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDB2002-0.4-SD | 0.1 | 0.2 | 0.4 | 0.03 | 50,000 | 500 | 50,000 | 500 | 50,000 | 500 | 50,000 | 750 |
| EPDB2002-0.6-SD | 0.1 | 0.2 | 0.6 | 0.025 | 50,000 | 450 | 50,000 | 450 | 50,000 | 450 | 50,000 | 680 |
| EPDB2002-1-SD | 0.1 | 0.2 | 1 | 0.017 | 50,000 | 450 | 50,000 | 450 | 50,000 | 450 | 50,000 | 680 |
| EPDB2003-0.5-SD | 0.15 | 0.3 | 0.5 | 0.033 | 50,000 | 800 | 50,000 | 800 | 50,000 | 800 | 50,000 | 1,200 |
| EPDB2003-1-SD | 0.15 | 0.3 | 1 | 0.026 | 50,000 | 700 | 50,000 | 700 | 50,000 | 700 | 50,000 | 1,050 |
| EPDB2003-1.5-SD | 0.15 | 0.3 | 1.5 | 0.02 | 50,000 | 600 | 50,000 | 600 | 50,000 | 600 | 50,000 | 900 |
| EPDB2004-1-SD | 0.2 | 0.4 | 1 | 0.05 | 50,000 | 980 | 50,000 | 980 | 50,000 | 980 | 47,800 | 1,470 |
| EPDB2004-1.5-SD | 0.2 | 0.4 | 1.5 | 0.04 | 50,000 | 840 | 50,000 | 840 | 50,000 | 840 | 43,000 | 1,260 |
| EPDB2004-2-SD | 0.2 | 0.4 | 2 | 0.034 | 50,000 | 700 | 50,000 | 700 | 47,700 | 700 | 38,200 | 1,050 |
| EPDB2005-2-SD | 0.25 | 0.5 | 2 | 0.1 | 50,000 | 1,000 | 50,000 | 1,000 | 48,000 | 960 | 38,400 | 1,280 |
| EPDB2005-4-SD | 0.25 | 0.5 | 4 | 0.06 | 50,000 | 900 | 50,000 | 900 | 43,200 | 780 | 34,560 | 1,050 |
| EPDB2005-6-SD | 0.25 | 0.5 | 6 | 0.03 | 50,000 | 850 | 50,000 | 850 | 38,400 | 650 | 30,720 | 810 |
| EPDB2006-2-SD | 0.3 | 0.6 | 2 | 0.12 | 50,000 | 1,500 | 50,000 | 1,500 | 48,000 | 1,440 | 38,400 | 1,820 |
| EPDB2006-4-SD | 0.3 | 0.6 | 4 | 0.07 | 50,000 | 1,420 | 50,000 | 1,420 | 43,200 | 1,230 | 34,560 | 1,490 |
| EPDB2006-6-SD | 0.3 | 0.6 | 6 | 0.04 | 50,000 | 1,350 | 50,000 | 1,350 | 43,200 | 1,170 | 34,560 | 1,490 |
| EPDB2008-4-SD | 0.4 | 0.8 | 4 | 0.16 | 50,000 | 1,800 | 50,000 | 1,800 | 48,000 | 1,730 | 38,400 | 1,820 |
| EPDB2008-6-SD | 0.4 | 0.8 | 6 | 0.1 | 50,000 | 1,620 | 50,000 | 1,620 | 43,200 | 1,400 | 34,560 | 1,490 |
| EPDB2008-8-SD | 0.4 | 0.8 | 8 | 0.05 | 50,000 | 1,610 | 50,000 | 1,610 | 38,400 | 1,240 | 34,560 | 1,490 |
| EPDB2010-4-SD | 0.5 | 1 | 4 | 0.2 | 50,000 | 2,500 | 50,000 | 2,500 | 43,200 | 2,160 | 34,560 | 2,440 |
| EPDB2010-8-SD | 0.5 | 1 | 8 | 0.12 | 50,000 | 2,250 | 50,000 | 2,250 | 38,880 | 1,750 | 31,100 | 2,010 |
| EPDB2010-12-SD | 0.5 | 1 | 12 | 0.06 | 50,000 | 2,130 | 46,660 | 1,980 | 34,560 | 1,470 | 27,650 | 1,570 |
| EPDB2015-6-SD | 0.75 | 1.5 | 6 | 0.3 | 50,000 | 3,300 | 45,360 | 3,000 | 33,600 | 2,220 | 26,880 | 1,910 |
| EPDB2015-12-SD | 0.75 | 1.5 | 12 | 0.18 | 45,360 | 2,700 | 40,820 | 2,430 | 30,240 | 1,800 | 24,190 | 1,570 |
| EPDB2015-18-SD | 0.75 | 1.5 | 18 | 0.09 | 40,320 | 2,270 | 36,290 | 2,040 | 26,880 | 1,510 | 21,500 | 1,220 |
| EPDB2020-8-SD | 1 | 2 | 8 | 0.4 | 37,800 | 3,410 | 34,020 | 3,060 | 25,200 | 2,270 | 20,160 | 1,910 |
| EPDB2020-16-SD | 1 | 2 | 16 | 0.24 | 34,020 | 2,450 | 30,620 | 2,200 | 22,680 | 1,630 | 18,100 | 1,570 |
| EPDB2020-24-SD | 1 | 2 | 24 | 0.12 | 30,240 | 2,060 | 27,220 | 1,850 | 20,160 | 1,370 | 16,130 | 1,220 |
| EPDB2030-12-SD | 1.5 | 3 | 12 | 0.6 | 28,800 | 4,320 | 25,920 | 3,890 | 19,200 | 2,880 | 15,360 | 1,820 |
| EPDB2030-24-SD | 1.5 | 3 | 24 | 0.36 | 25,920 | 3,500 | 23,330 | 3,150 | 17,280 | 2,330 | 13,820 | 1,490 |
| EPDB2030-36-SD | 1.5 | 3 | 36 | 0.18 | 23,040 | 2,940 | 20,740 | 2,650 | 15,360 | 1,960 | 12,300 | 1,320 |
| EPDB2040-16-SD | 2 | 4 | 16 | 0.8 | 20,700 | 4,140 | 18,630 | 3,730 | 13,800 | 2,760 | 11,500 | 2,300 |
| EPDB2040-32-SD | 2 | 4 | 32 | 0.48 | 18,630 | 3,360 | 16,770 | 3,020 | 12,420 | 2,240 | 10,350 | 1,860 |
| EPDB2040-48-SD | 2 | 4 | 48 | 0.24 | 16,560 | 2,820 | 14,900 | 2,540 | 11,040 | 1,880 | 9,100 | 1,640 |
| EPDB2050-20-SD | 2.5 | 5 | 20 | 1 | 16,200 | 3,890 | 14,580 | 3,500 | 10,800 | 2,590 | 8,640 | 1,560 |
| EPDB2050-40-SD | 2.5 | 5 | 40 | 0.6 | 14,580 | 3,150 | 13,120 | 2,840 | 9,720 | 2,100 | 7,780 | 1,400 |

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②この標準切削条件表は切削条件の目安を示したものです。実際の加工形状・使用機械・加工目的により条件を調整してください。
③機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

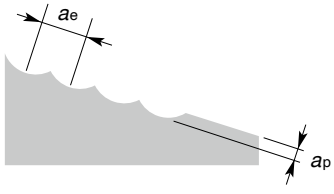
【Note】① An air blower is recommended for some resin materials.
② The cutting conditions shown in the table above are reference cutting conditions, and should be adjusted according to the actual shape to be machined, the machine used, and purpose for machining.
③If the machine rotation speed is insufficient, reduce the rotation speed and feed rate by the same ratio.

ap：軸方向切り込み量（mm）
ap : Axial direction cutting depth (mm)

### ＜仕上げ切削＞ Finishing

| ボール半径RE×外径DC Ball radius×Tool dia. (mm) | 被削材 Work material 1 アルミニウム合金展伸材 A5052,A7075等, etc. Expanded aluminum alloy material 回転数 n min-1 | 送り速度 Vf mm/min | 2 樹脂 アクリル等 Resin, Acrylic, etc. 回転数 n min-1 | 送り速度 Vf mm/min |
|---|---|---|---|---|
| RE0.1 x 0.2 | 50,000 | 1,000 | 50,000 | 1,000 |
| RE0.15 x 0.3 | 50,000 | 1,200 | 50,000 | 1,200 |
| RE0.2 x 0.4 | 50,000 | 1,500 | 50,000 | 1,500 |
| RE0.25×0.5 | 50,000 | 2,000 | 50,000 | 2,000 |
| RE0.3×0.6 | 48,000 | 1,920 | 48,000 | 1,920 |
| RE0.4×0.8 | 44,000 | 2,200 | 44,000 | 2,200 |
| RE0.5×1 | 40,000 | 2,400 | 40,000 | 2,400 |
| RE0.75×1.5 | 34,000 | 2,400 | 34,000 | 2,400 |
| RE1×2 | 30,000 | 2,400 | 30,000 | 2,400 |
| RE1.5×3 | 26,000 | 2,080 | 26,000 | 2,080 |
| RE2×4 | 24,000 | 1,920 | 24,000 | 1,920 |
| RE2.5×5 | 22,000 | 1,760 | 22,000 | 1,760 |

切り込み量 Depth of Cut（㎜）




ap≦0.02㎜～0.05㎜
ae≦0.02㎜～0.05㎜

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②この標準切削条件表は切削条件の目安を示したものです。
実際の加工形状・使用機械・加工目的により条件を調整してください。

【Note】① An air blower is recommended for some resin materials.
② The cutting conditions shown in the table above are reference cutting conditions, and should be adjusted according to the actual shape to be machined, the machine used, and purpose for machining.

# Epoch SD(S-DLC) Ball
# エポック SD(S-DLC) ボール

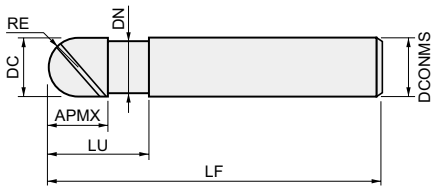
彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical / 中仕上 Semi Finishing / 仕上 Finishing

RE公差 RE tolerance ±0.005　h5

(mm)

高い耐溶着性、アルミ合金･銅の加工に適しています。DLCコーティング。
High welding resistance makes it ideal for machining aluminum alloys and copper. DLC Coating.

2枚刃
2flutes




## EPAB2○○○-SD

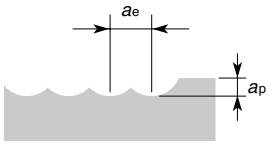
超硬 Carbide　SD　ねじれ角 30° Helix angle　切削条件表 A142 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 首下長 ℓ2 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|
| EPAB2060-SD | ● | 3 | 6 | 15 | 6 | 5.9 | 90 | 6 | 19,760 |
| EPAB2080-SD | ● | 4 | 8 | 20 | 8 | 7.9 | 100 | 8 | 25,810 |
| EPAB2100-SD | ● | 5 | 10 | 25 | 10 | 9.9 | 100 | 10 | 32,990 |
| EPAB2120-SD | ● | 6 | 12 | 30 | 12 | 11.9 | 110 | 12 | 42,870 |

## 標準切削条件表 Recommended cutting conditions　EPAB-SD

| 被削材 Work material | 1 アルミニウム合金展伸材 A5052,A7075等, etc. Expanded aluminum alloy material | | 2 アルミニウム合金鋳物 ダイキャスト Si 10%未満 Cast aluminum alloy material Die-casting, Si less than 10% | | 3 銅合金 C1100等, etc. Pure copper | | 4 樹脂 アクリル等 Resin, Acrylic, etc. | |
|---|---|---|---|---|---|---|---|---|
| ボール半径RE×外径DC Ball radius×Tool dia. (mm) | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min |
| RE3×6 | 27,000 | 3,300 | 21,600 | 2,310 | 13,300 | 1,600 | 10,600 | 1,280 |
| RE4×8 | 20,000 | 3,200 | 16,000 | 2,240 | 10,000 | 1,400 | 8,000 | 1,120 |
| RE5×10 | 16,000 | 3,000 | 12,800 | 2,100 | 8,000 | 1,280 | 6,400 | 1,030 |
| RE6×12 | 13,300 | 2,660 | 10,640 | 1,860 | 6,600 | 1,190 | 5,300 | 950 |

切り込み Depth of cut (mm)




ap≦0.2DC
ae≦0.6DC

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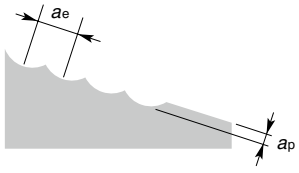
③機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

【Note】① An air blower is recommended for some resin materials.
② The cutting conditions shown in the table above are reference cutting conditions, and should be adjusted according to the actual shape to be machined, the machine used, and purpose for machining.
③ If the machine rotation speed is insufficient, reduce the rotation speed and feed rate by the same ratio.

### ＜仕上げ切削＞ Finishing

| 被削材 Work material | 1 アルミニウム合金展伸材 A5052,A7075等, etc. Expanded aluminum alloy material | | 2 樹脂 アクリル等 Resin, Acrylic, etc. | |
|---|---|---|---|---|
| ボール半径RE×外径DC Ball radius×Tool dia. (mm) | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min |
| RE3×6 | 20,000 | 1,600 | 20,000 | 1,600 |
| RE4×8 | 15,000 | 1,200 | 15,000 | 1,200 |
| RE5×10 | 12,000 | 1,200 | 12,000 | 1,200 |
| RE6×12 | 10,000 | 1,000 | 10,000 | 1,000 |

切り込み Depth of Cut (mm)




ap≦0.02mm～0.05mm
ae≦0.02mm～0.05mm

【注意】①樹脂の材質によってはエアブローを推奨致します。
②この標準切削条件表は切削条件の目安を示したものです。
実際の加工形状･使用機械･加工目的により条件を調整して下さい。

【Note】① An air blower is recommended for some resin materials.
② The cutting conditions shown in the table above are reference cutting conditions, and should be adjusted according to the actual shape to be machined, the machine used, and purpose for machining.

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | ◎ | ◎ |

## 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPAB-SD | × (N/A) | 6～12 |

●：標準在庫品です。●：Stocked items.

# Epoch HD Coating Deep Ball End Mill
# エポックHDコーティングディープボールエンドミル

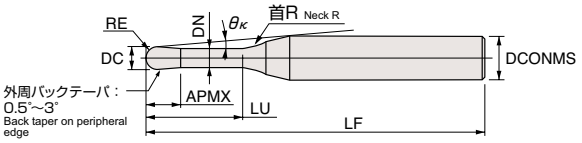
**ダイヤモンドコーティング** Diamond Coating

溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / 細部 Miniature / 中仕上 Semi Finishing / 仕上 Finishing / リブ・細部 Rib Miniature

h5

グラファイト・高Siアルミ合金・FRP加工に適しています。
ダイヤモンドコーティング。
Ideal for machining of graphite, high-Si aluminum alloys, and FRP. Diamond Coating.

2枚刃
2Flutes

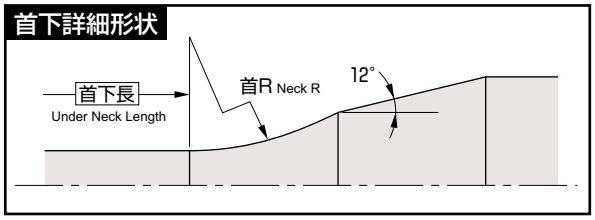



超硬 Carbide / HD / ねじれ30° Helix angle / 切削条件表 A143 Cutting Conditions

## EGDB2○○○-○○-HD

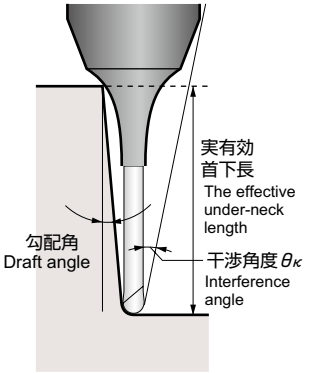
| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 首下長 Under neck length LU | 首径 Neck dia. DN | 刃長 Flute length APMX | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度 Interference angle (°) θκ | 勾配角に対する実有効首下長 The effective under-neck length for the various draft angles 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格 (円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EGDB2004-4-HD | ● | 0.2 | 0.4 | 4 | 0.37 | 0.6 | 60 | 4 | 10 | 8.3 | 5.07 | 5.45 | 5.78 | 6.08 | 6.63 | 40,280 |
| EGDB2004-8-HD | ● | | | 8 | 0.37 | 0.6 | 60 | 4 | 10 | 6.29 | 9.37 | 9.91 | 10.35 | 10.74 | 11.42 | 42,420 |
| EGDB2004-12-HD | ● | | | 12 | 0.37 | 0.6 | 60 | 4 | 10 | 5.06 | 13.62 | 14.26 | 14.79 | 15.24 | 16.02 | 44,570 |
| EGDB2006-5-HD | ● | 0.3 | 0.6 | 5 | 0.57 | 0.9 | 60 | 4 | 10 | 7.59 | 6.14 | 6.57 | 6.93 | 7.25 | 7.83 | 33,530 |
| EGDB2006-10-HD | ● | | | 10 | 0.57 | 0.9 | 60 | 4 | 10 | 5.47 | 11.49 | 12.08 | 12.57 | 12.99 | 13.72 | 33,530 |
| EGDB2006-15-HD | ● | | | 15 | 0.57 | 0.9 | 60 | 4 | 10 | 4.28 | 16.77 | 17.49 | 18.06 | 18.55 | 19.9 | 35,670 |
| EGDB2006-20-HD | ● | | | 20 | 0.57 | 0.9 | 60 | 4 | 10 | 3.51 | 22.01 | 22.82 | 23.47 | 24.01 | 26.54 | 37,820 |
| EGDB2010-10-HD | ● | 0.5 | 1 | 10 | 0.96 | 1.5 | 60 | 4 | 10 | 5.15 | 11.51 | 12.09 | 12.57 | 12.98 | 13.7 | 33,530 |
| EGDB2010-20-HD | ● | | | 20 | 0.96 | 1.5 | 60 | 4 | 10 | 3.23 | 22.02 | 22.83 | 23.47 | 24.01 | 26.51 | 33,530 |
| EGDB2010-30-HD | ● | | | 30 | 0.96 | 1.5 | 80 | 4 | 10 | 2.35 | 32.42 | 33.39 | 34.25 | 35.91 | 干渉なし | 35,670 |
| EGDB2010-40-HD | ● | | | 40 | 0.96 | 1.5 | 80 | 4 | 10 | 1.85 | 42.76 | 43.86 | 45.65 | 干渉なし | 干渉なし | 37,820 |
| EGDB2015-20-HD | ● | 0.75 | 1.5 | 20 | 1.44 | 2.25 | 60 | 4 | 10 | 2.84 | 22.06 | 22.85 | 23.48 | 24.01 | 干渉なし | 33,530 |
| EGDB2015-40-HD | ● | | | 40 | 1.44 | 2.25 | 80 | 4 | 10 | 1.59 | 42.78 | 43.87 | 45.67 | 干渉なし | 干渉なし | 35,670 |
| EGDB2020-20-HD | ● | 1 | 2 | 20 | 1.92 | 3 | 60 | 4 | 10 | 2.4 | 22.1 | 22.87 | 23.49 | 24.02 | 干渉なし | 33,530 |
| EGDB2020-40-HD | ● | | | 40 | 1.92 | 3 | 80 | 4 | 10 | 1.31 | 42.81 | 43.89 | 干渉なし | 干渉なし | 干渉なし | 35,670 |
| EGDB2020-60-HD | ● | | | 60 | 1.92 | 3 | 100 | 4 | 10 | 0.9 | 63.36 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 37,820 |
| EGDB2030-20-HD | ● | 1.5 | 3 | 20 | 2.88 | 4.5 | 60 | 4 | 10 | 1.32 | 22.18 | 22.91 | 干渉なし | 干渉なし | 干渉なし | 33,530 |
| EGDB2030-40-HD | ● | | | 40 | 2.88 | 4.5 | 80 | 4 | 10 | 0.69 | 42.87 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 33,530 |
| EGDB2030-60-HD | ● | | | 60 | 2.88 | 4.5 | 100 | 4 | 10 | 0.47 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 35,670 |

### 首下詳細形状




【注意】
加工物に勾配がついている場合、干渉領域は、首下長さよりも長くなります。それぞれの勾配角に対する実有効首下長をご参照ください。
また、工具が加工物に干渉する角度を干渉角度θκで表示していますので合わせてご参照ください。

【Note】
If the workpiece has draft angle, the interference length will be longer than the under-neck length.Please refer to the effective under-neck length for the various draft angles.
In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle θκ", and should also be referred to.




### 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| グラファイト・FRP・高Siアルミニウム合金など for Graphite, FRP, High Si aluminum alloy etc. | | | | | | | | |

### 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EGDB-HD | × (N/A) | × (N/A) |

●：標準在庫品です。●：Stocked items.　干渉なし：No interference

# Epoch HD Coating Deep Ball End Mill
# エポックHDコーティングディープボールエンドミル

## 標準切削条件表 Recommended cutting conditions

### EGDB-HD

| 被削材 Work material | | | | | | グラファイト Graphite | | アルミニウム合金鋳物 Cast aluminum alloy AC4A,ADC12等 (エアブローorウエット:水溶性) (Air-brow or wet:water-soluble agent) | |
|---|---|---|---|---|---|---|---|---|---|
| 商品コード Item code | ボール半径 RE Ball radius (mm) | 外径 DC Tool dia. (mm) | 首下長LU Under neck length (mm) | L/D | 切込み Depth of cut (mm) $a_p \times a_e$ | 回転数 $n$ $min^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ $min^{-1}$ | 送り速度 $v_f$ mm/min |
| EGDB2004-4-HD | 0.2 | 0.4 | 4 | 10 | 0.05×0.15 | 18,000～21,000 | 400～550 | 13,000～18,000 | 350～500 |
| EGDB2004-8-HD | | | 8 | 20 | 0.04×0.12 | 17,000～20,000 | 350～500 | 12,000～17,000 | 300～450 |
| EGDB2004-12-HD | | | 12 | 30 | 0.03×0.10 | 15,000～18,000 | 300～400 | 11,000～16,000 | 250～350 |
| EGDB2006-5-HD | 0.3 | 0.6 | 5 | 8 | 0.07×0.21 | 15,000～18,000 | 350～500 | 13,000～18,000 | 300～450 |
| EGDB2006-10-HD | | | 10 | 17 | 0.06×0.18 | 15,000～18,000 | 300～450 | 13,000～18,000 | 250～400 |
| EGDB2006-15-HD | | | 15 | 25 | 0.04×0.12 | 13,000～16,000 | 270～350 | 11,000～16,000 | 200～350 |
| EGDB2006-20-HD | | | 20 | 33 | 0.03×0.09 | 12,000～14,000 | 240～300 | 9,000～14,000 | 200～300 |
| EGDB2010-10-HD | 0.5 | 1 | 10 | 10 | 0.1×0.3 | 15,000～18,000 | 350～450 | 10,000～15,000 | 300～400 |
| EGDB2010-20-HD | | | 20 | 20 | 0.08×0.24 | 13,000～16,000 | 300～400 | 8,000～13,000 | 300～400 |
| EGDB2010-30-HD | | | 30 | 30 | 0.06×0.18 | 12,000～14,000 | 270～350 | 6,000～11,000 | 250～350 |
| EGDB2010-40-HD | | | 40 | 40 | 0.04×0.12 | 10,000～12,000 | 240～300 | 5,000～10,000 | 250～350 |
| EGDB2015-20-HD | 0.75 | 1.5 | 20 | 13 | 0.1×0.3 | 15,000～18,000 | 450～480 | 10,000～15,000 | 350～450 |
| EGDB2015-40-HD | | | 40 | 27 | 0.08×0.24 | 12,000～15,000 | 300～400 | 7,000～12,000 | 300～400 |
| EGDB2020-20-HD | 1 | 2 | 20 | 10 | 0.2×0.6 | 15,000～18,000 | 450～550 | 10,000～15,000 | 350～450 |
| EGDB2020-40-HD | | | 40 | 20 | 0.16×0.48 | 13,000～16,000 | 350～450 | 7,000～12,000 | 300～450 |
| EGDB2020-60-HD | | | 60 | 30 | 0.12×0.36 | 12,000～14,000 | 250～350 | 5,000～10,000 | 250～400 |
| EGDB2030-20-HD | 1.5 | 3 | 20 | 7 | 0.33×1.0 | 15,000～18,000 | 800～1,000 | 10,000～15,000 | 350～450 |
| EGDB2030-40-HD | | | 40 | 13 | 0.2×0.6 | 15,000～18,000 | 500～700 | 7,000～12,000 | 300～450 |
| EGDB2030-60-HD | | | 60 | 20 | 0.18×0.54 | 13,000～15,000 | 300～500 | 5,000～10,000 | 250～400 |

【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示したものです。実際の加工形状・使用機械・加工目的により条件を調整してください。

【Note】① Use the appropriate coolant for the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.

# Epoch HD Coating Ball End Mill
# エポックHDコーティングボールエンドミル

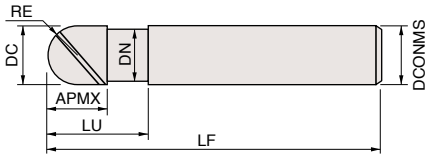
**ダイヤモンドコーティング** Diamond Coating

彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical / 中仕上 Semi Finishing / 仕上 Finishing

h5

グラファイト・高Siアルミ合金・FRP加工に適しています。
ダイヤモンドコーティング。
Ideal for machining of graphite, high-Si aluminum alloys, and FRP.
Diamond Coating.

2枚刃
2Flutes



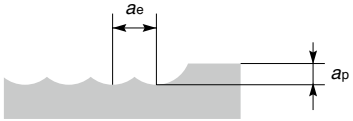

## EGB2○○○-HD

超硬 Carbide / HD / ねじれ30° Helix angle / 切削条件表A145 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 首下長 Under neck length LU | 首径 Neck dia. DN | 刃長 Flute length APMX | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|
| EGB2040-HD | ● | 2 | 4 | 40 | 3.9 | 8 | 100 | 4 | 41,350 |
| EGB2060-HD | ● | 3 | 6 | 60 | 5.9 | 12 | 120 | 6 | 53,080 |
| EGB2080-HD | ● | 4 | 8 | 80 | 7.9 | 16 | 140 | 8 | 65,200 |
| EGB2100-HD | ● | 5 | 10 | 100 | 9.9 | 20 | 150 | 10 | 84,840 |

## 標準切削条件表 Recommended cutting conditions

### EGB-HD

| 被削材 Work material | グラファイト Graphite | | アルミニウム合金鋳物 Cast aluminum alloy AC4A,ADC12等 (エアブローorウエット:水溶性) (Air-brow or wet:water-soluble agent) | |
|---|---|---|---|---|
| ボール半径×外径DC Ball radius × Tool dia. (mm) | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| RE2×4 | 8,000～10,000 | 1,200～1,500 | 6,000～9,000 | 800～1,200 |
| RE3×6 | 7,000～9,000 | 1,000～1,300 | 5,000～8,000 | 700～1,100 |
| RE4×8 | 6,000～8,000 | 900～1,100 | 4,000～7,000 | 600～1,000 |
| RE5×10 | 5,000～7,000 | 800～1,000 | 3,000～6,000 | 500～900 |
| 切込み量 Depth of cut (mm) |  ap≦0.1DC ae≦0.3DC | | | |



【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。

【Note】①Use the appropriate coolant for the work material and machining shape.
②These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦45HRC | 高硬度 Hardened steel >45HRC ≦55HRC | 高硬度 Hardened steel >55HRC ≦65HRC | 高硬度 Hardened steel >65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| グラファイト・FRP・高Siアルミニウム合金など for Graphite, FRP, High Si aluminum alloy etc. | | | | | | | | |

## 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EGB-HD | × (N/A) | × (N/A) |

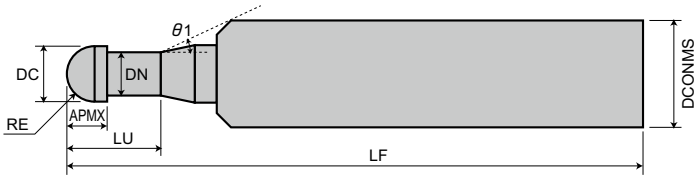
●：標準在庫品です。●：Stocked items.

# Poly Crystalline Diamond Ball End Mill
# 多結晶焼結ダイヤモンドボールエンドミル

曲面 Profiling　R Radius　仕上 Finishing

h4

金型の仕上げ加工に!!
Original poly crystalline diamond miniature ball end mill for mold finishing !!




## PCDB00○○

多結晶焼結ダイヤモンド Poly Crystalline Diamond

| 注文コード Order code | 在庫 Stock | 寸法 Size (mm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | ボール半径 Ball radius | 外径 Tool dia. | 刃長 Flute length | 首下長 Under neck length | 首径 Under neck dia. | 擬似テーパ半角 Interference angle | 全長 Overall length | シャンク径 Shank dia. |
| | | RE | DC | APMX | LU | DN | $\theta_1$ | LF | DCONMS |
| PCDB0004 | | **0.2** | **0.4** | 0.35 | 1.4 | 0.375 | 19° | 40 | 4 |
| PCDB0006 | | **0.3** | **0.6** | 0.45 | 2.1 | 0.57 | 21° | 40 | 4 |
| PCDB0008 | | **0.4** | **0.8** | 0.55 | 2.4 | 0.77 | 21° | 40 | 4 |
| PCDB0010 | | **0.5** | **1** | 0.65 | 3 | 0.96 | 23° | 40 | 4 |

※株式会社牧野フライス製作所殿の微細精密加工機iQ300鏡面加工システムに対応した寸法でご提供します。
This tool's specification fits Makino Milling Machine's iQ300 mirror surface finish solution.

### 対応被削材 Applicable work materia

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| | ◎ | ◎ | ◎ | ◎ | | | | |

### 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| PCDB | × (N/A) | × (N/A) |

無印：受注生産品です。　No Mark : Manufactured upon request only.

# Epoch CBN High Precision Ball End Mill
# エポックCBNハイプレシジョンボールエンドミル

平面 Planing | 彫込み Die-sinking | 曲面 Profiling | R Radius | 取りのこし Rest Material Machining | 細部 Miniature | 仕上 Finishing | リブ・細部 Rib Miniature | 切削条件表 A148 Cutting Conditions

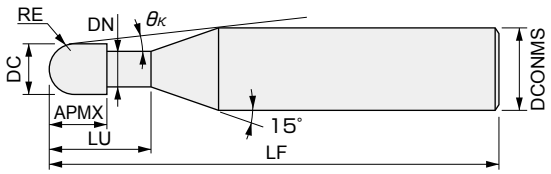
RE公差 RE tolerance: RE≦0.3：±0.003 / 0.3<RE：±0.005

h4

(mm)

高精度な加工を実現する高品質CBNボールエンドミル
High-quality CBN ball end mill to provide high-accuracy cutting.

外径実測値付き Includes actual measured mill diameter value.




## CBN-EHB2○○○-○○.○○

※外径実測値をケースに表示しています
Actual measured mill diameter value is shown on case.

REO.3以上は再研磨可能です。(必要全長40mm以上)
詳細はお問い合せください。
Regrinding of tools with RE0.3 or larger is possible. (Necessary total length is at least 40mm.) Please contact us for details.

CBN なしれ25° Helix angle

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 全数外径実測値表示 Display of actual measured tool dia. for all tools | | | | | | | 干渉角度 Interference angle (°) | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle | | | | | 希望小売価格(¥) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ボール半径 Ball radius | 外径 Tool dia. | 首下長 Under neck length | 溝長 Flute length | 首径 Neck dia. | 全長 Overall length | シャンク径 Shank dia. | | 0.5° | 1° | 1.5° | 2° | 3° | |
| | | RE | DC | LU | APMX | DN | LF | DCONMS | θK | | | | | | |
| CBN-EHB2002-0.5 | ● | 0.1 | 0.2 | 0.5 | 0.12 | 0.18 | 50 | 4 | 14.15 | 0.55 | 0.56 | 0.58 | 0.60 | 0.64 | 30,750 |
| CBN-EHB2002-0.75 | ● | | | 0.75 | 0.12 | 0.18 | 50 | 4 | 13.71 | 0.81 | 0.83 | 0.86 | 0.89 | 0.95 | 30,750 |
| CBN-EHB2002-1 | ● | | | 1 | 0.12 | 0.18 | 50 | 4 | 13.30 | 1.06 | 1.10 | 1.13 | 1.17 | 1.26 | 32,250 |
| CBN-EHB2002-1.5 | ● | | | 1.5 | 0.12 | 0.18 | 50 | 4 | 12.55 | 1.58 | 1.63 | 1.69 | 1.75 | 1.88 | 32,250 |
| CBN-EHB2002-2 | ● | | | 2 | 0.12 | 0.18 | 50 | 4 | 11.88 | 2.10 | 2.17 | 2.24 | 2.32 | 2.50 | 32,250 |
| CBN-EHB2003-0.5 | ● | 0.15 | 0.3 | 0.5 | 0.18 | 0.27 | 50 | 4 | 14.17 | 0.56 | 0.58 | 0.60 | 0.61 | 0.65 | 30,750 |
| CBN-EHB2003-0.75 | ● | | | 0.75 | 0.18 | 0.27 | 50 | 4 | 13.72 | 0.82 | 0.85 | 0.87 | 0.90 | 0.96 | 30,750 |
| CBN-EHB2003-1 | ● | | | 1 | 0.18 | 0.27 | 50 | 4 | 13.30 | 1.08 | 1.11 | 1.15 | 1.19 | 1.27 | 30,750 |
| CBN-EHB2003-1.5 | ● | | | 1.5 | 0.18 | 0.27 | 50 | 4 | 12.53 | 1.60 | 1.65 | 1.70 | 1.76 | 1.89 | 32,250 |
| CBN-EHB2003-2 | ● | | | 2 | 0.18 | 0.27 | 50 | 4 | 11.84 | 2.12 | 2.18 | 2.26 | 2.34 | 2.52 | 32,250 |
| CBN-EHB2003-3 | ● | | | 3 | 0.18 | 0.27 | 50 | 4 | 10.67 | 3.15 | 3.25 | 3.37 | 3.49 | 3.76 | 32,250 |
| CBN-EHB2004-0.75 | ● | 0.2 | 0.4 | 0.75 | 0.4 | 0.37 | 50 | 4 | 13.77 | 0.82 | 0.84 | 0.87 | 0.89 | 0.95 | 27,850 |
| CBN-EHB2004-1 | ● | | | 1 | 0.4 | 0.37 | 50 | 4 | 13.33 | 1.08 | 1.11 | 1.14 | 1.18 | 1.26 | 27,850 |
| CBN-EHB2004-1.5 | ● | | | 1.5 | 0.4 | 0.37 | 50 | 4 | 12.54 | 1.60 | 1.65 | 1.70 | 1.75 | 1.88 | 27,850 |
| CBN-EHB2004-2 | ● | | | 2 | 0.4 | 0.37 | 50 | 4 | 11.83 | 2.11 | 2.18 | 2.25 | 2.33 | 2.50 | 29,570 |
| CBN-EHB2004-3 | ● | | | 3 | 0.4 | 0.37 | 50 | 4 | 10.63 | 3.15 | 3.25 | 3.36 | 3.48 | 3.75 | 29,570 |
| CBN-EHB2005-1 | ● | 0.25 | 0.5 | 1 | 0.5 | 0.47 | 50 | 4 | 13.37 | 1.08 | 1.11 | 1.14 | 1.17 | 1.25 | 27,850 |
| CBN-EHB2005-1.5 | ● | | | 1.5 | 0.5 | 0.47 | 50 | 4 | 12.55 | 1.60 | 1.64 | 1.69 | 1.75 | 1.87 | 27,850 |
| CBN-EHB2005-2.5 | ● | | | 2.5 | 0.5 | 0.47 | 50 | 4 | 11.18 | 2.63 | 2.71 | 2.80 | 2.90 | 3.11 | 29,570 |
| CBN-EHB2005-3 | ● | | | 3 | 0.5 | 0.47 | 50 | 4 | 10.59 | 3.15 | 3.25 | 3.36 | 3.47 | 3.73 | 29,570 |
| CBN-EHB2006-1 | ● | 0.3 | 0.6 | 1 | 0.55 | 0.57 | 50 | 4 | 13.40 | 1.08 | 1.10 | 1.13 | 1.17 | 1.24 | 25,820 |
| CBN-EHB2006-1.5 | ● | | | 1.5 | 0.55 | 0.57 | 50 | 4 | 12.56 | 1.59 | 1.64 | 1.69 | 1.74 | 1.86 | 25,820 |
| CBN-EHB2006-3 | ● | | | 3 | 0.55 | 0.57 | 50 | 4 | 10.55 | 3.14 | 3.24 | 3.35 | 3.46 | 3.72 | 27,540 |
| CBN-EHB2008-1.5 | ● | 0.4 | 0.8 | 1.5 | 0.7 | 0.77 | 50 | 4 | 12.58 | 1.59 | 1.63 | 1.68 | 1.73 | 1.83 | 25,820 |
| CBN-EHB2008-2.5 | ● | | | 2.5 | 0.7 | 0.77 | 50 | 4 | 11.09 | 2.62 | 2.70 | 2.79 | 2.88 | 3.08 | 25,820 |
| CBN-EHB2008-4 | ● | | | 4 | 0.7 | 0.77 | 50 | 4 | 9.41 | 4.17 | 4.31 | 4.45 | 4.60 | 4.94 | 27,540 |
| CBN-EHB2010-1.5 | ● | 0.5 | 1 | 1.5 | 1 | 0.96 | 50 | 4 | 12.57 | 1.61 | 1.64 | 1.69 | 1.73 | 1.83 | 25,820 |
| CBN-EHB2010-2.5 | ● | | | 2.5 | 1 | 0.96 | 50 | 4 | 11.00 | 2.64 | 2.71 | 2.80 | 2.88 | 3.08 | 25,820 |
| CBN-EHB2010-4 | ● | | | 4 | 1 | 0.96 | 50 | 4 | 9.25 | 4.19 | 4.32 | 4.46 | 4.61 | 4.94 | 27,540 |
| CBN-EHB2010-5 | ● | | | 5 | 1 | 0.96 | 50 | 4 | 8.36 | 5.22 | 5.39 | 5.57 | 5.76 | 6.19 | 27,540 |
| CBN-EHB2015-2.5 | ● | 0.75 | 1.5 | 2.5 | 1.35 | 1.45 | 50 | 4 | 10.76 | 2.65 | 2.72 | 2.79 | 2.87 | 3.04 | 25,820 |
| CBN-EHB2015-5 | ● | | | 5 | 1.35 | 1.45 | 50 | 4 | 7.86 | 5.23 | 5.39 | 5.56 | 5.74 | 6.15 | 26,780 |
| CBN-EHB2015-7.5 | ● | | | 7.5 | 1.35 | 1.45 | 50 | 4 | 6.18 | 7.82 | 8.07 | 8.33 | 8.62 | 9.26 | 29,570 |
| CBN-EHB2020-2.5 | ● | 1 | 2 | 2.5 | 1.65 | 1.94 | 50 | 4 | 10.43 | 2.66 | 2.72 | 2.78 | 2.85 | 3.01 | 25,820 |
| CBN-EHB2020-5 | ● | | | 5 | 1.65 | 1.94 | 50 | 4 | 7.21 | 5.25 | 5.39 | 5.55 | 5.73 | 6.11 | 26,780 |
| CBN-EHB2020-7.5 | ● | | | 7.5 | 1.65 | 1.94 | 50 | 4 | 5.50 | 7.83 | 8.07 | 8.32 | 8.60 | 9.22 | 29,570 |
| CBN-EHB2020-10 | ● | | | 10 | 1.65 | 1.94 | 50 | 4 | 4.44 | 10.41 | 10.74 | 11.10 | 11.48 | 12.33 | 29,570 |

## 対応被削材 Applicable work materia

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦45HRC | 高硬度 Hardened steel > 45HRC ≦55HRC | 高硬度 Hardened steel > 55HRC ≦65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| | | ○ | ◎ | ◎ | | | | |

## 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| CBN-EHB | × (N/A) | 0.6 ～ 2 |

●：標準在庫品です。●：Stocked items.

# Epoch CBN High Precision Ball End Mill
# エポックCBNハイプレシジョンボールエンドミル

## 標準切削条件表 Recommended cutting conditions

### CBN-EHB

＜高能率加工条件＞ High efficiency condition

| 被削材 Work material | | | 焼入れ鋼 Hardened steels (50～55HRC) HPM38 | | | | 焼入れ鋼 Hardened steels (55～62HRC) SKD11,YXR3 | | | | 焼入れ鋼 Hardened steels (62～64HRC) SKH51,HAP10 | | | | 焼入れ鋼 Hardened steels (64～70HRC) HAP40,HAP72 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ボール半径 Ball radius RE (mm) | 外径 Tool dia. DC (mm) | 首下長 Under neck length LU (mm) | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 切込み量(mm) Depth of cut ap | ae | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 切込み量(mm) Depth of cut ap | ae | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 切込み量(mm) Depth of cut ap | ae | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 切込み量(mm) Depth of cut ap | ae |
| 0.1 | 0.2 | 0.5 | 50,000 | 480 | 0.006 | 0.018 | 50,000 | 420 | 0.006 | 0.018 | 50,000 | 350 | 0.004 | 0.012 | 50,000 | 290 | 0.004 | 0.012 |
| | | 0.75 | 50,000 | 480 | 0.004 | 0.012 | 50,000 | 420 | 0.004 | 0.012 | 50,000 | 350 | 0.003 | 0.009 | 50,000 | 290 | 0.003 | 0.009 |
| | | 1 | 50,000 | 480 | 0.003 | 0.009 | 50,000 | 420 | 0.003 | 0.009 | 50,000 | 350 | 0.002 | 0.006 | 50,000 | 290 | 0.002 | 0.006 |
| | | 1.5 | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| | | 2 | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| 0.15 | 0.3 | 0.5 | 50,000 | 720 | 0.009 | 0.027 | 50,000 | 620 | 0.009 | 0.027 | 50,000 | 530 | 0.007 | 0.021 | 50,000 | 430 | 0.006 | 0.018 |
| | | 0.75 | 50,000 | 720 | 0.009 | 0.027 | 50,000 | 620 | 0.009 | 0.027 | 50,000 | 530 | 0.007 | 0.021 | 50,000 | 430 | 0.006 | 0.018 |
| | | 1 | 50,000 | 720 | 0.008 | 0.024 | 50,000 | 620 | 0.008 | 0.024 | 50,000 | 530 | 0.006 | 0.018 | 50,000 | 430 | 0.005 | 0.015 |
| | | 1.5 | 50,000 | 720 | 0.005 | 0.015 | 50,000 | 620 | 0.005 | 0.015 | 50,000 | 530 | 0.004 | 0.012 | 50,000 | 430 | 0.003 | 0.009 |
| | | 2 | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| | | 3 | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| 0.2 | 0.4 | 0.75 | 50,000 | 1,020 | 0.012 | 0.036 | 50,000 | 880 | 0.012 | 0.036 | 50,000 | 750 | 0.01 | 0.03 | 50,000 | 610 | 0.008 | 0.024 |
| | | 1 | 50,000 | 1,020 | 0.012 | 0.036 | 50,000 | 880 | 0.012 | 0.036 | 50,000 | 750 | 0.01 | 0.03 | 50,000 | 610 | 0.008 | 0.024 |
| | | 1.5 | 50,000 | 1,020 | 0.008 | 0.024 | 50,000 | 880 | 0.008 | 0.024 | 50,000 | 750 | 0.007 | 0.021 | 50,000 | 610 | 0.005 | 0.015 |
| | | 2 | 50,000 | 1,020 | 0.006 | 0.018 | 50,000 | 880 | 0.006 | 0.018 | 50,000 | 750 | 0.005 | 0.015 | 50,000 | 610 | 0.004 | 0.012 |
| | | 3 | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| 0.25 | 0.5 | 1 | 50,000 | 1,280 | 0.015 | 0.045 | 50,000 | 1,110 | 0.015 | 0.045 | 50,000 | 940 | 0.012 | 0.036 | 50,000 | 770 | 0.01 | 0.03 |
| | | 1.5 | 50,000 | 1,280 | 0.015 | 0.045 | 50,000 | 1,110 | 0.015 | 0.045 | 50,000 | 940 | 0.012 | 0.036 | 50,000 | 770 | 0.01 | 0.03 |
| | | 2.5 | 50,000 | 1,280 | 0.008 | 0.024 | 50,000 | 1,110 | 0.008 | 0.024 | 50,000 | 940 | 0.006 | 0.018 | 50,000 | 770 | 0.005 | 0.015 |
| | | 3 | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| 0.3 | 0.6 | 1 | 50,000 | 1,620 | 0.018 | 0.054 | 50,000 | 1,400 | 0.018 | 0.054 | 50,000 | 1,190 | 0.015 | 0.045 | 50,000 | 970 | 0.012 | 0.036 |
| | | 1.5 | 50,000 | 1,620 | 0.018 | 0.054 | 50,000 | 1,400 | 0.018 | 0.054 | 50,000 | 1,190 | 0.015 | 0.045 | 50,000 | 970 | 0.012 | 0.036 |
| | | 3 | 50,000 | 1,620 | 0.009 | 0.027 | 50,000 | 1,400 | 0.009 | 0.027 | 50,000 | 1,190 | 0.007 | 0.021 | 50,000 | 970 | 0.006 | 0.018 |
| 0.4 | 0.8 | 1.5 | 50,000 | 2,160 | 0.024 | 0.072 | 50,000 | 1,870 | 0.024 | 0.072 | 50,000 | 1,580 | 0.02 | 0.06 | 50,000 | 1,300 | 0.016 | 0.048 |
| | | 2.5 | 50,000 | 2,160 | 0.024 | 0.072 | 50,000 | 1,870 | 0.024 | 0.072 | 50,000 | 1,580 | 0.02 | 0.06 | 50,000 | 1,300 | 0.016 | 0.048 |
| | | 4 | 40,000 | 1,730 | 0.012 | 0.036 | 40,000 | 1,500 | 0.012 | 0.036 | 40,000 | 1,270 | 0.01 | 0.03 | 40,000 | 1,040 | 0.008 | 0.024 |
| 0.5 | 1 | 1.5 | 40,000 | 2,400 | 0.03 | 0.09 | 40,000 | 2,080 | 0.03 | 0.09 | 40,000 | 1,760 | 0.024 | 0.072 | 40,000 | 1,440 | 0.02 | 0.06 |
| | | 2.5 | 40,000 | 2,400 | 0.03 | 0.09 | 40,000 | 2,080 | 0.03 | 0.09 | 40,000 | 1,760 | 0.024 | 0.072 | 40,000 | 1,440 | 0.02 | 0.06 |
| | | 4 | 36,000 | 2,160 | 0.02 | 0.06 | 36,000 | 1,870 | 0.02 | 0.06 | 36,000 | 1,580 | 0.016 | 0.048 | 36,000 | 1,300 | 0.013 | 0.039 |
| | | 5 | 32,000 | 1,920 | 0.015 | 0.045 | 32,000 | 1,660 | 0.015 | 0.045 | 32,000 | 1,410 | 0.012 | 0.036 | 32,000 | 1,150 | 0.01 | 0.03 |
| 0.75 | 1.5 | 2.5 | 27,000 | 2,430 | 0.045 | 0.135 | 27,000 | 2,110 | 0.045 | 0.135 | 27,000 | 1,780 | 0.036 | 0.108 | 27,000 | 1,460 | 0.03 | 0.09 |
| | | 5 | 27,000 | 2,430 | 0.045 | 0.135 | 27,000 | 2,110 | 0.045 | 0.135 | 27,000 | 1,780 | 0.036 | 0.108 | 27,000 | 1,460 | 0.03 | 0.09 |
| | | 7.5 | 21,000 | 1,890 | 0.03 | 0.09 | 21,000 | 1,640 | 0.03 | 0.09 | 21,000 | 1,390 | 0.024 | 0.072 | 21,000 | 1,130 | 0.02 | 0.06 |
| 1 | 2 | 2.5 | 20,000 | 2,400 | 0.06 | 0.18 | 20,000 | 2,080 | 0.06 | 0.18 | 20,000 | 1,760 | 0.048 | 0.144 | 20,000 | 1,440 | 0.04 | 0.12 |
| | | 5 | 20,000 | 2,400 | 0.06 | 0.18 | 20,000 | 2,080 | 0.06 | 0.18 | 20,000 | 1,760 | 0.048 | 0.144 | 20,000 | 1,440 | 0.04 | 0.12 |
| | | 7.5 | 18,000 | 2,160 | 0.04 | 0.12 | 18,000 | 1,870 | 0.04 | 0.12 | 18,000 | 1,580 | 0.032 | 0.096 | 18,000 | 1,300 | 0.027 | 0.081 |
| | | 10 | 16,000 | 1,920 | 0.03 | 0.09 | 16,000 | 1,660 | 0.03 | 0.09 | 16,000 | 1,410 | 0.024 | 0.072 | 16,000 | 1,150 | 0.02 | 0.06 |

【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

【Note】 1) Use the appropriate coolant for the work material and machining shape.
2) This standard cutting condition table is intended as reference cutting conditions. The conditions should be adjusted as necessary according to the actual conditions of machined shape, purpose, machine used, etc.
3) If the machine rotation speed is insufficient, reduce the rotation speed and feed rate by the same ratio.

## ＜仕上げ加工条件＞ Finishing condition

| 被削材 Work material | | | 焼入れ鋼 Hardened steels (50～55HRC) HPM38 | | | | 焼入れ鋼 Hardened steels (55～62HRC) SKD11,YXR3 | | | | 焼入れ鋼 Hardened steels (62～64HRC) SKH51,HAP10 | | | | 焼入れ鋼 Hardened steels (64～70HRC) HAP40,HAP72 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ボール半径 Ball radius RE (mm) | 外径 Tool dia. DC (mm) | 首下長 Under neck length LU (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 切込み量(mm) Depth of cut $a_p$ | $a_e$ | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 切込み量(mm) Depth of cut $a_p$ | $a_e$ | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 切込み量(mm) Depth of cut $a_p$ | $a_e$ | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 切込み量(mm) Depth of cut $a_p$ | $a_e$ |
| 0.1 | 0.2 | 0.5 | 50,000 | 420 | 0.004 | 0.004 | 50,000 | 350 | 0.004 | 0.004 | 50,000 | 290 | 0.004 | 0.004 | 50,000 | 220 | 0.004 | 0.004 |
| | | 0.75 | 50,000 | 420 | 0.003 | 0.003 | 50,000 | 350 | 0.003 | 0.003 | 50,000 | 290 | 0.003 | 0.003 | 50,000 | 220 | 0.003 | 0.003 |
| | | 1 | 50,000 | 420 | 0.002 | 0.002 | 50,000 | 350 | 0.002 | 0.002 | 50,000 | 290 | 0.002 | 0.002 | 50,000 | 220 | 0.002 | 0.002 |
| | | 1.5 | 50,000 | 420 | 0.001 | 0.001 | 50,000 | 350 | 0.001 | 0.001 | 50,000 | 290 | 0.001 | 0.001 | 50,000 | 220 | 0.001 | 0.001 |
| | | 2 | 50,000 | 420 | 0.001 | 0.001 | 50,000 | 350 | 0.001 | 0.001 | 50,000 | 290 | 0.001 | 0.001 | 50,000 | 220 | 0.001 | 0.001 |
| 0.15 | 0.3 | 0.5 | 50,000 | 620 | 0.006 | 0.006 | 50,000 | 530 | 0.006 | 0.006 | 50,000 | 430 | 0.006 | 0.006 | 50,000 | 340 | 0.006 | 0.006 |
| | | 0.75 | 50,000 | 620 | 0.006 | 0.006 | 50,000 | 530 | 0.006 | 0.006 | 50,000 | 430 | 0.006 | 0.006 | 50,000 | 340 | 0.006 | 0.006 |
| | | 1 | 50,000 | 620 | 0.005 | 0.005 | 50,000 | 530 | 0.005 | 0.005 | 50,000 | 430 | 0.005 | 0.005 | 50,000 | 340 | 0.005 | 0.005 |
| | | 1.5 | 50,000 | 620 | 0.003 | 0.003 | 50,000 | 530 | 0.003 | 0.003 | 50,000 | 430 | 0.003 | 0.003 | 50,000 | 340 | 0.003 | 0.003 |
| | | 2 | 50,000 | 620 | 0.003 | 0.003 | 50,000 | 530 | 0.003 | 0.003 | 50,000 | 430 | 0.003 | 0.003 | 50,000 | 340 | 0.003 | 0.003 |
| | | 3 | 40,000 | 500 | 0.002 | 0.002 | 40,000 | 420 | 0.002 | 0.002 | 40,000 | 350 | 0.002 | 0.002 | 40,000 | 270 | 0.002 | 0.002 |
| 0.2 | 0.4 | 0.75 | 50,000 | 880 | 0.008 | 0.008 | 50,000 | 750 | 0.008 | 0.008 | 50,000 | 610 | 0.008 | 0.008 | 50,000 | 480 | 0.008 | 0.008 |
| | | 1 | 50,000 | 880 | 0.008 | 0.008 | 50,000 | 750 | 0.008 | 0.008 | 50,000 | 610 | 0.008 | 0.008 | 50,000 | 480 | 0.008 | 0.008 |
| | | 1.5 | 50,000 | 880 | 0.005 | 0.005 | 50,000 | 750 | 0.005 | 0.005 | 50,000 | 610 | 0.005 | 0.005 | 50,000 | 480 | 0.005 | 0.005 |
| | | 2 | 50,000 | 880 | 0.004 | 0.004 | 50,000 | 750 | 0.004 | 0.004 | 50,000 | 610 | 0.004 | 0.004 | 50,000 | 480 | 0.004 | 0.004 |
| | | 3 | 50,000 | 880 | 0.003 | 0.003 | 50,000 | 750 | 0.003 | 0.003 | 50,000 | 610 | 0.003 | 0.003 | 50,000 | 480 | 0.003 | 0.003 |
| 0.25 | 0.5 | 1 | 50,000 | 1,110 | 0.01 | 0.01 | 50,000 | 940 | 0.01 | 0.01 | 50,000 | 770 | 0.01 | 0.01 | 50,000 | 600 | 0.01 | 0.01 |
| | | 1.5 | 50,000 | 1,110 | 0.01 | 0.01 | 50,000 | 940 | 0.01 | 0.01 | 50,000 | 770 | 0.01 | 0.01 | 50,000 | 600 | 0.01 | 0.01 |
| | | 2.5 | 50,000 | 1,110 | 0.005 | 0.005 | 50,000 | 940 | 0.005 | 0.005 | 50,000 | 770 | 0.005 | 0.005 | 50,000 | 600 | 0.005 | 0.005 |
| | | 3 | 48,000 | 1,060 | 0.005 | 0.005 | 48,000 | 900 | 0.005 | 0.005 | 48,000 | 730 | 0.005 | 0.005 | 48,000 | 570 | 0.005 | 0.005 |
| 0.3 | 0.6 | 1 | 50,000 | 1,400 | 0.012 | 0.012 | 50,000 | 1,190 | 0.012 | 0.012 | 50,000 | 970 | 0.012 | 0.012 | 50,000 | 760 | 0.012 | 0.012 |
| | | 1.5 | 50,000 | 1,400 | 0.012 | 0.012 | 50,000 | 1,190 | 0.012 | 0.012 | 50,000 | 970 | 0.012 | 0.012 | 50,000 | 760 | 0.012 | 0.012 |
| | | 3 | 50,000 | 1,400 | 0.006 | 0.006 | 50,000 | 1,190 | 0.006 | 0.006 | 50,000 | 970 | 0.006 | 0.006 | 50,000 | 760 | 0.006 | 0.006 |
| 0.4 | 0.8 | 1.5 | 50,000 | 1,870 | 0.016 | 0.016 | 50,000 | 1,580 | 0.016 | 0.016 | 50,000 | 1,300 | 0.016 | 0.016 | 50,000 | 1,010 | 0.016 | 0.016 |
| | | 2.5 | 50,000 | 1,870 | 0.016 | 0.016 | 50,000 | 1,580 | 0.016 | 0.016 | 50,000 | 1,300 | 0.016 | 0.016 | 50,000 | 1,010 | 0.016 | 0.016 |
| | | 4 | 40,000 | 1,500 | 0.008 | 0.008 | 40,000 | 1,270 | 0.008 | 0.008 | 40,000 | 1,040 | 0.008 | 0.008 | 40,000 | 810 | 0.008 | 0.008 |
| 0.5 | 1 | 1.5 | 40,000 | 2,080 | 0.02 | 0.02 | 40,000 | 1,760 | 0.02 | 0.02 | 40,000 | 1,440 | 0.02 | 0.02 | 40,000 | 1,120 | 0.02 | 0.02 |
| | | 2.5 | 40,000 | 2,080 | 0.02 | 0.02 | 40,000 | 1,760 | 0.02 | 0.02 | 40,000 | 1,440 | 0.02 | 0.02 | 40,000 | 1,120 | 0.02 | 0.02 |
| | | 4 | 36,000 | 1,870 | 0.013 | 0.013 | 36,000 | 1,580 | 0.013 | 0.013 | 36,000 | 1,300 | 0.013 | 0.013 | 36,000 | 1,010 | 0.013 | 0.013 |
| | | 5 | 32,000 | 1,660 | 0.01 | 0.01 | 32,000 | 1,410 | 0.01 | 0.01 | 32,000 | 1,150 | 0.01 | 0.01 | 32,000 | 900 | 0.01 | 0.01 |
| 0.75 | 1.5 | 2.5 | 27,000 | 2,110 | 0.03 | 0.03 | 27,000 | 1,780 | 0.03 | 0.03 | 27,000 | 1,460 | 0.03 | 0.03 | 27,000 | 1,130 | 0.03 | 0.03 |
| | | 5 | 27,000 | 2,110 | 0.03 | 0.03 | 27,000 | 1,780 | 0.03 | 0.03 | 27,000 | 1,460 | 0.03 | 0.03 | 27,000 | 1,130 | 0.03 | 0.03 |
| | | 7.5 | 21,000 | 1,640 | 0.02 | 0.02 | 21,000 | 1,390 | 0.02 | 0.02 | 21,000 | 1,130 | 0.02 | 0.02 | 21,000 | 880 | 0.02 | 0.02 |
| 1 | 2 | 2.5 | 20,000 | 2,080 | 0.04 | 0.04 | 20,000 | 1,760 | 0.04 | 0.04 | 20,000 | 1,440 | 0.04 | 0.04 | 20,000 | 1,120 | 0.04 | 0.04 |
| | | 5 | 20,000 | 2,080 | 0.04 | 0.04 | 20,000 | 1,760 | 0.04 | 0.04 | 20,000 | 1,440 | 0.04 | 0.04 | 20,000 | 1,120 | 0.04 | 0.04 |
| | | 7.5 | 18,000 | 1,870 | 0.027 | 0.027 | 18,000 | 1,580 | 0.027 | 0.027 | 18,000 | 1,300 | 0.027 | 0.027 | 18,000 | 1,010 | 0.027 | 0.027 |
| | | 10 | 16,000 | 1,660 | 0.02 | 0.02 | 16,000 | 1,410 | 0.02 | 0.02 | 16,000 | 1,150 | 0.02 | 0.02 | 16,000 | 900 | 0.02 | 0.02 |

【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

【Note】1) Use the appropriate coolant for the work material and machining shape.
2) This standard cutting condition table is intended as reference cutting conditions. The conditions should be adjusted as necessary according to the actual conditions of machined shape, purpose, machine used, etc.
3) If the machine rotation speed is insufficient, reduce the rotation speed and feed rate by the same ratio.

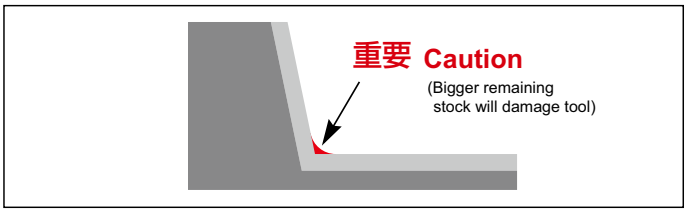
# Epoch CBN High Precision Ball End Mill
# エポックCBNハイプレシジョンボールエンドミル

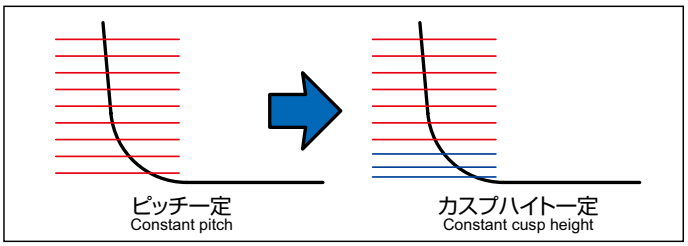
## 使用上の注意点 Cautions regarding use

### ＜中仕上げ加工に関して＞ About semi-finishing

安定した加工を行うために、中仕上げ加工にてコーナ部の削り残し加工を行ってください。(仕上げ加工における加工量を均一にする)
この時、カスプハイト量が一定になるプログラムにて加工することを推奨します。また、中仕上げ加工はCBNエンドミルで行うことを推奨します。

For stable machining, perform semi finishing to remove remaining stock in the corners. (This will make the machining amount for finishing uniform.)
At this time, it is recommended that the program should be set so that the cusp height will be a constant amount. In addition, it is recommended that semi finishing should be performed with CBN end mill.



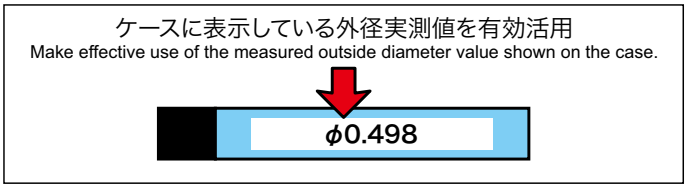

### ＜径補正値の入力＞ Input of diameter correction value

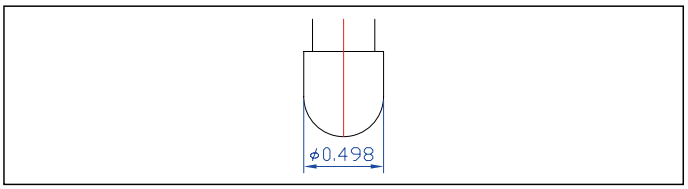
**エポックCBNハイプレシジョンボールエンドミルはケースに外径実測値を記載しています。**
荒加工～仕上げ加工までの工具径の実測値をCAMに入力する事で、最終的な加工精度を向上することが可能です。

【入力例】ボールエンドミル: 工具径φ0.498→R0.249

For Epoch CBN High Precision Ball End Mill, the measured outside diameter value is shown on the case.
Inputting the actual measured value for the tool diameter in CAM from roughing to finishing will enable improved final machining accuracy.

【Input example】Ball end mill: Tool diameter Ø0.498→R0.249




### ＜送り速度に関して＞ Regarding feed rate

機械実送り速度が入力値に達していないような場合、(ワーク寸法が小さくて送りが上がらない場合など)は、送り速度の加減速が急激に生じるため、欠損などの原因になります。このような時は機械が追従する送り速度を入力してください。

If the actual feed rate of the machine does not reach the set value (such as when workpiece is small and speed cannot be increased, etc.), sudden increases/decreases in feed rate may occur, which can cause chipping, etc.
In such cases, input the feed rate that the machine can support.

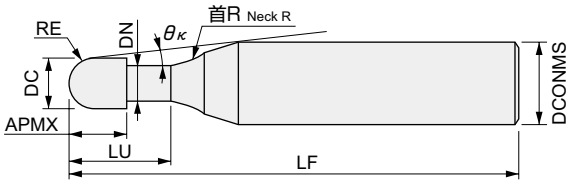
# Epoch CBN Super Ball End Mill
# エポックCBNスーパーボールエンドミル

平面 Planing | 彫込み Die-sinking | 曲面 Profiling | R Radius | 取りのこし Rest Material Machining | 細部 Miniature | 仕上 Finishing | リブ・細部 Rib Miniature | 切削条件表 A152 Cutting Conditions

RE公差 RE tolerance ±0.005 | h4 | (mm)

切れ味と刃先強度を両立した新発想CBNエンドミル。
New-concept CBN end mill providing both good cutting performance and strong flute edges.

Includes actual measured mill diameter value. 外径実測値付き




## CBN-EPSB2○○○-○○.○○-S/F

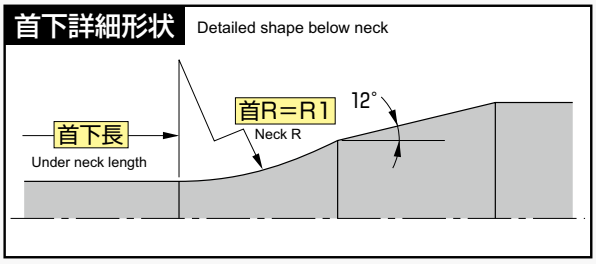
※外径実測値をケースに表示しています
Actual measured mill diameter value is shown on case.

CBN

| ストロング(S)刃形 Strong (S) type 商品コード Item code | 在庫 Stock | ファイン(F)刃形 Fine (F) type 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 全数外径実測値表示 Display of actual measured mill dia. for all tools ボール半径 Ball radius RE | 外径 Tool dia. DC | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度 Interference angle (°) θκ | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格(¥) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CBN-EPSB2002-0.5-S | ● | CBN-EPSB2002-0.5-F | ● | 0.1 | 0.2 | 0.5 | 0.12 | 0.18 | 50 | 4 | 1 | 11.45 | 0.67 | 0.7 | 0.72 | 0.75 | 0.8 | 32,670 |
| CBN-EPSB2002-1-S | ● | CBN-EPSB2002-1-F | ● | | | 1 | 0.12 | 0.18 | 50 | 4 | 1 | 10.88 | 1.19 | 1.24 | 1.28 | 1.32 | 1.38 | 34,280 |
| CBN-EPSB2003-0.75-S | ● | CBN-EPSB2003-0.75-F | ● | 0.15 | 0.3 | 0.75 | 0.18 | 0.27 | 50 | 4 | 1 | 11.17 | 0.95 | 0.99 | 1.02 | 1.05 | 1.1 | 32,670 |
| CBN-EPSB2003-1.5-S | ● | CBN-EPSB2003-1.5-F | ● | | | 1.5 | 0.18 | 0.27 | 50 | 4 | 1 | 10.36 | 1.73 | 1.79 | 1.83 | 1.88 | 2.03 | 34,280 |
| CBN-EPSB2004-1-S | ● | CBN-EPSB2004-1-F | ● | 0.2 | 0.4 | 1 | 0.24 | 0.37 | 50 | 4 | 1 | 10.91 | 1.21 | 1.25 | 1.29 | 1.32 | 1.38 | 29,680 |
| CBN-EPSB2004-2-S | ● | CBN-EPSB2004-2-F | ● | | | 2 | 0.24 | 0.37 | 50 | 4 | 1 | 9.88 | 2.25 | 2.31 | 2.37 | 2.43 | 2.68 | 31,490 |
| CBN-EPSB2005-1.5-S | ● | CBN-EPSB2005-1.5-F | ● | 0.25 | 0.5 | 1.5 | 0.3 | 0.47 | 50 | 4 | 1 | 10.39 | 1.73 | 1.78 | 1.83 | 1.87 | 2 | 29,680 |
| CBN-EPSB2005-3-S | ● | CBN-EPSB2005-3-F | ● | | | 3 | 0.3 | 0.47 | 50 | 4 | 1 | 9 | 3.28 | 3.36 | 3.46 | 3.62 | 3.99 | 31,490 |
| CBN-EPSB2006-1.5-S | ● | CBN-EPSB2006-1.5-F | ● | 0.3 | 0.6 | 1.5 | 0.36 | 0.57 | 50 | 4 | 1 | 10.4 | 1.73 | 1.78 | 1.82 | 1.86 | 1.98 | 27,430 |
| CBN-EPSB2006-3-S | ● | CBN-EPSB2006-3-F | ● | | | 3 | 0.36 | 0.57 | 50 | 4 | 1 | 8.98 | 3.28 | 3.36 | 3.46 | 3.61 | 3.97 | 29,250 |
| CBN-EPSB2008-2.5-S | ● | CBN-EPSB2008-2.5-F | ● | 0.4 | 0.8 | 2.5 | 0.48 | 0.77 | 50 | 4 | 1 | 9.37 | 2.76 | 2.83 | 2.89 | 2.99 | 3.28 | 27,430 |
| CBN-EPSB2008-5-S | ● | CBN-EPSB2008-5-F | ● | | | 5 | 0.48 | 0.77 | 50 | 4 | 1 | 7.48 | 5.33 | 5.48 | 5.72 | 5.99 | 6.6 | 29,680 |
| CBN-EPSB2010-2.5-S | ● | CBN-EPSB2010-2.5-F | ● | 0.5 | 1 | 2.5 | 0.6 | 0.96 | 50 | 4 | 1 | 9.31 | 2.77 | 2.84 | 2.89 | 3 | 3.28 | 27,430 |
| CBN-EPSB2010-5-S | ● | CBN-EPSB2010-5-F | ● | | | 5 | 0.6 | 0.96 | 50 | 4 | 1 | 7.34 | 5.34 | 5.5 | 5.74 | 5.99 | 6.6 | 29,250 |
| CBN-EPSB2010-10-S | ● | CBN-EPSB2010-10-F | ● | | | 10 | 0.6 | 0.96 | 50 | 4 | 1 | 5.15 | 10.5 | 10.95 | 11.44 | 11.98 | 13.23 | 30,320 |
| CBN-EPSB2015-5-S | ● | CBN-EPSB2015-5-F | ● | 0.75 | 1.5 | 5 | 0.9 | 1.44 | 50 | 4 | 1 | 6.94 | 5.36 | 5.53 | 5.75 | 6 | 6.58 | 28,500 |
| CBN-EPSB2015-10-S | ● | CBN-EPSB2015-10-F | ● | | | 10 | 0.9 | 1.44 | 50 | 4 | 1 | 4.68 | 10.54 | 10.98 | 11.46 | 11.98 | 13.22 | 31,490 |
| CBN-EPSB2020-5-S | ● | CBN-EPSB2020-5-F | ● | 1 | 2 | 5 | 1.2 | 1.92 | 50 | 4 | 1 | 6.42 | 5.38 | 5.56 | 5.77 | 6.01 | 6.56 | 28,500 |
| CBN-EPSB2020-10-S | ● | CBN-EPSB2020-10-F | ● | | | 10 | 1.2 | 1.92 | 50 | 4 | 1 | 4.12 | 10.58 | 11.01 | 11.48 | 11.99 | 13.2 | 31,490 |
| CBN-EPSB2020-20-S | ● | CBN-EPSB2020-20-F | ● | | | 20 | 1.2 | 1.92 | 55 | 4 | 1 | 2.4 | 21 | 21.9 | 22.88 | 23.96 | 干渉なし | 38,460 |

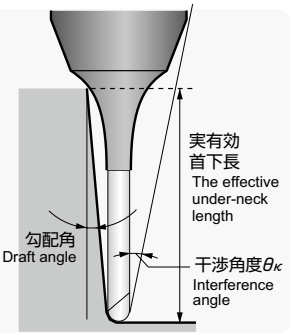
【基本推奨】F刃型:L/D(首下長/外径)≦5、 S刃型:L/D(首下長/外径)>5
【Basic recommendation】F type : L/D(under neck length/mill dia)≦5, S type : L/D(under neck length/mill dia)>5

### 首下詳細形状 Detailed shape below neck




【注意】
加工物に勾配がついている場合、干渉領域は、首下長さよりも長くなります。それぞれの勾配角に対する実有効首下長をご参照ください。
また、工具が加工物に干渉する角度を、干渉角度θκで表示していますので合わせてご参照ください。

【Note】
If the workpiece has draft angle, the interference length will be longer than the under-neck length.Please refer to the effective under-neck length for the various draft angles.
In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle θκ", and should also be referred to.




### 対応被削材 Applicable work materia

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦45HRC | 高硬度 Hardened steel >45HRC ≦55HRC | 高硬度 Hardened steel >55HRC ≦65HRC | 高硬度 Hardened steel >65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| | | ○ | ◎ | ◎ | | | | |

### 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| CBN-EPSB | × (N/A) | × (N/A) |

●：標準在庫品です。●：Stocked items. 干渉なし：No interference

# Epoch CBN Super Ball End Mill
# エポックCBNスーパーボールエンドミル

## 標準切削条件表 Recommended cutting conditions CBN-EPSB-S CBN-EPSB-F

### ＜中仕上げ加工条件＞ Semi-finishing condition

| 被削材 Work material | | | | | 1 焼入れ鋼 Hardened steels (～55HRC) HPM1,SKD61,SKT4 | | 2 焼入れ鋼 Hardened steels (55～65HRC) SKD11,SKH51 | | 3 焼入れ鋼 Hardened steels (65～68HRC) SKH,溶製ハイス | | 4 焼入れ鋼 Hardened steels (68～72HRC) HAP,粉末ハイス | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み比率 Ratio to standard depth of cut | | | | | 100% | | 90% | | 80% | | 70% | |
| ボール半径RE Ball radius (mm) | 外径DC Tool dia. (mm) | 首下長LU Under neck length (mm) | 切り込み量 Depth of cut (mm) ap | ae | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 0.1 | 0.2 | 0.5 | 0.005 | 0.015 | 50,000 | 600 | 48,000 | 500 | 45,000 | 410 | 43,000 | 320 |
| | | 1 | 0.005 | 0.015 | 46,000 | 460 | 44,000 | 390 | 42,000 | 320 | 39,000 | 240 |
| 0.15 | 0.3 | 0.75 | 0.006 | 0.018 | 50,000 | 900 | 47,000 | 740 | 45,000 | 610 | 42,000 | 470 |
| | | 1.5 | 0.006 | 0.018 | 45,000 | 680 | 42,000 | 550 | 40,000 | 450 | 38,000 | 360 |
| 0.2 | 0.4 | 1 | 0.008 | 0.024 | 46,000 | 1,100 | 44,000 | 920 | 42,000 | 760 | 39,000 | 590 |
| | | 2 | 0.008 | 0.024 | 41,000 | 820 | 39,000 | 680 | 37,000 | 560 | 35,000 | 440 |
| 0.25 | 0.5 | 1.5 | 0.013 | 0.039 | 46,000 | 1,380 | 44,000 | 1,160 | 41,000 | 920 | 39,000 | 730 |
| | | 3 | 0.01 | 0.03 | 41,000 | 1,030 | 39,000 | 850 | 37,000 | 690 | 35,000 | 550 |
| 0.3 | 0.6 | 1.5 | 0.015 | 0.045 | 42,000 | 1,760 | 40,000 | 1,470 | 38,000 | 1,200 | 36,000 | 950 |
| | | 3 | 0.012 | 0.036 | 38,000 | 1,370 | 36,000 | 1,130 | 34,000 | 920 | 32,000 | 720 |
| 0.4 | 0.8 | 2.5 | 0.02 | 0.06 | 42,000 | 2,350 | 40,000 | 1,960 | 38,000 | 1,600 | 36,000 | 1,260 |
| | | 5 | 0.016 | 0.048 | 38,000 | 2,130 | 36,000 | 1,760 | 34,000 | 1,430 | 32,000 | 1,120 |
| 0.5 | 1 | 2.5 | 0.035 | 0.105 | 38,000 | 2,660 | 36,000 | 2,210 | 34,000 | 1,790 | 32,000 | 1,400 |
| | | 5 | 0.02 | 0.06 | 34,000 | 2,380 | 33,000 | 2,020 | 31,000 | 1,630 | 29,000 | 1,270 |
| | | 10 | 0.015 | 0.045 | 27,000 | 1,620 | 25,000 | 1,310 | 24,000 | 1,080 | 23,000 | 860 |
| 0.75 | 1.5 | 5 | 0.03 | 0.09 | 32,000 | 2,400 | 30,000 | 1,970 | 29,000 | 1,630 | 27,000 | 1,270 |
| | | 10 | 0.02 | 0.06 | 22,000 | 1,320 | 21,000 | 1,100 | 20,000 | 900 | 19,000 | 710 |
| 1 | 2 | 5 | 0.05 | 0.15 | 28,000 | 2,800 | 27,000 | 2,360 | 25,000 | 1,880 | 24,000 | 1,500 |
| | | 10 | 0.03 | 0.09 | 25,000 | 2,500 | 24,000 | 2,100 | 23,000 | 1,730 | 21,000 | 1,310 |
| | | 20 | 0.02 | 0.06 | 20,000 | 1,600 | 19,000 | 1,330 | 18,000 | 1,080 | 17,000 | 850 |

### ＜仕上げ加工条件＞ Finishing condition

| 被削材 Work material | | | | | 1 焼入れ鋼 Hardened steels (～55HRC) HPM1,SKD61,SKT4 | | 2 焼入れ鋼 Hardened steels (55～65HRC) SKD11,SKH51 | | 3 焼入れ鋼 Hardened steels (65～68HRC) SKH,溶製ハイス | | 4 焼入れ鋼 Hardened steels (68～72HRC) HAP,粉末ハイス | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み比率 Ratio to standard depth of cut | | | | | 100% | | 90% | | 80% | | 70% | |
| ボール半径RE Ball radius (mm) | 外径DC Tool dia. (mm) | 首下長LU Under neck length (mm) | 切り込み量 Depth of cut (mm) ap | ae | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 0.1 | 0.2 | 0.5 | 0.005 | 0.015 | 50,000 | 480 | 48,000 | 410 | 45,000 | 350 | 43,000 | 290 |
| | | 1 | 0.005 | 0.015 | 46,000 | 370 | 44,000 | 320 | 42,000 | 270 | 39,000 | 220 |
| 0.15 | 0.3 | 0.75 | 0.005 | 0.015 | 50,000 | 720 | 47,000 | 610 | 45,000 | 520 | 42,000 | 420 |
| | | 1.5 | 0.005 | 0.015 | 45,000 | 540 | 42,000 | 450 | 40,000 | 380 | 38,000 | 320 |
| 0.2 | 0.4 | 1 | 0.006 | 0.018 | 46,000 | 880 | 44,000 | 760 | 42,000 | 650 | 39,000 | 520 |
| | | 2 | 0.006 | 0.018 | 41,000 | 660 | 39,000 | 560 | 37,000 | 470 | 35,000 | 390 |
| 0.25 | 0.5 | 1.5 | 0.008 | 0.024 | 46,000 | 1,100 | 44,000 | 950 | 41,000 | 790 | 39,000 | 660 |
| | | 3 | 0.008 | 0.024 | 41,000 | 820 | 39,000 | 700 | 37,000 | 590 | 35,000 | 490 |
| 0.3 | 0.6 | 1.5 | 0.01 | 0.03 | 42,000 | 1,410 | 40,000 | 1,210 | 38,000 | 1,020 | 36,000 | 850 |
| | | 3 | 0.008 | 0.024 | 38,000 | 1,090 | 36,000 | 930 | 34,000 | 780 | 32,000 | 650 |
| 0.4 | 0.8 | 2.5 | 0.015 | 0.045 | 42,000 | 1,880 | 40,000 | 1,610 | 38,000 | 1,360 | 36,000 | 1,130 |
| | | 5 | 0.012 | 0.036 | 38,000 | 1,700 | 36,000 | 1,450 | 34,000 | 1,220 | 32,000 | 1,000 |
| 0.5 | 1 | 2.5 | 0.02 | 0.06 | 38,000 | 2,130 | 36,000 | 1,810 | 34,000 | 1,520 | 32,000 | 1,250 |
| | | 5 | 0.018 | 0.054 | 34,000 | 1,900 | 33,000 | 1,660 | 31,000 | 1,390 | 29,000 | 1,140 |
| | | 10 | 0.01 | 0.03 | 27,000 | 1,300 | 25,000 | 1,080 | 24,000 | 920 | 23,000 | 770 |
| 0.75 | 1.5 | 5 | 0.023 | 0.069 | 32,000 | 1,920 | 30,000 | 1,620 | 29,000 | 1,390 | 27,000 | 1,130 |
| | | 10 | 0.018 | 0.054 | 22,000 | 1,060 | 21,000 | 910 | 20,000 | 770 | 19,000 | 640 |
| 1 | 2 | 5 | 0.025 | 0.075 | 28,000 | 2,240 | 27,000 | 1,940 | 25,000 | 1,600 | 24,000 | 1,340 |
| | | 10 | 0.02 | 0.06 | 25,000 | 2,000 | 24,000 | 1,730 | 23,000 | 1,470 | 21,000 | 1,180 |
| | | 20 | 0.012 | 0.036 | 20,000 | 1,280 | 19,000 | 1,090 | 18,000 | 920 | 17,000 | 760 |

(※)基本切り込みは被削材グループ1での目安を示しています。その他のグループの場合は、上表の切り込み比率を目安に調整してください。
The indicated standard cutting depth is a reference value for Group 1 work materials.
For materials in other groups, the cutting depth should be adjusted using the reference ratio shown in the above table.

【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

【Note】1) Use the appropriate coolant for the work material and machining shape.
2) This standard cutting condition table is intended as reference cutting conditions. The conditions should be adjusted as necessary according to the actual conditions of machined shape, purpose, machine used, etc.
3) If the machine rotation speed is insufficient, reduce the rotation speed and feed rate by the same ratio.

# Epoch Fine Ball -Migaki-
# エポックファインボール - 磨きレス -

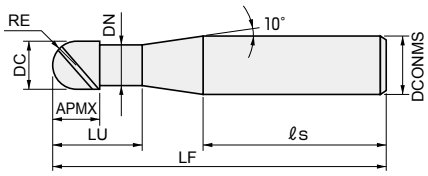
曲面 Profiling　仕上 Finishing

仕上げ加工に適しています。
Ideal for finish machining

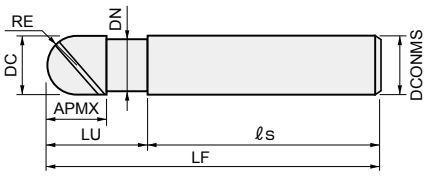
RE公差 RE tolerance ±0.005　h5

(mm)

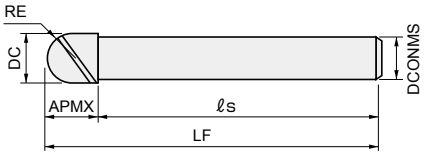
2枚刃 2Flutes




Aタイプ A type




Bタイプ B type



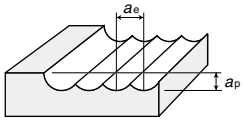

Cタイプ C type

## EFB2○○○

超硬 Carbide　C　ねじれ30° Helix angle　切削条件表A153 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ballr radius RE | 外径 Tool dia. DC | 刃長 Flute length APMX | 首径 Neck dia. DN | 首下長 Under neck length LU | シャンク長 Shank length ℓs | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 形状 Shape | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EFB2010 | ● | 0.5 | 1 | 1 | 0.95 | 2.2 | 39.2 | 50 | 4 | A | 11,250 |
| EFB2015 | ● | 0.75 | 1.5 | 1.5 | 1.4 | 3 | 39.6 | 50 | 4 | A | 11,790 |
| EFB2020 | ● | 1 | 2 | 2 | 1.9 | 4 | 34.4 | 50 | 6 | A | 11,790 |
| EFB2025 | ● | 1.25 | 2.5 | 2.5 | 2.4 | 5 | 34.8 | 50 | 6 | A | 12,650 |
| EFB2030 | ● | 1.5 | 3 | 3 | 2.9 | 6 | 55.2 | 70 | 6 | A | 12,650 |
| EFB2040 | ● | 2 | 4 | 4 | 3.9 | 8 | 56 | 70 | 6 | A | 12,650 |
| EFB2050 | ● | 2.5 | 5 | 5 | 4.9 | 10 | 66.9 | 80 | 6 | A | 14,150 |
| EFB2060 | ● | 3 | 6 | 6 | 5.9 | 12 | 78 | 90 | 6 | B | 14,930 |
| EFB2070 | ● | 3.5 | 7 | 7 | – | – | 83 | 90 | 6 | C | 17,290 |
| EFB2080 | ● | 4 | 8 | 8 | 7.9 | 16 | 84 | 100 | 8 | B | 19,530 |
| EFB2100 | ● | 5 | 10 | 10 | 9.9 | 20 | 80 | 100 | 10 | B | 25,030 |
| EFB2120 | ● | 6 | 12 | 12 | 11.9 | 24 | 86 | 110 | 12 | B | 32,210 |

## 標準切削条件表 Recommended cutting conditions　EFB




### <仕上げ加工> Finishing

| 被削材 Work material | 合金鋼・プリハードン鋼 Alloy steels, Pre-hardened steels (30~45HRC) SCM440、HPM1、CENA1、HPM50、NAK55、NAK80 | | | | 調質鋼 Hardened steels (45~53HRC) HPM38, STAVAX | | | |
|---|---|---|---|---|---|---|---|---|
| 条件域 Cutting range | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | |
| 切込み Depth of cut (mm) | $a_p$=0.01DC, $a_e$=0.02DC | | $a_p$=0.02DC, $a_e$=0.03DC | | $a_p$=0.01DC, $a_e$=0.02DC | | $a_p$=0.02DC, $a_e$=0.03DC | |
| ボール半径RE×外径DC Ball radius × Tool dia.(mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) |
| RE0.5×1 | 30,000 | 1,800 | 16,000 | 960 | 24,000 | 1,400 | 12,800 | 770 |
| RE1×2 | 25,000 | 2,500 | 16,000 | 1,600 | 25,000 | 2,500 | 16,000 | 1,600 |
| RE2×4 | 20,000 | 3,200 | 12,500 | 2,000 | 16,000 | 2,550 | 10,000 | 1,600 |
| RE3×6 | 16,000 | 3,200 | 8,500 | 1,700 | 12,800 | 2,500 | 6,800 | 1,350 |
| RE4×8 | 12,000 | 2,600 | 6,400 | 1,400 | 9,600 | 2,000 | 5,100 | 1,100 |
| RE5×10 | 9,500 | 2,300 | 5,100 | 1,200 | 7,600 | 1,800 | 4,000 | 960 |
| RE6×12 | 8,000 | 2,000 | 4,200 | 1,050 | 6,400 | 1,600 | 3,400 | 840 |

【注意】
①できるだけ高剛性、 高精度の機械をご使用ください。
②上表の切り込みは目安です。実際にはボールエンドミルのカスプハイト量を参考にピックフィード量を選定ください。 (A131頁参照)
③被削材、加工形状に合わせて、適切なクーラントを使用してください。
④この標準切削条件表は切削条件の目安を示すものです。 実際の加工では加工形状、目的、使用機械等により条件を調整してください。

【Note】
① Use as highly rigid and highly accurate machine as possible.
② The cutting depth shown in the above table is just for your guidance. For your actual use, select the most suitable pick feed rate referring to the cusp height of a ball end mill. (Refer p.A131)
③ Use the appropriate coolant for the work material and machining shape.
④ These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ |

## 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EFB | × (N/A) | 1 ~ 12 |

●：標準在庫品です。●：Stocked items.

# Epoch Super Hard Ball
# エポックスーパーハードボール

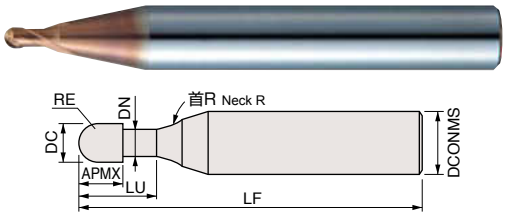
**首下長 1.5DC タイプ** | Under neck length 1.5DC type

小径高硬度用ボールエンドミル。
Ball end mill for small-diameter high-hardness machining.

溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / 細部 Miniature / 中仕上 Semi Finishing / 仕上 Finishing / リブ・細部 Rib Miniature

RE公差 RE tolerance: +0.001～−0.005 (h4) (mm)

2枚刃
2Flutes




## EPSB2○○○-H-TH

高精度規格品 High-accuracy rating product | 検査票付き Inspection certificate included

超硬 Carbide / TH / ねじれ30° Helix angle / 切削条件表 A155 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 刃長 Flute length APMX | 首径 Neck dia. DN | 首下長 Under neck length LU | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度(°) Incline angle θK | 勾配角に対する実有効首下長(mm) The effective under-neck length for the various draft angles 0.5° | 1° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPSB2001-H-TH | ● | 0.05 | 0.1 | 0.08 | 0.08 | 0.15 | 45 | 4 | 1 | 11.82 | 0.30 | 0.32 | 0.35 | 0.38 | 21,000 |
| EPSB2002-H-TH | ● | 0.1 | 0.2 | 0.15 | 0.17 | 0.3 | 45 | 4 | 1 | 11.66 | 0.49 | 0.50 | 0.54 | 0.58 | 18,330 |
| EPSB2003-H-TH | ● | 0.15 | 0.3 | 0.25 | 0.27 | 0.45 | 45 | 4 | 2 | 11.53 | 0.73 | 0.77 | 0.84 | 0.91 | 17,360 |
| EPSB2004-H-TH | ● | 0.2 | 0.4 | 0.3 | 0.37 | 0.6 | 45 | 4 | 2 | 11.39 | 0.88 | 0.93 | 1.01 | 1.09 | 17,360 |
| EPSB2005-H-TH | ● | 0.25 | 0.5 | 0.35 | 0.47 | 0.75 | 45 | 4 | 2 | 11.25 | 1.04 | 1.09 | 1.18 | 1.27 | 16,610 |
| EPSB2006-H-TH | ● | 0.3 | 0.6 | 0.4 | 0.57 | 0.9 | 45 | 4 | 4 | 11.10 | 1.33 | 1.42 | 1.59 | 1.75 | 16,610 |
| EPSB2008-H-TH | ● | 0.4 | 0.8 | 0.5 | 0.77 | 1.2 | 45 | 4 | 4 | 10.79 | 1.65 | 1.75 | 1.93 | 2.11 | 15,750 |
| EPSB2010-H-TH | ● | 0.5 | 1 | 0.8 | 0.96 | 1.5 | 45 | 6 | 4 | 11.01 | 2.01 | 2.12 | 2.31 | 2.49 | 14,790 |
| EPSB2012-H-TH | ● | 0.6 | 1.2 | 1.1 | 1.15 | 1.8 | 45 | 6 | 4 | 10.78 | 2.36 | 2.47 | 2.68 | 2.86 | 14,790 |
| EPSB2015-H-TH | ● | 0.75 | 1.5 | 1.35 | 1.44 | 2.25 | 45 | 6 | 4 | 10.43 | 2.87 | 2.99 | 3.20 | 3.40 | 15,530 |
| EPSB2020-H-TH | ● | 1 | 2 | 1.7 | 1.92 | 3 | 45 | 6 | 4 | 9.79 | 3.71 | 3.84 | 4.07 | 4.29 | 15,530 |

RE公差 RE tolerance: +0.003～−0.007 (h4) (mm)

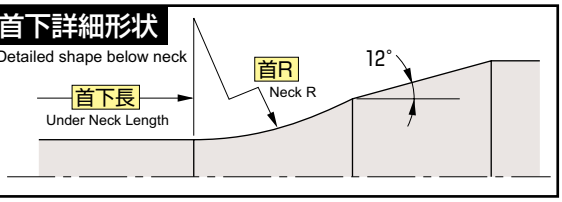
## EPSB2○○○-N-TH

標準規格品 Standard rating product

超硬 Carbide / TH / ねじれ30° Helix angle / 切削条件表 A155 Cutting Conditions

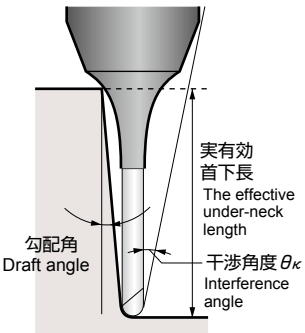
| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 刃長 Flute length APMX | 首径 Neck dia. DN | 首下長 Under neck length LU | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度(°) Incline angle θK | 勾配角に対する実有効首下長(mm) The effective under-neck length for the various draft angles 0.5° | 1° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPSB2001-N-TH | ● | 0.05 | 0.1 | 0.08 | 0.08 | 0.15 | 45 | 4 | 1 | 11.82 | 0.30 | 0.32 | 0.35 | 0.38 | 18,110 |
| EPSB2002-N-TH | ● | 0.1 | 0.2 | 0.15 | 0.17 | 0.3 | 45 | 4 | 1 | 11.66 | 0.49 | 0.50 | 0.54 | 0.58 | 15,650 |
| EPSB2003-N-TH | ● | 0.15 | 0.3 | 0.25 | 0.27 | 0.45 | 45 | 4 | 2 | 11.53 | 0.73 | 0.77 | 0.84 | 0.91 | 14,790 |
| EPSB2004-N-TH | ● | 0.2 | 0.4 | 0.3 | 0.37 | 0.6 | 45 | 4 | 2 | 11.39 | 0.88 | 0.93 | 1.01 | 1.09 | 14,790 |
| EPSB2005-N-TH | ● | 0.25 | 0.5 | 0.35 | 0.47 | 0.75 | 45 | 4 | 2 | 11.25 | 1.04 | 1.09 | 1.18 | 1.27 | 14,040 |
| EPSB2006-N-TH | ● | 0.3 | 0.6 | 0.4 | 0.57 | 0.9 | 45 | 4 | 4 | 11.10 | 1.33 | 1.42 | 1.59 | 1.75 | 14,040 |
| EPSB2008-N-TH | ● | 0.4 | 0.8 | 0.5 | 0.77 | 1.2 | 45 | 4 | 4 | 10.79 | 1.65 | 1.75 | 1.93 | 2.11 | 13,290 |
| EPSB2010-N-TH | ● | 0.5 | 1 | 0.8 | 0.96 | 1.5 | 45 | 6 | 4 | 11.01 | 2.01 | 2.12 | 2.31 | 2.49 | 12,440 |
| EPSB2012-N-TH | ● | 0.6 | 1.2 | 1.1 | 1.15 | 1.8 | 45 | 6 | 4 | 10.78 | 2.36 | 2.47 | 2.68 | 2.86 | 12,440 |
| EPSB2015-N-TH | ● | 0.75 | 1.5 | 1.35 | 1.44 | 2.25 | 45 | 6 | 4 | 10.43 | 2.87 | 2.99 | 3.20 | 3.40 | 13,080 |
| EPSB2020-N-TH | ● | 1 | 2 | 1.7 | 1.92 | 3 | 45 | 6 | 4 | 9.79 | 3.71 | 3.84 | 4.07 | 4.29 | 13,080 |

### 首下詳細形状
Detailed shape below neck




【注意】
加工物に勾配がついている場合、干渉領域は、首下長さよりも長くなります。それぞれの勾配角に対する実有効首下長をご参照ください。
また、工具が加工物に干渉する角度を干渉角度θKで表示していますので合わせてご参照ください。

【Note】
If the workpiece has draft angle, the interference length will be longer than the under-neck length.Please refer to the effective under-neck length for the various draft angles.
In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle θK", and should also be referred to.



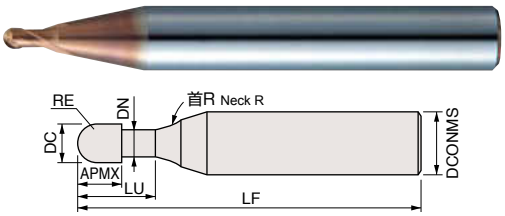

●：標準在庫品です。●：Stocked items.

## 首下長 3DC タイプ　Under neck length 3DC type

溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / 細部 Miniature / 中仕上 Semi Finishing / 仕上 Finishing / リブ・細部 Rib Miniature

RE公差 RE tolerance　+0.003～−0.007　h4　(mm)

2枚刃
2Flutes




# EPSB2○○○-○.○-N-TH

標準規格品 Standard rating product

超硬 Carbide / TH / ねじれ30° Helix angle / 切削条件表 A155 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 刃長 Flute length APMX | 首径 Neck dia. DN | 首下長 Under neck length LU | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度(°) Incline angle θκ | 勾配角に対する実有効首下長(mm) The effective under-neck length for the various draft angles 0.5° | 1° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPSB2001-0.3-N-TH | ● | 0.05 | 0.1 | 0.08 | 0.08 | 0.3 | 45 | 4 | 1 | 11.64 | 0.46 | 0.48 | 0.53 | 0.57 | 18,110 |
| EPSB2002-0.6-N-TH | ● | 0.1 | 0.2 | 0.15 | 0.17 | 0.6 | 45 | 4 | 1 | 11.30 | 0.80 | 0.83 | 0.88 | 0.93 | 15,650 |
| EPSB2003-0.9-N-TH | ● | 0.15 | 0.3 | 0.25 | 0.27 | 0.9 | 45 | 4 | 2 | 11.00 | 1.21 | 1.27 | 1.37 | 1.47 | 14,790 |
| EPSB2004-1.2-N-TH | ● | 0.2 | 0.4 | 0.3 | 0.37 | 1.2 | 45 | 4 | 2 | 10.69 | 1.52 | 1.59 | 1.71 | 1.82 | 14,790 |
| EPSB2005-1.5-N-TH | ● | 0.25 | 0.5 | 0.35 | 0.47 | 1.5 | 45 | 4 | 2 | 10.39 | 1.83 | 1.91 | 2.05 | 2.17 | 14,040 |
| EPSB2006-1.8-N-TH | ● | 0.3 | 0.6 | 0.4 | 0.57 | 1.8 | 45 | 4 | 4 | 10.08 | 2.30 | 2.44 | 2.68 | 2.88 | 14,040 |
| EPSB2008-2.4-N-TH | ● | 0.4 | 0.8 | 0.5 | 0.77 | 2.4 | 45 | 4 | 4 | 9.47 | 2.94 | 3.10 | 3.36 | 3.59 | 13,290 |
| EPSB2010-3-N-TH | ● | 0.5 | 1 | 0.8 | 0.96 | 3 | 45 | 6 | 4 | 9.88 | 3.61 | 3.78 | 4.06 | 4.30 | 12,440 |
| EPSB2012-3.6-N-TH | ● | 0.6 | 1.2 | 1.1 | 1.15 | 3.6 | 45 | 6 | 4 | 9.46 | 4.27 | 4.45 | 4.75 | 5.01 | 12,440 |
| EPSB2015-4.5-N-TH | ● | 0.75 | 1.5 | 1.35 | 1.44 | 4.5 | 45 | 6 | 4 | 8.84 | 5.24 | 5.44 | 5.76 | 6.04 | 13,080 |
| EPSB2020-6-N-TH | ● | 1 | 2 | 1.7 | 1.92 | 6 | 45 | 6 | 4 | 7.81 | 6.84 | 7.07 | 7.43 | 7.89 | 13,080 |

## 標準切削条件表 Recommended cutting conditions　EPSB-H-TH　EPSB-N-TH　EPSB-N-TH

| 被削材 Work material | | | 1 焼入れ鋼 Hardened steels (45～55HRC) SKD61,SKT4 | | 2 焼入れ鋼 Hardened steels (55～65HRC) SKD11,SKH51 | | 3 焼入れ鋼 Hardened steels (65～68HRC) SKH,溶製ハイス Welded HSS | | 4 焼入れ鋼 Hardened steels (68～72HRC) HAP,粉末ハイス Powdered HSS | |
|---|---|---|---|---|---|---|---|---|---|---|
| 切込み比率 Ratio to depth of cut | | | 100% | | 90% | | 70% | | 60% | |
| 商品コード Item code | 切込み量 Depth of cut ap | ae | 回転数n min-1 | 送り速度vf mm/min | 回転数n min-1 | 送り速度vf mm/min | 回転数n min-1 | 送り速度vf mm/min | 回転数n min-1 | 送り速度vf mm/min |
| EPSB2001-TH | 0.003 | 0.009 | 50,000 | 1,200 | 50,000 | 1,050 | 50,000 | 900 | 50,000 | 750 |
| EPSB2002-TH | 0.008 | 0.024 | 50,000 | 1,800 | 50,000 | 1,575 | 50,000 | 1,350 | 50,000 | 1,125 |
| EPSB2003-TH | 0.012 | 0.036 | 50,000 | 1,800 | 50,000 | 1,575 | 50,000 | 1,350 | 50,000 | 1,125 |
| EPSB2004-TH | 0.016 | 0.048 | 50,000 | 2,400 | 50,000 | 2,100 | 50,000 | 1,800 | 50,000 | 1,500 |
| EPSB2005-TH | 0.02 | 0.06 | 50,000 | 2,400 | 50,000 | 2,100 | 50,000 | 1,800 | 45,800 | 1,374 |
| EPSB2006-TH | 0.03 | 0.09 | 48,000 | 2,880 | 44,800 | 2,352 | 41,600 | 1,872 | 38,200 | 1,433 |
| EPSB2008-TH | 0.04 | 0.12 | 36,000 | 2,160 | 33,600 | 1,764 | 31,200 | 1,404 | 25,800 | 968 |
| EPSB2010-TH | 0.05 | 0.15 | 30,000 | 2,160 | 28,000 | 1,764 | 26,000 | 1,404 | 21,600 | 972 |
| EPSB2012-TH | 0.06 | 0.18 | 24,750 | 1,782 | 23,100 | 1,455 | 21,450 | 1,158 | 18,000 | 810 |
| EPSB2015-TH | 0.07 | 0.21 | 19,875 | 1,590 | 18,550 | 1,299 | 17,225 | 1,034 | 14,400 | 720 |
| EPSB2020-TH | 0.08 | 0.24 | 15,000 | 1,560 | 14,000 | 1,274 | 13,000 | 1,014 | 10,800 | 702 |

※基本切り込みは被削材グループ1での目安を示しています。その他のグループの場合は、上表の切り込み比率を目安に調整してください。
The figures in basic cutting depth column indicate only a rule of thumb for work group 1. For the other groups, see the figures in cutting ratio column and adjust your tools accordingly.

【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

【Note】①Use the appropriate coolant for the work material and machining shape.
②These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
③If the rpm of the machine is low, lower the feed rate also to put the rpm and feed rate in the same ratio.

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | > 55HRC ≦ 65HRC | > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| | ○ | ◎ | ◎ | ◎ | ○ | ◎ | ○ | ○ |

## 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPSB-H/N-TH | × (N/A) | × (N/A) |

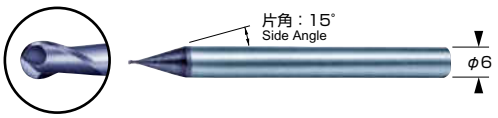
# Epoch Precision Miniature Ball End Mill
# エポック精密小径ボールエンドミル

小径精密加工用ボールエンドミル
Ball end mill for small-diameter high-precision machining

## ショートネック Short Neck

溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / 細部 Miniature / 仕上 Finishing

RE公差 RE tolerance ±0.007　シャンク部公差 Shank tolerance 0～−0.005　(mm)




## HPBS2○○○-C

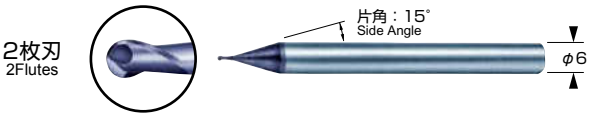
超硬 Carbide / C / ねじれ30° Helix angle / 切削条件表 A157 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius | 外径 Tool dia. | 刃長 Flute length | 首径 Neck dia. | 首下長 Under Neck length | 全長 Overall length | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|
| HPBS2010-C | ● | 0.5 | 1 | 1.3 | 首ぬすみ無し Without neck escape | 2 | 50 | 10,690 |
| HPBS2020-C | ● | 1 | 2 | 2.5 | | 3.5 | 50 | 11,250 |
| HPBS2030-C | ● | 1.5 | 3 | 4 | | 5 | 50 | 12,010 |
| HPBS2040-C | ● | 2 | 4 | 5 | | 6 | 50 | 12,010 |
| HPBS2050-C | ● | 2.5 | 5 | 6 | | 7 | 50 | 13,470 |
| HPBS2060-C | ● | 3 | 6 | 7.5 | − | − | 50 | 14,260 |

## レギュラーネック Regular Neck

溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / 細部 Miniature / 仕上 Finishing

RE公差 RE tolerance ±0.007　シャンク部公差 Shank tolerance 0～−0.005　(mm)




## HYPB2○○○-C

超硬 Carbide / C / ねじれ30° Helix angle / 切削条件表 A157 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius | 外径 Tool dia. | 刃長 Flute length | 首径 Neck dia. | 首下長 Under Neck length | 全長 Overall length | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|
| HYPB2002-C | ● | 0.1 | 0.2 | 0.3 | 首ぬすみ無し Without neck escape | 0.6 | 50 | 13,080 |
| HYPB2003-C | ● | 0.15 | 0.3 | 0.4 | | 0.7 | 50 | 12,440 |
| HYPB2004-C | ● | 0.2 | 0.4 | 0.5 | | 0.7 | 50 | 12,440 |
| HYPB2005-C | ● | 0.25 | 0.5 | 0.6 | 0.45 | 1.6 | 50 | 11,790 |
| HYPB2006-C | ● | 0.3 | 0.6 | 0.7 | 0.55 | 1.7 | 50 | 11,790 |
| HYPB2008-C | ● | 0.4 | 0.8 | 1 | 0.75 | 2.5 | 50 | 11,040 |
| HYPB2010-C | ● | 0.5 | 1 | 1.3 | 0.95 | 3.3 | 50 | 10,690 |
| HYPB2012-C | ● | 0.6 | 1.2 | 1.5 | 1.15 | 3.5 | 50 | 10,690 |
| HYPB2014-C | ● | 0.7 | 1.4 | 1.8 | 1.35 | 3.8 | 50 | 12,440 |
| HYPB2015-C | ● | 0.75 | 1.5 | 1.9 | 1.45 | 4.9 | 50 | 11,250 |
| HYPB2016-C | ● | 0.8 | 1.6 | 2 | 1.55 | 5 | 50 | 12,440 |
| HYPB2018-C | ● | 0.9 | 1.8 | 2.3 | 1.75 | 5.3 | 50 | 12,440 |
| HYPB2020-C | ● | 1 | 2 | 2.5 | 1.95 | 5.5 | 50 | 11,250 |
| HYPB2025-C | ● | 1.25 | 2.5 | 3 | 2.4 | 6 | 50 | 12,010 |
| HYPB2030-C | ● | 1.5 | 3 | 4 | 2.9 | 8 | 50 | 12,010 |
| HYPB2035-C | ● | 1.75 | 3.5 | 4.5 | 3.4 | 8.5 | 50 | 13,290 |
| HYPB2040-C | ● | 2 | 4 | 5 | 3.9 | 10 | 50 | 12,010 |
| HYPB2050-C | ● | 2.5 | 5 | 6 | 4.9 | 11 | 50 | 13,470 |
| HYPB2060-C | ● | 3 | 6 | 7.5 | 5.9 | 12.5 | 50 | 14,260 |

## HPBS-C、HYPB-C、HPSLN-C の対応被削材

Applicable work material of HPBS-C, HYPB-C, HPSLN-C

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ |

## 再研磨対応外径範囲

Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| HPBS-C | × (N/A) | 1 ～ 6 |
| HYPB-C | × (N/A) | 1 ～ 6 |
| HPBLN-C | × (N/A) | 1 ～ 6 |

●：標準在庫品です。●：Stocked items.

## ロングネック　Long Neck

溝 Slotting　彫込み Die-sinking　曲面 Profiling　R Radius　細部 Miniature　仕上 Finishing

RE公差 RE tolerance　±0.007

シャンク径公差 Shank tolerance　0～−0.005

(mm)

# HPBLN2○○○-C

超硬 Carbide　C　ねじれ30° Helix angle　切削条件表 A157 Cutting Conditions

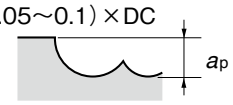
| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius | 外径 Tool dia. | 刃長 Flute length | 首径 Neck dia. | 首下長 Under Neck length | 全長 Overall length | 希望小売価格（円） Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|
| HPBLN2005-C | ● | 0.25 | 0.5 | 0.6 | 0.45 | 2.5 | 60 | 13,610 |
| HPBLN2006-C | ● | 0.3 | 0.6 | 0.7 | 0.55 | 3 | 60 | 13,610 |
| HPBLN2008-C | ● | 0.4 | 0.8 | 1 | 0.75 | 4 | 60 | 13,610 |
| HPBLN2010-C | ● | 0.5 | 1 | 1.3 | 0.95 | 5 | 60 | 12,440 |
| HPBLN2012-C | ● | 0.6 | 1.2 | 1.5 | 1.15 | 6 | 60 | 12,440 |
| HPBLN2014-C | ● | 0.7 | 1.4 | 1.8 | 1.35 | 7 | 60 | 14,460 |
| HPBLN2015-C | ● | 0.75 | 1.5 | 1.9 | 1.45 | 7.5 | 60 | 12,970 |
| HPBLN2016-C | ● | 0.8 | 1.6 | 2 | 1.55 | 8 | 60 | 14,460 |
| HPBLN2018-C | ● | 0.9 | 1.8 | 2.3 | 1.75 | 9 | 60 | 14,460 |
| HPBLN2020-C | ● | 1 | 2 | 2.5 | 1.95 | 10 | 60 | 12,970 |
| HPBLN2025-C | ● | 1.25 | 2.5 | 3 | 2.4 | 12.5 | 60 | 13,820 |
| HPBLN2030-C | ● | 1.5 | 3 | 4 | 2.9 | 15 | 80 | 13,820 |
| HPBLN2035-C | ● | 1.75 | 3.5 | 4.5 | 3.4 | 17.5 | 80 | 15,320 |
| HPBLN2040-C | ● | 2 | 4 | 5 | 3.9 | 20 | 80 | 13,820 |
| HPBLN2050-C | ● | 2.5 | 5 | 6 | 4.9 | 25 | 80 | 15,600 |
| HPBLN2060-C | ● | 3 | 6 | 7.5 | 5.9 | 30 | 80 | 16,500 |

●印：標準在庫品です。　● : Stocked items.

## 標準切削条件表 Recommended cutting conditions

**HPBS-C** ショートネック・ボール Short Neck, Ball
**HYPB-C** レギュラーネック・ボール Regular Neck, Ball
**HPBLN-C** ロングネック・ボール Long Neck, Ball

| ボール半径RE×外径DC Ball radius RE × Tool dia. DC | 回転数（n） Revolution min$^{-1}$ | 送り速度（Vf） mm/min Table speed Vf ボール刃（HYPB） Ball end (HYPB) | 被削材（50HRC以下） Work material (Under 50HRC) 炭素鋼、合金鋼、工具鋼、プリハードン鋼 Carbon steels, Alloy steels, Tool steels, Pre-hardened steels S50C、SCM、SKD、HPM1、NAK55 |
|---|---|---|---|
| (RE0.1×)0.2 | 20,000～50,000 | 100～1,500 | 切込み Depth of cut $a_p$＝(0.05～0.1)×DC |
| (RE0.2×)0.4 | | | |
| (RE0.3×)0.6 | | | |
| (RE0.5×)1.0 | | | |
| (RE1.0×)2.0 | 10,000～30,000 | 1,500～2,500 | |
| (RE1.5×)3.0 | | | |
| (RE2.0×)4.0 | 5,000～15,000 | 2,000～3,000 | |
| (RE3.0×)6.0 | | | |




## ■使用方法と注意点

1.被削材、加工形状に合わせて、適切なクーラントを使用してください。
2.この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
3.自動切込みが可能な、剛性のあるNC機の利用を推奨します。切込み回数が多いので手動機は適しません。
4.回転数が不足する場合は適当な増速装置を準備してください。増速装置は長時間耐える機種を推奨します。
5.能率を問わない場合（例、夜間無人加工など）は、2000 min$^{-1}$ 程度の低速でも使用できます。
6.工具径が小さいため、振れはできるだけ小さく押さえてください。
7.ロングネックタイプをご使用の場合は、切込み量を少なくするか、送り速度を上表の低い数値でご使用ください。

## Notes on Applications

1) Use the appropriate coolant for the work material and machining shape.
2) These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
3) Rigid N/C with automatic depth feeder is recommended. Manual machines are not recommended for multi-feed applications.
4) High-revolution spindle attachments are recommended.
5) Lower revolutions of about 2,000 r/min are applicable, in case of operation in night without an operator, with efficiency not required.
6) Set-up runout of end mills as small as possible, because of miniature end mills.

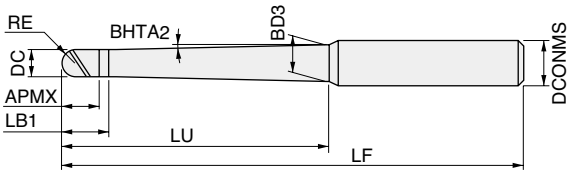
# Epoch Pencil Neck Ball
# エポックペンシルネックボール

**ペンシルレギュラーネック** Pencil Regular Neck

彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical / 取りのこし Rest Material Machining / 玉プチ Corner Recessing / 細部 Miniature / 仕上 Finishing / リブ・細部 Rib Miniature

RE公差 RE tolerance ±0.01　h6

(mm)




超硬 Carbide　C　ねじれ30° Helix angle　切削条件表 A159 Cutting Conditions

## EPBPN2○○○-○○

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 部首角度 Neck angle BHTA2 | 刃長 Flute length APMX | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首下長 Under neck length LU | 首下平行長 Under neck parallel length LB1 | 首元径 Neck dia. BD3 | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EPBPN2010-15 | ● | 0.5 | 1 | 1° 30′ | 2.5 | 60 | 6 | 20 | 4 | 1.8 | 15,430 |
| EPBPN2010-30 | ● | | | 3° | 2.5 | 80 | 6 | 40 | 4 | 4.8 | 14,460 |
| EPBPN2010-50 | ● | | | 5° | 2.5 | 60 | 6 | 20 | 4 | 3.8 | 13,610 |
| EPBPN2020-15 | ● | 1.0 | 2 | 1° 30′ | 5 | 60 | 6 | 20 | 7 | 2.7 | 15,430 |
| EPBPN2020-30 | ● | | | 3° | 5 | 80 | 6 | 40 | 7 | 5.5 | 14,460 |
| EPBPN2020-50 | ● | | | 5° | 5 | 60 | 6 | 20 | 7 | 4.3 | 13,610 |
| EPBPN2030-15 | ● | 1.5 | 3 | 1° 30′ | 8 | 90 | 6 | 50 | 10 | 5.1 | 15,000 |
| EPBPN2030-30 | ● | | | 3° | 8 | 70 | 6 | 30 | 10 | 5.1 | 14,040 |
| EPBPN2040-15 | ● | 2 | 4 | 1° 30′ | 8 | 90 | 6 | 48.2 | 10 | 6 | 15,000 |
| EPBPN2040-30 | ● | | | 3° | 8 | 70 | 6 | 29.1 | 10 | 6 | 14,040 |
| EPBPN2050-15 | ● | 2.5 | 5 | 1° 30′ | 10 | 110 | 8 | 60 | 12 | 7.5 | 19,870 |
| EPBPN2050-30 | ● | | | 3° | 10 | 90 | 8 | 40.6 | 12 | 8 | 18,750 |
| EPBPN2060-15 | ● | 3 | 6 | 1° 30′ | 12 | 110 | 8 | 52.2 | 14 | 8 | 20,880 |
| EPBPN2060-30 | ● | | | 3° | 12 | 90 | 8 | 33.1 | 14 | 8 | 19,640 |
| EPBPN2070-15 | ● | 3.5 | 7 | 1° 30′ | 14 | 120 | 10 | 60 | 16 | 9.3 | 25,810 |
| EPBPN2070-30 | ● | | | 3° | 14 | 100 | 10 | 40 | 16 | 9.5 | 24,360 |
| EPBPN2080-15 | ● | 4 | 8 | 1° 30′ | 14 | 120 | 10 | 54.2 | 16 | 10 | 27,160 |
| EPBPN2080-30 | ● | | | 3° | 14 | 100 | 10 | 35.1 | 16 | 10 | 25,590 |
| EPBPN2100-15 | ● | 5 | 10 | 1° 30′ | 18 | 130 | 12 | 58.2 | 20 | 12 | 33,220 |
| EPBPN2100-30 | ● | | | 3° | 18 | 110 | 12 | 39.1 | 20 | 12 | 31,420 |
| EPBPN2120-15 | ● | 6 | 12 | 1° 30′ | 22 | 160 | 16 | 80 | 25 | 14.9 | 51,740 |
| EPBPN2120-30 | ● | | | 3° | 22 | 140 | 16 | 63.2 | 25 | 16 | 47,130 |

### 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ |

### 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPBPN | × (N/A) | 1 ～ 12 |

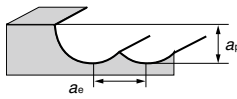
【注意】首下長／外径が10DCを超える工具の再研磨可否については、弊社営業にお問い合わせください。
【Note】Contact our sales office regarding whether or not regrinding is possible for tools where under neck length/tool diameter more than 10DC

●：標準在庫品です。●：Stocked items.

# 標準切削条件表 Recommended cutting conditions

## EPBPN

＜側面切削＞ Side milling




RE：ボール半径
DC：外径
L： コレットからの突き出し長さ
Length of projection from collet

| | ap:Z切込み | ae |
|---|---|---|
| RE≦1.0 | 0.05×RE以下 | 0.2×RE以下 |
| 1.0＜RE | 0.1×RE以下 | 0.2×RE以下 |

工具の付出し長さと外径の比率（L/D）
Ratio between tool projection length and flute diameter

L/D≦ 5の時：高い方の数値
5＜L/D＜10の時：中間の数値
L/D＝10の時：低い方の数値
10＜L/D の時：さらに30%下げる

| 被削材 Work material | 鋳鉄 Cast irons FC200、FCD | | 炭素鋼 Carbon steels (180～250HB) SS400、S55C | | 合金鋼 Alloy steels (25～35HRC) SCM、SNCM | | 工具鋼 Tool steels (25～35HRC) SKT、SKD61、ARK1 | | プリハードン鋼 Pre-hardened steels (35～45HRC) CENA1,NAK80 | | 焼入れ鋼 Hardened steels (45～55HRC) SKT,SKD61 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ボール半径RE×外径DC Tool dia.(mm) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) |
| RE1×2 | 11,100~15,000 | 1,550~2,100 | 11,100~13,000 | 1,550~1,820 | 8,000~11,100 | 1,100~1,500 | 8,000~11,100 | 1,100~1,500 | 6,400~11,100 | 900~1,500 | 4,800~8,000 | 380~640 |
| RE2×4 | 5,600~7,600 | 1,230~1,670 | 5,600~7,200 | 1,230~1,600 | 4,000~7,200 | 880~1,600 | 4,000~7,200 | 880~1,600 | 3,200~7,200 | 700~1,600 | 2,400~4,700 | 480~940 |
| RE3×6 | 3,700~5,800 | 925~1,450 | 3,700~5,800 | 890~1,400 | 2,600~5,800 | 620~1,400 | 2,600~5,800 | 620~1,400 | 2,100~5,800 | 500~1,400 | 1,600~5,800 | 300~1,300 |
| RE4×8 | 2,800~4,800 | 950~1,600 | 2,800~4,800 | 840~1,440 | 2,000~4,800 | 680~1,440 | 2,000~4,800 | 680~1,440 | 1,600~4,800 | 480~1,440 | 1,200~4,800 | 340~1,350 |
| RE5×10 | 2,230~4,800 | 890~1,920 | 2,230~4,800 | 800~1,730 | 1,600~4,800 | 580~1,730 | 1,600~4,800 | 580~1,730 | 1,600~4,800 | 480~1,440 | 950~4,800 | 290~1,450 |
| RE6×12 | 1,900~4,000 | 950~2,000 | 1,900~4,000 | 800~1,680 | 1,330~4,000 | 560~1,680 | 1,330~4,000 | 560~1,680 | 1,060~4,000 | 450~1,680 | 800~4,000 | 260~1,300 |

【注意】
①切削方法は、ダウンカットで使用ください。
②一般材、とくに高速切削は、乾式（エアブロー）またはオイルミストクーラントにてご使用ください。
③安定した切削を行うため、剛性の高い機械とセットアップでご使用ください。
④機械の回転数が足りない場合は、主軸回転数とテーブル送り速度を同比率で下げてください。
⑤被削材、加工形状に合わせて、適切なクーラントを使用してください。
⑥加工形状、機械の剛性、工具突き出し量等、ご使用の状況により、主軸回転数とテーブル送り速度の調整を行ってください。

【Note】
① Down-cutting is recommended.
② Use generally dry (air-blow) or oil-mist coolant, especially at the high-speed machining.
③ Use a machine tool with rigidity and rigid set-up, to machine stably.
④ When the revolution speed is not enough, reduce the revolution speed and table speed at the same ratio.
⑤ Use the appropriate coolant for the work material and machining shape.
⑥ Adjust the revolution speed and table speed, according to cutting conditions such as machining shape, rigidity of machine tool, over-hang and so on.

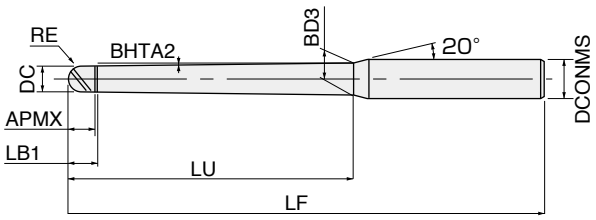
# Epoch Pencil Long Neck Ball
# エポックペンシルロングネックボール

**ペンシルロングネック** | Pencil Long Neck

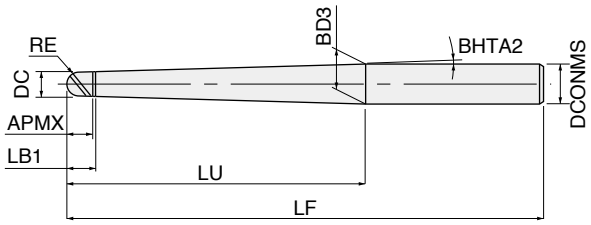
彫込み Die-sinking | 曲面 Profiling | R Radius | ヘリカル Helical | 取りのこし Rest Material Machining | 玉プチ Corner Recessing | 仕上 Finishing

RE公差 RE tolerance ±0.02 | h6

(mm)




Aタイプ A type




Bタイプ B type

## EPBPX2○○○-○○

超硬 Carbide | C | ねじれ30° Helix angle | 切削条件表 A161 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 首部角度 Neck angle BHTA2 | 刃長 Flute length APMX | 首平行長 Under neck parallel length LB1 | 首下長 Under neck length LU | 首元径 Neck dia. BD3 | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 形状 Shape | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPBPX2010-05 | ● | 0.5 | 1 | 30′ | 1.5 | 2 | 70 | 2.19 | 150 | 6 | A | 33,640 |
| EPBPX2010-10 | ● | | | 1° | 1.5 | 2 | 70 | 3.37 | 150 | 6 | A | 33,640 |
| EPBPX2010-15 | ● | | | 1°30′ | 1.5 | 2 | 97.47 | 6 | 150 | 6 | B | 38,350 |
| EPBPX2020-05 | ● | 1 | 2 | 30′ | 2.5 | 3.5 | 80 | 3.34 | 150 | 6 | A | 35,240 |
| EPBPX2020-10 | ● | | | 1° | 2.5 | 3.5 | 80 | 4.67 | 150 | 6 | A | 35,240 |
| EPBPX2020-15 | ● | | | 1°30′ | 2.5 | 3.5 | 79.88 | 6 | 150 | 6 | B | 35,240 |
| EPBPX2030-05 | ● | 1.5 | 3 | 30′ | 3.5 | 4.5 | 87 | 4.44 | 150 | 6 | A | 36,740 |
| EPBPX2030-10 | ● | | | 1° | 3.5 | 4.5 | 90.43 | 6 | 150 | 6 | B | 36,740 |
| EPBPX2030-15 | ● | | | 1°30′ | 3.5 | 4.5 | 99.97 | 8 | 150 | 8 | B | 41,130 |
| EPBPX2040-05 | ● | 2 | 4 | 30′ | 4.5 | 5.5 | 100 | 5.65 | 180 | 8 | A | 42,100 |
| EPBPX2040-10 | ● | | | 1° | 4.5 | 5.5 | 120.08 | 8 | 180 | 8 | B | 42,100 |
| EPBPX2040-15 | ● | | | 1°30′ | 4.5 | 5.5 | 81.88 | 8 | 180 | 8 | B | 42,100 |
| EPBPX2050-05 | ● | 2.5 | 5 | 30′ | 5.5 | 6.5 | 110 | 6.81 | 180 | 8 | A | 45,120 |
| EPBPX2050-10 | ● | | | 1° | 5.5 | 6.5 | 92.43 | 8 | 180 | 8 | B | 45,120 |
| EPBPX2050-15 | ● | | | 1°30′ | 5.5 | 6.5 | 101.97 | 10 | 180 | 10 | B | 45,120 |
| EPBPX2060-05 | ● | 3 | 6 | 30′ | 6.5 | 7.5 | 122.09 | 8 | 200 | 8 | B | 42,080 |
| EPBPX2060-10 | ● | | | 1° | 6.5 | 7.5 | 122.08 | 10 | 200 | 10 | B | 43,760 |
| EPBPX2060-15 | ● | | | 1°30′ | 6.5 | 7.5 | 122.07 | 12 | 200 | 12 | B | 43,760 |
| EPBPX2080-05 | ● | 4 | 8 | 30′ | 8.5 | 9.5 | 124.09 | 10 | 200 | 10 | B | 43,760 |
| EPBPX2080-10 | ● | | | 1° | 8.5 | 9.5 | 124.08 | 12 | 200 | 12 | B | 47,130 |
| EPBPX2080-15 | ● | | | 1°30′ | 8.5 | 9.5 | 124.07 | 14 | 200 | 14 | B | 51,180 |
| EPBPX2100-05 | ● | 5 | 10 | 30′ | 10.5 | 11.5 | 126.09 | 12 | 200 | 12 | B | 51,180 |
| EPBPX2100-10 | ● | | | 1° | 10.5 | 11.5 | 126.08 | 14 | 200 | 14 | B | 54,310 |
| EPBPX2100-15 | ● | | | 1°30′ | 10.5 | 11.5 | 126.07 | 16 | 200 | 16 | B | 58,240 |
| EPBPX2120-05 | ● | 6 | 12 | 30′ | 12.5 | 13.5 | 128.09 | 14 | 200 | 14 | B | 57,570 |
| EPBPX2120-10 | ● | | | 1° | 12.5 | 13.5 | 128.08 | 16 | 200 | 16 | B | 61,380 |
| EPBPX2120-15 | ● | | | 1°30′ | 12.5 | 13.5 | 128.07 | 18 | 200 | 18 | B | 66,990 |

### 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ |

### 再研磨対応外径範囲 Re-grinding compatibility range

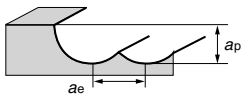
| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPBPX | × (N/A) | 2～12 |

【注意】首下長／外径が10DCを超える工具の再研磨可否については、弊社営業にお問い合わせください。
【Note】Contact our sales office regarding whether or not regrinding is possible for tools where under neck length/tool diameter more than 10DC

●：標準在庫品です。●：Stocked items.

# 標準切削条件表 Recommended cutting conditions EPBPX

## ＜側面切削＞ Side milling




RE：ボール半径
DC：外径
L：コレットからの突き出し長さ
Length of projection from collet

| | ap：Z切込み | ae |
|---|---|---|
| RE≦1.0 | 0.05×RE以下 | 0.2×RE以下 |
| 1.0＜RE | 0.1×RE以下 | 0.2×RE以下 |

工具の付出し長さと外径の比率（L/D）
Ratio between tool projection length and flute diameter
L/D≦20の時：高い方の数値
20＜L/D＜50の時：中間の数値
50＜L/D　の時：低い方の数値

| 被削材 Work material | 鋳鉄 Cast Irons FC200、FCD | | 炭素鋼 Carbon steels (180～250HB) SS400、S55C | | 合金鋼 Alloy steels (25～35HRC) SCM、SNCM | | 工具鋼 Tool steels (25～35HRC) SKT、SKD61、ARK1 | | プリハードン鋼 Pre-hardened steels (35～45HRC) CENA1,NAK80 | | 焼入れ鋼 Hardened steels (45～55HRC) SKT,SKD61 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ボール半径RE×外径DC Tool dia.(mm) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) |
| RE0.5×1 | 12,700~14,500 | 1,000~1,300 | 11,000~12,700 | 880~1,000 | 9,500~11,000 | 760~880 | 8,000~9,500 | 640~760 | 6,400~8,000 | 380~480 | 4,500~6,400 | 180~250 |
| RE1×2 | 6,400~7,200 | 720~860 | 5,600~6,400 | 560~640 | 4,800~5,600 | 480~560 | 4,000~4,800 | 360~430 | 3,200~4,000 | 220~280 | 2,400~3,200 | 100~130 |
| RE2×4 | 3,200~3,600 | 510~580 | 2,800~3,200 | 390~450 | 2,400~2,800 | 290~340 | 2,000~2,400 | 200~240 | 1,600~2,000 | 130~160 | 1,200~1,600 | 70~100 |
| RE3×6 | 2,100~2,400 | 420~480 | 1,900~2,100 | 340~380 | 1,600~1,900 | 260~300 | 1,300~1,600 | 180~225 | 1,050~1,300 | 125~160 | 800~1,050 | 80~100 |
| RE4×8 | 1,600~1,800 | 350~400 | 1,400~1,600 | 280~320 | 1,200~1,400 | 220~250 | 1,000~1,200 | 160~190 | 800~1,000 | 110~140 | 600~800 | 85~110 |
| RE5×10 | 1,300~1,450 | 340~380 | 1,100~1,300 | 265~310 | 960~1,100 | 210~240 | 800~960 | 130~200 | 640~800 | 115~145 | 480~640 | 80~100 |
| RE6×12 | 1,060~1,200 | 320~360 | 930~1,060 | 260~300 | 800~930 | 210~230 | 660~800 | 160~200 | 530~660 | 120~150 | 400~530 | 80~100 |

【注意】
①切削方法は、ダウンカットで使用ください。
②被削材、加工形状に合わせて、適切なクーラントを使用してください。
③一般材、とくに高速切削は、乾式（エアブロー）またはオイルミストクーラントにてご使用ください。
④安定した切削を行うため、剛性の高い機械とセットアップでご使用ください。
⑤機械の回転数が足りない場合は、主軸回転数とテーブル送り速度を同比率で下げてください。
⑥加工形状、機械の剛性、工具突き出し量等、ご使用の状況により、主軸回転数とテーブル送り速度の調整を行ってください。

【Note】
① Down-cutting is recommended.
② Use the appropriate coolant for the work material and machining shape.
③ Use generally dry (air-blow) or oil-mist coolant, especially at the high-speed machining.
④ Use a machine tool with rigidity and rigid set-up, to machine stably.
⑤ When the revolution speed is not enough, reduce the revolution speed and table speed at the same ratio.
⑥ Adjust the revolution speed and table speed, according to cutting conditions such as machining shape, rigidity of machine tool, over-hang and so on.

# 超硬ボール エンドミル

## 強力形・ショート刃長 Powerful type, Short

彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical / 中仕上 Semi Finishing / 仕上 Finishing

RE公差 RE tolerance ±0.01　h6

(mm)

2枚刃 2Flutes

超硬 Carbide　ねじれ30° Helix angle

## BEK2○○○

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius | 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|
| BEK2003 | ● | 0.15 | 0.3 | 0.6 | 50 | 3 | 11,250 |
| BEK2004 | ● | 0.2 | 0.4 | 0.8 | 50 | 3 | 11,250 |
| BEK2005 | ● | 0.25 | 0.5 | 1 | 50 | 3 | 10,690 |
| BEK2006 | ● | 0.3 | 0.6 | 1.2 | 50 | 3 | 10,690 |
| BEK2008 | ● | 0.4 | 0.8 | 1.6 | 50 | 3 | 9,980 |
| BEK2010 | ● | 0.5 | 1 | 2.5 | 50 | 4 | 9,180 |
| BEK2015 | ● | 0.75 | 1.5 | 4 | 50 | 4 | 9,740 |
| BEK2020 | ● | 1 | 2 | 5 | 50 | 6 | 9,740 |
| BEK2025 | ● | 1.25 | 2.5 | 7 | 50 | 6 | 10,450 |
| BEK2030 | ● | 1.5 | 3 | 8 | 70 | 6 | 10,450 |
| BEK2040 | ● | 2 | 4 | 8 | 70 | 6 | 10,450 |
| BEK2050 | ● | 2.5 | 5 | 10 | 80 | 6 | 11,790 |

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius | 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|
| BEK2060 | ● | 3 | 6 | 12 | 90 | 6 | 12,690 |
| BEK2070 | ● | 3.5 | 7 | 14 | 90 | 6 | 14,820 |
| BEK2080 | ● | 4 | 8 | 14 | 100 | 8 | 16,830 |
| BEK2090 | ● | 4.5 | 9 | 18 | 100 | 8 | 21,770 |
| BEK2100 | ● | 5 | 10 | 18 | 100 | 10 | 21,880 |
| BEK2110 | ● | 5.5 | 11 | 18 | 110 | 10 | 26,930 |
| BEK2120 | ● | 6 | 12 | 22 | 110 | 12 | 28,510 |
| BEK2130 | ● | 6.5 | 13 | 22 | 110 | 12 | 41,770 |
| BEK2140 | ● | 7 | 14 | 26 | 120 | 12 | 51,030 |
| BEK2160 | ● | 8 | 16 | 30 | 140 | 16 | 66,870 |
| BEK2180 | ● | 9 | 18 | 34 | 140 | 16 | 83,640 |
| BEK2200 | ● | 10 | 20 | 38 | 160 | 20 | 104,530 |

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦45HRC | 高硬度 Hardened steel >45HRC ≦55HRC | >55HRC ≦65HRC | >65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ○ | ○ | | | | ○ | ○ | ◎ | ◎ |

## 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| BEK | × (N/A) | 1 ～ 20 |

# Epoch Pencil Deep Ball
# エポックペンシルディープボール

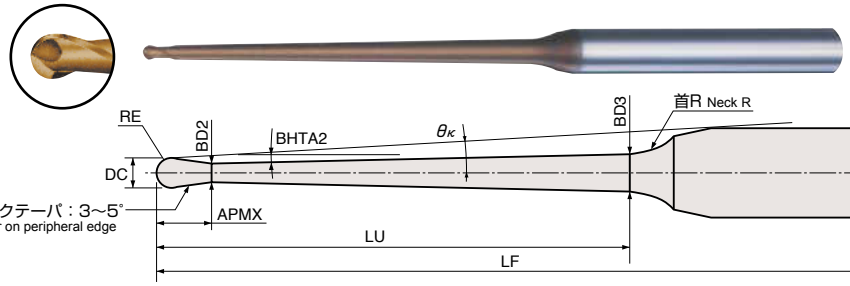
**ペンシルネック** | Pencil Regular Neck

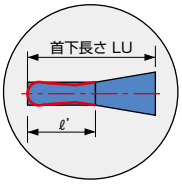
彫込み Die-sinking / 曲面 Profiling / R Radius / 取りのこし Rest Material Machining / 玉プチ Corner Recessing / 細部 Miniature / 中仕上 Semi Finishing / 仕上 Finishing / リブ・細部 Rib Miniature

RE公差 RE tolerance
RE≦0.25 : ±0.003
0.25<RE : ±0.005
h5
(mm)

THコーティング採用で高硬度材に適しています。高い耐折損性。
TH Coating makes it ideal for high-hardness materials. High breakage resistance.

2枚刃
2Flutes




【注意】RE 2mm以上はバックドラフト形状ではありません。
【Note】RE 2mm or higher does not have backdraft shape.

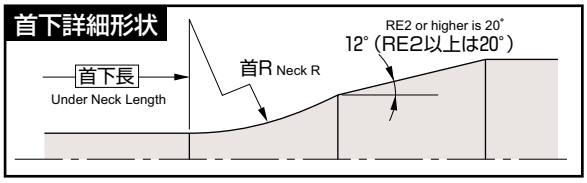
## EPDBP2○○○-○○-○○-TH

超硬 Carbide / TH / ねじれ30° Helix angle / 切削条件表 A165 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 首下長 Under neck length LU | 首部テーパ(半角) Neck angle BHTA2 | 刃長 Flute length APMX | 首径 Neck dia. BD2 | 首元径 Under neck dia. BD3 | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 仮想首長 Approx neck length ℓ' | 干渉角度 Interference angle (°) θκ | 勾配角に対する実有効首下長 The effective under-neck length for the various draft angles. 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDBP2002-1-04-TH | △ | 0.1 | 0.2 | 1 | 0.4 | 0.15 | 0.17 | 0.182 | 50 | 4 | 7 | 1.35 | 10.89 | 1.55 | 1.72 | 1.88 | 2.03 | 2.31 | 16,290 |
| EPDBP2002-1.5-04-TH | △ | | | 1.5 | 0.4 | 0.15 | 0.17 | 0.189 | 50 | 4 | 7 | 1.77 | 10.39 | 2.06 | 2.28 | 2.47 | 2.64 | 2.97 | 17,570 |
| EPDBP2002-2-09-TH | △ | | | 2 | 0.9 | 0.15 | 0.17 | 0.228 | 50 | 4 | 10 | 1.1 | 10.01 | – | 2.81 | 3.14 | 3.42 | 3.92 | 18,860 |
| EPDBP2002-2.5-09-TH | △ | | | 2.5 | 0.9 | 0.15 | 0.17 | 0.244 | 50 | 4 | 10 | 1.1 | 9.6 | – | 3.32 | 3.7 | 4.01 | 4.54 | 20,140 |
| EPDBP2003-2-04-TH | △ | 0.15 | 0.3 | 2 | 0.4 | 0.25 | 0.27 | 0.294 | 50 | 4 | 7 | 2.19 | 9.94 | 2.57 | 2.83 | 3.03 | 3.23 | 3.59 | 17,570 |
| EPDBP2003-3-09-TH | △ | | | 3 | 0.9 | 0.25 | 0.27 | 0.356 | 50 | 4 | 10 | 1.2 | 9.21 | – | 3.85 | 4.25 | 4.58 | 5.15 | 18,210 |
| EPDBP2003-4-09-TH | △ | | | 4 | 0.9 | 0.25 | 0.27 | 0.388 | 50 | 4 | 10 | 1.2 | 8.53 | – | 4.87 | 5.35 | 5.73 | 6.35 | 18,970 |
| EPDBP2004-2-04-TH | △ | 0.2 | 0.4 | 2 | 0.4 | 0.3 | 0.37 | 0.394 | 50 | 4 | 7 | 2.2 | 9.93 | 2.57 | 2.82 | 3.03 | 3.23 | 3.57 | 11,680 |
| EPDBP2004-3-04-TH | △ | | | 3 | 0.4 | 0.3 | 0.37 | 0.408 | 50 | 4 | 7 | 2.44 | 9.1 | 3.6 | 3.92 | 4.18 | 4.4 | 4.8 | 13,080 |
| EPDBP2004-4-04-TH | △ | | | 4 | 0.4 | 0.3 | 0.37 | 0.422 | 50 | 4 | 10 | 2.44 | 8.39 | 4.76 | 5.24 | 5.61 | 5.93 | 6.51 | 13,720 |
| EPDBP2004-4-09-TH | △ | | | 4 | 0.9 | 0.3 | 0.37 | 0.486 | 50 | 4 | 10 | 1.25 | 8.49 | – | 4.87 | 5.35 | 5.72 | 6.34 | 13,720 |
| EPDBP2004-5-04-TH | △ | | | 5 | 0.4 | 0.3 | 0.37 | 0.436 | 50 | 4 | 10 | 2.44 | 7.78 | 5.78 | 6.33 | 6.74 | 7.1 | 7.71 | 14,360 |
| EPDBP2004-5-09-TH | △ | | | 5 | 0.9 | 0.3 | 0.37 | 0.518 | 50 | 4 | 10 | 1.25 | 7.89 | – | 5.9 | 6.44 | 6.85 | 7.53 | 14,360 |
| EPDBP2005-4-04-TH | △ | 0.25 | 0.5 | 4 | 0.4 | 0.35 | 0.47 | 0.521 | 50 | 4 | 7 | 2.49 | 8.35 | 4.62 | 5.00 | 5.3 | 5.55 | 5.99 | 11,040 |
| EPDBP2005-8-09-TH | △ | | | 8 | 0.9 | 0.35 | 0.47 | 0.710 | 50 | 4 | 10 | 1.3 | 6.45 | – | 8.96 | 9.67 | 10.18 | 10.99 | 11,680 |
| EPDBP2005-12-09-TH | △ | | | 12 | 0.9 | 0.35 | 0.47 | 0.836 | 50 | 4 | 10 | 1.3 | 5.21 | – | 13.05 | 13.94 | 14.55 | 15.49 | 13,290 |
| EPDBP20054-2-04-TH | △ | 0.27 | 0.54 | 2 | 0.4 | 0.37 | 0.52 | 0.543 | 50 | 4 | 4 | 1.8 | 9.95 | 2.36 | 2.55 | 2.7 | 2.83 | 3.06 | 11,790 |
| EPDBP20054-4-04-TH | △ | | | 4 | 0.4 | 0.37 | 0.52 | 0.571 | 50 | 4 | 7 | 1.8 | 8.35 | 4.55 | 4.96 | 5.26 | 5.52 | 5.97 | 11,790 |
| EPDBP20054-5-04-TH | △ | | | 5 | 0.4 | 0.37 | 0.52 | 0.585 | 50 | 4 | 7 | 1.8 | 7.72 | 5.57 | 6.04 | 6.38 | 6.66 | 7.15 | 11,790 |
| EPDBP20054-6-04-TH | △ | | | 6 | 0.4 | 0.37 | 0.52 | 0.599 | 50 | 4 | 10 | 1.8 | 7.19 | 6.73 | 7.37 | 7.82 | 8.21 | 8.87 | 12,970 |
| EPDBP20054-6.5-04-TH | △ | | | 6.5 | 0.4 | 0.37 | 0.52 | 0.606 | 50 | 4 | 10 | 1.8 | 6.94 | 7.24 | 7.91 | 8.38 | 8.78 | 9.46 | 12,970 |
| EPDBP20054-7-04-TH | △ | | | 7 | 0.4 | 0.37 | 0.52 | 0.613 | 50 | 4 | 10 | 1.8 | 6.72 | 7.76 | 8.45 | 8.94 | 9.35 | 10.05 | 12,970 |
| EPDBP2006-2-04-TH | △ | 0.3 | 0.6 | 2 | 0.4 | 0.4 | 0.57 | 0.592 | 50 | 4 | 4 | 2.17 | 9.93 | 2.42 | 2.59 | 2.73 | 2.85 | 3.08 | 8,470 |
| EPDBP2006-4-04-TH | △ | | | 4 | 0.4 | 0.4 | 0.57 | 0.620 | 50 | 4 | 7 | 2.54 | 8.31 | 4.62 | 5 | 5.29 | 5.54 | 5.98 | 9,140 |
| EPDBP2006-6-04-TH | △ | | | 6 | 0.4 | 0.4 | 0.57 | 0.648 | 50 | 4 | 10 | 2.54 | 7.14 | 6.8 | 7.41 | 7.85 | 8.23 | 8.88 | 9,140 |
| EPDBP2006-6-09-TH | △ | | | 6 | 0.9 | 0.4 | 0.57 | 0.746 | 50 | 4 | 10 | 1.35 | 7.26 | – | 6.92 | 7.52 | 7.96 | 8.68 | 9,140 |
| EPDBP2006-8-09-TH | △ | | | 8 | 0.9 | 0.4 | 0.57 | 0.809 | 50 | 4 | 10 | 1.35 | 6.38 | – | 8.96 | 9.67 | 10.18 | 10.98 | 13,080 |
| EPDBP2006-10-04-TH | △ | | | 10 | 0.4 | 0.4 | 0.57 | 0.704 | 50 | 4 | 10 | 2.54 | 5.57 | 10.89 | 11.70 | 12.27 | 12.73 | 13.52 | 13,610 |
| EPDBP2006-10-09-TH | △ | | | 10 | 0.9 | 0.4 | 0.57 | 0.872 | 50 | 4 | 10 | 1.35 | 5.70 | – | 11.01 | 11.81 | 12.37 | 13.25 | 13,610 |
| EPDBP2006-12-09-TH | △ | | | 12 | 0.9 | 0.4 | 0.57 | 0.934 | 55 | 4 | 10 | 1.35 | 5.14 | – | 13.05 | 13.94 | 14.54 | 15.49 | 14,250 |
| EPDBP2006-15-04-TH | △ | | | 15 | 0.4 | 0.4 | 0.57 | 0.774 | 55 | 4 | 10 | 2.54 | 4.37 | 15.99 | 17.01 | 17.69 | 18.24 | 19.27 | 14,890 |
| EPDBP2006-15-09-TH | △ | | | 15 | 0.9 | 0.4 | 0.57 | 1.029 | 55 | 4 | 10 | 1.35 | 4.49 | – | 16.1 | 17.11 | 17.78 | 18.81 | 14,890 |
| EPDBP2008-4-04-TH | △ | 0.4 | 0.8 | 4 | 0.4 | 0.5 | 0.77 | 0.819 | 50 | 4 | 7 | 2.64 | 8.22 | 4.61 | 4.99 | 5.28 | 5.53 | 5.97 | 9,140 |
| EPDBP2008-6-04-TH | △ | | | 6 | 0.4 | 0.5 | 0.77 | 0.847 | 50 | 4 | 7 | 2.64 | 7.01 | 6.66 | 7.14 | 7.5 | 7.79 | 8.3 | 9,140 |
| EPDBP2008-8-09-TH | △ | | | 8 | 0.9 | 0.5 | 0.77 | 1.006 | 50 | 4 | 10 | 1.45 | 6.24 | – | 8.96 | 9.66 | 10.17 | 10.97 | 9,140 |
| EPDBP2008-12-09-TH | △ | | | 12 | 0.9 | 0.5 | 0.77 | 1.131 | 55 | 4 | 10 | 1.45 | 4.99 | – | 13.04 | 13.93 | 14.54 | 15.48 | 13,080 |
| EPDBP2008-16-09-TH | △ | | | 16 | 0.9 | 0.5 | 0.77 | 1.257 | 55 | 4 | 10 | 1.45 | 4.15 | – | 17.12 | 18.16 | 18.85 | 19.9 | 13,720 |

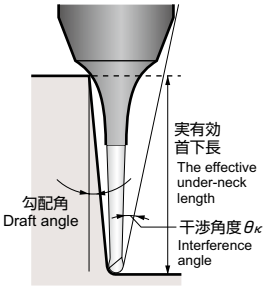
△印：在庫が無くなり次第受注生産品となるものです。 △：When the Stock is out, will become to produce on request. 干渉なし：No interference

**首下詳細形状**




【注意】
加工物に勾配がついている場合、干渉領域は、首下長さよりも長くなります。それぞれの勾配角に対する実有効首下長をご参照ください。
また、工具が加工物に干渉する角度を干渉角度$\theta_K$で表示していますので合わせてご参照ください。

【Note】
If the workpiece has draft angle, the interference length will be longer than the under-neck length.Please refer to the effective under-neck length for the various draft angles.
In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle $\theta_K$", and should also be referred to.




# EPDBP2○○○-○○-○○-TH

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 首下長 Under neck length LU | 首部テーパ半角 Neck angle BHTA2 | 刃長 Flute length APMX | 首径 Neck dia. BD2 | 首元径 Under neck dia. BD3 | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 仮想首長 Approx neck length ℓ' | 干渉角度 Interference angle (°) $\theta_K$ | 勾配角に対する実有効首下長 The effective under-neck length for the various draft angles. 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格（円）Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDBP2009-4-04-TH | △ | 0.45 | 0.9 | 4 | 0.4 | 0.6 | 0.86 | 0.907 | 50 | 4 | 4 | 3.46 | 8.15 | 4.5 | 4.75 | 4.94 | 5.11 | 5.41 | 9,520 |
| EPDBP2009-8-04-TH | △ | | | 8 | 0.4 | 0.6 | 0.86 | 0.963 | 55 | 4 | 7 | 3.46 | 6.03 | 8.75 | 9.30 | 9.7 | 10.03 | 10.6 | 9,520 |
| EPDBP2009-12-04-TH | △ | | | 12 | 0.4 | 0.6 | 0.86 | 1.019 | 55 | 4 | 10 | 3.46 | 4.78 | 12.99 | 13.86 | 14.46 | 14.95 | 15.78 | 9,850 |
| EPDBP2009-16-04-TH | △ | | | 16 | 0.4 | 0.6 | 0.86 | 1.075 | 60 | 4 | 10 | 3.46 | 3.96 | 17.07 | 18.08 | 18.77 | 19.33 | 20.54 | 11,790 |
| EPDBP2009-18-04-TH | △ | | | 18 | 0.4 | 0.6 | 0.86 | 1.103 | 65 | 4 | 10 | 3.46 | 3.65 | 19.1 | 20.19 | 20.91 | 21.50 | 23.11 | 13,720 |
| EPDBP2009-20-04-TH | △ | | | 20 | 0.4 | 0.6 | 0.86 | 1.131 | 65 | 4 | 10 | 3.46 | 3.38 | 21.13 | 22.29 | 23.05 | 23.66 | 25.68 | 13,720 |
| EPDBP2009-22-04-TH | △ | | | 22 | 0.4 | 0.6 | 0.86 | 1.159 | 65 | 4 | 10 | 3.46 | 3.15 | 23.17 | 24.38 | 25.17 | 25.81 | 28.24 | 13,720 |
| EPDBP2009-24-04-TH | △ | | | 24 | 0.4 | 0.6 | 0.86 | 1.187 | 70 | 4 | 10 | 3.46 | 2.95 | 25.2 | 26.47 | 27.29 | 27.96 | 干渉なし | 14,360 |
| EPDBP2010-6-04-TH | △ | 0.5 | 1 | 6 | 0.4 | 0.8 | 0.94 | 1.013 | 50 | 6 | 7 | 5.09 | 8.26 | 6.82 | 7.24 | 7.57 | 7.85 | 8.34 | 8,740 |
| EPDBP2010-8-04-TH | △ | | | 8 | 0.4 | 0.8 | 0.94 | 1.041 | 55 | 6 | 7 | 5.09 | 7.44 | 8.85 | 9.36 | 9.74 | 10.07 | 10.62 | 8,740 |
| EPDBP2010-10-04-TH | △ | | | 10 | 0.4 | 0.8 | 0.94 | 1.068 | 55 | 6 | 10 | 5.09 | 6.76 | 11.07 | 11.79 | 12.33 | 12.78 | 13.54 | 8,740 |
| EPDBP2010-10-09-TH | △ | | | 10 | 0.9 | 0.8 | 0.94 | 1.229 | 55 | 6 | 10 | 2.7 | 6.88 | – | 11.2 | 11.91 | 12.44 | 13.28 | 8,740 |
| EPDBP2010-15-09-TH | △ | | | 15 | 0.9 | 0.8 | 0.94 | 1.386 | 60 | 6 | 10 | 2.7 | 5.64 | – | 16.28 | 17.19 | 17.84 | 18.84 | 11,680 |
| EPDBP2010-20-04-TH | △ | | | 20 | 0.4 | 0.8 | 0.94 | 1.208 | 65 | 6 | 10 | 5.09 | 4.65 | 21.23 | 22.33 | 23.08 | 23.69 | 25.73 | 13,720 |
| EPDBP2010-20-09-TH | △ | | | 20 | 0.9 | 0.8 | 0.94 | 1.543 | 65 | 6 | 10 | 2.7 | 4.77 | – | 21.35 | 22.44 | 23.18 | 24.68 | 13,720 |
| EPDBP2010-25-09-TH | △ | | | 25 | 0.9 | 0.8 | 0.94 | 1.700 | 70 | 6 | 10 | 2.7 | 4.14 | – | 26.42 | 27.66 | 28.48 | 30.83 | 14,360 |
| EPDBP2010-30-04-TH | △ | | | 30 | 0.4 | 0.8 | 0.94 | 1.348 | 75 | 6 | 10 | 5.09 | 3.54 | 31.37 | 32.76 | 33.66 | 34.82 | 38.57 | 15,000 |
| EPDBP2010-30-09-TH | △ | | | 30 | 0.9 | 0.8 | 0.94 | 1.857 | 75 | 6 | 10 | 2.7 | 3.65 | – | 31.49 | 32.86 | 33.75 | 36.98 | 15,000 |
| EPDBP2010-35-09-TH | △ | | | 35 | 0.9 | 0.8 | 0.94 | 2.015 | 80 | 6 | 10 | 2.7 | 3.27 | – | 36.55 | 38.04 | 39 | 43.12 | 15,650 |
| EPDBP2010-40-09-TH | △ | | | 40 | 0.9 | 0.8 | 0.94 | 2.172 | 85 | 6 | 10 | 2.7 | 2.96 | – | 41.61 | 43.22 | 44.46 | 干渉なし | 16,720 |
| EPDBP2010-50-09-TH | △ | | | 50 | 0.9 | 0.8 | 0.94 | 2.486 | 95 | 6 | 10 | 2.7 | 2.48 | – | 51.73 | 53.53 | 55.55 | 干渉なし | 17,570 |
| EPDBP2010-60-09-TH | △ | | | 60 | 0.9 | 0.8 | 0.94 | 2.800 | 105 | 6 | 10 | 2.7 | 2.14 | – | 61.84 | 63.81 | 66.63 | 干渉なし | 18,750 |
| EPDBP2010-70-09-TH | △ | | | 70 | 0.9 | 0.8 | 0.94 | 3.114 | 115 | 6 | 10 | 2.7 | 1.88 | – | 71.94 | 74.09 | 干渉なし | 干渉なし | 19,500 |
| EPDBP2015-8-04-TH | △ | 0.75 | 1.5 | 8 | 0.4 | 1.35 | 1.42 | 1.513 | 55 | 6 | 7 | 7.07 | 7.21 | 8.95 | 9.41 | 9.78 | 10.09 | 10.62 | 8,740 |
| EPDBP2015-10-04-TH | △ | | | 10 | 0.4 | 1.35 | 1.42 | 1.541 | 55 | 6 | 7 | 7.07 | 6.51 | 10.97 | 11.52 | 11.93 | 12.28 | 12.9 | 8,740 |
| EPDBP2015-12-04-TH | △ | | | 12 | 0.4 | 1.35 | 1.42 | 1.569 | 55 | 6 | 7 | 7.07 | 5.93 | 13 | 13.62 | 14.07 | 14.45 | 15.47 | 10,420 |
| EPDBP2015-15-09-TH | △ | | | 15 | 0.9 | 1.35 | 1.42 | 1.849 | 60 | 6 | 10 | 3.89 | 5.36 | – | 16.4 | 17.25 | 17.88 | 18.86 | 10,420 |
| EPDBP2015-20-09-TH | △ | | | 20 | 0.9 | 1.35 | 1.42 | 2.006 | 65 | 6 | 10 | 3.89 | 4.5 | – | 21.47 | 22.49 | 23.21 | 24.72 | 10,420 |
| EPDBP2015-30-09-TH | △ | | | 30 | 0.9 | 1.35 | 1.42 | 2.320 | 75 | 6 | 10 | 3.89 | 3.4 | – | 31.59 | 32.9 | 33.78 | 37.01 | 14,360 |
| EPDBP2018-4-04-TH | △ | 0.9 | 1.8 | 4 | 0.4 | 1.6 | 1.73 | 1.764 | 50 | 6 | 4 | 4.38 | 9.14 | 4.63 | 4.83 | 4.99 | 5.14 | 5.4 | 10,420 |
| EPDBP2018-8-04-TH | △ | | | 8 | 0.4 | 1.6 | 1.73 | 1.819 | 50 | 6 | 4 | 6.61 | 7.07 | 8.68 | 9.02 | 9.27 | 9.49 | 10.27 | 10,420 |
| EPDBP2018-12-04-TH | △ | | | 12 | 0.4 | 1.6 | 1.73 | 1.875 | 55 | 6 | 7 | 6.61 | 5.77 | 12.97 | 13.59 | 14.05 | 14.43 | 15.4 | 10,420 |
| EPDBP2018-16-04-TH | △ | | | 16 | 0.4 | 1.6 | 1.73 | 1.931 | 60 | 6 | 7 | 6.61 | 4.87 | 17.02 | 17.77 | 18.3 | 18.73 | 20.54 | 10,420 |
| EPDBP2018-20-04-TH | △ | | | 20 | 0.4 | 1.6 | 1.73 | 1.987 | 65 | 6 | 10 | 6.61 | 4.21 | 21.29 | 22.35 | 23.08 | 23.68 | 25.67 | 10,420 |
| EPDBP2018-24-04-TH | △ | | | 24 | 0.4 | 1.6 | 1.73 | 2.043 | 65 | 6 | 10 | 6.61 | 3.71 | 25.35 | 26.53 | 27.33 | 27.97 | 30.8 | 11,900 |
| EPDBP2018-28-04-TH | △ | | | 28 | 0.4 | 1.6 | 1.73 | 2.099 | 70 | 6 | 10 | 6.61 | 3.32 | 29.4 | 30.69 | 31.55 | 32.49 | 35.94 | 14,150 |
| EPDBP2018-32-04-TH | △ | | | 32 | 0.4 | 1.6 | 1.73 | 2.154 | 70 | 6 | 10 | 6.61 | 3 | 33.45 | 34.85 | 35.76 | 37.11 | 干渉なし | 14,150 |
| EPDBP2018-36-04-TH | △ | | | 36 | 0.4 | 1.6 | 1.73 | 2.210 | 75 | 6 | 10 | 6.61 | 2.74 | 37.5 | 38.99 | 39.96 | 41.74 | 干渉なし | 14,150 |
| EPDBP2018-38-04-TH | △ | | | 38 | 0.4 | 1.6 | 1.73 | 2.238 | 80 | 6 | 10 | 6.61 | 2.62 | 39.53 | 41.06 | 42.05 | 44.06 | 干渉なし | 15,110 |
| EPDBP2018-40-04-TH | △ | | | 40 | 0.4 | 1.6 | 1.73 | 2.266 | 80 | 6 | 10 | 6.61 | 2.52 | 41.55 | 43.13 | 44.24 | 46.37 | 干渉なし | 15,110 |

## Epoch Pencil Deep Ball
# エポックペンシルディープボール

## EPDBP2○○○-○○-○○-TH

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 首下長 Under neck length LU | 首部テーパ(半角) Neck angle BHTA2 | 刃長 Flute length APMX | 首径 Neck dia. BD2 | 首元径 Under neck dia. BD3 | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 仮想首長 Approx neck length ℓ' | 干渉角度 Interference angle (°) θK | 勾配角に対する実有効首下長 The effective under-neck length for the various draft angles. 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDBP2020-8-04-TH | △ | 1 | 2 | 8 | 0.4 | 1.7 | 1.92 | 2.008 | 50 | 6 | 4 | 7.42 | 6.96 | 8.7 | 9.03 | 9.28 | 9.5 | 10.27 | 8,740 |
| EPDBP2020-12-04-TH | △ | | | 12 | 0.4 | 1.7 | 1.92 | 2.064 | 55 | 6 | 7 | 7.42 | 5.64 | 13 | 13.61 | 14.06 | 14.43 | 15.4 | 8,740 |
| EPDBP2020-16-04-TH | △ | | | 16 | 0.4 | 1.7 | 1.92 | 2.120 | 60 | 6 | 7 | 7.42 | 4.74 | 17.05 | 17.79 | 18.31 | 18.74 | 20.54 | 8,740 |
| EPDBP2020-20-04-TH | △ | | | 20 | 0.4 | 1.7 | 1.92 | 2.176 | 65 | 6 | 10 | 7.42 | 4.09 | 21.33 | 22.37 | 23.09 | 23.68 | 25.67 | 8,740 |
| EPDBP2020-20-09-TH | △ | | | 20 | 0.9 | 1.7 | 1.92 | 2.495 | 65 | 6 | 10 | 4.24 | 4.2 | – | 21.48 | 22.49 | 23.2 | 24.68 | 8,740 |
| EPDBP2020-25-09-TH | △ | | | 25 | 0.9 | 1.7 | 1.92 | 2.652 | 65 | 6 | 10 | 4.24 | 3.6 | – | 26.54 | 27.7 | 28.5 | 30.82 | 11,680 |
| EPDBP2020-30-04-TH | △ | | | 30 | 0.4 | 1.7 | 1.92 | 2.315 | 70 | 6 | 10 | 7.42 | 3.04 | 31.46 | 32.79 | 33.67 | 34.81 | 38.51 | 14,360 |
| EPDBP2020-30-09-TH | △ | | | 30 | 0.9 | 1.7 | 1.92 | 2.809 | 70 | 6 | 10 | 4.24 | 3.14 | – | 31.6 | 32.9 | 33.77 | 36.97 | 14,360 |
| EPDBP2020-35-09-TH | △ | | | 35 | 0.9 | 1.7 | 1.92 | 2.966 | 75 | 6 | 10 | 4.24 | 2.79 | – | 36.66 | 38.08 | 39.02 | 干渉なし | 15,000 |
| EPDBP2020-40-04-TH | △ | | | 40 | 0.4 | 1.7 | 1.92 | 2.455 | 80 | 6 | 10 | 7.42 | 2.42 | 41.58 | 43.14 | 44.26 | 46.39 | 干渉なし | 15,650 |
| EPDBP2020-40-09-TH | △ | | | 40 | 0.9 | 1.7 | 1.92 | 3.123 | 80 | 6 | 10 | 4.24 | 2.51 | – | 41.72 | 43.25 | 44.5 | 干渉なし | 15,650 |
| EPDBP2020-50-09-TH | △ | | | 50 | 0.9 | 1.7 | 1.92 | 3.438 | 90 | 6 | 10 | 4.24 | 2.09 | – | 51.82 | 53.56 | 55.58 | 干渉なし | 17,570 |
| EPDBP2020-60-09-TH | △ | | | 60 | 0.9 | 1.7 | 1.92 | 3.752 | 100 | 6 | 10 | 4.24 | 1.79 | – | 61.92 | 63.84 | 干渉なし | 干渉なし | 18,430 |
| EPDBP2020-70-09-TH | △ | | | 70 | 0.9 | 1.7 | 1.92 | 4.066 | 110 | 6 | 10 | 4.24 | 1.56 | – | 72.02 | 74.15 | 干渉なし | 干渉なし | 19,930 |
| EPDBP2030-8-04-TH | △ | 1.5 | 3 | 8 | 0.4 | 2.5 | 2.86 | 2.937 | 50 | 6 | 4 | 8.5 | 6.25 | 8.87 | 9.13 | 9.35 | 9.55 | 10.33 | 8,740 |
| EPDBP2030-16-04-TH | △ | | | 16 | 0.4 | 2.5 | 2.86 | 3.048 | 55 | 6 | 7 | 12.52 | 4.01 | 17.25 | 17.89 | 18.38 | 18.79 | 20.6 | 11,370 |
| EPDBP2030-20-04-TH | △ | | | 20 | 0.4 | 2.5 | 2.86 | 3.104 | 60 | 6 | 7 | 12.52 | 3.4 | 21.29 | 22.04 | 22.6 | 23.34 | 25.74 | 11,370 |
| EPDBP2030-30-04-TH | △ | | | 30 | 0.4 | 2.5 | 2.86 | 3.244 | 70 | 6 | 10 | 12.52 | 2.46 | 31.67 | 32.88 | 33.73 | 34.92 | 干渉なし | 13,080 |
| EPDBP2030-30-09-TH | △ | | | 30 | 0.9 | 2.5 | 2.86 | 3.724 | 70 | 6 | 10 | 6.95 | 2.54 | – | 31.82 | 33 | 33.84 | 干渉なし | 13,080 |
| EPDBP2030-40-04-TH | △ | | | 40 | 0.4 | 2.5 | 2.86 | 3.384 | 80 | 6 | 10 | 12.52 | 1.93 | 41.78 | 43.23 | 44.38 | 干渉なし | 干渉なし | 15,000 |
| EPDBP2030-40-09-TH | △ | | | 40 | 0.9 | 2.5 | 2.86 | 4.038 | 80 | 6 | 10 | 6.95 | 2 | – | 41.92 | 43.34 | 干渉なし | 干渉なし | 15,000 |
| EPDBP2030-50-09-TH | △ | | | 50 | 0.9 | 2.5 | 2.86 | 4.352 | 90 | 6 | 10 | 6.95 | 1.64 | – | 52.01 | 53.65 | 干渉なし | 干渉なし | 16,290 |
| EPDBP2030-60-09-TH | △ | | | 60 | 0.9 | 2.5 | 2.86 | 4.667 | 100 | 6 | 10 | 6.95 | 1.39 | – | 62.1 | 干渉なし | 干渉なし | 干渉なし | 17,570 |
| EPDBP2030-70-09-TH | △ | | | 70 | 0.9 | 2.5 | 2.86 | 4.981 | 110 | 6 | 10 | 6.95 | 1.2 | – | 72.19 | 干渉なし | 干渉なし | 干渉なし | 20,040 |
| EPDBP2040-20-10-TH | △ | 2 | 4 | 20 | 1 | 8 | 3.86 | 4.279 | 70 | 8 | 7 | 12.01 | 4.95 | 20.56 | 21.67 | 22.31 | 22.8 | 23.59 | 11,370 |
| EPDBP2040-30-10-TH | △ | | | 30 | 1 | 8 | 3.86 | 4.628 | 80 | 8 | 7 | 12.01 | 3.51 | 22.02 | 31.67 | 32.56 | 33.2 | 34.16 | 11,370 |
| EPDBP2040-40-10-TH | △ | | | 40 | 1 | 8 | 3.86 | 4.977 | 90 | 8 | 10 | 12.01 | 2.65 | 22.02 | 42.04 | 43.4 | 44.34 | 干渉なし | 14,460 |
| EPDBP2040-50-10-TH | △ | | | 50 | 1 | 8 | 3.86 | 5.326 | 100 | 8 | 10 | 12.01 | 2.17 | 22.02 | 52.04 | 53.65 | 54.71 | 干渉なし | 17,040 |
| EPDBP2040-60-10-TH | △ | | | 60 | 1 | 8 | 3.86 | 5.675 | 110 | 8 | 10 | 12.01 | 1.83 | 22.02 | 62.04 | 63.88 | 干渉なし | 干渉なし | 18,640 |
| EPDBP2050-30-10-TH | △ | 2.5 | 5 | 30 | 1 | 10 | 4.86 | 5.558 | 80 | 8 | 7 | 14.01 | 2.74 | 25.52 | 31.78 | 32.62 | 33.24 | 干渉なし | 17,850 |
| EPDBP2050-40-10-TH | △ | | | 40 | 1 | 10 | 4.86 | 5.907 | 90 | 8 | 7 | 14.01 | 2.09 | 25.52 | 41.78 | 42.84 | 43.57 | 干渉なし | 18,300 |
| EPDBP2050-60-10-TH | △ | | | 60 | 1 | 10 | 4.86 | 6.606 | 110 | 8 | 10 | 14.01 | 1.41 | 25.52 | 62.17 | 干渉なし | 干渉なし | 干渉なし | 20,540 |
| EPDBP2060-30-10-TH | △ | 3 | 6 | 30 | 1 | 12 | 5.86 | 6.488 | 80 | 8 | 7 | 16.01 | 1.9 | 29.03 | 31.89 | 32.68 | 干渉なし | 干渉なし | 17,850 |
| EPDBP2060-40-10-TH | △ | | | 40 | 1 | 12 | 5.86 | 6.837 | 90 | 8 | 7 | 16.01 | 1.44 | 29.03 | 41.89 | 干渉なし | 干渉なし | 干渉なし | 19,080 |
| EPDBP2060-50-10-TH | △ | | | 50 | 1 | 12 | 5.86 | 7.187 | 100 | 8 | 7 | 16.01 | 1.17 | 29.03 | 51.89 | 干渉なし | 干渉なし | 干渉なし | 21,770 |
| EPDBP2060-60-10-TH | △ | | | 60 | 1 | 12 | 5.86 | 7.536 | 110 | 10 | 10 | 16.01 | 1.86 | 29.03 | 62.29 | 63.98 | 干渉なし | 干渉なし | 29,630 |
| EPDBP2060-70-10-TH | △ | | | 70 | 1 | 12 | 5.86 | 7.885 | 120 | 10 | 10 | 16.01 | 1.61 | 29.03 | 72.29 | 74.19 | 干渉なし | 干渉なし | 31,420 |
| EPDBP2060-80-10-TH | △ | | | 80 | 1 | 12 | 5.86 | 8.234 | 130 | 10 | 10 | 16.01 | 1.42 | 29.03 | 82.29 | 干渉なし | 干渉なし | 干渉なし | 33,220 |
| EPDBP2080-50-10-TH | △ | 4 | 8 | 50 | 1 | 14 | 7.86 | 9.117 | 110 | 10 | 7 | 18.01 | 1.19 | 32.03 | 51.95 | 干渉なし | 干渉なし | 干渉なし | 29,630 |
| EPDBP2080-60-10-TH | △ | | | 60 | 1 | 14 | 7.86 | 9.466 | 120 | 10 | 7 | 18.01 | 0.99 | 32.03 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 31,420 |
| EPDBP2080-70-10-TH | △ | | | 70 | 1 | 14 | 7.86 | 9.815 | 130 | 10 | 7 | 18.01 | 0.86 | 32.03 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 33,220 |
| EPDBP2080-80-10-TH | △ | | | 80 | 1 | 14 | 7.86 | 10.164 | 140 | 12 | 10 | 18.01 | 1.43 | 32.03 | 82.37 | 干渉なし | 干渉なし | 干渉なし | 41,080 |
| EPDBP2100-60-10-TH | △ | 5 | 10 | 60 | 1 | 18 | 9.86 | 11.326 | 130 | 12 | 7 | 22.01 | 1.01 | 39.03 | 62.13 | 干渉なし | 干渉なし | 干渉なし | 38,830 |
| EPDBP2100-75-10-TH | △ | | | 75 | 1 | 18 | 9.86 | 11.850 | 140 | 12 | 7 | 22.01 | 0.81 | 39.03 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 41,080 |

### 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ |

### 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPDBP-TH | × (N/A) | 4 ～ 10 |

【注意】首下長／外径が10DCを超える工具の再研磨可否については、弊社営業にお問い合わせください。
【Note】Contact our sales office regarding whether or not regrinding is possible for tools where under neck length/tool diameter more than 10DC

△印：在庫が無くなり次第受注生産品となるものです。 △：When the Stock is out, will become to produce on request. 干渉なし：No interference

# 標準切削条件表 Recommended cutting conditions

## EPDBP-TH

| 被削材 Work material | | | | | 1 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 2 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 3 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 4 焼入れ鋼 Hardened steels (45～55HRC) | | 5 焼入れ鋼 Hardened steels (55～65HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み比率 | Ratio to standard depth of cut | | | | 100% | | 90% | | 80% | | 65% | | 60% | |
| ボール半径RE Ball radius (mm) | 外径DC Tool dia. (mm) | 首下長LU Under neck length (mm) | 首角度 Neck angle (°) | 基本切込み Standard depth of cut (mm) | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 0.1 | 0.2 | 1 | 0.4 | 0.017 | 40,000 | 800 | 34,000 | 680 | 28,000 | 504 | 26,000 | 416 | 26,000 | 364 |
| | | 1.5 | 0.4 | 0.009 | 40,000 | 800 | 34,000 | 680 | 28,000 | 504 | 26,000 | 416 | 26,000 | 364 |
| | | 2 | 0.9 | 0.007 | 32,000 | 461 | 27,200 | 392 | 22,400 | 323 | 20,800 | 266 | 20,800 | 233 |
| | | 2.5 | 0.9 | 0.004 | 26,000 | 333 | 22,100 | 283 | 18,200 | 204 | 16,900 | 189 | 16,900 | 162 |
| 0.15 | 0.3 | 2 | 0.4 | 0.025 | 40,000 | 1,200 | 34,000 | 1,020 | 28,000 | 756 | 26,000 | 624 | 26,000 | 546 |
| | | 3 | 0.9 | 0.013 | 32,000 | 691 | 27,200 | 588 | 22,400 | 484 | 20,800 | 399 | 20,800 | 349 |
| | | 4 | 0.9 | 0.010 | 26,000 | 499 | 22,100 | 424 | 18,200 | 306 | 16,900 | 284 | 16,900 | 243 |
| 0.2 | 0.4 | 2 | 0.4 | 0.035 | 40,000 | 1,600 | 34,000 | 1,360 | 28,000 | 1,008 | 26,000 | 832 | 26,000 | 728 |
| | | 3 | 0.4 | 0.020 | 40,000 | 1,600 | 34,000 | 1,360 | 28,000 | 1,008 | 26,000 | 832 | 26,000 | 728 |
| | | 4 | 0.4 | 0.007 | 32,000 | 922 | 27,200 | 783 | 22,400 | 645 | 20,800 | 532 | 20,800 | 466 |
| | | 4 | 0.9 | 0.009 | 32,000 | 922 | 27,200 | 783 | 22,400 | 645 | 20,800 | 532 | 20,800 | 466 |
| | | 5 | 0.4 | 0.006 | 26,000 | 666 | 22,100 | 566 | 18,200 | 408 | 16,900 | 379 | 16,900 | 324 |
| | | 5 | 0.9 | 0.007 | 26,000 | 666 | 22,100 | 566 | 18,200 | 408 | 16,900 | 379 | 16,900 | 324 |
| 0.25 | 0.5 | 4 | 0.4 | 0.040 | 40,000 | 2,000 | 34,000 | 1,700 | 28,000 | 1,260 | 26,000 | 1,040 | 26,000 | 910 |
| | | 8 | 0.9 | 0.010 | 26,000 | 728 | 22,100 | 619 | 18,200 | 446 | 16,900 | 414 | 16,900 | 355 |
| | | 12 | 0.9 | 0.005 | 22,400 | 627 | 19,040 | 533 | 15,680 | 384 | 14,560 | 357 | 14,560 | 306 |
| 0.27 | 0.54 | 2 | 0.4 | 0.050 | 40,000 | 2,160 | 34,000 | 1,836 | 28,000 | 1,361 | 26,000 | 1,123 | 26,000 | 983 |
| | | 4 | 0.4 | 0.037 | 40,000 | 2,160 | 34,000 | 1,836 | 28,000 | 1,361 | 26,000 | 1,123 | 26,000 | 983 |
| | | 5 | 0.4 | 0.031 | 40,000 | 1,512 | 34,000 | 1,428 | 28,000 | 1,176 | 26,000 | 1,040 | 26,000 | 832 |
| | | 6 | 0.4 | 0.025 | 26,000 | 1,244 | 22,100 | 1,058 | 18,200 | 871 | 16,900 | 676 | 16,900 | 629 |
| | | 6.5 | 0.4 | 0.020 | 26,000 | 1,011 | 22,100 | 859 | 18,200 | 619 | 16,900 | 575 | 16,900 | 493 |
| | | 7 | 0.4 | 0.015 | 26,000 | 899 | 22,100 | 812 | 18,200 | 585 | 16,900 | 543 | 16,900 | 465 |
| 0.3 | 0.6 | 2 | 0.4 | 0.055 | 40,000 | 2,400 | 34,000 | 2,040 | 28,000 | 1,512 | 26,000 | 1,248 | 26,000 | 1,092 |
| | | 4 | 0.4 | 0.035 | 40,000 | 2,400 | 34,000 | 2,040 | 28,000 | 1,512 | 26,000 | 1,248 | 26,000 | 1,092 |
| | | 6 | 0.4 | 0.018 | 32,000 | 1,382 | 27,200 | 1,175 | 22,400 | 968 | 20,800 | 799 | 20,800 | 699 |
| | | 6 | 0.9 | 0.020 | 32,000 | 1,382 | 27,200 | 1,175 | 22,400 | 968 | 20,800 | 799 | 20,800 | 699 |
| | | 8 | 0.9 | 0.020 | 26,000 | 998 | 22,100 | 849 | 18,200 | 612 | 16,900 | 568 | 16,900 | 487 |
| | | 10 | 0.4 | 0.013 | 26,000 | 874 | 22,100 | 743 | 18,200 | 535 | 16,900 | 497 | 16,900 | 426 |
| | | 10 | 0.9 | 0.015 | 26,000 | 874 | 22,100 | 743 | 18,200 | 535 | 16,900 | 497 | 16,900 | 426 |
| | | 12 | 0.9 | 0.010 | 26,000 | 874 | 22,100 | 743 | 18,200 | 535 | 16,900 | 497 | 16,900 | 426 |
| | | 15 | 0.4 | 0.005 | 22,400 | 753 | 19,040 | 640 | 15,680 | 461 | 14,560 | 367 | 14,560 | 367 |
| | | 15 | 0.9 | 0.006 | 22,400 | 753 | 19,040 | 640 | 15,680 | 461 | 14,560 | 367 | 14,560 | 367 |
| 0.4 | 0.8 | 4 | 0.4 | 0.062 | 32,000 | 2,560 | 27,200 | 2,176 | 22,400 | 1,613 | 20,800 | 1,331 | 20,800 | 1,165 |
| | | 6 | 0.4 | 0.045 | 32,000 | 2,560 | 27,200 | 2,176 | 22,400 | 1,613 | 20,800 | 1,331 | 20,800 | 1,165 |
| | | 8 | 0.9 | 0.026 | 25,600 | 1,475 | 21,760 | 1,253 | 17,920 | 1,032 | 16,640 | 852 | 16,640 | 745 |
| | | 12 | 0.9 | 0.020 | 20,800 | 1,065 | 17,680 | 905 | 14,560 | 699 | 13,520 | 606 | 13,520 | 519 |
| | | 16 | 0.9 | 0.018 | 20,800 | 932 | 17,680 | 792 | 14,560 | 612 | 13,520 | 530 | 13,520 | 454 |
| 0.45 | 0.9 | 4 | 0.4 | 0.063 | 28,300 | 2,547 | 24,055 | 2,165 | 19,810 | 1,605 | 18,395 | 1,324 | 18,395 | 1,159 |
| | | 8 | 0.4 | 0.050 | 28,300 | 2,547 | 24,055 | 2,165 | 19,810 | 1,605 | 18,395 | 1,324 | 18,395 | 1,159 |
| | | 12 | 0.4 | 0.037 | 18,400 | 1,325 | 15,640 | 1,126 | 12,880 | 811 | 11,960 | 753 | 11,960 | 646 |
| | | 16 | 0.4 | 0.024 | 18,400 | 1,325 | 15,640 | 1,126 | 12,880 | 811 | 11,960 | 753 | 11,960 | 646 |
| | | 18 | 0.4 | 0.018 | 18,400 | 1,325 | 15,640 | 1,126 | 12,880 | 811 | 11,960 | 753 | 11,960 | 646 |
| | | 20 | 0.4 | 0.015 | 15,850 | 1,141 | 13,473 | 970 | 11,095 | 699 | 10,303 | 649 | 10,303 | 556 |
| | | 22 | 0.4 | 0.012 | 15,850 | 1,141 | 13,473 | 970 | 11,095 | 699 | 10,303 | 649 | 10,303 | 556 |
| | | 24 | 0.4 | 0.009 | 14,150 | 1,019 | 12,028 | 866 | 9,905 | 624 | 9,198 | 579 | 9,198 | 497 |

【注意】ご使用にあたっては、A167ページの表下の項目と注意を参照してください。【Note】Upon usage, please refer to comments and notes below table on page A167.

Epoch Pencil Deep Ball

# エポックペンシルディープボール

## EPDBP-TH

| 被削材 Work material | | | | | 1 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 2 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 3 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 4 焼入れ鋼 Hardened steels (45～55HRC) | | 5 焼入れ鋼 Hardened steels (55～65HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み比率 Ratio to standard depth of cut | | | | | 100% | | 90% | | 80% | | 65% | | 60% | |
| ボール半径RE Ball radius (mm) | 外径DC Tool dia. (mm) | 首下長LU Under neck length (mm) | 首角度 Neck angle (°) | 基本切込み Standard depth of cut (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 0.5 | 1 | 6 | 0.4 | 0.055 | 25,600 | 2,560 | 21,760 | 2,176 | 17,920 | 1,613 | 16,640 | 1,331 | 16,640 | 1,165 |
| | | 8 | 0.4 | 0.055 | 25,600 | 2,560 | 21,760 | 2,176 | 17,920 | 1,613 | 16,640 | 1,331 | 16,640 | 1,165 |
| | | 10 | 0.4 | 0.032 | 20,800 | 1,872 | 17,680 | 1,591 | 14,560 | 1,310 | 13,520 | 1,082 | 13,520 | 946 |
| | | 10 | 0.9 | 0.035 | 20,800 | 1,872 | 17,680 | 1,591 | 14,560 | 1,310 | 13,520 | 1,082 | 13,520 | 946 |
| | | 15 | 0.9 | 0.028 | 16,640 | 1,331 | 14,144 | 1,132 | 11,648 | 874 | 10,816 | 757 | 10,816 | 649 |
| | | 20 | 0.4 | 0.018 | 16,640 | 1,331 | 14,144 | 1,132 | 11,648 | 874 | 10,816 | 757 | 10,816 | 649 |
| | | 20 | 0.9 | 0.020 | 16,640 | 1,331 | 14,144 | 1,132 | 11,648 | 874 | 10,816 | 757 | 10,816 | 649 |
| | | 25 | 0.9 | 0.017 | 14,560 | 1,165 | 12,376 | 990 | 10,192 | 764 | 9,464 | 662 | 9,464 | 568 |
| | | 30 | 0.4 | 0.015 | 12,480 | 874 | 10,608 | 743 | 8,736 | 568 | 8,112 | 487 | 8,112 | 406 |
| | | 30 | 0.9 | 0.017 | 12,480 | 874 | 10,608 | 743 | 8,736 | 568 | 8,112 | 487 | 8,112 | 406 |
| | | 35 | 0.9 | 0.010 | 10,400 | 728 | 8,840 | 619 | 7,280 | 473 | 6,760 | 406 | 6,760 | 338 |
| | | 40 | 0.9 | 0.009 | 10,000 | 700 | 8,500 | 595 | 7,000 | 455 | 6,500 | 390 | 6,500 | 325 |
| | | 50 | 0.9 | 0.007 | 9,500 | 665 | 8,075 | 565 | 6,650 | 432 | 6,175 | 371 | 6,175 | 309 |
| | | 60 | 0.9 | 0.005 | 9,000 | 630 | 7,650 | 536 | 6,300 | 410 | 5,850 | 351 | 5,850 | 293 |
| | | 70 | 0.9 | 0.003 | 8,500 | 595 | 7,225 | 506 | 5,950 | 387 | 5,525 | 332 | 5,525 | 276 |
| 0.75 | 1.5 | 8 | 0.4 | 0.070 | 16,960 | 2,544 | 14,416 | 2,162 | 11,872 | 1,603 | 11,024 | 1,323 | 11,024 | 1,158 |
| | | 10 | 0.4 | 0.070 | 16,960 | 2,544 | 14,416 | 2,162 | 11,872 | 1,603 | 11,024 | 1,323 | 11,024 | 1,158 |
| | | 12 | 0.4 | 0.070 | 16,960 | 2,544 | 14,416 | 2,162 | 11,872 | 1,603 | 11,024 | 1,323 | 11,024 | 1,158 |
| | | 15 | 0.9 | 0.045 | 13,568 | 1,832 | 11,533 | 1,557 | 9,498 | 1,282 | 8,819 | 1,058 | 8,819 | 926 |
| | | 20 | 0.9 | 0.040 | 11,024 | 1,323 | 9,370 | 1,124 | 7,717 | 810 | 7,166 | 752 | 7,166 | 645 |
| | | 30 | 0.9 | 0.028 | 11,024 | 1,323 | 9,370 | 1,124 | 7,717 | 810 | 7,166 | 752 | 7,166 | 645 |
| 0.9 | 1.8 | 4 | 0.4 | 0.120 | 14,200 | 2,556 | 12,070 | 2,173 | 9,940 | 1,610 | 9,230 | 1,329 | 9,230 | 1,163 |
| | | 8 | 0.4 | 0.100 | 14,200 | 2,556 | 12,070 | 2,173 | 9,940 | 1,610 | 9,230 | 1,329 | 9,230 | 1,163 |
| | | 12 | 0.4 | 0.080 | 14,200 | 2,556 | 12,070 | 2,173 | 9,940 | 1,610 | 9,230 | 1,329 | 9,230 | 1,163 |
| | | 16 | 0.4 | 0.071 | 14,200 | 2,556 | 12,070 | 2,173 | 9,940 | 1,610 | 9,230 | 1,329 | 9,230 | 1,163 |
| | | 20 | 0.4 | 0.062 | 9,230 | 1,329 | 7,846 | 1,130 | 6,461 | 814 | 6,000 | 756 | 6,000 | 648 |
| | | 24 | 0.4 | 0.053 | 9,230 | 1,329 | 7,846 | 1,130 | 6,461 | 814 | 6,000 | 756 | 6,000 | 648 |
| | | 28 | 0.4 | 0.044 | 9,230 | 1,329 | 7,846 | 1,130 | 6,461 | 814 | 6,000 | 756 | 6,000 | 648 |
| | | 32 | 0.4 | 0.036 | 9,230 | 1,329 | 7,846 | 1,130 | 6,461 | 814 | 6,000 | 756 | 6,000 | 648 |
| | | 36 | 0.4 | 0.028 | 9,230 | 1,329 | 7,846 | 1,130 | 6,461 | 814 | 6,000 | 756 | 6,000 | 648 |
| | | 38 | 0.4 | 0.020 | 8,000 | 1,152 | 6,800 | 979 | 5,600 | 706 | 5,200 | 655 | 5,200 | 562 |
| | | 40 | 0.4 | 0.015 | 8,000 | 1,152 | 6,800 | 979 | 5,600 | 706 | 5,200 | 655 | 5,200 | 562 |
| 1 | 2 | 8 | 0.4 | 0.150 | 15,200 | 3,040 | 12,920 | 2,584 | 10,640 | 1,915 | 9,880 | 1,581 | 9,880 | 1,383 |
| | | 12 | 0.4 | 0.090 | 15,200 | 3,040 | 12,920 | 2,584 | 10,640 | 1,915 | 9,880 | 1,581 | 9,880 | 1,383 |
| | | 16 | 0.4 | 0.090 | 15,200 | 3,040 | 12,920 | 2,584 | 10,640 | 1,915 | 9,880 | 1,581 | 9,880 | 1,383 |
| | | 20 | 0.4 | 0.060 | 12,160 | 2,189 | 10,336 | 1,860 | 8,512 | 1,532 | 7,904 | 1,265 | 7,904 | 1,107 |
| | | 20 | 0.9 | 0.070 | 12,160 | 2,189 | 10,336 | 1,860 | 8,512 | 1,532 | 7,904 | 1,265 | 7,904 | 1,107 |
| | | 25 | 0.9 | 0.070 | 9,880 | 1,581 | 8,398 | 1,344 | 6,916 | 968 | 6,422 | 899 | 6,422 | 771 |
| | | 30 | 0.4 | 0.040 | 9,880 | 1,581 | 8,398 | 1,344 | 6,916 | 968 | 6,422 | 899 | 6,422 | 771 |
| | | 30 | 0.9 | 0.045 | 9,880 | 1,581 | 8,398 | 1,344 | 6,916 | 968 | 6,422 | 899 | 6,422 | 771 |
| | | 35 | 0.9 | 0.045 | 9,880 | 1,581 | 8,398 | 1,344 | 6,916 | 968 | 6,422 | 899 | 6,422 | 771 |
| | | 40 | 0.4 | 0.030 | 9,880 | 1,581 | 8,398 | 1,344 | 6,916 | 968 | 6,422 | 899 | 6,422 | 771 |
| | | 40 | 0.9 | 0.035 | 9,880 | 1,581 | 8,398 | 1,344 | 6,916 | 968 | 6,422 | 899 | 6,422 | 771 |

| 被削材 Work material | | | | | 1 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 2 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 3 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 4 焼入れ鋼 Hardened steels (45～55HRC) | | 5 焼入れ鋼 Hardened steels (55～65HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み比率 | Ratio to standard depth of cut | | | | 100% | | 90% | | 80% | | 65% | | 60% | |
| ボール半径RE Ball radius (mm) | 外径DC Tool dia. (mm) | 首下長LU Under neck length (mm) | 首角度 Neck angle (°) | 基本切込み Standard depth of cut (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 1 | 2 | 50 | 0.9 | 0.017 | 8,512 | 1,192 | 7,235 | 1,013 | 5,958 | 775 | 5,533 | 664 | 5,533 | 553 |
| | | 60 | 0.9 | 0.009 | 7,235 | 1,013 | 6,150 | 861 | 5,065 | 658 | 4,703 | 564 | 4,703 | 470 |
| | | 70 | 0.9 | 0.005 | 6,150 | 861 | 5,227 | 732 | 4,305 | 560 | 3,997 | 480 | 3,997 | 400 |
| 1.5 | 3 | 8 | 0.4 | 0.320 | 12,720 | 3,816 | 10,812 | 3,244 | 8,904 | 2,404 | 8,268 | 1,984 | 8,268 | 1,736 |
| | | 16 | 0.4 | 0.220 | 12,720 | 3,816 | 10,812 | 3,244 | 8,904 | 2,404 | 8,268 | 1,984 | 8,268 | 1,736 |
| | | 20 | 0.4 | 0.150 | 12,720 | 3,434 | 10,812 | 2,919 | 8,904 | 2,137 | 8,268 | 1,736 | 8,268 | 1,488 |
| | | 30 | 0.4 | 0.080 | 10,176 | 2,748 | 8,650 | 2,335 | 7,123 | 1,496 | 6,614 | 1,389 | 6,614 | 1,191 |
| | | 30 | 0.9 | 0.090 | 10,176 | 2,748 | 8,650 | 2,335 | 7,123 | 1,496 | 6,614 | 1,389 | 6,614 | 1,191 |
| | | 40 | 0.4 | 0.060 | 8,268 | 1,984 | 7,028 | 1,687 | 5,788 | 1,215 | 5,374 | 1,129 | 5,374 | 967 |
| | | 40 | 0.9 | 0.070 | 8,268 | 1,984 | 7,028 | 1,687 | 5,788 | 1,215 | 5,374 | 1,129 | 5,374 | 967 |
| | | 50 | 0.9 | 0.050 | 8,268 | 1,984 | 7,028 | 1,687 | 5,788 | 1,215 | 5,374 | 1,129 | 5,374 | 967 |
| | | 60 | 0.9 | 0.030 | 7,123 | 1,710 | 6,055 | 1,453 | 4,986 | 1,047 | 4,630 | 972 | 4,630 | 833 |
| | | 70 | 0.9 | 0.020 | 6,233 | 1,496 | 5,298 | 1,271 | 4,363 | 916 | 4,051 | 851 | 4,051 | 729 |
| 2 | 4 | 20 | 1 | 0.320 | 11,900 | 2,860 | 10,100 | 2,420 | 9,000 | 2,050 | 7,800 | 1,680 | 7,800 | 1,590 |
| | | 30 | 1 | 0.230 | 11,900 | 2,570 | 10,100 | 2,180 | 9,000 | 1,850 | 7,800 | 1,520 | 7,800 | 1,430 |
| | | 40 | 1 | 0.140 | 9,500 | 1,940 | 8,100 | 1,650 | 7,200 | 1,400 | 6,200 | 1,140 | 6,200 | 1,080 |
| | | 50 | 1 | 0.110 | 7,800 | 1,590 | 6,600 | 1,350 | 5,800 | 1,120 | 5,000 | 920 | 5,000 | 870 |
| | | 60 | 1 | 0.070 | 7,800 | 1,590 | 6,600 | 1,350 | 5,800 | 1,120 | 5,000 | 920 | 5,000 | 870 |
| 2.5 | 5 | 30 | 1 | 0.340 | 9,500 | 2,140 | 8,100 | 1,820 | 7,200 | 1,540 | 6,200 | 1,260 | 6,200 | 1,190 |
| | | 40 | 1 | 0.250 | 9,500 | 2,140 | 8,100 | 1,820 | 7,200 | 1,540 | 6,200 | 1,260 | 6,200 | 1,190 |
| | | 60 | 1 | 0.150 | 6,200 | 1,320 | 5,300 | 1,130 | 4,700 | 950 | 4,000 | 770 | 4,000 | 720 |
| 3 | 6 | 30 | 1 | 0.450 | 8,000 | 2,000 | 6,800 | 1,700 | 6,000 | 1,430 | 5,200 | 1,170 | 5,200 | 1,110 |
| | | 40 | 1 | 0.400 | 8,000 | 1,800 | 6,800 | 1,530 | 6,000 | 1,280 | 5,200 | 1,050 | 5,200 | 990 |
| | | 50 | 1 | 0.320 | 8,000 | 1,800 | 6,800 | 1,530 | 6,000 | 1,280 | 5,200 | 1,050 | 5,200 | 990 |
| | | 60 | 1 | 0.220 | 6,400 | 1,360 | 5,400 | 1,150 | 4,800 | 970 | 4,100 | 780 | 4,100 | 740 |
| | | 70 | 1 | 0.180 | 5,200 | 1,110 | 4,400 | 940 | 3,900 | 790 | 3,400 | 650 | 3,400 | 610 |
| | | 80 | 1 | 0.140 | 5,200 | 1,110 | 4,400 | 940 | 3,900 | 790 | 3,400 | 650 | 3,400 | 610 |
| 4 | 8 | 50 | 1 | 0.500 | 6,000 | 1,460 | 5,100 | 1,240 | 4,500 | 1,040 | 3,900 | 850 | 3,900 | 810 |
| | | 60 | 1 | 0.430 | 6,000 | 1,460 | 5,100 | 1,240 | 4,500 | 1,040 | 3,900 | 850 | 3,900 | 810 |
| | | 70 | 1 | 0.330 | 6,000 | 1,460 | 5,100 | 1,240 | 4,500 | 1,040 | 3,900 | 850 | 3,900 | 810 |
| | | 80 | 1 | 0.250 | 4,800 | 1,100 | 4,100 | 940 | 3,600 | 780 | 3,100 | 640 | 3,100 | 600 |
| 5 | 10 | 60 | 1 | 0.700 | 4,800 | 1,300 | 4,100 | 1,110 | 3,600 | 920 | 3,100 | 750 | 3,100 | 710 |
| | | 75 | 1 | 0.500 | 4,800 | 1,300 | 4,100 | 1,110 | 3,600 | 920 | 3,100 | 750 | 3,100 | 710 |

※(1) 基本切込みは被削材グループ1での目安を示しています。その他のグループの場合は、上表の切込み比率を目安に調整して下さい。
※(2) リブ加工や止まり溝など、切りくずがつまりやすい切削の場合、切込み設定は基本切込みに切込み比率をかけて算出した切込み量を、さらにその80%まで小さくして使用してください。

※(1) Standard cutting depth is shown as the criteria for Group 1 workpieces. For other groups, adjust the cutting depth according to the cutting depth factors in the above table.
※(2) When performing cutting where cutting chips may cause clogging, such as for rib cutting, blind grooves, etc., cutting depth setting should be set by multiplying a cutting depth factor to calculate the cutting depth amount, and this amount should then be reduced to 80% of the calculated value.

【切込み設定例】 EPDBP2020-25-09-THの工具で焼き入れ鋼(50HRC) をリブ溝等高線切削する場合、
切込み=0.07(基本切込み)×0.65(焼き入れ鋼グループ4の切込み比率)×0.8(閉鎖域の切削)=0.036㎜

Cutting depth setting example: When cutting rib groove contours in quenched steel (50HRC) using an EPDBP2020-25-09-TH tool:
Cutting depth = 0.07 (standard cutting depth) × 0.65 (cutting depth factor for Group 4 quenched steel) × 0.8 (for closed-area cutting) = 0.036mm

【注意】 ①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

【Note】 ① Use the appropriate coolant for the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
③ If the rpm of the machine is low, lower the feed rate also to put the rpm and feed rate in the same ratio.

# Epoch Mega Feed Ball
# エポックメガフィードボール

**首下ストレート** | Straight Neck Type

3枚刃ボールエンドミル。不等分割でビビリ振動を抑制。
3-flute ball end mill. Uneven division suppresses chattering.

彫込み Die-sinking / 曲面 Profiling / R Radius / 荒 Roughing / 中仕上 Semi Finishing / 仕上 Finishing

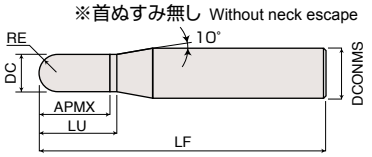
RE公差 RE tolerance
RE1～RE6 ：±0.01
RE8～RE10：±0.015

h5

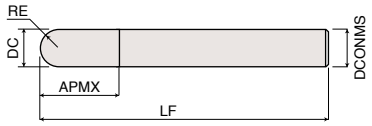
(mm)

※首ぬすみ無し Without neck escape

Aタイプ Type A




Bタイプ Type B




3枚刃 3Flutes

## EMB3○○○-TH

超硬 Carbide / TH / ねじれ40° Helix angle / 不等分割 Unequal pitch / 切削条件表 A169 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 刃長 Flute length APMX | 首下長 Under neck length LU | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首形状 Neck shape | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|
| EMB3020-TH | △ | 1 | 2 | 3 | 4 | 50 | 6 | A | 15,650 |
| EMB3030-TH | △ | 1.5 | 3 | 4.5 | 5.5 | 70 | 6 | A | 16,610 |
| EMB3040-TH | △ | 2 | 4 | 6 | 7 | 70 | 6 | A | 16,610 |
| EMB3050-TH | △ | 2.5 | 5 | 7.5 | 8.5 | 80 | 6 | A | 18,640 |
| EMB3060-TH | △ | 3 | 6 | 9 | – | 90 | 6 | B | 19,760 |
| EMB3080-TH | △ | 4 | 8 | 12 | – | 100 | 8 | B | 25,930 |
| EMB3100-TH | △ | 5 | 10 | 15 | – | 100 | 10 | B | 32,990 |
| EMB3120-TH | △ | 6 | 12 | 18 | – | 110 | 12 | B | 42,870 |
| EMB3160-TH | △ | 8 | 16 | 24 | – | 140 | 16 | B | 87,750 |
| EMB3200-TH | △ | 10 | 20 | 30 | – | 160 | 20 | B | 137,250 |

### 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ |

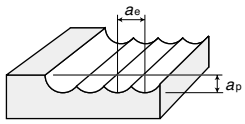
### 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EMB-TH | × (N/A) | 2～20 |

△印：在庫が無くなり次第受注生産品となるものです。　△：When the Stock is out, will become to produce on request.

# 標準切削条件表 Recommended cutting conditions

## EMB-TH
首下ストレートタイプ
Straight Neck

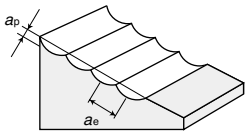



### 〈荒加工〉 Roughing

| 被削材 Work material | 炭素鋼・合金鋼 Carbon steels, Alloy steels 180～250HB | | 工具鋼 Tool steels 25～35HRC | | プリハードン鋼 Pre-hardened steels 35～45HRC | | 焼入れ鋼 Hardened steels 45～55HRC | | 焼入れ鋼 Hardened steels 55～65HRC | |
|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み(mm) Depth of Cut | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.07DC ae=0.21DC | | ap=0.05DC ae=0.15DC | |
| ボール半径RE Ball radius | 回転数n min-1 | 送り速度vf mm/min | 回転数n min-1 | 送り速度vf mm/min | 回転数n min-1 | 送り速度vf mm/min | 回転数n min-1 | 送り速度vf mm/min | 回転数n min-1 | 送り速度vf mm/min |
| RE1 | 35,000 | 3,680 | 31,800 | 3,340 | 28,600 | 2,850 | 25,500 | 2,140 | 22,300 | 1,400 |
| RE1.5 | 23,300 | 3,840 | 21,200 | 3,500 | 19,100 | 2,990 | 17,000 | 2,240 | 14,900 | 1,480 |
| RE2 | 17,500 | 3,940 | 15,900 | 3,580 | 14,300 | 3,060 | 12,700 | 2,290 | 11,100 | 1,500 |
| RE2.5 | 14,000 | 4,200 | 12,700 | 3,810 | 11,500 | 3,280 | 10,200 | 2,450 | 8,900 | 1,600 |
| RE3 | 11,700 | 4,390 | 10,600 | 3,980 | 9,500 | 3,380 | 8,500 | 2,550 | 7,400 | 1,670 |
| RE4 | 8,800 | 4,620 | 8,000 | 4,200 | 7,200 | 3,590 | 6,400 | 2,690 | 5,600 | 1,760 |
| RE5 | 7,000 | 4,620 | 6,400 | 4,220 | 5,700 | 3,570 | 5,100 | 2,690 | 4,500 | 1,780 |
| RE6 | 5,800 | 4,520 | 5,300 | 4,130 | 4,800 | 3,560 | 4,200 | 2,620 | 3,700 | 1,730 |
| RE8 | 4,400 | 4,220 | 4,000 | 3,840 | 3,600 | 3,280 | 3,200 | 2,460 | 2,800 | 1,610 |
| RE10 | 3,500 | 3,780 | 3,200 | 3,460 | 2,900 | 2,980 | 2,500 | 2,160 | 2,200 | 1,430 |

【注意】①できるだけ高剛性、高精度の機械をご使用ください。
②被削材、加工形状に合わせて、適切なクーラントを使用してください。
③この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。

【Note】① Use a highly rigid and accurate machine as possible.
② Use the appropriate coolant for the work material and machining shape.
③ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.




### 〈仕上げ加工〉 Finishing

| 被削材 Work material | 炭素鋼・合金鋼 Carbon steels, Alloy steels 180～250HB | | 工具鋼 Tool steels 25～35HRC | | プリハードン鋼 Pre-hardened steels 35～45HRC | | 焼入れ鋼 Hardened steels 45～55HRC | | 焼入れ鋼 Hardened steels 55～65HRC | |
|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み(mm) Depth of Cut | ap=0.05～0.1 ae=0.02DC | | ap=0.05～0.1 ae=0.02DC | | ap=0.05～0.1 ae=0.02DC | | ap=0.05～0.1 ae=0.02DC | | ap=0.05～0.1 ae=0.02DC | |
| ボール半径RE Ball radius | 回転数n min-1 | 送り速度vf mm/min | 回転数n min-1 | 送り速度vf mm/min | 回転数n min-1 | 送り速度vf mm/min | 回転数n min-1 | 送り速度vf mm/min | 回転数n min-1 | 送り速度vf mm/min |
| RE1 | 47,700 | 3,580 | 44,600 | 3,350 | 41,400 | 2,950 | 33,400 | 2,000 | 28,600 | 1,290 |
| RE1.5 | 31,800 | 3,820 | 29,700 | 3,560 | 27,600 | 3,150 | 22,300 | 2,140 | 19,100 | 1,380 |
| RE2 | 23,900 | 3,940 | 22,300 | 3,680 | 20,700 | 3,240 | 16,700 | 2,200 | 14,300 | 1,420 |
| RE2.5 | 19,100 | 4,010 | 17,800 | 3,740 | 16,600 | 3,310 | 13,400 | 2,250 | 11,500 | 1,450 |
| RE3 | 15,900 | 4,170 | 14,900 | 3,910 | 13,800 | 3,440 | 11,100 | 2,330 | 9,500 | 1,500 |
| RE4 | 11,900 | 4,280 | 11,100 | 4,000 | 10,300 | 3,520 | 8,400 | 2,420 | 7,200 | 1,560 |
| RE5 | 9,500 | 4,280 | 8,900 | 4,010 | 8,300 | 3,550 | 6,700 | 2,410 | 5,700 | 1,540 |
| RE6 | 8,000 | 4,320 | 7,400 | 4,000 | 6,900 | 3,540 | 5,600 | 2,420 | 4,800 | 1,560 |
| RE8 | 6,000 | 3,960 | 5,600 | 3,700 | 5,200 | 3,260 | 4,200 | 2,220 | 3,600 | 1,430 |
| RE10 | 4,800 | 3,740 | 4,500 | 3,510 | 4,100 | 3,040 | 3,300 | 2,060 | 2,900 | 1,360 |

【注意】①できるだけ高剛性、高精度の機械をご使用ください。
②上表の$a_e$(ピックフィード)は目安です。実際にはA131頁のカスプハイト表を参考に選定してください。
③被削材、加工形状に合わせて、適切なクーラントを使用してください。
④この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
⑤機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。

【Note】① Use a highly rigid and accurate machine as possible.
② The pick feed in the table is a general condition; please select the $a_e$ according to the cusp height requested (page A131).
③ Use the appropriate coolant for the work material and machining shape.
④ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
⑤ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

# Epoch Mega Feed Ball
# エポックメガフィードボール

**ペンシルネックタイプ** Pencil Neck Type

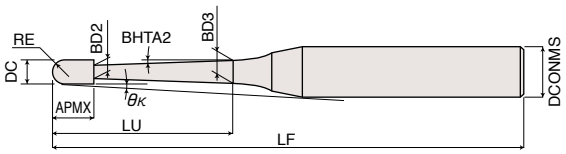
3枚刃ボールエンドミル。不等分割でビビリ振動を抑制。
3-flute ball end mill. Uneven division suppresses chattering.

彫込み Die-sinking / 曲面 Profiling / R Radius / 荒 Roughing / 中仕上 Semi Finishing / 仕上 Finishing

RE公差 RE tolerance ±0.01　h5

(mm)

3枚刃 3Flutes

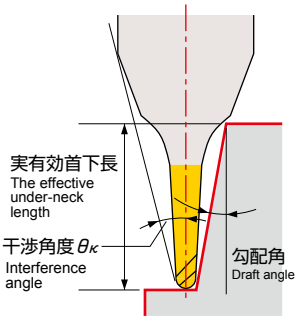



## EMBP3○○○-○○-10-TH

超硬 Carbide　TH　ねじれ40° Helix angle　不等分割 Unequal pitch　切削条件表 A171 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 首部テーパ半角 Neck angle BHTA2 | 首下長 Under Neck length LU | 刃長 Flute length APMX | 首径 Neck dia. BD2 | 首元径 Neck dia. BD3 | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 干渉角度 Interference angle (°) θK | 勾配角に対する実有効首下長 The effective under-neck length for the various draft angles. 1° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EMBP3040-30-10-TH | △ | 2 | 4 | 1 | 30 | 6 | 3.9 | 4.738 | 80 | 6 | 1.85 | 31.41 | 干渉なし | 干渉なし | 18,540 |
| EMBP3040-40-10-TH | △ | | | 1 | 40 | 6 | 3.9 | 5.087 | 90 | 6 | 1.4 | 41.72 | 干渉なし | 干渉なし | 19,180 |
| EMBP3040-50-10-TH | △ | | | 1 | 50 | 6 | 3.9 | 5.436 | 100 | 6 | 1.14 | 51.72 | 干渉なし | 干渉なし | 19,820 |
| EMBP3040-60-10-TH | △ | | | 1 | 60 | 6 | 3.9 | 5.785 | 100 | 6 | 0.97 | 干渉なし | 干渉なし | 干渉なし | 19,820 |
| EMBP3050-40-10-TH | △ | 2.5 | 5 | 1 | 40 | 7.5 | 4.9 | 6.035 | 90 | 8 | 2.04 | 41.5 | 44.46 | 干渉なし | 24,810 |
| EMBP3050-60-10-TH | △ | | | 1 | 60 | 7.5 | 4.9 | 6.733 | 110 | 8 | 1.41 | 61.83 | 干渉なし | 干渉なし | 26,260 |
| EMBP3060-50-10-TH | △ | 3 | 6 | 1 | 50 | 9 | 5.9 | 7.331 | 100 | 8 | 1.17 | 51.58 | 干渉なし | 干渉なし | 27,610 |
| EMBP3060-60-10-TH | △ | | | 1 | 60 | 9 | 5.9 | 7.680 | 110 | 8 | 0.98 | 干渉なし | 干渉なし | 干渉なし | 30,080 |
| EMBP3060-70-10-TH | △ | | | 1 | 70 | 9 | 5.9 | 8.030 | 120 | 10 | 1.6 | 71.93 | 干渉なし | 干渉なし | 36,590 |
| EMBP3060-80-10-TH | △ | | | 1 | 80 | 9 | 5.9 | 8.379 | 130 | 10 | 1.42 | 81.93 | 干渉なし | 干渉なし | 38,040 |
| EMBP3080-60-10-TH | △ | 4 | 8 | 1 | 60 | 12 | 7.9 | 9.576 | 120 | 10 | 1 | 干渉なし | 干渉なし | 干渉なし | 35,800 |
| EMBP3080-70-10-TH | △ | | | 1 | 70 | 12 | 7.9 | 9.925 | 130 | 10 | 0.86 | 干渉なし | 干渉なし | 干渉なし | 37,370 |
| EMBP3080-80-10-TH | △ | | | 1 | 80 | 12 | 7.9 | 10.274 | 140 | 12 | 1.44 | 82.11 | 干渉なし | 干渉なし | 43,320 |
| EMBP3100-60-10-TH | △ | 5 | 10 | 1 | 60 | 15 | 9.9 | 11.471 | 130 | 12 | 1.01 | 61.88 | 干渉なし | 干渉なし | 43,880 |
| EMBP3100-75-10-TH | △ | | | 1 | 75 | 15 | 9.9 | 11.995 | 140 | 12 | 0.82 | 干渉なし | 干渉なし | 干渉なし | 46,130 |

【注意】加工物に勾配がついている場合、干渉領域は、首下長さよりも長くなります。それぞれの勾配角に対する実有効首下長をご参照ください。
【Note】If the workpiece has draft angle, the interference length will be longer than the under-neck length.Please refer to the effective under-neck length for the various draft angles. In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle θK", and should also be referred to.




### 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ |

### 再研磨対応外径範囲 Re-grinding compatibility range

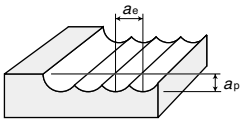
| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EMBP-TH | × (N/A) | 4～10 |

【注意】首下長／外径が10DCを超える工具の再研磨可否については、弊社営業にお問い合わせください。
【Note】Contact our sales office regarding whether or not regrinding is possible for tools where under neck length/tool diameter more than 10DC

△印：在庫が無くなり次第受注生産品となるものです。 △：When the Stock is out, will become to produce on request. 干渉なし：No interference

# 標準切削条件表 Recommended cutting conditions

## EMBP-TH
ペンシルネックタイプ
Pencil Neck

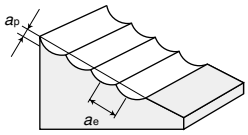



### 〈荒加工〉 Roughing

| 被削材 Work material | | 炭素鋼・合金鋼 Carbon steels, Alloy steels 180～250HB | | 工具鋼 Tool steels 25～35HRC | | プリハードン鋼 Pre-hardened steels 35～45HRC | | 焼入れ鋼 Hardened steels 45～55HRC | | 焼入れ鋼 Hardened steels 55～65HRC | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み (mm) Depth of Cut | | $a_p$=0.08DC $a_e$=0.24DC | | $a_p$=0.07DC $a_e$=0.21DC | | $a_p$=0.06DC $a_e$=0.18DC | | $a_p$=0.04DC $a_e$=0.12DC | | $a_p$=0.03DC $a_e$=0.09DC | |
| ボール半径RE Ball radius | 首下長 Under neck length (mm) | 回転数$n$ min$^{-1}$ | 送り速度$v_f$ mm/min | 回転数$n$ min$^{-1}$ | 送り速度$v_f$ mm/min | 回転数$n$ min$^{-1}$ | 送り速度$v_f$ mm/min | 回転数$n$ min$^{-1}$ | 送り速度$v_f$ mm/min | 回転数$n$ min$^{-1}$ | 送り速度$v_f$ mm/min |
| RE2 | 30 | 14,300 | 3,000 | 12,700 | 2,670 | 11,100 | 2,210 | 9,500 | 1,600 | 8,000 | 1,010 |
| | 40 | 12,900 | 2,710 | 11,500 | 2,420 | 10,000 | 2,000 | 8,600 | 1,440 | 7,200 | 910 |
| | 50 | 10,000 | 1,800 | 8,900 | 1,600 | 7,800 | 1,330 | 6,700 | 960 | 5,600 | 600 |
| | 60 | 7,200 | 1,080 | 6,400 | 960 | 5,600 | 800 | 4,800 | 580 | 4,000 | 360 |
| RE2.5 | 40 | 11,500 | 3,110 | 10,200 | 2,750 | 8,900 | 2,280 | 7,600 | 1,640 | 6,400 | 1,040 |
| | 60 | 9,200 | 2,210 | 8,100 | 1,940 | 7,100 | 1,620 | 6,100 | 1,170 | 5,100 | 730 |
| RE3 | 50 | 9,500 | 3,420 | 8,500 | 3,060 | 7,400 | 2,530 | 6,400 | 1,840 | 5,300 | 1,140 |
| | 60 | 8,600 | 3,100 | 7,600 | 2,740 | 6,700 | 2,290 | 5,700 | 1,640 | 4,800 | 1,040 |
| | 70 | 7,600 | 2,510 | 6,800 | 2,240 | 5,900 | 1,850 | 5,100 | 1,350 | 4,200 | 830 |
| | 80 | 6,700 | 2,010 | 5,900 | 1,770 | 5,200 | 1,480 | 4,500 | 1,150 | 3,700 | 670 |
| RE4 | 60 | 7,200 | 3,460 | 6,400 | 3,070 | 5,600 | 2,550 | 4,800 | 1,840 | 4,000 | 1,150 |
| | 70 | 6,800 | 3,260 | 6,000 | 2,880 | 5,300 | 2,420 | 4,500 | 1,730 | 3,800 | 1,090 |
| | 80 | 6,400 | 2,690 | 5,700 | 2,390 | 5,000 | 2,000 | 4,300 | 1,440 | 3,600 | 910 |
| RE5 | 60 | 6,300 | 3,780 | 5,600 | 3,360 | 4,900 | 2,790 | 4,200 | 2,020 | 3,500 | 1,260 |
| | 75 | 5,700 | 3,420 | 5,100 | 3,060 | 4,500 | 2,570 | 3,800 | 1,820 | 3,200 | 1,150 |

【注意】①できるだけ高剛性、高精度の機械をご使用ください。
②被削材、加工形状に合わせて、適切なクーラントを使用してください。
③この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。

【Note】① Use a highly rigid and accurate machine as possible.
② Use the appropriate coolant for the work material and machining shape.
③ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.




### 〈仕上げ加工〉 Finishing

| 被削材 Work material | | 炭素鋼・合金鋼 Carbon steels, Alloy steels 180～250HB | | 工具鋼 Tool steels 25～35HRC | | プリハードン鋼 Pre-hardened steels 35～45HRC | | 焼入れ鋼 Hardened steels 45～55HRC | | 焼入れ鋼 Hardened steels 55～65HRC | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み (mm) Depth of Cut | | $a_p$=0.05～0.1 $a_e$=0.02DC | | $a_p$=0.05～0.1 $a_e$=0.02DC | | $a_p$=0.05～0.1 $a_e$=0.02DC | | $a_p$=0.05～0.1 $a_e$=0.02DC | | $a_p$=0.05～0.1 $a_e$=0.02DC | |
| ボール半径RE Ball radius | 首下長 Under neck length (mm) | 回転数$n$ min$^{-1}$ | 送り速度$v_f$ mm/min | 回転数$n$ min$^{-1}$ | 送り速度$v_f$ mm/min | 回転数$n$ min$^{-1}$ | 送り速度$v_f$ mm/min | 回転数$n$ min$^{-1}$ | 送り速度$v_f$ mm/min | 回転数$n$ min$^{-1}$ | 送り速度$v_f$ mm/min |
| RE2 | 30 | 17,500 | 2,630 | 15,900 | 2,390 | 14,300 | 2,040 | 12,700 | 1,520 | 11,100 | 1,000 |
| | 40 | 15,800 | 2,370 | 14,300 | 2,150 | 12,900 | 1,840 | 11,500 | 1,380 | 10,000 | 900 |
| | 50 | 12,300 | 1,850 | 11,100 | 1,670 | 10,000 | 1,430 | 8,900 | 1,070 | 7,800 | 700 |
| | 60 | 8,800 | 1,060 | 8,000 | 960 | 7,200 | 820 | 6,400 | 610 | 5,600 | 400 |
| RE2.5 | 40 | 14,000 | 2,520 | 12,700 | 2,290 | 11,500 | 1,970 | 10,200 | 1,470 | 8,900 | 960 |
| | 60 | 11,200 | 1,680 | 10,200 | 1,530 | 9,200 | 1,310 | 8,100 | 970 | 7,100 | 640 |
| RE3 | 50 | 11,700 | 2,460 | 10,600 | 2,230 | 9,500 | 1,900 | 8,500 | 1,430 | 7,400 | 930 |
| | 60 | 10,500 | 2,210 | 9,500 | 2,000 | 8,600 | 1,720 | 7,600 | 1,280 | 6,700 | 840 |
| | 70 | 9,300 | 1,670 | 8,500 | 1,530 | 7,600 | 1,300 | 6,800 | 980 | 5,900 | 640 |
| | 80 | 8,200 | 1,230 | 7,400 | 1,110 | 6,700 | 950 | 5,900 | 750 | 5,200 | 470 |
| RE4 | 60 | 8,800 | 2,640 | 8,000 | 2,400 | 7,200 | 2,050 | 6,400 | 1,540 | 5,600 | 1,010 |
| | 70 | 8,300 | 2,490 | 7,600 | 2,280 | 6,800 | 1,940 | 6,000 | 1,440 | 5,300 | 950 |
| | 80 | 7,900 | 2,130 | 7,200 | 1,940 | 6,400 | 1,640 | 5,700 | 1,230 | 5,000 | 810 |
| RE5 | 60 | 7,700 | 2,770 | 7,000 | 2,520 | 6,300 | 2,150 | 5,600 | 1,610 | 4,900 | 1,060 |
| | 75 | 7,000 | 2,520 | 6,400 | 2,300 | 5,700 | 1,950 | 5,100 | 1,470 | 4,500 | 970 |

【注意】①できるだけ高剛性、高精度の機械をご使用ください。
②上表の$a_e$(ピックフィード)は目安です。実際にはA131頁のカスプハイト表を参考に選定してください。
③被削材、加工形状に合わせて、適切なクーラントを使用してください。
④この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
⑤機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。

【Note】① Use a highly rigid and accurate machine as possible.
② The pick feed in the table is a general condition; please select the $a_e$ according to the cusp height requested (page A131).
③ Use the appropriate coolant for the work material and machining shape.
④ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
⑤ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

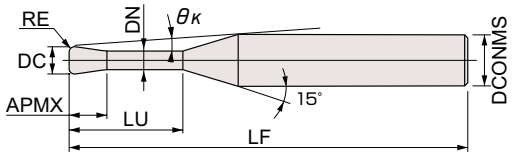
# Epoch Deep Radius Evolution Hard-TH3
# エポックディープラジアスエボリューションハード-TH3

**2枚刃** | 2 Flutes

溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / 細部 Miniature / 取りのこし Rest Material Machining / 中仕上 Semi Finishing / 仕上 Finishing / リブ・細部 Rib Miniature

RE公差 RE tolerance ±0.005 (中心基準 central axis) h4 (mm)

高硬度鋼の加工において優れた耐摩耗性を発揮。
金型の加工で優れた加工精度を実現。
Performs excellent wear resistance when cutting hardened steel and contributes to high precision machining of molds & dies.




※2枚刃はバックドラフト形状（強バックテーパ）を採用しています。
The 2-flute tool uses a backdraft profile (with strong back taper).

## EPDREH2○○○-○.○-○○○-TH3

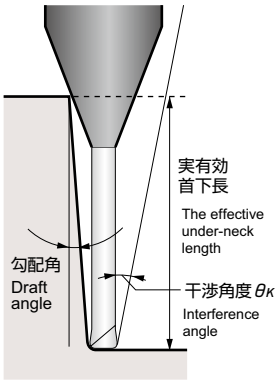
超硬 Carbide / TH3 / ねじれ30° Helix angle / 切削条件表 A180 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 干渉角度 Interference angle (°) θK | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格（円） Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDREH2002-0.5-002-TH3 | ● | 0.2 | 0.02 | 0.5 | 0.15 | 0.17 | 50 | 4 | 13.99 | 0.57 | 0.59 | 0.61 | 0.63 | 0.68 | 10,610 |
| EPDREH2002-1-002-TH3 | ● | | | 1 | 0.15 | 0.17 | 50 | 4 | 13.16 | 1.09 | 1.12 | 1.16 | 1.21 | 1.3 | 10,610 |
| EPDREH2002-0.5-005-TH3 | ● | | 0.05 | 0.5 | 0.15 | 0.17 | 50 | 4 | 14.05 | 0.57 | 0.59 | 0.61 | 0.63 | 0.67 | 10,610 |
| EPDREH2002-1-005-TH3 | ● | | | 1 | 0.15 | 0.17 | 50 | 4 | 13.21 | 1.08 | 1.12 | 1.16 | 1.2 | 1.3 | 10,610 |
| EPDREH2003-1-002-TH3 | ● | 0.3 | 0.02 | 1 | 0.25 | 0.27 | 50 | 4 | 13.12 | 1.09 | 1.12 | 1.16 | 1.21 | 1.3 | 10,260 |
| EPDREH2003-2-002-TH3 | ● | | | 2 | 0.25 | 0.27 | 50 | 4 | 11.7 | 2.12 | 2.19 | 2.27 | 2.36 | 2.55 | 10,260 |
| EPDREH2003-1-005-TH3 | ● | | 0.05 | 1 | 0.25 | 0.27 | 50 | 4 | 13.17 | 1.08 | 1,12 | 1.16 | 1.2 | 1.3 | 10,260 |
| EPDREH2003-2-005-TH3 | ● | | | 2 | 0.25 | 0.27 | 50 | 4 | 11.73 | 2.12 | 2.19 | 2.27 | 2.35 | 2.54 | 10,260 |
| EPDREH2004-1-002-TH3 | ● | 0.4 | 0.02 | 1 | 0.3 | 0.37 | 50 | 4 | 13.07 | 1.09 | 1.12 | 1.16 | 1.21 | 1.3 | 6,840 |
| EPDREH2004-2-002-TH3 | ● | | | 2 | 0.3 | 0.37 | 50 | 4 | 11.62 | 2.12 | 2.19 | 2.27 | 2.36 | 2.55 | 6,840 |
| EPDREH2004-1-005-TH3 | ● | | 0.05 | 1 | 0.3 | 0.37 | 50 | 4 | 13.12 | 1.08 | 1.12 | 1.16 | 1.2 | 1.3 | 6,840 |
| EPDREH2004-2-005-TH3 | ● | | | 2 | 0.3 | 0.37 | 50 | 4 | 11.66 | 2.12 | 2.19 | 2.27 | 2.35 | 2.54 | 6,840 |
| EPDREH2004-1-01-TH3 | ● | | 0.1 | 1 | 0.3 | 0.37 | 50 | 4 | 13.21 | 1.08 | 1.12 | 1.15 | 1.19 | 1.28 | 6,840 |
| EPDREH2004-2-01-TH3 | ● | | | 2 | 0.3 | 0.37 | 50 | 4 | 11.73 | 2.12 | 2.19 | 2.26 | 2.34 | 2.53 | 6,840 |
| EPDREH2005-1-002-TH3 | ● | 0.5 | 0.02 | 1 | 0.35 | 0.47 | 50 | 4 | 13.03 | 1.09 | 1.12 | 1.16 | 1.21 | 1.3 | 5,550 |
| EPDREH2005-2-002-TH3 | ● | | | 2 | 0.35 | 0.47 | 50 | 4 | 11.55 | 2.12 | 2.19 | 2.27 | 2.36 | 2.55 | 5,550 |
| EPDREH2005-3-002-TH3 | ● | | | 3 | 0.35 | 0.47 | 50 | 4 | 10.37 | 3.15 | 3.26 | 3.38 | 3.51 | 3.79 | 5,550 |
| EPDREH2005-1-005-TH3 | ● | | 0.05 | 1 | 0.35 | 0.47 | 50 | 4 | 13.08 | 1.08 | 1.12 | 1.16 | 1.2 | 1.3 | 5,550 |
| EPDREH2005-2-005-TH3 | ● | | | 2 | 0.35 | 0.47 | 50 | 4 | 11.59 | 2.12 | 2.19 | 2.27 | 2.35 | 2.54 | 5,550 |
| EPDREH2005-3-005-TH3 | ● | | | 3 | 0.35 | 0.47 | 50 | 4 | 10.4 | 3.15 | 3.26 | 3.38 | 3.5 | 3.78 | 5,550 |
| EPDREH2005-1-01-TH3 | ● | | 0.1 | 1 | 0.35 | 0.47 | 50 | 4 | 13.16 | 1.08 | 1.12 | 1.15 | 1.19 | 1.28 | 5,550 |
| EPDREH2005-2-01-TH3 | ● | | | 2 | 0.35 | 0.47 | 50 | 4 | 11.66 | 2.12 | 2.19 | 2.26 | 2.34 | 2.53 | 5,550 |
| EPDREH2005-3-01-TH3 | ● | | | 3 | 0.35 | 0.47 | 50 | 4 | 10.46 | 3.15 | 3.26 | 3.37 | 3.49 | 3.77 | 5,550 |
| EPDREH2006-2-002-TH3 | ● | 0.6 | 0.02 | 2 | 0.4 | 0.57 | 50 | 4 | 11.47 | 2.12 | 2.19 | 2.27 | 2.36 | 2.55 | 5,550 |
| EPDREH2006-4-002-TH3 | ● | | | 4 | 0.4 | 0.57 | 50 | 4 | 9.31 | 4.19 | 4.33 | 4.49 | 4.66 | 5.03 | 5,550 |
| EPDREH2006-2-005-TH3 | ● | | 0.05 | 2 | 0.4 | 0.57 | 50 | 4 | 11.51 | 2.12 | 2.19 | 2.27 | 2.35 | 2.54 | 5,550 |
| EPDREH2006-4-005-TH3 | ● | | | 4 | 0.4 | 0.57 | 50 | 4 | 9.33 | 4.19 | 4.33 | 4.48 | 4.65 | 5.03 | 5,550 |
| EPDREH2006-2-01-TH3 | ● | | 0.1 | 2 | 0.4 | 0.57 | 50 | 4 | 11.58 | 2.12 | 2.19 | 2.26 | 2.34 | 2.53 | 5,550 |
| EPDREH2006-4-01-TH3 | ● | | | 4 | 0.4 | 0.57 | 50 | 4 | 9.38 | 4.18 | 4.33 | 4.48 | 4.64 | 5.01 | 5,550 |
| EPDREH2008-2-002-TH3 | ● | 0.8 | 0.02 | 2 | 0.5 | 0.77 | 50 | 4 | 11.3 | 2.12 | 2.19 | 2.27 | 2.36 | 2.55 | 6,370 |
| EPDREH2008-4-002-TH3 | ● | | | 4 | 0.5 | 0.77 | 50 | 4 | 9.09 | 4.19 | 4.33 | 4.49 | 4.66 | 5.03 | 6,370 |
| EPDREH2008-2-005-TH3 | ● | | 0.05 | 2 | 0.5 | 0.77 | 50 | 4 | 11.35 | 2.12 | 2.19 | 2.27 | 2.35 | 2.54 | 6,370 |
| EPDREH2008-4-005-TH3 | ● | | | 4 | 0.5 | 0.77 | 50 | 4 | 9.12 | 4.19 | 4.33 | 4.48 | 4.65 | 5.03 | 6,370 |
| EPDREH2008-2-01-TH3 | ● | | 0.1 | 2 | 0.5 | 0.77 | 50 | 4 | 11.42 | 2.12 | 2.19 | 2.26 | 2.34 | 2.53 | 6,370 |
| EPDREH2008-4-01-TH3 | ● | | | 4 | 0.5 | 0.77 | 50 | 4 | 9.16 | 4.18 | 4.33 | 4.48 | 4.64 | 5.01 | 6,370 |
| EPDREH2008-2-02-TH3 | ● | | 0.2 | 2 | 0.5 | 0.77 | 50 | 4 | 11.56 | 2.11 | 2.18 | 2.25 | 2.33 | 2.5 | 6,370 |
| EPDREH2008-4-02-TH3 | ● | | | 4 | 0.5 | 0.77 | 50 | 4 | 9.25 | 4.18 | 4.32 | 4.47 | 4.63 | 4.99 | 6,370 |

●：標準在庫品です。●：Stocked items.　干渉なし：No interference

【注意】
エポックディープラジアスエボリューション EPDRE-ATHとは勾配角に対する実有効首下長が異なります。
再度ご確認お願いいたします。

【Note】
The actual effective length in incline angles is different from Epoch Deep Radius Evolution EPDRE-ATH.
Please recheck the interference area.




# EPDREH2○○○-○.○-○○○-TH3

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 干渉角度 Interference angle (°) θK | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格 (円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDREH2010-2-002-TH3 | ● | 1 | 0.02 | 2 | 0.8 | 0.94 | 50 | 4 | 11.04 | 2.18 | 2.25 | 2.33 | 2.42 | 2.62 | 5,430 |
| EPDREH2010-4-002-TH3 | ● | | | 4 | 0.8 | 0.94 | 50 | 4 | 8.8 | 4.24 | 4.39 | 4.55 | 4.72 | 5.1 | 5,430 |
| EPDREH2010-6-002-TH3 | ● | | | 6 | 0.8 | 0.94 | 50 | 4 | 7.32 | 6.31 | 6.53 | 6.77 | 7.02 | 7.59 | 5,900 |
| EPDREH2010-8-002-TH3 | ● | | | 8 | 0.8 | 0.94 | 50 | 4 | 6.26 | 8.38 | 8.67 | 8.98 | 9.32 | 10.07 | 5,900 |
| EPDREH2010-2-005-TH3 | ● | | 0.05 | 2 | 0.8 | 0.94 | 50 | 4 | 11.08 | 2.18 | 2.25 | 2.33 | 2.42 | 2.61 | 5,430 |
| EPDREH2010-4-005-TH3 | ● | | | 4 | 0.8 | 0.94 | 50 | 4 | 8.83 | 4.24 | 4.39 | 4.55 | 4.72 | 5.09 | 5,430 |
| EPDREH2010-6-005-TH3 | ● | | | 6 | 0.8 | 0.94 | 50 | 4 | 7.34 | 6.31 | 6.53 | 6.76 | 7.02 | 7.58 | 5,900 |
| EPDREH2010-8-005-TH3 | ● | | | 8 | 0.8 | 0.94 | 50 | 4 | 6.27 | 8.38 | 8.67 | 8.98 | 9.32 | 10.07 | 5,900 |
| EPDREH2010-2-01-TH3 | ● | | 0.1 | 2 | 0.8 | 0.94 | 50 | 4 | 11.16 | 2.17 | 2.25 | 2.33 | 2.41 | 2.6 | 5,430 |
| EPDREH2010-4-01-TH3 | ● | | | 4 | 0.8 | 0.94 | 50 | 4 | 8.88 | 4.24 | 4.39 | 4.54 | 4.71 | 5.08 | 5,430 |
| EPDREH2010-6-01-TH3 | ● | | | 6 | 0.8 | 0.94 | 50 | 4 | 7.37 | 6.31 | 6.53 | 6.76 | 7.01 | 7.57 | 5,900 |
| EPDREH2010-8-01-TH3 | ● | | | 8 | 0.8 | 0.94 | 50 | 4 | 6.29 | 8.38 | 8.67 | 8.97 | 9.31 | 10.06 | 5,900 |
| EPDREH2010-2-02-TH3 | ● | | 0.2 | 2 | 0.8 | 0.94 | 50 | 4 | 11.3 | 2.17 | 2.24 | 2.31 | 2.39 | 2.57 | 5,430 |
| EPDREH2010-4-02-TH3 | ● | | | 4 | 0.8 | 0.94 | 50 | 4 | 8.97 | 4.24 | 4.38 | 4.53 | 4.69 | 5.06 | 5,430 |
| EPDREH2010-6-02-TH3 | ● | | | 6 | 0.8 | 0.94 | 50 | 4 | 7.43 | 6.31 | 6.52 | 6.75 | 6.99 | 7.55 | 5,900 |
| EPDREH2010-8-02-TH3 | ● | | | 8 | 0.8 | 0.94 | 50 | 4 | 6.34 | 8.37 | 8.66 | 8.96 | 9.29 | 10.03 | 5,900 |

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ○ | ○ | ◎ | ◎ | ◎ | ○ | ◎ | ○ | ○ |

## 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPDREH2-TH3 | × (N/A) | × (N/A) |

# Epoch Deep Radius Evolution Hard-TH3
# エポックディープラジアスエボリューションハード-TH3

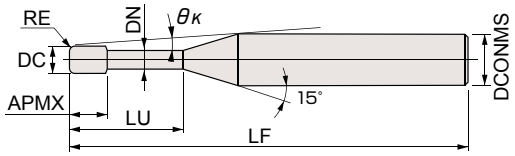
YouTube 動画公開中

4枚刃 | 4 Flutes

溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / 細部 Miniature / 取りのこし Rest Material Machining / 中仕上 Semi Finishing / 仕上 Finishing / リブ・細部 Rib Miniature

RE公差 RE tolerance ±0.005 (中心基準 central axis)　h4 DCONMS=4　h5 DCONMS=6　(mm)

高硬度鋼の加工において優れた耐摩耗性を発揮。
金型の加工で優れた加工精度を実現。
Performs excellent wear resistance when cutting hardened steel and contributes to high precision machining of molds & dies.




## EPDREH4○○○-○.○-○○○-TH3

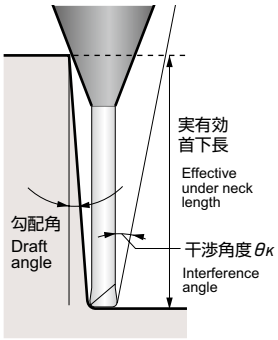
超硬 Carbide　TH3　ねじれ30° Helix angle　切削条件表 A184 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 干渉角度 Interference angle (°) θK | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDREH4010-1.5-002-TH3 | ● | 1 | 0.02 | 1.5 | 0.6 | 0.96 | 50 | 4 | 11.85 | 1.62 | 1.68 | 1.74 | 1.80 | 1.95 | 7,820 |
| EPDREH4010-2-002-TH3 | ● | | | 2 | 0.6 | 0.96 | 50 | 4 | 11.09 | 2.14 | 2.21 | 2.29 | 2.38 | 2.57 | 7,820 |
| EPDREH4010-2.5-002-TH3 | ● | | | 2.5 | 0.6 | 0.96 | 50 | 4 | 10.43 | 2.66 | 2.75 | 2.85 | 2.95 | 3.19 | 7,820 |
| EPDREH4010-3-002-TH3 | ● | | | 3 | 0.6 | 0.96 | 50 | 4 | 9.84 | 3.17 | 3.28 | 3.40 | 3.53 | 3.81 | 7,820 |
| EPDREH4010-4-002-TH3 | ● | | | 4 | 0.6 | 0.96 | 50 | 4 | 8.84 | 4.21 | 4.35 | 4.51 | 4.68 | 5.06 | 7,820 |
| EPDREH4010-5-002-TH3 | ● | | | 5 | 0.6 | 0.96 | 50 | 4 | 8.02 | 5.24 | 5.42 | 5.62 | 5.83 | 6.30 | 8,570 |
| EPDREH4010-6-002-TH3 | ● | | | 6 | 0.6 | 0.96 | 50 | 4 | 7.34 | 6.27 | 6.49 | 6.73 | 6.98 | 7.54 | 8,570 |
| EPDREH4010-8-002-TH3 | ● | | | 8 | 0.6 | 0.96 | 50 | 4 | 6.27 | 8.34 | 8.63 | 8.94 | 9.28 | 10.03 | 8,570 |
| EPDREH4010-1.5-005-TH3 | ● | | 0.05 | 1.5 | 0.6 | 0.96 | 50 | 4 | 11.90 | 1.62 | 1.68 | 1.73 | 1.80 | 1.94 | 7,820 |
| EPDREH4010-2-005-TH3 | ● | | | 2 | 0.6 | 0.96 | 50 | 4 | 11.14 | 2.14 | 2.21 | 2.29 | 2.37 | 2.56 | 7,820 |
| EPDREH4010-2.5-005-TH3 | ● | | | 2.5 | 0.6 | 0.96 | 50 | 4 | 10.47 | 2.65 | 2.75 | 2.84 | 2.95 | 3.18 | 7,820 |
| EPDREH4010-3-005-TH3 | ● | | | 3 | 0.6 | 0.96 | 50 | 4 | 9.87 | 3.17 | 3.28 | 3.40 | 3.52 | 3.81 | 7,820 |
| EPDREH4010-4-005-TH3 | ● | | | 4 | 0.6 | 0.96 | 50 | 4 | 8.87 | 4.21 | 4.35 | 4.51 | 4.67 | 5.05 | 7,820 |
| EPDREH4010-5-005-TH3 | ● | | | 5 | 0.6 | 0.96 | 50 | 4 | 8.04 | 5.24 | 5.42 | 5.61 | 5.82 | 6.29 | 8,570 |
| EPDREH4010-6-005-TH3 | ● | | | 6 | 0.6 | 0.96 | 50 | 4 | 7.36 | 6.27 | 6.49 | 6.72 | 6.97 | 7.53 | 8,570 |
| EPDREH4010-8-005-TH3 | ● | | | 8 | 0.6 | 0.96 | 50 | 4 | 6.29 | 8.34 | 8.63 | 8.94 | 9.27 | 10.02 | 8,570 |
| EPDREH4010-1.5-01-TH3 | ● | | 0.1 | 1.5 | 0.6 | 0.96 | 50 | 4 | 11.98 | 1.62 | 1.67 | 1.73 | 1.79 | 1.93 | 7,820 |
| EPDREH4010-2-01-TH3 | ● | | | 2 | 0.6 | 0.96 | 50 | 4 | 11.21 | 2.14 | 2.21 | 2.28 | 2.37 | 2.55 | 7,820 |
| EPDREH4010-2.5-01-TH3 | ● | | | 2.5 | 0.6 | 0.96 | 50 | 4 | 10.53 | 2.65 | 2.74 | 2.84 | 2.94 | 3.17 | 7,820 |
| EPDREH4010-3-01-TH3 | ● | | | 3 | 0.6 | 0.96 | 50 | 4 | 9.93 | 3.17 | 3.28 | 3.39 | 3.52 | 3.79 | 7,820 |
| EPDREH4010-4-01-TH3 | ● | | | 4 | 0.6 | 0.96 | 50 | 4 | 8.91 | 4.20 | 4.35 | 4.50 | 4.67 | 5.04 | 7,820 |
| EPDREH4010-5-01-TH3 | ● | | | 5 | 0.6 | 0.96 | 50 | 4 | 8.08 | 5.24 | 5.42 | 5.61 | 5.82 | 6.28 | 8,570 |
| EPDREH4010-6-01-TH3 | ● | | | 6 | 0.6 | 0.96 | 50 | 4 | 7.39 | 6.27 | 6.49 | 6.72 | 6.97 | 7.52 | 8,570 |
| EPDREH4010-8-01-TH3 | ● | | | 8 | 0.6 | 0.96 | 50 | 4 | 6.31 | 8.34 | 8.63 | 8.93 | 9.26 | 10.01 | 8,570 |
| EPDREH4010-1.5-02-TH3 | ● | | 0.2 | 1.5 | 0.6 | 0.96 | 50 | 4 | 12.15 | 1.62 | 1.67 | 1.72 | 1.78 | 1.91 | 7,820 |
| EPDREH4010-2-02-TH3 | ● | | | 2 | 0.6 | 0.96 | 50 | 4 | 11.36 | 2.13 | 2.20 | 2.27 | 2.35 | 2.53 | 7,820 |
| EPDREH4010-2.5-02-TH3 | ● | | | 2.5 | 0.6 | 0.96 | 50 | 4 | 10.66 | 2.65 | 2.74 | 2.83 | 2.93 | 3.15 | 7,820 |
| EPDREH4010-3-02-TH3 | ● | | | 3 | 0.6 | 0.96 | 50 | 4 | 10.04 | 3.17 | 3.27 | 3.38 | 3.50 | 3.77 | 7,820 |
| EPDREH4010-4-02-TH3 | ● | | | 4 | 0.6 | 0.96 | 50 | 4 | 9.00 | 4.20 | 4.34 | 4.49 | 4.65 | 5.01 | 7,820 |
| EPDREH4010-5-02-TH3 | ● | | | 5 | 0.6 | 0.96 | 50 | 4 | 8.16 | 5.23 | 5.41 | 5.60 | 5.80 | 6.26 | 8,570 |
| EPDREH4010-6-02-TH3 | ● | | | 6 | 0.6 | 0.96 | 50 | 4 | 7.45 | 6.27 | 6.48 | 6.71 | 6.95 | 7.50 | 8,570 |
| EPDREH4010-8-02-TH3 | ● | | | 8 | 0.6 | 0.96 | 50 | 4 | 6.36 | 8.33 | 8.62 | 8.92 | 9.25 | 9.99 | 8,570 |
| EPDREH4010-1.5-03-TH3 | ● | | 0.3 | 1.5 | 0.6 | 0.96 | 50 | 4 | 12.32 | 1.61 | 1.66 | 1.71 | 1.76 | 1.88 | 7,820 |
| EPDREH4010-2-03-TH3 | ● | | | 2 | 0.6 | 0.96 | 50 | 4 | 11.51 | 2.13 | 2.19 | 2.26 | 2.34 | 2.50 | 7,820 |
| EPDREH4010-2.5-03-TH3 | ● | | | 2.5 | 0.6 | 0.96 | 50 | 4 | 10.79 | 2.65 | 2.73 | 2.82 | 2.91 | 3.12 | 7,820 |
| EPDREH4010-3-03-TH3 | ● | | | 3 | 0.6 | 0.96 | 50 | 4 | 10.16 | 3.16 | 3.26 | 3.37 | 3.49 | 3.75 | 7,820 |
| EPDREH4010-4-03-TH3 | ● | | | 4 | 0.6 | 0.96 | 50 | 4 | 9.10 | 4.20 | 4.33 | 4.48 | 4.64 | 4.99 | 7,820 |
| EPDREH4010-5-03-TH3 | ● | | | 5 | 0.6 | 0.96 | 50 | 4 | 8.23 | 5.23 | 5.40 | 5.59 | 5.79 | 6.23 | 8,570 |
| EPDREH4010-6-03-TH3 | ● | | | 6 | 0.6 | 0.96 | 50 | 4 | 7.52 | 6.26 | 6.47 | 6.70 | 6.94 | 7.48 | 8,570 |
| EPDREH4010-8-03-TH3 | ● | | | 8 | 0.6 | 0.96 | 50 | 4 | 6.41 | 8.33 | 8.61 | 8.91 | 9.24 | 9.96 | 8,570 |

●印：標準在庫品です。　●：Stocked items.

【注意】
エポックディープラジアスエボリューション
EPDRE-ATHとは勾配角に対する実有効首下長が異なります。
再度ご確認お願いいたします。

【Note】
The actual effective under neck length with respect to the draft angle differs from the Epoch Deep Radius Evolution EPDRE-ATH. Please be sure to check this.




# EPDREH4○○○-○.○-○○○-TH3

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 干渉角度 Interference angle (°) θκ | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格（円） Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDREH4015-2-002-TH3 | ● | 1.5 | 0.02 | 2 | 0.9 | 1.44 | 50 | 4 | 10.49 | 2.18 | 2.25 | 2.33 | 2.42 | 2.62 | 8,320 |
| EPDREH4015-3-002-TH3 | ● | | | 3 | 0.9 | 1.44 | 50 | 4 | 9.16 | 3.21 | 3.32 | 3.44 | 3.57 | 3.86 | 8,320 |
| EPDREH4015-4-002-TH3 | ● | | | 4 | 0.9 | 1.44 | 50 | 4 | 8.13 | 4.24 | 4.39 | 4.55 | 4.72 | 5.10 | 8,320 |
| EPDREH4015-5-002-TH3 | ● | | | 5 | 0.9 | 1.44 | 50 | 4 | 7.31 | 5.28 | 5.46 | 5.66 | 5.87 | 6.35 | 8,320 |
| EPDREH4015-6-002-TH3 | ● | | | 6 | 0.9 | 1.44 | 50 | 4 | 6.63 | 6.31 | 6.53 | 6.77 | 7.02 | 7.59 | 8,320 |
| EPDREH4015-8-002-TH3 | ● | | | 8 | 0.9 | 1.44 | 50 | 4 | 5.60 | 8.38 | 8.67 | 8.98 | 9.32 | 10.07 | 8,820 |
| EPDREH4015-10-002-TH3 | ● | | | 10 | 0.9 | 1.44 | 50 | 4 | 4.85 | 10.45 | 10.81 | 11.20 | 11.62 | 12.56 | 8,820 |
| EPDREH4015-12-002-TH3 | ● | | | 12 | 0.9 | 1.44 | 50 | 4 | 4.27 | 12.51 | 12.95 | 13.42 | 13.92 | 15.05 | 8,820 |
| EPDREH4015-2-005-TH3 | ● | | 0.05 | 2 | 0.9 | 1.44 | 50 | 4 | 10.53 | 2.18 | 2.25 | 2.33 | 2.42 | 2.61 | 8,320 |
| EPDREH4015-3-005-TH3 | ● | | | 3 | 0.9 | 1.44 | 50 | 4 | 9.19 | 3.21 | 3.32 | 3.44 | 3.57 | 3.85 | 8,320 |
| EPDREH4015-4-005-TH3 | ● | | | 4 | 0.9 | 1.44 | 50 | 4 | 8.16 | 4.24 | 4.39 | 4.55 | 4.72 | 5.09 | 8,320 |
| EPDREH4015-5-005-TH3 | ● | | | 5 | 0.9 | 1.44 | 50 | 4 | 7.33 | 5.28 | 5.46 | 5.66 | 5.87 | 6.34 | 8,320 |
| EPDREH4015-6-005-TH3 | ● | | | 6 | 0.9 | 1.44 | 50 | 4 | 6.65 | 6.31 | 6.53 | 6.76 | 7.02 | 7.58 | 8,320 |
| EPDREH4015-8-005-TH3 | ● | | | 8 | 0.9 | 1.44 | 50 | 4 | 5.61 | 8.38 | 8.67 | 8.98 | 9.32 | 10.07 | 8,820 |
| EPDREH4015-10-005-TH3 | ● | | | 10 | 0.9 | 1.44 | 50 | 4 | 4.86 | 10.45 | 10.81 | 11.20 | 11.61 | 12.55 | 8,820 |
| EPDREH4015-12-005-TH3 | ● | | | 12 | 0.9 | 1.44 | 50 | 4 | 4.28 | 12.51 | 12.95 | 13.41 | 13.91 | 15.04 | 8,820 |
| EPDREH4015-2-01-TH3 | ● | | 0.1 | 2 | 0.9 | 1.44 | 50 | 4 | 10.61 | 2.17 | 2.25 | 2.33 | 2.41 | 2.60 | 8,320 |
| EPDREH4015-3-01-TH3 | ● | | | 3 | 0.9 | 1.44 | 50 | 4 | 9.25 | 3.21 | 3.32 | 3.43 | 3.56 | 3.84 | 8,320 |
| EPDREH4015-4-01-TH3 | ● | | | 4 | 0.9 | 1.44 | 50 | 4 | 8.20 | 4.24 | 4.39 | 4.54 | 4.71 | 5.08 | 8,320 |
| EPDREH4015-5-01-TH3 | ● | | | 5 | 0.9 | 1.44 | 50 | 4 | 7.37 | 5.28 | 5.46 | 5.65 | 5.86 | 6.33 | 8,320 |
| EPDREH4015-6-01-TH3 | ● | | | 6 | 0.9 | 1.44 | 50 | 4 | 6.68 | 6.31 | 6.53 | 6.76 | 7.01 | 7.57 | 8,320 |
| EPDREH4015-8-01-TH3 | ● | | | 8 | 0.9 | 1.44 | 50 | 4 | 5.64 | 8.38 | 8.67 | 8.97 | 9.31 | 10.06 | 8,820 |
| EPDREH4015-10-01-TH3 | ● | | | 10 | 0.9 | 1.44 | 50 | 4 | 4.87 | 10.44 | 10.80 | 11.19 | 11.61 | 12.54 | 8,820 |
| EPDREH4015-12-01-TH3 | ● | | | 12 | 0.9 | 1.44 | 50 | 4 | 4.29 | 12.51 | 12.94 | 13.41 | 13.91 | 15.03 | 8,820 |
| EPDREH4015-2-02-TH3 | ● | | 0.2 | 2 | 0.9 | 1.44 | 50 | 4 | 10.77 | 2.17 | 2.24 | 2.31 | 2.39 | 2.57 | 8,320 |
| EPDREH4015-3-02-TH3 | ● | | | 3 | 0.9 | 1.44 | 50 | 4 | 9.37 | 3.21 | 3.31 | 3.42 | 3.54 | 3.82 | 8,320 |
| EPDREH4015-4-02-TH3 | ● | | | 4 | 0.9 | 1.44 | 50 | 4 | 8.30 | 4.24 | 4.38 | 4.53 | 4.69 | 5.06 | 8,320 |
| EPDREH4015-5-02-TH3 | ● | | | 5 | 0.9 | 1.44 | 50 | 4 | 7.44 | 5.27 | 5.45 | 5.64 | 5.84 | 6.30 | 8,320 |
| EPDREH4015-6-02-TH3 | ● | | | 6 | 0.9 | 1.44 | 50 | 4 | 6.74 | 6.31 | 6.52 | 6.75 | 6.99 | 7.55 | 8,320 |
| EPDREH4015-8-02-TH3 | ● | | | 8 | 0.9 | 1.44 | 50 | 4 | 5.68 | 8.37 | 8.66 | 8.96 | 9.29 | 10.03 | 8,820 |
| EPDREH4015-10-02-TH3 | ● | | | 10 | 0.9 | 1.44 | 50 | 4 | 4.91 | 10.44 | 10.80 | 11.18 | 11.59 | 12.52 | 8,820 |
| EPDREH4015-12-02-TH3 | ● | | | 12 | 0.9 | 1.44 | 50 | 4 | 4.32 | 12.51 | 12.94 | 13.40 | 13.89 | 15.00 | 8,820 |
| EPDREH4015-2-03-TH3 | ● | | 0.3 | 2 | 0.9 | 1.44 | 50 | 4 | 10.93 | 2.17 | 2.23 | 2.30 | 2.38 | 2.55 | 8,320 |
| EPDREH4015-3-03-TH3 | ● | | | 3 | 0.9 | 1.44 | 50 | 4 | 9.50 | 3.20 | 3.30 | 3.41 | 3.53 | 3.79 | 8,320 |
| EPDREH4015-4-03-TH3 | ● | | | 4 | 0.9 | 1.44 | 50 | 4 | 8.39 | 4.24 | 4.37 | 4.52 | 4.68 | 5.04 | 8,320 |
| EPDREH4015-5-03-TH3 | ● | | | 5 | 0.9 | 1.44 | 50 | 4 | 7.52 | 5.27 | 5.44 | 5.63 | 5.83 | 6.28 | 8,320 |
| EPDREH4015-6-03-TH3 | ● | | | 6 | 0.9 | 1.44 | 50 | 4 | 6.81 | 6.30 | 6.51 | 6.74 | 6.98 | 7.52 | 8,320 |
| EPDREH4015-8-03-TH3 | ● | | | 8 | 0.9 | 1.44 | 50 | 4 | 5.73 | 8.37 | 8.65 | 8.95 | 9.28 | 10.01 | 8,820 |
| EPDREH4015-10-03-TH3 | ● | | | 10 | 0.9 | 1.44 | 50 | 4 | 4.94 | 10.44 | 10.79 | 11.17 | 11.58 | 12.49 | 8,820 |
| EPDREH4015-12-03-TH3 | ● | | | 12 | 0.9 | 1.44 | 50 | 4 | 4.34 | 12.50 | 12.93 | 13.39 | 13.88 | 14.98 | 8,820 |

EPDREH4 φ1 ～φ1.5の切削条件はA184、A185、A189、A190ページをご確認ください。For detailed information on the EPDREH4 ø1 to ø1.5 cutting conditions, refer to pages A184, A185, A189 and A190.

# エポックディープラジアスエボリューションハード-TH3

## EPDREH4○○○-○.○-○○○-TH3



| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 干渉角度 Interference angle (°) θK | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDREH4015-2-05-TH3 | ● | 1.5 | 0.5 | 2 | 0.9 | 1.44 | 50 | 4 | 11.27 | 2.16 | 2.22 | 2.28 | 2.35 | 2.50 | 8,320 |
| EPDREH4015-3-05-TH3 | ● | | | 3 | 0.9 | 1.44 | 50 | 4 | 9.75 | 3.19 | 3.29 | 3.39 | 3.50 | 3.75 | 8,320 |
| EPDREH4015-4-05-TH3 | ● | | | 4 | 0.9 | 1.44 | 50 | 4 | 8.59 | 4.23 | 4.36 | 4.50 | 4.65 | 4.99 | 8,320 |
| EPDREH4015-5-05-TH3 | ● | | | 5 | 0.9 | 1.44 | 50 | 4 | 7.68 | 5.26 | 5.43 | 5.61 | 5.80 | 6.23 | 8,320 |
| EPDREH4015-6-05-TH3 | ● | | | 6 | 0.9 | 1.44 | 50 | 4 | 6.94 | 6.30 | 6.50 | 6.72 | 6.95 | 7.47 | 8,320 |
| EPDREH4015-8-05-TH3 | ● | | | 8 | 0.9 | 1.44 | 50 | 4 | 5.82 | 8.36 | 8.64 | 8.93 | 9.25 | 9.96 | 8,820 |
| EPDREH4015-10-05-TH3 | ● | | | 10 | 0.9 | 1.44 | 50 | 4 | 5.01 | 10.43 | 10.78 | 11.15 | 11.55 | 12.45 | 8,820 |
| EPDREH4015-12-05-TH3 | ● | | | 12 | 0.9 | 1.44 | 50 | 4 | 4.40 | 12.50 | 12.92 | 13.37 | 13.85 | 14.93 | 8,820 |
| EPDREH4020-2.5-002-TH3 | ● | 2 | 0.02 | 2.5 | 1.2 | 1.92 | 50 | 4 | 8.94 | 2.73 | 2.83 | 2.93 | 3.04 | 3.28 | 8,320 |
| EPDREH4020-3-002-TH3 | ● | | | 3 | 1.2 | 1.92 | 50 | 4 | 8.30 | 3.25 | 3.36 | 3.48 | 3.61 | 3.91 | 8,320 |
| EPDREH4020-4-002-TH3 | ● | | | 4 | 1.2 | 1.92 | 50 | 4 | 7.25 | 4.28 | 4.43 | 4.59 | 4.76 | 5.15 | 8,320 |
| EPDREH4020-5-002-TH3 | ● | | | 5 | 1.2 | 1.92 | 50 | 4 | 6.44 | 5.32 | 5.50 | 5.70 | 5.91 | 6.39 | 8,320 |
| EPDREH4020-6-002-TH3 | ● | | | 6 | 1.2 | 1.92 | 50 | 4 | 5.80 | 6.35 | 6.57 | 6.81 | 7.06 | 7.63 | 8,320 |
| EPDREH4020-8-002-TH3 | ● | | | 8 | 1.2 | 1.92 | 50 | 4 | 4.82 | 8.42 | 8.71 | 9.02 | 9.36 | 10.12 | 8,820 |
| EPDREH4020-10-002-TH3 | ● | | | 10 | 1.2 | 1.92 | 50 | 4 | 4.13 | 10.49 | 10.85 | 11.24 | 11.66 | 12.61 | 8,820 |
| EPDREH4020-12-002-TH3 | ● | | | 12 | 1.2 | 1.92 | 50 | 4 | 3.61 | 12.55 | 12.99 | 13.46 | 13.96 | 15.09 | 8,820 |
| EPDREH4020-2.5-005-TH3 | ● | | 0.05 | 2.5 | 1.2 | 1.92 | 50 | 4 | 8.98 | 2.73 | 2.83 | 2.93 | 3.03 | 3.28 | 8,320 |
| EPDREH4020-3-005-TH3 | ● | | | 3 | 1.2 | 1.92 | 50 | 4 | 8.33 | 3.25 | 3.36 | 3.48 | 3.61 | 3.90 | 8,320 |
| EPDREH4020-4-005-TH3 | ● | | | 4 | 1.2 | 1.92 | 50 | 4 | 7.28 | 4.28 | 4.43 | 4.59 | 4.76 | 5.14 | 8,320 |
| EPDREH4020-5-005-TH3 | ● | | | 5 | 1.2 | 1.92 | 50 | 4 | 6.47 | 5.32 | 5.50 | 5.70 | 5.91 | 6.38 | 8,320 |
| EPDREH4020-6-005-TH3 | ● | | | 6 | 1.2 | 1.92 | 50 | 4 | 5.81 | 6.35 | 6.57 | 6.80 | 7.06 | 7.63 | 8,320 |
| EPDREH4020-8-005-TH3 | ● | | | 8 | 1.2 | 1.92 | 50 | 4 | 4.84 | 8.42 | 8.71 | 9.02 | 9.36 | 10.11 | 8,820 |
| EPDREH4020-10-005-TH3 | ● | | | 10 | 1.2 | 1.92 | 50 | 4 | 4.14 | 10.48 | 10.85 | 11.24 | 11.66 | 12.60 | 8,820 |
| EPDREH4020-12-005-TH3 | ● | | | 12 | 1.2 | 1.92 | 50 | 4 | 3.62 | 12.55 | 12.99 | 13.45 | 13.96 | 15.09 | 8,820 |
| EPDREH4020-2.5-01-TH3 | ● | | 0.1 | 2.5 | 1.2 | 1.92 | 50 | 4 | 9.05 | 2.73 | 2.82 | 2.92 | 3.03 | 3.26 | 8,320 |
| EPDREH4020-3-01-TH3 | ● | | | 3 | 1.2 | 1.92 | 50 | 4 | 8.39 | 3.25 | 3.36 | 3.47 | 3.60 | 3.89 | 8,320 |
| EPDREH4020-4-01-TH3 | ● | | | 4 | 1.2 | 1.92 | 50 | 4 | 7.33 | 4.28 | 4.43 | 4.58 | 4.75 | 5.13 | 8,320 |
| EPDREH4020-5-01-TH3 | ● | | | 5 | 1.2 | 1.92 | 50 | 4 | 6.50 | 5.31 | 5.50 | 5.69 | 5.90 | 6.37 | 8,320 |
| EPDREH4020-6-01-TH3 | ● | | | 6 | 1.2 | 1.92 | 50 | 4 | 5.84 | 6.35 | 6.57 | 6.80 | 7.05 | 7.62 | 8,320 |
| EPDREH4020-8-01-TH3 | ● | | | 8 | 1.2 | 1.92 | 50 | 4 | 4.86 | 8.42 | 8.71 | 9.02 | 9.35 | 10.10 | 8,820 |
| EPDREH4020-10-01-TH3 | ● | | | 10 | 1.2 | 1.92 | 50 | 4 | 4.16 | 10.48 | 10.84 | 11.23 | 11.65 | 12.59 | 8,820 |
| EPDREH4020-12-01-TH3 | ● | | | 12 | 1.2 | 1.92 | 50 | 4 | 3.63 | 12.55 | 12.98 | 13.45 | 13.95 | 15.07 | 8,820 |
| EPDREH4020-2.5-02-TH3 | ● | | 0.2 | 2.5 | 1.2 | 1.92 | 50 | 4 | 9.19 | 2.73 | 2.82 | 2.91 | 3.01 | 3.24 | 8,320 |
| EPDREH4020-3-02-TH3 | ● | | | 3 | 1.2 | 1.92 | 50 | 4 | 8.52 | 3.24 | 3.35 | 3.46 | 3.59 | 3.86 | 8,320 |
| EPDREH4020-4-02-TH3 | ● | | | 4 | 1.2 | 1.92 | 50 | 4 | 7.42 | 4.28 | 4.42 | 4.57 | 4.74 | 5.11 | 8,320 |
| EPDREH4020-5-02-TH3 | ● | | | 5 | 1.2 | 1.92 | 50 | 4 | 6.58 | 5.31 | 5.49 | 5.68 | 5.89 | 6.35 | 8,320 |
| EPDREH4020-6-02-TH3 | ● | | | 6 | 1.2 | 1.92 | 50 | 4 | 5.90 | 6.34 | 6.56 | 6.79 | 7.04 | 7.59 | 8,320 |
| EPDREH4020-8-02-TH3 | ● | | | 8 | 1.2 | 1.92 | 50 | 4 | 4.90 | 8.41 | 8.70 | 9.01 | 9.34 | 10.08 | 8,820 |
| EPDREH4020-10-02-TH3 | ● | | | 10 | 1.2 | 1.92 | 50 | 4 | 4.19 | 10.48 | 10.84 | 11.22 | 11.64 | 12.56 | 8,820 |
| EPDREH4020-12-02-TH3 | ● | | | 12 | 1.2 | 1.92 | 50 | 4 | 3.65 | 12.55 | 12.98 | 13.44 | 13.94 | 15.05 | 8,820 |
| EPDREH4020-2.5-03-TH3 | ● | | 0.3 | 2.5 | 1.2 | 1.92 | 50 | 4 | 9.34 | 2.72 | 2.81 | 2.90 | 3.00 | 3.22 | 8,320 |
| EPDREH4020-3-03-TH3 | ● | | | 3 | 1.2 | 1.92 | 50 | 4 | 8.64 | 3.24 | 3.34 | 3.45 | 3.57 | 3.84 | 8,320 |
| EPDREH4020-4-03-TH3 | ● | | | 4 | 1.2 | 1.92 | 50 | 4 | 7.52 | 4.27 | 4.41 | 4.56 | 4.72 | 5.08 | 8,320 |
| EPDREH4020-5-03-TH3 | ● | | | 5 | 1.2 | 1.92 | 50 | 4 | 6.65 | 5.31 | 5.48 | 5.67 | 5.87 | 6.33 | 8,320 |
| EPDREH4020-6-03-TH3 | ● | | | 6 | 1.2 | 1.92 | 50 | 4 | 5.96 | 6.34 | 6.55 | 6.78 | 7.02 | 7.57 | 8,320 |
| EPDREH4020-8-03-TH3 | ● | | | 8 | 1.2 | 1.92 | 50 | 4 | 4.94 | 8.41 | 8.69 | 8.99 | 9.32 | 10.05 | 8,820 |
| EPDREH4020-10-03-TH3 | ● | | | 10 | 1.2 | 1.92 | 50 | 4 | 4.22 | 10.48 | 10.83 | 11.21 | 11.62 | 12.54 | 8,820 |
| EPDREH4020-12-03-TH3 | ● | | | 12 | 1.2 | 1.92 | 50 | 4 | 3.68 | 12.54 | 12.97 | 13.43 | 13.92 | 15.03 | 8,820 |
| EPDREH4020-2.5-05-TH3 | ● | | 0.5 | 2.5 | 1.2 | 1.92 | 50 | 4 | 9.65 | 2.72 | 2.79 | 2.88 | 2.97 | 3.17 | 8,320 |
| EPDREH4020-3-05-TH3 | ● | | | 3 | 1.2 | 1.92 | 50 | 4 | 8.91 | 3.23 | 3.33 | 3.43 | 3.54 | 3.79 | 8,320 |
| EPDREH4020-4-05-TH3 | ● | | | 4 | 1.2 | 1.92 | 50 | 4 | 7.72 | 4.27 | 4.40 | 4.54 | 4.69 | 5.03 | 8,320 |

●印：標準在庫品です。　●：Stocked items.

# EPDREH4○○○-○.○-○○○-TH3

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 干渉角度 Interference angle (°) θK | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格（円） Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDREH4020-5-05-TH3 | ● | 2 | 0.5 | 5 | 1.2 | 1.92 | 50 | 4 | 6.81 | 5.30 | 5.47 | 5.65 | 5.84 | 6.28 | 8,320 |
| EPDREH4020-6-05-TH3 | ● | | | 6 | 1.2 | 1.92 | 50 | 4 | 6.09 | 6.33 | 6.54 | 6.76 | 6.99 | 7.52 | 8,320 |
| EPDREH4020-8-05-TH3 | ● | | | 8 | 1.2 | 1.92 | 50 | 4 | 5.03 | 8.40 | 8.68 | 8.97 | 9.29 | 10.01 | 8,820 |
| EPDREH4020-10-05-TH3 | ● | | | 10 | 1.2 | 1.92 | 50 | 4 | 4.28 | 10.47 | 10.82 | 11.19 | 11.59 | 12.49 | 8,820 |
| EPDREH4020-12-05-TH3 | ● | | | 12 | 1.2 | 1.92 | 50 | 4 | 3.72 | 12.54 | 12.96 | 13.41 | 13.89 | 14.98 | 8,820 |
| EPDREH4030-4-005-TH3 | ● | 3 | 0.05 | 4 | 1.8 | 2.88 | 50 | 6 | 8.73 | 4.36 | 4.51 | 4.67 | 4.84 | 5.23 | 8,320 |
| EPDREH4030-6-005-TH3 | ● | | | 6 | 1.8 | 2.88 | 50 | 6 | 7.27 | 6.43 | 6.65 | 6.89 | 7.14 | 7.72 | 8,320 |
| EPDREH4030-8-005-TH3 | ● | | | 8 | 1.8 | 2.88 | 55 | 6 | 6.22 | 8.49 | 8.79 | 9.10 | 9.44 | 10.21 | 8,320 |
| EPDREH4030-10-005-TH3 | ● | | | 10 | 1.8 | 2.88 | 55 | 6 | 5.44 | 10.56 | 10.93 | 11.32 | 11.74 | 12.69 | 9,080 |
| EPDREH4030-12-005-TH3 | ● | | | 12 | 1.8 | 2.88 | 60 | 6 | 4.83 | 12.63 | 13.07 | 13.54 | 14.04 | 15.18 | 9,080 |
| EPDREH4030-14-005-TH3 | ● | | | 14 | 1.8 | 2.88 | 60 | 6 | 4.34 | 14.70 | 15.21 | 15.75 | 16.34 | 17.67 | 10,210 |
| EPDREH4030-16-005-TH3 | ● | | | 16 | 1.8 | 2.88 | 60 | 6 | 3.95 | 16.76 | 17.35 | 17.97 | 18.64 | 20.15 | 10,210 |
| EPDREH4030-18-005-TH3 | ● | | | 18 | 1.8 | 2.88 | 65 | 6 | 3.62 | 18.83 | 19.49 | 20.19 | 20.94 | 22.64 | 10,210 |
| EPDREH4030-20-005-TH3 | ● | | | 20 | 1.8 | 2.88 | 65 | 6 | 3.34 | 20.90 | 21.62 | 22.40 | 23.24 | 25.12 | 10,210 |
| EPDREH4030-4-01-TH3 | ● | | 0.1 | 4 | 1.8 | 2.88 | 50 | 6 | 8.78 | 4.36 | 4.51 | 4.67 | 4.84 | 5.22 | 8,320 |
| EPDREH4030-6-01-TH3 | ● | | | 6 | 1.8 | 2.88 | 50 | 6 | 7.30 | 6.43 | 6.65 | 6.88 | 7.14 | 7.71 | 8,320 |
| EPDREH4030-8-01-TH3 | ● | | | 8 | 1.8 | 2.88 | 55 | 6 | 6.24 | 8.49 | 8.79 | 9.10 | 9.44 | 10.19 | 8,320 |
| EPDREH4030-10-01-TH3 | ● | | | 10 | 1.8 | 2.88 | 55 | 6 | 5.45 | 10.56 | 10.92 | 11.32 | 11.74 | 12.68 | 9,080 |
| EPDREH4030-12-01-TH3 | ● | | | 12 | 1.8 | 2.88 | 60 | 6 | 4.84 | 12.63 | 13.06 | 13.53 | 14.04 | 15.17 | 9,080 |
| EPDREH4030-14-01-TH3 | ● | | | 14 | 1.8 | 2.88 | 60 | 6 | 4.35 | 14.69 | 15.20 | 15.75 | 16.34 | 17.65 | 10,210 |
| EPDREH4030-16-01-TH3 | ● | | | 16 | 1.8 | 2.88 | 60 | 6 | 3.96 | 16.76 | 17.34 | 17.97 | 18.64 | 20.14 | 10,210 |
| EPDREH4030-18-01-TH3 | ● | | | 18 | 1.8 | 2.88 | 65 | 6 | 3.62 | 18.83 | 19.48 | 20.18 | 20.94 | 22.63 | 10,210 |
| EPDREH4030-20-01-TH3 | ● | | | 20 | 1.8 | 2.88 | 65 | 6 | 3.34 | 20.90 | 21.62 | 22.40 | 23.23 | 25.11 | 10,210 |
| EPDREH4030-4-02-TH3 | ● | | 0.2 | 4 | 1.8 | 2.88 | 50 | 6 | 8.87 | 4.35 | 4.50 | 4.66 | 4.82 | 5.20 | 8,320 |
| EPDREH4030-6-02-TH3 | ● | | | 6 | 1.8 | 2.88 | 50 | 6 | 7.36 | 6.42 | 6.64 | 6.87 | 7.12 | 7.68 | 8,320 |
| EPDREH4030-8-02-TH3 | ● | | | 8 | 1.8 | 2.88 | 55 | 6 | 6.29 | 8.49 | 8.78 | 9.09 | 9.42 | 10.17 | 8,320 |
| EPDREH4030-10-02-TH3 | ● | | | 10 | 1.8 | 2.88 | 55 | 6 | 5.49 | 10.56 | 10.92 | 11.30 | 11.72 | 12.66 | 9,080 |
| EPDREH4030-12-02-TH3 | ● | | | 12 | 1.8 | 2.88 | 60 | 6 | 4.87 | 12.62 | 13.06 | 13.52 | 14.02 | 15.14 | 9,080 |
| EPDREH4030-14-02-TH3 | ● | | | 14 | 1.8 | 2.88 | 60 | 6 | 4.38 | 14.69 | 15.20 | 15.74 | 16.32 | 17.63 | 10,210 |
| EPDREH4030-16-02-TH3 | ● | | | 16 | 1.8 | 2.88 | 60 | 6 | 3.97 | 16.76 | 17.34 | 17.95 | 18.62 | 20.12 | 10,210 |
| EPDREH4030-18-02-TH3 | ● | | | 18 | 1.8 | 2.88 | 65 | 6 | 3.64 | 18.83 | 19.47 | 20.17 | 20.92 | 22.60 | 10,210 |
| EPDREH4030-20-02-TH3 | ● | | | 20 | 1.8 | 2.88 | 65 | 6 | 3.36 | 20.89 | 21.61 | 22.39 | 23.22 | 25.09 | 10,210 |
| EPDREH4030-4-03-TH3 | ● | | 0.3 | 4 | 1.8 | 2.88 | 50 | 6 | 8.96 | 4.35 | 4.49 | 4.64 | 4.81 | 5.17 | 8,320 |
| EPDREH4030-6-03-TH3 | ● | | | 6 | 1.8 | 2.88 | 50 | 6 | 7.42 | 6.42 | 6.63 | 6.86 | 7.11 | 7.66 | 8,320 |
| EPDREH4030-8-03-TH3 | ● | | | 8 | 1.8 | 2.88 | 55 | 6 | 6.33 | 8.49 | 8.77 | 9.08 | 9.41 | 10.15 | 8,320 |
| EPDREH4030-10-03-TH3 | ● | | | 10 | 1.8 | 2.88 | 55 | 6 | 5.52 | 10.55 | 10.91 | 11.29 | 11.71 | 12.63 | 9,080 |
| EPDREH4030-12-03-TH3 | ● | | | 12 | 1.8 | 2.88 | 60 | 6 | 4.90 | 12.62 | 13.05 | 13.51 | 14.01 | 15.12 | 9,080 |
| EPDREH4030-14-03-TH3 | ● | | | 14 | 1.8 | 2.88 | 60 | 6 | 4.40 | 14.69 | 15.19 | 15.73 | 16.31 | 17.61 | 10,210 |
| EPDREH4030-16-03-TH3 | ● | | | 16 | 1.8 | 2.88 | 60 | 6 | 3.99 | 16.76 | 17.33 | 17.94 | 18.61 | 20.09 | 10,210 |
| EPDREH4030-18-03-TH3 | ● | | | 18 | 1.8 | 2.88 | 65 | 6 | 3.65 | 18.82 | 19.47 | 20.16 | 20.91 | 22.58 | 10,210 |
| EPDREH4030-20-03-TH3 | ● | | | 20 | 1.8 | 2.88 | 65 | 6 | 3.37 | 20.89 | 21.61 | 22.38 | 23.21 | 25.07 | 10,210 |
| EPDREH4030-4-05-TH3 | ● | | 0.5 | 4 | 1.8 | 2.88 | 50 | 6 | 9.15 | 4.34 | 4.48 | 4.62 | 4.78 | 5.13 | 8,320 |
| EPDREH4030-6-05-TH3 | ● | | | 6 | 1.8 | 2.88 | 50 | 6 | 7.55 | 6.41 | 6.62 | 6.84 | 7.08 | 7.61 | 8,320 |
| EPDREH4030-8-05-TH3 | ● | | | 8 | 1.8 | 2.88 | 55 | 6 | 6.43 | 8.48 | 8.76 | 9.06 | 9.38 | 10.10 | 8,320 |
| EPDREH4030-10-05-TH3 | ● | | | 10 | 1.8 | 2.88 | 55 | 6 | 5.60 | 10.55 | 10.90 | 11.27 | 11.68 | 12.59 | 9,080 |
| EPDREH4030-12-05-TH3 | ● | | | 12 | 1.8 | 2.88 | 60 | 6 | 4.95 | 12.61 | 13.04 | 13.49 | 13.98 | 15.07 | 9,080 |
| EPDREH4030-14-05-TH3 | ● | | | 14 | 1.8 | 2.88 | 60 | 6 | 4.44 | 14.68 | 15.18 | 15.71 | 16.28 | 17.56 | 10,210 |
| EPDREH4030-16-05-TH3 | ● | | | 16 | 1.8 | 2.88 | 60 | 6 | 4.03 | 16.75 | 17.31 | 17.92 | 18.58 | 20.05 | 10,210 |
| EPDREH4030-18-05-TH3 | ● | | | 18 | 1.8 | 2.88 | 65 | 6 | 3.69 | 18.82 | 19.45 | 20.14 | 20.88 | 22.53 | 10,210 |
| EPDREH4030-20-05-TH3 | ● | | | 20 | 1.8 | 2.88 | 65 | 6 | 3.40 | 20.88 | 21.59 | 22.36 | 23.18 | 25.02 | 10,210 |

EPDREH4 φ1.5～φ3の切削条件はA184～A186、A189～A191ページをご確認ください。For detailed information on the EPDREH4 ø1.5 to ø3 cutting conditions, refer to pages A184 to A186 and A189 to A191.

# エポックディープラジアスエボリューションハード-TH3

## EPDREH4○○○-○.○-○○○-TH3



| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 干渉角度 Interference angle (°) θK | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格（円） Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDREH4040-8-01-TH3 | ● | 4 | 0.1 | 8 | 3.5 | 3.85 | 55 | 6 | 4.80 | 8.55 | 8.84 | 9.16 | 9.50 | 10.26 | 11,340 |
| EPDREH4040-10-01-TH3 | ● | | | 10 | 3.5 | 3.85 | 60 | 6 | 4.12 | 10.62 | 10.98 | 11.38 | 11.80 | 12.75 | 11,340 |
| EPDREH4040-12-01-TH3 | ● | | | 12 | 3.5 | 3.85 | 60 | 6 | 3.60 | 12.68 | 13.12 | 13.59 | 14.10 | 15.24 | 11,340 |
| EPDREH4040-14-01-TH3 | ● | | | 14 | 3.5 | 3.85 | 60 | 6 | 3.20 | 14.75 | 15.26 | 15.81 | 16.40 | 17.72 | 11,340 |
| EPDREH4040-16-01-TH3 | ● | | | 16 | 3.5 | 3.85 | 60 | 6 | 2.88 | 16.82 | 17.40 | 18.03 | 18.70 | 干渉なし | 11,340 |
| EPDREH4040-18-01-TH3 | ● | | | 18 | 3.5 | 3.85 | 60 | 6 | 2.62 | 18.89 | 19.54 | 20.24 | 21.00 | 干渉なし | 12,600 |
| EPDREH4040-20-01-TH3 | ● | | | 20 | 3.5 | 3.85 | 65 | 6 | 2.40 | 20.95 | 21.68 | 22.46 | 23.30 | 干渉なし | 12,600 |
| EPDREH4040-22-01-TH3 | ● | | | 22 | 3.5 | 3.85 | 65 | 6 | 2.22 | 23.02 | 23.82 | 24.68 | 25.60 | 干渉なし | 12,600 |
| EPDREH4040-24-01-TH3 | ● | | | 24 | 3.5 | 3.85 | 70 | 6 | 2.06 | 25.09 | 25.96 | 26.89 | 27.90 | 干渉なし | 12,600 |
| EPDREH4040-8-02-TH3 | ● | | 0.2 | 8 | 3.5 | 3.85 | 55 | 6 | 4.84 | 8.55 | 8.84 | 9.15 | 9.49 | 10.24 | 11,340 |
| EPDREH4040-10-02-TH3 | ● | | | 10 | 3.5 | 3.85 | 60 | 6 | 4.15 | 10.61 | 10.98 | 11.37 | 11.79 | 12.73 | 11,340 |
| EPDREH4040-12-02-TH3 | ● | | | 12 | 3.5 | 3.85 | 60 | 6 | 3.62 | 12.68 | 13.12 | 13.58 | 14.09 | 15.21 | 11,340 |
| EPDREH4040-14-02-TH3 | ● | | | 14 | 3.5 | 3.85 | 60 | 6 | 3.22 | 14.75 | 15.26 | 15.80 | 16.39 | 17.70 | 11,340 |
| EPDREH4040-16-02-TH3 | ● | | | 16 | 3.5 | 3.85 | 60 | 6 | 2.89 | 16.82 | 17.40 | 18.02 | 18.69 | 干渉なし | 11,340 |
| EPDREH4040-18-02-TH3 | ● | | | 18 | 3.5 | 3.85 | 60 | 6 | 2.63 | 18.88 | 19.53 | 20.23 | 20.98 | 干渉なし | 12,600 |
| EPDREH4040-20-02-TH3 | ● | | | 20 | 3.5 | 3.85 | 65 | 6 | 2.41 | 20.95 | 21.67 | 22.45 | 23.28 | 干渉なし | 12,600 |
| EPDREH4040-22-02-TH3 | ● | | | 22 | 3.5 | 3.85 | 65 | 6 | 2.22 | 23.02 | 23.81 | 24.67 | 25.58 | 干渉なし | 12,600 |
| EPDREH4040-24-02-TH3 | ● | | | 24 | 3.5 | 3.85 | 70 | 6 | 2.06 | 25.09 | 25.95 | 26.88 | 27.88 | 干渉なし | 12,600 |
| EPDREH4040-8-03-TH3 | ● | | 0.3 | 8 | 3.5 | 3.85 | 55 | 6 | 4.89 | 8.54 | 8.83 | 9.14 | 9.47 | 10.22 | 11,340 |
| EPDREH4040-10-03-TH3 | ● | | | 10 | 3.5 | 3.85 | 60 | 6 | 4.18 | 10.61 | 10.97 | 11.36 | 11.77 | 12.70 | 11,340 |
| EPDREH4040-12-03-TH3 | ● | | | 12 | 3.5 | 3.85 | 60 | 6 | 3.65 | 12.68 | 13.11 | 13.57 | 14.07 | 15.19 | 11,340 |
| EPDREH4040-14-03-TH3 | ● | | | 14 | 3.5 | 3.85 | 60 | 6 | 3.24 | 14.75 | 15.25 | 15.79 | 16.37 | 17.68 | 11,340 |
| EPDREH4040-16-03-TH3 | ● | | | 16 | 3.5 | 3.85 | 60 | 6 | 2.91 | 16.81 | 17.39 | 18.01 | 18.67 | 干渉なし | 11,340 |
| EPDREH4040-18-03-TH3 | ● | | | 18 | 3.5 | 3.85 | 60 | 6 | 2.64 | 18.88 | 19.53 | 20.22 | 20.97 | 干渉なし | 12,600 |
| EPDREH4040-20-03-TH3 | ● | | | 20 | 3.5 | 3.85 | 65 | 6 | 2.42 | 20.95 | 21.67 | 22.44 | 23.27 | 干渉なし | 12,600 |
| EPDREH4040-22-03-TH3 | ● | | | 22 | 3.5 | 3.85 | 65 | 6 | 2.23 | 23.01 | 23.81 | 24.66 | 25.57 | 干渉なし | 12,600 |
| EPDREH4040-24-03-TH3 | ● | | | 24 | 3.5 | 3.85 | 70 | 6 | 2.07 | 25.08 | 25.95 | 26.87 | 27.87 | 干渉なし | 12,600 |
| EPDREH4040-8-05-TH3 | ● | | 0.5 | 8 | 3.5 | 3.85 | 55 | 6 | 4.97 | 8.54 | 8.82 | 9.12 | 9.44 | 10.17 | 11,340 |
| EPDREH4040-10-05-TH3 | ● | | | 10 | 3.5 | 3.85 | 60 | 6 | 4.24 | 10.60 | 10.96 | 11.33 | 11.74 | 12.66 | 11,340 |
| EPDREH4040-12-05-TH3 | ● | | | 12 | 3.5 | 3.85 | 60 | 6 | 3.69 | 12.67 | 13.10 | 13.55 | 14.04 | 15.14 | 11,340 |
| EPDREH4040-14-05-TH3 | ● | | | 14 | 3.5 | 3.85 | 60 | 6 | 3.27 | 14.74 | 15.24 | 15.77 | 16.34 | 17.63 | 11,340 |
| EPDREH4040-16-05-TH3 | ● | | | 16 | 3.5 | 3.85 | 60 | 6 | 2.94 | 16.81 | 17.37 | 17.98 | 18.64 | 干渉なし | 11,340 |
| EPDREH4040-18-05-TH3 | ● | | | 18 | 3.5 | 3.85 | 60 | 6 | 2.67 | 18.87 | 19.51 | 20.20 | 20.94 | 干渉なし | 12,600 |
| EPDREH4040-20-05-TH3 | ● | | | 20 | 3.5 | 3.85 | 65 | 6 | 2.44 | 20.94 | 21.65 | 22.42 | 23.24 | 干渉なし | 12,600 |
| EPDREH4040-22-05-TH3 | ● | | | 22 | 3.5 | 3.85 | 65 | 6 | 2.25 | 23.01 | 23.79 | 24.63 | 25.54 | 干渉なし | 12,600 |
| EPDREH4040-24-05-TH3 | ● | | | 24 | 3.5 | 3.85 | 70 | 6 | 2.09 | 25.08 | 25.93 | 26.85 | 27.84 | 干渉なし | 12,600 |
| EPDREH4040-8-10-TH3 | ● | | 1 | 8 | 3.5 | 3.85 | 55 | 6 | 5.19 | 8.52 | 8.78 | 9.06 | 9.37 | 10.05 | 11,340 |
| EPDREH4040-10-10-TH3 | ● | | | 10 | 3.5 | 3.85 | 60 | 6 | 4.40 | 10.59 | 10.92 | 11.28 | 11.67 | 12.54 | 11,340 |
| EPDREH4040-12-10-TH3 | ● | | | 12 | 3.5 | 3.85 | 60 | 6 | 3.82 | 12.65 | 13.06 | 13.50 | 13.97 | 15.02 | 11,340 |
| EPDREH4040-14-10-TH3 | ● | | | 14 | 3.5 | 3.85 | 60 | 6 | 3.37 | 14.72 | 15.20 | 15.71 | 16.27 | 17.51 | 11,340 |
| EPDREH4040-16-10-TH3 | ● | | | 16 | 3.5 | 3.85 | 60 | 6 | 3.02 | 16.79 | 17.34 | 17.93 | 18.57 | 20.00 | 11,340 |
| EPDREH4040-18-10-TH3 | ● | | | 18 | 3.5 | 3.85 | 60 | 6 | 2.73 | 18.86 | 19.48 | 20.15 | 20.87 | 干渉なし | 12,600 |
| EPDREH4040-20-10-TH3 | ● | | | 20 | 3.5 | 3.85 | 65 | 6 | 2.49 | 20.92 | 21.62 | 22.36 | 23.17 | 干渉なし | 12,600 |
| EPDREH4040-22-10-TH3 | ● | | | 22 | 3.5 | 3.85 | 65 | 6 | 2.29 | 22.99 | 23.76 | 24.58 | 25.47 | 干渉なし | 12,600 |
| EPDREH4040-24-10-TH3 | ● | | | 24 | 3.5 | 3.85 | 70 | 6 | 2.13 | 25.06 | 25.90 | 26.80 | 27.77 | 干渉なし | 12,600 |
| EPDREH4050-10-01-TH3 | ● | 5 | 0.1 | 10 | 4 | 4.85 | 60 | 6 | 2.38 | 10.62 | 10.98 | 11.38 | 11.80 | 干渉なし | 16,900 |
| EPDREH4050-15-01-TH3 | ● | | | 15 | 4 | 4.85 | 60 | 6 | 1.69 | 15.79 | 16.33 | 16.92 | 干渉なし | 干渉なし | 16,900 |
| EPDREH4050-20-01-TH3 | ● | | | 20 | 4 | 4.85 | 65 | 6 | 1.30 | 20.95 | 21.68 | 干渉なし | 干渉なし | 干渉なし | 16,900 |
| EPDREH4050-25-01-TH3 | ● | | | 25 | 4 | 4.85 | 70 | 6 | 1.06 | 26.12 | 27.03 | 干渉なし | 干渉なし | 干渉なし | 16,900 |
| EPDREH4050-10-02-TH3 | ● | | 0.2 | 10 | 4 | 4.85 | 60 | 6 | 2.40 | 10.61 | 10.98 | 11.37 | 11.79 | 干渉なし | 16,900 |
| EPDREH4050-15-02-TH3 | ● | | | 15 | 4 | 4.85 | 60 | 6 | 1.70 | 15.78 | 16.33 | 16.91 | 干渉なし | 干渉なし | 16,900 |

●印：標準在庫品です。　●：Stocked items.　干渉なし：No interference

# EPDREH4○○○-○.○-○○○-TH3

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 干渉角度 Interference angle (°) θK | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格（円） Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDREH4050-20-02-TH3 | ● | 5 | 0.2 | 20 | 4 | 4.85 | 65 | 6 | 1.31 | 20.95 | 21.67 | 干渉なし | 干渉なし | 干渉なし | 16,900 |
| EPDREH4050-25-02-TH3 | ● | | | 25 | 4 | 4.85 | 70 | 6 | 1.07 | 26.12 | 27.02 | 干渉なし | 干渉なし | 干渉なし | 16,900 |
| EPDREH4050-10-03-TH3 | ● | | 0.3 | 10 | 4 | 4.85 | 60 | 6 | 2.42 | 10.61 | 10.97 | 11.36 | 11.77 | 干渉なし | 16,900 |
| EPDREH4050-15-03-TH3 | ● | | | 15 | 4 | 4.85 | 60 | 6 | 1.71 | 15.78 | 16.32 | 16.90 | 干渉なし | 干渉なし | 16,900 |
| EPDREH4050-20-03-TH3 | ● | | | 20 | 4 | 4.85 | 65 | 6 | 1.32 | 20.95 | 21.67 | 干渉なし | 干渉なし | 干渉なし | 16,900 |
| EPDREH4050-25-03-TH3 | ● | | | 25 | 4 | 4.85 | 70 | 6 | 1.07 | 26.12 | 27.02 | 干渉なし | 干渉なし | 干渉なし | 16,900 |
| EPDREH4050-10-05-TH3 | ● | | 0.5 | 10 | 4 | 4.85 | 60 | 6 | 2.46 | 10.60 | 10.96 | 11.33 | 11.74 | 干渉なし | 16,900 |
| EPDREH4050-15-05-TH3 | ● | | | 15 | 4 | 4.85 | 60 | 6 | 1.73 | 15.77 | 16.31 | 16.88 | 干渉なし | 干渉なし | 16,900 |
| EPDREH4050-20-05-TH3 | ● | | | 20 | 4 | 4.85 | 65 | 6 | 1.33 | 20.94 | 21.65 | 干渉なし | 干渉なし | 干渉なし | 16,900 |
| EPDREH4050-25-05-TH3 | ● | | | 25 | 4 | 4.85 | 70 | 6 | 1.08 | 26.11 | 27.00 | 干渉なし | 干渉なし | 干渉なし | 16,900 |
| EPDREH4050-10-10-TH3 | ● | | 1 | 10 | 4 | 4.85 | 60 | 6 | 2.57 | 10.59 | 10.92 | 11.28 | 11.67 | 干渉なし | 16,900 |
| EPDREH4050-15-10-TH3 | ● | | | 15 | 4 | 4.85 | 60 | 6 | 1.78 | 15.76 | 16.27 | 16.82 | 干渉なし | 干渉なし | 16,900 |
| EPDREH4050-20-10-TH3 | ● | | | 20 | 4 | 4.85 | 65 | 6 | 1.36 | 20.92 | 21.62 | 干渉なし | 干渉なし | 干渉なし | 16,900 |
| EPDREH4050-25-10-TH3 | ● | | | 25 | 4 | 4.85 | 70 | 6 | 1.10 | 26.09 | 26.97 | 干渉なし | 干渉なし | 干渉なし | 16,900 |
| EPDREH4060-12-01-TH3 | ● | 6 | 0.1 | 12 | 5 | 5.85 | 60 | 6 | 0.00 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 12,360 |
| EPDREH4060-18-01-TH3 | ● | | | 18 | 5 | 5.85 | 60 | 6 | 0.00 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 15,690 |
| EPDREH4060-24-01-TH3 | ● | | | 24 | 5 | 5.85 | 70 | 6 | 0.00 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 15,690 |
| EPDREH4060-30-01-TH3 | ● | | | 30 | 5 | 5.85 | 80 | 6 | 0.00 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 15,690 |
| EPDREH4060-12-02-TH3 | ● | | 0.2 | 12 | 5 | 5.85 | 60 | 6 | 0.00 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 12,360 |
| EPDREH4060-18-02-TH3 | ● | | | 18 | 5 | 5.85 | 60 | 6 | 0.00 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 15,690 |
| EPDREH4060-24-02-TH3 | ● | | | 24 | 5 | 5.85 | 70 | 6 | 0.00 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 15,690 |
| EPDREH4060-30-02-TH3 | ● | | | 30 | 5 | 5.85 | 80 | 6 | 0.00 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 15,690 |
| EPDREH4060-12-03-TH3 | ● | | 0.3 | 12 | 5 | 5.85 | 60 | 6 | 0.00 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 12,360 |
| EPDREH4060-18-03-TH3 | ● | | | 18 | 5 | 5.85 | 60 | 6 | 0.00 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 15,690 |
| EPDREH4060-24-03-TH3 | ● | | | 24 | 5 | 5.85 | 70 | 6 | 0.00 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 15,690 |
| EPDREH4060-30-03-TH3 | ● | | | 30 | 5 | 5.85 | 80 | 6 | 0.00 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 15,690 |
| EPDREH4060-12-05-TH3 | ● | | 0.5 | 12 | 5 | 5.85 | 60 | 6 | 0.00 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 12,360 |
| EPDREH4060-18-05-TH3 | ● | | | 18 | 5 | 5.85 | 60 | 6 | 0.00 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 15,690 |
| EPDREH4060-24-05-TH3 | ● | | | 24 | 5 | 5.85 | 70 | 6 | 0.00 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 15,690 |
| EPDREH4060-30-05-TH3 | ● | | | 30 | 5 | 5.85 | 80 | 6 | 0.00 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 15,690 |
| EPDREH4060-12-10-TH3 | ● | | 1 | 12 | 5 | 5.85 | 60 | 6 | 0.00 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 12,360 |
| EPDREH4060-18-10-TH3 | ● | | | 18 | 5 | 5.85 | 60 | 6 | 0.00 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 15,690 |
| EPDREH4060-24-10-TH3 | ● | | | 24 | 5 | 5.85 | 70 | 6 | 0.00 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 15,690 |
| EPDREH4060-30-10-TH3 | ● | | | 30 | 5 | 5.85 | 80 | 6 | 0.00 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 15,690 |

EPDREH4 φ4、5、6の切削条件はA187, A188, A192, A193ページをご確認ください。For detailed information on the EPDREH4 ⌀5 and ⌀6 cutting conditions, refer to pages A187, A188, A192 and A193.

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ○ | ○ | ◎ | ◎ | ◎ | ○ | ◎ | ○ | ○ |

## 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPDREH4-TH3 | × (N/A) | 4～6 |

## 標準切削条件表
Recommended cutting conditions

2枚刃 2 Flutes

高能率切削条件 High efficiency cuttiing conditions

高精度切削条件 High accuracy cuttiing conditions

### EPDREH2-TH3

高精度切削条件はA182ページを参照してください。
Please refer to P.A182 about high accuracy cutting conditions

| 被削材 Work material | | | | 1 プリハードン鋼 Pre-hardened steels (35~45HRC) | | 2 焼入れ鋼 Hardened steels (45~55HRC) | | 3 焼入れ鋼 Hardened steels (55~65HRC) | | 4 焼入れ鋼 Hardened steels (65~68HRC) | | 5 焼入れ鋼 Hardened steels (68~72HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 100% | | 85% | | 80% | | 65% | | 55% | |
| 外径DC Tool dia. (mm) | コーナ半径RE Corner radius (mm) | 首下長 Under neck length (mm) | $a_p$ (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 0.2 | 0.02 | 0.5 | 0.016 | 42,500 | 710 | 37,500 | 550 | 35,000 | 450 | 31,500 | 410 | 31,880 | 320 |
| | | 1 | 0.011 | 42,500 | 710 | 37,500 | 550 | 35,000 | 450 | 31,500 | 410 | 31,880 | 320 |
| | 0.05 | 0.5 | 0.02 | 42,500 | 710 | 37,500 | 550 | 35,000 | 450 | 31,500 | 410 | 31,880 | 320 |
| | | 1 | 0.014 | 42,500 | 710 | 37,500 | 550 | 35,000 | 450 | 31,500 | 410 | 31,880 | 320 |
| 0.3 | 0.02 | 1 | 0.016 | 40,800 | 730 | 36,000 | 550 | 33,600 | 440 | 30,240 | 400 | 30,600 | 310 |
| | | 2 | 0.011 | 33,050 | 590 | 29,160 | 440 | 27,220 | 360 | 24,490 | 320 | 24,790 | 250 |
| | 0.05 | 1 | 0.021 | 40,800 | 730 | 36,000 | 550 | 33,600 | 440 | 30,240 | 400 | 30,600 | 310 |
| | | 2 | 0.012 | 33,050 | 590 | 29,160 | 440 | 27,220 | 360 | 24,490 | 320 | 24,790 | 250 |
| 0.4 | 0.02 | 1 | 0.016 | 32,260 | 790 | 28,800 | 620 | 26,730 | 510 | 24,050 | 460 | 24,480 | 360 |
| | | 2 | 0.013 | 32,260 | 710 | 28,800 | 560 | 26,730 | 460 | 24,050 | 410 | 24,480 | 320 |
| | 0.05 | 1 | 0.025 | 32,260 | 790 | 28,800 | 620 | 26,730 | 510 | 24,050 | 460 | 24,480 | 360 |
| | | 2 | 0.016 | 32,260 | 710 | 28,800 | 560 | 26,730 | 460 | 24,050 | 410 | 24,480 | 320 |
| | 0.1 | 1 | 0.033 | 32,260 | 790 | 28,800 | 620 | 26,730 | 510 | 24,050 | 460 | 24,480 | 360 |
| | | 2 | 0.028 | 32,260 | 710 | 28,800 | 560 | 26,730 | 460 | 24,050 | 410 | 24,480 | 320 |
| 0.5 | 0.02 | 1 | 0.016 | 32,260 | 790 | 28,800 | 620 | 26,730 | 510 | 24,050 | 460 | 24,480 | 360 |
| | | 2 | 0.013 | 32,260 | 790 | 28,800 | 620 | 26,730 | 510 | 24,050 | 460 | 24,480 | 360 |
| | | 3 | 0.01 | 26,440 | 630 | 23,330 | 470 | 21,770 | 380 | 19,600 | 340 | 19,830 | 270 |
| | 0.05 | 1 | 0.03 | 32,260 | 790 | 28,800 | 620 | 26,730 | 510 | 24,050 | 460 | 24,480 | 360 |
| | | 2 | 0.023 | 32,260 | 790 | 28,800 | 620 | 26,730 | 510 | 24,050 | 460 | 24,480 | 360 |
| | | 3 | 0.017 | 26,440 | 630 | 23,330 | 470 | 21,770 | 380 | 19,600 | 340 | 19,830 | 270 |
| | 0.1 | 1 | 0.035 | 32,260 | 790 | 28,800 | 620 | 26,730 | 510 | 24,050 | 460 | 24,480 | 360 |
| | | 2 | 0.03 | 32,260 | 790 | 28,800 | 620 | 26,730 | 510 | 24,050 | 460 | 24,480 | 360 |
| | | 3 | 0.02 | 26,440 | 630 | 23,330 | 470 | 21,770 | 380 | 19,600 | 340 | 19,830 | 270 |
| 0.6 | 0.02 | 2 | 0.016 | 32,260 | 990 | 28,800 | 770 | 26,730 | 640 | 24,050 | 570 | 24,480 | 440 |
| | | 4 | 0.013 | 26,440 | 790 | 23,330 | 590 | 21,770 | 480 | 19,600 | 430 | 19,830 | 330 |
| | 0.05 | 2 | 0.028 | 32,260 | 990 | 28,800 | 770 | 26,730 | 640 | 24,050 | 570 | 24,480 | 440 |
| | | 4 | 0.019 | 26,440 | 790 | 23,330 | 590 | 21,770 | 480 | 19,600 | 430 | 19,830 | 330 |
| | 0.1 | 2 | 0.035 | 32,260 | 990 | 28,800 | 770 | 26,730 | 640 | 24,050 | 570 | 24,480 | 440 |
| | | 4 | 0.024 | 26,440 | 790 | 23,330 | 590 | 21,770 | 480 | 19,600 | 430 | 19,830 | 330 |
| 0.8 | 0.02 | 2 | 0.023 | 34,000 | 1,410 | 30,000 | 1,110 | 28,000 | 900 | 25,200 | 810 | 25,500 | 630 |
| | | 4 | 0.016 | 34,000 | 1,130 | 30,000 | 890 | 28,000 | 720 | 25,200 | 650 | 25,500 | 510 |
| | 0.05 | 2 | 0.038 | 34,000 | 1,410 | 30,000 | 1,110 | 28,000 | 900 | 25,200 | 810 | 25,500 | 630 |
| | | 4 | 0.026 | 34,000 | 1,130 | 30,000 | 890 | 28,000 | 720 | 25,200 | 650 | 25,500 | 510 |
| | 0.1 | 2 | 0.047 | 34,000 | 1,410 | 30,000 | 1,110 | 28,000 | 900 | 25,200 | 810 | 25,500 | 630 |
| | | 4 | 0.032 | 34,000 | 1,130 | 30,000 | 890 | 28,000 | 720 | 25,200 | 650 | 25,500 | 510 |
| | 0.2 | 2 | 0.081 | 34,000 | 1,410 | 30,000 | 1,110 | 28,000 | 900 | 25,200 | 810 | 25,500 | 630 |
| | | 4 | 0.056 | 34,000 | 1,130 | 30,000 | 890 | 28,000 | 720 | 25,200 | 650 | 25,500 | 510 |

| 被削材 Work material | | | | 1 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 2 焼入れ鋼 Hardened steels (45～55HRC) | | 3 焼入れ鋼 Hardened steels (55～65HRC) | | 4 焼入れ鋼 Hardened steels (65～68HRC) | | 5 焼入れ鋼 Hardened steels (68～72HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 100% | | 85% | | 80% | | 65% | | 55% | |
| 外径DC Tool dia. (mm) | コーナ半径RE Corner radius (mm) | 首下長 Under neck length (mm) | $a_p$ (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 1 | 0.02 | 2 | 0.016 | 33,440 | 1,810 | 29,620 | 1,420 | 27,710 | 1,160 | 24,940 | 1,050 | 25,170 | 810 |
| | | 4 | 0.013 | 30,600 | 1,650 | 27,000 | 1,290 | 25,200 | 1,060 | 22,680 | 950 | 22,950 | 740 |
| | | 6 | 0.01 | 24,790 | 1,340 | 21,870 | 1,050 | 20,410 | 860 | 18,370 | 770 | 18,590 | 600 |
| | | 8 | 0.008 | 22,030 | 1,190 | 19,440 | 930 | 18,140 | 760 | 16,330 | 680 | 16,520 | 530 |
| | 0.05 | 2 | 0.046 | 33,440 | 1,810 | 29,620 | 1,420 | 27,710 | 1,160 | 24,940 | 1,050 | 25,170 | 810 |
| | | 4 | 0.027 | 30,600 | 1,650 | 27,000 | 1,290 | 25,200 | 1,060 | 22,680 | 950 | 22,950 | 740 |
| | | 6 | 0.017 | 24,790 | 1,340 | 21,870 | 1,050 | 20,410 | 860 | 18,370 | 770 | 18,590 | 600 |
| | | 8 | 0.016 | 22,030 | 1,190 | 19,440 | 930 | 18,140 | 760 | 16,330 | 680 | 16,520 | 530 |
| | 0.1 | 2 | 0.065 | 33,440 | 1,810 | 29,620 | 1,420 | 27,710 | 1,160 | 24,940 | 1,050 | 25,170 | 810 |
| | | 4 | 0.038 | 30,600 | 1,650 | 27,000 | 1,290 | 25,200 | 1,060 | 22,680 | 950 | 22,950 | 740 |
| | | 6 | 0.024 | 24,790 | 1,340 | 21,870 | 1,050 | 20,410 | 860 | 18,370 | 770 | 18,590 | 600 |
| | | 8 | 0.024 | 22,030 | 1,190 | 19,440 | 930 | 18,140 | 760 | 16,330 | 680 | 16,520 | 530 |
| | 0.2 | 2 | 0.11 | 33,440 | 1,810 | 29,620 | 1,420 | 27,710 | 1,160 | 24,940 | 1,050 | 25,170 | 810 |
| | | 4 | 0.07 | 30,600 | 1,650 | 27,000 | 1,290 | 25,200 | 1,060 | 22,680 | 950 | 22,950 | 740 |
| | | 6 | 0.04 | 24,790 | 1,340 | 21,870 | 1,050 | 20,410 | 860 | 18,370 | 770 | 18,590 | 600 |
| | | 8 | 0.04 | 22,030 | 1,190 | 19,440 | 930 | 18,140 | 760 | 16,330 | 680 | 16,520 | 530 |

(1) $a_p$は被削材グループ1での目安を示しています。その他のグループの場合は、上表の切込み比率を目安に調整してください。
(2) リブ加工や止まり溝など、切りくずがつまりやすい切削の場合、切込み設定は基本切込みに切込み比率をかけて算出した切込み量を、さらにその80%まで小さくして使用してください。
(3) $a_e$の設定は$a_p$×切込み比率×5倍以下を目安に調整してください。仕上げ加工を行う場合、理論カスプハイトを計算し設定してください。
(4) 彫り込み時の傾斜進入角は1°以下を推奨いたします。また、送り速度は条件表の70%以下に調整してください。
(5) 文字彫り加工のような溝切削の際は、送り速度は50%以下・$a_p$を30%以下を目安に調整してください。また往復切削による加工を推奨いたします。

(1) $a_p$ is shown as the criteria for Group1 workpieces. For other groups, adjust the cutting depth according to the cutting depth factors in the above table.
(2) When performing cutting where cutting chips may cause clogging, such as for rib cutting, blind grooves, etc., cutting depth setting should be set by multiplying a cutting depth factor to calculate the cutting depth amount, and this amount should then be reduced to 80% of the calculated value.
(3) Adjust by setting $a_e$ to (5 or less)×($a_p$)×(cutting depth ratio). When performing finishing cutting, calculate the theoretical cusp height and set accordingly.
(4) The recommended slope entrance angle when engraving is 1° or less. In addition, feed rate should be adjusted to 70% or less of the values in the cutting condition table.
(5) When slotting such engraving letters, adjust feed rate to 50% or less and $a_p$ to 30% or less of the values shown. In addition, cutting by reciprocal cutting is recommended.

【切込み設定例】

EPDREH2010-2-02-TH3の工具で焼入れ鋼(50HRC)をリブ溝等高線切削する場合、
切込み=0.11($a_p$)×0.85 (焼入れ鋼グループ2の切込み比率)×0.8(閉鎖域の切削)=0.075mm

Cutting depth setting example: When cutting rib groove contours in hardened steel (50HRC) using an EPDREH2010-2-02-TH3 tool:
Cutting depth = 0.11 ($a_p$) × 0.85 (cutting depth factor for Group 2 hardened steel) × 0.8 (for closed-area cutting) = 0.075mm

**【注意】** ①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

**【Note】** ① Use the appropriate coolant for the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
③ If the rpm of the machine is low, lower the feed rate also to put the rpm and feed rate in the same ratio.

# エポックディープラジアスエボリューションハード -TH3



## 標準切削条件表
Recommended cutting conditions

2枚刃
2 Flutes

高能率切削条件
High efficiency cuttiing condition

高精度切削条件
High accuracy cuttiing condition

## EPDREH2-TH3

高能率切削条件はA180ページを参照してください。
Please refer to P.A180 about high efficiency cutting conditions

| 被削材 Work material | | | | 1 プリハードン鋼 Pre-hardened steels (35~45HRC) | | 2 焼入れ鋼 Hardened steels (45~55HRC) | | 3 焼入れ鋼 Hardened steels (55~65HRC) | | 4 焼入れ鋼 Hardened steels (65~68HRC) | | 5 焼入れ鋼 Hardened steels (68~72HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 100% | | 85% | | 80% | | 65% | | 55% | |
| 外径DC Tool dia. (mm) | コーナ半径RE Corner radius (mm) | 首下長 Under neck length (mm) | $a_p$ (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 0.2 | 0.02 | 0.5 | 0.016 | 50,000 | 210 | 50,000 | 180 | 50,000 | 160 | 45,000 | 140 | 42,500 | 110 |
| | | 1 | 0.011 | 50,000 | 210 | 50,000 | 180 | 50,000 | 160 | 45,000 | 140 | 42,500 | 110 |
| | 0.05 | 0.5 | 0.02 | 50,000 | 210 | 50,000 | 180 | 50,000 | 160 | 45,000 | 140 | 42,500 | 110 |
| | | 1 | 0.014 | 50,000 | 210 | 50,000 | 180 | 50,000 | 160 | 45,000 | 140 | 42,500 | 110 |
| 0.3 | 0.02 | 1 | 0.016 | 50,000 | 460 | 50,000 | 340 | 50,000 | 320 | 45,000 | 290 | 42,500 | 220 |
| | | 2 | 0.011 | 45,000 | 420 | 45,000 | 300 | 45,000 | 290 | 40,500 | 260 | 38,250 | 200 |
| | 0.05 | 1 | 0.021 | 50,000 | 460 | 50,000 | 340 | 50,000 | 320 | 45,000 | 290 | 42,500 | 220 |
| | | 2 | 0.012 | 45,000 | 420 | 45,000 | 300 | 45,000 | 290 | 40,500 | 260 | 38,250 | 200 |
| 0.4 | 0.02 | 1 | 0.016 | 50,000 | 460 | 40,000 | 320 | 36,000 | 270 | 32,400 | 240 | 30,600 | 190 |
| | | 2 | 0.013 | 45,000 | 410 | 36,000 | 290 | 34,000 | 240 | 30,600 | 220 | 28,900 | 170 |
| | 0.05 | 1 | 0.025 | 50,000 | 460 | 40,000 | 320 | 36,000 | 270 | 32,400 | 240 | 30,600 | 190 |
| | | 2 | 0.016 | 45,000 | 410 | 36,000 | 290 | 34,000 | 240 | 30,600 | 220 | 28,900 | 170 |
| | 0.1 | 1 | 0.033 | 50,000 | 460 | 40,000 | 320 | 36,000 | 270 | 32,400 | 240 | 30,600 | 190 |
| | | 2 | 0.028 | 45,000 | 410 | 36,000 | 290 | 34,000 | 240 | 30,600 | 220 | 28,900 | 170 |
| 0.5 | 0.02 | 1 | 0.016 | 40,000 | 460 | 30,000 | 380 | 28,000 | 320 | 25,200 | 280 | 23,800 | 220 |
| | | 2 | 0.013 | 40,000 | 460 | 30,000 | 380 | 28,000 | 320 | 25,200 | 280 | 23,800 | 220 |
| | | 3 | 0.01 | 36,000 | 410 | 27,000 | 320 | 24,500 | 260 | 22,050 | 230 | 20,830 | 180 |
| | 0.05 | 1 | 0.03 | 40,000 | 460 | 30,000 | 380 | 28,000 | 320 | 25,200 | 280 | 23,800 | 220 |
| | | 2 | 0.023 | 40,000 | 460 | 30,000 | 380 | 28,000 | 320 | 25,200 | 280 | 23,800 | 220 |
| | | 3 | 0.017 | 36,000 | 410 | 27,000 | 320 | 24,500 | 260 | 22,050 | 230 | 20,830 | 180 |
| | 0.1 | 1 | 0.035 | 40,000 | 460 | 30,000 | 380 | 28,000 | 320 | 25,200 | 280 | 23,800 | 220 |
| | | 2 | 0.03 | 40,000 | 460 | 30,000 | 380 | 28,000 | 320 | 25,200 | 280 | 23,800 | 220 |
| | | 3 | 0.02 | 36,000 | 410 | 27,000 | 320 | 24,500 | 260 | 22,050 | 230 | 20,830 | 180 |
| 0.6 | 0.02 | 2 | 0.016 | 37,830 | 600 | 28,200 | 390 | 23,000 | 320 | 20,700 | 290 | 19,550 | 220 |
| | | 4 | 0.013 | 27,800 | 440 | 23,600 | 280 | 21,000 | 230 | 18,900 | 210 | 17,850 | 160 |
| | 0.05 | 2 | 0.028 | 37,830 | 600 | 28,200 | 390 | 23,000 | 320 | 20,700 | 290 | 19,550 | 220 |
| | | 4 | 0.019 | 27,800 | 440 | 23,600 | 280 | 21,000 | 230 | 18,900 | 210 | 17,850 | 160 |
| | 0.1 | 2 | 0.035 | 37,830 | 600 | 28,200 | 390 | 23,000 | 320 | 20,700 | 290 | 19,550 | 220 |
| | | 4 | 0.024 | 27,800 | 440 | 23,600 | 280 | 21,000 | 230 | 18,900 | 210 | 17,850 | 160 |
| 0.8 | 0.02 | 2 | 0.023 | 28,000 | 650 | 20,000 | 400 | 20,000 | 360 | 18,000 | 320 | 17,000 | 250 |
| | | 4 | 0.016 | 28,000 | 520 | 20,000 | 320 | 20,000 | 290 | 18,000 | 260 | 17,000 | 200 |
| | 0.05 | 2 | 0.038 | 28,000 | 650 | 20,000 | 400 | 20,000 | 360 | 18,000 | 320 | 17,000 | 250 |
| | | 4 | 0.026 | 28,000 | 520 | 20,000 | 320 | 20,000 | 290 | 18,000 | 260 | 17,000 | 200 |
| | 0.1 | 2 | 0.047 | 28,000 | 650 | 20,000 | 400 | 20,000 | 360 | 18,000 | 320 | 17,000 | 250 |
| | | 4 | 0.032 | 28,000 | 520 | 20,000 | 320 | 20,000 | 290 | 18,000 | 260 | 17,000 | 200 |
| | 0.2 | 2 | 0.081 | 28,000 | 650 | 20,000 | 400 | 20,000 | 360 | 18,000 | 320 | 17,000 | 250 |
| | | 4 | 0.056 | 28,000 | 520 | 20,000 | 320 | 20,000 | 290 | 18,000 | 260 | 17,000 | 200 |

| 被削材 Work material | | | | 1 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 2 焼入れ鋼 Hardened steels (45～55HRC) | | 3 焼入れ鋼 Hardened steels (55～65HRC) | | 4 焼入れ鋼 Hardened steels (65～68HRC) | | 5 焼入れ鋼 Hardened steels (68～72HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 100% | | 85% | | 80% | | 65% | | 55% | |
| 外径DC Tool dia. (mm) | コーナ半径RE Corner radius (mm) | 首下長 Under neck length (mm) | $a_p$ (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 1 | 0.02 | 2 | 0.016 | 30,290 | 1,210 | 26,730 | 960 | 24,950 | 800 | 22,450 | 720 | 21,210 | 560 |
| | | 4 | 0.013 | 27,540 | 1,040 | 24,300 | 820 | 22,680 | 670 | 20,410 | 600 | 19,280 | 470 |
| | | 6 | 0.01 | 22,310 | 840 | 19,680 | 660 | 18,370 | 540 | 16,530 | 490 | 15,620 | 380 |
| | | 8 | 0.008 | 19,830 | 750 | 17,500 | 590 | 16,330 | 480 | 14,700 | 430 | 13,880 | 340 |
| | 0.05 | 2 | 0.046 | 30,250 | 1,210 | 26,730 | 960 | 24,950 | 800 | 22,450 | 720 | 21,210 | 560 |
| | | 4 | 0.027 | 28,920 | 1,130 | 24,300 | 820 | 22,680 | 670 | 20,410 | 600 | 19,280 | 470 |
| | | 6 | 0.017 | 24,540 | 930 | 19,680 | 660 | 18,370 | 540 | 16,530 | 490 | 15,620 | 380 |
| | | 8 | 0.016 | 19,830 | 750 | 17,500 | 590 | 16,330 | 480 | 14,700 | 430 | 13,880 | 340 |
| | 0.1 | 2 | 0.065 | 30,290 | 1,210 | 26,730 | 960 | 24,950 | 800 | 22,450 | 720 | 21,210 | 560 |
| | | 4 | 0.038 | 27,540 | 1,040 | 24,300 | 820 | 22,680 | 670 | 20,410 | 600 | 19,280 | 470 |
| | | 6 | 0.024 | 22,310 | 840 | 19,680 | 660 | 18,370 | 540 | 16,530 | 490 | 15,620 | 380 |
| | | 8 | 0.024 | 19,830 | 750 | 17,500 | 590 | 16,330 | 480 | 14,700 | 430 | 13,880 | 340 |
| | 0.2 | 2 | 0.11 | 30,290 | 1,210 | 26,730 | 960 | 24,950 | 800 | 22,450 | 720 | 21,210 | 560 |
| | | 4 | 0.07 | 27,540 | 1,040 | 24,300 | 820 | 22,680 | 670 | 20,410 | 600 | 19,280 | 470 |
| | | 6 | 0.04 | 22,310 | 840 | 19,680 | 660 | 18,370 | 540 | 16,530 | 490 | 15,620 | 380 |
| | | 8 | 0.04 | 19,830 | 750 | 17,500 | 590 | 16,330 | 480 | 14,700 | 430 | 13,880 | 340 |

(1)$a_p$は被削材グループ1での目安を示しています。その他のグループの場合は、上表の切込み比率を目安に調整してください。
(2)リブ加工や止まり溝など、切りくずがつまりやすい切削の場合、切込み設定は基本切込みに切込み比率をかけて算出した切込み量を、さらにその80%まで小さくして使用してください。
(3)$a_e$の設定は$a_p$×切込み比率×5倍以下を目安に調整してください。仕上げ加工を行う場合、理論カスプハイトを計算し設定してください。
(4)彫り込み時の傾斜進入角は1°以下を推奨いたします。また、送り速度は条件表の70%以下に調整してください。
(5)文字彫り加工のような溝切削の際は、送り速度は50%以下・$a_p$を30%以下を目安に調整してください。また往復切削による加工を推奨いたします。

(1) $a_p$ is shown as the criteria for Group1 workpieces. For other groups, adjust the cutting depth according to the cutting depth factors in the above table.
(2) When performing cutting where cutting chips may cause clogging, such as for rib cutting, blind grooves, etc., cutting depth setting should be set by multiplying a cutting depth factor to calculate the cutting depth amount, and this amount should then be reduced to 80% of the calculated value.
(3) Adjust by setting $a_e$ to (5 or less)×($a_p$)×(cutting depth ratio). When performing finishing cutting, calculate the theoretical cusp height and set accordingly.
(4) The recommended slope entrance angle when engraving is 1° or less. In addition, feed rate should be adjusted to 70% or less of the values in the cutting condition table.
(5) When slotting such engraving letters, adjust feed rate to 50% or less and $a_p$ to 30% or less of the values shown. In addition, cutting by reciprocal cutting is recommended.

【切込み設定例】

EPDREH2010-2-02-TH3の工具で焼入れ鋼(50HRC)をリブ溝等高線切削する場合、
切込み=0.11($a_p$)×0.85 (焼入れ鋼グループ2の切込み比率)×0.8(閉鎖域の切削)=0.075mm

Cutting depth setting example: When cutting rib groove contours in hardened steel (50HRC) using an EPDREH2010-2-02-TH3 tool:
Cutting depth = 0.11 ($a_p$) × 0.85 (cutting depth factor for Group 2 hardened steel) × 0.8 (for closed-area cutting) = 0.075mm

【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

【Note】① Use the appropriate coolant for the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
③ If the rpm of the machine is low, lower the feed rate also to put the rpm and feed rate in the same ratio.

# エポックディープラジアスエボリューションハード-TH3

## 標準切削条件表
Recommended cutting conditions

4枚刃 4 Flutes

高能率切削条件 High efficiency cuttiing conditions

高精度切削条件 High accuracy cuttiing conditions



## EPDREH4-TH3

高精度切削条件はA189ページを参照してください。
Please refer to P.A189 about high accuracy cutting conditions

| 被削材 Work material | | | | 1 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 2 焼入れ鋼 Hardened steels (45～55HRC) | | 3 焼入れ鋼 Hardened steels (55～60HRC) | | 4 焼入れ鋼 Hardened steels (60～65HRC) | | 5 焼入れ鋼 Hardened steels (65～72HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Cutting depth ratio | | | | 120% | | 100% | | 70% | | 50% | | 25% | |
| 外径DC Tool dia. (mm) | コーナ半径RE Corner radius (mm) | 首下長 Under neck length (mm) | ap (mm) | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 1 | 0.02 | 1.5 | 0.019 | 38,900 | 3,420 | 38,900 | 3,110 | 28,300 | 2,040 | 23,000 | 1,840 | 21,200 | 1,440 |
| | | 2 | 0.016 | 35,000 | 3,080 | 35,000 | 2,800 | 25,500 | 1,840 | 20,700 | 1,660 | 19,100 | 1,300 |
| | | 2.5 | 0.015 | 31,800 | 2,800 | 31,800 | 2,540 | 23,100 | 1,660 | 18,800 | 1,500 | 17,400 | 1,180 |
| | | 3 | 0.014 | 29,200 | 2,570 | 29,200 | 2,340 | 21,200 | 1,530 | 17,200 | 1,380 | 15,900 | 1,080 |
| | | 4 | 0.013 | 25,000 | 2,200 | 25,000 | 2,000 | 18,200 | 1,310 | 14,800 | 1,180 | 13,600 | 920 |
| | | 5 | 0.013 | 21,900 | 1,930 | 21,900 | 1,750 | 15,900 | 1,140 | 12,900 | 1,030 | 11,900 | 810 |
| | | 6 | 0.007 | 19,500 | 1,720 | 19,500 | 1,560 | 14,100 | 1,020 | 11,500 | 920 | 10,600 | 720 |
| | | 8 | 0.004 | 15,900 | 1,400 | 15,900 | 1,270 | 11,600 | 840 | 9,400 | 750 | 8,700 | 590 |
| | 0.05 | 1.5 | 0.046 | 38,900 | 3,420 | 38,900 | 3,110 | 28,300 | 2,040 | 23,000 | 1,840 | 21,200 | 1,440 |
| | | 2 | 0.034 | 35,000 | 3,080 | 35,000 | 2,800 | 25,500 | 1,840 | 20,700 | 1,660 | 19,100 | 1,300 |
| | | 2.5 | 0.033 | 31,800 | 2,800 | 31,800 | 2,540 | 23,100 | 1,660 | 18,800 | 1,500 | 17,400 | 1,180 |
| | | 3 | 0.030 | 29,200 | 2,570 | 29,200 | 2,340 | 21,200 | 1,530 | 17,200 | 1,380 | 15,900 | 1,080 |
| | | 4 | 0.028 | 25,000 | 2,200 | 25,000 | 2,000 | 18,200 | 1,310 | 14,800 | 1,180 | 13,600 | 920 |
| | | 5 | 0.027 | 21,900 | 1,930 | 21,900 | 1,750 | 15,900 | 1,140 | 12,900 | 1,030 | 11,900 | 810 |
| | | 6 | 0.015 | 19,500 | 1,720 | 19,500 | 1,560 | 14,100 | 1,020 | 11,500 | 920 | 10,600 | 720 |
| | | 8 | 0.009 | 15,900 | 1,400 | 15,900 | 1,270 | 11,600 | 840 | 9,400 | 750 | 8,700 | 590 |
| | 0.1 | 1.5 | 0.056 | 38,900 | 3,420 | 38,900 | 3,110 | 28,300 | 2,040 | 23,000 | 1,840 | 21,200 | 1,440 |
| | | 2 | 0.042 | 35,000 | 3,080 | 35,000 | 2,800 | 25,500 | 1,840 | 20,700 | 1,660 | 19,100 | 1,300 |
| | | 2.5 | 0.040 | 31,800 | 2,800 | 31,800 | 2,540 | 23,100 | 1,660 | 18,800 | 1,500 | 17,400 | 1,180 |
| | | 3 | 0.037 | 29,200 | 2,570 | 29,200 | 2,340 | 21,200 | 1,530 | 17,200 | 1,380 | 15,900 | 1,080 |
| | | 4 | 0.035 | 25,000 | 2,200 | 25,000 | 2,000 | 18,200 | 1,310 | 14,800 | 1,180 | 13,600 | 920 |
| | | 5 | 0.034 | 21,900 | 1,930 | 21,900 | 1,750 | 15,900 | 1,140 | 12,900 | 1,030 | 11,900 | 810 |
| | | 6 | 0.019 | 19,500 | 1,720 | 19,500 | 1,560 | 14,100 | 1,020 | 11,500 | 920 | 10,600 | 720 |
| | | 8 | 0.011 | 15,900 | 1,400 | 15,900 | 1,270 | 11,600 | 840 | 9,400 | 750 | 8,700 | 590 |
| | 0.2 | 1.5 | 0.063 | 38,900 | 3,420 | 38,900 | 3,110 | 28,300 | 2,040 | 23,000 | 1,840 | 21,200 | 1,440 |
| | | 2 | 0.047 | 35,000 | 3,080 | 35,000 | 2,800 | 25,500 | 1,840 | 20,700 | 1,660 | 19,100 | 1,300 |
| | | 2.5 | 0.045 | 31,800 | 2,800 | 31,800 | 2,540 | 23,100 | 1,660 | 18,800 | 1,500 | 17,400 | 1,180 |
| | | 3 | 0.042 | 29,200 | 2,570 | 29,200 | 2,340 | 21,200 | 1,530 | 17,200 | 1,380 | 15,900 | 1,080 |
| | | 4 | 0.039 | 25,000 | 2,200 | 25,000 | 2,000 | 18,200 | 1,310 | 14,800 | 1,180 | 13,600 | 920 |
| | | 5 | 0.038 | 21,900 | 1,930 | 21,900 | 1,750 | 15,900 | 1,140 | 12,900 | 1,030 | 11,900 | 810 |
| | | 6 | 0.021 | 19,500 | 1,720 | 19,500 | 1,560 | 14,100 | 1,020 | 11,500 | 920 | 10,600 | 720 |
| | | 8 | 0.012 | 15,900 | 1,400 | 15,900 | 1,270 | 11,600 | 840 | 9,400 | 750 | 8,700 | 590 |
| | 0.3 | 1.5 | 0.070 | 38,900 | 3,420 | 38,900 | 3,110 | 28,300 | 2,040 | 23,000 | 1,840 | 21,200 | 1,440 |
| | | 2 | 0.053 | 35,000 | 3,080 | 35,000 | 2,800 | 25,500 | 1,840 | 20,700 | 1,660 | 19,100 | 1,300 |
| | | 2.5 | 0.050 | 31,800 | 2,800 | 31,800 | 2,540 | 23,100 | 1,660 | 18,800 | 1,500 | 17,400 | 1,180 |
| | | 3 | 0.047 | 29,200 | 2,570 | 29,200 | 2,340 | 21,200 | 1,530 | 17,200 | 1,380 | 15,900 | 1,080 |
| | | 4 | 0.044 | 25,000 | 2,200 | 25,000 | 2,000 | 18,200 | 1,310 | 14,800 | 1,180 | 13,600 | 920 |
| | | 5 | 0.042 | 21,900 | 1,930 | 21,900 | 1,750 | 15,900 | 1,140 | 12,900 | 1,030 | 11,900 | 810 |
| | | 6 | 0.023 | 19,500 | 1,720 | 19,500 | 1,560 | 14,100 | 1,020 | 11,500 | 920 | 10,600 | 720 |
| | | 8 | 0.013 | 15,900 | 1,400 | 15,900 | 1,270 | 11,600 | 840 | 9,400 | 750 | 8,700 | 590 |
| 1.5 | 0.02 | 2 | 0.017 | 26,900 | 3,310 | 26,900 | 3,010 | 19,600 | 1,980 | 15,900 | 1,780 | 14,700 | 1,400 |
| | | 3 | 0.016 | 23,300 | 2,870 | 23,300 | 2,610 | 17,000 | 1,710 | 13,800 | 1,550 | 12,700 | 1,210 |
| | | 4 | 0.014 | 20,600 | 2,540 | 20,600 | 2,310 | 15,000 | 1,510 | 12,200 | 1,370 | 11,200 | 1,070 |
| | | 5 | 0.013 | 18,400 | 2,270 | 18,400 | 2,060 | 13,400 | 1,350 | 10,900 | 1,220 | 10,100 | 960 |
| | | 6 | 0.012 | 16,700 | 2,060 | 16,700 | 1,870 | 12,100 | 1,220 | 9,900 | 1,110 | 9,100 | 870 |
| | | 8 | 0.011 | 15,200 | 1,870 | 15,200 | 1,700 | 11,100 | 1,120 | 9,000 | 1,010 | 8,300 | 790 |
| | | 10 | 0.010 | 14,000 | 1,720 | 14,000 | 1,570 | 10,200 | 1,030 | 8,300 | 930 | 7,600 | 720 |
| | | 12 | 0.008 | 12,100 | 1,490 | 12,100 | 1,360 | 8,800 | 890 | 7,100 | 800 | 6,600 | 630 |
| | 0.05 | 2 | 0.048 | 26,900 | 3,310 | 26,900 | 3,010 | 19,600 | 1,980 | 15,900 | 1,780 | 14,700 | 1,400 |
| | | 3 | 0.043 | 23,300 | 2,870 | 23,300 | 2,610 | 17,000 | 1,710 | 13,800 | 1,550 | 12,700 | 1,210 |
| | | 4 | 0.039 | 20,600 | 2,540 | 20,600 | 2,310 | 15,000 | 1,510 | 12,200 | 1,370 | 11,200 | 1,070 |
| | | 5 | 0.035 | 18,400 | 2,270 | 18,400 | 2,060 | 13,400 | 1,350 | 10,900 | 1,220 | 10,100 | 960 |
| | | 6 | 0.032 | 16,700 | 2,060 | 16,700 | 1,870 | 12,100 | 1,220 | 9,900 | 1,110 | 9,100 | 870 |
| | | 8 | 0.030 | 15,200 | 1,870 | 15,200 | 1,700 | 11,100 | 1,120 | 9,000 | 1,010 | 8,300 | 790 |
| | | 10 | 0.027 | 14,000 | 1,720 | 14,000 | 1,570 | 10,200 | 1,030 | 8,300 | 930 | 7,600 | 720 |
| | | 12 | 0.022 | 12,100 | 1,490 | 12,100 | 1,360 | 8,800 | 890 | 7,100 | 800 | 6,600 | 630 |
| | 0.1 | 2 | 0.078 | 26,900 | 3,310 | 26,900 | 3,010 | 19,600 | 1,980 | 15,900 | 1,780 | 14,700 | 1,400 |
| | | 3 | 0.071 | 23,300 | 2,870 | 23,300 | 2,610 | 17,000 | 1,710 | 13,800 | 1,550 | 12,700 | 1,210 |
| | | 4 | 0.064 | 20,600 | 2,540 | 20,600 | 2,310 | 15,000 | 1,510 | 12,200 | 1,370 | 11,200 | 1,070 |
| | | 5 | 0.057 | 18,400 | 2,270 | 18,400 | 2,060 | 13,400 | 1,350 | 10,900 | 1,220 | 10,100 | 960 |

| 被削材 Work material | | | | 1 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 2 焼入れ鋼 Hardened steels (45～55HRC) | | 3 焼入れ鋼 Hardened steels (55～60HRC) | | 4 焼入れ鋼 Hardened steels (60～65HRC) | | 5 焼入れ鋼 Hardened steels (65～72HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Cutting depth ratio | | | | 120% | | 100% | | 70% | | 50% | | 25% | |
| 外径DC Tool dia. (mm) | コーナ半径RE Corner radius (mm) | 首下長 Under neck length (mm) | ap (mm) | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min |
| 1.5 | 0.1 | 6 | 0.052 | 16,700 | 2,060 | 16,700 | 1,870 | 12,100 | 1,220 | 9,900 | 1,110 | 9,100 | 870 |
| | | 8 | 0.049 | 15,200 | 1,870 | 15,200 | 1,700 | 11,100 | 1,120 | 9,000 | 1,010 | 8,300 | 790 |
| | | 10 | 0.044 | 14,000 | 1,720 | 14,000 | 1,570 | 10,200 | 1,030 | 8,300 | 930 | 7,600 | 720 |
| | | 12 | 0.035 | 12,100 | 1,490 | 12,100 | 1,360 | 8,800 | 890 | 7,100 | 800 | 6,600 | 630 |
| | 0.2 | 2 | 0.082 | 26,900 | 3,310 | 26,900 | 3,010 | 19,600 | 1,980 | 15,900 | 1,780 | 14,700 | 1,400 |
| | | 3 | 0.075 | 23,300 | 2,870 | 23,300 | 2,610 | 17,000 | 1,710 | 13,800 | 1,550 | 12,700 | 1,210 |
| | | 4 | 0.067 | 20,600 | 2,540 | 20,600 | 2,310 | 15,000 | 1,510 | 12,200 | 1,370 | 11,200 | 1,070 |
| | | 5 | 0.060 | 18,400 | 2,270 | 18,400 | 2,060 | 13,400 | 1,350 | 10,900 | 1,220 | 10,100 | 960 |
| | | 6 | 0.055 | 16,700 | 2,060 | 16,700 | 1,870 | 12,100 | 1,220 | 9,900 | 1,110 | 9,100 | 870 |
| | | 8 | 0.051 | 15,200 | 1,870 | 15,200 | 1,700 | 11,100 | 1,120 | 9,000 | 1,010 | 8,300 | 790 |
| | | 10 | 0.047 | 14,000 | 1,720 | 14,000 | 1,570 | 10,200 | 1,030 | 8,300 | 930 | 7,600 | 720 |
| | | 12 | 0.037 | 12,100 | 1,490 | 12,100 | 1,360 | 8,800 | 890 | 7,100 | 800 | 6,600 | 630 |
| | 0.3 | 2 | 0.085 | 26,900 | 3,310 | 26,900 | 3,010 | 19,600 | 1,980 | 15,900 | 1,780 | 14,700 | 1,400 |
| | | 3 | 0.077 | 23,300 | 2,870 | 23,300 | 2,610 | 17,000 | 1,710 | 13,800 | 1,550 | 12,700 | 1,210 |
| | | 4 | 0.069 | 20,600 | 2,540 | 20,600 | 2,310 | 15,000 | 1,510 | 12,200 | 1,370 | 11,200 | 1,070 |
| | | 5 | 0.062 | 18,400 | 2,270 | 18,400 | 2,060 | 13,400 | 1,350 | 10,900 | 1,220 | 10,100 | 960 |
| | | 6 | 0.057 | 16,700 | 2,060 | 16,700 | 1,870 | 12,100 | 1,220 | 9,900 | 1,110 | 9,100 | 870 |
| | | 8 | 0.053 | 15,200 | 1,870 | 15,200 | 1,700 | 11,100 | 1,120 | 9,000 | 1,010 | 8,300 | 790 |
| | | 10 | 0.048 | 14,000 | 1,720 | 14,000 | 1,570 | 10,200 | 1,030 | 8,300 | 930 | 7,600 | 720 |
| | | 12 | 0.039 | 12,100 | 1,490 | 12,100 | 1,360 | 8,800 | 890 | 7,100 | 800 | 6,600 | 630 |
| | 0.5 | 2 | 0.087 | 26,900 | 3,310 | 26,900 | 3,010 | 19,600 | 1,980 | 15,900 | 1,780 | 14,700 | 1,400 |
| | | 3 | 0.079 | 23,300 | 2,870 | 23,300 | 2,610 | 17,000 | 1,710 | 13,800 | 1,550 | 12,700 | 1,210 |
| | | 4 | 0.071 | 20,600 | 2,540 | 20,600 | 2,310 | 15,000 | 1,510 | 12,200 | 1,370 | 11,200 | 1,070 |
| | | 5 | 0.063 | 18,400 | 2,270 | 18,400 | 2,060 | 13,400 | 1,350 | 10,900 | 1,220 | 10,100 | 960 |
| | | 6 | 0.058 | 16,700 | 2,060 | 16,700 | 1,870 | 12,100 | 1,220 | 9,900 | 1,110 | 9,100 | 870 |
| | | 8 | 0.054 | 15,200 | 1,870 | 15,200 | 1,700 | 11,100 | 1,120 | 9,000 | 1,010 | 8,300 | 790 |
| | | 10 | 0.049 | 14,000 | 1,720 | 14,000 | 1,570 | 10,200 | 1,030 | 8,300 | 930 | 7,600 | 720 |
| | | 12 | 0.039 | 12,100 | 1,490 | 12,100 | 1,360 | 8,800 | 890 | 7,100 | 800 | 6,600 | 630 |
| 2 | 0.02 | 2.5 | 0.018 | 20,600 | 3,630 | 20,600 | 3,300 | 15,000 | 2,160 | 12,200 | 1,950 | 11,200 | 1,520 |
| | | 3 | 0.016 | 19,500 | 3,430 | 19,500 | 3,120 | 14,100 | 2,030 | 11,500 | 1,840 | 10,600 | 1,440 |
| | | 4 | 0.014 | 17,500 | 3,080 | 17,500 | 2,800 | 12,700 | 1,830 | 10,300 | 1,650 | 9,500 | 1,290 |
| | | 5 | 0.014 | 15,900 | 2,800 | 15,900 | 2,540 | 11,600 | 1,670 | 9,400 | 1,500 | 8,700 | 1,180 |
| | | 6 | 0.013 | 14,600 | 2,570 | 14,600 | 2,340 | 10,600 | 1,530 | 8,600 | 1,380 | 8,000 | 1,090 |
| | | 8 | 0.013 | 12,500 | 2,200 | 12,500 | 2,000 | 9,100 | 1,310 | 7,400 | 1,180 | 6,800 | 920 |
| | | 10 | 0.012 | 10,900 | 1,920 | 10,900 | 1,740 | 8,000 | 1,150 | 6,500 | 1,040 | 6,000 | 820 |
| | | 12 | 0.009 | 9,700 | 1,710 | 9,700 | 1,550 | 7,100 | 1,020 | 5,700 | 910 | 5,300 | 720 |
| | 0.05 | 2.5 | 0.048 | 20,600 | 3,630 | 20,600 | 3,300 | 15,000 | 2,160 | 12,200 | 1,950 | 11,200 | 1,520 |
| | | 3 | 0.043 | 19,500 | 3,430 | 19,500 | 3,120 | 14,100 | 2,030 | 11,500 | 1,840 | 10,600 | 1,440 |
| | | 4 | 0.037 | 17,500 | 3,080 | 17,500 | 2,800 | 12,700 | 1,830 | 10,300 | 1,650 | 9,500 | 1,290 |
| | | 5 | 0.036 | 15,900 | 2,800 | 15,900 | 2,540 | 11,600 | 1,670 | 9,400 | 1,500 | 8,700 | 1,180 |
| | | 6 | 0.035 | 14,600 | 2,570 | 14,600 | 2,340 | 10,600 | 1,530 | 8,600 | 1,380 | 8,000 | 1,090 |
| | | 8 | 0.034 | 12,500 | 2,200 | 12,500 | 2,000 | 9,100 | 1,310 | 7,400 | 1,180 | 6,800 | 920 |
| | | 10 | 0.032 | 10,900 | 1,920 | 10,900 | 1,740 | 8,000 | 1,150 | 6,500 | 1,040 | 6,000 | 820 |
| | | 12 | 0.024 | 9,700 | 1,710 | 9,700 | 1,550 | 7,100 | 1,020 | 5,700 | 910 | 5,300 | 720 |
| | 0.1 | 2.5 | 0.082 | 20,600 | 3,630 | 20,600 | 3,300 | 15,000 | 2,160 | 12,200 | 1,950 | 11,200 | 1,520 |
| | | 3 | 0.073 | 19,500 | 3,430 | 19,500 | 3,120 | 14,100 | 2,030 | 11,500 | 1,840 | 10,600 | 1,440 |
| | | 4 | 0.063 | 17,500 | 3,080 | 17,500 | 2,800 | 12,700 | 1,830 | 10,300 | 1,650 | 9,500 | 1,290 |
| | | 5 | 0.061 | 15,900 | 2,800 | 15,900 | 2,540 | 11,600 | 1,670 | 9,400 | 1,500 | 8,700 | 1,180 |
| | | 6 | 0.059 | 14,600 | 2,570 | 14,600 | 2,340 | 10,600 | 1,530 | 8,600 | 1,380 | 8,000 | 1,090 |
| | | 8 | 0.058 | 12,500 | 2,200 | 12,500 | 2,000 | 9,100 | 1,310 | 7,400 | 1,180 | 6,800 | 920 |
| | | 10 | 0.054 | 10,900 | 1,920 | 10,900 | 1,740 | 8,000 | 1,150 | 6,500 | 1,040 | 6,000 | 820 |
| | | 12 | 0.041 | 9,700 | 1,710 | 9,700 | 1,550 | 7,100 | 1,020 | 5,700 | 910 | 5,300 | 720 |
| | 0.2 | 2.5 | 0.092 | 20,600 | 3,630 | 20,600 | 3,300 | 15,000 | 2,160 | 12,200 | 1,950 | 11,200 | 1,520 |
| | | 3 | 0.082 | 19,500 | 3,430 | 19,500 | 3,120 | 14,100 | 2,030 | 11,500 | 1,840 | 10,600 | 1,440 |
| | | 4 | 0.071 | 17,500 | 3,080 | 17,500 | 2,800 | 12,700 | 1,830 | 10,300 | 1,650 | 9,500 | 1,290 |
| | | 5 | 0.069 | 15,900 | 2,800 | 15,900 | 2,540 | 11,600 | 1,670 | 9,400 | 1,500 | 8,700 | 1,180 |
| | | 6 | 0.066 | 14,600 | 2,570 | 14,600 | 2,340 | 10,600 | 1,530 | 8,600 | 1,380 | 8,000 | 1,090 |
| | | 8 | 0.066 | 12,500 | 2,200 | 12,500 | 2,000 | 9,100 | 1,310 | 7,400 | 1,180 | 6,800 | 920 |
| | | 10 | 0.061 | 10,900 | 1,920 | 10,900 | 1,740 | 8,000 | 1,150 | 6,500 | 1,040 | 6,000 | 820 |
| | | 12 | 0.046 | 9,700 | 1,710 | 9,700 | 1,550 | 7,100 | 1,020 | 5,700 | 910 | 5,300 | 720 |

【注意】ご使用にあたっては、A188ページの表下の項目と注意を参照してください。【Note】Refer to the comments and notes below the table on page A188 regarding usage.

# Epoch Deep Radius Evolution Hard-TH3
# エポックディープラジアスエボリューションハード-TH3

**EPDREH4-TH3** | **4枚刃** 4 Flutes | **高能率切削条件** High-efficiency cutting conditions | 高精度切削条件 High-accuracy cutting conditions

高精度切削条件はA189ページを参照してください。
Please refer to P.A189 about high accuracy cutting conditions

| 被削材 Work material | | | | 1 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 2 焼入れ鋼 Hardened steels (45～55HRC) | | 3 焼入れ鋼 Hardened steels (55～60HRC) | | 4 焼入れ鋼 Hardened steels (60～65HRC) | | 5 焼入れ鋼 Hardened steels (65～72HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Cutting depth ratio | | | | 120% | | 100% | | 70% | | 50% | | 25% | |
| 外径DC Tool dia. (mm) | コーナ半径RE Corner radius (mm) | 首下長 Under neck length (mm) | $a_p$ (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 2 | 0.3 | 2.5 | 0.097 | 20,600 | 3,630 | 20,600 | 3,300 | 15,000 | 2,160 | 12,200 | 1,950 | 11,200 | 1,520 |
| | | 3 | 0.087 | 19,500 | 3,430 | 19,500 | 3,120 | 14,100 | 2,030 | 11,500 | 1,840 | 10,600 | 1,440 |
| | | 4 | 0.074 | 17,500 | 3,080 | 17,500 | 2,800 | 12,700 | 1,830 | 10,300 | 1,650 | 9,500 | 1,290 |
| | | 5 | 0.073 | 15,900 | 2,800 | 15,900 | 2,540 | 11,600 | 1,670 | 9,400 | 1,500 | 8,700 | 1,180 |
| | | 6 | 0.070 | 14,600 | 2,570 | 14,600 | 2,340 | 10,600 | 1,530 | 8,600 | 1,380 | 8,000 | 1,090 |
| | | 8 | 0.069 | 12,500 | 2,200 | 12,500 | 2,000 | 9,100 | 1,310 | 7,400 | 1,180 | 6,800 | 920 |
| | | 10 | 0.064 | 10,900 | 1,920 | 10,900 | 1,740 | 8,000 | 1,150 | 6,500 | 1,040 | 6,000 | 820 |
| | | 12 | 0.049 | 9,700 | 1,710 | 9,700 | 1,550 | 7,100 | 1,020 | 5,700 | 910 | 5,300 | 720 |
| | 0.5 | 2.5 | 0.102 | 20,600 | 3,630 | 20,600 | 3,300 | 15,000 | 2,160 | 12,200 | 1,950 | 11,200 | 1,520 |
| | | 3 | 0.091 | 19,500 | 3,430 | 19,500 | 3,120 | 14,100 | 2,030 | 11,500 | 1,840 | 10,600 | 1,440 |
| | | 4 | 0.078 | 17,500 | 3,080 | 17,500 | 2,800 | 12,700 | 1,830 | 10,300 | 1,650 | 9,500 | 1,290 |
| | | 5 | 0.076 | 15,900 | 2,800 | 15,900 | 2,540 | 11,600 | 1,670 | 9,400 | 1,500 | 8,700 | 1,180 |
| | | 6 | 0.074 | 14,600 | 2,570 | 14,600 | 2,340 | 10,600 | 1,530 | 8,600 | 1,380 | 8,000 | 1,090 |
| | | 8 | 0.073 | 12,500 | 2,200 | 12,500 | 2,000 | 9,100 | 1,310 | 7,400 | 1,180 | 6,800 | 920 |
| | | 10 | 0.068 | 10,900 | 1,920 | 10,900 | 1,740 | 8,000 | 1,150 | 6,500 | 1,040 | 6,000 | 820 |
| | | 12 | 0.051 | 9,700 | 1,710 | 9,700 | 1,550 | 7,100 | 1,020 | 5,700 | 910 | 5,300 | 720 |
| 3 | 0.05 | 4 | 0.045 | 18,600 | 2,950 | 18,600 | 2,680 | 13,500 | 1,750 | 11,000 | 1,580 | 10,200 | 1,250 |
| | | 6 | 0.043 | 15,400 | 2,440 | 15,400 | 2,220 | 11,200 | 1,450 | 9,100 | 1,310 | 8,400 | 1,030 |
| | | 8 | 0.042 | 13,100 | 2,080 | 13,100 | 1,890 | 9,500 | 1,230 | 7,700 | 1,110 | 7,100 | 870 |
| | | 10 | 0.041 | 11,400 | 1,810 | 11,400 | 1,640 | 8,300 | 1,080 | 6,700 | 960 | 6,200 | 760 |
| | | 12 | 0.038 | 10,100 | 1,600 | 10,100 | 1,450 | 7,300 | 950 | 5,900 | 850 | 5,500 | 670 |
| | | 14 | 0.035 | 9,000 | 1,430 | 9,000 | 1,300 | 6,600 | 860 | 5,300 | 760 | 4,900 | 600 |
| | | 16 | 0.034 | 8,200 | 1,300 | 8,200 | 1,180 | 5,900 | 760 | 4,800 | 690 | 4,500 | 550 |
| | | 18 | 0.030 | 7,500 | 1,190 | 7,500 | 1,080 | 5,400 | 700 | 4,400 | 630 | 4,100 | 500 |
| | | 20 | 0.022 | 6,900 | 1,090 | 6,900 | 990 | 5,000 | 650 | 4,100 | 590 | 3,800 | 470 |
| | 0.1 | 4 | 0.090 | 18,600 | 2,950 | 18,600 | 2,680 | 13,500 | 1,750 | 11,000 | 1,580 | 10,200 | 1,250 |
| | | 6 | 0.087 | 15,400 | 2,440 | 15,400 | 2,220 | 11,200 | 1,450 | 9,100 | 1,310 | 8,400 | 1,030 |
| | | 8 | 0.085 | 13,100 | 2,080 | 13,100 | 1,890 | 9,500 | 1,230 | 7,700 | 1,110 | 7,100 | 870 |
| | | 10 | 0.081 | 11,400 | 1,810 | 11,400 | 1,640 | 8,300 | 1,080 | 6,700 | 960 | 6,200 | 760 |
| | | 12 | 0.075 | 10,100 | 1,600 | 10,100 | 1,450 | 7,300 | 950 | 5,900 | 850 | 5,500 | 670 |
| | | 14 | 0.069 | 9,000 | 1,430 | 9,000 | 1,300 | 6,600 | 860 | 5,300 | 760 | 4,900 | 600 |
| | | 16 | 0.067 | 8,200 | 1,300 | 8,200 | 1,180 | 5,900 | 760 | 4,800 | 690 | 4,500 | 550 |
| | | 18 | 0.061 | 7,500 | 1,190 | 7,500 | 1,080 | 5,400 | 700 | 4,400 | 630 | 4,100 | 500 |
| | | 20 | 0.044 | 6,900 | 1,090 | 6,900 | 990 | 5,000 | 650 | 4,100 | 590 | 3,800 | 470 |
| | 0.2 | 4 | 0.102 | 18,600 | 2,950 | 18,600 | 2,680 | 13,500 | 1,750 | 11,000 | 1,580 | 10,200 | 1,250 |
| | | 6 | 0.098 | 15,400 | 2,440 | 15,400 | 2,220 | 11,200 | 1,450 | 9,100 | 1,310 | 8,400 | 1,030 |
| | | 8 | 0.095 | 13,100 | 2,080 | 13,100 | 1,890 | 9,500 | 1,230 | 7,700 | 1,110 | 7,100 | 870 |
| | | 10 | 0.092 | 11,400 | 1,810 | 11,400 | 1,640 | 8,300 | 1,080 | 6,700 | 960 | 6,200 | 760 |
| | | 12 | 0.085 | 10,100 | 1,600 | 10,100 | 1,450 | 7,300 | 950 | 5,900 | 850 | 5,500 | 670 |
| | | 14 | 0.078 | 9,000 | 1,430 | 9,000 | 1,300 | 6,600 | 860 | 5,300 | 760 | 4,900 | 600 |
| | | 16 | 0.076 | 8,200 | 1,300 | 8,200 | 1,180 | 5,900 | 760 | 4,800 | 690 | 4,500 | 550 |
| | | 18 | 0.068 | 7,500 | 1,190 | 7,500 | 1,080 | 5,400 | 700 | 4,400 | 630 | 4,100 | 500 |
| | | 20 | 0.050 | 6,900 | 1,090 | 6,900 | 990 | 5,000 | 650 | 4,100 | 590 | 3,800 | 470 |
| | 0.3 | 4 | 0.107 | 18,600 | 2,950 | 18,600 | 2,680 | 13,500 | 1,750 | 11,000 | 1,580 | 10,200 | 1,250 |
| | | 6 | 0.103 | 15,400 | 2,440 | 15,400 | 2,220 | 11,200 | 1,450 | 9,100 | 1,310 | 8,400 | 1,030 |
| | | 8 | 0.101 | 13,100 | 2,080 | 13,100 | 1,890 | 9,500 | 1,230 | 7,700 | 1,110 | 7,100 | 870 |
| | | 10 | 0.097 | 11,400 | 1,810 | 11,400 | 1,640 | 8,300 | 1,080 | 6,700 | 960 | 6,200 | 760 |
| | | 12 | 0.090 | 10,100 | 1,600 | 10,100 | 1,450 | 7,300 | 950 | 5,900 | 850 | 5,500 | 670 |
| | | 14 | 0.082 | 9,000 | 1,430 | 9,000 | 1,300 | 6,600 | 860 | 5,300 | 760 | 4,900 | 600 |
| | | 16 | 0.080 | 8,200 | 1,300 | 8,200 | 1,180 | 5,900 | 760 | 4,800 | 690 | 4,500 | 550 |
| | | 18 | 0.072 | 7,500 | 1,190 | 7,500 | 1,080 | 5,400 | 700 | 4,400 | 630 | 4,100 | 500 |
| | | 20 | 0.053 | 6,900 | 1,090 | 6,900 | 990 | 5,000 | 650 | 4,100 | 590 | 3,800 | 470 |
| | 0.5 | 4 | 0.113 | 18,600 | 2,950 | 18,600 | 2,680 | 13,500 | 1,750 | 11,000 | 1,580 | 10,200 | 1,250 |
| | | 6 | 0.109 | 15,400 | 2,440 | 15,400 | 2,220 | 11,200 | 1,450 | 9,100 | 1,310 | 8,400 | 1,030 |
| | | 8 | 0.106 | 13,100 | 2,080 | 13,100 | 1,890 | 9,500 | 1,230 | 7,700 | 1,110 | 7,100 | 870 |
| | | 10 | 0.102 | 11,400 | 1,810 | 11,400 | 1,640 | 8,300 | 1,080 | 6,700 | 960 | 6,200 | 760 |
| | | 12 | 0.094 | 10,100 | 1,600 | 10,100 | 1,450 | 7,300 | 950 | 5,900 | 850 | 5,500 | 670 |
| | | 14 | 0.087 | 9,000 | 1,430 | 9,000 | 1,300 | 6,600 | 860 | 5,300 | 760 | 4,900 | 600 |
| | | 16 | 0.084 | 8,200 | 1,300 | 8,200 | 1,180 | 5,900 | 760 | 4,800 | 690 | 4,500 | 550 |
| | | 18 | 0.076 | 7,500 | 1,190 | 7,500 | 1,080 | 5,400 | 700 | 4,400 | 630 | 4,100 | 500 |
| | | 20 | 0.056 | 6,900 | 1,090 | 6,900 | 990 | 5,000 | 650 | 4,100 | 590 | 3,800 | 470 |

| 被削材 Work material | | | | 1 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 2 焼入れ鋼 Hardened steels (45～55HRC) | | 3 焼入れ鋼 Hardened steels (55～60HRC) | | 4 焼入れ鋼 Hardened steels (60～65HRC) | | 5 焼入れ鋼 Hardened steels (65～72HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Cutting depth ratio | | | | 120% | | 100% | | 70% | | 50% | | 25% | |
| 外径DC Tool dia. (mm) | コーナ半径RE Corner radius (mm) | 首下長 Under neck length (mm) | $a_p$ (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 4 | 0.1 | 8 | 0.091 | 10,400 | 2,750 | 10,400 | 2,500 | 7,600 | 1,640 | 6,200 | 1,490 | 5,700 | 1,160 |
| | | 10 | 0.089 | 9,300 | 2,460 | 9,300 | 2,230 | 6,800 | 1,470 | 5,500 | 1,320 | 5,100 | 1,040 |
| | | 12 | 0.084 | 8,400 | 2,220 | 8,400 | 2,020 | 6,100 | 1,320 | 5,000 | 1,200 | 4,600 | 940 |
| | | 14 | 0.079 | 7,700 | 2,030 | 7,700 | 1,850 | 5,600 | 1,210 | 4,500 | 1,080 | 4,200 | 860 |
| | | 16 | 0.076 | 7,100 | 1,870 | 7,100 | 1,700 | 5,100 | 1,100 | 4,200 | 1,010 | 3,900 | 800 |
| | | 18 | 0.074 | 6,500 | 1,720 | 6,500 | 1,560 | 4,800 | 1,040 | 3,900 | 940 | 3,600 | 730 |
| | | 20 | 0.070 | 6,100 | 1,610 | 6,100 | 1,460 | 4,400 | 950 | 3,600 | 860 | 3,300 | 670 |
| | | 22 | 0.059 | 5,700 | 1,500 | 5,700 | 1,370 | 4,100 | 890 | 3,400 | 820 | 3,100 | 630 |
| | | 24 | 0.055 | 5,300 | 1,400 | 5,300 | 1,270 | 3,900 | 840 | 3,200 | 770 | 2,900 | 590 |
| | 0.2 | 8 | 0.126 | 10,400 | 2,750 | 10,400 | 2,500 | 7,600 | 1,640 | 6,200 | 1,490 | 5,700 | 1,160 |
| | | 10 | 0.123 | 9,300 | 2,460 | 9,300 | 2,230 | 6,800 | 1,470 | 5,500 | 1,320 | 5,100 | 1,040 |
| | | 12 | 0.117 | 8,400 | 2,220 | 8,400 | 2,020 | 6,100 | 1,320 | 5,000 | 1,200 | 4,600 | 940 |
| | | 14 | 0.109 | 7,700 | 2,030 | 7,700 | 1,850 | 5,600 | 1,210 | 4,500 | 1,080 | 4,200 | 860 |
| | | 16 | 0.105 | 7,100 | 1,870 | 7,100 | 1,700 | 5,100 | 1,100 | 4,200 | 1,010 | 3,900 | 800 |
| | | 18 | 0.102 | 6,500 | 1,720 | 6,500 | 1,560 | 4,800 | 1,040 | 3,900 | 940 | 3,600 | 730 |
| | | 20 | 0.097 | 6,100 | 1,610 | 6,100 | 1,460 | 4,400 | 950 | 3,600 | 860 | 3,300 | 670 |
| | | 22 | 0.081 | 5,700 | 1,500 | 5,700 | 1,370 | 4,100 | 890 | 3,400 | 820 | 3,100 | 630 |
| | | 24 | 0.077 | 5,300 | 1,400 | 5,300 | 1,270 | 3,900 | 840 | 3,200 | 770 | 2,900 | 590 |
| | 0.3 | 8 | 0.133 | 10,400 | 2,750 | 10,400 | 2,500 | 7,600 | 1,640 | 6,200 | 1,490 | 5,700 | 1,160 |
| | | 10 | 0.129 | 9,300 | 2,460 | 9,300 | 2,230 | 6,800 | 1,470 | 5,500 | 1,320 | 5,100 | 1,040 |
| | | 12 | 0.123 | 8,400 | 2,220 | 8,400 | 2,020 | 6,100 | 1,320 | 5,000 | 1,200 | 4,600 | 940 |
| | | 14 | 0.115 | 7,700 | 2,030 | 7,700 | 1,850 | 5,600 | 1,210 | 4,500 | 1,080 | 4,200 | 860 |
| | | 16 | 0.111 | 7,100 | 1,870 | 7,100 | 1,700 | 5,100 | 1,100 | 4,200 | 1,010 | 3,900 | 800 |
| | | 18 | 0.108 | 6,500 | 1,720 | 6,500 | 1,560 | 4,800 | 1,040 | 3,900 | 940 | 3,600 | 730 |
| | | 20 | 0.102 | 6,100 | 1,610 | 6,100 | 1,460 | 4,400 | 950 | 3,600 | 860 | 3,300 | 670 |
| | | 22 | 0.086 | 5,700 | 1,500 | 5,700 | 1,370 | 4,100 | 890 | 3,400 | 820 | 3,100 | 630 |
| | | 24 | 0.081 | 5,300 | 1,400 | 5,300 | 1,270 | 3,900 | 840 | 3,200 | 770 | 2,900 | 590 |
| | 0.5 | 8 | 0.137 | 10,400 | 2,750 | 10,400 | 2,500 | 7,600 | 1,640 | 6,200 | 1,490 | 5,700 | 1,160 |
| | | 10 | 0.133 | 9,300 | 2,460 | 9,300 | 2,230 | 6,800 | 1,470 | 5,500 | 1,320 | 5,100 | 1,040 |
| | | 12 | 0.127 | 8,400 | 2,220 | 8,400 | 2,020 | 6,100 | 1,320 | 5,000 | 1,200 | 4,600 | 940 |
| | | 14 | 0.118 | 7,700 | 2,030 | 7,700 | 1,850 | 5,600 | 1,210 | 4,500 | 1,080 | 4,200 | 860 |
| | | 16 | 0.114 | 7,100 | 1,870 | 7,100 | 1,700 | 5,100 | 1,100 | 4,200 | 1,010 | 3,900 | 800 |
| | | 18 | 0.111 | 6,500 | 1,720 | 6,500 | 1,560 | 4,800 | 1,040 | 3,900 | 940 | 3,600 | 730 |
| | | 20 | 0.106 | 6,100 | 1,610 | 6,100 | 1,460 | 4,400 | 950 | 3,600 | 860 | 3,300 | 670 |
| | | 22 | 0.088 | 5,700 | 1,500 | 5,700 | 1,370 | 4,100 | 890 | 3,400 | 820 | 3,100 | 630 |
| | | 24 | 0.084 | 5,300 | 1,400 | 5,300 | 1,270 | 3,900 | 840 | 3,200 | 770 | 2,900 | 590 |
| | 1 | 8 | 0.140 | 10,400 | 2,750 | 10,400 | 2,500 | 7,600 | 1,640 | 6,200 | 1,490 | 5,700 | 1,160 |
| | | 10 | 0.136 | 9,300 | 2,460 | 9,300 | 2,230 | 6,800 | 1,470 | 5,500 | 1,320 | 5,100 | 1,040 |
| | | 12 | 0.130 | 8,400 | 2,220 | 8,400 | 2,020 | 6,100 | 1,320 | 5,000 | 1,200 | 4,600 | 940 |
| | | 14 | 0.121 | 7,700 | 2,030 | 7,700 | 1,850 | 5,600 | 1,210 | 4,500 | 1,080 | 4,200 | 860 |
| | | 16 | 0.117 | 7,100 | 1,870 | 7,100 | 1,700 | 5,100 | 1,100 | 4,200 | 1,010 | 3,900 | 800 |
| | | 18 | 0.114 | 6,500 | 1,720 | 6,500 | 1,560 | 4,800 | 1,040 | 3,900 | 940 | 3,600 | 730 |
| | | 20 | 0.108 | 6,100 | 1,610 | 6,100 | 1,460 | 4,400 | 950 | 3,600 | 860 | 3,300 | 670 |
| | | 22 | 0.090 | 5,700 | 1,500 | 5,700 | 1,370 | 4,100 | 890 | 3,400 | 820 | 3,100 | 630 |
| | | 24 | 0.085 | 5,300 | 1,400 | 5,300 | 1,270 | 3,900 | 840 | 3,200 | 770 | 2,900 | 590 |
| 5 | 0.1 | 10 | 0.096 | 9,300 | 3,270 | 9,300 | 2,980 | 6,800 | 1,960 | 5,500 | 1,760 | 5,100 | 1,390 |
| | | 15 | 0.081 | 7,400 | 2,600 | 7,400 | 2,370 | 5,400 | 1,560 | 4,400 | 1,410 | 4,000 | 1,090 |
| | | 20 | 0.077 | 6,100 | 2,150 | 6,100 | 1,950 | 4,400 | 1,270 | 3,600 | 1,150 | 3,300 | 900 |
| | | 25 | 0.075 | 5,200 | 1,830 | 5,200 | 1,660 | 3,800 | 1,090 | 3,100 | 990 | 2,800 | 760 |
| | 0.2 | 10 | 0.123 | 9,300 | 3,270 | 9,300 | 2,980 | 6,800 | 1,960 | 5,500 | 1,760 | 5,100 | 1,390 |
| | | 15 | 0.103 | 7,400 | 2,600 | 7,400 | 2,370 | 5,400 | 1,560 | 4,400 | 1,410 | 4,000 | 1,090 |
| | | 20 | 0.098 | 6,100 | 2,150 | 6,100 | 1,950 | 4,400 | 1,270 | 3,600 | 1,150 | 3,300 | 900 |
| | | 25 | 0.095 | 5,200 | 1,830 | 5,200 | 1,660 | 3,800 | 1,090 | 3,100 | 990 | 2,800 | 760 |
| | 0.3 | 10 | 0.166 | 9,300 | 3,270 | 9,300 | 2,980 | 6,800 | 1,960 | 5,500 | 1,760 | 5,100 | 1,390 |
| | | 15 | 0.140 | 7,400 | 2,600 | 7,400 | 2,370 | 5,400 | 1,560 | 4,400 | 1,410 | 4,000 | 1,090 |
| | | 20 | 0.133 | 6,100 | 2,150 | 6,100 | 1,950 | 4,400 | 1,270 | 3,600 | 1,150 | 3,300 | 900 |
| | | 25 | 0.129 | 5,200 | 1,830 | 5,200 | 1,660 | 3,800 | 1,090 | 3,100 | 990 | 2,800 | 760 |
| | 0.5 | 10 | 0.172 | 9,300 | 3,270 | 9,300 | 2,980 | 6,800 | 1,960 | 5,500 | 1,760 | 5,100 | 1,390 |
| | | 15 | 0.144 | 7,400 | 2,600 | 7,400 | 2,370 | 5,400 | 1,560 | 4,400 | 1,410 | 4,000 | 1,090 |
| | | 20 | 0.137 | 6,100 | 2,150 | 6,100 | 1,950 | 4,400 | 1,270 | 3,600 | 1,150 | 3,300 | 900 |
| | | 25 | 0.133 | 5,200 | 1,830 | 5,200 | 1,660 | 3,800 | 1,090 | 3,100 | 990 | 2,800 | 760 |

【注意】ご使用にあたっては、A188ページの表下の項目と注意を参照してください。【Note】Refer to the comments and notes below the table on page A188 regarding usage.

# Epoch Deep Radius Evolution Hard-TH3
# エポックディープラジアスエボリューションハード-TH3

**EPDREH4-TH3** | **4枚刃** 4 Flutes | **高能率切削条件** High-efficiency cutting conditions | 高精度切削条件 High-accuracy cutting conditions

高精度切削条件はA189ページを参照してください。
Please refer to P.A189 about high accuracy cutting conditions

| 被削材 Work material | | | | 1 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 2 焼入れ鋼 Hardened steels (45～55HRC) | | 3 焼入れ鋼 Hardened steels (55～60HRC) | | 4 焼入れ鋼 Hardened steels (60～65HRC) | | 5 焼入れ鋼 Hardened steels (65～72HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Cutting depth ratio | | | | 120% | | 100% | | 70% | | 50% | | 25% | |
| 外径DC Tool dia. (mm) | コーナ半径RE Corner radius (mm) | 首下長 Under neck length (mm) | $a_p$ (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 5 | 1 | 10 | 0.175 | 9,300 | 3,270 | 9,300 | 2,980 | 6,800 | 1,960 | 5,500 | 1,760 | 5,100 | 1,390 |
| | | 15 | 0.147 | 7,400 | 2,600 | 7,400 | 2,370 | 5,400 | 1,560 | 4,400 | 1,410 | 4,000 | 1,090 |
| | | 20 | 0.140 | 6,100 | 2,150 | 6,100 | 1,950 | 4,400 | 1,270 | 3,600 | 1,150 | 3,300 | 900 |
| | | 25 | 0.135 | 5,200 | 1,830 | 5,200 | 1,660 | 3,800 | 1,090 | 3,100 | 990 | 2,800 | 760 |
| 6 | 0.1 | 12 | 0.098 | 8,300 | 3,290 | 8,300 | 2,990 | 6,100 | 1,980 | 4,900 | 1,760 | 4,500 | 1,380 |
| | | 18 | 0.088 | 6,500 | 2,570 | 6,500 | 2,340 | 4,700 | 1,520 | 3,800 | 1,370 | 3,500 | 1,070 |
| | | 24 | 0.082 | 5,300 | 2,100 | 5,300 | 1,910 | 3,900 | 1,260 | 3,100 | 1,120 | 2,900 | 890 |
| | | 30 | 0.079 | 4,500 | 1,780 | 4,500 | 1,620 | 3,300 | 1,070 | 2,700 | 970 | 2,400 | 730 |
| | 0.2 | 12 | 0.177 | 8,300 | 3,290 | 8,300 | 2,990 | 6,100 | 1,980 | 4,900 | 1,760 | 4,500 | 1,380 |
| | | 18 | 0.158 | 6,500 | 2,570 | 6,500 | 2,340 | 4,700 | 1,520 | 3,800 | 1,370 | 3,500 | 1,070 |
| | | 24 | 0.148 | 5,300 | 2,100 | 5,300 | 1,910 | 3,900 | 1,260 | 3,100 | 1,120 | 2,900 | 890 |
| | | 30 | 0.142 | 4,500 | 1,780 | 4,500 | 1,620 | 3,300 | 1,070 | 2,700 | 970 | 2,400 | 730 |
| | 0.3 | 12 | 0.187 | 8,300 | 3,290 | 8,300 | 2,990 | 6,100 | 1,980 | 4,900 | 1,760 | 4,500 | 1,380 |
| | | 18 | 0.166 | 6,500 | 2,570 | 6,500 | 2,340 | 4,700 | 1,520 | 3,800 | 1,370 | 3,500 | 1,070 |
| | | 24 | 0.156 | 5,300 | 2,100 | 5,300 | 1,910 | 3,900 | 1,260 | 3,100 | 1,120 | 2,900 | 890 |
| | | 30 | 0.150 | 4,500 | 1,780 | 4,500 | 1,620 | 3,300 | 1,070 | 2,700 | 970 | 2,400 | 730 |
| | 0.5 | 12 | 0.193 | 8,300 | 3,290 | 8,300 | 2,990 | 6,100 | 1,980 | 4,900 | 1,760 | 4,500 | 1,380 |
| | | 18 | 0.172 | 6,500 | 2,570 | 6,500 | 2,340 | 4,700 | 1,520 | 3,800 | 1,370 | 3,500 | 1,070 |
| | | 24 | 0.161 | 5,300 | 2,100 | 5,300 | 1,910 | 3,900 | 1,260 | 3,100 | 1,120 | 2,900 | 890 |
| | | 30 | 0.154 | 4,500 | 1,780 | 4,500 | 1,620 | 3,300 | 1,070 | 2,700 | 970 | 2,400 | 730 |
| | 1 | 12 | 0.197 | 8,300 | 3,290 | 8,300 | 2,990 | 6,100 | 1,980 | 4,900 | 1,760 | 4,500 | 1,380 |
| | | 18 | 0.175 | 6,500 | 2,570 | 6,500 | 2,340 | 4,700 | 1,520 | 3,800 | 1,370 | 3,500 | 1,070 |
| | | 24 | 0.164 | 5,300 | 2,100 | 5,300 | 1,910 | 3,900 | 1,260 | 3,100 | 1,120 | 2,900 | 890 |
| | | 30 | 0.158 | 4,500 | 1,780 | 4,500 | 1,620 | 3,300 | 1,070 | 2,700 | 970 | 2,400 | 730 |

(1) $a_p$は被削材グループ2での目安を示しています。その他のグループの場合は、上表の切込み比率を目安に調整してください。
(2) リブ加工や止まり溝など、切りくずがつまりやすい切削の場合、切込み設定は基本切込みに切込み比率をかけて算出した切込み量を、さらにその80%まで小さくして使用してください。
(3) $a_e$の設定は$a_p$×切込み比率×5倍以下を目安に調整してください。仕上げ加工を行う場合、理論カスプハイトを計算し設定してください。
(4) 彫り込み時の傾斜進入角は1°以下を推奨いたします。また、送り速度は条件表の70%以下に調整してください。
(5) 文字彫り加工のような溝切削の際は、送り速度は50%以下・$a_p$を30%以下を目安に調整してください。また往復切削による加工を推奨いたします。

(1) $a_p$ indicates guidelines for Group 2 workpieces. For other groups, adjust cutting depth based on the cutting depth factors in the above table.
(2) In cases in which cutting chips may cause clogging--for example, for rib cutting and blind grooves--set the cutting depth using a cutting depth factor to calculate the cutting depth amount. This amount should then be reduced to 80% of the calculated value.
(3) Adjust by setting $a_e$ to (5 or less) × ($a_p$) × (cutting depth ratio). For finishing cutting, calculate the theoretical cusp height and set accordingly.
(4) The recommended slope entrance angle when engraving is 1° or less. Adjust the feed rate to 70% or less of values presented in the cutting condition table.
(5) When slotting such engraving letters, adjust the feed rate to 50% or less and $a_p$ to 30% or less of the values shown. We recommend reciprocal cutting.

【切込み設定例】

EPDREH4010-2-02-TH3の工具で焼入れ鋼(50HRC)をリブ溝等高線切削する場合、
切込み=0.047($a_p$)×1(焼入れ鋼グループ2の切込み比率)×0.8(閉鎖域の切削)=0.0376mm

Cutting depth setting example: When cutting rib groove contours in hardened steel (50HRC) using an EPDREH4010-2-02-TH3 tool:
Cutting depth = 0.047 ($a_p$) × 1 (cutting depth factor for Group 2 Hardened steels) × 0.8 (for closed-area cutting) = 0.0376 mm

**【注意】** ①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

**【Note】** ① Use the appropriate coolant for the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
③ If the rpm of the machine is low, lower the feed rate also to put the rpm and feed rate in the same ratio.

# 標準切削条件表
Recommended cutting conditions

4枚刃 4 Flutes | 高能率切削条件 High efficiency cutting condition | 高精度切削条件 High accuracy cuttiing condition

## EPDREH4-TH3

高能率切削条件はA184ページを参照してください。
Please refer to P.A184 about high efficiency cutting conditions

| 被削材 Work material | | | | 1 プリハードン鋼 Pre-hardened steels (35~45HRC) | | 2 焼入れ鋼 Hardened steels (45~55HRC) | | 3 焼入れ鋼 Hardened steels (55~60HRC) | | 4 焼入れ鋼 Hardened steels (60~65HRC) | | 5 焼入れ鋼 Hardened steels (65~72HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Cutting depth ratio | | | | 120% | | 100% | | 70% | | 50% | | 25% | |
| 外径DC Tool dia. (mm) | コーナ半径RE Corner radius (mm) | 首下長 Under neck length (mm) | ap (mm) | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 1 | 0.02 | 1.5 | 0.016 | 32,300 | 2,840 | 32,300 | 2,580 | 23,500 | 1,690 | 19,100 | 1,530 | 17,600 | 1,200 |
| | | 2 | 0.013 | 29,100 | 2,560 | 29,100 | 2,320 | 21,200 | 1,530 | 17,200 | 1,380 | 15,900 | 1,080 |
| | | 2.5 | 0.013 | 26,400 | 2,320 | 26,400 | 2,110 | 19,200 | 1,380 | 15,600 | 1,250 | 14,400 | 980 |
| | | 3 | 0.012 | 24,200 | 2,130 | 24,200 | 1,940 | 17,600 | 1,270 | 14,300 | 1,150 | 13,200 | 900 |
| | | 4 | 0.011 | 20,800 | 1,830 | 20,800 | 1,660 | 15,100 | 1,090 | 12,300 | 980 | 11,300 | 760 |
| | | 5 | 0.010 | 18,200 | 1,600 | 18,200 | 1,450 | 13,200 | 950 | 10,700 | 850 | 9,900 | 670 |
| | | 6 | 0.006 | 16,200 | 1,430 | 16,200 | 1,290 | 11,700 | 850 | 9,500 | 760 | 8,800 | 600 |
| | | 8 | 0.003 | 13,200 | 1,160 | 13,200 | 1,060 | 9,600 | 700 | 7,800 | 620 | 7,200 | 490 |
| | 0.05 | 1.5 | 0.038 | 32,300 | 2,840 | 32,300 | 2,580 | 23,500 | 1,690 | 19,100 | 1,530 | 17,600 | 1,200 |
| | | 2 | 0.028 | 29,100 | 2,560 | 29,100 | 2,320 | 21,200 | 1,530 | 17,200 | 1,380 | 15,900 | 1,080 |
| | | 2.5 | 0.027 | 26,400 | 2,320 | 26,400 | 2,110 | 19,200 | 1,380 | 15,600 | 1,250 | 14,400 | 980 |
| | | 3 | 0.025 | 24,200 | 2,130 | 24,200 | 1,940 | 17,600 | 1,270 | 14,300 | 1,150 | 13,200 | 900 |
| | | 4 | 0.024 | 20,800 | 1,830 | 20,800 | 1,660 | 15,100 | 1,090 | 12,300 | 980 | 11,300 | 760 |
| | | 5 | 0.023 | 18,200 | 1,600 | 18,200 | 1,450 | 13,200 | 950 | 10,700 | 850 | 9,900 | 670 |
| | | 6 | 0.013 | 16,200 | 1,430 | 16,200 | 1,290 | 11,700 | 850 | 9,500 | 760 | 8,800 | 600 |
| | | 8 | 0.007 | 13,200 | 1,160 | 13,200 | 1,060 | 9,600 | 700 | 7,800 | 620 | 7,200 | 490 |
| | 0.1 | 1.5 | 0.046 | 32,300 | 2,840 | 32,300 | 2,580 | 23,500 | 1,690 | 19,100 | 1,530 | 17,600 | 1,200 |
| | | 2 | 0.035 | 29,100 | 2,560 | 29,100 | 2,320 | 21,200 | 1,530 | 17,200 | 1,380 | 15,900 | 1,080 |
| | | 2.5 | 0.033 | 26,400 | 2,320 | 26,400 | 2,110 | 19,200 | 1,380 | 15,600 | 1,250 | 14,400 | 980 |
| | | 3 | 0.031 | 24,200 | 2,130 | 24,200 | 1,940 | 17,600 | 1,270 | 14,300 | 1,150 | 13,200 | 900 |
| | | 4 | 0.029 | 20,800 | 1,830 | 20,800 | 1,660 | 15,100 | 1,090 | 12,300 | 980 | 11,300 | 760 |
| | | 5 | 0.028 | 18,200 | 1,600 | 18,200 | 1,450 | 13,200 | 950 | 10,700 | 850 | 9,900 | 670 |
| | | 6 | 0.015 | 16,200 | 1,430 | 16,200 | 1,290 | 11,700 | 850 | 9,500 | 760 | 8,800 | 600 |
| | | 8 | 0.009 | 13,200 | 1,160 | 13,200 | 1,060 | 9,600 | 700 | 7,800 | 620 | 7,200 | 490 |
| | 0.2 | 1.5 | 0.052 | 32,300 | 2,840 | 32,300 | 2,580 | 23,500 | 1,690 | 19,100 | 1,530 | 17,600 | 1,200 |
| | | 2 | 0.039 | 29,100 | 2,560 | 29,100 | 2,320 | 21,200 | 1,530 | 17,200 | 1,380 | 15,900 | 1,080 |
| | | 2.5 | 0.038 | 26,400 | 2,320 | 26,400 | 2,110 | 19,200 | 1,380 | 15,600 | 1,250 | 14,400 | 980 |
| | | 3 | 0.035 | 24,200 | 2,130 | 24,200 | 1,940 | 17,600 | 1,270 | 14,300 | 1,150 | 13,200 | 900 |
| | | 4 | 0.033 | 20,800 | 1,830 | 20,800 | 1,660 | 15,100 | 1,090 | 12,300 | 980 | 11,300 | 760 |
| | | 5 | 0.031 | 18,200 | 1,600 | 18,200 | 1,450 | 13,200 | 950 | 10,700 | 850 | 9,900 | 670 |
| | | 6 | 0.017 | 16,200 | 1,430 | 16,200 | 1,290 | 11,700 | 850 | 9,500 | 760 | 8,800 | 600 |
| | | 8 | 0.010 | 13,200 | 1,160 | 13,200 | 1,060 | 9,600 | 700 | 7,800 | 620 | 7,200 | 490 |
| | 0.3 | 1.5 | 0.058 | 32,300 | 2,840 | 32,300 | 2,580 | 23,500 | 1,690 | 19,100 | 1,530 | 17,600 | 1,200 |
| | | 2 | 0.044 | 29,100 | 2,560 | 29,100 | 2,320 | 21,200 | 1,530 | 17,200 | 1,380 | 15,900 | 1,080 |
| | | 2.5 | 0.042 | 26,400 | 2,320 | 26,400 | 2,110 | 19,200 | 1,380 | 15,600 | 1,250 | 14,400 | 980 |
| | | 3 | 0.039 | 24,200 | 2,130 | 24,200 | 1,940 | 17,600 | 1,270 | 14,300 | 1,150 | 13,200 | 900 |
| | | 4 | 0.036 | 20,800 | 1,830 | 20,800 | 1,660 | 15,100 | 1,090 | 12,300 | 980 | 11,300 | 760 |
| | | 5 | 0.035 | 18,200 | 1,600 | 18,200 | 1,450 | 13,200 | 950 | 10,700 | 850 | 9,900 | 670 |
| | | 6 | 0.019 | 16,200 | 1,430 | 16,200 | 1,290 | 11,700 | 850 | 9,500 | 760 | 8,800 | 600 |
| | | 8 | 0.011 | 13,200 | 1,160 | 13,200 | 1,060 | 9,600 | 700 | 7,800 | 620 | 7,200 | 490 |
| 1.5 | 0.02 | 2 | 0.014 | 22,300 | 2,750 | 22,300 | 2,500 | 16,300 | 1,640 | 13,200 | 1,480 | 12,200 | 1,160 |
| | | 3 | 0.013 | 19,300 | 2,380 | 19,300 | 2,170 | 14,100 | 1,420 | 11,500 | 1,290 | 10,500 | 1,000 |
| | | 4 | 0.012 | 17,100 | 2,110 | 17,100 | 1,920 | 12,500 | 1,250 | 10,100 | 1,140 | 9,300 | 890 |
| | | 5 | 0.010 | 15,300 | 1,880 | 15,300 | 1,710 | 11,100 | 1,120 | 9,000 | 1,010 | 8,400 | 800 |
| | | 6 | 0.010 | 13,900 | 1,710 | 13,900 | 1,550 | 10,000 | 1,010 | 8,200 | 920 | 7,600 | 720 |
| | | 8 | 0.008 | 12,600 | 1,550 | 12,600 | 1,410 | 9,200 | 930 | 7,500 | 840 | 6,900 | 660 |
| | | 10 | 0.007 | 11,600 | 1,430 | 11,600 | 1,300 | 8,500 | 850 | 6,900 | 770 | 6,300 | 600 |
| | | 12 | 0.004 | 10,000 | 1,240 | 10,000 | 1,130 | 7,300 | 740 | 5,900 | 660 | 5,500 | 520 |
| | 0.05 | 2 | 0.040 | 22,300 | 2,750 | 22,300 | 2,500 | 16,300 | 1,640 | 13,200 | 1,480 | 12,200 | 1,160 |
| | | 3 | 0.036 | 19,300 | 2,380 | 19,300 | 2,170 | 14,100 | 1,420 | 11,500 | 1,290 | 10,500 | 1,000 |
| | | 4 | 0.032 | 17,100 | 2,110 | 17,100 | 1,920 | 12,500 | 1,250 | 10,100 | 1,140 | 9,300 | 890 |
| | | 5 | 0.029 | 15,300 | 1,880 | 15,300 | 1,710 | 11,100 | 1,120 | 9,000 | 1,010 | 8,400 | 800 |
| | | 6 | 0.026 | 13,900 | 1,710 | 13,900 | 1,550 | 10,000 | 1,010 | 8,200 | 920 | 7,600 | 720 |
| | | 8 | 0.022 | 12,600 | 1,550 | 12,600 | 1,410 | 9,200 | 930 | 7,500 | 840 | 6,900 | 660 |
| | | 10 | 0.018 | 11,600 | 1,430 | 11,600 | 1,300 | 8,500 | 850 | 6,900 | 770 | 6,300 | 600 |
| | | 12 | 0.012 | 10,000 | 1,240 | 10,000 | 1,130 | 7,300 | 740 | 5,900 | 660 | 5,500 | 520 |
| | 0.1 | 2 | 0.065 | 22,300 | 2,750 | 22,300 | 2,500 | 16,300 | 1,640 | 13,200 | 1,480 | 12,200 | 1,160 |
| | | 3 | 0.059 | 19,300 | 2,380 | 19,300 | 2,170 | 14,100 | 1,420 | 11,500 | 1,290 | 10,500 | 1,000 |
| | | 4 | 0.053 | 17,100 | 2,110 | 17,100 | 1,920 | 12,500 | 1,250 | 10,100 | 1,140 | 9,300 | 890 |
| | | 5 | 0.047 | 15,300 | 1,880 | 15,300 | 1,710 | 11,100 | 1,120 | 9,000 | 1,010 | 8,400 | 800 |

【注意】ご使用にあたっては、A193ページの表下の項目と注意を参照してください。【Note】Refer to the comments and notes below the table on page A193 regarding usage.

# Epoch Deep Radius Evolution Hard-TH3
# エポックディープラジアスエボリューションハード-TH3

**EPDREH4-TH3** **4枚刃 4 Flutes** 高能率切削条件 High-efficiency cutting conditions **高精度切削条件 High-accuracy cutting conditions**

高能率切削条件はA184ページを参照してください。
Please refer to P.A184 about high efficiency cutting conditions

| 被削材 Work material | | | | 1 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 2 焼入れ鋼 Hardened steels (45～55HRC) | | 3 焼入れ鋼 Hardened steels (55～60HRC) | | 4 焼入れ鋼 Hardened steels (60～65HRC) | | 5 焼入れ鋼 Hardened steels (65～72HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Cutting depth ratio | | | | 120% | | 100% | | 70% | | 50% | | 25% | |
| 外径DC Tool dia. (mm) | コーナ半径RE Corner radius (mm) | 首下長 Under neck length (mm) | $a_p$ (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 1.5 | 0.1 | 6 | 0.043 | 13,900 | 1,710 | 13,900 | 1,550 | 10,000 | 1,010 | 8,200 | 920 | 7,600 | 720 |
| | | 8 | 0.037 | 12,600 | 1,550 | 12,600 | 1,410 | 9,200 | 930 | 7,500 | 840 | 6,900 | 660 |
| | | 10 | 0.029 | 11,600 | 1,430 | 11,600 | 1,300 | 8,500 | 850 | 6,900 | 770 | 6,300 | 600 |
| | | 12 | 0.020 | 10,000 | 1,240 | 10,000 | 1,130 | 7,300 | 740 | 5,900 | 660 | 5,500 | 520 |
| | 0.2 | 2 | 0.068 | 22,300 | 2,750 | 22,300 | 2,500 | 16,300 | 1,640 | 13,200 | 1,480 | 12,200 | 1,160 |
| | | 3 | 0.062 | 19,300 | 2,380 | 19,300 | 2,170 | 14,100 | 1,420 | 11,500 | 1,290 | 10,500 | 1,000 |
| | | 4 | 0.056 | 17,100 | 2,110 | 17,100 | 1,920 | 12,500 | 1,250 | 10,100 | 1,140 | 9,300 | 890 |
| | | 5 | 0.050 | 15,300 | 1,880 | 15,300 | 1,710 | 11,100 | 1,120 | 9,000 | 1,010 | 8,400 | 800 |
| | | 6 | 0.046 | 13,900 | 1,710 | 13,900 | 1,550 | 10,000 | 1,010 | 8,200 | 920 | 7,600 | 720 |
| | | 8 | 0.039 | 12,600 | 1,550 | 12,600 | 1,410 | 9,200 | 930 | 7,500 | 840 | 6,900 | 660 |
| | | 10 | 0.031 | 11,600 | 1,430 | 11,600 | 1,300 | 8,500 | 850 | 6,900 | 770 | 6,300 | 600 |
| | | 12 | 0.021 | 10,000 | 1,240 | 10,000 | 1,130 | 7,300 | 740 | 5,900 | 660 | 5,500 | 520 |
| | 0.3 | 2 | 0.070 | 22,300 | 2,750 | 22,300 | 2,500 | 16,300 | 1,640 | 13,200 | 1,480 | 12,200 | 1,160 |
| | | 3 | 0.064 | 19,300 | 2,380 | 19,300 | 2,170 | 14,100 | 1,420 | 11,500 | 1,290 | 10,500 | 1,000 |
| | | 4 | 0.058 | 17,100 | 2,110 | 17,100 | 1,920 | 12,500 | 1,250 | 10,100 | 1,140 | 9,300 | 890 |
| | | 5 | 0.051 | 15,300 | 1,880 | 15,300 | 1,710 | 11,100 | 1,120 | 9,000 | 1,010 | 8,400 | 800 |
| | | 6 | 0.047 | 13,900 | 1,710 | 13,900 | 1,550 | 10,000 | 1,010 | 8,200 | 920 | 7,600 | 720 |
| | | 8 | 0.040 | 12,600 | 1,550 | 12,600 | 1,410 | 9,200 | 930 | 7,500 | 840 | 6,900 | 660 |
| | | 10 | 0.032 | 11,600 | 1,430 | 11,600 | 1,300 | 8,500 | 850 | 6,900 | 770 | 6,300 | 600 |
| | | 12 | 0.021 | 10,000 | 1,240 | 10,000 | 1,130 | 7,300 | 740 | 5,900 | 660 | 5,500 | 520 |
| | 0.5 | 2 | 0.072 | 22,300 | 2,750 | 22,300 | 2,500 | 16,300 | 1,640 | 13,200 | 1,480 | 12,200 | 1,160 |
| | | 3 | 0.065 | 19,300 | 2,380 | 19,300 | 2,170 | 14,100 | 1,420 | 11,500 | 1,290 | 10,500 | 1,000 |
| | | 4 | 0.059 | 17,100 | 2,110 | 17,100 | 1,920 | 12,500 | 1,250 | 10,100 | 1,140 | 9,300 | 890 |
| | | 5 | 0.052 | 15,300 | 1,880 | 15,300 | 1,710 | 11,100 | 1,120 | 9,000 | 1,010 | 8,400 | 800 |
| | | 6 | 0.048 | 13,900 | 1,710 | 13,900 | 1,550 | 10,000 | 1,010 | 8,200 | 920 | 7,600 | 720 |
| | | 8 | 0.041 | 12,600 | 1,550 | 12,600 | 1,410 | 9,200 | 930 | 7,500 | 840 | 6,900 | 660 |
| | | 10 | 0.033 | 11,600 | 1,430 | 11,600 | 1,300 | 8,500 | 850 | 6,900 | 770 | 6,300 | 600 |
| | | 12 | 0.022 | 10,000 | 1,240 | 10,000 | 1,130 | 7,300 | 740 | 5,900 | 660 | 5,500 | 520 |
| 2 | 0.02 | 2.5 | 0.015 | 17,100 | 3,010 | 17,100 | 2,740 | 12,500 | 1,790 | 10,100 | 1,620 | 9,300 | 1,260 |
| | | 3 | 0.014 | 16,200 | 2,850 | 16,200 | 2,590 | 11,700 | 1,680 | 9,500 | 1,530 | 8,800 | 1,200 |
| | | 4 | 0.012 | 14,500 | 2,560 | 14,500 | 2,320 | 10,500 | 1,520 | 8,500 | 1,370 | 7,900 | 1,070 |
| | | 5 | 0.011 | 13,200 | 2,320 | 13,200 | 2,110 | 9,600 | 1,390 | 7,800 | 1,250 | 7,200 | 980 |
| | | 6 | 0.011 | 12,100 | 2,130 | 12,100 | 1,940 | 8,800 | 1,270 | 7,100 | 1,150 | 6,600 | 900 |
| | | 8 | 0.011 | 10,400 | 1,830 | 10,400 | 1,660 | 7,600 | 1,090 | 6,100 | 980 | 5,600 | 760 |
| | | 10 | 0.010 | 9,000 | 1,590 | 9,000 | 1,440 | 6,600 | 950 | 5,400 | 860 | 5,000 | 680 |
| | | 12 | 0.008 | 8,100 | 1,420 | 8,100 | 1,290 | 5,900 | 850 | 4,700 | 760 | 4,400 | 600 |
| | 0.05 | 2.5 | 0.040 | 17,100 | 3,010 | 17,100 | 2,740 | 12,500 | 1,790 | 10,100 | 1,620 | 9,300 | 1,260 |
| | | 3 | 0.036 | 16,200 | 2,850 | 16,200 | 2,590 | 11,700 | 1,680 | 9,500 | 1,530 | 8,800 | 1,200 |
| | | 4 | 0.031 | 14,500 | 2,560 | 14,500 | 2,320 | 10,500 | 1,520 | 8,500 | 1,370 | 7,900 | 1,070 |
| | | 5 | 0.030 | 13,200 | 2,320 | 13,200 | 2,110 | 9,600 | 1,390 | 7,800 | 1,250 | 7,200 | 980 |
| | | 6 | 0.029 | 12,100 | 2,130 | 12,100 | 1,940 | 8,800 | 1,270 | 7,100 | 1,150 | 6,600 | 900 |
| | | 8 | 0.028 | 10,400 | 1,830 | 10,400 | 1,660 | 7,600 | 1,090 | 6,100 | 980 | 5,600 | 760 |
| | | 10 | 0.026 | 9,000 | 1,590 | 9,000 | 1,440 | 6,600 | 950 | 5,400 | 860 | 5,000 | 680 |
| | | 12 | 0.020 | 8,100 | 1,420 | 8,100 | 1,290 | 5,900 | 850 | 4,700 | 760 | 4,400 | 600 |
| | 0.1 | 2.5 | 0.068 | 17,100 | 3,010 | 17,100 | 2,740 | 12,500 | 1,790 | 10,100 | 1,620 | 9,300 | 1,260 |
| | | 3 | 0.061 | 16,200 | 2,850 | 16,200 | 2,590 | 11,700 | 1,680 | 9,500 | 1,530 | 8,800 | 1,200 |
| | | 4 | 0.052 | 14,500 | 2,560 | 14,500 | 2,320 | 10,500 | 1,520 | 8,500 | 1,370 | 7,900 | 1,070 |
| | | 5 | 0.051 | 13,200 | 2,320 | 13,200 | 2,110 | 9,600 | 1,390 | 7,800 | 1,250 | 7,200 | 980 |
| | | 6 | 0.049 | 12,100 | 2,130 | 12,100 | 1,940 | 8,800 | 1,270 | 7,100 | 1,150 | 6,600 | 900 |
| | | 8 | 0.048 | 10,400 | 1,830 | 10,400 | 1,660 | 7,600 | 1,090 | 6,100 | 980 | 5,600 | 760 |
| | | 10 | 0.045 | 9,000 | 1,590 | 9,000 | 1,440 | 6,600 | 950 | 5,400 | 860 | 5,000 | 680 |
| | | 12 | 0.034 | 8,100 | 1,420 | 8,100 | 1,290 | 5,900 | 850 | 4,700 | 760 | 4,400 | 600 |
| | 0.2 | 2.5 | 0.077 | 17,100 | 3,010 | 17,100 | 2,740 | 12,500 | 1,790 | 10,100 | 1,620 | 9,300 | 1,260 |
| | | 3 | 0.068 | 16,200 | 2,850 | 16,200 | 2,590 | 11,700 | 1,680 | 9,500 | 1,530 | 8,800 | 1,200 |
| | | 4 | 0.059 | 14,500 | 2,560 | 14,500 | 2,320 | 10,500 | 1,520 | 8,500 | 1,370 | 7,900 | 1,070 |
| | | 5 | 0.057 | 13,200 | 2,320 | 13,200 | 2,110 | 9,600 | 1,390 | 7,800 | 1,250 | 7,200 | 980 |
| | | 6 | 0.055 | 12,100 | 2,130 | 12,100 | 1,940 | 8,800 | 1,270 | 7,100 | 1,150 | 6,600 | 900 |
| | | 8 | 0.054 | 10,400 | 1,830 | 10,400 | 1,660 | 7,600 | 1,090 | 6,100 | 980 | 5,600 | 760 |
| | | 10 | 0.050 | 9,000 | 1,590 | 9,000 | 1,440 | 6,600 | 950 | 5,400 | 860 | 5,000 | 680 |
| | | 12 | 0.038 | 8,100 | 1,420 | 8,100 | 1,290 | 5,900 | 850 | 4,700 | 760 | 4,400 | 600 |

| 被削材 Work material | | | | 1 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 2 焼入れ鋼 Hardened steels (45～55HRC) | | 3 焼入れ鋼 Hardened steels (55～60HRC) | | 4 焼入れ鋼 Hardened steels (60～65HRC) | | 5 焼入れ鋼 Hardened steels (65～72HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Cutting depth ratio | | | | 120% | | 100% | | 70% | | 50% | | 25% | |
| 外径DC Tool dia. (mm) | コーナ半径RE Corner radius (mm) | 首下長 Under neck length (mm) | $a_p$ (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 2 | 0.3 | 2.5 | 0.081 | 17,100 | 3,010 | 17,100 | 2,740 | 12,500 | 1,790 | 10,100 | 1,620 | 9,300 | 1,260 |
| | | 3 | 0.072 | 16,200 | 2,850 | 16,200 | 2,590 | 11,700 | 1,680 | 9,500 | 1,530 | 8,800 | 1,200 |
| | | 4 | 0.062 | 14,500 | 2,560 | 14,500 | 2,320 | 10,500 | 1,520 | 8,500 | 1,370 | 7,900 | 1,070 |
| | | 5 | 0.060 | 13,200 | 2,320 | 13,200 | 2,110 | 9,600 | 1,390 | 7,800 | 1,250 | 7,200 | 980 |
| | | 6 | 0.058 | 12,100 | 2,130 | 12,100 | 1,940 | 8,800 | 1,270 | 7,100 | 1,150 | 6,600 | 900 |
| | | 8 | 0.057 | 10,400 | 1,830 | 10,400 | 1,660 | 7,600 | 1,090 | 6,100 | 980 | 5,600 | 760 |
| | | 10 | 0.053 | 9,000 | 1,590 | 9,000 | 1,440 | 6,600 | 950 | 5,400 | 860 | 5,000 | 680 |
| | | 12 | 0.041 | 8,100 | 1,420 | 8,100 | 1,290 | 5,900 | 850 | 4,700 | 760 | 4,400 | 600 |
| | 0.5 | 2.5 | 0.085 | 17,100 | 3,010 | 17,100 | 2,740 | 12,500 | 1,790 | 10,100 | 1,620 | 9,300 | 1,260 |
| | | 3 | 0.076 | 16,200 | 2,850 | 16,200 | 2,590 | 11,700 | 1,680 | 9,500 | 1,530 | 8,800 | 1,200 |
| | | 4 | 0.065 | 14,500 | 2,560 | 14,500 | 2,320 | 10,500 | 1,520 | 8,500 | 1,370 | 7,900 | 1,070 |
| | | 5 | 0.063 | 13,200 | 2,320 | 13,200 | 2,110 | 9,600 | 1,390 | 7,800 | 1,250 | 7,200 | 980 |
| | | 6 | 0.061 | 12,100 | 2,130 | 12,100 | 1,940 | 8,800 | 1,270 | 7,100 | 1,150 | 6,600 | 900 |
| | | 8 | 0.061 | 10,400 | 1,830 | 10,400 | 1,660 | 7,600 | 1,090 | 6,100 | 980 | 5,600 | 760 |
| | | 10 | 0.056 | 9,000 | 1,590 | 9,000 | 1,440 | 6,600 | 950 | 5,400 | 860 | 5,000 | 680 |
| | | 12 | 0.043 | 8,100 | 1,420 | 8,100 | 1,290 | 5,900 | 850 | 4,700 | 760 | 4,400 | 600 |
| 3 | 0.05 | 4 | 0.037 | 15,400 | 2,450 | 15,400 | 2,220 | 11,200 | 1,450 | 9,100 | 1,310 | 8,500 | 1,040 |
| | | 6 | 0.036 | 12,800 | 2,030 | 12,800 | 1,840 | 9,300 | 1,200 | 7,600 | 1,090 | 7,000 | 850 |
| | | 8 | 0.035 | 10,900 | 1,730 | 10,900 | 1,570 | 7,900 | 1,020 | 6,400 | 920 | 5,900 | 720 |
| | | 10 | 0.034 | 9,500 | 1,500 | 9,500 | 1,360 | 6,900 | 900 | 5,600 | 800 | 5,100 | 630 |
| | | 12 | 0.031 | 8,400 | 1,330 | 8,400 | 1,200 | 6,100 | 790 | 4,900 | 710 | 4,600 | 560 |
| | | 14 | 0.029 | 7,500 | 1,190 | 7,500 | 1,080 | 5,500 | 710 | 4,400 | 630 | 4,100 | 500 |
| | | 16 | 0.028 | 6,800 | 1,080 | 6,800 | 980 | 4,900 | 630 | 4,000 | 570 | 3,700 | 460 |
| | | 18 | 0.025 | 6,200 | 990 | 6,200 | 900 | 4,500 | 580 | 3,700 | 520 | 3,400 | 420 |
| | | 20 | 0.018 | 5,700 | 900 | 5,700 | 820 | 4,200 | 540 | 3,400 | 490 | 3,200 | 390 |
| | 0.1 | 4 | 0.075 | 15,400 | 2,450 | 15,400 | 2,220 | 11,200 | 1,450 | 9,100 | 1,310 | 8,500 | 1,040 |
| | | 6 | 0.072 | 12,800 | 2,030 | 12,800 | 1,840 | 9,300 | 1,200 | 7,600 | 1,090 | 7,000 | 850 |
| | | 8 | 0.070 | 10,900 | 1,730 | 10,900 | 1,570 | 7,900 | 1,020 | 6,400 | 920 | 5,900 | 720 |
| | | 10 | 0.068 | 9,500 | 1,500 | 9,500 | 1,360 | 6,900 | 900 | 5,600 | 800 | 5,100 | 630 |
| | | 12 | 0.063 | 8,400 | 1,330 | 8,400 | 1,200 | 6,100 | 790 | 4,900 | 710 | 4,600 | 560 |
| | | 14 | 0.058 | 7,500 | 1,190 | 7,500 | 1,080 | 5,500 | 710 | 4,400 | 630 | 4,100 | 500 |
| | | 16 | 0.056 | 6,800 | 1,080 | 6,800 | 980 | 4,900 | 630 | 4,000 | 570 | 3,700 | 460 |
| | | 18 | 0.051 | 6,200 | 990 | 6,200 | 900 | 4,500 | 580 | 3,700 | 520 | 3,400 | 420 |
| | | 20 | 0.037 | 5,700 | 900 | 5,700 | 820 | 4,200 | 540 | 3,400 | 490 | 3,200 | 390 |
| | 0.2 | 4 | 0.084 | 15,400 | 2,450 | 15,400 | 2,220 | 11,200 | 1,450 | 9,100 | 1,310 | 8,500 | 1,040 |
| | | 6 | 0.081 | 12,800 | 2,030 | 12,800 | 1,840 | 9,300 | 1,200 | 7,600 | 1,090 | 7,000 | 850 |
| | | 8 | 0.079 | 10,900 | 1,730 | 10,900 | 1,570 | 7,900 | 1,020 | 6,400 | 920 | 5,900 | 720 |
| | | 10 | 0.076 | 9,500 | 1,500 | 9,500 | 1,360 | 6,900 | 900 | 5,600 | 800 | 5,100 | 630 |
| | | 12 | 0.070 | 8,400 | 1,330 | 8,400 | 1,200 | 6,100 | 790 | 4,900 | 710 | 4,600 | 560 |
| | | 14 | 0.065 | 7,500 | 1,190 | 7,500 | 1,080 | 5,500 | 710 | 4,400 | 630 | 4,100 | 500 |
| | | 16 | 0.063 | 6,800 | 1,080 | 6,800 | 980 | 4,900 | 630 | 4,000 | 570 | 3,700 | 460 |
| | | 18 | 0.057 | 6,200 | 990 | 6,200 | 900 | 4,500 | 580 | 3,700 | 520 | 3,400 | 420 |
| | | 20 | 0.041 | 5,700 | 900 | 5,700 | 820 | 4,200 | 540 | 3,400 | 490 | 3,200 | 390 |
| | 0.3 | 4 | 0.089 | 15,400 | 2,450 | 15,400 | 2,220 | 11,200 | 1,450 | 9,100 | 1,310 | 8,500 | 1,040 |
| | | 6 | 0.086 | 12,800 | 2,030 | 12,800 | 1,840 | 9,300 | 1,200 | 7,600 | 1,090 | 7,000 | 850 |
| | | 8 | 0.084 | 10,900 | 1,730 | 10,900 | 1,570 | 7,900 | 1,020 | 6,400 | 920 | 5,900 | 720 |
| | | 10 | 0.080 | 9,500 | 1,500 | 9,500 | 1,360 | 6,900 | 900 | 5,600 | 800 | 5,100 | 630 |
| | | 12 | 0.074 | 8,400 | 1,330 | 8,400 | 1,200 | 6,100 | 790 | 4,900 | 710 | 4,600 | 560 |
| | | 14 | 0.068 | 7,500 | 1,190 | 7,500 | 1,080 | 5,500 | 710 | 4,400 | 630 | 4,100 | 500 |
| | | 16 | 0.066 | 6,800 | 1,080 | 6,800 | 980 | 4,900 | 630 | 4,000 | 570 | 3,700 | 460 |
| | | 18 | 0.060 | 6,200 | 990 | 6,200 | 900 | 4,500 | 580 | 3,700 | 520 | 3,400 | 420 |
| | | 20 | 0.044 | 5,700 | 900 | 5,700 | 820 | 4,200 | 540 | 3,400 | 490 | 3,200 | 390 |
| | 0.5 | 4 | 0.094 | 15,400 | 2,450 | 15,400 | 2,220 | 11,200 | 1,450 | 9,100 | 1,310 | 8,500 | 1,040 |
| | | 6 | 0.090 | 12,800 | 2,030 | 12,800 | 1,840 | 9,300 | 1,200 | 7,600 | 1,090 | 7,000 | 850 |
| | | 8 | 0.088 | 10,900 | 1,730 | 10,900 | 1,570 | 7,900 | 1,020 | 6,400 | 920 | 5,900 | 720 |
| | | 10 | 0.084 | 9,500 | 1,500 | 9,500 | 1,360 | 6,900 | 900 | 5,600 | 800 | 5,100 | 630 |
| | | 12 | 0.078 | 8,400 | 1,330 | 8,400 | 1,200 | 6,100 | 790 | 4,900 | 710 | 4,600 | 560 |
| | | 14 | 0.072 | 7,500 | 1,190 | 7,500 | 1,080 | 5,500 | 710 | 4,400 | 630 | 4,100 | 500 |
| | | 16 | 0.070 | 6,800 | 1,080 | 6,800 | 980 | 4,900 | 630 | 4,000 | 570 | 3,700 | 460 |
| | | 18 | 0.063 | 6,200 | 990 | 6,200 | 900 | 4,500 | 580 | 3,700 | 520 | 3,400 | 420 |
| | | 20 | 0.046 | 5,700 | 900 | 5,700 | 820 | 4,200 | 540 | 3,400 | 490 | 3,200 | 390 |

【注意】ご使用にあたっては、A193ページの表下の項目と注意を参照してください。【Note】Refer to the comments and notes below the table on page A193 regarding usage.

# Epoch Deep Radius Evolution Hard-TH3
# エポックディープラジアスエボリューションハード-TH3

**EPDREH4-TH3** **4枚刃 4 Flutes** 高能率切削条件 High-efficiency cutting conditions **高精度切削条件 High-accuracy cutting conditions**

高能率切削条件はA184ページを参照してください。
Please refer to P.A184 about high efficiency cutting conditions

| 被削材 Work material | | | | 1 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 2 焼入れ鋼 Hardened steels (45～55HRC) | | 3 焼入れ鋼 Hardened steels (55～60HRC) | | 4 焼入れ鋼 Hardened steels (60～65HRC) | | 5 焼入れ鋼 Hardened steels (65～72HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Cutting depth ratio | | | | 120% | | 100% | | 70% | | 50% | | 25% | |
| 外径DC Tool dia. (mm) | コーナ半径RE Corner radius (mm) | 首下長 Under neck length (mm) | $a_p$ (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 4 | 0.1 | 8 | 0.076 | 8,600 | 2,280 | 8,600 | 2,080 | 6,300 | 1,360 | 5,100 | 1,240 | 4,700 | 960 |
| | | 10 | 0.073 | 7,700 | 2,040 | 7,700 | 1,850 | 5,600 | 1,220 | 4,600 | 1,100 | 4,200 | 860 |
| | | 12 | 0.070 | 7,000 | 1,840 | 7,000 | 1,680 | 5,100 | 1,100 | 4,200 | 1,000 | 3,800 | 780 |
| | | 14 | 0.065 | 6,400 | 1,680 | 6,400 | 1,540 | 4,600 | 1,000 | 3,700 | 900 | 3,500 | 710 |
| | | 16 | 0.063 | 5,900 | 1,550 | 5,900 | 1,410 | 4,200 | 910 | 3,500 | 840 | 3,200 | 660 |
| | | 18 | 0.061 | 5,400 | 1,430 | 5,400 | 1,290 | 4,000 | 860 | 3,200 | 780 | 3,000 | 610 |
| | | 20 | 0.058 | 5,100 | 1,340 | 5,100 | 1,210 | 3,700 | 790 | 3,000 | 710 | 2,700 | 560 |
| | | 22 | 0.049 | 4,700 | 1,250 | 4,700 | 1,140 | 3,400 | 740 | 2,800 | 680 | 2,600 | 520 |
| | | 24 | 0.046 | 4,400 | 1,160 | 4,400 | 1,050 | 3,200 | 700 | 2,700 | 640 | 2,400 | 490 |
| | 0.2 | 8 | 0.105 | 8,600 | 2,280 | 8,600 | 2,080 | 6,300 | 1,360 | 5,100 | 1,240 | 4,700 | 960 |
| | | 10 | 0.102 | 7,700 | 2,040 | 7,700 | 1,850 | 5,600 | 1,220 | 4,600 | 1,100 | 4,200 | 860 |
| | | 12 | 0.097 | 7,000 | 1,840 | 7,000 | 1,680 | 5,100 | 1,100 | 4,200 | 1,000 | 3,800 | 780 |
| | | 14 | 0.090 | 6,400 | 1,680 | 6,400 | 1,540 | 4,600 | 1,000 | 3,700 | 900 | 3,500 | 710 |
| | | 16 | 0.087 | 5,900 | 1,550 | 5,900 | 1,410 | 4,200 | 910 | 3,500 | 840 | 3,200 | 660 |
| | | 18 | 0.085 | 5,400 | 1,430 | 5,400 | 1,290 | 4,000 | 860 | 3,200 | 780 | 3,000 | 610 |
| | | 20 | 0.080 | 5,100 | 1,340 | 5,100 | 1,210 | 3,700 | 790 | 3,000 | 710 | 2,700 | 560 |
| | | 22 | 0.067 | 4,700 | 1,250 | 4,700 | 1,140 | 3,400 | 740 | 2,800 | 680 | 2,600 | 520 |
| | | 24 | 0.064 | 4,400 | 1,160 | 4,400 | 1,050 | 3,200 | 700 | 2,700 | 640 | 2,400 | 490 |
| | 0.3 | 8 | 0.110 | 8,600 | 2,280 | 8,600 | 2,080 | 6,300 | 1,360 | 5,100 | 1,240 | 4,700 | 960 |
| | | 10 | 0.107 | 7,700 | 2,040 | 7,700 | 1,850 | 5,600 | 1,220 | 4,600 | 1,100 | 4,200 | 860 |
| | | 12 | 0.102 | 7,000 | 1,840 | 7,000 | 1,680 | 5,100 | 1,100 | 4,200 | 1,000 | 3,800 | 780 |
| | | 14 | 0.095 | 6,400 | 1,680 | 6,400 | 1,540 | 4,600 | 1,000 | 3,700 | 900 | 3,500 | 710 |
| | | 16 | 0.092 | 5,900 | 1,550 | 5,900 | 1,410 | 4,200 | 910 | 3,500 | 840 | 3,200 | 660 |
| | | 18 | 0.090 | 5,400 | 1,430 | 5,400 | 1,290 | 4,000 | 860 | 3,200 | 780 | 3,000 | 610 |
| | | 20 | 0.085 | 5,100 | 1,340 | 5,100 | 1,210 | 3,700 | 790 | 3,000 | 710 | 2,700 | 560 |
| | | 22 | 0.071 | 4,700 | 1,250 | 4,700 | 1,140 | 3,400 | 740 | 2,800 | 680 | 2,600 | 520 |
| | | 24 | 0.067 | 4,400 | 1,160 | 4,400 | 1,050 | 3,200 | 700 | 2,700 | 640 | 2,400 | 490 |
| | 0.5 | 8 | 0.114 | 8,600 | 2,280 | 8,600 | 2,080 | 6,300 | 1,360 | 5,100 | 1,240 | 4,700 | 960 |
| | | 10 | 0.111 | 7,700 | 2,040 | 7,700 | 1,850 | 5,600 | 1,220 | 4,600 | 1,100 | 4,200 | 860 |
| | | 12 | 0.105 | 7,000 | 1,840 | 7,000 | 1,680 | 5,100 | 1,100 | 4,200 | 1,000 | 3,800 | 780 |
| | | 14 | 0.098 | 6,400 | 1,680 | 6,400 | 1,540 | 4,600 | 1,000 | 3,700 | 900 | 3,500 | 710 |
| | | 16 | 0.095 | 5,900 | 1,550 | 5,900 | 1,410 | 4,200 | 910 | 3,500 | 840 | 3,200 | 660 |
| | | 18 | 0.092 | 5,400 | 1,430 | 5,400 | 1,290 | 4,000 | 860 | 3,200 | 780 | 3,000 | 610 |
| | | 20 | 0.088 | 5,100 | 1,340 | 5,100 | 1,210 | 3,700 | 790 | 3,000 | 710 | 2,700 | 560 |
| | | 22 | 0.073 | 4,700 | 1,250 | 4,700 | 1,140 | 3,400 | 740 | 2,800 | 680 | 2,600 | 520 |
| | | 24 | 0.069 | 4,400 | 1,160 | 4,400 | 1,050 | 3,200 | 700 | 2,700 | 640 | 2,400 | 490 |
| | 1 | 8 | 0.116 | 8,600 | 2,280 | 8,600 | 2,080 | 6,300 | 1,360 | 5,100 | 1,240 | 4,700 | 960 |
| | | 10 | 0.113 | 7,700 | 2,040 | 7,700 | 1,850 | 5,600 | 1,220 | 4,600 | 1,100 | 4,200 | 860 |
| | | 12 | 0.108 | 7,000 | 1,840 | 7,000 | 1,680 | 5,100 | 1,100 | 4,200 | 1,000 | 3,800 | 780 |
| | | 14 | 0.100 | 6,400 | 1,680 | 6,400 | 1,540 | 4,600 | 1,000 | 3,700 | 900 | 3,500 | 710 |
| | | 16 | 0.097 | 5,900 | 1,550 | 5,900 | 1,410 | 4,200 | 910 | 3,500 | 840 | 3,200 | 660 |
| | | 18 | 0.094 | 5,400 | 1,430 | 5,400 | 1,290 | 4,000 | 860 | 3,200 | 780 | 3,000 | 610 |
| | | 20 | 0.089 | 5,100 | 1,340 | 5,100 | 1,210 | 3,700 | 790 | 3,000 | 710 | 2,700 | 560 |
| | | 22 | 0.075 | 4,700 | 1,250 | 4,700 | 1,140 | 3,400 | 740 | 2,800 | 680 | 2,600 | 520 |
| | | 24 | 0.071 | 4,400 | 1,160 | 4,400 | 1,050 | 3,200 | 700 | 2,700 | 640 | 2,400 | 490 |
| 5 | 0.1 | 10 | 0.080 | 7,700 | 2,710 | 7,700 | 2,470 | 5,600 | 1,630 | 4,600 | 1,460 | 4,200 | 1,150 |
| | | 15 | 0.067 | 6,100 | 2,160 | 6,100 | 1,970 | 4,500 | 1,290 | 3,700 | 1,170 | 3,300 | 900 |
| | | 20 | 0.064 | 5,100 | 1,780 | 5,100 | 1,620 | 3,700 | 1,050 | 3,000 | 950 | 2,700 | 750 |
| | | 25 | 0.062 | 4,300 | 1,520 | 4,300 | 1,380 | 3,200 | 900 | 2,600 | 820 | 2,300 | 630 |
| | 0.2 | 10 | 0.102 | 7,700 | 2,710 | 7,700 | 2,470 | 5,600 | 1,630 | 4,600 | 1,460 | 4,200 | 1,150 |
| | | 15 | 0.086 | 6,100 | 2,160 | 6,100 | 1,970 | 4,500 | 1,290 | 3,700 | 1,170 | 3,300 | 900 |
| | | 20 | 0.081 | 5,100 | 1,780 | 5,100 | 1,620 | 3,700 | 1,050 | 3,000 | 950 | 2,700 | 750 |
| | | 25 | 0.079 | 4,300 | 1,520 | 4,300 | 1,380 | 3,200 | 900 | 2,600 | 820 | 2,300 | 630 |
| | 0.3 | 10 | 0.138 | 7,700 | 2,710 | 7,700 | 2,470 | 5,600 | 1,630 | 4,600 | 1,460 | 4,200 | 1,150 |
| | | 15 | 0.116 | 6,100 | 2,160 | 6,100 | 1,970 | 4,500 | 1,290 | 3,700 | 1,170 | 3,300 | 900 |
| | | 20 | 0.110 | 5,100 | 1,780 | 5,100 | 1,620 | 3,700 | 1,050 | 3,000 | 950 | 2,700 | 750 |
| | | 25 | 0.107 | 4,300 | 1,520 | 4,300 | 1,380 | 3,200 | 900 | 2,600 | 820 | 2,300 | 630 |
| | 0.5 | 10 | 0.142 | 7,700 | 2,710 | 7,700 | 2,470 | 5,600 | 1,630 | 4,600 | 1,460 | 4,200 | 1,150 |
| | | 15 | 0.120 | 6,100 | 2,160 | 6,100 | 1,970 | 4,500 | 1,290 | 3,700 | 1,170 | 3,300 | 900 |
| | | 20 | 0.114 | 5,100 | 1,780 | 5,100 | 1,620 | 3,700 | 1,050 | 3,000 | 950 | 2,700 | 750 |
| | | 25 | 0.110 | 4,300 | 1,520 | 4,300 | 1,380 | 3,200 | 900 | 2,600 | 820 | 2,300 | 630 |

| 被削材 Work material | | | | 1 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 2 焼入れ鋼 Hardened steels (45～55HRC) | | 3 焼入れ鋼 Hardened steels (55～60HRC) | | 4 焼入れ鋼 Hardened steels (60～65HRC) | | 5 焼入れ鋼 Hardened steels (65～72HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Cutting depth ratio | | | | 120% | | 100% | | 70% | | 50% | | 25% | |
| 外径DC Tool dia. (mm) | コーナ半径RE Corner radius (mm) | 首下長 Under neck length (mm) | $a_p$ (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 5 | 1 | 10 | 0.145 | 7,700 | 2,710 | 7,700 | 2,470 | 5,600 | 1,630 | 4,600 | 1,460 | 4,200 | 1,150 |
| | | 15 | 0.122 | 6,100 | 2,160 | 6,100 | 1,970 | 4,500 | 1,290 | 3,700 | 1,170 | 3,300 | 900 |
| | | 20 | 0.116 | 5,100 | 1,780 | 5,100 | 1,620 | 3,700 | 1,050 | 3,000 | 950 | 2,700 | 750 |
| | | 25 | 0.112 | 4,300 | 1,520 | 4,300 | 1,380 | 3,200 | 900 | 2,600 | 820 | 2,300 | 630 |
| 6 | 0.1 | 12 | 0.082 | 6,900 | 2,730 | 6,900 | 2,480 | 5,100 | 1,640 | 4,100 | 1,460 | 3,700 | 1,150 |
| | | 18 | 0.073 | 5,400 | 2,130 | 5,400 | 1,940 | 3,900 | 1,260 | 3,200 | 1,140 | 2,900 | 890 |
| | | 24 | 0.068 | 4,400 | 1,740 | 4,400 | 1,590 | 3,200 | 1,050 | 2,600 | 930 | 2,400 | 740 |
| | | 30 | 0.065 | 3,700 | 1,480 | 3,700 | 1,340 | 2,700 | 890 | 2,200 | 810 | 2,000 | 610 |
| | 0.2 | 12 | 0.147 | 6,900 | 2,730 | 6,900 | 2,480 | 5,100 | 1,640 | 4,100 | 1,460 | 3,700 | 1,150 |
| | | 18 | 0.131 | 5,400 | 2,130 | 5,400 | 1,940 | 3,900 | 1,260 | 3,200 | 1,140 | 2,900 | 890 |
| | | 24 | 0.123 | 4,400 | 1,740 | 4,400 | 1,590 | 3,200 | 1,050 | 2,600 | 930 | 2,400 | 740 |
| | | 30 | 0.118 | 3,700 | 1,480 | 3,700 | 1,340 | 2,700 | 890 | 2,200 | 810 | 2,000 | 610 |
| | 0.3 | 12 | 0.155 | 6,900 | 2,730 | 6,900 | 2,480 | 5,100 | 1,640 | 4,100 | 1,460 | 3,700 | 1,150 |
| | | 18 | 0.138 | 5,400 | 2,130 | 5,400 | 1,940 | 3,900 | 1,260 | 3,200 | 1,140 | 2,900 | 890 |
| | | 24 | 0.129 | 4,400 | 1,740 | 4,400 | 1,590 | 3,200 | 1,050 | 2,600 | 930 | 2,400 | 740 |
| | | 30 | 0.124 | 3,700 | 1,480 | 3,700 | 1,340 | 2,700 | 890 | 2,200 | 810 | 2,000 | 610 |
| | 0.5 | 12 | 0.160 | 6,900 | 2,730 | 6,900 | 2,480 | 5,100 | 1,640 | 4,100 | 1,460 | 3,700 | 1,150 |
| | | 18 | 0.142 | 5,400 | 2,130 | 5,400 | 1,940 | 3,900 | 1,260 | 3,200 | 1,140 | 2,900 | 890 |
| | | 24 | 0.133 | 4,400 | 1,740 | 4,400 | 1,590 | 3,200 | 1,050 | 2,600 | 930 | 2,400 | 740 |
| | | 30 | 0.128 | 3,700 | 1,480 | 3,700 | 1,340 | 2,700 | 890 | 2,200 | 810 | 2,000 | 610 |
| | 1 | 12 | 0.163 | 6,900 | 2,730 | 6,900 | 2,480 | 5,100 | 1,640 | 4,100 | 1,460 | 3,700 | 1,150 |
| | | 18 | 0.145 | 5,400 | 2,130 | 5,400 | 1,940 | 3,900 | 1,260 | 3,200 | 1,140 | 2,900 | 890 |
| | | 24 | 0.136 | 4,400 | 1,740 | 4,400 | 1,590 | 3,200 | 1,050 | 2,600 | 930 | 2,400 | 740 |
| | | 30 | 0.131 | 3,700 | 1,480 | 3,700 | 1,340 | 2,700 | 890 | 2,200 | 810 | 2,000 | 610 |

(1)$a_p$は被削材グループ2での目安を示しています。その他のグループの場合は、上表の切込み比率を目安に調整してください。
(2)リブ加工や止まり溝など、切りくずがつまりやすい切削の場合、切込み設定は基本切込みに切込み比率をかけて算出した切込み量を、さらにその80%まで小さくして使用してください。
(3)$a_e$の設定は$a_p$×切込み比率×5倍以下を目安に調整してください。仕上げ加工を行う場合、理論カスプハイトを計算し設定してください。
(4)彫り込み時の傾斜進入角は1°以下を推奨いたします。また、送り速度は条件表の70%以下に調整してください。
(5)文字彫り加工のような溝切削の際は、送り速度は50%以下・$a_p$を30%以下を目安に調整してください。また往復切削による加工を推奨いたします。

(1) $a_p$ indicates guidelines for Group 2 workpieces. For other groups, adjust cutting depth based on the cutting depth factors in the above table.
(2) In cases in which cutting chips may cause clogging--for example, for rib cutting and blind grooves--set the cutting depth using a cutting depth factor to calculate the cutting depth amount. This amount should then be reduced to 80% of the calculated value.
(3) Adjust by setting $a_e$ to (5 or less) × ($a_p$) × (cutting depth ratio). For finishing cutting, calculate the theoretical cusp height and set accordingly.
(4) The recommended slope entrance angle when engraving is 1° or less. Adjust the feed rate to 70% or less of values presented in the cutting condition table.
(5) When slotting such engraving letters, adjust the feed rate to 50% or less and $a_p$ to 30% or less of the values shown. We recommend reciprocal cutting.

【切込み設定例】

EPDREH4010-2-02-TH3の工具で焼入れ鋼(50HRC)をリブ溝等高線切削する場合、
切込み=0.039($a_p$)×1(焼入れ鋼グループ2の切込み比率)×0.8(閉鎖域の切削)=0.0312mm

Cutting depth setting example: When cutting rib groove contours in hardened steel (50HRC) using an EPDREH4010-2-02-TH3 tool:
Cutting depth = 0.039 ($a_p$) × 1 (cutting depth factor for Group 2 Hardened steels) × 0.8 (for closed-area cutting) = 0.0312mm

【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

【Note】① Use the appropriate coolant for the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
③ If the rpm of the machine is low, lower the feed rate also to put the rpm and feed rate in the same ratio.

# Epoch Deep Radius Evolution
# エポックディープラジアスエボリューション

**ストレートネック** | Straight Neck

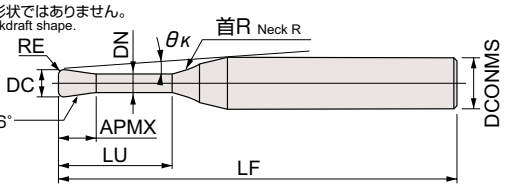
溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / 細部 Miniature / 取りのこし Rest Material Machining / 中仕上 Semi Finishing / 仕上 Finishing / リブ・細部 Rib Miniature

RE公差 RE tolerance ±0.005 (中心基準 central axis) h5 (mm)

刃先と首形状の改良によりタオレを抑制し高精度加工を実現。
ATHコーティングの採用で更なる長寿命加工。
Improved flute tip shape and neck shape suppresses warping to enable high-accuracy cutting.
Use of ATH coating further extends tool life.

2枚刃 2 Flutes

外径φ4以上はバックドラフト形状ではありません。
φ 4 or higher does not have backdraft shape.



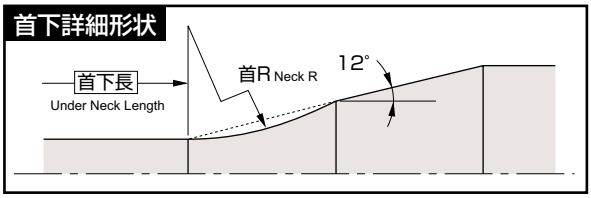

## EPDRE2○○○○-○○.○-○○○-ATH

超硬 Carbide / ATH / なじれ30° Helix angle / 切削条件表 A200 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度 Interference angle (°) θK | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格 (円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDRE2002-0.5-002-ATH | ● | 0.2 | 0.02 | 0.5 | 0.15 | 0.17 | 50 | 4 | 1 | 11.33 | 0.70 | 0.73 | 0.75 | 0.78 | 0.83 | 10,610 |
| EPDRE2002-1-002-ATH | ● | | | 1 | 0.15 | 0.17 | 50 | 4 | 1 | 10.77 | 1.22 | 1.26 | 1.30 | 1.34 | 1.41 | 10,610 |
| EPDRE2002-2-002-ATH | ● | | | 2 | 0.15 | 0.17 | 50 | 4 | 1 | 9.81 | 2.26 | 2.32 | 2.38 | 2.47 | 2.74 | 10,610 |
| EPDRE2002-0.5-005-ATH | ● | | 0.05 | 0.5 | 0.15 | 0.17 | 50 | 4 | 1 | 11.36 | 0.70 | 0.73 | 0.75 | 0.78 | 0.82 | 10,610 |
| EPDRE2002-1-005-ATH | ● | | | 1 | 0.15 | 0.17 | 50 | 4 | 1 | 10.81 | 1.22 | 1.26 | 1.30 | 1.34 | 1.40 | 10,610 |
| EPDRE2002-1.5-005-ATH | ● | | | 1.5 | 0.15 | 0.17 | 50 | 4 | 1 | 10.30 | 1.74 | 1.79 | 1.84 | 1.89 | 2.06 | 10,610 |
| EPDRE2002-2-005-ATH | ● | | | 2 | 0.15 | 0.17 | 50 | 4 | 1 | 9.84 | 2.25 | 2.32 | 2.38 | 2.46 | 2.73 | 10,610 |
| EPDRE2003-1-002-ATH | ● | 0.3 | 0.02 | 1 | 0.25 | 0.27 | 50 | 4 | 2 | 10.74 | 1.32 | 1.39 | 1.45 | 1.51 | 1.62 | 10,260 |
| EPDRE2003-2-002-ATH | ● | | | 2 | 0.25 | 0.27 | 50 | 4 | 2 | 9.77 | 2.37 | 2.47 | 2.56 | 2.64 | 2.78 | 10,260 |
| EPDRE2003-3-002-ATH | ● | | | 3 | 0.25 | 0.27 | 50 | 4 | 2 | 8.95 | 3.42 | 3.54 | 3.65 | 3.74 | 4.06 | 11,370 |
| EPDRE2003-1-005-ATH | ● | | 0.05 | 1 | 0.25 | 0.27 | 50 | 4 | 2 | 10.78 | 1.32 | 1.39 | 1.45 | 1.50 | 1.61 | 10,260 |
| EPDRE2003-1.5-005-ATH | ● | | | 1.5 | 0.25 | 0.27 | 50 | 4 | 2 | 10.26 | 1.84 | 1.93 | 2.01 | 2.07 | 2.20 | 10,260 |
| EPDRE2003-2-005-ATH | ● | | | 2 | 0.25 | 0.27 | 50 | 4 | 2 | 9.79 | 2.37 | 2.47 | 2.56 | 2.64 | 2.77 | 10,260 |
| EPDRE2003-2.5-005-ATH | ● | | | 2.5 | 0.25 | 0.27 | 50 | 4 | 2 | 9.36 | 2.89 | 3.01 | 3.10 | 3.19 | 3.39 | 11,370 |
| EPDRE2003-3-005-ATH | ● | | | 3 | 0.25 | 0.27 | 50 | 4 | 2 | 8.97 | 3.41 | 3.54 | 3.65 | 3.74 | 4.05 | 11,370 |
| EPDRE2004-1-002-ATH | ● | 0.4 | 0.02 | 1 | 0.3 | 0.37 | 50 | 4 | 2 | 10.71 | 1.32 | 1.39 | 1.45 | 1.51 | 1.62 | 6,840 |
| EPDRE2004-2-002-ATH | ● | | | 2 | 0.3 | 0.37 | 50 | 4 | 2 | 9.72 | 2.37 | 2.47 | 2.56 | 2.64 | 2.78 | 6,840 |
| EPDRE2004-3-002-ATH | ● | | | 3 | 0.3 | 0.37 | 50 | 4 | 2 | 8.89 | 3.42 | 3.54 | 3.65 | 3.74 | 4.06 | 6,840 |
| EPDRE2004-4-002-ATH | ● | | | 4 | 0.3 | 0.37 | 50 | 4 | 2 | 8.19 | 4.46 | 4.60 | 4.73 | 4.86 | 5.39 | 6,840 |
| EPDRE2004-1-005-ATH | ● | | 0.05 | 1 | 0.3 | 0.37 | 50 | 4 | 2 | 10.75 | 1.32 | 1.39 | 1.45 | 1.50 | 1.61 | 6,840 |
| EPDRE2004-1.5-005-ATH | ● | | | 1.5 | 0.3 | 0.37 | 50 | 4 | 2 | 10.22 | 1.84 | 1.93 | 2.01 | 2.07 | 2.20 | 6,840 |
| EPDRE2004-2-005-ATH | ● | | | 2 | 0.3 | 0.37 | 50 | 4 | 2 | 9.74 | 2.37 | 2.47 | 2.56 | 2.64 | 2.77 | 6,840 |
| EPDRE2004-2.5-005-ATH | ● | | | 2.5 | 0.3 | 0.37 | 50 | 4 | 2 | 9.31 | 2.89 | 3.01 | 3.10 | 3.19 | 3.39 | 6,840 |
| EPDRE2004-3-005-ATH | ● | | | 3 | 0.3 | 0.37 | 50 | 4 | 2 | 8.91 | 3.41 | 3.54 | 3.65 | 3.74 | 4.05 | 6,840 |
| EPDRE2004-3.5-005-ATH | ● | | | 3.5 | 0.3 | 0.37 | 50 | 4 | 2 | 8.54 | 3.93 | 4.07 | 4.19 | 4.29 | 4.72 | 6,840 |
| EPDRE2004-4-005-ATH | ● | | | 4 | 0.3 | 0.37 | 50 | 4 | 2 | 8.21 | 4.45 | 4.60 | 4.72 | 4.86 | 5.38 | 6,840 |
| EPDRE2004-1-01-ATH | ● | | 0.1 | 1 | 0.3 | 0.37 | 50 | 4 | 2 | 10.80 | 1.31 | 1.38 | 1.44 | 1.50 | 1.60 | 6,840 |
| EPDRE2004-2-01-ATH | ● | | | 2 | 0.3 | 0.37 | 50 | 4 | 2 | 9.79 | 2.37 | 2.47 | 2.55 | 2.63 | 2.77 | 6,840 |
| EPDRE2004-3-01-ATH | ● | | | 3 | 0.3 | 0.37 | 50 | 4 | 2 | 8.95 | 3.41 | 3.54 | 3.64 | 3.74 | 4.04 | 6,840 |
| EPDRE2004-4-01-ATH | ● | | | 4 | 0.3 | 0.37 | 50 | 4 | 2 | 8.24 | 4.45 | 4.60 | 4.72 | 4.85 | 5.37 | 6,840 |
| EPDRE2005-1-002-ATH | ● | 0.5 | 0.02 | 1 | 0.35 | 0.47 | 50 | 4 | 2 | 10.68 | 1.32 | 1.39 | 1.45 | 1.51 | 1.62 | 5,550 |
| EPDRE2005-2-002-ATH | ● | | | 2 | 0.35 | 0.47 | 50 | 4 | 2 | 9.66 | 2.37 | 2.47 | 2.56 | 2.64 | 2.78 | 5,550 |
| EPDRE2005-3-002-ATH | ● | | | 3 | 0.35 | 0.47 | 50 | 4 | 2 | 8.82 | 3.42 | 3.54 | 3.65 | 3.74 | 4.06 | 5,550 |
| EPDRE2005-4-002-ATH | ● | | | 4 | 0.35 | 0.47 | 50 | 4 | 2 | 8.11 | 4.46 | 4.60 | 4.73 | 4.86 | 5.39 | 5,550 |
| EPDRE2005-6-002-ATH | ● | | | 6 | 0.35 | 0.47 | 50 | 4 | 2 | 6.99 | 6.53 | 6.71 | 6.92 | 7.26 | 8.05 | 5,550 |
| EPDRE2005-1-005-ATH | ● | | 0.05 | 1 | 0.35 | 0.47 | 50 | 4 | 2 | 10.71 | 1.32 | 1.39 | 1.45 | 1.50 | 1.61 | 5,550 |
| EPDRE2005-2-005-ATH | ● | | | 2 | 0.35 | 0.47 | 50 | 4 | 2 | 9.69 | 2.37 | 2.47 | 2.56 | 2.64 | 2.77 | 5,550 |
| EPDRE2005-3-005-ATH | ● | | | 3 | 0.35 | 0.47 | 50 | 4 | 2 | 8.84 | 3.41 | 3.54 | 3.65 | 3.74 | 4.05 | 5,550 |
| EPDRE2005-4-005-ATH | ● | | | 4 | 0.35 | 0.47 | 50 | 4 | 2 | 8.13 | 4.45 | 4.60 | 4.72 | 4.86 | 5.38 | 5,550 |
| EPDRE2005-5-005-ATH | ● | | | 5 | 0.35 | 0.47 | 50 | 4 | 2 | 7.53 | 5.49 | 5.66 | 5.79 | 6.05 | 6.71 | 5,550 |
| EPDRE2005-6-005-ATH | ● | | | 6 | 0.35 | 0.47 | 50 | 4 | 2 | 7.00 | 6.53 | 6.71 | 6.91 | 7.25 | 8.04 | 5,550 |
| EPDRE2005-1-01-ATH | ● | | 0.1 | 1 | 0.35 | 0.47 | 50 | 4 | 2 | 10.77 | 1.31 | 1.38 | 1.44 | 1.50 | 1.60 | 5,550 |
| EPDRE2005-2-01-ATH | ● | | | 2 | 0.35 | 0.47 | 50 | 4 | 2 | 9.74 | 2.37 | 2.47 | 2.55 | 2.63 | 2.77 | 5,550 |
| EPDRE2005-3-01-ATH | ● | | | 3 | 0.35 | 0.47 | 50 | 4 | 2 | 8.88 | 3.41 | 3.54 | 3.64 | 3.74 | 4.04 | 5,550 |
| EPDRE2005-4-01-ATH | ● | | | 4 | 0.35 | 0.47 | 50 | 4 | 2 | 8.17 | 4.45 | 4.60 | 4.72 | 4.85 | 5.37 | 5,550 |
| EPDRE2005-5-01-ATH | ● | | | 5 | 0.35 | 0.47 | 50 | 4 | 2 | 7.55 | 5.49 | 5.66 | 5.79 | 6.04 | 6.69 | 5,550 |
| EPDRE2005-6-01-ATH | ● | | | 6 | 0.35 | 0.47 | 50 | 4 | 2 | 7.03 | 6.52 | 6.71 | 6.90 | 7.24 | 8.02 | 5,550 |
| EPDRE2006-2-002-ATH | ● | 0.6 | 0.02 | 2 | 0.4 | 0.57 | 50 | 4 | 4 | 9.61 | 2.54 | 2.70 | 2.83 | 2.96 | 3.19 | 5,550 |
| EPDRE2006-4-002-ATH | ● | | | 4 | 0.4 | 0.57 | 50 | 4 | 4 | 8.04 | 4.66 | 4.88 | 5.07 | 5.24 | 5.52 | 5,550 |
| EPDRE2006-6-002-ATH | ● | | | 6 | 0.4 | 0.57 | 50 | 4 | 4 | 6.90 | 6.76 | 7.03 | 7.26 | 7.45 | 8.05 | 5,550 |
| EPDRE2006-2-005-ATH | ● | | 0.05 | 2 | 0.4 | 0.57 | 50 | 4 | 4 | 9.64 | 2.54 | 2.69 | 2.83 | 2.95 | 3.18 | 5,550 |
| EPDRE2006-4-005-ATH | ● | | | 4 | 0.4 | 0.57 | 50 | 4 | 4 | 8.06 | 4.66 | 4.88 | 5.07 | 5.23 | 5.52 | 5,550 |
| EPDRE2006-6-005-ATH | ● | | | 6 | 0.4 | 0.57 | 50 | 4 | 4 | 6.92 | 6.76 | 7.03 | 7.26 | 7.45 | 8.04 | 5,550 |
| EPDRE2006-8-005-ATH | ● | | | 8 | 0.4 | 0.57 | 50 | 4 | 4 | 6.06 | 8.85 | 9.16 | 9.41 | 9.64 | 10.69 | 5,550 |
| EPDRE2006-10-005-ATH | ● | | | 10 | 0.4 | 0.57 | 50 | 4 | 4 | 5.39 | 10.93 | 11.28 | 11.55 | 12.04 | 13.35 | 5,550 |
| EPDRE2006-2-01-ATH | ● | | 0.1 | 2 | 0.4 | 0.57 | 50 | 4 | 4 | 9.68 | 2.53 | 2.69 | 2.82 | 2.95 | 3.17 | 5,550 |
| EPDRE2006-4-01-ATH | ● | | | 4 | 0.4 | 0.57 | 50 | 4 | 4 | 8.09 | 4.65 | 4.88 | 5.06 | 5.23 | 5.51 | 5,550 |
| EPDRE2006-6-01-ATH | ● | | | 6 | 0.4 | 0.57 | 50 | 4 | 4 | 6.94 | 6.76 | 7.03 | 7.25 | 7.44 | 8.02 | 5,550 |
| EPDRE2006-8-01-ATH | ● | | | 8 | 0.4 | 0.57 | 50 | 4 | 4 | 6.08 | 8.85 | 9.16 | 9.41 | 9.63 | 10.67 | 5,550 |
| EPDRE2006-10-01-ATH | ● | | | 10 | 0.4 | 0.57 | 50 | 4 | 4 | 5.41 | 10.92 | 11.27 | 11.55 | 12.03 | 13.33 | 5,550 |

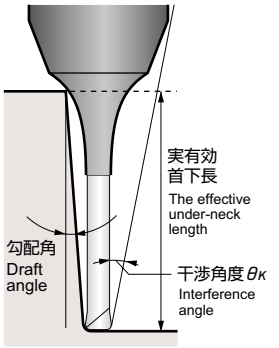
●：標準在庫品です。●：Stocked items.

首下詳細形状




【注意】
エポックディープラジアスEPDRとは有効首下長が異なります。再度ご確認お願いいたします。

【Note】
The effective under-neck length is different from Epoch Deep Radius EPDR. Please recheck the interference region.




# EPDRE2○○○○-○○.○-○○○-ATH

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度 Interference angle (°) θK | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDRE2007-2-005-ATH | ● | 0.7 | 0.05 | 2 | 0.45 | 0.67 | 50 | 4 | 4 | 9.58 | 2.54 | 2.69 | 2.83 | 2.95 | 3.18 | 5,900 |
| EPDRE2007-4-005-ATH | ● | | | 4 | 0.45 | 0.67 | 50 | 4 | 4 | 7.98 | 4.66 | 4.88 | 5.07 | 5.23 | 5.52 | 5,900 |
| EPDRE2007-6-005-ATH | ● | | | 6 | 0.45 | 0.67 | 50 | 4 | 4 | 6.83 | 6.76 | 7.03 | 7.26 | 7.45 | 8.04 | 5,900 |
| EPDRE2007-2-01-ATH | ● | | 0.1 | 2 | 0.45 | 0.67 | 50 | 4 | 4 | 9.63 | 2.53 | 2.69 | 2.82 | 2.95 | 3.17 | 5,900 |
| EPDRE2007-4-01-ATH | ● | | | 4 | 0.45 | 0.67 | 50 | 4 | 4 | 8.01 | 4.65 | 4.88 | 5.06 | 5.23 | 5.51 | 5,900 |
| EPDRE2007-6-01-ATH | ● | | | 6 | 0.45 | 0.67 | 50 | 4 | 4 | 6.86 | 6.76 | 7.03 | 7.25 | 7.44 | 8.02 | 5,900 |
| EPDRE2008-2-002-ATH | ● | 0.8 | 0.02 | 2 | 0.5 | 0.77 | 50 | 4 | 4 | 9.49 | 2.54 | 2.70 | 2.83 | 2.96 | 3.19 | 6,370 |
| EPDRE2008-4-002-ATH | ● | | | 4 | 0.5 | 0.77 | 50 | 4 | 4 | 7.87 | 4.66 | 4.88 | 5.07 | 5.24 | 5.52 | 6,370 |
| EPDRE2008-6-002-ATH | ● | | | 6 | 0.5 | 0.77 | 50 | 4 | 4 | 6.73 | 6.76 | 7.03 | 7.26 | 7.45 | 8.05 | 6,370 |
| EPDRE2008-2-005-ATH | ● | | 0.05 | 2 | 0.5 | 0.77 | 50 | 4 | 4 | 9.52 | 2.54 | 2.69 | 2.83 | 2.95 | 3.18 | 6,370 |
| EPDRE2008-4-005-ATH | ● | | | 4 | 0.5 | 0.77 | 50 | 4 | 4 | 7.89 | 4.66 | 4.88 | 5.07 | 5.23 | 5.52 | 6,370 |
| EPDRE2008-6-005-ATH | ● | | | 6 | 0.5 | 0.77 | 50 | 4 | 4 | 6.74 | 6.76 | 7.03 | 7.26 | 7.45 | 8.04 | 6,370 |
| EPDRE2008-8-005-ATH | ● | | | 8 | 0.5 | 0.77 | 50 | 4 | 4 | 5.88 | 8.85 | 9.16 | 9.41 | 9.64 | 10.69 | 6,370 |
| EPDRE2008-12-005-ATH | ● | | | 12 | 0.5 | 0.77 | 55 | 4 | 4 | 4.68 | 13.00 | 13.38 | 13.75 | 14.43 | 16.00 | 6,370 |
| EPDRE2008-2-01-ATH | ● | | 0.1 | 2 | 0.5 | 0.77 | 50 | 4 | 4 | 9.57 | 2.53 | 2.69 | 2.82 | 2.95 | 3.17 | 6,370 |
| EPDRE2008-4-01-ATH | ● | | | 4 | 0.5 | 0.77 | 50 | 4 | 4 | 7.93 | 4.65 | 4.88 | 5.06 | 5.23 | 5.51 | 6,370 |
| EPDRE2008-6-01-ATH | ● | | | 6 | 0.5 | 0.77 | 50 | 4 | 4 | 6.77 | 6.76 | 7.03 | 7.25 | 7.44 | 8.02 | 6,370 |
| EPDRE2008-8-01-ATH | ● | | | 8 | 0.5 | 0.77 | 50 | 4 | 4 | 5.90 | 8.85 | 9.16 | 9.41 | 9.63 | 10.67 | 6,370 |
| EPDRE2008-12-01-ATH | ● | | | 12 | 0.5 | 0.77 | 55 | 4 | 4 | 4.70 | 13.00 | 13.38 | 13.75 | 14.42 | 15.98 | 6,370 |
| EPDRE2008-2-02-ATH | ● | | 0.2 | 2 | 0.5 | 0.77 | 50 | 4 | 4 | 9.67 | 2.53 | 2.68 | 2.81 | 2.93 | 3.15 | 6,370 |
| EPDRE2008-4-02-ATH | ● | | | 4 | 0.5 | 0.77 | 50 | 4 | 4 | 8.00 | 4.65 | 4.87 | 5.05 | 5.21 | 5.50 | 6,370 |
| EPDRE2008-6-02-ATH | ● | | | 6 | 0.5 | 0.77 | 50 | 4 | 4 | 6.82 | 6.75 | 7.02 | 7.24 | 7.43 | 7.99 | 6,370 |
| EPDRE2008-8-02-ATH | ● | | | 8 | 0.5 | 0.77 | 50 | 4 | 4 | 5.94 | 8.84 | 9.15 | 9.40 | 9.62 | 10.64 | 6,370 |
| EPDRE2008-12-02-ATH | ● | | | 12 | 0.5 | 0.77 | 55 | 4 | 4 | 4.72 | 12.99 | 13.37 | 13.73 | 14.40 | 15.95 | 6,370 |
| EPDRE2010-2-002-ATH | ● | 1 | 0.02 | 2 | 0.8 | 0.94 | 50 | 4 | 4 | 9.29 | 2.64 | 2.78 | 2.91 | 3.03 | 3.24 | 5,430 |
| EPDRE2010-4-002-ATH | ● | | | 4 | 0.8 | 0.94 | 50 | 4 | 4 | 7.65 | 4.75 | 4.95 | 5.13 | 5.29 | 5.56 | 5,430 |
| EPDRE2010-6-002-ATH | ● | | | 6 | 0.8 | 0.94 | 50 | 4 | 4 | 6.50 | 6.84 | 7.09 | 7.31 | 7.49 | 8.14 | 5,900 |
| EPDRE2010-8-002-ATH | ● | | | 8 | 0.8 | 0.94 | 50 | 4 | 4 | 5.65 | 8.92 | 9.21 | 9.46 | 9.73 | 10.79 | 5,900 |
| EPDRE2010-10-002-ATH | ● | | | 10 | 0.8 | 0.94 | 50 | 4 | 4 | 5.00 | 10.99 | 11.32 | 11.59 | 12.13 | 13.45 | 5,900 |
| EPDRE2010-12-002-ATH | ● | | | 12 | 0.8 | 0.94 | 55 | 4 | 4 | 4.48 | 13.06 | 13.42 | 13.84 | 14.52 | 16.10 | 5,900 |
| EPDRE2010-2-005-ATH | ● | | 0.05 | 2 | 0.8 | 0.94 | 50 | 4 | 4 | 9.32 | 2.64 | 2.78 | 2.91 | 3.02 | 3.24 | 5,430 |
| EPDRE2010-3-005-ATH | ● | | | 3 | 0.8 | 0.94 | 50 | 4 | 4 | 8.41 | 3.70 | 3.87 | 4.02 | 4.16 | 4.41 | 5,430 |
| EPDRE2010-4-005-ATH | ● | | | 4 | 0.8 | 0.94 | 50 | 4 | 4 | 7.67 | 4.75 | 4.95 | 5.13 | 5.28 | 5.56 | 5,430 |
| EPDRE2010-5-005-ATH | ● | | | 5 | 0.8 | 0.94 | 50 | 4 | 4 | 7.04 | 5.79 | 6.02 | 6.22 | 6.39 | 6.80 | 5,430 |
| EPDRE2010-6-005-ATH | ● | | | 6 | 0.8 | 0.94 | 50 | 4 | 4 | 6.51 | 6.84 | 7.09 | 7.30 | 7.49 | 8.13 | 5,900 |
| EPDRE2010-8-005-ATH | ● | | | 8 | 0.8 | 0.94 | 50 | 4 | 4 | 5.66 | 8.92 | 9.21 | 9.46 | 9.73 | 10.78 | 5,900 |
| EPDRE2010-10-005-ATH | ● | | | 10 | 0.8 | 0.94 | 50 | 4 | 4 | 5.00 | 10.99 | 11.32 | 11.59 | 12.12 | 13.44 | 5,900 |
| EPDRE2010-12-005-ATH | ● | | | 12 | 0.8 | 0.94 | 55 | 4 | 4 | 4.48 | 13.06 | 13.42 | 13.84 | 14.51 | 16.09 | 5,900 |
| EPDRE2010-16-005-ATH | ● | | | 16 | 0.8 | 0.94 | 60 | 4 | 4 | 3.71 | 17.18 | 17.60 | 18.40 | 19.30 | 21.40 | 7,790 |
| EPDRE2010-20-005-ATH | ● | | | 20 | 0.8 | 0.94 | 60 | 4 | 4 | 3.17 | 21.29 | 21.93 | 22.96 | 24.09 | 26.71 | 8,610 |
| EPDRE2010-2-01-ATH | ● | | 0.1 | 2 | 0.8 | 0.94 | 50 | 4 | 4 | 9.37 | 2.64 | 2.78 | 2.90 | 3.01 | 3.23 | 5,430 |
| EPDRE2010-3-01-ATH | ● | | | 3 | 0.8 | 0.94 | 50 | 4 | 4 | 8.45 | 3.69 | 3.87 | 4.02 | 4.15 | 4.40 | 5,430 |
| EPDRE2010-4-01-ATH | ● | | | 4 | 0.8 | 0.94 | 50 | 4 | 4 | 7.70 | 4.74 | 4.95 | 5.12 | 5.28 | 5.55 | 5,430 |
| EPDRE2010-5-01-ATH | ● | | | 5 | 0.8 | 0.94 | 50 | 4 | 4 | 7.07 | 5.79 | 6.02 | 6.21 | 6.39 | 6.79 | 5,430 |
| EPDRE2010-6-01-ATH | ● | | | 6 | 0.8 | 0.94 | 50 | 4 | 4 | 6.54 | 6.83 | 7.09 | 7.30 | 7.49 | 8.11 | 5,900 |
| EPDRE2010-8-01-ATH | ● | | | 8 | 0.8 | 0.94 | 50 | 4 | 4 | 5.68 | 8.91 | 9.21 | 9.45 | 9.72 | 10.77 | 5,900 |
| EPDRE2010-10-01-ATH | ● | | | 10 | 0.8 | 0.94 | 50 | 4 | 4 | 5.02 | 10.99 | 11.32 | 11.59 | 12.11 | 13.42 | 5,900 |
| EPDRE2010-12-01-ATH | ● | | | 12 | 0.8 | 0.94 | 55 | 4 | 4 | 4.50 | 13.06 | 13.42 | 13.83 | 14.50 | 16.08 | 5,900 |
| EPDRE2010-16-01-ATH | ● | | | 16 | 0.8 | 0.94 | 60 | 4 | 4 | 3.72 | 17.18 | 17.60 | 18.39 | 19.29 | 21.39 | 7,790 |
| EPDRE2010-20-01-ATH | ● | | | 20 | 0.8 | 0.94 | 60 | 4 | 4 | 3.17 | 21.29 | 21.93 | 22.95 | 24.08 | 26.70 | 8,610 |
| EPDRE2010-2-02-ATH | ● | | 0.2 | 2 | 0.8 | 0.94 | 50 | 4 | 4 | 9.47 | 2.63 | 2.77 | 2.89 | 3.00 | 3.21 | 5,430 |
| EPDRE2010-3-02-ATH | ● | | | 3 | 0.8 | 0.94 | 50 | 4 | 4 | 8.54 | 3.69 | 3.86 | 4.01 | 4.14 | 4.39 | 5,430 |
| EPDRE2010-4-02-ATH | ● | | | 4 | 0.8 | 0.94 | 50 | 4 | 4 | 7.77 | 4.74 | 4.94 | 5.11 | 5.27 | 5.54 | 5,430 |
| EPDRE2010-5-02-ATH | ● | | | 5 | 0.8 | 0.94 | 50 | 4 | 4 | 7.13 | 5.79 | 6.01 | 6.21 | 6.38 | 6.75 | 5,430 |
| EPDRE2010-6-02-ATH | ● | | | 6 | 0.8 | 0.94 | 50 | 4 | 4 | 6.59 | 6.83 | 7.08 | 7.29 | 7.48 | 8.08 | 5,900 |
| EPDRE2010-8-02-ATH | ● | | | 8 | 0.8 | 0.94 | 50 | 4 | 4 | 5.72 | 8.91 | 9.20 | 9.45 | 9.70 | 10.74 | 5,900 |
| EPDRE2010-10-02-ATH | ● | | | 10 | 0.8 | 0.94 | 50 | 4 | 4 | 5.05 | 10.98 | 11.32 | 11.58 | 12.09 | 13.39 | 5,900 |
| EPDRE2010-12-02-ATH | ● | | | 12 | 0.8 | 0.94 | 55 | 4 | 4 | 4.52 | 13.05 | 13.42 | 13.81 | 14.48 | 16.05 | 5,900 |
| EPDRE2010-16-02-ATH | ● | | | 16 | 0.8 | 0.94 | 60 | 4 | 4 | 3.74 | 17.18 | 17.59 | 18.38 | 19.27 | 21.35 | 7,790 |
| EPDRE2010-20-02-ATH | ● | | | 20 | 0.8 | 0.94 | 60 | 4 | 4 | 3.19 | 21.29 | 21.92 | 22.94 | 24.06 | 26.66 | 8,610 |

# EPDRE2○○○-○○.○-○○○-ATH

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度 Interference angle (°) θK | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDRE2010-2-03-ATH | ● | 1 | 0.3 | 2 | 0.8 | 0.94 | 50 | 4 | 4 | 9.57 | 2.63 | 2.76 | 2.87 | 2.98 | 3.19 | 5,430 |
| EPDRE2010-3-03-ATH | ● | | | 3 | 0.8 | 0.94 | 50 | 4 | 4 | 8.62 | 3.68 | 3.85 | 3.99 | 4.13 | 4.37 | 5,430 |
| EPDRE2010-4-03-ATH | ● | | | 4 | 0.8 | 0.94 | 50 | 4 | 4 | 7.84 | 4.73 | 4.93 | 5.10 | 5.25 | 5.53 | 5,430 |
| EPDRE2010-5-03-ATH | ● | | | 5 | 0.8 | 0.94 | 50 | 4 | 4 | 7.19 | 5.78 | 6.01 | 6.20 | 6.37 | 6.72 | 5,430 |
| EPDRE2010-6-03-ATH | ● | | | 6 | 0.8 | 0.94 | 50 | 4 | 4 | 6.64 | 6.82 | 7.07 | 7.28 | 7.47 | 8.05 | 5,900 |
| EPDRE2010-8-03-ATH | ● | | | 8 | 0.8 | 0.94 | 50 | 4 | 4 | 5.75 | 8.91 | 9.20 | 9.44 | 9.68 | 10.70 | 5,900 |
| EPDRE2010-10-03-ATH | ● | | | 10 | 0.8 | 0.94 | 50 | 4 | 4 | 5.08 | 10.98 | 11.31 | 11.58 | 12.07 | 13.36 | 5,900 |
| EPDRE2010-12-03-ATH | ● | | | 12 | 0.8 | 0.94 | 55 | 4 | 4 | 4.54 | 13.05 | 13.41 | 13.80 | 14.46 | 16.01 | 5,900 |
| EPDRE2010-16-03-ATH | ● | | | 16 | 0.8 | 0.94 | 60 | 4 | 4 | 3.75 | 17.17 | 17.59 | 18.36 | 19.25 | 21.32 | 7,790 |
| EPDRE2010-20-03-ATH | ● | | | 20 | 0.8 | 0.94 | 60 | 4 | 4 | 3.20 | 21.28 | 21.91 | 22.92 | 24.04 | 26.63 | 8,610 |
| EPDRE20125-5-01-ATH | ● | 1.25 | 0.1 | 5 | 1.15 | 1.18 | 50 | 4 | 4 | 6.80 | 5.81 | 6.04 | 6.23 | 6.40 | 6.82 | 6,020 |
| EPDRE20125-10-01-ATH | ● | | | 10 | 1.15 | 1.18 | 50 | 4 | 4 | 4.76 | 11.01 | 11.34 | 11.60 | 12.14 | 13.45 | 6,020 |
| EPDRE20125-15-01-ATH | ● | | | 15 | 1.15 | 1.18 | 55 | 4 | 4 | 3.66 | 16.17 | 16.57 | 17.28 | 18.12 | 20.09 | 6,020 |
| EPDRE20125-20-01-ATH | ● | | | 20 | 1.15 | 1.18 | 60 | 4 | 4 | 2.97 | 21.30 | 21.95 | 22.98 | 24.10 | 干渉なし | 9,200 |
| EPDRE20125-5-02-ATH | ● | | 0.2 | 5 | 1.15 | 1.18 | 50 | 4 | 4 | 6.86 | 5.81 | 6.03 | 6.22 | 6.39 | 6.79 | 6,020 |
| EPDRE20125-10-02-ATH | ● | | | 10 | 1.15 | 1.18 | 50 | 4 | 4 | 4.79 | 11.00 | 11.33 | 11.59 | 12.12 | 13.42 | 6,020 |
| EPDRE20125-15-02-ATH | ● | | | 15 | 1.15 | 1.18 | 55 | 4 | 4 | 3.68 | 16.16 | 16.56 | 17.26 | 18.10 | 20.06 | 6,020 |
| EPDRE20125-20-02-ATH | ● | | | 20 | 1.15 | 1.18 | 60 | 4 | 4 | 2.98 | 21.30 | 21.95 | 22.97 | 24.09 | 干渉なし | 9,200 |
| EPDRE20125-5-03-ATH | ● | | 0.3 | 5 | 1.15 | 1.18 | 50 | 4 | 4 | 6.92 | 5.81 | 6.03 | 6.21 | 6.38 | 6.75 | 6,020 |
| EPDRE20125-10-03-ATH | ● | | | 10 | 1.15 | 1.18 | 50 | 4 | 4 | 4.82 | 11.00 | 11.32 | 11.59 | 12.10 | 13.39 | 6,020 |
| EPDRE20125-15-03-ATH | ● | | | 15 | 1.15 | 1.18 | 55 | 4 | 4 | 3.69 | 16.16 | 16.56 | 17.25 | 18.08 | 20.03 | 6,020 |
| EPDRE20125-20-03-ATH | ● | | | 20 | 1.15 | 1.18 | 60 | 4 | 4 | 2.99 | 21.30 | 21.94 | 22.95 | 24.07 | 干渉なし | 9,200 |
| EPDRE2015-4-01-ATH | ● | 1.5 | 0.1 | 4 | 1.35 | 1.42 | 50 | 4 | 4 | 7.15 | 4.80 | 4.99 | 5.16 | 5.31 | 5.58 | 5,780 |
| EPDRE2015-6-01-ATH | ● | | | 6 | 1.35 | 1.42 | 50 | 4 | 4 | 5.97 | 6.88 | 7.12 | 7.33 | 7.51 | 8.18 | 5,780 |
| EPDRE2015-8-01-ATH | ● | | | 8 | 1.35 | 1.42 | 50 | 4 | 4 | 5.12 | 8.96 | 9.24 | 9.48 | 9.77 | 10.83 | 6,020 |
| EPDRE2015-12-01-ATH | ● | | | 12 | 1.35 | 1.42 | 55 | 4 | 4 | 3.98 | 13.09 | 13.45 | 13.88 | 14.56 | 16.14 | 6,020 |
| EPDRE2015-15-01-ATH | ● | | | 15 | 1.35 | 1.42 | 55 | 4 | 4 | 3.42 | 16.18 | 16.58 | 17.30 | 18.15 | 20.12 | 6,020 |
| EPDRE2015-20-01-ATH | ● | | | 20 | 1.35 | 1.42 | 60 | 4 | 4 | 2.76 | 21.32 | 21.98 | 23.01 | 24.13 | 干渉なし | 6,020 |
| EPDRE2015-4-02-ATH | ● | | 0.2 | 4 | 1.35 | 1.42 | 50 | 4 | 4 | 7.22 | 4.79 | 4.98 | 5.15 | 5.30 | 5.57 | 5,780 |
| EPDRE2015-6-02-ATH | ● | | | 6 | 1.35 | 1.42 | 50 | 4 | 4 | 6.02 | 6.88 | 7.12 | 7.32 | 7.50 | 8.14 | 5,780 |
| EPDRE2015-8-02-ATH | ● | | | 8 | 1.35 | 1.42 | 50 | 4 | 4 | 5.16 | 8.95 | 9.24 | 9.47 | 9.75 | 10.80 | 6,020 |
| EPDRE2015-12-02-ATH | ● | | | 12 | 1.35 | 1.42 | 55 | 4 | 4 | 4.01 | 13.09 | 13.44 | 13.87 | 14.54 | 16.11 | 6,020 |
| EPDRE2015-15-02-ATH | ● | | | 15 | 1.35 | 1.42 | 55 | 4 | 4 | 3.43 | 16.18 | 16.58 | 17.29 | 18.13 | 20.09 | 6,020 |
| EPDRE2015-20-02-ATH | ● | | | 20 | 1.35 | 1.42 | 60 | 4 | 4 | 2.77 | 21.32 | 21.97 | 22.99 | 24.11 | 干渉なし | 6,020 |
| EPDRE2015-4-03-ATH | ● | | 0.3 | 4 | 1.35 | 1.42 | 50 | 4 | 4 | 7.30 | 4.79 | 4.97 | 5.14 | 5.29 | 5.55 | 5,780 |
| EPDRE2015-6-03-ATH | ● | | | 6 | 1.35 | 1.42 | 50 | 4 | 4 | 6.07 | 6.87 | 7.11 | 7.31 | 7.49 | 8.11 | 5,780 |
| EPDRE2015-8-03-ATH | ● | | | 8 | 1.35 | 1.42 | 50 | 4 | 4 | 5.19 | 8.95 | 9.23 | 9.47 | 9.73 | 10.77 | 6,020 |
| EPDRE2015-12-03-ATH | ● | | | 12 | 1.35 | 1.42 | 55 | 4 | 4 | 4.03 | 13.09 | 13.44 | 13.85 | 14.52 | 16.08 | 6,020 |
| EPDRE2015-15-03-ATH | ● | | | 15 | 1.35 | 1.42 | 55 | 4 | 4 | 3.45 | 16.18 | 16.57 | 17.28 | 18.11 | 20.06 | 6,020 |
| EPDRE2015-20-03-ATH | ● | | | 20 | 1.35 | 1.42 | 60 | 4 | 4 | 2.78 | 21.31 | 21.96 | 22.98 | 24.09 | 干渉なし | 6,020 |
| EPDRE2015-4-05-ATH | ● | | 0.5 | 4 | 1.35 | 1.42 | 50 | 4 | 4 | 7.45 | 4.78 | 4.96 | 5.12 | 5.26 | 5.53 | 5,780 |
| EPDRE2015-6-05-ATH | ● | | | 6 | 1.35 | 1.42 | 50 | 4 | 4 | 6.17 | 6.86 | 7.10 | 7.30 | 7.48 | 8.05 | 5,780 |
| EPDRE2015-8-05-ATH | ● | | | 8 | 1.35 | 1.42 | 50 | 4 | 4 | 5.27 | 8.94 | 9.22 | 9.45 | 9.70 | 10.70 | 6,020 |
| EPDRE2015-12-05-ATH | ● | | | 12 | 1.35 | 1.42 | 55 | 4 | 4 | 4.07 | 13.08 | 13.43 | 13.83 | 14.48 | 16.01 | 6,020 |
| EPDRE2015-15-05-ATH | ● | | | 15 | 1.35 | 1.42 | 55 | 4 | 4 | 3.48 | 16.17 | 16.56 | 17.25 | 18.07 | 19.99 | 6,020 |
| EPDRE2015-20-05-ATH | ● | | | 20 | 1.35 | 1.42 | 60 | 4 | 4 | 2.80 | 21.31 | 21.95 | 22.95 | 24.06 | 干渉なし | 6,020 |
| EPDRE20175-5-01-ATH | ● | 1.75 | 0.1 | 5 | 1.55 | 1.67 | 50 | 4 | 4 | 6.19 | 5.84 | 6.06 | 6.25 | 6.42 | 6.85 | 5,780 |
| EPDRE20175-10-01-ATH | ● | | | 10 | 1.55 | 1.67 | 50 | 4 | 4 | 4.19 | 11.03 | 11.35 | 11.61 | 12.17 | 13.49 | 6,020 |
| EPDRE20175-15-01-ATH | ● | | | 15 | 1.55 | 1.67 | 55 | 4 | 4 | 3.16 | 16.18 | 16.58 | 17.30 | 18.15 | 20.12 | 6,020 |
| EPDRE20175-20-01-ATH | ● | | | 20 | 1.55 | 1.67 | 60 | 4 | 4 | 2.54 | 21.32 | 21.98 | 23.01 | 24.13 | 干渉なし | 6,020 |
| EPDRE20175-5-02-ATH | ● | | 0.2 | 5 | 1.55 | 1.67 | 50 | 4 | 4 | 6.25 | 5.84 | 6.05 | 6.24 | 6.41 | 6.82 | 5,780 |
| EPDRE20175-10-02-ATH | ● | | | 10 | 1.55 | 1.67 | 50 | 4 | 4 | 4.22 | 11.02 | 11.34 | 11.61 | 12.15 | 13.45 | 6,020 |
| EPDRE20175-15-02-ATH | ● | | | 15 | 1.55 | 1.67 | 55 | 4 | 4 | 3.18 | 16.18 | 16.58 | 17.29 | 18.13 | 20.09 | 6,020 |
| EPDRE20175-20-02-ATH | ● | | | 20 | 1.55 | 1.67 | 60 | 4 | 4 | 2.55 | 21.32 | 21.97 | 22.99 | 24.11 | 干渉なし | 6,020 |
| EPDRE20175-5-03-ATH | ● | | 0.3 | 5 | 1.55 | 1.67 | 50 | 4 | 4 | 6.31 | 5.83 | 6.05 | 6.23 | 6.40 | 6.79 | 5,780 |
| EPDRE20175-10-03-ATH | ● | | | 10 | 1.55 | 1.67 | 50 | 4 | 4 | 4.24 | 11.02 | 11.34 | 11.60 | 12.13 | 13.42 | 6,020 |
| EPDRE20175-15-03-ATH | ● | | | 15 | 1.55 | 1.67 | 55 | 4 | 4 | 3.20 | 16.18 | 16.57 | 17.28 | 18.11 | 20.06 | 6,020 |
| EPDRE20175-20-03-ATH | ● | | | 20 | 1.55 | 1.67 | 60 | 4 | 4 | 2.56 | 21.31 | 21.96 | 22.98 | 24.09 | 干渉なし | 6,020 |

●：標準在庫品です。●：Stocked items.　干渉なし：No interference

# EPDRE2○○○-○○.○-○○○-ATH

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度 Interference angle (°) θK | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格 (円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDRE2020-4-01-ATH | ● | 2 | 0.1 | 4 | 1.7 | 1.92 | 50 | 4 | 4 | 6.49 | 4.80 | 4.99 | 5.16 | 5.31 | 5.58 | 5,780 |
| EPDRE2020-6-01-ATH | ● | | | 6 | 1.7 | 1.92 | 50 | 4 | 4 | 5.30 | 6.88 | 7.12 | 7.33 | 7.51 | 8.18 | 5,780 |
| EPDRE2020-8-01-ATH | ● | | | 8 | 1.7 | 1.92 | 50 | 4 | 4 | 4.47 | 8.96 | 9.24 | 9.48 | 9.77 | 10.83 | 6,020 |
| EPDRE2020-12-01-ATH | ● | | | 12 | 1.7 | 1.92 | 55 | 4 | 4 | 3.41 | 13.09 | 13.45 | 13.88 | 14.56 | 16.14 | 6,020 |
| EPDRE2020-16-01-ATH | ● | | | 16 | 1.7 | 1.92 | 55 | 4 | 4 | 2.76 | 17.21 | 17.62 | 18.44 | 19.35 | 干渉なし | 6,020 |
| EPDRE2020-20-01-ATH | ● | | | 20 | 1.7 | 1.92 | 60 | 4 | 4 | 2.31 | 21.32 | 21.98 | 23.01 | 24.13 | 干渉なし | 6,020 |
| EPDRE2020-25-01-ATH | ● | | | 25 | 1.7 | 1.92 | 65 | 4 | 4 | 1.93 | 26.44 | 27.43 | 28.71 | 干渉なし | 干渉なし | 6,020 |
| EPDRE2020-30-01-ATH | ● | | | 30 | 1.7 | 1.92 | 70 | 4 | 4 | 1.65 | 31.55 | 32.88 | 34.41 | 干渉なし | 干渉なし | 6,020 |
| EPDRE2020-4-02-ATH | ● | | 0.2 | 4 | 1.7 | 1.92 | 50 | 4 | 4 | 6.57 | 4.79 | 4.98 | 5.15 | 5.30 | 5.57 | 5,780 |
| EPDRE2020-6-02-ATH | ● | | | 6 | 1.7 | 1.92 | 50 | 4 | 4 | 5.35 | 6.88 | 7.12 | 7.32 | 7.50 | 8.14 | 5,780 |
| EPDRE2020-8-02-ATH | ● | | | 8 | 1.7 | 1.92 | 50 | 4 | 4 | 4.51 | 8.95 | 9.24 | 9.47 | 9.75 | 10.80 | 6,020 |
| EPDRE2020-12-02-ATH | ● | | | 12 | 1.7 | 1.92 | 55 | 4 | 4 | 3.43 | 13.09 | 13.44 | 13.87 | 14.54 | 16.11 | 6,020 |
| EPDRE2020-16-02-ATH | ● | | | 16 | 1.7 | 1.92 | 55 | 4 | 4 | 2.77 | 17.21 | 17.62 | 18.43 | 19.33 | 干渉なし | 6,020 |
| EPDRE2020-20-02-ATH | ● | | | 20 | 1.7 | 1.92 | 60 | 4 | 4 | 2.32 | 21.32 | 21.97 | 22.99 | 24.11 | 干渉なし | 6,020 |
| EPDRE2020-25-02-ATH | ● | | | 25 | 1.7 | 1.92 | 65 | 4 | 4 | 1.93 | 26.44 | 27.42 | 28.69 | 干渉なし | 干渉なし | 6,020 |
| EPDRE2020-30-02-ATH | ● | | | 30 | 1.7 | 1.92 | 70 | 4 | 4 | 1.66 | 31.55 | 32.87 | 34.40 | 干渉なし | 干渉なし | 6,020 |
| EPDRE2020-4-03-ATH | ● | | 0.3 | 4 | 1.7 | 1.92 | 50 | 4 | 4 | 6.64 | 4.79 | 4.97 | 5.14 | 5.29 | 5.55 | 5,780 |
| EPDRE2020-6-03-ATH | ● | | | 6 | 1.7 | 1.92 | 50 | 4 | 4 | 5.40 | 6.87 | 7.11 | 7.31 | 7.49 | 8.11 | 5,780 |
| EPDRE2020-8-03-ATH | ● | | | 8 | 1.7 | 1.92 | 50 | 4 | 4 | 4.55 | 8.95 | 9.23 | 9.47 | 9.73 | 10.77 | 6,020 |
| EPDRE2020-12-03-ATH | ● | | | 12 | 1.7 | 1.92 | 55 | 4 | 4 | 3.45 | 13.09 | 13.44 | 13.85 | 14.52 | 16.08 | 6,020 |
| EPDRE2020-16-03-ATH | ● | | | 16 | 1.7 | 1.92 | 55 | 4 | 4 | 2.79 | 17.21 | 17.61 | 18.42 | 19.31 | 干渉なし | 6,020 |
| EPDRE2020-20-03-ATH | ● | | | 20 | 1.7 | 1.92 | 60 | 4 | 4 | 2.33 | 21.31 | 21.96 | 22.98 | 24.09 | 干渉なし | 6,020 |
| EPDRE2020-25-03-ATH | ● | | | 25 | 1.7 | 1.92 | 65 | 4 | 4 | 1.94 | 26.43 | 27.41 | 28.68 | 干渉なし | 干渉なし | 6,020 |
| EPDRE2020-30-03-ATH | ● | | | 30 | 1.7 | 1.92 | 70 | 4 | 4 | 1.66 | 31.55 | 32.86 | 34.38 | 干渉なし | 干渉なし | 6,020 |
| EPDRE2020-6-05-ATH | ● | | 0.5 | 6 | 1.7 | 1.92 | 50 | 4 | 4 | 5.50 | 6.86 | 7.10 | 7.30 | 7.48 | 8.05 | 5,780 |
| EPDRE2020-8-05-ATH | ● | | | 8 | 1.7 | 1.92 | 50 | 4 | 4 | 4.62 | 8.94 | 9.22 | 9.45 | 9.70 | 10.70 | 6,020 |
| EPDRE2020-12-05-ATH | ● | | | 12 | 1.7 | 1.92 | 55 | 4 | 4 | 3.50 | 13.08 | 13.43 | 13.83 | 14.48 | 16.01 | 6,020 |
| EPDRE2020-16-05-ATH | ● | | | 16 | 1.7 | 1.92 | 55 | 4 | 4 | 2.81 | 17.20 | 17.61 | 18.39 | 19.27 | 干渉なし | 6,020 |
| EPDRE2020-20-05-ATH | ● | | | 20 | 1.7 | 1.92 | 60 | 4 | 4 | 2.35 | 21.31 | 21.95 | 22.95 | 24.06 | 干渉なし | 6,020 |
| EPDRE2020-25-05-ATH | ● | | | 25 | 1.7 | 1.92 | 65 | 4 | 4 | 1.95 | 26.43 | 27.39 | 28.65 | 干渉なし | 干渉なし | 6,020 |
| EPDRE2020-30-05-ATH | ● | | | 30 | 1.7 | 1.92 | 70 | 4 | 4 | 1.67 | 31.54 | 32.84 | 34.36 | 干渉なし | 干渉なし | 6,020 |
| EPDRE2020-6-08-ATH | ● | | 0.8 | 6 | 1.7 | 1.92 | 50 | 4 | 4 | 5.66 | 6.85 | 7.08 | 7.27 | 7.45 | 7.95 | 5,780 |
| EPDRE2020-8-08-ATH | ● | | | 8 | 1.7 | 1.92 | 50 | 4 | 4 | 4.73 | 8.93 | 9.20 | 9.43 | 9.64 | 10.61 | 6,020 |
| EPDRE2020-12-08-ATH | ● | | | 12 | 1.7 | 1.92 | 55 | 4 | 4 | 3.56 | 13.07 | 13.41 | 13.78 | 14.42 | 15.92 | 6,020 |
| EPDRE2020-16-08-ATH | ● | | | 16 | 1.7 | 1.92 | 55 | 4 | 4 | 2.85 | 17.19 | 17.59 | 18.35 | 19.21 | 干渉なし | 6,020 |
| EPDRE2020-20-08-ATH | ● | | | 20 | 1.7 | 1.92 | 60 | 4 | 4 | 2.38 | 21.30 | 21.92 | 22.91 | 24.00 | 干渉なし | 6,020 |
| EPDRE2020-25-08-ATH | ● | | | 25 | 1.7 | 1.92 | 65 | 4 | 4 | 1.97 | 26.42 | 27.37 | 28.61 | 干渉なし | 干渉なし | 6,020 |
| EPDRE2020-30-08-ATH | ● | | | 30 | 1.7 | 1.92 | 70 | 4 | 4 | 1.69 | 31.53 | 32.81 | 34.31 | 干渉なし | 干渉なし | 6,020 |
| EPDRE2025-10-01-ATH | ● | 2.5 | 0.1 | 10 | 2 | 2.39 | 50 | 4 | 4 | 3.14 | 11.08 | 11.39 | 11.68 | 12.25 | 13.58 | 6,370 |
| EPDRE2025-20-01-ATH | ● | | | 20 | 2 | 2.39 | 60 | 4 | 4 | 1.82 | 21.36 | 22.06 | 23.09 | 干渉なし | 干渉なし | 6,490 |
| EPDRE2025-30-01-ATH | ● | | | 30 | 2 | 2.39 | 70 | 4 | 4 | 1.28 | 31.59 | 32.95 | 干渉なし | 干渉なし | 干渉なし | 6,720 |
| EPDRE2025-10-02-ATH | ● | | 0.2 | 10 | 2 | 2.39 | 50 | 4 | 4 | 3.16 | 11.08 | 11.39 | 11.67 | 12.23 | 13.55 | 6,370 |
| EPDRE2025-20-02-ATH | ● | | | 20 | 2 | 2.39 | 60 | 4 | 4 | 1.83 | 21.36 | 22.05 | 23.07 | 干渉なし | 干渉なし | 6,490 |
| EPDRE2025-30-02-ATH | ● | | | 30 | 2 | 2.39 | 70 | 4 | 4 | 1.28 | 31.58 | 32.94 | 干渉なし | 干渉なし | 干渉なし | 6,720 |
| EPDRE2025-10-03-ATH | ● | | 0.3 | 10 | 2 | 2.39 | 50 | 4 | 4 | 3.19 | 11.08 | 11.38 | 11.65 | 12.21 | 13.52 | 6,370 |
| EPDRE2025-20-03-ATH | ● | | | 20 | 2 | 2.39 | 60 | 4 | 4 | 1.83 | 21.36 | 22.04 | 23.06 | 干渉なし | 干渉なし | 6,490 |
| EPDRE2025-30-03-ATH | ● | | | 30 | 2 | 2.39 | 70 | 4 | 4 | 1.29 | 31.58 | 32.93 | 干渉なし | 干渉なし | 干渉なし | 6,720 |
| EPDRE2025-10-05-ATH | ● | | 0.5 | 10 | 2 | 2.39 | 50 | 4 | 4 | 3.24 | 11.07 | 11.37 | 11.63 | 12.17 | 13.45 | 6,370 |
| EPDRE2025-20-05-ATH | ● | | | 20 | 2 | 2.39 | 60 | 4 | 4 | 1.85 | 21.35 | 22.02 | 23.03 | 干渉なし | 干渉なし | 6,490 |
| EPDRE2025-30-05-ATH | ● | | | 30 | 2 | 2.39 | 70 | 4 | 4 | 1.30 | 31.58 | 32.92 | 干渉なし | 干渉なし | 干渉なし | 6,720 |
| EPDRE2030-6-01-ATH | ● | 3 | 0.1 | 6 | 2.5 | 2.86 | 50 | 6 | 4 | 6.45 | 7.01 | 7.23 | 7.42 | 7.59 | 8.36 | 9,220 |
| EPDRE2030-8-01-ATH | ● | | | 8 | 2.5 | 2.86 | 55 | 6 | 4 | 5.61 | 9.07 | 9.34 | 9.56 | 9.94 | 11.02 | 9,220 |
| EPDRE2030-12-01-ATH | ● | | | 12 | 2.5 | 2.86 | 60 | 6 | 4 | 4.45 | 13.20 | 13.53 | 14.04 | 14.73 | 16.33 | 9,220 |
| EPDRE2030-16-01-ATH | ● | | | 16 | 2.5 | 2.86 | 60 | 6 | 4 | 3.69 | 17.30 | 17.78 | 18.60 | 19.52 | 21.64 | 9,430 |
| EPDRE2030-18-01-ATH | ● | | | 18 | 2.5 | 2.86 | 65 | 6 | 4 | 3.40 | 19.35 | 19.96 | 20.89 | 21.91 | 24.29 | 9,430 |
| EPDRE2030-20-01-ATH | ● | | | 20 | 2.5 | 2.86 | 65 | 6 | 4 | 3.15 | 21.40 | 22.13 | 23.17 | 24.30 | 26.95 | 9,760 |
| EPDRE2030-30-01-ATH | ● | | | 30 | 2.5 | 2.86 | 75 | 6 | 4 | 2.31 | 31.62 | 33.03 | 34.57 | 36.27 | 干渉なし | 10,180 |
| EPDRE2030-35-01-ATH | ● | | | 35 | 2.5 | 2.86 | 80 | 6 | 4 | 2.04 | 36.83 | 38.48 | 40.27 | 42.25 | 干渉なし | 10,180 |

# EPDRE2○○○○-○○.○-○○○-ATH

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度 Interference angle (°) θK | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDRE2030-6-02-ATH | ● | 3 | 0.2 | 6 | 2.5 | 2.86 | 50 | 6 | 4 | 6.49 | 7.00 | 7.22 | 7.41 | 7.58 | 8.33 | 9,220 |
| EPDRE2030-8-02-ATH | ● | | | 8 | 2.5 | 2.86 | 55 | 6 | 4 | 5.65 | 9.07 | 9.33 | 9.55 | 9.92 | 10.99 | 9,220 |
| EPDRE2030-12-02-ATH | ● | | | 12 | 2.5 | 2.86 | 60 | 6 | 4 | 4.48 | 13.19 | 13.52 | 14.03 | 14.71 | 16.30 | 9,220 |
| EPDRE2030-16-02-ATH | ● | | | 16 | 2.5 | 2.86 | 60 | 6 | 4 | 3.71 | 17.30 | 17.77 | 18.59 | 19.50 | 21.60 | 9,430 |
| EPDRE2030-18-02-ATH | ● | | | 18 | 2.5 | 2.86 | 65 | 6 | 4 | 3.41 | 19.35 | 19.95 | 20.87 | 21.89 | 24.26 | 9,430 |
| EPDRE2030-20-02-ATH | ● | | | 20 | 2.5 | 2.86 | 65 | 6 | 4 | 3.16 | 21.40 | 22.13 | 23.15 | 24.28 | 26.91 | 9,760 |
| EPDRE2030-30-02-ATH | ● | | | 30 | 2.5 | 2.86 | 75 | 6 | 4 | 2.31 | 31.62 | 33.02 | 34.56 | 36.25 | 干渉なし | 10,180 |
| EPDRE2030-35-02-ATH | ● | | | 35 | 2.5 | 2.86 | 80 | 6 | 4 | 2.04 | 36.83 | 38.47 | 40.26 | 42.23 | 干渉なし | 10,180 |
| EPDRE2030-6-03-ATH | ● | | 0.3 | 6 | 2.5 | 2.86 | 50 | 6 | 4 | 6.54 | 7.00 | 7.22 | 7.40 | 7.57 | 8.30 | 9,220 |
| EPDRE2030-8-03-ATH | ● | | | 8 | 2.5 | 2.86 | 55 | 6 | 4 | 5.68 | 9.07 | 9.33 | 9.54 | 9.90 | 10.95 | 9,220 |
| EPDRE2030-12-03-ATH | ● | | | 12 | 2.5 | 2.86 | 60 | 6 | 4 | 4.50 | 13.19 | 13.52 | 14.02 | 14.69 | 16.26 | 9,220 |
| EPDRE2030-16-03-ATH | ● | | | 16 | 2.5 | 2.86 | 60 | 6 | 4 | 3.72 | 17.30 | 17.76 | 18.58 | 19.48 | 21.57 | 9,430 |
| EPDRE2030-18-03-ATH | ● | | | 18 | 2.5 | 2.86 | 65 | 6 | 4 | 3.43 | 19.35 | 19.94 | 20.86 | 21.87 | 24.23 | 9,430 |
| EPDRE2030-20-03-ATH | ● | | | 20 | 2.5 | 2.86 | 65 | 6 | 4 | 3.17 | 21.40 | 22.12 | 23.14 | 24.26 | 26.88 | 9,760 |
| EPDRE2030-30-03-ATH | ● | | | 30 | 2.5 | 2.86 | 75 | 6 | 4 | 2.32 | 31.62 | 33.01 | 34.54 | 36.23 | 干渉なし | 10,180 |
| EPDRE2030-35-03-ATH | ● | | | 35 | 2.5 | 2.86 | 80 | 6 | 4 | 2.05 | 36.82 | 38.46 | 40.25 | 42.21 | 干渉なし | 10,180 |
| EPDRE2030-8-05-ATH | ● | | 0.5 | 8 | 2.5 | 2.86 | 55 | 6 | 4 | 5.76 | 9.06 | 9.31 | 9.53 | 9.87 | 10.89 | 9,220 |
| EPDRE2030-12-05-ATH | ● | | | 12 | 2.5 | 2.86 | 60 | 6 | 4 | 4.55 | 13.18 | 13.51 | 13.99 | 14.65 | 16.20 | 9,220 |
| EPDRE2030-16-05-ATH | ● | | | 16 | 2.5 | 2.86 | 60 | 6 | 4 | 3.75 | 17.29 | 17.74 | 18.55 | 19.44 | 21.51 | 9,430 |
| EPDRE2030-18-05-ATH | ● | | | 18 | 2.5 | 2.86 | 65 | 6 | 4 | 3.45 | 19.34 | 19.92 | 20.83 | 21.83 | 24.16 | 9,430 |
| EPDRE2030-20-05-ATH | ● | | | 20 | 2.5 | 2.86 | 65 | 6 | 4 | 3.20 | 21.39 | 22.10 | 23.11 | 24.22 | 26.82 | 9,760 |
| EPDRE2030-30-05-ATH | ● | | | 30 | 2.5 | 2.86 | 75 | 6 | 4 | 2.33 | 31.61 | 32.99 | 34.52 | 36.19 | 干渉なし | 10,180 |
| EPDRE2030-35-05-ATH | ● | | | 35 | 2.5 | 2.86 | 80 | 6 | 4 | 2.06 | 36.82 | 38.44 | 40.22 | 42.17 | 干渉なし | 10,180 |
| EPDRE2030-8-1-ATH | ● | | 1 | 8 | 2.5 | 2.86 | 55 | 6 | 4 | 5.96 | 9.05 | 9.29 | 9.50 | 9.77 | 10.73 | 9,220 |
| EPDRE2030-12-1-ATH | ● | | | 12 | 2.5 | 2.86 | 60 | 6 | 4 | 4.67 | 13.17 | 13.49 | 13.92 | 14.55 | 16.04 | 9,220 |
| EPDRE2030-16-1-ATH | ● | | | 16 | 2.5 | 2.86 | 60 | 6 | 4 | 3.84 | 17.28 | 17.70 | 18.48 | 19.34 | 21.35 | 9,430 |
| EPDRE2030-18-1-ATH | ● | | | 18 | 2.5 | 2.86 | 65 | 6 | 4 | 3.52 | 19.33 | 19.88 | 20.76 | 21.73 | 24.00 | 9,430 |
| EPDRE2030-20-1-ATH | ● | | | 20 | 2.5 | 2.86 | 65 | 6 | 4 | 3.26 | 21.38 | 22.05 | 23.04 | 24.13 | 26.66 | 9,760 |
| EPDRE2030-30-1-ATH | ● | | | 30 | 2.5 | 2.86 | 75 | 6 | 4 | 2.37 | 31.60 | 32.95 | 34.45 | 36.09 | 干渉なし | 10,180 |
| EPDRE2030-35-1-ATH | ● | | | 35 | 2.5 | 2.86 | 80 | 6 | 4 | 2.08 | 36.79 | 38.40 | 40.15 | 42.08 | 干渉なし | 10,180 |
| EPDRE2040-8-01-ATH | ● | 4 | 0.1 | 8 | 3.5 | 3.8 | 55 | 6 | 4 | 4.38 | 9.18 | 9.42 | 9.64 | 10.11 | 11.21 | 9,220 |
| EPDRE2040-12-01-ATH | ● | | | 12 | 3.5 | 3.8 | 60 | 6 | 4 | 3.36 | 13.29 | 13.60 | 14.20 | 14.90 | 16.51 | 9,220 |
| EPDRE2040-16-01-ATH | ● | | | 16 | 3.5 | 3.8 | 60 | 6 | 4 | 2.72 | 17.39 | 17.93 | 18.77 | 19.68 | 干渉なし | 9,220 |
| EPDRE2040-20-01-ATH | ● | | | 20 | 3.5 | 3.8 | 65 | 6 | 4 | 2.29 | 21.48 | 22.29 | 23.33 | 24.47 | 干渉なし | 9,220 |
| EPDRE2040-30-01-ATH | ● | | | 30 | 3.5 | 3.8 | 75 | 6 | 4 | 1.64 | 31.77 | 33.18 | 34.73 | 干渉なし | 干渉なし | 9,220 |
| EPDRE2040-35-01-ATH | ● | | | 35 | 3.5 | 3.8 | 80 | 6 | 4 | 1.43 | 36.98 | 38.63 | 干渉なし | 干渉なし | 干渉なし | 9,220 |
| EPDRE2040-45-01-ATH | ● | | | 45 | 3.5 | 3.8 | 90 | 6 | 4 | 1.15 | 47.41 | 49.52 | 干渉なし | 干渉なし | 干渉なし | 14,680 |
| EPDRE2040-8-02-ATH | ● | | 0.2 | 8 | 3.5 | 3.8 | 55 | 6 | 4 | 4.41 | 9.18 | 9.42 | 9.63 | 10.09 | 11.17 | 9,220 |
| EPDRE2040-12-02-ATH | ● | | | 12 | 3.5 | 3.8 | 60 | 6 | 4 | 3.38 | 13.29 | 13.59 | 14.19 | 14.88 | 16.48 | 9,220 |
| EPDRE2040-16-02-ATH | ● | | | 16 | 3.5 | 3.8 | 60 | 6 | 4 | 2.73 | 17.39 | 17.92 | 18.75 | 19.66 | 干渉なし | 9,220 |
| EPDRE2040-20-02-ATH | ● | | | 20 | 3.5 | 3.8 | 65 | 6 | 4 | 2.30 | 21.48 | 22.28 | 23.31 | 24.45 | 干渉なし | 9,220 |
| EPDRE2040-30-02-ATH | ● | | | 30 | 3.5 | 3.8 | 75 | 6 | 4 | 1.64 | 31.76 | 33.17 | 34.72 | 干渉なし | 干渉なし | 9,220 |
| EPDRE2040-35-02-ATH | ● | | | 35 | 3.5 | 3.8 | 80 | 6 | 4 | 1.44 | 36.98 | 38.62 | 干渉なし | 干渉なし | 干渉なし | 9,220 |
| EPDRE2040-45-02-ATH | ● | | | 45 | 3.5 | 3.8 | 90 | 6 | 4 | 1.15 | 47.40 | 49.52 | 干渉なし | 干渉なし | 干渉なし | 14,680 |
| EPDRE2040-8-03-ATH | ● | | 0.3 | 8 | 3.5 | 3.8 | 55 | 6 | 4 | 4.45 | 9.17 | 9.41 | 9.62 | 10.07 | 11.14 | 9,220 |
| EPDRE2040-12-03-ATH | ● | | | 12 | 3.5 | 3.8 | 60 | 6 | 4 | 3.40 | 13.28 | 13.59 | 14.18 | 14.86 | 16.45 | 9,220 |
| EPDRE2040-16-03-ATH | ● | | | 16 | 3.5 | 3.8 | 60 | 6 | 4 | 2.75 | 17.38 | 17.91 | 18.74 | 19.65 | 干渉なし | 9,220 |
| EPDRE2040-20-03-ATH | ● | | | 20 | 3.5 | 3.8 | 65 | 6 | 4 | 2.31 | 21.48 | 22.27 | 23.30 | 24.43 | 干渉なし | 9,220 |
| EPDRE2040-30-03-ATH | ● | | | 30 | 3.5 | 3.8 | 75 | 6 | 4 | 1.65 | 31.76 | 33.16 | 34.71 | 干渉なし | 干渉なし | 9,220 |
| EPDRE2040-35-03-ATH | ● | | | 35 | 3.5 | 3.8 | 80 | 6 | 4 | 1.44 | 36.97 | 38.61 | 干渉なし | 干渉なし | 干渉なし | 9,220 |
| EPDRE2040-45-03-ATH | ● | | | 45 | 3.5 | 3.8 | 90 | 6 | 4 | 1.15 | 47.40 | 49.51 | 干渉なし | 干渉なし | 干渉なし | 14,680 |
| EPDRE2040-12-05-ATH | ● | | 0.5 | 12 | 3.5 | 3.8 | 60 | 6 | 4 | 3.44 | 13.28 | 13.58 | 14.15 | 14.82 | 16.39 | 9,220 |
| EPDRE2040-16-05-ATH | ● | | | 16 | 3.5 | 3.8 | 60 | 6 | 4 | 2.77 | 17.38 | 17.89 | 18.71 | 19.61 | 干渉なし | 9,220 |
| EPDRE2040-20-05-ATH | ● | | | 20 | 3.5 | 3.8 | 65 | 6 | 4 | 2.33 | 21.47 | 22.25 | 23.27 | 24.39 | 干渉なし | 9,220 |
| EPDRE2040-30-05-ATH | ● | | | 30 | 3.5 | 3.8 | 75 | 6 | 4 | 1.66 | 31.75 | 33.15 | 34.68 | 干渉なし | 干渉なし | 9,220 |
| EPDRE2040-35-05-ATH | ● | | | 35 | 3.5 | 3.8 | 80 | 6 | 4 | 1.45 | 36.96 | 38.59 | 干渉なし | 干渉なし | 干渉なし | 9,220 |
| EPDRE2040-45-05-ATH | ● | | | 45 | 3.5 | 3.8 | 90 | 6 | 4 | 1.16 | 47.39 | 49.49 | 干渉なし | 干渉なし | 干渉なし | 14,680 |

●：標準在庫品です。●：Stocked items.　干渉なし：No interference

# EPDRE2○○○○-○○.○-○○○-ATH

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度 Interference angle (°) θK | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格 (円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDRE2040-12-1-ATH | ● | 4 | 1 | 12 | 3.5 | 3.8 | 60 | 6 | 4 | 3.54 | 13.27 | 13.56 | 14.08 | 14.72 | 16.23 | 9,220 |
| EPDRE2040-16-1-ATH | ● | | | 16 | 3.5 | 3.8 | 60 | 6 | 4 | 2.84 | 17.37 | 17.85 | 18.64 | 19.51 | 干渉なし | 9,220 |
| EPDRE2040-20-1-ATH | ● | | | 20 | 3.5 | 3.8 | 65 | 6 | 4 | 2.37 | 21.46 | 22.21 | 23.20 | 24.30 | 干渉なし | 9,220 |
| EPDRE2040-30-1-ATH | ● | | | 30 | 3.5 | 3.8 | 75 | 6 | 4 | 1.68 | 31.73 | 33.10 | 34.61 | 干渉なし | 干渉なし | 9,220 |
| EPDRE2040-35-1-ATH | ● | | | 35 | 3.5 | 3.8 | 80 | 6 | 4 | 1.47 | 36.94 | 38.55 | 干渉なし | 干渉なし | 干渉なし | 9,220 |
| EPDRE2040-45-1-ATH | ● | | | 45 | 3.5 | 3.8 | 90 | 6 | 4 | 1.17 | 47.37 | 49.44 | 干渉なし | 干渉なし | 干渉なし | 14,680 |
| EPDRE2050-20-01-ATH | ● | 5 | 0.1 | 20 | 4 | 4.75 | 65 | 6 | 4 | 1.26 | 21.54 | 22.42 | 干渉なし | 干渉なし | 干渉なし | 12,240 |
| EPDRE2050-40-01-ATH | ● | | | 40 | 4 | 4.75 | 85 | 6 | 4 | 0.67 | 42.32 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 15,380 |
| EPDRE2050-20-02-ATH | ● | | 0.2 | 20 | 4 | 4.75 | 65 | 6 | 4 | 1.26 | 21.54 | 22.41 | 干渉なし | 干渉なし | 干渉なし | 12,240 |
| EPDRE2050-40-02-ATH | ● | | | 40 | 4 | 4.75 | 85 | 6 | 4 | 0.68 | 42.31 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 15,380 |
| EPDRE2050-20-03-ATH | ● | | 0.3 | 20 | 4 | 4.75 | 65 | 6 | 4 | 1.27 | 21.54 | 22.40 | 干渉なし | 干渉なし | 干渉なし | 12,240 |
| EPDRE2050-40-03-ATH | ● | | | 40 | 4 | 4.75 | 85 | 6 | 4 | 0.68 | 42.31 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 15,380 |
| EPDRE2050-20-05-ATH | ● | | 0.5 | 20 | 4 | 4.75 | 65 | 6 | 4 | 1.28 | 21.54 | 22.38 | 干渉なし | 干渉なし | 干渉なし | 12,240 |
| EPDRE2050-40-05-ATH | ● | | | 40 | 4 | 4.75 | 85 | 6 | 4 | 0.68 | 42.30 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 15,380 |
| EPDRE2050-20-1-ATH | ● | | 1 | 20 | 4 | 4.75 | 65 | 6 | 4 | 1.31 | 21.53 | 22.34 | 干渉なし | 干渉なし | 干渉なし | 12,240 |
| EPDRE2050-40-1-ATH | ● | | | 40 | 4 | 4.75 | 85 | 6 | 4 | 0.69 | 42.28 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 15,380 |
| EPDRE2060-12-01-ATH | ● | 6 | 0.1 | 12 | 5 | 5.7 | 50 | 6 | – | 0.01 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 12,240 |
| EPDRE2060-18-01-ATH | ● | | | 18 | 5 | 5.7 | 60 | 6 | – | 0.01 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 12,240 |
| EPDRE2060-24-01-ATH | ● | | | 24 | 5 | 5.7 | 70 | 6 | – | 0.01 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 12,240 |
| EPDRE2060-35-01-ATH | ● | | | 35 | 5 | 5.7 | 80 | 6 | – | 0.01 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 15,380 |
| EPDRE2060-55-01-ATH | ● | | | 55 | 5 | 5.7 | 100 | 6 | – | 0.01 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 19,200 |
| EPDRE2060-12-02-ATH | ● | | 0.2 | 12 | 5 | 5.7 | 50 | 6 | – | 0.01 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 12,240 |
| EPDRE2060-18-02-ATH | ● | | | 18 | 5 | 5.7 | 60 | 6 | – | 0.01 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 12,240 |
| EPDRE2060-24-02-ATH | ● | | | 24 | 5 | 5.7 | 70 | 6 | – | 0.01 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 12,240 |
| EPDRE2060-35-02-ATH | ● | | | 35 | 5 | 5.7 | 80 | 6 | – | 0.01 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 15,380 |
| EPDRE2060-55-02-ATH | ● | | | 55 | 5 | 5.7 | 100 | 6 | – | 0.01 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 19,200 |
| EPDRE2060-12-03-ATH | ● | | 0.3 | 12 | 5 | 5.7 | 50 | 6 | – | 0.01 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 12,240 |
| EPDRE2060-18-03-ATH | ● | | | 18 | 5 | 5.7 | 60 | 6 | – | 0.01 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 12,240 |
| EPDRE2060-24-03-ATH | ● | | | 24 | 5 | 5.7 | 70 | 6 | – | 0.01 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 12,240 |
| EPDRE2060-35-03-ATH | ● | | | 35 | 5 | 5.7 | 80 | 6 | – | 0.01 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 15,380 |
| EPDRE2060-55-03-ATH | ● | | | 55 | 5 | 5.7 | 100 | 6 | – | 0.01 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 19,200 |
| EPDRE2060-18-05-ATH | ● | | 0.5 | 18 | 5 | 5.7 | 60 | 6 | – | 0.01 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 12,240 |
| EPDRE2060-24-05-ATH | ● | | | 24 | 5 | 5.7 | 70 | 6 | – | 0.01 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 12,240 |
| EPDRE2060-35-05-ATH | ● | | | 35 | 5 | 5.7 | 80 | 6 | – | 0.01 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 15,380 |
| EPDRE2060-55-05-ATH | ● | | | 55 | 5 | 5.7 | 100 | 6 | – | 0.01 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 19,200 |
| EPDRE2060-18-1-ATH | ● | | 1 | 18 | 5 | 5.7 | 60 | 6 | – | 0.01 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 12,240 |
| EPDRE2060-24-1-ATH | ● | | | 24 | 5 | 5.7 | 70 | 6 | – | 0.01 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 12,240 |
| EPDRE2060-35-1-ATH | ● | | | 35 | 5 | 5.7 | 80 | 6 | – | 0.01 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 15,380 |
| EPDRE2060-55-1-ATH | ● | | | 55 | 5 | 5.7 | 100 | 6 | – | 0.01 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 19,200 |

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ○ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ |

## 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPDRE-ATH | × (N/A) | 4 ～ 6 |

【注意】首下長／外径が10DCを超える工具の再研磨可否については、弊社営業にお問い合わせください。
【Note】Contact our sales office regarding whether or not regrinding is possible for tools where under neck length/tool diameter more than 10DC

## 標準切削条件表
Recommended cutting conditions

高能率切削条件 High efficiency cuttiing conditions

高精度切削条件 High accuracy cuttiing conditions



## EPDRE-ATH

高精度切削条件はA205 ページを参照してください。
Please refer to P.A205 about high accuracy cutting conditions

| 被削材 Work material | | | | 1 銅 Copper | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼き入れ鋼 Hardened steels (45～55HRC) | | 6 焼き入れ鋼 Hardened steels (55～65HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 120% | | 100% | | 90% | | 80% | | 65% | | 60% | |
| 外径 Tool dia. (mm) | コーナ半径 RE Corner radius (mm) | 首下長 Under neck length (mm) | ap (mm) | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 0.2 | 0.02 | 0.5 | 0.016 | 50,000 | 922 | 50,000 | 922 | 45,000 | 829 | 42,500 | 705 | 37,500 | 553 | 35,000 | 452 |
| | | 1 | 0.011 | 50,000 | 922 | 50,000 | 922 | 45,000 | 829 | 42,500 | 705 | 37,500 | 553 | 35,000 | 452 |
| | | 2 | 0.007 | 50,000 | 809 | 42,000 | 774 | 40,500 | 746 | 38,250 | 635 | 33,750 | 498 | 31,500 | 406 |
| | 0.05 | 0.5 | 0.02 | 50,000 | 922 | 50,000 | 922 | 45,000 | 829 | 42,500 | 705 | 37,500 | 553 | 35,000 | 452 |
| | | 1 | 0.014 | 50,000 | 922 | 50,000 | 922 | 45,000 | 829 | 42,500 | 705 | 37,500 | 553 | 35,000 | 452 |
| | | 1.5 | 0.008 | 50,000 | 809 | 47,000 | 866 | 42,750 | 788 | 40,375 | 670 | 35,625 | 525 | 33,250 | 429 |
| | | 2 | 0.008 | 50,000 | 809 | 42,000 | 774 | 40,500 | 746 | 38,250 | 635 | 33,750 | 498 | 31,500 | 406 |
| 0.3 | 0.02 | 1 | 0.016 | 50,000 | 1,208 | 48,000 | 1,161 | 43,200 | 1,045 | 40,800 | 733 | 36,000 | 547 | 33,600 | 441 |
| | | 2 | 0.011 | 45,000 | 998 | 38,880 | 860 | 34,992 | 774 | 33,048 | 594 | 29,160 | 443 | 27,216 | 357 |
| | | 3 | 0.007 | 42,750 | 881 | 36,936 | 760 | 33,242 | 684 | 31,396 | 525 | 27,702 | 392 | 25,855 | 316 |
| | 0.05 | 1 | 0.021 | 50,000 | 1,208 | 48,000 | 1,161 | 43,200 | 1,045 | 40,800 | 733 | 36,000 | 547 | 33,600 | 441 |
| | | 1.5 | 0.016 | 47,500 | 1,147 | 45,600 | 1,103 | 41,040 | 993 | 38,760 | 697 | 34,200 | 520 | 31,920 | 419 |
| | | 2 | 0.012 | 45,000 | 998 | 38,880 | 860 | 34,992 | 774 | 33,048 | 594 | 29,160 | 443 | 27,216 | 357 |
| | | 2.5 | 0.01 | 45,000 | 998 | 38,880 | 860 | 34,992 | 774 | 33,048 | 594 | 29,160 | 443 | 27,216 | 357 |
| | | 3 | 0.008 | 42,750 | 881 | 36,936 | 760 | 33,242 | 684 | 31,396 | 525 | 27,702 | 392 | 25,855 | 316 |
| 0.4 | 0.02 | 1 | 0.016 | 46,080 | 1,239 | 38,300 | 1,032 | 34,560 | 929 | 32,256 | 793 | 28,800 | 620 | 26,726 | 508 |
| | | 2 | 0.013 | 46,080 | 1,115 | 38,300 | 929 | 34,560 | 836 | 32,256 | 714 | 28,800 | 557 | 26,726 | 457 |
| | | 3 | 0.01 | 35,250 | 780 | 29,325 | 649 | 26,437 | 585 | 24,675 | 499 | 22,031 | 390 | 20,445 | 320 |
| | | 4 | 0.007 | 29,029 | 642 | 24,150 | 535 | 21,772 | 481 | 20,320 | 411 | 18,143 | 321 | 16,837 | 263 |
| | 0.05 | 1 | 0.025 | 46,080 | 1,239 | 38,300 | 1,032 | 34,560 | 929 | 32,256 | 793 | 28,800 | 620 | 26,726 | 508 |
| | | 1.5 | 0.02 | 46,080 | 1,239 | 38,300 | 1,032 | 34,560 | 929 | 32,256 | 793 | 28,800 | 620 | 26,726 | 508 |
| | | 2 | 0.016 | 46,080 | 1,115 | 38,300 | 929 | 34,560 | 836 | 32,256 | 714 | 28,800 | 557 | 26,726 | 457 |
| | | 2.5 | 0.015 | 43,200 | 1,062 | 36,000 | 885 | 32,400 | 796 | 30,600 | 677 | 27,000 | 531 | 25,200 | 434 |
| | | 3 | 0.014 | 35,250 | 780 | 29,325 | 649 | 26,437 | 585 | 24,675 | 499 | 22,031 | 390 | 20,445 | 320 |
| | | 3.5 | 0.012 | 33,048 | 731 | 27,540 | 609 | 24,786 | 548 | 23,409 | 467 | 20,655 | 365 | 19,278 | 299 |
| | | 4 | 0.008 | 29,029 | 642 | 24,150 | 535 | 21,772 | 481 | 20,320 | 411 | 18,143 | 321 | 16,837 | 263 |
| | 0.1 | 1 | 0.033 | 46,080 | 1,239 | 38,300 | 1,032 | 34,560 | 929 | 32,256 | 793 | 28,800 | 620 | 26,726 | 508 |
| | | 2 | 0.028 | 46,080 | 1,115 | 38,300 | 929 | 34,560 | 836 | 32,256 | 714 | 28,800 | 557 | 26,726 | 457 |
| | | 3 | 0.016 | 35,250 | 780 | 29,325 | 649 | 26,437 | 585 | 24,675 | 499 | 22,031 | 390 | 20,445 | 320 |
| | | 4 | 0.01 | 29,029 | 642 | 24,150 | 535 | 21,772 | 481 | 20,320 | 411 | 18,143 | 321 | 16,837 | 263 |
| 0.5 | 0.02 | 1 | 0.016 | 46,080 | 1,239 | 38,300 | 1,032 | 34,560 | 929 | 32,256 | 793 | 28,800 | 620 | 26,726 | 508 |
| | | 2 | 0.013 | 46,080 | 1,239 | 38,300 | 1,032 | 34,560 | 929 | 32,256 | 793 | 28,800 | 620 | 26,726 | 508 |
| | | 3 | 0.01 | 37,325 | 1,000 | 31,104 | 839 | 27,994 | 750 | 26,438 | 634 | 23,328 | 473 | 21,773 | 381 |
| | | 4 | 0.008 | 33,178 | 889 | 27,648 | 746 | 24,883 | 666 | 23,501 | 563 | 20,736 | 420 | 19,354 | 339 |
| | | 6 | 0.006 | 25,805 | 666 | 21,504 | 555 | 19,354 | 499 | 18,278 | 320 | 16,128 | 282 | 15,053 | 222 |
| | 0.05 | 1 | 0.03 | 46,080 | 1,239 | 38,300 | 1,032 | 34,560 | 929 | 32,256 | 793 | 28,800 | 620 | 26,726 | 508 |
| | | 2 | 0.023 | 46,080 | 1,239 | 38,300 | 1,032 | 34,560 | 929 | 32,256 | 793 | 28,800 | 620 | 26,726 | 508 |
| | | 3 | 0.017 | 37,325 | 1,000 | 31,104 | 839 | 27,994 | 750 | 26,438 | 634 | 23,328 | 473 | 21,773 | 381 |
| | | 4 | 0.017 | 33,178 | 889 | 27,648 | 746 | 24,883 | 666 | 23,501 | 563 | 20,736 | 420 | 19,354 | 339 |
| | | 5 | 0.011 | 29,030 | 778 | 24,192 | 653 | 21,773 | 583 | 20,563 | 493 | 18,144 | 368 | 16,934 | 297 |
| | | 6 | 0.008 | 25,805 | 666 | 21,504 | 555 | 19,354 | 499 | 18,278 | 320 | 16,128 | 282 | 15,053 | 222 |
| | 0.1 | 1 | 0.035 | 46,080 | 1,239 | 38,300 | 1,032 | 34,560 | 929 | 32,256 | 793 | 28,800 | 620 | 26,726 | 508 |
| | | 2 | 0.03 | 46,080 | 1,239 | 38,300 | 1,032 | 34,560 | 929 | 32,256 | 793 | 28,800 | 620 | 26,726 | 508 |
| | | 3 | 0.02 | 37,325 | 1,000 | 31,104 | 839 | 27,994 | 750 | 26,438 | 634 | 23,328 | 473 | 21,773 | 381 |
| | | 4 | 0.02 | 33,178 | 889 | 27,648 | 746 | 24,883 | 666 | 23,501 | 563 | 20,736 | 420 | 19,354 | 339 |
| | | 5 | 0.013 | 29,030 | 778 | 24,192 | 653 | 21,773 | 583 | 20,563 | 493 | 18,144 | 368 | 16,934 | 297 |
| | | 6 | 0.013 | 25,805 | 666 | 21,504 | 555 | 19,354 | 499 | 18,278 | 320 | 16,128 | 282 | 15,053 | 222 |
| 0.6 | 0.02 | 2 | 0.016 | 46,080 | 1,751 | 38,300 | 1,455 | 34,560 | 1,313 | 32,256 | 991 | 28,800 | 774 | 26,726 | 635 |
| | | 4 | 0.013 | 37,325 | 1,376 | 31,104 | 1,147 | 27,994 | 1,032 | 26,438 | 792 | 23,328 | 591 | 21,773 | 477 |
| | | 6 | 0.01 | 29,030 | 1,070 | 24,192 | 892 | 21,773 | 803 | 20,563 | 616 | 18,144 | 460 | 16,934 | 371 |
| | 0.05 | 2 | 0.028 | 46,080 | 1,751 | 38,300 | 1,455 | 34,560 | 1,313 | 32,256 | 991 | 28,800 | 774 | 26,726 | 635 |
| | | 4 | 0.019 | 37,325 | 1,376 | 31,104 | 1,147 | 27,994 | 1,032 | 26,438 | 792 | 23,328 | 591 | 21,773 | 477 |
| | | 6 | 0.012 | 29,030 | 1,070 | 24,192 | 892 | 21,773 | 803 | 20,563 | 616 | 18,144 | 460 | 16,934 | 371 |
| | | 8 | 0.01 | 27,579 | 1,017 | 22,982 | 847 | 20,684 | 763 | 19,535 | 585 | 17,237 | 437 | 16,088 | 352 |
| | | 10 | 0.007 | 24,676 | 814 | 20,563 | 678 | 18,507 | 610 | 17,479 | 489 | 15,422 | 355 | 14,394 | 287 |
| | 0.1 | 2 | 0.035 | 46,080 | 1,751 | 38,300 | 1,455 | 34,560 | 1,313 | 32,256 | 991 | 28,800 | 774 | 26,726 | 635 |
| | | 4 | 0.024 | 37,325 | 1,376 | 31,104 | 1,147 | 27,994 | 1,032 | 26,438 | 792 | 23,328 | 591 | 21,773 | 477 |
| | | 6 | 0.015 | 29,030 | 1,070 | 24,192 | 892 | 21,773 | 803 | 20,563 | 616 | 18,144 | 460 | 16,934 | 371 |
| | | 8 | 0.013 | 27,579 | 1,017 | 22,982 | 847 | 20,684 | 763 | 19,535 | 585 | 17,237 | 437 | 16,088 | 352 |
| | | 10 | 0.009 | 24,676 | 814 | 20,563 | 678 | 18,507 | 610 | 17,479 | 489 | 15,422 | 355 | 14,394 | 287 |
| 0.7 | 0.05 | 2 | 0.035 | 45,960 | 1,751 | 38,300 | 1,455 | 34,470 | 1,313 | 32,555 | 991 | 28,725 | 774 | 26,810 | 635 |
| | | 4 | 0.024 | 37,325 | 1,376 | 31,104 | 1,147 | 27,994 | 1,032 | 26,438 | 792 | 23,328 | 591 | 21,773 | 477 |
| | | 6 | 0.015 | 29,030 | 1,070 | 24,192 | 892 | 21,773 | 803 | 20,563 | 616 | 18,144 | 460 | 16,934 | 371 |
| | 0.1 | 2 | 0.042 | 45,960 | 1,751 | 38,300 | 1,455 | 34,470 | 1,313 | 32,555 | 991 | 28,725 | 774 | 26,810 | 635 |
| | | 4 | 0.029 | 37,325 | 1,376 | 31,104 | 1,147 | 27,994 | 1,032 | 26,438 | 792 | 23,328 | 591 | 21,773 | 477 |
| | | 6 | 0.018 | 29,030 | 1,070 | 24,192 | 892 | 21,773 | 803 | 20,563 | 616 | 18,144 | 460 | 16,934 | 371 |
| 0.8 | 0.02 | 2 | 0.016 | 48,000 | 2,211 | 40,000 | 1,843 | 36,000 | 1,658 | 34,000 | 1,410 | 30,000 | 1,106 | 28,000 | 903 |
| | | 4 | 0.016 | 48,000 | 1,769 | 40,000 | 1,475 | 36,000 | 1,327 | 34,000 | 1,128 | 30,000 | 885 | 28,000 | 723 |
| | | 6 | 0.013 | 36,720 | 1,218 | 30,600 | 1,015 | 27,540 | 914 | 26,010 | 863 | 22,950 | 677 | 21,420 | 553 |
| | 0.05 | 2 | 0.038 | 48,000 | 2,211 | 40,000 | 1,843 | 36,000 | 1,658 | 34,000 | 1,410 | 30,000 | 1,106 | 28,000 | 903 |
| | | 4 | 0.026 | 48,000 | 1,769 | 40,000 | 1,475 | 36,000 | 1,327 | 34,000 | 1,128 | 30,000 | 885 | 28,000 | 723 |
| | | 6 | 0.015 | 36,720 | 1,218 | 30,600 | 1,015 | 27,540 | 914 | 26,010 | 863 | 22,950 | 677 | 21,420 | 553 |
| | | 8 | 0.012 | 29,376 | 906 | 24,480 | 755 | 22,032 | 680 | 20,808 | 642 | 18,360 | 504 | 17,136 | 411 |
| | | 12 | 0.01 | 26,438 | 759 | 22,032 | 632 | 19,829 | 569 | 18,727 | 537 | 16,524 | 421 | 15,422 | 344 |

| 被削材 Work material | | | | 1 銅 Copper | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼き入れ鋼 Hardened steels (45～55HRC) | | 6 焼き入れ鋼 Hardened steels (55～65HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 120% | | 100% | | 90% | | 80% | | 65% | | 60% | |
| 外径 Tool dia. (mm) | コーナ半径 RE Corner radius (mm) | 首下長 Under neck length (mm) | ap (mm) | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 0.8 | 0.1 | 2 | 0.047 | 48,000 | 2,211 | 40,000 | 1,843 | 36,000 | 1,658 | 34,000 | 1,410 | 30,000 | 1,106 | 28,000 | 903 |
| | | 4 | 0.032 | 48,000 | 1,769 | 40,000 | 1,475 | 36,000 | 1,327 | 34,000 | 1,128 | 30,000 | 885 | 28,000 | 723 |
| | | 6 | 0.019 | 36,720 | 1,218 | 30,600 | 1,015 | 27,540 | 914 | 26,010 | 863 | 22,950 | 677 | 21,420 | 553 |
| | | 8 | 0.015 | 29,376 | 906 | 24,480 | 755 | 22,032 | 680 | 20,808 | 642 | 18,360 | 504 | 17,136 | 411 |
| | | 12 | 0.012 | 26,438 | 759 | 22,032 | 632 | 19,829 | 569 | 18,727 | 537 | 16,524 | 421 | 15,422 | 344 |
| | 0.2 | 2 | 0.081 | 48,000 | 2,211 | 40,000 | 1,843 | 36,000 | 1,658 | 34,000 | 1,410 | 30,000 | 1,106 | 28,000 | 903 |
| | | 4 | 0.056 | 48,000 | 1,769 | 40,000 | 1,475 | 36,000 | 1,327 | 34,000 | 1,128 | 30,000 | 885 | 28,000 | 723 |
| | | 6 | 0.032 | 36,720 | 1,218 | 30,600 | 1,015 | 27,540 | 914 | 26,010 | 863 | 22,950 | 677 | 21,420 | 553 |
| | | 8 | 0.018 | 29,376 | 906 | 24,480 | 755 | 22,032 | 680 | 20,808 | 642 | 18,360 | 504 | 17,136 | 411 |
| | | 12 | 0.015 | 26,438 | 759 | 22,032 | 632 | 19,829 | 569 | 18,727 | 537 | 16,524 | 421 | 15,422 | 344 |
| 1 | 0.02 | 2 | 0.016 | 47,770 | 2,866 | 39,490 | 2,369 | 35,668 | 2,140 | 33,439 | 1,805 | 29,617 | 1,421 | 27,707 | 1,163 |
| | | 4 | 0.013 | 43,200 | 2,588 | 36,000 | 2,157 | 32,400 | 1,941 | 30,600 | 1,650 | 27,000 | 1,294 | 25,200 | 1,057 |
| | | 6 | 0.01 | 34,992 | 1,887 | 29,160 | 1,572 | 29,299 | 1,757 | 24,786 | 1,336 | 21,870 | 1,048 | 20,412 | 856 |
| | | 8 | 0.008 | 31,104 | 1,677 | 25,920 | 1,397 | 26,244 | 1,415 | 22,032 | 1,188 | 19,440 | 932 | 18,144 | 761 |
| | | 10 | 0.006 | 27,216 | 1,467 | 22,680 | 1,223 | 23,328 | 1,258 | 19,278 | 1,039 | 17,010 | 815 | 15,876 | 666 |
| | | 12 | 0.005 | 24,192 | 1,159 | 20,160 | 966 | 20,412 | 1,100 | 17,136 | 719 | 15,120 | 634 | 14,112 | 507 |
| | 0.05 | 2 | 0.046 | 47,770 | 2,866 | 39,490 | 2,369 | 35,668 | 2,140 | 33,439 | 1,805 | 29,617 | 1,421 | 27,707 | 1,163 |
| | | 3 | 0.035 | 47,770 | 2,866 | 39,490 | 2,369 | 35,668 | 2,140 | 33,439 | 1,805 | 29,617 | 1,421 | 27,707 | 1,163 |
| | | 4 | 0.027 | 43,200 | 2,588 | 36,000 | 2,157 | 32,400 | 1,941 | 30,600 | 1,650 | 27,000 | 1,294 | 25,200 | 1,057 |
| | | 5 | 0.021 | 39,808 | 2,388 | 31,847 | 1,910 | 29,299 | 1,757 | 27,707 | 1,496 | 24,522 | 1,177 | 22,929 | 963 |
| | | 6 | 0.017 | 34,992 | 1,887 | 29,160 | 1,572 | 26,244 | 1,415 | 24,786 | 1,336 | 21,870 | 1,048 | 20,412 | 856 |
| | | 8 | 0.016 | 31,104 | 1,677 | 25,920 | 1,397 | 23,328 | 1,258 | 22,032 | 1,188 | 19,440 | 932 | 18,144 | 761 |
| | | 10 | 0.011 | 27,216 | 1,467 | 22,680 | 1,223 | 20,412 | 1,100 | 19,278 | 1,039 | 17,010 | 815 | 15,876 | 666 |
| | | 12 | 0.01 | 24,192 | 1,159 | 20,160 | 966 | 18,144 | 870 | 17,136 | 719 | 15,120 | 634 | 14,112 | 507 |
| | | 16 | 0.006 | 24,192 | 1,014 | 20,160 | 845 | 18,144 | 761 | 17,136 | 667 | 15,120 | 543 | 14,112 | 423 |
| | | 20 | 0.004 | 18,144 | 761 | 15,120 | 634 | 13,608 | 571 | 12,852 | 500 | 11,340 | 408 | 10,584 | 317 |
| | 0.1 | 2 | 0.065 | 47,770 | 2,866 | 39,490 | 2,369 | 35,668 | 2,140 | 33,439 | 1,805 | 29,617 | 1,421 | 27,707 | 1,163 |
| | | 3 | 0.05 | 47,770 | 2,866 | 39,490 | 2,369 | 35,668 | 2,140 | 33,439 | 1,805 | 29,617 | 1,421 | 27,707 | 1,163 |
| | | 4 | 0.038 | 43,200 | 2,588 | 36,000 | 2,157 | 32,400 | 1,941 | 30,600 | 1,650 | 27,000 | 1,294 | 25,200 | 1,057 |
| | | 5 | 0.03 | 39,808 | 2,388 | 31,847 | 1,910 | 29,299 | 1,757 | 27,707 | 1,496 | 24,522 | 1,177 | 22,929 | 963 |
| | | 6 | 0.024 | 34,992 | 1,887 | 29,160 | 1,572 | 26,244 | 1,415 | 24,786 | 1,336 | 21,870 | 1,048 | 20,412 | 856 |
| | | 8 | 0.024 | 31,104 | 1,677 | 25,920 | 1,397 | 23,328 | 1,258 | 22,032 | 1,188 | 19,440 | 932 | 18,144 | 761 |
| | | 10 | 0.015 | 27,216 | 1,467 | 22,680 | 1,223 | 20,412 | 1,100 | 19,278 | 1,039 | 17,010 | 815 | 15,876 | 666 |
| | | 12 | 0.015 | 24,192 | 1,159 | 20,160 | 966 | 18,144 | 870 | 17,136 | 719 | 15,120 | 634 | 14,112 | 507 |
| | | 16 | 0.009 | 24,192 | 1,014 | 20,160 | 845 | 18,144 | 761 | 17,136 | 667 | 15,120 | 543 | 14,112 | 423 |
| | | 20 | 0.006 | 18,144 | 761 | 15,120 | 634 | 13,608 | 571 | 12,852 | 500 | 11,340 | 408 | 10,584 | 317 |
| | 0.2 | 2 | 0.11 | 47,770 | 2,866 | 39,490 | 2,369 | 35,668 | 2,140 | 33,439 | 1,805 | 29,617 | 1,421 | 27,707 | 1,163 |
| | | 3 | 0.09 | 47,770 | 2,866 | 39,490 | 2,369 | 35,668 | 2,140 | 33,439 | 1,805 | 29,617 | 1,421 | 27,707 | 1,163 |
| | | 4 | 0.07 | 43,200 | 2,588 | 36,000 | 2,157 | 32,400 | 1,941 | 30,600 | 1,650 | 27,000 | 1,294 | 25,200 | 1,057 |
| | | 5 | 0.05 | 39,808 | 2,388 | 31,847 | 1,910 | 29,299 | 1,757 | 27,707 | 1,496 | 24,522 | 1,177 | 22,929 | 963 |
| | | 6 | 0.04 | 34,992 | 1,887 | 29,160 | 1,572 | 26,244 | 1,415 | 24,786 | 1,336 | 21,870 | 1,048 | 20,412 | 856 |
| | | 8 | 0.04 | 31,104 | 1,677 | 25,920 | 1,397 | 23,328 | 1,258 | 22,032 | 1,188 | 19,440 | 932 | 18,144 | 761 |
| | | 10 | 0.025 | 27,216 | 1,467 | 22,680 | 1,223 | 20,412 | 1,100 | 19,278 | 1,039 | 17,010 | 815 | 15,876 | 666 |
| | | 12 | 0.025 | 24,192 | 1,159 | 20,160 | 966 | 18,144 | 870 | 17,136 | 719 | 15,120 | 634 | 14,112 | 507 |
| | | 16 | 0.015 | 24,192 | 1,014 | 20,160 | 845 | 18,144 | 761 | 17,136 | 667 | 15,120 | 543 | 14,112 | 423 |
| | | 20 | 0.01 | 18,144 | 761 | 15,120 | 634 | 13,608 | 571 | 12,852 | 500 | 11,340 | 408 | 10,584 | 317 |
| | 0.3 | 2 | 0.11 | 47,770 | 2,866 | 39,490 | 2,369 | 35,668 | 2,140 | 33,439 | 1,805 | 29,617 | 1,421 | 27,707 | 1,163 |
| | | 3 | 0.09 | 47,770 | 2,866 | 39,490 | 2,369 | 35,668 | 2,140 | 33,439 | 1,805 | 29,617 | 1,421 | 27,707 | 1,163 |
| | | 4 | 0.07 | 43,200 | 2,588 | 36,000 | 2,157 | 32,400 | 1,941 | 30,600 | 1,650 | 27,000 | 1,294 | 25,200 | 1,057 |
| | | 5 | 0.05 | 39,808 | 2,388 | 31,847 | 1,910 | 29,299 | 1,757 | 27,707 | 1,496 | 24,522 | 1,177 | 22,929 | 963 |
| | | 6 | 0.04 | 34,992 | 1,887 | 29,160 | 1,572 | 26,244 | 1,415 | 24,786 | 1,336 | 21,870 | 1,048 | 20,412 | 856 |
| | | 8 | 0.04 | 31,104 | 1,677 | 25,920 | 1,397 | 23,328 | 1,258 | 22,032 | 1,188 | 19,440 | 932 | 18,144 | 761 |
| | | 10 | 0.025 | 27,216 | 1,467 | 22,680 | 1,223 | 20,412 | 1,100 | 19,278 | 1,039 | 17,010 | 815 | 15,876 | 666 |
| | | 12 | 0.025 | 24,192 | 1,159 | 20,160 | 966 | 18,144 | 870 | 17,136 | 719 | 15,120 | 634 | 14,112 | 507 |
| | | 16 | 0.015 | 24,192 | 1,014 | 20,160 | 845 | 18,144 | 761 | 17,136 | 667 | 15,120 | 543 | 14,112 | 423 |
| | | 20 | 0.01 | 18,144 | 761 | 15,120 | 634 | 13,608 | 571 | 12,852 | 500 | 11,340 | 408 | 10,584 | 317 |
| 1.25 | 0.1 | 5 | 0.03 | 39,808 | 2,388 | 31,847 | 1,910 | 29,299 | 1,757 | 27,707 | 1,496 | 24,522 | 1,177 | 22,929 | 963 |
| | | 10 | 0.015 | 27,216 | 1,467 | 25,920 | 1,397 | 20,412 | 1,100 | 19,278 | 1,039 | 17,010 | 815 | 15,876 | 666 |
| | | 15 | 0.01 | 24,192 | 1,014 | 20,160 | 845 | 18,144 | 761 | 17,136 | 667 | 15,120 | 543 | 14,112 | 423 |
| | | 20 | 0.006 | 18,144 | 761 | 15,120 | 634 | 13,608 | 571 | 12,852 | 500 | 11,340 | 408 | 10,584 | 317 |
| | 0.2 | 5 | 0.05 | 39,808 | 2,388 | 31,847 | 1,910 | 29,299 | 1,757 | 27,707 | 1,496 | 24,522 | 1,177 | 22,929 | 963 |
| | | 10 | 0.025 | 27,216 | 1,467 | 25,920 | 1,397 | 20,412 | 1,100 | 19,278 | 1,039 | 17,010 | 815 | 15,876 | 666 |
| | | 15 | 0.016 | 24,192 | 1,014 | 20,160 | 845 | 18,144 | 761 | 17,136 | 667 | 15,120 | 543 | 14,112 | 423 |
| | | 20 | 0.01 | 18,144 | 761 | 15,120 | 634 | 13,608 | 571 | 12,852 | 500 | 11,340 | 408 | 10,584 | 317 |
| | 0.3 | 5 | 0.05 | 39,808 | 2,388 | 31,847 | 1,910 | 29,299 | 1,757 | 27,707 | 1,496 | 24,522 | 1,177 | 22,929 | 963 |
| | | 10 | 0.025 | 27,216 | 1,467 | 25,920 | 1,397 | 20,412 | 1,100 | 19,278 | 1,039 | 17,010 | 815 | 15,876 | 666 |
| | | 15 | 0.016 | 24,192 | 1,014 | 20,160 | 845 | 18,144 | 761 | 17,136 | 667 | 15,120 | 543 | 14,112 | 423 |
| | | 20 | 0.01 | 18,144 | 761 | 15,120 | 634 | 13,608 | 571 | 12,852 | 500 | 11,340 | 408 | 10,584 | 317 |
| 1.5 | 0.1 | 4 | 0.042 | 33,264 | 2,153 | 27,700 | 1,793 | 24,948 | 1,614 | 23,285 | 1,378 | 20,790 | 1,076 | 19,293 | 883 |
| | | 6 | 0.04 | 31,847 | 2,057 | 26,539 | 1,714 | 23,779 | 1,536 | 22,505 | 1,332 | 19,957 | 1,033 | 18,471 | 845 |
| | | 8 | 0.036 | 30,240 | 1,956 | 25,200 | 1,630 | 22,680 | 1,467 | 21,420 | 1,268 | 18,900 | 979 | 17,640 | 807 |
| | | 12 | 0.036 | 24,192 | 1,565 | 20,160 | 1,304 | 18,144 | 1,174 | 17,136 | 1,014 | 15,120 | 783 | 14,112 | 646 |
| | | 15 | 0.023 | 18,816 | 1,082 | 15,680 | 902 | 14,112 | 812 | 13,328 | 671 | 11,760 | 592 | 10,976 | 473 |
| | | 20 | 0.018 | 18,816 | 978 | 15,680 | 815 | 14,112 | 733 | 13,328 | 613 | 11,760 | 540 | 10,976 | 428 |

【注意】ご使用にあたっては、A204ページの表下の項目と注意を参照してください。【Note】Upon usage, please refer to comments and notes below table on page A204.

Epoch Deep Radius Evolution

# エポックディープラジアスエボリューション

## EPDRE-ATH

**高能率切削条件** High efficiency cuttiing condition

高精度切削条件 High accuracy cuttiing condition

高精度切削条件はA205ページを参照してください。
Please refer to P.A205 about high accuracy cutting conditions

| 被削材 Work material | | | | 1 銅 Copper | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼入れ鋼 Hardened steels (45～55HRC) | | 6 焼入れ鋼 Hardened steels (55～65HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 120% | | 100% | | 90% | | 80% | | 65% | | 60% | |
| 外径 Tool dia. (mm) | コーナ半径 RE Corner radius (mm) | 首下長 Under neck length (mm) | ap (mm) | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min |
| 1.5 | 0.2 | 4 | 0.07 | 33,264 | 2,153 | 27,700 | 1,793 | 24,948 | 1,614 | 23,285 | 1,378 | 20,790 | 1,076 | 19,293 | 883 |
| | | 6 | 0.065 | 31,847 | 2,057 | 26,539 | 1,714 | 23,779 | 1,536 | 22,505 | 1,332 | 19,957 | 1,033 | 18,471 | 845 |
| | | 8 | 0.06 | 30,240 | 1,956 | 25,200 | 1,630 | 22,680 | 1,467 | 21,420 | 1,268 | 18,900 | 979 | 17,640 | 807 |
| | | 12 | 0.06 | 24,192 | 1,565 | 20,160 | 1,304 | 18,144 | 1,174 | 17,136 | 1,014 | 15,120 | 783 | 14,112 | 646 |
| | | 15 | 0.038 | 18,816 | 1,082 | 15,680 | 902 | 14,112 | 812 | 13,328 | 671 | 11,760 | 592 | 10,976 | 473 |
| | | 20 | 0.03 | 18,816 | 978 | 15,680 | 815 | 14,112 | 733 | 13,328 | 613 | 11,760 | 540 | 10,976 | 428 |
| | 0.3 | 4 | 0.07 | 33,264 | 2,153 | 27,700 | 1,793 | 24,948 | 1,614 | 23,285 | 1,378 | 20,790 | 1,076 | 19,293 | 883 |
| | | 6 | 0.065 | 31,847 | 2,057 | 26,539 | 1,714 | 23,779 | 1,536 | 22,505 | 1,332 | 19,957 | 1,033 | 18,471 | 845 |
| | | 8 | 0.06 | 30,240 | 1,956 | 25,200 | 1,630 | 22,680 | 1,467 | 21,420 | 1,268 | 18,900 | 979 | 17,640 | 807 |
| | | 12 | 0.06 | 24,192 | 1,565 | 20,160 | 1,304 | 18,144 | 1,174 | 17,136 | 1,014 | 15,120 | 783 | 14,112 | 646 |
| | | 15 | 0.038 | 18,816 | 1,082 | 15,680 | 902 | 14,112 | 812 | 13,328 | 671 | 11,760 | 592 | 10,976 | 473 |
| | | 20 | 0.03 | 18,816 | 978 | 15,680 | 815 | 14,112 | 733 | 13,328 | 613 | 11,760 | 540 | 10,976 | 428 |
| | 0.5 | 4 | 0.085 | 33,264 | 2,153 | 27,700 | 1,793 | 24,948 | 1,614 | 23,285 | 1,378 | 20,790 | 1,076 | 19,293 | 883 |
| | | 6 | 0.08 | 31,847 | 2,057 | 26,539 | 1,714 | 23,779 | 1,536 | 22,505 | 1,332 | 19,957 | 1,033 | 18,471 | 845 |
| | | 8 | 0.07 | 30,240 | 1,956 | 25,200 | 1,630 | 22,680 | 1,467 | 21,420 | 1,268 | 18,900 | 979 | 17,640 | 807 |
| | | 12 | 0.065 | 24,192 | 1,565 | 20,160 | 1,304 | 18,144 | 1,174 | 17,136 | 1,014 | 15,120 | 783 | 14,112 | 646 |
| | | 15 | 0.045 | 18,816 | 1,082 | 15,680 | 902 | 14,112 | 812 | 13,328 | 671 | 11,760 | 592 | 10,976 | 473 |
| | | 20 | 0.035 | 18,816 | 978 | 15,680 | 815 | 14,112 | 733 | 13,328 | 613 | 11,760 | 540 | 10,976 | 428 |
| 1.75 | 0.1 | 5 | 0.04 | 31,847 | 2,057 | 26,539 | 1,714 | 23,779 | 1,536 | 22,505 | 1,332 | 19,957 | 1,033 | 18,471 | 845 |
| | | 10 | 0.036 | 24,192 | 1,565 | 20,160 | 1,304 | 18,144 | 1,174 | 17,136 | 1,014 | 15,120 | 783 | 14,112 | 646 |
| | | 15 | 0.023 | 18,816 | 1,082 | 15,680 | 902 | 14,112 | 812 | 13,328 | 671 | 11,760 | 592 | 10,976 | 473 |
| | | 20 | 0.018 | 18,816 | 978 | 15,680 | 815 | 14,112 | 733 | 13,328 | 613 | 11,760 | 540 | 10,976 | 428 |
| | 0.2 | 5 | 0.065 | 31,847 | 2,057 | 26,539 | 1,714 | 23,779 | 1,536 | 22,505 | 1,332 | 19,957 | 1,033 | 18,471 | 845 |
| | | 10 | 0.06 | 24,192 | 1,565 | 20,160 | 1,304 | 18,144 | 1,174 | 17,136 | 1,014 | 15,120 | 783 | 14,112 | 646 |
| | | 15 | 0.038 | 18,816 | 1,082 | 15,680 | 902 | 14,112 | 812 | 13,328 | 671 | 11,760 | 592 | 10,976 | 473 |
| | | 20 | 0.03 | 18,816 | 978 | 15,680 | 815 | 14,112 | 733 | 13,328 | 613 | 11,760 | 540 | 10,976 | 428 |
| | 0.3 | 5 | 0.065 | 31,847 | 2,057 | 26,539 | 1,714 | 23,779 | 1,536 | 22,505 | 1,332 | 19,957 | 1,033 | 18,471 | 845 |
| | | 10 | 0.06 | 24,192 | 1,565 | 20,160 | 1,304 | 18,144 | 1,174 | 17,136 | 1,014 | 15,120 | 783 | 14,112 | 646 |
| | | 15 | 0.038 | 18,816 | 1,082 | 15,680 | 902 | 14,112 | 812 | 13,328 | 671 | 11,760 | 592 | 10,976 | 473 |
| | | 20 | 0.03 | 18,816 | 978 | 15,680 | 815 | 14,112 | 733 | 13,328 | 613 | 11,760 | 540 | 10,976 | 428 |
| 2 | 0.1 | 4 | 0.08 | 28,662 | 3,221 | 24,203 | 2,720 | 21,815 | 2,452 | 20,541 | 2,308 | 18,152 | 1,630 | 17,038 | 1,339 |
| | | 6 | 0.07 | 27,720 | 3,114 | 23,100 | 2,595 | 20,790 | 2,335 | 19,635 | 2,205 | 17,325 | 1,557 | 16,170 | 1,271 |
| | | 8 | 0.055 | 25,200 | 2,830 | 21,000 | 2,359 | 18,900 | 2,123 | 17,850 | 2,005 | 15,750 | 1,415 | 14,700 | 1,156 |
| | | 12 | 0.03 | 20,412 | 2,063 | 17,010 | 1,720 | 15,309 | 1,548 | 14,459 | 1,462 | 12,758 | 1,146 | 11,907 | 936 |
| | | 16 | 0.03 | 18,144 | 1,834 | 15,120 | 1,528 | 13,608 | 1,376 | 12,852 | 1,299 | 11,340 | 1,019 | 10,584 | 832 |
| | | 20 | 0.025 | 15,876 | 1,605 | 13,230 | 1,337 | 11,907 | 1,204 | 11,246 | 1,137 | 9,923 | 801 | 9,261 | 653 |
| | | 25 | 0.015 | 15,876 | 1,605 | 13,230 | 1,337 | 11,907 | 1,204 | 11,246 | 1,137 | 9,923 | 801 | 9,261 | 653 |
| | | 30 | 0.01 | 15,082 | 1,525 | 12,569 | 1,271 | 11,312 | 1,143 | 10,683 | 1,080 | 9,426 | 761 | 8,798 | 621 |
| | 0.2 | 4 | 0.1 | 28,662 | 3,221 | 24,203 | 2,720 | 21,815 | 2,452 | 20,541 | 2,308 | 18,152 | 1,630 | 17,038 | 1,339 |
| | | 6 | 0.08 | 27,720 | 3,114 | 23,100 | 2,595 | 20,790 | 2,335 | 19,635 | 2,205 | 17,325 | 1,557 | 16,170 | 1,271 |
| | | 8 | 0.07 | 25,200 | 2,830 | 21,000 | 2,359 | 18,900 | 2,123 | 17,850 | 2,005 | 15,750 | 1,415 | 14,700 | 1,156 |
| | | 12 | 0.04 | 20,412 | 2,063 | 17,010 | 1,720 | 15,309 | 1,548 | 14,459 | 1,462 | 12,758 | 1,146 | 11,907 | 936 |
| | | 16 | 0.04 | 18,144 | 1,834 | 15,120 | 1,528 | 13,608 | 1,376 | 12,852 | 1,299 | 11,340 | 1,019 | 10,584 | 832 |
| | | 20 | 0.035 | 15,876 | 1,605 | 13,230 | 1,337 | 11,907 | 1,204 | 11,246 | 1,137 | 9,923 | 801 | 9,261 | 653 |
| | | 25 | 0.025 | 15,876 | 1,605 | 13,230 | 1,337 | 11,907 | 1,204 | 11,246 | 1,137 | 9,923 | 801 | 9,261 | 653 |
| | | 30 | 0.017 | 15,082 | 1,525 | 12,569 | 1,271 | 11,312 | 1,143 | 10,683 | 1,080 | 9,426 | 761 | 8,798 | 621 |
| | 0.3 | 4 | 0.13 | 28,662 | 3,221 | 24,203 | 2,720 | 21,815 | 2,452 | 20,541 | 2,308 | 18,152 | 1,630 | 17,038 | 1,339 |
| | | 6 | 0.11 | 27,720 | 3,114 | 23,100 | 2,595 | 20,790 | 2,335 | 19,635 | 2,205 | 17,325 | 1,557 | 16,170 | 1,271 |
| | | 8 | 0.09 | 25,200 | 2,830 | 21,000 | 2,359 | 18,900 | 2,123 | 17,850 | 2,005 | 15,750 | 1,415 | 14,700 | 1,156 |
| | | 12 | 0.06 | 20,412 | 2,063 | 17,010 | 1,720 | 15,309 | 1,548 | 14,459 | 1,462 | 12,758 | 1,146 | 11,907 | 936 |
| | | 16 | 0.06 | 18,144 | 1,834 | 15,120 | 1,528 | 13,608 | 1,376 | 12,852 | 1,299 | 11,340 | 1,019 | 10,584 | 832 |
| | | 20 | 0.037 | 15,876 | 1,605 | 13,230 | 1,337 | 11,907 | 1,204 | 11,246 | 1,137 | 9,923 | 801 | 9,261 | 653 |
| | | 25 | 0.03 | 15,876 | 1,605 | 13,230 | 1,337 | 11,907 | 1,204 | 11,246 | 1,137 | 9,923 | 801 | 9,261 | 653 |
| | | 30 | 0.021 | 15,082 | 1,525 | 12,569 | 1,271 | 11,312 | 1,143 | 10,683 | 1,080 | 9,426 | 761 | 8,798 | 621 |
| | 0.5 | 6 | 0.17 | 27,720 | 3,114 | 23,100 | 2,595 | 20,790 | 2,335 | 19,635 | 2,205 | 17,325 | 1,557 | 16,170 | 1,271 |
| | | 8 | 0.14 | 25,200 | 2,830 | 21,000 | 2,359 | 18,900 | 2,123 | 17,850 | 2,005 | 15,750 | 1,415 | 14,700 | 1,156 |
| | | 12 | 0.08 | 20,412 | 2,063 | 17,010 | 1,720 | 15,309 | 1,548 | 14,459 | 1,462 | 12,758 | 1,146 | 11,907 | 936 |
| | | 16 | 0.08 | 18,144 | 1,834 | 15,120 | 1,528 | 13,608 | 1,376 | 12,852 | 1,299 | 11,340 | 1,019 | 10,584 | 832 |
| | | 20 | 0.05 | 15,876 | 1,605 | 13,230 | 1,337 | 11,907 | 1,204 | 11,246 | 1,137 | 9,923 | 801 | 9,261 | 653 |
| | | 25 | 0.05 | 15,876 | 1,605 | 13,230 | 1,337 | 11,907 | 1,204 | 11,246 | 1,137 | 9,923 | 801 | 9,261 | 653 |
| | | 30 | 0.03 | 15,082 | 1,525 | 12,569 | 1,271 | 11,312 | 1,143 | 10,683 | 1,080 | 9,426 | 761 | 8,798 | 621 |
| | 0.8 | 6 | 0.22 | 27,720 | 3,114 | 23,100 | 2,595 | 20,790 | 2,335 | 19,635 | 2,205 | 17,325 | 1,557 | 16,170 | 1,271 |
| | | 8 | 0.2 | 25,200 | 2,830 | 21,000 | 2,359 | 18,900 | 2,123 | 17,850 | 2,005 | 15,750 | 1,415 | 14,700 | 1,156 |
| | | 12 | 0.13 | 20,412 | 2,063 | 17,010 | 1,720 | 15,309 | 1,548 | 14,459 | 1,462 | 12,758 | 1,146 | 11,907 | 936 |
| | | 16 | 0.1 | 18,144 | 1,834 | 15,120 | 1,528 | 13,608 | 1,376 | 12,852 | 1,299 | 11,340 | 1,019 | 10,584 | 832 |
| | | 20 | 0.06 | 15,876 | 1,605 | 13,230 | 1,337 | 11,907 | 1,204 | 11,246 | 1,137 | 9,923 | 801 | 9,261 | 653 |
| | | 25 | 0.057 | 15,876 | 1,605 | 13,230 | 1,337 | 11,907 | 1,204 | 11,246 | 1,137 | 9,923 | 801 | 9,261 | 653 |
| | | 30 | 0.045 | 15,082 | 1,525 | 12,569 | 1,271 | 11,312 | 1,143 | 10,683 | 1,080 | 9,426 | 761 | 8,798 | 621 |

| 被削材 Work material | | | | 1 銅 Copper | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼入れ鋼 Hardened steels (45～55HRC) | | 6 焼入れ鋼 Hardened steels (55～65HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 120% | | 100% | | 90% | | 80% | | 65% | | 60% | |
| 外径 Tool dia. (mm) | コーナ半径 RE Corner radius (mm) | 首下長 Under neck length (mm) | $a_p$ (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 2.5 | 0.1 | 10 | 0.05 | 20,412 | 2,293 | 17,010 | 1,720 | 15,309 | 1,548 | 14,459 | 1,462 | 12,758 | 1,146 | 11,907 | 936 |
| | | 20 | 0.03 | 15,876 | 1,783 | 13,230 | 1,337 | 11,907 | 1,204 | 11,246 | 1,137 | 9,923 | 801 | 9,261 | 653 |
| | | 30 | 0.015 | 15,082 | 1,525 | 12,569 | 1,271 | 11,312 | 1,143 | 10,683 | 1,080 | 9,426 | 761 | 8,798 | 621 |
| | 0.2 | 10 | 0.07 | 20,412 | 2,293 | 17,010 | 1,720 | 15,309 | 1,548 | 14,459 | 1,462 | 12,758 | 1,146 | 11,907 | 936 |
| | | 20 | 0.04 | 15,876 | 1,783 | 13,230 | 1,337 | 11,907 | 1,204 | 11,246 | 1,137 | 9,923 | 801 | 9,261 | 653 |
| | | 30 | 0.025 | 15,082 | 1,525 | 12,569 | 1,271 | 11,312 | 1,143 | 10,683 | 1,080 | 9,426 | 761 | 8,798 | 621 |
| | 0.3 | 10 | 0.09 | 20,412 | 2,293 | 17,010 | 1,720 | 15,309 | 1,548 | 14,459 | 1,462 | 12,758 | 1,146 | 11,907 | 936 |
| | | 20 | 0.06 | 15,876 | 1,783 | 13,230 | 1,337 | 11,907 | 1,204 | 11,246 | 1,137 | 9,923 | 801 | 9,261 | 653 |
| | | 30 | 0.03 | 15,082 | 1,525 | 12,569 | 1,271 | 11,312 | 1,143 | 10,683 | 1,080 | 9,426 | 761 | 8,798 | 621 |
| | 0.5 | 10 | 0.12 | 20,412 | 2,293 | 17,010 | 1,720 | 15,309 | 1,548 | 14,459 | 1,462 | 12,758 | 1,146 | 11,907 | 936 |
| | | 20 | 0.08 | 15,876 | 1,783 | 13,230 | 1,337 | 11,907 | 1,204 | 11,246 | 1,137 | 9,923 | 801 | 9,261 | 653 |
| | | 30 | 0.05 | 15,082 | 1,525 | 12,569 | 1,271 | 11,312 | 1,143 | 10,683 | 1,080 | 9,426 | 761 | 8,798 | 621 |
| 3 | 0.1 | 6 | 0.08 | 19,200 | 2,696 | 16,000 | 2,246 | 14,400 | 2,022 | 13,600 | 1,909 | 12,000 | 1,348 | 11,200 | 1,101 |
| | | 8 | 0.07 | 19,200 | 2,696 | 16,000 | 2,246 | 14,400 | 2,022 | 13,600 | 1,909 | 12,000 | 1,348 | 11,200 | 1,101 |
| | | 12 | 0.05 | 19,200 | 2,696 | 16,000 | 2,246 | 14,400 | 2,022 | 13,600 | 1,909 | 12,000 | 1,348 | 11,200 | 1,101 |
| | | 16 | 0.035 | 19,200 | 2,696 | 16,000 | 2,246 | 14,400 | 2,022 | 13,600 | 1,909 | 12,000 | 1,348 | 11,200 | 1,101 |
| | | 18 | 0.035 | 16,985 | 2,384 | 14,331 | 2,012 | 12,738 | 1,788 | 12,208 | 1,714 | 10,615 | 1,193 | 10,084 | 992 |
| | | 20 | 0.035 | 15,552 | 2,184 | 12,960 | 1,820 | 11,664 | 1,638 | 11,016 | 1,547 | 9,720 | 1,092 | 9,072 | 892 |
| | | 30 | 0.027 | 12,096 | 1,524 | 10,080 | 1,270 | 9,072 | 1,143 | 8,568 | 1,079 | 7,560 | 771 | 7,056 | 621 |
| | | 35 | 0.02 | 12,096 | 1,524 | 10,080 | 1,270 | 9,072 | 1,143 | 8,568 | 1,079 | 7,560 | 771 | 7,056 | 621 |
| | 0.2 | 6 | 0.1 | 19,200 | 2,696 | 16,000 | 2,246 | 14,400 | 2,022 | 13,600 | 1,909 | 12,000 | 1,348 | 11,200 | 1,101 |
| | | 8 | 0.09 | 19,200 | 2,696 | 16,000 | 2,246 | 14,400 | 2,022 | 13,600 | 1,909 | 12,000 | 1,348 | 11,200 | 1,101 |
| | | 12 | 0.07 | 19,200 | 2,696 | 16,000 | 2,246 | 14,400 | 2,022 | 13,600 | 1,909 | 12,000 | 1,348 | 11,200 | 1,101 |
| | | 16 | 0.05 | 19,200 | 2,696 | 16,000 | 2,246 | 14,400 | 2,022 | 13,600 | 1,909 | 12,000 | 1,348 | 11,200 | 1,101 |
| | | 18 | 0.05 | 16,985 | 2,384 | 14,331 | 2,012 | 12,738 | 1,788 | 12,208 | 1,714 | 10,615 | 1,193 | 10,084 | 992 |
| | | 20 | 0.05 | 15,552 | 2,184 | 12,960 | 1,820 | 11,664 | 1,638 | 11,016 | 1,547 | 9,720 | 1,092 | 9,072 | 892 |
| | | 30 | 0.04 | 12,096 | 1,524 | 10,080 | 1,270 | 9,072 | 1,143 | 8,568 | 1,079 | 7,560 | 771 | 7,056 | 621 |
| | | 35 | 0.035 | 12,096 | 1,524 | 10,080 | 1,270 | 9,072 | 1,143 | 8,568 | 1,079 | 7,560 | 771 | 7,056 | 621 |
| | 0.3 | 6 | 0.145 | 19,200 | 2,696 | 16,000 | 2,246 | 14,400 | 2,022 | 13,600 | 1,909 | 12,000 | 1,348 | 11,200 | 1,101 |
| | | 8 | 0.13 | 19,200 | 2,696 | 16,000 | 2,246 | 14,400 | 2,022 | 13,600 | 1,909 | 12,000 | 1,348 | 11,200 | 1,101 |
| | | 12 | 0.1 | 19,200 | 2,696 | 16,000 | 2,246 | 14,400 | 2,022 | 13,600 | 1,909 | 12,000 | 1,348 | 11,200 | 1,101 |
| | | 16 | 0.075 | 19,200 | 2,696 | 16,000 | 2,246 | 14,400 | 2,022 | 13,600 | 1,909 | 12,000 | 1,348 | 11,200 | 1,101 |
| | | 18 | 0.075 | 16,985 | 2,384 | 14,331 | 2,012 | 12,738 | 1,788 | 12,208 | 1,714 | 10,615 | 1,193 | 10,084 | 992 |
| | | 20 | 0.075 | 15,552 | 2,184 | 12,960 | 1,820 | 11,664 | 1,638 | 11,016 | 1,547 | 9,720 | 1,092 | 9,072 | 892 |
| | | 30 | 0.06 | 12,096 | 1,524 | 10,080 | 1,270 | 9,072 | 1,143 | 8,568 | 1,079 | 7,560 | 771 | 7,056 | 621 |
| | | 35 | 0.05 | 12,096 | 1,524 | 10,080 | 1,270 | 9,072 | 1,143 | 8,568 | 1,079 | 7,560 | 771 | 7,056 | 621 |
| | 0.5 | 8 | 0.18 | 19,200 | 2,696 | 16,000 | 2,246 | 14,400 | 2,022 | 13,600 | 1,909 | 12,000 | 1,348 | 11,200 | 1,101 |
| | | 12 | 0.13 | 19,200 | 2,696 | 16,000 | 2,246 | 14,400 | 2,022 | 13,600 | 1,909 | 12,000 | 1,348 | 11,200 | 1,101 |
| | | 16 | 0.1 | 19,200 | 2,696 | 16,000 | 2,246 | 14,400 | 2,022 | 13,600 | 1,909 | 12,000 | 1,348 | 11,200 | 1,101 |
| | | 18 | 0.1 | 16,985 | 2,384 | 14,331 | 2,012 | 12,738 | 1,788 | 13,600 | 1,909 | 10,615 | 1,193 | 10,084 | 992 |
| | | 20 | 0.1 | 15,552 | 2,184 | 12,960 | 1,820 | 11,664 | 1,638 | 11,016 | 1,547 | 9,720 | 1,092 | 9,072 | 892 |
| | | 30 | 0.08 | 12,096 | 1,524 | 10,080 | 1,270 | 9,072 | 1,143 | 8,568 | 1,079 | 7,560 | 771 | 7,056 | 621 |
| | | 35 | 0.065 | 12,096 | 1,524 | 10,080 | 1,270 | 9,072 | 1,143 | 8,568 | 1,079 | 7,560 | 771 | 7,056 | 621 |
| | 1 | 8 | 0.2 | 19,200 | 2,696 | 16,000 | 2,246 | 14,400 | 2,022 | 13,600 | 1,909 | 12,000 | 1,348 | 11,200 | 1,101 |
| | | 12 | 0.15 | 19,200 | 2,696 | 16,000 | 2,246 | 14,400 | 2,022 | 13,600 | 1,909 | 12,000 | 1,348 | 11,200 | 1,101 |
| | | 16 | 0.12 | 19,200 | 2,696 | 16,000 | 2,246 | 14,400 | 2,022 | 13,600 | 1,909 | 12,000 | 1,348 | 11,200 | 1,101 |
| | | 18 | 0.11 | 16,985 | 2,384 | 14,331 | 2,012 | 12,738 | 1,788 | 13,600 | 1,909 | 10,615 | 1,193 | 10,084 | 992 |
| | | 20 | 0.11 | 15,552 | 2,184 | 12,960 | 1,820 | 11,664 | 1,638 | 11,016 | 1,547 | 9,720 | 1,092 | 9,072 | 892 |
| | | 30 | 0.09 | 12,096 | 1,524 | 10,080 | 1,270 | 9,072 | 1,143 | 8,568 | 1,079 | 7,560 | 771 | 7,056 | 621 |
| | | 35 | 0.075 | 12,096 | 1,524 | 10,080 | 1,270 | 9,072 | 1,143 | 8,568 | 1,079 | 7,560 | 771 | 7,056 | 621 |
| 4 | 0.1 | 8 | 0.08 | 16,560 | 2,880 | 13,800 | 2,400 | 12,420 | 2,160 | 11,730 | 2,040 | 10,350 | 1,440 | 9,660 | 1,176 |
| | | 12 | 0.065 | 16,560 | 2,880 | 13,800 | 2,400 | 12,420 | 2,160 | 11,730 | 2,040 | 10,350 | 1,440 | 9,660 | 1,176 |
| | | 16 | 0.06 | 13,733 | 2,388 | 11,445 | 1,990 | 10,071 | 1,751 | 9,613 | 1,671 | 8,240 | 1,146 | 7,782 | 947 |
| | | 20 | 0.055 | 13,733 | 2,388 | 11,445 | 1,990 | 10,071 | 1,751 | 9,613 | 1,671 | 8,240 | 1,146 | 7,782 | 947 |
| | | 30 | 0.045 | 10,985 | 1,719 | 9,154 | 1,433 | 8,239 | 1,290 | 7,781 | 1,218 | 6,866 | 860 | 6,408 | 702 |
| | | 35 | 0.04 | 10,985 | 1,719 | 9,154 | 1,433 | 8,239 | 1,290 | 7,781 | 1,218 | 6,866 | 860 | 6,408 | 702 |
| | | 45 | 0.03 | 8,789 | 1,100 | 7,324 | 917 | 6,592 | 825 | 6,226 | 780 | 5,494 | 554 | 5,127 | 446 |
| | 0.2 | 8 | 0.16 | 16,560 | 2,880 | 13,800 | 2,400 | 12,420 | 2,160 | 11,730 | 2,040 | 10,350 | 1,440 | 9,660 | 1,176 |
| | | 12 | 0.14 | 16,560 | 2,880 | 13,800 | 2,400 | 12,420 | 2,160 | 11,730 | 2,040 | 10,350 | 1,440 | 9,660 | 1,176 |
| | | 16 | 0.13 | 13,733 | 2,388 | 11,445 | 1,990 | 10,071 | 1,751 | 9,613 | 1,671 | 8,240 | 1,146 | 7,782 | 947 |
| | | 20 | 0.11 | 13,733 | 2,388 | 11,445 | 1,990 | 10,071 | 1,751 | 9,613 | 1,671 | 8,240 | 1,146 | 7,782 | 947 |
| | | 30 | 0.1 | 10,985 | 1,719 | 9,154 | 1,433 | 8,239 | 1,290 | 7,781 | 1,218 | 6,866 | 860 | 6,408 | 702 |
| | | 35 | 0.08 | 10,985 | 1,719 | 9,154 | 1,433 | 8,239 | 1,290 | 7,781 | 1,218 | 6,866 | 860 | 6,408 | 702 |
| | | 45 | 0.06 | 8,789 | 1,100 | 7,324 | 917 | 6,592 | 825 | 6,226 | 780 | 5,494 | 554 | 5,127 | 446 |
| | 0.3 | 8 | 0.24 | 16,560 | 2,880 | 13,800 | 2,400 | 12,420 | 2,160 | 11,730 | 2,040 | 10,350 | 1,440 | 9,660 | 1,176 |
| | | 12 | 0.22 | 16,560 | 2,880 | 13,800 | 2,400 | 12,420 | 2,160 | 11,730 | 2,040 | 10,350 | 1,440 | 9,660 | 1,176 |
| | | 16 | 0.2 | 13,733 | 2,388 | 11,445 | 1,990 | 10,071 | 1,751 | 9,613 | 1,671 | 8,240 | 1,146 | 7,782 | 947 |
| | | 20 | 0.18 | 13,733 | 2,388 | 11,445 | 1,990 | 10,071 | 1,751 | 9,613 | 1,671 | 8,240 | 1,146 | 7,782 | 947 |
| | | 30 | 0.16 | 10,985 | 1,719 | 9,154 | 1,433 | 8,239 | 1,290 | 7,781 | 1,218 | 6,866 | 860 | 6,408 | 702 |
| | | 35 | 0.14 | 10,985 | 1,719 | 9,154 | 1,433 | 8,239 | 1,290 | 7,781 | 1,218 | 6,866 | 860 | 6,408 | 702 |
| | | 45 | 0.12 | 8,789 | 1,100 | 7,324 | 917 | 6,592 | 825 | 6,226 | 780 | 5,494 | 554 | 5,127 | 446 |

【注意】ご使用にあたっては、A204ページの表下の項目と注意を参照してください。【Note】Upon usage, please refer to comments and notes below table on page A204.

## Epoch Deep Radius Evolution
# エポックディープラジアスエボリューション

**EPDRE-ATH**

**高能率切削条件** High efficiency cuttiing condition

高精度切削条件 High accuracy cutting condition

高精度切削条件はA205ページを参照してください。
Please refer to P.A205 about high accuracy cutting conditions

| 被削材 Work material | | | | 1 銅 Copper | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼入れ鋼 Hardened steels (45～55HRC) | | 6 焼入れ鋼 Hardened steels (55～65HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 120% | | 100% | | 90% | | 80% | | 65% | | 60% | |
| 外径 Tool dia. (mm) | コーナ半径 RE Corner radius (mm) | 首下長 Under neck length (mm) | $a_p$ (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 4 | 0.5 | 12 | 0.35 | 16,560 | 2,880 | 13,800 | 2,400 | 12,420 | 2,160 | 11,730 | 2,040 | 10,350 | 1,440 | 9,660 | 1,176 |
| | | 16 | 0.25 | 13,733 | 2,388 | 11,445 | 1,990 | 10,071 | 1,751 | 9,613 | 1,671 | 8,240 | 1,146 | 7,782 | 947 |
| | | 20 | 0.2 | 13,733 | 2,388 | 11,445 | 1,990 | 10,071 | 1,751 | 9,613 | 1,671 | 8,240 | 1,146 | 7,782 | 947 |
| | | 30 | 0.15 | 10,985 | 1,719 | 9,154 | 1,433 | 8,239 | 1,290 | 7,781 | 1,218 | 6,866 | 860 | 6,408 | 702 |
| | | 35 | 0.1 | 10,985 | 1,719 | 9,154 | 1,433 | 8,239 | 1,290 | 7,781 | 1,218 | 6,866 | 860 | 6,408 | 702 |
| | | 45 | 0.05 | 8,789 | 1,100 | 7,324 | 917 | 6,592 | 825 | 6,226 | 780 | 5,494 | 554 | 5,127 | 446 |
| | 1 | 12 | 0.4 | 16,560 | 2,880 | 13,800 | 2,400 | 12,420 | 2,160 | 11,730 | 2,040 | 10,350 | 1,440 | 9,660 | 1,176 |
| | | 16 | 0.29 | 13,733 | 2,388 | 11,445 | 1,990 | 10,071 | 1,751 | 9,613 | 1,671 | 8,240 | 1,146 | 7,782 | 947 |
| | | 20 | 0.23 | 13,733 | 2,388 | 11,445 | 1,990 | 10,071 | 1,751 | 9,613 | 1,671 | 8,240 | 1,146 | 7,782 | 947 |
| | | 30 | 0.17 | 10,985 | 1,719 | 9,154 | 1,433 | 8,239 | 1,290 | 7,781 | 1,218 | 6,866 | 860 | 6,408 | 702 |
| | | 35 | 0.12 | 10,985 | 1,719 | 9,154 | 1,433 | 8,239 | 1,290 | 7,781 | 1,218 | 6,866 | 860 | 6,408 | 702 |
| | | 45 | 0.06 | 8,789 | 1,100 | 7,324 | 917 | 6,592 | 825 | 6,226 | 780 | 5,494 | 554 | 5,127 | 446 |
| 5 | 0.1 | 20 | 0.08 | 13,179 | 2,865 | 10,983 | 2,388 | 9,884 | 2,149 | 9,336 | 2,029 | 8,237 | 1,433 | 7,688 | 1,170 |
| | | 40 | 0.06 | 11,868 | 2,312 | 9,890 | 1,926 | 8,901 | 1,734 | 8,407 | 1,637 | 7,418 | 1,156 | 6,923 | 944 |
| | 0.2 | 20 | 0.16 | 13,179 | 2,865 | 10,983 | 2,388 | 9,884 | 2,149 | 9,336 | 2,029 | 8,237 | 1,433 | 7,688 | 1,170 |
| | | 40 | 0.13 | 11,868 | 2,312 | 9,890 | 1,926 | 8,901 | 1,734 | 8,407 | 1,637 | 7,418 | 1,156 | 6,923 | 944 |
| | 0.3 | 20 | 0.24 | 13,179 | 2,865 | 10,983 | 2,388 | 9,884 | 2,149 | 9,336 | 2,029 | 8,237 | 1,433 | 7,688 | 1,170 |
| | | 40 | 0.2 | 11,868 | 2,312 | 9,890 | 1,926 | 8,901 | 1,734 | 8,407 | 1,637 | 7,418 | 1,156 | 6,923 | 944 |
| | 0.5 | 20 | 0.35 | 13,179 | 2,865 | 10,983 | 2,388 | 9,884 | 2,149 | 9,336 | 2,029 | 8,237 | 1,433 | 7,688 | 1,170 |
| | | 40 | 0.135 | 11,868 | 2,312 | 9,890 | 1,926 | 8,901 | 1,734 | 8,407 | 1,637 | 7,418 | 1,156 | 6,923 | 944 |
| | 1 | 20 | 0.4 | 13,179 | 2,865 | 10,983 | 2,388 | 9,884 | 2,149 | 9,336 | 2,029 | 8,237 | 1,433 | 7,688 | 1,170 |
| | | 40 | 0.15 | 11,868 | 2,312 | 9,890 | 1,926 | 8,901 | 1,734 | 8,407 | 1,637 | 7,418 | 1,156 | 6,923 | 944 |
| 6 | 0.1 | 12 | 0.08 | 10,985 | 2,866 | 9,154 | 2,388 | 8,239 | 2,149 | 7,781 | 2,030 | 6,866 | 1,433 | 6,408 | 1,170 |
| | | 18 | 0.065 | 10,985 | 2,866 | 9,154 | 2,388 | 8,239 | 2,149 | 7,781 | 2,030 | 6,866 | 1,433 | 6,408 | 1,170 |
| | | 24 | 0.06 | 10,985 | 2,866 | 9,154 | 2,388 | 8,239 | 2,149 | 7,781 | 2,030 | 6,866 | 1,433 | 6,408 | 1,170 |
| | | 35 | 0.05 | 9,881 | 2,320 | 8,234 | 1,933 | 7,411 | 1,740 | 6,999 | 1,643 | 6,176 | 1,160 | 5,764 | 947 |
| | | 55 | 0.04 | 7,687 | 1,805 | 6,406 | 1,504 | 5,765 | 1,354 | 5,445 | 1,278 | 4,805 | 902 | 4,484 | 737 |
| | 0.2 | 12 | 0.16 | 10,985 | 2,866 | 9,154 | 2,388 | 8,239 | 2,149 | 7,781 | 2,030 | 6,866 | 1,433 | 6,408 | 1,170 |
| | | 18 | 0.14 | 10,985 | 2,866 | 9,154 | 2,388 | 8,239 | 2,149 | 7,781 | 2,030 | 6,866 | 1,433 | 6,408 | 1,170 |
| | | 24 | 0.13 | 10,985 | 2,866 | 9,154 | 2,388 | 8,239 | 2,149 | 7,781 | 2,030 | 6,866 | 1,433 | 6,408 | 1,170 |
| | | 35 | 0.11 | 9,881 | 2,320 | 8,234 | 1,933 | 7,411 | 1,740 | 6,999 | 1,643 | 6,176 | 1,160 | 5,764 | 947 |
| | | 55 | 0.08 | 7,687 | 1,805 | 6,406 | 1,504 | 5,765 | 1,354 | 5,445 | 1,278 | 4,805 | 902 | 4,484 | 737 |
| | 0.3 | 12 | 0.24 | 10,985 | 2,866 | 9,154 | 2,388 | 8,239 | 2,149 | 7,781 | 2,030 | 6,866 | 1,433 | 6,408 | 1,170 |
| | | 18 | 0.22 | 10,985 | 2,866 | 9,154 | 2,388 | 8,239 | 2,149 | 7,781 | 2,030 | 6,866 | 1,433 | 6,408 | 1,170 |
| | | 24 | 0.2 | 10,985 | 2,866 | 9,154 | 2,388 | 8,239 | 2,149 | 7,781 | 2,030 | 6,866 | 1,433 | 6,408 | 1,170 |
| | | 35 | 0.18 | 9,881 | 2,320 | 8,234 | 1,933 | 7,411 | 1,740 | 6,999 | 1,643 | 6,176 | 1,160 | 5,764 | 947 |
| | | 55 | 0.14 | 7,687 | 1,805 | 6,406 | 1,504 | 5,765 | 1,354 | 5,445 | 1,278 | 4,805 | 902 | 4,484 | 737 |
| | 0.5 | 18 | 0.35 | 10,985 | 2,866 | 9,154 | 2,388 | 8,239 | 2,149 | 7,781 | 2,030 | 6,866 | 1,433 | 6,408 | 1,170 |
| | | 24 | 0.29 | 10,985 | 2,866 | 9,154 | 2,388 | 8,239 | 2,149 | 7,781 | 2,030 | 6,866 | 1,433 | 6,408 | 1,170 |
| | | 35 | 0.24 | 9,881 | 2,320 | 8,234 | 1,933 | 7,411 | 1,740 | 6,999 | 1,643 | 6,176 | 1,160 | 5,764 | 947 |
| | | 55 | 0.165 | 7,687 | 1,805 | 6,406 | 1,504 | 5,765 | 1,354 | 5,445 | 1,278 | 4,805 | 902 | 4,484 | 737 |
| | 1 | 18 | 0.4 | 10,985 | 2,866 | 9,154 | 2,388 | 8,239 | 2,149 | 7,781 | 2,030 | 6,866 | 1,433 | 6,408 | 1,170 |
| | | 24 | 0.35 | 10,985 | 2,866 | 9,154 | 2,388 | 8,239 | 2,149 | 7,781 | 2,030 | 6,866 | 1,433 | 6,408 | 1,170 |
| | | 35 | 0.28 | 9,881 | 2,320 | 8,234 | 1,933 | 7,411 | 1,740 | 6,999 | 1,643 | 6,176 | 1,160 | 5,764 | 947 |
| | | 55 | 0.2 | 7,687 | 1,805 | 6,406 | 1,504 | 5,765 | 1,354 | 5,445 | 1,278 | 4,805 | 902 | 4,484 | 737 |

※(1)$a_p$は被削材グループ2での目安を示しています。その他のグループの場合は、上表の切込み比率を目安に調整してください。
※(2)リブ加工や止まり溝など、切りくずがつまりやすい切削の場合、切込み設定は基本切込みに切込み比率をかけて算出した切込み量を、さらにその80%まで小さくして使用してください。
※(3)$a_e$の設定は$a_p$×切込み比率×5倍以下を目安に調整してください。仕上げ加工を行う場合、理論カスプハイトを計算し設定してください。
※(4)掘り込み時のアプローチ方法は、ヘリカルか傾斜での加工を推奨いたします。
※(5)L/Dが5以上の場合、
①彫り込み時の傾斜進入角は1°以下を推奨いたします。また、送り速度は条件表の70%以下に調整してください。
②文字彫り加工のような溝切削の際は、送り速度は50%以下・$a_p$を30%以下を目安に調整してください。また往復切削による加工を推奨いたします。

※(1) $a_p$ is shown as the criteria for Group 2 workpieces. For other groups, adjust the cutting depth according to the cutting depth factors in the above table.
※(2) When performing cutting where cutting chips may cause clogging, such as for rib cutting, blind grooves, etc., cutting depth setting should be set by multiplying a cutting depth factor to calculate the cutting depth amount, and this amount should then be reduced to 80% of the calculated value.
※(3) Adjust by setting $a_e$ to (5 or less)×($a_p$)×(cutting depth ratio). When performing finishing cutting, calculate the theoretical cusp height and set accordingly.
※(4) Helical or sloped cutting is recommended for the approach method when engraving.
※(5) When L/D is 5 or greater:
①The recommended slope entrance angle when engraving is 1° or less. In addition, feed rate should be adjusted to 70% or less of the values in the cutting condition table.
②When slotting such engraving letters, adjust feed rate to 50% or less and ap to 30% or less of the values shown. In addition, cutting by reciprocal cutting is recommended.

【切込み設定例】EPDRE2030-6-02-ATHの工具でプリハードン鋼(40HRC)をリブ溝等高線切削する場合、
切込み=0.1($a_p$)×0.8(プリハードン鋼グループ4の切込み比率)×0.8(閉鎖域の切削)=0.064mm

Cutting depth setting example: When cutting rib groove contours in pre-hardened steel (40HRC) using an EPDRE2030-6-02-ATH tool:
Cutting depth = 0.1 ($a_p$) × 0.8 (cutting depth factor for Group 4 pre-hardened steel) × 0.8 (for closed-area cutting) = 0.064mm

**【注意】**
①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

**【Note】**
① Use the appropriate coolant for the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
③ If the rpm of the machine is low, lower the feed rate also to put the rpm and feed rate in the same ratio.

# EPDRE-ATH

高能率切削条件はA200ページを参照してください。
Please refer to P.A200 about high efficiency cutting conditions

| 被削材 Work material | | | | 1 銅 Copper | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼き入れ鋼 Hardened steels (45～55HRC) | | 6 焼き入れ鋼 Hardened steels (55～65HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 120% | | 100% | | 90% | | 80% | | 65% | | 60% | |
| 外径 Tool dia. (mm) | コーナ半径 RE Corner radius (mm) | 首下長 Under neck length (mm) | ap (mm) | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 0.2 | 0.02 | 0.5 | 0.016 | 50,000 | 307 | 50,000 | 258 | 50,000 | 230 | 50,000 | 205 | 50,000 | 180 | 50,000 | 160 |
| | | 1 | 0.011 | 50,000 | 307 | 50,000 | 258 | 50,000 | 230 | 50,000 | 205 | 50,000 | 180 | 50,000 | 160 |
| | | 2 | 0.007 | 50,000 | 246 | 42,000 | 202 | 37,800 | 181 | 36,700 | 176 | 36,700 | 162 | 36,700 | 147 |
| | 0.05 | 0.5 | 0.02 | 50,000 | 307 | 50,000 | 258 | 50,000 | 230 | 50,000 | 205 | 50,000 | 180 | 50,000 | 160 |
| | | 1 | 0.014 | 50,000 | 307 | 50,000 | 258 | 50,000 | 230 | 50,000 | 205 | 50,000 | 180 | 50,000 | 160 |
| | | 1.5 | 0.008 | 50,000 | 276 | 50,000 | 240 | 48,600 | 223 | 45,900 | 202 | 45,900 | 170 | 45,900 | 153 |
| | | 2 | 0.008 | 50,000 | 246 | 42,000 | 202 | 37,800 | 181 | 36,700 | 176 | 36,700 | 162 | 36,700 | 147 |
| 0.3 | 0.02 | 1 | 0.016 | 50,000 | 696 | 50,000 | 585 | 50,000 | 516 | 50,000 | 456 | 50,000 | 336 | 50,000 | 320 |
| | | 2 | 0.011 | 45,000 | 620 | 45,000 | 530 | 45,000 | 460 | 45,000 | 420 | 45,000 | 300 | 45,000 | 290 |
| | | 3 | 0.007 | 40,000 | 504 | 35,000 | 412 | 35,000 | 358 | 35,000 | 326 | 30,000 | 200 | 30,000 | 194 |
| | 0.05 | 1 | 0.021 | 50,000 | 696 | 50,000 | 585 | 50,000 | 516 | 50,000 | 456 | 50,000 | 336 | 50,000 | 320 |
| | | 1.5 | 0.016 | 50,000 | 696 | 50,000 | 585 | 45,000 | 516 | 45,000 | 456 | 45,000 | 336 | 45,000 | 320 |
| | | 2 | 0.012 | 45,000 | 620 | 45,000 | 530 | 45,000 | 460 | 45,000 | 420 | 45,000 | 300 | 45,000 | 290 |
| | | 2.5 | 0.01 | 40,000 | 551 | 40,000 | 471 | 40,000 | 409 | 40,000 | 373 | 40,000 | 267 | 40,000 | 258 |
| | | 3 | 0.008 | 40,000 | 504 | 35,000 | 412 | 35,000 | 358 | 35,000 | 326 | 30,000 | 200 | 30,000 | 194 |
| 0.4 | 0.02 | 1 | 0.016 | 50,000 | 691 | 50,000 | 580 | 50,000 | 518 | 50,000 | 461 | 40,000 | 320 | 36,000 | 270 |
| | | 2 | 0.013 | 45,000 | 620 | 45,000 | 520 | 45,000 | 470 | 45,000 | 410 | 36,000 | 290 | 34,000 | 240 |
| | | 3 | 0.01 | 40,000 | 480 | 40,000 | 410 | 40,000 | 370 | 40,000 | 330 | 32,800 | 240 | 25,600 | 200 |
| | | 4 | 0.007 | 30,000 | 370 | 30,000 | 320 | 30,000 | 280 | 30,000 | 250 | 21,600 | 160 | 19,200 | 150 |
| | 0.05 | 1 | 0.025 | 50,000 | 691 | 50,000 | 580 | 50,000 | 518 | 50,000 | 461 | 40,000 | 320 | 36,000 | 270 |
| | | 1.5 | 0.02 | 50,000 | 691 | 50,000 | 580 | 50,000 | 518 | 50,000 | 461 | 40,000 | 320 | 36,000 | 270 |
| | | 2 | 0.016 | 45,000 | 620 | 45,000 | 520 | 45,000 | 470 | 45,000 | 410 | 36,000 | 290 | 34,000 | 240 |
| | | 2.5 | 0.015 | 40,500 | 560 | 40,500 | 480 | 40,500 | 400 | 40,500 | 370 | 33,400 | 270 | 30,600 | 220 |
| | | 3 | 0.014 | 40,000 | 480 | 40,000 | 410 | 40,000 | 370 | 40,000 | 330 | 32,800 | 240 | 25,600 | 200 |
| | | 3.5 | 0.012 | 36,000 | 420 | 36,000 | 380 | 36,000 | 320 | 36,000 | 300 | 29,400 | 200 | 22,920 | 180 |
| | | 4 | 0.008 | 30,000 | 370 | 30,000 | 320 | 30,000 | 280 | 30,000 | 250 | 21,600 | 160 | 19,200 | 150 |
| | 0.1 | 1 | 0.033 | 50,000 | 691 | 50,000 | 580 | 50,000 | 518 | 50,000 | 461 | 40,000 | 320 | 36,000 | 270 |
| | | 2 | 0.028 | 45,000 | 620 | 45,000 | 520 | 45,000 | 470 | 45,000 | 410 | 36,000 | 290 | 34,000 | 240 |
| | | 3 | 0.016 | 40,000 | 480 | 40,000 | 410 | 40,000 | 370 | 40,000 | 330 | 32,800 | 240 | 25,600 | 200 |
| | | 4 | 0.01 | 30,000 | 370 | 30,000 | 320 | 30,000 | 280 | 30,000 | 250 | 21,600 | 160 | 19,200 | 150 |
| 0.5 | 0.02 | 1 | 0.016 | 50,000 | 1,070 | 50,000 | 898 | 50,000 | 756 | 40,000 | 464 | 30,000 | 378 | 28,000 | 315 |
| | | 2 | 0.013 | 50,000 | 1,070 | 50,000 | 898 | 50,000 | 756 | 40,000 | 464 | 30,000 | 378 | 28,000 | 315 |
| | | 3 | 0.01 | 45,000 | 960 | 45,000 | 810 | 45,000 | 684 | 36,000 | 414 | 27,000 | 315 | 24,500 | 261 |
| | | 4 | 0.008 | 40,000 | 850 | 40,000 | 720 | 40,000 | 603 | 32,000 | 378 | 24,000 | 279 | 20,000 | 234 |
| | | 6 | 0.006 | 30,000 | 570 | 28,800 | 480 | 24,000 | 380 | 19,400 | 260 | 18,000 | 250 | 15,000 | 200 |
| | 0.05 | 1 | 0.03 | 50,000 | 1,070 | 50,000 | 898 | 50,000 | 756 | 40,000 | 464 | 30,000 | 378 | 28,000 | 315 |
| | | 2 | 0.023 | 50,000 | 1,070 | 50,000 | 898 | 50,000 | 756 | 40,000 | 464 | 30,000 | 378 | 28,000 | 315 |
| | | 3 | 0.017 | 45,000 | 960 | 45,000 | 810 | 45,000 | 684 | 36,000 | 414 | 27,000 | 315 | 24,500 | 261 |
| | | 4 | 0.017 | 40,000 | 850 | 40,000 | 720 | 40,000 | 603 | 32,000 | 378 | 24,000 | 279 | 20,000 | 234 |
| | | 5 | 0.011 | 30,000 | 640 | 28,800 | 540 | 24,000 | 380 | 19,400 | 280 | 18,000 | 250 | 15,000 | 200 |
| | | 6 | 0.008 | 30,000 | 570 | 28,800 | 480 | 24,000 | 380 | 19,400 | 260 | 18,000 | 250 | 15,000 | 200 |
| | 0.1 | 1 | 0.035 | 50,000 | 1,070 | 50,000 | 898 | 50,000 | 756 | 40,000 | 464 | 30,000 | 378 | 28,000 | 315 |
| | | 2 | 0.03 | 50,000 | 1,070 | 50,000 | 898 | 50,000 | 756 | 40,000 | 464 | 30,000 | 378 | 28,000 | 315 |
| | | 3 | 0.02 | 45,000 | 960 | 45,000 | 810 | 45,000 | 684 | 36,000 | 414 | 27,000 | 315 | 24,500 | 261 |
| | | 4 | 0.02 | 40,000 | 850 | 40,000 | 720 | 40,000 | 603 | 32,000 | 378 | 24,000 | 279 | 20,000 | 234 |
| | | 5 | 0.013 | 30,000 | 640 | 28,800 | 540 | 24,000 | 380 | 19,400 | 280 | 18,000 | 250 | 15,000 | 200 |
| | | 6 | 0.013 | 30,000 | 570 | 28,800 | 480 | 24,000 | 380 | 19,400 | 260 | 18,000 | 250 | 15,000 | 200 |
| 0.6 | 0.02 | 2 | 0.016 | 50,000 | 1,380 | 50,000 | 1,159 | 46,800 | 920 | 37,830 | 600 | 28,200 | 390 | 23,000 | 320 |
| | | 4 | 0.013 | 40,000 | 980 | 40,000 | 830 | 34,500 | 620 | 27,800 | 440 | 23,600 | 280 | 21,000 | 230 |
| | | 6 | 0.01 | 30,000 | 580 | 24,000 | 490 | 20,000 | 360 | 18,000 | 300 | 17,800 | 240 | 15,000 | 210 |
| | 0.05 | 2 | 0.028 | 50,000 | 1,380 | 50,000 | 1,159 | 46,800 | 920 | 37,830 | 600 | 28,200 | 390 | 23,000 | 320 |
| | | 4 | 0.019 | 40,000 | 980 | 40,000 | 830 | 34,500 | 620 | 27,800 | 440 | 23,600 | 280 | 21,000 | 230 |
| | | 6 | 0.012 | 30,000 | 580 | 24,000 | 490 | 20,000 | 360 | 18,000 | 300 | 17,800 | 240 | 15,000 | 210 |
| | | 8 | 0.01 | 30,000 | 551 | 24,000 | 466 | 20,000 | 342 | 18,000 | 285 | 17,800 | 228 | 15,000 | 200 |
| | | 10 | 0.007 | 30,000 | 534 | 24,000 | 451 | 20,000 | 331 | 18,000 | 276 | 17,800 | 221 | 15,000 | 193 |
| | 0.1 | 2 | 0.035 | 50,000 | 1,380 | 50,000 | 1,159 | 46,800 | 920 | 37,830 | 600 | 28,200 | 390 | 23,000 | 320 |
| | | 4 | 0.024 | 40,000 | 980 | 40,000 | 830 | 34,500 | 620 | 27,800 | 440 | 23,600 | 280 | 21,000 | 230 |
| | | 6 | 0.015 | 30,000 | 580 | 24,000 | 490 | 20,000 | 360 | 18,000 | 300 | 17,800 | 240 | 15,000 | 210 |
| | | 8 | 0.013 | 30,000 | 551 | 24,000 | 466 | 20,000 | 342 | 18,000 | 285 | 17,800 | 228 | 15,000 | 200 |
| | | 10 | 0.009 | 30,000 | 534 | 24,000 | 451 | 20,000 | 331 | 18,000 | 276 | 17,800 | 221 | 15,000 | 193 |
| 0.7 | 0.05 | 2 | 0.035 | 49,200 | 1,244 | 49,200 | 1,054 | 42,430 | 787 | 34,190 | 558 | 29,030 | 355 | 25,830 | 292 |
| | | 4 | 0.024 | 40,000 | 980 | 40,000 | 830 | 34,500 | 620 | 27,800 | 440 | 23,600 | 280 | 21,000 | 230 |
| | | 6 | 0.015 | 30,000 | 580 | 24,000 | 490 | 20,000 | 360 | 18,000 | 300 | 17,800 | 240 | 15,000 | 210 |
| | 0.1 | 2 | 0.042 | 49,200 | 1,244 | 49,200 | 1,054 | 42,430 | 787 | 34,190 | 558 | 29,030 | 355 | 25,830 | 292 |
| | | 4 | 0.029 | 40,000 | 980 | 40,000 | 830 | 34,500 | 620 | 27,800 | 440 | 23,600 | 280 | 21,000 | 230 |
| | | 6 | 0.018 | 30,000 | 580 | 24,000 | 490 | 20,000 | 360 | 18,000 | 300 | 17,800 | 240 | 15,000 | 210 |
| 0.8 | 0.02 | 2 | 0.016 | 50,000 | 1,640 | 48,000 | 1,378 | 36,000 | 937 | 28,000 | 647 | 20,000 | 400 | 20,000 | 360 |
| | | 4 | 0.016 | 50,000 | 1,312 | 48,000 | 1,102 | 36,000 | 750 | 28,000 | 518 | 20,000 | 320 | 20,000 | 288 |
| | | 6 | 0.013 | 40,000 | 950 | 38,700 | 800 | 26,000 | 530 | 25,000 | 461 | 18,000 | 288 | 18,000 | 256 |
| | 0.05 | 2 | 0.038 | 50,000 | 1,640 | 48,000 | 1,378 | 36,000 | 937 | 28,000 | 647 | 20,000 | 400 | 20,000 | 360 |
| | | 4 | 0.026 | 50,000 | 1,312 | 48,000 | 1,102 | 36,000 | 750 | 28,000 | 518 | 20,000 | 320 | 20,000 | 288 |
| | | 6 | 0.015 | 40,000 | 950 | 38,700 | 800 | 26,000 | 530 | 25,000 | 461 | 18,000 | 288 | 18,000 | 256 |
| | | 8 | 0.012 | 30,000 | 713 | 29,025 | 600 | 20,800 | 424 | 20,000 | 369 | 16,200 | 259 | 16,200 | 230 |
| | | 12 | 0.01 | 30,000 | 677 | 29,025 | 570 | 20,800 | 403 | 20,000 | 350 | 16,200 | 246 | 16,200 | 219 |

【注意】ご使用にあたっては、A209ページの表下の項目と注意を参照してください。【Note】Upon usage, please refer to comments and notes below table on page A209.

Epoch Deep Radius Evolution

# エポックディープラジアスエボリューション

## EPDRE-ATH

高能率切削条件 High efficiency cuttiing condition

**高精度切削条件 High accuracy cuttiing condition**

高能率切削条件はA200ページを参照してください。
Please refer to P.A200 about high efficiency cutting conditions

| 被削材 Work material | | | | 1 銅 Copper | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼き入れ鋼 Hardened steels (45～55HRC) | | 6 焼き入れ鋼 Hardened steels (55～65HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 120% | | 100% | | 90% | | 80% | | 65% | | 60% | |
| 外径 Tool dia. (mm) | コーナ半径 RE Corner radius (mm) | 首下長 Under neck length (mm) | ap (mm) | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 0.8 | 0.1 | 2 | 0.047 | 50,000 | 1,640 | 48,000 | 1,378 | 36,000 | 937 | 28,000 | 647 | 20,000 | 400 | 20,000 | 360 |
| | | 4 | 0.032 | 50,000 | 1,312 | 48,000 | 1,102 | 36,000 | 750 | 28,000 | 518 | 20,000 | 320 | 20,000 | 288 |
| | | 6 | 0.019 | 40,000 | 950 | 38,700 | 800 | 26,000 | 530 | 25,000 | 461 | 18,000 | 288 | 18,000 | 256 |
| | | 8 | 0.015 | 30,000 | 713 | 29,025 | 600 | 20,800 | 424 | 20,000 | 369 | 16,200 | 259 | 16,200 | 230 |
| | | 12 | 0.012 | 30,000 | 677 | 29,025 | 570 | 20,800 | 403 | 20,000 | 350 | 16,200 | 246 | 16,200 | 219 |
| | 0.2 | 2 | 0.081 | 50,000 | 1,640 | 48,000 | 1,378 | 36,000 | 937 | 28,000 | 647 | 20,000 | 400 | 20,000 | 360 |
| | | 4 | 0.056 | 50,000 | 1,312 | 48,000 | 1,102 | 36,000 | 750 | 28,000 | 518 | 20,000 | 320 | 20,000 | 288 |
| | | 6 | 0.032 | 40,000 | 950 | 38,700 | 800 | 26,000 | 530 | 25,000 | 461 | 18,000 | 288 | 18,000 | 256 |
| | | 8 | 0.018 | 30,000 | 713 | 29,025 | 600 | 20,800 | 424 | 20,000 | 369 | 16,200 | 259 | 16,200 | 230 |
| | | 12 | 0.015 | 30,000 | 677 | 29,025 | 570 | 20,800 | 403 | 20,000 | 350 | 16,200 | 246 | 16,200 | 219 |
| 1 | 0.02 | 2 | 0.016 | 42,675 | 1,877 | 35,668 | 1,569 | 32,076 | 1,411 | 30,294 | 1,212 | 26,730 | 962 | 24,948 | 798 |
| | | 4 | 0.013 | 38,880 | 1,630 | 32,400 | 1,359 | 29,160 | 1,223 | 27,540 | 1,039 | 24,300 | 815 | 22,680 | 666 |
| | | 6 | 0.01 | 31,493 | 1,189 | 26,244 | 990 | 23,620 | 891 | 22,307 | 842 | 19,683 | 660 | 18,371 | 539 |
| | | 8 | 0.008 | 27,994 | 1,056 | 23,328 | 880 | 20,995 | 792 | 19,829 | 748 | 17,496 | 587 | 16,330 | 479 |
| | | 10 | 0.006 | 21,773 | 924 | 20,412 | 770 | 18,371 | 693 | 17,350 | 655 | 15,309 | 514 | 14,288 | 419 |
| | | 12 | 0.005 | 21,773 | 730 | 18,144 | 609 | 16,330 | 548 | 15,422 | 453 | 13,608 | 399 | 12,701 | 320 |
| | 0.05 | 2 | 0.046 | 42,675 | 1,877 | 35,668 | 1,569 | 32,076 | 1,411 | 30,254 | 1,210 | 26,730 | 962 | 24,948 | 798 |
| | | 3 | 0.035 | 40,796 | 1,754 | 34,020 | 1,462 | 30,618 | 1,317 | 30,294 | 1,212 | 25,515 | 867 | 23,814 | 714 |
| | | 4 | 0.027 | 38,880 | 1,630 | 32,400 | 1,359 | 29,160 | 1,223 | 28,917 | 1,128 | 24,300 | 815 | 22,680 | 666 |
| | | 5 | 0.021 | 34,713 | 1,388 | 28,868 | 1,154 | 25,982 | 1,039 | 27,540 | 1,039 | 21,651 | 727 | 20,208 | 594 |
| | | 6 | 0.017 | 31,493 | 1,189 | 26,244 | 990 | 23,620 | 891 | 24,538 | 928 | 19,683 | 660 | 18,371 | 539 |
| | | 8 | 0.016 | 27,994 | 1,056 | 23,328 | 880 | 20,995 | 792 | 19,829 | 748 | 17,496 | 587 | 16,330 | 479 |
| | | 10 | 0.011 | 24,494 | 924 | 20,412 | 770 | 18,371 | 693 | 17,350 | 655 | 15,309 | 514 | 14,288 | 419 |
| | | 12 | 0.01 | 21,773 | 730 | 18,144 | 609 | 16,330 | 548 | 15,422 | 453 | 13,608 | 399 | 12,701 | 320 |
| | | 16 | 0.006 | 21,773 | 639 | 18,144 | 533 | 16,330 | 479 | 15,422 | 420 | 13,608 | 342 | 12,701 | 266 |
| | | 20 | 0.004 | 16,330 | 479 | 13,608 | 399 | 12,247 | 359 | 11,567 | 315 | 10,206 | 257 | 9,526 | 200 |
| | 0.1 | 2 | 0.065 | 42,675 | 1,877 | 35,668 | 1,569 | 32,076 | 1,411 | 30,294 | 1,212 | 26,730 | 962 | 24,948 | 798 |
| | | 3 | 0.05 | 40,796 | 1,754 | 34,020 | 1,462 | 30,618 | 1,317 | 28,917 | 1,128 | 25,515 | 867 | 23,814 | 714 |
| | | 4 | 0.038 | 38,880 | 1,630 | 32,400 | 1,359 | 29,160 | 1,223 | 27,540 | 1,039 | 24,300 | 815 | 22,680 | 666 |
| | | 5 | 0.03 | 34,713 | 1,388 | 28,868 | 1,154 | 25,982 | 1,039 | 24,538 | 928 | 21,651 | 727 | 20,208 | 594 |
| | | 6 | 0.024 | 31,493 | 1,189 | 26,244 | 990 | 23,620 | 891 | 22,307 | 842 | 19,683 | 660 | 18,371 | 539 |
| | | 8 | 0.024 | 27,994 | 1,056 | 23,328 | 880 | 20,995 | 792 | 19,829 | 748 | 17,496 | 587 | 16,330 | 479 |
| | | 10 | 0.015 | 24,494 | 924 | 20,412 | 770 | 18,371 | 693 | 17,350 | 655 | 15,309 | 514 | 14,288 | 419 |
| | | 12 | 0.015 | 21,773 | 730 | 18,144 | 609 | 16,330 | 548 | 15,422 | 453 | 13,608 | 399 | 12,701 | 320 |
| | | 16 | 0.009 | 21,773 | 639 | 18,144 | 533 | 16,330 | 479 | 15,422 | 420 | 13,608 | 342 | 12,701 | 266 |
| | | 20 | 0.006 | 16,330 | 479 | 13,608 | 399 | 12,247 | 359 | 11,567 | 315 | 10,206 | 257 | 9,526 | 200 |
| | 0.2 | 2 | 0.11 | 42,675 | 1,877 | 35,668 | 1,569 | 32,076 | 1,411 | 30,294 | 1,212 | 26,730 | 962 | 24,948 | 798 |
| | | 3 | 0.09 | 40,796 | 1,754 | 34,020 | 1,462 | 30,618 | 1,317 | 28,917 | 1,128 | 25,515 | 867 | 23,814 | 714 |
| | | 4 | 0.07 | 38,880 | 1,630 | 32,400 | 1,359 | 29,160 | 1,223 | 27,540 | 1,039 | 24,300 | 815 | 22,680 | 666 |
| | | 5 | 0.05 | 34,713 | 1,388 | 28,868 | 1,154 | 25,982 | 1,039 | 24,538 | 928 | 21,651 | 727 | 20,208 | 594 |
| | | 6 | 0.04 | 31,493 | 1,189 | 26,244 | 990 | 23,620 | 891 | 22,307 | 842 | 19,683 | 660 | 18,371 | 539 |
| | | 8 | 0.04 | 27,994 | 1,056 | 23,328 | 880 | 20,995 | 792 | 19,829 | 748 | 17,496 | 587 | 16,330 | 479 |
| | | 10 | 0.025 | 24,494 | 924 | 20,412 | 770 | 18,371 | 693 | 17,350 | 655 | 15,309 | 514 | 14,288 | 419 |
| | | 12 | 0.025 | 21,773 | 730 | 18,144 | 609 | 16,330 | 548 | 15,422 | 453 | 13,608 | 399 | 12,701 | 320 |
| | | 16 | 0.015 | 21,773 | 639 | 18,144 | 533 | 16,330 | 479 | 15,422 | 420 | 13,608 | 342 | 12,701 | 266 |
| | | 20 | 0.01 | 16,330 | 479 | 13,608 | 399 | 12,247 | 359 | 11,567 | 315 | 10,206 | 257 | 9,526 | 200 |
| | 0.3 | 2 | 0.11 | 42,675 | 1,877 | 35,668 | 1,569 | 32,076 | 1,411 | 30,294 | 1,212 | 26,730 | 962 | 24,948 | 798 |
| | | 3 | 0.09 | 40,796 | 1,754 | 34,020 | 1,462 | 30,618 | 1,317 | 28,917 | 1,128 | 25,515 | 867 | 23,814 | 714 |
| | | 4 | 0.07 | 38,880 | 1,630 | 32,400 | 1,359 | 29,160 | 1,223 | 27,540 | 1,039 | 24,300 | 815 | 22,680 | 666 |
| | | 5 | 0.05 | 34,713 | 1,388 | 28,868 | 1,154 | 25,982 | 1,039 | 24,538 | 928 | 21,651 | 727 | 20,208 | 594 |
| | | 6 | 0.04 | 31,493 | 1,189 | 26,244 | 990 | 23,620 | 891 | 22,307 | 842 | 19,683 | 660 | 18,371 | 539 |
| | | 8 | 0.04 | 27,994 | 1,056 | 23,328 | 880 | 20,995 | 792 | 19,829 | 748 | 17,496 | 587 | 16,330 | 479 |
| | | 10 | 0.025 | 24,494 | 924 | 20,412 | 770 | 18,371 | 693 | 17,350 | 655 | 15,309 | 514 | 14,288 | 419 |
| | | 12 | 0.025 | 21,773 | 730 | 18,144 | 609 | 16,330 | 548 | 15,422 | 453 | 13,608 | 399 | 12,701 | 320 |
| | | 16 | 0.015 | 21,773 | 639 | 18,144 | 533 | 16,330 | 479 | 15,422 | 420 | 13,608 | 342 | 12,701 | 266 |
| | | 20 | 0.01 | 16,330 | 479 | 13,608 | 399 | 12,247 | 359 | 11,567 | 315 | 10,206 | 257 | 9,526 | 200 |
| 1.25 | 0.1 | 5 | 0.03 | 34,713 | 1,388 | 28,868 | 1,154 | 25,982 | 1,039 | 24,538 | 928 | 21,651 | 727 | 20,208 | 594 |
| | | 10 | 0.015 | 24,494 | 924 | 20,412 | 770 | 18,371 | 693 | 17,350 | 655 | 15,309 | 514 | 14,288 | 419 |
| | | 15 | 0.01 | 21,773 | 639 | 18,144 | 533 | 16,330 | 548 | 15,422 | 453 | 13,608 | 342 | 12,701 | 266 |
| | | 20 | 0.006 | 16,330 | 479 | 13,608 | 399 | 12,247 | 359 | 11,567 | 315 | 10,206 | 257 | 9,526 | 200 |
| | 0.2 | 5 | 0.05 | 34,713 | 1,388 | 28,868 | 1,154 | 25,982 | 1,039 | 24,538 | 928 | 21,651 | 727 | 20,208 | 594 |
| | | 10 | 0.025 | 24,494 | 924 | 20,412 | 770 | 18,371 | 693 | 17,350 | 655 | 15,309 | 514 | 14,288 | 419 |
| | | 15 | 0.016 | 21,773 | 639 | 18,144 | 533 | 16,330 | 548 | 15,422 | 453 | 13,608 | 342 | 12,701 | 266 |
| | | 20 | 0.01 | 16,330 | 479 | 13,608 | 399 | 12,247 | 359 | 11,567 | 315 | 10,206 | 257 | 9,526 | 200 |
| | 0.3 | 5 | 0.05 | 34,713 | 1,388 | 28,868 | 1,154 | 25,982 | 1,039 | 24,538 | 928 | 21,651 | 727 | 20,208 | 594 |
| | | 10 | 0.025 | 24,494 | 924 | 20,412 | 770 | 18,371 | 693 | 17,350 | 655 | 15,309 | 514 | 14,288 | 419 |
| | | 15 | 0.016 | 21,773 | 639 | 18,144 | 533 | 16,330 | 548 | 15,422 | 453 | 13,608 | 342 | 12,701 | 266 |
| | | 20 | 0.01 | 16,330 | 479 | 13,608 | 399 | 12,247 | 359 | 11,567 | 315 | 10,206 | 257 | 9,526 | 200 |
| 1.5 | 0.1 | 4 | 0.042 | 29,938 | 1,356 | 24,930 | 1,130 | 22,453 | 1,017 | 20,956 | 947 | 18,711 | 752 | 17,364 | 611 |
| | | 6 | 0.04 | 28,450 | 1,285 | 23,779 | 1,074 | 21,443 | 969 | 20,382 | 921 | 17,834 | 716 | 16,560 | 582 |
| | | 8 | 0.036 | 27,216 | 1,233 | 22,680 | 1,027 | 20,412 | 924 | 19,278 | 873 | 17,010 | 685 | 15,876 | 559 |
| | | 12 | 0.036 | 21,773 | 986 | 18,144 | 822 | 16,330 | 740 | 15,422 | 698 | 13,608 | 548 | 12,701 | 447 |
| | | 15 | 0.023 | 16,934 | 682 | 14,112 | 568 | 12,701 | 511 | 11,995 | 423 | 10,584 | 373 | 9,878 | 298 |
| | | 20 | 0.018 | 16,934 | 682 | 14,112 | 568 | 12,701 | 511 | 11,995 | 423 | 10,584 | 373 | 9,878 | 298 |

| 被削材 Work material | | | | 1 銅 Copper | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼入れ鋼 Hardened steels (45～55HRC) | | 6 焼入れ鋼 Hardened steels (55～65HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 120% | | 100% | | 90% | | 80% | | 65% | | 60% | |
| 外径 Tool dia. (mm) | コーナ半径 RE Corner radius (mm) | 首下長 Under neck length (mm) | ap (mm) | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min |
| 1.5 | 0.2 | 4 | 0.07 | 29,938 | 1,356 | 24,930 | 1,130 | 22,453 | 1,017 | 20,956 | 868 | 18,711 | 678 | 17,364 | 556 |
| | | 6 | 0.065 | 28,450 | 1,285 | 23,779 | 1,074 | 21,443 | 969 | 20,382 | 921 | 17,834 | 716 | 16,560 | 582 |
| | | 8 | 0.06 | 27,216 | 1,233 | 22,680 | 1,027 | 20,412 | 924 | 19,278 | 873 | 17,010 | 685 | 15,876 | 559 |
| | | 12 | 0.06 | 21,773 | 986 | 18,144 | 822 | 16,330 | 740 | 15,422 | 698 | 13,608 | 548 | 12,701 | 447 |
| | | 15 | 0.038 | 16,934 | 682 | 14,112 | 568 | 12,701 | 511 | 11,995 | 423 | 10,584 | 373 | 9,878 | 298 |
| | | 20 | 0.03 | 16,934 | 682 | 14,112 | 568 | 12,701 | 511 | 11,995 | 423 | 10,584 | 373 | 9,878 | 298 |
| | 0.3 | 4 | 0.07 | 29,938 | 1,356 | 24,930 | 1,130 | 22,453 | 1,017 | 20,956 | 868 | 18,711 | 678 | 17,364 | 556 |
| | | 6 | 0.065 | 28,450 | 1,285 | 23,779 | 1,074 | 21,443 | 969 | 20,382 | 921 | 17,834 | 716 | 16,560 | 582 |
| | | 8 | 0.06 | 27,216 | 1,233 | 22,680 | 1,027 | 20,412 | 924 | 19,278 | 873 | 17,010 | 685 | 15,876 | 559 |
| | | 12 | 0.06 | 21,773 | 986 | 18,144 | 822 | 16,330 | 740 | 15,422 | 698 | 13,608 | 548 | 12,701 | 447 |
| | | 15 | 0.038 | 16,934 | 682 | 14,112 | 568 | 12,701 | 511 | 11,995 | 423 | 10,584 | 373 | 9,878 | 298 |
| | | 20 | 0.03 | 16,934 | 682 | 14,112 | 568 | 12,701 | 511 | 11,995 | 423 | 10,584 | 373 | 9,878 | 298 |
| | 0.5 | 4 | 0.085 | 29,938 | 1,356 | 24,930 | 1,130 | 22,453 | 1,017 | 20,956 | 868 | 18,711 | 678 | 17,364 | 556 |
| | | 6 | 0.08 | 28,450 | 1,285 | 23,779 | 1,074 | 21,443 | 969 | 20,382 | 921 | 17,834 | 716 | 16,560 | 582 |
| | | 8 | 0.07 | 27,216 | 1,233 | 22,680 | 1,027 | 20,412 | 924 | 19,278 | 873 | 17,010 | 685 | 15,876 | 559 |
| | | 12 | 0.065 | 21,773 | 986 | 18,144 | 822 | 16,330 | 740 | 15,422 | 698 | 13,608 | 548 | 12,701 | 447 |
| | | 15 | 0.045 | 16,934 | 682 | 14,112 | 568 | 12,701 | 511 | 11,995 | 423 | 10,584 | 373 | 9,878 | 298 |
| | | 20 | 0.035 | 16,934 | 682 | 14,112 | 568 | 12,701 | 511 | 11,995 | 423 | 10,584 | 373 | 9,878 | 298 |
| 1.75 | 0.1 | 5 | 0.04 | 29,938 | 1,356 | 24,930 | 1,130 | 22,453 | 1,017 | 20,956 | 868 | 18,711 | 678 | 17,364 | 556 |
| | | 10 | 0.036 | 27,216 | 1,233 | 22,680 | 1,027 | 20,412 | 924 | 19,278 | 873 | 17,010 | 685 | 15,876 | 559 |
| | | 15 | 0.023 | 16,934 | 682 | 14,112 | 568 | 12,701 | 511 | 11,995 | 423 | 10,584 | 373 | 9,878 | 298 |
| | | 20 | 0.018 | 16,934 | 682 | 14,112 | 568 | 12,701 | 511 | 11,995 | 423 | 10,584 | 373 | 9,878 | 298 |
| | 0.2 | 5 | 0.065 | 29,938 | 1,356 | 24,930 | 1,130 | 22,453 | 1,017 | 20,956 | 868 | 18,711 | 678 | 17,364 | 556 |
| | | 10 | 0.06 | 27,216 | 1,233 | 22,680 | 1,027 | 20,412 | 924 | 19,278 | 873 | 17,010 | 685 | 15,876 | 559 |
| | | 15 | 0.038 | 16,934 | 682 | 14,112 | 568 | 12,701 | 511 | 11,995 | 423 | 10,584 | 373 | 9,878 | 298 |
| | | 20 | 0.03 | 16,934 | 682 | 14,112 | 568 | 12,701 | 511 | 11,995 | 423 | 10,584 | 373 | 9,878 | 298 |
| | 0.3 | 5 | 0.065 | 29,938 | 1,356 | 24,930 | 1,130 | 22,453 | 1,017 | 20,956 | 868 | 18,711 | 678 | 17,364 | 556 |
| | | 10 | 0.06 | 27,216 | 1,233 | 22,680 | 1,027 | 20,412 | 924 | 19,278 | 873 | 17,010 | 685 | 15,876 | 559 |
| | | 15 | 0.038 | 16,934 | 682 | 14,112 | 568 | 12,701 | 511 | 11,995 | 423 | 10,584 | 373 | 9,878 | 298 |
| | | 20 | 0.03 | 16,934 | 682 | 14,112 | 568 | 12,701 | 511 | 11,995 | 423 | 10,584 | 373 | 9,878 | 298 |
| 2 | 0.1 | 4 | 0.08 | 26,114 | 2,052 | 21,974 | 1,727 | 19,745 | 1,551 | 18,471 | 1,451 | 16,401 | 1,033 | 15,286 | 840 |
| | | 6 | 0.07 | 24,948 | 1,962 | 20,790 | 1,635 | 18,711 | 1,471 | 17,672 | 1,389 | 15,593 | 981 | 14,553 | 801 |
| | | 8 | 0.055 | 22,680 | 1,783 | 18,900 | 1,486 | 17,010 | 1,337 | 16,065 | 1,263 | 14,175 | 892 | 13,230 | 728 |
| | | 12 | 0.03 | 18,371 | 1,300 | 15,309 | 1,083 | 13,778 | 975 | 13,013 | 921 | 11,482 | 722 | 10,716 | 590 |
| | | 16 | 0.03 | 16,330 | 1,156 | 13,608 | 963 | 12,247 | 867 | 11,567 | 818 | 10,206 | 642 | 9,526 | 524 |
| | | 20 | 0.025 | 14,288 | 1,011 | 11,907 | 843 | 10,716 | 758 | 10,121 | 716 | 8,930 | 562 | 8,335 | 459 |
| | | 25 | 0.015 | 14,288 | 908 | 11,907 | 757 | 10,716 | 681 | 10,121 | 643 | 8,930 | 505 | 8,335 | 411 |
| | | 30 | 0.01 | 13,574 | 863 | 11,312 | 719 | 10,180 | 647 | 9,615 | 611 | 8,484 | 480 | 7,918 | 391 |
| | 0.2 | 4 | 0.1 | 26,114 | 2,052 | 21,974 | 1,727 | 19,745 | 1,551 | 18,471 | 1,451 | 16,401 | 1,033 | 15,286 | 840 |
| | | 6 | 0.08 | 24,948 | 1,962 | 20,790 | 1,635 | 18,711 | 1,471 | 17,672 | 1,389 | 15,593 | 981 | 14,553 | 801 |
| | | 8 | 0.07 | 22,680 | 1,783 | 18,900 | 1,486 | 17,010 | 1,337 | 16,065 | 1,263 | 14,175 | 892 | 13,230 | 728 |
| | | 12 | 0.04 | 18,371 | 1,300 | 15,309 | 1,083 | 13,778 | 975 | 13,013 | 921 | 11,482 | 722 | 10,716 | 590 |
| | | 16 | 0.04 | 16,330 | 1,156 | 13,608 | 963 | 12,247 | 867 | 11,567 | 818 | 10,206 | 642 | 9,526 | 524 |
| | | 20 | 0.035 | 14,288 | 1,011 | 11,907 | 843 | 10,716 | 758 | 10,121 | 716 | 8,930 | 562 | 8,335 | 459 |
| | | 25 | 0.025 | 14,288 | 908 | 11,907 | 757 | 10,716 | 681 | 10,121 | 643 | 8,930 | 505 | 8,335 | 411 |
| | | 30 | 0.017 | 13,574 | 863 | 11,312 | 719 | 10,180 | 647 | 9,615 | 611 | 8,484 | 480 | 7,918 | 391 |
| | 0.3 | 4 | 0.13 | 26,114 | 2,052 | 21,974 | 1,727 | 19,745 | 1,551 | 18,471 | 1,451 | 16,401 | 1,033 | 15,286 | 840 |
| | | 6 | 0.11 | 24,948 | 1,962 | 20,790 | 1,635 | 18,711 | 1,471 | 17,672 | 1,389 | 15,593 | 981 | 14,553 | 801 |
| | | 8 | 0.09 | 22,680 | 1,783 | 18,900 | 1,486 | 17,010 | 1,337 | 16,065 | 1,263 | 14,175 | 892 | 13,230 | 728 |
| | | 12 | 0.06 | 18,371 | 1,444 | 15,309 | 1,083 | 13,778 | 975 | 13,013 | 921 | 11,482 | 722 | 10,716 | 590 |
| | | 16 | 0.06 | 16,330 | 1,284 | 13,608 | 963 | 12,247 | 867 | 11,567 | 818 | 10,206 | 642 | 9,526 | 524 |
| | | 20 | 0.037 | 14,288 | 1,123 | 11,907 | 843 | 10,716 | 758 | 10,121 | 716 | 8,930 | 562 | 8,335 | 459 |
| | | 25 | 0.03 | 14,288 | 908 | 11,907 | 757 | 10,716 | 681 | 10,121 | 643 | 8,930 | 505 | 8,335 | 411 |
| | | 30 | 0.021 | 13,574 | 863 | 11,312 | 719 | 10,180 | 647 | 9,615 | 611 | 8,484 | 480 | 7,918 | 391 |
| | 0.5 | 6 | 0.17 | 24,948 | 1,962 | 20,790 | 1,635 | 18,711 | 1,471 | 17,672 | 1,389 | 15,593 | 981 | 14,553 | 801 |
| | | 8 | 0.14 | 22,680 | 1,783 | 18,900 | 1,486 | 17,010 | 1,337 | 16,065 | 1,263 | 14,175 | 892 | 13,230 | 728 |
| | | 12 | 0.08 | 18,371 | 1,444 | 15,309 | 1,083 | 13,778 | 975 | 13,013 | 1,023 | 11,482 | 722 | 10,716 | 590 |
| | | 16 | 0.08 | 16,330 | 1,284 | 13,608 | 963 | 12,247 | 867 | 11,567 | 818 | 10,206 | 642 | 9,526 | 524 |
| | | 20 | 0.05 | 14,288 | 1,123 | 11,907 | 843 | 10,716 | 758 | 10,121 | 716 | 8,930 | 562 | 8,335 | 459 |
| | | 25 | 0.05 | 14,288 | 908 | 11,907 | 757 | 10,716 | 681 | 10,121 | 643 | 8,930 | 505 | 8,335 | 411 |
| | | 30 | 0.03 | 13,574 | 863 | 11,312 | 719 | 10,180 | 647 | 9,615 | 611 | 8,484 | 480 | 7,918 | 391 |
| | 0.8 | 6 | 0.22 | 24,948 | 1,962 | 20,790 | 1,635 | 18,711 | 1,471 | 17,672 | 1,389 | 15,593 | 981 | 14,553 | 801 |
| | | 8 | 0.2 | 22,680 | 1,783 | 18,900 | 1,486 | 17,010 | 1,337 | 16,065 | 1,263 | 14,175 | 892 | 13,230 | 728 |
| | | 12 | 0.13 | 18,371 | 1,444 | 15,309 | 1,083 | 13,778 | 975 | 13,013 | 921 | 11,482 | 722 | 10,716 | 590 |
| | | 16 | 0.1 | 16,330 | 1,284 | 13,608 | 963 | 12,247 | 867 | 11,567 | 818 | 10,206 | 642 | 9,526 | 524 |
| | | 20 | 0.06 | 14,288 | 1,123 | 11,907 | 843 | 10,716 | 758 | 10,121 | 716 | 8,930 | 562 | 8,335 | 459 |
| | | 25 | 0.057 | 14,288 | 908 | 11,907 | 757 | 10,716 | 681 | 10,121 | 643 | 8,930 | 505 | 8,335 | 411 |
| | | 30 | 0.045 | 13,574 | 863 | 11,312 | 719 | 10,180 | 647 | 9,615 | 611 | 8,484 | 480 | 7,918 | 391 |

【注意】ご使用にあたっては、A209ページの表下の項目と注意を参照してください。【Note】Upon usage, please refer to comments and notes below table on page A209.

# EPDRE-ATH

高能率切削条件
High efficiency cuttiing condition

**高精度切削条件**
**High accuracy cuttiing condition**

高能率切削条件はA200ページを参照してください。
Please refer to P.A200 about high efficiency cutting conditions



| 被削材 Work material | | | | 1 銅 Copper | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼入れ鋼 Hardened steels (45～55HRC) | | 6 焼入れ鋼 Hardened steels (55～65HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 120% | | 100% | | 90% | | 80% | | 65% | | 60% | |
| 外径 Tool dia. (mm) | コーナ半径 RE Corner radius (mm) | 首下長 Under neck length (mm) | ap (mm) | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min |
| 2.5 | 0.1 | 10 | 0.055 | 22,680 | 1,783 | 18,900 | 1,486 | 17,010 | 1,337 | 16,065 | 1,263 | 14,175 | 892 | 13,230 | 728 |
| | | 20 | 0.03 | 16,330 | 1,284 | 13,608 | 963 | 12,247 | 867 | 11,567 | 818 | 10,206 | 642 | 9,526 | 524 |
| | | 30 | 0.015 | 14,288 | 1,008 | 11,907 | 757 | 10,716 | 681 | 10,121 | 643 | 8,930 | 505 | 8,335 | 411 |
| | 0.2 | 10 | 0.07 | 22,680 | 1,783 | 18,900 | 1,486 | 17,010 | 1,337 | 16,065 | 1,263 | 14,175 | 892 | 13,230 | 728 |
| | | 20 | 0.04 | 16,330 | 1,284 | 13,608 | 963 | 12,247 | 867 | 11,567 | 818 | 10,206 | 642 | 9,526 | 524 |
| | | 30 | 0.025 | 14,288 | 1,008 | 11,907 | 757 | 10,716 | 681 | 10,121 | 643 | 8,930 | 505 | 8,335 | 411 |
| | 0.3 | 10 | 0.09 | 22,680 | 1,783 | 18,900 | 1,486 | 17,010 | 1,337 | 16,065 | 1,263 | 14,175 | 892 | 13,230 | 728 |
| | | 20 | 0.06 | 16,330 | 1,284 | 13,608 | 963 | 12,247 | 867 | 11,567 | 818 | 10,206 | 642 | 9,526 | 524 |
| | | 30 | 0.03 | 14,288 | 1,008 | 11,907 | 757 | 10,716 | 681 | 10,121 | 643 | 8,930 | 505 | 8,335 | 411 |
| | 0.5 | 10 | 0.14 | 22,680 | 1,783 | 18,900 | 1,486 | 17,010 | 1,337 | 16,065 | 1,263 | 14,175 | 892 | 13,230 | 728 |
| | | 20 | 0.08 | 16,330 | 1,284 | 13,608 | 963 | 12,247 | 867 | 11,567 | 818 | 10,206 | 642 | 9,526 | 524 |
| | | 30 | 0.05 | 14,288 | 1,008 | 11,907 | 757 | 10,716 | 681 | 10,121 | 643 | 8,930 | 505 | 8,335 | 411 |
| 3 | 0.1 | 6 | 0.08 | 17,280 | 1,698 | 14,400 | 1,415 | 12,960 | 1,274 | 12,240 | 1,203 | 10,800 | 849 | 10,080 | 693 |
| | | 8 | 0.07 | 17,280 | 1,698 | 14,400 | 1,415 | 12,960 | 1,274 | 12,240 | 1,203 | 10,800 | 849 | 10,080 | 693 |
| | | 12 | 0.05 | 17,280 | 1,698 | 14,400 | 1,415 | 12,960 | 1,274 | 12,240 | 1,203 | 10,800 | 849 | 10,080 | 693 |
| | | 16 | 0.035 | 17,280 | 1,698 | 14,400 | 1,415 | 12,960 | 1,274 | 12,240 | 1,203 | 10,800 | 849 | 10,080 | 693 |
| | | 18 | 0.035 | 15,498 | 1,521 | 12,951 | 1,271 | 11,677 | 1,149 | 10,934 | 1,073 | 9,766 | 767 | 9,023 | 620 |
| | | 20 | 0.035 | 13,997 | 1,376 | 11,664 | 1,146 | 10,498 | 1,032 | 9,914 | 974 | 8,748 | 687 | 8,165 | 561 |
| | | 30 | 0.027 | 10,886 | 962 | 9,072 | 801 | 8,165 | 721 | 7,711 | 681 | 6,804 | 480 | 6,350 | 393 |
| | | 35 | 0.02 | 10,886 | 962 | 9,072 | 801 | 8,165 | 721 | 7,711 | 681 | 6,804 | 480 | 6,350 | 393 |
| | 0.2 | 6 | 0.1 | 17,280 | 1,698 | 14,400 | 1,415 | 12,960 | 1,274 | 12,240 | 1,203 | 10,800 | 849 | 10,080 | 693 |
| | | 8 | 0.09 | 17,280 | 1,698 | 14,400 | 1,415 | 12,960 | 1,274 | 12,240 | 1,203 | 10,800 | 849 | 10,080 | 693 |
| | | 12 | 0.07 | 17,280 | 1,698 | 14,400 | 1,415 | 12,960 | 1,274 | 12,240 | 1,203 | 10,800 | 849 | 10,080 | 693 |
| | | 16 | 0.05 | 17,280 | 1,698 | 14,400 | 1,415 | 12,960 | 1,274 | 12,240 | 1,203 | 10,800 | 849 | 10,080 | 693 |
| | | 18 | 0.05 | 15,498 | 1,521 | 12,951 | 1,271 | 11,677 | 1,149 | 10,934 | 1,073 | 9,766 | 767 | 9,023 | 620 |
| | | 20 | 0.05 | 13,997 | 1,376 | 11,664 | 1,146 | 10,498 | 1,032 | 9,914 | 974 | 8,748 | 687 | 8,165 | 561 |
| | | 30 | 0.04 | 10,886 | 962 | 9,072 | 801 | 8,165 | 721 | 7,711 | 681 | 6,804 | 480 | 6,350 | 393 |
| | | 35 | 0.035 | 10,886 | 962 | 9,072 | 801 | 8,165 | 721 | 7,711 | 681 | 6,804 | 480 | 6,350 | 393 |
| | 0.3 | 6 | 0.145 | 17,280 | 1,698 | 14,400 | 1,415 | 12,960 | 1,274 | 12,240 | 1,203 | 10,800 | 849 | 10,080 | 693 |
| | | 8 | 0.13 | 17,280 | 1,698 | 14,400 | 1,415 | 12,960 | 1,274 | 12,240 | 1,203 | 10,800 | 849 | 10,080 | 693 |
| | | 12 | 0.1 | 17,280 | 1,698 | 14,400 | 1,415 | 12,960 | 1,274 | 12,240 | 1,203 | 10,800 | 849 | 10,080 | 693 |
| | | 16 | 0.075 | 17,280 | 1,698 | 14,400 | 1,415 | 12,960 | 1,274 | 12,240 | 1,203 | 10,800 | 849 | 10,080 | 693 |
| | | 18 | 0.075 | 15,498 | 1,521 | 12,951 | 1,271 | 11,677 | 1,149 | 10,934 | 1,073 | 9,766 | 767 | 9,023 | 620 |
| | | 20 | 0.075 | 13,997 | 1,376 | 11,664 | 1,146 | 10,498 | 1,032 | 9,914 | 974 | 8,748 | 687 | 8,165 | 561 |
| | | 30 | 0.06 | 10,886 | 962 | 9,072 | 801 | 8,165 | 721 | 7,711 | 681 | 6,804 | 480 | 6,350 | 393 |
| | | 35 | 0.05 | 10,886 | 962 | 9,072 | 801 | 8,165 | 721 | 7,711 | 681 | 6,804 | 480 | 6,350 | 393 |
| | 0.5 | 8 | 0.18 | 17,280 | 1,698 | 14,400 | 1,415 | 12,960 | 1,274 | 12,240 | 1,203 | 10,800 | 849 | 10,080 | 693 |
| | | 12 | 0.13 | 17,280 | 1,698 | 14,400 | 1,415 | 12,960 | 1,274 | 12,240 | 1,203 | 10,800 | 849 | 10,080 | 693 |
| | | 16 | 0.1 | 17,280 | 1,698 | 14,400 | 1,415 | 12,960 | 1,274 | 12,240 | 1,203 | 10,800 | 849 | 10,080 | 693 |
| | | 18 | 0.1 | 15,498 | 1,521 | 12,951 | 1,271 | 11,677 | 1,149 | 10,934 | 1,073 | 9,766 | 767 | 9,023 | 620 |
| | | 20 | 0.1 | 13,997 | 1,376 | 11,664 | 1,146 | 10,498 | 1,032 | 9,914 | 974 | 8,748 | 687 | 8,165 | 561 |
| | | 30 | 0.08 | 10,886 | 962 | 9,072 | 801 | 8,165 | 721 | 7,711 | 681 | 6,804 | 480 | 6,350 | 393 |
| | | 35 | 0.065 | 10,886 | 962 | 9,072 | 801 | 8,165 | 721 | 7,711 | 681 | 6,804 | 480 | 6,350 | 393 |
| | 1 | 8 | 0.2 | 17,280 | 1,698 | 14,400 | 1,415 | 12,960 | 1,274 | 12,240 | 1,203 | 10,800 | 849 | 10,080 | 693 |
| | | 12 | 0.15 | 17,280 | 1,698 | 14,400 | 1,415 | 12,960 | 1,274 | 12,240 | 1,203 | 10,800 | 849 | 10,080 | 693 |
| | | 16 | 0.12 | 17,280 | 1,698 | 14,400 | 1,415 | 12,960 | 1,274 | 12,240 | 1,203 | 10,800 | 849 | 10,080 | 693 |
| | | 18 | 0.11 | 15,498 | 1,521 | 12,951 | 1,271 | 11,677 | 1,149 | 10,934 | 1,073 | 9,766 | 767 | 9,023 | 620 |
| | | 20 | 0.11 | 13,997 | 1,376 | 11,664 | 1,146 | 10,498 | 1,032 | 9,914 | 974 | 8,748 | 687 | 8,165 | 561 |
| | | 30 | 0.09 | 10,886 | 962 | 9,072 | 801 | 8,165 | 721 | 7,711 | 681 | 6,804 | 480 | 6,350 | 393 |
| | | 35 | 0.075 | 10,886 | 962 | 9,072 | 801 | 8,165 | 721 | 7,711 | 681 | 6,804 | 480 | 6,350 | 393 |
| 4 | 0.1 | 8 | 0.08 | 13,455 | 2,340 | 11,213 | 1,950 | 10,091 | 1,755 | 9,531 | 1,658 | 8,410 | 1,170 | 7,849 | 956 |
| | | 12 | 0.065 | 13,455 | 2,340 | 11,213 | 1,950 | 10,091 | 1,755 | 9,531 | 1,658 | 8,410 | 1,170 | 7,849 | 956 |
| | | 16 | 0.06 | 12,360 | 2,149 | 10,255 | 1,783 | 9,155 | 1,592 | 8,697 | 1,512 | 7,599 | 1,057 | 6,684 | 814 |
| | | 20 | 0.055 | 12,360 | 2,149 | 10,255 | 1,783 | 9,155 | 1,592 | 8,697 | 1,512 | 7,599 | 1,057 | 6,684 | 814 |
| | | 30 | 0.045 | 12,360 | 2,149 | 10,255 | 1,783 | 9,155 | 1,592 | 6,867 | 1,075 | 5,491 | 688 | 5,124 | 561 |
| | | 35 | 0.04 | 12,360 | 2,149 | 10,255 | 1,783 | 9,155 | 1,592 | 6,867 | 1,075 | 5,491 | 688 | 5,124 | 561 |
| | | 45 | 0.03 | 9,888 | 1,289 | 8,240 | 1,075 | 7,324 | 955 | 5,584 | 728 | 4,944 | 516 | 4,119 | 358 |
| | 0.2 | 8 | 0.16 | 13,455 | 2,340 | 11,213 | 1,950 | 10,091 | 1,755 | 9,531 | 1,658 | 8,410 | 1,170 | 7,849 | 956 |
| | | 12 | 0.14 | 13,455 | 2,340 | 11,213 | 1,950 | 10,091 | 1,755 | 9,531 | 1,658 | 8,410 | 1,170 | 7,849 | 956 |
| | | 16 | 0.13 | 12,360 | 2,149 | 10,255 | 1,783 | 9,155 | 1,592 | 8,697 | 1,512 | 7,599 | 1,057 | 6,684 | 814 |
| | | 20 | 0.11 | 12,360 | 2,149 | 10,255 | 1,783 | 9,155 | 1,592 | 8,697 | 1,512 | 7,599 | 1,057 | 6,684 | 814 |
| | | 30 | 0.1 | 12,360 | 2,149 | 10,255 | 1,783 | 9,155 | 1,592 | 6,867 | 1,075 | 5,491 | 688 | 5,124 | 561 |
| | | 35 | 0.08 | 12,360 | 2,149 | 10,255 | 1,783 | 9,155 | 1,592 | 6,867 | 1,075 | 5,491 | 688 | 5,124 | 561 |
| | | 45 | 0.06 | 9,888 | 1,289 | 8,240 | 1,075 | 7,324 | 955 | 5,584 | 728 | 4,944 | 516 | 4,119 | 358 |
| | 0.3 | 8 | 0.24 | 13,455 | 2,340 | 11,213 | 1,950 | 10,091 | 1,755 | 9,531 | 1,658 | 8,410 | 1,170 | 7,849 | 956 |
| | | 12 | 0.22 | 13,455 | 2,340 | 11,213 | 1,950 | 10,091 | 1,755 | 9,531 | 1,658 | 8,410 | 1,170 | 7,849 | 956 |
| | | 16 | 0.2 | 12,360 | 2,149 | 10,255 | 1,783 | 9,155 | 1,592 | 8,697 | 1,512 | 7,599 | 1,057 | 6,684 | 814 |
| | | 20 | 0.18 | 12,360 | 2,149 | 10,255 | 1,783 | 9,155 | 1,592 | 8,697 | 1,512 | 7,599 | 1,057 | 6,684 | 814 |
| | | 30 | 0.16 | 12,360 | 2,149 | 10,255 | 1,783 | 9,155 | 1,592 | 6,867 | 1,075 | 5,491 | 688 | 5,124 | 561 |
| | | 35 | 0.14 | 12,360 | 2,149 | 10,255 | 1,783 | 9,155 | 1,592 | 6,867 | 1,075 | 5,491 | 688 | 5,124 | 561 |
| | | 45 | 0.12 | 9,888 | 1,289 | 8,240 | 1,075 | 7,324 | 955 | 5,584 | 728 | 4,944 | 516 | 4,119 | 358 |

| 被削材 Work material | | | | 1 銅 Copper | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼入れ鋼 Hardened steels (45～55HRC) | | 6 焼入れ鋼 Hardened steels (55～65HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 120% | | 100% | | 90% | | 80% | | 65% | | 60% | |
| 外径 Tool dia. (mm) | コーナ半径 RE Corner radius (mm) | 首下長 Under neck length (mm) | ap (mm) | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min |
| 4 | 0.5 | 12 | 0.35 | 13,455 | 2,340 | 11,213 | 1,950 | 10,091 | 1,755 | 9,531 | 1,658 | 8,410 | 1,170 | 7,849 | 956 |
| | | 16 | 0.25 | 12,360 | 2,149 | 10,255 | 1,783 | 9,155 | 1,592 | 8,697 | 1,512 | 7,599 | 1,057 | 6,684 | 814 |
| | | 20 | 0.2 | 12,360 | 2,149 | 10,255 | 1,783 | 9,155 | 1,592 | 8,697 | 1,512 | 7,599 | 1,057 | 6,684 | 814 |
| | | 30 | 0.15 | 12,360 | 2,149 | 10,255 | 1,783 | 9,155 | 1,592 | 6,867 | 1,075 | 5,491 | 688 | 5,124 | 561 |
| | | 35 | 0.1 | 12,360 | 2,149 | 10,255 | 1,783 | 9,155 | 1,592 | 6,867 | 1,075 | 5,491 | 688 | 5,124 | 561 |
| | | 45 | 0.05 | 9,888 | 1,289 | 8,240 | 1,075 | 7,324 | 955 | 5,584 | 728 | 4,944 | 516 | 4,119 | 358 |
| | 1 | 12 | 0.4 | 13,455 | 2,340 | 11,213 | 1,950 | 10,091 | 1,755 | 9,531 | 1,658 | 8,410 | 1,170 | 7,849 | 956 |
| | | 16 | 0.29 | 12,360 | 2,149 | 10,255 | 1,783 | 9,155 | 1,592 | 8,697 | 1,512 | 7,599 | 1,057 | 6,684 | 814 |
| | | 20 | 0.23 | 12,360 | 2,149 | 10,255 | 1,783 | 9,155 | 1,592 | 8,697 | 1,512 | 7,599 | 1,057 | 6,684 | 814 |
| | | 30 | 0.17 | 12,360 | 2,149 | 10,255 | 1,783 | 9,155 | 1,592 | 6,867 | 1,075 | 5,491 | 688 | 5,124 | 561 |
| | | 35 | 0.12 | 12,360 | 2,149 | 10,255 | 1,783 | 9,155 | 1,592 | 6,867 | 1,075 | 5,491 | 688 | 5,124 | 561 |
| | | 45 | 0.06 | 9,888 | 1,289 | 8,240 | 1,075 | 7,324 | 955 | 5,584 | 728 | 4,944 | 516 | 4,119 | 358 |
| 5 | 0.1 | 20 | 0.08 | 10,985 | 2,388 | 9,154 | 1,990 | 8,239 | 1,791 | 7,781 | 1,692 | 6,866 | 1,194 | 6,408 | 975 |
| | | 40 | 0.06 | 7,907 | 1,540 | 6,590 | 1,284 | 5,931 | 1,155 | 5,602 | 1,091 | 4,943 | 770 | 4,613 | 629 |
| | 0.2 | 20 | 0.16 | 10,985 | 2,388 | 9,154 | 1,990 | 8,239 | 1,791 | 7,781 | 1,692 | 6,866 | 1,194 | 6,408 | 975 |
| | | 40 | 0.13 | 7,907 | 1,540 | 6,590 | 1,284 | 5,931 | 1,155 | 5,602 | 1,091 | 4,943 | 770 | 4,613 | 629 |
| | 0.3 | 20 | 0.24 | 10,985 | 2,388 | 9,154 | 1,990 | 8,239 | 1,791 | 7,781 | 1,692 | 6,866 | 1,194 | 6,408 | 975 |
| | | 40 | 0.2 | 7,907 | 1,540 | 6,590 | 1,284 | 5,931 | 1,155 | 5,602 | 1,091 | 4,943 | 770 | 4,613 | 629 |
| | 0.5 | 20 | 0.35 | 10,985 | 2,388 | 9,154 | 1,990 | 8,239 | 1,791 | 7,781 | 1,692 | 6,866 | 1,194 | 6,408 | 975 |
| | | 40 | 0.135 | 7,907 | 1,540 | 6,590 | 1,284 | 5,931 | 1,155 | 5,602 | 1,091 | 4,943 | 770 | 4,613 | 629 |
| | 1 | 20 | 0.4 | 10,985 | 2,388 | 9,154 | 1,990 | 8,239 | 1,791 | 7,781 | 1,692 | 6,866 | 1,194 | 6,408 | 975 |
| | | 40 | 0.15 | 7,907 | 1,540 | 6,590 | 1,284 | 5,931 | 1,155 | 5,602 | 1,091 | 4,943 | 770 | 4,613 | 629 |
| 6 | 0.1 | 12 | 0.08 | 9,156 | 2,389 | 7,630 | 1,991 | 6,868 | 1,791 | 6,486 | 1,692 | 5,722 | 1,194 | 5,342 | 975 |
| | | 18 | 0.065 | 9,156 | 2,389 | 7,630 | 1,991 | 6,868 | 1,791 | 6,486 | 1,692 | 5,722 | 1,194 | 5,342 | 975 |
| | | 24 | 0.06 | 9,156 | 2,389 | 7,630 | 1,991 | 6,868 | 1,791 | 6,486 | 1,692 | 5,722 | 1,194 | 5,342 | 975 |
| | | 35 | 0.05 | 7,783 | 1,827 | 6,486 | 1,523 | 5,837 | 1,371 | 5,513 | 1,294 | 4,865 | 914 | 4,540 | 746 |
| | | 55 | 0.04 | 6,590 | 1,260 | 5,491 | 1,050 | 4,943 | 945 | 4,668 | 892 | 4,118 | 623 | 3,844 | 508 |
| | 0.2 | 12 | 0.16 | 9,156 | 2,389 | 7,630 | 1,991 | 6,868 | 1,791 | 6,486 | 1,692 | 5,722 | 1,194 | 5,342 | 975 |
| | | 18 | 0.14 | 9,156 | 2,389 | 7,630 | 1,991 | 6,868 | 1,791 | 6,486 | 1,692 | 5,722 | 1,194 | 5,342 | 975 |
| | | 24 | 0.13 | 9,156 | 2,389 | 7,630 | 1,991 | 6,868 | 1,791 | 6,486 | 1,692 | 5,722 | 1,194 | 5,342 | 975 |
| | | 35 | 0.11 | 7,783 | 1,827 | 6,486 | 1,523 | 5,837 | 1,371 | 5,513 | 1,294 | 4,865 | 914 | 4,540 | 746 |
| | | 55 | 0.08 | 6,590 | 1,260 | 5,491 | 1,050 | 4,943 | 945 | 4,668 | 892 | 4,118 | 623 | 3,844 | 508 |
| | 0.3 | 12 | 0.24 | 9,156 | 2,389 | 7,630 | 1,991 | 6,868 | 1,791 | 6,486 | 1,692 | 5,722 | 1,194 | 5,342 | 975 |
| | | 18 | 0.22 | 9,156 | 2,389 | 7,630 | 1,991 | 6,868 | 1,791 | 6,486 | 1,692 | 5,722 | 1,194 | 5,342 | 975 |
| | | 24 | 0.2 | 9,156 | 2,389 | 7,630 | 1,991 | 6,868 | 1,791 | 6,486 | 1,692 | 5,722 | 1,194 | 5,342 | 975 |
| | | 35 | 0.18 | 7,783 | 1,827 | 6,486 | 1,523 | 5,837 | 1,371 | 5,513 | 1,294 | 4,865 | 914 | 4,540 | 746 |
| | | 55 | 0.14 | 6,590 | 1,260 | 5,491 | 1,050 | 4,943 | 945 | 4,668 | 892 | 4,118 | 623 | 3,844 | 508 |
| | 0.5 | 18 | 0.35 | 9,156 | 2,389 | 7,630 | 1,991 | 6,868 | 1,791 | 6,486 | 1,692 | 5,722 | 1,194 | 5,342 | 975 |
| | | 24 | 0.29 | 9,156 | 2,389 | 7,630 | 1,991 | 6,868 | 1,791 | 6,486 | 1,692 | 5,722 | 1,194 | 5,342 | 975 |
| | | 35 | 0.24 | 7,783 | 1,827 | 6,486 | 1,523 | 5,837 | 1,371 | 5,513 | 1,294 | 4,865 | 914 | 4,540 | 746 |
| | | 55 | 0.165 | 6,590 | 1,260 | 5,491 | 1,050 | 4,943 | 945 | 4,668 | 892 | 4,118 | 623 | 3,844 | 508 |
| | 1 | 18 | 0.4 | 9,156 | 2,389 | 7,630 | 1,991 | 6,868 | 1,791 | 6,486 | 1,692 | 5,722 | 1,194 | 5,342 | 975 |
| | | 24 | 0.35 | 9,156 | 2,389 | 7,630 | 1,991 | 6,868 | 1,791 | 6,486 | 1,692 | 5,722 | 1,194 | 5,342 | 975 |
| | | 35 | 0.28 | 7,783 | 1,827 | 6,486 | 1,523 | 5,837 | 1,371 | 5,513 | 1,294 | 4,865 | 914 | 4,540 | 746 |
| | | 55 | 0.2 | 6,590 | 1,260 | 5,491 | 1,050 | 4,943 | 945 | 4,668 | 892 | 4,118 | 623 | 3,844 | 508 |

※(1)apは被削材グループ2での目安を示しています。その他のグループの場合は、上表の切込み比率を目安に調整してください。
※(2)リブ加工や止まり溝など、切りくずがつまりやすい切削の場合、切込み設定は基本切込みに切込み比率をかけて算出した切込み量を、さらにその80%まで小さくして使用してください。
※(3)aeの設定はap×切込み比率×5倍以下を目安に調整してください。仕上げ加工を行う場合、理論カスプハイトを計算し設定してください。
※(4)Z切り込み時のアプローチ方法は、ヘリカルか傾斜での加工を推奨いたします。
※(5)L/Dが5以上の場合、
①彫り込み時の傾斜進入角は1°以下を推奨いたします。また、送り速度は条件表の70%以下に調整してください。
②文字彫り加工のような溝切削の際は、送り速度は50%以下・apを30%以下を目安に調整してください。また往復切削による加工を推奨いたします。

※(1) $a_p$ is shown as the criteria for Group 2 workpieces. For other groups, adjust the cutting depth according to the cutting depth factors in the above table.
※(2) When performing cutting where cutting chips may cause clogging, such as for rib cutting, blind grooves, etc., cutting depth setting should be set by multiplying a cutting depth factor to calculate the cutting depth amount, and this amount should then be reduced to 80% of the calculated value.
※(3) Adjust by setting $a_e$ to (5 or less)×($a_p$)×(cutting depth ratio). When performing finishing cutting, calculate the theoretical cusp height and set accordingly.
※(4) Helical or sloped cutting is recommended for the approach method when engraving.
※(5) When L/D is 5 or greater:
①The recommended slope entrance angle when engraving is 1° or less. In addition, feed rate should be adjusted to 70% or less of the values in the cutting condition table.
②When slotting such engraving letters, adjust feed rate to 50% or less and ap to 30% or less of the values shown. In addition, cutting by reciprocal cutting is recommended.

【切込み設定例】EPDRE2030-6-02-ATHの工具でプリハードン鋼(40HRC)をリブ溝等高線切削する場合、
切込み=0.1($a_p$)×0.8(プリハードン鋼グループ4の切込み比率)×0.8(閉鎖域の切削)=0.064mm

Cutting depth setting example: When cutting rib groove contours in pre-hardened steel (40HRC) using an EPDRE2030-6-02-ATH tool:
Cutting depth = 0.1 ($a_p$) × 0.8 (cutting depth factor for Group 4 pre-hardened steel) × 0.8 (for closed-area cutting) = 0.064mm

**【注意】**
①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

**【Note】**
① Use the appropriate coolant for the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
③ If the rpm of the machine is low, lower the feed rate also to put the rpm and feed rate in the same ratio.

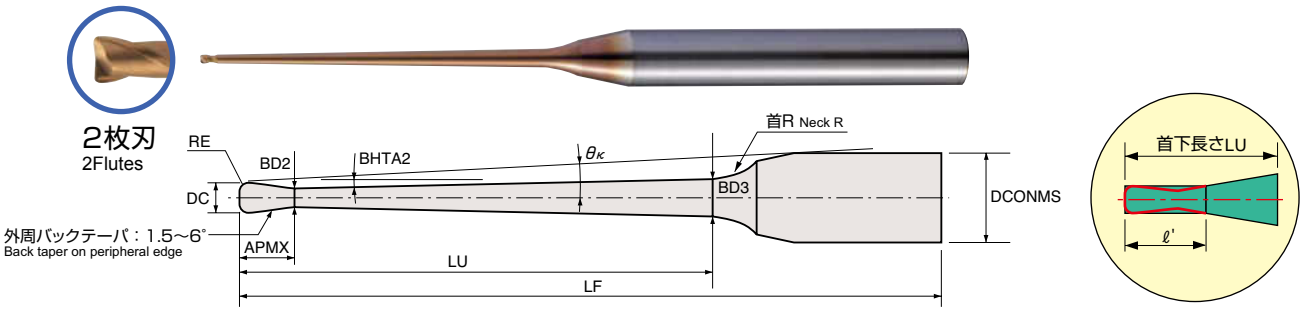
# Epoch Pencil Deep Radius
# エポックペンシルディープラジアス

**ペンシルネック** | Pencil Neck

THコーティング採用で高硬度材に適しています。高い耐折損性。
TH Coating makes it ideal for high-hardness materials. High breakage resistance.

彫込み Die-sinking / 曲面 Profiling / R Radius / 細部 Miniature / 取りのこし Rest Material Machining / 中仕上 Semi Finishing / 仕上 Finishing / リブ・細部 Rib Miniature

外径公差 Dia.tolerance 0～−0.015　RE公差 RE tolerance ±0.005　h5　(mm)



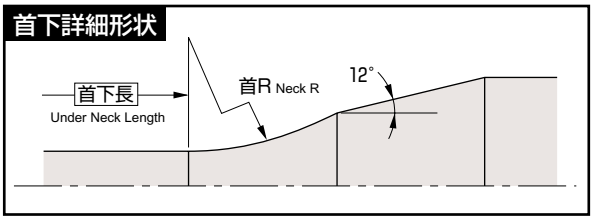

## EPDRP2○○○-○○-○○○○-TH

超硬 Carbide / TH / ねじれ角 30° Helix angle / 切削条件表 A212 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 首下長 Under neck length LU | 首部テーパ半角 Neck angle BHTA2 | 刃長 Flute length APMX | 首径 Neck dia. BD2 | 首元径 Under Neck dia. BD3 | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 仮想首長 Approx neck length ℓ' | 干渉角度 Interference angle (°) θκ | 勾配角に対する実有効首下長 Actual effective length in incline angles 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDRP2002-2-09005-TH | ● | 0.2 | 0.05 | 2 | 0.9 | 0.15 | 0.17 | 0.228 | 50 | 4 | 10 | 1.1 | 9.96 | – | 2.82 | 3.15 | 3.44 | 3.93 | 18,860 |
| EPDRP2004-4-09005-TH | ● | 0.4 | 0.05 | 4 | 0.9 | 0.3 | 0.37 | 0.486 | 50 | 4 | 10 | 1.25 | 8.39 | – | 4.91 | 5.38 | 5.76 | 6.38 | 13,720 |
| EPDRP2004-5-09005-TH | ● | | | 5 | 0.9 | 0.3 | 0.37 | 0.518 | 50 | 4 | 10 | 1.25 | 7.8 | – | 5.93 | 6.47 | 6.88 | 7.56 | 14,360 |
| EPDRP2004-4-0901-TH | ● | | 0.1 | 4 | 0.9 | 0.3 | 0.37 | 0.486 | 50 | 4 | 10 | 1.25 | 8.42 | – | 4.9 | 5.37 | 5.74 | 6.37 | 13,720 |
| EPDRP2004-5-0901-TH | ● | | | 5 | 0.9 | 0.3 | 0.37 | 0.518 | 50 | 4 | 10 | 1.25 | 7.83 | – | 5.92 | 6.46 | 6.87 | 7.55 | 14,360 |
| EPDRP2005-5-0901-TH | ● | 0.5 | 0.1 | 5 | 0.9 | 0.35 | 0.47 | 0.616 | 50 | 4 | 10 | 1.3 | 7.75 | – | 5.93 | 6.47 | 6.88 | 7.55 | 14,360 |
| EPDRP2005-8-0901-TH | ● | | | 8 | 0.9 | 0.35 | 0.47 | 0.710 | 50 | 4 | 10 | 1.3 | 6.39 | – | 9 | 9.7 | 10.21 | 11.02 | 14,360 |
| EPDRP2005-10-0901-TH | ● | | | 10 | 0.9 | 0.35 | 0.47 | 0.773 | 55 | 4 | 10 | 1.3 | 5.72 | – | 11.04 | 11.84 | 12.4 | 13.28 | 14,360 |
| EPDRP2006-12-0901-TH | ● | 0.6 | 0.1 | 12 | 0.9 | 0.4 | 0.57 | 0.934 | 55 | 4 | 10 | 1.35 | 5.09 | – | 13.08 | 13.97 | 14.57 | 15.52 | 14,250 |
| EPDRP2006-15-0901-TH | ● | | | 15 | 0.9 | 0.4 | 0.57 | 1.029 | 55 | 4 | 10 | 1.35 | 4.45 | – | 16.14 | 17.14 | 17.81 | 18.84 | 14,890 |
| EPDRP2008-6-0402-TH | ● | 0.8 | 0.2 | 6 | 0.4 | 0.5 | 0.77 | 0.847 | 50 | 4 | 7 | 2.64 | 6.91 | 6.68 | 7.16 | 7.52 | 7.82 | 8.34 | 9,140 |
| EPDRP2008-12-0902-TH | ● | | | 12 | 0.9 | 0.5 | 0.77 | 1.131 | 55 | 4 | 10 | 1.45 | 4.94 | – | 13.08 | 13.96 | 14.57 | 15.51 | 13,080 |
| EPDRP2010-8-0402-TH | ● | 1 | 0.2 | 8 | 0.4 | 0.8 | 0.94 | 1.041 | 55 | 6 | 7 | 5.09 | 7.32 | 8.87 | 9.39 | 9.78 | 10.11 | 10.66 | 8,740 |
| EPDRP2010-10-0902-TH | ● | | | 10 | 0.9 | 0.8 | 0.94 | 1.229 | 55 | 6 | 10 | 2.7 | 6.79 | – | 11.24 | 11.95 | 12.48 | 13.34 | 8,740 |
| EPDRP2010-15-0902-TH | ● | | | 15 | 0.9 | 0.8 | 0.94 | 1.386 | 60 | 6 | 10 | 2.7 | 5.57 | – | 16.32 | 17.23 | 17.88 | 18.88 | 11,680 |
| EPDRP2010-20-0902-TH | ● | | | 20 | 0.9 | 0.8 | 0.94 | 1.543 | 65 | 6 | 10 | 2.7 | 4.72 | – | 21.39 | 22.47 | 23.21 | 24.78 | 13,720 |
| EPDRP2010-25-0902-TH | ● | | | 25 | 0.9 | 0.8 | 0.94 | 1.700 | 70 | 6 | 10 | 2.7 | 4.1 | – | 26.46 | 27.69 | 28.51 | 30.93 | 14,360 |
| EPDRP2010-30-0902-TH | ● | | | 30 | 0.9 | 0.8 | 0.94 | 1.857 | 75 | 6 | 10 | 2.7 | 3.62 | – | 31.53 | 32.89 | 33.78 | 37.07 | 15,000 |
| EPDRP2010-35-0902-TH | ● | | | 35 | 0.9 | 0.8 | 0.94 | 2.015 | 80 | 6 | 10 | 2.7 | 3.24 | – | 36.59 | 38.07 | 39.03 | 43.22 | 15,650 |
| EPDRP2010-8-0403-TH | ● | | 0.3 | 8 | 0.4 | 0.8 | 0.94 | 1.041 | 55 | 6 | 7 | 5.09 | 7.36 | 8.87 | 9.38 | 9.77 | 10.09 | 10.65 | 8,740 |
| EPDRP2010-15-0903-TH | ● | | | 15 | 0.9 | 0.8 | 0.94 | 1.386 | 60 | 6 | 10 | 2.7 | 5.59 | – | 16.31 | 17.22 | 17.86 | 18.87 | 11,680 |
| EPDRP2010-25-0903-TH | ● | | | 25 | 0.9 | 0.8 | 0.94 | 1.700 | 70 | 6 | 10 | 2.7 | 4.11 | – | 26.45 | 27.68 | 28.5 | 30.89 | 14,360 |
| EPDRP2010-30-0903-TH | ● | | | 30 | 0.9 | 0.8 | 0.94 | 1.857 | 75 | 6 | 10 | 2.7 | 3.63 | – | 31.52 | 32.88 | 33.77 | 37.04 | 15,000 |
| EPDRP2015-10-0402-TH | ● | 1.5 | 0.2 | 10 | 0.4 | 1.35 | 1.42 | 1.541 | 55 | 6 | 7 | 7.07 | 6.33 | 11.01 | 11.56 | 11.98 | 12.34 | 13.08 | 8,740 |
| EPDRP2015-15-0902-TH | ● | | | 15 | 0.9 | 1.35 | 1.42 | 1.849 | 60 | 6 | 10 | 3.89 | 5.24 | – | 16.47 | 17.32 | 17.95 | 18.93 | 10,420 |
| EPDRP2015-20-0902-TH | ● | | | 20 | 0.9 | 1.35 | 1.42 | 2.006 | 65 | 6 | 10 | 3.89 | 4.41 | – | 21.54 | 22.55 | 23.27 | 24.9 | 10,420 |
| EPDRP2015-25-0902-TH | ● | | | 25 | 0.9 | 1.35 | 1.42 | 2.163 | 70 | 6 | 10 | 3.89 | 3.81 | – | 26.6 | 27.76 | 28.57 | 31.04 | 14,360 |
| EPDRP2015-30-0902-TH | ● | | | 30 | 0.9 | 1.35 | 1.42 | 2.320 | 75 | 6 | 10 | 3.89 | 3.35 | – | 31.66 | 32.95 | 33.83 | 37.19 | 14,360 |
| EPDRP2015-10-0403-TH | ● | | 0.3 | 10 | 0.4 | 1.35 | 1.42 | 1.541 | 55 | 6 | 7 | 7.07 | 6.36 | 11 | 11.56 | 11.97 | 12.33 | 13.04 | 8,740 |
| EPDRP2015-20-0903-TH | ● | | | 20 | 0.9 | 1.35 | 1.42 | 2.006 | 65 | 6 | 10 | 3.89 | 4.43 | – | 21.52 | 22.54 | 23.26 | 24.86 | 10,420 |
| EPDRP2015-25-0903-TH | ● | | | 25 | 0.9 | 1.35 | 1.42 | 2.163 | 70 | 6 | 10 | 3.89 | 3.82 | – | 26.59 | 27.75 | 28.56 | 31.01 | 14,360 |
| EPDRP2015-30-0903-TH | ● | | | 30 | 0.9 | 1.35 | 1.42 | 2.320 | 75 | 6 | 10 | 3.89 | 3.36 | – | 31.65 | 32.95 | 33.82 | 37.16 | 14,360 |

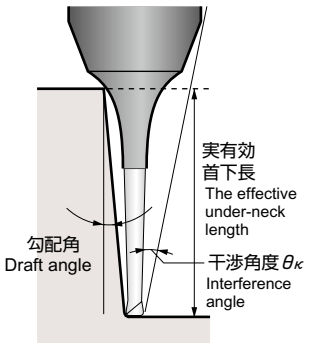
●：標準在庫品です。●：Stocked items.

## 首下詳細形状




【注意】
加工物に勾配がついている場合、干渉領域は、首下長さよりも長くなります。それぞれの勾配角に対する実有効首下長をご参照ください。
また、工具が加工物に干渉する角度を干渉角度θκで表示していますので合わせてご参照ください。

【Note】
If the workpiece has draft angle, the interference length will be longer than the under-neck length.Please refer to the effective under-neck length for the various draft angles.
In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle θκ", and should also be referred to.




# EPDRP2○○○-○○-○○○○○-TH

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 首下長 Under neck length LU | 首部テーパ半角 Neck angle BHTA2 | 刃長 Flute length APMX | 首径 Neck dia. BD2 | 首元径 Under Neck dia. BD3 | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 仮想首長 Approx neck length ℓ' | 干渉角度 Interference angle (°) θκ | 勾配角に対する実有効首下長 Actual effective length in incline angles 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDRP2020-30-0902-TH | ● | 2 | 0.2 | 30 | 0.9 | 1.7 | 1.92 | 2.809 | 70 | 6 | 10 | 4.24 | 3.07 | – | 31.69 | 32.97 | 33.84 | 37.22 | 14,360 |
| EPDRP2020-40-0902-TH | ● | | | 40 | 0.9 | 1.7 | 1.92 | 3.123 | 80 | 6 | 10 | 4.24 | 2.46 | – | 41.8 | 43.32 | 44.66 | 干渉なし | 15,650 |
| EPDRP2020-50-0902-TH | ● | | | 50 | 0.9 | 1.7 | 1.92 | 3.438 | 90 | 6 | 10 | 4.24 | 2.06 | – | 51.9 | 53.62 | 55.74 | 干渉なし | 17,570 |
| EPDRP2020-12-0403-TH | ● | | 0.3 | 12 | 0.4 | 1.7 | 1.92 | 2.064 | 55 | 6 | 7 | 7.42 | 5.46 | 13.05 | 13.66 | 14.12 | 14.5 | 15.63 | 8,740 |
| EPDRP2020-20-0903-TH | ● | | | 20 | 0.9 | 1.7 | 1.92 | 2.495 | 65 | 6 | 10 | 4.24 | 4.1 | – | 21.56 | 22.57 | 23.28 | 24.9 | 8,740 |
| EPDRP2020-30-0903-TH | ● | | | 30 | 0.9 | 1.7 | 1.92 | 2.809 | 70 | 6 | 10 | 4.24 | 3.08 | – | 31.68 | 32.96 | 33.84 | 37.19 | 14,360 |
| EPDRP2020-40-0903-TH | ● | | | 40 | 0.9 | 1.7 | 1.92 | 3.123 | 80 | 6 | 10 | 4.24 | 2.47 | – | 41.79 | 43.31 | 44.64 | 干渉なし | 15,650 |
| EPDRP2020-50-0903-TH | ● | | | 50 | 0.9 | 1.7 | 1.92 | 3.438 | 90 | 6 | 10 | 4.24 | 2.06 | – | 51.89 | 53.61 | 55.72 | 干渉なし | 17,570 |
| EPDRP2020-8-0405-TH | ● | | 0.5 | 8 | 0.4 | 1.7 | 1.92 | 2.008 | 50 | 6 | 4 | 7.42 | 6.76 | 8.73 | 9.06 | 9.32 | 9.54 | 10.43 | 8,740 |
| EPDRP2020-12-0405-TH | ● | | | 12 | 0.4 | 1.7 | 1.92 | 2.064 | 55 | 6 | 7 | 7.42 | 5.51 | 13.03 | 13.65 | 14.1 | 14.48 | 15.56 | 8,740 |
| EPDRP2020-16-0405-TH | ● | | | 16 | 0.4 | 1.7 | 1.92 | 2.120 | 60 | 6 | 7 | 7.42 | 4.65 | 17.08 | 17.82 | 18.35 | 18.78 | 20.7 | 8,740 |
| EPDRP2020-20-0905-TH | ● | | | 20 | 0.9 | 1.7 | 1.92 | 2.495 | 65 | 6 | 10 | 4.24 | 4.13 | – | 21.54 | 22.54 | 23.26 | 24.84 | 8,740 |
| EPDRP2020-25-0905-TH | ● | | | 25 | 0.9 | 1.7 | 1.92 | 2.652 | 65 | 6 | 10 | 4.24 | 3.54 | – | 26.6 | 27.75 | 28.55 | 30.98 | 11,680 |
| EPDRP2020-30-0905-TH | ● | | | 30 | 0.9 | 1.7 | 1.92 | 2.809 | 70 | 6 | 10 | 4.24 | 3.1 | – | 31.66 | 32.95 | 33.82 | 37.13 | 14,360 |
| EPDRP2020-40-0905-TH | ● | | | 40 | 0.9 | 1.7 | 1.92 | 3.123 | 80 | 6 | 10 | 4.24 | 2.48 | – | 41.77 | 43.29 | 44.6 | 干渉なし | 15,650 |
| EPDRP2020-50-0905-TH | ● | | | 50 | 0.9 | 1.7 | 1.92 | 3.438 | 90 | 6 | 10 | 4.24 | 2.07 | – | 51.87 | 53.6 | 55.68 | 干渉なし | 17,570 |
| EPDRP2030-40-0902-TH | ● | 3 | 0.2 | 40 | 0.9 | 2.5 | 2.86 | 4.038 | 80 | 6 | 10 | 6.95 | 1.94 | – | 42.04 | 43.44 | 干渉なし | 干渉なし | 15,000 |
| EPDRP2030-50-0902-TH | ● | | | 50 | 0.9 | 2.5 | 2.86 | 4.352 | 90 | 6 | 10 | 6.95 | 1.6 | – | 52.13 | 53.74 | 干渉なし | 干渉なし | 16,290 |
| EPDRP2030-60-0902-TH | ● | | | 60 | 0.9 | 2.5 | 2.86 | 4.667 | 100 | 6 | 10 | 6.95 | 1.36 | – | 62.21 | 干渉なし | 干渉なし | 干渉なし | 17,570 |
| EPDRP2030-40-0903-TH | ● | | 0.3 | 40 | 0.9 | 2.5 | 2.86 | 4.038 | 80 | 6 | 10 | 6.95 | 1.94 | – | 42.03 | 43.44 | 干渉なし | 干渉なし | 15,000 |
| EPDRP2030-50-0903-TH | ● | | | 50 | 0.9 | 2.5 | 2.86 | 4.352 | 90 | 6 | 10 | 6.95 | 1.61 | – | 52.12 | 53.73 | 干渉なし | 干渉なし | 16,290 |
| EPDRP2030-60-0903-TH | ● | | | 60 | 0.9 | 2.5 | 2.86 | 4.667 | 100 | 6 | 10 | 6.95 | 1.36 | – | 62.21 | 干渉なし | 干渉なし | 干渉なし | 17,570 |
| EPDRP2030-40-0905-TH | ● | | 0.5 | 40 | 0.9 | 2.5 | 2.86 | 4.038 | 80 | 6 | 10 | 6.95 | 1.95 | – | 42.01 | 43.42 | 干渉なし | 干渉なし | 15,000 |
| EPDRP2030-50-0905-TH | ● | | | 50 | 0.9 | 2.5 | 2.86 | 4.352 | 90 | 6 | 10 | 6.95 | 1.61 | – | 52.1 | 53.71 | 干渉なし | 干渉なし | 16,290 |
| EPDRP2030-60-0905-TH | ● | | | 60 | 0.9 | 2.5 | 2.86 | 4.667 | 100 | 6 | 10 | 6.95 | 1.37 | – | 62.19 | 干渉なし | 干渉なし | 干渉なし | 17,570 |

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ○ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ |

## 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPDRP-TH | × (N/A) | × (N/A) |

●：標準在庫品です。●：Stocked items.　干渉なし：No interference

# Epoch Pencil Deep Radius
# エポックペンシルディープラジアス

## 標準切削条件表 Recommended cutting conditions

### EPDRP-TH

#### 標準切削条件 Standard cutting condition

| 被削材 Work material | | | | 1 銅 Coppers | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼入れ鋼 Hardened steels (45～55HRC) | | 6 焼入れ鋼 Hardened steels (55～65HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 120% | | 100% | | 90% | | 80% | | 65% | | 60% | |
| 外径DC Tool dia. (mm) | コーナ半径RE Corner radius (mm) | 首下長LU Under neck length (mm) | 基本切り込み Standard depth of cut (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 0.2 | 0.05 | 2 | 0.007 | 40,000 | 896 | 39,600 | 887 | 35,640 | 798 | 33,660 | 754 | 29,700 | 591 | 27,720 | 483 |
| 0.4 | 0.05 | 4 | 0.009 | 36,115 | 1,078 | 30,096 | 899 | 27,086 | 809 | 25,582 | 764 | 22,572 | 599 | 21,067 | 489 |
| | | 5 | 0.007 | 32,102 | 852 | 26,752 | 710 | 24,077 | 639 | 22,739 | 528 | 20,064 | 466 | 18,726 | 373 |
| | 0.1 | 4 | 0.009 | 38,016 | 1,135 | 31,680 | 946 | 28,512 | 851 | 26,928 | 804 | 23,760 | 631 | 22,176 | 515 |
| | | 5 | 0.007 | 33,792 | 897 | 28,160 | 747 | 25,344 | 673 | 23,936 | 556 | 21,120 | 490 | 19,712 | 392 |
| 0.5 | 0.1 | 5 | 0.013 | 36,495 | 1,308 | 30,413 | 1,090 | 27,372 | 981 | 25,851 | 753 | 22,810 | 562 | 21,289 | 453 |
| | | 8 | 0.008 | 29,196 | 814 | 24,330 | 678 | 21,897 | 610 | 20,681 | 468 | 18,248 | 350 | 17,031 | 282 |
| | | 10 | 0.007 | 21,897 | 610 | 18,248 | 509 | 16,423 | 458 | 15,511 | 351 | 13,686 | 262 | 12,773 | 211 |
| 0.6 | 0.1 | 12 | 0.01 | 24,452 | 949 | 20,377 | 791 | 18,339 | 712 | 17,320 | 546 | 15,282 | 408 | 14,264 | 329 |
| | | 15 | 0.006 | 20,072 | 779 | 16,727 | 649 | 15,054 | 584 | 14,218 | 448 | 12,545 | 335 | 11,709 | 270 |
| 0.8 | 0.2 | 6 | 0.045 | 38,016 | 1,301 | 31,680 | 1,084 | 28,512 | 976 | 26,928 | 921 | 23,760 | 723 | 22,176 | 590 |
| | | 12 | 0.02 | 33,792 | 1,121 | 28,160 | 934 | 25,344 | 841 | 23,936 | 695 | 21,120 | 613 | 19,712 | 490 |
| 1 | 0.2 | 8 | 0.04 | 34,214 | 1,756 | 28,512 | 1,463 | 25,661 | 1,317 | 24,235 | 1,244 | 21,384 | 976 | 19,958 | 797 |
| | | 10 | 0.035 | 34,214 | 1,916 | 28,512 | 1,596 | 25,661 | 1,437 | 24,235 | 1,357 | 21,384 | 1,064 | 19,958 | 869 |
| | | 15 | 0.028 | 30,413 | 1,514 | 25,344 | 1,261 | 22,810 | 1,135 | 21,542 | 938 | 19,008 | 828 | 17,741 | 662 |
| | | 20 | 0.02 | 22,810 | 993 | 19,008 | 828 | 17,107 | 745 | 16,157 | 653 | 14,256 | 532 | 13,306 | 414 |
| | | 25 | 0.017 | 19,008 | 828 | 15,840 | 690 | 14,256 | 621 | 13,464 | 544 | 11,880 | 443 | 11,088 | 345 |
| | | 30 | 0.017 | 19,008 | 828 | 15,840 | 690 | 14,256 | 621 | 13,464 | 544 | 11,880 | 443 | 11,088 | 345 |
| | | 35 | 0.01 | 19,008 | 828 | 15,840 | 690 | 14,256 | 621 | 13,464 | 544 | 11,880 | 443 | 11,088 | 345 |
| | 0.3 | 8 | 0.04 | 34,214 | 1,756 | 28,512 | 1,463 | 25,661 | 1,317 | 24,235 | 1,244 | 21,384 | 976 | 19,958 | 797 |
| | | 15 | 0.028 | 30,413 | 1,514 | 25,344 | 1,261 | 22,810 | 1,135 | 21,542 | 938 | 19,008 | 828 | 17,741 | 662 |
| | | 25 | 0.017 | 19,008 | 828 | 15,840 | 690 | 14,256 | 621 | 13,464 | 544 | 11,880 | 443 | 11,088 | 345 |
| | | 30 | 0.017 | 19,008 | 828 | 15,840 | 690 | 14,256 | 621 | 13,464 | 544 | 11,880 | 443 | 11,088 | 345 |
| 1.5 | 0.2 | 10 | 0.05 | 26,020 | 1,295 | 21,683 | 1,079 | 19,515 | 971 | 18,431 | 803 | 16,262 | 708 | 15,178 | 567 |
| | | 15 | 0.045 | 23,654 | 1,177 | 19,712 | 981 | 17,741 | 883 | 16,755 | 730 | 14,784 | 644 | 13,798 | 515 |
| | | 20 | 0.042 | 20,816 | 1,036 | 17,347 | 863 | 15,612 | 777 | 14,745 | 642 | 13,010 | 567 | 12,143 | 453 |
| | | 25 | 0.032 | 17,741 | 773 | 14,784 | 644 | 13,306 | 579 | 12,566 | 508 | 11,088 | 414 | 10,349 | 322 |
| | | 30 | 0.028 | 14,784 | 644 | 12,320 | 536 | 11,088 | 483 | 10,472 | 423 | 9,240 | 345 | 8,624 | 268 |
| | 0.3 | 10 | 0.05 | 26,020 | 1,295 | 21,683 | 1,079 | 19,515 | 971 | 18,431 | 803 | 16,262 | 708 | 15,178 | 567 |
| | | 20 | 0.042 | 20,816 | 1,036 | 17,347 | 863 | 15,612 | 777 | 14,745 | 642 | 13,010 | 567 | 12,143 | 453 |
| | | 25 | 0.032 | 17,741 | 773 | 14,784 | 644 | 13,306 | 579 | 12,566 | 508 | 11,088 | 414 | 10,349 | 322 |
| | | 30 | 0.028 | 14,784 | 644 | 12,320 | 536 | 11,088 | 483 | 10,472 | 423 | 9,240 | 345 | 8,624 | 268 |

| 被削材 Work material | | | | 1 銅 Coppers | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼入れ鋼 Hardened steels (45～55HRC) | | 6 焼入れ鋼 Hardened steels (55～65HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 120% | | 100% | | 90% | | 80% | | 65% | | 60% | |
| 外径DC Tool dia. (mm) | コーナ半径RE Corner radius (mm) | 首下長LU Under neck length (mm) | 基本切り込み Standard depth of cut (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 2 | 0.2 | 30 | 0.045 | 16,128 | 1,505 | 13,440 | 1,254 | 12,096 | 1,129 | 11,424 | 933 | 10,080 | 823 | 9,408 | 658 |
| | | 40 | 0.035 | 12,096 | 988 | 10,080 | 823 | 9,072 | 741 | 8,568 | 650 | 7,560 | 529 | 7,056 | 412 |
| | | 50 | 0.017 | 10,080 | 823 | 8,400 | 686 | 7,560 | 617 | 7,140 | 541 | 6,300 | 441 | 5,880 | 343 |
| | 0.3 | 12 | 0.088 | 27,216 | 2,177 | 22,680 | 1,814 | 20,412 | 1,633 | 19,278 | 1,427 | 17,010 | 1,191 | 15,876 | 1,048 |
| | | 20 | 0.054 | 21,773 | 1,742 | 18,144 | 1,452 | 16,330 | 1,306 | 15,422 | 1,141 | 13,608 | 953 | 12,701 | 838 |
| | | 30 | 0.045 | 16,128 | 1,672 | 13,440 | 1,393 | 12,096 | 1,254 | 11,424 | 1,036 | 10,080 | 914 | 9,408 | 732 |
| | | 40 | 0.035 | 12,096 | 1,097 | 10,080 | 914 | 9,072 | 823 | 8,568 | 722 | 7,560 | 588 | 7,056 | 457 |
| | | 50 | 0.017 | 10,080 | 914 | 8,400 | 762 | 7,560 | 686 | 7,140 | 601 | 6,300 | 490 | 5,880 | 381 |
| | 0.5 | 8 | 0.17 | 27,216 | 2,177 | 22,680 | 1,814 | 20,412 | 1,633 | 19,278 | 1,427 | 17,010 | 1,191 | 15,876 | 1,048 |
| | | 12 | 0.088 | 27,216 | 2,177 | 22,680 | 1,814 | 20,412 | 1,633 | 19,278 | 1,427 | 17,010 | 1,191 | 15,876 | 1,048 |
| | | 16 | 0.088 | 23,134 | 1,851 | 19,278 | 1,542 | 17,350 | 1,388 | 16,386 | 1,213 | 14,459 | 1,012 | 13,495 | 891 |
| | | 20 | 0.054 | 21,773 | 1,742 | 18,144 | 1,452 | 16,330 | 1,306 | 15,422 | 1,141 | 13,608 | 953 | 12,701 | 838 |
| | | 25 | 0.054 | 19,051 | 1,524 | 15,876 | 1,270 | 14,288 | 1,143 | 13,495 | 999 | 11,907 | 833 | 11,113 | 733 |
| | | 30 | 0.045 | 16,128 | 1,672 | 13,440 | 1,393 | 12,096 | 1,254 | 11,424 | 1,036 | 10,080 | 914 | 9,408 | 732 |
| | | 40 | 0.035 | 12,096 | 1,097 | 10,080 | 914 | 9,072 | 823 | 8,568 | 722 | 7,560 | 588 | 7,056 | 457 |
| | | 50 | 0.017 | 10,080 | 914 | 8,400 | 762 | 7,560 | 686 | 7,140 | 601 | 6,300 | 490 | 5,880 | 381 |
| 3 | 0.2 | 40 | 0.07 | 12,288 | 1,147 | 10,240 | 956 | 9,216 | 860 | 8,704 | 711 | 7,680 | 627 | 7,168 | 502 |
| | | 50 | 0.05 | 9,216 | 752 | 7,680 | 627 | 6,912 | 564 | 6,528 | 495 | 5,760 | 403 | 5,376 | 314 |
| | | 60 | 0.03 | 7,680 | 627 | 6,400 | 523 | 5,760 | 470 | 5,440 | 412 | 4,800 | 336 | 4,480 | 261 |
| | 0.3 | 40 | 0.07 | 12,288 | 1,274 | 10,240 | 1,062 | 9,216 | 956 | 8,704 | 790 | 7,680 | 697 | 7,168 | 557 |
| | | 50 | 0.05 | 9,216 | 836 | 7,680 | 697 | 6,912 | 627 | 6,528 | 550 | 5,760 | 448 | 5,376 | 348 |
| | | 60 | 0.03 | 7,680 | 697 | 6,400 | 581 | 5,760 | 523 | 5,440 | 458 | 4,800 | 373 | 4,480 | 290 |
| | 0.5 | 40 | 0.07 | 12,288 | 1,274 | 10,240 | 1,062 | 9,216 | 956 | 8,704 | 790 | 7,680 | 697 | 7,168 | 557 |
| | | 50 | 0.05 | 9,216 | 836 | 7,680 | 697 | 6,912 | 627 | 6,528 | 550 | 5,760 | 448 | 5,376 | 348 |
| | | 60 | 0.03 | 7,680 | 697 | 6,400 | 581 | 5,760 | 523 | 5,440 | 458 | 4,800 | 373 | 4,480 | 290 |

※基本切込みは被削材グループ2での目安を示しています。その他のグループの場合は、上表の切込み比率を目安に調整して下さい。
※Standard cutting depth is shown as the criteria for Group 2 workpieces. For other groups, adjust the cutting depth according to the cutting depth factors in the above table.

【注意】 ①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

【Note】 ① Use the appropriate coolant for the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
③ If the rpm of the machine is low, lower the feed rate also to put the rpm and feed rate in the same ratio.

# Epoch Pencil Deep Radius
# エポックペンシルディープラジアス

## EPDRP-TH

### 高能率切削条件 High efficiency cutting condition

| 被削材 Work material | | | | 1 銅 Coppers | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼入れ鋼 Hardened steels (45～55HRC) | | 6 焼入れ鋼 Hardened steels (55～65HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 120% | | 100% | | 90% | | 80% | | 65% | | 60% | |
| 外径DC Tool dia. (mm) | コーナ半径RE Corner radius (mm) | 首下長LU Under neck length (mm) | 基本切り込み Standard depth of cut (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 0.2 | 0.05 | 2 | 0.007 | 50,000 | 1,244 | 49,500 | 1,232 | 44,550 | 1,109 | 42,075 | 1,047 | 37,125 | 821 | 34,650 | 671 |
| 0.4 | 0.05 | 4 | 0.009 | 45,144 | 1,498 | 37,620 | 1,248 | 33,858 | 1,123 | 31,977 | 1,061 | 28,215 | 832 | 26,334 | 680 |
| | | 5 | 0.007 | 40,128 | 1,183 | 33,440 | 986 | 30,096 | 888 | 28,424 | 733 | 25,080 | 647 | 23,408 | 518 |
| | 0.1 | 4 | 0.009 | 47,520 | 1,577 | 39,600 | 1,314 | 35,640 | 1,182 | 33,660 | 1,117 | 29,700 | 876 | 27,720 | 715 |
| | | 5 | 0.007 | 42,240 | 1,246 | 35,200 | 1,038 | 31,680 | 934 | 29,920 | 772 | 26,400 | 681 | 24,640 | 545 |
| 0.5 | 0.1 | 5 | 0.013 | 45,619 | 1,816 | 38,016 | 1,514 | 34,214 | 1,362 | 32,314 | 1,045 | 28,512 | 780 | 26,611 | 629 |
| | | 8 | 0.008 | 36,495 | 1,130 | 30,413 | 942 | 27,372 | 848 | 25,851 | 650 | 22,810 | 486 | 21,289 | 391 |
| | | 10 | 0.007 | 27,372 | 848 | 22,810 | 706 | 20,529 | 636 | 19,388 | 488 | 17,107 | 364 | 15,967 | 294 |
| 0.6 | 0.1 | 12 | 0.01 | 30,565 | 1,318 | 25,471 | 1,099 | 22,924 | 989 | 21,650 | 759 | 19,103 | 566 | 17,830 | 457 |
| | | 15 | 0.006 | 25,091 | 1,082 | 20,909 | 902 | 18,818 | 812 | 17,772 | 623 | 15,682 | 465 | 14,636 | 375 |
| 0.8 | 0.2 | 6 | 0.045 | 47,520 | 1,807 | 39,600 | 1,505 | 35,640 | 1,355 | 33,660 | 1,280 | 29,700 | 1,004 | 27,720 | 820 |
| | | 12 | 0.02 | 42,240 | 1,557 | 35,200 | 1,298 | 31,680 | 1,168 | 29,920 | 965 | 26,400 | 852 | 24,640 | 681 |
| 1 | 0.2 | 8 | 0.04 | 42,768 | 2,439 | 35,640 | 2,032 | 32,076 | 1,829 | 30,294 | 1,727 | 26,730 | 1,355 | 24,948 | 1,106 |
| | | 10 | 0.035 | 42,768 | 2,661 | 35,640 | 2,217 | 32,076 | 1,995 | 30,294 | 1,885 | 26,730 | 1,478 | 24,948 | 1,207 |
| | | 15 | 0.028 | 38,016 | 2,102 | 31,680 | 1,752 | 28,512 | 1,577 | 26,928 | 1,303 | 23,760 | 1,150 | 22,176 | 920 |
| | | 20 | 0.02 | 28,512 | 1,380 | 23,760 | 1,150 | 21,384 | 1,035 | 20,196 | 907 | 17,820 | 739 | 16,632 | 575 |
| | | 25 | 0.017 | 23,760 | 1,150 | 19,800 | 958 | 17,820 | 862 | 16,830 | 756 | 14,850 | 616 | 13,860 | 479 |
| | | 30 | 0.017 | 23,760 | 1,150 | 19,800 | 958 | 17,820 | 862 | 16,830 | 756 | 14,850 | 616 | 13,860 | 479 |
| | | 35 | 0.01 | 23,760 | 1,150 | 19,800 | 958 | 17,820 | 862 | 16,830 | 756 | 14,850 | 616 | 13,860 | 479 |
| | 0.3 | 8 | 0.04 | 42,768 | 2,439 | 35,640 | 2,032 | 32,076 | 1,829 | 30,294 | 1,727 | 26,730 | 1,355 | 24,948 | 1,106 |
| | | 15 | 0.028 | 38,016 | 2,102 | 31,680 | 1,752 | 28,512 | 1,577 | 26,928 | 1,303 | 23,760 | 1,150 | 22,176 | 920 |
| | | 25 | 0.017 | 23,760 | 1,150 | 19,800 | 958 | 17,820 | 862 | 16,830 | 756 | 14,850 | 616 | 13,860 | 479 |
| | | 30 | 0.017 | 23,760 | 1,150 | 19,800 | 958 | 17,820 | 862 | 16,830 | 756 | 14,850 | 616 | 13,860 | 479 |
| 1.5 | 0.2 | 10 | 0.05 | 32,525 | 1,798 | 27,104 | 1,499 | 24,394 | 1,349 | 23,038 | 1,115 | 20,328 | 984 | 18,973 | 787 |
| | | 15 | 0.045 | 29,568 | 1,635 | 24,640 | 1,362 | 22,176 | 1,226 | 20,944 | 1,013 | 18,480 | 894 | 17,248 | 715 |
| | | 20 | 0.042 | 26,020 | 1,439 | 21,683 | 1,199 | 19,515 | 1,079 | 18,431 | 892 | 16,262 | 787 | 15,178 | 629 |
| | | 25 | 0.032 | 22,176 | 1,073 | 18,480 | 894 | 16,632 | 805 | 15,708 | 706 | 13,860 | 575 | 12,936 | 447 |
| | | 30 | 0.028 | 18,480 | 894 | 15,400 | 745 | 13,860 | 671 | 13,090 | 588 | 11,550 | 479 | 10,780 | 373 |
| | 0.3 | 10 | 0.05 | 32,525 | 1,798 | 27,104 | 1,499 | 24,394 | 1,349 | 23,038 | 1,115 | 20,328 | 984 | 18,973 | 787 |
| | | 20 | 0.042 | 26,020 | 1,439 | 21,683 | 1,199 | 19,515 | 1,079 | 18,431 | 892 | 16,262 | 787 | 15,178 | 629 |
| | | 25 | 0.032 | 22,176 | 1,073 | 18,480 | 894 | 16,632 | 805 | 15,708 | 706 | 13,860 | 575 | 12,936 | 447 |
| | | 30 | 0.028 | 18,480 | 894 | 15,400 | 745 | 13,860 | 671 | 13,090 | 588 | 11,550 | 479 | 10,780 | 373 |

| 被削材 Work material | | | | 1 銅 Coppers | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼入れ鋼 Hardened steels (45～55HRC) | | 6 焼入れ鋼 Hardened steels (55～65HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 120% | | 100% | | 90% | | 80% | | 65% | | 60% | |
| 外径DC Tool dia. (mm) | コーナ半径RE Corner radius (mm) | 首下長LU Under neck length (mm) | 基本切り込み Standard depth of cut (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 2 | 0.2 | 30 | 0.045 | 20,160 | 2,090 | 16,800 | 1,742 | 15,120 | 1,568 | 14,280 | 1,295 | 12,600 | 1,143 | 11,760 | 914 |
| | | 40 | 0.035 | 15,120 | 1,372 | 12,600 | 1,143 | 11,340 | 1,029 | 10,710 | 902 | 9,450 | 735 | 8,820 | 572 |
| | | 50 | 0.017 | 12,600 | 1,143 | 10,500 | 953 | 9,450 | 857 | 8,925 | 752 | 7,875 | 612 | 7,350 | 476 |
| | 0.3 | 12 | 0.088 | 31,298 | 3,130 | 26,082 | 2,608 | 23,474 | 2,347 | 22,170 | 1,951 | 19,562 | 1,643 | 18,257 | 1,461 |
| | | 20 | 0.054 | 25,039 | 2,504 | 20,866 | 2,087 | 18,779 | 1,878 | 17,736 | 1,561 | 15,649 | 1,315 | 14,606 | 1,168 |
| | | 30 | 0.045 | 20,160 | 2,322 | 16,800 | 1,935 | 15,120 | 1,742 | 14,280 | 1,439 | 12,600 | 1,270 | 11,760 | 1,016 |
| | | 40 | 0.035 | 15,120 | 1,524 | 12,600 | 1,270 | 11,340 | 1,143 | 10,710 | 1,002 | 9,450 | 816 | 8,820 | 635 |
| | | 50 | 0.017 | 12,600 | 1,270 | 10,500 | 1,058 | 9,450 | 953 | 8,925 | 835 | 7,875 | 680 | 7,350 | 529 |
| | 0.5 | 8 | 0.17 | 31,298 | 3,130 | 26,082 | 2,608 | 23,474 | 2,347 | 22,170 | 1,951 | 19,562 | 1,643 | 18,257 | 1,461 |
| | | 12 | 0.088 | 31,298 | 3,130 | 26,082 | 2,608 | 23,474 | 2,347 | 22,170 | 1,951 | 19,562 | 1,643 | 18,257 | 1,461 |
| | | 16 | 0.088 | 26,604 | 2,660 | 22,170 | 2,217 | 19,953 | 1,995 | 18,844 | 1,658 | 16,627 | 1,397 | 15,519 | 1,242 |
| | | 20 | 0.054 | 25,039 | 2,504 | 20,866 | 2,087 | 18,779 | 1,878 | 17,736 | 1,561 | 15,650 | 1,315 | 14,606 | 1,168 |
| | | 25 | 0.054 | 21,909 | 2,191 | 18,257 | 1,826 | 16,432 | 1,643 | 15,519 | 1,366 | 13,693 | 1,150 | 12,780 | 1,022 |
| | | 30 | 0.045 | 20,160 | 2,322 | 16,800 | 1,935 | 15,120 | 1,742 | 14,280 | 1,439 | 12,600 | 1,270 | 11,760 | 1,016 |
| | | 40 | 0.035 | 15,120 | 1,524 | 12,600 | 1,270 | 11,340 | 1,143 | 10,710 | 1,002 | 9,450 | 816 | 8,820 | 635 |
| | | 50 | 0.017 | 12,600 | 1,270 | 10,500 | 1,058 | 9,450 | 953 | 8,925 | 835 | 7,875 | 680 | 7,350 | 529 |
| 3 | 0.2 | 40 | 0.07 | 15,360 | 1,593 | 12,800 | 1,327 | 11,520 | 1,194 | 10,880 | 987 | 9,600 | 871 | 8,960 | 697 |
| | | 50 | 0.05 | 11,520 | 1,045 | 9,600 | 871 | 8,640 | 784 | 8,160 | 687 | 7,200 | 560 | 6,720 | 435 |
| | | 60 | 0.03 | 9,600 | 871 | 8,000 | 726 | 7,200 | 653 | 6,800 | 573 | 6,000 | 467 | 5,600 | 363 |
| | 0.3 | 40 | 0.07 | 15,360 | 1,769 | 12,800 | 1,475 | 11,520 | 1,327 | 10,880 | 1,097 | 9,600 | 968 | 8,960 | 774 |
| | | 50 | 0.05 | 11,520 | 1,161 | 9,600 | 968 | 8,640 | 871 | 8,160 | 764 | 7,200 | 622 | 6,720 | 484 |
| | | 60 | 0.03 | 9,600 | 968 | 8,000 | 806 | 7,200 | 726 | 6,800 | 636 | 6,000 | 518 | 5,600 | 403 |
| | 0.5 | 40 | 0.07 | 15,360 | 1,769 | 12,800 | 1,475 | 11,520 | 1,327 | 10,880 | 1,097 | 9,600 | 968 | 8,960 | 774 |
| | | 50 | 0.05 | 11,520 | 1,161 | 9,600 | 968 | 8,640 | 871 | 8,160 | 764 | 7,200 | 622 | 6,720 | 484 |
| | | 60 | 0.03 | 9,600 | 968 | 8,000 | 806 | 7,200 | 726 | 6,800 | 636 | 6,000 | 518 | 5,600 | 403 |

※基本切込みは被削材グループ2での目安を示しています。その他のグループの場合は、上表の切込み比率を目安に調整して下さい。
※Standard cutting depth is shown as the criteria for Group 2 workpieces. For other groups, adjust the cutting depth according to the cutting depth factors in the above table.

【注意】 ①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

【Note】 ① Use the appropriate coolant for the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
③ If the rpm of the machine is low, lower the feed rate also to put the rpm and feed rate in the same ratio.

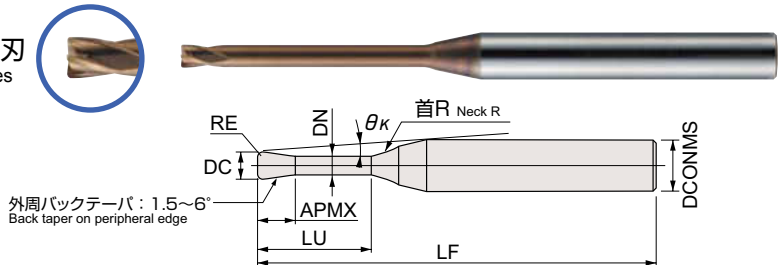
# Epoch Deep Radius F
# エポックディープラジアス F

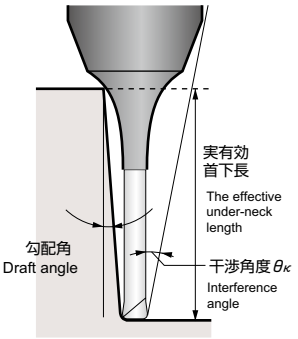
溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / 細部 Miniature / 取りのこし Rest Material Machining / 中仕上 Semi Finishing / 仕上 Finishing / リブ・細部 Rib Miniature

高精度ディープラジアス。
High-accuracy deep radius mill

RE公差 RE tolerance ±0.005 (中心基準 central axis)　h5

(mm)




## EPDRF4○○○-○○-○○○-TH

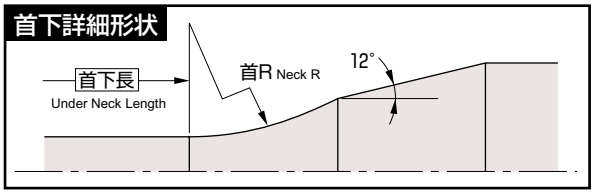
外径φ4以上はバックドラフト形状ではありません。
φ4 or larger does not have backdraft shape.

超硬 Carbide　TH　ねじれ20° Helix angle　切削条件表 A219 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度 Interference angle (°) θK | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDRF4010-4-005-TH | ● | 1 | 0.05 | 4 | 0.8 | 0.94 | 50 | 4 | 4 | 7.67 | 4.75 | 4.95 | 5.13 | 5.28 | 5.56 | 8,430 |
| EPDRF4010-6-005-TH | ● | | | 6 | 0.8 | 0.94 | 50 | 4 | 4 | 6.51 | 6.84 | 7.09 | 7.3 | 7.49 | 8.13 | 9,130 |
| EPDRF4010-8-005-TH | ● | | | 8 | 0.8 | 0.94 | 50 | 4 | 4 | 5.66 | 8.92 | 9.21 | 9.46 | 9.73 | 10.78 | 9,130 |
| EPDRF4010-10-005-TH | ● | | | 10 | 0.8 | 0.94 | 50 | 4 | 4 | 5 | 10.99 | 11.32 | 11.59 | 12.12 | 13.44 | 9,130 |
| EPDRF4010-12-005-TH | ● | | | 12 | 0.8 | 0.94 | 60 | 4 | 4 | 4.48 | 13.06 | 13.42 | 13.84 | 14.51 | 16.09 | 9,130 |
| EPDRF4010-16-005-TH | ● | | | 16 | 0.8 | 0.94 | 60 | 4 | 4 | 3.71 | 17.18 | 17.6 | 18.4 | 19.3 | 21.4 | 11,580 |
| EPDRF4010-20-005-TH | ● | | | 20 | 0.8 | 0.94 | 60 | 4 | 4 | 3.17 | 21.29 | 21.93 | 22.96 | 24.09 | 26.71 | 14,250 |
| EPDRF4010-4-01-TH | ● | | 0.1 | 4 | 0.8 | 0.94 | 50 | 4 | 4 | 7.7 | 4.74 | 4.95 | 5.12 | 5.28 | 5.55 | 8,430 |
| EPDRF4010-6-01-TH | ● | | | 6 | 0.8 | 0.94 | 50 | 4 | 4 | 6.54 | 6.83 | 7.09 | 7.3 | 7.49 | 8.11 | 9,130 |
| EPDRF4010-8-01-TH | ● | | | 8 | 0.8 | 0.94 | 50 | 4 | 4 | 5.68 | 8.91 | 9.21 | 9.45 | 9.72 | 10.77 | 9,130 |
| EPDRF4010-10-01-TH | ● | | | 10 | 0.8 | 0.94 | 50 | 4 | 4 | 5.02 | 10.99 | 11.32 | 11.59 | 12.11 | 13.42 | 9,130 |
| EPDRF4010-12-01-TH | ● | | | 12 | 0.8 | 0.94 | 60 | 4 | 4 | 4.5 | 13.06 | 13.42 | 13.83 | 14.5 | 16.08 | 9,130 |
| EPDRF4010-16-01-TH | ● | | | 16 | 0.8 | 0.94 | 60 | 4 | 4 | 3.72 | 17.18 | 17.6 | 18.39 | 19.29 | 21.39 | 11,580 |
| EPDRF4010-20-01-TH | ● | | | 20 | 0.8 | 0.94 | 60 | 4 | 4 | 3.17 | 21.29 | 21.93 | 22.95 | 24.08 | 26.7 | 14,250 |
| EPDRF4015-4-005-TH | ● | 1.5 | 0.05 | 4 | 1.35 | 1.42 | 50 | 4 | 4 | 7.12 | 4.8 | 4.99 | 5.16 | 5.31 | 5.59 | 9,130 |
| EPDRF4015-8-005-TH | ● | | | 8 | 1.35 | 1.42 | 50 | 4 | 4 | 5.1 | 8.96 | 9.25 | 9.48 | 9.78 | 10.85 | 9,130 |
| EPDRF4015-12-005-TH | ● | | | 12 | 1.35 | 1.42 | 60 | 4 | 4 | 3.97 | 13.09 | 13.45 | 13.89 | 14.57 | 16.16 | 10,830 |
| EPDRF4015-15-005-TH | ● | | | 15 | 1.35 | 1.42 | 60 | 4 | 4 | 3.41 | 16.18 | 16.58 | 17.31 | 18.16 | 20.14 | 10,830 |
| EPDRF4015-20-005-TH | ● | | | 20 | 1.35 | 1.42 | 60 | 4 | 4 | 2.76 | 21.32 | 21.98 | 23.01 | 24.14 | – | 10,830 |
| EPDRF4015-4-01-TH | ● | | 0.1 | 4 | 1.35 | 1.42 | 50 | 4 | 4 | 7.15 | 4.8 | 4.99 | 5.16 | 5.31 | 5.58 | 9,130 |
| EPDRF4015-8-01-TH | ● | | | 8 | 1.35 | 1.42 | 50 | 4 | 4 | 5.12 | 8.96 | 9.24 | 9.48 | 9.77 | 10.83 | 9,130 |
| EPDRF4015-12-01-TH | ● | | | 12 | 1.35 | 1.42 | 60 | 4 | 4 | 3.98 | 13.09 | 13.45 | 13.88 | 14.56 | 16.14 | 10,830 |
| EPDRF4015-15-01-TH | ● | | | 15 | 1.35 | 1.42 | 60 | 4 | 4 | 3.42 | 16.18 | 16.58 | 17.3 | 18.15 | 20.12 | 10,830 |
| EPDRF4015-20-01-TH | ● | | | 20 | 1.35 | 1.42 | 60 | 4 | 4 | 2.76 | 21.32 | 21.98 | 23.01 | 24.13 | – | 10,830 |
| EPDRF4020-4-005-TH | ● | 2 | 0.05 | 4 | 1.7 | 1.92 | 50 | 4 | 4 | 6.46 | 4.8 | 4.99 | 5.16 | 5.31 | 5.59 | 7,480 |
| EPDRF4020-6-005-TH | ● | | | 6 | 1.7 | 1.92 | 50 | 4 | 4 | 5.27 | 6.88 | 7.13 | 7.33 | 7.52 | 8.19 | 8,430 |
| EPDRF4020-8-005-TH | ● | | | 8 | 1.7 | 1.92 | 50 | 4 | 4 | 4.46 | 8.96 | 9.25 | 9.48 | 9.78 | 10.85 | 9,130 |
| EPDRF4020-12-005-TH | ● | | | 12 | 1.7 | 1.92 | 60 | 4 | 4 | 3.4 | 13.09 | 13.45 | 13.89 | 14.57 | 16.16 | 9,130 |
| EPDRF4020-16-005-TH | ● | | | 16 | 1.7 | 1.92 | 60 | 4 | 4 | 2.75 | 17.21 | 17.63 | 18.45 | 19.36 | – | 9,130 |
| EPDRF4020-20-005-TH | ● | | | 20 | 1.7 | 1.92 | 60 | 4 | 4 | 2.31 | 21.32 | 21.98 | 23.01 | 24.14 | – | 9,130 |
| EPDRF4020-4-01-TH | ● | | 0.1 | 4 | 1.7 | 1.92 | 50 | 4 | 4 | 6.49 | 4.8 | 4.99 | 5.16 | 5.31 | 5.58 | 7,480 |
| EPDRF4020-6-01-TH | ● | | | 6 | 1.7 | 1.92 | 50 | 4 | 4 | 5.3 | 6.88 | 7.12 | 7.33 | 7.51 | 8.18 | 8,430 |
| EPDRF4020-8-01-TH | ● | | | 8 | 1.7 | 1.92 | 50 | 4 | 4 | 4.47 | 8.96 | 9.24 | 9.48 | 9.77 | 10.83 | 9,130 |
| EPDRF4020-12-01-TH | ● | | | 12 | 1.7 | 1.92 | 60 | 4 | 4 | 3.41 | 13.09 | 13.45 | 13.88 | 14.56 | 16.14 | 9,130 |
| EPDRF4020-16-01-TH | ● | | | 16 | 1.7 | 1.92 | 60 | 4 | 4 | 2.76 | 17.21 | 17.62 | 18.44 | 19.35 | – | 9,130 |
| EPDRF4020-20-01-TH | ● | | | 20 | 1.7 | 1.92 | 60 | 4 | 4 | 2.31 | 21.32 | 21.98 | 23.01 | 24.13 | – | 9,130 |
| EPDRF4020-4-02-TH | ● | | 0.2 | 4 | 1.7 | 1.92 | 50 | 4 | 4 | 6.57 | 4.79 | 4.98 | 5.15 | 5.3 | 5.57 | 7,480 |
| EPDRF4020-6-02-TH | ● | | | 6 | 1.7 | 1.92 | 50 | 4 | 4 | 5.35 | 6.88 | 7.12 | 7.32 | 7.5 | 8.14 | 8,430 |
| EPDRF4020-8-02-TH | ● | | | 8 | 1.7 | 1.92 | 50 | 4 | 4 | 4.51 | 8.95 | 9.24 | 9.47 | 9.75 | 10.8 | 9,130 |
| EPDRF4020-12-02-TH | ● | | | 12 | 1.7 | 1.92 | 60 | 4 | 4 | 3.43 | 13.09 | 13.44 | 13.87 | 14.54 | 16.11 | 9,130 |
| EPDRF4020-16-02-TH | ● | | | 16 | 1.7 | 1.92 | 60 | 4 | 4 | 2.77 | 17.21 | 17.62 | 18.43 | 19.33 | – | 9,130 |
| EPDRF4020-20-02-TH | ● | | | 20 | 1.7 | 1.92 | 60 | 4 | 4 | 2.32 | 21.32 | 21.97 | 22.99 | 24.11 | – | 9,130 |
| EPDRF4020-25-02-TH | ● | | | 25 | 1.7 | 1.92 | 70 | 4 | 4 | 1.93 | 26.44 | 27.42 | 28.69 | – | – | 12,220 |
| EPDRF4020-30-02-TH | ● | | | 30 | 1.7 | 1.92 | 70 | 4 | 4 | 1.66 | 31.55 | 32.87 | 34.4 | – | – | 15,000 |

●印：標準在庫品です。
●：Stocked items.

首下詳細形状




# EPDRF4○○○-○○-○○○-TH

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度 Interference angle (°) $\theta_K$ | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDRF4020-4-03-TH | ● | 2 | 0.3 | 4 | 1.7 | 1.92 | 50 | 4 | 4 | 6.64 | 4.79 | 4.97 | 5.14 | 5.29 | 5.55 | 7,480 |
| EPDRF4020-8-03-TH | ● | | | 8 | 1.7 | 1.92 | 50 | 4 | 4 | 4.55 | 8.95 | 9.23 | 9.47 | 9.73 | 10.77 | 9,130 |
| EPDRF4020-12-03-TH | ● | | | 12 | 1.7 | 1.92 | 60 | 4 | 4 | 3.45 | 13.09 | 13.44 | 13.85 | 14.52 | 16.08 | 9,130 |
| EPDRF4020-16-03-TH | ● | | | 16 | 1.7 | 1.92 | 60 | 4 | 4 | 2.79 | 17.21 | 17.61 | 18.42 | 19.31 | – | 9,130 |
| EPDRF4020-20-03-TH | ● | | | 20 | 1.7 | 1.92 | 60 | 4 | 4 | 2.33 | 21.31 | 21.96 | 22.98 | 24.09 | – | 9,130 |
| EPDRF4020-4-05-TH | ● | | 0.5 | 4 | 1.7 | 1.92 | 50 | 4 | 4 | 6.8 | 4.78 | 4.96 | 5.12 | 5.26 | 5.53 | 7,480 |
| EPDRF4020-6-05-TH | ● | | | 6 | 1.7 | 1.92 | 50 | 4 | 4 | 5.5 | 6.86 | 7.1 | 7.3 | 7.48 | 8.05 | 8,430 |
| EPDRF4020-8-05-TH | ● | | | 8 | 1.7 | 1.92 | 50 | 4 | 4 | 4.62 | 8.94 | 9.22 | 9.45 | 9.7 | 10.7 | 9,130 |
| EPDRF4020-12-05-TH | ● | | | 12 | 1.7 | 1.92 | 60 | 4 | 4 | 3.5 | 13.08 | 13.43 | 13.83 | 14.48 | 16.01 | 9,130 |
| EPDRF4020-16-05-TH | ● | | | 16 | 1.7 | 1.92 | 60 | 4 | 4 | 2.81 | 17.2 | 17.61 | 18.39 | 19.27 | – | 9,130 |
| EPDRF4020-20-05-TH | ● | | | 20 | 1.7 | 1.92 | 60 | 4 | 4 | 2.35 | 21.31 | 21.95 | 22.95 | 24.06 | – | 9,130 |
| EPDRF4020-25-05-TH | ● | | | 25 | 1.7 | 1.92 | 70 | 4 | 4 | 1.95 | 26.43 | 27.39 | 28.65 | – | – | 12,220 |
| EPDRF4020-30-05-TH | ● | | | 30 | 1.7 | 1.92 | 70 | 4 | 4 | 1.67 | 31.54 | 32.84 | 34.36 | – | – | 15,000 |
| EPDRF4025-8-01-TH | ● | 2.5 | 0.1 | 8 | 2 | 2.4 | 50 | 4 | 4 | 3.68 | 9 | 9.27 | 9.51 | 9.83 | 10.89 | 9,130 |
| EPDRF4025-16-01-TH | ● | | | 16 | 2 | 2.4 | 60 | 4 | 4 | 2.19 | 17.24 | 17.67 | 18.5 | 19.4 | – | 9,580 |
| EPDRF4025-20-01-TH | ● | | | 20 | 2 | 2.4 | 60 | 4 | 4 | 1.82 | 21.35 | 22.03 | 23.06 | – | – | 9,580 |
| EPDRF4025-8-02-TH | ● | | 0.2 | 8 | 2 | 2.4 | 50 | 4 | 4 | 3.72 | 8.99 | 9.27 | 9.5 | 9.81 | 10.86 | 9,130 |
| EPDRF4025-16-02-TH | ● | | | 16 | 2 | 2.4 | 60 | 4 | 4 | 2.2 | 17.24 | 17.67 | 18.48 | 19.38 | – | 9,580 |
| EPDRF4025-20-02-TH | ● | | | 20 | 2 | 2.4 | 60 | 4 | 4 | 1.83 | 21.34 | 22.02 | 23.05 | – | – | 9,580 |
| EPDRF4025-12-03-TH | ● | | 0.3 | 12 | 2 | 2.4 | 60 | 4 | 4 | 2.78 | 13.12 | 13.47 | 13.91 | 14.58 | – | 9,580 |
| EPDRF4025-20-03-TH | ● | | | 20 | 2 | 2.4 | 60 | 4 | 4 | 1.84 | 21.34 | 22.01 | 23.03 | – | – | 9,580 |
| EPDRF4025-12-05-TH | ● | | 0.5 | 12 | 2 | 2.4 | 60 | 4 | 4 | 2.82 | 13.12 | 13.46 | 13.88 | 14.54 | – | 9,580 |
| EPDRF4025-20-05-TH | ● | | | 20 | 2 | 2.4 | 60 | 4 | 4 | 1.85 | 21.34 | 22 | 23 | – | – | 9,580 |
| EPDRF4030-8-01-TH | ● | 3 | 0.1 | 8 | 2.5 | 2.86 | 60 | 6 | 4 | 5.61 | 9.07 | 9.34 | 9.56 | 9.94 | 11.02 | 9,130 |
| EPDRF4030-16-01-TH | ● | | | 16 | 2.5 | 2.86 | 60 | 6 | 4 | 3.69 | 17.3 | 17.78 | 18.6 | 19.52 | 21.64 | 11,790 |
| EPDRF4030-25-01-TH | ● | | | 25 | 2.5 | 2.86 | 70 | 6 | 4 | 2.67 | 26.52 | 27.58 | 28.87 | 30.28 | – | 11,790 |
| EPDRF4030-30-01-TH | ● | | | 30 | 2.5 | 2.86 | 80 | 6 | 4 | 2.31 | 31.62 | 33.03 | 34.57 | 36.27 | – | 13,610 |
| EPDRF4030-8-02-TH | ● | | 0.2 | 8 | 2.5 | 2.86 | 60 | 6 | 4 | 5.65 | 9.07 | 9.33 | 9.55 | 9.92 | 10.99 | 9,130 |
| EPDRF4030-12-02-TH | ● | | | 12 | 2.5 | 2.86 | 60 | 6 | 4 | 4.48 | 13.19 | 13.52 | 14.03 | 14.71 | 16.3 | 10,470 |
| EPDRF4030-16-02-TH | ● | | | 16 | 2.5 | 2.86 | 60 | 6 | 4 | 3.71 | 17.3 | 17.77 | 18.59 | 19.5 | 21.6 | 11,790 |
| EPDRF4030-20-02-TH | ● | | | 20 | 2.5 | 2.86 | 70 | 6 | 4 | 3.16 | 21.4 | 22.13 | 23.15 | 24.28 | 26.91 | 11,790 |
| EPDRF4030-25-02-TH | ● | | | 25 | 2.5 | 2.86 | 70 | 6 | 4 | 2.67 | 26.51 | 27.57 | 28.86 | 30.27 | – | 11,790 |
| EPDRF4030-30-02-TH | ● | | | 30 | 2.5 | 2.86 | 80 | 6 | 4 | 2.31 | 31.62 | 33.02 | 34.56 | 36.25 | – | 13,610 |
| EPDRF4030-8-03-TH | ● | | 0.3 | 8 | 2.5 | 2.86 | 60 | 6 | 4 | 5.68 | 9.07 | 9.33 | 9.54 | 9.9 | 10.95 | 9,130 |
| EPDRF4030-16-03-TH | ● | | | 16 | 2.5 | 2.86 | 60 | 6 | 4 | 3.72 | 17.3 | 17.76 | 18.58 | 19.48 | 21.57 | 11,790 |
| EPDRF4030-20-03-TH | ● | | | 20 | 2.5 | 2.86 | 70 | 6 | 4 | 3.17 | 21.4 | 22.12 | 23.14 | 24.26 | 26.88 | 11,790 |
| EPDRF4030-25-03-TH | ● | | | 25 | 2.5 | 2.86 | 70 | 6 | 4 | 2.68 | 26.51 | 27.56 | 28.84 | 30.25 | – | 11,790 |
| EPDRF4030-30-03-TH | ● | | | 30 | 2.5 | 2.86 | 80 | 6 | 4 | 2.32 | 31.62 | 33.01 | 34.54 | 36.23 | – | 13,610 |
| EPDRF4030-8-05-TH | ● | | 0.5 | 8 | 2.5 | 2.86 | 60 | 6 | 4 | 5.76 | 9.06 | 9.31 | 9.53 | 9.87 | 10.89 | 9,130 |
| EPDRF4030-12-05-TH | ● | | | 12 | 2.5 | 2.86 | 60 | 6 | 4 | 4.55 | 13.18 | 13.51 | 13.99 | 14.65 | 16.2 | 10,470 |
| EPDRF4030-16-05-TH | ● | | | 16 | 2.5 | 2.86 | 60 | 6 | 4 | 3.75 | 17.29 | 17.74 | 18.55 | 19.44 | 21.51 | 11,790 |
| EPDRF4030-20-05-TH | ● | | | 20 | 2.5 | 2.86 | 70 | 6 | 4 | 3.2 | 21.39 | 22.1 | 23.11 | 24.22 | 26.82 | 11,790 |
| EPDRF4030-25-05-TH | ● | | | 25 | 2.5 | 2.86 | 70 | 6 | 4 | 2.7 | 26.51 | 27.55 | 28.81 | 30.21 | – | 11,790 |
| EPDRF4030-30-05-TH | ● | | | 30 | 2.5 | 2.86 | 80 | 6 | 4 | 2.33 | 31.61 | 32.99 | 34.52 | 36.19 | – | 13,610 |
| EPDRF4030-35-05-TH | ● | | | 35 | 2.5 | 2.86 | 80 | 6 | 4 | 2.06 | 36.82 | 38.44 | 40.22 | 42.17 | – | 15,000 |

Epoch Deep Radius F

# エポックディープラジアス F

## EPDRF4○○○-○○-○○○-TH

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度 Interference angle (°) $\theta_K$ | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDRF4040-12-01-TH | ● | 4 | 0.1 | 12 | 4 | 3.9 | 60 | 6 | 4 | 3.4 | 13.13 | 13.47 | 13.94 | 14.62 | 16.2 | 10,470 |
| EPDRF4040-20-01-TH | ● | | | 20 | 4 | 3.9 | 60 | 6 | 4 | 2.31 | 21.35 | 22.03 | 23.06 | 24.19 | – | 11,790 |
| EPDRF4040-30-01-TH | ● | | | 30 | 4 | 3.9 | 80 | 6 | 4 | 1.65 | 31.57 | 32.93 | 34.46 | – | – | 11,790 |
| EPDRF4040-40-01-TH | ● | | | 40 | 4 | 3.9 | 80 | 6 | 4 | 1.28 | 41.95 | 43.82 | – | – | – | 15,000 |
| EPDRF4040-12-02-TH | ● | | 0.2 | 12 | 4 | 3.9 | 60 | 6 | 4 | 3.42 | 13.12 | 13.47 | 13.92 | 14.6 | 16.17 | 10,470 |
| EPDRF4040-20-02-TH | ● | | | 20 | 4 | 3.9 | 60 | 6 | 4 | 2.32 | 21.34 | 22.02 | 23.05 | 24.17 | – | 11,790 |
| EPDRF4040-30-02-TH | ● | | | 30 | 4 | 3.9 | 80 | 6 | 4 | 1.65 | 31.57 | 32.92 | 34.45 | – | – | 11,790 |
| EPDRF4040-40-02-TH | ● | | | 40 | 4 | 3.9 | 80 | 6 | 4 | 1.29 | 41.94 | 43.81 | – | – | – | 15,000 |
| EPDRF4040-12-03-TH | ● | | 0.3 | 12 | 4 | 3.9 | 60 | 6 | 4 | 3.44 | 13.12 | 13.47 | 13.91 | 14.58 | 16.14 | 10,470 |
| EPDRF4040-20-03-TH | ● | | | 20 | 4 | 3.9 | 60 | 6 | 4 | 2.33 | 21.34 | 22.01 | 23.03 | 24.15 | – | 11,790 |
| EPDRF4040-30-03-TH | ● | | | 30 | 4 | 3.9 | 80 | 6 | 4 | 1.66 | 31.57 | 32.91 | 34.44 | – | – | 11,790 |
| EPDRF4040-40-03-TH | ● | | | 40 | 4 | 3.9 | 80 | 6 | 4 | 1.29 | 41.94 | 43.8 | – | – | – | 15,000 |
| EPDRF4040-12-05-TH | ● | | 0.5 | 12 | 4 | 3.9 | 60 | 6 | 4 | 3.49 | 13.12 | 13.46 | 13.88 | 14.54 | 16.07 | 10,470 |
| EPDRF4040-20-05-TH | ● | | | 20 | 4 | 3.9 | 60 | 6 | 4 | 2.35 | 21.34 | 22 | 23 | 24.11 | – | 11,790 |
| EPDRF4040-30-05-TH | ● | | | 30 | 4 | 3.9 | 80 | 6 | 4 | 1.67 | 31.57 | 32.89 | 34.41 | – | – | 11,790 |
| EPDRF4040-40-05-TH | ● | | | 40 | 4 | 3.9 | 80 | 6 | 4 | 1.29 | 41.93 | 43.79 | – | – | – | 15,000 |
| EPDRF4050-20-01-TH | ● | 5 | 0.1 | 20 | 5 | 4.9 | 70 | 6 | 4 | 1.28 | 21.35 | 22.03 | – | – | – | 17,740 |
| EPDRF4050-40-01-TH | ● | | | 40 | 5 | 4.9 | 90 | 6 | 4 | 0.68 | 41.95 | – | – | – | – | 19,080 |
| EPDRF4050-20-02-TH | ● | | 0.2 | 20 | 5 | 4.9 | 70 | 6 | 4 | 1.28 | 21.34 | 22.02 | – | – | – | 17,740 |
| EPDRF4050-40-02-TH | ● | | | 40 | 5 | 4.9 | 90 | 6 | 4 | 0.68 | 41.94 | – | – | – | – | 19,080 |
| EPDRF4050-20-03-TH | ● | | 0.3 | 20 | 5 | 4.9 | 70 | 6 | 4 | 1.29 | 21.34 | 22.01 | – | – | – | 17,740 |
| EPDRF4050-40-03-TH | ● | | | 40 | 5 | 4.9 | 90 | 6 | 4 | 0.68 | 41.94 | – | – | – | – | 19,080 |
| EPDRF4050-20-05-TH | ● | | 0.5 | 20 | 5 | 4.9 | 70 | 6 | 4 | 1.3 | 21.34 | 22 | – | – | – | 17,740 |
| EPDRF4050-40-05-TH | ● | | | 40 | 5 | 4.9 | 90 | 6 | 4 | 0.69 | 41.93 | – | – | – | – | 19,080 |
| EPDRF4050-20-10-TH | ● | | 1 | 20 | 5 | 4.9 | 70 | 6 | 4 | 1.33 | 21.32 | 21.95 | – | – | – | 17,740 |
| EPDRF4050-40-10-TH | ● | | | 40 | 5 | 4.9 | 90 | 6 | 4 | 0.69 | 41.91 | – | – | – | – | 19,080 |
| EPDRF4060-30-02-TH | ● | 6 | 0.2 | 30 | 6 | 5.9 | 80 | 6 | 4 | 0 | – | – | – | – | – | 18,640 |
| EPDRF4060-54-02-TH | ● | | | 54 | 6 | 5.9 | 100 | 6 | 4 | 0 | – | – | – | – | – | 22,790 |
| EPDRF4060-72-02-TH | ● | | | 72 | 6 | 5.9 | 120 | 6 | 4 | 0 | – | – | – | – | – | 26,930 |
| EPDRF4060-30-03-TH | ● | | 0.3 | 30 | 6 | 5.9 | 80 | 6 | 4 | 0 | – | – | – | – | – | 18,640 |
| EPDRF4060-54-03-TH | ● | | | 54 | 6 | 5.9 | 100 | 6 | 4 | 0 | – | – | – | – | – | 22,790 |
| EPDRF4060-72-03-TH | ● | | | 72 | 6 | 5.9 | 120 | 6 | 4 | 0 | – | – | – | – | – | 26,930 |
| EPDRF4060-30-05-TH | ● | | 0.5 | 30 | 6 | 5.9 | 80 | 6 | 4 | 0 | – | – | – | – | – | 18,640 |
| EPDRF4060-54-05-TH | ● | | | 54 | 6 | 5.9 | 100 | 6 | 4 | 0 | – | – | – | – | – | 22,790 |
| EPDRF4060-72-05-TH | ● | | | 72 | 6 | 5.9 | 120 | 6 | 4 | 0 | – | – | – | – | – | 26,930 |
| EPDRF4060-30-10-TH | ● | | 1 | 30 | 6 | 5.9 | 80 | 6 | 4 | 0 | – | – | – | – | – | 18,640 |
| EPDRF4060-54-10-TH | ● | | | 54 | 6 | 5.9 | 100 | 6 | 4 | 0 | – | – | – | – | – | 22,790 |
| EPDRF4060-72-10-TH | ● | | | 72 | 6 | 5.9 | 120 | 6 | 4 | 0 | – | – | – | – | – | 26,930 |

### 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ |

### 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPDRF-TH | × (N/A) | 4～6 |

【注意】首下長／外径が10DCを超える工具の再研磨可否については、弊社営業にお問い合わせください。
【Note】Contact our sales office regarding whether or not regrinding is possible for tools where under neck length/tool diameter more than 10DC

●：標準在庫品です。●：Stocked items.

# 標準切削条件表 Recommended cutting conditions

## EPDRF-TH

| 被削材 Work material | | | | 1 銅 Copper | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼入れ鋼 Hardened steels (45～55HRC) | | 6 焼入れ鋼 Hardened steels (55～65HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 120% | | 100% | | 90% | | 80% | | 65% | | 60% | |
| 外径DC Tool dia. (mm) | コーナ半径RE Corner radius (mm) | 首下長LU Under neck length (mm) | 基本切り込み Standard depth of Cut (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 1 | 0.05 | 4 | 0.012 | 38,900 | 2,440 | 31,120 | 1,952 | 28,008 | 1,757 | 26,608 | 1,669 | 23,947 | 1,230 | 22,749 | 1,000 |
| | | 6 | 0.01 | 31,500 | 1,780 | 25,200 | 1,424 | 22,680 | 1,282 | 21,546 | 1,218 | 19,391 | 990 | 18,422 | 810 |
| | | 8 | 0.008 | 28,000 | 1,580 | 22,400 | 1,264 | 20,160 | 1,138 | 19,152 | 1,081 | 17,237 | 880 | 16,375 | 720 |
| | | 10 | 0.005 | 24,500 | 1,390 | 19,600 | 1,112 | 17,640 | 1,001 | 16,758 | 951 | 15,082 | 770 | 14,328 | 630 |
| | | 12 | 0.004 | 21,800 | 1,100 | 17,440 | 880 | 15,696 | 792 | 14,911 | 752 | 13,420 | 600 | 12,749 | 480 |
| | | 16 | 0.003 | 21,800 | 960 | 17,440 | 768 | 15,696 | 691 | 14,911 | 657 | 13,420 | 510 | 12,749 | 400 |
| | | 20 | 0.002 | 16,300 | 720 | 13,040 | 576 | 11,736 | 518 | 11,149 | 492 | 10,034 | 385 | 9,533 | 300 |
| | 0.1 | 4 | 0.02 | 38,900 | 2,440 | 31,120 | 1,952 | 28,008 | 1,757 | 26,608 | 1,669 | 23,947 | 1,230 | 22,749 | 1,000 |
| | | 6 | 0.018 | 31,500 | 1,780 | 25,200 | 1,424 | 22,680 | 1,282 | 21,546 | 1,218 | 19,391 | 990 | 18,422 | 810 |
| | | 8 | 0.014 | 28,000 | 1,580 | 22,400 | 1,264 | 20,160 | 1,138 | 19,152 | 1,081 | 17,237 | 880 | 16,375 | 720 |
| | | 10 | 0.01 | 24,500 | 1,390 | 19,600 | 1,112 | 17,640 | 1,001 | 16,758 | 951 | 15,082 | 770 | 14,328 | 630 |
| | | 12 | 0.008 | 21,800 | 1,100 | 17,440 | 880 | 15,696 | 792 | 14,911 | 752 | 13,420 | 600 | 12,749 | 480 |
| | | 16 | 0.006 | 21,800 | 960 | 17,440 | 768 | 15,696 | 691 | 14,911 | 657 | 13,420 | 510 | 12,749 | 400 |
| | | 20 | 0.004 | 16,300 | 720 | 13,040 | 576 | 11,736 | 518 | 11,149 | 492 | 10,034 | 385 | 9,533 | 300 |
| 1.5 | 0.05 | 4 | 0.02 | 29,900 | 2,030 | 23,920 | 1,624 | 21,528 | 1,462 | 20,452 | 1,389 | 18,406 | 1,020 | 17,486 | 830 |
| | | 8 | 0.014 | 27,200 | 1,850 | 21,760 | 1,480 | 19,584 | 1,332 | 18,605 | 1,265 | 16,744 | 1,030 | 15,907 | 840 |
| | | 12 | 0.007 | 21,800 | 1,480 | 17,440 | 1,184 | 15,696 | 1,066 | 14,911 | 1,012 | 13,420 | 820 | 12,749 | 670 |
| | | 15 | 0.006 | 16,900 | 1,020 | 13,520 | 816 | 12,168 | 734 | 11,560 | 698 | 10,404 | 560 | 9,883 | 450 |
| | | 20 | 0.004 | 16,900 | 1,020 | 13,520 | 816 | 12,168 | 734 | 11,560 | 698 | 10,404 | 560 | 9,883 | 450 |
| | 0.1 | 4 | 0.027 | 29,900 | 2,030 | 23,920 | 1,624 | 21,528 | 1,462 | 20,452 | 1,389 | 18,406 | 1,020 | 17,486 | 830 |
| | | 8 | 0.02 | 27,200 | 1,850 | 21,760 | 1,480 | 19,584 | 1,332 | 18,605 | 1,265 | 16,744 | 1,030 | 15,907 | 840 |
| | | 12 | 0.017 | 21,800 | 1,480 | 17,440 | 1,184 | 15,696 | 1,066 | 14,911 | 1,012 | 13,420 | 820 | 12,749 | 670 |
| | | 15 | 0.014 | 16,900 | 1,020 | 13,520 | 816 | 12,168 | 734 | 11,560 | 698 | 10,404 | 560 | 9,883 | 450 |
| | | 20 | 0.01 | 16,900 | 1,020 | 13,520 | 816 | 12,168 | 734 | 11,560 | 698 | 10,404 | 560 | 9,883 | 450 |
| 2 | 0.05 | 4 | 0.035 | 24,900 | 2,940 | 20,800 | 2,450 | 18,700 | 2,210 | 17,700 | 2,080 | 15,600 | 1,470 | 14,600 | 1,200 |
| | | 6 | 0.03 | 24,900 | 2,940 | 20,800 | 2,450 | 18,700 | 2,210 | 17,700 | 2,080 | 15,600 | 1,470 | 14,600 | 1,200 |
| | | 8 | 0.025 | 22,700 | 2,670 | 18,900 | 2,230 | 17,000 | 2,010 | 16,100 | 1,890 | 14,200 | 1,340 | 13,200 | 1,090 |
| | | 12 | 0.02 | 18,400 | 1,950 | 15,300 | 1,620 | 13,800 | 1,460 | 13,000 | 1,380 | 11,500 | 1,080 | 10,700 | 890 |
| | | 16 | 0.015 | 16,300 | 1,730 | 13,600 | 1,440 | 12,200 | 1,300 | 11,600 | 1,230 | 10,200 | 960 | 9,500 | 790 |
| | | 20 | 0.01 | 14,300 | 1,520 | 11,900 | 1,260 | 10,700 | 1,140 | 10,100 | 1,070 | 8,900 | 840 | 8,300 | 690 |
| | 0.1 | 4 | 0.042 | 24,900 | 2,940 | 20,800 | 2,450 | 18,700 | 2,210 | 17,700 | 2,080 | 15,600 | 1,470 | 14,600 | 1,200 |
| | | 6 | 0.042 | 24,900 | 2,940 | 20,800 | 2,450 | 18,700 | 2,210 | 17,700 | 2,080 | 15,600 | 1,470 | 14,600 | 1,200 |
| | | 8 | 0.036 | 22,700 | 2,670 | 18,900 | 2,230 | 17,000 | 2,010 | 16,100 | 1,890 | 14,200 | 1,340 | 13,200 | 1,090 |
| | | 12 | 0.036 | 18,400 | 1,950 | 15,300 | 1,620 | 13,800 | 1,460 | 13,000 | 1,380 | 11,500 | 1,080 | 10,700 | 890 |
| | | 16 | 0.023 | 16,300 | 1,730 | 13,600 | 1,440 | 12,200 | 1,300 | 11,600 | 1,230 | 10,200 | 960 | 9,500 | 790 |
| | | 20 | 0.018 | 14,300 | 1,520 | 11,900 | 1,260 | 10,700 | 1,140 | 10,100 | 1,070 | 8,900 | 840 | 8,300 | 690 |
| | 0.2 | 4 | 0.08 | 24,900 | 2,940 | 20,800 | 2,450 | 18,700 | 2,210 | 17,700 | 2,080 | 15,600 | 1,470 | 14,600 | 1,200 |
| | | 6 | 0.08 | 24,900 | 2,940 | 20,800 | 2,450 | 18,700 | 2,210 | 17,700 | 2,080 | 15,600 | 1,470 | 14,600 | 1,200 |
| | | 8 | 0.07 | 22,700 | 2,670 | 18,900 | 2,230 | 17,000 | 2,010 | 16,100 | 1,890 | 14,200 | 1,340 | 13,200 | 1,090 |
| | | 12 | 0.04 | 18,400 | 1,950 | 15,300 | 1,620 | 13,800 | 1,460 | 13,000 | 1,380 | 11,500 | 1,080 | 10,700 | 890 |
| | | 16 | 0.04 | 16,300 | 1,730 | 13,600 | 1,440 | 12,200 | 1,300 | 11,600 | 1,230 | 10,200 | 960 | 9,500 | 790 |
| | | 20 | 0.035 | 14,300 | 1,520 | 11,900 | 1,260 | 10,700 | 1,140 | 10,100 | 1,070 | 8,900 | 840 | 8,300 | 690 |
| | | 25 | 0.025 | 14,300 | 1,520 | 11,900 | 1,260 | 10,700 | 1,140 | 10,100 | 1,070 | 8,900 | 840 | 8,300 | 690 |
| | | 30 | 0.017 | 13,600 | 1,440 | 11,300 | 1,200 | 10,200 | 1,080 | 9,600 | 1,020 | 8,500 | 800 | 7,900 | 650 |
| | 0.3 | 4 | 0.11 | 24,900 | 2,940 | 20,800 | 2,450 | 18,700 | 2,210 | 17,700 | 2,080 | 15,600 | 1,470 | 14,600 | 1,200 |
| | | 8 | 0.09 | 22,700 | 2,850 | 18,900 | 2,350 | 17,000 | 2,100 | 16,100 | 1,950 | 14,200 | 1,490 | 13,200 | 1,210 |
| | | 12 | 0.06 | 18,400 | 2,170 | 15,300 | 1,810 | 13,800 | 1,620 | 13,000 | 1,530 | 11,500 | 1,200 | 10,700 | 980 |
| | | 16 | 0.06 | 16,300 | 1,930 | 13,600 | 1,610 | 12,200 | 1,440 | 11,600 | 1,360 | 10,200 | 1,070 | 9,500 | 870 |
| | | 20 | 0.037 | 14,300 | 1,680 | 11,900 | 1,400 | 10,700 | 1,260 | 10,100 | 1,190 | 8,900 | 940 | 8,300 | 770 |

【注意】ご使用にあたっては、A221ページの表下の項目と注意を参照してください。【Note】Upon usage, please refer to comments and notes below table on page A221.

# Epoch Deep Radius F
# エポックディープラジアス F

## EPDRF-TH

| 被削材 Work material | | | | 1 銅 Copper | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼入れ鋼 Hardened steels (45～55HRC) | | 6 焼入れ鋼 Hardened steels (55～65HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 120% | | 100% | | 90% | | 80% | | 65% | | 60% | |
| 外径DC Tool dia. (mm) | コーナ半径RE Corner radius (mm) | 首下長LU Under neck length (mm) | 基本切り込み Standard depth of Cut (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 2 | 0.5 | 4 | 0.17 | 24,900 | 2,940 | 20,800 | 2,450 | 18,700 | 2,210 | 17,700 | 2,080 | 15,600 | 1,470 | 14,600 | 1,200 |
| | | 6 | 0.17 | 24,900 | 2,940 | 20,800 | 2,450 | 18,700 | 2,210 | 17,700 | 2,080 | 15,600 | 1,470 | 14,600 | 1,200 |
| | | 8 | 0.14 | 22,700 | 2,850 | 18,900 | 2,350 | 17,000 | 2,100 | 16,100 | 1,950 | 14,200 | 1,490 | 13,200 | 1,210 |
| | | 12 | 0.08 | 18,400 | 2,170 | 15,300 | 1,810 | 13,800 | 1,620 | 13,000 | 1,530 | 11,500 | 1,200 | 10,700 | 980 |
| | | 16 | 0.08 | 16,300 | 1,930 | 13,600 | 1,610 | 12,200 | 1,440 | 11,600 | 1,360 | 10,200 | 1,070 | 9,500 | 870 |
| | | 20 | 0.05 | 14,300 | 1,680 | 11,900 | 1,400 | 10,700 | 1,260 | 10,100 | 1,190 | 8,900 | 940 | 8,300 | 770 |
| | | 25 | 0.05 | 14,300 | 1,680 | 11,900 | 1,400 | 10,700 | 1,260 | 10,100 | 1,190 | 8,900 | 940 | 8,300 | 770 |
| | | 30 | 0.03 | 13,600 | 1,600 | 11,300 | 1,330 | 10,200 | 1,200 | 9,600 | 1,130 | 8,500 | 850 | 7,900 | 730 |
| 2.5 | 0.1 | 8 | 0.047 | 22,700 | 2,970 | 18,900 | 2,480 | 17,000 | 2,230 | 16,100 | 2,100 | 14,200 | 1,490 | 13,200 | 1,210 |
| | | 16 | 0.037 | 16,300 | 1,930 | 13,600 | 1,610 | 12,200 | 1,440 | 11,600 | 1,360 | 10,200 | 1,070 | 9,500 | 870 |
| | | 20 | 0.025 | 14,300 | 1,680 | 11,900 | 1,400 | 10,700 | 1,260 | 10,100 | 1,190 | 8,900 | 940 | 8,300 | 770 |
| | 0.2 | 8 | 0.08 | 19,400 | 2,570 | 16,200 | 2,140 | 14,600 | 1,920 | 13,800 | 1,820 | 12,200 | 1,280 | 11,300 | 1,100 |
| | | 16 | 0.045 | 16,900 | 2,130 | 14,100 | 1,770 | 12,700 | 1,600 | 12,000 | 1,510 | 10,600 | 1,110 | 9,900 | 960 |
| | | 20 | 0.042 | 14,100 | 1,750 | 11,800 | 1,410 | 10,600 | 1,270 | 10,000 | 1,200 | 8,800 | 930 | 8,200 | 790 |
| | 0.3 | 12 | 0.09 | 17,700 | 2,350 | 14,800 | 1,960 | 13,300 | 1,760 | 12,500 | 1,660 | 11,100 | 1,230 | 10,300 | 1,010 |
| | | 20 | 0.052 | 14,100 | 1,870 | 11,800 | 1,560 | 10,600 | 1,400 | 10,000 | 1,330 | 8,800 | 1,040 | 8,200 | 850 |
| | 0.5 | 12 | 0.1 | 17,700 | 2,350 | 14,800 | 1,960 | 13,300 | 1,760 | 12,500 | 1,660 | 11,100 | 1,230 | 10,300 | 1,010 |
| | | 20 | 0.07 | 14,100 | 1,870 | 11,800 | 1,560 | 10,600 | 1,400 | 10,000 | 1,330 | 8,800 | 1,040 | 8,200 | 850 |
| 3 | 0.1 | 8 | 0.055 | 17,300 | 2,550 | 14,400 | 2,120 | 13,000 | 1,910 | 12,200 | 1,800 | 10,800 | 1,270 | 10,100 | 1,040 |
| | | 16 | 0.035 | 17,300 | 2,550 | 14,400 | 2,120 | 13,000 | 1,910 | 12,200 | 1,800 | 10,800 | 1,270 | 10,100 | 1,040 |
| | | 25 | 0.022 | 14,000 | 2,060 | 11,700 | 1,720 | 10,500 | 1,550 | 9,900 | 1,460 | 8,700 | 1,150 | 8,200 | 940 |
| | | 30 | 0.014 | 10,900 | 2,060 | 9,100 | 1,720 | 8,200 | 1,550 | 7,700 | 1,460 | 6,800 | 1,150 | 6,400 | 940 |
| | 0.2 | 8 | 0.09 | 17,300 | 2,550 | 14,400 | 2,120 | 13,000 | 1,910 | 12,200 | 1,800 | 10,800 | 1,270 | 10,100 | 1,040 |
| | | 12 | 0.07 | 17,300 | 2,550 | 14,400 | 2,120 | 13,000 | 1,910 | 12,200 | 1,800 | 10,800 | 1,270 | 10,100 | 1,040 |
| | | 16 | 0.05 | 17,300 | 2,550 | 14,400 | 2,120 | 13,000 | 1,910 | 12,200 | 1,800 | 10,800 | 1,270 | 10,100 | 1,040 |
| | | 20 | 0.05 | 14,000 | 2,060 | 11,700 | 1,720 | 10,500 | 1,550 | 9,900 | 1,460 | 8,700 | 1,150 | 8,200 | 940 |
| | | 25 | 0.045 | 14,000 | 2,060 | 11,700 | 1,720 | 10,500 | 1,550 | 9,900 | 1,460 | 8,700 | 1,150 | 8,200 | 940 |
| | | 30 | 0.04 | 10,900 | 2,060 | 9,100 | 1,720 | 8,200 | 1,550 | 7,700 | 1,460 | 6,800 | 1,150 | 6,400 | 940 |
| | 0.3 | 8 | 0.13 | 17,300 | 2,830 | 14,400 | 2,360 | 13,000 | 2,120 | 12,200 | 2,010 | 10,800 | 1,410 | 10,100 | 1,160 |
| | | 16 | 0.075 | 17,300 | 2,830 | 14,400 | 2,360 | 13,000 | 2,120 | 12,200 | 2,010 | 10,800 | 1,410 | 10,100 | 1,160 |
| | | 20 | 0.075 | 14,000 | 2,290 | 11,700 | 1,910 | 10,500 | 1,720 | 9,900 | 1,620 | 8,700 | 1,270 | 8,200 | 1,040 |
| | | 25 | 0.067 | 14,000 | 2,290 | 11,700 | 1,910 | 10,500 | 1,720 | 9,900 | 1,620 | 8,700 | 1,270 | 8,200 | 1,040 |
| | | 30 | 0.06 | 10,900 | 2,290 | 9,100 | 1,910 | 8,200 | 1,720 | 7,700 | 1,620 | 6,800 | 1,270 | 6,400 | 1,040 |
| | 0.5 | 8 | 0.18 | 17,300 | 2,830 | 14,400 | 2,360 | 13,000 | 2,120 | 12,200 | 2,010 | 10,800 | 1,410 | 10,100 | 1,160 |
| | | 12 | 0.13 | 17,300 | 2,830 | 14,400 | 2,360 | 13,000 | 2,120 | 12,200 | 2,010 | 10,800 | 1,410 | 10,100 | 1,160 |
| | | 16 | 0.1 | 17,300 | 2,830 | 14,400 | 2,360 | 13,000 | 2,120 | 12,200 | 2,010 | 10,800 | 1,410 | 10,100 | 1,160 |
| | | 20 | 0.1 | 14,000 | 2,290 | 11,700 | 1,910 | 10,500 | 1,720 | 9,900 | 1,620 | 8,700 | 1,270 | 8,200 | 1,040 |
| | | 25 | 0.09 | 14,000 | 2,290 | 11,700 | 1,910 | 10,500 | 1,720 | 9,900 | 1,620 | 8,700 | 1,270 | 8,200 | 1,040 |
| | | 30 | 0.08 | 10,900 | 2,290 | 9,100 | 1,910 | 8,200 | 1,720 | 7,700 | 1,620 | 6,800 | 1,270 | 6,400 | 1,040 |
| | | 35 | 0.065 | 10,900 | 2,290 | 9,100 | 1,910 | 8,200 | 1,720 | 7,700 | 1,620 | 6,800 | 1,270 | 6,400 | 1,040 |
| 4 | 0.1 | 12 | 0.065 | 12,400 | 3,350 | 10,400 | 2,790 | 9,300 | 2,520 | 8,800 | 2,240 | 7,800 | 1,750 | 7,200 | 1,300 |
| | | 20 | 0.055 | 12,400 | 3,350 | 10,400 | 2,790 | 9,300 | 2,520 | 8,800 | 2,240 | 7,800 | 1,750 | 7,200 | 1,300 |
| | | 30 | 0.045 | 11,200 | 3,020 | 9,300 | 2,520 | 8,400 | 2,010 | 7,900 | 1,830 | 7,000 | 1,470 | 6,500 | 1,170 |
| | | 40 | 0.03 | 11,200 | 3,020 | 9,300 | 2,520 | 8,400 | 2,010 | 7,900 | 1,830 | 7,000 | 1,470 | 6,500 | 1,170 |
| | 0.2 | 12 | 0.13 | 12,400 | 3,350 | 10,400 | 2,790 | 9,300 | 2,520 | 8,800 | 2,240 | 7,800 | 1,750 | 7,200 | 1,300 |
| | | 20 | 0.1 | 12,400 | 3,350 | 10,400 | 2,790 | 9,300 | 2,520 | 8,800 | 2,240 | 7,800 | 1,750 | 7,200 | 1,300 |
| | | 30 | 0.08 | 11,200 | 3,020 | 9,300 | 2,520 | 8,400 | 2,010 | 7,900 | 1,830 | 7,000 | 1,470 | 6,500 | 1,170 |
| | | 40 | 0.06 | 11,200 | 3,020 | 9,300 | 2,520 | 8,400 | 2,010 | 7,900 | 1,830 | 7,000 | 1,470 | 6,500 | 1,170 |

| 被削材 Work material | | | | 1 銅 Copper | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼入れ鋼 Hardened steels (45～55HRC) | | 6 焼入れ鋼 Hardened steels (55～65HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 120% | | 100% | | 90% | | 80% | | 65% | | 60% | |
| 外径DC Tool dia. (mm) | コーナ半径RE Corner radius (mm) | 首下長LU Under neck length (mm) | 基本切り込み Standard depth of Cut (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 4 | 0.3 | 12 | 0.17 | 12,400 | 3,350 | 10,400 | 2,790 | 9,300 | 2,520 | 8,800 | 2,380 | 7,800 | 1,860 | 7,200 | 1,410 |
| | | 20 | 0.13 | 12,400 | 3,350 | 10,400 | 2,790 | 9,300 | 2,520 | 8,800 | 2,380 | 7,800 | 1,860 | 7,200 | 1,410 |
| | | 30 | 0.1 | 11,200 | 3,020 | 9,300 | 2,520 | 8,400 | 2,260 | 7,900 | 1,900 | 7,000 | 1,570 | 6,500 | 1,170 |
| | | 40 | 0.08 | 11,200 | 3,020 | 9,300 | 2,520 | 8,400 | 2,260 | 7,900 | 1,900 | 7,000 | 1,570 | 6,500 | 1,170 |
| | 0.5 | 12 | 0.24 | 12,400 | 3,350 | 10,400 | 2,790 | 9,300 | 2,520 | 8,800 | 2,380 | 7,800 | 1,860 | 7,200 | 1,410 |
| | | 20 | 0.2 | 12,400 | 3,350 | 10,400 | 2,790 | 9,300 | 2,520 | 8,800 | 2,380 | 7,800 | 1,860 | 7,200 | 1,410 |
| | | 30 | 0.17 | 11,200 | 3,020 | 9,300 | 2,520 | 8,400 | 2,260 | 7,900 | 1,900 | 7,000 | 1,570 | 6,500 | 1,170 |
| | | 40 | 0.1 | 11,200 | 3,020 | 9,300 | 2,520 | 8,400 | 2,260 | 7,900 | 1,900 | 7,000 | 1,570 | 6,500 | 1,170 |
| 5 | 0.1 | 20 | 0.07 | 9,700 | 2,620 | 8,100 | 2,190 | 7,300 | 1,970 | 6,900 | 1,760 | 6,100 | 1,370 | 5,700 | 1,020 |
| | | 40 | 0.035 | 8,700 | 2,360 | 7,300 | 1,970 | 6,600 | 1,570 | 6,200 | 1,430 | 5,500 | 1,150 | 5,100 | 920 |
| | 0.2 | 20 | 0.15 | 9,700 | 2,620 | 8,100 | 2,190 | 7,300 | 1,970 | 6,900 | 1,760 | 6,100 | 1,370 | 5,700 | 1,020 |
| | | 40 | 0.08 | 8,700 | 2,360 | 7,300 | 1,970 | 6,600 | 1,570 | 6,200 | 1,430 | 5,500 | 1,150 | 5,100 | 920 |
| | 0.3 | 20 | 0.21 | 9,700 | 2,620 | 8,100 | 2,190 | 7,300 | 1,970 | 6,900 | 1,860 | 6,100 | 1,460 | 5,700 | 1,110 |
| | | 40 | 0.1 | 8,700 | 2,360 | 7,300 | 1,970 | 6,600 | 1,770 | 6,200 | 1,490 | 5,500 | 1,230 | 5,100 | 920 |
| | 0.5 | 20 | 0.28 | 9,700 | 2,620 | 8,100 | 2,190 | 7,300 | 1,970 | 6,900 | 1,860 | 6,100 | 1,460 | 5,700 | 1,110 |
| | | 40 | 0.14 | 8,700 | 2,360 | 7,300 | 1,970 | 6,600 | 1,770 | 6,200 | 1,490 | 5,500 | 1,230 | 5,100 | 920 |
| | 1 | 20 | 0.35 | 9,700 | 2,620 | 8,100 | 2,190 | 7,300 | 1,970 | 6,900 | 1,860 | 6,100 | 1,460 | 5,700 | 1,110 |
| | | 40 | 0.18 | 8,700 | 2,360 | 7,300 | 1,970 | 6,600 | 1,770 | 6,200 | 1,490 | 5,500 | 1,230 | 5,100 | 920 |
| 6 | 0.2 | 30 | 0.15 | 8,600 | 2,330 | 7,200 | 1,940 | 6,500 | 1,750 | 6,100 | 1,560 | 5,400 | 1,220 | 5,000 | 910 |
| | | 54 | 0.1 | 7,800 | 2,100 | 6,500 | 1,750 | 5,800 | 1,400 | 5,500 | 1,270 | 4,900 | 1,020 | 4,500 | 820 |
| | | 72 | 0.07 | 7,800 | 2,100 | 6,500 | 1,750 | 5,800 | 1,400 | 5,500 | 1,270 | 4,900 | 1,020 | 4,500 | 820 |
| | 0.3 | 30 | 0.25 | 8,600 | 2,330 | 7,200 | 1,940 | 6,500 | 1,750 | 6,100 | 1,560 | 5,400 | 1,300 | 5,000 | 980 |
| | | 54 | 0.18 | 7,800 | 2,100 | 6,500 | 1,750 | 5,800 | 1,570 | 5,500 | 1,270 | 4,900 | 1,090 | 4,500 | 820 |
| | | 72 | 0.1 | 7,800 | 2,100 | 6,500 | 1,750 | 5,800 | 1,570 | 5,500 | 1,270 | 4,900 | 1,090 | 4,500 | 820 |
| | 0.5 | 30 | 0.35 | 8,600 | 2,330 | 7,200 | 1,940 | 6,500 | 1,750 | 6,100 | 1,650 | 5,400 | 1,300 | 5,000 | 980 |
| | | 54 | 0.25 | 7,800 | 2,100 | 6,500 | 1,750 | 5,800 | 1,570 | 5,500 | 1,320 | 4,900 | 1,090 | 4,500 | 820 |
| | | 72 | 0.15 | 7,800 | 2,100 | 6,500 | 1,750 | 5,800 | 1,570 | 5,500 | 1,320 | 4,900 | 1,090 | 4,500 | 820 |
| | 1 | 30 | 0.55 | 8,600 | 2,330 | 7,200 | 1,940 | 6,500 | 1,750 | 6,100 | 1,650 | 5,400 | 1,300 | 5,000 | 980 |
| | | 54 | 0.4 | 7,800 | 2,100 | 6,500 | 1,750 | 5,800 | 1,570 | 5,500 | 1,320 | 4,900 | 1,090 | 4,500 | 820 |
| | | 72 | 0.22 | 7,800 | 2,100 | 6,500 | 1,750 | 5,800 | 1,570 | 5,500 | 1,320 | 4,900 | 1,090 | 4,500 | 820 |

## 【注意】

基本切り込みは被削材グループ2での目安を示しています。その他のグループの場合は、上表の切り込み比率を目安に調整してください。
上記条件は仕上げ加工条件の目安です。荒加工においては、送り速度を更に30%程度上げる事が可能です。

①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示ものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

## 【Note】

The indicated standard cutting depth is a reference value for Group 2 work materials. For materials in other groups, the cutting depth should be adjusted using the reference ratio shown in the above table.
The above conditions are reference conditions for finish machining. For rough machining, it is possible to increase the feed rate by around 30%.

①Use the appropriate coolant for the work material and machining shape.
②These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions.
In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
③If the machine rotation speed is insufficient, reduce the rotation speed and feed rate by the same ratio.

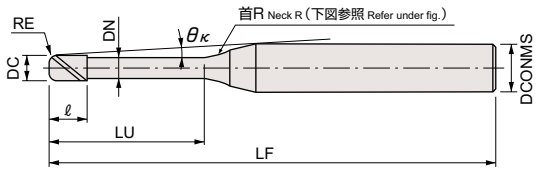
# Epoch Turbo Rib
# エポックターボリブ

**ストレートネック** | Straight Neck

溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / 細部 Miniature / 取りのこし Rest Material Machining / 荒 Roughing / 中仕上 Semi Finishing / 仕上 Finishing / リブ・細部 Rib Miniature

RE公差 RE tolerance ±0.01　h5　(mm)

ビビリ振動を抑制して、より深くより速く加工可能。
Suppresses chattering to enable deeper, faster machining.



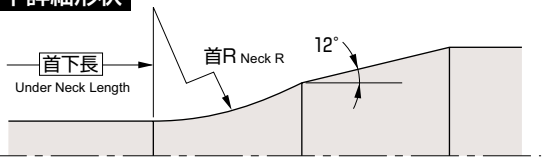

4枚刃 4Flutes

## ETR4○○○○-○○-○○-TH

超硬 Carbide　TH　ねじれ45° Helix angle　切削条件表 A224 Cutting Conditions

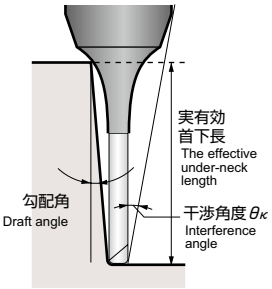
| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 首下長 Under neck length LU | 刃長 Flute length ℓ | 首径 Neck dia. DN | 全長L Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度 Interference angle (°) θκ | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ETR4010-5-02-TH | ● | 1 | 0.2 | 5 | 1 | 0.94 | 50 | 6 | 4 | 8.52 | 5.79 | 6.01 | 6.21 | 6.38 | 6.75 | 10,110 |
| ETR4010-7.5-02-TH | ● | | | 7.5 | 1 | 0.94 | 50 | 6 | 4 | 7.42 | 8.39 | 8.68 | 8.91 | 9.11 | 10.07 | 10,940 |
| ETR4010-10-02-TH | ● | | | 10 | 1 | 0.94 | 50 | 6 | 4 | 6.58 | 10.98 | 11.32 | 11.58 | 12.09 | 13.39 | 10,940 |
| ETR4010-12.5-02-TH | ● | | | 12.5 | 1 | 0.94 | 60 | 6 | 4 | 5.90 | 13.57 | 13.94 | 14.38 | 15.08 | 16.71 | 10,940 |
| ETR4010-15-02-TH | ● | | | 15 | 1 | 0.94 | 60 | 6 | 4 | 5.35 | 16.15 | 16.55 | 17.24 | 18.07 | 20.03 | 13,930 |
| ETR4010-17.5-02-TH | ● | | | 17.5 | 1 | 0.94 | 60 | 6 | 4 | 4.90 | 18.72 | 19.20 | 20.09 | 21.07 | 23.35 | 13,930 |
| ETR4010-20-02-TH | ● | | | 20 | 1 | 0.94 | 60 | 6 | 4 | 4.51 | 21.29 | 21.92 | 22.94 | 24.06 | 26.66 | 17,140 |
| ETR4010-22.5-02-TH | ● | | | 22.5 | 1 | 0.94 | 70 | 6 | 4 | 4.19 | 23.85 | 24.64 | 25.79 | 27.05 | 29.98 | 22,930 |
| ETR4010-25-02-TH | ● | | | 25 | 1 | 0.94 | 70 | 6 | 4 | 3.90 | 26.41 | 27.37 | 28.64 | 30.04 | 33.30 | 22,930 |
| ETR4010-27.5-02-TH | ● | | | 27.5 | 1 | 0.94 | 70 | 6 | 4 | 3.65 | 28.97 | 30.09 | 31.49 | 33.03 | 36.62 | 28,180 |
| ETR4010-30-02-TH | ● | | | 30 | 1 | 0.94 | 70 | 6 | 4 | 3.44 | 31.52 | 32.82 | 34.34 | 36.02 | 39.94 | 28,180 |
| ETR40125-5-02-TH | ● | 1.25 | 0.2 | 5 | 1.25 | 1.18 | 50 | 6 | 4 | 8.38 | 5.81 | 6.03 | 6.22 | 6.39 | 6.79 | 10,110 |
| ETR40125-10-02-TH | ● | | | 10 | 1.25 | 1.18 | 50 | 6 | 4 | 6.42 | 11.00 | 11.33 | 11.59 | 12.12 | 13.42 | 10,940 |
| ETR40125-15-02-TH | ● | | | 15 | 1.25 | 1.18 | 60 | 6 | 4 | 5.20 | 16.16 | 16.56 | 17.26 | 18.10 | 20.06 | 13,930 |
| ETR40125-20-02-TH | ● | | | 20 | 1.25 | 1.18 | 60 | 6 | 4 | 4.37 | 21.30 | 21.95 | 22.97 | 24.09 | 26.69 | 17,140 |
| ETR40125-25-02-TH | ● | | | 25 | 1.25 | 1.18 | 70 | 6 | 4 | 3.77 | 26.42 | 27.39 | 28.67 | 30.07 | 33.33 | 22,930 |
| ETR40125-30-02-TH | ● | | | 30 | 1.25 | 1.18 | 70 | 6 | 4 | 3.31 | 31.54 | 32.84 | 34.37 | 36.05 | 39.97 | 28,180 |
| ETR4015-5-03-TH | ● | 1.5 | 0.3 | 5 | 1.5 | 1.42 | 50 | 6 | 4 | 8.28 | 5.83 | 6.05 | 6.23 | 6.40 | 6.79 | 10,410 |
| ETR4015-10-03-TH | ● | | | 10 | 1.5 | 1.42 | 50 | 6 | 4 | 6.28 | 11.02 | 11.34 | 11.60 | 12.13 | 13.42 | 10,940 |
| ETR4015-15-03-TH | ● | | | 15 | 1.5 | 1.42 | 60 | 6 | 4 | 5.05 | 16.18 | 16.57 | 17.28 | 18.11 | 20.06 | 12,970 |
| ETR4015-20-03-TH | ● | | | 20 | 1.5 | 1.42 | 60 | 6 | 4 | 4.23 | 21.31 | 21.96 | 22.98 | 24.09 | 26.69 | 12,970 |
| ETR4015-25-03-TH | ● | | | 25 | 1.5 | 1.42 | 70 | 6 | 4 | 3.63 | 26.43 | 27.41 | 28.68 | 30.08 | 33.33 | 17,360 |
| ETR4015-30-03-TH | ● | | | 30 | 1.5 | 1.42 | 70 | 6 | 4 | 3.19 | 31.55 | 32.86 | 34.38 | 36.06 | 39.97 | 21,320 |
| ETR40175-10-03-TH | ● | 1.75 | 0.3 | 10 | 1.75 | 1.65 | 50 | 6 | 4 | 6.09 | 11.06 | 11.37 | 11.63 | 12.18 | 13.48 | 10,940 |
| ETR40175-20-03-TH | ● | | | 20 | 1.75 | 1.65 | 60 | 6 | 4 | 4.07 | 21.34 | 22.01 | 23.03 | 24.15 | 26.76 | 12,970 |
| ETR40175-30-03-TH | ● | | | 30 | 1.75 | 1.65 | 70 | 6 | 4 | 3.05 | 31.57 | 32.91 | 34.44 | 36.12 | 40.03 | 21,320 |
| ETR40175-40-03-TH | ● | | | 40 | 1.75 | 1.65 | 80 | 6 | 4 | 2.44 | 41.94 | 43.80 | 45.84 | 48.08 | 干渉なし | 25,600 |
| ETR4020-10-05-TH | ● | 2 | 0.5 | 10 | 2 | 1.92 | 50 | 6 | 4 | 5.98 | 11.01 | 11.33 | 11.59 | 12.09 | 13.36 | 10,940 |
| ETR4020-15-05-TH | ● | | | 15 | 2 | 1.92 | 60 | 6 | 4 | 4.75 | 16.17 | 16.56 | 17.25 | 18.07 | 19.99 | 10,940 |
| ETR4020-20-05-TH | ● | | | 20 | 2 | 1.92 | 60 | 6 | 4 | 3.94 | 21.31 | 21.95 | 22.95 | 24.06 | 26.63 | 10,940 |
| ETR4020-25-05-TH | ● | | | 25 | 2 | 1.92 | 70 | 6 | 4 | 3.36 | 26.43 | 27.39 | 28.65 | 30.04 | 33.27 | 14,680 |
| ETR4020-30-05-TH | ● | | | 30 | 2 | 1.92 | 70 | 6 | 4 | 2.93 | 31.54 | 32.84 | 34.36 | 36.02 | 干渉なし | 18,000 |
| ETR4020-35-05-TH | ● | | | 35 | 2 | 1.92 | 80 | 6 | 4 | 2.60 | 36.67 | 38.29 | 40.06 | 42.00 | 干渉なし | 19,820 |
| ETR4020-40-05-TH | ● | | | 40 | 2 | 1.92 | 80 | 6 | 4 | 2.34 | 41.88 | 43.73 | 45.76 | 47.99 | 干渉なし | 21,650 |
| ETR4025-10-05-TH | ● | 2.5 | 0.5 | 10 | 2.5 | 2.4 | 50 | 6 | 4 | 5.57 | 11.05 | 11.36 | 11.61 | 12.15 | 13.42 | 10,940 |
| ETR4025-20-05-TH | ● | | | 20 | 2.5 | 2.4 | 60 | 6 | 4 | 3.59 | 21.34 | 22.00 | 23.00 | 24.11 | 26.69 | 11,470 |
| ETR4025-30-05-TH | ● | | | 30 | 2.5 | 2.4 | 70 | 6 | 4 | 2.64 | 31.57 | 32.89 | 34.41 | 36.08 | 干渉なし | 18,860 |
| ETR4025-40-05-TH | ● | | | 40 | 2.5 | 2.4 | 80 | 6 | 4 | 2.09 | 41.93 | 43.79 | 45.81 | 48.04 | 干渉なし | 22,610 |
| ETR4025-50-05-TH | ● | | | 50 | 2.5 | 2.4 | 90 | 6 | 4 | 1.73 | 52.36 | 54.68 | 57.22 | 干渉なし | 干渉なし | 26,780 |
| ETR4030-10-08-TH | ● | 3 | 0.8 | 10 | 3 | 2.86 | 50 | 6 | 4 | 5.17 | 11.12 | 11.40 | 11.66 | 12.20 | 13.45 | 12,540 |
| ETR4030-20-08-TH | ● | | | 20 | 3 | 2.86 | 60 | 6 | 4 | 3.23 | 21.39 | 22.07 | 23.07 | 24.17 | 26.72 | 14,150 |
| ETR4030-30-08-TH | ● | | | 30 | 3 | 2.86 | 70 | 6 | 4 | 2.35 | 31.61 | 32.97 | 34.47 | 36.13 | 干渉なし | 16,290 |
| ETR4030-40-08-TH | ● | | | 40 | 3 | 2.86 | 80 | 6 | 4 | 1.85 | 42.02 | 43.86 | 45.88 | 干渉なし | 干渉なし | 20,780 |
| ETR4030-50-08-TH | ● | | | 50 | 3 | 2.86 | 90 | 6 | 4 | 1.52 | 52.45 | 54.76 | 57.28 | 干渉なし | 干渉なし | 24,530 |

### 首下詳細形状




【注意】
加工物に勾配がついている場合、干渉領域は、首下長さよりも長くなります。それぞれの勾配角に対する実有効首下長をご参照ください。
また、工具が加工物に干渉する角度を干渉角度θκで表示していますので合わせてご参照ください。

【Note】
If the workpiece has draft angle, the interference length will be longer than the under-neck length.Please refer to the effective under-neck length for the various draft angles.
In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle θκ", and should also be referred to.




●：標準在庫品です。●：Stocked items.　干渉なし：No interference

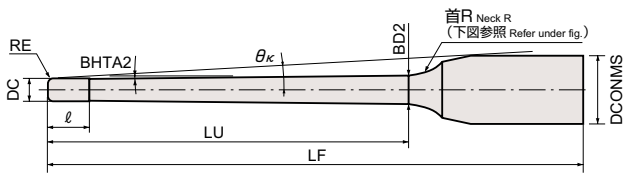
## ペンシルネック Pencil Neck

彫込み Die-sinking / 曲面 Profiling / R Radius / 細部 Miniature / 取りのこし Rest Material Machining / 荒 Roughing / 中仕上 Semi Finishing / 仕上 Finishing / リブ・細部 Rib Miniature

RE公差 RE tolerance ±0.01　h5　(mm)

4枚刃 4Flutes

ビビリ振動を抑制して、より深くより速く加工可能。
Suppresses chattering to enable deeper, faster machining.




# ETRP4○○○○-○○-○○○○-TH

超硬 Carbide / TH / ねじれ45° Helix angle / 切削条件表 A225 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 首下長 Under neck length LU | 首部テーパ半角 Neck angle BHTA2 | 刃長 Flute length ℓ | 首元径dn Under neck dia. BD2 | 全長L Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度 Interference angle (°) θκ | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0° | 1° | 1.5° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ETRP4010-5-0902-TH | ● | 1 | 0.2 | 5 | 0.9 | 1 | 1.066 | 60 | 6 | 4 | 8.67 | 2.91 | 5.70 | 5.96 | 6.17 | 6.51 | 12,540 |
| ETRP4010-7.5-0902-TH | ● | | | 7.5 | 0.9 | 1 | 1.144 | 60 | 6 | 7 | 7.61 | 2.91 | 8.50 | 8.97 | 9.34 | 9.93 | 12,540 |
| ETRP4010-10-0902-TH | ● | | | 10 | 0.9 | 1 | 1.223 | 60 | 6 | 7 | 6.78 | 2.91 | 11.04 | 11.60 | 12.03 | 12.70 | 12,540 |
| ETRP4010-15-0902-TH | ● | | | 15 | 0.9 | 1 | 1.380 | 60 | 6 | 10 | 5.57 | 2.91 | 16.35 | 17.25 | 17.89 | 18.89 | 16,830 |
| ETRP4010-20-0902-TH | ● | | | 20 | 0.9 | 1 | 1.537 | 70 | 6 | 10 | 4.72 | 2.91 | 21.42 | 22.49 | 23.22 | 24.80 | 19,820 |
| ETRP4010-25-0902-TH | ● | | | 25 | 0.9 | 1 | 1.694 | 70 | 6 | 10 | 4.10 | 2.91 | 26.49 | 27.70 | 28.52 | 30.95 | 20,680 |
| ETRP4010-30-0902-TH | ● | | | 30 | 0.9 | 1 | 1.851 | 80 | 6 | 10 | 3.62 | 2.91 | 31.55 | 32.90 | 33.79 | 37.09 | 21,650 |
| ETRP4010-35-0902-TH | ● | | | 35 | 0.9 | 1 | 2.008 | 80 | 6 | 10 | 3.24 | 2.91 | 36.61 | 38.08 | 39.03 | 43.24 | 22,500 |
| ETRP4010-40-0902-TH | ● | | | 40 | 0.9 | 1 | 2.165 | 90 | 6 | 10 | 2.94 | 2.91 | 41.67 | 43.25 | 44.54 | 干渉なし | 24,000 |
| ETRP4010-45-0902-TH | ● | | | 45 | 0.9 | 1 | 2.322 | 90 | 6 | 10 | 2.68 | 2.91 | 46.73 | 48.41 | 50.08 | 干渉なし | 24,640 |
| ETRP4010-50-0902-TH | ● | | | 50 | 0.9 | 1 | 2.480 | 100 | 6 | 10 | 2.47 | 2.91 | 51.78 | 53.56 | 55.62 | 干渉なし | 25,290 |
| ETRP40125-10-0902-TH | ● | 1.25 | 0.2 | 10 | 0.9 | 1.25 | 1.455 | 60 | 6 | 7 | 6.62 | 3.47 | 11.10 | 11.65 | 12.06 | 12.73 | 12,540 |
| ETRP40125-15-0902-TH | ● | | | 15 | 0.9 | 1.25 | 1.612 | 60 | 6 | 10 | 5.41 | 3.47 | 16.42 | 17.29 | 17.92 | 18.91 | 16,830 |
| ETRP40125-20-0902-TH | ● | | | 20 | 0.9 | 1.25 | 1.769 | 70 | 6 | 10 | 4.57 | 3.47 | 21.49 | 22.52 | 23.25 | 24.86 | 19,820 |
| ETRP40125-30-0902-TH | ● | | | 30 | 0.9 | 1.25 | 2.083 | 80 | 6 | 10 | 3.49 | 3.47 | 31.61 | 32.93 | 33.81 | 37.15 | 21,650 |
| ETRP40125-40-0902-TH | ● | | | 40 | 0.9 | 1.25 | 2.397 | 90 | 6 | 10 | 2.82 | 3.47 | 41.73 | 43.28 | 44.59 | 干渉なし | 24,000 |
| ETRP40125-50-0902-TH | ● | | | 50 | 0.9 | 1.25 | 2.712 | 100 | 6 | 10 | 2.37 | 3.47 | 51.83 | 53.59 | 55.67 | 干渉なし | 25,290 |
| ETRP4015-10-0903-TH | ● | 1.5 | 0.3 | 10 | 0.9 | 1.5 | 1.687 | 60 | 6 | 7 | 6.47 | 4.04 | 11.15 | 11.67 | 12.08 | 12.74 | 12,540 |
| ETRP4015-15-0903-TH | ● | | | 15 | 0.9 | 1.5 | 1.844 | 60 | 6 | 7 | 5.26 | 4.04 | 16.21 | 16.89 | 17.40 | 18.73 | 15,000 |
| ETRP4015-20-0903-TH | ● | | | 20 | 0.9 | 1.5 | 2.001 | 70 | 6 | 10 | 4.43 | 4.04 | 21.54 | 22.55 | 23.27 | 24.88 | 15,000 |
| ETRP4015-30-0903-TH | ● | | | 30 | 0.9 | 1.5 | 2.315 | 80 | 6 | 10 | 3.36 | 4.04 | 31.66 | 32.95 | 33.83 | 37.17 | 20,680 |
| ETRP4015-40-0903-TH | ● | | | 40 | 0.9 | 1.5 | 2.630 | 90 | 6 | 10 | 2.71 | 4.04 | 41.77 | 43.30 | 44.62 | 干渉なし | 24,000 |
| ETRP4015-50-0903-TH | ● | | | 50 | 0.9 | 1.5 | 2.944 | 100 | 6 | 10 | 2.27 | 4.04 | 51.88 | 53.60 | 55.70 | 干渉なし | 25,290 |
| ETRP40175-10-0903-TH | ● | 1.75 | 0.3 | 10 | 0.9 | 1.75 | 1.909 | 60 | 6 | 7 | 6.28 | 4.93 | 11.24 | 11.74 | 12.13 | 12.77 | 12,540 |
| ETRP40175-15-0903-TH | ● | | | 15 | 0.9 | 1.75 | 2.066 | 60 | 6 | 7 | 5.07 | 4.93 | 16.29 | 16.95 | 17.44 | 18.82 | 15,000 |
| ETRP40175-20-0903-TH | ● | | | 20 | 0.9 | 1.75 | 2.223 | 70 | 6 | 10 | 4.26 | 4.93 | 21.64 | 22.61 | 23.32 | 24.97 | 15,000 |
| ETRP40175-30-0903-TH | ● | | | 30 | 0.9 | 1.75 | 2.538 | 80 | 6 | 10 | 3.22 | 4.93 | 31.75 | 33.00 | 33.86 | 37.26 | 20,680 |
| ETRP40175-40-0903-TH | ● | | | 40 | 0.9 | 1.75 | 2.852 | 90 | 6 | 10 | 2.59 | 4.93 | 41.86 | 43.34 | 44.70 | 干渉なし | 24,000 |
| ETRP40175-50-0903-TH | ● | | | 50 | 0.9 | 1.75 | 3.166 | 100 | 6 | 10 | 2.16 | 4.93 | 51.95 | 53.64 | 55.78 | 干渉なし | 25,290 |
| ETRP4020-15-0905-TH | ● | 2 | 0.5 | 15 | 0.9 | 2 | 2.328 | 60 | 6 | 7 | 4.95 | 4.54 | 16.23 | 16.91 | 17.40 | 18.72 | 12,540 |
| ETRP4020-20-0905-TH | ● | | | 20 | 0.9 | 2 | 2.486 | 70 | 6 | 7 | 4.12 | 4.54 | 21.29 | 22.10 | 22.67 | 24.86 | 12,540 |
| ETRP4020-25-0905-TH | ● | | | 25 | 0.9 | 2 | 2.643 | 70 | 6 | 10 | 3.54 | 4.54 | 26.63 | 27.77 | 28.57 | 31.01 | 16,830 |
| ETRP4020-30-0905-TH | ● | | | 30 | 0.9 | 2 | 2.800 | 80 | 6 | 10 | 3.1 | 4.54 | 31.69 | 32.96 | 33.83 | 37.16 | 20,680 |
| ETRP4020-35-0905-TH | ● | | | 35 | 0.9 | 2 | 2.957 | 80 | 6 | 10 | 2.75 | 4.54 | 36.75 | 38.14 | 39.09 | 干渉なし | 21,650 |
| ETRP4020-40-0905-TH | ● | | | 40 | 0.9 | 2 | 3.114 | 90 | 6 | 10 | 2.48 | 4.54 | 41.80 | 43.31 | 44.63 | 干渉なし | 22,500 |
| ETRP4020-45-0905-TH | ● | | | 45 | 0.9 | 2 | 3.271 | 90 | 6 | 10 | 2.25 | 4.54 | 46.85 | 48.46 | 50.17 | 干渉なし | 25,290 |
| ETRP4020-50-0905-TH | ● | | | 50 | 0.9 | 2 | 3.428 | 100 | 6 | 10 | 2.07 | 4.54 | 51.90 | 53.61 | 55.71 | 干渉なし | 25,290 |
| ETRP4020-55-0905-TH | ● | | | 55 | 0.9 | 2 | 3.585 | 100 | 6 | 10 | 1.91 | 4.54 | 56.95 | 58.75 | 干渉なし | 干渉なし | 26,900 |
| ETRP4020-60-0905-TH | ● | | | 60 | 0.9 | 2 | 3.742 | 110 | 6 | 10 | 1.77 | 4.54 | 62.00 | 63.89 | 干渉なし | 干渉なし | 26,900 |
| ETRP4025-20-0905-TH | ● | 2.5 | 0.5 | 20 | 0.9 | 2.5 | 2.950 | 70 | 6 | 7 | 3.76 | 5.68 | 21.39 | 22.16 | 22.72 | 24.98 | 16,290 |
| ETRP4025-30-0905-TH | ● | | | 30 | 0.9 | 2.5 | 3.264 | 80 | 6 | 10 | 2.79 | 5.68 | 31.80 | 33.02 | 33.88 | 干渉なし | 20,680 |
| ETRP4025-40-0905-TH | ● | | | 40 | 0.9 | 2.5 | 3.578 | 90 | 6 | 10 | 2.22 | 5.68 | 41.90 | 43.36 | 44.73 | 干渉なし | 22,500 |
| ETRP4025-50-0905-TH | ● | | | 50 | 0.9 | 2.5 | 3.892 | 100 | 6 | 10 | 1.85 | 5.68 | 52.00 | 53.66 | 干渉なし | 干渉なし | 25,290 |
| ETRP4025-60-0905-TH | ● | | | 60 | 0.9 | 2.5 | 4.207 | 110 | 6 | 10 | 1.58 | 5.68 | 62.09 | 63.93 | 干渉なし | 干渉なし | 26,900 |
| ETRP4030-20-0908-TH | ● | 3 | 0.8 | 20 | 0.9 | 3 | 3.394 | 70 | 6 | 7 | 3.39 | 7.45 | 21.50 | 22.22 | 22.76 | 25.05 | 16,290 |
| ETRP4030-30-0908-TH | ● | | | 30 | 0.9 | 3 | 3.708 | 80 | 6 | 7 | 2.49 | 7.45 | 31.59 | 32.54 | 33.74 | 干渉なし | 18,750 |
| ETRP4030-40-0908-TH | ● | | | 40 | 0.9 | 3 | 4.022 | 90 | 6 | 10 | 1.96 | 7.45 | 42.03 | 43.42 | 干渉なし | 干渉なし | 21,650 |
| ETRP4030-50-0908-TH | ● | | | 50 | 0.9 | 3 | 4.337 | 100 | 6 | 10 | 1.62 | 7.45 | 52.12 | 53.72 | 干渉なし | 干渉なし | 23,360 |
| ETRP4030-60-0908-TH | ● | | | 60 | 0.9 | 3 | 4.651 | 110 | 6 | 10 | 1.37 | 7.45 | 62.20 | 干渉なし | 干渉なし | 干渉なし | 25,290 |

## ETR-TH、ETRP-TH の対応被削材

Applicable work material of ETR-TH, ETRP-TH

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ○ | | ○ | ◎ | ○ | ○ |

## 再研磨対応外径範囲 Re-grinding compatibility range

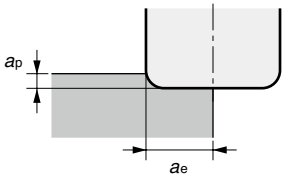
| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| ETR-TH | × (N/A) | 2～3 |
| ETRP-TH | × (N/A) | 2～3 |

【注意】首下長／外径が10DCを超える工具の再研磨可否については、弊社営業にお問い合わせください。
【Note】Contact our sales office regarding whether or not regrinding is possible for tools where under neck length/tool diameter more than 10DC

# Epoch Turbo Rib
# エポックターボリブ

## 標準切削条件表 Recommended cutting conditions

**ETR-TH**
首下ストレート
Straight Neck

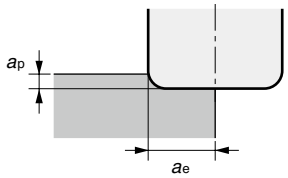



| 被削材 Work material | | 鋳鉄・炭素鋼・合金鋼 Cast irons, Carbon steels, Alloy steels (150～250HB) FC S50C SCM | | | | 工具鋼 Tool steels (25～35HRC) SUS304 SKD | | | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80 CENA1 | | | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61 SKT4 | | | | 焼入れ鋼 Hardened steels (55～60HRC) SKD11 SKH51 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 外径 Tool dia. mm | 首下長 Under neck length mm | 回転数 min-1 | 送り速度 mm/min | ap mm | ae mm | 回転数 min-1 | 送り速度 mm/min | ap mm | ae mm | 回転数 min-1 | 送り速度 mm/min | ap mm | ae mm | 回転数 min-1 | 送り速度 mm/min | ap mm | ae mm | 回転数 min-1 | 送り速度 mm/min | ap mm | ae mm |
| 1 | 5 | 32,000 | 5,820 | 0.040 | 0.50 | 27,100 | 4,510 | 0.040 | 0.50 | 22,300 | 2,900 | 0.032 | 0.50 | 19,100 | 2,480 | 0.020 | 0.50 | 15,900 | 830 | 0.012 | 0.50 |
| | 7.5 | 32,000 | 5,820 | 0.027 | 0.50 | 27,100 | 4,510 | 0.027 | 0.50 | 22,300 | 2,900 | 0.021 | 0.50 | 19,100 | 2,480 | 0.013 | 0.50 | 15,900 | 830 | 0.008 | 0.50 |
| | 10 | 32,000 | 5,820 | 0.020 | 0.50 | 27,100 | 4,510 | 0.020 | 0.50 | 22,300 | 2,900 | 0.016 | 0.50 | 19,100 | 2,480 | 0.010 | 0.50 | 15,900 | 830 | 0.006 | 0.50 |
| | 12.5 | 28,800 | 5,240 | 0.016 | 0.50 | 24,400 | 4,060 | 0.016 | 0.50 | 20,100 | 2,610 | 0.013 | 0.50 | 17,200 | 2,230 | 0.008 | 0.50 | 14,300 | 750 | 0.005 | 0.50 |
| | 15 | 28,800 | 5,240 | 0.013 | 0.50 | 24,400 | 4,060 | 0.013 | 0.50 | 20,100 | 2,610 | 0.011 | 0.50 | 17,200 | 2,230 | 0.007 | 0.50 | 14,300 | 750 | 0.004 | 0.50 |
| | 17.5 | 25,600 | 4,660 | 0.011 | 0.50 | 21,700 | 3,610 | 0.011 | 0.50 | 17,800 | 2,320 | 0.009 | 0.50 | 15,300 | 1,980 | 0.006 | 0.50 | 12,700 | 660 | 0.003 | 0.50 |
| | 20 | 25,600 | 4,660 | 0.010 | 0.50 | 21,700 | 3,610 | 0.010 | 0.50 | 17,800 | 2,320 | 0.008 | 0.50 | 15,300 | 1,980 | 0.005 | 0.50 | 12,700 | 660 | 0.003 | 0.50 |
| | 22.5 | 22,400 | 4,070 | 0.009 | 0.50 | 19,000 | 3,160 | 0.009 | 0.50 | 15,600 | 2,030 | 0.007 | 0.50 | 13,400 | 1,740 | 0.004 | 0.50 | 11,100 | 580 | 0.003 | 0.50 |
| | 25 | 22,400 | 4,070 | 0.008 | 0.50 | 19,000 | 3,160 | 0.008 | 0.50 | 15,600 | 2,030 | 0.006 | 0.50 | 13,400 | 1,740 | 0.004 | 0.50 | 11,100 | 580 | 0.002 | 0.50 |
| | 27.5 | 19,200 | 3,490 | 0.007 | 0.50 | 16,300 | 2,710 | 0.007 | 0.50 | 13,400 | 1,740 | 0.006 | 0.50 | 11,500 | 1,490 | 0.004 | 0.50 | 9,500 | 500 | 0.002 | 0.50 |
| | 30 | 19,200 | 3,490 | 0.007 | 0.50 | 16,300 | 2,710 | 0.007 | 0.50 | 13,400 | 1,740 | 0.005 | 0.50 | 11,500 | 1,490 | 0.003 | 0.50 | 9,500 | 500 | 0.002 | 0.50 |
| 1.25 | 5 | 25,000 | 6,130 | 0.063 | 0.62 | 21,600 | 4,840 | 0.063 | 0.62 | 17,800 | 3,120 | 0.050 | 0.62 | 15,300 | 2,680 | 0.031 | 0.62 | 12,700 | 890 | 0.019 | 0.62 |
| | 10 | 25,000 | 6,130 | 0.031 | 0.62 | 21,600 | 4,840 | 0.031 | 0.62 | 17,800 | 3,120 | 0.025 | 0.62 | 15,300 | 2,680 | 0.016 | 0.62 | 12,700 | 890 | 0.009 | 0.62 |
| | 15 | 22,500 | 5,520 | 0.021 | 0.62 | 19,400 | 4,360 | 0.021 | 0.62 | 16,000 | 2,810 | 0.017 | 0.62 | 13,800 | 2,410 | 0.010 | 0.62 | 11,400 | 800 | 0.006 | 0.62 |
| | 20 | 20,000 | 4,900 | 0.016 | 0.62 | 17,300 | 3,870 | 0.016 | 0.62 | 14,200 | 2,500 | 0.013 | 0.62 | 12,200 | 2,140 | 0.008 | 0.62 | 10,200 | 710 | 0.005 | 0.62 |
| | 25 | 20,000 | 4,900 | 0.013 | 0.62 | 17,300 | 3,870 | 0.013 | 0.62 | 14,200 | 2,500 | 0.010 | 0.62 | 12,200 | 2,140 | 0.006 | 0.62 | 10,200 | 710 | 0.004 | 0.62 |
| | 30 | 17,500 | 4,290 | 0.010 | 0.62 | 15,100 | 3,390 | 0.010 | 0.62 | 12,500 | 2,180 | 0.008 | 0.62 | 10,700 | 1,880 | 0.005 | 0.62 | 8,900 | 620 | 0.003 | 0.62 |
| 1.5 | 5 | 21,000 | 6,620 | 0.090 | 0.75 | 18,000 | 5,180 | 0.090 | 0.75 | 14,900 | 3,350 | 0.072 | 0.75 | 12,700 | 2,860 | 0.045 | 0.75 | 10,600 | 950 | 0.027 | 0.75 |
| | 10 | 21,000 | 6,620 | 0.045 | 0.75 | 18,000 | 5,180 | 0.045 | 0.75 | 14,900 | 3,350 | 0.036 | 0.75 | 12,700 | 2,860 | 0.023 | 0.75 | 10,600 | 950 | 0.014 | 0.75 |
| | 15 | 21,000 | 6,620 | 0.030 | 0.75 | 18,000 | 5,180 | 0.030 | 0.75 | 14,900 | 3,350 | 0.024 | 0.75 | 12,700 | 2,860 | 0.015 | 0.75 | 10,600 | 950 | 0.009 | 0.75 |
| | 20 | 18,900 | 5,960 | 0.023 | 0.75 | 16,200 | 4,660 | 0.023 | 0.75 | 13,400 | 3,020 | 0.018 | 0.75 | 11,400 | 2,570 | 0.011 | 0.75 | 9,500 | 860 | 0.007 | 0.75 |
| | 25 | 16,800 | 5,300 | 0.018 | 0.75 | 14,400 | 4,140 | 0.018 | 0.75 | 11,900 | 2,680 | 0.014 | 0.75 | 10,200 | 2,290 | 0.009 | 0.75 | 8,500 | 760 | 0.005 | 0.75 |
| | 30 | 16,800 | 5,300 | 0.015 | 0.75 | 14,400 | 4,140 | 0.015 | 0.75 | 11,900 | 2,680 | 0.012 | 0.75 | 10,200 | 2,290 | 0.008 | 0.75 | 8,500 | 760 | 0.005 | 0.75 |
| 1.75 | 10 | 18,000 | 7,060 | 0.061 | 0.87 | 15,500 | 5,560 | 0.061 | 0.87 | 12,700 | 3,560 | 0.049 | 0.87 | 10,900 | 3,050 | 0.031 | 0.87 | 9,100 | 1,020 | 0.018 | 0.87 |
| | 20 | 16,200 | 6,350 | 0.031 | 0.87 | 14,000 | 5,000 | 0.031 | 0.87 | 11,400 | 3,200 | 0.025 | 0.87 | 9,800 | 2,750 | 0.015 | 0.87 | 8,200 | 920 | 0.009 | 0.87 |
| | 30 | 14,400 | 5,650 | 0.020 | 0.87 | 12,400 | 4,450 | 0.020 | 0.87 | 10,200 | 2,850 | 0.016 | 0.87 | 8,700 | 2,440 | 0.010 | 0.87 | 7,300 | 820 | 0.006 | 0.87 |
| | 40 | 12,600 | 4,940 | 0.015 | 0.87 | 10,900 | 3,890 | 0.015 | 0.87 | 8,900 | 2,490 | 0.012 | 0.87 | 7,600 | 2,140 | 0.008 | 0.87 | 6,400 | 710 | 0.005 | 0.87 |
| 2 | 10 | 16,000 | 7,620 | 0.080 | 1.00 | 13,500 | 5,880 | 0.080 | 1.00 | 11,100 | 3,770 | 0.064 | 1.00 | 9,500 | 3,230 | 0.040 | 1.00 | 8,000 | 1,090 | 0.024 | 1.00 |
| | 15 | 16,000 | 7,620 | 0.053 | 1.00 | 13,500 | 5,880 | 0.053 | 1.00 | 11,100 | 3,770 | 0.043 | 1.00 | 9,500 | 3,230 | 0.027 | 1.00 | 8,000 | 1,090 | 0.016 | 1.00 |
| | 20 | 16,000 | 7,620 | 0.040 | 1.00 | 13,500 | 5,880 | 0.040 | 1.00 | 11,100 | 3,770 | 0.032 | 1.00 | 9,500 | 3,230 | 0.020 | 1.00 | 8,000 | 1,090 | 0.012 | 1.00 |
| | 25 | 14,400 | 6,860 | 0.032 | 1.00 | 12,200 | 5,290 | 0.032 | 1.00 | 10,000 | 3,390 | 0.026 | 1.00 | 8,600 | 2,910 | 0.016 | 1.00 | 7,200 | 980 | 0.010 | 1.00 |
| | 30 | 14,400 | 6,860 | 0.027 | 1.00 | 12,200 | 5,290 | 0.027 | 1.00 | 10,000 | 3,390 | 0.021 | 1.00 | 8,600 | 2,910 | 0.013 | 1.00 | 7,200 | 980 | 0.008 | 1.00 |
| | 35 | 12,800 | 6,100 | 0.023 | 1.00 | 10,800 | 4,700 | 0.023 | 1.00 | 8,900 | 3,020 | 0.018 | 1.00 | 7,600 | 2,580 | 0.011 | 1.00 | 6,400 | 870 | 0.007 | 1.00 |
| | 40 | 12,800 | 6,100 | 0.020 | 1.00 | 10,800 | 4,700 | 0.020 | 1.00 | 8,900 | 3,020 | 0.016 | 1.00 | 7,600 | 2,580 | 0.010 | 1.00 | 6,400 | 870 | 0.006 | 1.00 |
| 2.5 | 10 | 13,000 | 8,190 | 0.125 | 1.25 | 10,800 | 6,220 | 0.125 | 1.25 | 8,900 | 4,010 | 0.100 | 1.25 | 7,600 | 3,420 | 0.063 | 1.25 | 6,400 | 1,150 | 0.038 | 1.25 |
| | 20 | 13,000 | 8,190 | 0.063 | 1.25 | 10,800 | 6,220 | 0.063 | 1.25 | 8,900 | 4,010 | 0.050 | 1.25 | 7,600 | 3,420 | 0.031 | 1.25 | 6,400 | 1,150 | 0.019 | 1.25 |
| | 30 | 11,700 | 7,370 | 0.042 | 1.25 | 9,700 | 5,600 | 0.042 | 1.25 | 8,000 | 3,610 | 0.033 | 1.25 | 6,800 | 3,080 | 0.021 | 1.25 | 5,800 | 1,040 | 0.013 | 1.25 |
| | 40 | 10,400 | 6,550 | 0.031 | 1.25 | 8,600 | 4,980 | 0.031 | 1.25 | 7,100 | 3,210 | 0.025 | 1.25 | 6,100 | 2,740 | 0.016 | 1.25 | 5,100 | 920 | 0.009 | 1.25 |
| | 50 | 10,400 | 6,550 | 0.025 | 1.25 | 8,600 | 4,980 | 0.025 | 1.25 | 7,100 | 3,210 | 0.020 | 1.25 | 6,100 | 2,740 | 0.013 | 1.25 | 5,100 | 920 | 0.008 | 1.25 |
| 3 | 10 | 10,600 | 8,460 | 0.180 | 1.40 | 9,000 | 6,570 | 0.180 | 1.40 | 7,400 | 4,220 | 0.144 | 1.40 | 6,400 | 3,650 | 0.090 | 1.40 | 5,300 | 1,210 | 0.054 | 1.40 |
| | 20 | 10,600 | 8,460 | 0.090 | 1.40 | 9,000 | 6,570 | 0.090 | 1.40 | 7,400 | 4,220 | 0.072 | 1.40 | 6,400 | 3,650 | 0.045 | 1.40 | 5,300 | 1,210 | 0.027 | 1.40 |
| | 30 | 10,600 | 8,460 | 0.060 | 1.40 | 9,000 | 6,570 | 0.060 | 1.40 | 7,400 | 4,220 | 0.048 | 1.40 | 6,400 | 3,650 | 0.030 | 1.40 | 5,300 | 1,210 | 0.018 | 1.40 |
| | 40 | 9,540 | 7,610 | 0.045 | 1.40 | 8,100 | 5,910 | 0.045 | 1.40 | 6,700 | 3,800 | 0.036 | 1.40 | 5,800 | 3,290 | 0.023 | 1.40 | 4,800 | 1,090 | 0.014 | 1.40 |
| | 50 | 8,480 | 6,770 | 0.036 | 1.40 | 7,200 | 5,260 | 0.036 | 1.40 | 5,900 | 3,380 | 0.029 | 1.40 | 5,100 | 2,920 | 0.018 | 1.40 | 4,200 | 970 | 0.011 | 1.40 |

【注意】
①できるだけ高剛性、高精度の機械をご使用ください。
②被削材、加工形状に合わせて、適切なクーラントを使用してください。
③この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。
⑤彫り込み時の傾斜進入角度を1°として送り速度は上記の60～70%で設定ください。
⑥最初から首下長の長い(L/D=15以上)工具をご使用の場合は、工具のバタつきを抑制し加工を安定させる為に、首下長の短いタイプやボール等で加工形状に合わせたガイドを加工しておくことを推奨いたします。

# ETRP-TH

ペンシルネックタイプ
Straight Neck




| 被削材 Work material | | 鋳鉄・炭素鋼・合金鋼 Cast irons, Carbon steels, Alloy steels (150～250HB) FC S50C SCM | | | | 工具鋼 Tool steels (25～35HRC) SUS304 SKD | | | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80 CENA1 | | | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61 SKT4 | | | | 焼入れ鋼 Hardened steels (55～60HRC) SKD11 SKH51 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 外径 Tool dia. mm | 首下長 Under neck length mm | 回転数 min-1 | 送り速度 mm/min | ap mm | ae mm | 回転数 min-1 | 送り速度 mm/min | ap mm | ae mm | 回転数 min-1 | 送り速度 mm/min | ap mm | ae mm | 回転数 min-1 | 送り速度 mm/min | ap mm | ae mm | 回転数 min-1 | 送り速度 mm/min | ap mm | ae mm |
| 1 | 5 | 32,000 | 5,820 | 0.060 | 0.50 | 27,100 | 4,510 | 0.060 | 0.50 | 22,300 | 2,900 | 0.048 | 0.50 | 19,100 | 2,480 | 0.030 | 0.50 | 15,900 | 830 | 0.018 | 0.50 |
| | 7.5 | 32,000 | 5,820 | 0.045 | 0.50 | 27,100 | 4,510 | 0.045 | 0.50 | 22,300 | 2,900 | 0.036 | 0.50 | 19,100 | 2,480 | 0.023 | 0.50 | 15,900 | 830 | 0.013 | 0.50 |
| | 10 | 32,000 | 5,820 | 0.030 | 0.50 | 27,100 | 4,510 | 0.030 | 0.50 | 22,300 | 2,900 | 0.024 | 0.50 | 19,100 | 2,480 | 0.015 | 0.50 | 15,900 | 830 | 0.009 | 0.50 |
| | 15 | 28,800 | 5,240 | 0.020 | 0.50 | 24,400 | 4,060 | 0.020 | 0.50 | 20,100 | 2,610 | 0.016 | 0.50 | 17,200 | 2,230 | 0.010 | 0.50 | 14,300 | 750 | 0.006 | 0.50 |
| | 20 | 28,800 | 5,240 | 0.015 | 0.50 | 24,400 | 4,060 | 0.015 | 0.50 | 20,100 | 2,610 | 0.012 | 0.50 | 17,200 | 2,230 | 0.008 | 0.50 | 14,300 | 750 | 0.005 | 0.50 |
| | 25 | 25,600 | 4,660 | 0.012 | 0.50 | 21,700 | 3,610 | 0.012 | 0.50 | 17,800 | 2,320 | 0.010 | 0.50 | 15,300 | 1,980 | 0.006 | 0.50 | 12,700 | 660 | 0.004 | 0.50 |
| | 30 | 24,000 | 4,370 | 0.010 | 0.50 | 20,300 | 3,380 | 0.010 | 0.50 | 16,700 | 2,180 | 0.008 | 0.50 | 14,300 | 1,860 | 0.005 | 0.50 | 11,900 | 620 | 0.003 | 0.50 |
| | 35 | 22,400 | 4,070 | 0.009 | 0.50 | 19,000 | 3,160 | 0.009 | 0.50 | 15,600 | 2,030 | 0.007 | 0.50 | 13,400 | 1,740 | 0.004 | 0.50 | 11,100 | 580 | 0.003 | 0.50 |
| | 40 | 20,800 | 3,780 | 0.008 | 0.50 | 17,600 | 2,930 | 0.008 | 0.50 | 14,500 | 1,890 | 0.006 | 0.50 | 12,400 | 1,610 | 0.004 | 0.50 | 10,300 | 540 | 0.002 | 0.50 |
| | 45 | 19,200 | 3,490 | 0.007 | 0.50 | 16,300 | 2,710 | 0.007 | 0.50 | 13,400 | 1,740 | 0.005 | 0.50 | 11,500 | 1,490 | 0.003 | 0.50 | 9,500 | 500 | 0.002 | 0.50 |
| | 50 | 16,000 | 2,910 | 0.006 | 0.50 | 13,600 | 2,260 | 0.006 | 0.50 | 11,200 | 1,450 | 0.005 | 0.50 | 9,600 | 1,240 | 0.003 | 0.50 | 8,000 | 420 | 0.002 | 0.50 |
| 1.25 | 10 | 25,000 | 6,130 | 0.047 | 0.62 | 21,600 | 4,840 | 0.047 | 0.62 | 17,800 | 3,120 | 0.038 | 0.62 | 15,300 | 2,680 | 0.023 | 0.62 | 12,700 | 890 | 0.014 | 0.62 |
| | 15 | 23,800 | 5,830 | 0.035 | 0.62 | 20,500 | 4,600 | 0.035 | 0.62 | 16,900 | 2,965 | 0.029 | 0.62 | 14,550 | 2,545 | 0.018 | 0.62 | 12,050 | 845 | 0.011 | 0.62 |
| | 20 | 22,500 | 5,520 | 0.023 | 0.62 | 19,400 | 4,360 | 0.023 | 0.62 | 16,000 | 2,810 | 0.019 | 0.62 | 13,800 | 2,410 | 0.012 | 0.62 | 11,400 | 800 | 0.007 | 0.62 |
| | 30 | 20,000 | 4,900 | 0.016 | 0.62 | 17,300 | 3,870 | 0.016 | 0.62 | 14,200 | 2,500 | 0.013 | 0.62 | 12,200 | 2,140 | 0.008 | 0.62 | 10,200 | 710 | 0.005 | 0.62 |
| | 40 | 17,500 | 4,290 | 0.012 | 0.62 | 15,100 | 3,390 | 0.012 | 0.62 | 12,500 | 2,180 | 0.009 | 0.62 | 10,700 | 1,880 | 0.006 | 0.62 | 8,900 | 620 | 0.004 | 0.62 |
| | 50 | 16,300 | 3,980 | 0.009 | 0.62 | 14,000 | 3,150 | 0.009 | 0.62 | 11,600 | 2,030 | 0.008 | 0.62 | 9,900 | 1,740 | 0.005 | 0.62 | 8,300 | 580 | 0.003 | 0.62 |
| 1.5 | 10 | 21,000 | 6,620 | 0.068 | 0.75 | 18,000 | 5,180 | 0.068 | 0.75 | 14,900 | 3,350 | 0.054 | 0.75 | 12,700 | 2,860 | 0.034 | 0.75 | 10,600 | 950 | 0.020 | 0.75 |
| | 15 | 21,000 | 6,620 | 0.051 | 0.75 | 18,000 | 5,180 | 0.051 | 0.75 | 14,900 | 3,350 | 0.041 | 0.75 | 12,700 | 2,860 | 0.026 | 0.75 | 10,600 | 950 | 0.015 | 0.75 |
| | 20 | 18,900 | 5,960 | 0.034 | 0.75 | 16,200 | 4,660 | 0.034 | 0.75 | 13,400 | 3,020 | 0.027 | 0.75 | 11,400 | 2,570 | 0.017 | 0.75 | 9,500 | 860 | 0.010 | 0.75 |
| | 30 | 18,900 | 5,960 | 0.023 | 0.75 | 16,200 | 4,660 | 0.023 | 0.75 | 13,400 | 3,020 | 0.018 | 0.75 | 11,400 | 2,570 | 0.011 | 0.75 | 9,500 | 860 | 0.007 | 0.75 |
| | 40 | 15,800 | 4,970 | 0.017 | 0.75 | 13,500 | 3,890 | 0.017 | 0.75 | 11,200 | 2,510 | 0.014 | 0.75 | 9,500 | 2,150 | 0.008 | 0.75 | 8,000 | 710 | 0.005 | 0.75 |
| | 50 | 14,700 | 4,630 | 0.014 | 0.75 | 12,600 | 3,630 | 0.014 | 0.75 | 10,400 | 2,350 | 0.011 | 0.75 | 8,900 | 2,000 | 0.007 | 0.75 | 7,400 | 670 | 0.004 | 0.75 |
| 1.75 | 10 | 18,000 | 7,060 | 0.092 | 0.87 | 15,500 | 5,560 | 0.092 | 0.87 | 12,700 | 3,560 | 0.074 | 0.87 | 10,900 | 3,050 | 0.046 | 0.87 | 9,100 | 1,020 | 0.028 | 0.87 |
| | 15 | 18,000 | 7,060 | 0.069 | 0.87 | 15,500 | 5,560 | 0.069 | 0.87 | 12,700 | 3,560 | 0.056 | 0.87 | 10,900 | 3,050 | 0.035 | 0.87 | 9,100 | 1,020 | 0.021 | 0.87 |
| | 20 | 16,200 | 6,350 | 0.046 | 0.87 | 14,000 | 5,000 | 0.046 | 0.87 | 11,400 | 3,200 | 0.037 | 0.87 | 9,800 | 2,750 | 0.023 | 0.87 | 8,200 | 920 | 0.014 | 0.87 |
| | 30 | 16,200 | 6,350 | 0.031 | 0.87 | 14,000 | 5,000 | 0.031 | 0.87 | 11,400 | 3,200 | 0.025 | 0.87 | 9,800 | 2,750 | 0.015 | 0.87 | 8,200 | 920 | 0.009 | 0.87 |
| | 40 | 14,400 | 5,650 | 0.023 | 0.87 | 12,400 | 4,450 | 0.023 | 0.87 | 10,200 | 2,850 | 0.018 | 0.87 | 8,700 | 2,440 | 0.011 | 0.87 | 7,300 | 820 | 0.007 | 0.87 |
| | 50 | 13,500 | 5,300 | 0.018 | 0.87 | 11,600 | 4,170 | 0.018 | 0.87 | 9,500 | 2,670 | 0.015 | 0.87 | 8,200 | 2,290 | 0.009 | 0.87 | 6,800 | 770 | 0.006 | 0.87 |
| 2 | 15 | 16,000 | 7,620 | 0.080 | 1.00 | 13,500 | 5,880 | 0.080 | 1.00 | 11,100 | 3,770 | 0.064 | 1.00 | 9,500 | 3,230 | 0.040 | 1.00 | 8,000 | 1,090 | 0.024 | 1.00 |
| | 20 | 16,000 | 7,620 | 0.060 | 1.00 | 13,500 | 5,880 | 0.060 | 1.00 | 11,100 | 3,770 | 0.048 | 1.00 | 9,500 | 3,230 | 0.030 | 1.00 | 8,000 | 1,090 | 0.018 | 1.00 |
| | 25 | 14,400 | 6,860 | 0.048 | 1.00 | 12,200 | 5,290 | 0.048 | 1.00 | 10,000 | 3,390 | 0.038 | 1.00 | 8,600 | 2,910 | 0.024 | 1.00 | 7,200 | 980 | 0.014 | 1.00 |
| | 30 | 14,400 | 6,860 | 0.040 | 1.00 | 12,200 | 5,290 | 0.040 | 1.00 | 10,000 | 3,390 | 0.032 | 1.00 | 8,600 | 2,910 | 0.020 | 1.00 | 7,200 | 980 | 0.012 | 1.00 |
| | 35 | 14,400 | 6,860 | 0.034 | 1.00 | 12,200 | 5,290 | 0.034 | 1.00 | 10,000 | 3,390 | 0.027 | 1.00 | 8,600 | 2,910 | 0.017 | 1.00 | 7,200 | 980 | 0.010 | 1.00 |
| | 40 | 14,400 | 6,860 | 0.030 | 1.00 | 12,200 | 5,290 | 0.030 | 1.00 | 10,000 | 3,390 | 0.024 | 1.00 | 8,600 | 2,910 | 0.015 | 1.00 | 7,200 | 980 | 0.009 | 1.00 |
| | 45 | 12,800 | 6,100 | 0.027 | 1.00 | 10,800 | 4,700 | 0.027 | 1.00 | 8,900 | 3,020 | 0.021 | 1.00 | 7,600 | 2,580 | 0.013 | 1.00 | 6,400 | 870 | 0.008 | 1.00 |
| | 50 | 12,800 | 6,100 | 0.024 | 1.00 | 10,800 | 4,700 | 0.024 | 1.00 | 8,900 | 3,020 | 0.019 | 1.00 | 7,600 | 2,580 | 0.012 | 1.00 | 6,400 | 870 | 0.007 | 1.00 |
| | 55 | 12,000 | 5,720 | 0.022 | 1.00 | 10,100 | 4,410 | 0.022 | 1.00 | 8,300 | 2,830 | 0.017 | 1.00 | 7,100 | 2,420 | 0.011 | 1.00 | 6,000 | 820 | 0.007 | 1.00 |
| | 60 | 12,000 | 5,720 | 0.020 | 1.00 | 10,100 | 4,410 | 0.020 | 1.00 | 8,300 | 2,830 | 0.016 | 1.00 | 7,100 | 2,420 | 0.010 | 1.00 | 6,000 | 820 | 0.006 | 1.00 |
| 2.5 | 20 | 13,000 | 8,190 | 0.094 | 1.25 | 10,800 | 6,220 | 0.094 | 1.25 | 8,900 | 4,010 | 0.075 | 1.25 | 7,600 | 3,420 | 0.047 | 1.25 | 6,400 | 1,150 | 0.028 | 1.25 |
| | 30 | 11,700 | 7,370 | 0.063 | 1.25 | 9,700 | 5,600 | 0.063 | 1.25 | 8,000 | 3,610 | 0.050 | 1.25 | 6,800 | 3,080 | 0.031 | 1.25 | 5,800 | 1,040 | 0.019 | 1.25 |
| | 40 | 11,700 | 7,370 | 0.047 | 1.25 | 9,700 | 5,600 | 0.047 | 1.25 | 8,000 | 3,610 | 0.038 | 1.25 | 6,800 | 3,080 | 0.023 | 1.25 | 5,800 | 1,040 | 0.014 | 1.25 |
| | 50 | 11,700 | 7,370 | 0.038 | 1.25 | 9,700 | 5,600 | 0.038 | 1.25 | 8,000 | 3,610 | 0.030 | 1.25 | 6,800 | 3,080 | 0.019 | 1.25 | 5,800 | 1,040 | 0.011 | 1.25 |
| | 60 | 10,400 | 6,550 | 0.031 | 1.25 | 8,600 | 4,980 | 0.031 | 1.25 | 7,100 | 3,210 | 0.025 | 1.25 | 6,100 | 2,740 | 0.016 | 1.25 | 5,100 | 920 | 0.009 | 1.25 |
| 3 | 20 | 10,600 | 8,460 | 0.135 | 1.40 | 9,000 | 6,570 | 0.135 | 1.40 | 7,400 | 4,220 | 0.108 | 1.40 | 6,400 | 3,650 | 0.068 | 1.40 | 5,300 | 1,210 | 0.041 | 1.40 |
| | 30 | 10,600 | 8,460 | 0.090 | 1.40 | 9,000 | 6,570 | 0.090 | 1.40 | 7,400 | 4,220 | 0.072 | 1.40 | 6,400 | 3,650 | 0.045 | 1.40 | 5,300 | 1,210 | 0.027 | 1.40 |
| | 40 | 9,500 | 7,610 | 0.068 | 1.40 | 8,100 | 5,910 | 0.068 | 1.40 | 6,700 | 3,800 | 0.054 | 1.40 | 5,800 | 3,290 | 0.034 | 1.40 | 4,800 | 1,090 | 0.020 | 1.40 |
| | 50 | 9,500 | 7,610 | 0.054 | 1.40 | 8,100 | 5,910 | 0.054 | 1.40 | 6,700 | 3,800 | 0.043 | 1.40 | 5,800 | 3,290 | 0.027 | 1.40 | 4,800 | 1,090 | 0.016 | 1.40 |
| | 60 | 9,500 | 7,610 | 0.045 | 1.40 | 8,100 | 5,910 | 0.045 | 1.40 | 6,700 | 3,800 | 0.036 | 1.40 | 5,800 | 3,290 | 0.023 | 1.40 | 4,800 | 1,090 | 0.014 | 1.40 |

【Note】
① Use a machine having as high rigidity and high accuracy as possible.
② Use the appropriate coolant for the work material and machining shape.
③ The cutting conditions shown in this table are intended as general criteria and should be adjusted according to the cutting shape, purpose, machine used, etc.
④ If the rotation speed of the machine is insufficient, reduce the rotation speed and feed rate by the same ratios.
⑤ For cutting in, set the ramp introduction angle to 1° and set the feed rate to 60 to 70% of the above values.
⑥ In the case of using tools with L/D = 15 or more length from the first process, in order to suppress the chattering vibration of the tools and stabilize the cutting, it is recommended to make suitable guides by using short neck type or ball end mills.

# Epoch Turbo Mill
# エポックターボミル

ビビリ振動を抑制。高能率加工用コーナRエンドミル。
Suppresses chattering. Corner R end mill for high-efficiency machining.

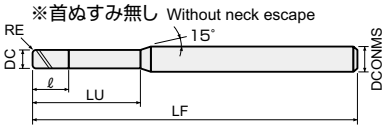
## 首下ストレート　Straight Neck

彫込み Die-sinking　曲面 Profiling　R Radius　荒 Roughing　中仕上 Semi Finishing

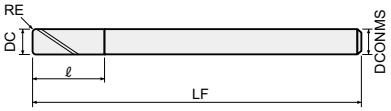
RE公差 RE tolerance　±0.015　h5　(mm)

※首ぬすみ無し Without neck escape

Aタイプ A type




Bタイプ B type




## ETM4○○○-○○-TH

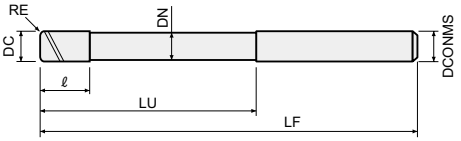
超硬 Carbide　TH　ねじれ角 45° Helix angle　切削条件表 A228 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 首下長 Under neck length LU | 刃長 Flute length ℓ | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首形状 Shape | 希望小売価格(円) Suggested retail price(￥) |
|---|---|---|---|---|---|---|---|---|---|
| ETM4020-05-TH | ● | 2 | 0.5 | 6 | 4 | 70 | 6 | A | 19,500 |
| ETM4030-08-TH | ● | 3 | 0.8 | 9 | 6 | 70 | 6 | | 19,280 |
| ETM4040-10-TH | ● | 4 | 1.0 | 12 | 8 | 70 | 6 | | 19,280 |
| ETM4050-12-TH | ● | 5 | 1.2 | 15 | 10 | 70 | 6 | | 20,430 |
| ETM4060-15-TH | ● | 6 | 1.5 | — | 12 | 90 | 6 | B | 21,770 |
| ETM4080-20-TH | ● | 8 | 2.0 | — | 16 | 100 | 8 | | 28,050 |
| ETM4100-20-TH | ● | 10 | 2.0 | — | 20 | 110 | 10 | | 34,790 |
| ETM4120-20-TH | ● | 12 | 2.0 | — | 24 | 120 | 12 | | 46,350 |
| ETM4160-30-TH | ● | 16 | 3.0 | — | 32 | 140 | 16 | | 103,360 |
| ETM4200-30-TH | ● | 20 | 3.0 | — | 40 | 150 | 20 | | 144,280 |

## ロングネック　Long Neck

彫込み Die-sinking　曲面 Profiling　R Radius　荒 Roughing　中仕上 Semi Finishing

RE公差 RE tolerance　±0.015　h5　(mm)




## ETMLN4○○○-○○○-○○-TH

超硬 Carbide　TH　ねじれ角 45° Helix angle　切削条件表 A228 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 首下長 Under neck length LU | 刃長 Flute length ℓ | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 希望小売価格(円) Suggested retail price(￥) |
|---|---|---|---|---|---|---|---|---|---|
| ETMLN4040-20-10-TH | ● | 4 | 1.0 | 20 | 6 | 3.8 | 70 | 4 | 16,500 |
| ETMLN4040-28-10-TH | ● | | | 28 | 6 | 3.8 | 70 | 4 | 17,140 |
| ETMLN4060-30-15-TH | ● | 6 | 1.5 | 30 | 9 | 5.7 | 75 | 6 | 19,310 |
| ETMLN4060-42-15-TH | ● | | | 42 | 9 | 5.7 | 90 | 6 | 20,090 |
| ETMLN4060-54-15-TH | ● | | | 54 | 9 | 5.7 | 100 | 6 | 20,990 |
| ETMLN4080-40-20-TH | ● | 8 | 2.0 | 40 | 12 | 7.6 | 85 | 8 | 24,920 |
| ETMLN4080-56-20-TH | ● | | | 56 | 12 | 7.6 | 100 | 8 | 26,600 |
| ETMLN4080-72-20-TH | ● | | | 72 | 12 | 7.6 | 120 | 8 | 29,860 |
| ETMLN4100-50-20-TH | ● | 10 | 2.0 | 50 | 15 | 9.5 | 100 | 10 | 29,970 |
| ETMLN4100-70-20-TH | ● | | | 70 | 15 | 9.5 | 120 | 10 | 33,550 |
| ETMLN4100-90-20-TH | ● | | | 90 | 15 | 9.5 | 140 | 10 | 36,810 |
| ETMLN4120-60-20-TH | ● | 12 | 2.0 | 60 | 18 | 11.5 | 110 | 12 | 41,300 |
| ETMLN4120-84-20-TH | ● | | | 84 | 18 | 11.5 | 135 | 12 | 45,680 |
| ETMLN4120-108-20-TH | ● | | | 108 | 18 | 11.5 | 160 | 12 | 53,190 |
| ETMLN4160-80-30-TH | ● | 16 | 3.0 | 80 | 24 | 15.5 | 140 | 16 | 94,320 |
| ETMLN4160-120-30-TH | ● | | | 120 | 24 | 15.5 | 175 | 16 | 107,920 |

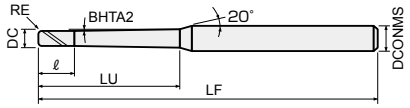
●印：標準在庫品です。　●：Stocked items.

## ペンシルネック　Pencil Neck

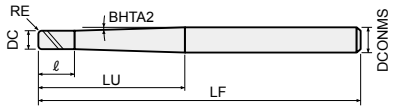
彫込み Die-sinking　曲面 Profiling　R Radius　荒 Roughing　中仕上 Semi Finishing

RE公差 RE tolerance　±0.015　h5　(mm)

Aタイプ A type




Bタイプ B type




# ETMP4○○○-○○○-○○-TH

超硬 Carbide　TH　ねじれ45° Helix angle　切削条件表 A228 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 首下長 Under neck length LU | 刃長 Flute length ℓ | 首部テーパ半角 Neck angle BHTA2 | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首形状 Shape | 希望小売価格(円) Suggested retail price(￥) |
|---|---|---|---|---|---|---|---|---|---|---|
| ETMP4020-12-05-TH | ● | 2 | 0.5 | 12 | 3 | 1° | 70 | 6 | A | 17,140 |
| ETMP4020-16-05-TH | ● | | | 16 | 3 | 1° | 70 | 6 | A | 17,470 |
| ETMP4020-20-05-TH | ● | | | 20 | 3 | 1° | 70 | 6 | A | 17,470 |
| ETMP4030-18-08-TH | ● | 3 | 0.8 | 18 | 4.5 | 1° | 80 | 6 | A | 16,610 |
| ETMP4030-24-08-TH | ● | | | 24 | 4.5 | 1° | 80 | 6 | A | 17,140 |
| ETMP4030-30-08-TH | ● | | | 30 | 4.5 | 1° | 80 | 6 | A | 17,570 |
| ETMP4040-24-10-TH | ● | 4 | 1.0 | 24 | 6 | 1° | 90 | 6 | A | 17,360 |
| ETMP4040-32-10-TH | ● | | | 32 | 6 | 1° | 90 | 6 | A | 17,790 |
| ETMP4040-40-10-TH | ● | | | 40 | 6 | 1° | 90 | 6 | A | 18,330 |
| ETMP4050-30-12-TH | ● | 5 | 1.2 | 30 | 7.5 | 1° | 90 | 6 | A | 18,970 |
| ETMP4050-40-12-TH | ● | | | 40 | 7.5 | 1° | 100 | 8 | A | 24,020 |
| ETMP4050-50-12-TH | ● | | | 50 | 7.5 | 1° | 110 | 8 | A | 25,810 |
| ETMP4060-40-15-TH | ● | 6 | 1.5 | 40 | 9 | 1° | 100 | 8 | A | 24,580 |
| ETMP4060-55-15-TH | ● | | | 55 | 9 | 1° | 110 | 8 | A | 26,600 |
| ETMP4060-67-15-TH | ● | | | 67 | 9 | 1° | 125 | 8 | B | 27,830 |
| ETMP4080-55-20-TH | ● | 8 | 2.0 | 55 | 12 | 1° | 110 | 10 | A | 30,860 |
| ETMP4080-70-20-TH | ● | | | 70 | 12 | 1° | 130 | 10 | B | 32,660 |
| ETMP4080-90-20-TH | ● | | | 90 | 12 | 1° | 145 | 12 | A | 40,400 |
| ETMP4100-73-20-TH | ● | 10 | 2.0 | 73 | 15 | 1° | 135 | 12 | B | 39,620 |
| ETMP4100-95-20-TH | ● | | | 95 | 15 | 1° | 150 | 16 | A | 78,780 |
| ETMP4100-115-20-TH | ● | | | 115 | 15 | 1° | 170 | 16 | A | 84,720 |
| ETMP4120-80-20-TH | ● | 12 | 2.0 | 80 | 18 | 1° | 135 | 16 | A | 83,480 |
| ETMP4120-105-20-TH | ● | | | 105 | 18 | 1° | 160 | 16 | A | 90,330 |
| ETMP4160-105-30-TH | ● | 16 | 3.0 | 105 | 24 | 1° | 160 | 20 | A | 137,250 |
| ETMP4160-140-30-TH | ● | | | 140 | 24 | 1° | 200 | 20 | B | 156,010 |

## ETM-TH、ETMLN-TH、ETMP-THの対応被削材

Applicable work material of ETM-TH, ETMLN-TH, ETMP-TH

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ○ | | ○ | ◎ | ○ | ○ |

## 再研磨対応外径範囲

Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| ETM-TH | × (N/A) | 2～20 |
| ETMLN-TH | × (N/A) | 4～16 |
| ETMP-TH | × (N/A) | 2～16 |

【注意】首下長／外径が10DCを超える工具の再研磨可否については、弊社営業にお問い合わせください。
【Note】Contact our sales office regarding whether or not regrinding is possible for tools where under neck length/tool diameter more than 10DC

# Epoch Turbo Mill
# エポックターボミル

## 標準切削条件表 Recommended cutting conditions

**ETM-TH** 首下ストレート Straight Neck
**ETMLN-TH** ロングネック Long Neck
**ETMP-TH** ペンシルネック Pencil Neck

設備や用途に合わせて下記5種類の切削条件から使用条件を選択ください。まずは一般条件での使用を推奨します。
Select the conditions for use from the five types of cutting conditions below based on the equipment and application. It is recommended that the standard condition be used first.

| | | 特長 Features |
|---|---|---|
| 荒加工条件 Roughing condition | 一般条件 Standard condition | 低速で使用でき汎用性のある条件です。<br>最も長寿命で安定した高能率加工が可能です。<br>General-purpose condition for low-speed use. Provides stable high-efficiency cutting with the longest tool life. |
| | 高速条件 High speed condition | 高性能な高速機で高送りに機械が追従できる場合に適用できる条件です。<br>高速回転により、送り速度がアップし、一般条件以上の高能率加工が可能です。<br>Condition for use with high-performance high-speed machines capable of high feed rates.<br>Enables ultra-high-efficiency cutting by enabling higher feed rates due to higher rotation speeds. |
| | 高切り込み条件 High depth of cut condition | 一般条件では送り速度が追従しないが、機械剛性は十分にある場合に適用できる条件です。送り速度が低い分、切り込みを大きく設定し、能率低下を最小限に抑えます。<br>Condition for machines which are not capable of the feed rates of the standard condition, but which have sufficient rigidity.<br>The reduced feed rate is compensated for by setting a large cutting depth, minimizing reductions in work efficiency. |
| | 低負荷条件 Low load condition | 1刃送り量を小さくして切削負荷を小さくした条件です。<br>切削抵抗を低減できるので、剛性のない機械でも使用可能です。<br>Condition which reduces cutting load by reducing the per-flute feed rate.<br>Since cutting resistance can be reduced, it enables use even on machines with low rigidity. |
| 仕上げ条件 Finish condition | | 仕上げ加工に用いる条件です。<br>最も高精度な仕上げ加工が可能です。(コーナ半径RE精度±0.015)<br>Condition for finish cutting.<br>High-accuracy finishing is possible. (Tolerance on RE is ±0.015mm.) |

## 一般条件表（低速・高送り） Standard conditions (Low revolution, High feed)

| 被削材 Work material | 鋳鉄・炭素鋼・合金鋼 Cast irons, Carbon steels, Alloy steels (150～250HB) FC, S50C, SCM | | | 工具鋼 Tool steels (25～35HRC) SKD | | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80, CENA1 | | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61,SKT4 | | | 焼入れ鋼 Hardened steels (55～60HRC) SKD11,SKH51 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み比率 Ratio to standard depth of cut | 100% | | | 100% | | | 100% | | | 70% | | | 50% | | |
| 外径DC Tool dia.(mm) | 回転数 $n$ ($min^{-1}$) | 1刃送り $f_z$ (mm/t) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 1刃送り $f_z$ (mm/t) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 1刃送り $f_z$ (mm/t) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 1刃送り $f_z$ (mm/t) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 1刃送り $f_z$ (mm/t) | 送り速度 $v_f$ (mm/min) |
| φ2 | 12,000 | 0.11 | 5,380 | 11,000 | 0.1 | 4,510 | 10,000 | 0.08 | 3,200 | 8,000 | 0.08 | 2,560 | 8,000 | 0.03 | 1,020 |
| φ3 | 8,000 | 0.19 | 6,050 | 7,400 | 0.17 | 5,110 | 6,900 | 0.14 | 3,730 | 5,300 | 0.14 | 2,860 | 5,300 | 0.05 | 1,140 |
| φ4 | 6,000 | 0.27 | 6,380 | 5,600 | 0.24 | 5,450 | 5,200 | 0.19 | 3,950 | 4,000 | 0.19 | 3,040 | 4,000 | 0.08 | 1,220 |
| φ5 | 4,800 | 0.33 | 6,380 | 4,500 | 0.3 | 5,470 | 4,100 | 0.24 | 3,900 | 3,200 | 0.24 | 3,040 | 3,200 | 0.1 | 1,220 |
| φ6 | 4,000 | 0.42 | 6,720 | 3,700 | 0.38 | 5,680 | 3,400 | 0.3 | 4,080 | 2,700 | 0.3 | 3,240 | 2,700 | 0.12 | 1,300 |
| φ8 | 3,000 | 0.56 | 6,720 | 2,800 | 0.51 | 5,730 | 2,600 | 0.4 | 4,160 | 2,000 | 0.4 | 3,200 | 2,000 | 0.16 | 1,280 |
| φ10 | 2,400 | 0.7 | 6,720 | 2,200 | 0.64 | 5,630 | 2,100 | 0.5 | 4,200 | 1,600 | 0.5 | 3,200 | 1,600 | 0.2 | 1,280 |
| φ12 | 2,000 | 0.8 | 6,380 | 1,900 | 0.73 | 5,540 | 1,700 | 0.57 | 3,880 | 1,300 | 0.57 | 2,960 | 1,300 | 0.23 | 1,190 |
| φ16 | 1,500 | 0.9 | 5,380 | 1,400 | 0.82 | 4,590 | 1,300 | 0.64 | 3,330 | 1,000 | 0.64 | 2,560 | 1,000 | 0.26 | 1,020 |
| φ20 | 1,200 | 0.91 | 4,370 | 1,100 | 0.83 | 3,660 | 1,000 | 0.65 | 2,600 | 800 | 0.65 | 2,080 | 800 | 0.26 | 830 |

【注意】
①できるだけ高剛性、高精度の機械をご使用ください。
②被削材、加工形状に合わせて、適切なクーラントを使用してください。
③この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。

【Note】
① Use a highly rigid and accurate machine as possible.
② Use the appropriate coolant for the work material and machining shape.
③ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

## 高速条件表（高速・高送り）

High speed conditions (High revolution, High feed)

| 被削材 Work material | 鋳鉄・炭素鋼・合金鋼 Cast irons, Carbon steels, Alloy steels (150～250HB) FC, S50C, SCM | | | 工具鋼 Tool steels (25～35HRC) SKD | | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80, CENA1 | | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61,SKT4 | | | 焼入れ鋼 Hardened steels (55～60HRC) SKD11,SKH51 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み比率 Ratio to standard depth of cut | 80% | | | 80% | | | 70% | | | 60% | | | 40% | | |
| 外径DC Tool dia.(mm) | 回転数 $n$ ($min^{-1}$) | 1刃送り $f_z$ (mm/t) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 1刃送り $f_z$ (mm/t) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 1刃送り $f_z$ (mm/t) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 1刃送り $f_z$ (mm/t) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 1刃送り $f_z$ (mm/t) | 送り速度 $v_f$ (mm/min) |
| **φ2** | 20,000 | 0.11 | 8,960 | 18,000 | 0.1 | 7,370 | 16,000 | 0.08 | 5,120 | 12,700 | 0.08 | 4,060 | 11,100 | 0.03 | 1,420 |
| **φ3** | 13,300 | 0.19 | 10,050 | 11,700 | 0.17 | 8,090 | 10,600 | 0.14 | 5,720 | 8,500 | 0.14 | 4,590 | 7,400 | 0.05 | 1,600 |
| **φ4** | 9,900 | 0.27 | 10,530 | 8,800 | 0.24 | 8,560 | 8,000 | 0.19 | 6,080 | 6,400 | 0.19 | 4,860 | 5,600 | 0.08 | 1,700 |
| **φ5** | 8,000 | 0.33 | 10,640 | 7,000 | 0.3 | 8,510 | 6,400 | 0.24 | 6,080 | 5,100 | 0.24 | 4,850 | 4,500 | 0.1 | 1,710 |
| **φ6** | 6,600 | 0.42 | 11,090 | 5,800 | 0.38 | 8,910 | 5,300 | 0.3 | 6,360 | 4,200 | 0.3 | 5,040 | 3,700 | 0.12 | 1,780 |
| **φ8** | 5,000 | 0.56 | 11,200 | 4,400 | 0.51 | 9,010 | 4,000 | 0.4 | 6,400 | 3,200 | 0.4 | 5,120 | 2,800 | 0.16 | 1,790 |
| **φ10** | 4,000 | 0.7 | 11,200 | 3,500 | 0.64 | 8,960 | 3,200 | 0.5 | 6,400 | 2,500 | 0.5 | 5,000 | 2,200 | 0.2 | 1,760 |
| **φ12** | 3,300 | 0.8 | 10,530 | 2,900 | 0.73 | 8,460 | 2,700 | 0.57 | 6,160 | 2,100 | 0.57 | 4,790 | 1,900 | 0.23 | 1,730 |
| **φ16** | 2,500 | 0.9 | 8,960 | 2,200 | 0.82 | 7,210 | 2,000 | 0.64 | 5,120 | 1,600 | 0.64 | 4,100 | 1,400 | 0.26 | 1,430 |
| **φ20** | 2,000 | 0.91 | 7,280 | 1,800 | 0.83 | 5,990 | 1,600 | 0.65 | 4,160 | 1,300 | 0.65 | 3,380 | 1,100 | 0.26 | 1,140 |

## 高切り込み条件表（低速・高切り込み）

High depth of cut conditions (Low revolution, High depth of cut)

| 被削材 Work material | 鋳鉄・炭素鋼・合金鋼 Cast irons, Carbon steels, Alloy steels (150～250HB) FC, S50C, SCM | | | 工具鋼 Tool steels (25～35HRC) SKD | | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80, CENA1 | | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61,SKT4 | | | 焼入れ鋼 Hardened steels (55～60HRC) SKD11,SKH51 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み比率 Ratio to standard depth of cut | 200% | | | 180% | | | 160% | | | 120% | | | 70% | | |
| 外径DC Tool dia.(mm) | 回転数 $n$ ($min^{-1}$) | 1刃送り $f_z$ (mm/t) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 1刃送り $f_z$ (mm/t) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 1刃送り $f_z$ (mm/t) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 1刃送り $f_z$ (mm/t) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 1刃送り $f_z$ (mm/t) | 送り速度 $v_f$ (mm/min) |
| **φ2** | 12,000 | 0.05 | 2,460 | 11,000 | 0.05 | 2,110 | 10,000 | 0.04 | 1,600 | 8,000 | 0.04 | 1,280 | 8,000 | 0.02 | 610 |
| **φ3** | 8,000 | 0.09 | 2,760 | 7,400 | 0.08 | 2,400 | 6,900 | 0.07 | 1,860 | 5,300 | 0.07 | 1,430 | 5,300 | 0.03 | 690 |
| **φ4** | 6,000 | 0.12 | 2,920 | 5,600 | 0.11 | 2,550 | 5,200 | 0.1 | 1,980 | 4,000 | 0.1 | 1,520 | 4,000 | 0.05 | 730 |
| **φ5** | 4,800 | 0.15 | 2,920 | 4,500 | 0.14 | 2,570 | 4,100 | 0.12 | 1,950 | 3,200 | 0.12 | 1,520 | 3,200 | 0.06 | 730 |
| **φ6** | 4,000 | 0.19 | 3,070 | 3,700 | 0.18 | 2,660 | 3,400 | 0.15 | 2,040 | 2,700 | 0.15 | 1,620 | 2,700 | 0.07 | 780 |
| **φ8** | 3,000 | 0.26 | 3,070 | 2,800 | 0.24 | 2,690 | 2,600 | 0.2 | 2,080 | 2,000 | 0.2 | 1,600 | 2,000 | 0.1 | 770 |
| **φ10** | 2,400 | 0.32 | 3,070 | 2,200 | 0.3 | 2,640 | 2,100 | 0.25 | 2,100 | 1,600 | 0.25 | 1,600 | 1,600 | 0.12 | 770 |
| **φ12** | 2,000 | 0.36 | 2,920 | 1,900 | 0.34 | 2,600 | 1,700 | 0.29 | 1,940 | 1,300 | 0.29 | 1,480 | 1,300 | 0.14 | 710 |
| **φ16** | 1,500 | 0.41 | 2,460 | 1,400 | 0.38 | 2,150 | 1,300 | 0.32 | 1,660 | 1,000 | 0.32 | 1,280 | 1,000 | 0.15 | 610 |
| **φ20** | 1,200 | 0.42 | 2,000 | 1,100 | 0.39 | 1,720 | 1,000 | 0.33 | 1,300 | 800 | 0.33 | 1,040 | 800 | 0.16 | 500 |

【注意】
①できるだけ高剛性、高精度の機械をご使用ください。
②被削材、加工形状に合わせて、適切なクーラントを使用してください。
③この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。

【Note】
① Use a highly rigid and accurate machine as possible.
② Use the appropriate coolant for the work material and machining shape.
③ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

# Epoch Turbo Mill
# エポックターボミル

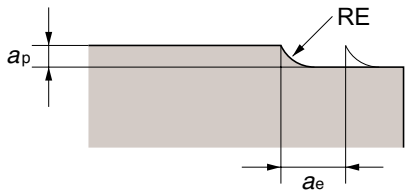
## 低負荷条件表（中速・高送り） Low load conditions (Medium revolution, high feed)

| 被削材 Work material | 鋳鉄･炭素鋼･合金鋼 Cast irons, Carbon steels, Alloy steels (150～250HB) FC, S50C, SCM | | | 工具鋼 Tool steels (25～35HRC) SKD | | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80, CENA1 | | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61,SKT4 | | | 焼入れ鋼 Hardened steels (55～60HRC) SKD11,SKH51 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み比率 Ratio to standard depth of cut | 100% | | | 100% | | | 100% | | | 70% | | | 50% | | |
| 外径DC Tool dia.(mm) | 回転数 $n$ ($min^{-1}$) | 1刃送り $f_z$ (mm/t) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 1刃送り $f_z$ (mm/t) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 1刃送り $f_z$ (mm/t) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 1刃送り $f_z$ (mm/t) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 1刃送り $f_z$ (mm/t) | 送り速度 $v_f$ (mm/min) |
| **φ2** | 15,000 | 0.09 | 5,180 | 14,000 | 0.08 | 4,300 | 14,000 | 0.06 | 3,400 | 10,300 | 0.06 | 2,310 | 9,500 | 0.02 | 910 |
| **φ3** | 10,100 | 0.15 | 5,890 | 9,500 | 0.13 | 4,920 | 9,000 | 0.1 | 3,690 | 6,900 | 0.09 | 2,610 | 6,400 | 0.04 | 1,040 |
| **φ4** | 7,600 | 0.21 | 6,240 | 7,200 | 0.18 | 5,250 | 6,800 | 0.14 | 3,930 | 5,200 | 0.13 | 2,770 | 4,800 | 0.06 | 1,090 |
| **φ5** | 6,000 | 0.26 | 6,160 | 5,700 | 0.23 | 5,200 | 5,400 | 0.18 | 3,900 | 4,100 | 0.17 | 2,730 | 3,800 | 0.07 | 1,080 |
| **φ6** | 5,000 | 0.32 | 6,480 | 4,800 | 0.29 | 5,530 | 4,500 | 0.23 | 4,100 | 3,400 | 0.21 | 2,860 | 3,200 | 0.09 | 1,150 |
| **φ8** | 3,800 | 0.43 | 6,570 | 3,600 | 0.38 | 5,530 | 3,400 | 0.3 | 4,130 | 2,600 | 0.28 | 2,910 | 2,400 | 0.12 | 1,150 |
| **φ10** | 3,000 | 0.54 | 6,480 | 2,900 | 0.48 | 5,570 | 2,700 | 0.38 | 4,100 | 2,100 | 0.35 | 2,940 | 1,900 | 0.15 | 1,140 |
| **φ12** | 2,500 | 0.62 | 6,160 | 2,400 | 0.55 | 5,250 | 2,300 | 0.43 | 3,990 | 1,700 | 0.4 | 2,710 | 1,600 | 0.17 | 1,090 |
| **φ16** | 1,900 | 0.69 | 5,250 | 1,800 | 0.61 | 4,420 | 1,700 | 0.49 | 3,310 | 1,300 | 0.45 | 2,330 | 1,200 | 0.19 | 920 |
| **φ20** | 1,500 | 0.7 | 4,210 | 1,400 | 0.62 | 3,490 | 1,400 | 0.49 | 2,770 | 1,000 | 0.46 | 1,820 | 1,000 | 0.2 | 780 |

【注意】
①できるだけ高剛性、高精度の機械をご使用ください。
②被削材、加工形状に合わせて、適切なクーラントを使用してください。
③この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。

【Note】
① Use a highly rigid and accurate machine as possible.
② Use the appropriate coolant for the work material and machining shape.
③ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

## 切り込み量と工具突き出し比率 Relation between the depth of cut and overhang.




$a_e$:工具先端フラット部の半径＝(外径DC／2)－コーナ半径RE
Half of flat length on bottom edge　Tool dia.　Corner radius

$a_p$:下表参照 Below table

| 工具突き出し比率 Overhang | $a_p$ ：Z方向切り込み Z pick mm | 工具突き出し比率 Overhang | $a_p$ ：Z方向切り込み Z pick mm |
|---|---|---|---|
| **5DC以下** or less | 0.3×RE×切り込み比率 Cutting depth ratio | **8DC** | 0.23×RE×切り込み比率 Cutting depth ratio |
| **6DC** | 0.27×RE×切り込み比率 Cutting depth ratio | **9DC** | 0.19×RE×切り込み比率 Cutting depth ratio |
| **7DC** | 0.25×RE×切り込み比率 Cutting depth ratio | **10DC** | 0.15×RE×切り込み比率 Cutting depth ratio |

① 上表の6DC以上は ペンシルネックタイプでの切り込みを示しています 。6DC 以上のストレートタイプ・ロングネックタイプの場合、Z方向の切り込み量を上記より10%程度小さく設定してください。
② 等高線・ダウンカットでご使用ください。Z方向は傾斜切り込み（傾斜角1°）とし、この際の送り速度は70%～60%に下げてください。
③ コーナ減速を設定していただくことを推奨いたします。減速距離は使用工具の約半径分、送り速度は60%～50%に下げてください。

① Feed rates for pencil-neck types are shown for 6DC and higher in the above table. For straight type and long-neck type of 6DC or higher, cutting depth in the Z direction should be set about 10% lower than the above values.
② Use for cutting contour lines or down cutting. In Z direction, cut at an incline (incline angle: 1°) and reduce feed rate to between 60% and 70%.
③ It is recommended that speed reduction for corners be set. The speed reduction distance should be approximately 1/2 the diameter of the tool being used, and the feed rate should be reduced to between 50% and 60%.

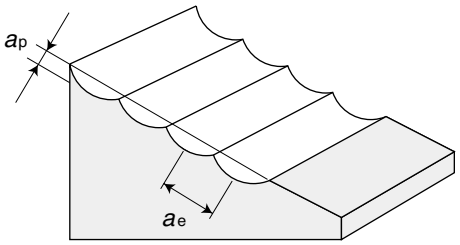
## 仕上げ条件 Finish condition

| 被削材 Work material | 鋳鉄・炭素鋼・合金鋼 Cast irons, Carbon steels, Alloy steels (150～250HB) FC, S50C, SCM | | | 工具鋼 Tool steels (25～35HRC) SKD | | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80, CENA1 | | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61,SKT4 | | | 焼入れ鋼 Hardened steels (55～60HRC) SKD11,SKH51 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 外径DC Tool dia.(mm) | 回転数 $n$ (min$^{-1}$) | 1刃送り $f_z$ (mm/t) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ (min$^{-1}$) | 1刃送り $f_z$ (mm/t) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ (min$^{-1}$) | 1刃送り $f_z$ (mm/t) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ (min$^{-1}$) | 1刃送り $f_z$ (mm/t) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ (min$^{-1}$) | 1刃送り $f_z$ (mm/t) | 送り速度 $v_f$ (mm/min) |
| **φ2** | 29,000 | 0.02 | 1,860 | 24,000 | 0.01 | 1,230 | 19,000 | 0.01 | 730 | 14,300 | 0.01 | 460 | 11,100 | 0.01 | 280 |
| **φ3** | 19,100 | 0.03 | 2,060 | 15,900 | 0.02 | 1,370 | 12,700 | 0.02 | 820 | 9,500 | 0.01 | 510 | 7,400 | 0.01 | 320 |
| **φ4** | 14,300 | 0.04 | 2,170 | 11,900 | 0.03 | 1,450 | 9,500 | 0.02 | 870 | 7,200 | 0.02 | 550 | 5,600 | 0.02 | 340 |
| **φ5** | 11,500 | 0.05 | 2,190 | 9,500 | 0.04 | 1,440 | 7,600 | 0.03 | 870 | 5,700 | 0.02 | 540 | 4,500 | 0.02 | 340 |
| **φ6** | 9,500 | 0.06 | 2,280 | 8,000 | 0.05 | 1,540 | 6,400 | 0.04 | 920 | 4,800 | 0.03 | 580 | 3,700 | 0.02 | 360 |
| **φ8** | 7,200 | 0.08 | 2,300 | 6,000 | 0.06 | 1,540 | 4,800 | 0.05 | 920 | 3,600 | 0.04 | 580 | 2,800 | 0.03 | 360 |
| **φ10** | 5,700 | 0.1 | 2,280 | 4,800 | 0.08 | 1,540 | 3,800 | 0.06 | 910 | 2,900 | 0.05 | 580 | 2,200 | 0.04 | 350 |
| **φ12** | 4,800 | 0.11 | 2,190 | 4,000 | 0.09 | 1,460 | 3,200 | 0.07 | 880 | 2,400 | 0.06 | 550 | 1,900 | 0.05 | 350 |
| **φ16** | 3,600 | 0.13 | 1,840 | 3,000 | 0.1 | 1,230 | 2,400 | 0.08 | 740 | 1,800 | 0.06 | 460 | 1,400 | 0.05 | 290 |
| **φ20** | 2,900 | 0.13 | 1,510 | 2,400 | 0.1 | 1,000 | 1,900 | 0.08 | 590 | 1,400 | 0.07 | 360 | 1,100 | 0.05 | 230 |

【注意】
①できるだけ高剛性、高精度の機械をご使用ください。
②下図の切り込みは目安です。実際にはカスプハイトを参考に選定してくだい。
③被削材、加工形状に合わせて、適切なクーラントを使用してください。
④この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
⑤機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。

【Note】
① Use a highly rigid and accurate machine as possible.
② The below cutting depths are general criteria. In actual use, the cutting depth should be selected by referring to the cusp height.
③ Use the appropriate coolant for the work material and machining shape.
④ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
⑤ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

## 切り込み量 Depth of cut




$a_p$：仕上げ代
$a_p$=0.05㎜～0.1㎜
$a_e$：ピックフィード
$a_e$=0.1RE

# Epoch G Turbo
# エポックGターボ

## 2枚刃 2Flutes

平面 Planing / 側面 Side Cutting / 溝 Slotting / 彫込み Die-sinking / ヘリカル Helical / 荒 Roughing / 中仕上 Semi Finishing

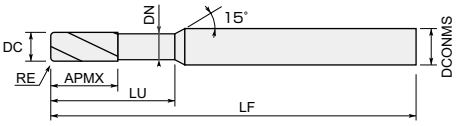
外径公差 Dia.tolerance 0～−0.03　RE公差 RE tolerance ±0.01　h5

(mm)

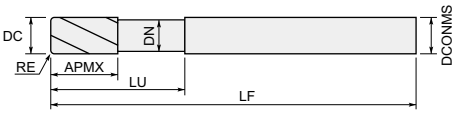
低抵抗刃形の採用により高硬度材の高能率加工が可能。汎用性重視。
Employs low-resistance flute shape to enable high-efficiency machining of high-hardness materials. Focus on general-purpose characteristics.

2枚刃 2Flutes

Aタイプ A type




Bタイプ B type




## HGOF2○○○-○○-TH

超硬 Carbide　ATH　切削条件表 A233 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 刃長 Flute length APMX | 首下長 Under neck length LU | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 刃数 No. of flutes | 形状 Shape | 希望小売価格(円) Suggested retail price(￥) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HGOF2020-05-TH | ● | 2 | 0.5 | 3 | 6 | 1.9 | 60 | 6 | 2 | A | 13,610 |
| HGOF2030-08-TH | ● | 3 | 0.8 | 4.5 | 9 | 2.9 | 60 | 6 | 2 | A | 13,390 |
| HGOF2040-10-TH | ● | 4 | 1 | 6 | 12 | 3.8 | 60 | 6 | 2 | A | 13,390 |
| HGOF2050-12-TH | ● | 5 | 1.2 | 7.5 | 15 | 4.7 | 60 | 6 | 2 | A | 14,260 |
| HGOF2060-15-TH | ● | 6 | 1.5 | 9 | 18 | 5.7 | 60 | 6 | 2 | B | 15,150 |
| HGOF2080-20-TH | ● | 8 | 2 | 12 | 24 | 7.6 | 75 | 8 | 2 | B | 19,530 |
| HGOF2100-20-TH | ● | 10 | 2 | 15 | 30 | 9.5 | 80 | 10 | 2 | B | 24,250 |
| HGOF2120-20-TH | ● | 12 | 2 | 18 | 36 | 11.5 | 100 | 12 | 2 | B | 32,210 |

## 4枚刃 4Flutes

平面 Planing / 溝 Slotting / 彫込み Die-sinking / ヘリカル Helical / 荒 Roughing / 中仕上 Semi Finishing

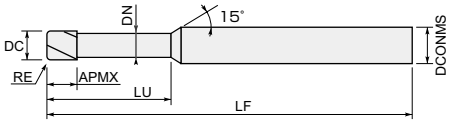
外径公差 Dia.tolerance 0～−0.03　RE公差 RE tolerance ±0.01　h5

(mm)

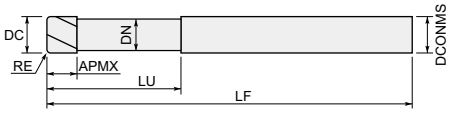
低抵抗刃形の採用により高硬度材の高能率加工が可能。
Employs low-resistance flute shape to enable high-efficiency machining of high-hardness materials.

4枚刃 4Flutes

Aタイプ A type




Bタイプ B type




## HGOF4○○○-○○-TH

超硬 Carbide　ATH　切削条件表 A234 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 刃長 Flute length APMX | 首下長 Under neck length LU | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 刃数 No. of flutes | 形状 Shape | 希望小売価格(円) Suggested retail price(￥) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HGOF4020-05-TH | ● | 2 | 0.5 | 1 | 6 | 1.9 | 60 | 6 | 4 | A | 15,650 |
| HGOF4030-08-TH | ● | 3 | 0.8 | 1.5 | 9 | 2.9 | 60 | 6 | 4 | A | 15,430 |
| HGOF4040-10-TH | ● | 4 | 1 | 2 | 12 | 3.8 | 60 | 6 | 4 | A | 15,430 |
| HGOF4050-12-TH | ● | 5 | 1.2 | 2.5 | 15 | 4.7 | 60 | 6 | 4 | A | 16,390 |
| HGOF4060-15-TH | ● | 6 | 1.5 | 3 | 18 | 5.7 | 60 | 6 | 4 | B | 17,400 |
| HGOF4080-20-TH | ● | 8 | 2 | 4 | 24 | 7.6 | 75 | 8 | 4 | B | 22,440 |
| HGOF4100-20-TH | ● | 10 | 2 | 5 | 30 | 9.5 | 80 | 10 | 4 | B | 27,830 |
| HGOF4120-20-TH | ● | 12 | 2 | 6 | 36 | 11.5 | 100 | 12 | 4 | B | 37,030 |

## 対応被削材 Applicable work material

| 刃数 No. of flutes | 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|---|
| 2 | ◎ | ◎ | ◎ | ◎ | | ○ | ◎ | ○ | ○ |
| 4 | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ |

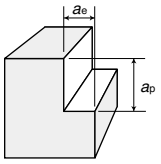
## 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| HGOF2-TH | 6～12 | 2～12 |
| HGOF4-TH | × (N/A) | 2～12 |

●：標準在庫品です。●：Stocked items.

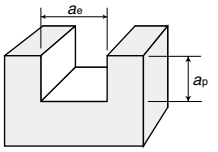
# 標準切削条件表 Recommended cutting conditions

## HGOF2-TH
2枚刃
2Flutes




### 〈側面切削〉 Side milling

| 被削材 Work material | 鋳鉄・炭素鋼・合金鋼 Cast irons, Carbon steels, Alloy steels (200～250HB) FC, S50C | | 合金鋼 Alloy steels (25～35HRC) SKD,SCM | | ステンレス鋼 Stainless steels (25～35HRC) SUS304 | | プリハードン鋼 Pre-hardened steels (35～45HRC) CENA1, NAK80 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61,SKT4 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | ap≦1.5DC ae=0.15DC | | ap≦1.5DC ae=0.1DC | | ap≦1.5DC ae=0.1DC | | ap≦1.5DC ae=0.07DC | | ap≦1.5DC ae=0.05DC | |
| 外径 DC Tool dia.(mm) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| φ2 | 14,300 | 385 | 14,300 | 345 | 10,000 | 225 | 12,700 | 280 | 11,100 | 200 |
| φ3 | 9,600 | 430 | 9,600 | 385 | 6,720 | 250 | 8,500 | 305 | 7,400 | 230 |
| φ4 | 7,200 | 460 | 7,200 | 415 | 5,040 | 270 | 6,400 | 330 | 5,600 | 250 |
| φ5 | 5,700 | 500 | 5,700 | 450 | 4,000 | 295 | 5,100 | 360 | 4,500 | 275 |
| φ6 | 4,800 | 540 | 4,800 | 485 | 3,360 | 315 | 4,200 | 375 | 3,700 | 290 |
| φ8 | 3,600 | 575 | 3,600 | 520 | 2,520 | 340 | 3,200 | 410 | 2,800 | 315 |
| φ10 | 2,900 | 535 | 2,900 | 480 | 2,030 | 315 | 2,500 | 370 | 2,200 | 285 |
| φ12 | 2,400 | 500 | 2,400 | 450 | 1,680 | 295 | 2,100 | 350 | 1,900 | 275 |




### 〈溝切削〉 Slotting

| 被削材 Work material | 鋳鉄・炭素鋼・合金鋼 Cast irons, Carbon steels, Alloy steels (200～250HB) FC, S50C | | 合金鋼 Alloy steels (25～35HRC) SKD,SCM | | ステンレス鋼 Stainless steels (25～35HRC) SUS304 | | プリハードン鋼 Pre-hardened steels (35～45HRC) CENA1, NAK80 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61,SKT4 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | ap≦1DC ae=1DC | | ap≦0.5DC ae=1DC | | ap≦0.5DC ae=1DC | | ap≦0.5DC ae=1DC | | ap≦0.2DC ae=1DC | |
| 外径 DC Tool dia.(mm) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| φ2 | 9,550 | 168 | 9,550 | 136 | 6,685 | 90 | 8,750 | 112 | 8,000 | 76 |
| φ3 | 6,400 | 196 | 6,400 | 176 | 4,480 | 115 | 5,800 | 144 | 5,300 | 96 |
| φ4 | 4,800 | 220 | 4,800 | 200 | 3,360 | 130 | 4,400 | 164 | 4,000 | 112 |
| φ5 | 3,800 | 232 | 3,800 | 212 | 2,660 | 138 | 3,500 | 172 | 3,200 | 116 |
| φ6 | 3,200 | 244 | 3,200 | 220 | 2,240 | 145 | 2,900 | 180 | 2,700 | 124 |
| φ8 | 2,400 | 260 | 2,400 | 236 | 1,680 | 155 | 2,200 | 192 | 2,000 | 132 |
| φ10 | 1,900 | 232 | 1,900 | 208 | 1,330 | 135 | 1,800 | 176 | 1,600 | 116 |
| φ12 | 1,600 | 216 | 1,600 | 192 | 1,120 | 125 | 1,500 | 160 | 1,300 | 104 |

【注意】①できるだけ高剛性、高精度の機械をご使用ください。
②被削材、加工形状に合わせて、適切なクーラントを使用してください。
③この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。
⑤更に能率を上げる場合は、回転数と送り速度を同比率にて上げてください。

【Note】① Use a highly rigid and accurate machine as possible.
② Use the appropriate coolant for the work material and machining shape.
③ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.
⑤ To increase efficiency even further, increase the rotation speed and the feed rate by the same ratio.

# Epoch G Turbo
# エポックGターボ

**2枚刃は送り速度のみを50%を目安に下げてください。また2枚刃は55HRC以上の被削材には推奨しておりません**
When using the 2-flute model, set feed rate only to 50% of the value below as a general criteria. Further, it is not recommended to use the 2-flute model for cutting materials with hardness of 55HRC.

**HGOF2-TH** 2枚刃 2Flutes
**HGOF4-TH** 4枚刃 4Flutes

## 〈等高線加工〉Contouring

| 被削材 Work material | 鋳鉄・炭素鋼・合金鋼 Cast Irons, Carbon steels, Alloy steels (150～250HB) FC, S50C, SCM | | | | 工具鋼 Tool steels (25～35HRC) SUS304, SKD | | | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80, CENA1 | | | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61,SKT4 | | | | 焼入れ鋼 Hardened steels (55～60HRC) SKD11, SKH51 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 外径 DC Tool dia.(mm) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | ap (mm) | ae (mm) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | ap (mm) | ae (mm) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | ap (mm) | ae (mm) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | ap (mm) | ae (mm) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | ap (mm) | ae (mm) |
| **φ2** | 12,000 | 5,380 | 0.12 | 0.5 | 11,000 | 4,510 | 0.12 | 0.5 | 10,000 | 3,200 | 0.12 | 0.5 | 8,000 | 2,560 | 0.08 | 0.5 | 8,000 | 1,275 | 0.06 | 0.5 |
| **φ3** | 8,000 | 6,050 | 0.19 | 0.7 | 7,400 | 5,110 | 0.19 | 0.7 | 6,900 | 3,730 | 0.19 | 0.7 | 5,300 | 2,860 | 0.13 | 0.7 | 5,300 | 1,425 | 0.10 | 0.7 |
| **φ4** | 6,000 | 6,380 | 0.24 | 1 | 5,600 | 5,450 | 0.24 | 1 | 5,200 | 3,950 | 0.24 | 1 | 4,000 | 3,040 | 0.17 | 1 | 4,000 | 1,525 | 0.12 | 1 |
| **φ5** | 4,800 | 6,380 | 0.29 | 1.3 | 4,500 | 5,470 | 0.29 | 1.3 | 4,100 | 3,900 | 0.29 | 1.3 | 3,200 | 3,040 | 0.20 | 1.3 | 3,200 | 1,525 | 0.14 | 1.3 |
| **φ6** | 4,000 | 6,720 | 0.36 | 1.5 | 3,700 | 5,680 | 0.36 | 1.5 | 3,400 | 4,080 | 0.36 | 1.5 | 2,700 | 3,240 | 0.25 | 1.5 | 2,700 | 1,625 | 0.18 | 1.5 |
| **φ8** | 3,000 | 6,720 | 0.48 | 2 | 2,800 | 5,730 | 0.48 | 2 | 2,600 | 4,160 | 0.48 | 2 | 2,000 | 3,200 | 0.34 | 2 | 2,000 | 1,600 | 0.24 | 2 |
| **φ10** | 2,400 | 6,720 | 0.48 | 3 | 2,200 | 5,630 | 0.48 | 3 | 2,100 | 4,200 | 0.48 | 3 | 1,600 | 3,200 | 0.34 | 3 | 1,600 | 1,600 | 0.24 | 3 |
| **φ12** | 2,000 | 6,380 | 0.48 | 4 | 1,900 | 5,540 | 0.48 | 4 | 1,700 | 3,880 | 0.48 | 4 | 1,300 | 2,960 | 0.34 | 4 | 1,300 | 1,488 | 0.24 | 4 |

**【注意】**①できるだけ高剛性、高精度の機械をご使用ください。
②被削材、加工形状に合わせて、適切なクーラントを使用してください。
③この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。

**【Note】** ① Use a highly rigid and accurate machine as possible.
② Use the appropriate coolant for the work material and machining shape.
③ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

# Epoch SUS Multi
# エポックSUSマルチ

**レギュラー刃長・ラジアスタイプ** Regular, Radius type

平面 Planing / 側面 Side Cutting / 溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical / 荒 Roughing / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance
φ1～φ6 ：0～−0.015
φ7～φ20：0～−0.02

h5 φ6～12　h6 φ16, φ20

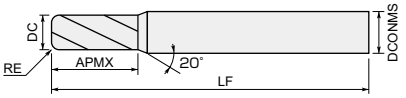
(mm)

ステンレス鋼、炭素鋼、合金鋼等の荒～仕上げ加工までマルチに対応。
Multi-purpose for roughing to finishing of stainless steel, carbon steel, alloy steel, etc.

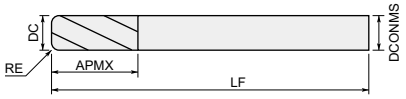
スクエアはA311頁を参照してください
Please refer to page A311 for Square

4枚刃
4 Flutes

Aタイプ A type




Bタイプ B type




## EPSM4○○○-R○.○-PN

超硬 Carbide / PN / ねじれ40° Helix angle / 不等分割 Unequal pitch / 切削条件表 A240 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Coner radius RE | 刃長 Flute length APMX | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 刃数 No. of flutes | 形状 Shape | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|
| EPSM4010-R0.1-PN | ● | 1 | 0.1 | 2.5 | 56 | 6 | 4 | A | 10,830 |
| EPSM4020-R0.1-PN | ● | 2 | 0.1 | 5 | 56 | 6 | 4 | A | 10,830 |
| EPSM4020-R0.2-PN | ● | | 0.2 | 5 | 56 | 6 | 4 | A | 10,830 |
| EPSM4030-R0.2-PN | ● | 3 | 0.2 | 7.5 | 56 | 6 | 4 | A | 10,830 |
| EPSM4030-R0.5-PN | ● | | 0.5 | 7.5 | 56 | 6 | 4 | A | 10,830 |
| EPSM4040-R0.2-PN | ● | 4 | 0.2 | 10 | 56 | 6 | 4 | A | 11,150 |
| EPSM4040-R0.5-PN | ● | | 0.5 | 10 | 56 | 6 | 4 | A | 11,150 |
| EPSM4040-R1.0-PN | ● | | 1 | 10 | 56 | 6 | 4 | A | 11,150 |
| EPSM4050-R0.2-PN | ● | 5 | 0.2 | 12.5 | 56 | 6 | 4 | A | 12,350 |
| EPSM4050-R0.5-PN | ● | | 0.5 | 12.5 | 56 | 6 | 4 | A | 12,350 |
| EPSM4050-R1.0-PN | ● | | 1 | 12.5 | 56 | 6 | 4 | A | 12,350 |
| EPSM4060-R0.3-PN | ● | 6 | 0.3 | 15 | 56 | 6 | 4 | B | 13,140 |
| EPSM4060-R0.5-PN | ● | | 0.5 | 15 | 56 | 6 | 4 | B | 13,140 |
| EPSM4060-R1.0-PN | ● | | 1 | 15 | 56 | 6 | 4 | B | 13,140 |
| EPSM4060-R1.5-PN | ● | | 1.5 | 15 | 56 | 6 | 4 | B | 13,140 |
| EPSM4070-R0.3-PN | ● | 7 | 0.3 | 17.5 | 63 | 8 | 4 | A | 15,380 |
| EPSM4070-R0.5-PN | ● | | 0.5 | 17.5 | 63 | 8 | 4 | A | 15,380 |
| EPSM4070-R1.0-PN | ● | | 1 | 17.5 | 63 | 8 | 4 | A | 15,380 |
| EPSM4080-R0.3-PN | ● | 8 | 0.3 | 20 | 63 | 8 | 4 | B | 15,380 |
| EPSM4080-R0.5-PN | ● | | 0.5 | 20 | 63 | 8 | 4 | B | 15,380 |
| EPSM4080-R1.0-PN | ● | | 1 | 20 | 63 | 8 | 4 | B | 15,380 |
| EPSM4080-R1.5-PN | ● | | 1.5 | 20 | 63 | 8 | 4 | B | 15,380 |
| EPSM4080-R2.0-PN | ● | | 2 | 20 | 63 | 8 | 4 | B | 15,380 |
| EPSM4090-R0.3-PN | ● | 9 | 0.3 | 22.5 | 74 | 10 | 4 | A | 19,870 |
| EPSM4090-R0.5-PN | ● | | 0.5 | 22.5 | 74 | 10 | 4 | A | 19,870 |
| EPSM4090-R1.0-PN | ● | | 1 | 22.5 | 74 | 10 | 4 | A | 19,870 |
| EPSM4100-R0.3-PN | ● | 10 | 0.3 | 25 | 74 | 10 | 4 | B | 19,870 |
| EPSM4100-R0.5-PN | ● | | 0.5 | 25 | 74 | 10 | 4 | B | 19,870 |
| EPSM4100-R1.0-PN | ● | | 1 | 25 | 74 | 10 | 4 | B | 19,870 |
| EPSM4100-R1.5-PN | ● | | 1.5 | 25 | 74 | 10 | 4 | B | 19,870 |
| EPSM4100-R2.0-PN | ● | | 2 | 25 | 74 | 10 | 4 | B | 19,870 |
| EPSM4110-R0.3-PN | ● | 11 | 0.3 | 27.5 | 86 | 12 | 4 | A | 23,910 |
| EPSM4110-R0.5-PN | ● | | 0.5 | 27.5 | 86 | 12 | 4 | A | 23,910 |
| EPSM4110-R1.0-PN | ● | | 1 | 27.5 | 86 | 12 | 4 | A | 23,910 |
| EPSM4120-R0.3-PN | ● | 12 | 0.3 | 30 | 86 | 12 | 4 | B | 23,910 |
| EPSM4120-R0.5-PN | ● | | 0.5 | 30 | 86 | 12 | 4 | B | 23,910 |
| EPSM4120-R1.0-PN | ● | | 1 | 30 | 86 | 12 | 4 | B | 23,910 |
| EPSM4120-R1.5-PN | ● | | 1.5 | 30 | 86 | 12 | 4 | B | 23,910 |
| EPSM4120-R2.0-PN | ● | | 2 | 30 | 86 | 12 | 4 | B | 23,910 |
| EPSM4120-R2.5-PN | ● | | 2.5 | 30 | 86 | 12 | 4 | B | 23,910 |
| EPSM4120-R3.0-PN | ● | | 3 | 30 | 86 | 12 | 4 | B | 23,910 |

●印：標準在庫品です。□印：特定代理店在庫です。弊社営業へお問い合せください。
● : Stocked items.　□ : Stocked by specified distributor. Contact with our sales department.

Epoch SUS Multi

# エポックSUSマルチ

## EPSM4○○○-R○.○-PN

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Coner radius RE | 刃長 Flute length APMX | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 刃数 No. of flutes | 形状 Shape | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|
| EPSM4130-R0.5-PN | □ | 13 | 0.5 | 32.5 | 105 | 16 | 4 | A | – |
| EPSM4130-R1.0-PN | □ | | 1 | 32.5 | 105 | 16 | 4 | A | – |
| EPSM4130-R1.5-PN | □ | | 1.5 | 32.5 | 105 | 16 | 4 | A | – |
| EPSM4130-R2.0-PN | □ | | 2 | 32.5 | 105 | 16 | 4 | A | – |
| EPSM4130-R3.0-PN | □ | | 3 | 32.5 | 105 | 16 | 4 | A | – |
| EPSM4140-R0.5-PN | □ | 14 | 0.5 | 35 | 105 | 16 | 4 | A | – |
| EPSM4140-R1.0-PN | □ | | 1 | 35 | 105 | 16 | 4 | A | – |
| EPSM4140-R1.5-PN | □ | | 1.5 | 35 | 105 | 16 | 4 | A | – |
| EPSM4140-R2.0-PN | □ | | 2 | 35 | 105 | 16 | 4 | A | – |
| EPSM4140-R3.0-PN | □ | | 3 | 35 | 105 | 16 | 4 | A | – |
| EPSM4150-R0.5-PN | □ | 15 | 0.5 | 37.5 | 110 | 16 | 4 | A | – |
| EPSM4150-R1.0-PN | □ | | 1 | 37.5 | 110 | 16 | 4 | A | – |
| EPSM4150-R1.5-PN | □ | | 1.5 | 37.5 | 110 | 16 | 4 | A | – |
| EPSM4150-R2.0-PN | □ | | 2 | 37.5 | 110 | 16 | 4 | A | – |
| EPSM4150-R3.0-PN | □ | | 3 | 37.5 | 110 | 16 | 4 | A | – |
| EPSM4160-R0.5-PN | ● | 16 | 0.5 | 40 | 110 | 16 | 4 | B | 48,100 |
| EPSM4160-R1.0-PN | ● | | 1 | 40 | 110 | 16 | 4 | B | 48,100 |
| EPSM4160-R1.5-PN | ● | | 1.5 | 40 | 110 | 16 | 4 | B | 48,100 |
| EPSM4160-R2.0-PN | ● | | 2 | 40 | 110 | 16 | 4 | B | 48,100 |
| EPSM4160-R3.0-PN | ● | | 3 | 40 | 110 | 16 | 4 | B | 48,100 |
| EPSM4170-R0.5-PN | □ | 17 | 0.5 | 42.5 | 120 | 20 | 4 | A | – |
| EPSM4170-R1.0-PN | □ | | 1 | 42.5 | 120 | 20 | 4 | A | – |
| EPSM4170-R1.5-PN | □ | | 1.5 | 42.5 | 120 | 20 | 4 | A | – |
| EPSM4170-R2.0-PN | □ | | 2 | 42.5 | 120 | 20 | 4 | A | – |
| EPSM4170-R3.0-PN | □ | | 3 | 42.5 | 120 | 20 | 4 | A | – |
| EPSM4180-R0.5-PN | □ | 18 | 0.5 | 45 | 120 | 20 | 4 | A | – |
| EPSM4180-R1.0-PN | □ | | 1 | 45 | 120 | 20 | 4 | A | – |
| EPSM4180-R1.5-PN | □ | | 1.5 | 45 | 120 | 20 | 4 | A | – |
| EPSM4180-R2.0-PN | □ | | 2 | 45 | 120 | 20 | 4 | A | – |
| EPSM4180-R3.0-PN | □ | | 3 | 45 | 120 | 20 | 4 | A | – |
| EPSM4190-R0.5-PN | □ | 19 | 0.5 | 47.5 | 125 | 20 | 4 | A | – |
| EPSM4190-R1.0-PN | □ | | 1 | 47.5 | 125 | 20 | 4 | A | – |
| EPSM4190-R1.5-PN | □ | | 1.5 | 47.5 | 125 | 20 | 4 | A | – |
| EPSM4190-R2.0-PN | □ | | 2 | 47.5 | 125 | 20 | 4 | A | – |
| EPSM4190-R3.0-PN | □ | | 3 | 47.5 | 125 | 20 | 4 | A | – |
| EPSM4200-R0.5-PN | ● | 20 | 0.5 | 50 | 125 | 20 | 4 | B | 68,630 |
| EPSM4200-R1.0-PN | ● | | 1 | 50 | 125 | 20 | 4 | B | 68,630 |
| EPSM4200-R1.5-PN | ● | | 1.5 | 50 | 125 | 20 | 4 | B | 68,630 |
| EPSM4200-R2.0-PN | ● | | 2 | 50 | 125 | 20 | 4 | B | 68,630 |
| EPSM4200-R3.0-PN | ● | | 3 | 50 | 125 | 20 | 4 | B | 68,630 |
| EPSM4200-R5.0-PN | ● | | 5 | 50 | 125 | 20 | 4 | B | 68,630 |

### 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | | | | ◎ | ◎ | ◎ | ◎ |

### 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPSM-CR-PN | 6～20 | 4～20 |

●：標準在庫品です。 □印：特定代理店在庫です。弊社営業へお問合せください
●：Stocked items. □：Stocked by specified distributor. Contact with our sales department.

## ロング刃長・ラジアスタイプ　Long, Radius type

側面 Side Cutting　曲面 Profiling　R Radius　中仕上 Semi Finishing　仕上 Finishing

外径公差 Dia.tolerance　φ6　：0～−0.015
φ8～φ20：0～−0.02

h5 φ6～12　h6 φ16,φ20

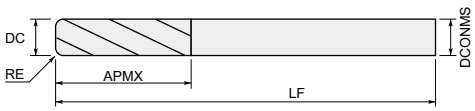
(mm)

ステンレス鋼、炭素鋼、合金鋼等の荒～仕上げ加工までマルチに対応。
Multi-purpose for roughing to finishing of stainless steel, carbon steel, alloy steel, etc.

スクエアはA311頁を参照してください
Please refer to page A311 for Square

4枚刃
4 Flutes

Bタイプ
B type




# EPSML4○○○-R○.○-PN

超硬 Carbide　PN　ねじれ40° Helix angle　不等分割 Unequal pitch　切削条件表 A246 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Coner radius RE | 刃長 Flute length APMX | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 刃数 No. of flutes | 形状 Shape | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|
| EPSML4060-R0.3-PN | □ | 6 | 0.3 | 30 | 70 | 6 | 4 | B | — |
| EPSML4060-R0.5-PN | □ | | 0.5 | 30 | 70 | 6 | 4 | B | — |
| EPSML4060-R1.0-PN | □ | | 1 | 30 | 70 | 6 | 4 | B | — |
| EPSML4060-R1.5-PN | □ | | 1.5 | 30 | 70 | 6 | 4 | B | — |
| EPSML4080-R0.3-PN | □ | 8 | 0.3 | 40 | 80 | 8 | 4 | B | — |
| EPSML4080-R0.5-PN | □ | | 0.5 | 40 | 80 | 8 | 4 | B | — |
| EPSML4080-R1.0-PN | □ | | 1 | 40 | 80 | 8 | 4 | B | — |
| EPSML4080-R1.5-PN | □ | | 1.5 | 40 | 80 | 8 | 4 | B | — |
| EPSML4080-R2.0-PN | □ | | 2 | 40 | 80 | 8 | 4 | B | — |
| EPSML4100-R0.3-PN | □ | 10 | 0.3 | 50 | 100 | 10 | 4 | B | — |
| EPSML4100-R0.5-PN | □ | | 0.5 | 50 | 100 | 10 | 4 | B | — |
| EPSML4100-R1.0-PN | □ | | 1 | 50 | 100 | 10 | 4 | B | — |
| EPSML4100-R1.5-PN | □ | | 1.5 | 50 | 100 | 10 | 4 | B | — |
| EPSML4100-R2.0-PN | □ | | 2 | 50 | 100 | 10 | 4 | B | — |
| EPSML4120-R0.3-PN | □ | 12 | 0.3 | 60 | 120 | 12 | 4 | B | — |
| EPSML4120-R0.5-PN | □ | | 0.5 | 60 | 120 | 12 | 4 | B | — |
| EPSML4120-R1.0-PN | □ | | 1 | 60 | 120 | 12 | 4 | B | — |
| EPSML4120-R1.5-PN | □ | | 1.5 | 60 | 120 | 12 | 4 | B | — |
| EPSML4120-R2.0-PN | □ | | 2 | 60 | 120 | 12 | 4 | B | — |
| EPSML4120-R2.5-PN | □ | | 2.5 | 60 | 120 | 12 | 4 | B | — |
| EPSML4120-R3.0-PN | □ | | 3 | 60 | 120 | 12 | 4 | B | — |
| EPSML4160-R0.5-PN | □ | 16 | 0.5 | 80 | 135 | 16 | 4 | B | — |
| EPSML4160-R1.0-PN | □ | | 1 | 80 | 135 | 16 | 4 | B | — |
| EPSML4160-R1.5-PN | □ | | 1.5 | 80 | 135 | 16 | 4 | B | — |
| EPSML4160-R2.0-PN | □ | | 2 | 80 | 135 | 16 | 4 | B | — |
| EPSML4160-R3.0-PN | □ | | 3 | 80 | 135 | 16 | 4 | B | — |
| EPSML4200-R0.5-PN | □ | 20 | 0.5 | 100 | 155 | 20 | 4 | B | — |
| EPSML4200-R1.0-PN | □ | | 1 | 100 | 155 | 20 | 4 | B | — |
| EPSML4200-R1.5-PN | □ | | 1.5 | 100 | 155 | 20 | 4 | B | — |
| EPSML4200-R2.0-PN | □ | | 2 | 100 | 155 | 20 | 4 | B | — |
| EPSML4200-R3.0-PN | □ | | 3 | 100 | 155 | 20 | 4 | B | — |
| EPSML4200-R5.0-PN | □ | | 5 | 100 | 155 | 20 | 4 | B | — |

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | | | | ◎ | ◎ | ◎ | ◎ |

## 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPSML-CR-PN | 6 ～ 20 | 6 ～ 20 |

# Epoch SUS Multi
# エポックSUSマルチ

## 首下 5DC・ラジアスタイプ　Under neck 5DC, Radius type

ステンレス鋼、炭素鋼、合金鋼等の荒～仕上げ加工までマルチに対応。
Multi-purpose for roughing to finishing of stainless steel, carbon steel, alloy steel, etc.

スクエアはA311頁を参照してください
Please refer to page A311 for Square

平面 Planing / 側面 Side Cutting / 溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical / 荒 Roughing / 中仕上 Semi Finishing / 仕上 Finishing

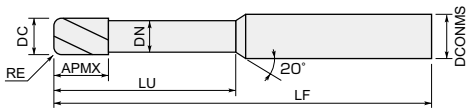
外径公差 Dia.tolerance
φ1～φ6　：0～−0.015
φ7～φ20：0～−0.02

h5 φ6～12　h6 φ16,φ20

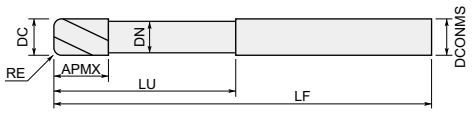
(mm)

4枚刃
4 Flutes

Aタイプ
A type




Bタイプ
B type




## EPSM4○○○-○○○-R○.○-PN

超硬 Carbide / PN / ねじれ40° Helix angle / 不等分割 Unequal pitch / 切削条件表 A243 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Coner radius RE | 刃長 Flute length APMX | 首下長 Under neck length LU | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 刃数 No. of flutes | 形状 Shape | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EPSM4010-5-R0.1-PN | ● | 1 | 0.1 | 1.5 | 5 | 0.96 | 68 | 6 | 4 | A | 11,900 |
| EPSM4020-10-R0.1-PN | ● | 2 | 0.1 | 3 | 10 | 1.92 | 68 | 6 | 4 | A | 11,900 |
| EPSM4020-10-R0.2-PN | ● | | 0.2 | 3 | 10 | 1.92 | 68 | 6 | 4 | A | 11,900 |
| EPSM4030-15-R0.2-PN | ● | 3 | 0.2 | 4.5 | 15 | 2.88 | 68 | 6 | 4 | A | 11,900 |
| EPSM4030-15-R0.5-PN | ● | | 0.5 | 4.5 | 15 | 2.88 | 68 | 6 | 4 | A | 11,900 |
| EPSM4040-20-R0.2-PN | ● | 4 | 0.2 | 6 | 20 | 3.7 | 68 | 6 | 4 | A | 12,220 |
| EPSM4040-20-R0.5-PN | ● | | 0.5 | 6 | 20 | 3.7 | 68 | 6 | 4 | A | 12,220 |
| EPSM4040-20-R1.0-PN | ● | | 1 | 6 | 20 | 3.7 | 68 | 6 | 4 | A | 12,220 |
| EPSM4050-25-R0.2-PN | ● | 5 | 0.2 | 7.5 | 25 | 4.6 | 68 | 6 | 4 | A | 13,590 |
| EPSM4050-25-R0.5-PN | ● | | 0.5 | 7.5 | 25 | 4.6 | 68 | 6 | 4 | A | 13,590 |
| EPSM4050-25-R1.0-PN | ● | | 1 | 7.5 | 25 | 4.6 | 68 | 6 | 4 | A | 13,590 |
| EPSM4060-30-R0.3-PN | ● | 6 | 0.3 | 9 | 30 | 5.5 | 68 | 6 | 4 | B | 14,480 |
| EPSM4060-30-R0.5-PN | ● | | 0.5 | 9 | 30 | 5.5 | 68 | 6 | 4 | B | 14,480 |
| EPSM4060-30-R1.0-PN | ● | | 1 | 9 | 30 | 5.5 | 68 | 6 | 4 | B | 14,480 |
| EPSM4060-30-R1.5-PN | ● | | 1.5 | 9 | 30 | 5.5 | 68 | 6 | 4 | B | 14,480 |
| EPSM4070-35-R0.3-PN | ● | 7 | 0.3 | 10.5 | 35 | 6.4 | 80 | 8 | 4 | A | 16,960 |
| EPSM4070-35-R0.5-PN | ● | | 0.5 | 10.5 | 35 | 6.4 | 80 | 8 | 4 | A | 16,960 |
| EPSM4070-35-R1.0-PN | ● | | 1 | 10.5 | 35 | 6.4 | 80 | 8 | 4 | A | 16,960 |
| EPSM4080-40-R0.3-PN | ● | 8 | 0.3 | 12 | 40 | 7.3 | 80 | 8 | 4 | B | 16,960 |
| EPSM4080-40-R0.5-PN | ● | | 0.5 | 12 | 40 | 7.3 | 80 | 8 | 4 | B | 16,960 |
| EPSM4080-40-R1.0-PN | ● | | 1 | 12 | 40 | 7.3 | 80 | 8 | 4 | B | 16,960 |
| EPSM4080-40-R1.5-PN | ● | | 1.5 | 12 | 40 | 7.3 | 80 | 8 | 4 | B | 16,960 |
| EPSM4080-40-R2.0-PN | ● | | 2 | 12 | 40 | 7.3 | 80 | 8 | 4 | B | 16,960 |
| EPSM4090-45-R0.3-PN | ● | 9 | 0.3 | 13.5 | 45 | 8.3 | 94 | 10 | 4 | A | 21,880 |
| EPSM4090-45-R0.5-PN | ● | | 0.5 | 13.5 | 45 | 8.3 | 94 | 10 | 4 | A | 21,880 |
| EPSM4090-45-R1.0-PN | ● | | 1 | 13.5 | 45 | 8.3 | 94 | 10 | 4 | A | 21,880 |
| EPSM4100-50-R0.3-PN | ● | 10 | 0.3 | 15 | 50 | 9.1 | 94 | 10 | 4 | B | 21,880 |
| EPSM4100-50-R0.5-PN | ● | | 0.5 | 15 | 50 | 9.1 | 94 | 10 | 4 | B | 21,880 |
| EPSM4100-50-R1.0-PN | ● | | 1 | 15 | 50 | 9.1 | 94 | 10 | 4 | B | 21,880 |
| EPSM4100-50-R1.5-PN | ● | | 1.5 | 15 | 50 | 9.1 | 94 | 10 | 4 | B | 21,880 |
| EPSM4100-50-R2.0-PN | ● | | 2 | 15 | 50 | 9.1 | 94 | 10 | 4 | B | 21,880 |
| EPSM4110-55-R0.3-PN | ● | 11 | 0.3 | 16.5 | 55 | 10.2 | 110 | 12 | 4 | A | 26,260 |
| EPSM4110-55-R0.5-PN | ● | | 0.5 | 16.5 | 55 | 10.2 | 110 | 12 | 4 | A | 26,260 |
| EPSM4110-55-R1.0-PN | ● | | 1 | 16.5 | 55 | 10.2 | 110 | 12 | 4 | A | 26,260 |
| EPSM4120-60-R0.3-PN | ● | 12 | 0.3 | 18 | 60 | 11 | 110 | 12 | 4 | B | 26,260 |
| EPSM4120-60-R0.5-PN | ● | | 0.5 | 18 | 60 | 11 | 110 | 12 | 4 | B | 26,260 |
| EPSM4120-60-R1.0-PN | ● | | 1 | 18 | 60 | 11 | 110 | 12 | 4 | B | 26,260 |
| EPSM4120-60-R1.5-PN | ● | | 1.5 | 18 | 60 | 11 | 110 | 12 | 4 | B | 26,260 |
| EPSM4120-60-R2.0-PN | ● | | 2 | 18 | 60 | 11 | 110 | 12 | 4 | B | 26,260 |
| EPSM4120-60-R2.5-PN | ● | | 2.5 | 18 | 60 | 11 | 110 | 12 | 4 | B | 26,260 |
| EPSM4120-60-R3.0-PN | ● | | 3 | 18 | 60 | 11 | 110 | 12 | 4 | B | 26,260 |

●：標準在庫品です。　□印：特定代理店在庫です。弊社営業へお問合せください
●：Stocked items.　□：Stocked by specified distributor. Contact with our sales department.

# EPSM4○○○-○○○-R○.○-PN

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Coner radius RE | 刃長 Flute length APMX | 首下長 Under neck length LU | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 刃数 No. of flutes | 形状 Shape | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EPSM4130-65-R0.5-PN | □ | 13 | 0.5 | 19.5 | 65 | 11.7 | 125 | 16 | 4 | A | – |
| EPSM4130-65-R1.0-PN | □ | | 1 | 19.5 | 65 | 11.7 | 125 | 16 | 4 | A | – |
| EPSM4130-65-R1.5-PN | □ | | 1.5 | 19.5 | 65 | 11.7 | 125 | 16 | 4 | A | – |
| EPSM4130-65-R2.0-PN | □ | | 2 | 19.5 | 65 | 11.7 | 125 | 16 | 4 | A | – |
| EPSM4130-65-R3.0-PN | □ | | 3 | 19.5 | 65 | 11.7 | 125 | 16 | 4 | A | – |
| EPSM4140-70-R0.5-PN | □ | 14 | 0.5 | 21 | 70 | 12.7 | 125 | 16 | 4 | A | – |
| EPSM4140-70-R1.0-PN | □ | | 1 | 21 | 70 | 12.7 | 125 | 16 | 4 | A | – |
| EPSM4140-70-R1.5-PN | □ | | 1.5 | 21 | 70 | 12.7 | 125 | 16 | 4 | A | – |
| EPSM4140-70-R2.0-PN | □ | | 2 | 21 | 70 | 12.7 | 125 | 16 | 4 | A | – |
| EPSM4140-70-R3.0-PN | □ | | 3 | 21 | 70 | 12.7 | 125 | 16 | 4 | A | – |
| EPSM4150-75-R0.5-PN | □ | 15 | 0.5 | 22.5 | 75 | 13.6 | 135 | 16 | 4 | A | – |
| EPSM4150-75-R1.0-PN | □ | | 1 | 22.5 | 75 | 13.6 | 135 | 16 | 4 | A | – |
| EPSM4150-75-R1.5-PN | □ | | 1.5 | 22.5 | 75 | 13.6 | 135 | 16 | 4 | A | – |
| EPSM4150-75-R2.0-PN | □ | | 2 | 22.5 | 75 | 13.6 | 135 | 16 | 4 | A | – |
| EPSM4150-75-R3.0-PN | □ | | 3 | 22.5 | 75 | 13.6 | 135 | 16 | 4 | A | – |
| EPSM4160-80-R0.5-PN | ● | 16 | 0.5 | 24 | 80 | 14.5 | 135 | 16 | 4 | B | 52,920 |
| EPSM4160-80-R1.0-PN | ● | | 1 | 24 | 80 | 14.5 | 135 | 16 | 4 | B | 52,920 |
| EPSM4160-80-R1.5-PN | ● | | 1.5 | 24 | 80 | 14.5 | 135 | 16 | 4 | B | 52,920 |
| EPSM4160-80-R2.0-PN | ● | | 2 | 24 | 80 | 14.5 | 135 | 16 | 4 | B | 52,920 |
| EPSM4160-80-R3.0-PN | ● | | 3 | 24 | 80 | 14.5 | 135 | 16 | 4 | B | 52,920 |
| EPSM4170-85-R0.5-PN | □ | 17 | 0.5 | 25.5 | 85 | 15.4 | 145 | 20 | 4 | A | – |
| EPSM4170-85-R1.0-PN | □ | | 1 | 25.5 | 85 | 15.4 | 145 | 20 | 4 | A | – |
| EPSM4170-85-R1.5-PN | □ | | 1.5 | 25.5 | 85 | 15.4 | 145 | 20 | 4 | A | – |
| EPSM4170-85-R2.0-PN | □ | | 2 | 25.5 | 85 | 15.4 | 145 | 20 | 4 | A | – |
| EPSM4170-85-R3.0-PN | □ | | 3 | 25.5 | 85 | 15.4 | 145 | 20 | 4 | A | – |
| EPSM4180-90-R0.5-PN | □ | 18 | 0.5 | 27 | 90 | 16.3 | 145 | 20 | 4 | A | – |
| EPSM4180-90-R1.0-PN | □ | | 1 | 27 | 90 | 16.3 | 145 | 20 | 4 | A | – |
| EPSM4180-90-R1.5-PN | □ | | 1.5 | 27 | 90 | 16.3 | 145 | 20 | 4 | A | – |
| EPSM4180-90-R2.0-PN | □ | | 2 | 27 | 90 | 16.3 | 145 | 20 | 4 | A | – |
| EPSM4180-90-R3.0-PN | □ | | 3 | 27 | 90 | 16.3 | 145 | 20 | 4 | A | – |
| EPSM4190-95-R0.5-PN | □ | 19 | 0.5 | 28.5 | 95 | 17.3 | 155 | 20 | 4 | A | – |
| EPSM4190-95-R1.0-PN | □ | | 1 | 28.5 | 95 | 17.3 | 155 | 20 | 4 | A | – |
| EPSM4190-95-R1.5-PN | □ | | 1.5 | 28.5 | 95 | 17.3 | 155 | 20 | 4 | A | – |
| EPSM4190-95-R2.0-PN | □ | | 2 | 28.5 | 95 | 17.3 | 155 | 20 | 4 | A | – |
| EPSM4190-95-R3.0-PN | □ | | 3 | 28.5 | 95 | 17.3 | 155 | 20 | 4 | A | – |
| EPSM4200-100-R0.5-PN | ● | 20 | 0.5 | 30 | 100 | 18.2 | 155 | 20 | 4 | B | 75,550 |
| EPSM4200-100-R1.0-PN | ● | | 1 | 30 | 100 | 18.2 | 155 | 20 | 4 | B | 75,550 |
| EPSM4200-100-R1.5-PN | ● | | 1.5 | 30 | 100 | 18.2 | 155 | 20 | 4 | B | 75,550 |
| EPSM4200-100-R2.0-PN | ● | | 2 | 30 | 100 | 18.2 | 155 | 20 | 4 | B | 75,550 |
| EPSM4200-100-R3.0-PN | ● | | 3 | 30 | 100 | 18.2 | 155 | 20 | 4 | B | 75,550 |
| EPSM4200-100-R5.0-PN | ● | | 5 | 30 | 100 | 18.2 | 155 | 20 | 4 | B | 75,550 |

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | | | | ◎ | ◎ | ◎ | ◎ |

## 再研磨対応外径範囲 Re-grinding compatibility range

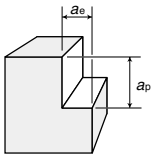
| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPSM-5DC-CR-PN | 6～20 | 4～20 |

# Epoch SUS Multi
# エポックSUSマルチ

## 標準切削条件表 Recommended cutting conditions

### 汎用 側面切削条件 General Side milling conditions

**EPSM-CR**
レギュラー刃長･コーナR付き
Regular, Corner radius




| 外径 DC Tool dia. (mm) | 炭素鋼・合金鋼・鋳鉄 (～30HRC) Carbon steels, Alloy steels Cast irons | | 工具鋼・プリハードン鋼 (30～40HRC) Tool steels, Pre-hardened steels | | ステンレス鋼 Stainless steels | | チタン合金 Titanium alloys | | 超耐熱合金 Super heat-resistant alloys | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ap=1DC, ae=0.5DC | | ap=1DC, ae=0.5DC | | ap=1DC, ae=0.5DC | | ap=1DC, ae=0.1DC | | ap=1DC, ae=0.05DC | |
| | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 1 | 31,800 | 760 | 22,300 | 360 | 19,100 | 310 | 12,700 | 150 | 9,500 | 76 |
| 2 | 15,900 | 810 | 11,100 | 380 | 9,500 | 320 | 6,400 | 160 | 4,800 | 82 |
| 3 | 10,600 | 860 | 7,400 | 400 | 6,400 | 350 | 4,200 | 170 | 3,200 | 86 |
| 4 | 8,000 | 910 | 5,600 | 430 | 4,800 | 360 | 3,200 | 180 | 2,400 | 91 |
| 5 | 6,400 | 960 | 4,500 | 450 | 3,800 | 380 | 2,500 | 190 | 1,900 | 95 |
| 6 | 5,300 | 950 | 3,700 | 440 | 3,200 | 380 | 2,100 | 190 | 1,600 | 96 |
| 7 | 4,500 | 940 | 3,200 | 450 | 2,700 | 380 | 1,800 | 190 | 1,400 | 98 |
| 8 | 4,000 | 960 | 2,800 | 450 | 2,400 | 380 | 1,600 | 190 | 1,200 | 96 |
| 9 | 3,500 | 940 | 2,500 | 450 | 2,100 | 380 | 1,400 | 190 | 1,100 | 99 |
| 10 | 3,200 | 960 | 2,200 | 440 | 1,900 | 380 | 1,300 | 200 | 1,000 | 100 |
| 11 | 2,900 | 910 | 2,000 | 420 | 1,700 | 360 | 1,200 | 190 | 900 | 94 |
| 12 | 2,700 | 870 | 1,900 | 410 | 1,600 | 350 | 1,100 | 180 | 800 | 86 |
| 13 | 2,400 | 820 | 1,700 | 390 | 1,500 | 340 | 1,000 | 170 | 700 | 80 |
| 14 | 2,300 | 840 | 1,600 | 390 | 1,400 | 340 | 900 | 160 | 700 | 85 |
| 15 | 2,100 | 810 | 1,500 | 390 | 1,300 | 340 | 800 | 150 | 600 | 77 |
| 16 | 2,000 | 820 | 1,400 | 380 | 1,200 | 330 | 800 | 160 | 600 | 82 |
| 17 | 1,900 | 800 | 1,300 | 370 | 1,100 | 310 | 700 | 150 | 600 | 85 |
| 18 | 1,800 | 800 | 1,200 | 350 | 1,100 | 320 | 700 | 150 | 500 | 74 |
| 19 | 1,700 | 780 | 1,200 | 370 | 1,000 | 310 | 700 | 160 | 500 | 77 |
| 20 | 1,600 | 770 | 1,100 | 350 | 1,000 | 320 | 600 | 140 | 500 | 80 |

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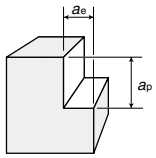
被削材、加工形状に合わせて、適切なクーラントを使用してください。
できるだけ高剛性、高精度の機械及びチャックをご使用ください。
この標準切削条件表は切削条件の目安を示すものです。実際の加工では、加工条件、目的、使用機械等により条件を調整してください。
ビビリや異常振動が発生する場合は条件を調整してください。

【Note】PN coating is less electro conductive. Therefore, electric transmitted measuring systems may not work.
Use the appropriate coolant for the work material and machining shape.
Use the high-rigidity and high accuracy machine as possible.
These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
Please adjust it if chatter or abnormal vibration occurs.

# 高速 側面切削条件 High speed Side milling conditions

## EPSM-CR

レギュラー刃長･コーナR付き
Regular, Corner radius




| 外径 DC Tool dia. (mm) | 炭素鋼・合金鋼・鋳鉄（～30HRC） Carbon steels, Alloy steels Cast irons | | 工具鋼・プリハードン鋼（30～40HRC） Tool steels, Pre-hardened steels | | ステンレス鋼 Stainless steels | | チタン合金 Titanium alloys | | 超耐熱合金 Super heat-resistant alloys | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ap=1DC, ae=0.5DC | | ap=1DC , ae=0.5DC | | ap=1DC, ae=0.5DC | | ap=1DC, ae=0.1DC | | ap=1DC ae=0.05DC | |
| | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 1 | 41,400 | 990 | 31,800 | 510 | 28,600 | 460 | 19,100 | 230 | 15,900 | 127 |
| 2 | 20,700 | 1,060 | 15,900 | 540 | 14,300 | 490 | 9,500 | 240 | 8,000 | 136 |
| 3 | 13,800 | 1,120 | 10,600 | 570 | 9,500 | 510 | 6,400 | 260 | 5,300 | 143 |
| 4 | 10,300 | 1,170 | 8,000 | 610 | 7,200 | 550 | 4,800 | 270 | 4,000 | 152 |
| 5 | 8,300 | 1,250 | 6,400 | 640 | 5,700 | 570 | 3,800 | 280 | 3,200 | 160 |
| 6 | 6,900 | 1,240 | 5,300 | 640 | 4,800 | 580 | 3,200 | 290 | 2,700 | 162 |
| 7 | 5,900 | 1,240 | 4,500 | 630 | 4,100 | 570 | 2,700 | 280 | 2,300 | 161 |
| 8 | 5,200 | 1,250 | 4,000 | 640 | 3,600 | 580 | 2,400 | 290 | 2,000 | 160 |
| 9 | 4,600 | 1,240 | 3,500 | 630 | 3,200 | 580 | 2,100 | 280 | 1,800 | 162 |
| 10 | 4,100 | 1,230 | 3,200 | 640 | 2,900 | 580 | 1,900 | 290 | 1,600 | 160 |
| 11 | 3,800 | 1,190 | 2,900 | 610 | 2,600 | 540 | 1,700 | 270 | 1,400 | 146 |
| 12 | 3,400 | 1,100 | 2,700 | 580 | 2,400 | 520 | 1,600 | 260 | 1,300 | 140 |
| 13 | 3,200 | 1,100 | 2,400 | 550 | 2,200 | 500 | 1,500 | 260 | 1,200 | 137 |
| 14 | 3,000 | 1,100 | 2,300 | 560 | 2,000 | 490 | 1,400 | 260 | 1,100 | 134 |
| 15 | 2,800 | 1,080 | 2,100 | 540 | 1,900 | 490 | 1,300 | 250 | 1,100 | 142 |
| 16 | 2,600 | 1,060 | 2,000 | 540 | 1,800 | 490 | 1,200 | 240 | 1,000 | 136 |
| 17 | 2,400 | 1,020 | 1,900 | 540 | 1,700 | 480 | 1,100 | 230 | 900 | 127 |
| 18 | 2,300 | 1,020 | 1,800 | 530 | 1,600 | 470 | 1,100 | 240 | 900 | 133 |
| 19 | 2,200 | 1,020 | 1,700 | 520 | 1,500 | 460 | 1,000 | 230 | 800 | 123 |
| 20 | 2,100 | 1,010 | 1,600 | 510 | 1,400 | 450 | 1,000 | 240 | 800 | 128 |

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被削材、加工形状に合わせて、適切なクーラントを使用してください。
できるだけ高剛性、高精度の機械及びチャックをご使用ください。
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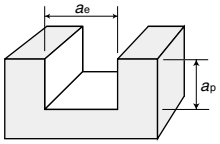
ビビリや異常振動が発生する場合は条件を調整してください。

【Note】PN coating is less electro conductive. Therefore, electric transmitted measuring systems may not work.
Use the appropriate coolant for the work material and machining shape.
Use the high-rigidity and high accuracy machine as possible.
These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
Please adjust it if chatter or abnormal vibration occurs.

# Epoch SUS Multi
# エポックSUSマルチ

## 汎用 溝切削条件 General Slotting conditions

**EPSM-CR**
レギュラー刃長・コーナR付き
Regular, Corner radius




| 外径 DC Tool dia. (mm) | 炭素鋼・合金鋼・鋳鉄 (～30HRC) Carbon steels, Alloy steels Cast iron | | 工具鋼・プリハードン鋼 (30～40HRC) Tool steels, Pre-hardened steels | | ステンレス鋼 Stainless steels | | チタン合金 Titanium alloys | | 超耐熱合金 Super heat-resistant alloys | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ap=1DC | | ap=1DC | | ap=1DC | | ap=0.5DC | | ap=0.5DC | |
| | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 1 | 28,600 | 360 | 19,100 | 190 | 17,500 | 130 | 11,100 | 60 | 6,400 | 19 |
| 2 | 14,300 | 430 | 9,500 | 230 | 8,800 | 160 | 5,600 | 70 | 3,200 | 23 |
| 3 | 9,500 | 500 | 6,400 | 270 | 5,800 | 180 | 3,700 | 80 | 2,100 | 26 |
| 4 | 7,200 | 580 | 4,800 | 310 | 4,400 | 210 | 2,800 | 90 | 1,600 | 31 |
| 5 | 5,700 | 640 | 3,800 | 340 | 3,500 | 240 | 2,200 | 100 | 1,300 | 35 |
| 6 | 4,800 | 720 | 3,200 | 380 | 2,900 | 260 | 1,900 | 110 | 1,100 | 40 |
| 7 | 4,100 | 720 | 2,700 | 380 | 2,500 | 260 | 1,600 | 110 | 900 | 38 |
| 8 | 3,600 | 720 | 2,400 | 380 | 2,200 | 260 | 1,400 | 110 | 800 | 38 |
| 9 | 3,200 | 720 | 2,100 | 380 | 1,900 | 260 | 1,200 | 110 | 700 | 38 |
| 10 | 2,900 | 730 | 1,900 | 380 | 1,800 | 270 | 1,100 | 110 | 600 | 36 |
| 11 | 2,600 | 680 | 1,700 | 360 | 1,600 | 250 | 1,000 | 100 | 600 | 38 |
| 12 | 2,400 | 650 | 1,600 | 350 | 1,500 | 240 | 900 | 100 | 500 | 32 |
| 13 | 2,200 | 630 | 1,500 | 340 | 1,300 | 220 | 900 | 100 | 500 | 34 |
| 14 | 2,000 | 610 | 1,400 | 340 | 1,300 | 240 | 800 | 100 | 500 | 37 |
| 15 | 1,900 | 610 | 1,300 | 340 | 1,200 | 230 | 700 | 90 | 400 | 31 |
| 16 | 1,800 | 610 | 1,200 | 330 | 1,100 | 220 | 700 | 100 | 400 | 33 |
| 17 | 1,700 | 600 | 1,100 | 310 | 1,000 | 210 | 700 | 100 | 400 | 34 |
| 18 | 1,600 | 590 | 1,100 | 320 | 1,000 | 220 | 600 | 90 | 400 | 35 |
| 19 | 1,500 | 580 | 1,000 | 310 | 900 | 210 | 600 | 90 | 300 | 28 |
| 20 | 1,400 | 560 | 1,000 | 320 | 900 | 220 | 600 | 100 | 300 | 29 |

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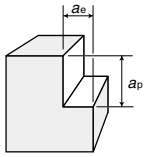
できるだけ高剛性、高精度の機械及びチャックをご使用ください。
この標準切削条件表は切削条件の目安を示すものです。実際の加工では、加工条件、目的、使用機械等により条件を調整してください。
ビビリや異常振動が発生する場合は条件を調整してください。
座繰り加工を行う際に、送り速度を溝条件の1/5に、0.01DCのステップに設定してください。
傾斜進入加工を行う際に、進入角度を3°以下、送り速度を溝条件の70%送りに設定してください。

【Note】PN coating is less electro conductive. Therefore, electric transmitted measuring systems may not work.
Use the appropriate coolant for the work material and machining shape.
Use the high-rigidity and high accuracy machine as possible.
These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
Please adjust it if chatter or abnormal vibration occurs.
Please setup feed 1/5 that of slotting parameter and step 0.01DC for drilling application.
Please setup feed 70% of slotting parameter and ramping angle 3° for ramping application.

# 側面仕上げ切削条件 Side finishing conditions

**EPSM-CR** レギュラー刃長・コーナR付き Regular, Corner radius

**EPSM-5DC-CR**※ 首下5DCタイプ・コーナR付き Under neck 5DC, Corner radius




| 外径 DC Tool dia. (mm) | 炭素鋼・合金鋼・鋳鉄（～30HRC） Carbon steels, Alloy steels Cast irons | | 工具鋼・プリハードン鋼（30～40HRC） Tool steels, Pre-hardened steels | | ステンレス鋼 Stainless steels | | チタン合金 Titanium alloys | | 超耐熱合金 Super heat-resistant alloys | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ap=1DC, ae=0.001～0.02DC | | ap=1DC, ae=0.001～0.02DC | | ap=1DC, ae=0.001～0.02DC | | ap=1DC, ae=0.001～0.02DC | | ap=1DC, ae=0.001～0.02DC | |
| | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 1 | 45,500 | 980 | 35,000 | 500 | 31,500 | 450 | 21,000 | 230 | 17,500 | 130 |
| 2 | 22,800 | 1,050 | 17,500 | 540 | 15,800 | 480 | 10,500 | 240 | 8,800 | 130 |
| 3 | 15,200 | 1,110 | 11,700 | 570 | 10,500 | 510 | 7,000 | 260 | 5,800 | 140 |
| 4 | 11,400 | 1,170 | 8,800 | 600 | 7,900 | 540 | 5,300 | 270 | 4,400 | 150 |
| 5 | 9,100 | 1,230 | 7,000 | 630 | 6,300 | 570 | 4,200 | 280 | 3,500 | 160 |
| 6 | 7,600 | 1,230 | 5,800 | 630 | 5,300 | 570 | 3,500 | 280 | 2,900 | 160 |
| 7 | 6,500 | 1,230 | 5,000 | 630 | 4,500 | 570 | 3,000 | 280 | 2,500 | 160 |
| 8 | 5,700 | 1,230 | 4,400 | 630 | 3,900 | 560 | 2,600 | 280 | 2,200 | 160 |
| 9 | 5,100 | 1,240 | 3,900 | 630 | 3,500 | 570 | 2,300 | 280 | 1,900 | 150 |
| 10 | 4,600 | 1,240 | 3,500 | 630 | 3,200 | 580 | 2,100 | 280 | 1,800 | 160 |
| 11 | 4,100 | 1,160 | 3,200 | 600 | 2,900 | 550 | 1,900 | 270 | 1,600 | 150 |
| 12 | 3,800 | 1,110 | 2,900 | 560 | 2,600 | 510 | 1,800 | 260 | 1,500 | 150 |
| 13 | 3,500 | 1,080 | 2,700 | 560 | 2,400 | 490 | 1,600 | 250 | 1,300 | 130 |
| 14 | 3,300 | 1,090 | 2,500 | 550 | 2,300 | 500 | 1,500 | 250 | 1,300 | 140 |
| 15 | 3,000 | 1,040 | 2,300 | 530 | 2,100 | 490 | 1,400 | 240 | 1,200 | 140 |
| 16 | 2,800 | 1,030 | 2,200 | 540 | 2,000 | 490 | 1,300 | 240 | 1,100 | 130 |
| 17 | 2,700 | 1,030 | 2,100 | 530 | 1,900 | 480 | 1,200 | 230 | 1,000 | 130 |
| 18 | 2,500 | 1,000 | 1,900 | 500 | 1,800 | 480 | 1,200 | 240 | 1,000 | 130 |
| 19 | 2,400 | 1,000 | 1,800 | 500 | 1,700 | 470 | 1,100 | 230 | 900 | 120 |
| 20 | 2,300 | 990 | 1,800 | 520 | 1,600 | 460 | 1,100 | 240 | 900 | 130 |

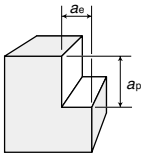
※上表はレギュラー刃の切削条件表です。5DCタイプをご使用の場合は回転数・送り速度を70%を目安に調整してください。

※The table above indicates cutting parameter for regular type, please reduce both rotation and feed rate to 70% when using 5DC type

# Epoch SUS Multi
# エポックSUSマルチ

## 汎用 側面切削条件 General Side milling conditions

**EPSM-5DC-CR**
首下5DCタイプ・コーナR付き
Under neck 5DC, Corner radius




| 外径 DC Tool dia. (mm) | 炭素鋼・合金鋼・鋳鉄 (～30HRC) Carbon steels, Alloy steels Cast irons | | 工具鋼・プリハードン鋼 (30～40HRC) Tool steels, Pre-hardened steels | | ステンレス鋼 Stainless steels | | チタン合金 Titanium alloys | | 超耐熱合金 Super heat-resistant alloys | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ap=0.5DC, ae=0.25DC | | ap=0.5DC, ae=0.25DC | | ap=0.5DC, ae=0.25DC | | ap=0.5DC, ae=0.1DC | | ap=0.5DC, ae=0.05DC | |
| | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 1 | 28,600 | 690 | 19,100 | 310 | 15,900 | 250 | 12,700 | 150 | 9,500 | 76 |
| 2 | 14,300 | 730 | 9,500 | 320 | 8,000 | 270 | 6,400 | 160 | 4,800 | 82 |
| 3 | 9,500 | 770 | 6,400 | 350 | 5,300 | 290 | 4,200 | 170 | 3,200 | 86 |
| 4 | 7,200 | 820 | 4,800 | 360 | 4,000 | 300 | 3,200 | 180 | 2,400 | 91 |
| 5 | 5,700 | 860 | 3,800 | 380 | 3,200 | 320 | 2,500 | 190 | 1,900 | 95 |
| 6 | 4,800 | 860 | 3,200 | 380 | 2,700 | 320 | 2,100 | 190 | 1,600 | 96 |
| 7 | 4,100 | 860 | 2,700 | 380 | 2,300 | 320 | 1,800 | 190 | 1,400 | 98 |
| 8 | 3,600 | 860 | 2,400 | 380 | 2,000 | 320 | 1,600 | 190 | 1,200 | 96 |
| 9 | 3,200 | 860 | 2,100 | 380 | 1,800 | 320 | 1,400 | 190 | 1,100 | 99 |
| 10 | 2,900 | 870 | 1,900 | 380 | 1,600 | 320 | 1,300 | 200 | 1,000 | 100 |
| 11 | 2,600 | 820 | 1,700 | 360 | 1,400 | 290 | 1,200 | 190 | 900 | 94 |
| 12 | 2,400 | 780 | 1,600 | 350 | 1,300 | 280 | 1,100 | 180 | 800 | 86 |
| 13 | 2,200 | 760 | 1,500 | 350 | 1,200 | 280 | 1,000 | 170 | 700 | 81 |
| 14 | 2,000 | 740 | 1,400 | 340 | 1,100 | 270 | 900 | 170 | 700 | 86 |
| 15 | 1,900 | 740 | 1,300 | 340 | 1,100 | 280 | 800 | 150 | 600 | 77 |
| 16 | 1,800 | 730 | 1,200 | 330 | 1,000 | 270 | 800 | 160 | 600 | 82 |
| 17 | 1,700 | 730 | 1,100 | 310 | 900 | 260 | 700 | 150 | 600 | 86 |
| 18 | 1,600 | 720 | 1,100 | 330 | 900 | 270 | 700 | 160 | 500 | 75 |
| 19 | 1,500 | 690 | 1,000 | 310 | 800 | 250 | 700 | 160 | 500 | 77 |
| 20 | 1,400 | 670 | 1,000 | 320 | 800 | 260 | 600 | 140 | 500 | 80 |

※2 上表は5DCタイプおよび5DC 突出した際の切削条件表です。工具突出し量により条件を調整してください。
※2 The above table shows cutting conditions for 5DC type tools with a 5DC overhang. Adjust conditions according to the tool overhang amount.

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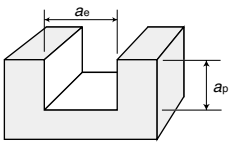
被削材、加工形状に合わせて、適切なクーラントを使用してください。
できるだけ高剛性、高精度の機械及びチャックをご使用ください。
この標準切削条件表は切削条件の目安を示すものです。実際の加工では、加工条件、目的、使用機械等により条件を調整してください。
ビビリや異常振動が発生する場合は条件を調整してください。

【Note】PN coating is less electro conductive. Therefore, electric transmitted measuring systems may not work.
Use the appropriate coolant for the work material and machining shape.
Use the high-rigidity and high accuracy machine as possible
These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
Please adjust it if chatter or abnormal vibration occurs.

## 汎用 溝切削条件 General Slotting conditions

**EPSM-5DC-CR**
首下5DCタイプ・コーナR付き
Under neck 5DC, Corner radius




| 外径 DC Tool dia. (mm) | 炭素鋼・合金鋼・鋳鉄（～30HRC） Carbon steels, Alloy steels Cast irons | | 工具鋼・プリハードン鋼（30～40HRC） Tool steels, Pre-hardened steels | | ステンレス鋼 Stainless steels | | チタン合金 Titanium alloys | | 超耐熱合金 Super heat-resistant alloys | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ap=0.5DC | | ap=0.5DC | | ap=0.5DC | | ap=0.25DC | | ap=0.25DC | |
| | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 1 | 25,500 | 320 | 15,900 | 160 | 14,300 | 110 | 9,500 | 50 | 4,800 | 14 |
| 2 | 12,700 | 380 | 8,000 | 190 | 7,200 | 130 | 4,800 | 60 | 2,400 | 17 |
| 3 | 8,500 | 450 | 5,300 | 220 | 4,800 | 150 | 3,200 | 70 | 1,600 | 20 |
| 4 | 6,400 | 510 | 4,000 | 260 | 3,600 | 170 | 2,400 | 80 | 1,200 | 23 |
| 5 | 5,100 | 570 | 3,200 | 290 | 2,900 | 200 | 1,900 | 90 | 1,000 | 27 |
| 6 | 4,200 | 630 | 2,700 | 320 | 2,400 | 220 | 1,600 | 100 | 800 | 29 |
| 7 | 3,600 | 630 | 2,300 | 320 | 2,000 | 210 | 1,400 | 100 | 700 | 29 |
| 8 | 3,200 | 640 | 2,000 | 320 | 1,800 | 220 | 1,200 | 100 | 600 | 29 |
| 9 | 2,800 | 630 | 1,800 | 320 | 1,600 | 220 | 1,100 | 100 | 500 | 27 |
| 10 | 2,500 | 630 | 1,600 | 320 | 1,400 | 210 | 1,000 | 100 | 500 | 30 |
| 11 | 2,300 | 600 | 1,400 | 290 | 1,300 | 200 | 900 | 90 | 400 | 25 |
| 12 | 2,100 | 570 | 1,300 | 280 | 1,200 | 190 | 800 | 90 | 400 | 26 |
| 13 | 2,000 | 580 | 1,200 | 280 | 1,100 | 190 | 700 | 80 | 400 | 28 |
| 14 | 1,800 | 550 | 1,100 | 270 | 1,000 | 180 | 700 | 90 | 300 | 22 |
| 15 | 1,700 | 550 | 1,100 | 280 | 1,000 | 190 | 600 | 80 | 300 | 23 |
| 16 | 1,600 | 540 | 1,000 | 270 | 900 | 180 | 600 | 80 | 300 | 24 |
| 17 | 1,500 | 540 | 900 | 260 | 800 | 170 | 600 | 90 | 300 | 26 |
| 18 | 1,400 | 520 | 900 | 270 | 800 | 180 | 500 | 70 | 300 | 27 |
| 19 | 1,300 | 500 | 800 | 250 | 800 | 180 | 500 | 80 | 300 | 28 |
| 20 | 1,300 | 520 | 800 | 260 | 700 | 170 | 500 | 80 | 200 | 19 |

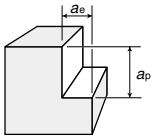
【注意】本工具のPNコーティングはその性質上、通電性が微小です。従って、通電方式の工具長測定装置をご使用の際にはご注意ください。
被削材、加工形状に合わせて、適切なクーラントを使用してください。
できるだけ高剛性、高精度の機械及びチャックをご使用ください。
この標準切削条件表は切削条件の目安を示すものです。実際の加工では、加工条件、目的、使用機械等により条件を調整してください。
ビビリや異常振動が発生する場合は条件を調整してください。
座繰り加工を行う際に、送り速度を溝条件の1/5に、0.01DCのステップに設定してください。
傾斜進入加工を行う際に、進入角度を3°以下、送り速度を溝条件の70%送りに設定してください。

【Note】PN coating is less electro conductive. Therefore, electric transmitted measuring systems may not work.
Use the appropriate coolant for the work material and machining shape.
Use the high-rigidity and high accuracy machine as possible
These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
Please adjust it if chatter or abnormal vibration occurs.
Please setup feed 1/5 that of slotting parameter and step 0.01DC for drilling application.
Please setup feed 70% of slotting parameter and ramping angle 3° for ramping application.

# Epoch SUS Multi
# エポックSUSマルチ

## 汎用 側面切削条件 General Side milling conditions

**EPSML-CR**
ロング刃長・コーナR付き
Long, Corner radius




| 外径 DC Tool dia. (mm) | 炭素鋼・合金鋼・鋳鉄（～30HRC） Carbon steels, Alloy steels Cast irons | | 工具鋼・プリハードン鋼（30～40HRC） Tool steels, Pre-hardened steels | | ステンレス鋼 Stainless steels | | チタン合金 Titanium alloys | | 超耐熱合金 Super heat-resistant alloys | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ap=3DC, ae=0.05DC | | ap=3DC, ae=0.05DC | | ap=3DC, ae=0.05DC | | ap=3DC, ae=0.02DC | | ap=3DC, ae=0.01DC | |
| | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 6 | 2,700 | 490 | 1,900 | 230 | 1,600 | 190 | 1,100 | 100 | 800 | 48 |
| 8 | 2,000 | 480 | 1,400 | 220 | 1,200 | 190 | 800 | 100 | 600 | 48 |
| 10 | 1,600 | 480 | 1,100 | 220 | 1,000 | 200 | 600 | 90 | 500 | 50 |
| 12 | 1,300 | 420 | 900 | 190 | 800 | 170 | 500 | 80 | 400 | 43 |
| 16 | 1,000 | 410 | 700 | 190 | 600 | 160 | 400 | 80 | 300 | 41 |
| 20 | 800 | 380 | 600 | 190 | 500 | 160 | 300 | 70 | 200 | 32 |

【注意】本工具のPNコーティングはその性質上、通電性が微小です。従って、通電方式の工具長測定装置をご使用の際にはご注意ください。
被削材、加工形状に合わせて、適切なクーラントを使用してください。
できるだけ高剛性、高精度の機械及びチャックをご使用ください。
この標準切削条件表は切削条件の目安を示すものです。実際の加工では、加工条件、目的、使用機械等により条件を調整してください。
ビビリや異常振動が発生する場合は条件を調整してください。

【Note】PN coating is less electro conductive. Therefore, electric transmitted measuring systems may not work.
Use the appropriate coolant for the work material and machining shape.
Use the high-rigidity and high accuracy machine as possible
These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
Please adjust it if chatter or abnormal vibration occurs.

# Epoch TH Power Mill
# エポック TH パワーミル

高硬度材加工用。切りくず排出性抜群で高能率が可能。
For machining of high-hardness materials. Excellent chip removal performance enables high efficiency.

スクエアはA328頁を参照してください
Please refer to page A328 for Square

**コーナR付き** | Corner radius

平面 Planing | 側面 Side Cutting | 溝 Slotting | 彫込み Die-sinking | 曲面 Profiling | R Radius | ヘリカル Helical | 荒 Roughing | 中仕上 Semi Finishing | 仕上 Finishing

外径公差 Dia.tolerance
φ3～φ6 ：0～−0.015
φ8～φ20：0～−0.02

h6

(mm)

## EPP4○○○-○○-TH

超硬 Carbide | TH | ねじれ角 43° Helix angle | 切削条件表 A248 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | コーナ半径 Corner radius | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|
| EPP4030-02-TH | ● | 3 | 0.2 | 8 | 60 | 6 | 15,960 |
| EPP4030-05-TH | ● | | 0.5 | 8 | 60 | 6 | 15,960 |
| EPP4040-02-TH | ● | 4 | 0.2 | 11 | 60 | 6 | 16,720 |
| EPP4040-05-TH | ● | | 0.5 | 11 | 60 | 6 | 16,720 |
| EPP4040-10-TH | ● | | 1.0 | 11 | 60 | 6 | 16,720 |
| EPP4050-02-TH | ● | 5 | 0.2 | 13 | 60 | 6 | 18,640 |
| EPP4050-05-TH | ● | | 0.5 | 13 | 60 | 6 | 18,640 |
| EPP4050-10-TH | ● | | 1.0 | 13 | 60 | 6 | 18,640 |
| EPP4060-03-TH | ● | 6 | 0.3 | 13 | 60 | 6 | 20,430 |
| EPP4060-05-TH | ● | | 0.5 | 13 | 60 | 6 | 20,430 |
| EPP4060-10-TH | ● | | 1.0 | 13 | 60 | 6 | 20,430 |
| EPP4060-15-TH | ● | | 1.5 | 13 | 60 | 6 | 20,430 |
| EPP4080-03-TH | ● | 8 | 0.3 | 19 | 75 | 8 | 25,030 |
| EPP4080-05-TH | ● | | 0.5 | 19 | 75 | 8 | 25,030 |
| EPP4080-10-TH | ● | | 1.0 | 19 | 75 | 8 | 25,030 |
| EPP4080-15-TH | ● | | 1.5 | 19 | 75 | 8 | 25,030 |
| EPP4080-20-TH | ● | | 2.0 | 19 | 75 | 8 | 25,030 |
| EPP4100-03-TH | ● | 10 | 0.3 | 22 | 80 | 10 | 33,550 |
| EPP4100-05-TH | ● | | 0.5 | 22 | 80 | 10 | 33,550 |
| EPP4100-10-TH | ● | | 1.0 | 22 | 80 | 10 | 33,550 |
| EPP4100-15-TH | ● | | 1.5 | 22 | 80 | 10 | 33,550 |
| EPP4100-20-TH | ● | | 2.0 | 22 | 80 | 10 | 33,550 |
| EPP4120-05-TH | ● | 12 | 0.5 | 26 | 100 | 12 | 42,080 |
| EPP4120-10-TH | ● | | 1.0 | 26 | 100 | 12 | 42,080 |
| EPP4120-15-TH | ● | | 1.5 | 26 | 100 | 12 | 42,080 |
| EPP4120-20-TH | ● | | 2.0 | 26 | 100 | 12 | 42,080 |
| EPP4120-30-TH | ● | | 3.0 | 26 | 100 | 12 | 42,080 |
| EPP4160-10-TH | ● | 16 | 1.0 | 32 | 110 | 16 | 96,550 |
| EPP4160-15-TH | ● | | 1.5 | 32 | 110 | 16 | 96,550 |
| EPP4160-20-TH | ● | | 2.0 | 32 | 110 | 16 | 96,550 |
| EPP4160-30-TH | ● | | 3.0 | 32 | 110 | 16 | 96,550 |
| EPP4200-10-TH | ● | 20 | 1.0 | 38 | 125 | 20 | 140,760 |
| EPP4200-15-TH | ● | | 1.5 | 38 | 125 | 20 | 140,760 |
| EPP4200-20-TH | ● | | 2.0 | 38 | 125 | 20 | 140,760 |
| EPP4200-30-TH | ● | | 3.0 | 38 | 125 | 20 | 140,760 |

### 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ |

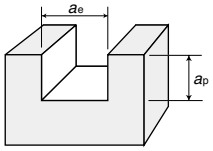
### 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPP-CR-TH | 6～20 | 3～20 |

●：標準在庫品です。●：Stocked items.

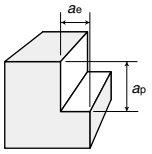
## 標準切削条件表 Recommended cutting conditions

### EPP4-CR-TH
レギュラー刃長・コーナR付き
Regular, Corner radius




### ＜溝切削＞ Slotting

| 被削材 Work material | 合金鋼 Alloy steels (200～250HB) SKD61,SKD11 | | | | 合金鋼 Alloy steels (25～35HRC) SCM440 | | | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80 | | | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61,SKT4 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 条件域 Cutting range | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | |
| 切込み Depth of cut (mm) | ap≦0.5DC ae=1DC | | ap≦1DC ae=1DC | | | | ap≦0.5DC ae=1DC | | | | ap≦0.5DC ae=1DC | | | | ap≦0.2DC ae=1DC | |
| 外径DC Tool dia. (mm) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) |
| **ϕ3** | 8,500 | 820 | 6,400 | 490 | | | 6,400 | 440 | | | 5,800 | 360 | | | 5,300 | 240 |
| **ϕ4** | 6,400 | 920 | 4,800 | 550 | | | 4,800 | 500 | | | 4,400 | 410 | | | 4,000 | 280 |
| **ϕ5** | 5,100 | 980 | 3,800 | 580 | | | 3,800 | 530 | | | 3,500 | 430 | | | 3,200 | 290 |
| **ϕ6** | 4,200 | 1,010 | 3,200 | 610 | | | 3,200 | 550 | | | 2,900 | 450 | | | 2,700 | 310 |
| **ϕ8** | 3,200 | 1,090 | 2,400 | 650 | | | 2,400 | 590 | | | 2,200 | 480 | | | 2,000 | 330 |
| **ϕ10** | 2,500 | 950 | 1,900 | 580 | | | 1,900 | 520 | | | 1,800 | 440 | | | 1,600 | 290 |
| **ϕ12** | 2,100 | 880 | 1,600 | 540 | | | 1,600 | 480 | | | 1,500 | 400 | | | 1,300 | 260 |
| **ϕ16** | 1,600 | 770 | 1,200 | 460 | | | 1,200 | 410 | | | 1,100 | 340 | | | 1,000 | 230 |
| **ϕ20** | 1,300 | 750 | 1,000 | 460 | | | 1,000 | 420 | | | 900 | 330 | | | 800 | 200 |




### ＜側面切削＞ Side milling

| 被削材 Work material | 合金鋼 Alloy steels (200～250HB) SKD61,SKD11 | | | | 合金鋼 Alloy steels (25～35HRC) SCM440 | | | | プリハードン鋼 Pre-hardened steels (35～45HRC) CENA1,NAK80 | | | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61,SKT4 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 条件域 Cutting range | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | |
| 切込み Depth of cut (mm) | ap=1.5DC ae=0.1DC | | ap=1.5DC ae=0.15DC | | ap=1.5DC ae=0.05DC | | ap=1.5DC ae=0.1DC | | ap=1.5DC ae=0.05DC | | ap=1.5DC ae=0.07DC | | ap=1.5DC ae=0.02DC | | ap=1.5DC ae=0.05DC | |
| 外径DC Tool dia. (mm) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) |
| **ϕ3** | 16,000 | 1,800 | 9,600 | 860 | 14,000 | 1,400 | 9,600 | 770 | 12,000 | 1,100 | 8,500 | 610 | 11,000 | 860 | 7,400 | 460 |
| **ϕ4** | 12,000 | 1,900 | 7,200 | 920 | 10,000 | 1,400 | 7,200 | 830 | 8,800 | 1,100 | 6,400 | 660 | 8,000 | 900 | 5,600 | 500 |
| **ϕ5** | 9,600 | 2,100 | 5,700 | 1,000 | 8,300 | 1,600 | 5,700 | 900 | 7,000 | 1,200 | 5,100 | 720 | 6,400 | 990 | 4,500 | 550 |
| **ϕ6** | 8,000 | 2,200 | 4,800 | 1,080 | 6,900 | 1,700 | 4,800 | 970 | 5,800 | 1,300 | 4,200 | 750 | 5,300 | 1,040 | 3,700 | 580 |
| **ϕ8** | 6,000 | 2,400 | 3,600 | 1,150 | 5,200 | 1,900 | 3,600 | 1,040 | 4,400 | 1,400 | 3,200 | 820 | 4,000 | 1,120 | 2,800 | 630 |
| **ϕ10** | 4,800 | 2,200 | 2,900 | 1,070 | 4,100 | 1,700 | 2,900 | 960 | 3,500 | 1,300 | 2,500 | 740 | 3,200 | 1,030 | 2,200 | 570 |
| **ϕ12** | 4,000 | 2,100 | 2,400 | 1,000 | 3,500 | 1,600 | 2,400 | 900 | 2,900 | 1,200 | 2,100 | 700 | 2,700 | 980 | 1,900 | 550 |
| **ϕ16** | 3,000 | 1,700 | 1,800 | 810 | 2,600 | 1,300 | 1,800 | 730 | 2,200 | 1,000 | 1,600 | 570 | 2,000 | 780 | 1,400 | 440 |
| **ϕ20** | 2,400 | 1,400 | 1,400 | 670 | 2,100 | 1,100 | 1,400 | 600 | 1,800 | 860 | 1,300 | 500 | 1,590 | 670 | 1,110 | 370 |

【注意】 ①できるだけ高剛性、高精度の機械をご使用ください。
②被削材、加工形状に合わせて、適切なクーラントを使用してください。
③この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。

【Note】 ① Use a highly rigid and accurate machine as possible.
② Use the appropriate coolant for the work material and machining shape.
③ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

# Epoch Power Mill
# エポックパワーミル

切りくず排出性抜群で高能率が可能。
Excellent chip removal enables high efficiency.

スクエアはA336頁を参照してください
Please refer to page A336 for Square

## レギュラー刃長・コーナR付き　Regular, Corner radius

平面 Planing / 側面 Side Cutting / 溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical / 荒 Roughing / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance
φ3～φ6　：0～−0.015
φ8～φ25　：0～−0.02

h6

(mm)

### EPP4○○○-○○

超硬 Carbide / C / ねじれ43° Helix angle / 切削条件表 A251 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | コーナ半径 Corner radius | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|
| EPP4030-02 | ● | 3 | 0.2 | 8 | 60 | 6 | 14,460 |
| EPP4030-05 | ● | | 0.5 | 8 | 60 | 6 | 14,460 |
| EPP4040-02 | ● | 4 | 0.2 | 11 | 60 | 6 | 15,220 |
| EPP4040-05 | ● | | 0.5 | 11 | 60 | 6 | 15,220 |
| EPP4040-10 | ● | | 1 | 11 | 60 | 6 | 15,220 |
| EPP4050-02 | ● | 5 | 0.2 | 13 | 60 | 6 | 16,960 |
| EPP4050-05 | ● | | 0.5 | 13 | 60 | 6 | 16,960 |
| EPP4050-10 | ● | | 1 | 13 | 60 | 6 | 16,960 |
| EPP4060-03 | ● | 6 | 0.3 | 13 | 60 | 6 | 18,520 |
| EPP4060-05 | ● | | 0.5 | 13 | 60 | 6 | 18,520 |
| EPP4060-10 | ● | | 1 | 13 | 60 | 6 | 18,520 |
| EPP4060-15 | ● | | 1.5 | 13 | 60 | 6 | 18,520 |
| EPP4080-03 | ● | 8 | 0.3 | 19 | 75 | 8 | 22,790 |
| EPP4080-05 | ● | | 0.5 | 19 | 75 | 8 | 22,790 |
| EPP4080-10 | ● | | 1 | 19 | 75 | 8 | 22,790 |
| EPP4080-15 | ● | | 1.5 | 19 | 75 | 8 | 22,790 |
| EPP4080-20 | ● | | 2 | 19 | 75 | 8 | 22,790 |
| EPP4100-03 | ● | 10 | 0.3 | 22 | 80 | 10 | 30,530 |
| EPP4100-05 | ● | | 0.5 | 22 | 80 | 10 | 30,530 |
| EPP4100-10 | ● | | 1 | 22 | 80 | 10 | 30,530 |
| EPP4100-15 | ● | | 1.5 | 22 | 80 | 10 | 30,530 |
| EPP4100-20 | ● | | 2 | 22 | 80 | 10 | 30,530 |
| EPP4120-05 | ● | 12 | 0.5 | 26 | 100 | 12 | 38,270 |
| EPP4120-10 | ● | | 1 | 26 | 100 | 12 | 38,270 |
| EPP4120-15 | ● | | 1.5 | 26 | 100 | 12 | 38,270 |
| EPP4120-20 | ● | | 2 | 26 | 100 | 12 | 38,270 |
| EPP4120-30 | ● | | 3 | 26 | 100 | 12 | 38,270 |
| EPP4160-10 | ● | 16 | 1 | 32 | 110 | 16 | 87,750 |
| EPP4160-15 | ● | | 1.5 | 32 | 110 | 16 | 87,750 |
| EPP4160-20 | ● | | 2 | 32 | 110 | 16 | 87,750 |
| EPP4160-30 | ● | | 3 | 32 | 110 | 16 | 87,750 |
| EPP4200-10 | ● | 20 | 1 | 38 | 125 | 20 | 127,860 |
| EPP4200-15 | ● | | 1.5 | 38 | 125 | 20 | 127,860 |
| EPP4200-20 | ● | | 2 | 38 | 125 | 20 | 127,860 |
| EPP4200-30 | ● | | 3 | 38 | 125 | 20 | 127,860 |
| EPP4250-10 | □ | 25 | 1 | 63 | 140 | 25 | — |
| EPP4250-15 | □ | | 1.5 | 63 | 140 | 25 | — |
| EPP4250-20 | □ | | 2 | 63 | 140 | 25 | — |
| EPP4250-30 | □ | | 3 | 63 | 140 | 25 | — |

## ロング刃長・コーナR付き　Long, Corner radius

側面 Side Cutting / 曲面 Profiling / R Radius / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance
φ6　：0～−0.015
φ8～φ25　：0～−0.02

h6

(mm)

### EPPL4○○○-○○

超硬 Carbide / C / ねじれ43° Helix angle / 切削条件表 A253 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | コーナ半径 Corner radius | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|
| EPPL4060-05 | ● | 6 | 0.5 | 25 | 70 | 6 | 25,930 |
| EPPL4060-10 | ● | | 1 | 25 | 70 | 6 | 25,930 |
| EPPL4080-05 | ● | 8 | 0.5 | 35 | 90 | 8 | 31,870 |
| EPPL4080-10 | ● | | 1 | 35 | 90 | 8 | 31,870 |
| EPPL4080-15 | ● | | 1.5 | 35 | 90 | 8 | 31,870 |
| EPPL4080-20 | ● | | 2 | 35 | 90 | 8 | 31,870 |
| EPPL4100-05 | ● | 10 | 0.5 | 45 | 100 | 10 | 42,760 |
| EPPL4100-10 | ● | | 1 | 45 | 100 | 10 | 42,760 |
| EPPL4100-15 | ● | | 1.5 | 45 | 100 | 10 | 42,760 |
| EPPL4100-20 | ● | | 2 | 45 | 100 | 10 | 42,760 |
| EPPL4120-05 | ● | 12 | 0.5 | 55 | 120 | 12 | 53,640 |
| EPPL4120-10 | ● | | 1 | 55 | 120 | 12 | 53,640 |
| EPPL4120-15 | ● | | 1.5 | 55 | 120 | 12 | 53,640 |
| EPPL4120-20 | ● | | 2 | 55 | 120 | 12 | 53,640 |
| EPPL4120-30 | ● | | 3 | 55 | 120 | 12 | 53,640 |
| EPPL4160-10 | ● | 16 | 1 | 65 | 135 | 16 | 123,170 |
| EPPL4160-15 | ● | | 1.5 | 65 | 135 | 16 | 123,170 |
| EPPL4160-20 | ● | | 2 | 65 | 135 | 16 | 123,170 |
| EPPL4160-30 | ● | | 3 | 65 | 135 | 16 | 123,170 |
| EPPL4200-10 | ● | 20 | 1 | 75 | 155 | 20 | 179,470 |
| EPPL4200-15 | ● | | 1.5 | 75 | 155 | 20 | 179,470 |
| EPPL4200-20 | ● | | 2 | 75 | 155 | 20 | 179,470 |
| EPPL4200-30 | ● | | 3 | 75 | 155 | 20 | 179,470 |
| EPPL4250-10 | □ | 25 | 1 | 100 | 200 | 25 | — |
| EPPL4250-15 | □ | | 1.5 | 100 | 200 | 25 | — |
| EPPL4250-20 | □ | | 2 | 100 | 200 | 25 | — |
| EPPL4250-30 | □ | | 3 | 100 | 200 | 25 | — |

## EPP-CR、EPPL-CR、EPPLS-CR の対応被削材

Applicable work material of EPP-CR, EPPL-CR, EPPLS-CR

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | > 55HRC ≦ 65HRC | > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | ○ | | ○ | ○ | | |

## 再研磨対応外径範囲

Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPP-CR | 6 ～ 25 | 3 ～ 25 |
| EPPL-CR | 6 ～ 25 | 6 ～ 25 |
| EPPLS-CR | 6 ～ 17 | 3 ～ 17 |

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●：Stocked items.　□：Stocked by specified distributor. Contact with our sales department.

# Epoch Power Mill
# エポックパワーミル

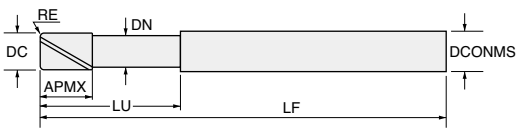
切りくず排出性抜群で高能率が可能。
Excellent chip removal enables high efficiency.

スクエアはA336頁を参照してください
Please refer to page A336 for Square

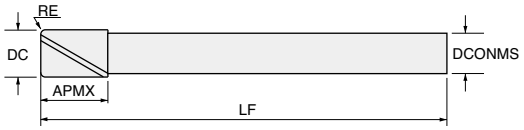
## ロングシャンク・コーナR付き　Long Shank, Corner radius

側面 Side Cutting　曲面 Profiling　R Radius　中仕上 Semi Finishing　仕上 Finishing

外径公差 Dia.tolerance
φ3～φ6　：0～−0.015
φ7～φ17：0～−0.02
h6
(mm)




A タイプ
A type




B タイプ
B type

## EPPLS4○○○-○○

超硬 Carbide　C　ねじれ43° Helix angle　切削条件表 A253 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 刃長 Flute length APMX | 首径 Neck dia. DN | 首下長 Under neck length LU | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 形状 Shape | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|---|
| EPPLS4030-02 | ● | 3 | 0.2 | 4.5 | 2.9 | 10.5 | 80 | 6 | A | 17,570 |
| EPPLS4030-05 | ● | | 0.5 | 4.5 | 2.9 | 10.5 | 80 | 6 | A | 17,570 |
| EPPLS4040-02 | ● | 4 | 0.2 | 6 | 3.8 | 14 | 80 | 6 | A | 18,330 |
| EPPLS4040-05 | ● | | 0.5 | 6 | 3.8 | 14 | 80 | 6 | A | 18,330 |
| EPPLS4050-02 | ● | 5 | 0.2 | 7.5 | 4.8 | 17.5 | 100 | 6 | A | 22,110 |
| EPPLS4050-05 | ● | | 0.5 | 7.5 | 4.8 | 17.5 | 100 | 6 | A | 22,110 |
| EPPLS4060-03 | ● | 6 | 0.3 | 9 | − | − | 120 | 5 | B | 25,030 |
| EPPLS4060-05 | ● | | 0.5 | 9 | − | − | 120 | 5 | B | 25,030 |
| EPPLS4060-10 | ● | | 1 | 9 | − | − | 120 | 5 | B | 25,030 |
| EPPLS4070-03 | ● | 7 | 0.3 | 9 | − | − | 120 | 6 | B | 25,030 |
| EPPLS4070-05 | ● | | 0.5 | 9 | − | − | 120 | 6 | B | 25,030 |
| EPPLS4070-10 | ● | | 1 | 9 | − | − | 120 | 6 | B | 25,030 |
| EPPLS4080-05 | ● | 8 | 0.5 | 12 | − | − | 135 | 7 | B | 30,750 |
| EPPLS4080-10 | ● | | 1 | 12 | − | − | 135 | 7 | B | 30,750 |
| EPPLS4080-15 | ● | | 1.5 | 12 | − | − | 135 | 7 | B | 30,750 |
| EPPLS4090-05 | ● | 9 | 0.5 | 12 | − | − | 135 | 8 | B | 30,750 |
| EPPLS4090-10 | ● | | 1 | 12 | − | − | 135 | 8 | B | 30,750 |
| EPPLS4090-15 | ● | | 1.5 | 12 | − | − | 135 | 8 | B | 30,750 |
| EPPLS4100-05 | ● | 10 | 0.5 | 15 | − | − | 150 | 9 | B | 41,300 |
| EPPLS4100-10 | ● | | 1 | 15 | − | − | 150 | 9 | B | 41,300 |
| EPPLS4100-15 | ● | | 1.5 | 15 | − | − | 150 | 9 | B | 41,300 |
| EPPLS4110-05 | ● | 11 | 0.5 | 15 | − | − | 150 | 10 | B | 41,300 |
| EPPLS4110-10 | ● | | 1 | 15 | − | − | 150 | 10 | B | 41,300 |
| EPPLS4110-15 | ● | | 1.5 | 15 | − | − | 150 | 10 | B | 41,300 |
| EPPLS4120-05 | ● | 12 | 0.5 | 18 | − | − | 160 | 11 | B | 51,850 |
| EPPLS4120-10 | ● | | 1 | 18 | − | − | 160 | 11 | B | 51,850 |
| EPPLS4120-15 | ● | | 1.5 | 18 | − | − | 160 | 11 | B | 51,850 |
| EPPLS4120-20 | ● | | 2 | 18 | − | − | 160 | 11 | B | 51,850 |
| EPPLS4130-05 | ● | 13 | 0.5 | 18 | − | − | 160 | 12 | B | 61,360 |
| EPPLS4130-10 | ● | | 1 | 18 | − | − | 160 | 12 | B | 61,360 |
| EPPLS4130-15 | ● | | 1.5 | 18 | − | − | 160 | 12 | B | 61,360 |
| EPPLS4130-20 | ● | | 2 | 18 | − | − | 160 | 12 | B | 61,360 |
| EPPLS4160-10 | ● | 16 | 1 | 24 | − | − | 180 | 15 | B | 114,370 |
| EPPLS4160-15 | ● | | 1.5 | 24 | − | − | 180 | 15 | B | 114,370 |
| EPPLS4160-20 | ● | | 2 | 24 | − | − | 180 | 15 | B | 114,370 |
| EPPLS4170-10 | ● | 17 | 1 | 24 | − | − | 180 | 16 | B | 114,370 |
| EPPLS4170-15 | ● | | 1.5 | 24 | − | − | 180 | 16 | B | 114,370 |
| EPPLS4170-20 | ● | | 2 | 24 | − | − | 180 | 16 | B | 114,370 |

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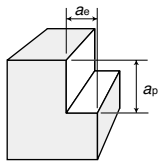
●：Stocked items.　□：Stocked by specified distributor. Contact with our sales department.

# 標準切削条件表 Recommended cutting conditions

## EPP-CR
レギュラー刃長・コーナR付き
Regular, Corner radius




## ＜側面切削＞ Side milling

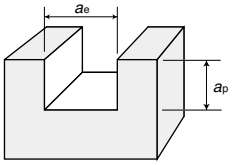
| 被削材 Work material | | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) SUS304、SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | | チタン合金 Titanium alloys Ti-6Al-4V | | 超耐熱合金 Super heat-resistant alloys Inconel Hasteloy | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | | ap＝1.5DC ae＝0.1DC | | ap＝1.5DC ae＝0.1DC | | ap＝1.5DC ae＝0.1DC | | ap＝1.5DC ae＝0.1DC | | ap＝1.5DC ae＝0.1DC | | ap＝1.5DC ae＝0.05DC | | ap＝1.5DC ae＝0.05DC | | ap＝1.5DC ae＝0.05DC | |
| | 外径DC Tool dia. (mm) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) |
| 高速条件 High speed | φ3 | 12,700 | 1,020 | 12,700 | 1,020 | 10,600 | 850 | 8,490 | 510 | 8,490 | 510 | 6,370 | 250 | 6,370 | 250 | 2,650 | 110 |
| | φ4 | 9,550 | 1,150 | 9,550 | 1,150 | 7,960 | 960 | 6,370 | 640 | 6,370 | 640 | 4,770 | 380 | 4,770 | 380 | 1,990 | 160 |
| | φ5 | 7,640 | 1,220 | 7,640 | 1,220 | 6,370 | 1,020 | 5,090 | 710 | 5,090 | 710 | 3,820 | 460 | 3,820 | 460 | 1,590 | 190 |
| | φ6 | 6,370 | 1,270 | 6,370 | 1,270 | 5,310 | 1,060 | 4,240 | 680 | 4,240 | 680 | 3,180 | 450 | 3,180 | 450 | 1,330 | 190 |
| | φ8 | 4,770 | 1,340 | 4,770 | 1,340 | 3,980 | 1,110 | 3,180 | 640 | 3,180 | 640 | 2,390 | 430 | 2,390 | 430 | 990 | 180 |
| | φ10 | 3,820 | 1,220 | 3,820 | 1,220 | 3,180 | 1,020 | 2,550 | 610 | 2,550 | 610 | 1,910 | 420 | 1,910 | 420 | 800 | 180 |
| | φ12 | 3,180 | 1,140 | 3,180 | 1,140 | 2,650 | 950 | 2,120 | 590 | 2,120 | 590 | 1,590 | 380 | 1,590 | 380 | 660 | 160 |
| | φ16 | 2,390 | 960 | 2,390 | 960 | 1,990 | 800 | 1,590 | 540 | 1,590 | 540 | 1,190 | 330 | 1,190 | 330 | 500 | 140 |
| | φ20 | 1,910 | 920 | 1,910 | 920 | 1,590 | 760 | 1,270 | 510 | 1,270 | 510 | 950 | 300 | 950 | 300 | 400 | 130 |
| 汎用条件 General | φ3 | 10,600 | 850 | 10,600 | 850 | 8,490 | 680 | 6,370 | 380 | 6,370 | 380 | 4,240 | 170 | 4,240 | 170 | 2,120 | 85 |
| | φ4 | 7,960 | 960 | 7,960 | 960 | 6,370 | 760 | 4,770 | 480 | 4,770 | 480 | 3,180 | 250 | 3,180 | 250 | 1,590 | 130 |
| | φ5 | 6,370 | 1,020 | 6,370 | 1,020 | 5,090 | 810 | 3,820 | 530 | 3,820 | 530 | 2,550 | 310 | 2,550 | 310 | 1,270 | 150 |
| | φ6 | 5,310 | 1,060 | 5,310 | 1,060 | 4,240 | 850 | 3,180 | 510 | 3,180 | 510 | 2,120 | 300 | 2,120 | 300 | 1,060 | 150 |
| | φ8 | 3,980 | 1,110 | 3,980 | 1,110 | 3,180 | 890 | 2,390 | 480 | 2,390 | 480 | 1,590 | 290 | 1,590 | 290 | 800 | 140 |
| | φ10 | 3,180 | 1,020 | 3,180 | 1,020 | 2,550 | 820 | 1,910 | 460 | 1,910 | 460 | 1,270 | 280 | 1,270 | 280 | 640 | 140 |
| | φ12 | 2,650 | 950 | 2,650 | 950 | 2,120 | 760 | 1,590 | 450 | 1,590 | 450 | 1,060 | 250 | 1,060 | 250 | 530 | 130 |
| | φ16 | 1,990 | 800 | 1,990 | 800 | 1,590 | 640 | 1,190 | 400 | 1,190 | 400 | 800 | 220 | 800 | 220 | 400 | 110 |
| | φ20 | 1,590 | 760 | 1,590 | 760 | 1,270 | 610 | 950 | 380 | 950 | 380 | 640 | 200 | 640 | 200 | 320 | 100 |

【注意】
①切削方法は、ダウンカットで使用ください。
②一般材、とくに高速切削は、乾式（エアブロー）またはオイルミストクーラントにてご使用ください。
③ステンレス鋼および超耐熱合金には、不水溶性切削油のご使用が適しています。
④安定した切削を行うため、剛性の高い機械とセットアップでご使用ください。
⑤機械の回転数が足りない場合は、主軸回転数とテーブル送り速度を同比率で下げてください。
⑥加工形状、機械の剛性、工具突き出し量等、ご使用の状況により、主軸回転数とテーブル送り速度の調整を行ってください。

【Note】
① Down-cutting is recommended.
② Use generally dry (air-blow) or oil-mist coolant, especially at the high-speed machining.
③ Oil base coolant is recommended for machining stainless steels and heat-resistant alloys.
④ Use a machine tool with rigidity and rigid set-up, to machine stably.
⑤ When the revolution speed is not enough, reduce the revolution speed and table speed at the same ratio.
⑥ Adjust the revolution speed and table speed, according to cutting conditions such as machining shape, rigidity of machine tool, over-hang and so on.

## EPP-CR

レギュラー刃長・コーナR付き
Regular, Corner radius




### ＜溝切削＞ Slotting

| 被削材 Work material | | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) SUS304、SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | | チタン合金 Titanium alloys Ti-6Al-4V | | 超耐熱合金 Super heat-resistant alloys Inconel Hasteloy | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 高速条件 High speed | 切込み Depth of cut (mm) | ap≦0.5DC ae＝1DC | | ap≦0.5DC ae＝1DC | | ap≦0.5DC ae＝1DC | | ap≦0.2DC ae＝1DC | | ap≦0.2DC ae＝1DC | | | | | | | |
| | 外径DC Tool dia. (mm) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| | φ3 | 5,310 | 420 | 8,490 | 680 | 7,430 | 590 | 5,310 | 320 | 5,310 | 320 | | | | | | |
| | φ4 | 3,980 | 480 | 6,370 | 760 | 5,570 | 670 | 3,980 | 400 | 3,980 | 400 | | | | | | |
| | φ5 | 3,180 | 510 | 5,090 | 810 | 4,460 | 710 | 3,180 | 450 | 3,180 | 450 | | | | | | |
| | φ6 | 2,650 | 530 | 4,240 | 850 | 3,710 | 740 | 2,650 | 420 | 2,650 | 420 | | | | | | |
| | φ8 | 1,990 | 560 | 3,180 | 890 | 2,790 | 780 | 1,990 | 400 | 1,990 | 400 | | | | | | |
| | φ10 | 1,590 | 510 | 2,550 | 820 | 2,230 | 710 | 1,590 | 380 | 1,590 | 380 | | | | | | |
| | φ12 | 1,330 | 480 | 2,120 | 760 | 1,860 | 670 | 1,330 | 370 | 1,330 | 370 | | | | | | |
| | φ16 | 990 | 400 | 1,590 | 640 | 1,390 | 560 | 990 | 340 | 990 | 340 | | | | | | |
| | φ20 | 800 | 380 | 1,270 | 610 | 1,110 | 530 | 800 | 320 | 800 | 320 | | | | | | |
| 汎用条件 General | 切込み Depth of cut (mm) | ap≦1DC ae＝1DC | | ap≦1DC ae＝1DC | | ap≦1DC ae＝1DC | | ap≦0.5DC ae＝1DC | | ap≦0.5DC ae＝1DC | | ap≦0.2DC ae＝1DC | | ap≦0.2DC ae＝1DC | | ap≦0.2DC ae＝1DC | |
| | 外径DC Tool dia. (mm) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| | φ3 | 3,180 | 250 | 7,430 | 590 | 5,310 | 420 | 4,240 | 250 | 4,240 | 250 | 2,120 | 85 | 3,180 | 130 | 1,590 | 65 |
| | φ4 | 2,390 | 290 | 5,570 | 670 | 3,980 | 480 | 3,180 | 320 | 3,180 | 320 | 1,590 | 130 | 2,390 | 190 | 1,190 | 95 |
| | φ5 | 1,910 | 310 | 4,460 | 710 | 3,180 | 510 | 2,550 | 360 | 2,550 | 360 | 1,270 | 150 | 1,910 | 230 | 950 | 110 |
| | φ6 | 1,590 | 320 | 3,710 | 740 | 2,650 | 530 | 2,120 | 340 | 2,120 | 340 | 1,060 | 150 | 1,590 | 220 | 800 | 110 |
| | φ8 | 1,190 | 330 | 2,790 | 780 | 1,990 | 560 | 1,590 | 320 | 1,590 | 320 | 800 | 140 | 1,190 | 210 | 600 | 110 |
| | φ10 | 950 | 300 | 2,230 | 710 | 1,590 | 510 | 1,270 | 300 | 1,270 | 300 | 640 | 140 | 950 | 210 | 480 | 110 |
| | φ12 | 800 | 290 | 1,860 | 670 | 1,330 | 480 | 1,060 | 300 | 1,060 | 300 | 530 | 130 | 800 | 190 | 400 | 95 |
| | φ16 | 600 | 240 | 1,390 | 560 | 990 | 400 | 800 | 270 | 800 | 270 | 400 | 110 | 600 | 170 | 300 | 85 |
| | φ20 | 480 | 230 | 1,110 | 530 | 800 | 380 | 640 | 260 | 640 | 260 | 320 | 100 | 480 | 150 | 240 | 75 |

【注意】

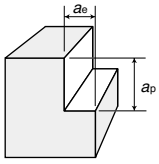
①一般材、とくに高速切削は、乾式（エアブロー）またはオイルミストクーラントにてご使用ください。
②ステンレス鋼および超耐熱合金には、不水溶性切削油のご使用が適しています。
③安定した切削を行うため、剛性の高い機械とセットアップでご使用ください。
④機械の回転数が足りない場合は、主軸回転数とテーブル送り速度を同比率で下げてください。
⑤加工形状、機械の剛性、工具突き出し量等、ご使用の状況により、主軸回転数とテーブル送り速度の調整を行ってください。

【Note】

① Use generally dry (air-blow) or oil-mist coolant, especially at the high-speed machining.
② Oil base coolant is recommended for machining stainless steels and heat-resistant alloys.
③ Use a machine tool with rigidity and rigid set-up, to machine stably.
④ When the revolution speed is not enough, reduce the revolution speed and table speed at the same ratio.
⑤ Adjust the revolution speed and table speed, according to cutting conditions such as machining shape, rigidity of machine tool, over-hang and so on.

## EPPL-CR

ロング刃長・コーナR付き
Long, Corner radius

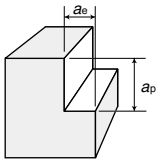



### ＜側面切削＞ Side milling

| 被削材 Work material | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) SUS304、SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | | チタン合金 Titanium alloys Ti-6Al-4V | | 超耐熱合金 Super heat-resistant alloys Inconel Hasteloy | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | ap＝3DC ae＝0.02DC | | ap＝3DC ae＝0.02DC | | ap＝3DC ae＝0.02DC | | ap＝3DC ae＝0.02DC | | ap＝3DC ae＝0.02DC | | ap＝3DC ae＝0.01DC | | ap＝3DC ae＝0.01DC | | ap＝3DC ae＝0.01DC | |
| 外径DC Tool dia. (mm) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) |
| **ϕ6** | 2,650 | 530 | 2,650 | 530 | 2,120 | 420 | 1,590 | 250 | 1,590 | 250 | 1,060 | 150 | 1,060 | 150 | 530 | 75 |
| **ϕ8** | 1,990 | 560 | 1,990 | 560 | 1,590 | 450 | 1,190 | 240 | 1,190 | 240 | 800 | 140 | 800 | 140 | 400 | 70 |
| **ϕ10** | 1,590 | 510 | 1,590 | 510 | 1,270 | 410 | 950 | 230 | 950 | 230 | 640 | 140 | 640 | 140 | 320 | 70 |
| **ϕ12** | 1,330 | 480 | 1,330 | 480 | 1,060 | 380 | 800 | 220 | 800 | 220 | 530 | 130 | 530 | 130 | 270 | 65 |
| **ϕ16** | 990 | 400 | 990 | 400 | 800 | 320 | 600 | 200 | 600 | 200 | 400 | 110 | 400 | 110 | 200 | 55 |
| **ϕ20** | 800 | 380 | 800 | 380 | 640 | 310 | 480 | 190 | 480 | 190 | 320 | 100 | 320 | 100 | 160 | 50 |

## EPPLS-CR

ロングシャンク・コーナR付き
Long Shank, Corner radius




### ＜側面切削＞ Side milling

| 被削材 Work material | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) SUS304、SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | | チタン合金 Titanium alloys Ti-6Al-4V | | 超耐熱合金 Super heat-resistant alloys Inconel Hasteloy | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | ap＝1.5DC ae＝0.1DC | | ap＝1.5DC ae＝0.1DC | | ap＝1.5DC ae＝0.1DC | | ap＝1.5DC ae＝0.1DC | | ap＝1.5DC ae＝0.1DC | | ap＝1.5DC ae＝0.05DC | | ap＝1.5DC ae＝0.05DC | | ap＝1.5DC ae＝0.05DC | |
| 外径DC Tool dia. (mm) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) |
| **ϕ3** | 5,310 | 420 | 5,310 | 420 | 4,240 | 340 | 3,180 | 190 | 3,180 | 190 | 2,120 | 85 | 2,120 | 85 | 1,060 | 42 |
| **ϕ4** | 3,980 | 480 | 3,980 | 480 | 3,180 | 380 | 2,390 | 240 | 2,390 | 240 | 1,590 | 130 | 1,590 | 130 | 800 | 65 |
| **ϕ5** | 3,180 | 510 | 3,180 | 510 | 2,550 | 410 | 1,910 | 270 | 1,910 | 270 | 1,270 | 150 | 1,270 | 150 | 640 | 75 |
| **ϕ6** | 2,650 | 530 | 2,650 | 530 | 2,120 | 420 | 1,590 | 250 | 1,590 | 250 | 1,060 | 150 | 1,060 | 150 | 530 | 75 |
| **ϕ8** | 1,990 | 560 | 1,990 | 560 | 1,590 | 450 | 1,190 | 240 | 1,190 | 240 | 800 | 140 | 800 | 140 | 400 | 70 |
| **ϕ10** | 1,590 | 510 | 1,590 | 510 | 1,270 | 410 | 950 | 230 | 950 | 230 | 640 | 140 | 640 | 140 | 320 | 70 |
| **ϕ12** | 1,330 | 480 | 1,330 | 480 | 1,060 | 380 | 800 | 220 | 800 | 220 | 530 | 130 | 530 | 130 | 270 | 65 |
| **ϕ16** | 990 | 400 | 990 | 400 | 800 | 320 | 600 | 200 | 600 | 200 | 400 | 110 | 400 | 110 | 200 | 55 |

**【注意】**

①切削方法は、ダウンカットで使用ください。
②一般材、とくに高速切削は、乾式（エアブロー）またはオイルミストクーラントにてご使用ください。
③ステンレス鋼および超耐熱合金には、不水溶性切削油のご使用が適しています。
④安定した切削を行うため、剛性の高い機械とセットアップでご使用ください。
⑤機械の回転数が足りない場合は、主軸回転数とテーブル送り速度を同比率で下げてください。
⑥加工形状、機械の剛性、工具突き出し量等、ご使用の状況により、主軸回転数とテーブル送り速度の調整を行ってください。

**【Note】**

① Down-cutting is recommended.
② Use generally dry (air-blow) or oil-mist coolant, especially at the high-speed machining.
③ Oil base coolant is recommended for machining stainless steels and heat-resistant alloys.
④ Use a machine tool with rigidity and rigid set-up, to machine stably.
⑤ When the revolution speed is not enough, reduce the revolution speed and table speed at the same ratio.
⑥ Adjust the revolution speed and table speed, according to cutting conditions such as machining shape, rigidity of machine tool, over-hang and so on.

## 8-flutes End Mill for Vertical Wall/Bottom Face Finishing

# 立壁／底面仕上げ用8枚刃エンドミル

YouTube 動画公開中

平面 Planing | 側面 Side Cutting | 溝 Slotting | 彫込み Die-sinking | 曲面 Profiling | 中仕上 Semi Finishing | 仕上 Finishing

外径公差 Dia.tolerance
φ6 : 0～−0.015
φ7～φ12 : 0～−0.02

h5 φ6,8,10,12 | h6 φ7,9,11

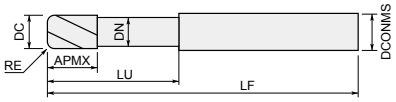
(mm)

立壁と底面の仕上げ加工の”極” これ1本で立壁と底面を仕上げる!!
The Zenith of Milling for Vertical Wall and Bottom Face Finishing
Vertical wall and bottom face finishing with a single tool!

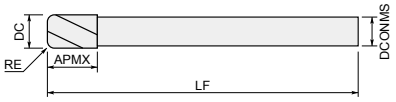
スクエアはA344頁を参照してください
Please refer to page A344 for Square

8枚刃
8 Flutes

Aタイプ A type




Bタイプ B type




## ER8WB○○○○LN(LS)-○○-R○.○-ATH

超硬 Carbide | ATH | ねじれ角 38° Helix angle | 切削条件表 A255 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 刃長 Flute length APMX | 首下長 Under neck length LU | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 形状 Shape | 希望小売価格 Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|---|
| ER8WB0600LN-20-R1.0-ATH | ● | 6 | 1 | 7 | 20 | 5.88 | 70 | 6 | A | 17,070 |
| ER8WB0600LN-30-R1.0-ATH | ● | | 1 | 7 | 30 | 5.88 | 80 | 6 | A | 17,750 |
| ER8WB0600LN-40-R1.0-ATH | ● | | 1 | 7 | 40 | 5.88 | 90 | 6 | A | 18,460 |
| ER8WB0600LN-50-R1.0-ATH | ● | | 1 | 7 | 50 | 5.88 | 100 | 6 | A | 19,180 |
| ER8WB0700LS-R1.0-ATH | ● | 7 | 1 | 8 | – | – | 90 | 6 | B | 25,630 |
| ER8WB0800LN-30-R1.0-ATH | ● | 8 | 1 | 9 | 30 | 7.84 | 75 | 8 | A | 18,870 |
| ER8WB0800LN-40-R1.0-ATH | ● | | 1 | 9 | 40 | 7.84 | 90 | 8 | A | 20,010 |
| ER8WB0800LN-50-R1.0-ATH | ● | | 1 | 9 | 50 | 7.84 | 100 | 8 | A | 20,890 |
| ER8WB0800LN-60-R1.0-ATH | ● | | 1 | 9 | 60 | 7.84 | 110 | 8 | A | 22,360 |
| ER8WB0900LS-R1.0-ATH | ● | 9 | 1 | 10 | – | – | 100 | 8 | B | 29,230 |
| ER8WB1000LN-35-R1.0-ATH | ● | 10 | 1 | 11 | 35 | 9.8 | 80 | 10 | A | 22,420 |
| ER8WB1000LN-50-R1.0-ATH | ● | | 1 | 11 | 50 | 9.8 | 100 | 10 | A | 24,580 |
| ER8WB1000LN-60-R1.0-ATH | ● | | 1 | 11 | 60 | 9.8 | 110 | 10 | A | 26,140 |
| ER8WB1000LN-80-R1.0-ATH | ● | | 1 | 11 | 80 | 9.8 | 130 | 10 | A | 28,480 |
| ER8WB1100LS-R1.0-ATH | ● | 11 | 1 | 12 | – | – | 110 | 10 | B | 34,930 |
| ER8WB1200LN-40-R1.0-ATH | ● | 12 | 1 | 13 | 40 | 11.8 | 90 | 12 | A | 27,370 |
| ER8WB1200LN-60-R1.0-ATH | ● | | 1 | 13 | 60 | 11.8 | 110 | 12 | A | 30,340 |
| ER8WB1200LN-80-R1.0-ATH | ● | | 1 | 13 | 80 | 11.8 | 130 | 12 | A | 32,970 |
| ER8WB1200LN-100-R1.0-ATH | ● | | 1 | 13 | 100 | 11.8 | 150 | 12 | A | 35,600 |

### 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ○ | ◎ | ◎ | | | | | | |

### 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| ER8WB-ATH | 6～12 | 6～12 |

●：標準在庫品です。 ●：Stocked items.

# 標準切削条件表 Recommended cutting conditions ER8WB-ATH

## 立壁仕上げ Vertical wall finishing

| 被削材 Work material | | | 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 工具鋼 Tool steels (25～35HRC) | | プリハードン鋼 Pre-hardened steels (35～45HRC) | | 焼入れ鋼 Hardened steels (45～55HRC) | | 焼入れ鋼 Hardened steels (55～62HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 商品コード Item code | 軸切込み ap (mm) | 径切込み ae (mm) | 回転数 n ($min^{-1}$) | 送り速度 vf (mm/min) | 回転数 n ($min^{-1}$) | 送り速度 vf (mm/min) | 回転数 n ($min^{-1}$) | 送り速度 vf (mm/min) | 回転数 n ($min^{-1}$) | 送り速度 vf (mm/min) | 回転数 n ($min^{-1}$) | 送り速度 vf (mm/min) |
| **ER8WB0600LN-20-R1.0-ATH** | 3 | ≦0.1 | 7960 | 1910 | 6370 | 1530 | 4770 | 1140 | 3180 | 760 | 2650 | 640 |
| **ER8WB0600LN-30-R1.0-ATH** | 3 | ≦0.1 | 6630 | 1590 | 5310 | 1270 | 3980 | 960 | 2650 | 640 | 2120 | 510 |
| **ER8WB0600LN-40-R1.0-ATH** | 3 | ≦0.1 | 4640 | 780 | 3710 | 620 | 2790 | 470 | 1860 | 310 | 1490 | 250 |
| **ER8WB0600LN-50-R1.0-ATH** | 3 | ≦0.1 | 3320 | 400 | 2650 | 320 | 1990 | 240 | 1330 | 160 | 1060 | 130 |
| **ER8WB0700LS-R1.0-ATH** | 3.5 | ≦0.1 | 5680 | 1590 | 4550 | 1270 | 3410 | 950 | 2270 | 640 | 1820 | 510 |
| **ER8WB0800LN-30-R1.0-ATH** | 4 | ≦0.1 | 5970 | 1910 | 4770 | 1530 | 3580 | 1150 | 2390 | 760 | 1990 | 640 |
| **ER8WB0800LN-40-R1.0-ATH** | 4 | ≦0.1 | 4970 | 1590 | 3980 | 1270 | 2980 | 950 | 1990 | 640 | 1590 | 510 |
| **ER8WB0800LN-50-R1.0-ATH** | 4 | ≦0.1 | 3480 | 890 | 2790 | 620 | 2090 | 540 | 1390 | 360 | 1110 | 280 |
| **ER8WB0800LN-60-R1.0-ATH** | 4 | ≦0.1 | 2490 | 400 | 1990 | 320 | 1490 | 240 | 990 | 160 | 800 | 130 |
| **ER8WB0900LS-R1.0-ATH** | 4.5 | ≦0.1 | 4420 | 1590 | 3540 | 1270 | 2650 | 950 | 1770 | 640 | 1410 | 510 |
| **ER8WB1000LN-35-R1.0-ATH** | 5 | ≦0.1 | 4770 | 1910 | 3820 | 1530 | 2860 | 1140 | 1910 | 760 | 1590 | 640 |
| **ER8WB1000LN-50-R1.0-ATH** | 5 | ≦0.1 | 3980 | 1590 | 3180 | 1270 | 2390 | 960 | 1590 | 640 | 1270 | 510 |
| **ER8WB1000LN-60-R1.0-ATH** | 5 | ≦0.1 | 2790 | 890 | 2230 | 620 | 1670 | 530 | 1110 | 360 | 890 | 280 |
| **ER8WB1000LN-80-R1.0-ATH** | 5 | ≦0.1 | 1990 | 400 | 1590 | 320 | 1190 | 240 | 800 | 160 | 640 | 130 |
| **ER8WB1100LS-R1.0-ATH** | 5.5 | ≦0.1 | 3620 | 1510 | 2890 | 1210 | 2170 | 910 | 1450 | 610 | 1160 | 480 |
| **ER8WB1200LN-40-R1.0-ATH** | 6 | ≦0.1 | 3980 | 1720 | 3180 | 1370 | 2390 | 1030 | 1590 | 690 | 1330 | 570 |
| **ER8WB1200LN-60-R1.0-ATH** | 6 | ≦0.1 | 3320 | 1430 | 2650 | 1140 | 1990 | 860 | 1330 | 570 | 1060 | 460 |
| **ER8WB1200LN-80-R1.0-ATH** | 6 | ≦0.1 | 2320 | 700 | 1860 | 560 | 1390 | 420 | 930 | 280 | 740 | 220 |
| **ER8WB1200LN-100-R1.0-ATH** | 6 | ≦0.1 | 1660 | 360 | 1330 | 290 | 990 | 210 | 660 | 140 | 530 | 110 |

※ロングシャンクタイプ(φ7,9,11)の切削条件は工具突き出し量が5DC(工具径×5倍)時の条件です。突き出し量を変更する場合は下記補正値を参考に条件を設定ください。
* Cutting conditions for the long-shank type (⌀7/9/11) are for a tool projection of 5DC (tool diameter × 5). Modify the conditions using the following correction factors if the projection amount changes:

### ロングシャンクタイプの切削条件補正値 Cutting condition correction factors for long-shank type (%)

| 被削材 Work material | | | 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 工具鋼 Tool steels (25～35HRC) | | プリハードン鋼 Pre-hardened steels (35～45HRC) | | 焼入れ鋼 Hardened steels (45～55HRC) | | 焼入れ鋼 Hardened steels (55～62HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 突出し量 Projection | 軸切込み ap (mm) | 径切込み ae (mm) | 回転数 n ($min^{-1}$) | 送り速度 vf (mm/min) | 回転数 n ($min^{-1}$) | 送り速度 vf (mm/min) | 回転数 n ($min^{-1}$) | 送り速度 vf (mm/min) | 回転数 n ($min^{-1}$) | 送り速度 vf (mm/min) | 回転数 n ($min^{-1}$) | 送り速度 vf (mm/min) |
| **5DC** | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| **6DC** | 100% | 100% | 70% | 60% | 70% | 60% | 70% | 60% | 70% | 60% | 70% | 60% |
| **7DC** | 100% | 100% | 70% | 50% | 70% | 50% | 70% | 50% | 70% | 50% | 70% | 50% |

【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②できるだけ高剛性、高精度の機械をご使用ください。
③この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

【Note】① Use the appropriate coolant for the work material and machining shape.
② Use a highly rigid and accurate machine as possible.
③ These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

# 8-flutes End Mill for Vertical Wall/Bottom Face Finishing
# 立壁／底面仕上げ用8枚刃エンドミル

## ER8WB-ATH

### 底面仕上げ Bottom face finishing

※底面仕上げはラジアスタイプ(ER8WB-ATH)をご使用ください。A radius type (ER8WB-ATH) should be used for bottom face finishing.

| 被削材 Work material | | | 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 工具鋼 Tool steels (25～35HRC) | | プリハードン鋼 Pre-hardened steels (35～45HRC) | | 焼入れ鋼 Hardened steels (45～55HRC) | | 焼入れ鋼 Hardened steels (55～62HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 商品コード Item code | 軸切込み *ap* (mm) | 径切込み *ae* (mm) | 回転数 *n* ($min^{-1}$) | 送り速度 *Vf* (mm/min) | 回転数 *n* ($min^{-1}$) | 送り速度 *Vf* (mm/min) | 回転数 *n* ($min^{-1}$) | 送り速度 *Vf* (mm/min) | 回転数 *n* ($min^{-1}$) | 送り速度 *Vf* (mm/min) | 回転数 *n* ($min^{-1}$) | 送り速度 *Vf* (mm/min) |
| **ER8WB0600LN-20-R1.0-ATH** | 0.05～0.1 | 3～6 | 9550 | 2290 | 7960 | 1910 | 6370 | 1530 | 4770 | 1140 | 3180 | 760 |
| **ER8WB0600LN-30-R1.0-ATH** | 0.05～0.1 | 3～6 | 7960 | 1910 | 6630 | 1590 | 5310 | 1270 | 3980 | 960 | 2650 | 640 |
| **ER8WB0600LN-40-R1.0-ATH** | 0.05～0.1 | 3～6 | 5570 | 940 | 4640 | 780 | 3710 | 620 | 2790 | 470 | 1860 | 310 |
| **ER8WB0600LN-50-R1.0-ATH** | 0.05～0.1 | 3～6 | 3980 | 480 | 3320 | 400 | 2650 | 320 | 1990 | 240 | 1330 | 160 |
| **ER8WB0700LS-R1.0-ATH** | 0.05～0.1 | 3.5～7 | 6820 | 1910 | 5680 | 1590 | 4550 | 1270 | 3410 | 950 | 2270 | 640 |
| **ER8WB0800LN-30-R1.0-ATH** | 0.05～0.1 | 4～8 | 7160 | 2290 | 5970 | 1910 | 4770 | 1530 | 3580 | 1150 | 2390 | 760 |
| **ER8WB0800LN-40-R1.0-ATH** | 0.05～0.1 | 4～8 | 5970 | 1910 | 4970 | 1590 | 3980 | 1270 | 2980 | 950 | 1990 | 640 |
| **ER8WB0800LN-50-R1.0-ATH** | 0.05～0.1 | 4～8 | 4180 | 1070 | 3480 | 890 | 2790 | 710 | 2090 | 540 | 1390 | 360 |
| **ER8WB0800LN-60-R1.0-ATH** | 0.05～0.1 | 4～8 | 2980 | 480 | 2490 | 400 | 1990 | 320 | 1490 | 240 | 990 | 160 |
| **ER8WB0900LS-R1.0-ATH** | 0.05～0.1 | 4.5～9 | 5310 | 1910 | 4420 | 1590 | 3540 | 1270 | 2650 | 950 | 1770 | 640 |
| **ER8WB1000LN-35-R1.0-ATH** | 0.05～0.1 | 5～10 | 5730 | 2290 | 4770 | 1910 | 3820 | 1530 | 2860 | 1140 | 1910 | 760 |
| **ER8WB1000LN-50-R1.0-ATH** | 0.05～0.1 | 5～10 | 4770 | 1910 | 3980 | 1590 | 3180 | 1270 | 2390 | 960 | 1590 | 640 |
| **ER8WB1000LN-60-R1.0-ATH** | 0.05～0.1 | 5～10 | 3340 | 1070 | 2790 | 890 | 2230 | 710 | 1670 | 530 | 1110 | 360 |
| **ER8WB1000LN-80-R1.0-ATH** | 0.05～0.1 | 5～10 | 2390 | 480 | 1990 | 400 | 1590 | 320 | 1190 | 240 | 800 | 160 |
| **ER8WB1100LS-R1.0-ATH** | 0.05～0.1 | 5.5～11 | 4340 | 1810 | 3620 | 1510 | 2890 | 1210 | 2170 | 910 | 1450 | 610 |
| **ER8WB1200LN-40-R1.0-ATH** | 0.05～0.1 | 6～12 | 4770 | 2060 | 3980 | 1720 | 3180 | 1370 | 2390 | 1030 | 1590 | 690 |
| **ER8WB1200LN-60-R1.0-ATH** | 0.05～0.1 | 6～12 | 3980 | 1720 | 3320 | 1430 | 2650 | 1140 | 1990 | 860 | 1330 | 570 |
| **ER8WB1200LN-80-R1.0-ATH** | 0.05～0.1 | 6～12 | 2790 | 840 | 2320 | 700 | 1860 | 560 | 1390 | 420 | 930 | 280 |
| **ER8WB1200LN-100-R1.0-ATH** | 0.05～0.1 | 6～12 | 1990 | 430 | 1660 | 360 | 1330 | 290 | 990 | 210 | 660 | 140 |

※ロングシャンクタイプ(Φ7,9,11)の切削条件は工具突き出し量が5DC(工具径×5倍)時の条件です。突き出し量を変更する場合は下記補正値を参考に条件を設定ください。
* Cutting conditions for the long-shank type (⌀7/9/11) are for a tool projection of 5DC (tool diameter × 5). Modify the conditions using the following correction factors if the projection amount changes:

### ロングシャンクタイプの切削条件補正値 Cutting condition correction factors for long-shank type (%)

| 被削材 Work material | | | 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 工具鋼 Tool steels (25～35HRC) | | プリハードン鋼 Pre-hardened steels (35～45HRC) | | 焼入れ鋼 Hardened steels (45～55HRC) | | 焼入れ鋼 Hardened steels (55～62HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 突出し量 Projection | 軸切込み *ap* (mm) | 径切込み *ae* (mm) | 回転数 *n* ($min^{-1}$) | 送り速度 *Vf* (mm/min) | 回転数 *n* ($min^{-1}$) | 送り速度 *Vf* (mm/min) | 回転数 *n* ($min^{-1}$) | 送り速度 *Vf* (mm/min) | 回転数 *n* ($min^{-1}$) | 送り速度 *Vf* (mm/min) | 回転数 *n* ($min^{-1}$) | 送り速度 *Vf* (mm/min) |
| **5DC** | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| **6DC** | 100% | 100% | 70% | 60% | 70% | 60% | 70% | 60% | 70% | 60% | 70% | 60% |
| **7DC** | 100% | 100% | 70% | 50% | 70% | 50% | 70% | 50% | 70% | 50% | 70% | 50% |

【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②できるだけ高剛性、高精度の機械をご使用ください。
③この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。
⑤溝切削の場合、送り速度を50%を目安に調整してください。
⑥傾斜切削の場合、傾斜角は0.5°以下、送り速度を50%を目安に調整してください。

【Note】① Use the appropriate coolant for the work material and machining shape.
② Use a highly rigid and accurate machine as possible.
③ These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.
⑤ For slotting, adjust the feed rate to 50% as general criteria.
⑥ For ramping, adjust the ramp angle to 0.5° or less and the feed rate to 50% as general criteria.

# End mill for adaptive milling
# 高能率側面切削用エンドミル

YouTube 動画公開中

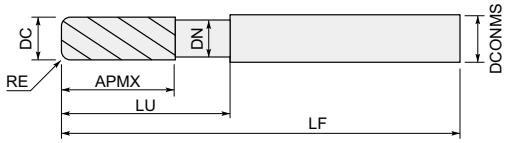
## 首下 3.5DCタイプ　Under neck 3.5DC type

高能率側面切削 Adaptive milling / 平面 Planing / 側面 Side Cutting / 曲面 Profiling / ヘリカル Helical / 荒 Roughing / 中仕上 Semi Finishing

外径公差 Dia.tolerance
φ6 : 0～−0.015
φ8～φ20 : 0～−0.02
h5 φ6,8,10,12　h6 φ16,20
(mm)

負荷制御ツールパスとの組合せで高能率な加工を実現!
Enables high-efficiency machining in conjunction with adaptive milling tool paths!

5枚刃
5 Flutes




## ER5HS○○-PN

超硬 Carbide / PN / なじれ40° Helix angle / 不等分割 Unequal pitch / 切削条件表 A258 Cutting Conditions

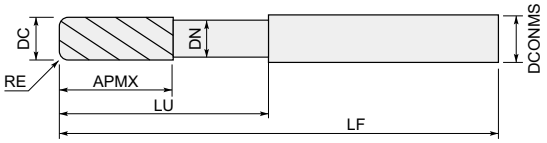
| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 刃長 Flute length APMX | 首下長 Under neck length LU | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 希望小売価格 Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|
| ER5HS06-PN | ● | 6 | 0.5 | 18 | 21 | 5.5 | 60 | 6 | 13,140 |
| ER5HS08-PN | ● | 8 | 1.0 | 24 | 28 | 7.3 | 75 | 8 | 15,380 |
| ER5HS10-PN | ● | 10 | 1.0 | 30 | 35 | 9.2 | 80 | 10 | 19,870 |
| ER5HS12-PN | ● | 12 | 1.0 | 36 | 42 | 11 | 100 | 12 | 23,910 |
| ER5HS16-PN | ● | 16 | 1.0 | 48 | 56 | 14.7 | 110 | 16 | 51,600 |
| ER5HS20-PN | ● | 20 | 1.0 | 60 | 70 | 18.4 | 125 | 20 | 71,900 |

## 首下 5DC タイプ　Under neck 5DC type

高能率側面切削 Adaptive milling / 平面 Planing / 側面 Side Cutting / 曲面 Profiling / ヘリカル Helical / 荒 Roughing / 中仕上 Semi Finishing

外径公差 Dia.tolerance
φ6 : 0～−0.015
φ8～φ20 : 0～−0.02
h5 φ6,8,10,12　h6 φ16,20
(mm)

5枚刃
5 Flutes




## ER5HS○○-○○-PN

超硬 Carbide / PN / なじれ40° Helix angle / 不等分割 Unequal pitch / 切削条件表 A258 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 刃長 Flute length APMX | 首下長 Under neck length LU | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 希望小売価格 Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|
| ER5HS06-30-PN | ● | 6 | 0.5 | 18 | 30 | 5.5 | 70 | 6 | 14,480 |
| ER5HS08-40-PN | ● | 8 | 1.0 | 24 | 40 | 7.3 | 80 | 8 | 16,960 |
| ER5HS10-50-PN | ● | 10 | 1.0 | 30 | 50 | 9.2 | 100 | 10 | 21,880 |
| ER5HS12-60-PN | ● | 12 | 1.0 | 36 | 60 | 11 | 120 | 12 | 26,260 |
| ER5HS16-80-PN | ● | 16 | 1.0 | 48 | 80 | 14.7 | 135 | 16 | 58,100 |
| ER5HS20-100-PN | ● | 20 | 1.0 | 60 | 100 | 18.4 | 155 | 20 | 84,000 |

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | > 55HRC ≦ 65HRC | > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | | | | ○ | ○ | | |

## 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| ER5HS-PN | 6 ～ 20 | 6 ～ 20 |

●：標準在庫品です。 ●：Stocked items.

# End mill for adaptive milling
# 高能率側面切削用エンドミル

## 標準切削条件表 Recommended cutting conditions ER5HS-3.5DC-PN ER5HS-5DC-PN

### 標準切削条件 Recommended cutting conditions

| 被削材 Work material | 炭素鋼・合金鋼 Carbon steels, Alloy steels (～30HRC) | | プリハードン鋼 Pre-hardened steels (30～40HRC) | | ステンレス鋼 Stainless steels | |
|---|---|---|---|---|---|---|
| 切削速度 Cutting speed | $v_c$=150m/min | | $v_c$=100m/min | | $v_c$=150m/min | |
| 切込み Depth of cut (mm) | $a_p$=3DC-1mm, $a_e$=0.08DC | | $a_p$=3DC-1mm, $a_e$=0.08DC | | $a_p$=3DC-1mm, $a_e$=0.06DC | |
| 外径DC Tool dia.(mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) |
| **6** | 7,960 | 3,980 | 5,310 | 2,655 | 7,960 | 3,180 |
| **8** | 5,970 | 2,985 | 3,980 | 1,990 | 5,970 | 2,390 |
| **10** | 4,775 | 2,865 | 3,185 | 1,910 | 4,775 | 2,390 |
| **12** | 3,980 | 2,390 | 2,660 | 1,600 | 3,980 | 1,990 |
| **16** | 2,990 | 1,500 | 1,990 | 1,000 | 2,990 | 1,200 |
| **20** | 2,390 | 1,200 | 1,600 | 800 | 2,390 | 960 |

### 首下5DC切削条件（標準切削条件に対しての割合） Under neck 5DC cutting conditions (as percentage of recommended cutting conditions)

| 被削材 Work material | 炭素鋼・合金鋼 Carbon steels, Alloy steels (～30HRC) | | | プリハードン鋼 Pre-hardened steels (30～40HRC) | | | ステンレス鋼 Stainless steels | | |
|---|---|---|---|---|---|---|---|---|---|
| 割合 Percentage | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | 径方向切込み $a_e$ (mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | 径方向切込み $a_e$ (mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | 径方向切込み $a_e$ (mm) |
| | 100% | 100% | 60% | 100% | 50% | 75% | 100% | 100% | 50% |

$a_p$は標準切削条件を参考に調整ください。切削条件例 炭素鋼：$\phi$10 $n$=4,775$min^{-1}$ $v_f$=2,865mm/min $a_p$=29mm $a_e$=0.48mm
Adjust $a_p$ by referring to the recommended cutting conditions. Example of carbon steel:

### 高速切削条件（首下3.5DCのみ） High-speed cutting conditions (under neck 3.5DC only)

| 被削材 Work material | 炭素鋼・合金鋼 Carbon steels, Alloy steels (～30HRC) | | プリハードン鋼 Pre-hardened steels (30～40HRC) | |
|---|---|---|---|---|
| 切削速度 Cutting speed | $v_c$=200m/min | | $v_c$=150m/min | |
| 切込み Depth of cut (mm) | $a_p$=3DC-1mm, $a_e$=0.08DC | | $a_p$=3DC-1mm, $a_e$=0.08DC | |
| 外径DC Tool dia.(mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) |
| **6** | 10,610 | 5,300 | 7,960 | 3,980 |
| **8** | 7,960 | 4,000 | 5,970 | 2,985 |
| **10** | 6,370 | 3,820 | 4,775 | 2,865 |
| **12** | 5,310 | 3,190 | 3,980 | 2,390 |
| **16** | 3,980 | 2,000 | 2,990 | 1,500 |
| **20** | 3,185 | 1,600 | 2,390 | 1,200 |

ステンレス鋼の高速切削は推奨いたしません。 High-speed cutting is not recommended with stainless steel.

### 【注意】

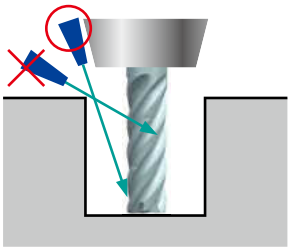
①できるだけ高剛性の機械をご使用ください。
※$\phi$16 以上の工具を使用する際は BT50 クラス以上の高剛性の機械をご使用ください。
②閉塞域が多い切削ではコレットスルーエアーなど、ホルダー端面からのクーラント供給をご使用ください。
③被削材、加工形状に合わせて、適切なクーラントを使用してください。
④この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
⑤機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。
⑥彫り込み時の傾斜進入角度は推奨1°として送り速度は上記の50～60%で設定ください。
また、回転数が調整可能な場合は$v_c$=100m/min程度に設定ください。

### 【Note】

① Use a highly rigid machine as possible.
※When using $\phi$16 or larger tools, use a BT50-class or higher high-rigidity machine.
② Supply coolant from the holder end face (using a through-collet air supply, for example) when cutting work material with many enclosed areas.
③ Use the appropriate coolant for the work material and machining shape.
④ These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
⑤ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.
⑥ The recommended ramping angle for helical interpolation is 1°. Set the feed rate to between 50% and 60% of the values indicated above. Additionally, where this can be adjusted, set the rotation speed to around $v_c$ = 100 m/min.

## クーラントについて Coolant

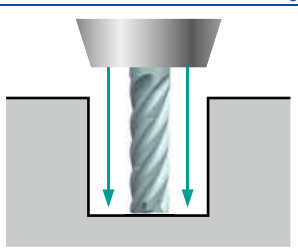
### クーラントノズル Coolant nozzle



クーラントノズルをご使用される際は、クーラントが底まで当たる位置にクーラントノズルを設定してください。またクーラント圧は切りくずが排出されるように調整してください。設定が悪い場合は切りくず詰まりによる刃先損傷や工具折損を引き起こす可能性があります。

When using a coolant nozzle, arrange the coolant nozzle so that the coolant hits the end of the tool.
Adjust the coolant pressure required to discharge the chips. Insufficient pressure may result in edge damage or tool breakage due to chip clogging.

### コレットスルーなどの端面供給 End feed using through-collet supply



コレットスルーなどを使用することで、切りくずの排出が良好となり、刃先損傷や工具折損を低減します。

Using a through-collet coolant feed improves chip discharge and reduces edge damage and tool breakage.

# Epoch Mirus Type R
# エポックミルス タイプR

## 4枚刃・ラジアス・ストレート・3DC　4 flutes, Radius, Straight, 3DC

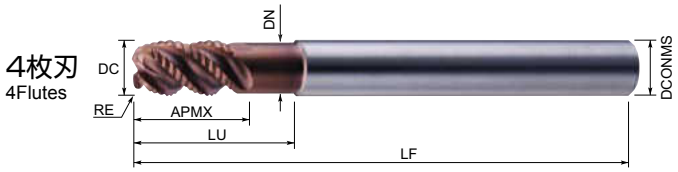
平面 Planing / 側面 Side Cutting / 溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical / 座ぐり Spot Facing / 取りのこし Rest Material Machining / 荒 Roughing / 中仕上 Semi Finishing

外径公差 Dia.tolerance　0～−0.05　h5

(mm)

高切り込み&高送りにより驚異の加工能率を実現。
Achieves amazing machining efficiency with high cutting depth and high feed rate.

スクエアはA346頁を参照してください
Please refer to page A346 for Square




## EMXR4○○○-○○-○○-TH 3DC

超硬 Carbide / ATH / ねじれ45° Helix angle / 切削条件表 A261 Cutting Conditions

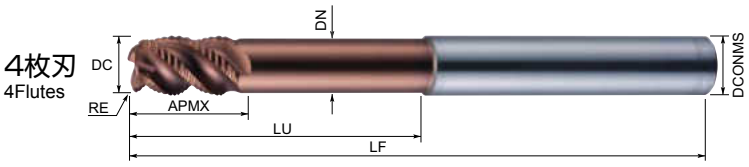
| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. DC | 刃長 Flute length APMX | コーナ半径 Corner radius RE | 首径 Neck dia. DN | 首下長 Under neck length LU | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 刃数 No. of flutes | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|---|
| EMXR4060-18-15-TH | ● | 6 | 9 | 1.5 | 5.5 | 18 | 60 | 6 | 4 | 20,650 |
| EMXR4080-24-20-TH | ● | 8 | 12 | 2 | 7.3 | 24 | 75 | 8 | 4 | 25,250 |
| EMXR4100-30-20-TH | ● | 10 | 15 | 2 | 9.1 | 30 | 80 | 10 | 4 | 33,440 |
| EMXR4120-36-20-TH | ● | 12 | 18 | 2 | 11 | 36 | 100 | 12 | 4 | 42,310 |

## 4枚刃・ラジアス・ストレート・5DC　4 flutes, Radius, Straight, 5DC

平面 Planing / 側面 Side Cutting / 溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical / 座ぐり Spot Facing / 取りのこし Rest Material Machining / 荒 Roughing / 中仕上 Semi Finishing

外径公差 Dia.tolerance　0～−0.05　h5

(mm)




## EMXR4○○○-○○-○○-TH 5DC

超硬 Carbide / ATH / ねじれ45° Helix angle / 切削条件表 A262 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. DC | 刃長 Flute length APMX | コーナ半径 Corner radius RE | 首径 Neck dia. DN | 首下長 Under neck length LU | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 刃数 No. of flutes | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|---|
| EMXR4060-30-15-TH | ● | 6 | 9 | 1.5 | 5.5 | 30 | 75 | 6 | 4 | 22,680 |
| EMXR4080-40-20-TH | ● | 8 | 12 | 2 | 7.3 | 40 | 85 | 8 | 4 | 27,830 |
| EMXR4100-50-20-TH | ● | 10 | 15 | 2 | 9.1 | 50 | 100 | 10 | 4 | 36,810 |
| EMXR4120-60-20-TH | ● | 12 | 18 | 2 | 11 | 60 | 110 | 12 | 4 | 46,570 |

## EMXR-3DC-TH、EMXR-5DC-THの対応被削材

Applicable work material of EMXR-3DC-TH, EMXR-5DC-TH

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | | | | | ○ | ○ |

## 再研磨対応外径範囲

Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EMXR-3DC-TH | 6～12 | 6～12 |
| EMXR-5DC-TH | 6～12 | 6～12 |

●：標準在庫品です。●：Stocked items.

# Epoch Mirus Type N
# エポックミルス タイプ N

高切り込み&高送りにより驚異の加工能率を実現。
Achieves amazing machining efficiency with high cutting depth and high feed rate.

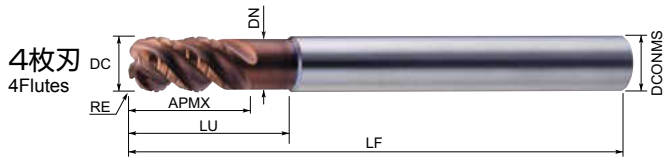
## 4枚刃・ラジアス・ストレート・3DC　4 flutes, Radius, Straight, 3DC

平面 Planing / 側面 Side Cutting / 溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical / 座ぐり Spot Facing / 取りのこし Rest Material Machining / 荒 Roughing / 中仕上 Semi Finishing

外径公差 Dia.tolerance　0～−0.03　h5

(mm)

スクエアはA347 頁を参照してください
Please refer to page A347 for Square




## EMXN4○○○-○○-○○-TH 3DC

超硬 Carbide / RTH / なじれ45° Helix angle / 切削条件表 A261 Cutting Conditions

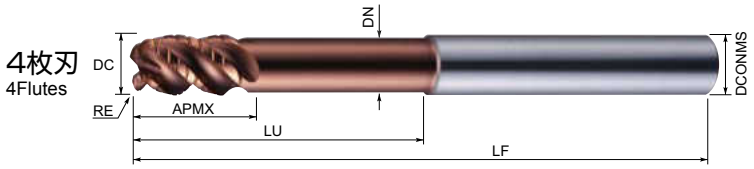
| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. DC | 刃長 Flute length APMX | コーナ半径 Corner radius RE | 首径 Neck dia. DN | 首下長 Under neck length LU | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 刃数 No. of flutes | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|---|
| EMXN4060-18-05-TH | ● | 6 | 9 | 0.5 | 5.5 | 18 | 60 | 6 | 4 | 20,650 |
| EMXN4060-18-15-TH | ● | | 9 | 1.5 | 5.5 | 18 | 60 | 6 | 4 | 20,650 |
| EMXN4080-24-05-TH | ● | 8 | 12 | 0.5 | 7.3 | 24 | 75 | 8 | 4 | 25,250 |
| EMXN4080-24-20-TH | ● | | 12 | 2 | 7.3 | 24 | 75 | 8 | 4 | 25,250 |
| EMXN4100-30-05-TH | ● | 10 | 15 | 0.5 | 9.1 | 30 | 80 | 10 | 4 | 33,440 |
| EMXN4100-30-20-TH | ● | | 15 | 2 | 9.1 | 30 | 80 | 10 | 4 | 33,440 |
| EMXN4120-36-05-TH | ● | 12 | 18 | 0.5 | 11 | 36 | 100 | 12 | 4 | 42,310 |
| EMXN4120-36-20-TH | ● | | 18 | 2 | 11 | 36 | 100 | 12 | 4 | 42,310 |

## 4枚刃・ラジアス・ストレート・5DC　4 flutes, Radius, Straight, 5DC

平面 Planing / 側面 Side Cutting / 溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical / 座ぐり Spot Facing / 取りのこし Rest Material Machining / 荒 Roughing / 中仕上 Semi Finishing

外径公差 Dia.tolerance　0～−0.03　h5

(mm)




## EMXN4○○○-○○-○○-TH 5DC

超硬 Carbide / RTH / なじれ45° Helix angle / 切削条件表 A262 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. DC | 刃長 Flute length APMX | コーナ半径 Corner radius RE | 首径 Neck dia. DN | 首下長 Under neck length LU | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 刃数 No. of flutes | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|---|
| EMXN4060-30-15-TH | ● | 6 | 9 | 1.5 | 5.5 | 30 | 75 | 6 | 4 | 22,680 |
| EMXN4080-40-20-TH | ● | 8 | 12 | 2 | 7.3 | 40 | 85 | 8 | 4 | 27,830 |
| EMXN4100-50-20-TH | ● | 10 | 15 | 2 | 9.1 | 50 | 100 | 10 | 4 | 36,810 |
| EMXN4120-60-20-TH | ● | 12 | 18 | 2 | 11 | 60 | 110 | 12 | 4 | 46,570 |

## EMXN-3DC-TH、EMXN-5DC-THの対応被削材

Applicable work material of EMXN-3DC-TH, EMXR-5DC-TH

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | | | | | ○ | ○ |

## 再研磨対応外径範囲

Re-grinding compatibility range

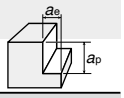
| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EMXN-3DC-TH | 6～12 | 6～12 |
| EMXN-5DC-TH | 6～12 | 6～12 |

# 標準切削条件表 Recommended cutting conditions

**EMXR-CR-TH EMXN-CR-TH** 4枚刃・ラジアス・ストレート 4 flutes, Radius, Straight, 3D **3DC**



## 側面切削 Side milling



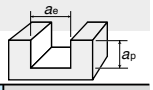

タイプR Type R

| | 鋳鉄・炭素鋼・合金鋼 Cast iron, Carbon steels, Alloy steels (150～250HB) FC、S50C、SCM | | 工具鋼 Tool steels (25～35HRC) SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80、CENA1 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | |
|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | $a_p$=1.0DC $a_e$=0.5DC | | $a_p$=1.0DC $a_e$=0.375DC | | $a_p$=1.0DC $a_e$=0.25DC | | $a_p$=1.0DC $a_e$=0.125DC | |
| 外径DC Tool dia.(mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| φ6 | 8,000 | 1,380 | 7,200 | 1,000 | 6,400 | 710 | 5,600 | 500 |
| φ8 | 6,000 | 1,460 | 5,400 | 1,050 | 4,800 | 750 | 4,200 | 520 |
| φ10 | 4,800 | 1,460 | 4,300 | 1,050 | 3,800 | 740 | 3,300 | 510 |
| φ12 | 4,000 | 1,380 | 3,600 | 1,000 | 3,200 | 710 | 2,800 | 500 |

タイプN Type N

| | 鋳鉄・炭素鋼・合金鋼 Cast iron, Carbon steels, Alloy steels (150～250HB) FC、S50C、SCM | | 工具鋼 Tool steels (25～35HRC) SKD | | ステンレス鋼 Stainless steels SUS | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80、CENA1 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | $a_p$=1.0DC $a_e$=0.5DC | | $a_p$=1.0DC $a_e$=0.375DC | | $a_p$=1.0DC $a_e$=0.375DC | | $a_p$=1.0DC $a_e$=0.25DC | | $a_p$=1.0DC $a_e$=0.125DC | |
| 外径DC Tool dia.(mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| φ6 | 7,400 | 1,280 | 6,600 | 910 | 6,600 | 270 | 5,800 | 640 | 5,000 | 440 |
| φ8 | 5,600 | 1,360 | 5,000 | 970 | 5,000 | 290 | 4,400 | 680 | 3,800 | 470 |
| φ10 | 4,500 | 1,370 | 4,000 | 970 | 4,000 | 290 | 3,500 | 680 | 3,000 | 470 |
| φ12 | 3,700 | 1,280 | 3,300 | 910 | 3,300 | 270 | 2,900 | 640 | 2,500 | 440 |

## 溝 切 削 Slotting




タイプR Type R

| | 鋳鉄・炭素鋼・合金鋼 Cast iron, Carbon steels, Alloy steels (150～250HB) FC、S50C、SCM | | 工具鋼 Tool steels (25～35HRC) SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80、CENA1 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | |
|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | $a_p$=1.0DC | | $a_p$=0.8DC | | $a_p$=0.5DC | | $a_p$=0.2DC | |
| 外径DC Tool dia.(mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| φ6 | 6,900 | 950 | 6,100 | 670 | 5,300 | 470 | 4,500 | 320 |
| φ8 | 5,200 | 1,010 | 4,600 | 720 | 4,000 | 500 | 3,400 | 340 |
| φ10 | 4,100 | 1,000 | 3,700 | 720 | 3,200 | 500 | 2,700 | 340 |
| φ12 | 3,400 | 940 | 3,100 | 690 | 2,700 | 480 | 2,300 | 330 |

タイプN Type N

| | 鋳鉄・炭素鋼・合金鋼 Cast iron, Carbon steels, Alloy steels (150～250HB) FC、S50C、SCM | | 工具鋼 Tool steels (25～35HRC) SKD | | ステンレス鋼 Stainless steels SUS | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80、CENA1 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | $a_p$=1.0DC | | $a_p$=0.8DC | | $a_p$=0.8DC | | $a_p$=0.5DC | | $a_p$=0.2DC | |
| 外径DC Tool dia.(mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| φ6 | 6,400 | 880 | 5,600 | 620 | 5,600 | 190 | 4,800 | 420 | 4,000 | 280 |
| φ8 | 4,800 | 930 | 4,200 | 650 | 4,200 | 200 | 3,600 | 450 | 3,000 | 300 |
| φ10 | 3,800 | 920 | 3,300 | 640 | 3,300 | 190 | 2,900 | 450 | 2,400 | 300 |
| φ12 | 3,200 | 880 | 2,800 | 620 | 2,800 | 190 | 2,400 | 420 | 2,000 | 280 |

## 傾斜切削 Ramping

タイプR Type R

| | 鋳鉄・炭素鋼・合金鋼 Cast iron, Carbon steels, Alloy steels (150～250HB) FC、S50C、SCM | | 工具鋼 Tool steels (25～35HRC) SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80、CENA1 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | |
|---|---|---|---|---|---|---|---|---|
| 最大傾斜角 Max. ramping angle | 30°以下 30° or less | | 15°以下 15° or less | | 15°以下 15° or less | | 5°以下 5° or less | |
| 外径DC Tool dia.(mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| φ6 | 6,900 | 750 | 6,100 | 530 | 5,300 | 370 | 4,500 | 250 |
| φ8 | 5,200 | 790 | 4,600 | 560 | 4,000 | 390 | 3,400 | 260 |
| φ10 | 4,100 | 780 | 3,700 | 560 | 3,200 | 390 | 2,700 | 260 |
| φ12 | 3,400 | 730 | 3,100 | 540 | 2,700 | 370 | 2,300 | 250 |

タイプN Type N

| | 鋳鉄・炭素鋼・合金鋼 Cast iron, Carbon steels, Alloy steels (150～250HB) FC、S50C、SCM | | 工具鋼 Tool steels (25～35HRC) SKD | | ステンレス鋼 Stainless steels SUS | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80、CENA1 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 最大傾斜角 Max. ramping angle | 20°以下 20° or less | | 10°以下 10° or less | | 5°以下 5° or less | | 10°以下 10° or less | | 5°以下 5° or less | |
| 外径DC Tool dia.(mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| φ6 | 6,400 | 690 | 5,600 | 480 | 5,600 | 140 | 4,800 | 330 | 4,000 | 220 |
| φ8 | 4,800 | 730 | 4,200 | 510 | 4,200 | 150 | 3,600 | 350 | 3,000 | 230 |
| φ10 | 3,800 | 720 | 3,300 | 500 | 3,300 | 150 | 2,900 | 350 | 2,400 | 230 |
| φ12 | 3,200 | 690 | 2,800 | 480 | 2,800 | 140 | 2,400 | 330 | 2,000 | 220 |

## 往復倣い加工 Two-way profiling

タイプR Type R

| | 鋳鉄・炭素鋼・合金鋼 Cast iron, Carbon steels, Alloy steels (150～250HB) FC、S50C、SCM | | 工具鋼 Tool steels (25～35HRC) SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80、CENA1 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | |
|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | 最大max. $a_e$=0.5DC | | 最大max. $a_e$=0.375DC | | 最大max. $a_e$=0.25DC | | 最大max. $a_e$=0.125DC | |
| 外径DC Tool dia.(mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| φ6 | 8,000 | 1,730 | 7,200 | 1,240 | 6,400 | 880 | 5,600 | 620 |
| φ8 | 6,000 | 1,820 | 5,400 | 1,310 | 4,800 | 930 | 4,200 | 650 |
| φ10 | 4,800 | 1,820 | 4,300 | 1,310 | 3,800 | 920 | 3,300 | 640 |
| φ12 | 4,000 | 1,730 | 3,600 | 1,240 | 3,200 | 880 | 2,800 | 620 |

タイプN Type N

| | 鋳鉄・炭素鋼・合金鋼 Cast iron, Carbon steels, Alloy steels (150～250HB) FC、S50C、SCM | | 工具鋼 Tool steels (25～35HRC) SKD | | ステンレス鋼 Stainless steels SUS | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80、CENA1 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | 最大max. $a_e$=0.5DC | | 最大max. $a_e$=0.375DC | | 最大max. $a_e$=0.375DC | | 最大max. $a_e$=0.25DC | | 最大max. $a_e$=0.125DC | |
| 外径DC Tool dia.(mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| φ6 | 7,400 | 1,600 | 6,600 | 1,140 | 6,600 | 340 | 5,800 | 800 | 5,000 | 550 |
| φ8 | 5,600 | 1,700 | 5,000 | 1,220 | 5,000 | 370 | 4,400 | 860 | 3,800 | 590 |
| φ10 | 4,500 | 1,710 | 4,000 | 1,220 | 4,000 | 370 | 3,500 | 850 | 3,000 | 580 |
| φ12 | 3,700 | 1,600 | 3,300 | 1,140 | 3,300 | 340 | 2,900 | 800 | 2,500 | 550 |

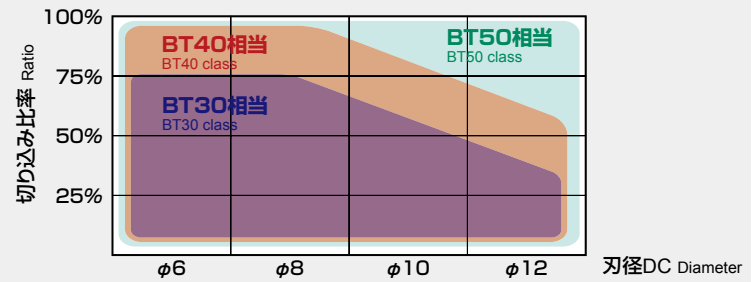
【注意】ご使用にあたっては、次ページの表下の項目と注意を参照してください。【Note】Upon usage, please refer to comments and notes below table on next page.

## 主軸別 使用領域概念図

Cutting condition adjustment based on spindle type

標準切削条件はBT50相当の主軸での切削条件です。
主軸剛性の弱い機械では右記の図を参考に切り込み量を調整してください。

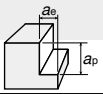
Standard cutting condition is for BT50 class spindle situation.
Please adjust the step according to right chart.



# Epoch Mirus Type R/Type N
# エポックミルス タイプR／タイプN

## EMXR-CR-TH EMXN-CR-TH 4枚刃・ラジアス・ストレート 4 flutes, Radius, Straight, 5DC 5DC

### 側面切削 Side milling



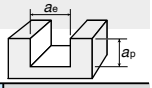

タイプR Type R

| | 鋳鉄・炭素鋼・合金鋼 Cast iron, Carbon steels, Alloy steels (150～250HB) FC、S50C、SCM | | 工具鋼 Tool steels (25～35HRC) SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80、CENA1 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | |
|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | $a_p$=0.7DC $a_e$=0.35DC | | $a_p$=0.7DC $a_e$=0.26DC | | $a_p$=0.7DC $a_e$=0.175DC | | $a_p$=0.7DC $a_e$=0.087DC | |
| 外径DC Tool dia.(mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| φ6 | 5,600 | 970 | 4,800 | 660 | 4,000 | 440 | 3,200 | 280 |
| φ8 | 4,200 | 1,020 | 3,600 | 700 | 3,000 | 470 | 2,400 | 300 |
| φ10 | 3,300 | 1,000 | 2,900 | 710 | 2,400 | 470 | 1,900 | 300 |
| φ12 | 2,800 | 970 | 2,400 | 660 | 2,000 | 440 | 1,600 | 280 |

タイプN Type N

| | 鋳鉄・炭素鋼・合金鋼 Cast iron, Carbon steels, Alloy steels (150～250HB) FC、S50C、SCM | | 工具鋼 Tool steels (25～35HRC) SKD | | ステンレス鋼 Stainless steels SUS | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80、CENA1 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | $a_p$=0.7DC $a_e$=0.35DC | | $a_p$=0.7DC $a_e$=0.26DC | | $a_p$=0.7DC $a_e$=0.26DC | | $a_p$=0.7DC $a_e$=0.175DC | | $a_p$=0.7DC $a_e$=0.087DC | |
| 外径DC Tool dia.(mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| φ6 | 5,300 | 920 | 4,500 | 620 | 4,500 | 190 | 3,700 | 410 | 2,900 | 260 |
| φ8 | 4,000 | 970 | 3,400 | 660 | 3,400 | 200 | 2,800 | 440 | 2,200 | 270 |
| φ10 | 3,200 | 970 | 2,700 | 660 | 2,700 | 200 | 2,200 | 430 | 1,800 | 280 |
| φ12 | 2,700 | 930 | 2,300 | 640 | 2,300 | 190 | 1,900 | 420 | 1,500 | 270 |

### 溝 切 削 Slotting




タイプR Type R

| | 鋳鉄・炭素鋼・合金鋼 Cast iron, Carbon steels, Alloy steels (150～250HB) FC、S50C、SCM | | 工具鋼 Tool steels (25～35HRC) SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80、CENA1 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | |
|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | $a_p$=0.7DC | | $a_p$=0.56DC | | $a_p$=0.35DC | | $a_p$=0.14DC | |
| 外径DC Tool dia.(mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| φ6 | 4,200 | 580 | 3,400 | 380 | 2,700 | 240 | 1,900 | 130 |
| φ8 | 3,200 | 620 | 2,600 | 400 | 2,000 | 250 | 1,400 | 140 |
| φ10 | 2,500 | 610 | 2,100 | 410 | 1,600 | 250 | 1,100 | 140 |
| φ12 | 2,100 | 580 | 1,700 | 380 | 1,300 | 230 | 900 | 130 |

タイプN Type N

| | 鋳鉄・炭素鋼・合金鋼 Cast iron, Carbon steels, Alloy steels (150～250HB) FC、S50C、SCM | | 工具鋼 Tool steels (25～35HRC) SKD | | ステンレス鋼 Stainless steels SUS | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80、CENA1 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | $a_p$=0.7DC | | $a_p$=0.56DC | | $a_p$=0.56DC | | $a_p$=0.35DC | | $a_p$=0.14DC | |
| 外径DC Tool dia.(mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| φ6 | 3,700 | 510 | 2,900 | 320 | 2,900 | 100 | 2,100 | 190 | 1,300 | 90 |
| φ8 | 2,800 | 540 | 2,200 | 340 | 2,200 | 100 | 1,600 | 200 | 1,000 | 100 |
| φ10 | 2,200 | 540 | 1,800 | 350 | 1,800 | 110 | 1,300 | 200 | 800 | 100 |
| φ12 | 1,900 | 530 | 1,500 | 330 | 1,500 | 100 | 1,100 | 190 | 700 | 100 |

### 傾斜切削 Ramping

タイプR Type R

| | 鋳鉄・炭素鋼・合金鋼 Cast iron, Carbon steels, Alloy steels (150～250HB) FC、S50C、SCM | | 工具鋼 Tool steels (25～35HRC) SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80、CENA1 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | |
|---|---|---|---|---|---|---|---|---|
| 最大傾斜角 Max. ramping angle | 30°以下 30° or less | | 15°以下 15° or less | | 15°以下 15° or less | | 5°以下 5° or less | |
| 外径DC Tool dia.(mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| φ6 | 4,800 | 520 | 4,000 | 350 | 3,200 | 220 | 2,400 | 130 |
| φ8 | 3,600 | 550 | 3,000 | 360 | 2,400 | 230 | 1,800 | 140 |
| φ10 | 2,900 | 550 | 2,400 | 360 | 1,900 | 230 | 1,400 | 140 |
| φ12 | 2,400 | 520 | 2,000 | 350 | 1,600 | 220 | 1,200 | 130 |

タイプN Type N

| | 鋳鉄・炭素鋼・合金鋼 Cast iron, Carbon steels, Alloy steels (150～250HB) FC、S50C、SCM | | 工具鋼 Tool steels (25～35HRC) SKD | | ステンレス鋼 Stainless steels SUS | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80、CENA1 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 最大傾斜角 Max. ramping angle | 20°以下 20° or less | | 10°以下 10° or less | | 5°以下 5° or less | | 10°以下 10° or less | | 5°以下 5° or less | |
| 外径DC Tool dia.(mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| φ6 | 4,500 | 490 | 3,700 | 320 | 3,700 | 100 | 2,900 | 200 | 2,100 | 120 |
| φ8 | 3,400 | 520 | 2,800 | 340 | 2,800 | 100 | 2,200 | 210 | 1,600 | 120 |
| φ10 | 2,700 | 510 | 2,200 | 330 | 2,200 | 100 | 1,800 | 220 | 1,300 | 130 |
| φ12 | 2,300 | 500 | 1,900 | 330 | 1,900 | 100 | 1,500 | 210 | 1,100 | 120 |

### 往復倣い加工 Two-way profiling

図① Fig.1

タイプR Type R

| | 鋳鉄・炭素鋼・合金鋼 Cast iron, Carbon steels, Alloy steels (150～250HB) FC、S50C、SCM | | 工具鋼 Tool steels (25～35HRC) SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80、CENA1 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | |
|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | 最大max. $a_e$=0.35DC | | 最大max. $a_e$=0.26DC | | 最大max. $a_e$=0.175DC | | 最大max. $a_e$=0.087DC | |
| 外径DC Tool dia.(mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| φ6 | 5,600 | 1,210 | 4,800 | 830 | 4,000 | 550 | 3,200 | 350 |
| φ8 | 4,200 | 1,280 | 3,600 | 880 | 3,000 | 580 | 2,400 | 370 |
| φ10 | 3,300 | 1,250 | 2,900 | 880 | 2,400 | 580 | 1,900 | 370 |
| φ12 | 2,800 | 1,210 | 2,400 | 830 | 2,000 | 550 | 1,600 | 350 |

タイプN Type N

| | 鋳鉄・炭素鋼・合金鋼 Cast iron, Carbon steels, Alloy steels (150～250HB) FC、S50C、SCM | | 工具鋼 Tool steels (25～35HRC) SKD | | ステンレス鋼 Stainless steels SUS | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80、CENA1 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | 最大max. $a_e$=0.35DC | | 最大max. $a_e$=0.26DC | | 最大max. $a_e$=0.26DC | | 最大max. $a_e$=0.175DC | | 最大max. $a_e$=0.087DC | |
| 外径DC Tool dia.(mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| φ6 | 5,300 | 1,140 | 4,500 | 780 | 4,500 | 230 | 3,700 | 510 | 2,900 | 320 |
| φ8 | 4,000 | 1,220 | 3,400 | 830 | 3,400 | 250 | 2,800 | 540 | 2,200 | 340 |
| φ10 | 3,200 | 1,220 | 2,700 | 820 | 2,700 | 250 | 2,200 | 540 | 1,800 | 350 |
| φ12 | 2,700 | 1,170 | 2,300 | 790 | 2,300 | 240 | 1,900 | 530 | 1,500 | 330 |

※タイプRはステンレス鋼及びチタン合金に推奨できません。

【特長】 本工具を用いると、図①に示すような形状から、往復倣い加工を行うことが可能です。
図①形状の切削条件は側面切削条件を参照ください。

【注意】
①ラジアスタイプではZ突込み加工は出来ません。
②できるだけ高剛性、高精度の機械をご使用ください。
③この切削条件表は切削条件の目安を示すものです。
実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。
⑤エアーブローやクーラントの位置に十分ご注意ください。
⑥使用条件(コレット等)によっては、工具が抜ける恐れがありますので、機械・ホルダーの種類によって、条件を調整してください。

※Type R is not recommendable for milling stainless steel or Ti alloy.

Features MIRUS has the capability of two-way profiling a work from geometry as figure 1 shown. Please refer to side milling cutting conditions for previous process.

Note
① Radius type is not recommendable for Z plunging.
② Use a highly rigid and accurate machine as possible.
③ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.
⑤ Please ensure that air blow or coolant is correctly positioned in order to remove the chip immediately.
⑥ In order to avoid clamping looseness, Please adjust cutting conditions according to type of machine center and holder.

# Epoch High Hard Radius
# エポックハイハードラジアス



YouTube 動画公開中

彫込み Die-sinking　曲面 Profiling　R Radius　荒 Roughing

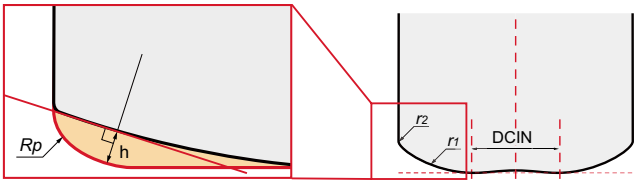
刃先交換式高送り工具をソリッド化、高硬度鋼の高送り加工が可能です。
Adopt the design of indexable high-feed cutter to solid end mill.
High feed cutting for high hardness steel possible

外径公差 Dia.tolerance　0～−0.02

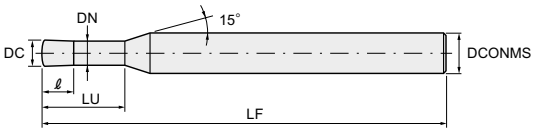
h5

DCONMS≦6　：0～−0.005
6<DCONMS≦10：0～−0.006
10<DCONMS　：0～−0.008
(mm)

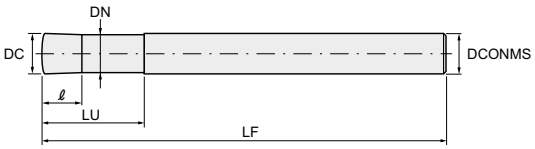
4、6枚刃
4,6 Flutes




Aタイプ A type




Bタイプ B type

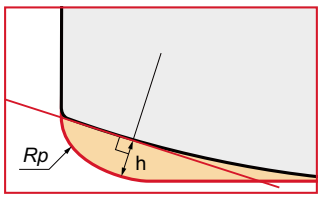



## EHHRE○○○○(-S○)-TH3

超硬 Carbide　TH3　ねじれ20° Helix angle　切削条件表 A264 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. DC | 近似R Approx radius Rp | 先端フラット径 Lowest point diameter DCIN | 底R End R r1 | コーナR Corner radius r2 | 首下長 Under Neck length LU | 刃長 Flute length ℓ | 首径 Neck dia. DN | 全長 Overall Length LF | シャンク径 Shank dia. DCONMS | 刃数 No. of flutes | 形状 Type | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EHHRE4010-S4-TH3 | ● | 1 | 0.134 | 0.28 | 1.1 | 0.1 | 3 | 1 | 0.95 | 50 | 4 | 4 | A | 11,250 |
| EHHRE4010-S6-TH3 | ● | | | | | | | 1 | 0.95 | 50 | 6 | 4 | A | 12,440 |
| EHHRE4020-S4-TH3 | ● | 2 | 0.194 | 0.56 | 2.2 | 0.1 | 6 | 2 | 1.9 | 50 | 4 | 4 | A | 11,900 |
| EHHRE4020-S6-TH3 | ● | | | | | | | 2 | 1.9 | 50 | 6 | 4 | A | 13,080 |
| EHHRE4030-S4-TH3 | ● | 3 | 0.328 | 0.84 | 3.3 | 0.2 | 9 | 3 | 2.9 | 60 | 4 | 4 | A | 12,540 |
| EHHRE4030-S6-TH3 | ● | | | | | | | 3 | 2.9 | 60 | 6 | 4 | A | 13,820 |
| EHHRE6040-S4-TH3 | ● | 4 | 0.387 | 1.12 | 4.4 | 0.2 | 12 | 4 | 3.9 | 60 | 4 | 6 | B | 12,540 |
| EHHRE6040-S6-TH3 | ● | | | | | | | 4 | 3.9 | 60 | 6 | 6 | A | 13,820 |
| EHHRE6050-TH3 | ● | 5 | 0.521 | 1.4 | 5.5 | 0.3 | 15 | 5 | 4.7 | 60 | 6 | 6 | A | 15,600 |
| EHHRE6060-TH3 | ● | 6 | 0.581 | 1.68 | 6.6 | 0.3 | 18 | 6 | 5.7 | 60 | 6 | 6 | B | 16,500 |
| EHHRE6080-TH3 | ● | 8 | 0.849 | 2.24 | 8.8 | 0.5 | 24 | 8 | 7.6 | 75 | 8 | 6 | B | 21,550 |
| EHHRE6100-TH3 | ● | 10 | 0.968 | 2.8 | 11 | 0.5 | 30 | 10 | 9.5 | 80 | 10 | 6 | B | 27,490 |
| EHHRE6120-TH3 | ● | 12 | 1.088 | 3.36 | 13.2 | 0.5 | 36 | 12 | 11.5 | 100 | 12 | 6 | B | 35,690 |

## 加工プログラム作成上の注意点 Precaution for creating machining program




・CAMでラジアスエンドミルとして寸法値を入力する場合は、コーナR値は近似Rを使用してください
・工具形状データが必要な場合は、弊社ホームページのTool SearchよりDXFデータをダウンロードしてください

・When entering corner radius into CAM as radius end mill, Please use approximate R for your programing corner radius.
・For precise tool definition for the CAM system please download DXF data from "TOOL SEARCH" program on our website.

**【注意】**

・本工具は工具形状が通常のラジアス工具とは異なるため、工具自動測定の際は、調整が必要になる場合があります。測定機の機種によっては、正確に測定出来ない場合がありますので、工具形状をDXFにて確認頂きご使用下さい。
・Since the shape of this tool is different from that of a conventional radius tool, adjustment may be required in case of using automatic tool measurement equipment.
Depending on the model of the measuring equipment, it may not be possible to measure accurately, so please check the tool shape with DXF before use.

| 外径 DC Tool Dia. | CAM入力近似Rと最大削り残り量 Approx radius and maximum remains at CAM input 近似R Rp Approx radius | 最大削り残り量 h Max remains | 傾斜切削の最大傾斜角 θ Ramping angle | 加工可能なヘリカル穴径 D Possible helical hole dia. |
|---|---|---|---|---|
| Φ1 | 0.134 | 0.026 | 0.5° 以下 0.5° or less | 1.3～1.9 |
| Φ2 | 0.194 | 0.068 | | 2.6～3.8 |
| Φ3 | 0.328 | 0.094 | | 3.9～5.7 |
| Φ4 | 0.387 | 0.136 | | 5.2～7.6 |
| Φ5 | 0.521 | 0.162 | | 6.4～9.5 |
| Φ6 | 0.581 | 0.204 | | 7.7～11.4 |
| Φ8 | 0.849 | 0.255 | | 10.3～15.2 |
| Φ10 | 0.968 | 0.34 | | 12.8～19.0 |
| Φ12 | 1.088 | 0.424 | | 15.4～22.8 |

※ヘリカル加工を行う場合は送り速度を標準切削条件の70%に設定してください。
For helical machining, Please set feed rate to 70% of recommended cutting condition.

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦45HRC | 高硬度 Hardened steel >45HRC ≦55HRC | 高硬度 Hardened steel >55HRC ≦65HRC | 高硬度 Hardened steel >65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| | | ○ | ◎ | ◎ | | | | |

## 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EHHRE-TH3 | × (N/A) | 2～12 |

●：標準在庫品です。●：Stocked items.

# Epoch High Hard Radius
# エポックハイハードラジアス

## 標準切削条件表 Recommended cutting conditions EHHRE-TH3

### 一般切削条件（寿命重視） General cutting conditions (Emphasis on tool life)

| 被削材 Work material | | 焼入れ鋼 Hardened steels (50～55HRC) ※1 | | | | 焼入れ鋼 Hardened steels (55～62HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|
| 外径DC Tool dia. (mm) | 刃数 No. of flutes | 切削速度 Cutting speed vc=80m/min | | | | 切削速度 Cutting speed vc=60m/min | | | |
| | | n (min-1) | Vf (mm/min) | ap (mm) | ae (mm) | n (min-1) | Vf (mm/min) | ap (mm) | ae (mm) |
| 1 | 4 | 25,500 | 3,670 | 0.040 | 0.55 | 19,100 | 1,720 | 0.023 | 0.55 |
| 2 | 4 | 12,700 | 3,660 | 0.080 | 1.1 | 9,600 | 1,730 | 0.046 | 1.1 |
| 3 | 4 | 8,500 | 3,840 | 0.120 | 1.65 | 6,400 | 1,800 | 0.069 | 1.65 |
| 4 | 6 | 6,400 | 5,840 | 0.160 | 2.2 | 4,800 | 2,740 | 0.092 | 2.2 |
| 5 | 6 | 5,100 | 5,940 | 0.200 | 2.75 | 3,800 | 2,760 | 0.115 | 2.75 |
| 6 | 6 | 4,200 | 5,870 | 0.240 | 3.3 | 3,200 | 2,790 | 0.138 | 3.3 |
| 8 | 6 | 3,200 | 6,140 | 0.320 | 4.4 | 2,400 | 2,880 | 0.184 | 4.4 |
| 10 | 6 | 2,500 | 6,000 | 0.400 | 5.5 | 1,900 | 2,850 | 0.230 | 5.5 |
| 12 | 6 | 2,100 | 5,750 | 0.480 | 6.6 | 1,600 | 2,740 | 0.276 | 6.6 |

| 被削材 Work material | | 焼入れ鋼 Hardened steels (62～66HRC) | | | | 焼入れ鋼 Hardened steels (66～72HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|
| 外径DC Tool dia. (mm) | 刃数 No. of flutes | 切削速度 Cutting speed vc=50m/min | | | | 切削速度 Cutting speed vc=40m/min | | | |
| | | n (min-1) | Vf (mm/min) | ap (mm) | ae (mm) | n (min-1) | Vf (mm/min) | ap (mm) | ae (mm) |
| 1 | 4 | 15,900 | 1,070 | 0.019 | 0.55 | 12,700 | 570 | 0.013 | 0.5 |
| 2 | 4 | 8,000 | 1,080 | 0.038 | 1.1 | 6,400 | 580 | 0.026 | 1 |
| 3 | 4 | 5,300 | 1,120 | 0.057 | 1.65 | 4,200 | 590 | 0.039 | 1.5 |
| 4 | 6 | 4,000 | 1,710 | 0.076 | 2.2 | 3,200 | 910 | 0.052 | 2 |
| 5 | 6 | 3,200 | 1,750 | 0.095 | 2.75 | 2,500 | 910 | 0.065 | 2.5 |
| 6 | 6 | 2,700 | 1,770 | 0.114 | 3.3 | 2,100 | 920 | 0.078 | 3 |
| 8 | 6 | 2,000 | 1,800 | 0.152 | 4.4 | 1,600 | 960 | 0.104 | 4 |
| 10 | 6 | 1,600 | 1,800 | 0.190 | 5.5 | 1,300 | 980 | 0.130 | 5 |
| 12 | 6 | 1,300 | 1,670 | 0.228 | 6.6 | 1,100 | 940 | 0.156 | 6 |

### 高能率切削条件（能率重視） Cutting conditions for high-efficiency cutting (Emphasis on efficiency)

| 被削材 Work material | | 焼入れ鋼 Hardened steels (50～55HRC) ※1 | | | | 焼入れ鋼 Hardened steels (55～62HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|
| 外径DC Tool dia. (mm) | 刃数 No. of flutes | 切削速度 Cutting speed vc=100m/min | | | | 切削速度 Cutting speed vc=70m/min | | | |
| | | n (min-1) | Vf (mm/min) | ap (mm) | ae (mm) | n (min-1) | Vf (mm/min) | ap (mm) | ae (mm) |
| 1 | 4 | 31,880 | 4,730 | 0.038 | 0.7 | 22,280 | 2,070 | 0.022 | 0.7 |
| 2 | 4 | 15,880 | 4,710 | 0.076 | 1.4 | 11,200 | 2,080 | 0.044 | 1.4 |
| 3 | 4 | 10,630 | 4,940 | 0.114 | 2.1 | 7,470 | 2,170 | 0.066 | 2.1 |
| 4 | 6 | 8,000 | 7,510 | 0.152 | 2.8 | 5,600 | 3,290 | 0.087 | 2.8 |
| 5 | 6 | 6,380 | 7,650 | 0.190 | 3.5 | 4,430 | 3,320 | 0.109 | 3.5 |
| 6 | 6 | 5,250 | 7,550 | 0.228 | 4.2 | 3,730 | 3,350 | 0.131 | 4.2 |
| 8 | 6 | 4,000 | 7,910 | 0.304 | 5.6 | 2,800 | 3,460 | 0.175 | 5.6 |
| 10 | 6 | 3,130 | 7,740 | 0.380 | 7 | 2,220 | 3,430 | 0.219 | 7 |
| 12 | 6 | 2,630 | 7,410 | 0.456 | 8.4 | 1,870 | 3,290 | 0.262 | 8.4 |

| 被削材 Work material | | 焼入れ鋼 Hardened steels (62～66HRC) | | | | 焼入れ鋼 Hardened steels (66～72HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|
| 外径DC Tool dia. (mm) | 刃数 No. of flutes | 切削速度 Cutting speed vc=60m/min | | | | 切削速度 Cutting speed vc=50m/min | | | |
| | | n (min-1) | Vf (mm/min) | ap (mm) | ae (mm) | n (min-1) | Vf (mm/min) | ap (mm) | ae (mm) |
| 1 | 4 | 19,080 | 1,330 | 0.018 | 0.7 | 15,880 | 740 | 0.012 | 0.6 |
| 2 | 4 | 9,600 | 1,330 | 0.036 | 1.4 | 8,000 | 740 | 0.025 | 1.2 |
| 3 | 4 | 6,360 | 1,390 | 0.054 | 2.1 | 5,250 | 760 | 0.037 | 1.8 |
| 4 | 6 | 4,800 | 2,110 | 0.072 | 2.8 | 4,000 | 1,170 | 0.049 | 2.4 |
| 5 | 6 | 3,840 | 2,160 | 0.090 | 3.5 | 3,130 | 1,170 | 0.062 | 3 |
| 6 | 6 | 3,240 | 2,190 | 0.108 | 4.2 | 2,630 | 1,180 | 0.074 | 3.6 |
| 8 | 6 | 2,400 | 2,220 | 0.144 | 5.6 | 2,000 | 1,240 | 0.099 | 4.8 |
| 10 | 6 | 1,920 | 2,220 | 0.181 | 7 | 1,630 | 1,260 | 0.124 | 6 |
| 12 | 6 | 1,560 | 2,060 | 0.217 | 8.4 | 1,380 | 1,220 | 0.148 | 7.2 |

【注意】
①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②できるだけ高剛性、高精度の機械をご使用ください。
③この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。
**⑤等高線加工での使用をお願いいたします。**
**⑥ピック量aeを先端フラット径より大きく設定するとカスプが残ります。**

① Use the appropriate coolant for the work material and machining shape.
② Use a highly rigid and accurate machine as possible.
③ These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.
⑤ **Please use for contouring process.**
⑥ **Setting pick feed (ae) larger than lowest point diameter will remain cusp.**

**※1 EHHRE-TH3は高硬度鋼加工刃形を採用しておりますので高靭性熱間工具鋼（SKD61改良鋼）には適していません。高靭性熱間工具鋼にはEMBE-ATHを推奨します。**
**Since EHHRE-TH3 adopts a cutting edge geometry for high hardness steel cutting, it is not suitable for sticky hard material such as hot forging material SKD61 (reformed). EMBE-ATH is recommended for cutting SKD61 (reformed).**

# Epoch TH Hard
# エポックTHハード

高硬度材加工用ラジアスエンドミル。
Radius end mill for machining high-hardness materials.

スクエアはA352頁を参照してください
Please refer to page A352 for Square

**レギュラー刃長・コーナR付き** Regular, Corner radius

高能率側面切削 Adaptive milling | 側面 Side Cutting | 曲面 Profiling | R Radius | 中仕上 Semi Finishing | 仕上 Finishing

外径公差 Dia.tolerance
φ6 : 0～−0.015
φ8～φ20 : 0～−0.02
h6

(mm)

## CEPR6○○○-○○-TH

超硬 Carbide | TH | なじれ46° Helix angle | 切削条件表 A266 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | コーナ半径 Corner radius | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 刃数 No. of Flutes | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|
| CEPR6060-03-TH | ● | 6 | 0.3 | 15 | 60 | 6 | 6 | 21,100 |
| CEPR6060-05-TH | ● | | 0.5 | 15 | 60 | 6 | 6 | 21,100 |
| CEPR6060-10-TH | ● | | 1.0 | 15 | 60 | 6 | 6 | 21,100 |
| CEPR6080-03-TH | ● | 8 | 0.3 | 20 | 75 | 8 | 6 | 26,600 |
| CEPR6080-05-TH | ● | | 0.5 | 20 | 75 | 8 | 6 | 26,600 |
| CEPR6080-10-TH | ● | | 1.0 | 20 | 75 | 8 | 6 | 26,600 |
| CEPR6100-05-TH | ● | 10 | 0.5 | 25 | 80 | 10 | 6 | 35,690 |
| CEPR6100-10-TH | ● | | 1.0 | 25 | 80 | 10 | 6 | 35,690 |
| CEPR6100-15-TH | ● | | 1.5 | 25 | 80 | 10 | 6 | 35,690 |
| CEPR6100-20-TH | ● | | 2.0 | 25 | 80 | 10 | 6 | 35,690 |
| CEPR6120-05-TH | ● | 12 | 0.5 | 30 | 100 | 12 | 6 | 43,650 |
| CEPR6120-10-TH | ● | | 1.0 | 30 | 100 | 12 | 6 | 43,650 |
| CEPR6120-15-TH | ● | | 1.5 | 30 | 100 | 12 | 6 | 43,650 |
| CEPR6120-20-TH | ● | | 2.0 | 30 | 100 | 12 | 6 | 43,650 |
| CEPR6160-10-TH | ● | 16 | 1.0 | 40 | 110 | 16 | 6 | 101,600 |
| CEPR6160-20-TH | ● | | 2.0 | 40 | 110 | 16 | 6 | 101,600 |
| CEPR6200-10-TH | ● | 20 | 1.0 | 45 | 125 | 20 | 6 | 150,150 |
| CEPR6200-20-TH | ● | | 2.0 | 45 | 125 | 20 | 6 | 150,150 |
| CEPR6200-30-TH | ● | | 3.0 | 45 | 125 | 20 | 6 | 150,150 |

## ○ 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | | |

## ○ 再研磨対応外径範囲 Re-grinding compatibility range

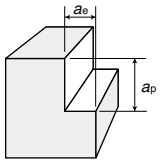
| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| CEPR-CR-TH | 8 ～ 20 | 6 ～ 20 |

●：標準在庫品です。●：Stocked items.

# Epoch TH Hard
# エポックTHハード

## 標準切削条件表 Recommended cutting conditions

**CEPR-CR-TH**
コーナR付き
Corner radius




### ＜側面切削＞ Side milling

| 被削材 Work material | | 工具鋼 Tool steels (25～35HRC) SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) CENA1,NAK80 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | | 焼入れ鋼 Hardened steels (55～65HRC) SKD11, SKH51 | | 焼入れ鋼 Hardened steels (65～70HRC) SKH, HAP | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 高速条件 High Speed | 切込み Depth of cut (mm) | ap=1.5DC | ae=0.1DC | ap=1.5DC | ae=0.05DC | ap=1.5DC | ae=0.03DC | ap=1.5DC | ae=0.02DC | ap=1.5DC | ae=0.02DC |
| | 外径DC Tool dia. (mm) | 回転数n (min-1) | 送り速度vf (mm/min) | 回転数n (min-1) | 送り速度vf (mm/min) | 回転数n (min-1) | 送り速度vf (mm/min) | 回転数n (min-1) | 送り速度vf (mm/min) | 回転数n (min-1) | 送り速度vf (mm/min) |
| | φ6 | 13,000 | 4,910 | 13,000 | 4,390 | 11,000 | 3,270 | 8,000 | 2,160 | 5,300 | 1,290 |
| | φ8 | 10,000 | 5,040 | 10,000 | 4,500 | 8,000 | 3,170 | 6,000 | 2,160 | 4,000 | 1,300 |
| | φ10 | 8,000 | 4,840 | 8,000 | 4,320 | 6,400 | 3,040 | 4,800 | 2,070 | 3,200 | 1,240 |
| | φ12 | 6,600 | 4,440 | 6,600 | 3,960 | 5,300 | 2,800 | 4,000 | 1,920 | 2,700 | 1,170 |
| | φ16 | 5,000 | 4,200 | 5,000 | 3,750 | 4,000 | 2,640 | 3,000 | 1,800 | 2,000 | 1,080 |
| | φ20 | 4,000 | 4,030 | 4,000 | 3,600 | 3,200 | 2,530 | 2,400 | 1,730 | 1,600 | 1,040 |
| 汎用条件 General | 切込み Depth of cut (mm) | ap=1.5DC | ae=0.1DC | ap=1.5DC | ae=0.1DC | ap=1.5DC | ae=0.06DC | ap=1.5DC | ae=0.04DC | ap=1.5DC | ae=0.04DC |
| | 外径DC Tool dia. (mm) | 回転数n (min-1) | 送り速度vf (mm/min) | 回転数n (min-1) | 送り速度vf (mm/min) | 回転数n (min-1) | 送り速度vf (mm/min) | 回転数n (min-1) | 送り速度vf (mm/min) | 回転数n (min-1) | 送り速度vf (mm/min) |
| | φ6 | 6,400 | 2,420 | 5,300 | 1,250 | 4,200 | 870 | 3,200 | 600 | 2,100 | 360 |
| | φ8 | 4,800 | 2,420 | 4,000 | 1,260 | 3,200 | 890 | 2,400 | 600 | 1,600 | 360 |
| | φ10 | 3,800 | 2,300 | 3,200 | 1,210 | 2,500 | 830 | 1,900 | 570 | 1,300 | 350 |
| | φ12 | 3,200 | 2,150 | 2,700 | 1,130 | 2,100 | 780 | 1,600 | 540 | 1,100 | 330 |
| | φ16 | 2,400 | 2,070 | 2,000 | 1,080 | 1,600 | 760 | 1,200 | 520 | 800 | 310 |
| | φ20 | 1,900 | 1,920 | 1,600 | 1,010 | 1,300 | 720 | 1,000 | 500 | 600 | 270 |

【注意】 ①できるだけ高剛性、高精度の機械をご使用ください。
②被削材、加工形状に合わせて、適切なクーラントを使用してください。
③この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。

【Note】 ① Use a highly rigid and accurate machine as possible.
② Use the appropriate coolant for the work material and machining shape.
③ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

# Epoch End Mill
# エポックエンドミル

高硬度材加工用ラジアスエンドミル。
Radius end mill for machining high-hardness materials.

スクエアはA355頁を参照してください
Please refer to page A355 for Square

**エポック21・コーナR付き** | Epoch 21, Corner radius

高能率側面切削 Adaptive milling | 側面 Side Cutting | 曲面 Profiling | R Radius | 中仕上 Semi Finishing | 仕上 Finishing

外径公差 Dia.tolerance
φ6 : 0～−0.015
φ8～φ30 : 0～−0.02
h6
(mm)

φ20以下　φ25以上

## CEPR○○○○-○○

超硬 Carbide | C | なじれ46° Helix angle | 切削条件表 A268 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | コーナ半径 Corner radius | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 刃数 No.of Flutes | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|
| CEPR6060-03 | ● | 6 | 0.3 | 15 | 60 | 6 | 6 | 19,200 |
| CEPR6060-05 | ● | | 0.5 | 15 | 60 | 6 | 6 | 19,200 |
| CEPR6060-10 | ● | | 1 | 15 | 60 | 6 | 6 | 19,200 |
| CEPR6080-03 | ● | 8 | 0.3 | 20 | 75 | 8 | 6 | 24,130 |
| CEPR6080-05 | ● | | 0.5 | 20 | 75 | 8 | 6 | 24,130 |
| CEPR6080-10 | ● | | 1 | 20 | 75 | 8 | 6 | 24,130 |
| CEPR6080-15 | ● | | 1.5 | 20 | 75 | 8 | 6 | 24,130 |
| CEPR6100-05 | ● | 10 | 0.5 | 25 | 80 | 10 | 6 | 32,430 |
| CEPR6100-10 | ● | | 1 | 25 | 80 | 10 | 6 | 32,430 |
| CEPR6100-15 | ● | | 1.5 | 25 | 80 | 10 | 6 | 32,430 |
| CEPR6100-20 | ● | | 2 | 25 | 80 | 10 | 6 | 32,430 |
| CEPR6120-05 | ● | 12 | 0.5 | 30 | 100 | 12 | 6 | 39,620 |
| CEPR6120-10 | ● | | 1 | 30 | 100 | 12 | 6 | 39,620 |
| CEPR6120-15 | ● | | 1.5 | 30 | 100 | 12 | 6 | 39,620 |
| CEPR6120-20 | ● | | 2 | 30 | 100 | 12 | 6 | 39,620 |
| CEPR6160-10 | ● | 16 | 1 | 40 | 110 | 16 | 6 | 92,330 |
| CEPR6160-15 | ● | | 1.5 | 40 | 110 | 16 | 6 | 92,330 |
| CEPR6160-20 | ● | | 2 | 40 | 110 | 16 | 6 | 92,330 |
| CEPR6160-25 | ● | | 2.5 | 40 | 110 | 16 | 6 | 92,330 |
| CEPR6200-10 | ● | 20 | 1 | 45 | 125 | 20 | 6 | 136,070 |
| CEPR6200-15 | ● | | 1.5 | 45 | 125 | 20 | 6 | 136,070 |
| CEPR6200-20 | ● | | 2 | 45 | 125 | 20 | 6 | 136,070 |
| CEPR6200-25 | ● | | 2.5 | 45 | 125 | 20 | 6 | 136,070 |
| CEPR6200-30 | ● | | 3 | 45 | 125 | 20 | 6 | 136,070 |
| CEPR8250-10 | □ | 25 | 1 | 50 | 140 | 25 | 8 | — |
| CEPR8250-15 | □ | | 1.5 | 50 | 140 | 25 | 8 | — |
| CEPR8250-20 | □ | | 2 | 50 | 140 | 25 | 8 | — |
| CEPR8250-25 | □ | | 2.5 | 50 | 140 | 25 | 8 | — |
| CEPR8250-30 | □ | | 3 | 50 | 140 | 25 | 8 | — |
| CEPR8300-10 | □ | 30 | 1 | 60 | 165 | 32 | 8 | — |
| CEPR8300-15 | □ | | 1.5 | 60 | 165 | 32 | 8 | — |
| CEPR8300-20 | □ | | 2 | 60 | 165 | 32 | 8 | — |
| CEPR8300-25 | □ | | 2.5 | 60 | 165 | 32 | 8 | — |
| CEPR8300-30 | □ | | 3 | 60 | 165 | 32 | 8 | — |

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | ○ | | ○ | ○ | | |

## 再研磨対応外径範囲 Re-grinding compatibility range

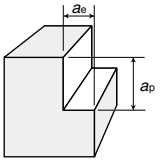
| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| CEPR-CR | 8 ～ 30 | 6 ～ 30 |

●印：標準在庫品です。
●：Stocked items.
□印：特定代理店在庫です。弊社営業へお問合せください。
□：Stocked by specified distributor. Contact with our sales department.

# Epoch End Mill
# エポックエンドミル

## 標準切削条件表 Recommended cutting conditions

### CEPR-CR
エポック21・レギュラー刃長・コーナR付き
Epoch21, Regular, Corner radius




### ＜側面切削＞ Side milling

| 被削材 Work material | | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) SUS304、SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | | 焼入れ鋼 Hardened steels (55～65HRC) SKD11、SKH51 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | | ap＝1.5DC ae≦0.1DC | | ap＝1.5DC ae≦0.1DC | | ap＝1.5DC ae≦0.05DC | | ap＝1.5DC ae≦0.05DC | | ap＝1.5DC ae≦0.02DC | | ap＝1.5DC ae≦0.01DC | | ap＝1.5DC ae≦0.01DC | |
| | 外径DC Tool dia. (mm) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) |
| 高速条件 High Speed | φ6 | 16,660 | 7,980 | 16,000 | 6,700 | 15,000 | 6,300 | 13,800 | 5,000 | 13,300 | 4,800 | 6,400 | 2,300 | 5,300 | 1,900 |
| | φ8 | 12,500 | 7,860 | 12,000 | 7,200 | 11,100 | 6,700 | 10,300 | 4,330 | 9,950 | 4,180 | 4,800 | 2,000 | 4,000 | 1,680 |
| | φ10 | 10,000 | 6,900 | 9,550 | 6,300 | 8,900 | 5,800 | 8,300 | 4,000 | 8,000 | 3,840 | 3,800 | 1,800 | 3,200 | 1,500 |
| | φ12 | 8,330 | 6,250 | 8,000 | 5,760 | 7,400 | 5,300 | 6,900 | 4,140 | 6,600 | 3,900 | 3,200 | 1,920 | 2,650 | 1,590 |
| | φ16 | 6,250 | 5,060 | 6,000 | 4,680 | 5,600 | 4,400 | 5,200 | 3,750 | 5,000 | 3,600 | 2,400 | 1,730 | 2,000 | 1,440 |
| | φ20 | 5,000 | 4,200 | 4,770 | 3,720 | 4,460 | 3,500 | 4,140 | 3,000 | 4,000 | 2,880 | 1,900 | 1,400 | 1,600 | 1,150 |
| | φ25 | 4,000 | 4,480 | 3,800 | 4,000 | 3,560 | 3,700 | 3,300 | 3,170 | 3,200 | 3,070 | 1,500 | 1,440 | 1,270 | 1,200 |
| | φ30 | 3,330 | 3,700 | 3,200 | 3,330 | 3,000 | 3,120 | 2,760 | 2,650 | 2,650 | 2,540 | 1,300 | 1,250 | 1,060 | 1,000 |
| 汎用条件 General | φ6 | 8,500 | 3,250 | 8,500 | 3,570 | 6,400 | 2,700 | 5,850 | 2,100 | 4,800 | 1,730 | 2,100 | 750 | 1,300 | 470 |
| | φ8 | 6,400 | 4,000 | 6,400 | 3,840 | 4,770 | 2,860 | 4,400 | 1,850 | 3,600 | 1,500 | 1,600 | 670 | 1,000 | 420 |
| | φ10 | 5,100 | 3,500 | 5,100 | 3,350 | 3,800 | 2,500 | 3,500 | 1,680 | 2,900 | 1,400 | 1,300 | 625 | 800 | 380 |
| | φ12 | 4,200 | 3,150 | 4,200 | 3,000 | 3,200 | 2,300 | 2,920 | 1,750 | 2,400 | 1,440 | 1,060 | 640 | 660 | 400 |
| | φ16 | 3,200 | 2,600 | 3,200 | 2,500 | 2,400 | 1,870 | 2,200 | 1,600 | 1,800 | 1,300 | 800 | 580 | 500 | 360 |
| | φ20 | 2,550 | 1,800 | 2,550 | 2,000 | 1,900 | 1,500 | 1,750 | 1,260 | 1,450 | 1,040 | 640 | 460 | 400 | 290 |
| | φ25 | 2,040 | 2,300 | 2,040 | 2,120 | 1,530 | 1,600 | 1,400 | 1,340 | 1,150 | 1,100 | 510 | 490 | 320 | 300 |
| | φ30 | 1,700 | 1,900 | 1,700 | 1,770 | 1,270 | 1,320 | 1,170 | 1,120 | 950 | 910 | 420 | 400 | 265 | 254 |

【注意】
①切削方法は、ダウンカットで使用ください。
②一般材、とくに高速切削は、乾式（エアブロー）またはオイルミストクーラントにてご使用ください。
③ステンレス鋼および超耐熱合金には、不水溶性切削油のご使用が適しています。
④安定した切削を行うため、剛性の高い機械とセットアップでご使用ください。
⑤機械の回転数が足りない場合は、主軸回転数とテーブル送り速度を同比率で下げてください。
⑥加工形状、機械の剛性、工具突き出し量等、ご使用の状況により、主軸回転数とテーブル送り速度の調整を行ってください。

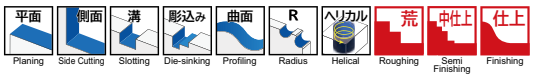
【Note】
① Down-cutting is recommended.
② Use generally dry (air-blow) or oil-mist coolant, especially at the high-speed machining.
③ Oil base coolant is recommended for machining stainless steels and heat-resistant alloys.
④ Use a machine tool with rigidity and rigid set-up, to machine stably.
⑤ When the revolution speed is not enough, reduce the revolution speed and table speed at the same ratio.
⑥ Adjust the revolution speed and table speed, according to cutting conditions such as machining shape, rigidity of machine tool, over-hang and so on.

# Epoch Aero Power Mill
# エポックエアロパワーミル

耐熱鋼、チタン合金などの難削材に適しています。
Ideal for difficult-to-cut materials such as heat-resistant steel, titanium alloys, etc.

スクエアはA371頁を参照してください
Please refer to page A371 for Square

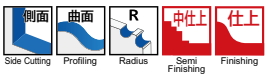
## 4枚刃・コーナR付き　4 flutes, Corner radius




外径公差 Dia.tolerance　0～−0.02　h6

(mm)

## 6枚刃・コーナR付き　6 flutes, Corner radius




外径公差 Dia.tolerance　0～−0.02　h6

(mm)

4枚刃 4Flutes

6枚刃 6Flutes

切削条件表 A270 Cutting Conditions

## EAP4○○○-○○-TH

超硬 Carbide　TH　なじれ43° Helix angle　不等分割 Unequal pitch

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | コーナ半径 Corner radius | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|---|
| EAP4060-05-TH | ◎ | 6 | 0.5 | 15 | 60 | 6 |
| EAP4060-10-TH | ◎ | | 1 | 15 | 60 | 6 |
| EAP4080-05-TH | ◎ | 8 | 0.5 | 20 | 75 | 8 |
| EAP4080-10-TH | ◎ | | 1 | 20 | 75 | 8 |
| EAP4080-15-TH | ◎ | | 1.5 | 20 | 75 | 8 |
| EAP4100-05-TH | ◎ | 10 | 0.5 | 25 | 80 | 10 |
| EAP4100-10-TH | ◎ | | 1 | 25 | 80 | 10 |
| EAP4100-15-TH | ◎ | | 1.5 | 25 | 80 | 10 |
| EAP4100-20-TH | ◎ | | 2 | 25 | 80 | 10 |
| EAP4120-05-TH | ◎ | 12 | 0.5 | 30 | 100 | 12 |
| EAP4120-10-TH | ◎ | | 1 | 30 | 100 | 12 |
| EAP4120-15-TH | ◎ | | 1.5 | 30 | 100 | 12 |
| EAP4120-20-TH | ◎ | | 2 | 30 | 100 | 12 |
| EAP4160-10-TH | ◎ | 16 | 1 | 40 | 110 | 16 |
| EAP4160-15-TH | ◎ | | 1.5 | 40 | 110 | 16 |
| EAP4160-20-TH | ◎ | | 2 | 40 | 110 | 16 |
| EAP4160-30-TH | ◎ | | 3 | 40 | 110 | 16 |
| EAP4200-10-TH | ◎ | 20 | 1 | 45 | 125 | 20 |
| EAP4200-15-TH | ◎ | | 1.5 | 45 | 125 | 20 |
| EAP4200-20-TH | ◎ | | 2 | 45 | 125 | 20 |
| EAP4200-30-TH | ◎ | | 3 | 45 | 125 | 20 |

切削条件表 A271 Cutting Conditions

## EAP6○○○-○○-TH

超硬 Carbide　TH　なじれ43° Helix angle　不等分割 Unequal pitch

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | コーナ半径 Corner radius | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|---|
| EAP6060-05-TH | ◎ | 6 | 0.5 | 15 | 60 | 6 |
| EAP6060-10-TH | ◎ | | 1 | 15 | 60 | 6 |
| EAP6080-05-TH | ◎ | 8 | 0.5 | 20 | 75 | 8 |
| EAP6080-10-TH | ◎ | | 1 | 20 | 75 | 8 |
| EAP6080-15-TH | ◎ | | 1.5 | 20 | 75 | 8 |
| EAP6100-05-TH | ◎ | 10 | 0.5 | 25 | 80 | 10 |
| EAP6100-10-TH | ◎ | | 1 | 25 | 80 | 10 |
| EAP6100-15-TH | ◎ | | 1.5 | 25 | 80 | 10 |
| EAP6100-20-TH | ◎ | | 2 | 25 | 80 | 10 |
| EAP6120-05-TH | ◎ | 12 | 0.5 | 30 | 100 | 12 |
| EAP6120-10-TH | ◎ | | 1 | 30 | 100 | 12 |
| EAP6120-15-TH | ◎ | | 1.5 | 30 | 100 | 12 |
| EAP6120-20-TH | ◎ | | 2 | 30 | 100 | 12 |
| EAP6160-10-TH | ◎ | 16 | 1 | 40 | 110 | 16 |
| EAP6160-15-TH | ◎ | | 1.5 | 40 | 110 | 16 |
| EAP6200-10-TH | ◎ | 20 | 1 | 45 | 125 | 20 |
| EAP6200-15-TH | ◎ | | 1.5 | 45 | 125 | 20 |

## EAP4-CR-TH、EAP6-CR-TH の対応被削材

Applicable work material of EAP4-CR-TH, EAP6-CR-TH

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| | | | | | ◎ | ◎ | ○ | ○ |

## 再研磨対応外径範囲

Re-grinding compatibility range

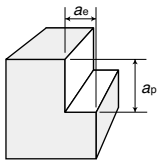
| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EAP4-CR-TH | 6 ～ 20 | 6 ～ 20 |
| EAP6-CR-TH | 8 ～ 20 | 6 ～ 20 |

◎印：メーカー在庫品です。弊社営業へお問い合せください。◎ : Manufacturer stocked items. Contact with our sales department.

# Epoch Aero Power Mill
# エポックエアロパワーミル

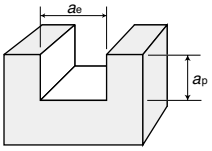
## 標準切削条件表 Recommended cutting conditions

### EAP4-CR-TH
4枚刃・レギュラー刃長・コーナR付き
4ft, Regular, Corner radius




〈側面切削〉 Side milling

| 被削材 Work material | 合金鋼 Alloy steels SCM, SNCM | | ステンレス鋼・耐熱鋼 Stainless steels, Heat resistant steels SUS, SUH | | チタン・チタン合金 Titanium Titanium alloys Ti-6Al-4V | | 超耐熱合金 Super heat resistant alloys Inconel718 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61,SKT4 |
|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | ap= 1.5DC ae＜0.1DC | | ap= 1DC ae＜0.05DC | | ap= 1DC ae＜0.05DC | | ap= 1DC ae＜0.05DC | | |
| 外径 DC Tool dia.(mm) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | |
| φ6 | 5,300 | 1,060 | 3,700 | 590 | 3,700 | 590 | 2,100 | 230 | 適していません Unsuitable for high hardness material. |
| φ8 | 4,000 | 1,110 | 2,800 | 560 | 2,800 | 560 | 1,600 | 220 | |
| φ10 | 3,200 | 1,020 | 2,200 | 540 | 2,200 | 540 | 1,300 | 200 | |
| φ12 | 2,700 | 960 | 1,900 | 520 | 1,850 | 520 | 1,100 | 170 | |
| φ16 | 2,000 | 800 | 1,400 | 450 | 1,400 | 450 | 800 | 130 | |
| φ20 | 1,600 | 760 | 1,100 | 450 | 1,100 | 450 | 640 | 100 | |




〈溝切削〉 Slotting

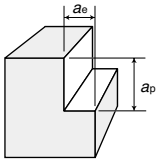
| 被削材 Work material | 合金鋼 Alloy steels SCM, SNCM | | ステンレス鋼・耐熱鋼 Stainless steels, Heat resistant steels SUS, SUH | | チタン・チタン合金 Titanium Titanium alloys Ti-6Al-4V | | 超耐熱合金 Super heat resistant alloys Inconel718 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61,SKT4 |
|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | ap＜1DC ae=1DC | | ap= 0.5DC ae=1DC | | ap= 0.2DC ae=1DC | | ap= 0.2DC ae=1DC | | |
| 外径 DC Tool dia.(mm) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | |
| φ6 | 2,650 | 420 | 2,400 | 380 | 2,100 | 340 | 1,000 | 100 | 適していません Unsuitable for high hardness material. |
| φ8 | 2,000 | 400 | 1,800 | 360 | 1,600 | 320 | 720 | 90 | |
| φ10 | 1,600 | 380 | 1,450 | 340 | 1,300 | 310 | 600 | 85 | |
| φ12 | 1,300 | 370 | 1,200 | 330 | 1,050 | 300 | 500 | 70 | |
| φ16 | 1,000 | 320 | 900 | 290 | 800 | 250 | 360 | 50 | |
| φ20 | 800 | 320 | 700 | 290 | 650 | 250 | 290 | 40 | |

【注意】 ①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②できるだけ高剛性、高精度の機械及びチャックをご使用ください。
③この標準切削条件表は切削条件の目安を示すものです。ビビリや異常振動が発生する場合は条件を調整してください。

【Note】 ①Use the appropriate coolant for the work material and machining shape.
②Use the high-rigidity and high accuracy machine as possible
③Cutting parameters in shown table are general recommendation. Please adjust it if chatter or abnormal vibration occurs.

## EAP6-CR-TH

6枚刃・レギュラー刃長・コーナR付き
6ft, Regular, Corner radius




〈側面切削〉 Side milling

| 被削材 Work material | 合金鋼 Alloy steels SCM, SNCM | | ステンレス鋼・耐熱鋼 Stainless steels, Heat resistant steels SUS, SUH | | チタン・チタン合金 Titanium Titanium alloys Ti-6Al-4V | | 超耐熱合金 Super heat resistant alloys Inconel718 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61,SKT4 |
|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | $a_p$= 1.5DC $a_e$＜0.1DC | | $a_p$= 1DC $a_e$＜0.05DC | | $a_p$= 1DC $a_e$＜0.05DC | | $a_p$= 1DC $a_e$＜0.05DC | | |
| 外径 DC Tool dia.(mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $V_f$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 送り速度 $V_f$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 送り速度 $V_f$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 送り速度 $V_f$ (mm/min) | |
| **φ6** | 7,950 | 1,910 | 4,250 | 920 | 3,700 | 800 | 2,100 | 320 | 適していません Unsuitable for high hardness material. |
| **φ8** | 6,000 | 1,970 | 3,200 | 900 | 2,800 | 790 | 1,600 | 300 | |
| **φ10** | 4,800 | 2,010 | 2,550 | 760 | 2,200 | 670 | 1,300 | 260 | |
| **φ12** | 4,000 | 1,910 | 2,100 | 840 | 1,850 | 740 | 1,100 | 230 | |
| **φ16** | 3,000 | 1,610 | 1,600 | 740 | 1,400 | 640 | 800 | 180 | |
| **φ20** | 2,400 | 1,430 | 1,300 | 690 | 1,100 | 600 | 640 | 150 | |

【注意】 ①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②できるだけ高剛性、高精度の機械及びチャックをご使用ください。
③この標準切削条件表は切削条件の目安を示すものです。ビビリや異常振動が発生する場合は条件を調整してください。

【Note】 ①Use the appropriate coolant for the work material and machining shape.
②Use the high-rigidity and high accuracy machine as possible
③Cutting parameters in shown table are general recommendation. Please adjust it if chatter or abnormal vibration occurs.

## 加工上の注意点

### Cautions

❶ 高硬度材の切削には不適です。硬さが45HRCを超える材料の場合には、CEPR-THあるいはEPP-THを推奨いたします。
When handling the work with hardness more than 45HRC, please use our CEPR-TH or EPP-TH.

❷ 必ず十分なクーラントをかけて、切削を行ってください。
Coolant is necessary for machining heat resistant materials.

❸ 板材のような剛性の弱いワーク形状の溝切削の場合には、トロコイド加工を推奨します。
In the case of slotting in a plate, We recommend using a trochoidal cutting.

❹ 耐熱鋼と超耐熱合金の穴加工には、4枚刃仕様でのヘリカル加工あるいは弊社のノンステップボーラーを推奨いたします。
When hole machining is needed on heat resistant material, We recommend performing a helical boring by Adopting EAP4, or using our NSB borer for higher efficiency.

❺ 耐熱鋼と超耐熱合金の切削においては、加工硬化面を切削する事を避けるために、0.1mm以上の径方向切込み量を推奨いたします。
In order to avoid constant cutting work-hardened layer, We recommend to set up width of cut more than 0.1mm.

# Epoch Mirus Type A for Aluminium
# エポックミルス タイプA（アルミ用）

**メーカー在庫品** Manufacture stocked items

高能率アルミ加工用エンドミル
High efficiency end mill for aliminium.

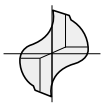
スクエアはA374頁を参照してください
Please refer to page A374 for Square

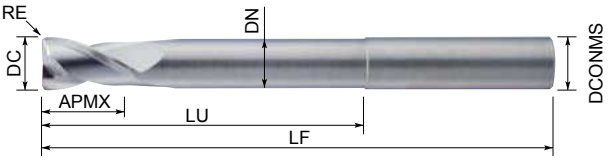
平面 Planing / 側面 Side Cutting / 溝 Slotting / 彫込み Die-sinking / ヘリカル Helical / 座ぐり Spot Facing / 荒 Roughing / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance 0～−0.02　h5

(mm)

## 2枚刃タイプ 2Flutes type



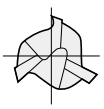


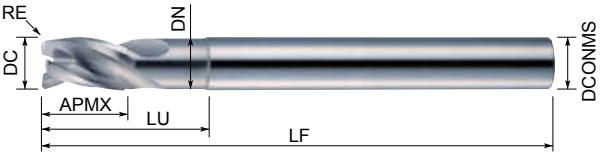

**EMXA2○○○-○○○-○○** ノンコーティング Non Coating

超硬 Carbide / ねじれ30° Helix angle / 切削条件表 A274 Cutting Conditions

| | 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 刃長 Flute length APMX | 首下長 Under neck length LU | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS |
|---|---|---|---|---|---|---|---|---|---|
| ラジアス Radius | EMXA2100-45-10 | ◎ | ϕ10 | 1.0 | 8 | 45 | 9.5 | 80 | 10 |
| | EMXA2120-60-10 | ◎ | ϕ12 | 1.0 | 10 | 60 | 11.5 | 100 | 12 |
| | EMXA2160-75-10 | ◎ | ϕ16 | 1.0 | 13 | 75 | 15.5 | 120 | 16 |
| | EMXA2200-80-30 | ◎ | ϕ20 | 3.0 | 16 | 80 | 19.5 | 125 | 20 |
| | EMXA2250-100-30 | ◎ | ϕ25 | 3.0 | 20 | 100 | 24.5 | 150 | 25 |

## 3枚刃タイプ 3Flutes type






**EMXA3○○○-○○-○○** ノンコーティング Non Coating

超硬 Carbide / ねじれ30° Helix angle / 切削条件表 A274 Cutting Conditions

| | 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 刃長 Flute length APMX | 首下長 Under neck length LU | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS |
|---|---|---|---|---|---|---|---|---|---|
| ラジアス Radius | EMXA3030-9-05 | ◎ | 3 | 0.5 | 4.5 | 9 | 2.9 | 60 | 6 |
| | EMXA3040-12-05 | ◎ | 4 | | 6 | 12 | 3.75 | 60 | 6 |
| | EMXA3050-15-05 | ◎ | 5 | | 7.5 | 15 | 4.75 | 80 | 6 |
| | EMXA3060-18-05 | ◎ | 6 | | 9 | 18 | 5.75 | 80 | 6 |
| | EMXA3080-24-05 | ◎ | 8 | | 12 | 24 | 7.5 | 90 | 8 |
| | EMXA3100-30-10 | ◎ | 10 | 1.0 | 15 | 30 | 9.5 | 100 | 10 |
| | EMXA3120-36-10 | ◎ | 12 | | 18 | 36 | 11.5 | 120 | 12 |
| | EMXA3160-45-10 | ◎ | 16 | | 19 | 45 | 15.5 | 90 | 16 |

**受注生産品（フルオーダー）** Made-to-order items (Full-order)

平面 Planing / 側面 Side Cutting / 溝 Slotting / 彫込み Die-sinking / ヘリカル Helical / 座ぐり Spot Facing / 荒 Roughing / 中仕上 Semi Finishing / 仕上 Finishing / 切削条件表 A274 Cutting Conditions

上記以外のラインナップにつきましては、下記範囲にて受注生産品として承ります。
For the lineup of products other than above-mentioned list, made-to-order products within the following ranges are available.

## ご注文方法 Ordering method

ご注文コード：EMXA○○○○-(A)-(B)-(C)
Order code

刃数 No. of flutes / 外径 Mill dia. / 首下長 Under neck length / コーナ半径 Corner radius / コーティング Coating

外径・刃数　：2枚刃タイプ：ϕ10～ϕ25
　　3枚刃タイプ：ϕ3～ϕ16
首下長　：10DC以下
　　（ただし、全長によってはお受け出来ない場合があります。）
コーナ半径　：0.05mm～0.3DC　※コーナ半径無しも可能です。
コーティング　：ノンコーティング／PNコーティング／SDコーティング

Mill dia., No.of flutes : 2Flutes type : ϕ10～ϕ25
　: 3Flutes type : ϕ3～ϕ16
Under neck length : 10DC or less (However, orders cannot be accepted in some cases depending on the overall length.)
Corner radius : 0.05mm to 0.3DC
　※Square type is also availablle.
Coating : Non Coating/ PN Coating / SD Coating

◎印：メーカー在庫品です。弊社営業へお問い合せください。　◎: Manufacturer stocked items. Contact with our sales department.

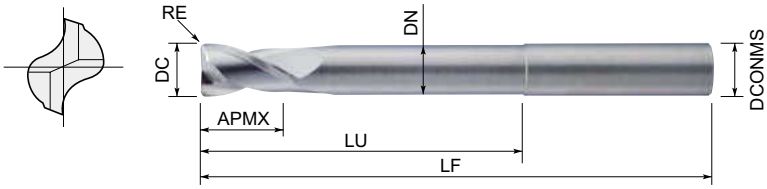
## 受注生産品（セミオーダー） Made-to-order items (Semi-order)

平面 Planing / 側面 Side Cutting / 溝 Slotting / 彫込み Die-sinking / ヘリカル Helical / 座ぐり Spot Facing / 荒 Roughing / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance 0～−0.02　h5　(mm)

## 2枚刃タイプ 2Flutes type

コーナR、コーティングをご指定ください。
Please specify the desired corner radius and coating.



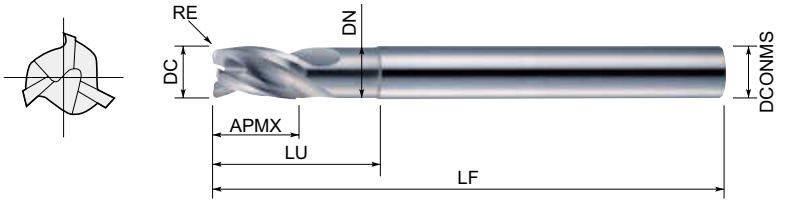

# EMXA2○○○-○○○-(B)-(C)

超硬 Carbide　SD　PN　ねじれ30° Helix angle　切削条件表 A274 Cutting Conditions

| ご注文コード Order code | | コーティングの種類 Kind of coating (C) | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Corner radius (B) RE | 刃長 Flute length APMX | 首下長 Under neck length (A) LU | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS |
|---|---|---|---|---|---|---|---|---|---|
| ラジアス Radius | EMXA2100-45-(B)-(C) | 無し Non-coat/PN/SD | 10 | ご要望のコーナ半径をご指定下さい Please specify the desired corner radius. ※コーナ半径無しも可能です。Square type is also availablle. | 8 | 45 | 9.5 | 80 | 10 |
| | EMXA2100-60-(B)-(C) | 無し Non-coat/PN/SD | | | 8 | 60 | 9.5 | 95 | 10 |
| | EMXA2120-45-(B)-(C) | 無し Non-coat/PN/SD | 12 | | 10 | 45 | 11.5 | 85 | 12 |
| | EMXA2120-60-(B)-(C) | 無し Non-coat/PN/SD | | | 10 | 60 | 11.5 | 100 | 12 |
| | EMXA2160-45-(B)-(C) | 無し Non-coat/PN/SD | 16 | | 13 | 45 | 15.5 | 90 | 16 |
| | EMXA2160-60-(B)-(C) | 無し Non-coat/PN/SD | | | 13 | 60 | 15.5 | 105 | 16 |
| | EMXA2160-75-(B)-(C) | 無し Non-coat/PN/SD | | | 13 | 75 | 15.5 | 120 | 16 |
| | EMXA2200-45-(B)-(C) | 無し Non-coat/PN/SD | 20 | | 16 | 45 | 19.5 | 90 | 20 |
| | EMXA2200-60-(B)-(C) | 無し Non-coat/PN/SD | | | 16 | 60 | 19.5 | 105 | 20 |
| | EMXA2200-80-(B)-(C) | 無し Non-coat/PN/SD | | | 16 | 80 | 19.5 | 125 | 20 |
| | EMXA2200-100-(B)-(C) | 無し Non-coat/PN/SD | | | 16 | 100 | 19.5 | 145 | 20 |
| | EMXA2250-45-(B)-(C) | 無し Non-coat/PN/SD | 25 | | 20 | 45 | 24.5 | 95 | 25 |
| | EMXA2250-60-(B)-(C) | 無し Non-coat/PN/SD | | | 20 | 60 | 24.5 | 110 | 25 |
| | EMXA2250-80-(B)-(C) | 無し Non-coat/PN/SD | | | 20 | 80 | 24.5 | 130 | 25 |
| | EMXA2250-100-(B)-(C) | 無し Non-coat/PN/SD | | | 20 | 100 | 24.5 | 150 | 25 |

## 3枚刃タイプ 3Flutes type

首下長さ、コーティングをご指定ください。
Please specify the desired under neck length and coating.




# EMXA3○○○-(A)-○○-(C)

超硬 Carbide　SD　PN　ねじれ30° Helix angle　切削条件表 A274 Cutting Conditions

| ご注文コード Order code | | コーティングの種類 Kind of coating (C) | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Corner radius (B) RE | 刃長 Flute length APMX | 首下長 Under neck length (A) LU | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS |
|---|---|---|---|---|---|---|---|---|---|
| ラジアス Radius | EMXA3030-(A)-05-(C) | 無し Non-coat/PN/SD | 3 | 0.5 | 4.5 | 8DC以下の長さでご指定下さい Please specify a length of 8DCor less. | 2.9 | 60 | 6 |
| | EMXA3040-(A)-05-(C) | 無し Non-coat/PN/SD | 4 | | 6 | | 3.75 | 60 | 6 |
| | EMXA3050-(A)-05-(C) | 無し Non-coat/PN/SD | 5 | | 7.5 | | 4.75 | 80 | 6 |
| | EMXA3060-(A)-05-(C) | 無し Non-coat/PN/SD | 6 | | 9 | | 5.75 | 80 | 6 |
| | EMXA3080-(A)-05-(C) | 無し Non-coat/PN/SD | 8 | | 12 | 5DC以下の長さでご指定下さい Please specify a length of 5DC or less. | 7.5 | 90 | 8 |
| | EMXA3100-(A)-10-(C) | 無し Non-coat/PN/SD | 10 | 1.0 | 15 | | 9.5 | 100 | 10 |
| | EMXA3120-(A)-10-(C) | 無し Non-coat/PN/SD | 12 | | 18 | | 11.5 | 120 | 12 |
| | EMXA3160-45-10-(C) | 無し Non-coat/PN/SD | 16 | | 19 | 45 | 15.5 | 90 | 16 |
| | EMXA3160-75-10-(C) | 無し Non-coat/PN/SD | | | 19 | 75 | 15.5 | 120 | 16 |

## EMXA2、EMXA3の対応被削材

Applicable work material of EMXA2, EMXA3

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | ◎ | ◎ |

## 再研磨対応外径範囲

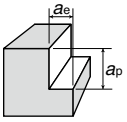
Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EMXA2 | 10～25 | 10～25 |
| EMXA3 | 6～16 | 3～16 |

# Epoch Mirus Type A for Aluminium
# エポックミルス タイプA（アルミ用）

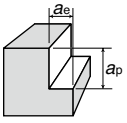
## 参考切削条件表 Refference cutting conditions

### ＜側面切削＞ Side milling 2枚刃タイプ 2Flutes type




| 被削材 Work material | | | アルミ合金(A7075等) Aluminum alloys | | | | アルミ合金鋳物(AC4A等) Cast Aluminum alloys | | | | 銅･銅合金(C1100等) Copper, Copper alloys | | | | 樹脂等 Rasin etc. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 外径DC Tool dia. (mm) | 首下長 Under neck length (mm) | 切込み Depth of cut ap,ae (mm) | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | |
| | | | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min |
| 10 | 45 | ap≦0.5DC ae≦0.8DC | 22,000 | 3,300 | 6,000 | 1,600 | 18,500 | 2,300 | 5,100 | 1,200 | 10,000 | 1,500 | 3,500 | 750 | 10,120 | 1,650 | 3,500 | 800 |
| | 60 | | 20,000 | 3,000 | 5,500 | 1,500 | 17,000 | 2,100 | 4,700 | 1,000 | 9,200 | 1,400 | 3,200 | 700 | 9,200 | 1,500 | 3,200 | 750 |
| 12 | 45 | | 24,000 | 6,600 | 7,700 | 2,200 | 21,000 | 4,600 | 6,500 | 1,500 | 11,000 | 3,000 | 3,500 | 1,000 | 11,040 | 3,300 | 3,500 | 1,100 |
| | 60 | | 22,000 | 6,000 | 7,000 | 2,000 | 18,500 | 4,200 | 5,800 | 1,400 | 10,000 | 2,700 | 3,200 | 920 | 10,120 | 3,000 | 3,200 | 1,000 |
| 16 | 45 | | 29,000 | 7,200 | 11,000 | 2,400 | 24,500 | 5,000 | 9,200 | 1,700 | 13,000 | 3,300 | 5,000 | 1,100 | 13,340 | 3,600 | 5,000 | 1,200 |
| | 60 | | 26,000 | 6,600 | 9,900 | 2,200 | 22,000 | 4,600 | 8,300 | 1,500 | 12,000 | 3,000 | 4,500 | 1,000 | 11,960 | 3,300 | 4,500 | 1,100 |
| | 75 | | 24,000 | 6,000 | 9,000 | 2,000 | 20,000 | 4,200 | 7,500 | 1,400 | 11,000 | 2,700 | 4,100 | 900 | 11,040 | 3,000 | 4,100 | 1,000 |
| 20 | 45 | | 30,000 | 8,000 | 9,300 | 1,300 | 25,000 | 5,600 | 7,800 | 900 | 14,000 | 3,700 | 4,300 | 600 | 13,800 | 4,000 | 4,300 | 650 |
| | 60 | | 27,000 | 7,300 | 8,500 | 1,200 | 23,000 | 5,100 | 7,100 | 850 | 12,500 | 3,300 | 3,900 | 550 | 12,420 | 3,650 | 3,900 | 600 |
| | 80 | | 24,000 | 6,600 | 7,700 | 1,100 | 20,000 | 4,600 | 6,500 | 750 | 11,000 | 3,000 | 3,500 | 500 | 11,040 | 3,300 | 3,500 | 550 |
| | 100 | | 22,000 | 6,000 | 7,000 | 1,000 | 18,500 | 4,200 | 5,800 | 700 | 10,000 | 2,700 | 3,200 | 450 | 10,120 | 3,000 | 3,200 | 500 |
| 25 | 45 | | 24,000 | 8,000 | 11,000 | 1,300 | 20,000 | 5,600 | 9,200 | 900 | 11,000 | 3,700 | 5,000 | 600 | 11,040 | 4,000 | 5,000 | 650 |
| | 60 | | 22,000 | 7,300 | 10,000 | 1,200 | 18,500 | 5,100 | 8,400 | 850 | 10,000 | 3,300 | 4,600 | 550 | 10,120 | 3,650 | 4,600 | 600 |
| | 80 | | 20,000 | 6,600 | 8,800 | 1,100 | 16,800 | 4,600 | 7,400 | 750 | 9,200 | 3,000 | 4,000 | 500 | 9,200 | 3,300 | 4,000 | 550 |
| | 100 | | 18,000 | 6,000 | 8,000 | 1,000 | 15,000 | 4,200 | 6,700 | 700 | 8,300 | 2,700 | 3,700 | 460 | 8,280 | 3,000 | 3,700 | 500 |

### ＜側面切削＞ Side milling 3枚刃タイプ 3Flutes type

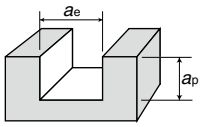



| 被削材 Work material | | | アルミ合金(A7075等) Aluminum alloys | | | | アルミ合金鋳物(AC4A等) Cast Aluminum alloys | | | | 銅･銅合金(C1100等) Copper, Copper alloys | | | | 樹脂等 Rasin etc. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 外径DC Tool dia. (mm) | 首下長 Under neck length (mm) | 切込み Depth of cut ap,ae (mm) | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | |
| | | | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min |
| 3 | 3DC以下 | ap≦1.0DC ae≦0.2DC | 26,000 | 9,000 | 20,800 | 4,500 | 21,000 | 6,000 | 16,800 | 3,000 | 21,000 | 4,000 | 16,800 | 2,000 | 21,000 | 4,400 | 16,800 | 2,200 |
| | 3DC～5DC | | 19,500 | 6,300 | 15,600 | 3,150 | 15,500 | 4,200 | 12,400 | 2,100 | 15,500 | 2,800 | 12,400 | 1,400 | 15,500 | 3,100 | 12,400 | 1,550 |
| | 5DC～8DC | | 14,000 | 3,000 | 11,200 | 1,500 | 12,000 | 2,940 | 9,600 | 1,500 | 12,000 | 2,100 | 9,600 | 1,100 | 12,000 | 2,300 | 9,600 | 1,150 |
| 4 | 3DC以下 | | 24,000 | 8,100 | 19,200 | 4,050 | 19,000 | 6,000 | 15,200 | 3,000 | 18,000 | 4,050 | 14,400 | 2,050 | 18,000 | 4,450 | 14,400 | 2,250 |
| | 3DC～5DC | | 18,000 | 5,700 | 14,400 | 2,850 | 14,250 | 4,200 | 11,400 | 2,100 | 13,500 | 2,800 | 10,800 | 1,400 | 13,500 | 3,100 | 10,800 | 1,550 |
| | 5DC～8DC | | 13,500 | 3,900 | 10,800 | 1,950 | 10,500 | 2,940 | 8,400 | 1,500 | 10,125 | 2,100 | 8,100 | 1,100 | 10,125 | 2,300 | 8,100 | 1,150 |
| 5 | 3DC以下 | | 20,000 | 8,500 | 16,000 | 4,250 | 16,000 | 6,000 | 12,800 | 3,000 | 15,000 | 4,200 | 12,000 | 2,100 | 15,000 | 4,600 | 12,000 | 2,300 |
| | 3DC～5DC | | 15,000 | 6,000 | 12,000 | 3,000 | 12,000 | 4,200 | 9,600 | 2,100 | 11,250 | 2,950 | 9,000 | 1,500 | 11,250 | 3,250 | 9,000 | 1,650 |
| | 5DC～8DC | | 11,250 | 4,200 | 9,000 | 2,100 | 9,000 | 2,940 | 7,200 | 1,500 | 8,438 | 2,100 | 6,750 | 1,100 | 8,438 | 2,300 | 6,750 | 1,150 |
| 6 | 3DC以下 | | 20,000 | 9,000 | 16,000 | 4,500 | 13,000 | 6,000 | 10,400 | 3,000 | 12,000 | 4,500 | 9,600 | 2,250 | 12,000 | 4,950 | 9,600 | 2,500 |
| | 3DC～5DC | | 15,000 | 6,300 | 12,000 | 3,150 | 9,750 | 4,200 | 7,800 | 2,100 | 9,000 | 3,150 | 7,200 | 1,600 | 9,000 | 3,450 | 7,200 | 1,750 |
| | 5DC～8DC | | 11,250 | 4,400 | 9,000 | 2,200 | 7,300 | 3,000 | 5,850 | 1,500 | 6,750 | 2,200 | 5,400 | 1,100 | 6,750 | 2,400 | 5,400 | 1,200 |
| 8 | 3DC以下 | | 18,000 | 9,000 | 14,400 | 4,500 | 10,000 | 4,300 | 8,000 | 2,150 | 9,600 | 3,800 | 7,700 | 1,900 | 9,600 | 4,200 | 7,680 | 2,100 |
| | 3DC～5DC | | 13,500 | 6,300 | 10,800 | 3,150 | 7,500 | 3,100 | 6,000 | 1,550 | 7,200 | 2,650 | 5,750 | 1,350 | 7,200 | 2,900 | 5,760 | 1,450 |
| | 5DC～8DC | | 10,125 | 4,400 | 8,100 | 2,200 | 5,650 | 2,300 | 4,500 | 1,150 | 5,400 | 1,850 | 4,350 | 950 | 5,400 | 2,000 | 4,320 | 1,000 |
| 10 | 3DC以下 | | 17,000 | 9,000 | 13,600 | 4,500 | 10,000 | 4,300 | 8,000 | 2,150 | 9,600 | 3,800 | 7,700 | 1,900 | 9,600 | 4,200 | 7,680 | 2,100 |
| | 3DC～5DC | | 12,750 | 6,300 | 10,200 | 3,150 | 7,500 | 3,100 | 6,000 | 1,550 | 7,200 | 2,650 | 5,750 | 1,350 | 7,200 | 2,900 | 5,760 | 1,450 |
| | 5DC～8DC | | 9,550 | 4,400 | 7,640 | 2,200 | 5,650 | 2,300 | 4,500 | 1,150 | 5,400 | 1,850 | 4,350 | 950 | 5,400 | 2,000 | 4,320 | 1,000 |
| 12 | 3DC以下 | | 17,000 | 9,000 | 13,600 | 4,500 | 10,000 | 4,300 | 8,000 | 2,150 | 9,600 | 3,800 | 7,700 | 1,900 | 9,600 | 4,200 | 7,680 | 2,100 |
| | 3DC～5DC | | 12,750 | 6,300 | 10,200 | 3,150 | 7,500 | 3,100 | 6,000 | 1,550 | 7,200 | 2,650 | 5,750 | 1,350 | 7,200 | 2,900 | 5,760 | 1,450 |
| | 5DC～8DC | | 9,550 | 4,400 | 7,650 | 2,200 | 5,650 | 2,300 | 4,500 | 1,150 | 5,400 | 1,850 | 4,350 | 950 | 5,400 | 2,050 | 4,320 | 1,050 |
| 16 | 3DC以下 | | 17,000 | 9,000 | 13,600 | 4,500 | 10,000 | 4,300 | 8,000 | 2,150 | 9,600 | 3,800 | 7,700 | 1,900 | 9,600 | 4,200 | 7,680 | 2,100 |
| | 3DC～5DC | | 12,750 | 6,300 | 10,200 | 3,150 | 7,500 | 3,100 | 6,000 | 1,550 | 7,200 | 2,650 | 5,750 | 1,350 | 7,200 | 2,900 | 5,760 | 1,450 |
| | 5DC～8DC | | 9,550 | 4,400 | 7,650 | 2,200 | 5,625 | 2,300 | 4,500 | 1,150 | 5,400 | 1,850 | 4,350 | 950 | 5,400 | 2,050 | 4,320 | 1,050 |

【注意】
①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③切込み量apは目安です。機械剛性、ワーク剛性により調節してください。apを小さくすれば送りはさらに上がります。
④水溶性切削液のご使用を推奨いたします。
⑤機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

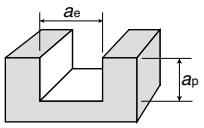
【Note】
①Use the appropriate coolant for the work material and machining shape.
②These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
③The recommended ap (depth of cut) is a genaral recommend. Please adjust basing on your machine and work piece rigidity.
If ap is reduced, higher feed should be possible.
④Please apply water base coolant, when using EMXA series.
⑤If the machine rotation speed is insufficient , reduce the rotation speed and feed rage by the same ratio.

## ＜溝切削＞ Slotting 2枚刃タイプ 2Flutes type




| 被削材 Work material | | | アルミ合金(A7075等) Aluminum alloys | | | | アルミ合金鋳物(AC4A等) Cast Aluminum alloys | | | | 銅・銅合金(C1100等) Copper, Copper alloys | | | | 樹脂等 Rasin etc. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 外径DC Tool dia. (mm) | 首下長 Under neck length (mm) | 切込み Depth of cut ap,ae (mm) | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | |
| | | | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min |
| 10 | 45 | ap≦0.5DC ae≦1.0DC | 22,000 | 2,640 | 6,000 | 1,280 | 18,500 | 1,840 | 5,100 | 960 | 10,000 | 1,200 | 3,500 | 600 | 10,120 | 1,320 | 3,500 | 640 |
| | 60 | | 20,000 | 2,400 | 5,500 | 1,200 | 17,000 | 1,680 | 4,700 | 800 | 9,200 | 1,120 | 3,200 | 560 | 9,200 | 1,200 | 3,200 | 600 |
| 12 | 45 | | 24,000 | 5,280 | 7,700 | 1,760 | 21,000 | 3,680 | 6,500 | 1,200 | 11,000 | 2,400 | 3,500 | 800 | 11,040 | 2,640 | 3,500 | 880 |
| | 60 | | 22,000 | 4,800 | 7,000 | 1,600 | 18,500 | 3,360 | 5,800 | 1,120 | 10,000 | 2,160 | 3,200 | 736 | 10,120 | 2,400 | 3,200 | 800 |
| 16 | 45 | | 29,000 | 5,760 | 11,000 | 1,920 | 24,500 | 4,000 | 9,200 | 1,360 | 13,000 | 2,640 | 5,000 | 880 | 13,340 | 2,880 | 5,000 | 960 |
| | 60 | | 26,000 | 5,280 | 9,900 | 1,760 | 22,000 | 3,680 | 8,300 | 1,200 | 12,000 | 2,400 | 4,500 | 800 | 11,960 | 2,640 | 4,500 | 880 |
| | 75 | | 24,000 | 4,800 | 9,000 | 1,600 | 20,000 | 3,360 | 7,500 | 1,120 | 11,000 | 2,160 | 4,100 | 720 | 11,040 | 2,400 | 4,100 | 800 |
| 20 | 45 | | 30,000 | 6,400 | 9,300 | 1,040 | 25,000 | 4,480 | 7,800 | 720 | 14,000 | 2,960 | 4,300 | 480 | 13,800 | 3,200 | 4,300 | 520 |
| | 60 | | 27,000 | 5,840 | 8,500 | 960 | 23,000 | 4,080 | 7,100 | 680 | 12,500 | 2,640 | 3,900 | 440 | 12,420 | 2,920 | 3,900 | 480 |
| | 80 | | 24,000 | 5,280 | 7,700 | 880 | 20,000 | 3,680 | 6,500 | 600 | 11,000 | 2,400 | 3,500 | 400 | 11,040 | 2,640 | 3,500 | 440 |
| | 100 | | 22,000 | 4,800 | 7,000 | 800 | 18,500 | 3,360 | 5,800 | 560 | 10,000 | 2,160 | 3,200 | 360 | 10,120 | 2,400 | 3,200 | 400 |
| 25 | 45 | | 24,000 | 6,400 | 11,000 | 1,040 | 20,000 | 4,480 | 9,200 | 720 | 11,000 | 2,960 | 5,000 | 480 | 11,040 | 3,200 | 5,000 | 520 |
| | 60 | | 22,000 | 5,840 | 10,000 | 960 | 18,500 | 4,080 | 8,400 | 680 | 10,000 | 2,640 | 4,600 | 440 | 10,120 | 2,920 | 4,600 | 480 |
| | 80 | | 20,000 | 5,280 | 8,800 | 880 | 16,800 | 3,680 | 7,400 | 600 | 9,200 | 2,400 | 4,000 | 400 | 9,200 | 2,640 | 4,000 | 440 |
| | 100 | | 18,000 | 4,800 | 8,000 | 800 | 15,000 | 3,360 | 6,700 | 560 | 8,300 | 2,160 | 3,700 | 370 | 8,280 | 2,400 | 3,700 | 400 |

## ＜溝切削＞ Slotting 3枚刃タイプ 3Flutes type




| 被削材 Work material | | | アルミ合金(A7075等) Aluminum alloys | | | | アルミ合金鋳物(AC4A等) Cast Aluminum alloys | | | | 銅・銅合金(C1100等) Copper, Copper alloys | | | | 樹脂等 Rasin etc. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 外径DC Tool dia. (mm) | 首下長 Under neck length (mm) | 切込み Depth of cut ap,ae (mm) | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | |
| | | | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min |
| 3 | 3DC以下 | ap≦0.5DC ae=1.0DC | 20,000 | 3,000 | 16,000 | 1,800 | 17,000 | 2,200 | 13,600 | 1,350 | 16,000 | 2,000 | 8,000 | 1,000 | 16,000 | 2,200 | 8,000 | 1,100 |
| | 3DC～5DC | | 15,000 | 2,300 | 12,000 | 1,350 | 12,750 | 1,700 | 10,200 | 1,050 | 12,000 | 1,500 | 6,000 | 750 | 12,000 | 1,650 | 6,000 | 850 |
| | 5DC～8DC | | 11,250 | 1,700 | 9,000 | 1,050 | 9,500 | 1,200 | 7,600 | 750 | 9,000 | 1,125 | 4,500 | 550 | 9,000 | 1,250 | 4,500 | 650 |
| 4 | 3DC以下 | | 19,000 | 3,300 | 15,200 | 2,000 | 16,000 | 2,250 | 12,800 | 1,350 | 15,000 | 2,050 | 7,500 | 1,050 | 15,000 | 2,250 | 7,500 | 1,150 |
| | 3DC～5DC | | 14,250 | 2,400 | 11,400 | 1,450 | 12,000 | 1,700 | 9,600 | 1,050 | 11,250 | 1,500 | 5,650 | 750 | 11,250 | 1,650 | 5,650 | 850 |
| | 5DC～8DC | | 10,700 | 1,900 | 8,650 | 1,150 | 9,000 | 1,300 | 7,200 | 750 | 8,450 | 1,150 | 4,250 | 550 | 8,450 | 1,250 | 4,250 | 650 |
| 5 | 3DC以下 | | 16,000 | 3,400 | 12,800 | 2,050 | 14,000 | 2,400 | 11,200 | 1,450 | 13,500 | 2,050 | 6,750 | 1,025 | 13,500 | 2,250 | 6,750 | 1,150 |
| | 3DC～5DC | | 12,000 | 2,500 | 9,600 | 1,500 | 10,500 | 1,800 | 8,400 | 1,050 | 10,125 | 1,500 | 5,050 | 750 | 10,125 | 1,650 | 5,050 | 850 |
| | 5DC～8DC | | 9,000 | 2,000 | 7,200 | 1,200 | 7,850 | 1,300 | 6,280 | 750 | 7,600 | 1,150 | 3,800 | 550 | 7,600 | 1,250 | 3,800 | 650 |
| 6 | 3DC以下 | | 13,000 | 3,600 | 10,400 | 2,150 | 11,000 | 2,550 | 8,800 | 1,550 | 10,500 | 2,000 | 5,250 | 1,000 | 10,500 | 2,200 | 5,250 | 1,100 |
| | 3DC～5DC | | 9,750 | 2,700 | 7,800 | 1,600 | 8,250 | 1,900 | 6,600 | 1,150 | 7,900 | 1,500 | 3,950 | 750 | 7,900 | 1,650 | 3,950 | 850 |
| | 5DC～8DC | | 7,300 | 2,000 | 5,840 | 1,200 | 6,200 | 1,400 | 4,960 | 850 | 5,950 | 1,150 | 3,000 | 550 | 5,950 | 1,250 | 3,000 | 650 |
| 8 | 3DC以下 | | 9,500 | 3,900 | 7,600 | 2,350 | 8,000 | 2,700 | 6,400 | 1,650 | 7,500 | 2,250 | 3,750 | 1,150 | 7,500 | 2,500 | 3,750 | 1,250 |
| | 3DC～5DC | | 7,150 | 3,000 | 5,700 | 1,800 | 6,000 | 2,000 | 4,800 | 1,200 | 5,650 | 1,700 | 2,850 | 850 | 5,650 | 1,900 | 2,850 | 950 |
| | 5DC～8DC | | 5,350 | 2,200 | 4,250 | 1,350 | 4,500 | 1,500 | 3,600 | 900 | 4,250 | 1,250 | 2,150 | 650 | 4,250 | 1,400 | 2,150 | 700 |
| 10 | 3DC以下 | | 7,600 | 3,900 | 6,050 | 2,350 | 6,400 | 2,700 | 5,150 | 1,650 | 6,000 | 2,250 | 3,000 | 1,150 | 6,000 | 2,500 | 3,000 | 1,250 |
| | 3DC～5DC | | 5,700 | 3,000 | 4,550 | 1,800 | 4,800 | 2,000 | 3,850 | 1,200 | 4,500 | 1,700 | 2,250 | 850 | 4,500 | 1,900 | 2,250 | 950 |
| | 5DC～8DC | | 4,250 | 2,200 | 3,400 | 1,350 | 3,600 | 1,500 | 2,850 | 900 | 3,400 | 1,250 | 1,700 | 650 | 3,400 | 1,400 | 1,700 | 700 |
| 12 | 3DC以下 | | 7,600 | 3,900 | 6,050 | 2,350 | 6,400 | 2,700 | 5,150 | 1,650 | 6,000 | 2,250 | 3,000 | 1,150 | 6,000 | 2,500 | 3,000 | 1,250 |
| | 3DC～5DC | | 5,700 | 3,000 | 4,550 | 1,800 | 4,800 | 2,000 | 3,850 | 1,200 | 4,500 | 1,700 | 2,250 | 850 | 4,500 | 1,900 | 2,250 | 950 |
| | 5DC～8DC | | 4,250 | 2,200 | 3,400 | 1,350 | 3,600 | 1,500 | 2,850 | 900 | 3,400 | 1,250 | 1,700 | 650 | 3,400 | 1,400 | 1,700 | 700 |
| 16 | 3DC以下 | | 7,600 | 3,900 | 6,050 | 2,350 | 6,400 | 2,700 | 5,150 | 1,650 | 6,000 | 2,250 | 3,000 | 1,150 | 6,000 | 2,500 | 3,000 | 1,250 |
| | 3DC～5DC | | 5,700 | 3,000 | 4,550 | 1,800 | 4,800 | 2,000 | 3,850 | 1,200 | 4,500 | 1,700 | 2,250 | 850 | 4,500 | 1,900 | 2,250 | 950 |
| | 5DC～8DC | | 4,250 | 2,200 | 3,400 | 1,350 | 3,600 | 1,500 | 2,850 | 900 | 3,400 | 1,250 | 1,700 | 650 | 3,400 | 1,400 | 1,700 | 700 |

【注意】①この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
②切込み量apは目安です。機械剛性、ワーク剛性により調節してください。apを小さくすれば送りはさらに上がります。
③水溶性切削液のご使用を推奨いたします。
④機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

【Note】①These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
②The recommended ap (depth of cut) is a genaral recommend. Please adjust basing on your machine and work piece rigidity. If ap is reduced, higher feed should be possible.
③Please apply water base coolant, when using EMXA series.
④If the machine rotation speed is insufficient , reduce the rotation speed and feed rage by the same ratio.

# Multi Flutes Taper Raidus End Mill
# 多刃テーパラジアスエンドミル

受注生産品 Made-to-order items

平面 Planing / 側面 Side Cutting / 曲面 Profiling / 中仕上 Semi Finishing / 仕上 Finishing

RE公差 RE tolerance ±0.03　h6

(mm)

難削材対応刃形と多刃化による高送り加工の実現!
最新鋭の機械との組合せにより更なる高送り加工も可能!
Flute shape compatible with difficult-to-cut materials and use of multiple flutes realizes high-feed-rate machining!
Enables even higher feed rate machining when combined with state-of-the-art machines!

※コーナ半径及び刃部テーパ半角の別サイズについては別途ご相談ください
For tools with other sizes of corner radius or taper angle on side, please ask our sales office.

超硬 Carbide　PN　切削条件表 A276 Cutting Conditions

| 寸法 Size (mm) | | | | | 刃部テーパ半角※ Taper angle on side (°) | 刃数 No. of flutes | 備考 Note |
|---|---|---|---|---|---|---|---|
| 外径 Tool dia. | コーナ半径※ Corner radius | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | | | |
| DC | RE | APMX | LF | DCONMS | BHTA1 | | |
| **11** | **1.0** | 3.56 | 100 | 12 | 8 | 9 | 3穴OH付 With 3 oil holes |
| **15** | **1.0** | 3.56 | 110 | 16 | 8 | 12 | 3穴OH付 With 3 oil holes |
| **19** | **1.0** | 3.56 | 110 | 20 | 8 | 12 | 3穴OH付 With 3 oil holes |

**オイルホールなしも製作可能です。** Products without oil holes can also be manufactured.

## 標準切削条件表 Recommended cutting conditions

| 外径 DC Tool dia. (mm) | 切込み ap × ae Depth of cut (mm) | ステンレス鋼 Stainless steels (12Cr鋼、SUS400系、SUS600系) | | 超耐熱合金 Super heat-resistant alloys (Ni 基合金等) (Nickel based alloys etc.) | |
|---|---|---|---|---|---|
| | | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min |
| **11** | **0.3×0.9** | 5,790 | 3,130 | 2,320 | 1,040 |
| **15** | **0.4×1.2** | 4,250 | 3,060 | 1,700 | 1,020 |
| **19** | **0.5×1.5** | 3,350 | 3,220 | 1,340 | 1,130 |

【注意】・被削材、加工形状に合わせて、適切なクーラントを使用してください。
・できるだけ高剛性、高精度の機械およびチャックをご使用ください。
・この標準切削条件表は切削条件の目安を示すものです。実際の加工では、加工条件、目的、使用機械等により条件を調整してください。
・ビビりや異常振動が発生する場合は条件を調整してください。
・オイルホールにより一部底刃が切れている部分があるため、底刃を使用した座繰り加工やヘリカル加工等には不適です。

【Note】・Use the appropriate coolant for the work material and machining shape.
・Use the high-rigidity and high accuracy machine as possible
・Cutting parameters in shown table are general recommendation. Please adjust it if chatter or abnormal vibration occurs.
・If chattering or abnormal vibrations occur, adjust the conditions.
・Since part of the bottom flute is cut due to the oil hole, it is not suitable for spot facing, helical milling, etc. using the bottom flute.

## 対応被削材 Applicable work materia

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| | | | | | ◎ | ◎ | | |

## 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| | 11 ～ 19 | 11 ～ 19 |

●：標準在庫品です。●：Stocked items.　干渉なし：No interference

# Epoch HD Coating Deep Radius End Mill
# エポックHDコーティングディープラジアスエンドミル

**ダイヤモンドコーティング** Diamond Coating

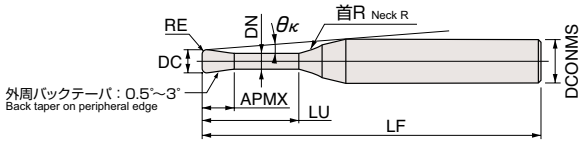
溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / 細部 Miniature / 取りのこし Rest Material Machining / 中仕上 Semi Finishing / 仕上 Finishing / リブ・細部 Rib Miniature

h5

グラファイト・高Siアルミ合金・FRP加工に適しています。
ダイヤモンドコーティング。
Ideal for machining of graphite, high-Si aluminum alloys, and FRP. Diamond Coating.



2枚刃
2Flutes

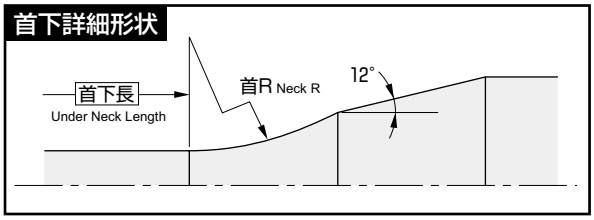



## EGDR2○○○-○○-○○-HD

超硬 Carbide / HD / ねじれ30° Helix angle / 切削条件表A278 Cutting Conditions

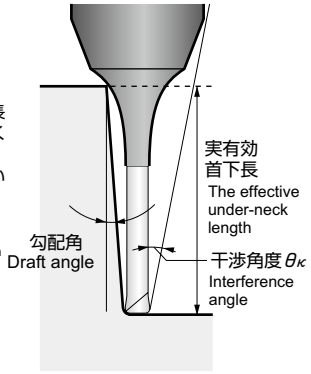
| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 首下長 Under neck length LU | 首径 Neck dia. DN | 刃長 Flute length APMX | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度 Interference angle (°) θκ | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EGDR2005-5-01-HD | ● | 0.5 | 0.1 | 5 | 0.47 | 0.75 | 60 | 4 | 10 | 7.55 | 6.16 | 6.59 | 6.96 | 7.29 | 7.87 | 33,530 |
| EGDR2005-10-01-HD | ● | 0.5 | 0.1 | 10 | 0.47 | 0.75 | 60 | 4 | 10 | 5.5 | 11.5 | 12.1 | 12.59 | 13.01 | 13.75 | 33,530 |
| EGDR2005-15-01-HD | ● | 0.5 | 0.1 | 15 | 0.47 | 0.75 | 60 | 4 | 10 | 4.32 | 16.78 | 17.5 | 18.07 | 18.57 | 19.97 | 35,670 |
| EGDR2005-20-01-HD | ● | 0.5 | 0.1 | 20 | 0.47 | 0.75 | 60 | 4 | 10 | 3.56 | 22.02 | 22.84 | 23.48 | 24.03 | 26.6 | 37,820 |
| EGDR2010-10-02-HD | ● | 1 | 0.2 | 10 | 0.96 | 1.5 | 60 | 4 | 10 | 5.06 | 11.53 | 12.12 | 12.6 | 13.02 | 13.75 | 33,530 |
| EGDR2010-20-02-HD | ● | 1 | 0.2 | 20 | 0.96 | 1.5 | 60 | 4 | 10 | 3.19 | 22.04 | 22.85 | 23.49 | 24.04 | 26.6 | 33,530 |
| EGDR2010-30-02-HD | ● | 1 | 0.2 | 30 | 0.96 | 1.5 | 80 | 4 | 10 | 2.33 | 32.43 | 33.41 | 34.29 | 35.97 | 干渉なし | 35,670 |
| EGDR2010-40-02-HD | ● | 1 | 0.2 | 40 | 0.96 | 1.5 | 80 | 4 | 10 | 1.83 | 42.77 | 43.87 | 45.69 | 干渉なし | 干渉なし | 37,820 |
| EGDR2015-20-02-HD | ● | 1.5 | 0.2 | 20 | 1.44 | 2.25 | 60 | 4 | 10 | 2.78 | 22.09 | 22.88 | 23.52 | 24.06 | 干渉なし | 33,530 |
| EGDR2015-40-02-HD | ● | 1.5 | 0.2 | 40 | 1.44 | 2.25 | 80 | 4 | 10 | 1.57 | 42.8 | 43.9 | 45.75 | 干渉なし | 干渉なし | 35,670 |
| EGDR2020-20-02-HD | ● | 2 | 0.2 | 20 | 1.92 | 3 | 60 | 4 | 10 | 2.32 | 22.13 | 22.92 | 23.55 | 24.11 | 干渉なし | 33,530 |
| EGDR2020-40-02-HD | ● | 2 | 0.2 | 40 | 1.92 | 3 | 80 | 4 | 10 | 1.29 | 42.84 | 43.92 | 干渉なし | 干渉なし | 干渉なし | 35,670 |
| EGDR2020-60-02-HD | ● | 2 | 0.2 | 60 | 1.92 | 3 | 100 | 4 | 10 | 0.89 | 63.38 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 37,820 |
| EGDR2030-20-02-HD | ● | 3 | 0.2 | 20 | 2.88 | 4.5 | 60 | 4 | 10 | 1.25 | 22.23 | 22.99 | 干渉なし | 干渉なし | 干渉なし | 33,530 |
| EGDR2030-40-02-HD | ● | 3 | 0.2 | 40 | 2.88 | 4.5 | 80 | 4 | 10 | 0.67 | 42.9 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 33,530 |
| EGDR2030-60-02-HD | ● | 3 | 0.2 | 60 | 2.88 | 4.5 | 100 | 4 | 10 | 0.46 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 35,670 |

### 首下詳細形状




【注意】
加工物に勾配がついている場合、干渉領域は、首下長さよりも長くなります。それぞれの勾配角に対する実有効首下長をご参照ください。
また、工具が加工物に干渉する角度を干渉角度θκで表示していますので合わせてご参照ください。

【Note】
If the workpiece has draft angle, the interference length will be longer than the under-neck length.Please refer to the effective under-neck length for the various draft angles.
In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle θκ", and should also be referred to.




### 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| グラファイト・FRP・高Siアルミニウム合金など for Graphite, FRP, High Si aluminum alloy etc. | | | | | | | | |

### 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EGDR-HD | × (N/A) | × (N/A) |

●：標準在庫品です。●：Stocked items.　干渉なし：No interference

# Epoch HD Coating Deep Radius End Mill
# エポックHDコーティングディープラジアスエンドミル

## 標準切削条件表 Recommended cutting conditions

### EGDR-HD

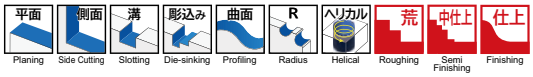
| | | | | | 被削材 Work material | グラファイト Graphite | | アルミニウム合金鋳物 Cast aluminum alloys AC4A,ADC12等 (エアブローorウエット:水溶性) (Air-brow or wet:water-soluble agent) | |
|---|---|---|---|---|---|---|---|---|---|
| 商品コード Item code | 外径DC Tool dia. (㎜) | コーナ半径RE Corner radius (㎜) | 首下長LU Under neck length (㎜) | L/D | 切込み量 Depth of cut (㎜) $a_p \times a_e$ | 回転数 $n$ $min^{-1}$ | 送り速度 $v_f$ ㎜/min | 回転数 $n$ $min^{-1}$ | 送り速度 $v_f$ ㎜/min |
| EGDR2005-5-01-HD | 0.5 | 0.1 | 5 | 10 | 0.05×0.4 | 15,000～18,000 | 700～900 | 13,000～18,000 | 400～600 |
| EGDR2005-10-01-HD | 0.5 | 0.1 | 10 | 20 | 0.05×0.4 | 14,000～16,000 | 650～800 | 13,000～18,000 | 300～600 |
| EGDR2005-15-01-HD | 0.5 | 0.1 | 15 | 30 | 0.045×0.4 | 12,000～15,000 | 650～750 | 11,000～16,000 | 200～500 |
| EGDR2005-20-01-HD | 0.5 | 0.1 | 20 | 40 | 0.04×0.4 | 10,000～13,000 | 600～700 | 9,000～14,000 | 200～400 |
| EGDR2010-10-02-HD | 1 | 0.2 | 10 | 10 | 0.1×0.8 | 13,000～16,000 | 650～800 | 10,000～15,000 | 300～600 |
| EGDR2010-20-02-HD | 1 | 0.2 | 20 | 20 | 0.1×0.8 | 12,000～14,000 | 600～700 | 8,000～13,000 | 300～600 |
| EGDR2010-30-02-HD | 1 | 0.2 | 30 | 30 | 0.08×0.8 | 10,000～12,000 | 550～650 | 6,000～11,000 | 250～500 |
| EGDR2010-40-02-HD | 1 | 0.2 | 40 | 40 | 0.06×0.8 | 9,000～11,000 | 500～600 | 5,000～10,000 | 250～500 |
| EGDR2015-20-02-HD | 1.5 | 0.2 | 20 | 13 | 0.15×1.0 | 12,000～15,000 | 700～850 | 10,000～15,000 | 350～600 |
| EGDR2015-40-02-HD | 1.5 | 0.2 | 40 | 27 | 0.12×1.0 | 10,000～12,000 | 650～750 | 7,000～12,000 | 300～500 |
| EGDR2020-20-02-HD | 2 | 0.2 | 20 | 10 | 0.2×1.4 | 12,000～15,000 | 650～800 | 10,000～15,000 | 350～650 |
| EGDR2020-40-02-HD | 2 | 0.2 | 40 | 20 | 0.16×1.4 | 10,000～13,000 | 500～750 | 7,000～12,000 | 300～550 |
| EGDR2020-60-02-HD | 2 | 0.2 | 60 | 30 | 0.12×1.4 | 8,000～10,000 | 550～700 | 5,000～10,000 | 250～500 |
| EGDR2030-20-02-HD | 3 | 0.2 | 20 | 7 | 0.3×2.1 | 10,000～13,000 | 750～850 | 10,000～15,000 | 350～650 |
| EGDR2030-40-02-HD | 3 | 0.2 | 40 | 13 | 0.24×2.1 | 8,000～10,000 | 650～750 | 7,000～12,000 | 300～650 |
| EGDR2030-60-02-HD | 3 | 0.2 | 60 | 20 | 0.2×2.1 | 7,000～ 9,000 | 600～700 | 5,000～10,000 | 250～600 |

【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。

【Note】①Use the appropriate coolant for the work material and machining shape.
②These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.

# Epoch HD Coating Radius End Mill
# エポックHDコーティング ラジアスエンドミル

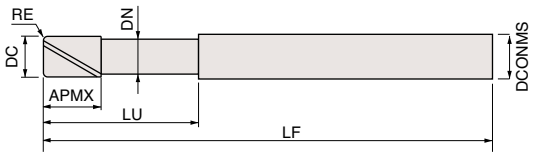
**ダイヤモンドコーティング** Diamond Coating




h5

グラファイト・高Siアルミ合金・FRP加工に適しています。
ダイヤモンドコーティング。
Ideal for machining of graphite, high-Si aluminum alloys, and FRP.
Diamond Coating.

2枚刃
2Flutes



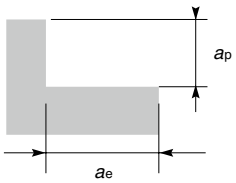

## EGR2○○○-05-HD

超硬 Carbide　HD　ねじれ角30° Helix angle　切削条件表A279 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 首下長 Under neck length LU | 首径 Neck dia. DN | 刃長 Flute length APMX | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 希望小売価格(円) Suggested retail price(￥) |
|---|---|---|---|---|---|---|---|---|---|
| EGR2040-05-HD | ● | 4 | 0.5 | 40 | 3.9 | 8 | 100 | 4 | 41,350 |
| EGR2060-05-HD | ● | 6 | | 60 | 5.9 | 12 | 120 | 6 | 53,080 |
| EGR2080-05-HD | ● | 8 | | 80 | 7.9 | 16 | 140 | 8 | 65,200 |
| EGR2100-05-HD | ● | 10 | | 100 | 9.9 | 20 | 150 | 10 | 84,840 |

## 標準切削条件表 Recommended cutting conditions

### EGR-HD

| 被削材 Work material | グラファイト Graphite | | アルミニウム合金鋳物 Cast aluminum alloys AC4A,ADC12等 (エアブローorウエット:水溶性) (Air-brow or wet:water-soluble agent) | |
|---|---|---|---|---|
| 外径DC Tool Dia. (mm) | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 4 | 8,000～10000 | 1,300～1,600 | 6,000～9,000 | 900～1,300 |
| 6 | 7,000～9000 | 1,500～1,800 | 5,000～8,000 | 800～1,200 |
| 8 | 6,000～8000 | 1,700～2,000 | 4,000～7,000 | 700～1,100 |
| 10 | 6,000～8000 | 1,900～2,200 | 3,000～6,000 | 600～1,000 |
| 切込み量 Depth of cut (mm) |  | | | |



$a_p \leqq 0.1DC$
$a_e \leqq 0.8DC$

【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。

【Note】① Use the appropriate coolant for the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions.
In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| グラファイト・FRP・高Siアルミニウム合金など for Graphite, FRP, High Si aluminum alloy etc. | | | | | | | | |

## 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EGR-HD | × (N/A) | × (N/A) |

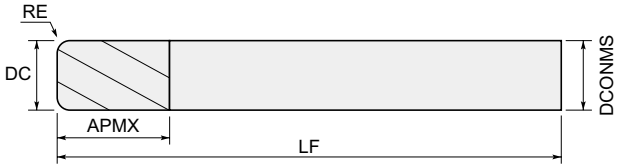
●：標準在庫品です。●：Stocked items.

# Ceramic End Mill Corner Radius Type
# セラミックエンドミル コーナRタイプ

平面 Planing　側面 Side Cutting　荒 Roughing

外径公差 Dia.tolerance −0.01～−0.04　RE公差 RE tolerance ±0.02　h5　(mm)

次世代の高能率加工を実現!
切削速度$v_c$=800m/minを実現!!
Achieves next-generation high-performance machining!
Achieves cutting speed of $v_c$=800m/min.!




## SCE6○○○-R○.○○

セラミック Ceramic　切削条件表 A280 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. DC | 刃長 Flute length APMX | コーナ半径 Corner radius RE | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 刃数 No. of flutes | 希望小売価格(円) Suggested retail price(￥) |
|---|---|---|---|---|---|---|---|---|
| SCE6060-R0.75 | ● | 6 | 6 | 0.75 | 60 | 6 | 6 | 38,380 |
| SCE6080-R1.00 | ● | 8 | 8 | 1 | 70 | 8 | 6 | 49,150 |
| SCE6100-R1.25 | ● | 10 | 10 | 1.25 | 80 | 10 | 6 | 59,470 |
| SCE6120-R1.50 | ● | 12 | 12 | 1.5 | 80 | 12 | 6 | 71,140 |

## 標準切削条件表 Recommended cutting conditions

**被削材：超耐熱合金**
Work material : Super heat resistant alloys

| 外径 DC Tool dia. (mm) | 切削速度 $v_c$ Cutting speed (m/min) | 一刃送り $f_z$ Feed per tooth (mm/t) | 平面 Planing 切込み $a_p$ Depth of cut (mm) | 平面 Planing 切込み $a_e$ Depth of cut (mm) | 側面 Side cutting 切込み $a_p$ Depth of cut (mm) | 側面 Side cutting 切込み $a_e$ Depth of cut (mm) |
|---|---|---|---|---|---|---|
| 6 | 400～1,000 | 0.024 | 0.3以下 or less | 3.0以下 or less | 6.0以下 or less | 0.6以下 or less |
| 8 | | 0.028 | 0.4以下 or less | 4.0以下 or less | 8.0以下 or less | 0.8以下 or less |
| 10 | | 0.03 | 0.5以下 or less | 5.0以下 or less | 10.0以下 or less | 1.0以下 or less |
| 12 | | 0.032 | 0.6以下 or less | 6.0以下 or less | 12.0以下 or less | 1.2以下 or less |

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦45HRC | 高硬度 Hardened steel > 45HRC ≦55HRC | 高硬度 Hardened steel > 55HRC ≦65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| | | | | | | ◎ | | |

## 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) |
|---|---|
| SCE-R | 6～12 |

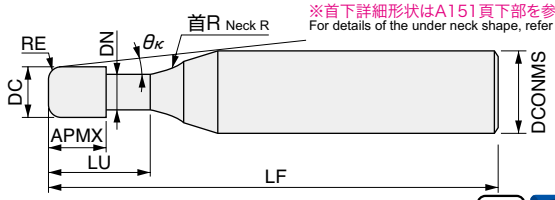
# Epoch CBN Super Radius End Mill
# エポックCBNスーパーラジアスエンドミル

RE公差 ±0.005 (中心基準 central axis)　h4

(mm)

切れ味と刃先強度を両立した新発想CBNエンドミル。
New-concept CBN end mill providing both good cutting performance and strong flute edges.

Includes actual measured mill diameter value. **外径実測値付き**




※首下詳細形状はA151頁下部を参照ください。
For details of the under neck shape, refer to p. A151

## CBN-EPSR2○○○-○○.○-○○○

※外径実測値をケースに表示しています
Actual measured mill diameter value is shown on case.

CBN 切削条件表 A282 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度 Interference angle (°) θκ | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格(¥) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CBN-EPSR2002-0.5-005 | ● | 0.2 | 0.05 | 0.5 | 0.07 | 0.18 | 50 | 4 | 1 | 11.39 | 0.67 | 0.7 | 0.73 | 0.76 | 0.81 | 29,680 |
| CBN-EPSR2002-1-005 | ● | | | 1 | 0.07 | 0.18 | 50 | 4 | 1 | 10.83 | 1.19 | 1.24 | 1.28 | 1.32 | 1.39 | 30,530 |
| CBN-EPSR2003-0.5-005 | ● | 0.3 | 0.05 | 0.5 | 0.11 | 0.27 | 50 | 4 | 1 | 11.35 | 0.7 | 0.73 | 0.75 | 0.78 | 0.82 | 29,350 |
| CBN-EPSR2003-0.75-005 | ● | | | 0.75 | 0.11 | 0.27 | 50 | 4 | 1 | 11.05 | 0.96 | 0.99 | 1.03 | 1.06 | 1.12 | 29,780 |
| CBN-EPSR2003-1.5-005 | ● | | | 1.5 | 0.11 | 0.27 | 50 | 4 | 1 | 10.26 | 1.74 | 1.79 | 1.84 | 1.89 | 2.06 | 30,110 |
| CBN-EPSR2003-2-005 | ● | | | 2 | 0.11 | 0.27 | 50 | 4 | 1 | 9.79 | 2.25 | 2.32 | 2.38 | 2.46 | 2.73 | 30,530 |
| CBN-EPSR2004-0.5-005 | ● | 0.4 | 0.05 | 0.5 | 0.14 | 0.37 | 50 | 4 | 1 | 11.33 | 0.7 | 0.73 | 0.75 | 0.78 | 0.82 | 27,850 |
| CBN-EPSR2004-1-005 | ● | | | 1 | 0.14 | 0.37 | 50 | 4 | 1 | 10.75 | 1.22 | 1.26 | 1.3 | 1.34 | 1.4 | 28,070 |
| CBN-EPSR2004-2-005 | ● | | | 2 | 0.14 | 0.37 | 50 | 4 | 1 | 9.74 | 2.25 | 2.32 | 2.38 | 2.46 | 2.73 | 28,710 |
| CBN-EPSR2005-0.5-005 | ● | 0.5 | 0.05 | 0.5 | 0.18 | 0.47 | 50 | 4 | 1 | 11.31 | 0.7 | 0.73 | 0.75 | 0.78 | 0.82 | 22,820 |
| CBN-EPSR2005-1.5-005 | ● | | | 1.5 | 0.18 | 0.47 | 50 | 4 | 1 | 10.18 | 1.74 | 1.79 | 1.84 | 1.89 | 2.06 | 23,250 |
| CBN-EPSR2005-3-005 | ● | | | 3 | 0.18 | 0.47 | 50 | 4 | 1 | 8.84 | 3.29 | 3.37 | 3.49 | 3.66 | 4.05 | 24,530 |
| CBN-EPSR2005-0.5-01 | ● | | 0.1 | 0.5 | 0.18 | 0.47 | 50 | 4 | 1 | 11.37 | 0.7 | 0.72 | 0.75 | 0.77 | 0.82 | 22,820 |
| CBN-EPSR2005-1.5-01 | ● | | | 1.5 | 0.18 | 0.47 | 50 | 4 | 1 | 10.23 | 1.74 | 1.79 | 1.84 | 1.88 | 2.05 | 23,250 |
| CBN-EPSR2005-3-01 | ● | | | 3 | 0.18 | 0.47 | 50 | 4 | 1 | 8.88 | 3.28 | 3.37 | 3.48 | 3.65 | 4.04 | 24,530 |
| CBN-EPSR2006-1.5-01 | ● | 0.6 | 0.1 | 1.5 | 0.21 | 0.57 | 50 | 4 | 1 | 10.18 | 1.74 | 1.79 | 1.84 | 1.88 | 2.05 | 23,250 |
| CBN-EPSR2006-3-01 | ● | | | 3 | 0.21 | 0.57 | 50 | 4 | 1 | 8.82 | 3.28 | 3.37 | 3.48 | 3.65 | 4.04 | 24,530 |
| CBN-EPSR2008-2.5-01 | ● | 0.8 | 0.1 | 2.5 | 0.28 | 0.77 | 50 | 4 | 1 | 9.1 | 2.77 | 2.84 | 2.91 | 3.05 | 3.37 | 25,500 |
| CBN-EPSR2008-5-01 | ● | | | 5 | 0.28 | 0.77 | 50 | 4 | 1 | 7.3 | 5.34 | 5.51 | 5.76 | 6.04 | 6.69 | 26,240 |
| CBN-EPSR2010-1-005 | ● | 1 | 0.05 | 1 | 0.35 | 0.96 | 50 | 4 | 1 | 10.5 | 1.24 | 1.28 | 1.32 | 1.35 | 1.43 | 21,320 |
| CBN-EPSR2010-2.5-005 | ● | | | 2.5 | 0.35 | 0.96 | 50 | 4 | 1 | 8.88 | 2.79 | 2.86 | 2.95 | 3.09 | 3.42 | 21,320 |
| CBN-EPSR2010-5-005 | ● | | | 5 | 0.35 | 0.96 | 50 | 4 | 1 | 7.07 | 5.35 | 5.54 | 5.8 | 6.08 | 6.74 | 24,100 |
| CBN-EPSR2010-1-01 | ● | | 0.1 | 1 | 0.35 | 0.96 | 50 | 4 | 1 | 10.56 | 1.24 | 1.28 | 1.31 | 1.35 | 1.42 | 21,320 |
| CBN-EPSR2010-2.5-01 | ● | | | 2.5 | 0.35 | 0.96 | 50 | 4 | 1 | 8.93 | 2.79 | 2.86 | 2.94 | 3.08 | 3.41 | 21,320 |
| CBN-EPSR2010-5-01 | ● | | | 5 | 0.35 | 0.96 | 50 | 4 | 1 | 7.1 | 5.35 | 5.54 | 5.79 | 6.07 | 6.72 | 24,100 |
| CBN-EPSR2010-2.5-02 | ● | | 0.2 | 2.5 | 0.35 | 0.96 | 50 | 4 | 1 | 9.02 | 2.78 | 2.85 | 2.93 | 3.06 | 3.37 | 21,320 |
| CBN-EPSR2010-5-02 | ● | | | 5 | 0.35 | 0.96 | 50 | 4 | 1 | 7.16 | 5.35 | 5.53 | 5.78 | 6.05 | 6.69 | 24,100 |
| CBN-EPSR2010-10-02 | ● | | | 10 | 0.35 | 0.96 | 50 | 4 | 1 | 5.06 | 10.51 | 10.97 | 11.48 | 12.03 | 13.33 | 26,780 |
| CBN-EPSR2015-2-005 | ● | 1.5 | 0.05 | 2 | 0.53 | 1.44 | 50 | 4 | 1 | 8.92 | 2.31 | 2.36 | 2.43 | 2.55 | 2.82 | 22,180 |
| CBN-EPSR2015-5-005 | ● | | | 5 | 0.53 | 1.44 | 50 | 4 | 1 | 6.5 | 5.38 | 5.59 | 5.85 | 6.14 | 6.8 | 25,070 |
| CBN-EPSR2015-2-01 | ● | | 0.1 | 2 | 0.53 | 1.44 | 50 | 4 | 1 | 8.97 | 2.31 | 2.36 | 2.42 | 2.54 | 2.8 | 22,180 |
| CBN-EPSR2015-5-01 | ● | | | 5 | 0.53 | 1.44 | 50 | 4 | 1 | 6.53 | 5.38 | 5.59 | 5.84 | 6.13 | 6.79 | 25,070 |
| CBN-EPSR2015-5-02 | ● | | 0.2 | 5 | 0.53 | 1.44 | 50 | 4 | 1 | 6.59 | 5.38 | 5.58 | 5.83 | 6.11 | 6.75 | 25,070 |
| CBN-EPSR2015-10-02 | ● | | | 10 | 0.53 | 1.44 | 50 | 4 | 1 | 4.52 | 10.56 | 11.03 | 11.53 | 12.09 | 13.39 | 27,850 |
| CBN-EPSR2020-3-005 | ● | 2 | 0.05 | 3 | 0.7 | 1.92 | 50 | 4 | 1 | 7.27 | 3.36 | 3.46 | 3.62 | 3.8 | 4.21 | 25,930 |
| CBN-EPSR2020-5-005 | ● | | | 5 | 0.7 | 1.92 | 50 | 4 | 1 | 5.81 | 5.4 | 5.64 | 5.91 | 6.19 | 6.87 | 25,930 |
| CBN-EPSR2020-10-005 | ● | | | 10 | 0.7 | 1.92 | 50 | 4 | 1 | 3.86 | 10.62 | 11.09 | 11.61 | 12.18 | 13.5 | 28,920 |
| CBN-EPSR2020-3-01 | ● | | 0.1 | 3 | 0.7 | 1.92 | 50 | 4 | 1 | 7.32 | 3.36 | 3.46 | 3.62 | 3.79 | 4.19 | 25,930 |
| CBN-EPSR2020-5-01 | ● | | | 5 | 0.7 | 1.92 | 50 | 4 | 1 | 5.84 | 5.4 | 5.64 | 5.9 | 6.18 | 6.85 | 25,930 |
| CBN-EPSR2020-10-01 | ● | | | 10 | 0.7 | 1.92 | 50 | 4 | 1 | 3.87 | 10.62 | 11.09 | 11.6 | 12.17 | 13.49 | 28,920 |
| CBN-EPSR2020-5-02 | ● | | 0.2 | 5 | 0.7 | 1.92 | 50 | 4 | 1 | 5.9 | 5.4 | 5.63 | 5.88 | 6.16 | 6.82 | 25,930 |
| CBN-EPSR2020-10-02 | ● | | | 10 | 0.7 | 1.92 | 50 | 4 | 1 | 3.9 | 10.61 | 11.08 | 11.59 | 12.15 | 13.45 | 28,820 |
| CBN-EPSR2020-20-02 | ● | | | 20 | 0.7 | 1.92 | 55 | 4 | 1 | 2.32 | 21.04 | 21.97 | 22.99 | 24.11 | 干渉なし | 33,210 |
| CBN-EPSR2030-6-005 | ● | 3 | 0.05 | 6 | 1.05 | 2.86 | 50 | 4 | 1 | 3.32 | 6.59 | 6.89 | 7.21 | 7.56 | 8.38 | 32,890 |
| CBN-EPSR2030-6-01 | ● | | 0.1 | 6 | 1.05 | 2.86 | 50 | 4 | 1 | 3.34 | 6.59 | 6.88 | 7.2 | 7.55 | 8.36 | 32,890 |
| CBN-EPSR2030-6-05 | ● | | 0.5 | 6 | 1.05 | 2.86 | 50 | 4 | 1 | 3.5 | 6.57 | 6.85 | 7.14 | 7.47 | 8.24 | 32,890 |

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| | | ○ | ◎ | ◎ | | | | |

## 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| CBN-EPSR | × (N/A) | × (N/A) |

●：標準在庫品です。●：Stocked items.　干渉なし：No interference

Epoch CBN Super Radius End Mill

# エポックCBNスーパーラジアスエンドミル

## 標準切削条件表 Recommended cutting conditions CBN-EPSR

### ＜仕上げ加工条件＞ Finishing condition

| 被削材 Work material | | | | | 1 焼入れ鋼 Hardened steels (～55HRC) HPM1,SKD61,SKT4 | | 2 焼入れ鋼 Hardened steels (55～65HRC) SKD11,SKH51 | | 3 焼入れ鋼 Hardened steels (65～68HRC) SKH,溶製ハイス | | 4 焼入れ鋼 Hardened steels (68～72HRC) HAP,粉末ハイス | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み比率 Ratio to standard depth of cut | | | | | 100% | | 90% | | 80% | | 70% | |
| 外径DC Tool dia. (mm) | コーナ半径RE Corner radius (mm) | 首下長LU Under neck length (mm) | 切り込み量 Depth of cut (mm) $a_p$ | 切り込み量 Depth of cut (mm) $a_e$ | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 0.2 | 0.05 | 0.5 | 0.004 | 0.05 | 50,000 | 400 | 48,000 | 350 | 45,000 | 290 | 43,000 | 240 |
| | | 1 | 0.003 | 0.05 | 45,000 | 340 | 43,000 | 290 | 41,000 | 250 | 38,000 | 200 |
| 0.3 | 0.05 | 0.5 | 0.006 | 0.1 | 50,000 | 600 | 48,000 | 520 | 45,000 | 430 | 43,000 | 360 |
| | | 0.75 | 0.006 | 0.1 | 50,000 | 600 | 48,000 | 520 | 45,000 | 430 | 43,000 | 360 |
| | | 1.5 | 0.005 | 0.1 | 45,000 | 510 | 43,000 | 440 | 41,000 | 370 | 38,000 | 300 |
| | | 2 | 0.003 | 0.1 | 40,000 | 430 | 38,000 | 370 | 36,000 | 310 | 34,000 | 260 |
| 0.4 | 0.05 | 0.5 | 0.008 | 0.15 | 46,000 | 740 | 44,000 | 630 | 41,000 | 520 | 39,000 | 440 |
| | | 1 | 0.008 | 0.15 | 46,000 | 740 | 44,000 | 630 | 41,000 | 520 | 39,000 | 440 |
| | | 2 | 0.006 | 0.15 | 41,000 | 620 | 39,000 | 530 | 37,000 | 450 | 35,000 | 370 |
| 0.5 | 0.05 | 0.5 | 0.01 | 0.2 | 46,000 | 920 | 44,000 | 790 | 41,000 | 660 | 39,000 | 550 |
| | | 1.5 | 0.01 | 0.2 | 46,000 | 920 | 44,000 | 790 | 41,000 | 660 | 39,000 | 550 |
| | | 3 | 0.005 | 0.2 | 37,000 | 670 | 35,000 | 570 | 33,000 | 480 | 31,000 | 390 |
| | 0.1 | 0.5 | 0.01 | 0.15 | 46,000 | 920 | 44,000 | 790 | 41,000 | 660 | 39,000 | 550 |
| | | 1.5 | 0.01 | 0.15 | 46,000 | 920 | 44,000 | 790 | 41,000 | 660 | 39,000 | 550 |
| | | 3 | 0.005 | 0.15 | 37,000 | 670 | 35,000 | 570 | 33,000 | 480 | 31,000 | 390 |
| 0.6 | 0.1 | 1.5 | 0.012 | 0.2 | 42,000 | 1,010 | 40,000 | 860 | 38,000 | 730 | 36,000 | 600 |
| | | 3 | 0.009 | 0.2 | 38,000 | 870 | 36,000 | 740 | 34,000 | 620 | 32,000 | 510 |
| 0.8 | 0.1 | 2.5 | 0.012 | 0.3 | 42,000 | 1,280 | 40,000 | 1,090 | 38,000 | 920 | 36,000 | 770 |
| | | 5 | 0.008 | 0.3 | 38,000 | 1,090 | 36,000 | 930 | 34,000 | 780 | 32,000 | 650 |
| 1 | 0.05 | 1 | 0.02 | 0.45 | 38,000 | 1,520 | 36,000 | 1,300 | 34,000 | 1,090 | 32,000 | 900 |
| | | 2.5 | 0.02 | 0.45 | 38,000 | 1,520 | 36,000 | 1,300 | 34,000 | 1,090 | 32,000 | 900 |
| | | 5 | 0.015 | 0.45 | 34,000 | 1,290 | 32,000 | 1,090 | 31,000 | 940 | 29,000 | 770 |
| | 0.1 | 1 | 0.02 | 0.4 | 38,000 | 1,520 | 36,000 | 1,300 | 34,000 | 1,090 | 32,000 | 900 |
| | | 2.5 | 0.02 | 0.4 | 38,000 | 1,520 | 36,000 | 1,300 | 34,000 | 1,090 | 32,000 | 900 |
| | | 5 | 0.015 | 0.4 | 34,000 | 1,290 | 32,000 | 1,090 | 31,000 | 940 | 29,000 | 770 |
| | 0.2 | 2.5 | 0.02 | 0.3 | 38,000 | 1,520 | 36,000 | 1,300 | 34,000 | 1,090 | 32,000 | 900 |
| | | 5 | 0.015 | 0.3 | 34,000 | 1,290 | 32,000 | 1,090 | 31,000 | 940 | 29,000 | 770 |
| | | 10 | 0.005 | 0.3 | 27,000 | 920 | 26,000 | 800 | 24,000 | 650 | 23,000 | 550 |
| 1.5 | 0.05 | 2 | 0.02 | 0.7 | 32,000 | 1,920 | 30,000 | 1,620 | 29,000 | 1,390 | 27,000 | 1,130 |
| | | 5 | 0.02 | 0.7 | 29,000 | 1,650 | 28,000 | 1,440 | 26,000 | 1,190 | 25,000 | 1,000 |
| | 0.1 | 2 | 0.02 | 0.65 | 32,000 | 1,920 | 30,000 | 1,620 | 29,000 | 1,390 | 27,000 | 1,130 |
| | | 5 | 0.02 | 0.65 | 29,000 | 1,650 | 28,000 | 1,440 | 26,000 | 1,190 | 25,000 | 1,000 |
| | 0.2 | 5 | 0.02 | 0.55 | 29,000 | 1,650 | 28,000 | 1,440 | 26,000 | 1,190 | 25,000 | 1,000 |
| | | 10 | 0.015 | 0.55 | 26,000 | 1,400 | 25,000 | 1,220 | 23,000 | 990 | 22,000 | 830 |
| 2 | 0.05 | 3 | 0.02 | 0.95 | 28,000 | 2,240 | 27,000 | 1,940 | 25,000 | 1,600 | 24,000 | 1,340 |
| | | 5 | 0.02 | 0.95 | 28,000 | 2,240 | 27,000 | 1,940 | 25,000 | 1,600 | 24,000 | 1,340 |
| | | 10 | 0.02 | 0.95 | 25,000 | 1,900 | 24,000 | 1,640 | 23,000 | 1,400 | 21,000 | 1,120 |
| | 0.1 | 3 | 0.02 | 0.9 | 28,000 | 2,240 | 27,000 | 1,940 | 25,000 | 1,600 | 24,000 | 1,340 |
| | | 5 | 0.02 | 0.9 | 28,000 | 2,240 | 27,000 | 1,940 | 25,000 | 1,600 | 24,000 | 1,340 |
| | | 10 | 0.02 | 0.9 | 25,000 | 1,900 | 24,000 | 1,640 | 23,000 | 1,400 | 21,000 | 1,120 |
| | 0.2 | 5 | 0.02 | 0.8 | 28,000 | 2,240 | 27,000 | 1,940 | 25,000 | 1,600 | 24,000 | 1,340 |
| | | 10 | 0.02 | 0.8 | 25,000 | 1,900 | 24,000 | 1,640 | 23,000 | 1,400 | 21,000 | 1,120 |
| | | 20 | 0.01 | 0.8 | 20,000 | 1,360 | 19,000 | 1,160 | 18,000 | 980 | 17,000 | 810 |
| 3 | 0.05 | 6 | 0.02 | 1.45 | 24,000 | 2,450 | 23,000 | 2,110 | 22,000 | 1,800 | 20,000 | 1,430 |
| | 0.1 | 6 | 0.02 | 1.4 | 24,000 | 2,450 | 23,000 | 2,110 | 22,000 | 1,800 | 20,000 | 1,430 |
| | 0.5 | 6 | 0.02 | 1 | 24,000 | 2,450 | 23,000 | 2,110 | 22,000 | 1,800 | 20,000 | 1,430 |

※基本切り込みは被削材グループ1での目安を示しています。その他のグループの場合は、上表の切り込み比率を目安に調整してください。
本切削条件における切り込み量は、底面加工時を想定して算出しております。勾配面などの仕上げ加工においては、理論面粗さ（カスプハイト量）から設定してください。

The indicated standard cutting depth is a reference value for Group 1 work materials. For materials in other groups, the cutting depth should be adjusted using the reference ratio shown in the above table.
The depth of cut stated in these cutting conditions are calculated assuming bottom surface machining. For finishing machining such as slope machining, it should be set according to the theoretical surface roughness (cusp height).

【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

【Note】1) Use the appropriate coolant for the work material and machining shape.
2) This standard cutting condition table is intended as reference cutting conditions. The conditions should be adjusted as necessary according to the actual conditions of machined shape, purpose, machine used, etc.
3) If the machine rotation speed is insufficient, reduce the rotation speed and feed rate by the same ratio.

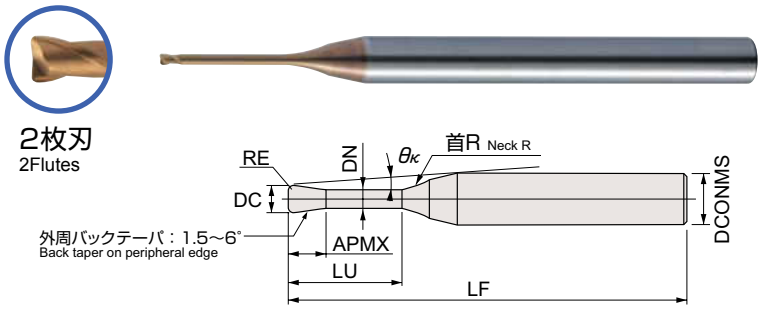
# Epoch Deep Radius
# エポックディープラジアス

**ストレートネック** | Straight Neck

溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / 細部 Miniature / 取りのこし Rest Material Machining / 中仕上 Semi Finishing / 仕上 Finishing / リブ・細部 Rib Miniature

外径公差 Dia.tolerance 0～−0.015　RE公差 RE tolerance ±0.005　h5　(mm)

THコーティング採用で高硬度材に適しています。高い耐折損性。
TH Coating makes it ideal for high-hardness materials. High breakage resistance.




## EPDR2○○○-○○.○-○○○-TH

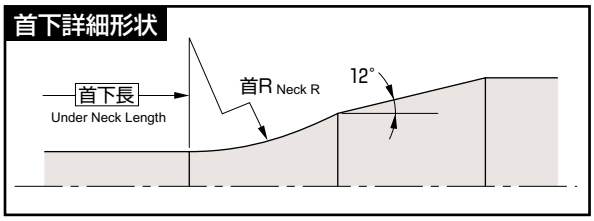
超硬 Carbide　TH　ねじれ角 30° Helix angle　切削条件表 A286 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度 Interference angle (°) θκ | 勾配角に対する実有効首下長 Actual effective length in incline angles 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格 (円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDR2002-0.5-005-TH | △ | 0.2 | 0.05 | 0.5 | 0.15 | 0.17 | 50 | 4 | 4 | 11.36 | 0.92 | 1 | 1.07 | 1.15 | 1.29 | 13,610 |
| EPDR2002-1-005-TH | △ | | | 1 | 0.15 | 0.17 | 50 | 4 | 7 | 10.81 | 1.63 | 1.79 | 1.95 | 2.09 | 2.37 | 14,150 |
| EPDR2002-1.5-005-TH | △ | | | 1.5 | 0.15 | 0.17 | 50 | 4 | 7 | 10.3 | 2.18 | 2.38 | 2.56 | 2.72 | 3.04 | 15,320 |
| EPDR2002-2-005-TH | △ | | | 2 | 0.15 | 0.17 | 50 | 4 | 10 | 9.84 | 2.89 | 3.17 | 3.43 | 3.67 | 4.12 | 16,720 |
| EPDR2003-1-005-TH | △ | 0.3 | 0.05 | 1 | 0.25 | 0.27 | 50 | 4 | 4 | 10.78 | 1.46 | 1.57 | 1.67 | 1.77 | 1.95 | 14,150 |
| EPDR2003-1.5-005-TH | △ | | | 1.5 | 0.25 | 0.27 | 50 | 4 | 7 | 10.26 | 2.18 | 2.38 | 2.56 | 2.72 | 3.04 | 15,320 |
| EPDR2003-2-005-TH | △ | | | 2 | 0.25 | 0.27 | 50 | 4 | 7 | 9.79 | 2.73 | 2.95 | 3.15 | 3.34 | 3.68 | 15,320 |
| EPDR2003-2.5-005-TH | △ | | | 2.5 | 0.25 | 0.27 | 50 | 4 | 7 | 9.36 | 3.27 | 3.52 | 3.74 | 3.94 | 4.31 | 15,860 |
| EPDR2003-3-005-TH | △ | | | 3 | 0.25 | 0.27 | 50 | 4 | 10 | 8.97 | 3.99 | 4.33 | 4.63 | 4.91 | 5.41 | 15,860 |
| EPDR2004-1-005-TH | △ | 0.4 | 0.05 | 1 | 0.3 | 0.37 | 50 | 4 | 4 | 10.75 | 1.46 | 1.57 | 1.67 | 1.77 | 1.95 | 9,630 |
| EPDR2004-1.5-005-TH | △ | | | 1.5 | 0.3 | 0.37 | 50 | 4 | 4 | 10.22 | 2 | 2.13 | 2.26 | 2.37 | 2.57 | 10,200 |
| EPDR2004-2-005-TH | △ | | | 2 | 0.3 | 0.37 | 50 | 4 | 7 | 9.74 | 2.73 | 2.95 | 3.15 | 3.34 | 3.68 | 10,200 |
| EPDR2004-2.5-005-TH | △ | | | 2.5 | 0.3 | 0.37 | 50 | 4 | 7 | 9.31 | 3.27 | 3.52 | 3.74 | 3.94 | 4.31 | 10,580 |
| EPDR2004-3-005-TH | △ | | | 3 | 0.3 | 0.37 | 50 | 4 | 7 | 8.91 | 3.81 | 4.09 | 4.32 | 4.54 | 4.92 | 11,370 |
| EPDR2004-3.5-005-TH | △ | | | 3.5 | 0.3 | 0.37 | 50 | 4 | 7 | 8.54 | 4.35 | 4.65 | 4.9 | 5.13 | 5.53 | 11,370 |
| EPDR2004-4-005-TH | △ | | | 4 | 0.3 | 0.37 | 50 | 4 | 10 | 8.21 | 5.08 | 5.47 | 5.81 | 6.11 | 6.66 | 11,370 |
| EPDR2004-2-01-TH | △ | | 0.1 | 2 | 0.3 | 0.37 | 50 | 4 | 7 | 9.79 | 2.72 | 2.94 | 3.14 | 3.33 | 3.67 | 10,200 |
| EPDR2004-3-01-TH | △ | | | 3 | 0.3 | 0.37 | 50 | 4 | 7 | 8.95 | 3.81 | 4.08 | 4.32 | 4.53 | 4.91 | 11,370 |
| EPDR2004-4-01-TH | △ | | | 4 | 0.3 | 0.37 | 50 | 4 | 10 | 8.24 | 5.07 | 5.47 | 5.8 | 6.1 | 6.65 | 11,370 |
| EPDR2005-1-005-TH | △ | 0.5 | 0.05 | 1 | 0.35 | 0.47 | 50 | 4 | 4 | 10.71 | 1.46 | 1.57 | 1.67 | 1.77 | 1.95 | 9,630 |
| EPDR2005-2-005-TH | △ | | | 2 | 0.35 | 0.47 | 50 | 4 | 4 | 9.69 | 2.54 | 2.69 | 2.83 | 2.95 | 3.18 | 9,630 |
| EPDR2005-3-005-TH | △ | | | 3 | 0.35 | 0.47 | 50 | 4 | 7 | 8.84 | 3.81 | 4.09 | 4.32 | 4.54 | 4.92 | 9,630 |
| EPDR2005-4-005-TH | △ | | | 4 | 0.35 | 0.47 | 50 | 4 | 7 | 8.13 | 4.89 | 5.2 | 5.47 | 5.71 | 6.13 | 9,630 |
| EPDR2005-5-005-TH | △ | | | 5 | 0.35 | 0.47 | 50 | 4 | 10 | 7.53 | 6.16 | 6.6 | 6.97 | 7.3 | 7.88 | 9,630 |
| EPDR2005-6-005-TH | △ | | | 6 | 0.35 | 0.47 | 50 | 4 | 10 | 7 | 7.24 | 7.71 | 8.11 | 8.46 | 9.08 | 10,200 |
| EPDR2005-1-01-TH | △ | | 0.1 | 1 | 0.35 | 0.47 | 50 | 4 | 4 | 10.77 | 1.46 | 1.56 | 1.66 | 1.76 | 1.93 | 9,630 |
| EPDR2005-2-01-TH | △ | | | 2 | 0.35 | 0.47 | 50 | 4 | 4 | 9.74 | 2.53 | 2.69 | 2.82 | 2.95 | 3.17 | 9,630 |
| EPDR2005-3-01-TH | △ | | | 3 | 0.35 | 0.47 | 50 | 4 | 7 | 8.88 | 3.81 | 4.08 | 4.32 | 4.53 | 4.91 | 9,630 |
| EPDR2005-4-01-TH | △ | | | 4 | 0.35 | 0.47 | 50 | 4 | 7 | 8.17 | 4.89 | 5.2 | 5.46 | 5.7 | 6.12 | 9,630 |
| EPDR2005-5-01-TH | △ | | | 5 | 0.35 | 0.47 | 50 | 4 | 10 | 7.55 | 6.16 | 6.59 | 6.96 | 7.29 | 7.87 | 9,630 |
| EPDR2005-6-01-TH | △ | | | 6 | 0.35 | 0.47 | 50 | 4 | 10 | 7.03 | 7.24 | 7.71 | 8.1 | 8.45 | 9.07 | 10,200 |

△印：在庫が無くなり次第受注生産品となるものです。 △：When the Stock is out, will become to produce on request.

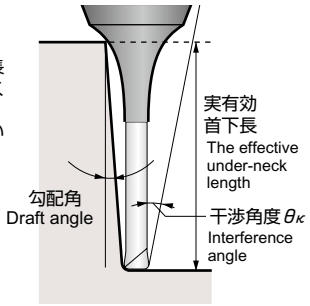
# Epoch Deep Radius
# エポックディープラジアス

**首下詳細形状**




【注意】
加工物に勾配がついている場合、干渉領域は、首下長さよりも長くなります。それぞれの勾配角に対する実有効首下長をご参照ください。
また、工具が加工物に干渉する角度を干渉角度θκで表示していますので合わせてご参照ください。

【Note】
If the workpiece has draft angle, the interference length will be longer than the under-neck length.Please refer to the effective under-neck length for the various draft angles.
In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle θκ", and should also be referred to.




## EPDR2○○○-○○.○-○○○-TH

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度 Interference angle (°) θκ | 勾配角に対する実有効首下長 Actual effective length in incline angles 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDR2006-2-01-TH | △ | 0.6 | 0.1 | 2 | 0.4 | 0.57 | 50 | 4 | 4 | 9.68 | 2.53 | 2.69 | 2.82 | 2.95 | 3.17 | 7,370 |
| EPDR2006-4-01-TH | △ | | | 4 | 0.4 | 0.57 | 50 | 4 | 7 | 8.09 | 4.89 | 5.2 | 5.46 | 5.7 | 6.12 | 7,930 |
| EPDR2006-6-01-TH | △ | | | 6 | 0.4 | 0.57 | 50 | 4 | 10 | 6.94 | 7.24 | 7.71 | 8.1 | 8.45 | 9.07 | 7,930 |
| EPDR2006-8-01-TH | △ | | | 8 | 0.4 | 0.57 | 50 | 4 | 10 | 6.08 | 9.38 | 9.92 | 10.36 | 10.75 | 11.43 | 11,370 |
| EPDR2006-10-01-TH | △ | | | 10 | 0.4 | 0.57 | 50 | 4 | 10 | 5.41 | 11.5 | 12.1 | 12.59 | 13.01 | 13.75 | 11,790 |
| EPDR2008-4-01-TH | △ | 0.8 | 0.1 | 4 | 0.5 | 0.77 | 50 | 4 | 7 | 7.93 | 4.88 | 5.2 | 5.46 | 5.7 | 6.12 | 7,930 |
| EPDR2008-6-01-TH | △ | | | 6 | 0.5 | 0.77 | 50 | 4 | 7 | 6.77 | 7.02 | 7.4 | 7.71 | 7.99 | 8.48 | 7,930 |
| EPDR2008-8-01-TH | △ | | | 8 | 0.5 | 0.77 | 50 | 4 | 10 | 5.9 | 9.38 | 9.92 | 10.36 | 10.75 | 11.43 | 7,930 |
| EPDR2008-12-01-TH | △ | | | 12 | 0.5 | 0.77 | 55 | 4 | 10 | 4.7 | 13.62 | 14.27 | 14.79 | 15.25 | 16.03 | 11,370 |
| EPDR2008-4-02-TH | △ | | 0.2 | 4 | 0.5 | 0.77 | 50 | 4 | 7 | 8 | 4.88 | 5.19 | 5.45 | 5.68 | 6.1 | 7,930 |
| EPDR2008-6-02-TH | △ | | | 6 | 0.5 | 0.77 | 50 | 4 | 7 | 6.82 | 7.01 | 7.39 | 7.7 | 7.98 | 8.46 | 7,930 |
| EPDR2010-4-01-TH | △ | 1 | 0.1 | 4 | 0.8 | 0.94 | 50 | 4 | 4 | 7.7 | 4.74 | 4.95 | 5.12 | 5.28 | 5.55 | 7,030 |
| EPDR2010-6-01-TH | △ | | | 6 | 0.8 | 0.94 | 50 | 4 | 7 | 6.54 | 7.12 | 7.48 | 7.78 | 8.05 | 8.52 | 7,610 |
| EPDR2010-8-01-TH | △ | | | 8 | 0.8 | 0.94 | 50 | 4 | 7 | 5.68 | 9.23 | 9.64 | 9.99 | 10.29 | 10.81 | 7,610 |
| EPDR2010-10-01-TH | △ | | | 10 | 0.8 | 0.94 | 50 | 4 | 10 | 5.02 | 11.6 | 12.18 | 12.65 | 13.07 | 13.79 | 7,610 |
| EPDR2010-12-01-TH | △ | | | 12 | 0.8 | 0.94 | 55 | 4 | 10 | 4.5 | 13.71 | 14.34 | 14.85 | 15.3 | 16.08 | 7,610 |
| EPDR2010-16-01-TH | △ | | | 16 | 0.8 | 0.94 | 60 | 4 | 10 | 3.72 | 17.91 | 18.63 | 19.21 | 19.71 | 21.39 | 9,630 |
| EPDR2010-20-01-TH | △ | | | 20 | 0.8 | 0.94 | 60 | 4 | 10 | 3.17 | 22.09 | 22.89 | 23.52 | 24.08 | 26.7 | 11,900 |
| EPDR2010-4-02-TH | △ | | 0.2 | 4 | 0.8 | 0.94 | 50 | 4 | 4 | 7.77 | 4.74 | 4.94 | 5.11 | 5.27 | 5.54 | 7,030 |
| EPDR2010-6-02-TH | △ | | | 6 | 0.8 | 0.94 | 50 | 4 | 7 | 6.59 | 7.12 | 7.47 | 7.77 | 8.03 | 8.51 | 7,610 |
| EPDR2010-8-02-TH | △ | | | 8 | 0.8 | 0.94 | 50 | 4 | 7 | 5.72 | 9.22 | 9.63 | 9.98 | 10.28 | 10.8 | 7,610 |
| EPDR2010-10-02-TH | △ | | | 10 | 0.8 | 0.94 | 50 | 4 | 10 | 5.05 | 11.6 | 12.17 | 12.64 | 13.05 | 13.77 | 7,610 |
| EPDR2010-12-02-TH | △ | | | 12 | 0.8 | 0.94 | 55 | 4 | 10 | 4.52 | 13.71 | 14.33 | 14.84 | 15.29 | 16.05 | 7,610 |
| EPDR2010-16-02-TH | △ | | | 16 | 0.8 | 0.94 | 60 | 4 | 10 | 3.74 | 17.91 | 18.62 | 19.2 | 19.7 | 21.35 | 9,630 |
| EPDR2010-20-02-TH | △ | | | 20 | 0.8 | 0.94 | 60 | 4 | 10 | 3.19 | 22.09 | 22.88 | 23.52 | 24.06 | 26.66 | 11,900 |
| EPDR2010-6-03-TH | △ | | 0.3 | 6 | 0.8 | 0.94 | 50 | 4 | 7 | 6.64 | 7.11 | 7.46 | 7.76 | 8.02 | 8.49 | 7,610 |
| EPDR2010-10-03-TH | △ | | | 10 | 0.8 | 0.94 | 50 | 4 | 10 | 5.08 | 11.59 | 12.16 | 12.63 | 13.04 | 13.76 | 7,610 |
| EPDR2010-16-03-TH | △ | | | 16 | 0.8 | 0.94 | 60 | 4 | 10 | 3.75 | 17.9 | 18.62 | 19.19 | 19.69 | 21.32 | 9,630 |
| EPDR2010-20-03-TH | △ | | | 20 | 0.8 | 0.94 | 60 | 4 | 10 | 3.2 | 22.08 | 22.88 | 23.51 | 24.05 | 26.63 | 11,900 |
| EPDR2015-4-01-TH | △ | 1.5 | 0.1 | 4 | 1.35 | 1.42 | 50 | 4 | 4 | 7.15 | 4.8 | 4.99 | 5.16 | 5.31 | 5.58 | 7,610 |
| EPDR2015-8-01-TH | △ | | | 8 | 1.35 | 1.42 | 50 | 4 | 7 | 5.12 | 9.29 | 9.69 | 10.02 | 10.32 | 10.84 | 7,610 |
| EPDR2015-12-01-TH | △ | | | 12 | 1.35 | 1.42 | 55 | 4 | 7 | 3.98 | 13.47 | 13.96 | 14.37 | 14.72 | 16.14 | 9,060 |
| EPDR2015-15-01-TH | △ | | | 15 | 1.35 | 1.42 | 55 | 4 | 10 | 3.42 | 16.92 | 17.6 | 18.16 | 18.64 | 20.12 | 9,060 |
| EPDR2015-20-01-TH | △ | | | 20 | 1.35 | 1.42 | 60 | 4 | 10 | 2.76 | 22.14 | 22.92 | 23.55 | 24.13 | 干渉なし | 9,060 |
| EPDR2015-4-02-TH | △ | | 0.2 | 4 | 1.35 | 1.42 | 50 | 4 | 4 | 7.22 | 4.79 | 4.98 | 5.15 | 5.3 | 5.57 | 7,610 |
| EPDR2015-8-02-TH | △ | | | 8 | 1.35 | 1.42 | 50 | 4 | 7 | 5.16 | 9.28 | 9.68 | 10.01 | 10.31 | 10.82 | 7,610 |
| EPDR2015-12-02-TH | △ | | | 12 | 1.35 | 1.42 | 55 | 4 | 7 | 4.01 | 13.46 | 13.96 | 14.36 | 14.71 | 16.11 | 9,060 |
| EPDR2015-15-02-TH | △ | | | 15 | 1.35 | 1.42 | 55 | 4 | 10 | 3.43 | 16.91 | 17.59 | 18.15 | 18.63 | 20.09 | 9,060 |
| EPDR2015-20-02-TH | △ | | | 20 | 1.35 | 1.42 | 60 | 4 | 10 | 2.77 | 22.13 | 22.92 | 23.55 | 24.11 | 干渉なし | 9,060 |
| EPDR2015-8-03-TH | △ | | 0.3 | 8 | 1.35 | 1.42 | 50 | 4 | 7 | 5.19 | 9.28 | 9.67 | 10 | 10.3 | 10.81 | 7,610 |
| EPDR2015-15-03-TH | △ | | | 15 | 1.35 | 1.42 | 55 | 4 | 10 | 3.45 | 16.91 | 17.59 | 18.14 | 18.62 | 20.06 | 9,060 |
| EPDR2015-20-03-TH | △ | | | 20 | 1.35 | 1.42 | 60 | 4 | 10 | 2.78 | 22.13 | 22.91 | 23.54 | 24.09 | 干渉なし | 9,060 |

△印：在庫が無くなり次第受注生産品となるものです。 △：When the Stock is out, will become to produce on request. 干渉なし：No interference

# EPDR2○○○-○○.○-○○○-TH

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度 Interference angle (°) θK | 勾配角に対する実有効首下長 Actual effective length in incline angles 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDR2020-6-02-TH | △ | 2 | 0.2 | 6 | 1.7 | 1.92 | 50 | 4 | 4 | 5.35 | 6.88 | 7.12 | 7.32 | 7.5 | 8.14 | 7,030 |
| EPDR2020-8-02-TH | △ | | | 8 | 1.7 | 1.92 | 50 | 4 | 4 | 4.51 | 8.95 | 9.24 | 9.47 | 9.75 | 10.8 | 7,610 |
| EPDR2020-12-02-TH | △ | | | 12 | 1.7 | 1.92 | 55 | 4 | 7 | 3.43 | 13.46 | 13.96 | 14.36 | 14.71 | 16.11 | 7,610 |
| EPDR2020-16-02-TH | △ | | | 16 | 1.7 | 1.92 | 55 | 4 | 7 | 2.77 | 17.62 | 18.19 | 18.65 | 19.33 | 干渉なし | 7,610 |
| EPDR2020-20-02-TH | △ | | | 20 | 1.7 | 1.92 | 60 | 4 | 10 | 2.32 | 22.13 | 22.92 | 23.55 | 24.11 | 干渉なし | 7,610 |
| EPDR2020-25-02-TH | △ | | | 25 | 1.7 | 1.92 | 65 | 4 | 10 | 1.93 | 27.33 | 28.2 | 28.89 | 干渉なし | 干渉なし | 10,200 |
| EPDR2020-30-02-TH | △ | | | 30 | 1.7 | 1.92 | 70 | 4 | 10 | 1.66 | 32.51 | 33.46 | 34.4 | 干渉なし | 干渉なし | 12,540 |
| EPDR2020-8-03-TH | △ | | 0.3 | 8 | 1.7 | 1.92 | 50 | 4 | 4 | 4.55 | 8.95 | 9.23 | 9.47 | 9.73 | 10.77 | 7,610 |
| EPDR2020-16-03-TH | △ | | | 16 | 1.7 | 1.92 | 55 | 4 | 7 | 2.79 | 17.62 | 18.19 | 18.64 | 19.31 | 干渉なし | 7,610 |
| EPDR2020-20-03-TH | △ | | | 20 | 1.7 | 1.92 | 60 | 4 | 10 | 2.33 | 22.13 | 22.91 | 23.54 | 24.09 | 干渉なし | 7,610 |
| EPDR2020-6-05-TH | △ | | 0.5 | 6 | 1.7 | 1.92 | 50 | 4 | 4 | 5.5 | 6.86 | 7.1 | 7.3 | 7.48 | 8.05 | 7,030 |
| EPDR2020-8-05-TH | △ | | | 8 | 1.7 | 1.92 | 50 | 4 | 4 | 4.62 | 8.94 | 9.22 | 9.45 | 9.69 | 10.7 | 7,610 |
| EPDR2020-12-05-TH | △ | | | 12 | 1.7 | 1.92 | 55 | 4 | 7 | 3.5 | 13.45 | 13.94 | 14.33 | 14.68 | 16.01 | 7,610 |
| EPDR2020-16-05-TH | △ | | | 16 | 1.7 | 1.92 | 55 | 4 | 7 | 2.81 | 17.61 | 18.18 | 18.63 | 19.27 | 干渉なし | 7,610 |
| EPDR2020-20-05-TH | △ | | | 20 | 1.7 | 1.92 | 60 | 4 | 10 | 2.35 | 22.12 | 22.9 | 23.52 | 24.06 | 干渉なし | 7,610 |
| EPDR2020-25-05-TH | △ | | | 25 | 1.7 | 1.92 | 65 | 4 | 10 | 1.95 | 27.32 | 28.19 | 28.87 | 干渉なし | 干渉なし | 10,200 |
| EPDR2020-30-05-TH | △ | | | 30 | 1.7 | 1.92 | 70 | 4 | 10 | 1.67 | 32.5 | 33.45 | 34.36 | 干渉なし | 干渉なし | 12,540 |
| EPDR2020-8-08-TH | △ | | 0.8 | 8 | 1.7 | 1.92 | 50 | 4 | 4 | 4.73 | 8.93 | 9.2 | 9.43 | 9.64 | 10.61 | 7,610 |
| EPDR2020-16-08-TH | △ | | | 16 | 1.7 | 1.92 | 55 | 4 | 7 | 2.85 | 17.6 | 18.16 | 18.61 | 19.21 | 干渉なし | 7,610 |
| EPDR2020-20-08-TH | △ | | | 20 | 1.7 | 1.92 | 60 | 4 | 10 | 2.38 | 22.11 | 22.88 | 23.5 | 24.03 | 干渉なし | 7,610 |
| EPDR2030-8-02-TH | △ | 3 | 0.2 | 8 | 2.5 | 2.86 | 55 | 6 | 4 | 5.65 | 9.07 | 9.33 | 9.55 | 9.92 | 10.99 | 7,610 |
| EPDR2030-12-02-TH | △ | | | 12 | 2.5 | 2.86 | 60 | 6 | 4 | 4.48 | 13.19 | 13.52 | 14.03 | 14.71 | 16.29 | 8,730 |
| EPDR2030-16-02-TH | △ | | | 16 | 2.5 | 2.86 | 60 | 6 | 7 | 3.71 | 17.75 | 18.29 | 18.73 | 19.5 | 21.6 | 9,860 |
| EPDR2030-20-02-TH | △ | | | 20 | 2.5 | 2.86 | 65 | 6 | 7 | 3.16 | 21.88 | 22.49 | 23.15 | 24.28 | 26.91 | 9,860 |
| EPDR2030-30-02-TH | △ | | | 30 | 2.5 | 2.86 | 75 | 6 | 10 | 2.31 | 32.63 | 33.55 | 34.56 | 36.25 | 干渉なし | 11,370 |
| EPDR2030-35-02-TH | △ | | | 35 | 2.5 | 2.86 | 80 | 6 | 10 | 2.04 | 37.79 | 38.78 | 40.26 | 42.23 | 干渉なし | 12,540 |
| EPDR2030-8-03-TH | △ | | 0.3 | 8 | 2.5 | 2.86 | 55 | 6 | 4 | 5.68 | 9.07 | 9.33 | 9.54 | 9.9 | 10.95 | 7,610 |
| EPDR2030-16-03-TH | △ | | | 16 | 2.5 | 2.86 | 60 | 6 | 7 | 3.72 | 17.74 | 18.28 | 18.72 | 19.48 | 21.57 | 9,860 |
| EPDR2030-20-03-TH | △ | | | 20 | 2.5 | 2.86 | 65 | 6 | 7 | 3.17 | 21.88 | 22.48 | 23.14 | 24.26 | 26.88 | 9,860 |
| EPDR2030-30-03-TH | △ | | | 30 | 2.5 | 2.86 | 75 | 6 | 10 | 2.32 | 32.62 | 33.54 | 34.54 | 36.23 | 干渉なし | 11,370 |
| EPDR2030-8-05-TH | △ | | 0.5 | 8 | 2.5 | 2.86 | 55 | 6 | 4 | 5.76 | 9.06 | 9.31 | 9.53 | 9.86 | 10.89 | 7,610 |
| EPDR2030-12-05-TH | △ | | | 12 | 2.5 | 2.86 | 60 | 6 | 4 | 4.55 | 13.18 | 13.51 | 13.99 | 14.65 | 16.2 | 8,730 |
| EPDR2030-16-05-TH | △ | | | 16 | 2.5 | 2.86 | 60 | 6 | 7 | 3.75 | 17.74 | 18.27 | 18.71 | 19.44 | 21.51 | 9,860 |
| EPDR2030-20-05-TH | △ | | | 20 | 2.5 | 2.86 | 65 | 6 | 7 | 3.2 | 21.87 | 22.47 | 23.11 | 24.22 | 26.82 | 9,860 |
| EPDR2030-30-05-TH | △ | | | 30 | 2.5 | 2.86 | 75 | 6 | 10 | 2.33 | 32.62 | 33.53 | 34.52 | 36.19 | 干渉なし | 11,370 |
| EPDR2030-35-05-TH | △ | | | 35 | 2.5 | 2.86 | 80 | 6 | 10 | 2.06 | 37.78 | 38.77 | 40.22 | 42.17 | 干渉なし | 12,540 |

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ |

## 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPDR-TH | × (N/A) | × (N/A) |

## 標準切削条件表 Recommended cutting conditions

### EPDR-TH

#### 標準切削条件 Standard cutting condition

| 被削材 Work material | | | | 1 銅 Coppers | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼入れ鋼 Hardened steels (45～55HRC) | | 6 焼入れ鋼 Hardened steels (55～65HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 120% | | 100% | | 90% | | 80% | | 65% | | 60% | |
| 外径DC Tool dia. (mm) | コーナ半径RE Corner radius (mm) | 首下長LU Under neck length (mm) | 基本切り込み Standard depth of cut (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 0.2 | 0.05 | 0.5 | 0.02 | 50,000 | 307 | 50,000 | 258 | 50,000 | 230 | 50,000 | 205 | 50,000 | 180 | 50,000 | 160 |
| | | 1 | 0.014 | 50,000 | 307 | 50,000 | 258 | 50,000 | 230 | 50,000 | 205 | 50,000 | 180 | 50,000 | 160 |
| | | 1.5 | 0.008 | 50,000 | 276 | 50,000 | 240 | 48,600 | 223 | 45,900 | 202 | 45,900 | 170 | 45,900 | 153 |
| | | 2 | 0.008 | 50,000 | 246 | 42,000 | 202 | 37,800 | 181 | 36,700 | 176 | 36,700 | 162 | 36,700 | 147 |
| 0.3 | 0.05 | 1 | 0.021 | 50,000 | 696 | 50,000 | 585 | 50,000 | 516 | 50,000 | 456 | 50,000 | 336 | 50,000 | 320 |
| | | 1.5 | 0.016 | 50,000 | 696 | 50,000 | 585 | 45,000 | 516 | 45,000 | 456 | 45,000 | 336 | 45,000 | 320 |
| | | 2 | 0.012 | 45,000 | 620 | 45,000 | 530 | 45,000 | 460 | 45,000 | 420 | 45,000 | 300 | 45,000 | 290 |
| | | 2.5 | 0.01 | 40,000 | 551 | 40,000 | 471 | 40,000 | 409 | 40,000 | 373 | 40,000 | 267 | 40,000 | 258 |
| | | 3 | 0.008 | 40,000 | 504 | 35,000 | 412 | 35,000 | 358 | 35,000 | 326 | 30,000 | 200 | 30,000 | 194 |
| 0.4 | 0.05 | 1 | 0.025 | 50,000 | 691 | 50,000 | 580 | 50,000 | 518 | 50,000 | 461 | 40,000 | 320 | 36,000 | 270 |
| | | 1.5 | 0.02 | 50,000 | 691 | 50,000 | 580 | 50,000 | 518 | 50,000 | 461 | 40,000 | 320 | 36,000 | 270 |
| | | 2 | 0.016 | 45,000 | 620 | 45,000 | 520 | 45,000 | 470 | 45,000 | 410 | 36,000 | 290 | 34,000 | 240 |
| | | 2.5 | 0.015 | 40,500 | 560 | 40,500 | 480 | 40,500 | 400 | 40,500 | 370 | 33,400 | 270 | 30,600 | 220 |
| | | 3 | 0.014 | 40,000 | 480 | 40,000 | 410 | 40,000 | 370 | 40,000 | 330 | 32,800 | 240 | 25,600 | 200 |
| | | 3.5 | 0.012 | 36,000 | 420 | 36,000 | 380 | 36,000 | 320 | 36,000 | 300 | 29,400 | 200 | 22,920 | 180 |
| | | 4 | 0.008 | 30,000 | 370 | 30,000 | 320 | 30,000 | 280 | 30,000 | 250 | 21,600 | 160 | 19,200 | 150 |
| | 0.1 | 2 | 0.028 | 45,000 | 620 | 45,000 | 520 | 45,000 | 470 | 45,000 | 410 | 36,000 | 290 | 34,000 | 240 |
| | | 3 | 0.016 | 40,000 | 480 | 40,000 | 410 | 40,000 | 370 | 40,000 | 330 | 32,800 | 240 | 25,600 | 200 |
| | | 4 | 0.01 | 30,000 | 370 | 30,000 | 320 | 30,000 | 280 | 30,000 | 250 | 21,600 | 160 | 19,200 | 150 |
| 0.5 | 0.05 | 1 | 0.03 | 50,000 | 1,070 | 50,000 | 898 | 50,000 | 756 | 40,000 | 464 | 30,000 | 378 | 28,000 | 315 |
| | | 2 | 0.023 | 50,000 | 1,070 | 50,000 | 898 | 50,000 | 756 | 40,000 | 464 | 30,000 | 378 | 28,000 | 315 |
| | | 3 | 0.017 | 45,000 | 960 | 45,000 | 810 | 45,000 | 684 | 36,000 | 414 | 27,000 | 315 | 24,500 | 261 |
| | | 4 | 0.017 | 40,000 | 850 | 40,000 | 720 | 40,000 | 603 | 32,000 | 378 | 24,000 | 279 | 20,000 | 234 |
| | | 5 | 0.011 | 30,000 | 640 | 28,800 | 540 | 24,000 | 380 | 19,400 | 280 | 18,000 | 250 | 15,000 | 200 |
| | | 6 | 0.008 | 30,000 | 570 | 28,800 | 480 | 24,000 | 380 | 19,400 | 260 | 18,000 | 250 | 15,000 | 200 |
| | 0.1 | 1 | 0.035 | 50,000 | 1,070 | 50,000 | 898 | 50,000 | 756 | 40,000 | 464 | 30,000 | 378 | 28,000 | 315 |
| | | 2 | 0.03 | 50,000 | 1,070 | 50,000 | 898 | 50,000 | 756 | 40,000 | 464 | 30,000 | 378 | 28,000 | 315 |
| | | 3 | 0.02 | 45,000 | 960 | 45,000 | 810 | 45,000 | 684 | 36,000 | 414 | 27,000 | 315 | 24,500 | 261 |
| | | 4 | 0.02 | 40,000 | 850 | 40,000 | 720 | 40,000 | 603 | 32,000 | 378 | 24,000 | 279 | 20,000 | 234 |
| | | 5 | 0.013 | 30,000 | 640 | 28,800 | 540 | 24,000 | 380 | 19,400 | 280 | 18,000 | 250 | 15,000 | 200 |
| | | 6 | 0.013 | 30,000 | 570 | 28,800 | 480 | 24,000 | 380 | 19,400 | 260 | 18,000 | 250 | 15,000 | 200 |
| 0.6 | 0.1 | 2 | 0.035 | 50,000 | 1,380 | 50,000 | 1,159 | 46,800 | 920 | 37,830 | 600 | 28,200 | 390 | 23,000 | 320 |
| | | 4 | 0.024 | 40,000 | 980 | 40,000 | 830 | 34,500 | 620 | 27,800 | 440 | 23,600 | 280 | 21,000 | 230 |
| | | 6 | 0.015 | 30,000 | 580 | 24,000 | 490 | 20,000 | 360 | 18,000 | 300 | 17,800 | 240 | 15,000 | 210 |
| | | 8 | 0.013 | 30,000 | 551 | 24,000 | 466 | 20,000 | 342 | 18,000 | 285 | 17,800 | 228 | 15,000 | 200 |
| | | 10 | 0.009 | 30,000 | 534 | 24,000 | 451 | 20,000 | 331 | 18,000 | 276 | 17,800 | 221 | 15,000 | 193 |
| 0.8 | 0.1 | 4 | 0.032 | 50,000 | 1,312 | 48,000 | 1,102 | 36,000 | 750 | 28,000 | 518 | 20,000 | 320 | 20,000 | 288 |
| | | 6 | 0.019 | 40,000 | 950 | 38,700 | 800 | 26,000 | 530 | 25,000 | 461 | 18,000 | 288 | 18,000 | 256 |
| | | 8 | 0.015 | 30,000 | 713 | 29,025 | 600 | 20,800 | 424 | 20,000 | 369 | 16,200 | 259 | 16,200 | 230 |
| | | 12 | 0.012 | 30,000 | 677 | 29,025 | 570 | 20,800 | 403 | 20,000 | 350 | 16,200 | 246 | 16,200 | 219 |
| | 0.2 | 4 | 0.056 | 50,000 | 1,312 | 48,000 | 1,102 | 36,000 | 750 | 28,000 | 518 | 20,000 | 320 | 20,000 | 288 |
| | | 6 | 0.032 | 40,000 | 950 | 38,700 | 800 | 26,000 | 530 | 25,000 | 461 | 18,000 | 288 | 18,000 | 256 |

| 被削材 Work material | | | | 1 銅 Coppers | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼入れ鋼 Hardened steels (45～55HRC) | | 6 焼入れ鋼 Hardened steels (55～65HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 120% | | 100% | | 90% | | 80% | | 65% | | 60% | |
| 外径DC Tool dia. (mm) | コーナ半径RE Corner radius (mm) | 首下長LU Under neck length (mm) | 基本切り込み Standard depth of cut (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 1 | 0.1 | 4 | 0.038 | 38,880 | 1,630 | 32,400 | 1,359 | 29,160 | 1,223 | 27,540 | 1,039 | 24,300 | 815 | 22,680 | 666 |
| | | 6 | 0.024 | 31,493 | 1,189 | 26,244 | 990 | 23,620 | 891 | 22,307 | 842 | 19,683 | 660 | 18,371 | 539 |
| | | 8 | 0.024 | 27,994 | 1,056 | 23,328 | 880 | 20,995 | 792 | 19,829 | 748 | 17,496 | 587 | 16,330 | 479 |
| | | 10 | 0.015 | 24,494 | 924 | 20,412 | 770 | 18,371 | 693 | 17,350 | 655 | 15,309 | 514 | 14,288 | 419 |
| | | 12 | 0.015 | 21,773 | 730 | 18,144 | 609 | 16,330 | 548 | 15,422 | 453 | 13,608 | 399 | 12,701 | 320 |
| | | 16 | 0.009 | 21,773 | 639 | 18,144 | 533 | 16,330 | 479 | 15,422 | 420 | 13,608 | 342 | 12,701 | 266 |
| | | 20 | 0.006 | 16,330 | 479 | 13,608 | 399 | 12,247 | 359 | 11,567 | 315 | 10,206 | 257 | 9,526 | 200 |
| | 0.2 | 4 | 0.07 | 38,880 | 1,630 | 32,400 | 1,359 | 29,160 | 1,223 | 27,540 | 1,039 | 24,300 | 815 | 22,680 | 666 |
| | | 6 | 0.04 | 31,493 | 1,189 | 26,244 | 990 | 23,620 | 891 | 22,307 | 842 | 19,683 | 660 | 18,371 | 539 |
| | | 8 | 0.04 | 27,994 | 1,056 | 23,328 | 880 | 20,995 | 792 | 19,829 | 748 | 17,496 | 587 | 16,330 | 479 |
| | | 10 | 0.025 | 24,494 | 924 | 20,412 | 770 | 18,371 | 693 | 17,350 | 655 | 15,309 | 514 | 14,288 | 419 |
| | | 12 | 0.025 | 21,773 | 730 | 18,144 | 609 | 16,330 | 548 | 15,422 | 453 | 13,608 | 399 | 12,701 | 320 |
| | | 16 | 0.015 | 21,773 | 639 | 18,144 | 533 | 16,330 | 479 | 15,422 | 420 | 13,608 | 342 | 12,701 | 266 |
| | | 20 | 0.01 | 16,330 | 479 | 13,608 | 399 | 12,247 | 359 | 11,567 | 315 | 10,206 | 257 | 9,526 | 200 |
| | 0.3 | 6 | 0.04 | 31,493 | 1,189 | 26,244 | 990 | 23,620 | 891 | 22,307 | 842 | 19,683 | 660 | 18,371 | 539 |
| | | 10 | 0.025 | 24,494 | 924 | 20,412 | 770 | 18,371 | 693 | 17,350 | 655 | 15,309 | 514 | 14,288 | 419 |
| | | 16 | 0.015 | 21,773 | 639 | 18,144 | 533 | 16,330 | 479 | 15,422 | 420 | 13,608 | 342 | 12,701 | 266 |
| | | 20 | 0.01 | 16,330 | 479 | 13,608 | 399 | 12,247 | 359 | 11,567 | 315 | 10,206 | 257 | 9,526 | 200 |
| 1.5 | 0.1 | 4 | 0.042 | 29,938 | 1,356 | 24,930 | 1,130 | 22,453 | 1,017 | 20,956 | 868 | 18,711 | 678 | 17,364 | 556 |
| | | 8 | 0.036 | 27,216 | 1,233 | 22,680 | 1,027 | 20,412 | 924 | 19,278 | 873 | 17,010 | 685 | 15,876 | 559 |
| | | 12 | 0.036 | 21,773 | 986 | 18,144 | 822 | 16,330 | 740 | 15,422 | 698 | 13,608 | 548 | 12,701 | 447 |
| | | 15 | 0.023 | 16,934 | 682 | 14,112 | 568 | 12,701 | 511 | 11,995 | 423 | 10,584 | 373 | 9,878 | 298 |
| | | 20 | 0.018 | 16,934 | 682 | 14,112 | 568 | 12,701 | 511 | 11,995 | 423 | 10,584 | 373 | 9,878 | 298 |
| | 0.2 | 4 | 0.07 | 29,938 | 1,356 | 24,930 | 1,130 | 22,453 | 1,017 | 20,956 | 868 | 18,711 | 678 | 17,364 | 556 |
| | | 8 | 0.06 | 27,216 | 1,233 | 22,680 | 1,027 | 20,412 | 924 | 19,278 | 873 | 17,010 | 685 | 15,876 | 559 |
| | | 12 | 0.06 | 21,773 | 986 | 18,144 | 822 | 16,330 | 740 | 15,422 | 698 | 13,608 | 548 | 12,701 | 447 |
| | | 15 | 0.038 | 16,934 | 682 | 14,112 | 568 | 12,701 | 511 | 11,995 | 423 | 10,584 | 373 | 9,878 | 298 |
| | | 20 | 0.03 | 16,934 | 682 | 14,112 | 568 | 12,701 | 511 | 11,995 | 423 | 10,584 | 373 | 9,878 | 298 |
| | 0.3 | 8 | 0.06 | 27,216 | 1,233 | 22,680 | 1,027 | 20,412 | 924 | 19,278 | 873 | 17,010 | 685 | 15,876 | 559 |
| | | 15 | 0.038 | 16,934 | 682 | 14,112 | 568 | 12,701 | 511 | 11,995 | 423 | 10,584 | 373 | 9,878 | 298 |
| | | 20 | 0.03 | 16,934 | 682 | 14,112 | 568 | 12,701 | 511 | 11,995 | 423 | 10,584 | 373 | 9,878 | 298 |

【注意】ご使用にあたっては、A288ページの表下の項目と注意を参照してください。【Note】Upon usage, please refer to comments and notes below table on page A288.

Epoch Deep Radius

# エポックディープラジアス

## EPDR-TH

### 標準切削条件 Standard cutting condition

| 被削材 Work material | | | | 1 銅 Coppers | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼入れ鋼 Hardened steels (45～55HRC) | | 6 焼入れ鋼 Hardened steels (55～65HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 120% | | 100% | | 90% | | 80% | | 65% | | 60% | |
| 外径DC Tool dia. (mm) | コーナ半径RE Corner radius (mm) | 首下長LU Under neck length (mm) | 基本切り込み Standard depth of cut (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 2 | 0.2 | 6 | 0.08 | 24,948 | 1,962 | 20,790 | 1,635 | 18,711 | 1,471 | 17,672 | 1,389 | 15,593 | 981 | 14,553 | 801 |
| | | 8 | 0.07 | 22,680 | 1,783 | 18,900 | 1,486 | 17,010 | 1,337 | 16,065 | 1,263 | 14,175 | 892 | 13,230 | 728 |
| | | 12 | 0.04 | 18,371 | 1,300 | 15,309 | 1,083 | 13,778 | 975 | 13,013 | 921 | 11,482 | 722 | 10,716 | 590 |
| | | 16 | 0.04 | 16,330 | 1,156 | 13,608 | 963 | 12,247 | 867 | 11,567 | 818 | 10,206 | 642 | 9,526 | 524 |
| | | 20 | 0.035 | 14,288 | 1,011 | 11,907 | 843 | 10,716 | 758 | 10,121 | 716 | 8,930 | 562 | 8,335 | 459 |
| | | 25 | 0.025 | 14,288 | 1,011 | 11,907 | 843 | 10,716 | 758 | 10,121 | 716 | 8,930 | 562 | 8,335 | 459 |
| | | 30 | 0.017 | 13,574 | 961 | 11,312 | 800 | 10,180 | 720 | 9,615 | 680 | 8,484 | 534 | 7,918 | 436 |
| | 0.3 | 8 | 0.09 | 22,680 | 1,981 | 18,900 | 1,651 | 17,010 | 1,486 | 16,065 | 1,403 | 14,175 | 991 | 13,230 | 809 |
| | | 16 | 0.06 | 16,330 | 1,284 | 13,608 | 1,070 | 12,247 | 963 | 11,567 | 909 | 10,206 | 713 | 9,526 | 583 |
| | | 20 | 0.037 | 14,288 | 1,123 | 11,907 | 936 | 10,716 | 843 | 10,121 | 796 | 8,930 | 624 | 8,335 | 510 |
| | 0.5 | 6 | 0.17 | 24,948 | 1,962 | 20,790 | 1,635 | 18,711 | 1,471 | 17,672 | 1,389 | 15,593 | 981 | 14,553 | 801 |
| | | 8 | 0.14 | 22,680 | 1,981 | 18,900 | 1,651 | 17,010 | 1,486 | 16,065 | 1,403 | 14,175 | 991 | 13,230 | 809 |
| | | 12 | 0.08 | 18,371 | 1,444 | 15,309 | 1,204 | 13,778 | 1,083 | 13,013 | 1,023 | 11,482 | 802 | 10,716 | 655 |
| | | 16 | 0.08 | 16,330 | 1,284 | 13,608 | 1,070 | 12,247 | 963 | 11,567 | 909 | 10,206 | 713 | 9,526 | 583 |
| | | 20 | 0.05 | 14,288 | 1,123 | 11,907 | 936 | 10,716 | 843 | 10,121 | 796 | 8,930 | 624 | 8,335 | 510 |
| | | 25 | 0.05 | 14,288 | 1,123 | 11,907 | 936 | 10,716 | 843 | 10,121 | 796 | 8,930 | 624 | 8,335 | 510 |
| | | 30 | 0.03 | 13,574 | 1,067 | 11,312 | 889 | 10,180 | 800 | 9,615 | 756 | 8,484 | 593 | 7,918 | 484 |
| | 0.8 | 8 | 0.2 | 22,680 | 1,981 | 18,900 | 1,651 | 17,010 | 1,486 | 16,065 | 1,403 | 14,175 | 991 | 13,230 | 809 |
| | | 16 | 0.1 | 16,330 | 1,284 | 13,608 | 1,070 | 12,247 | 963 | 11,567 | 909 | 10,206 | 713 | 9,526 | 583 |
| | | 20 | 0.06 | 14,288 | 1,123 | 11,907 | 936 | 10,716 | 843 | 10,121 | 796 | 8,930 | 624 | 8,335 | 510 |
| 3 | 0.2 | 8 | 0.09 | 17,280 | 1,698 | 14,400 | 1,415 | 12,960 | 1,274 | 12,240 | 1,203 | 10,800 | 849 | 10,080 | 693 |
| | | 12 | 0.07 | 17,280 | 1,698 | 14,400 | 1,415 | 12,960 | 1,274 | 12,240 | 1,203 | 10,800 | 849 | 10,080 | 693 |
| | | 16 | 0.05 | 17,280 | 1,698 | 14,400 | 1,415 | 12,960 | 1,274 | 12,240 | 1,203 | 10,800 | 849 | 10,080 | 693 |
| | | 20 | 0.05 | 13,997 | 1,376 | 11,664 | 1,146 | 10,498 | 1,032 | 9,914 | 974 | 8,748 | 764 | 8,165 | 624 |
| | | 30 | 0.04 | 10,886 | 1,376 | 9,072 | 1,146 | 8,165 | 1,032 | 7,711 | 974 | 6,804 | 764 | 6,350 | 624 |
| | | 35 | 0.035 | 10,886 | 1,376 | 9,072 | 1,146 | 8,165 | 1,032 | 7,711 | 974 | 6,804 | 764 | 6,350 | 624 |
| | 0.3 | 8 | 0.13 | 17,280 | 1,887 | 14,400 | 1,572 | 12,960 | 1,415 | 12,240 | 1,337 | 10,800 | 943 | 10,080 | 771 |
| | | 16 | 0.075 | 17,280 | 1,887 | 14,400 | 1,572 | 12,960 | 1,415 | 12,240 | 1,337 | 10,800 | 943 | 10,080 | 771 |
| | | 20 | 0.075 | 13,997 | 1,528 | 11,664 | 1,274 | 10,498 | 1,146 | 9,914 | 1,083 | 8,748 | 849 | 8,165 | 693 |
| | | 30 | 0.06 | 10,886 | 1,528 | 9,072 | 1,274 | 8,165 | 1,146 | 7,711 | 1,083 | 6,804 | 849 | 6,350 | 693 |
| | 0.5 | 8 | 0.18 | 17,280 | 1,887 | 14,400 | 1,572 | 12,960 | 1,415 | 12,240 | 1,337 | 10,800 | 943 | 10,080 | 771 |
| | | 12 | 0.13 | 17,280 | 1,887 | 14,400 | 1,572 | 12,960 | 1,415 | 12,240 | 1,337 | 10,800 | 943 | 10,080 | 771 |
| | | 16 | 0.1 | 17,280 | 1,887 | 14,400 | 1,572 | 12,960 | 1,415 | 12,240 | 1,337 | 10,800 | 943 | 10,080 | 771 |
| | | 20 | 0.1 | 13,997 | 1,528 | 11,664 | 1,274 | 10,498 | 1,146 | 9,914 | 1,083 | 8,748 | 849 | 8,165 | 693 |
| | | 30 | 0.08 | 10,886 | 1,528 | 9,072 | 1,274 | 8,165 | 1,146 | 7,711 | 1,083 | 6,804 | 849 | 6,350 | 693 |
| | | 35 | 0.065 | 10,886 | 1,528 | 9,072 | 1,274 | 8,165 | 1,146 | 7,711 | 1,083 | 6,804 | 849 | 6,350 | 693 |

※基本切込みは被削材グループ2での目安を示しています。その他のグループの場合は、上表の切込み比率を目安に調整して下さい。
※Standard cutting depth is shown as the criteria for Group 2 workpieces. For other groups, adjust the cutting depth according to the cutting depth factors in the above table.

【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

【Note】
1. Use the appropriate coolant for the work material and machining shape.
2. These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
3. If the rpm of the machine is low, lower the feed rate also to put the rpm and feed rate in the same ratio.

## 高能率切削条件 High efficiency cutting condition

| 被削材 Work material | | | | 1 銅 Coppers | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼入れ鋼 Hardened steels (45～55HRC) | | 6 焼入れ鋼 Hardened steels (55～65HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 120% | | 100% | | 90% | | 80% | | 65% | | 60% | |
| 外径DC Tool dia. (mm) | コーナ半径RE Corner radius (mm) | 首下長LU Under neck length (mm) | 基本切り込み Standard depth of cut (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 0.2 | 0.05 | 0.5 | 0.02 | 50,000 | 922 | 50,000 | 922 | 45,000 | 829 | 42,500 | 705 | 37,500 | 553 | 35,000 | 452 |
| | | 1 | 0.014 | 50,000 | 922 | 50,000 | 922 | 45,000 | 829 | 42,500 | 705 | 37,500 | 553 | 35,000 | 452 |
| | | 1.5 | 0.008 | 50,000 | 922 | 47,000 | 866 | 42,750 | 788 | 40,375 | 670 | 35,625 | 525 | 33,250 | 429 |
| | | 2 | 0.008 | 50,000 | 922 | 42,000 | 774 | 40,500 | 746 | 38,250 | 635 | 33,750 | 498 | 31,500 | 406 |
| 0.3 | 0.05 | 1 | 0.021 | 50,000 | 1,208 | 48,000 | 1,161 | 43,200 | 1,045 | 40,800 | 733 | 36,000 | 547 | 33,600 | 441 |
| | | 1.5 | 0.016 | 47,500 | 1,147 | 45,600 | 1,103 | 41,040 | 993 | 38,760 | 697 | 34,200 | 520 | 31,920 | 419 |
| | | 2 | 0.012 | 45,000 | 998 | 38,880 | 860 | 34,992 | 774 | 33,048 | 594 | 29,160 | 443 | 27,216 | 357 |
| | | 2.5 | 0.01 | 45,000 | 998 | 38,880 | 860 | 34,992 | 774 | 33,048 | 594 | 29,160 | 443 | 27,216 | 357 |
| | | 3 | 0.008 | 42,750 | 881 | 36,936 | 760 | 33,242 | 684 | 31,396 | 525 | 27,702 | 392 | 25,855 | 316 |
| 0.4 | 0.05 | 1 | 0.025 | 46,080 | 1,239 | 38,300 | 1,032 | 34,560 | 929 | 32,256 | 793 | 28,800 | 620 | 26,726 | 508 |
| | | 1.5 | 0.02 | 46,080 | 1,239 | 38,300 | 1,032 | 34,560 | 929 | 32,256 | 793 | 28,800 | 620 | 26,726 | 508 |
| | | 2 | 0.016 | 46,080 | 1,115 | 38,300 | 929 | 34,560 | 836 | 32,256 | 714 | 28,800 | 557 | 26,726 | 457 |
| | | 2.5 | 0.015 | 43,200 | 1,062 | 36,000 | 885 | 32,400 | 796 | 30,600 | 677 | 27,000 | 531 | 25,200 | 434 |
| | | 3 | 0.014 | 35,250 | 780 | 29,325 | 649 | 26,437 | 585 | 24,675 | 499 | 22,031 | 390 | 20,445 | 320 |
| | | 3.5 | 0.012 | 33,048 | 731 | 27,540 | 609 | 24,786 | 548 | 23,409 | 518 | 20,655 | 406 | 19,278 | 332 |
| | | 4 | 0.008 | 29,029 | 642 | 24,150 | 535 | 21,772 | 481 | 20,320 | 411 | 18,143 | 321 | 16,837 | 263 |
| | 0.1 | 2 | 0.028 | 48,000 | 1,180 | 40,000 | 983 | 36,000 | 885 | 34,000 | 752 | 30,000 | 590 | 28,000 | 482 |
| | | 3 | 0.016 | 36,720 | 812 | 30,600 | 677 | 27,540 | 609 | 26,010 | 575 | 22,950 | 451 | 21,420 | 368 |
| | | 4 | 0.01 | 30,240 | 669 | 25,200 | 557 | 22,680 | 502 | 21,420 | 474 | 18,900 | 372 | 17,640 | 303 |
| 0.5 | 0.05 | 1 | 0.03 | 46,080 | 1,239 | 38,300 | 1,032 | 34,560 | 929 | 32,256 | 793 | 28,800 | 620 | 26,726 | 508 |
| | | 2 | 0.023 | 46,080 | 1,239 | 38,300 | 1,032 | 34,560 | 929 | 32,256 | 793 | 28,800 | 620 | 26,726 | 508 |
| | | 3 | 0.017 | 37,325 | 1,101 | 31,104 | 917 | 27,994 | 826 | 26,438 | 634 | 23,328 | 473 | 21,773 | 381 |
| | | 4 | 0.017 | 33,178 | 978 | 27,648 | 815 | 24,883 | 734 | 23,501 | 563 | 20,736 | 420 | 19,354 | 339 |
| | | 5 | 0.011 | 29,030 | 856 | 24,192 | 713 | 21,773 | 642 | 20,563 | 493 | 18,144 | 368 | 16,934 | 297 |
| | | 6 | 0.008 | 25,805 | 666 | 21,504 | 555 | 19,354 | 499 | 18,278 | 320 | 16,128 | 282 | 15,053 | 222 |
| | 0.1 | 1 | 0.035 | 46,080 | 1,239 | 38,300 | 1,032 | 34,560 | 929 | 32,256 | 793 | 28,800 | 620 | 26,726 | 508 |
| | | 2 | 0.03 | 46,080 | 1,239 | 38,300 | 1,032 | 34,560 | 929 | 32,256 | 793 | 28,800 | 620 | 26,726 | 508 |
| | | 3 | 0.02 | 37,325 | 1,101 | 31,104 | 917 | 27,994 | 826 | 26,438 | 634 | 23,328 | 473 | 21,773 | 381 |
| | | 4 | 0.02 | 33,178 | 978 | 27,648 | 815 | 24,883 | 734 | 23,501 | 563 | 20,736 | 420 | 19,354 | 339 |
| | | 5 | 0.013 | 29,030 | 856 | 24,192 | 713 | 21,773 | 642 | 20,563 | 493 | 18,144 | 368 | 16,934 | 297 |
| | | 6 | 0.013 | 25,805 | 666 | 21,504 | 555 | 19,354 | 499 | 18,278 | 320 | 16,128 | 282 | 15,053 | 222 |
| 0.6 | 0.1 | 2 | 0.035 | 46,080 | 1,548 | 38,300 | 1,290 | 34,560 | 1,161 | 32,256 | 991 | 28,800 | 774 | 26,726 | 635 |
| | | 4 | 0.024 | 37,325 | 1,376 | 31,104 | 1,147 | 27,994 | 1,032 | 26,438 | 792 | 23,328 | 591 | 21,773 | 477 |
| | | 6 | 0.015 | 29,030 | 1,070 | 24,192 | 892 | 21,773 | 803 | 20,563 | 616 | 18,144 | 460 | 16,934 | 371 |
| | | 8 | 0.013 | 27,579 | 1,017 | 22,982 | 847 | 20,684 | 763 | 19,535 | 585 | 17,237 | 437 | 16,088 | 352 |
| | | 10 | 0.009 | 24,676 | 910 | 20,563 | 758 | 18,507 | 682 | 17,479 | 524 | 15,422 | 391 | 14,394 | 315 |
| 0.8 | 0.1 | 4 | 0.032 | 48,000 | 1,769 | 40,000 | 1,475 | 36,000 | 1,327 | 34,000 | 1,128 | 30,000 | 885 | 28,000 | 723 |
| | | 6 | 0.019 | 36,720 | 1,218 | 30,600 | 1,015 | 27,540 | 914 | 26,010 | 863 | 22,950 | 677 | 21,420 | 553 |
| | | 8 | 0.015 | 29,376 | 906 | 24,480 | 755 | 22,032 | 680 | 20,808 | 642 | 18,360 | 504 | 17,136 | 411 |
| | | 12 | 0.012 | 26,438 | 759 | 22,032 | 632 | 19,829 | 569 | 18,727 | 537 | 16,524 | 421 | 15,422 | 344 |
| | 0.2 | 4 | 0.056 | 48,000 | 1,769 | 40,000 | 1,475 | 36,000 | 1,327 | 34,000 | 1,128 | 30,000 | 885 | 28,000 | 723 |
| | | 6 | 0.032 | 36,720 | 1,218 | 30,600 | 1,015 | 27,540 | 914 | 26,010 | 863 | 22,950 | 677 | 21,420 | 553 |

【注意】ご使用にあたっては、A291ページの表下の項目と注意を参照してください。【Note】Upon usage, please refer to comments and notes below table on page A291.

Epoch Deep Radius

# エポックディープラジアス

## EPDR-TH

### 高能率切削条件 High efficiency cutting condition

| 被削材 Work material | | | | 1 銅 Coppers | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼入れ鋼 Hardened steels (45～55HRC) | | 6 焼入れ鋼 Hardened steels (55～65HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 120% | | 100% | | 90% | | 80% | | 65% | | 60% | |
| 外径DC Tool dia. (mm) | コーナ半径RE Corner radius (mm) | 首下長LU Under neck length (mm) | 基本切り込み Standard depth of cut (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 1 | 0.1 | 4 | 0.038 | 43,200 | 2,588 | 36,000 | 2,157 | 32,400 | 1,941 | 30,600 | 1,650 | 27,000 | 1,294 | 25,200 | 1,057 |
| | | 6 | 0.024 | 34,992 | 1,887 | 29,160 | 1,572 | 26,244 | 1,415 | 24,786 | 1,336 | 21,870 | 1,048 | 20,412 | 856 |
| | | 8 | 0.024 | 31,104 | 1,677 | 25,920 | 1,397 | 23,328 | 1,258 | 22,032 | 1,188 | 19,440 | 932 | 18,144 | 761 |
| | | 10 | 0.015 | 27,216 | 1,467 | 22,680 | 1,223 | 20,412 | 1,100 | 19,278 | 1,039 | 17,010 | 815 | 15,876 | 666 |
| | | 12 | 0.015 | 24,192 | 1,159 | 20,160 | 966 | 18,144 | 870 | 17,136 | 719 | 15,120 | 634 | 14,112 | 507 |
| | | 16 | 0.009 | 24,192 | 1,014 | 20,160 | 845 | 18,144 | 761 | 17,136 | 667 | 15,120 | 543 | 14,112 | 423 |
| | | 20 | 0.006 | 18,144 | 761 | 15,120 | 634 | 13,608 | 571 | 12,852 | 500 | 11,340 | 408 | 10,584 | 317 |
| | 0.2 | 4 | 0.07 | 43,200 | 2,588 | 36,000 | 2,157 | 32,400 | 1,941 | 30,600 | 1,650 | 27,000 | 1,294 | 25,200 | 1,057 |
| | | 6 | 0.04 | 34,992 | 1,887 | 29,160 | 1,572 | 26,244 | 1,415 | 24,786 | 1,336 | 21,870 | 1,048 | 20,412 | 856 |
| | | 8 | 0.04 | 31,104 | 1,677 | 25,920 | 1,397 | 23,328 | 1,258 | 22,032 | 1,188 | 19,440 | 932 | 18,144 | 761 |
| | | 10 | 0.025 | 27,216 | 1,467 | 22,680 | 1,223 | 20,412 | 1,100 | 19,278 | 1,039 | 17,010 | 815 | 15,876 | 666 |
| | | 12 | 0.025 | 24,192 | 1,159 | 20,160 | 966 | 18,144 | 870 | 17,136 | 719 | 15,120 | 634 | 14,112 | 507 |
| | | 16 | 0.015 | 24,192 | 1,014 | 20,160 | 845 | 18,144 | 761 | 17,136 | 667 | 15,120 | 543 | 14,112 | 423 |
| | | 20 | 0.01 | 18,144 | 761 | 15,120 | 634 | 13,608 | 571 | 12,852 | 500 | 11,340 | 408 | 10,584 | 317 |
| | 0.3 | 6 | 0.04 | 34,992 | 1,887 | 29,160 | 1,572 | 26,244 | 1,415 | 24,786 | 1,336 | 21,870 | 1,048 | 20,412 | 856 |
| | | 10 | 0.025 | 27,216 | 1,467 | 22,680 | 1,223 | 20,412 | 1,100 | 19,278 | 1,039 | 17,010 | 815 | 15,876 | 666 |
| | | 16 | 0.015 | 24,192 | 1,014 | 20,160 | 845 | 18,144 | 761 | 17,136 | 667 | 15,120 | 543 | 14,112 | 423 |
| | | 20 | 0.01 | 18,144 | 761 | 15,120 | 634 | 13,608 | 571 | 12,852 | 500 | 11,340 | 408 | 10,584 | 317 |
| 1.5 | 0.1 | 4 | 0.042 | 33,264 | 2,153 | 27,700 | 1,793 | 24,948 | 1,614 | 23,285 | 1,378 | 20,790 | 1,076 | 19,293 | 883 |
| | | 8 | 0.036 | 30,240 | 1,956 | 25,200 | 1,630 | 22,680 | 1,467 | 21,420 | 1,386 | 18,900 | 1,087 | 17,640 | 888 |
| | | 12 | 0.036 | 24,192 | 1,565 | 20,160 | 1,304 | 18,144 | 1,174 | 17,136 | 1,109 | 15,120 | 870 | 14,112 | 710 |
| | | 15 | 0.023 | 18,816 | 1,082 | 15,680 | 902 | 14,112 | 812 | 13,328 | 671 | 11,760 | 592 | 10,976 | 473 |
| | | 20 | 0.018 | 18,816 | 1,082 | 15,680 | 902 | 14,112 | 812 | 13,328 | 671 | 11,760 | 592 | 10,976 | 473 |
| | 0.2 | 4 | 0.07 | 33,264 | 2,153 | 27,700 | 1,793 | 24,948 | 1,614 | 23,285 | 1,378 | 20,790 | 1,076 | 19,293 | 883 |
| | | 8 | 0.06 | 30,240 | 1,956 | 25,200 | 1,630 | 22,680 | 1,467 | 21,420 | 1,386 | 18,900 | 1,087 | 17,640 | 888 |
| | | 12 | 0.06 | 24,192 | 1,565 | 20,160 | 1,304 | 18,144 | 1,174 | 17,136 | 1,109 | 15,120 | 870 | 14,112 | 710 |
| | | 15 | 0.038 | 18,816 | 1,082 | 15,680 | 902 | 14,112 | 812 | 13,328 | 671 | 11,760 | 592 | 10,976 | 473 |
| | | 20 | 0.03 | 18,816 | 1,082 | 15,680 | 902 | 14,112 | 812 | 13,328 | 671 | 11,760 | 592 | 10,976 | 473 |
| | 0.3 | 8 | 0.06 | 30,240 | 1,956 | 25,200 | 1,630 | 22,680 | 1,467 | 21,420 | 1,386 | 18,900 | 1,087 | 17,640 | 888 |
| | | 15 | 0.038 | 18,816 | 1,082 | 15,680 | 902 | 14,112 | 812 | 13,328 | 671 | 11,760 | 592 | 10,976 | 473 |
| | | 20 | 0.03 | 18,816 | 1,082 | 15,680 | 902 | 14,112 | 812 | 13,328 | 671 | 11,760 | 592 | 10,976 | 473 |

| 被削材 Work material | | | | 1 銅 Coppers | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼入れ鋼 Hardened steels (45～55HRC) | | 6 焼入れ鋼 Hardened steels (55～65HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切り込み比率 Ratio to standard depth of cut | | | | 120% | | 100% | | 90% | | 80% | | 65% | | 60% | |
| 外径DC Tool dia. (mm) | コーナ半径RE Corner radius (mm) | 首下長LU Under neck length (mm) | 基本切り込み Standard depth of cut (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 2 | 0.2 | 6 | 0.08 | 27,720 | 3,114 | 23,100 | 2,595 | 20,790 | 2,335 | 19,635 | 2,205 | 17,325 | 1,557 | 16,170 | 1,271 |
| | | 8 | 0.07 | 25,200 | 2,830 | 21,000 | 2,359 | 18,900 | 2,123 | 17,850 | 2,005 | 15,750 | 1,415 | 14,700 | 1,156 |
| | | 12 | 0.04 | 20,412 | 2,063 | 17,010 | 1,720 | 15,309 | 1,548 | 14,459 | 1,462 | 12,758 | 1,146 | 11,907 | 936 |
| | | 16 | 0.04 | 18,144 | 1,834 | 15,120 | 1,528 | 13,608 | 1,376 | 12,852 | 1,299 | 11,340 | 1,019 | 10,584 | 832 |
| | | 20 | 0.035 | 15,876 | 1,605 | 13,230 | 1,337 | 11,907 | 1,204 | 11,246 | 1,137 | 9,923 | 892 | 9,261 | 728 |
| | | 25 | 0.025 | 15,876 | 1,605 | 13,230 | 1,337 | 11,907 | 1,204 | 11,246 | 1,137 | 9,923 | 892 | 9,261 | 728 |
| | | 30 | 0.017 | 15,082 | 1,525 | 12,569 | 1,271 | 11,312 | 1,143 | 10,683 | 1,080 | 9,426 | 847 | 8,798 | 692 |
| | 0.3 | 8 | 0.09 | 25,200 | 3,145 | 21,000 | 2,621 | 18,900 | 2,359 | 17,850 | 2,228 | 15,750 | 1,572 | 14,700 | 1,284 |
| | | 16 | 0.06 | 18,144 | 2,038 | 15,120 | 1,698 | 13,608 | 1,528 | 12,852 | 1,444 | 11,340 | 1,132 | 10,584 | 925 |
| | | 20 | 0.037 | 15,876 | 1,783 | 13,230 | 1,486 | 11,907 | 1,337 | 11,246 | 1,263 | 9,923 | 991 | 9,261 | 809 |
| | 0.5 | 6 | 0.17 | 27,720 | 3,459 | 23,100 | 2,883 | 20,790 | 2,595 | 19,635 | 2,450 | 17,325 | 1,730 | 16,170 | 1,413 |
| | | 8 | 0.14 | 25,200 | 3,145 | 21,000 | 2,621 | 18,900 | 2,359 | 17,850 | 2,228 | 15,750 | 1,572 | 14,700 | 1,284 |
| | | 12 | 0.08 | 20,412 | 2,293 | 17,010 | 1,911 | 15,309 | 1,720 | 14,459 | 1,624 | 12,758 | 1,274 | 11,907 | 1,040 |
| | | 16 | 0.08 | 18,144 | 2,038 | 15,120 | 1,698 | 13,608 | 1,528 | 12,852 | 1,444 | 11,340 | 1,132 | 10,584 | 925 |
| | | 20 | 0.05 | 15,876 | 1,783 | 13,230 | 1,486 | 11,907 | 1,337 | 11,246 | 1,263 | 9,923 | 991 | 9,261 | 809 |
| | | 25 | 0.05 | 15,876 | 1,783 | 13,230 | 1,486 | 11,907 | 1,337 | 11,246 | 1,263 | 9,923 | 991 | 9,261 | 809 |
| | | 30 | 0.03 | 15,082 | 1,694 | 12,569 | 1,412 | 11,312 | 1,271 | 10,683 | 1,200 | 9,426 | 941 | 8,798 | 769 |
| | 0.8 | 8 | 0.2 | 25,200 | 3,145 | 21,000 | 2,621 | 18,900 | 2,359 | 17,850 | 2,228 | 15,750 | 1,572 | 14,700 | 1,284 |
| | | 16 | 0.1 | 18,144 | 2,038 | 15,120 | 1,698 | 13,608 | 1,528 | 12,852 | 1,444 | 11,340 | 1,132 | 10,584 | 925 |
| | | 20 | 0.06 | 15,876 | 1,783 | 13,230 | 1,486 | 11,907 | 1,337 | 11,246 | 1,263 | 9,923 | 991 | 9,261 | 809 |
| 3 | 0.2 | 8 | 0.09 | 19,200 | 2,696 | 16,000 | 2,246 | 14,400 | 2,022 | 13,600 | 1,909 | 12,000 | 1,348 | 11,200 | 1,101 |
| | | 12 | 0.07 | 19,200 | 2,696 | 16,000 | 2,246 | 14,400 | 2,022 | 13,600 | 1,909 | 12,000 | 1,348 | 11,200 | 1,101 |
| | | 16 | 0.05 | 19,200 | 2,696 | 16,000 | 2,246 | 14,400 | 2,022 | 13,600 | 1,909 | 12,000 | 1,348 | 11,200 | 1,101 |
| | | 20 | 0.05 | 15,552 | 2,184 | 12,960 | 1,820 | 11,664 | 1,638 | 11,016 | 1,547 | 9,720 | 1,213 | 9,072 | 991 |
| | | 30 | 0.04 | 12,096 | 2,184 | 10,080 | 1,820 | 9,072 | 1,638 | 8,568 | 1,547 | 7,560 | 1,213 | 7,056 | 991 |
| | | 35 | 0.035 | 12,096 | 2,184 | 10,080 | 1,820 | 9,072 | 1,638 | 8,568 | 1,547 | 7,560 | 1,213 | 7,056 | 991 |
| | 0.3 | 8 | 0.13 | 19,200 | 2,995 | 16,000 | 2,496 | 14,400 | 2,246 | 13,600 | 2,122 | 12,000 | 1,498 | 11,200 | 1,223 |
| | | 16 | 0.075 | 19,200 | 2,995 | 16,000 | 2,496 | 14,400 | 2,246 | 13,600 | 2,122 | 12,000 | 1,498 | 11,200 | 1,223 |
| | | 20 | 0.075 | 15,552 | 2,426 | 12,960 | 2,022 | 11,664 | 1,820 | 11,016 | 1,718 | 9,720 | 1,348 | 9,072 | 1,101 |
| | | 30 | 0.06 | 12,096 | 2,426 | 10,080 | 2,022 | 9,072 | 1,820 | 8,568 | 1,718 | 7,560 | 1,348 | 7,056 | 1,101 |
| | 0.5 | 8 | 0.18 | 19,200 | 2,995 | 16,000 | 2,496 | 14,400 | 2,246 | 13,600 | 2,122 | 12,000 | 1,498 | 11,200 | 1,223 |
| | | 12 | 0.13 | 19,200 | 2,995 | 16,000 | 2,496 | 14,400 | 2,246 | 13,600 | 2,122 | 12,000 | 1,498 | 11,200 | 1,223 |
| | | 16 | 0.1 | 19,200 | 2,995 | 16,000 | 2,496 | 14,400 | 2,246 | 13,600 | 2,122 | 12,000 | 1,498 | 11,200 | 1,223 |
| | | 20 | 0.1 | 15,552 | 2,426 | 12,960 | 2,022 | 11,664 | 1,820 | 11,016 | 1,718 | 9,720 | 1,348 | 9,072 | 1,101 |
| | | 30 | 0.08 | 12,096 | 2,426 | 10,080 | 2,022 | 9,072 | 1,820 | 8,568 | 1,718 | 7,560 | 1,348 | 7,056 | 1,101 |
| | | 35 | 0.065 | 12,096 | 2,426 | 10,080 | 2,022 | 9,072 | 1,820 | 8,568 | 1,718 | 7,560 | 1,348 | 7,056 | 1,101 |

※基本切込みは被削材グループ2での目安を示しています。その他のグループの場合は、上表の切込み比率を目安に調整して下さい。
※Standard cutting depth is shown as the criteria for Group 2 workpieces. For other groups, adjust the cutting depth according to the cutting depth factors in the above table.

【注意】 ①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

【Note】
1. Use the appropriate coolant for the work material and machining shape.
2. These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
3. If the rpm of the machine is low, lower the feed rate also to put the rpm and feed rate in the same ratio.

## Epoch Deep Square Evolution

# エポックディープスクエア エボリューション

ATHCoating

側面 Side Cutting　溝 Slotting　細部 Miniature　仕上 Finishing　リブ・細部 Rib Miniature

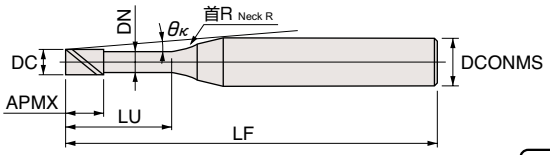
外径公差 Dia.tolerance
φ0.1～φ0.5：0～−0.007
φ0.6～φ0.9：0～−0.01
φ1～φ6　：0～−0.015

h5

(mm)

刃先と首形状の改良によりタオレを抑制し高精度加工を実現。
ATH&PNコーティングの採用で更なる長寿命加工。
Improved flute tip shape and neck shape suppresses warping to enable high-accuracy cutting. Use of ATH and PN coatings further extends tool life.

2枚刃
2 Flutes




切削条件表 A298 Cutting Conditions

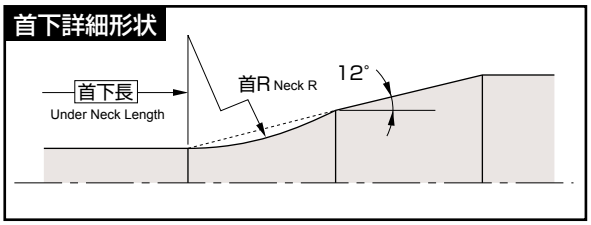
超硬 Carbide　ATH　ねじれ30° Helix angle

## EPDSE2○○○-○○.○-ATH

| 商品コード Item code | 在庫 Stock ATH | 寸法 Size(mm) 外径 Tool dia. DC | 首下長 Under Neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度 Interference angle θκ | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDSE2001-0.3-ATH | ● | 0.1 | 0.3 | 0.15 | 0.08 | 45 | 4 | 1 | 11.58 | 0.46 | 0.49 | 0.51 | 0.53 | 0.58 | 15,320 |
| EPDSE2001-0.5-ATH | ● | | 0.5 | 0.15 | 0.08 | 45 | 4 | 1 | 11.35 | 0.67 | 0.71 | 0.74 | 0.76 | 0.82 | 16,720 |
| EPDSE2001-1-ATH | ● | | 1 | 0.15 | 0.08 | 45 | 4 | 1 | 10.81 | 1.20 | 1.25 | 1.29 | 1.33 | 1.39 | 20,890 |
| EPDSE2002-0.5-ATH | ● | 0.2 | 0.5 | 0.3 | 0.17 | 50 | 4 | 1 | 11.30 | 0.70 | 0.73 | 0.76 | 0.78 | 0.83 | 10,030 |
| EPDSE2002-1-ATH | ● | | 1 | 0.3 | 0.17 | 50 | 4 | 1 | 10.75 | 1.22 | 1.27 | 1.31 | 1.34 | 1.42 | 10,830 |
| EPDSE2002-1.5-ATH | ● | | 1.5 | 0.3 | 0.17 | 50 | 4 | 1 | 10.25 | 1.74 | 1.80 | 1.85 | 1.89 | 2.08 | 13,080 |
| EPDSE2002-2-ATH | ● | | 2 | 0.3 | 0.17 | 50 | 4 | 1 | 9.80 | 2.26 | 2.32 | 2.38 | 2.47 | 2.74 | 14,680 |
| EPDSE2002-3-ATH | ● | | 3 | 0.3 | 0.17 | 50 | 4 | 1 | 9.00 | 3.29 | 3.37 | 3.50 | 3.67 | 4.07 | 15,220 |
| EPDSE2003-1-ATH | ● | 0.3 | 1 | 0.45 | 0.27 | 50 | 4 | 2 | 10.72 | 1.32 | 1.39 | 1.45 | 1.51 | 1.62 | 8,780 |
| EPDSE2003-1.5-ATH | ● | | 1.5 | 0.45 | 0.27 | 50 | 4 | 2 | 10.21 | 1.85 | 1.93 | 2.01 | 2.08 | 2.21 | 8,780 |
| EPDSE2003-2-ATH | ● | | 2 | 0.45 | 0.27 | 50 | 4 | 2 | 9.75 | 2.37 | 2.47 | 2.56 | 2.64 | 2.78 | 10,830 |
| EPDSE2003-2.5-ATH | ● | | 2.5 | 0.45 | 0.27 | 50 | 4 | 2 | 9.32 | 2.89 | 3.01 | 3.11 | 3.20 | 3.41 | 11,250 |
| EPDSE2003-3-ATH | ● | | 3 | 0.45 | 0.27 | 50 | 4 | 2 | 8.93 | 3.42 | 3.54 | 3.65 | 3.75 | 4.07 | 11,250 |
| EPDSE2004-1-ATH | ● | 0.4 | 1 | 0.6 | 0.37 | 50 | 4 | 2 | 10.69 | 1.32 | 1.39 | 1.45 | 1.51 | 1.62 | 6,410 |
| EPDSE2004-1.5-ATH | ● | | 1.5 | 0.6 | 0.37 | 50 | 4 | 2 | 10.17 | 1.85 | 1.93 | 2.01 | 2.08 | 2.21 | 6,410 |
| EPDSE2004-2-ATH | ● | | 2 | 0.6 | 0.37 | 50 | 4 | 2 | 9.70 | 2.37 | 2.47 | 2.56 | 2.64 | 2.78 | 6,410 |
| EPDSE2004-2.5-ATH | ● | | 2.5 | 0.6 | 0.37 | 50 | 4 | 2 | 9.27 | 2.89 | 3.01 | 3.11 | 3.20 | 3.41 | 6,410 |
| EPDSE2004-3-ATH | ● | | 3 | 0.6 | 0.37 | 50 | 4 | 2 | 8.87 | 3.42 | 3.54 | 3.65 | 3.75 | 4.07 | 6,410 |
| EPDSE2004-3.5-ATH | ● | | 3.5 | 0.6 | 0.37 | 50 | 4 | 2 | 8.51 | 3.94 | 4.08 | 4.19 | 4.29 | 4.73 | 6,410 |
| EPDSE2004-4-ATH | ● | | 4 | 0.6 | 0.37 | 50 | 4 | 2 | 8.17 | 4.46 | 4.61 | 4.73 | 4.87 | 5.40 | 6,410 |
| EPDSE2004-5-ATH | ● | | 5 | 0.6 | 0.37 | 50 | 4 | 2 | 7.58 | 5.49 | 5.66 | 5.79 | 6.06 | 6.72 | 6,410 |
| EPDSE2004-6-ATH | ● | | 6 | 0.6 | 0.37 | 50 | 4 | 2 | 7.06 | 6.53 | 6.71 | 6.92 | 7.26 | 8.05 | 7,940 |
| EPDSE2004-8-ATH | ● | | 8 | 0.6 | 0.37 | 50 | 4 | 2 | 6.22 | 8.59 | 8.80 | 9.20 | 9.65 | 10.71 | 13,930 |
| EPDSE2004-10-ATH | ● | | 10 | 0.6 | 0.37 | 50 | 4 | 2 | 5.55 | 10.64 | 10.97 | 11.48 | 12.05 | 13.36 | 15,220 |
| EPDSE2005-1-ATH | ● | 0.5 | 1 | 0.75 | 0.47 | 50 | 4 | 2 | 10.66 | 1.32 | 1.39 | 1.45 | 1.51 | 1.62 | 4,600 |
| EPDSE2005-1.5-ATH | ● | | 1.5 | 0.75 | 0.47 | 50 | 4 | 2 | 10.13 | 1.85 | 1.93 | 2.01 | 2.08 | 2.21 | 4,600 |
| EPDSE2005-2-ATH | ● | | 2 | 0.75 | 0.47 | 50 | 4 | 2 | 9.64 | 2.37 | 2.47 | 2.56 | 2.64 | 2.78 | 4,600 |
| EPDSE2005-2.5-ATH | ● | | 2.5 | 0.75 | 0.47 | 50 | 4 | 2 | 9.21 | 2.89 | 3.01 | 3.11 | 3.20 | 3.41 | 4,600 |
| EPDSE2005-3-ATH | ● | | 3 | 0.75 | 0.47 | 50 | 4 | 2 | 8.81 | 3.42 | 3.54 | 3.65 | 3.75 | 4.07 | 4,600 |
| EPDSE2005-4-ATH | ● | | 4 | 0.75 | 0.47 | 50 | 4 | 2 | 8.10 | 4.46 | 4.61 | 4.73 | 4.87 | 5.40 | 4,600 |
| EPDSE2005-5-ATH | ● | | 5 | 0.75 | 0.47 | 50 | 4 | 2 | 7.50 | 5.49 | 5.66 | 5.79 | 6.06 | 6.72 | 4,600 |
| EPDSE2005-6-ATH | ● | | 6 | 0.75 | 0.47 | 50 | 4 | 2 | 6.98 | 6.53 | 6.71 | 6.92 | 7.26 | 8.05 | 4,600 |
| EPDSE2005-8-ATH | ● | | 8 | 0.75 | 0.47 | 50 | 4 | 2 | 6.13 | 8.59 | 8.80 | 9.20 | 9.65 | 10.71 | 7,670 |
| EPDSE2005-10-ATH | ● | | 10 | 0.75 | 0.47 | 50 | 4 | 2 | 5.47 | 10.64 | 10.97 | 11.48 | 12.05 | 13.36 | 7,670 |
| EPDSE2006-2-ATH | ● | 0.6 | 2 | 0.9 | 0.57 | 50 | 4 | 4 | 9.59 | 2.54 | 2.70 | 2.84 | 2.96 | 3.19 | 4,890 |
| EPDSE2006-3-ATH | ● | | 3 | 0.9 | 0.57 | 50 | 4 | 4 | 8.74 | 3.60 | 3.80 | 3.96 | 4.11 | 4.37 | 4,890 |
| EPDSE2006-4-ATH | ● | | 4 | 0.9 | 0.57 | 50 | 4 | 4 | 8.02 | 4.66 | 4.89 | 5.07 | 5.24 | 5.53 | 4,890 |
| EPDSE2006-5-ATH | ● | | 5 | 0.9 | 0.57 | 50 | 4 | 4 | 7.42 | 5.71 | 5.96 | 6.17 | 6.35 | 6.72 | 4,890 |
| EPDSE2006-6-ATH | ● | | 6 | 0.9 | 0.57 | 50 | 4 | 4 | 6.90 | 6.76 | 7.04 | 7.26 | 7.45 | 8.05 | 4,890 |
| EPDSE2006-7-ATH | ● | | 7 | 0.9 | 0.57 | 50 | 4 | 4 | 6.44 | 7.81 | 8.10 | 8.34 | 8.55 | 9.38 | 6,140 |
| EPDSE2006-8-ATH | ● | | 8 | 0.9 | 0.57 | 50 | 4 | 4 | 6.04 | 8.85 | 9.17 | 9.42 | 9.65 | 10.71 | 7,940 |
| EPDSE2006-9-ATH | ● | | 9 | 0.9 | 0.57 | 50 | 4 | 4 | 5.69 | 9.89 | 10.22 | 10.49 | 10.85 | 12.03 | 9,200 |
| EPDSE2006-10-ATH | ● | | 10 | 0.9 | 0.57 | 50 | 4 | 4 | 5.38 | 10.93 | 11.28 | 11.56 | 12.05 | 13.36 | 9,200 |
| EPDSE2007-2-ATH | ● | 0.7 | 2 | 1.05 | 0.67 | 50 | 4 | 4 | 9.53 | 2.54 | 2.70 | 2.84 | 2.96 | 3.19 | 5,580 |
| EPDSE2007-4-ATH | ● | | 4 | 1.05 | 0.67 | 50 | 4 | 4 | 7.94 | 4.66 | 4.89 | 5.07 | 5.24 | 5.53 | 5,580 |
| EPDSE2007-6-ATH | ● | | 6 | 1.05 | 0.67 | 50 | 4 | 4 | 6.81 | 6.76 | 7.04 | 7.26 | 7.45 | 8.05 | 5,580 |
| EPDSE2007-8-ATH | ● | | 8 | 1.05 | 0.67 | 50 | 4 | 4 | 5.95 | 8.85 | 9.17 | 9.42 | 9.65 | 10.71 | 9,060 |
| EPDSE2007-10-ATH | ● | | 10 | 1.05 | 0.67 | 50 | 4 | 4 | 5.29 | 10.93 | 11.28 | 11.56 | 12.05 | 13.36 | 11,900 |

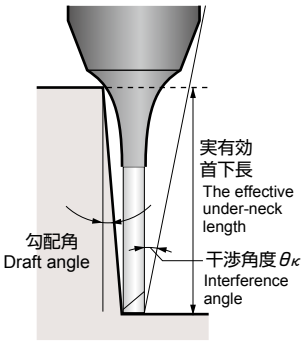
●：標準在庫品です。●：Stocked items.　干渉なし：No interference

首下詳細形状




【注意】
エポックディープスクエアEPDSとは有効首下長が異なります。再度ご確認お願いいたします。

【Note】
The effective under-neck length is different from Epoch Deep Square EPDS. Please recheck the interference region.




# EPDSE2○○○-○○.○-ATH

| 商品コード Item code | 在庫 Stock ATH | 寸法 Size(mm) 外径 Tool dia. DC | 首下長 Under Neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度 Interference angle θK | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDSE2008-2-ATH | ● | 0.8 | 2 | 1.2 | 0.77 | 50 | 4 | 4 | 9.47 | 2.54 | 2.70 | 2.84 | 2.96 | 3.19 | 5,440 |
| EPDSE2008-4-ATH | ● | | 4 | 1.2 | 0.77 | 50 | 4 | 4 | 7.86 | 4.66 | 4.89 | 5.07 | 5.24 | 5.53 | 5,440 |
| EPDSE2008-6-ATH | ● | | 6 | 1.2 | 0.77 | 50 | 4 | 4 | 6.72 | 6.76 | 7.04 | 7.26 | 7.45 | 8.05 | 5,440 |
| EPDSE2008-8-ATH | ● | | 8 | 1.2 | 0.77 | 50 | 4 | 4 | 5.86 | 8.85 | 9.17 | 9.42 | 9.65 | 10.71 | 5,440 |
| EPDSE2008-10-ATH | ● | | 10 | 1.2 | 0.77 | 50 | 4 | 4 | 5.20 | 10.93 | 11.28 | 11.56 | 12.05 | 13.36 | 7,940 |
| EPDSE2008-12-ATH | ● | | 12 | 1.2 | 0.77 | 55 | 4 | 4 | 4.67 | 13.00 | 13.38 | 13.76 | 14.44 | 16.02 | 9,060 |
| EPDSE2009-2-ATH | ● | 0.9 | 2 | 1.35 | 0.86 | 50 | 4 | 4 | 9.38 | 2.58 | 2.73 | 2.86 | 2.98 | 3.21 | 6,270 |
| EPDSE2009-4-ATH | ● | | 4 | 1.35 | 0.86 | 50 | 4 | 4 | 7.76 | 4.69 | 4.91 | 5.09 | 5.26 | 5.54 | 6,270 |
| EPDSE2009-6-ATH | ● | | 6 | 1.35 | 0.86 | 50 | 4 | 4 | 6.61 | 6.79 | 7.06 | 7.28 | 7.47 | 8.08 | 6,270 |
| EPDSE2009-8-ATH | ● | | 8 | 1.35 | 0.86 | 50 | 4 | 4 | 5.76 | 8.87 | 9.18 | 9.43 | 9.68 | 10.74 | 6,270 |
| EPDSE2009-10-ATH | ● | | 10 | 1.35 | 0.86 | 50 | 4 | 4 | 5.10 | 10.95 | 11.30 | 11.57 | 12.07 | 13.39 | 6,270 |
| EPDSE2009-12-ATH | ● | | 12 | 1.35 | 0.86 | 55 | 4 | 4 | 4.58 | 13.02 | 13.40 | 13.79 | 14.47 | 16.05 | 7,160 |
| EPDSE2010-2-ATH | ● | 1 | 2 | 1.5 | 0.96 | 50 | 4 | 4 | 9.31 | 2.58 | 2.73 | 2.86 | 2.98 | 3.21 | 4,890 |
| EPDSE2010-3-ATH | ● | | 3 | 1.5 | 0.96 | 50 | 4 | 4 | 8.41 | 3.64 | 3.82 | 3.99 | 4.13 | 4.39 | 4,890 |
| EPDSE2010-4-ATH | ● | | 4 | 1.5 | 0.96 | 50 | 4 | 4 | 7.67 | 4.69 | 4.91 | 5.09 | 5.26 | 5.54 | 4,890 |
| EPDSE2010-5-ATH | ● | | 5 | 1.5 | 0.96 | 50 | 4 | 4 | 7.04 | 5.74 | 5.99 | 6.19 | 6.37 | 6.76 | 4,890 |
| EPDSE2010-6-ATH | ● | | 6 | 1.5 | 0.96 | 50 | 4 | 4 | 6.51 | 6.79 | 7.06 | 7.28 | 7.47 | 8.08 | 4,890 |
| EPDSE2010-7-ATH | ● | | 7 | 1.5 | 0.96 | 50 | 4 | 4 | 6.06 | 7.83 | 8.12 | 8.36 | 8.56 | 9.41 | 4,890 |
| EPDSE2010-8-ATH | ● | | 8 | 1.5 | 0.96 | 50 | 4 | 4 | 5.66 | 8.87 | 9.18 | 9.43 | 9.68 | 10.74 | 4,890 |
| EPDSE2010-9-ATH | ● | | 9 | 1.5 | 0.96 | 50 | 4 | 4 | 5.31 | 9.91 | 10.24 | 10.50 | 10.88 | 12.07 | 4,890 |
| EPDSE2010-10-ATH | ● | | 10 | 1.5 | 0.96 | 50 | 4 | 4 | 5.00 | 10.95 | 11.30 | 11.57 | 12.07 | 13.39 | 4,890 |
| EPDSE2010-12-ATH | ● | | 12 | 1.5 | 0.96 | 55 | 4 | 4 | 4.48 | 13.02 | 13.40 | 13.79 | 14.47 | 16.05 | 4,890 |
| EPDSE2010-14-ATH | ● | | 14 | 1.5 | 0.96 | 55 | 4 | 4 | 4.06 | 15.09 | 15.49 | 16.07 | 16.86 | 18.70 | 4,890 |
| EPDSE2010-16-ATH | ● | | 16 | 1.5 | 0.96 | 55 | 4 | 4 | 3.71 | 17.15 | 17.58 | 18.35 | 19.25 | 21.36 | 7,940 |
| EPDSE2010-20-ATH | ● | | 20 | 1.5 | 0.96 | 60 | 4 | 4 | 3.17 | 21.26 | 21.89 | 22.91 | 24.04 | 26.66 | 7,940 |
| EPDSE2010-25-ATH | ● | | 25 | 1.5 | 0.96 | 65 | 4 | 4 | 2.68 | 26.39 | 27.33 | 28.61 | 30.02 | 干渉なし | 9,200 |
| EPDSE2012-4-ATH | ● | 1.2 | 4 | 1.8 | 1.15 | 50 | 4 | 4 | 7.46 | 4.72 | 4.93 | 5.11 | 5.27 | 5.55 | 5,160 |
| EPDSE2012-6-ATH | ● | | 6 | 1.8 | 1.15 | 50 | 4 | 4 | 6.29 | 6.81 | 7.08 | 7.29 | 7.48 | 8.11 | 5,160 |
| EPDSE2012-8-ATH | ● | | 8 | 1.8 | 1.15 | 50 | 4 | 4 | 5.44 | 8.90 | 9.20 | 9.45 | 9.71 | 10.77 | 5,160 |
| EPDSE2012-10-ATH | ● | | 10 | 1.8 | 1.15 | 50 | 4 | 4 | 4.80 | 10.97 | 11.31 | 11.58 | 12.10 | 13.42 | 5,160 |
| EPDSE2012-12-ATH | ● | | 12 | 1.8 | 1.15 | 55 | 4 | 4 | 4.29 | 13.04 | 13.41 | 13.82 | 14.49 | 16.08 | 5,160 |
| EPDSE2012-16-ATH | ● | | 16 | 1.8 | 1.15 | 55 | 4 | 4 | 3.53 | 17.16 | 17.59 | 18.38 | 19.28 | 21.39 | 8,230 |
| EPDSE2014-6-ATH | ● | 1.4 | 6 | 2.1 | 1.34 | 50 | 4 | 4 | 6.06 | 6.84 | 7.09 | 7.31 | 7.50 | 8.15 | 5,300 |
| EPDSE2014-12-ATH | ● | | 12 | 2.1 | 1.34 | 55 | 4 | 4 | 4.08 | 13.06 | 13.43 | 13.84 | 14.52 | 16.11 | 5,300 |
| EPDSE2015-4-ATH | ● | 1.5 | 4 | 2.25 | 1.44 | 50 | 4 | 4 | 7.11 | 4.75 | 4.95 | 5.13 | 5.29 | 5.57 | 5,160 |
| EPDSE2015-6-ATH | ● | | 6 | 2.25 | 1.44 | 50 | 4 | 4 | 5.94 | 6.84 | 7.09 | 7.31 | 7.50 | 8.15 | 5,160 |
| EPDSE2015-8-ATH | ● | | 8 | 2.25 | 1.44 | 50 | 4 | 4 | 5.10 | 8.92 | 9.22 | 9.46 | 9.74 | 10.80 | 5,160 |
| EPDSE2015-10-ATH | ● | | 10 | 2.25 | 1.44 | 50 | 4 | 4 | 4.47 | 10.99 | 11.33 | 11.59 | 12.13 | 13.45 | 5,160 |
| EPDSE2015-12-ATH | ● | | 12 | 2.25 | 1.44 | 55 | 4 | 4 | 3.97 | 13.06 | 13.43 | 13.84 | 14.52 | 16.11 | 5,160 |
| EPDSE2015-14-ATH | ● | | 14 | 2.25 | 1.44 | 55 | 4 | 4 | 3.58 | 15.12 | 15.52 | 16.12 | 16.92 | 18.76 | 5,300 |
| EPDSE2015-16-ATH | ● | | 16 | 2.25 | 1.44 | 55 | 4 | 4 | 3.25 | 17.18 | 17.60 | 18.40 | 19.31 | 21.42 | 5,300 |
| EPDSE2015-18-ATH | ● | | 18 | 2.25 | 1.44 | 60 | 4 | 4 | 2.98 | 19.24 | 19.76 | 20.69 | 21.70 | 干渉なし | 5,300 |
| EPDSE2015-20-ATH | ● | | 20 | 2.25 | 1.44 | 60 | 4 | 4 | 2.76 | 21.29 | 21.94 | 22.97 | 24.10 | 干渉なし | 5,300 |
| EPDSE2015-25-ATH | ● | | 25 | 2.25 | 1.44 | 65 | 4 | 4 | 2.31 | 26.42 | 27.39 | 28.67 | 30.08 | 干渉なし | 7,940 |
| EPDSE2015-30-ATH | ● | | 30 | 2.25 | 1.44 | 70 | 4 | 4 | 1.99 | 31.53 | 32.83 | 34.37 | 干渉なし | 干渉なし | 7,940 |
| EPDSE2015-35-ATH | ● | | 35 | 2.25 | 1.44 | 75 | 4 | 4 | 1.75 | 36.64 | 38.28 | 40.07 | 干渉なし | 干渉なし | 9,060 |
| EPDSE2015-40-ATH | ● | | 40 | 2.25 | 1.44 | 80 | 4 | 4 | 1.56 | 41.85 | 43.73 | 45.78 | 干渉なし | 干渉なし | 10,170 |
| EPDSE2016-6-ATH | ● | 1.6 | 6 | 2.4 | 1.54 | 50 | 4 | 4 | 5.82 | 6.84 | 7.09 | 7.31 | 7.50 | 8.15 | 5,300 |
| EPDSE2016-8-ATH | ● | | 8 | 2.4 | 1.54 | 50 | 4 | 4 | 4.98 | 8.92 | 9.22 | 9.46 | 9.74 | 10.80 | 5,300 |
| EPDSE2018-6-ATH | ● | 1.8 | 6 | 2.7 | 1.73 | 50 | 4 | 4 | 5.55 | 6.86 | 7.11 | 7.32 | 7.51 | 8.18 | 5,300 |
| EPDSE2018-8-ATH | ● | | 8 | 2.7 | 1.73 | 50 | 4 | 4 | 4.72 | 8.94 | 9.23 | 9.47 | 9.76 | 10.83 | 5,300 |

Epoch Deep Square Evolution

# エポックディープスクエア エボリューション

ATHCoating

## EPDSE2○○○-○○.○-ATH

| 商品コード Item code | 在庫 Stock ATH | 寸法 Size(mm) 外径 Tool dia. DC | 首下長 Under Neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度 Interference angle θK | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格（円）Suggested retail price（¥） |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDSE2020-4-ATH | ● | 2 | 4 | 3 | 1.92 | 50 | 4 | 4 | 6.42 | 4.80 | 5.00 | 5.17 | 5.32 | 5.59 | 5,160 |
| EPDSE2020-6-ATH | ● | | 6 | 3 | 1.92 | 50 | 4 | 4 | 5.25 | 6.88 | 7.13 | 7.34 | 7.52 | 8.21 | 5,160 |
| EPDSE2020-8-ATH | ● | | 8 | 3 | 1.92 | 50 | 4 | 4 | 4.44 | 8.96 | 9.25 | 9.49 | 9.79 | 10.86 | 5,160 |
| EPDSE2020-10-ATH | ● | | 10 | 3 | 1.92 | 50 | 4 | 4 | 3.85 | 11.03 | 11.35 | 11.62 | 12.19 | 13.52 | 5,160 |
| EPDSE2020-12-ATH | ● | | 12 | 3 | 1.92 | 55 | 4 | 4 | 3.39 | 13.10 | 13.45 | 13.90 | 14.58 | 16.17 | 5,160 |
| EPDSE2020-14-ATH | ● | | 14 | 3 | 1.92 | 55 | 4 | 4 | 3.03 | 15.16 | 15.54 | 16.18 | 16.97 | 18.83 | 5,160 |
| EPDSE2020-16-ATH | ● | | 16 | 3 | 1.92 | 55 | 4 | 4 | 2.75 | 17.21 | 17.63 | 18.46 | 19.37 | 干渉なし | 5,160 |
| EPDSE2020-18-ATH | ● | | 18 | 3 | 1.92 | 60 | 4 | 4 | 2.51 | 19.27 | 19.81 | 20.74 | 21.76 | 干渉なし | 5,160 |
| EPDSE2020-20-ATH | ● | | 20 | 3 | 1.92 | 60 | 4 | 4 | 2.31 | 21.32 | 21.99 | 23.02 | 24.15 | 干渉なし | 5,160 |
| EPDSE2020-25-ATH | ● | | 25 | 3 | 1.92 | 65 | 4 | 4 | 1.92 | 26.44 | 27.44 | 28.72 | 干渉なし | 干渉なし | 5,160 |
| EPDSE2020-30-ATH | ● | | 30 | 3 | 1.92 | 70 | 4 | 4 | 1.65 | 31.55 | 32.88 | 34.42 | 干渉なし | 干渉なし | 6,410 |
| EPDSE2020-35-ATH | ● | | 35 | 3 | 1.92 | 75 | 4 | 4 | 1.44 | 36.69 | 38.33 | 干渉なし | 干渉なし | 干渉なし | 7,670 |
| EPDSE2020-40-ATH | ● | | 40 | 3 | 1.92 | 80 | 4 | 4 | 1.28 | 41.90 | 43.78 | 干渉なし | 干渉なし | 干渉なし | 9,610 |
| EPDSE2020-50-ATH | ● | | 50 | 3 | 1.92 | 90 | 4 | 4 | 1.05 | 52.33 | 54.67 | 干渉なし | 干渉なし | 干渉なし | 11,580 |
| EPDSE2025-8-ATH | ● | 2.5 | 8 | 3.75 | 2.4 | 50 | 4 | 4 | 3.65 | 9.00 | 9.28 | 9.51 | 9.85 | 10.93 | 5,440 |
| EPDSE2025-12-ATH | ● | | 12 | 3.75 | 2.4 | 55 | 4 | 4 | 2.73 | 13.13 | 13.48 | 13.95 | 14.64 | 干渉なし | 5,440 |
| EPDSE2025-16-ATH | ● | | 16 | 3.75 | 2.4 | 55 | 4 | 4 | 2.18 | 17.25 | 17.68 | 18.51 | 19.42 | 干渉なし | 5,440 |
| EPDSE2025-20-ATH | ● | | 20 | 3.75 | 2.4 | 60 | 4 | 4 | 1.81 | 21.35 | 22.04 | 23.07 | 干渉なし | 干渉なし | 5,440 |
| EPDSE2025-30-ATH | ● | | 30 | 3.75 | 2.4 | 70 | 4 | 4 | 1.28 | 31.58 | 32.94 | 干渉なし | 干渉なし | 干渉なし | 5,850 |
| EPDSE2025-40-ATH | ● | | 40 | 3.75 | 2.4 | 80 | 4 | 4 | 0.99 | 41.95 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 8,230 |
| EPDSE2025-50-ATH | ● | | 50 | 3.75 | 2.4 | 90 | 4 | 4 | 0.80 | 52.38 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 10,170 |
| EPDSE2030-8-ATH | ● | 3 | 8 | 4.5 | 2.88 | 55 | 6 | 4 | 5.59 | 9.04 | 9.31 | 9.54 | 9.91 | 10.99 | 6,970 |
| EPDSE2030-12-ATH | ● | | 12 | 4.5 | 2.88 | 60 | 6 | 4 | 4.44 | 13.16 | 13.50 | 14.00 | 14.69 | 16.30 | 6,970 |
| EPDSE2030-16-ATH | ● | | 16 | 4.5 | 2.88 | 60 | 6 | 4 | 3.68 | 17.28 | 17.73 | 18.57 | 19.48 | 21.61 | 6,970 |
| EPDSE2030-20-ATH | ● | | 20 | 4.5 | 2.88 | 65 | 6 | 4 | 3.15 | 21.38 | 22.09 | 23.13 | 24.26 | 26.91 | 6,970 |
| EPDSE2030-25-ATH | ● | | 25 | 4.5 | 2.88 | 70 | 6 | 4 | 2.66 | 26.49 | 27.54 | 28.83 | 30.25 | 干渉なし | 6,970 |
| EPDSE2030-30-ATH | ● | | 30 | 4.5 | 2.88 | 75 | 6 | 4 | 2.31 | 31.60 | 32.99 | 34.53 | 36.23 | 干渉なし | 8,360 |
| EPDSE2030-40-ATH | ● | | 40 | 4.5 | 2.88 | 90 | 6 | 4 | 1.82 | 42.00 | 43.88 | 45.94 | 干渉なし | 干渉なし | 8,650 |
| EPDSE2030-50-ATH | ● | | 50 | 4.5 | 2.88 | 100 | 6 | 4 | 1.50 | 52.43 | 54.78 | 干渉なし | 干渉なし | 干渉なし | 12,110 |
| EPDSE2040-12-ATH | ● | 4 | 12 | 6 | 3.85 | 60 | 6 | 4 | 3.36 | 13.21 | 13.54 | 14.08 | 14.78 | 16.39 | 8,090 |
| EPDSE2040-16-ATH | ● | | 16 | 6 | 3.85 | 60 | 6 | 4 | 2.72 | 17.32 | 17.81 | 18.65 | 19.56 | 干渉なし | 8,090 |
| EPDSE2040-20-ATH | ● | | 20 | 6 | 3.85 | 70 | 6 | 4 | 2.29 | 21.42 | 22.17 | 23.21 | 24.35 | 干渉なし | 8,090 |
| EPDSE2040-25-ATH | ● | | 25 | 6 | 3.85 | 70 | 6 | 4 | 1.91 | 26.53 | 27.62 | 28.91 | 干渉なし | 干渉なし | 8,090 |
| EPDSE2040-30-ATH | ● | | 30 | 6 | 3.85 | 80 | 6 | 4 | 1.64 | 31.65 | 33.06 | 34.61 | 干渉なし | 干渉なし | 8,090 |
| EPDSE2040-35-ATH | ● | | 35 | 6 | 3.85 | 80 | 6 | 4 | 1.44 | 36.86 | 38.51 | 干渉なし | 干渉なし | 干渉なし | 8,090 |
| EPDSE2040-40-ATH | ● | | 40 | 6 | 3.85 | 90 | 6 | 4 | 1.28 | 42.08 | 43.96 | 干渉なし | 干渉なし | 干渉なし | 10,170 |
| EPDSE2040-50-ATH | ● | | 50 | 6 | 3.85 | 100 | 6 | 4 | 1.05 | 52.50 | 54.85 | 干渉なし | 干渉なし | 干渉なし | 15,000 |
| EPDSE2050-20-ATH | ● | 5 | 20 | 7.5 | 4.85 | 70 | 6 | 4 | 1.27 | 21.42 | 22.17 | 干渉なし | 干渉なし | 干渉なし | 10,650 |
| EPDSE2050-25-ATH | ● | | 25 | 7.5 | 4.85 | 70 | 6 | 4 | 1.04 | 26.53 | 27.62 | 干渉なし | 干渉なし | 干渉なし | 10,650 |
| EPDSE2050-30-ATH | ● | | 30 | 7.5 | 4.85 | 80 | 6 | 4 | 0.88 | 31.65 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 10,650 |
| EPDSE2050-40-ATH | ● | | 40 | 7.5 | 4.85 | 90 | 6 | 4 | 0.68 | 42.08 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 10,650 |
| EPDSE2050-50-ATH | ● | | 50 | 7.5 | 4.85 | 100 | 6 | 4 | 0.55 | 52.50 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 16,830 |
| EPDSE2060-20-ATH | ● | 6 | 20 | 9 | 5.85 | 70 | 6 | - | 0 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 10,950 |
| EPDSE2060-30-ATH | ● | | 30 | 9 | 5.85 | 80 | 6 | - | 0 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 11,220 |
| EPDSE2060-40-ATH | ● | | 40 | 9 | 5.85 | 90 | 6 | - | 0 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 13,250 |
| EPDSE2060-50-ATH | ● | | 50 | 9 | 5.85 | 100 | 6 | - | 0 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 16,830 |

### 被削材

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ○ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ |

### 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPDSE-ATH | 6 | 2～6 |

【注意】首下長／外径が10DCを超える工具の再研磨可否については、弊社営業にお問い合わせください。
【Note】Contact our sales office regarding whether or not regrinding is possible for tools where under neck length/tool diameter more than 10DC

●：標準在庫品です。●：Stocked items.　干渉なし：No interference

## Epoch Deep Square Evolution

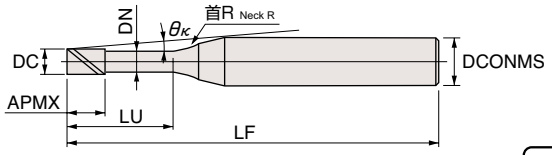
# エポックディープスクエア エボリューション PNCoating

側面 Side Cutting / 溝 Slotting / 細部 Miniature / 仕上 Finishing / リブ・細部 Rib Miniature

外径公差 Dia.tolerance
φ0.1～φ0.5 : 0～−0.007
φ0.6～φ0.9 : 0～−0.01
φ1～φ6 : 0～−0.015
h5
(mm)

刃先と首形状の改良によりタオレを抑制し高精度加工を実現。
ATH&PNコーティングの採用で更なる長寿命加工。
Improved flute tip shape and neck shape suppresses warping to enable high-accuracy cutting. Use of ATH and PN coatings further extends tool life.

2枚刃
2 Flutes




切削条件表 A298 Cutting Conditions

超硬 Carbide / PN / ねじれ30° Helix angle

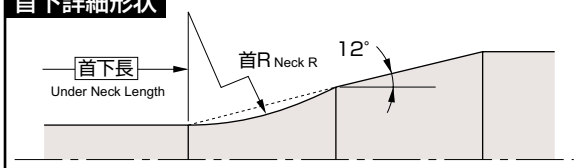
## EPDSE2○○○-○○.○-PN

| 商品コード Item code | 在庫 Stock PN | 寸法 Size(mm) 外径 Tool dia. DC | 首下長 Under Neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度 Interference angle θK | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDSE2001-0.3-PN | ● | 0.1 | 0.3 | 0.15 | 0.08 | 45 | 4 | 1 | 11.58 | 0.46 | 0.49 | 0.51 | 0.53 | 0.58 | 12,970 |
| EPDSE2001-0.5-PN | ● | | 0.5 | 0.15 | 0.08 | 45 | 4 | 1 | 11.35 | 0.67 | 0.71 | 0.74 | 0.76 | 0.82 | 14,150 |
| EPDSE2001-1-PN | ● | | 1 | 0.15 | 0.08 | 45 | 4 | 1 | 10.81 | 1.20 | 1.25 | 1.29 | 1.33 | 1.39 | 17,680 |
| EPDSE2002-0.5-PN | ● | 0.2 | 0.5 | 0.3 | 0.17 | 50 | 4 | 1 | 11.30 | 0.70 | 0.73 | 0.76 | 0.78 | 0.83 | 8,490 |
| EPDSE2002-1-PN | ● | | 1 | 0.3 | 0.17 | 50 | 4 | 1 | 10.75 | 1.22 | 1.27 | 1.31 | 1.34 | 1.42 | 9,200 |
| EPDSE2002-1.5-PN | ● | | 1.5 | 0.3 | 0.17 | 50 | 4 | 1 | 10.25 | 1.74 | 1.80 | 1.85 | 1.89 | 2.08 | 11,040 |
| EPDSE2002-2-PN | ● | | 2 | 0.3 | 0.17 | 50 | 4 | 1 | 9.80 | 2.26 | 2.32 | 2.38 | 2.47 | 2.74 | 12,440 |
| EPDSE2002-3-PN | ● | | 3 | 0.3 | 0.17 | 50 | 4 | 1 | 9.00 | 3.29 | 3.37 | 3.50 | 3.67 | 4.07 | 12,860 |
| EPDSE2003-1-PN | ● | 0.3 | 1 | 0.45 | 0.27 | 50 | 4 | 2 | 10.72 | 1.32 | 1.39 | 1.45 | 1.51 | 1.62 | 7,430 |
| EPDSE2003-1.5-PN | ● | | 1.5 | 0.45 | 0.27 | 50 | 4 | 2 | 10.21 | 1.85 | 1.93 | 2.01 | 2.08 | 2.21 | 7,430 |
| EPDSE2003-2-PN | ● | | 2 | 0.45 | 0.27 | 50 | 4 | 2 | 9.75 | 2.37 | 2.47 | 2.56 | 2.64 | 2.78 | 9,200 |
| EPDSE2003-2.5-PN | ● | | 2.5 | 0.45 | 0.27 | 50 | 4 | 2 | 9.32 | 2.89 | 3.01 | 3.11 | 3.20 | 3.41 | 9,550 |
| EPDSE2003-3-PN | ● | | 3 | 0.45 | 0.27 | 50 | 4 | 2 | 8.93 | 3.42 | 3.54 | 3.65 | 3.75 | 4.07 | 9,550 |
| EPDSE2004-1-PN | ● | 0.4 | 1 | 0.6 | 0.37 | 50 | 4 | 2 | 10.69 | 1.32 | 1.39 | 1.45 | 1.51 | 1.62 | 5,430 |
| EPDSE2004-1.5-PN | ● | | 1.5 | 0.6 | 0.37 | 50 | 4 | 2 | 10.17 | 1.85 | 1.93 | 2.01 | 2.08 | 2.21 | 5,430 |
| EPDSE2004-2-PN | ● | | 2 | 0.6 | 0.37 | 50 | 4 | 2 | 9.70 | 2.37 | 2.47 | 2.56 | 2.64 | 2.78 | 5,430 |
| EPDSE2004-2.5-PN | ● | | 2.5 | 0.6 | 0.37 | 50 | 4 | 2 | 9.27 | 2.89 | 3.01 | 3.11 | 3.20 | 3.41 | 5,430 |
| EPDSE2004-3-PN | ● | | 3 | 0.6 | 0.37 | 50 | 4 | 2 | 8.87 | 3.42 | 3.54 | 3.65 | 3.75 | 4.07 | 5,430 |
| EPDSE2004-3.5-PN | ● | | 3.5 | 0.6 | 0.37 | 50 | 4 | 2 | 8.51 | 3.94 | 4.08 | 4.19 | 4.29 | 4.73 | 5,430 |
| EPDSE2004-4-PN | ● | | 4 | 0.6 | 0.37 | 50 | 4 | 2 | 8.17 | 4.46 | 4.61 | 4.73 | 4.87 | 5.40 | 5,430 |
| EPDSE2004-5-PN | ● | | 5 | 0.6 | 0.37 | 50 | 4 | 2 | 7.58 | 5.49 | 5.66 | 5.79 | 6.06 | 6.72 | 5,430 |
| EPDSE2004-6-PN | ● | | 6 | 0.6 | 0.37 | 50 | 4 | 2 | 7.06 | 6.53 | 6.71 | 6.92 | 7.26 | 8.05 | 6,720 |
| EPDSE2004-8-PN | ● | | 8 | 0.6 | 0.37 | 50 | 4 | 2 | 6.22 | 8.59 | 8.80 | 9.20 | 9.65 | 10.71 | 11,790 |
| EPDSE2004-10-PN | ● | | 10 | 0.6 | 0.37 | 50 | 4 | 2 | 5.55 | 10.64 | 10.97 | 11.48 | 12.05 | 13.36 | 12,860 |
| EPDSE2005-1-PN | ● | 0.5 | 1 | 0.75 | 0.47 | 50 | 4 | 2 | 10.66 | 1.32 | 1.39 | 1.45 | 1.51 | 1.62 | 3,900 |
| EPDSE2005-1.5-PN | ● | | 1.5 | 0.75 | 0.47 | 50 | 4 | 2 | 10.13 | 1.85 | 1.93 | 2.01 | 2.08 | 2.21 | 3,900 |
| EPDSE2005-2-PN | ● | | 2 | 0.75 | 0.47 | 50 | 4 | 2 | 9.64 | 2.37 | 2.47 | 2.56 | 2.64 | 2.78 | 3,900 |
| EPDSE2005-2.5-PN | ● | | 2.5 | 0.75 | 0.47 | 50 | 4 | 2 | 9.21 | 2.89 | 3.01 | 3.11 | 3.20 | 3.41 | 3,900 |
| EPDSE2005-3-PN | ● | | 3 | 0.75 | 0.47 | 50 | 4 | 2 | 8.81 | 3.42 | 3.54 | 3.65 | 3.75 | 4.07 | 3,900 |
| EPDSE2005-4-PN | ● | | 4 | 0.75 | 0.47 | 50 | 4 | 2 | 8.10 | 4.46 | 4.61 | 4.73 | 4.87 | 5.40 | 3,900 |
| EPDSE2005-5-PN | ● | | 5 | 0.75 | 0.47 | 50 | 4 | 2 | 7.50 | 5.49 | 5.66 | 5.79 | 6.06 | 6.72 | 3,900 |
| EPDSE2005-6-PN | ● | | 6 | 0.75 | 0.47 | 50 | 4 | 2 | 6.98 | 6.53 | 6.71 | 6.92 | 7.26 | 8.05 | 3,900 |
| EPDSE2005-8-PN | ● | | 8 | 0.75 | 0.47 | 50 | 4 | 2 | 6.13 | 8.59 | 8.80 | 9.20 | 9.65 | 10.71 | 6,490 |
| EPDSE2005-10-PN | ● | | 10 | 0.75 | 0.47 | 50 | 4 | 2 | 5.47 | 10.64 | 10.97 | 11.48 | 12.05 | 13.36 | 6,490 |
| EPDSE2006-2-PN | ● | 0.6 | 2 | 0.9 | 0.57 | 50 | 4 | 4 | 9.59 | 2.54 | 2.70 | 2.84 | 2.96 | 3.19 | 4,130 |
| EPDSE2006-3-PN | ● | | 3 | 0.9 | 0.57 | 50 | 4 | 4 | 8.74 | 3.60 | 3.80 | 3.96 | 4.11 | 4.37 | 4,130 |
| EPDSE2006-4-PN | ● | | 4 | 0.9 | 0.57 | 50 | 4 | 4 | 8.02 | 4.66 | 4.89 | 5.07 | 5.24 | 5.53 | 4,130 |
| EPDSE2006-5-PN | ● | | 5 | 0.9 | 0.57 | 50 | 4 | 4 | 7.42 | 5.71 | 5.96 | 6.17 | 6.35 | 6.72 | 4,130 |
| EPDSE2006-6-PN | ● | | 6 | 0.9 | 0.57 | 50 | 4 | 4 | 6.90 | 6.76 | 7.04 | 7.26 | 7.45 | 8.05 | 4,130 |
| EPDSE2006-7-PN | ● | | 7 | 0.9 | 0.57 | 50 | 4 | 4 | 6.44 | 7.81 | 8.10 | 8.34 | 8.55 | 9.38 | 5,190 |
| EPDSE2006-8-PN | ● | | 8 | 0.9 | 0.57 | 50 | 4 | 4 | 6.04 | 8.85 | 9.17 | 9.42 | 9.65 | 10.71 | 6,720 |
| EPDSE2006-9-PN | ● | | 9 | 0.9 | 0.57 | 50 | 4 | 4 | 5.69 | 9.89 | 10.22 | 10.49 | 10.85 | 12.03 | 7,790 |
| EPDSE2006-10-PN | ● | | 10 | 0.9 | 0.57 | 50 | 4 | 4 | 5.38 | 10.93 | 11.28 | 11.56 | 12.05 | 13.36 | 7,790 |
| EPDSE2007-2-PN | ● | 0.7 | 2 | 1.05 | 0.67 | 50 | 4 | 4 | 9.53 | 2.54 | 2.70 | 2.84 | 2.96 | 3.19 | 4,720 |
| EPDSE2007-4-PN | ● | | 4 | 1.05 | 0.67 | 50 | 4 | 4 | 7.94 | 4.66 | 4.89 | 5.07 | 5.24 | 5.53 | 4,720 |
| EPDSE2007-6-PN | ● | | 6 | 1.05 | 0.67 | 50 | 4 | 4 | 6.81 | 6.76 | 7.04 | 7.26 | 7.45 | 8.05 | 4,720 |
| EPDSE2007-8-PN | ● | | 8 | 1.05 | 0.67 | 50 | 4 | 4 | 5.95 | 8.85 | 9.17 | 9.42 | 9.65 | 10.71 | 7,670 |
| EPDSE2007-10-PN | ● | | 10 | 1.05 | 0.67 | 50 | 4 | 4 | 5.29 | 10.93 | 11.28 | 11.56 | 12.05 | 13.36 | 10,020 |

## Epoch Deep Square Evolution

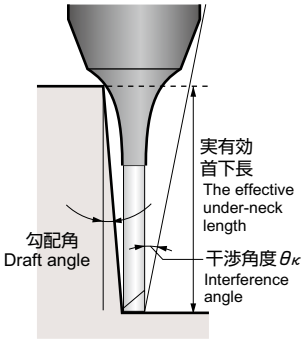
# エポックディープスクエア エボリューション PNCoating

**首下詳細形状**




**【注意】**
エポックディープスクエアEPDSとは有効首下長が異なります。再度ご確認お願いいたします。

**【Note】**
The effective under-neck length is different from Epoch Deep Square EPDS. Please recheck the interference region.




## EPDSE2○○○-○○.○-PN

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) | | | | | | | 干渉角度 Interference angle | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle | | | | | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PN | 外径 Tool dia. DC | 首下長 Under Neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | θK | 0.5° | 1° | 1.5° | 2° | 3° | |
| EPDSE2008-2-PN | ● | 0.8 | 2 | 1.2 | 0.77 | 50 | 4 | 4 | 9.47 | 2.54 | 2.70 | 2.84 | 2.96 | 3.19 | 4,600 |
| EPDSE2008-4-PN | ● | | 4 | 1.2 | 0.77 | 50 | 4 | 4 | 7.86 | 4.66 | 4.89 | 5.07 | 5.24 | 5.53 | 4,600 |
| EPDSE2008-6-PN | ● | | 6 | 1.2 | 0.77 | 50 | 4 | 4 | 6.72 | 6.76 | 7.04 | 7.26 | 7.45 | 8.05 | 4,600 |
| EPDSE2008-8-PN | ● | | 8 | 1.2 | 0.77 | 50 | 4 | 4 | 5.86 | 8.85 | 9.17 | 9.42 | 9.65 | 10.71 | 4,600 |
| EPDSE2008-10-PN | ● | | 10 | 1.2 | 0.77 | 50 | 4 | 4 | 5.20 | 10.93 | 11.28 | 11.56 | 12.05 | 13.36 | 6,720 |
| EPDSE2008-12-PN | ● | | 12 | 1.2 | 0.77 | 55 | 4 | 4 | 4.67 | 13.00 | 13.38 | 13.76 | 14.44 | 16.02 | 7,670 |
| EPDSE2009-2-PN | ● | 0.9 | 2 | 1.35 | 0.86 | 50 | 4 | 4 | 9.38 | 2.58 | 2.73 | 2.86 | 2.98 | 3.21 | 5,310 |
| EPDSE2009-4-PN | ● | | 4 | 1.35 | 0.86 | 50 | 4 | 4 | 7.76 | 4.69 | 4.91 | 5.09 | 5.26 | 5.54 | 5,310 |
| EPDSE2009-6-PN | ● | | 6 | 1.35 | 0.86 | 50 | 4 | 4 | 6.61 | 6.79 | 7.06 | 7.28 | 7.47 | 8.08 | 5,310 |
| EPDSE2009-8-PN | ● | | 8 | 1.35 | 0.86 | 50 | 4 | 4 | 5.76 | 8.87 | 9.18 | 9.43 | 9.68 | 10.74 | 5,310 |
| EPDSE2009-10-PN | ● | | 10 | 1.35 | 0.86 | 50 | 4 | 4 | 5.10 | 10.95 | 11.30 | 11.57 | 12.07 | 13.39 | 5,310 |
| EPDSE2009-12-PN | ● | | 12 | 1.35 | 0.86 | 55 | 4 | 4 | 4.58 | 13.02 | 13.40 | 13.79 | 14.47 | 16.05 | 6,050 |
| EPDSE2010-2-PN | ● | 1 | 2 | 1.5 | 0.96 | 50 | 4 | 4 | 9.31 | 2.58 | 2.73 | 2.86 | 2.98 | 3.21 | 4,130 |
| EPDSE2010-3-PN | ● | | 3 | 1.5 | 0.96 | 50 | 4 | 4 | 8.41 | 3.64 | 3.82 | 3.99 | 4.13 | 4.39 | 4,130 |
| EPDSE2010-4-PN | ● | | 4 | 1.5 | 0.96 | 50 | 4 | 4 | 7.67 | 4.69 | 4.91 | 5.09 | 5.26 | 5.54 | 4,130 |
| EPDSE2010-5-PN | ● | | 5 | 1.5 | 0.96 | 50 | 4 | 4 | 7.04 | 5.74 | 5.99 | 6.19 | 6.37 | 6.76 | 4,130 |
| EPDSE2010-6-PN | ● | | 6 | 1.5 | 0.96 | 50 | 4 | 4 | 6.51 | 6.79 | 7.06 | 7.28 | 7.47 | 8.08 | 4,130 |
| EPDSE2010-7-PN | ● | | 7 | 1.5 | 0.96 | 50 | 4 | 4 | 6.06 | 7.83 | 8.12 | 8.36 | 8.56 | 9.41 | 4,130 |
| EPDSE2010-8-PN | ● | | 8 | 1.5 | 0.96 | 50 | 4 | 4 | 5.66 | 8.87 | 9.18 | 9.43 | 9.68 | 10.74 | 4,130 |
| EPDSE2010-9-PN | ● | | 9 | 1.5 | 0.96 | 50 | 4 | 4 | 5.31 | 9.91 | 10.24 | 10.50 | 10.88 | 12.07 | 4,130 |
| EPDSE2010-10-PN | ● | | 10 | 1.5 | 0.96 | 50 | 4 | 4 | 5.00 | 10.95 | 11.30 | 11.57 | 12.07 | 13.39 | 4,130 |
| EPDSE2010-12-PN | ● | | 12 | 1.5 | 0.96 | 55 | 4 | 4 | 4.48 | 13.02 | 13.40 | 13.79 | 14.47 | 16.05 | 4,130 |
| EPDSE2010-14-PN | ● | | 14 | 1.5 | 0.96 | 55 | 4 | 4 | 4.06 | 15.09 | 15.49 | 16.07 | 16.86 | 18.70 | 4,130 |
| EPDSE2010-16-PN | ● | | 16 | 1.5 | 0.96 | 55 | 4 | 4 | 3.71 | 17.15 | 17.58 | 18.35 | 19.25 | 21.36 | 6,720 |
| EPDSE2010-20-PN | ● | | 20 | 1.5 | 0.96 | 60 | 4 | 4 | 3.17 | 21.26 | 21.89 | 22.91 | 24.04 | 26.66 | 6,720 |
| EPDSE2010-25-PN | ● | | 25 | 1.5 | 0.96 | 65 | 4 | 4 | 2.68 | 26.39 | 27.33 | 28.61 | 30.02 | 干渉なし | 7,790 |
| EPDSE2012-4-PN | ● | 1.2 | 4 | 1.8 | 1.15 | 50 | 4 | 4 | 7.46 | 4.72 | 4.93 | 5.11 | 5.27 | 5.55 | 4,370 |
| EPDSE2012-6-PN | ● | | 6 | 1.8 | 1.15 | 50 | 4 | 4 | 6.29 | 6.81 | 7.08 | 7.29 | 7.48 | 8.11 | 4,370 |
| EPDSE2012-8-PN | ● | | 8 | 1.8 | 1.15 | 50 | 4 | 4 | 5.44 | 8.90 | 9.20 | 9.45 | 9.71 | 10.77 | 4,370 |
| EPDSE2012-10-PN | ● | | 10 | 1.8 | 1.15 | 50 | 4 | 4 | 4.80 | 10.97 | 11.31 | 11.58 | 12.10 | 13.42 | 4,370 |
| EPDSE2012-12-PN | ● | | 12 | 1.8 | 1.15 | 55 | 4 | 4 | 4.29 | 13.04 | 13.41 | 13.82 | 14.49 | 16.08 | 4,370 |
| EPDSE2012-16-PN | ● | | 16 | 1.8 | 1.15 | 55 | 4 | 4 | 3.53 | 17.16 | 17.59 | 18.38 | 19.28 | 21.39 | 6,960 |
| EPDSE2014-6-PN | ● | 1.4 | 6 | 2.1 | 1.34 | 50 | 4 | 4 | 6.06 | 6.84 | 7.09 | 7.31 | 7.50 | 8.15 | 4,490 |
| EPDSE2014-12-PN | ● | | 12 | 2.1 | 1.34 | 55 | 4 | 4 | 4.08 | 13.06 | 13.43 | 13.84 | 14.52 | 16.11 | 4,490 |
| EPDSE2015-4-PN | ● | 1.5 | 4 | 2.25 | 1.44 | 50 | 4 | 4 | 7.11 | 4.75 | 4.95 | 5.13 | 5.29 | 5.57 | 4,370 |
| EPDSE2015-6-PN | ● | | 6 | 2.25 | 1.44 | 50 | 4 | 4 | 5.94 | 6.84 | 7.09 | 7.31 | 7.50 | 8.15 | 4,370 |
| EPDSE2015-8-PN | ● | | 8 | 2.25 | 1.44 | 50 | 4 | 4 | 5.10 | 8.92 | 9.22 | 9.46 | 9.74 | 10.80 | 4,370 |
| EPDSE2015-10-PN | ● | | 10 | 2.25 | 1.44 | 50 | 4 | 4 | 4.47 | 10.99 | 11.33 | 11.59 | 12.13 | 13.45 | 4,370 |
| EPDSE2015-12-PN | ● | | 12 | 2.25 | 1.44 | 55 | 4 | 4 | 3.97 | 13.06 | 13.43 | 13.84 | 14.52 | 16.11 | 4,370 |
| EPDSE2015-14-PN | ● | | 14 | 2.25 | 1.44 | 55 | 4 | 4 | 3.58 | 15.12 | 15.52 | 16.12 | 16.92 | 18.76 | 4,490 |
| EPDSE2015-16-PN | ● | | 16 | 2.25 | 1.44 | 55 | 4 | 4 | 3.25 | 17.18 | 17.60 | 18.40 | 19.31 | 21.42 | 4,490 |
| EPDSE2015-18-PN | ● | | 18 | 2.25 | 1.44 | 60 | 4 | 4 | 2.98 | 19.24 | 19.76 | 20.69 | 21.70 | 干渉なし | 4,490 |
| EPDSE2015-20-PN | ● | | 20 | 2.25 | 1.44 | 60 | 4 | 4 | 2.76 | 21.29 | 21.94 | 22.97 | 24.10 | 干渉なし | 4,490 |
| EPDSE2015-25-PN | ● | | 25 | 2.25 | 1.44 | 65 | 4 | 4 | 2.31 | 26.42 | 27.39 | 28.67 | 30.08 | 干渉なし | 6,720 |
| EPDSE2015-30-PN | ● | | 30 | 2.25 | 1.44 | 70 | 4 | 4 | 1.99 | 31.53 | 32.83 | 34.37 | 干渉なし | 干渉なし | 6,720 |
| EPDSE2015-35-PN | ● | | 35 | 2.25 | 1.44 | 75 | 4 | 4 | 1.75 | 36.64 | 38.28 | 40.07 | 干渉なし | 干渉なし | 7,670 |
| EPDSE2015-40-PN | ● | | 40 | 2.25 | 1.44 | 80 | 4 | 4 | 1.56 | 41.85 | 43.73 | 45.78 | 干渉なし | 干渉なし | 8,610 |
| EPDSE2016-6-PN | ● | 1.6 | 6 | 2.4 | 1.54 | 50 | 4 | 4 | 5.82 | 6.84 | 7.09 | 7.31 | 7.50 | 8.15 | 4,490 |
| EPDSE2016-8-PN | ● | | 8 | 2.4 | 1.54 | 50 | 4 | 4 | 4.98 | 8.92 | 9.22 | 9.46 | 9.74 | 10.80 | 4,490 |
| EPDSE2018-6-PN | ● | 1.8 | 6 | 2.7 | 1.73 | 50 | 4 | 4 | 5.55 | 6.86 | 7.11 | 7.32 | 7.51 | 8.18 | 4,490 |
| EPDSE2018-8-PN | ● | | 8 | 2.7 | 1.73 | 50 | 4 | 4 | 4.72 | 8.94 | 9.23 | 9.47 | 9.76 | 10.83 | 4,490 |

●：標準在庫品です。●：Stocked items.　干渉なし：No interference

# EPDSE2○○○-○○.○-PN

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) | | | | | | | 干渉角度 Interference angle | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle | | | | | 希望小売価格（円） Suggested retail price（¥） |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PN | 外径 Tool dia. DC | 首下長 Under Neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | $\theta_K$ | 0.5° | 1° | 1.5° | 2° | 3° | |
| EPDSE2020-4-PN | ● | 2 | 4 | 3 | 1.92 | 50 | 4 | 4 | 6.42 | 4.80 | 5.00 | 5.17 | 5.32 | 5.59 | 4,370 |
| EPDSE2020-6-PN | ● | | 6 | 3 | 1.92 | 50 | 4 | 4 | 5.25 | 6.88 | 7.13 | 7.34 | 7.52 | 8.21 | 4,370 |
| EPDSE2020-8-PN | ● | | 8 | 3 | 1.92 | 50 | 4 | 4 | 4.44 | 8.96 | 9.25 | 9.49 | 9.79 | 10.86 | 4,370 |
| EPDSE2020-10-PN | ● | | 10 | 3 | 1.92 | 50 | 4 | 4 | 3.85 | 11.03 | 11.35 | 11.62 | 12.19 | 13.52 | 4,370 |
| EPDSE2020-12-PN | ● | | 12 | 3 | 1.92 | 55 | 4 | 4 | 3.39 | 13.10 | 13.45 | 13.90 | 14.58 | 16.17 | 4,370 |
| EPDSE2020-14-PN | ● | | 14 | 3 | 1.92 | 55 | 4 | 4 | 3.03 | 15.16 | 15.54 | 16.18 | 16.97 | 18.83 | 4,370 |
| EPDSE2020-16-PN | ● | | 16 | 3 | 1.92 | 55 | 4 | 4 | 2.75 | 17.21 | 17.63 | 18.46 | 19.37 | 干渉なし | 4,370 |
| EPDSE2020-18-PN | ● | | 18 | 3 | 1.92 | 60 | 4 | 4 | 2.51 | 19.27 | 19.81 | 20.74 | 21.76 | 干渉なし | 4,370 |
| EPDSE2020-20-PN | ● | | 20 | 3 | 1.92 | 60 | 4 | 4 | 2.31 | 21.32 | 21.99 | 23.02 | 24.15 | 干渉なし | 4,370 |
| EPDSE2020-25-PN | ● | | 25 | 3 | 1.92 | 65 | 4 | 4 | 1.92 | 26.44 | 27.44 | 28.72 | 干渉なし | 干渉なし | 4,370 |
| EPDSE2020-30-PN | ● | | 30 | 3 | 1.92 | 70 | 4 | 4 | 1.65 | 31.55 | 32.88 | 34.42 | 干渉なし | 干渉なし | 5,430 |
| EPDSE2020-35-PN | ● | | 35 | 3 | 1.92 | 75 | 4 | 4 | 1.44 | 36.69 | 38.33 | 干渉なし | 干渉なし | 干渉なし | 6,490 |
| EPDSE2020-40-PN | ● | | 40 | 3 | 1.92 | 80 | 4 | 4 | 1.28 | 41.90 | 43.78 | 干渉なし | 干渉なし | 干渉なし | 8,140 |
| EPDSE2020-50-PN | ● | | 50 | 3 | 1.92 | 90 | 4 | 4 | 1.05 | 52.33 | 54.67 | 干渉なし | 干渉なし | 干渉なし | 9,790 |
| EPDSE2025-8-PN | ● | 2.5 | 8 | 3.75 | 2.4 | 50 | 4 | 4 | 3.65 | 9.00 | 9.28 | 9.51 | 9.85 | 10.93 | 4,600 |
| EPDSE2025-12-PN | ● | | 12 | 3.75 | 2.4 | 55 | 4 | 4 | 2.73 | 13.13 | 13.48 | 13.95 | 14.64 | 干渉なし | 4,600 |
| EPDSE2025-16-PN | ● | | 16 | 3.75 | 2.4 | 55 | 4 | 4 | 2.18 | 17.25 | 17.68 | 18.51 | 19.42 | 干渉なし | 4,600 |
| EPDSE2025-20-PN | ● | | 20 | 3.75 | 2.4 | 60 | 4 | 4 | 1.81 | 21.35 | 22.04 | 23.07 | 干渉なし | 干渉なし | 4,600 |
| EPDSE2025-30-PN | ● | | 30 | 3.75 | 2.4 | 70 | 4 | 4 | 1.28 | 31.58 | 32.94 | 干渉なし | 干渉なし | 干渉なし | 4,960 |
| EPDSE2025-40-PN | ● | | 40 | 3.75 | 2.4 | 80 | 4 | 4 | 0.99 | 41.95 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 6,960 |
| EPDSE2025-50-PN | ● | | 50 | 3.75 | 2.4 | 90 | 4 | 4 | 0.80 | 52.38 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 8,610 |
| EPDSE2030-8-PN | ● | 3 | 8 | 4.5 | 2.88 | 55 | 6 | 4 | 5.59 | 9.04 | 9.31 | 9.54 | 9.91 | 10.99 | 5,900 |
| EPDSE2030-12-PN | ● | | 12 | 4.5 | 2.88 | 60 | 6 | 4 | 4.44 | 13.16 | 13.50 | 14.00 | 14.69 | 16.30 | 5,900 |
| EPDSE2030-16-PN | ● | | 16 | 4.5 | 2.88 | 60 | 6 | 4 | 3.68 | 17.28 | 17.73 | 18.57 | 19.48 | 21.61 | 5,900 |
| EPDSE2030-20-PN | ● | | 20 | 4.5 | 2.88 | 65 | 6 | 4 | 3.15 | 21.38 | 22.09 | 23.13 | 24.26 | 26.91 | 5,900 |
| EPDSE2030-25-PN | ● | | 25 | 4.5 | 2.88 | 70 | 6 | 4 | 2.66 | 26.49 | 27.54 | 28.83 | 30.25 | 干渉なし | 5,900 |
| EPDSE2030-30-PN | ● | | 30 | 4.5 | 2.88 | 75 | 6 | 4 | 2.31 | 31.60 | 32.99 | 34.53 | 36.23 | 干渉なし | 7,080 |
| EPDSE2030-40-PN | ● | | 40 | 4.5 | 2.88 | 90 | 6 | 4 | 1.82 | 42.00 | 43.88 | 45.94 | 干渉なし | 干渉なし | 7,310 |
| EPDSE2030-50-PN | ● | | 50 | 4.5 | 2.88 | 100 | 6 | 4 | 1.50 | 52.43 | 54.78 | 干渉なし | 干渉なし | 干渉なし | 10,260 |
| EPDSE2040-12-PN | ● | 4 | 12 | 6 | 3.85 | 60 | 6 | 4 | 3.36 | 13.21 | 13.54 | 14.08 | 14.78 | 16.39 | 6,840 |
| EPDSE2040-16-PN | ● | | 16 | 6 | 3.85 | 60 | 6 | 4 | 2.72 | 17.32 | 17.81 | 18.65 | 19.56 | 干渉なし | 6,840 |
| EPDSE2040-20-PN | ● | | 20 | 6 | 3.85 | 70 | 6 | 4 | 2.29 | 21.42 | 22.17 | 23.21 | 24.35 | 干渉なし | 6,840 |
| EPDSE2040-25-PN | ● | | 25 | 6 | 3.85 | 70 | 6 | 4 | 1.91 | 26.53 | 27.62 | 28.91 | 干渉なし | 干渉なし | 6,840 |
| EPDSE2040-30-PN | ● | | 30 | 6 | 3.85 | 80 | 6 | 4 | 1.64 | 31.65 | 33.06 | 34.61 | 干渉なし | 干渉なし | 6,840 |
| EPDSE2040-35-PN | ● | | 35 | 6 | 3.85 | 80 | 6 | 4 | 1.44 | 36.86 | 38.51 | 干渉なし | 干渉なし | 干渉なし | 6,840 |
| EPDSE2040-40-PN | ● | | 40 | 6 | 3.85 | 90 | 6 | 4 | 1.28 | 42.08 | 43.96 | 干渉なし | 干渉なし | 干渉なし | 8,610 |
| EPDSE2040-50-PN | ● | | 50 | 6 | 3.85 | 100 | 6 | 4 | 1.05 | 52.50 | 54.85 | 干渉なし | 干渉なし | 干渉なし | 12,750 |
| EPDSE2050-20-PN | ● | 5 | 20 | 7.5 | 4.85 | 70 | 6 | 4 | 1.27 | 21.42 | 22.17 | 干渉なし | 干渉なし | 干渉なし | 9,020 |
| EPDSE2050-25-PN | ● | | 25 | 7.5 | 4.85 | 70 | 6 | 4 | 1.04 | 26.53 | 27.62 | 干渉なし | 干渉なし | 干渉なし | 9,020 |
| EPDSE2050-30-PN | ● | | 30 | 7.5 | 4.85 | 80 | 6 | 4 | 0.88 | 31.65 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 9,020 |
| EPDSE2050-40-PN | ● | | 40 | 7.5 | 4.85 | 90 | 6 | 4 | 0.68 | 42.08 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 9,020 |
| EPDSE2050-50-PN | ● | | 50 | 7.5 | 4.85 | 100 | 6 | 4 | 0.55 | 52.50 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 14,260 |
| EPDSE2060-20-PN | ● | 6 | 20 | 9 | 5.85 | 70 | 6 | - | 0 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 9,270 |
| EPDSE2060-30-PN | ● | | 30 | 9 | 5.85 | 80 | 6 | - | 0 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 9,510 |
| EPDSE2060-40-PN | ● | | 40 | 9 | 5.85 | 90 | 6 | - | 0 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 11,220 |
| EPDSE2060-50-PN | ● | | 50 | 9 | 5.85 | 100 | 6 | - | 0 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 14,260 |

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ○ | | ◎ | ◎ | ◎ | ◎ |

## 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPDSE-PN | 6 | 2～6 |

【注意】首下長／外径が10DCを超える工具の再研磨可否については、弊社営業にお問い合わせください。
【Note】Contact our sales office regarding whether or not regrinding is possible for tools where under neck length/tool diameter more than 10DC

## 標準切削条件表
Recommended cutting conditions

高能率切削条件 High efficiency cuttiing conditions
高精度切削条件 High accuracy cutting conditions

## EPDSE-ATH EPDSE-PN

高精度切削条件はA301ページを参照してください。
Please refer to P.A301 about high accuracy cutting conditions

| 推奨領域 Recommended range | | | PNシリーズ PN series / ATHシリーズ ATH series | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 被削材 Work material | | | 1 銅 Coppers | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼入れ鋼 Hardened steels (45～55HRC) | | 6 焼入れ鋼 Hardened steels (55～65HRC) | |
| 切込み比率 Ratio to standard depth of cut | | | 120% | | 100% | | 90% | | 70% | | 50% | | 45% | |
| 外径DC Tool dia. (mm) | 首下長LU Under neck length (mm) | ap (mm) | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 0.1 | 0.3 | 0.006 | 50,000 | 500 | 50,000 | 500 | 50,000 | 475 | 48,600 | 348 | 42,750 | 255 | 40,050 | 208 |
| | 0.5 | 0.004 | 50,000 | 500 | 50,000 | 500 | 50,000 | 475 | 48,600 | 348 | 42,750 | 255 | 40,050 | 208 |
| | 1 | 0.003 | 50,000 | 455 | 50,000 | 455 | 48,600 | 430 | 43,700 | 315 | 38,500 | 232 | 36,050 | 187 |
| 0.2 | 0.5 | 0.02 | 50,000 | 708 | 45,000 | 638 | 40,500 | 574 | 38,250 | 403 | 33,750 | 301 | 31,500 | 242 |
| | 1 | 0.014 | 50,000 | 708 | 45,000 | 638 | 40,500 | 574 | 38,250 | 403 | 33,750 | 301 | 31,500 | 242 |
| | 1.5 | 0.008 | 48,600 | 630 | 40,500 | 525 | 36,450 | 472 | 34,425 | 362 | 30,375 | 271 | 28,350 | 218 |
| | 2 | 0.005 | 43,200 | 504 | 36,000 | 420 | 32,400 | 378 | 30,600 | 286 | 27,000 | 214 | 25,200 | 172 |
| | 3 | 0.003 | 43,200 | 454 | 36,000 | 378 | 32,400 | 340 | 30,600 | 257 | 27,000 | 193 | 25,200 | 155 |
| 0.3 | 1 | 0.021 | 48,000 | 680 | 40,000 | 567 | 36,000 | 510 | 34,000 | 358 | 30,000 | 267 | 28,000 | 216 |
| | 1.5 | 0.021 | 48,000 | 680 | 40,000 | 567 | 36,000 | 510 | 34,000 | 358 | 30,000 | 267 | 28,000 | 216 |
| | 2 | 0.012 | 43,200 | 560 | 36,000 | 467 | 32,400 | 420 | 30,600 | 322 | 27,000 | 241 | 25,200 | 194 |
| | 2.5 | 0.01 | 43,200 | 560 | 36,000 | 467 | 32,400 | 420 | 30,600 | 322 | 27,000 | 241 | 25,200 | 194 |
| | 3 | 0.008 | 43,200 | 560 | 36,000 | 467 | 32,400 | 420 | 30,600 | 322 | 27,000 | 241 | 25,200 | 194 |
| 0.4 | 1 | 0.04 | 38,400 | 847 | 32,000 | 706 | 28,800 | 635 | 27,200 | 446 | 24,000 | 333 | 22,400 | 268 |
| | 1.5 | 0.028 | 38,400 | 847 | 32,000 | 706 | 28,800 | 635 | 27,200 | 446 | 24,000 | 333 | 22,400 | 268 |
| | 2 | 0.028 | 38,400 | 847 | 32,000 | 706 | 28,800 | 635 | 27,200 | 446 | 24,000 | 333 | 22,400 | 268 |
| | 2.5 | 0.022 | 34,560 | 697 | 28,800 | 581 | 25,920 | 523 | 24,480 | 401 | 21,600 | 299 | 20,160 | 241 |
| | 3 | 0.016 | 34,560 | 697 | 28,800 | 581 | 25,920 | 523 | 24,480 | 401 | 21,600 | 299 | 20,160 | 241 |
| | 3.5 | 0.012 | 34,560 | 697 | 28,800 | 581 | 25,920 | 523 | 24,480 | 401 | 21,600 | 299 | 20,160 | 241 |
| | 4 | 0.01 | 34,560 | 697 | 28,800 | 581 | 25,920 | 523 | 24,480 | 401 | 21,600 | 299 | 20,160 | 241 |
| | 5 | 0.01 | 30,720 | 542 | 25,600 | 452 | 23,040 | 406 | 21,760 | 260 | 19,200 | 230 | 17,920 | 181 |
| | 6 | 0.006 | 30,720 | 542 | 25,600 | 452 | 23,040 | 406 | 21,760 | 260 | 19,200 | 230 | 17,920 | 181 |
| | 8 | 0.003 | 26,880 | 413 | 22,400 | 344 | 20,160 | 310 | 19,040 | 200 | 16,800 | 172 | 15,680 | 131 |
| | 10 | 0.002 | 23,040 | 304 | 19,200 | 253 | 17,280 | 228 | 16,320 | 147 | 14,400 | 127 | 13,440 | 96 |
| 0.5 | 1 | 0.05 | 38,400 | 847 | 32,000 | 706 | 28,800 | 635 | 27,200 | 535 | 24,000 | 333 | 22,400 | 268 |
| | 1.5 | 0.05 | 38,400 | 847 | 32,000 | 706 | 28,800 | 635 | 27,200 | 535 | 24,000 | 333 | 22,400 | 268 |
| | 2 | 0.035 | 38,400 | 847 | 32,000 | 706 | 28,800 | 635 | 27,200 | 535 | 24,000 | 333 | 22,400 | 268 |
| | 2.5 | 0.03 | 34,560 | 697 | 28,800 | 581 | 25,920 | 523 | 24,480 | 441 | 21,600 | 299 | 20,160 | 241 |
| | 3 | 0.02 | 34,560 | 697 | 28,800 | 581 | 25,920 | 523 | 24,480 | 441 | 21,600 | 299 | 20,160 | 241 |
| | 4 | 0.02 | 34,560 | 697 | 28,800 | 581 | 25,920 | 523 | 24,480 | 401 | 21,600 | 299 | 20,160 | 241 |
| | 5 | 0.013 | 34,560 | 697 | 28,800 | 581 | 25,920 | 523 | 24,480 | 401 | 21,600 | 299 | 20,160 | 241 |
| | 6 | 0.013 | 30,720 | 542 | 25,600 | 452 | 23,040 | 406 | 21,760 | 260 | 19,200 | 230 | 17,920 | 181 |
| | 8 | 0.008 | 30,720 | 464 | 25,600 | 387 | 23,040 | 348 | 21,760 | 247 | 19,200 | 194 | 17,920 | 147 |
| | 10 | 0.004 | 26,880 | 360 | 22,400 | 300 | 20,160 | 270 | 19,040 | 174 | 16,800 | 150 | 15,680 | 114 |
| 0.6 | 2 | 0.042 | 38,400 | 1,210 | 32,000 | 1,008 | 28,800 | 907 | 27,200 | 636 | 24,000 | 475 | 22,400 | 383 |
| | 3 | 0.035 | 34,560 | 995 | 28,800 | 829 | 25,920 | 746 | 24,480 | 573 | 21,600 | 428 | 20,160 | 345 |
| | 4 | 0.024 | 34,560 | 995 | 28,800 | 829 | 25,920 | 746 | 24,480 | 573 | 21,600 | 428 | 20,160 | 345 |
| | 5 | 0.02 | 34,560 | 995 | 28,800 | 829 | 25,920 | 746 | 24,480 | 573 | 21,600 | 428 | 20,160 | 345 |
| | 6 | 0.015 | 34,560 | 995 | 28,800 | 829 | 25,920 | 746 | 24,480 | 573 | 21,600 | 428 | 20,160 | 345 |
| | 7 | 0.015 | 30,720 | 859 | 25,600 | 716 | 23,040 | 644 | 21,760 | 494 | 19,200 | 369 | 17,920 | 298 |
| | 8 | 0.015 | 30,720 | 774 | 25,600 | 645 | 23,040 | 581 | 21,760 | 372 | 19,200 | 328 | 17,920 | 258 |
| | 9 | 0.012 | 30,720 | 774 | 25,600 | 645 | 23,040 | 581 | 21,760 | 372 | 19,200 | 328 | 17,920 | 258 |
| | 10 | 0.009 | 30,720 | 774 | 25,600 | 645 | 23,040 | 581 | 21,760 | 372 | 19,200 | 328 | 17,920 | 258 |
| 0.7 | 2 | 0.07 | 38,400 | 1,210 | 32,000 | 1,008 | 28,800 | 907 | 27,200 | 636 | 24,000 | 475 | 22,400 | 384 |
| | 4 | 0.049 | 34,560 | 995 | 28,800 | 829 | 25,920 | 746 | 24,480 | 573 | 21,600 | 428 | 20,160 | 345 |
| | 6 | 0.018 | 34,560 | 995 | 28,800 | 829 | 25,920 | 746 | 24,480 | 573 | 21,600 | 428 | 20,160 | 345 |
| | 8 | 0.018 | 30,720 | 774 | 25,600 | 645 | 23,040 | 581 | 21,760 | 372 | 19,200 | 328 | 17,920 | 258 |
| | 10 | 0.018 | 30,720 | 774 | 25,600 | 645 | 23,040 | 581 | 21,760 | 372 | 19,200 | 328 | 17,920 | 258 |

| 推奨領域 Recommended range | | | PNシリーズ PN series / ATHシリーズ ATH series | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 被削材 Work material | | | 1 銅 Coppers | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼入れ鋼 Hardened steels (45～55HRC) | | 6 焼入れ鋼 Hardened steels (55～65HRC) | |
| 切込み比率 Ratio to standard depth of cut | | | 120% | | 100% | | 90% | | 70% | | 50% | | 45% | |
| 外径DC Tool dia. (mm) | 首下長LU Under neck length (mm) | $a_p$ (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 0.8 | 2 | 0.08 | 38,400 | 1,210 | 32,000 | 1,008 | 28,800 | 907 | 27,200 | 780 | 24,000 | 688 | 22,400 | 422 |
| | 4 | 0.056 | 38,400 | 1,210 | 32,000 | 1,008 | 28,800 | 907 | 27,200 | 780 | 24,000 | 688 | 22,400 | 422 |
| | 6 | 0.032 | 34,560 | 995 | 28,800 | 829 | 25,920 | 746 | 24,480 | 678 | 24,000 | 665 | 20,160 | 379 |
| | 8 | 0.02 | 34,560 | 995 | 28,800 | 829 | 25,920 | 746 | 24,480 | 573 | 21,600 | 428 | 20,160 | 345 |
| | 10 | 0.02 | 30,720 | 774 | 25,600 | 645 | 23,040 | 581 | 21,760 | 372 | 19,200 | 328 | 17,920 | 258 |
| | 12 | 0.012 | 30,720 | 774 | 25,600 | 645 | 23,040 | 581 | 21,760 | 372 | 19,200 | 328 | 17,920 | 258 |
| 0.9 | 2 | 0.09 | 38,400 | 1,326 | 32,000 | 1,205 | 28,800 | 1,085 | 27,200 | 833 | 24,000 | 674 | 22,400 | 502 |
| | 4 | 0.063 | 38,400 | 1,326 | 32,000 | 1,205 | 28,800 | 1,085 | 27,200 | 833 | 24,000 | 674 | 22,400 | 502 |
| | 6 | 0.036 | 34,560 | 1094 | 28,800 | 994 | 25,920 | 895 | 24,480 | 687 | 21,600 | 556 | 20,160 | 414 |
| | 8 | 0.023 | 34,560 | 1094 | 28,800 | 911 | 25,920 | 820 | 24,480 | 630 | 21,600 | 513 | 20,160 | 379 |
| | 10 | 0.023 | 30,720 | 774 | 25,600 | 645 | 23,040 | 581 | 21,760 | 372 | 19,200 | 328 | 17,920 | 258 |
| | 12 | 0.023 | 30,720 | 774 | 25,600 | 645 | 23,040 | 581 | 21,760 | 372 | 19,200 | 328 | 17,920 | 258 |
| 1 | 2 | 0.1 | 34,560 | 1,628 | 28,800 | 1,356 | 25,920 | 1,220 | 24,480 | 1,150 | 22,930 | 1,008 | 20,160 | 846 |
| | 3 | 0.085 | 34,560 | 1,628 | 28,800 | 1,356 | 25,920 | 1,220 | 24,480 | 1,150 | 22,930 | 1,008 | 20,160 | 846 |
| | 4 | 0.07 | 34,560 | 1,628 | 28,800 | 1,356 | 25,920 | 1,220 | 24,480 | 1,077 | 22,930 | 963 | 20,160 | 766 |
| | 5 | 0.055 | 34,560 | 1,628 | 28,800 | 1,356 | 25,920 | 1,220 | 24,480 | 1,028 | 22,930 | 871 | 20,160 | 685 |
| | 6 | 0.04 | 31,104 | 1,344 | 25,920 | 1,120 | 23,328 | 1,008 | 22,032 | 903 | 20,700 | 745 | 18,144 | 465 |
| | 7 | 0.04 | 31,104 | 1,344 | 25,920 | 1,120 | 23,328 | 1,008 | 22,032 | 837 | 20,700 | 703 | 18,144 | 465 |
| | 8 | 0.04 | 31,104 | 1,344 | 25,920 | 1,120 | 23,328 | 1,008 | 22,032 | 837 | 20,700 | 622 | 18,144 | 465 |
| | 9 | 0.033 | 31,104 | 1,344 | 25,920 | 1,120 | 23,328 | 1,008 | 22,032 | 773 | 19,440 | 577 | 18,144 | 465 |
| | 10 | 0.025 | 31,104 | 1,344 | 25,920 | 1,120 | 23,328 | 1,008 | 22,032 | 773 | 19,440 | 577 | 18,144 | 465 |
| | 12 | 0.025 | 27,648 | 1,045 | 23,040 | 871 | 20,736 | 784 | 19,584 | 502 | 17,280 | 443 | 16,128 | 348 |
| | 14 | 0.025 | 27,648 | 1,045 | 23,040 | 871 | 20,736 | 784 | 19,584 | 502 | 17,280 | 443 | 16,128 | 348 |
| | 16 | 0.015 | 27,648 | 896 | 23,040 | 746 | 20,736 | 672 | 19,584 | 476 | 17,280 | 373 | 16,128 | 283 |
| | 20 | 0.01 | 24,828 | 732 | 20,690 | 610 | 22,345 | 549 | 17,587 | 348 | 15,518 | 305 | 14,483 | 226 |
| | 25 | 0.005 | 21,000 | 569 | 17,500 | 474 | 18,900 | 427 | 14,875 | 270 | 13,125 | 237 | 12,250 | 175 |
| 1.2 | 4 | 0.09 | 30,720 | 1,452 | 25,600 | 1,210 | 23,040 | 1,089 | 21,760 | 870 | 19,200 | 570 | 17,920 | 460 |
| | 6 | 0.084 | 30,720 | 1,452 | 25,600 | 1,210 | 23,040 | 1,089 | 21,760 | 870 | 19,200 | 570 | 17,920 | 460 |
| | 8 | 0.048 | 27,648 | 1,194 | 23,040 | 995 | 20,736 | 896 | 19,584 | 783 | 17,280 | 513 | 16,128 | 414 |
| | 10 | 0.03 | 27,648 | 1,194 | 23,040 | 995 | 20,736 | 896 | 19,584 | 744 | 17,280 | 513 | 16,128 | 414 |
| | 12 | 0.03 | 27,648 | 1,194 | 23,040 | 995 | 20,736 | 896 | 19,584 | 687 | 17,280 | 513 | 16,128 | 414 |
| | 16 | 0.02 | 24,576 | 1,061 | 20,480 | 884 | 18,432 | 796 | 17,408 | 611 | 15,360 | 456 | 14,336 | 368 |
| 1.4 | 6 | 0.1 | 26,880 | 1,270 | 22,400 | 1,058 | 20,160 | 953 | 19,040 | 668 | 16,800 | 499 | 15,680 | 403 |
| | 12 | 0.035 | 24,192 | 1,045 | 20,160 | 871 | 18,144 | 784 | 17,136 | 601 | 15,120 | 449 | 14,112 | 362 |
| 1.5 | 4 | 0.11 | 26,880 | 1,397 | 22,400 | 1,163 | 20,160 | 1048 | 19,040 | 801 | 16,800 | 648 | 15,680 | 482 |
| | 6 | 0.11 | 26,880 | 1,397 | 22,400 | 1,163 | 20,160 | 1048 | 19,040 | 801 | 16,800 | 623 | 15,680 | 482 |
| | 8 | 0.08 | 24,192 | 1,149 | 20,160 | 958 | 18,144 | 940 | 17,136 | 721 | 15,120 | 538 | 14,112 | 416 |
| | 10 | 0.06 | 24,192 | 1,149 | 20,160 | 871 | 18,144 | 862 | 17,136 | 721 | 15,120 | 538 | 14,112 | 416 |
| | 12 | 0.06 | 24,192 | 1,045 | 20,160 | 871 | 18,144 | 784 | 17,136 | 721 | 15,120 | 449 | 14,112 | 362 |
| | 14 | 0.038 | 24,192 | 1,045 | 20,160 | 871 | 18,144 | 784 | 17,136 | 721 | 15,120 | 449 | 14,112 | 362 |
| | 16 | 0.038 | 21,504 | 813 | 17,920 | 677 | 16,128 | 610 | 15,232 | 391 | 13,440 | 345 | 12,544 | 271 |
| | 18 | 0.038 | 21,504 | 813 | 17,920 | 677 | 16,128 | 610 | 15,232 | 391 | 13,440 | 345 | 12,544 | 271 |
| | 20 | 0.038 | 21,504 | 813 | 17,920 | 677 | 16,128 | 610 | 15,232 | 391 | 13,440 | 345 | 12,544 | 271 |
| | 25 | 0.023 | 16,128 | 523 | 13,440 | 435 | 12,096 | 392 | 11,424 | 278 | 10,080 | 218 | 9,408 | 165 |
| | 30 | 0.015 | 13,440 | 355 | 11,200 | 296 | 12,096 | 266 | 9,520 | 178 | 8,400 | 139 | 7,840 | 112 |
| | 35 | 0.01 | 13,440 | 355 | 11,200 | 296 | 12,096 | 266 | 9,520 | 178 | 8,400 | 139 | 7,840 | 112 |
| | 40 | 0.005 | 10,752 | 190 | 8,960 | 158 | 8,064 | 142 | 7,616 | 95 | 6,720 | 74 | 6,272 | 60 |
| 1.6 | 6 | 0.11 | 24,960 | 1,310 | 20,800 | 1,201 | 18,720 | 1,130 | 17,680 | 759 | 15,600 | 566 | 14,560 | 456 |
| | 8 | 0.11 | 24,960 | 1,310 | 20,800 | 1,201 | 18,720 | 983 | 17,680 | 690 | 15,600 | 566 | 14,560 | 456 |
| 1.8 | 6 | 0.13 | 24,960 | 1,310 | 20,800 | 1,201 | 18,720 | 1,179 | 17,680 | 759 | 15,600 | 618 | 14,560 | 498 |
| | 8 | 0.13 | 24,960 | 1,310 | 20,800 | 1,201 | 18,720 | 1,081 | 17,680 | 690 | 15,600 | 618 | 14,560 | 498 |

【注意】ご使用にあたっては、A300ページの表下の項目と注意を参照してください。【Note】Upon usage, please refer to comments and notes below table on page A300.

Epoch Deep Square Evolution

# エポックディープスクエア エボリューション

## EPDSE-ATH　EPDSE-PN

**高能率切削条件** High efficiency cuttiing condition　　高精度切削条件 High accuracy cuttiing condition

高精度切削条件はA301ページを参照してください。
Please refer to P.A301 about high accuracy cutting conditions

| 推奨領域 Recommended range | | | PNシリーズ PN series / ATHシリーズ ATH series | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 被削材 Work material | | | 1 銅 Coppers | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼入れ鋼 Hardened steels (45～55HRC) | | 6 焼入れ鋼 Hardened steels (55～65HRC) | |
| 切込み比率 Ratio to standard depth of cut | | | 120% | | 100% | | 90% | | 70% | | 50% | | 45% | |
| 外径DC Tool dia. (mm) | 首下長LU Under neck length (mm) | ap (mm) | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min |
| 2 | 4 | 0.2 | 20,160 | 1,397 | 16,800 | 1,174 | 15,120 | 1,048 | 14,280 | 734 | 12,600 | 548 | 11,760 | 443 |
| | 6 | 0.2 | 20,160 | 1,397 | 16,800 | 1,174 | 15,120 | 1,048 | 14,280 | 734 | 12,600 | 548 | 11,760 | 443 |
| | 8 | 0.14 | 20,160 | 1,397 | 16,800 | 1,174 | 15,120 | 1,048 | 14,280 | 734 | 12,600 | 548 | 11,760 | 443 |
| | 10 | 0.14 | 20,160 | 1,397 | 16,800 | 1,174 | 15,120 | 1,048 | 14,280 | 734 | 12,600 | 548 | 11,760 | 443 |
| | 12 | 0.1 | 18,144 | 1,149 | 15,120 | 958 | 13,608 | 862 | 12,852 | 661 | 11,340 | 493 | 10,584 | 398 |
| | 14 | 0.08 | 18,144 | 1,149 | 15,120 | 958 | 13,608 | 862 | 12,852 | 661 | 11,340 | 493 | 10,584 | 362 |
| | 16 | 0.08 | 18,144 | 1,045 | 15,120 | 914 | 13,608 | 862 | 12,852 | 601 | 11,340 | 449 | 10,584 | 362 |
| | 18 | 0.05 | 18,144 | 1,045 | 15,120 | 914 | 13,608 | 862 | 12,852 | 601 | 11,340 | 449 | 10,584 | 362 |
| | 20 | 0.05 | 18,144 | 1,045 | 15,120 | 871 | 13,608 | 784 | 12,852 | 601 | 11,340 | 449 | 10,584 | 362 |
| | 25 | 0.05 | 16,128 | 813 | 13,440 | 677 | 12,096 | 610 | 11,424 | 391 | 10,080 | 345 | 9,408 | 271 |
| | 30 | 0.03 | 16,128 | 813 | 13,440 | 677 | 12,096 | 610 | 11,424 | 391 | 10,080 | 345 | 9,408 | 271 |
| | 35 | 0.02 | 14,112 | 583 | 11,760 | 486 | 10,584 | 437 | 9,996 | 282 | 8,820 | 228 | 8,232 | 185 |
| | 40 | 0.01 | 14,112 | 583 | 11,760 | 486 | 10,584 | 437 | 9,996 | 282 | 8,820 | 228 | 8,232 | 185 |
| | 50 | 0.005 | 12,096 | 355 | 10,080 | 296 | 9,072 | 266 | 8,568 | 172 | 7,560 | 139 | 7,056 | 112 |
| 2.5 | 8 | 0.18 | 17,280 | 1,497 | 14,400 | 1,247 | 12,960 | 1,123 | 12,240 | 787 | 10,800 | 642 | 10,080 | 474 |
| | 12 | 0.18 | 17,280 | 1,260 | 14,400 | 1,247 | 12,960 | 1,123 | 12,240 | 716 | 10,800 | 588 | 10,080 | 431 |
| | 16 | 0.1 | 15,552 | 1,120 | 12,960 | 1,073 | 11,664 | 966 | 11,016 | 644 | 9,720 | 529 | 9,072 | 388 |
| | 20 | 0.1 | 15,552 | 1,120 | 12,960 | 933 | 11,664 | 840 | 11,016 | 644 | 9,720 | 529 | 9,072 | 388 |
| | 30 | 0.06 | 13,824 | 870 | 11,520 | 725 | 10,368 | 653 | 9,792 | 435 | 8,640 | 341 | 8,064 | 276 |
| | 40 | 0.03 | 12,096 | 625 | 10,080 | 521 | 9,072 | 469 | 8,568 | 313 | 7,560 | 245 | 7,056 | 198 |
| | 50 | 0.01 | 12,096 | 625 | 10,080 | 521 | 9,072 | 469 | 8,568 | 313 | 7,560 | 245 | 7,056 | 198 |
| 3 | 8 | 0.3 | 15,360 | 1,331 | 12,800 | 1,108 | 11,520 | 997 | 10,880 | 699 | 10,600 | 570 | 8,960 | 422 |
| | 12 | 0.21 | 15,360 | 1,331 | 12,800 | 1,108 | 11,520 | 997 | 10,880 | 699 | 10,600 | 570 | 8,960 | 422 |
| | 16 | 0.15 | 13,824 | 1,144 | 11,520 | 994 | 10,368 | 820 | 9,792 | 630 | 9,450 | 513 | 8,064 | 379 |
| | 20 | 0.12 | 13,824 | 995 | 11,520 | 911 | 10,368 | 820 | 9,792 | 630 | 9,450 | 513 | 8,064 | 379 |
| | 25 | 0.08 | 13,824 | 995 | 11,520 | 911 | 10,368 | 820 | 9,792 | 630 | 9,450 | 513 | 8,064 | 379 |
| | 30 | 0.08 | 13,824 | 995 | 11,520 | 829 | 10,368 | 746 | 9,792 | 630 | 9,450 | 513 | 8,064 | 347 |
| | 40 | 0.05 | 12,288 | 884 | 10,240 | 737 | 9,216 | 663 | 8,704 | 509 | 7,680 | 380 | 7,168 | 307 |
| | 50 | 0.02 | 10,752 | 556 | 8,960 | 463 | 8,064 | 417 | 7,616 | 278 | 6,720 | 218 | 6,272 | 176 |
| 4 | 12 | 0.4 | 11,500 | 2,300 | 9,400 | 1,880 | 8,460 | 1,524 | 7,990 | 1,358 | 7,050 | 902 | 6,580 | 728 |
| | 16 | 0.28 | 11,500 | 2,300 | 9,400 | 1,880 | 8,460 | 1,524 | 7,990 | 1,358 | 7,050 | 902 | 6,580 | 728 |
| | 20 | 0.28 | 10,350 | 2,070 | 8,460 | 1,692 | 7,614 | 1,371 | 7,191 | 1,222 | 6,345 | 812 | 5,922 | 655 |
| | 25 | 0.16 | 10,350 | 1,863 | 8,460 | 1,524 | 7,614 | 1,233 | 7,191 | 1,100 | 6,345 | 812 | 5,922 | 655 |
| | 30 | 0.16 | 10,350 | 1,863 | 8,460 | 1,524 | 7,614 | 1,233 | 7,191 | 1,100 | 6,345 | 812 | 5,922 | 655 |
| | 35 | 0.1 | 9,137 | 1,645 | 7,614 | 1,371 | 6,853 | 1,110 | 6,472 | 990 | 5,711 | 731 | 5,330 | 589 |
| | 40 | 0.1 | 9,137 | 1,645 | 7,614 | 1,371 | 6,853 | 1,110 | 6,472 | 990 | 5,711 | 731 | 5,330 | 589 |
| | 50 | 0.06 | 7,896 | 1,128 | 6,580 | 940 | 5,922 | 846 | 5,593 | 658 | 4,935 | 442 | 4,606 | 357 |
| 5 | 20 | 0.3 | 9,014 | 1,802 | 7,512 | 1,652 | 6,761 | 1,487 | 6,385 | 1,051 | 5,634 | 706 | 5,258 | 571 |
| | 25 | 0.3 | 8,112 | 1,621 | 6,760 | 1,351 | 6,084 | 1,216 | 5,746 | 946 | 5,070 | 635 | 4,732 | 513 |
| | 30 | 0.2 | 8,112 | 1,461 | 6,760 | 1,217 | 6,084 | 1,094 | 5,746 | 851 | 5,070 | 573 | 4,732 | 462 |
| | 40 | 0.15 | 7,301 | 1,315 | 6,084 | 1,096 | 5,476 | 986 | 5,171 | 767 | 4,563 | 515 | 4,259 | 416 |
| | 50 | 0.1 | 7,301 | 1,315 | 6,084 | 1,096 | 5,476 | 986 | 5,171 | 767 | 4,563 | 515 | 4,259 | 416 |
| 6 | 20 | 0.5 | 7,418 | 1,629 | 6,182 | 1,481 | 5,564 | 1,333 | 5,255 | 1,036 | 4,637 | 766 | 4,327 | 562 |
| | 30 | 0.4 | 6,744 | 1,480 | 5,620 | 1,346 | 5,058 | 1,212 | 4,777 | 942 | 4,215 | 696 | 3,934 | 511 |
| | 40 | 0.3 | 6,744 | 1,332 | 5,620 | 1,109 | 5,058 | 998 | 4,777 | 847 | 4,215 | 625 | 3,934 | 459 |
| | 50 | 0.2 | 6,000 | 1,090 | 5,000 | 986 | 4,500 | 887 | 4,250 | 690 | 3,750 | 515 | 3,500 | 379 |

※apは被削材グループ2での目安を示しています。その他のグループの場合は、上表の切込み比率を目安に調整してください。
※ap is shown as the criteria for Group 2 workpieces. For other groups, adjust the cutting depth according to the cutting depth factors in the above table.

**【注意】**
①PNコーティングはその性質上、通電性が微小です。従って、通電方式の工具長測定装置をご使用の際にはご注意ください。
②被削材、加工形状に合わせて、適切なクーラントを使用してください。
③この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

**【Note】**
① PN coating is less electro conductive. Therefore, electric transmitted measuring systems may not work.
② Use the appropriate coolant for the work material and machining shape.
③ These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
④ If the rpm of the machine is low, lower the feed rate also to put the rpm and feed rate in the same ratio.

# 標準切削条件表
Recommended cutting conditions

高能率切削条件 High efficiency cuttiing condition
高精度切削条件 High accuracy cuttiing condition

## EPDSE-ATH EPDSE-PN

高能率切削条件はA298ページを参照してください。
Please refer to P.A298 about high efficiency cutting conditions

| 推奨領域 Recommended range | | | PNシリーズ PN series / ATHシリーズ ATH series | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 被削材 Work material | | | 1 銅 Coppers | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼入れ鋼 Hardened steels (45～55HRC) | | 6 焼入れ鋼 Hardened steels (55～65HRC) | |
| 切込み比率 Ratio to standard depth of cut | | | 120% | | 100% | | 90% | | 70% | | 50% | | 45% | |
| 外径DC Tool dia. (mm) | 首下長LU Under neck length (mm) | ap (mm) | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 0.1 | 0.3 | 0.006 | 50,000 | 350 | 50,000 | 350 | 50,000 | 332 | 48,600 | 242 | 42,750 | 178 | 40,050 | 144 |
| | 0.5 | 0.004 | 50,000 | 350 | 50,000 | 350 | 50,000 | 332 | 48,600 | 242 | 42,750 | 178 | 40,050 | 144 |
| | 1 | 0.003 | 50,000 | 318 | 50,000 | 318 | 48,600 | 301 | 43,700 | 220 | 38,500 | 162 | 36,050 | 129 |
| 0.2 | 0.5 | 0.015 | 50,000 | 495 | 45,000 | 446 | 40,500 | 401 | 38,250 | 282 | 33,750 | 210 | 31,500 | 169 |
| | 1 | 0.011 | 50,000 | 495 | 45,000 | 446 | 40,500 | 401 | 38,250 | 282 | 33,750 | 210 | 31,500 | 169 |
| | 1.5 | 0.006 | 48,600 | 441 | 40,500 | 367 | 36,450 | 330 | 34,425 | 253 | 30,375 | 189 | 28,350 | 152 |
| | 2 | 0.004 | 43,200 | 352 | 36,000 | 294 | 32,400 | 264 | 30,600 | 200 | 27,000 | 165 | 25,200 | 147 |
| | 3 | 0.002 | 43,200 | 317 | 36,000 | 264 | 32,400 | 238 | 30,600 | 179 | 27,000 | 165 | 25,200 | 133 |
| 0.3 | 1 | 0.021 | 48,000 | 544 | 40,000 | 453 | 36,000 | 408 | 34,000 | 286 | 30,000 | 240 | 28,000 | 193 |
| | 1.5 | 0.021 | 48,000 | 544 | 40,000 | 453 | 36,000 | 408 | 34,000 | 286 | 30,000 | 240 | 28,000 | 193 |
| | 2 | 0.012 | 43,200 | 448 | 36,000 | 373 | 32,400 | 336 | 30,600 | 257 | 27,000 | 192 | 25,200 | 155 |
| | 2.5 | 0.01 | 43,200 | 448 | 36,000 | 373 | 32,400 | 336 | 30,600 | 257 | 27,000 | 192 | 25,200 | 155 |
| | 3 | 0.008 | 43,200 | 448 | 36,000 | 373 | 32,400 | 336 | 30,600 | 257 | 27,000 | 180 | 25,200 | 145 |
| 0.4 | 1 | 0.04 | 38,400 | 762 | 32,000 | 635 | 28,800 | 571 | 27,200 | 401 | 24,000 | 297 | 22,400 | 241 |
| | 1.5 | 0.028 | 38,400 | 762 | 32,000 | 635 | 28,800 | 571 | 27,200 | 401 | 24,000 | 297 | 22,400 | 241 |
| | 2 | 0.028 | 38,400 | 762 | 32,000 | 635 | 28,800 | 571 | 27,200 | 401 | 24,000 | 297 | 22,400 | 241 |
| | 2.5 | 0.022 | 34,560 | 557 | 28,800 | 464 | 25,920 | 418 | 24,480 | 320 | 21,600 | 239 | 20,160 | 192 |
| | 3 | 0.016 | 34,560 | 557 | 28,800 | 464 | 25,920 | 418 | 24,480 | 320 | 21,600 | 239 | 20,160 | 192 |
| | 3.5 | 0.012 | 34,560 | 557 | 28,800 | 464 | 25,920 | 418 | 24,480 | 320 | 21,600 | 239 | 20,160 | 192 |
| | 4 | 0.01 | 34,560 | 557 | 28,800 | 464 | 25,920 | 418 | 24,480 | 320 | 21,600 | 239 | 20,160 | 192 |
| | 5 | 0.01 | 30,720 | 406 | 25,600 | 316 | 23,040 | 284 | 21,760 | 208 | 19,200 | 184 | 17,920 | 144 |
| | 6 | 0.006 | 30,720 | 406 | 25,600 | 316 | 23,040 | 284 | 21,760 | 208 | 19,200 | 184 | 17,920 | 144 |
| | 8 | 0.003 | 26,880 | 289 | 22,400 | 240 | 20,160 | 217 | 19,040 | 160 | 16,800 | 141 | 15,680 | 128 |
| | 10 | 0.002 | 23,040 | 212 | 19,200 | 177 | 17,280 | 159 | 16,320 | 117 | 14,400 | 103 | 13,440 | 94 |
| 0.5 | 1 | 0.05 | 38,400 | 762 | 32,000 | 635 | 28,800 | 571 | 27,200 | 446 | 24,000 | 299 | 22,400 | 241 |
| | 1.5 | 0.05 | 38,400 | 762 | 32,000 | 635 | 28,800 | 571 | 27,200 | 446 | 24,000 | 299 | 22,400 | 241 |
| | 2 | 0.035 | 38,400 | 762 | 32,000 | 635 | 28,800 | 571 | 27,200 | 446 | 24,000 | 299 | 22,400 | 241 |
| | 2.5 | 0.03 | 34,560 | 557 | 28,800 | 464 | 25,920 | 418 | 24,480 | 354 | 21,600 | 239 | 20,160 | 192 |
| | 3 | 0.02 | 34,560 | 557 | 28,800 | 464 | 25,920 | 418 | 24,480 | 354 | 21,600 | 239 | 20,160 | 192 |
| | 4 | 0.02 | 34,560 | 557 | 28,800 | 464 | 25,920 | 418 | 24,480 | 320 | 21,600 | 239 | 20,160 | 192 |
| | 5 | 0.013 | 34,560 | 557 | 28,800 | 464 | 25,920 | 418 | 24,480 | 320 | 21,600 | 239 | 20,160 | 192 |
| | 6 | 0.013 | 30,720 | 433 | 25,600 | 361 | 23,040 | 324 | 21,760 | 208 | 19,200 | 184 | 17,920 | 144 |
| | 8 | 0.008 | 30,720 | 371 | 25,600 | 309 | 23,040 | 278 | 21,760 | 172 | 19,200 | 155 | 17,920 | 117 |
| | 10 | 0.004 | 26,880 | 288 | 22,400 | 240 | 20,160 | 216 | 19,040 | 121 | 16,800 | 105 | 15,680 | 79 |
| 0.6 | 2 | 0.042 | 38,400 | 1,089 | 32,000 | 907 | 28,800 | 816 | 27,200 | 572 | 24,000 | 427 | 22,400 | 344 |
| | 3 | 0.035 | 34,560 | 895 | 28,800 | 746 | 25,920 | 671 | 24,480 | 515 | 21,600 | 385 | 20,160 | 310 |
| | 4 | 0.024 | 34,560 | 895 | 28,800 | 746 | 25,920 | 671 | 24,480 | 515 | 21,600 | 385 | 20,160 | 310 |
| | 5 | 0.02 | 34,560 | 796 | 28,800 | 663 | 25,920 | 596 | 24,480 | 458 | 21,600 | 342 | 20,160 | 276 |
| | 6 | 0.015 | 34,560 | 796 | 28,800 | 663 | 25,920 | 596 | 24,480 | 458 | 21,600 | 342 | 20,160 | 276 |
| | 7 | 0.015 | 30,720 | 687 | 25,600 | 572 | 23,040 | 515 | 21,760 | 395 | 19,200 | 295 | 17,920 | 238 |
| | 8 | 0.015 | 30,720 | 595 | 25,600 | 516 | 23,040 | 464 | 21,760 | 297 | 19,200 | 262 | 17,920 | 206 |
| | 9 | 0.012 | 30,720 | 595 | 25,600 | 516 | 23,040 | 464 | 21,760 | 297 | 19,200 | 262 | 17,920 | 206 |
| | 10 | 0.009 | 30,720 | 595 | 25,600 | 516 | 23,040 | 464 | 21,760 | 297 | 19,200 | 262 | 17,920 | 206 |
| 0.7 | 2 | 0.07 | 38,400 | 1,089 | 32,000 | 907 | 28,800 | 816 | 27,200 | 572 | 24,000 | 427 | 22,400 | 344 |
| | 4 | 0.049 | 34,560 | 796 | 28,800 | 663 | 25,920 | 596 | 24,480 | 458 | 21,600 | 342 | 20,160 | 276 |
| | 6 | 0.018 | 34,560 | 796 | 28,800 | 663 | 25,920 | 596 | 24,480 | 458 | 21,600 | 342 | 20,160 | 276 |
| | 8 | 0.018 | 30,720 | 541 | 25,600 | 451 | 23,040 | 406 | 21,760 | 260 | 19,200 | 229 | 17,920 | 180 |
| | 10 | 0.018 | 30,720 | 541 | 25,600 | 451 | 23,040 | 406 | 21,760 | 260 | 19,200 | 229 | 17,920 | 180 |

【注意】ご使用にあたっては、A303ページの表下の項目と注意を参照してください。
【Note】Upon usage, please refer to comments and notes below table on page A303.

Epoch Deep Square Evolution

# エポックディープスクエア エボリューション

## EPDSE-ATH EPDSE-PN

高能率切削条件 High efficiency cuttiing condition

**高精度切削条件 High accuracy cuttiing condition**

高能率切削条件はA298ページを参照してください。
Please refer to P.A298 about high efficiency cutting conditions

| 推奨領域 Recommended range | | | PNシリーズ PN series / ATHシリーズ ATH series | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 被削材 Work material | | | 1 銅 Coppers | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180~250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25~35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35~45HRC) | | 5 焼入れ鋼 Hardened steels (45~55HRC) | | 6 焼入れ鋼 Hardened steels (55~65HRC) | |
| 切込み比率 Ratio to standard depth of cut | | | 120% | | 100% | | 90% | | 70% | | 50% | | 45% | |
| 外径DC Tool dia. (mm) | 首下長LU Under neck length (mm) | ap (mm) | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min |
| 0.8 | 2 | 0.08 | 38,400 | 1,089 | 32,000 | 907 | 28,800 | 816 | 27,200 | 636 | 24,000 | 475 | 22,400 | 383 |
| | 4 | 0.056 | 38,400 | 1,089 | 32,000 | 907 | 28,800 | 816 | 27,200 | 636 | 24,000 | 475 | 22,400 | 383 |
| | 6 | 0.032 | 34,560 | 796 | 28,800 | 663 | 25,920 | 596 | 24,480 | 573 | 21,600 | 428 | 20,160 | 345 |
| | 8 | 0.02 | 34,560 | 796 | 28,800 | 663 | 25,920 | 596 | 24,480 | 458 | 21,600 | 342 | 20,160 | 276 |
| | 10 | 0.02 | 30,720 | 541 | 25,600 | 451 | 23,040 | 406 | 21,760 | 260 | 19,200 | 229 | 17,920 | 180 |
| | 12 | 0.012 | 30,720 | 541 | 25,600 | 451 | 23,040 | 406 | 21,760 | 260 | 19,200 | 229 | 17,920 | 180 |
| 0.9 | 2 | 0.09 | 38,400 | 1,206 | 32,000 | 1,005 | 28,800 | 904 | 27,200 | 695 | 24,000 | 519 | 22,400 | 418 |
| | 4 | 0.063 | 38,400 | 1,206 | 32,000 | 1,005 | 28,800 | 904 | 27,200 | 695 | 24,000 | 519 | 22,400 | 418 |
| | 6 | 0.036 | 34,560 | 995 | 28,800 | 829 | 25,920 | 746 | 24,480 | 573 | 21,600 | 428 | 20,160 | 345 |
| | 8 | 0.023 | 34,560 | 995 | 28,800 | 746 | 25,920 | 746 | 24,480 | 573 | 21,600 | 428 | 20,160 | 345 |
| | 10 | 0.023 | 30,720 | 619 | 25,600 | 516 | 23,040 | 464 | 21,760 | 297 | 19,200 | 262 | 17,920 | 206 |
| | 12 | 0.023 | 30,720 | 541 | 25,600 | 451 | 23,040 | 414 | 21,760 | 297 | 19,200 | 262 | 17,920 | 206 |
| 1 | 2 | 0.09 | 34,560 | 1,465 | 28,800 | 1,220 | 25,920 | 1,098 | 24,480 | 936 | 21,600 | 699 | 20,160 | 563 |
| | 3 | 0.07 | 34,560 | 1,465 | 28,800 | 1,220 | 25,920 | 1,098 | 24,480 | 936 | 21,600 | 699 | 20,160 | 563 |
| | 4 | 0.065 | 34,560 | 1,465 | 28,800 | 1,220 | 25,920 | 1,098 | 24,480 | 936 | 21,600 | 699 | 20,160 | 563 |
| | 5 | 0.05 | 34,560 | 1,465 | 28,800 | 1,220 | 25,920 | 1,098 | 24,480 | 936 | 21,600 | 699 | 20,160 | 563 |
| | 6 | 0.035 | 31,104 | 1,276 | 25,920 | 1,008 | 23,328 | 907 | 22,032 | 773 | 19,440 | 577 | 18,144 | 418 |
| | 7 | 0.035 | 31,104 | 1,276 | 25,920 | 1,008 | 23,328 | 907 | 22,032 | 773 | 19,440 | 577 | 18,144 | 418 |
| | 8 | 0.035 | 31,104 | 1,209 | 25,920 | 1,008 | 23,328 | 907 | 22,032 | 773 | 19,440 | 577 | 18,144 | 418 |
| | 9 | 0.03 | 31,104 | 1,209 | 25,920 | 1,008 | 23,328 | 907 | 22,032 | 695 | 19,440 | 461 | 18,144 | 372 |
| | 10 | 0.022 | 31,104 | 1,209 | 25,920 | 896 | 23,328 | 816 | 22,032 | 695 | 19,440 | 461 | 18,144 | 372 |
| | 12 | 0.022 | 27,648 | 836 | 23,040 | 696 | 20,736 | 627 | 19,584 | 401 | 17,280 | 354 | 16,128 | 278 |
| | 14 | 0.022 | 27,648 | 836 | 23,040 | 696 | 20,736 | 627 | 19,584 | 401 | 17,280 | 354 | 16,128 | 278 |
| | 16 | 0.012 | 27,648 | 716 | 23,040 | 596 | 20,736 | 537 | 19,584 | 380 | 17,280 | 298 | 16,128 | 226 |
| | 20 | 0.008 | 24,828 | 586 | 20,690 | 488 | 18,621 | 439 | 17,587 | 278 | 15,518 | 213 | 14,483 | 158 |
| | 25 | 0.005 | 21,000 | 455 | 17,500 | 379 | 15,750 | 341 | 14,875 | 216 | 13,125 | 165 | 12,250 | 122 |
| 1.2 | 4 | 0.09 | 30,720 | 1,306 | 25,600 | 1,089 | 23,040 | 980 | 21,760 | 760 | 19,200 | 513 | 17,920 | 414 |
| | 6 | 0.084 | 30,720 | 1,306 | 25,600 | 1,089 | 23,040 | 980 | 21,760 | 760 | 19,200 | 513 | 17,920 | 414 |
| | 8 | 0.048 | 27,648 | 1,074 | 23,040 | 895 | 20,736 | 806 | 19,584 | 684 | 17,280 | 461 | 16,128 | 372 |
| | 10 | 0.03 | 27,648 | 1,074 | 23,040 | 895 | 20,736 | 806 | 19,584 | 684 | 17,280 | 461 | 16,128 | 372 |
| | 12 | 0.03 | 27,648 | 955 | 23,040 | 716 | 20,736 | 642 | 19,584 | 549 | 17,280 | 410 | 16,128 | 331 |
| | 16 | 0.02 | 24,576 | 848 | 20,480 | 707 | 18,432 | 557 | 17,408 | 488 | 15,360 | 364 | 14,336 | 294 |
| 1.4 | 6 | 0.1 | 26,880 | 1,143 | 22,400 | 952 | 20,160 | 857 | 19,040 | 601 | 16,800 | 449 | 15,680 | 361 |
| | 12 | 0.035 | 24,192 | 940 | 20,160 | 783 | 18,144 | 705 | 17,136 | 540 | 15,120 | 404 | 14,112 | 325 |
| 1.5 | 4 | 0.11 | 26,880 | 1,270 | 22,400 | 1,058 | 20,160 | 953 | 19,040 | 668 | 16,800 | 499 | 15,680 | 402 |
| | 6 | 0.11 | 26,880 | 1,143 | 22,400 | 952 | 20,160 | 866 | 19,040 | 668 | 16,800 | 499 | 15,680 | 402 |
| | 8 | 0.06 | 24,192 | 1,045 | 20,160 | 871 | 18,144 | 784 | 17,136 | 601 | 15,120 | 449 | 14,112 | 362 |
| | 10 | 0.06 | 24,192 | 1,045 | 20,160 | 783 | 18,144 | 705 | 17,136 | 601 | 15,120 | 449 | 14,112 | 362 |
| | 12 | 0.06 | 24,192 | 940 | 20,160 | 783 | 18,144 | 705 | 17,136 | 601 | 15,120 | 404 | 14,112 | 325 |
| | 14 | 0.038 | 24,192 | 940 | 20,160 | 783 | 18,144 | 705 | 17,136 | 601 | 15,120 | 404 | 14,112 | 325 |
| | 16 | 0.038 | 21,504 | 731 | 17,920 | 609 | 16,128 | 549 | 15,232 | 351 | 13,440 | 310 | 12,544 | 243 |
| | 18 | 0.038 | 21,504 | 731 | 17,920 | 609 | 16,128 | 549 | 15,232 | 351 | 13,440 | 310 | 12,544 | 243 |
| | 20 | 0.038 | 21,504 | 731 | 17,920 | 609 | 16,128 | 488 | 15,232 | 312 | 13,440 | 276 | 12,544 | 216 |
| | 25 | 0.023 | 16,128 | 470 | 13,440 | 391 | 12,096 | 313 | 11,424 | 222 | 10,080 | 174 | 9,408 | 132 |
| | 30 | 0.015 | 13,440 | 319 | 11,200 | 266 | 12,096 | 212 | 9,520 | 149 | 8,400 | 111 | 7,840 | 89 |
| | 35 | 0.01 | 13,440 | 284 | 11,200 | 236 | 12,096 | 186 | 9,520 | 149 | 8,400 | 111 | 7,840 | 89 |
| | 40 | 0.005 | 10,752 | 152 | 8,960 | 126 | 8,064 | 113 | 7,616 | 76 | 6,720 | 59 | 6,272 | 48 |
| 1.6 | 6 | 0.11 | 24,960 | 1,179 | 20,800 | 977 | 18,720 | 884 | 17,680 | 690 | 15,600 | 515 | 14,560 | 415 |
| | 8 | 0.11 | 24,960 | 1,179 | 20,800 | 977 | 18,720 | 884 | 17,680 | 621 | 15,600 | 515 | 14,560 | 415 |
| 1.8 | 6 | 0.13 | 24,960 | 1,179 | 20,800 | 997 | 18,720 | 884 | 17,680 | 690 | 15,600 | 515 | 14,560 | 415 |
| | 8 | 0.13 | 24,960 | 1,179 | 20,800 | 997 | 18,720 | 884 | 17,680 | 621 | 15,600 | 515 | 14,560 | 415 |

| 推奨領域 Recommended range | | | PNシリーズ PN series / ATHシリーズ ATH series | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 被削材 Work material | | | 1 銅 Coppers | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼入れ鋼 Hardened steels (45～55HRC) | | 6 焼入れ鋼 Hardened steels (55～65HRC) | |
| 切込み比率 Ratio to standard depth of cut | | | 120% | | 100% | | 90% | | 70% | | 50% | | 45% | |
| 外径DC Tool dia. (mm) | 首下長LU Under neck length (mm) | $a_p$ (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 2 | 4 | 0.2 | 20,160 | 1,270 | 16,800 | 952 | 15,120 | 861 | 14,280 | 655 | 12,600 | 499 | 11,760 | 402 |
| | 6 | 0.2 | 20,160 | 1,270 | 16,800 | 952 | 15,120 | 861 | 14,280 | 655 | 12,600 | 499 | 11,760 | 402 |
| | 8 | 0.14 | 20,160 | 1,270 | 16,800 | 952 | 15,120 | 861 | 14,280 | 655 | 12,600 | 499 | 11,760 | 402 |
| | 10 | 0.14 | 20,160 | 1,270 | 16,800 | 952 | 15,120 | 861 | 14,280 | 655 | 12,600 | 499 | 11,760 | 402 |
| | 12 | 0.08 | 18,144 | 1,045 | 15,120 | 871 | 13,608 | 784 | 12,852 | 590 | 11,340 | 449 | 10,584 | 362 |
| | 14 | 0.08 | 18,144 | 1,045 | 15,120 | 871 | 13,608 | 784 | 12,852 | 590 | 11,340 | 449 | 10,584 | 325 |
| | 16 | 0.08 | 18,144 | 940 | 15,120 | 783 | 13,608 | 707 | 12,852 | 540 | 11,340 | 426 | 10,584 | 325 |
| | 18 | 0.05 | 18,144 | 940 | 15,120 | 783 | 13,608 | 707 | 12,852 | 540 | 11,340 | 404 | 10,584 | 289 |
| | 20 | 0.05 | 18,144 | 888 | 15,120 | 696 | 13,608 | 627 | 12,852 | 480 | 11,340 | 359 | 10,584 | 289 |
| | 25 | 0.05 | 16,128 | 731 | 13,440 | 609 | 12,096 | 549 | 11,424 | 312 | 10,080 | 310 | 9,408 | 232 |
| | 30 | 0.03 | 16,128 | 650 | 13,440 | 541 | 12,096 | 488 | 11,424 | 273 | 10,080 | 276 | 9,408 | 216 |
| | 35 | 0.02 | 14,112 | 466 | 11,760 | 388 | 10,584 | 349 | 9,996 | 225 | 8,820 | 182 | 8,232 | 148 |
| | 40 | 0.01 | 14,112 | 408 | 11,760 | 340 | 10,586 | 306 | 9,996 | 197 | 8,820 | 159 | 8,232 | 129 |
| | 50 | 0.005 | 12,096 | 284 | 10,080 | 236 | 9,072 | 186 | 8,568 | 120 | 7,560 | 97 | 7,056 | 78 |
| 2.5 | 8 | 0.18 | 17,280 | 1,361 | 14,400 | 1,134 | 12,960 | 1,021 | 12,240 | 716 | 10,800 | 535 | 10,080 | 431 |
| | 12 | 0.18 | 17,280 | 1,134 | 14,400 | 1,020 | 12,960 | 933 | 12,240 | 644 | 10,800 | 520 | 10,080 | 387 |
| | 16 | 0.1 | 15,552 | 1,008 | 12,960 | 839 | 11,664 | 758 | 11,016 | 579 | 9,720 | 450 | 9,072 | 349 |
| | 20 | 0.1 | 15,552 | 840 | 12,960 | 794 | 11,664 | 711 | 11,016 | 515 | 9,720 | 450 | 9,072 | 310 |
| | 30 | 0.06 | 13,824 | 696 | 11,520 | 580 | 10,368 | 457 | 9,792 | 348 | 8,640 | 272 | 8,064 | 220 |
| | 40 | 0.03 | 12,096 | 437 | 10,080 | 364 | 9,072 | 328 | 8,568 | 250 | 7,560 | 196 | 7,056 | 158 |
| | 50 | 0.01 | 12,096 | 375 | 10,080 | 338 | 9,072 | 304 | 8,568 | 203 | 7,560 | 171 | 7,056 | 138 |
| 3 | 8 | 0.3 | 15,360 | 1,210 | 12,800 | 1,008 | 11,520 | 907 | 10,880 | 636 | 9,600 | 475 | 8,960 | 383 |
| | 12 | 0.21 | 15,360 | 1,210 | 12,800 | 1,008 | 11,520 | 907 | 10,880 | 636 | 9,600 | 475 | 8,960 | 383 |
| | 16 | 0.12 | 13,824 | 995 | 11,520 | 829 | 10,368 | 746 | 9,792 | 573 | 8,640 | 428 | 8,064 | 344 |
| | 20 | 0.12 | 13,824 | 895 | 11,520 | 787 | 10,368 | 705 | 9,792 | 573 | 8,640 | 428 | 8,064 | 344 |
| | 25 | 0.08 | 13,824 | 895 | 11,520 | 787 | 10,368 | 705 | 9,792 | 573 | 8,640 | 428 | 8,064 | 344 |
| | 30 | 0.08 | 13,824 | 796 | 11,520 | 663 | 10,368 | 601 | 9,792 | 573 | 8,640 | 428 | 8,064 | 310 |
| | 40 | 0.05 | 12,288 | 618 | 10,240 | 515 | 9,216 | 464 | 8,704 | 356 | 7,680 | 304 | 7,168 | 245 |
| | 50 | 0.02 | 10,752 | 389 | 8,960 | 347 | 8,064 | 291 | 7,616 | 194 | 6,720 | 152 | 6,272 | 123 |
| 4 | 12 | 0.4 | 11,500 | 2,070 | 9,400 | 1,692 | 8,460 | 1,370 | 7,990 | 1,222 | 7,050 | 811 | 6,580 | 654 |
| | 16 | 0.28 | 11,500 | 2,070 | 9,400 | 1,692 | 8,460 | 1,370 | 7,990 | 1,222 | 7,050 | 811 | 6,580 | 654 |
| | 20 | 0.28 | 10,350 | 1,863 | 8,460 | 1,522 | 7,614 | 1,233 | 7,191 | 1,099 | 6,345 | 730 | 5,922 | 588 |
| | 25 | 0.16 | 10,350 | 1,676 | 8,460 | 1,370 | 7,614 | 1,109 | 7,191 | 990 | 6,345 | 730 | 5,922 | 588 |
| | 30 | 0.16 | 10,350 | 1,676 | 8,460 | 1,370 | 7,614 | 1,109 | 7,191 | 880 | 6,345 | 649 | 5,922 | 588 |
| | 35 | 0.1 | 9,137 | 1,316 | 7,614 | 1,096 | 6,853 | 888 | 6,472 | 792 | 5,711 | 584 | 5,330 | 471 |
| | 40 | 0.1 | 9,137 | 1,151 | 7,614 | 959 | 6,853 | 777 | 6,472 | 693 | 5,711 | 511 | 5,330 | 412 |
| | 50 | 0.06 | 7,896 | 789 | 6,580 | 658 | 7,106 | 592 | 5,593 | 460 | 4,935 | 309 | 4,606 | 249 |
| 5 | 20 | 0.3 | 9,014 | 1,621 | 7,512 | 1,351 | 6,761 | 1,216 | 6,385 | 945 | 5,634 | 635 | 5,258 | 513 |
| | 25 | 0.3 | 8,112 | 1,458 | 6,760 | 1,215 | 6,084 | 1,094 | 5,746 | 850 | 5,070 | 571 | 4,732 | 461 |
| | 30 | 0.2 | 8,112 | 1,313 | 6,760 | 1,094 | 6,084 | 984 | 5,746 | 765 | 5,070 | 514 | 4,732 | 415 |
| | 40 | 0.15 | 7,301 | 1,052 | 6,084 | 876 | 5,476 | 788 | 5,171 | 613 | 4,563 | 412 | 4,259 | 332 |
| | 50 | 0.1 | 7,301 | 986 | 6,084 | 876 | 5,476 | 690 | 5,171 | 575 | 4,563 | 360 | 4,259 | 291 |
| 6 | 20 | 0.5 | 7,418 | 1,481 | 6,182 | 1,234 | 5,564 | 1,111 | 5,255 | 864 | 4,637 | 580 | 4,327 | 469 |
| | 30 | 0.4 | 6,744 | 1,346 | 5,620 | 1,122 | 5,058 | 1,010 | 4,777 | 785 | 4,215 | 527 | 3,934 | 426 |
| | 40 | 0.3 | 6,744 | 1,211 | 5,620 | 1,009 | 5,058 | 908 | 4,777 | 706 | 4,215 | 474 | 3,934 | 383 |
| | 50 | 0.2 | 6,000 | 981 | 5,000 | 817 | 4,500 | 735 | 4,250 | 636 | 3,750 | 427 | 3,500 | 345 |

※$a_p$は被削材グループ2での目安を示しています。その他のグループの場合は、上表の切込み比率を目安に調整してください。
※$a_p$ is shown as the criteria for Group 2 workpieces. For other groups, adjust the cutting depth according to the cutting depth factors in the above table.

**【注意】** ①PNコーティングはその性質上、通電性が微小です。従って、通電方式の工具長測定装置をご使用の際にはご注意ください。
②被削材、加工形状に合わせて、適切なクーラントを使用してください。
③この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

**【Note】** ① PN coating is less electro conductive. Therefore, electric transmitted measuring systems may not work.
② Use the appropriate coolant for the work material and machining shape.
③ These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
④ If the rpm of the machine is low, lower the feed rate also to put the rpm and feed rate in the same ratio.

# Epoch Panacea Square
# エポックパナシアスクエア

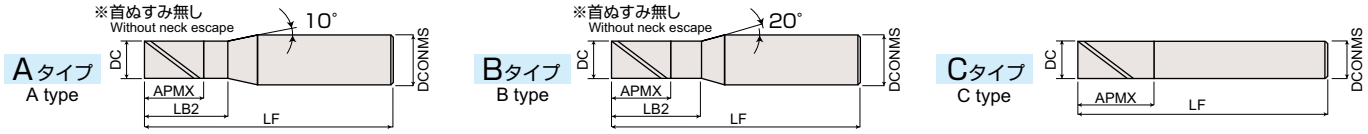
驚異の耐密着性と耐摩耗性のPNコーティング。幅広い被削材の加工が可能。
PN Coating for amazing seizure resistance and wear resistance. Enables machining of a wide variety of materials.

**2枚刃** | 2 flutes

平面 Planing / 側面 Side Cutting / 溝 Slotting / 彫込み Die-sinking / ヘリカル Helical / 座ぐり Spot Facing / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance
φ0.2～φ0.9：0～−0.015
φ1.0～φ20：0～−0.02
h5
(mm)

2枚刃
2Flutes




## HGOS2○○○-PN

超硬 Carbide / PN / ねじれ30° Helix angle / 切削条件表 A306 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 首下長 Under neck length LB2 | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 刃数 No. of flutes | タイプ Type | 希望小売価格 (円) Suggested retail price(￥) |
|---|---|---|---|---|---|---|---|---|---|
| HGOS2002-PN | ● | 0.2 | 0.4 | 0.6 | 40 | 4 | 2 | A | 9,180 |
| HGOS2003-PN | ● | 0.3 | 0.6 | 0.9 | 40 | 4 | 2 | A | 8,490 |
| HGOS2004-PN | ● | 0.4 | 0.8 | 1.1 | 40 | 4 | 2 | A | 8,490 |
| HGOS2005-PN | ● | 0.5 | 1 | 1.3 | 40 | 4 | 2 | A | 8,160 |
| HGOS2006-PN | ● | 0.6 | 1.2 | 1.5 | 40 | 4 | 2 | A | 8,160 |
| HGOS2007-PN | ● | 0.7 | 1.4 | 1.7 | 40 | 4 | 2 | A | 8,000 |
| HGOS2008-PN | ● | 0.8 | 1.6 | 1.9 | 40 | 4 | 2 | A | 8,000 |
| HGOS2009-PN | ● | 0.9 | 1.8 | 2.1 | 40 | 4 | 2 | A | 7,670 |
| HGOS2010-PN | ● | 1 | 2 | 2.5 | 40 | 4 | 2 | A | 6,720 |
| HGOS2015-PN | ● | 1.5 | 3 | 3.5 | 40 | 4 | 2 | A | 6,720 |
| HGOS2020-PN | ● | 2 | 6 | 7 | 40 | 4 | 2 | A | 6,720 |
| HGOS2025-PN | ● | 2.5 | 8 | 9 | 40 | 4 | 2 | A | 6,720 |
| HGOS2030-PN | ● | 3 | 8 | 9 | 45 | 6 | 2 | A | 7,940 |
| HGOS2035-PN | ● | 3.5 | 10 | 11 | 45 | 6 | 2 | A | 8,280 |
| HGOS2040-PN | ● | 4 | 11 | 12 | 45 | 6 | 2 | B | 8,280 |
| HGOS2045-PN | ● | 4.5 | 11 | 12 | 45 | 6 | 2 | B | 9,390 |
| HGOS2050-PN | ● | 5 | 13 | 14 | 60 | 6 | 2 | B | 9,390 |
| HGOS2055-PN | ● | 5.5 | 13 | 14 | 60 | 6 | 2 | B | 10,070 |
| HGOS2060-PN | ● | 6 | 13 | - | 60 | 6 | 2 | C | 9,720 |
| HGOS2070-PN | ● | 7 | 16 | 17 | 70 | 8 | 2 | B | 11,570 |
| HGOS2080-PN | ● | 8 | 19 | - | 75 | 8 | 2 | C | 12,580 |
| HGOS2090-PN | ● | 9 | 19 | 20 | 80 | 10 | 2 | B | 15,150 |
| HGOS2100-PN | ● | 10 | 22 | - | 80 | 10 | 2 | C | 15,600 |
| HGOS2120-PN | ● | 12 | 26 | - | 100 | 12 | 2 | C | 21,100 |
| HGOS2160-PN | ● | 16 | 35 | - | 110 | 16 | 2 | C | 42,820 |
| HGOS2200-PN | ● | 20 | 40 | - | 125 | 20 | 2 | C | 72,730 |

●：標準在庫品です。●：Stocked items.

## 4枚刃 4 flutes

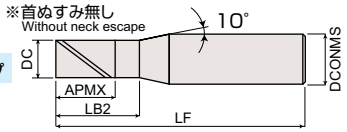
平面 Planing | 側面 Side Cutting | 彫込み Die-sinking | ヘリカル Helical | 座ぐり Spot Facing | 中仕上 Semi Finishing | 仕上 Finishing

外径公差 Dia.tolerance 0～−0.02　h5

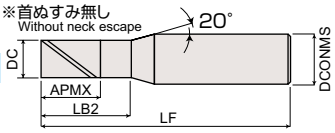
(mm)

4枚刃
4Flutes

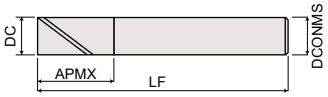
Aタイプ A type




Bタイプ B type




Cタイプ C type




## HGOS4○○○-PN

超硬 Carbide | PN | ねじれ30° Helix angle | 切削条件表 A306 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 首下長 Under neck length LB2 | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 刃数 No. of flutes | タイプ Type | 希望小売価格 (円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|
| HGOS4010-PN | ● | 1 | 2.5 | 3 | 40 | 4 | 4 | A | 8,930 |
| HGOS4015-PN | ● | 1.5 | 4 | 4.5 | 40 | 4 | 4 | A | 8,930 |
| HGOS4020-PN | ● | 2 | 6 | 7 | 40 | 4 | 4 | A | 8,930 |
| HGOS4025-PN | ● | 2.5 | 8 | 9 | 40 | 4 | 4 | A | 9,100 |
| HGOS4030-PN | ● | 3 | 10 | 11 | 45 | 6 | 4 | A | 9,100 |
| HGOS4040-PN | ● | 4 | 12 | 13 | 45 | 6 | 4 | B | 9,450 |
| HGOS4050-PN | ● | 5 | 15 | 16 | 60 | 6 | 4 | B | 10,550 |
| HGOS4060-PN | ● | 6 | 15 | - | 60 | 6 | 4 | C | 11,460 |
| HGOS4080-PN | ● | 8 | 20 | - | 75 | 8 | 4 | C | 14,260 |
| HGOS4100-PN | ● | 10 | 25 | - | 80 | 10 | 4 | C | 18,970 |
| HGOS4120-PN | ● | 12 | 30 | - | 100 | 12 | 4 | C | 23,910 |
| HGOS4160-PN | ● | 16 | 35 | - | 110 | 16 | 4 | C | 54,910 |
| HGOS4200-PN | ● | 20 | 40 | - | 125 | 20 | 4 | C | 80,240 |

### HGOS2-PN、HGOS4-PNの対応被削材

Applicable work material of HGOS2-PN, HGOS4-PN

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | | | ◎ | ○ | ◎ | ◎ |

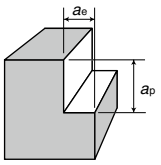
### 再研磨対応外径範囲

Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| HGOS2-PN | 6～20 | 2～20 |
| HGOS4-PN | 6～20 | 2～20 |

●：標準在庫品です。●：Stocked items.　干渉なし：No interference

# 標準切削条件表 Recommended cutting conditions




## HGOS2-PN HGOS4-PN

### 側面切削 Side cutting

| 外径 DC Tool dia. (mm) | 刃長 APMX Flute length (mm) | 銅合金・アルミ合金 Copper alloys, Aluminum alloys | | | | 鋳鉄・炭素鋼 Cast irons, Carbon steels (150～200HB) FC250,S50C,S55C | | | | ステンレス鋼 Stainless steels (25～35HRC) SUS304,SUS316 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 回転数 min-1 | 送り速度 mm/min | ap mm | ae mm | 回転数 min-1 | 送り速度 mm/min | ap mm | ae mm | 回転数 min-1 | 送り速度 mm/min | ap mm | ae mm |
| 0.2 | 0.4 | 66,879 | 669 | 0.300 | 0.010 | 55,732 | 557 | 0.300 | 0.010 | 33,439 | 301 | 0.300 | 0.008 |
| 0.3 | 0.6 | 44,586 | 446 | 0.450 | 0.015 | 37,155 | 372 | 0.450 | 0.015 | 22,293 | 201 | 0.450 | 0.012 |
| 0.4 | 0.8 | 38,217 | 382 | 0.600 | 0.020 | 27,866 | 279 | 0.600 | 0.020 | 16,720 | 150 | 0.600 | 0.016 |
| 0.5 | 1 | 38,217 | 382 | 0.750 | 0.025 | 25,478 | 255 | 0.750 | 0.025 | 15,287 | 138 | 0.750 | 0.020 |
| 0.6 | 1.2 | 41,401 | 662 | 0.900 | 0.030 | 26,539 | 425 | 0.900 | 0.030 | 15,924 | 229 | 0.900 | 0.024 |
| 0.7 | 1.4 | 35,487 | 568 | 1.050 | 0.035 | 29,572 | 473 | 1.050 | 0.035 | 17,743 | 256 | 1.050 | 0.028 |
| 0.8 | 1.6 | 33,439 | 535 | 1.200 | 0.040 | 25,876 | 414 | 1.200 | 0.040 | 15,525 | 224 | 1.200 | 0.032 |
| 0.9 | 1.8 | 33,970 | 544 | 1.350 | 0.045 | 24,770 | 396 | 1.350 | 0.045 | 14,862 | 214 | 1.350 | 0.036 |
| 1 | 2 | 38,217 | 764 | 1.500 | 0.050 | 25,478 | 510 | 1.500 | 0.050 | 15,287 | 275 | 1.500 | 0.040 |
| 1.5 | 3 | 28,025 | 561 | 2.250 | 0.150 | 21,231 | 425 | 2.250 | 0.150 | 12,739 | 229 | 2.250 | 0.135 |
| 2 | 6 | 21,019 | 631 | 3.000 | 0.200 | 17,516 | 525 | 3.000 | 0.200 | 10,510 | 284 | 3.000 | 0.180 |
| 2.5 | 8 | 16,815 | 504 | 3.750 | 0.250 | 14,013 | 420 | 3.750 | 0.250 | 8,408 | 227 | 3.750 | 0.225 |
| 3 | 8 | 15,287 | 611 | 4.500 | 0.300 | 11,677 | 467 | 4.500 | 0.300 | 7,006 | 252 | 4.500 | 0.270 |
| 3.5 | 10 | 13,103 | 524 | 5.250 | 0.350 | 10,919 | 437 | 5.250 | 0.350 | 6,551 | 236 | 5.250 | 0.315 |
| 4 | 11 | 11,465 | 573 | 6.000 | 0.400 | 9,554 | 478 | 6.000 | 0.400 | 5,732 | 258 | 6.000 | 0.360 |
| 4.5 | 11 | 10,191 | 510 | 6.750 | 0.450 | 8,493 | 425 | 6.750 | 0.450 | 5,096 | 229 | 6.750 | 0.405 |
| 5 | 13 | 9,172 | 550 | 7.500 | 0.500 | 7,643 | 459 | 7.500 | 0.500 | 4,586 | 248 | 7.500 | 0.450 |
| 5.5 | 13 | 8,338 | 500 | 8.250 | 0.550 | 6,948 | 417 | 8.250 | 0.550 | 4,169 | 225 | 8.250 | 0.495 |
| 6 | 13 | 7,643 | 459 | 9.000 | 0.600 | 6,369 | 382 | 9.000 | 0.600 | 3,822 | 206 | 9.000 | 0.540 |
| 7 | 16 | 6,551 | 459 | 10.500 | 0.700 | 5,460 | 382 | 10.500 | 0.700 | 3,276 | 206 | 10.500 | 0.630 |
| 8 | 19 | 5,732 | 401 | 12.000 | 0.800 | 4,777 | 334 | 12.000 | 0.800 | 2,866 | 181 | 12.000 | 0.720 |
| 9 | 19 | 5,096 | 408 | 13.500 | 0.900 | 4,246 | 340 | 13.500 | 0.900 | 2,548 | 183 | 13.500 | 0.810 |
| 10 | 22 | 4,586 | 459 | 15.000 | 1.000 | 3,822 | 382 | 15.000 | 1.000 | 2,293 | 206 | 15.000 | 0.900 |
| 12 | 26 | 3,822 | 459 | 18.000 | 1.200 | 3,185 | 382 | 18.000 | 1.200 | 1,911 | 206 | 18.000 | 1.080 |
| 16 | 35 | 2,866 | 401 | 24.000 | 1.600 | 2,389 | 334 | 24.000 | 1.600 | 1,433 | 181 | 24.000 | 1.440 |
| 20 | 40 | 2,293 | 367 | 30.000 | 2.000 | 1,911 | 306 | 30.000 | 2.000 | 1,146 | 165 | 30.000 | 1.800 |

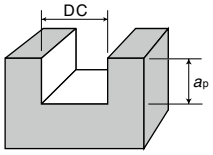
| 外径 DC Tool dia. (mm) | 刃長 APMX Flute length (mm) | 合金鋼・工具鋼 Alloy steels (25～35HRC) HPM7,SKD61Ⓐ,SKT4 | | | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM-MAGIC,CENA1,NAK80 | | | | 焼入れ鋼 Hardened steels (45～52HRC) SKD61Ⓗ,HPM38,DAC-MAGIC | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 回転数 min-1 | 送り速度 mm/min | ap mm | ae mm | 回転数 min-1 | 送り速度 mm/min | ap mm | ae mm | 回転数 min-1 | 送り速度 mm/min | ap mm | ae mm |
| 0.2 | 0.4 | 33,439 | 301 | 0.300 | 0.008 | 26,752 | 217 | 0.300 | 0.006 | 16,720 | 105 | 0.300 | 0.006 |
| 0.3 | 0.6 | 22,293 | 201 | 0.450 | 0.012 | 17,834 | 144 | 0.450 | 0.009 | 11,146 | 70 | 0.450 | 0.009 |
| 0.4 | 0.8 | 16,720 | 150 | 0.600 | 0.016 | 13,376 | 108 | 0.600 | 0.012 | 8,360 | 53 | 0.600 | 0.012 |
| 0.5 | 1 | 15,287 | 138 | 0.750 | 0.020 | 12,229 | 99 | 0.750 | 0.015 | 7,643 | 48 | 0.750 | 0.015 |
| 0.6 | 1.2 | 15,924 | 229 | 0.900 | 0.024 | 12,739 | 165 | 0.900 | 0.018 | 7,962 | 80 | 0.900 | 0.018 |
| 0.7 | 1.4 | 17,743 | 256 | 1.050 | 0.028 | 14,195 | 184 | 1.050 | 0.021 | 8,872 | 89 | 1.050 | 0.021 |
| 0.8 | 1.6 | 15,525 | 224 | 1.200 | 0.032 | 12,420 | 161 | 1.200 | 0.024 | 7,763 | 78 | 1.200 | 0.024 |
| 0.9 | 1.8 | 14,862 | 214 | 1.350 | 0.036 | 11,890 | 154 | 1.350 | 0.027 | 7,431 | 75 | 1.350 | 0.027 |
| 1 | 2 | 15,287 | 275 | 1.500 | 0.040 | 12,229 | 198 | 1.500 | 0.030 | 7,643 | 96 | 1.500 | 0.030 |
| 1.5 | 3 | 12,739 | 229 | 2.250 | 0.135 | 10,191 | 165 | 2.250 | 0.120 | 6,369 | 80 | 2.250 | 0.045 |
| 2 | 6 | 10,510 | 284 | 3.000 | 0.180 | 6,115 | 149 | 3.000 | 0.160 | 5,732 | 108 | 3.000 | 0.060 |
| 2.5 | 8 | 8,408 | 227 | 3.750 | 0.225 | 5,707 | 139 | 3.750 | 0.200 | 5,350 | 101 | 3.750 | 0.075 |
| 3 | 8 | 7,006 | 252 | 4.500 | 0.270 | 5,096 | 165 | 4.500 | 0.240 | 4,777 | 120 | 4.500 | 0.090 |
| 3.5 | 10 | 6,551 | 236 | 5.250 | 0.315 | 4,659 | 151 | 5.250 | 0.280 | 4,368 | 110 | 5.250 | 0.105 |
| 4 | 11 | 5,732 | 258 | 6.000 | 0.360 | 4,331 | 175 | 6.000 | 0.320 | 4,061 | 128 | 6.000 | 0.120 |
| 4.5 | 11 | 5,096 | 229 | 6.750 | 0.405 | 4,076 | 165 | 6.750 | 0.360 | 3,822 | 120 | 6.750 | 0.135 |
| 5 | 13 | 4,586 | 248 | 7.500 | 0.450 | 3,873 | 188 | 7.500 | 0.400 | 3,631 | 137 | 7.500 | 0.150 |
| 5.5 | 13 | 4,169 | 225 | 8.250 | 0.495 | 3,706 | 180 | 8.250 | 0.440 | 3,474 | 131 | 8.250 | 0.165 |
| 6 | 13 | 3,822 | 206 | 9.000 | 0.540 | 3,397 | 165 | 9.000 | 0.480 | 3,185 | 120 | 9.000 | 0.180 |
| 7 | 16 | 3,276 | 206 | 10.500 | 0.630 | 2,912 | 165 | 10.500 | 0.560 | 2,730 | 120 | 10.500 | 0.210 |
| 8 | 19 | 2,866 | 181 | 12.000 | 0.720 | 2,548 | 144 | 12.000 | 0.640 | 2,389 | 105 | 12.000 | 0.240 |
| 9 | 19 | 2,548 | 183 | 13.500 | 0.810 | 2,265 | 147 | 13.500 | 0.720 | 2,123 | 107 | 13.500 | 0.270 |
| 10 | 22 | 2,293 | 206 | 15.000 | 0.900 | 2,038 | 165 | 15.000 | 0.800 | 1,911 | 120 | 15.000 | 0.300 |
| 12 | 26 | 1,911 | 206 | 18.000 | 1.080 | 1,699 | 165 | 18.000 | 0.960 | 1,592 | 120 | 18.000 | 0.360 |
| 16 | 35 | 1,433 | 181 | 24.000 | 1.440 | 1,274 | 144 | 24.000 | 1.280 | 1,194 | 105 | 24.000 | 0.480 |
| 20 | 40 | 1,146 | 165 | 30.000 | 1.800 | 1,019 | 132 | 30.000 | 1.600 | 955 | 96 | 30.000 | 0.600 |

【注意】
①本工具のPNコーティングはその性質上、通電性が微小です。従って通電方式の工具長測定装置をご使用の際にはご注意ください。
②切削条件は2枚刃の場合を示します。4枚刃は送り速度を1.5倍にしてください。
③できるだけ高剛性、高精度の機械をご使用ください。
④被削材、加工形状に合わせて、適切なクーラントを使用してください。
⑤この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的使用機械等により条件を調整してください。
⑥機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。

【Note】
① PN coating is less electro conductive. Therefore, electric transmitted measuring systems may not work.
② The cutting conditions given above is applied to 2 flutes type end mills. As for 4 flutes type, increase the feed rate by 1.5 times.
③ Use a highly rigid and accurate machine as possible.
④ Use the appropriate coolant for the work material and machining shape.
⑤ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
⑥ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

# HGOS2-PN

## 溝切削 Slotting




| 外径 DC Tool dia. (mm) | 刃長 APMX Flute length (mm) | 銅合金・アルミ合金 Copper alloys, Aluminum alloys | | | 鋳鉄・炭素鋼 Cast irons, Carbon steels (150～200HB) FC250,S50C,S55C | | | ステンレス鋼 Stainless steels (25～35HRC) SUS304,SUS316 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 回転数 min-1 | 送り速度 mm/min | ap mm | 回転数 min-1 | 送り速度 mm/min | ap mm | 回転数 min-1 | 送り速度 mm/min | ap mm |
| 0.2 | 0.4 | 58,678 | 235 | 0.01 | 53,344 | 213 | 0.01 | 37,341 | 157 | 0.01 |
| 0.3 | 0.6 | 39,119 | 156 | 0.02 | 35,563 | 142 | 0.02 | 24,894 | 120 | 0.02 |
| 0.4 | 0.8 | 35,032 | 140 | 0.02 | 26,672 | 107 | 0.02 | 22,293 | 103 | 0.02 |
| 0.5 | 1 | 31,529 | 126 | 0.03 | 25,478 | 102 | 0.03 | 20,064 | 103 | 0.03 |
| 0.6 | 1.2 | 32,113 | 180 | 0.03 | 23,885 | 191 | 0.03 | 20,435 | 143 | 0.03 |
| 0.7 | 1.4 | 30,027 | 240 | 0.04 | 25,023 | 200 | 0.04 | 19,108 | 161 | 0.04 |
| 0.8 | 1.6 | 28,463 | 228 | 0.04 | 23,885 | 191 | 0.04 | 18,113 | 152 | 0.04 |
| 0.9 | 1.8 | 27,247 | 218 | 0.05 | 23,001 | 184 | 0.05 | 17,339 | 143 | 0.05 |
| 1 | 2 | 28,025 | 215 | 0.05 | 22,293 | 175 | 0.05 | 17,834 | 125 | 0.05 |
| 1.5 | 3 | 21,019 | 210 | 0.08 | 16,985 | 170 | 0.08 | 12,739 | 115 | 0.08 |
| 2 | 6 | 15,764 | 189 | 0.12 | 14,331 | 172 | 0.12 | 8,917 | 96 | 0.12 |
| 2.5 | 8 | 12,611 | 151 | 0.18 | 11,465 | 138 | 0.18 | 7,643 | 83 | 0.18 |
| 3 | 8 | 11,677 | 163 | 0.30 | 9,554 | 134 | 0.30 | 6,794 | 86 | 0.30 |
| 3.5 | 10 | 10,009 | 140 | 0.35 | 9,099 | 127 | 0.35 | 6,187 | 78 | 0.35 |
| 4 | 11 | 8,758 | 140 | 0.60 | 7,962 | 127 | 0.60 | 5,732 | 83 | 0.60 |
| 4.5 | 11 | 7,785 | 125 | 0.90 | 7,077 | 113 | 0.90 | 4,034 | 58 | 0.90 |
| 5 | 13 | 7,006 | 140 | 1.25 | 6,369 | 127 | 1.25 | 3,822 | 69 | 1.25 |
| 5.5 | 13 | 6,369 | 127 | 1.38 | 5,790 | 116 | 1.38 | 3,648 | 66 | 1.38 |
| 6 | 13 | 5,839 | 160 | 1.80 | 5,308 | 150 | 1.80 | 3,503 | 90 | 1.80 |
| 7 | 16 | 5,005 | 200 | 2.45 | 4,550 | 182 | 2.45 | 3,139 | 113 | 2.45 |
| 8 | 19 | 4,379 | 215 | 3.20 | 3,981 | 200 | 3.20 | 1,672 | 125 | 3.20 |
| 9 | 19 | 3,892 | 234 | 4.05 | 3,539 | 212 | 4.05 | 1,486 | 146 | 4.05 |
| 10 | 22 | 3,503 | 210 | 5.00 | 3,185 | 191 | 5.00 | 1,338 | 134 | 5.00 |
| 12 | 26 | 2,919 | 234 | 6.00 | 2,654 | 212 | 6.00 | 1,115 | 103 | 6.00 |
| 16 | 35 | 2,189 | 219 | 8.00 | 1,990 | 199 | 8.00 | 975 | 100 | 8.00 |
| 20 | 40 | 1,752 | 210 | 10.00 | 1,592 | 191 | 10.00 | 836 | 103 | 10.00 |

| 外径 DC Tool dia. (mm) | 刃長 APMX Flute length (mm) | 合金鋼・工具鋼 Alloy steels (25～35HRC) HPM7,SKD61Ⓐ,SKT4 | | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM-MAGIC,CENA1,NAK80 | | | 焼入れ鋼 Hardened steels (45～52HRC) SKD61Ⓗ,HPM38,DAC-MAGIC | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 回転数 min-1 | 送り速度 mm/min | ap mm | 回転数 min-1 | 送り速度 mm/min | ap mm | 回転数 min-1 | 送り速度 mm/min | ap mm |
| 0.2 | 0.4 | 24,005 | 122 | 0.01 | 14,936 | 56 | 0.01 | 8,402 | 34 | 0.01 |
| 0.3 | 0.6 | 16,003 | 109 | 0.02 | 9,958 | 50 | 0.01 | 5,601 | 30 | 0.01 |
| 0.4 | 0.8 | 14,331 | 103 | 0.02 | 8,917 | 56 | 0.02 | 5,016 | 34 | 0.02 |
| 0.5 | 1 | 12,898 | 93 | 0.03 | 8,025 | 51 | 0.02 | 4,514 | 31 | 0.02 |
| 0.6 | 1.2 | 13,137 | 112 | 0.03 | 8,174 | 51 | 0.03 | 4,598 | 31 | 0.02 |
| 0.7 | 1.4 | 12,284 | 125 | 0.04 | 7,643 | 58 | 0.03 | 4,299 | 35 | 0.03 |
| 0.8 | 1.6 | 11,644 | 119 | 0.04 | 7,245 | 55 | 0.04 | 4,075 | 33 | 0.03 |
| 0.9 | 1.8 | 11,146 | 133 | 0.05 | 6,936 | 61 | 0.04 | 3,901 | 37 | 0.04 |
| 1 | 2 | 11,465 | 125 | 0.05 | 7,134 | 58 | 0.05 | 4,013 | 35 | 0.04 |
| 1.5 | 3 | 9,554 | 114 | 0.08 | 5,945 | 52 | 0.07 | 3,344 | 32 | 0.06 |
| 2 | 6 | 7,166 | 122 | 0.12 | 4,459 | 56 | 0.11 | 2,508 | 34 | 0.10 |
| 2.5 | 8 | 5,732 | 97 | 0.18 | 3,567 | 45 | 0.16 | 2,006 | 27 | 0.14 |
| 3 | 8 | 4,777 | 81 | 0.30 | 2,972 | 37 | 0.27 | 1,672 | 23 | 0.24 |
| 3.5 | 10 | 4,095 | 104 | 0.35 | 2,548 | 48 | 0.32 | 1,433 | 29 | 0.28 |
| 4 | 11 | 3,583 | 91 | 0.60 | 2,229 | 42 | 0.54 | 1,254 | 26 | 0.49 |
| 4.5 | 11 | 3,185 | 92 | 0.90 | 1,982 | 50 | 0.81 | 1,115 | 30 | 0.73 |
| 5 | 13 | 2,866 | 103 | 1.25 | 1,783 | 45 | 1.13 | 1,003 | 27 | 1.01 |
| 5.5 | 13 | 2,606 | 89 | 1.38 | 1,621 | 41 | 1.24 | 912 | 25 | 1.11 |
| 6 | 13 | 2,389 | 105 | 1.80 | 1,486 | 48 | 1.62 | 836 | 30 | 1.46 |
| 7 | 16 | 2,047 | 122 | 2.45 | 1,274 | 56 | 2.21 | 717 | 34 | 1.98 |
| 8 | 19 | 1,075 | 120 | 3.20 | 669 | 54 | 2.88 | 376 | 33 | 2.59 |
| 9 | 19 | 955 | 114 | 4.05 | 594 | 52 | 3.65 | 334 | 32 | 3.28 |
| 10 | 22 | 860 | 117 | 5.00 | 535 | 54 | 4.50 | 301 | 33 | 4.05 |
| 12 | 26 | 717 | 110 | 6.00 | 446 | 51 | 5.40 | 251 | 31 | 4.86 |
| 16 | 35 | 627 | 107 | 8.00 | 390 | 49 | 7.20 | 219 | 30 | 6.48 |
| 20 | 40 | 537 | 100 | 10.00 | 334 | 51 | 9.00 | 188 | 31 | 8.10 |

【注意】4枚刃は溝切削には適しません。 【Note】The 4 flutes not suitable for slotting.

# Epoch CS Power Mill 3flutes
# エポックCSパワーミル 3枚刃

**レギュラー刃長** | Regular

3枚刃多機能エンドミル。CSコーティング採用で長寿命。
3-flute multi-function end mill. Uses CS Coating for long life.

平面 Planing / 側面 Side Cutting / 溝 Slotting / 彫込み Die-sinking / ヘリカル Helical / 座ぐり Spot Facing / 荒 Roughing / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance
φ2～φ6 : 0～−0.015
φ6.5～φ25 : 0～−0.02
h5

(mm)

3枚刃 3Flutes

## EPP3○○○-CS

超硬 Carbide / CS / ねじれ43° Helix angle / 切削条件表 A309 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| EPP3020-CS | □ | 2 | 6 | 60 | 6 | — |
| EPP3025-CS | □ | 2.5 | 8 | 60 | 6 | — |
| EPP3030-CS | ● | 3 | 8 | 60 | 6 | 10,940 |
| EPP3035-CS | □ | 3.5 | 10 | 60 | 6 | — |
| EPP3040-CS | ● | 4 | 11 | 60 | 6 | 11,470 |
| EPP3045-CS | □ | 4.5 | 11 | 60 | 6 | — |
| EPP3050-CS | ● | 5 | 13 | 60 | 6 | 12,800 |
| EPP3055-CS | □ | 5.5 | 13 | 60 | 6 | — |
| EPP3060-CS | ● | 6 | 13 | 60 | 6 | 14,030 |
| EPP3065-CS | □ | 6.5 | 16 | 70 | 8 | — |
| EPP3070-CS | □ | 7 | 16 | 70 | 8 | — |
| EPP3075-CS | □ | 7.5 | 16 | 70 | 8 | — |
| EPP3080-CS | ● | 8 | 19 | 75 | 8 | 17,180 |
| EPP3085-CS | □ | 8.5 | 19 | 80 | 10 | — |
| EPP3090-CS | □ | 9 | 19 | 80 | 10 | — |
| EPP3095-CS | □ | 9.5 | 19 | 80 | 10 | — |
| EPP3100-CS | ● | 10 | 22 | 80 | 10 | 23,130 |
| EPP3110-CS | □ | 11 | 22 | 100 | 12 | — |
| EPP3120-CS | ● | 12 | 26 | 100 | 12 | 28,960 |
| EPP3130-CS | □ | 13 | 26 | 100 | 12 | — |
| EPP3140-CS | □ | 14 | 26 | 110 | 16 | — |
| EPP3150-CS | □ | 15 | 26 | 110 | 16 | — |
| EPP3160-CS | ● | 16 | 32 | 110 | 16 | 66,640 |
| EPP3170-CS | □ | 17 | 32 | 110 | 16 | — |
| EPP3180-CS | □ | 18 | 32 | 125 | 20 | — |
| EPP3190-CS | □ | 19 | 32 | 125 | 20 | — |
| EPP3200-CS | ● | 20 | 38 | 125 | 20 | 97,250 |
| EPP3210-CS | □ | 21 | 38 | 125 | 20 | — |
| EPP3220-CS | □ | 22 | 38 | 125 | 20 | — |
| EPP3230-CS | □ | 23 | 45 | 140 | 25 | — |
| EPP3240-CS | □ | 24 | 45 | 140 | 25 | — |
| EPP3250-CS | □ | 25 | 63 | 140 | 25 | — |

### 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ○ | | ◎ | ◎ | ◎ | ◎ |

### 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPP3-CS | 6 ～ 25 | 3NT 2 ～ 25 |

●印：標準在庫品です。
●：Stocked items.
□印：特定代理店在庫です。弊社営業へお問合せください。
□：Stocked by specified distributor. Contact with our sales department.

# 標準切削条件表 Recommended cutting conditions

## EPP3-CS

**溝切削** Slotting　　**側面切削** Side milling

| 被削材 Work material | | アルミニウム合金展伸材 Aluminum alloy wrought A7075 A5052 | | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400, S50C | | 合金鋼 Alloy steels (200～250HB) SCM, SNCM | | 工具鋼・プリハードン鋼 Tool steels, Pre-hardened steels (25～40HRC) SKD, CENA1 | | ステンレス鋼 Stainless steels SUS304 SUS630 | | チタン合金 Titanium alloys Ti-6Al-4V | | 超耐熱合金 Super heat-resistant alloys Inconel Hasteloy | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 高速条件 High speed | 溝切込み (Slotting) Depth of cut (mm) | ap≦0.5DC ae=1DC | | ap≦0.5DC ae=1DC | | ap≦0.5DC ae=1DC | | ap≦0.5DC ae=1DC | | | | | | | | | |
| | 側面切込み (Side milling) Depth of cut (mm) | ap=1.5DC ae=0.1DC | | ap=1.5DC ae=0.1DC | | ap=1.5DC ae=0.1DC | | ap=1.5DC ae=0.1DC | | | | | | | | | |
| | 外径DC Tool Dia. (mm) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) |
| | φ2 | 50,000 | 2,240 | 9,500 | 420 | 14,000 | 630 | 11,000 | 490 | | | | | | | | |
| | φ3 | 37,000 | 2,800 | 6,400 | 480 | 9,600 | 860 | 7,400 | 670 | | | | | | | | |
| | φ4 | 28,000 | 2,900 | 4,800 | 500 | 7,200 | 860 | 5,600 | 670 | | | | | | | | |
| | φ5 | 22,000 | 3,200 | 3,800 | 550 | 5,700 | 940 | 4,500 | 740 | | | | | | | | |
| | φ6 | 19,000 | 3,500 | 3,200 | 600 | 4,800 | 1,010 | 3,700 | 780 | | | | | | | | |
| | φ8 | 14,000 | 3,600 | 2,400 | 610 | 3,600 | 1,030 | 2,800 | 800 | | | | | | | | |
| | φ10 | 11,000 | 3,300 | 1,900 | 570 | 2,900 | 1,000 | 2,200 | 760 | | | | | | | | |
| | φ12 | 9,300 | 3,100 | 1,600 | 530 | 2,400 | 900 | 1,900 | 710 | | | | | | | | |
| | φ16 | 7,000 | 2,600 | 1,200 | 450 | 1,800 | 760 | 1,400 | 590 | | | | | | | | |
| | φ20 | 5,600 | 2,400 | 1,000 | 420 | 1,400 | 650 | 1,100 | 510 | | | | | | | | |
| | φ25 | 4,460 | 2,000 | 760 | 340 | 1,100 | 500 | 890 | 400 | | | | | | | | |
| 汎用条件 General | 溝切込み (Slotting) Depth of cut (mm) | ap≦1DC ae=1DC | | ap≦1DC ae=1DC | | ap≦1DC ae=1DC | | ap≦1DC ae=1DC | | ap≦0.5DC ae=1DC | | ap≦0.5DC ae=1DC | | ap≦0.2DC ae=1DC | | ap≦0.2DC ae=1DC | |
| | 側面切込み (Side milling) Depth of cut (mm) | ap=1.5DC ae=0.2DC | | ap=1.5DC ae=0.2DC | | ap=1.5DC ae=0.2DC | | ap=1.5DC ae=0.15DC | | ap=1.5DC ae=0.1DC | | ap=1.5DC ae=0.1DC | | ap=1.5DC ae=0.1DC | | ap=1.5DC ae=0.05DC | |
| | 外径DC Tool Dia. (mm) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) |
| | φ2 | 31,800 | 1,400 | 6,400 | 380 | 11,000 | 660 | 8,000 | 360 | 8,000 | 360 | 7,950 | 280 | 7,950 | 360 | 3,180 | 80 |
| | φ3 | 21,000 | 1,600 | 4,200 | 320 | 7,400 | 560 | 5,300 | 400 | 5,300 | 360 | 5,300 | 290 | 5,300 | 360 | 2,100 | 90 |
| | φ4 | 16,000 | 1,700 | 3,200 | 340 | 5,600 | 590 | 4,000 | 420 | 4,000 | 360 | 4,000 | 290 | 4,000 | 360 | 1,600 | 100 |
| | φ5 | 13,000 | 1,900 | 2,500 | 360 | 4,500 | 650 | 3,200 | 460 | 3,200 | 400 | 3,200 | 320 | 3,200 | 400 | 1,300 | 110 |
| | φ6 | 11,000 | 2,000 | 2,100 | 390 | 3,700 | 690 | 2,700 | 500 | 2,700 | 430 | 2,700 | 340 | 2,700 | 430 | 1,100 | 120 |
| | φ8 | 8,000 | 2,000 | 1,600 | 410 | 2,800 | 710 | 2,000 | 510 | 2,000 | 430 | 2,000 | 340 | 2,000 | 430 | 800 | 110 |
| | φ10 | 6,400 | 1,900 | 1,300 | 390 | 2,200 | 660 | 1,600 | 480 | 1,600 | 410 | 1,600 | 330 | 1,600 | 410 | 640 | 110 |
| | φ12 | 5,300 | 1,700 | 1,100 | 360 | 1,900 | 630 | 1,300 | 430 | 1,300 | 370 | 1,300 | 290 | 1,300 | 370 | 530 | 100 |
| | φ16 | 4,000 | 1,500 | 800 | 300 | 1,400 | 530 | 1,000 | 380 | 1,000 | 320 | 1,000 | 250 | 1,000 | 320 | 400 | 80 |
| | φ20 | 3,200 | 1,300 | 600 | 250 | 1,100 | 460 | 800 | 340 | 800 | 280 | 800 | 220 | 800 | 280 | 320 | 70 |
| | φ25 | 2,550 | 1,100 | 510 | 240 | 890 | 430 | 640 | 230 | 640 | 230 | 630 | 190 | 630 | 250 | 250 | 60 |

※溝切削については上表の条件を、側面切削については回転数が上表の1～1.3倍、送り速度が1～1.5倍の条件を標準切削条件といたします。
※座ぐり切削は汎用条件の回転数で、送り速度のみ1/5程度に下げてご使用ください。

For slotting, please refer to above table with depth of cut for slotting.
For side milling, please increase Revolution Speed to 1～1.3 times and Feed Rate to 1～1.5 times of above table.
When the rpm generally used for slotting is used for spot facing, just lower the feed rate by about 20%.

【注意】
①できるだけ高剛性、高精度の機械をご使用ください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。
④ステンレス鋼・超耐熱合金には、切削液をご使用ください。（防火対策を必ず行ってください。）

【Note】
① Use a highly rigid and accurate machine as possible.
② These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
③ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.
④ For the stainless steel and heat resistant alloys please use cutting fluid. (Please provide adequate fire prevention.)

# Epoch SUS Finish
# エポックSUSフィニッシュ

仕上げ加工用にSUSフィニッシュを追加。
Additional lineup of Epoch SUS Finish for finishing.

## レギュラー刃長 Regular

平面 Planing / 側面 Side Cutting / 溝 Slotting / ヘリカル Helical / 座ぐり Spot Facing / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance　φ3～φ6 ：0～−0.015
φ7～φ12：0～−0.02　h5

(mm)

4枚刃 4 Flutes

## ミディアム刃長 Medium

側面 Side Cutting / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance　φ3～φ6 ：0～−0.015
φ7～φ12：0～−0.02　h5

(mm)

4枚刃 4 Flutes

## EPSF4○○○-PN

超硬 Carbide / PN / ねじれ43° Helix angle / 不等分割 Unequal pitch / 切削条件表 A325 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 形状 Shape | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|
| EPSF4030-PN | ● | 3 | 7.5 | 56 | 6 | A | 8,090 |
| EPSF4035-PN | ● | 3.5 | 8.8 | 56 | 6 | A | 9,180 |
| EPSF4040-PN | ● | 4 | 10 | 56 | 6 | A | 8,530 |
| EPSF4045-PN | ● | 4.5 | 11.3 | 56 | 6 | A | 10,250 |
| EPSF4050-PN | ● | 5 | 12.5 | 56 | 6 | A | 9,520 |
| EPSF4055-PN | ● | 5.5 | 13.8 | 56 | 6 | A | 11,220 |
| EPSF4060-PN | ● | 6 | 15 | 56 | 6 | B | 10,370 |
| EPSF4070-PN | ● | 7 | 17.5 | 63 | 8 | A | 12,870 |
| EPSF4080-PN | ● | 8 | 20 | 63 | 8 | B | 12,870 |
| EPSF4090-PN | ● | 9 | 22.5 | 74 | 10 | A | 17,460 |
| EPSF4100-PN | ● | 10 | 25 | 74 | 10 | B | 17,460 |
| EPSF4110-PN | ● | 11 | 27.5 | 86 | 12 | A | 21,700 |
| EPSF4120-PN | ● | 12 | 30 | 86 | 12 | B | 21,700 |

## EPSFM○○○-PN

超硬 Carbide / PN / ねじれ43° Helix angle / 不等分割 Unequal pitch / 切削条件表 A327 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 形状 Shape | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|
| EPSFM4030-PN | ● | 3 | 12 | 56 | 6 | A | 9,640 |
| EPSFM4035-PN | ● | 3.5 | 14 | 56 | 6 | A | 11,150 |
| EPSFM4040-PN | ● | 4 | 16 | 56 | 6 | A | 10,240 |
| EPSFM4045-PN | ● | 4.5 | 18 | 70 | 6 | A | 12,350 |
| EPSFM4050-PN | ● | 5 | 20 | 70 | 6 | A | 11,370 |
| EPSFM4055-PN | ● | 5.5 | 22 | 70 | 6 | A | 13,590 |
| EPSFM4060-PN | ● | 6 | 24 | 70 | 6 | B | 12,490 |
| EPSFM4070-PN | ● | 7 | 28 | 75 | 8 | A | 15,290 |
| EPSFM4080-PN | ● | 8 | 32 | 80 | 8 | B | 15,290 |
| EPSFM4090-PN | ● | 9 | 36 | 100 | 10 | A | 20,490 |
| EPSFM4100-PN | ● | 10 | 40 | 100 | 10 | B | 20,490 |
| EPSFM4110-PN | ● | 11 | 44 | 120 | 12 | A | 25,850 |
| EPSFM4120-PN | ● | 12 | 48 | 120 | 12 | B | 25,850 |

## ロング刃長 Long

側面 Side Cutting / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance　φ3～φ6 ：0～−0.015
φ7～φ12：0～−0.02　h5

(mm)

4枚刃 4 Flutes

## EPSFL4○○○-PN

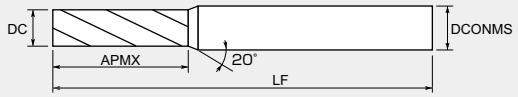
超硬 Carbide / PN / ねじれ43° Helix angle / 不等分割 Unequal pitch / 切削条件表 A327 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 形状 Shape | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|
| EPSFL4030-PN | ● | 3 | 15 | 56 | 6 | A | 14,490 |
| EPSFL4040-PN | ● | 4 | 20 | 70 | 6 | A | 15,180 |
| EPSFL4050-PN | ● | 5 | 25 | 70 | 6 | A | 16,930 |
| EPSFL4060-PN | ● | 6 | 30 | 70 | 6 | B | 18,370 |
| EPSFL4070-PN | ● | 7 | 35 | 80 | 8 | A | 23,030 |
| EPSFL4080-PN | ● | 8 | 40 | 80 | 8 | B | 23,030 |
| EPSFL4090-PN | ● | 9 | 45 | 100 | 10 | A | 30,970 |
| EPSFL4100-PN | ● | 10 | 50 | 100 | 10 | B | 30,970 |
| EPSFL4110-PN | ● | 11 | 55 | 120 | 12 | A | 37,990 |
| EPSFL4120-PN | ● | 12 | 60 | 120 | 12 | B | 37,990 |

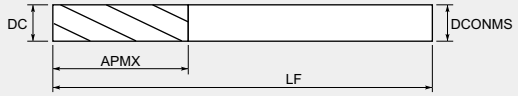
●印：標準在庫品です。　●：Stocked Items.

## エポックSUSフィニッシュの工具形状
Tool shape of Epoch SUS Finish

Aタイプ A type




Bタイプ B type




## EPSF-PN、EPSFM-PN、EPSFL-PNの対応被削材
Applicable work material of EPSF-PN, EPSFM-PN, EPSFL-PN

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦45HRC | 高硬度 Hardened steel >45HRC ≦55HRC | 高硬度 Hardened steel >55HRC ≦65HRC | 高硬度 Hardened steel >65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | | | | ◎ | ◎ | ◎ | ◎ |

## 再研磨対応外径範囲
Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPSF-PN | 6～12 | 4～12 |
| EPSFM-PN | 6～12 | 4～12 |
| EPSFL-PN | 6～12 | 4～12 |

# Epoch SUS Multi
# エポックSUSマルチ

YouTube 動画公開中

**ショート刃長** | Short

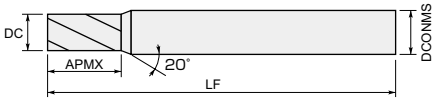
平面 Planing / 側面 Side Cutting / 溝 Slotting / ヘリカル Helical / 座ぐり Spot Facing / 荒 Roughing / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance
φ1～φ6 : 0～−0.015
φ6.1～φ20 : 0～−0.02
h5 φ6～12 / h6 φ16,φ20
(mm)

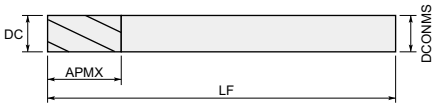
ステンレス鋼、炭素鋼、合金鋼等の荒～仕上げ加工までマルチに対応。
Multi-purpose for roughing to finishing of stainless steel, carbon steel, alloy steel, etc.

ラジアスはA235頁を参照してください
Please refer to page A235 for Radius

Aタイプ A type




Bタイプ B type




4枚刃
4 Flutes

超硬 Carbide / PN / ねじれ40° Helix angle / 不等分割 Unequal pitch / 切削条件表 A319 Cutting Conditions

## EPSMS4○○○-PN

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 形状 Shape | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|
| EPSMS4010-PN | □ | 1 | 1.5 | 56 | 6 | A | — |
| EPSMS4011-PN | □ | 1.1 | 1.7 | 56 | 6 | A | — |
| EPSMS4012-PN | □ | 1.2 | 1.8 | 56 | 6 | A | — |
| EPSMS4013-PN | □ | 1.3 | 2 | 56 | 6 | A | — |
| EPSMS4014-PN | □ | 1.4 | 2.1 | 56 | 6 | A | — |
| EPSMS4015-PN | □ | 1.5 | 2.3 | 56 | 6 | A | — |
| EPSMS4016-PN | □ | 1.6 | 2.4 | 56 | 6 | A | — |
| EPSMS4017-PN | □ | 1.7 | 2.6 | 56 | 6 | A | — |
| EPSMS4018-PN | □ | 1.8 | 2.7 | 56 | 6 | A | — |
| EPSMS4019-PN | □ | 1.9 | 2.9 | 56 | 6 | A | — |
| EPSMS4020-PN | □ | 2 | 3 | 56 | 6 | A | — |
| EPSMS4021-PN | □ | 2.1 | 3.2 | 56 | 6 | A | — |
| EPSMS4022-PN | □ | 2.2 | 3.3 | 56 | 6 | A | — |
| EPSMS4023-PN | □ | 2.3 | 3.5 | 56 | 6 | A | — |
| EPSMS4024-PN | □ | 2.4 | 3.6 | 56 | 6 | A | — |
| EPSMS4025-PN | □ | 2.5 | 3.8 | 56 | 6 | A | — |
| EPSMS4026-PN | □ | 2.6 | 3.9 | 56 | 6 | A | — |
| EPSMS4027-PN | □ | 2.7 | 4.1 | 56 | 6 | A | — |
| EPSMS4028-PN | □ | 2.8 | 4.2 | 56 | 6 | A | — |
| EPSMS4029-PN | □ | 2.9 | 4.4 | 56 | 6 | A | — |
| EPSMS4030-PN | □ | 3 | 4.5 | 56 | 6 | A | — |
| EPSMS4031-PN | □ | 3.1 | 4.7 | 56 | 6 | A | — |
| EPSMS4032-PN | □ | 3.2 | 4.8 | 56 | 6 | A | — |
| EPSMS4033-PN | □ | 3.3 | 5 | 56 | 6 | A | — |
| EPSMS4034-PN | □ | 3.4 | 5.1 | 56 | 6 | A | — |
| EPSMS4035-PN | □ | 3.5 | 5.3 | 56 | 6 | A | — |
| EPSMS4036-PN | □ | 3.6 | 5.4 | 56 | 6 | A | — |
| EPSMS4037-PN | □ | 3.7 | 5.6 | 56 | 6 | A | — |
| EPSMS4038-PN | □ | 3.8 | 5.7 | 56 | 6 | A | — |
| EPSMS4039-PN | □ | 3.9 | 5.9 | 56 | 6 | A | — |
| EPSMS4040-PN | □ | 4 | 6 | 56 | 6 | A | — |
| EPSMS4041-PN | □ | 4.1 | 6.2 | 56 | 6 | A | — |
| EPSMS4042-PN | □ | 4.2 | 6.3 | 56 | 6 | A | — |
| EPSMS4043-PN | □ | 4.3 | 6.5 | 56 | 6 | A | — |
| EPSMS4044-PN | □ | 4.4 | 6.6 | 56 | 6 | A | — |
| EPSMS4045-PN | □ | 4.5 | 6.8 | 56 | 6 | A | — |
| EPSMS4046-PN | □ | 4.6 | 6.9 | 56 | 6 | A | — |
| EPSMS4047-PN | □ | 4.7 | 7.1 | 56 | 6 | A | — |
| EPSMS4048-PN | □ | 4.8 | 7.2 | 56 | 6 | A | — |
| EPSMS4049-PN | □ | 4.9 | 7.4 | 56 | 6 | A | — |

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 形状 Shape | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|
| EPSMS4050-PN | □ | 5 | 7.5 | 56 | 6 | A | — |
| EPSMS4051-PN | □ | 5.1 | 7.7 | 56 | 6 | A | — |
| EPSMS4052-PN | □ | 5.2 | 7.8 | 56 | 6 | A | — |
| EPSMS4053-PN | □ | 5.3 | 8 | 56 | 6 | A | — |
| EPSMS4054-PN | □ | 5.4 | 8.1 | 56 | 6 | A | — |
| EPSMS4055-PN | □ | 5.5 | 8.3 | 56 | 6 | A | — |
| EPSMS4056-PN | □ | 5.6 | 8.4 | 56 | 6 | A | — |
| EPSMS4057-PN | □ | 5.7 | 8.6 | 56 | 6 | A | — |
| EPSMS4058-PN | □ | 5.8 | 8.7 | 56 | 6 | A | — |
| EPSMS4059-PN | □ | 5.9 | 8.9 | 56 | 6 | A | — |
| EPSMS4060-PN | □ | 6 | 9 | 56 | 6 | B | — |
| EPSMS4061-PN | □ | 6.1 | 9.2 | 63 | 8 | A | — |
| EPSMS4062-PN | □ | 6.2 | 9.3 | 63 | 8 | A | — |
| EPSMS4063-PN | □ | 6.3 | 9.5 | 63 | 8 | A | — |
| EPSMS4064-PN | □ | 6.4 | 9.6 | 63 | 8 | A | — |
| EPSMS4065-PN | □ | 6.5 | 9.8 | 63 | 8 | A | — |
| EPSMS4066-PN | □ | 6.6 | 9.9 | 63 | 8 | A | — |
| EPSMS4067-PN | □ | 6.7 | 10.1 | 63 | 8 | A | — |
| EPSMS4068-PN | □ | 6.8 | 10.2 | 63 | 8 | A | — |
| EPSMS4069-PN | □ | 6.9 | 10.4 | 63 | 8 | A | — |
| EPSMS4070-PN | □ | 7 | 10.5 | 63 | 8 | A | — |
| EPSMS4071-PN | □ | 7.1 | 10.7 | 63 | 8 | A | — |
| EPSMS4072-PN | □ | 7.2 | 10.8 | 63 | 8 | A | — |
| EPSMS4073-PN | □ | 7.3 | 11 | 63 | 8 | A | — |
| EPSMS4074-PN | □ | 7.4 | 11.1 | 63 | 8 | A | — |
| EPSMS4075-PN | □ | 7.5 | 11.3 | 63 | 8 | A | — |
| EPSMS4076-PN | □ | 7.6 | 11.4 | 63 | 8 | A | — |
| EPSMS4077-PN | □ | 7.7 | 11.6 | 63 | 8 | A | — |
| EPSMS4078-PN | □ | 7.8 | 11.7 | 63 | 8 | A | — |
| EPSMS4079-PN | □ | 7.9 | 11.9 | 63 | 8 | A | — |
| EPSMS4080-PN | □ | 8 | 12 | 63 | 8 | B | — |
| EPSMS4081-PN | □ | 8.1 | 12.2 | 74 | 10 | A | — |
| EPSMS4082-PN | □ | 8.2 | 12.3 | 74 | 10 | A | — |
| EPSMS4083-PN | □ | 8.3 | 12.5 | 74 | 10 | A | — |
| EPSMS4084-PN | □ | 8.4 | 12.6 | 74 | 10 | A | — |
| EPSMS4085-PN | □ | 8.5 | 12.8 | 74 | 10 | A | — |
| EPSMS4086-PN | □ | 8.6 | 12.9 | 74 | 10 | A | — |
| EPSMS4087-PN | □ | 8.7 | 13.1 | 74 | 10 | A | — |
| EPSMS4088-PN | □ | 8.8 | 13.2 | 74 | 10 | A | — |
| EPSMS4089-PN | □ | 8.9 | 13.4 | 74 | 10 | A | — |

□印：特定代理店在庫です。弊社営業へお問合せください。
□ : Stocked by specified distributor. Contact with our sales department.

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## EPSMS4○○○-PN

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 形状 Shape | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|
| EPSMS4090-PN | □ | 9 | 13.5 | 74 | 10 | A | — |
| EPSMS4091-PN | □ | 9.1 | 13.7 | 74 | 10 | A | — |
| EPSMS4092-PN | □ | 9.2 | 13.8 | 74 | 10 | A | — |
| EPSMS4093-PN | □ | 9.3 | 14 | 74 | 10 | A | — |
| EPSMS4094-PN | □ | 9.4 | 14.1 | 74 | 10 | A | — |
| EPSMS4095-PN | □ | 9.5 | 14.3 | 74 | 10 | A | — |
| EPSMS4096-PN | □ | 9.6 | 14.4 | 74 | 10 | A | — |
| EPSMS4097-PN | □ | 9.7 | 14.6 | 74 | 10 | A | — |
| EPSMS4098-PN | □ | 9.8 | 14.7 | 74 | 10 | A | — |
| EPSMS4099-PN | □ | 9.9 | 14.9 | 74 | 10 | A | — |
| EPSMS4100-PN | □ | 10 | 15 | 74 | 10 | B | — |
| EPSMS4101-PN | □ | 10.1 | 15.2 | 86 | 12 | A | — |
| EPSMS4102-PN | □ | 10.2 | 15.3 | 86 | 12 | A | — |
| EPSMS4103-PN | □ | 10.3 | 15.5 | 86 | 12 | A | — |
| EPSMS4104-PN | □ | 10.4 | 15.6 | 86 | 12 | A | — |
| EPSMS4105-PN | □ | 10.5 | 15.8 | 86 | 12 | A | — |
| EPSMS4106-PN | □ | 10.6 | 15.9 | 86 | 12 | A | — |
| EPSMS4107-PN | □ | 10.7 | 16.1 | 86 | 12 | A | — |
| EPSMS4108-PN | □ | 10.8 | 16.2 | 86 | 12 | A | — |
| EPSMS4109-PN | □ | 10.9 | 16.4 | 86 | 12 | A | — |
| EPSMS4110-PN | □ | 11 | 16.5 | 86 | 12 | A | — |
| EPSMS4111-PN | □ | 11.1 | 16.7 | 86 | 12 | A | — |
| EPSMS4112-PN | □ | 11.2 | 16.8 | 86 | 12 | A | — |
| EPSMS4113-PN | □ | 11.3 | 17 | 86 | 12 | A | — |

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 形状 Shape | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|
| EPSMS4114-PN | □ | 11.4 | 17.1 | 86 | 12 | A | — |
| EPSMS4115-PN | □ | 11.5 | 17.3 | 86 | 12 | A | — |
| EPSMS4116-PN | □ | 11.6 | 17.4 | 86 | 12 | A | — |
| EPSMS4117-PN | □ | 11.7 | 17.6 | 86 | 12 | A | — |
| EPSMS4118-PN | □ | 11.8 | 17.7 | 86 | 12 | A | — |
| EPSMS4119-PN | □ | 11.9 | 17.9 | 86 | 12 | A | — |
| EPSMS4120-PN | □ | 12 | 18 | 86 | 12 | B | — |
| EPSMS4125-PN | □ | 12.5 | 18.8 | 100 | 16 | A | — |
| EPSMS4130-PN | □ | 13 | 19.5 | 100 | 16 | A | — |
| EPSMS4135-PN | □ | 13.5 | 20.3 | 100 | 16 | A | — |
| EPSMS4140-PN | □ | 14 | 21 | 100 | 16 | A | — |
| EPSMS4145-PN | □ | 14.5 | 21.8 | 100 | 16 | A | — |
| EPSMS4150-PN | □ | 15 | 22.5 | 100 | 16 | A | — |
| EPSMS4155-PN | □ | 15.5 | 23.3 | 100 | 16 | A | — |
| EPSMS4160-PN | □ | 16 | 24 | 100 | 16 | B | — |
| EPSMS4165-PN | □ | 16.5 | 24.8 | 110 | 20 | A | — |
| EPSMS4170-PN | □ | 17 | 25.5 | 110 | 20 | A | — |
| EPSMS4175-PN | □ | 17.5 | 26.3 | 110 | 20 | A | — |
| EPSMS4180-PN | □ | 18 | 27 | 110 | 20 | A | — |
| EPSMS4185-PN | □ | 18.5 | 27.8 | 110 | 20 | A | — |
| EPSMS4190-PN | □ | 19 | 28.5 | 110 | 20 | A | — |
| EPSMS4195-PN | □ | 19.5 | 29.3 | 110 | 20 | A | — |
| EPSMS4200-PN | □ | 20 | 30 | 110 | 20 | B | — |

### 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | | | | ◎ | ◎ | ◎ | ◎ |

### 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPSMS-PN | 6～20 | 4～20 |

●印：標準在庫品です。
●：Stocked items.

□印：特定代理店在庫です。弊社営業へお問合せください。
□：Stocked by specified distributor. Contact with our sales department.

## レギュラー刃長 Regular

平面 Planing / 側面 Side Cutting / 溝 Slotting / ヘリカル Helical / 座ぐり Spot Facing / 荒 Roughing / 中仕上 Semi Finishing / 仕上 Finishing

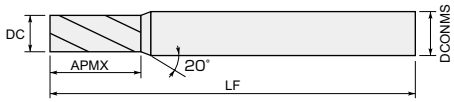
外径公差 Dia.tolerance
φ1～φ6　：0～−0.015
φ6.05～φ20：0～−0.02
h5 φ6～12　h6 φ16, φ20
(mm)

ステンレス鋼、炭素鋼、合金鋼等の荒～仕上げ加工までマルチに対応。
Multi-purpose for roughing to finishing of stainless steel, carbon steel, alloy steel, etc.

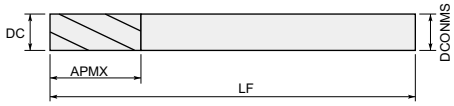
ラジアスはA235頁を参照してください
Please refer to page A235 for Radius

4枚刃
4 Flutes

Aタイプ A type




Bタイプ B type




超硬 Carbide / PN / ねじれ40° Helix angle / 不等分割 Unequal pitch / 切削条件表 A319 Cutting Conditions

# EPSM4□□□□-PN

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 形状 Shape | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|
| EPSM4010-PN | ● | 1 | 2.5 | 56 | 6 | A | 7,500 |
| EPSM40105-PN | □ | 1.05 | 2.8 | 56 | 6 | A | — |
| EPSM4011-PN | □ | 1.1 | 2.8 | 56 | 6 | A | — |
| EPSM40115-PN | □ | 1.15 | 3 | 56 | 6 | A | — |
| EPSM4012-PN | □ | 1.2 | 3 | 56 | 6 | A | — |
| EPSM40125-PN | □ | 1.25 | 3.3 | 56 | 6 | A | — |
| EPSM4013-PN | □ | 1.3 | 3.3 | 56 | 6 | A | — |
| EPSM40135-PN | □ | 1.35 | 3.5 | 56 | 6 | A | — |
| EPSM4014-PN | □ | 1.4 | 3.5 | 56 | 6 | A | — |
| EPSM40145-PN | □ | 1.45 | 3.8 | 56 | 6 | A | — |
| EPSM4015-PN | □ | 1.5 | 3.8 | 56 | 6 | A | — |
| EPSM40155-PN | □ | 1.55 | 4 | 56 | 6 | A | — |
| EPSM4016-PN | □ | 1.6 | 4 | 56 | 6 | A | — |
| EPSM40165-PN | □ | 1.65 | 4.3 | 56 | 6 | A | — |
| EPSM4017-PN | □ | 1.7 | 4.3 | 56 | 6 | A | — |
| EPSM40175-PN | □ | 1.75 | 4.5 | 56 | 6 | A | — |
| EPSM4018-PN | □ | 1.8 | 4.5 | 56 | 6 | A | — |
| EPSM40185-PN | □ | 1.85 | 4.8 | 56 | 6 | A | — |
| EPSM4019-PN | □ | 1.9 | 4.8 | 56 | 6 | A | — |
| EPSM40195-PN | □ | 1.95 | 5 | 56 | 6 | A | — |
| EPSM4020-PN | ● | 2 | 5 | 56 | 6 | A | 7,500 |
| EPSM40205-PN | □ | 2.05 | 5.3 | 56 | 6 | A | — |
| EPSM4021-PN | □ | 2.1 | 5.3 | 56 | 6 | A | — |
| EPSM40215-PN | □ | 2.15 | 5.5 | 56 | 6 | A | — |
| EPSM4022-PN | □ | 2.2 | 5.5 | 56 | 6 | A | — |
| EPSM40225-PN | □ | 2.25 | 5.8 | 56 | 6 | A | — |
| EPSM4023-PN | □ | 2.3 | 5.8 | 56 | 6 | A | — |
| EPSM40235-PN | □ | 2.35 | 6 | 56 | 6 | A | — |
| EPSM4024-PN | □ | 2.4 | 6 | 56 | 6 | A | — |
| EPSM40245-PN | □ | 2.45 | 6.3 | 56 | 6 | A | — |
| EPSM4025-PN | □ | 2.5 | 6.3 | 56 | 6 | A | — |
| EPSM40255-PN | □ | 2.55 | 6.5 | 56 | 6 | A | — |
| EPSM4026-PN | □ | 2.6 | 6.5 | 56 | 6 | A | — |
| EPSM40265-PN | □ | 2.65 | 6.8 | 56 | 6 | A | — |
| EPSM4027-PN | □ | 2.7 | 6.8 | 56 | 6 | A | — |
| EPSM40275-PN | □ | 2.75 | 7 | 56 | 6 | A | — |
| EPSM4028-PN | □ | 2.8 | 7 | 56 | 6 | A | — |
| EPSM40285-PN | □ | 2.85 | 7.3 | 56 | 6 | A | — |
| EPSM4029-PN | □ | 2.9 | 7.3 | 56 | 6 | A | — |
| EPSM40295-PN | □ | 2.95 | 7.5 | 56 | 6 | A | — |
| EPSM4030-PN | ● | 3 | 7.5 | 56 | 6 | A | 7,500 |
| EPSM40305-PN | □ | 3.05 | 7.8 | 56 | 6 | A | — |
| EPSM4031-PN | □ | 3.1 | 7.8 | 56 | 6 | A | — |
| EPSM40315-PN | □ | 3.15 | 8 | 56 | 6 | A | — |
| EPSM4032-PN | □ | 3.2 | 8 | 56 | 6 | A | — |
| EPSM40325-PN | □ | 3.25 | 8.3 | 56 | 6 | A | — |
| EPSM4033-PN | □ | 3.3 | 8.3 | 56 | 6 | A | — |
| EPSM40335-PN | □ | 3.35 | 8.5 | 56 | 6 | A | — |
| EPSM4034-PN | □ | 3.4 | 8.5 | 56 | 6 | A | — |
| EPSM40345-PN | □ | 3.45 | 8.8 | 56 | 6 | A | — |
| EPSM4035-PN | □ | 3.5 | 8.8 | 56 | 6 | A | — |
| EPSM40355-PN | □ | 3.55 | 9 | 56 | 6 | A | — |
| EPSM4036-PN | □ | 3.6 | 9 | 56 | 6 | A | — |
| EPSM40365-PN | □ | 3.65 | 9.3 | 56 | 6 | A | — |
| EPSM4037-PN | □ | 3.7 | 9.3 | 56 | 6 | A | — |

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 形状 Shape | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|
| EPSM40375-PN | □ | 3.75 | 9.5 | 56 | 6 | A | — |
| EPSM4038-PN | □ | 3.8 | 9.5 | 56 | 6 | A | — |
| EPSM40385-PN | □ | 3.85 | 9.8 | 56 | 6 | A | — |
| EPSM4039-PN | □ | 3.9 | 9.8 | 56 | 6 | A | — |
| EPSM40395-PN | □ | 3.95 | 10 | 56 | 6 | A | — |
| EPSM4040-PN | ● | 4 | 10 | 56 | 6 | A | 7,890 |
| EPSM40405-PN | □ | 4.05 | 10.3 | 56 | 6 | A | — |
| EPSM4041-PN | □ | 4.1 | 10.3 | 56 | 6 | A | — |
| EPSM40415-PN | □ | 4.15 | 10.5 | 56 | 6 | A | — |
| EPSM4042-PN | □ | 4.2 | 10.5 | 56 | 6 | A | — |
| EPSM40425-PN | □ | 4.25 | 10.8 | 56 | 6 | A | — |
| EPSM4043-PN | □ | 4.3 | 10.8 | 56 | 6 | A | — |
| EPSM40435-PN | □ | 4.35 | 11 | 56 | 6 | A | — |
| EPSM4044-PN | □ | 4.4 | 11 | 56 | 6 | A | — |
| EPSM40445-PN | □ | 4.45 | 11.3 | 56 | 6 | A | — |
| EPSM4045-PN | □ | 4.5 | 11.3 | 56 | 6 | A | — |
| EPSM40455-PN | □ | 4.55 | 11.5 | 56 | 6 | A | — |
| EPSM4046-PN | □ | 4.6 | 11.5 | 56 | 6 | A | — |
| EPSM40465-PN | □ | 4.65 | 11.8 | 56 | 6 | A | — |
| EPSM4047-PN | □ | 4.7 | 11.8 | 56 | 6 | A | — |
| EPSM40475-PN | □ | 4.75 | 12 | 56 | 6 | A | — |
| EPSM4048-PN | □ | 4.8 | 12 | 56 | 6 | A | — |
| EPSM40485-PN | □ | 4.85 | 12.3 | 56 | 6 | A | — |
| EPSM4049-PN | □ | 4.9 | 12.3 | 56 | 6 | A | — |
| EPSM40495-PN | □ | 4.95 | 12.5 | 56 | 6 | A | — |
| EPSM4050-PN | ● | 5 | 12.5 | 56 | 6 | A | 8,820 |
| EPSM40505-PN | □ | 5.05 | 12.8 | 56 | 6 | A | — |
| EPSM4051-PN | □ | 5.1 | 12.8 | 56 | 6 | A | — |
| EPSM40515-PN | □ | 5.15 | 13 | 56 | 6 | A | — |
| EPSM4052-PN | □ | 5.2 | 13 | 56 | 6 | A | — |
| EPSM40525-PN | □ | 5.25 | 13.3 | 56 | 6 | A | — |
| EPSM4053-PN | □ | 5.3 | 13.3 | 56 | 6 | A | — |
| EPSM40535-PN | □ | 5.35 | 13.5 | 56 | 6 | A | — |
| EPSM4054-PN | □ | 5.4 | 13.5 | 56 | 6 | A | — |
| EPSM40545-PN | □ | 5.45 | 13.8 | 56 | 6 | A | — |
| EPSM4055-PN | □ | 5.5 | 13.8 | 56 | 6 | A | — |
| EPSM40555-PN | □ | 5.55 | 14 | 56 | 6 | A | — |
| EPSM4056-PN | □ | 5.6 | 14 | 56 | 6 | A | — |
| EPSM40565-PN | □ | 5.65 | 14.3 | 56 | 6 | A | — |
| EPSM4057-PN | □ | 5.7 | 14.3 | 56 | 6 | A | — |
| EPSM40575-PN | □ | 5.75 | 14.5 | 56 | 6 | A | — |
| EPSM4058-PN | □ | 5.8 | 14.5 | 56 | 6 | A | — |
| EPSM40585-PN | □ | 5.85 | 14.8 | 56 | 6 | A | — |
| EPSM4059-PN | □ | 5.9 | 14.8 | 56 | 6 | A | — |
| EPSM40595-PN | □ | 5.95 | 15 | 56 | 6 | A | — |
| EPSM4060-PN | ● | 6 | 15 | 56 | 6 | B | 9,610 |
| EPSM40605-PN | □ | 6.05 | 15.3 | 63 | 8 | A | — |
| EPSM4061-PN | □ | 6.1 | 15.3 | 63 | 8 | A | — |
| EPSM40615-PN | □ | 6.15 | 15.5 | 63 | 8 | A | — |
| EPSM4062-PN | □ | 6.2 | 15.5 | 63 | 8 | A | — |
| EPSM40625-PN | □ | 6.25 | 15.8 | 63 | 8 | A | — |
| EPSM4063-PN | □ | 6.3 | 15.8 | 63 | 8 | A | — |
| EPSM40635-PN | □ | 6.35 | 16 | 63 | 8 | A | — |
| EPSM4064-PN | □ | 6.4 | 16 | 63 | 8 | A | — |
| EPSM40645-PN | □ | 6.45 | 16.3 | 63 | 8 | A | — |

●印：標準在庫品です。● : Stocked items.　□印：特定代理店在庫です。弊社営業へお問合せください。□ : Stocked by specified distributor. Contact with our sales department.

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## EPSM4○○○○-PN

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 形状 Shape | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|
| EPSM4065-PN | □ | 6.5 | 16.3 | 63 | 8 | A | — |
| EPSM40655-PN | □ | 6.55 | 16.5 | 63 | 8 | A | — |
| EPSM4066-PN | □ | 6.6 | 16.5 | 63 | 8 | A | — |
| EPSM40665-PN | □ | 6.65 | 16.8 | 63 | 8 | A | — |
| EPSM4067-PN | □ | 6.7 | 16.8 | 63 | 8 | A | — |
| EPSM40675-PN | □ | 6.75 | 17 | 63 | 8 | A | — |
| EPSM4068-PN | □ | 6.8 | 17 | 63 | 8 | A | — |
| EPSM40685-PN | □ | 6.85 | 17.3 | 63 | 8 | A | — |
| EPSM4069-PN | □ | 6.9 | 17.3 | 63 | 8 | A | — |
| EPSM40695-PN | □ | 6.95 | 17.5 | 63 | 8 | A | — |
| EPSM4070-PN | ● | 7 | 17.5 | 63 | 8 | A | 11,910 |
| EPSM40705-PN | □ | 7.05 | 17.8 | 63 | 8 | A | — |
| EPSM4071-PN | □ | 7.1 | 17.8 | 63 | 8 | A | — |
| EPSM40715-PN | □ | 7.15 | 18 | 63 | 8 | A | — |
| EPSM4072-PN | □ | 7.2 | 18 | 63 | 8 | A | — |
| EPSM40725-PN | □ | 7.25 | 18.3 | 63 | 8 | A | — |
| EPSM4073-PN | □ | 7.3 | 18.3 | 63 | 8 | A | — |
| EPSM40735-PN | □ | 7.35 | 18.5 | 63 | 8 | A | — |
| EPSM4074-PN | □ | 7.4 | 18.5 | 63 | 8 | A | — |
| EPSM40745-PN | □ | 7.45 | 18.8 | 63 | 8 | A | — |
| EPSM4075-PN | □ | 7.5 | 18.8 | 63 | 8 | A | — |
| EPSM40755-PN | □ | 7.55 | 19 | 63 | 8 | A | — |
| EPSM4076-PN | □ | 7.6 | 19 | 63 | 8 | A | — |
| EPSM40765-PN | □ | 7.65 | 19.3 | 63 | 8 | A | — |
| EPSM4077-PN | □ | 7.7 | 19.3 | 63 | 8 | A | — |
| EPSM40775-PN | □ | 7.75 | 19.5 | 63 | 8 | A | — |
| EPSM4078-PN | □ | 7.8 | 19.5 | 63 | 8 | A | — |
| EPSM40785-PN | □ | 7.85 | 19.8 | 63 | 8 | A | — |
| EPSM4079-PN | □ | 7.9 | 19.8 | 63 | 8 | A | — |
| EPSM40795-PN | □ | 7.95 | 20 | 63 | 8 | A | — |
| EPSM4080-PN | ● | 8 | 20 | 63 | 8 | B | 11,910 |
| EPSM40805-PN | □ | 8.05 | 20.3 | 74 | 10 | A | — |
| EPSM4081-PN | □ | 8.1 | 20.3 | 74 | 10 | A | — |
| EPSM40815-PN | □ | 8.15 | 20.5 | 74 | 10 | A | — |
| EPSM4082-PN | □ | 8.2 | 20.5 | 74 | 10 | A | — |
| EPSM40825-PN | □ | 8.25 | 20.8 | 74 | 10 | A | — |
| EPSM4083-PN | □ | 8.3 | 20.8 | 74 | 10 | A | — |
| EPSM40835-PN | □ | 8.35 | 21 | 74 | 10 | A | — |
| EPSM4084-PN | □ | 8.4 | 21 | 74 | 10 | A | — |
| EPSM40845-PN | □ | 8.45 | 21.3 | 74 | 10 | A | — |
| EPSM4085-PN | □ | 8.5 | 21.3 | 74 | 10 | A | — |
| EPSM40855-PN | □ | 8.55 | 21.5 | 74 | 10 | A | — |
| EPSM4086-PN | □ | 8.6 | 21.5 | 74 | 10 | A | — |
| EPSM40865-PN | □ | 8.65 | 21.8 | 74 | 10 | A | — |
| EPSM4087-PN | □ | 8.7 | 21.8 | 74 | 10 | A | — |
| EPSM40875-PN | □ | 8.75 | 22 | 74 | 10 | A | — |
| EPSM4088-PN | □ | 8.8 | 22 | 74 | 10 | A | — |
| EPSM40885-PN | □ | 8.85 | 22.3 | 74 | 10 | A | — |
| EPSM4089-PN | □ | 8.9 | 22.3 | 74 | 10 | A | — |
| EPSM40895-PN | □ | 8.95 | 22.5 | 74 | 10 | A | — |
| EPSM4090-PN | ● | 9 | 22.5 | 74 | 10 | A | 16,160 |
| EPSM40905-PN | □ | 9.05 | 22.8 | 74 | 10 | A | — |
| EPSM4091-PN | □ | 9.1 | 22.8 | 74 | 10 | A | — |
| EPSM40915-PN | □ | 9.15 | 23 | 74 | 10 | A | — |
| EPSM4092-PN | □ | 9.2 | 23 | 74 | 10 | A | — |
| EPSM40925-PN | □ | 9.25 | 23.3 | 74 | 10 | A | — |
| EPSM4093-PN | □ | 9.3 | 23.3 | 74 | 10 | A | — |
| EPSM40935-PN | □ | 9.35 | 23.5 | 74 | 10 | A | — |
| EPSM4094-PN | □ | 9.4 | 23.5 | 74 | 10 | A | — |
| EPSM40945-PN | □ | 9.45 | 23.8 | 74 | 10 | A | — |
| EPSM4095-PN | □ | 9.5 | 23.8 | 74 | 10 | A | — |
| EPSM40955-PN | □ | 9.55 | 24 | 74 | 10 | A | — |
| EPSM4096-PN | □ | 9.6 | 24 | 74 | 10 | A | — |
| EPSM40965-PN | □ | 9.65 | 24.3 | 74 | 10 | A | — |
| EPSM4097-PN | □ | 9.7 | 24.3 | 74 | 10 | A | — |
| EPSM40975-PN | □ | 9.75 | 24.5 | 74 | 10 | A | — |
| EPSM4098-PN | □ | 9.8 | 24.5 | 74 | 10 | A | — |
| EPSM40985-PN | □ | 9.85 | 24.8 | 74 | 10 | A | — |
| EPSM4099-PN | □ | 9.9 | 24.8 | 74 | 10 | A | — |
| EPSM40995-PN | □ | 9.95 | 25 | 74 | 10 | A | — |
| EPSM4100-PN | ● | 10 | 25 | 74 | 10 | B | 16,160 |
| EPSM4101-PN | □ | 10.1 | 25.3 | 86 | 12 | A | — |
| EPSM4102-PN | □ | 10.2 | 25.5 | 86 | 12 | A | — |
| EPSM4103-PN | □ | 10.3 | 25.8 | 86 | 12 | A | — |
| EPSM4104-PN | □ | 10.4 | 26 | 86 | 12 | A | — |
| EPSM4105-PN | □ | 10.5 | 26.3 | 86 | 12 | A | — |
| EPSM4106-PN | □ | 10.6 | 26.5 | 86 | 12 | A | — |
| EPSM4107-PN | □ | 10.7 | 26.8 | 86 | 12 | A | — |
| EPSM4108-PN | □ | 10.8 | 27 | 86 | 12 | A | — |
| EPSM4109-PN | □ | 10.9 | 27.3 | 86 | 12 | A | — |
| EPSM4110-PN | ● | 11 | 27.5 | 86 | 12 | A | 20,090 |
| EPSM4111-PN | □ | 11.1 | 27.8 | 86 | 12 | A | — |
| EPSM4112-PN | □ | 11.2 | 28 | 86 | 12 | A | — |
| EPSM4113-PN | □ | 11.3 | 28.3 | 86 | 12 | A | — |
| EPSM4114-PN | □ | 11.4 | 28.5 | 86 | 12 | A | — |
| EPSM4115-PN | □ | 11.5 | 28.8 | 86 | 12 | A | — |
| EPSM4116-PN | □ | 11.6 | 29 | 86 | 12 | A | — |
| EPSM4117-PN | □ | 11.7 | 29.3 | 86 | 12 | A | — |
| EPSM4118-PN | □ | 11.8 | 29.5 | 86 | 12 | A | — |
| EPSM4119-PN | □ | 11.9 | 29.8 | 86 | 12 | A | — |
| EPSM4120-PN | ● | 12 | 30 | 86 | 12 | B | 20,090 |
| EPSM4125-PN | □ | 12.5 | 31.3 | 105 | 16 | A | — |
| EPSM4130-PN | □ | 13 | 32.5 | 105 | 16 | A | — |
| EPSM4135-PN | □ | 13.5 | 33.8 | 105 | 16 | A | — |
| EPSM4140-PN | □ | 14 | 35 | 105 | 16 | A | — |
| EPSM4145-PN | □ | 14.5 | 36.3 | 110 | 16 | A | — |
| EPSM4150-PN | □ | 15 | 37.5 | 110 | 16 | A | — |
| EPSM4155-PN | □ | 15.5 | 38.8 | 110 | 16 | A | — |
| EPSM4160-PN | ● | 16 | 40 | 110 | 16 | B | 45,050 |
| EPSM4165-PN | □ | 16.5 | 41.3 | 120 | 20 | A | — |
| EPSM4170-PN | □ | 17 | 42.5 | 120 | 20 | A | — |
| EPSM4175-PN | □ | 17.5 | 43.8 | 120 | 20 | A | — |
| EPSM4180-PN | □ | 18 | 45 | 120 | 20 | A | — |
| EPSM4185-PN | □ | 18.5 | 46.3 | 125 | 20 | A | — |
| EPSM4190-PN | □ | 19 | 47.5 | 125 | 20 | A | — |
| EPSM4195-PN | □ | 19.5 | 48.8 | 125 | 20 | A | — |
| EPSM4200-PN | ● | 20 | 50 | 125 | 20 | B | 65,460 |

### EPSM、EPSMM-PN、EPSML-PNの対応被削材

Applicable work material of EPSM-PN, EPSMM-PN, EPSML-PN

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | | | | ◎ | ◎ | ◎ | ◎ |

### 再研磨対応外径範囲

Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPSM-PN | 6～20 | 4～20 |
| EPSMM-PN | 6～20 | 4～20 |
| EPSML-PN | 6～20 | 6～20 |

●印：標準在庫品です。
●：Stocked items.

□印：特定代理店在庫です。弊社営業へお問合せください。
□：Stocked by specified distributor. Contact with our sales department.

## ミディアム刃長 Medium

側面 Side Cutting / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance
φ3～φ6 : 0～−0.015
φ7～φ20 : 0～−0.02

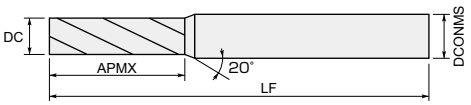
h5 (φ6～12) / h6 (φ16, φ20)

(mm)

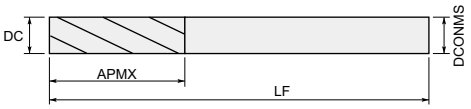
ステンレス鋼、炭素鋼、合金鋼等の荒～仕上げ加工までマルチに対応。
Multi-purpose for roughing to finishing of stainless steel, carbon steel, alloy steel, etc.

ラジアスはA235頁を参照してください
Please refer to page A235 for Radius

Aタイプ A type




Bタイプ B type




4枚刃 4 Flutes

超硬 Carbide / PN / ねじれ40° Helix angle / 不等分割 Unequal pitch / 切削条件表 A324 Cutting Conditions

# EPSMM4○○○-PN

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 形状 Shape | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|
| EPSMM4030-PN | ● | 3 | 12 | 56 | 6 | A | 8,930 |
| EPSMM4040-PN | ● | 4 | 16 | 56 | 6 | A | 9,490 |
| EPSMM4050-PN | ● | 5 | 20 | 70 | 6 | A | 10,530 |
| EPSMM4060-PN | ● | 6 | 24 | 70 | 6 | B | 11,570 |
| EPSMM4070-PN | ● | 7 | 28 | 75 | 8 | A | 14,150 |
| EPSMM4080-PN | ● | 8 | 32 | 80 | 8 | B | 14,150 |

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 形状 Shape | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|
| EPSMM4090-PN | ● | 9 | 36 | 100 | 10 | A | 18,970 |
| EPSMM4100-PN | ● | 10 | 40 | 100 | 10 | B | 18,970 |
| EPSMM4110-PN | ● | 11 | 44 | 120 | 12 | A | 23,910 |
| EPSMM4120-PN | ● | 12 | 48 | 120 | 12 | B | 23,910 |
| EPSMM4160-PN | ● | 16 | 64 | 135 | 16 | B | 54,430 |
| EPSMM4200-PN | ● | 20 | 80 | 155 | 20 | B | 79,540 |

## ロング刃長 Long

側面 Side Cutting / 中仕上 Semi Finishing / 仕上 Finishing

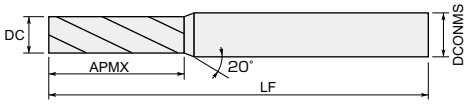
外径公差 Dia.tolerance
φ6 : 0～−0.015
φ7～φ20 : 0～−0.02

h5 (φ6～12) / h6 (φ16, φ20)

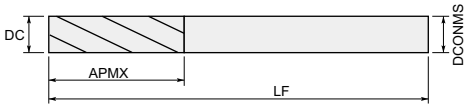
(mm)

ステンレス鋼、炭素鋼、合金鋼等の荒～仕上げ加工までマルチに対応。
Multi-purpose for roughing to finishing of stainless steel, carbon steel, alloy steel, etc.

Aタイプ A type




Bタイプ B type




4枚刃 4 Flutes

超硬 Carbide / PN / ねじれ40° Helix angle / 不等分割 Unequal pitch / 切削条件表 A324 Cutting Conditions

# EPSML4○○○-PN

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 刃数 No. of flutes | 形状 Shape | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|
| EPSML4060-PN | ● | 6 | 30 | 70 | 6 | 4 | B | 16,270 |
| EPSML4070-PN | □ | 7 | 35 | 80 | 8 | 4 | A | – |
| EPSML4080-PN | ● | 8 | 40 | 80 | 8 | 4 | B | 20,200 |
| EPSML4090-PN | □ | 9 | 45 | 100 | 10 | 4 | A | – |
| EPSML4100-PN | ● | 10 | 50 | 100 | 10 | 4 | B | 27,490 |
| EPSML4110-PN | □ | 11 | 55 | 120 | 12 | 4 | A | – |
| EPSML4120-PN | ● | 12 | 60 | 120 | 12 | 4 | B | 34,120 |
| EPSML4130-PN | □ | 13 | 65 | 130 | 16 | 4 | A | – |
| EPSML4140-PN | □ | 14 | 70 | 130 | 16 | 4 | A | – |
| EPSML4150-PN | □ | 15 | 75 | 130 | 16 | 4 | A | – |
| EPSML4160-PN | ● | 16 | 80 | 135 | 16 | 4 | B | 76,610 |
| EPSML4170-PN | □ | 17 | 85 | 135 | 20 | 4 | A | – |
| EPSML4180-PN | □ | 18 | 90 | 145 | 20 | 4 | A | – |
| EPSML4190-PN | □ | 19 | 95 | 145 | 20 | 4 | A | – |
| EPSML4200-PN | ● | 20 | 100 | 155 | 20 | 4 | B | 111,320 |

# Epoch SUS Multi
# エポックSUSマルチ

YouTube 動画公開中

## ロングシャンク　Long shank

側面 Side Cutting　中仕上 Semi Finishing　仕上 Finishing

外径公差 Dia.tolerance
φ3～φ6 ：0～−0.015
φ7～φ17：0～−0.02

h5 DC:3～5　h6 DC:6～17

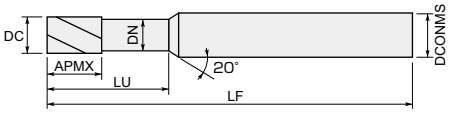
(mm)

ステンレス鋼、炭素鋼、合金鋼等の荒～仕上げ加工までマルチに対応。
Multi-purpose for roughing to finishing of stainless steel, carbon steel, alloy steel, etc.

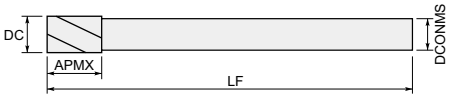
ラジアスはA235頁を参照してください
Please refer to page A235 for Radius

4枚刃
4 Flutes

Aタイプ
A type




Bタイプ
B type




超硬 Carbide　PN　ねじれ40° Helix angle　不等分割 Unequal pitch　切削条件表 A322 Cutting Conditions

## EPSMLS4○○○-PN

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 首下長 Under neck length LU | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 刃数 No. of flutes | 形状 Shape | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|---|
| EPSMLS4030-PN | ● | 3 | 4.5 | 10.5 | 2.88 | 80 | 6 | 4 | A | 10,210 |
| EPSMLS4040-PN | ● | 4 | 6 | 14 | 3.7 | 80 | 6 | 4 | A | 10,710 |
| EPSMLS4050-PN | ● | 5 | 7.5 | 17.5 | 4.6 | 100 | 6 | 4 | A | 12,910 |
| EPSMLS4060-PN | ● | 6 | 9 | – | – | 120 | 5 | 4 | B | 14,590 |
| EPSMLS4070-PN | ● | 7 | 9 | – | – | 120 | 6 | 4 | B | 18,080 |
| EPSMLS4080-PN | ● | 8 | 12 | – | – | 135 | 7 | 4 | B | 18,080 |
| EPSMLS4090-PN | ● | 9 | 12 | – | – | 135 | 8 | 4 | B | 24,130 |
| EPSMLS4100-PN | ● | 10 | 15 | – | – | 150 | 9 | 4 | B | 24,130 |
| EPSMLS4110-PN | ● | 11 | 15 | – | – | 150 | 10 | 4 | B | 30,300 |
| EPSMLS4120-PN | ● | 12 | 18 | – | – | 160 | 11 | 4 | B | 30,300 |
| EPSMLS4130-PN | ● | 13 | 18 | – | – | 160 | 12 | 4 | B | 35,910 |
| EPSMLS4160-PN | ● | 16 | 24 | – | – | 180 | 15 | 4 | B | 66,870 |
| EPSMLS4170-PN | ● | 17 | 24 | – | – | 180 | 16 | 4 | B | 66,870 |

●印：標準在庫品です。
●：Stocked items.
□印：特定代理店在庫です。弊社営業へお問合せください。
□：Stocked by specified distributor. Contact with our sales department.

首下3DC | Under neck 3DC

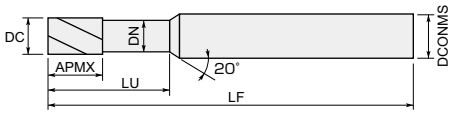
平面 Planing | 側面 Side Cutting | 溝 Slotting | ヘリカル Helical | 座ぐり Spot Facing | 荒 Roughing | 中仕上 Semi Finishing | 仕上 Finishing

外径公差 Dia.tolerance
φ1～φ6　：0～−0.015
φ6.5～φ20：0～−0.02
h5 φ6～12　h6 φ16, φ20
(mm)

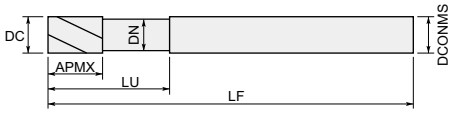
ステンレス鋼、炭素鋼、合金鋼等の荒～仕上げ加工までマルチに対応。
Multi-purpose for roughing to finishing of stainless steel, carbon steel, alloy steel, etc.

4枚刃
4 Flutes

Aタイプ A type




Bタイプ B type




# EPSM4○○○-○○.○-PN

超硬 Carbide | PN | ねじれ40° Helix angle | 不等分割 Unequal pitch | 切削条件表 A319 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 首下長 Under neck length LU | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 刃数 No. of flutes | 形状 Shape | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|---|
| EPSM4010-3-PN | ● | 1 | 1.5 | 3 | 0.96 | 56 | 6 | 4 | A | 7,500 |
| EPSM4015-4.5-PN | □ | 1.5 | 2.3 | 4.5 | 1.44 | 56 | 6 | 4 | A | – |
| EPSM4020-6-PN | ● | 2 | 3 | 6 | 1.92 | 56 | 6 | 4 | A | 7,500 |
| EPSM4025-7.5-PN | □ | 2.5 | 3.8 | 7.5 | 2.4 | 56 | 6 | 4 | A | – |
| EPSM4030-9-PN | ● | 3 | 4.5 | 9 | 2.88 | 56 | 6 | 4 | A | 7,500 |
| EPSM4035-10.5-PN | □ | 3.5 | 5.3 | 10.5 | 3.35 | 56 | 6 | 4 | A | – |
| EPSM4040-12-PN | ● | 4 | 6 | 12 | 3.7 | 56 | 6 | 4 | A | 7,890 |
| EPSM4045-13.5-PN | □ | 4.5 | 6.8 | 13.5 | 4.15 | 56 | 6 | 4 | A | – |
| EPSM4050-15-PN | ● | 5 | 7.5 | 15 | 4.6 | 56 | 6 | 4 | A | 8,820 |
| EPSM4055-16.5-PN | □ | 5.5 | 8.3 | 16.5 | 5.05 | 56 | 6 | 4 | A | – |
| EPSM4060-18-PN | ● | 6 | 9 | 18 | 5.5 | 56 | 6 | 4 | B | 9,610 |
| EPSM4065-19.5-PN | □ | 6.5 | 9.8 | 19.5 | 5.95 | 63 | 8 | 4 | A | – |
| EPSM4070-21-PN | ● | 7 | 10.5 | 21 | 6.4 | 63 | 8 | 4 | A | 11,910 |
| EPSM4075-22.5-PN | □ | 7.5 | 11.3 | 22.5 | 6.85 | 63 | 8 | 4 | A | – |
| EPSM4080-24-PN | ● | 8 | 12 | 24 | 7.3 | 63 | 8 | 4 | B | 11,910 |
| EPSM4085-25.5-PN | □ | 8.5 | 12.8 | 25.5 | 7.8 | 74 | 10 | 4 | A | – |
| EPSM4090-27-PN | ● | 9 | 13.5 | 27 | 8.3 | 74 | 10 | 4 | A | 16,160 |
| EPSM4095-28.5-PN | □ | 9.5 | 14.3 | 28.5 | 8.7 | 74 | 10 | 4 | A | – |
| EPSM4100-30-PN | ● | 10 | 15 | 30 | 9.1 | 74 | 10 | 4 | B | 16,160 |
| EPSM4105-31.5-PN | □ | 10.5 | 15.8 | 31.5 | 9.65 | 86 | 12 | 4 | A | – |
| EPSM4110-33-PN | ● | 11 | 16.5 | 33 | 10.2 | 86 | 12 | 4 | A | 20,090 |
| EPSM4115-34.5-PN | □ | 11.5 | 17.3 | 34.5 | 10.6 | 86 | 12 | 4 | A | – |
| EPSM4120-36-PN | ● | 12 | 18 | 36 | 11 | 86 | 12 | 4 | B | 20,090 |
| EPSM4130-39-PN | □ | 13 | 19.5 | 39 | 11.7 | 105 | 16 | 4 | A | – |
| EPSM4140-42-PN | □ | 14 | 21 | 42 | 12.7 | 105 | 16 | 4 | A | – |
| EPSM4150-45-PN | □ | 15 | 22.5 | 45 | 13.6 | 110 | 16 | 4 | A | – |
| EPSM4160-48-PN | ● | 16 | 24 | 48 | 14.5 | 110 | 16 | 4 | B | 45,050 |
| EPSM4170-51-PN | □ | 17 | 25.5 | 51 | 15.4 | 120 | 20 | 4 | A | – |
| EPSM4180-54-PN | □ | 18 | 27 | 54 | 16.3 | 120 | 20 | 4 | A | – |
| EPSM4190-57-PN | □ | 19 | 28.5 | 57 | 17.3 | 125 | 20 | 4 | A | – |
| EPSM4200-60-PN | ● | 20 | 30 | 60 | 18.2 | 125 | 20 | 4 | B | 65,460 |

## EPSMLS-PN、EPSM-3D-PN の対応被削材

Applicable work material of EPSMLS-PN, EPSM-3D-PN

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | | | | ◎ | ◎ | ◎ | ◎ |

## 再研磨対応外径範囲

Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPSMLS-PN | 6～17 | 4～17 |
| EPSM-3DC-PN | 6～20 | 4～20 |

# Epoch SUS Finish / Multi
# エポックSUSマルチ

YouTube 動画公開中

首下5DC | Under neck 5DC

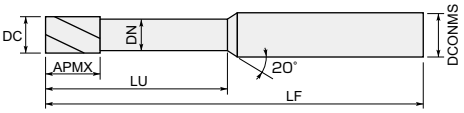
ステンレス鋼、炭素鋼、合金鋼等の荒～仕上げ加工までマルチに対応。
Multi-purpose for roughing to finishing of stainless steel, carbon steel, alloy steel, etc.

ラジアスはA235頁を参照してください
Please refer to page A235 for Radius

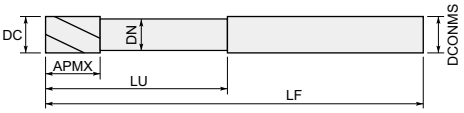
平面 Planing | 側面 Side Cutting | 溝 Slotting | ヘリカル Helical | 座ぐり Spot Facing | 荒 Roughing | 中仕上 Semi Finishing | 仕上 Finishing

外径公差 Dia.tolerance
φ1～φ6 : 0～−0.015
φ6.5～φ20 : 0～−0.02
h5 (φ6～12) h6 (φ16,φ20)
(mm)

Aタイプ A type




Bタイプ B type




4枚刃
4 Flutes

## EPSM4○○○-○○○.○-PN

超硬 Carbide | PN | ねじれ40° Helix angle | 不等分割 Unequal pitch | 切削条件表 A322 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 首下長 Under neck length LU | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 刃数 No. of flutes | 形状 Shape | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|---|
| EPSM4010-5-PN | ● | 1 | 1.5 | 5 | 0.96 | 68 | 6 | 4 | A | 8,260 |
| EPSM4015-7.5-PN | □ | 1.5 | 2.3 | 7.5 | 1.44 | 68 | 6 | 4 | A | – |
| EPSM4020-10-PN | ● | 2 | 3 | 10 | 1.92 | 68 | 6 | 4 | A | 8,260 |
| EPSM4025-12.5-PN | □ | 2.5 | 3.8 | 12.5 | 2.4 | 68 | 6 | 4 | A | – |
| EPSM4030-15-PN | ● | 3 | 4.5 | 15 | 2.88 | 68 | 6 | 4 | A | 8,260 |
| EPSM4035-17.5-PN | □ | 3.5 | 5.3 | 17.5 | 3.35 | 68 | 6 | 4 | A | – |
| EPSM4040-20-PN | ● | 4 | 6 | 20 | 3.7 | 68 | 6 | 4 | A | 8,690 |
| EPSM4045-22.5-PN | □ | 4.5 | 6.8 | 22.5 | 4.15 | 68 | 6 | 4 | A | – |
| EPSM4050-25-PN | ● | 5 | 7.5 | 25 | 4.6 | 68 | 6 | 4 | A | 9,710 |
| EPSM4055-27.5-PN | □ | 5.5 | 8.3 | 27.5 | 5.05 | 68 | 6 | 4 | A | – |
| EPSM4060-30-PN | ● | 6 | 9 | 30 | 5.5 | 68 | 6 | 4 | B | 10,560 |
| EPSM4065-32.5-PN | □ | 6.5 | 9.8 | 32.5 | 5.95 | 80 | 8 | 4 | A | – |
| EPSM4070-35-PN | ● | 7 | 10.5 | 35 | 6.4 | 80 | 8 | 4 | A | 13,140 |
| EPSM4075-37.5-PN | □ | 7.5 | 11.3 | 37.5 | 6.85 | 80 | 8 | 4 | A | – |
| EPSM4080-40-PN | ● | 8 | 12 | 40 | 7.3 | 80 | 8 | 4 | B | 13,140 |
| EPSM4085-42.5-PN | □ | 8.5 | 12.8 | 42.5 | 7.8 | 94 | 10 | 4 | A | – |
| EPSM4090-45-PN | ● | 9 | 13.5 | 45 | 8.3 | 94 | 10 | 4 | A | 17,740 |
| EPSM4095-47.5-PN | □ | 9.5 | 14.3 | 47.5 | 8.7 | 94 | 10 | 4 | A | – |
| EPSM4100-50-PN | ● | 10 | 15 | 50 | 9.1 | 94 | 10 | 4 | B | 17,740 |
| EPSM4105-52.5-PN | □ | 10.5 | 15.8 | 52.5 | 9.65 | 110 | 12 | 4 | A | – |
| EPSM4110-55-PN | ● | 11 | 16.5 | 55 | 10.2 | 110 | 12 | 4 | A | 22,110 |
| EPSM4115-57.5-PN | □ | 11.5 | 17.3 | 57.5 | 10.6 | 110 | 12 | 4 | A | – |
| EPSM4120-60-PN | ● | 12 | 18 | 60 | 11 | 110 | 12 | 4 | B | 22,110 |
| EPSM4130-65-PN | □ | 13 | 19.5 | 65 | 11.7 | 125 | 16 | 4 | A | – |
| EPSM4140-70-PN | □ | 14 | 21 | 70 | 12.7 | 125 | 16 | 4 | A | – |
| EPSM4150-75-PN | □ | 15 | 22.5 | 75 | 13.6 | 135 | 16 | 4 | A | – |
| EPSM4160-80-PN | ● | 16 | 24 | 80 | 14.5 | 135 | 16 | 4 | B | 49,510 |
| EPSM4170-85-PN | □ | 17 | 25.5 | 85 | 15.4 | 145 | 20 | 4 | A | – |
| EPSM4180-90-PN | □ | 18 | 27 | 90 | 16.3 | 145 | 20 | 4 | A | – |
| EPSM4190-95-PN | □ | 19 | 28.5 | 95 | 17.3 | 155 | 20 | 4 | A | – |
| EPSM4200-100-PN | ● | 20 | 30 | 100 | 18.2 | 155 | 20 | 4 | B | 72,030 |

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | | | | ◎ | ◎ | ◎ | ◎ |

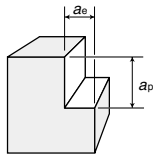
## 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPSM-5DC-PN | 6 ～ 20 | 4 ～ 20 |

# 標準切削条件表 Recommended cutting conditions

## 汎用 側面切削条件 General Side milling conditions

**EPSMS※** ショート刃長 Short
**EPSM** レギュラー刃長 Regular
**EPSM-3DC** 首下3DCタイプ Under neck 3DC




| 外径 DC Tool dia. (mm) | 炭素鋼・合金鋼・鋳鉄 (～30HRC) Carbon steels, Alloy steels Cast irons | | 工具鋼・プリハードン鋼 (30～40HRC) Tool steels, Pre-hardened steels | | ステンレス鋼 Stainless steels | | チタン合金 Titanium alloys | | 超耐熱合金 Super heat-resistant alloys | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ap=1DC, ae=0.5DC | | ap=1DC, ae=0.5DC | | ap=1DC, ae=0.5DC | | ap=1DC, ae=0.1DC | | ap=1DC, ae=0.05DC | |
| | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 1 | 31,800 | 760 | 22,300 | 360 | 19,100 | 310 | 12,700 | 150 | 9,500 | 76 |
| 1.5 | 21,200 | 780 | 14,900 | 370 | 12,700 | 310 | 8,500 | 160 | 6,400 | 79 |
| 2 | 15,900 | 810 | 11,100 | 380 | 9,500 | 320 | 6,400 | 160 | 4,800 | 82 |
| 2.5 | 12,700 | 830 | 8,900 | 390 | 7,600 | 330 | 5,100 | 170 | 3,800 | 83 |
| 3 | 10,600 | 860 | 7,400 | 400 | 6,400 | 350 | 4,200 | 170 | 3,200 | 86 |
| 3.5 | 9,100 | 880 | 6,400 | 410 | 5,500 | 350 | 3,600 | 170 | 2,700 | 87 |
| 4 | 8,000 | 910 | 5,600 | 430 | 4,800 | 360 | 3,200 | 180 | 2,400 | 91 |
| 4.5 | 7,100 | 930 | 5,000 | 440 | 4,200 | 370 | 2,800 | 180 | 2,100 | 92 |
| 5 | 6,400 | 960 | 4,500 | 450 | 3,800 | 380 | 2,500 | 190 | 1,900 | 95 |
| 5.5 | 5,800 | 960 | 4,100 | 450 | 3,500 | 380 | 2,300 | 190 | 1,700 | 93 |
| 6 | 5,300 | 950 | 3,700 | 440 | 3,200 | 380 | 2,100 | 190 | 1,600 | 96 |
| 6.5 | 4,900 | 960 | 3,400 | 440 | 2,900 | 380 | 2,000 | 200 | 1,500 | 97 |
| 7 | 4,500 | 940 | 3,200 | 450 | 2,700 | 380 | 1,800 | 190 | 1,400 | 98 |
| 7.5 | 4,200 | 940 | 3,000 | 450 | 2,500 | 370 | 1,700 | 190 | 1,300 | 97 |
| 8 | 4,000 | 960 | 2,800 | 450 | 2,400 | 380 | 1,600 | 190 | 1,200 | 96 |
| 8.5 | 3,700 | 940 | 2,600 | 440 | 2,200 | 370 | 1,500 | 190 | 1,100 | 93 |
| 9 | 3,500 | 940 | 2,500 | 450 | 2,100 | 380 | 1,400 | 190 | 1,100 | 99 |
| 9.5 | 3,400 | 970 | 2,300 | 440 | 2,000 | 380 | 1,300 | 190 | 1,000 | 95 |
| 10 | 3,200 | 960 | 2,200 | 440 | 1,900 | 380 | 1,300 | 200 | 1,000 | 100 |
| 10.5 | 3,000 | 920 | 2,100 | 430 | 1,800 | 370 | 1,200 | 180 | 900 | 92 |
| 11 | 2,900 | 910 | 2,000 | 420 | 1,700 | 360 | 1,200 | 190 | 900 | 94 |
| 11.5 | 2,800 | 890 | 1,900 | 400 | 1,700 | 360 | 1,100 | 170 | 800 | 85 |
| 12 | 2,700 | 870 | 1,900 | 410 | 1,600 | 350 | 1,100 | 180 | 800 | 86 |
| 13 | 2,400 | 820 | 1,700 | 390 | 1,500 | 340 | 1,000 | 170 | 700 | 80 |
| 14 | 2,300 | 840 | 1,600 | 390 | 1,400 | 340 | 900 | 160 | 700 | 85 |
| 15 | 2,100 | 810 | 1,500 | 390 | 1,300 | 340 | 800 | 150 | 600 | 77 |
| 16 | 2,000 | 820 | 1,400 | 380 | 1,200 | 330 | 800 | 160 | 600 | 82 |
| 17 | 1,900 | 800 | 1,300 | 370 | 1,100 | 310 | 700 | 150 | 600 | 85 |
| 18 | 1,800 | 800 | 1,200 | 350 | 1,100 | 320 | 700 | 150 | 500 | 74 |
| 19 | 1,700 | 780 | 1,200 | 370 | 1,000 | 310 | 700 | 160 | 500 | 77 |
| 20 | 1,600 | 770 | 1,100 | 350 | 1,000 | 320 | 600 | 140 | 500 | 80 |

※上表はレギュラー刃及び3DCタイプの切削条件表です。ショート刃をご使用の場合回転数･送り速度を1.1倍程度を目安に調整してください。
※The table above indicates cutting parameter for regular type and 3DC type, please reduce both rotation and feed rate to 1.1 times when using short type.

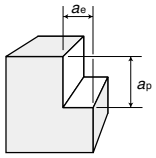
【注意】本工具のPNコーティングはその性質上、通電性が微小です。従って、通電方式の工具長測定装置をご使用の際にはご注意ください。
被削材、加工形状に合わせて、適切なクーラントを使用してください。
できるだけ高剛性、高精度の機械及びチャックをご使用ください。
この標準切削条件表は切削条件の目安を示すものです。実際の加工では、加工条件、目的、使用機械等により条件を調整してください。
ビビリや異常振動が発生する場合は条件を調整してください。

【Note】PN coating is less electro conductive. Therefore, electric transmitted measuring systems may not work.
Use the appropriate coolant for the work material and machining shape.
Use the high-rigidity and high accuracy machine as possible.
These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
Please adjust it if chatter or abnormal vibration occurs.

# Epoch SUS Finish / Multi
# エポックSUSマルチ

## 高速 側面切削条件 High speed Side milling conditions

**EPSMS**※ ショート刃長 Short
**EPSM** レギュラー刃長 Regular
**EPSM-3DC** 首下3DCタイプ Under neck 3DC




| 外径 DC Tool dia. (mm) | 炭素鋼・合金鋼・鋳鉄（～30HRC） Carbon steels, Alloy steels Cast irons | | 工具鋼・プリハードン鋼（30～40HRC） Tool steels, Pre-hardened steels | | ステンレス鋼 Stainless steels | | チタン合金 Titanium alloys | | 超耐熱合金 Super heat-resistant alloys | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ap=1DC, ae=0.5DC | | ap=1DC, ae=0.5DC | | ap=1DC, ae=0.5DC | | ap=1DC, ae=0.1DC | | ap=1DC, ae=0.05DC | |
| | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min |
| 1 | 41,400 | 990 | 31,800 | 510 | 28,600 | 460 | 19,100 | 230 | 15,900 | 127 |
| 1.5 | 27,600 | 1,020 | 21,200 | 520 | 19,100 | 470 | 12,700 | 230 | 10,600 | 130 |
| 2 | 20,700 | 1,060 | 15,900 | 540 | 14,300 | 490 | 9,500 | 240 | 8,000 | 136 |
| 2.5 | 16,600 | 1,080 | 12,700 | 550 | 11,500 | 500 | 7,600 | 250 | 6,400 | 139 |
| 3 | 13,800 | 1,120 | 10,600 | 570 | 9,500 | 510 | 6,400 | 260 | 5,300 | 143 |
| 3.5 | 11,800 | 1,140 | 9,100 | 590 | 8,200 | 530 | 5,500 | 270 | 4,500 | 145 |
| 4 | 10,300 | 1,170 | 8,000 | 610 | 7,200 | 550 | 4,800 | 270 | 4,000 | 152 |
| 4.5 | 9,200 | 1,200 | 7,100 | 620 | 6,400 | 560 | 4,200 | 270 | 3,500 | 153 |
| 5 | 8,300 | 1,250 | 6,400 | 640 | 5,700 | 570 | 3,800 | 280 | 3,200 | 160 |
| 5.5 | 7,500 | 1,240 | 5,800 | 640 | 5,200 | 570 | 3,500 | 290 | 2,900 | 160 |
| 6 | 6,900 | 1,240 | 5,300 | 640 | 4,800 | 580 | 3,200 | 290 | 2,700 | 162 |
| 6.5 | 6,400 | 1,250 | 4,900 | 640 | 4,400 | 570 | 2,900 | 280 | 2,400 | 156 |
| 7 | 5,900 | 1,240 | 4,500 | 630 | 4,100 | 570 | 2,700 | 280 | 2,300 | 161 |
| 7.5 | 5,500 | 1,240 | 4,200 | 630 | 3,800 | 570 | 2,500 | 280 | 2,100 | 158 |
| 8 | 5,200 | 1,250 | 4,000 | 640 | 3,600 | 580 | 2,400 | 290 | 2,000 | 160 |
| 8.5 | 4,900 | 1,250 | 3,700 | 630 | 3,400 | 580 | 2,200 | 280 | 1,900 | 162 |
| 9 | 4,600 | 1,240 | 3,500 | 630 | 3,200 | 580 | 2,100 | 280 | 1,800 | 162 |
| 9.5 | 4,400 | 1,250 | 3,400 | 650 | 3,000 | 570 | 2,000 | 280 | 1,700 | 162 |
| 10 | 4,100 | 1,230 | 3,200 | 640 | 2,900 | 580 | 1,900 | 290 | 1,600 | 160 |
| 10.5 | 3,900 | 1,190 | 3,000 | 610 | 2,700 | 550 | 1,800 | 270 | 1,500 | 153 |
| 11 | 3,800 | 1,190 | 2,900 | 610 | 2,600 | 540 | 1,700 | 270 | 1,400 | 146 |
| 11.5 | 3,600 | 1,140 | 2,800 | 590 | 2,500 | 530 | 1,700 | 270 | 1,400 | 148 |
| 12 | 3,400 | 1,100 | 2,700 | 580 | 2,400 | 520 | 1,600 | 260 | 1,300 | 140 |
| 13 | 3,200 | 1,100 | 2,400 | 550 | 2,200 | 500 | 1,500 | 260 | 1,200 | 137 |
| 14 | 3,000 | 1,100 | 2,300 | 560 | 2,000 | 490 | 1,400 | 260 | 1,100 | 134 |
| 15 | 2,800 | 1,080 | 2,100 | 540 | 1,900 | 490 | 1,300 | 250 | 1,100 | 142 |
| 16 | 2,600 | 1,060 | 2,000 | 540 | 1,800 | 490 | 1,200 | 240 | 1,000 | 136 |
| 17 | 2,400 | 1,020 | 1,900 | 540 | 1,700 | 480 | 1,100 | 230 | 900 | 127 |
| 18 | 2,300 | 1,020 | 1,800 | 530 | 1,600 | 470 | 1,100 | 240 | 900 | 133 |
| 19 | 2,200 | 1,020 | 1,700 | 520 | 1,500 | 460 | 1,000 | 230 | 800 | 123 |
| 20 | 2,100 | 1,010 | 1,600 | 510 | 1,400 | 450 | 1,000 | 240 | 800 | 128 |

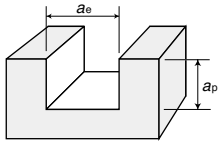
※上表はレギュラー刃及び3DCタイプの切削条件表です。ショート刃をご使用の場合回転数･送り速度を1.1倍程度を目安に調整してください。
※The table above indicates cutting parameter for regular type and 3DC type, please reduce both rotation and feed rate to 1.1 times when using short type

【注意】本工具のPNコーティングはその性質上、通電性が微小です。従って、通電方式の工具長測定装置をご使用の際にはご注意ください。
被削材、加工形状に合わせて、適切なクーラントを使用してください。
できるだけ高剛性、高精度の機械及びチャックをご使用ください。
この標準切削条件表は切削条件の目安を示すものです。実際の加工では、加工条件、目的、使用機械等により条件を調整してください。
ビビリや異常振動が発生する場合は条件を調整してください。

【Note】PN coating is less electro conductive. Therefore, electric transmitted measuring systems may not work.
Use the appropriate coolant for the work material and machining shape.
Use the high-rigidity and high accuracy machine as possible.
These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
Please adjust it if chatter or abnormal vibration occurs.

## 汎用 溝切削条件 General Slotting conditions

**EPSMS**※ ショート刃長 Short
**EPSM** レギュラー刃長 Regular
**EPSM-3DC** 首下3DCタイプ Under neck 3DC




| 外径 DC Tool dia. (mm) | 炭素鋼・合金鋼・鋳鉄（～30HRC） Carbon steels, Alloy steels Cast irons | | 工具鋼・プリハードン鋼（30～40HRC） Tool steels, Pre-hardened steels | | ステンレス鋼 Stainless steels | | チタン合金 Titanium alloys | | 超耐熱合金 Super heat-resistant alloys | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ap=1DC | | ap=1DC | | ap=1DC | | ap=0.5DC | | ap=0.5DC | |
| | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min |
| 1 | 28,600 | 360 | 19,100 | 190 | 17,500 | 130 | 11,100 | 60 | 6,400 | 19 |
| 1.5 | 19,100 | 390 | 12,700 | 210 | 11,700 | 140 | 7,400 | 60 | 4,200 | 21 |
| 2 | 14,300 | 430 | 9,500 | 230 | 8,800 | 160 | 5,600 | 70 | 3,200 | 23 |
| 2.5 | 11,500 | 470 | 7,600 | 250 | 7,000 | 170 | 4,500 | 70 | 2,500 | 24 |
| 3 | 9,500 | 500 | 6,400 | 270 | 5,800 | 180 | 3,700 | 80 | 2,100 | 26 |
| 3.5 | 8,200 | 540 | 5,500 | 290 | 5,000 | 200 | 3,200 | 80 | 1,800 | 28 |
| 4 | 7,200 | 580 | 4,800 | 310 | 4,400 | 210 | 2,800 | 90 | 1,600 | 31 |
| 4.5 | 6,400 | 610 | 4,200 | 320 | 3,900 | 220 | 2,500 | 100 | 1,400 | 32 |
| 5 | 5,700 | 640 | 3,800 | 340 | 3,500 | 240 | 2,200 | 100 | 1,300 | 35 |
| 5.5 | 5,200 | 680 | 3,500 | 370 | 3,200 | 250 | 2,000 | 100 | 1,200 | 38 |
| 6 | 4,800 | 720 | 3,200 | 380 | 2,900 | 260 | 1,900 | 110 | 1,100 | 40 |
| 6.5 | 4,400 | 710 | 2,900 | 380 | 2,700 | 260 | 1,700 | 110 | 1,000 | 39 |
| 7 | 4,100 | 720 | 2,700 | 380 | 2,500 | 260 | 1,600 | 110 | 900 | 38 |
| 7.5 | 3,800 | 710 | 2,500 | 370 | 2,300 | 260 | 1,500 | 110 | 800 | 36 |
| 8 | 3,600 | 720 | 2,400 | 380 | 2,200 | 260 | 1,400 | 110 | 800 | 38 |
| 8.5 | 3,400 | 720 | 2,200 | 370 | 2,100 | 270 | 1,300 | 110 | 700 | 36 |
| 9 | 3,200 | 720 | 2,100 | 380 | 1,900 | 260 | 1,200 | 110 | 700 | 38 |
| 9.5 | 3,000 | 710 | 2,000 | 380 | 1,800 | 260 | 1,200 | 110 | 700 | 40 |
| 10 | 2,900 | 730 | 1,900 | 380 | 1,800 | 270 | 1,100 | 110 | 600 | 36 |
| 10.5 | 2,700 | 690 | 1,800 | 370 | 1,700 | 260 | 1,100 | 110 | 600 | 37 |
| 11 | 2,600 | 680 | 1,700 | 360 | 1,600 | 250 | 1,000 | 100 | 600 | 38 |
| 11.5 | 2,500 | 660 | 1,700 | 360 | 1,500 | 240 | 1,000 | 110 | 600 | 38 |
| 12 | 2,400 | 650 | 1,600 | 350 | 1,500 | 240 | 900 | 100 | 500 | 32 |
| 13 | 2,200 | 630 | 1,500 | 340 | 1,300 | 220 | 900 | 100 | 500 | 34 |
| 14 | 2,000 | 610 | 1,400 | 340 | 1,300 | 240 | 800 | 100 | 500 | 37 |
| 15 | 1,900 | 610 | 1,300 | 340 | 1,200 | 230 | 700 | 90 | 400 | 31 |
| 16 | 1,800 | 610 | 1,200 | 330 | 1,100 | 220 | 700 | 100 | 400 | 33 |
| 17 | 1,700 | 600 | 1,100 | 310 | 1,000 | 210 | 700 | 100 | 400 | 34 |
| 18 | 1,600 | 590 | 1,100 | 320 | 1,000 | 220 | 600 | 90 | 400 | 35 |
| 19 | 1,500 | 580 | 1,000 | 310 | 900 | 210 | 600 | 90 | 300 | 28 |
| 20 | 1,400 | 560 | 1,000 | 320 | 900 | 220 | 600 | 100 | 300 | 29 |

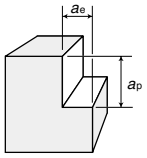
※上表はレギュラー刃及び3DCタイプの切削条件表です。ショート刃をご使用の場合回転数･送り速度を1.1倍程度を目安に調整してください。
※The table above indicates cutting parameter for regular type and 3DC type, please reduce both rotation and feed rate to 1.1 times when using short type.

【注意】本工具のPNコーティングはその性質上、通電性が微小です。従って、通電方式の工具長測定装置をご使用の際にはご注意ください。
被削材、加工形状に合わせて、適切なクーラントを使用してください。
できるだけ高剛性、高精度の機械及びチャックをご使用ください。
この標準切削条件表は切削条件の目安を示すものです。実際の加工では、加工条件、目的、使用機械等により条件を調整してください。
ビビリや異常振動が発生する場合は条件を調整してください。
座繰り加工を行う際に、送り速度を溝条件の1/5に、0.01DCのステップに設定してください。
傾斜進入加工を行う際に、進入角度を3°以下、送り速度を溝条件の70%送りに設定してください。

【Note】PN coating is less electro conductive. Therefore, electric transmitted measuring systems may not work.
Use the appropriate coolant for the work material and machining shape.
Use the high-rigidity and high accuracy machine as possible.
These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
Please adjust it if chatter or abnormal vibration occurs.
Please setup feed 1/5 that of slotting parameter and step 0.01DC for drilling application.
Please setup feed 70% of slotting parameter and ramping angle 3° for ramping application.

## 汎用 側面切削条件 General Side milling conditions

**EPSMLS** ロングシャンク Long shank
**EPSM-5DC** 首下5DCタイプ Under neck 5DC




| 外径 DC Tool dia. (mm) | 炭素鋼・合金鋼・鋳鉄 (～30HRC) Carbon steels, Alloy steels Cast irons | | 工具鋼・プリハードン鋼 (30～40HRC) Tool steels, Pre-hardened steels | | ステンレス鋼 Stainless steels | | チタン合金 Titanium alloys | | 超耐熱合金 Super heat-resistant alloys | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ap=0.5DC, ae=0.25DC | | ap=0.5DC, ae=0.25DC | | ap=0.5DC, ae=0.25DC | | ap=0.5DC, ae=0.1DC | | ap=0.5DC, ae=0.05DC | |
| | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min |
| 1 | 28,600 | 690 | 19,100 | 310 | 15,900 | 250 | 12,700 | 150 | 9,500 | 76 |
| 1.5 | 19,100 | 710 | 12,700 | 320 | 10,600 | 260 | 8,500 | 160 | 6,400 | 80 |
| 2 | 14,300 | 730 | 9,500 | 320 | 8,000 | 270 | 6,400 | 160 | 4,800 | 82 |
| 2.5 | 11,500 | 760 | 7,600 | 330 | 6,400 | 280 | 5,100 | 170 | 3,800 | 84 |
| 3 | 9,500 | 770 | 6,400 | 350 | 5,300 | 290 | 4,200 | 170 | 3,200 | 86 |
| 3.5 | 8,200 | 800 | 5,500 | 360 | 4,500 | 290 | 3,600 | 180 | 2,700 | 88 |
| 4 | 7,200 | 820 | 4,800 | 360 | 4,000 | 300 | 3,200 | 180 | 2,400 | 91 |
| 4.5 | 6,400 | 850 | 4,200 | 370 | 3,500 | 310 | 2,800 | 190 | 2,100 | 93 |
| 5 | 5,700 | 860 | 3,800 | 380 | 3,200 | 320 | 2,500 | 190 | 1,900 | 95 |
| 5.5 | 5,200 | 860 | 3,500 | 390 | 2,900 | 320 | 2,300 | 190 | 1,700 | 94 |
| 6 | 4,800 | 860 | 3,200 | 380 | 2,700 | 320 | 2,100 | 190 | 1,600 | 96 |
| 6.5 | 4,400 | 860 | 2,900 | 380 | 2,400 | 310 | 2,000 | 200 | 1,500 | 98 |
| 7 | 4,100 | 860 | 2,700 | 380 | 2,300 | 320 | 1,800 | 190 | 1,400 | 98 |
| 7.5 | 3,800 | 860 | 2,500 | 380 | 2,100 | 320 | 1,700 | 190 | 1,300 | 98 |
| 8 | 3,600 | 860 | 2,400 | 380 | 2,000 | 320 | 1,600 | 190 | 1,200 | 96 |
| 8.5 | 3,400 | 870 | 2,200 | 370 | 1,900 | 320 | 1,500 | 190 | 1,100 | 94 |
| 9 | 3,200 | 860 | 2,100 | 380 | 1,800 | 320 | 1,400 | 190 | 1,100 | 99 |
| 9.5 | 3,000 | 860 | 2,000 | 380 | 1,700 | 320 | 1,300 | 190 | 1,000 | 95 |
| 10 | 2,900 | 870 | 1,900 | 380 | 1,600 | 320 | 1,300 | 200 | 1,000 | 100 |
| 10.5 | 2,700 | 830 | 1,800 | 370 | 1,500 | 310 | 1,200 | 190 | 900 | 93 |
| 11 | 2,600 | 820 | 1,700 | 360 | 1,400 | 290 | 1,200 | 190 | 900 | 94 |
| 11.5 | 2,500 | 800 | 1,700 | 360 | 1,400 | 300 | 1,100 | 180 | 800 | 86 |
| 12 | 2,400 | 780 | 1,600 | 350 | 1,300 | 280 | 1,100 | 180 | 800 | 86 |
| 13 | 2,200 | 760 | 1,500 | 350 | 1,200 | 280 | 1,000 | 170 | 700 | 81 |
| 14 | 2,000 | 740 | 1,400 | 340 | 1,100 | 270 | 900 | 170 | 700 | 86 |
| 15 | 1,900 | 740 | 1,300 | 340 | 1,100 | 280 | 800 | 150 | 600 | 77 |
| 16 | 1,800 | 730 | 1,200 | 330 | 1,000 | 270 | 800 | 160 | 600 | 82 |
| 17 | 1,700 | 730 | 1,100 | 310 | 900 | 260 | 700 | 150 | 600 | 86 |
| 18 | 1,600 | 720 | 1,100 | 330 | 900 | 270 | 700 | 160 | 500 | 75 |
| 19 | 1,500 | 690 | 1,000 | 310 | 800 | 250 | 700 | 160 | 500 | 77 |
| 20 | 1,400 | 670 | 1,000 | 320 | 800 | 260 | 600 | 140 | 500 | 80 |

※3 上表は5DCタイプおよび5DC突出した際の切削条件表です。工具突出し量により条件を調整してください。
※3 The above table shows cutting conditions for 5DC type tools with a 5DC overhang. Adjust conditions according to the tool overhang amount.

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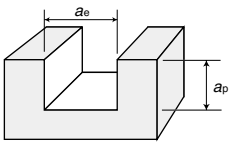
被削材、加工形状に合わせて、適切なクーラントを使用してください。
できるだけ高剛性、高精度の機械及びチャックをご使用ください。
この標準切削条件表は切削条件の目安を示すものです。実際の加工では、加工条件、目的、使用機械等により条件を調整してください。
ビビリや異常振動が発生する場合は条件を調整してください。

【Note】PN coating is less electro conductive. Therefore, electric transmitted measuring systems may not work.
Use the appropriate coolant for the work material and machining shape.
Use the high-rigidity and high accuracy machine as possible
These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
Please adjust it if chatter or abnormal vibration occurs.

## 汎用 溝切削条件 General Slotting conditions

**EPSM-5DC**
首下5DCタイプ
Under neck 5DC




| 外径 DC Tool dia. (mm) | 炭素鋼・合金鋼・鋳鉄（～30HRC） Carbon steels, Alloy steels Cast irons | | 工具鋼・プリハードン鋼（30～40HRC） Tool steels, Pre-hardened steels | | ステンレス鋼 Stainless steels | | チタン合金 Titanium alloys | | 超耐熱合金 Super heat-resistant alloys | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ap=0.5DC | | ap=0.5DC | | ap=0.5DC | | ap=0.25DC | | ap=0.25DC | |
| | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 1 | 25,500 | 320 | 15,900 | 160 | 14,300 | 110 | 9,500 | 50 | 4,800 | 14 |
| 1.5 | 17,000 | 350 | 10,600 | 170 | 9,500 | 120 | 6,400 | 50 | 3,200 | 16 |
| 2 | 12,700 | 380 | 8,000 | 190 | 7,200 | 130 | 4,800 | 60 | 2,400 | 17 |
| 2.5 | 10,200 | 410 | 6,400 | 210 | 5,700 | 140 | 3,800 | 60 | 1,900 | 19 |
| 3 | 8,500 | 450 | 5,300 | 220 | 4,800 | 150 | 3,200 | 70 | 1,600 | 20 |
| 3.5 | 7,300 | 480 | 4,500 | 240 | 4,100 | 160 | 2,700 | 70 | 1,400 | 22 |
| 4 | 6,400 | 510 | 4,000 | 260 | 3,600 | 170 | 2,400 | 80 | 1,200 | 23 |
| 4.5 | 5,700 | 550 | 3,500 | 270 | 3,200 | 180 | 2,100 | 80 | 1,100 | 25 |
| 5 | 5,100 | 570 | 3,200 | 290 | 2,900 | 200 | 1,900 | 90 | 1,000 | 27 |
| 5.5 | 4,600 | 600 | 2,900 | 300 | 2,600 | 200 | 1,700 | 90 | 900 | 28 |
| 6 | 4,200 | 630 | 2,700 | 320 | 2,400 | 220 | 1,600 | 100 | 800 | 29 |
| 6.5 | 3,900 | 630 | 2,400 | 310 | 2,200 | 210 | 1,500 | 100 | 700 | 27 |
| 7 | 3,600 | 630 | 2,300 | 320 | 2,000 | 210 | 1,400 | 100 | 700 | 29 |
| 7.5 | 3,400 | 640 | 2,100 | 320 | 1,900 | 210 | 1,300 | 100 | 600 | 27 |
| 8 | 3,200 | 640 | 2,000 | 320 | 1,800 | 220 | 1,200 | 100 | 600 | 29 |
| 8.5 | 3,000 | 640 | 1,900 | 320 | 1,700 | 220 | 1,100 | 90 | 600 | 31 |
| 9 | 2,800 | 630 | 1,800 | 320 | 1,600 | 220 | 1,100 | 100 | 500 | 27 |
| 9.5 | 2,700 | 640 | 1,700 | 320 | 1,500 | 210 | 1,000 | 100 | 500 | 29 |
| 10 | 2,500 | 630 | 1,600 | 320 | 1,400 | 210 | 1,000 | 100 | 500 | 30 |
| 10.5 | 2,400 | 620 | 1,500 | 310 | 1,400 | 220 | 900 | 90 | 500 | 31 |
| 11 | 2,300 | 600 | 1,400 | 290 | 1,300 | 200 | 900 | 90 | 400 | 25 |
| 11.5 | 2,200 | 590 | 1,400 | 300 | 1,200 | 190 | 800 | 90 | 400 | 26 |
| 12 | 2,100 | 570 | 1,300 | 280 | 1,200 | 190 | 800 | 90 | 400 | 26 |
| 13 | 2,000 | 580 | 1,200 | 280 | 1,100 | 190 | 700 | 80 | 400 | 28 |
| 14 | 1,800 | 550 | 1,100 | 270 | 1,000 | 180 | 700 | 90 | 300 | 22 |
| 15 | 1,700 | 550 | 1,100 | 280 | 1,000 | 190 | 600 | 80 | 300 | 23 |
| 16 | 1,600 | 540 | 1,000 | 270 | 900 | 180 | 600 | 80 | 300 | 24 |
| 17 | 1,500 | 540 | 900 | 260 | 800 | 170 | 600 | 90 | 300 | 26 |
| 18 | 1,400 | 520 | 900 | 270 | 800 | 180 | 500 | 70 | 300 | 27 |
| 19 | 1,300 | 500 | 800 | 250 | 800 | 180 | 500 | 80 | 300 | 28 |
| 20 | 1,300 | 520 | 800 | 260 | 700 | 170 | 500 | 80 | 200 | 19 |

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できるだけ高剛性、高精度の機械及びチャックをご使用ください。
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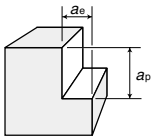
ビビリや異常振動が発生する場合は条件を調整してください。
座繰り加工を行う際に、送り速度を溝条件の1/5に、0.01DCのステップに設定してください。
傾斜進入加工を行う際に、進入角度を3°以下、送り速度を溝条件の70%送りに設定してください。

【Note】PN coating is less electro conductive. Therefore, electric transmitted measuring systems may not work.
Use the appropriate coolant for the work material and machining shape.
Use the high-rigidity and high accuracy machine as possible
These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
Please adjust it if chatter or abnormal vibration occurs.
Please setup feed 1/5 that of slotting parameter and step 0.01DC for drilling application.
Please setup feed 70% of slotting parameter and ramping angle 3° for ramping application.

## 汎用 側面切削条件
**General Side milling conditions**

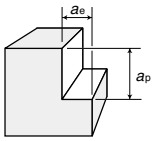
**EPSMM**
ミディアム刃長
Medium




| 外径 DC Tool dia. (mm) | 炭素鋼・合金鋼・鋳鉄 (～30HRC) Carbon steels, Alloy steels, Cast irons | | 工具鋼・プリハードン鋼 (30～40HRC) Tool steels, Pre-hardened steels | | ステンレス鋼 Stainless steels | | チタン合金 Titanium alloys | | 超耐熱合金 Super heat-resistant alloys | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ap=2.5DC, ae=0.05DC | | ap=2.5DC, ae=0.05DC | | ap=2.5DC, ae=0.05DC | | ap=2.5DC, ae=0.03DC | | ap=2.5DC, ae=0.02DC | |
| | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 3 | 7,400 | 600 | 5,300 | 290 | 4,500 | 240 | 3,000 | 120 | 2,100 | 57 |
| 4 | 5,600 | 640 | 4,000 | 300 | 3,400 | 260 | 2,200 | 120 | 1,600 | 61 |
| 5 | 4,500 | 670 | 3,200 | 320 | 2,700 | 270 | 1,800 | 130 | 1,300 | 65 |
| 6 | 3,700 | 660 | 2,600 | 310 | 2,300 | 270 | 1,500 | 130 | 1,100 | 66 |
| 7 | 3,200 | 670 | 2,200 | 310 | 2,000 | 280 | 1,300 | 130 | 900 | 63 |
| 8 | 2,800 | 670 | 2,000 | 320 | 1,700 | 270 | 1,100 | 130 | 800 | 64 |
| 9 | 2,500 | 670 | 1,700 | 310 | 1,500 | 270 | 1,000 | 130 | 700 | 63 |
| 10 | 2,200 | 660 | 1,600 | 320 | 1,400 | 280 | 900 | 130 | 600 | 60 |
| 11 | 2,000 | 630 | 1,400 | 290 | 1,200 | 250 | 800 | 120 | 600 | 63 |
| 12 | 1,800 | 580 | 1,300 | 280 | 1,100 | 240 | 750 | 120 | 500 | 54 |
| 16 | 1,400 | 570 | 1,000 | 270 | 850 | 230 | 550 | 110 | 400 | 54 |
| 20 | 1,100 | 530 | 800 | 260 | 650 | 210 | 450 | 110 | 300 | 48 |

## 汎用 側面切削条件
**General Side milling conditions**

**EPSML**
ロング刃長
Long




| 外径 DC Tool dia. (mm) | 炭素鋼・合金鋼・鋳鉄 (～30HRC) Carbon steels, Alloy steels, Cast irons | | 工具鋼・プリハードン鋼 (30～40HRC) Tool steels, Pre-hardened steels | | ステンレス鋼 Stainless steels | | チタン合金 Titanium alloys | | 超耐熱合金 Super heat-resistant alloys | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ap=3DC, ae=0.05DC | | ap=3DC, ae=0.05DC | | ap=3DC, ae=0.05DC | | ap=3DC, ae=0.02DC | | ap=3DC, ae=0.01DC | |
| | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 6 | 2,700 | 490 | 1,900 | 230 | 1,600 | 190 | 1,100 | 100 | 800 | 48 |
| 8 | 2,000 | 480 | 1,400 | 220 | 1,200 | 190 | 800 | 100 | 600 | 48 |
| 10 | 1,600 | 480 | 1,100 | 220 | 1,000 | 200 | 600 | 90 | 500 | 50 |
| 12 | 1,300 | 420 | 900 | 190 | 800 | 170 | 500 | 80 | 400 | 43 |
| 16 | 1,000 | 410 | 700 | 190 | 600 | 160 | 400 | 80 | 300 | 41 |
| 20 | 800 | 380 | 600 | 190 | 500 | 160 | 300 | 70 | 200 | 32 |

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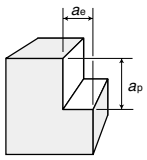
【Note】PN coating is less electro conductive. Therefore, electric transmitted measuring systems may not work.
Use the appropriate coolant for the work material and machining shape.
Use the high-rigidity and high accuracy machine as possible
These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
Please adjust it if chatter or abnormal vibration occurs.

## 汎用 側面切削条件 General Side milling conditions

**EPSF**
レギュラー刃長
Regular




| 外径 DC Tool dia. (mm) | 炭素鋼・合金鋼・鋳鉄 (～30HRC) Carbon steels, Alloy steels Cast irons | | 工具鋼・プリハードン鋼 (30～40HRC) Tool steels, Pre-hardened steels | | ステンレス鋼 Stainless steels | | チタン合金 Titanium alloys | | 超耐熱合金 Super heat-resistant alloys | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ap=1.0DC, ae=0.2DC | | ap=1.0DC, ae=0.1DC | | ap=1.0DC, ae=0.1DC | | ap=1.0DC, ae=0.05DC | | ap=1.0DC, ae=0.05DC | |
| | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| **3** | 9,000 | 850 | 6,900 | 470 | 6,400 | 430 | 5,300 | 140 | 4,200 | 85 |
| **3.5** | 7,700 | 850 | 5,900 | 460 | 5,500 | 430 | 4,500 | 140 | 3,600 | 85 |
| **4** | 6,800 | 900 | 5,200 | 490 | 4,800 | 460 | 4,000 | 150 | 3,200 | 91 |
| **4.5** | 6,000 | 900 | 4,600 | 490 | 4,200 | 450 | 3,500 | 150 | 2,800 | 90 |
| **5** | 5,400 | 950 | 4,100 | 510 | 3,800 | 480 | 3,200 | 160 | 2,500 | 94 |
| **5.5** | 4,900 | 940 | 3,800 | 520 | 3,500 | 480 | 2,900 | 160 | 2,300 | 95 |
| **6** | 4,500 | 950 | 3,400 | 510 | 3,200 | 480 | 2,700 | 160 | 2,100 | 95 |
| **7** | 3,900 | 960 | 3,000 | 530 | 2,700 | 470 | 2,300 | 160 | 1,800 | 95 |
| **8** | 3,400 | 950 | 2,600 | 520 | 2,400 | 480 | 2,000 | 160 | 1,600 | 96 |
| **9** | 3,000 | 950 | 2,300 | 520 | 2,100 | 470 | 1,800 | 160 | 1,400 | 95 |
| **10** | 2,700 | 950 | 2,100 | 530 | 1,900 | 480 | 1,600 | 160 | 1,300 | 98 |
| **11** | 2,500 | 910 | 1,900 | 500 | 1,700 | 440 | 1,400 | 150 | 1,200 | 94 |
| **12** | 2,300 | 870 | 1,700 | 460 | 1,600 | 430 | 1,300 | 140 | 1,100 | 89 |

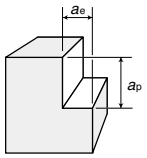
【注意】本工具のPNコーティングはその性質上、通電性が低いため、通電方式の工具長測定装置を使用の際には注意してください。
被削材、加工形状に合わせて、適切なクーラントを使用してください。
この切削条件表は切削条件の目安を示すものです。実際の加工では、加工条件、目的、使用機械等により条件を調整してください。

【Note】PN coating is less electro conductive. Therefore, electric transmitted measuring systems may not work.
Use the appropriate coolant for the work material and machining shape.
These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.

# Epoch SUS Finish / Multi
# エポックSUSフィニッシュ／マルチ

## 側面仕上げ切削条件 Side finishing conditions

| EPSF | EPSMS※2 | EPSM | EPSM-3DC | EPSM-5DC※2 |
|---|---|---|---|---|
| レギュラー刃長 Regular | ショート刃長 Short | レギュラー刃長 Regular | 首下3DCタイプ Under neck 3DC | 首下5DCタイプ Under neck 5DC |




| 外径 DC Tool dia. (mm) | 炭素鋼・合金鋼・鋳鉄（～30HRC） Carbon steels, Alloy steels Cast irons | | 工具鋼・プリハードン鋼（30～40HRC） Tool steels, Pre-hardened steels | | ステンレス鋼 Stainless steels | | チタン合金 Titanium alloys | | 超耐熱合金 Super heat-resistant alloys | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ap=1DC, ae=0.001～0.02DC | | ap=1DC, ae=0.001～0.02DC | | ap=1DC, ae=0.001～0.02DC | | ap=1DC, ae=0.001～0.02DC | | ap=1DC, ae=0.001～0.02DC | |
| | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 1 | 45,500 | 980 | 35,000 | 500 | 31,500 | 450 | 21,000 | 230 | 17,500 | 130 |
| 1.5 | 30,300 | 1,010 | 23,300 | 520 | 21,000 | 460 | 14,000 | 230 | 11,700 | 130 |
| 2 | 22,800 | 1,050 | 17,500 | 540 | 15,800 | 480 | 10,500 | 240 | 8,800 | 130 |
| 2.5 | 18,200 | 1,070 | 14,000 | 550 | 12,600 | 490 | 8,400 | 250 | 7,000 | 140 |
| 3 | 15,200 | 1,110 | 11,700 | 570 | 10,500 | 510 | 7,000 | 260 | 5,800 | 140 |
| 3.5 | 13,000 | 1,130 | 10,000 | 580 | 9,000 | 520 | 6,000 | 260 | 5,000 | 140 |
| 4 | 11,400 | 1,170 | 8,800 | 600 | 7,900 | 540 | 5,300 | 270 | 4,400 | 150 |
| 4.5 | 10,100 | 1,190 | 7,800 | 610 | 7,000 | 550 | 4,700 | 280 | 3,900 | 150 |
| 5 | 9,100 | 1,230 | 7,000 | 630 | 6,300 | 570 | 4,200 | 280 | 3,500 | 160 |
| 5.5 | 8,300 | 1,230 | 6,400 | 630 | 5,700 | 560 | 3,800 | 280 | 3,200 | 160 |
| 6 | 7,600 | 1,230 | 5,800 | 630 | 5,300 | 570 | 3,500 | 280 | 2,900 | 160 |
| 6.5 | 7,000 | 1,230 | 5,400 | 630 | 4,800 | 560 | 3,200 | 280 | 2,700 | 160 |
| 7 | 6,500 | 1,230 | 5,000 | 630 | 4,500 | 570 | 3,000 | 280 | 2,500 | 160 |
| 7.5 | 6,100 | 1,240 | 4,700 | 630 | 4,200 | 570 | 2,800 | 280 | 2,300 | 160 |
| 8 | 5,700 | 1,230 | 4,400 | 630 | 3,900 | 560 | 2,600 | 280 | 2,200 | 160 |
| 8.5 | 5,400 | 1,240 | 4,100 | 630 | 3,700 | 570 | 2,500 | 290 | 2,100 | 160 |
| 9 | 5,100 | 1,240 | 3,900 | 630 | 3,500 | 570 | 2,300 | 280 | 1,900 | 150 |
| 9.5 | 4,800 | 1,230 | 3,700 | 630 | 3,300 | 560 | 2,200 | 280 | 1,800 | 150 |
| 10 | 4,600 | 1,240 | 3,500 | 630 | 3,200 | 580 | 2,100 | 280 | 1,800 | 160 |
| 10.5 | 4,300 | 1,180 | 3,300 | 600 | 3,000 | 550 | 2,000 | 270 | 1,700 | 160 |
| 11 | 4,100 | 1,160 | 3,200 | 600 | 2,900 | 550 | 1,900 | 270 | 1,600 | 150 |
| 11.5 | 4,000 | 1,140 | 3,000 | 570 | 2,700 | 510 | 1,800 | 260 | 1,500 | 140 |
| 12 | 3,800 | 1,110 | 2,900 | 560 | 2,600 | 510 | 1,800 | 260 | 1,500 | 150 |
| 13 | 3,500 | 1,080 | 2,700 | 560 | 2,400 | 490 | 1,600 | 250 | 1,300 | 130 |
| 14 | 3,300 | 1,090 | 2,500 | 550 | 2,300 | 500 | 1,500 | 250 | 1,300 | 140 |
| 15 | 3,000 | 1,040 | 2,300 | 530 | 2,100 | 490 | 1,400 | 240 | 1,200 | 140 |
| 16 | 2,800 | 1,030 | 2,200 | 540 | 2,000 | 490 | 1,300 | 240 | 1,100 | 130 |
| 17 | 2,700 | 1,030 | 2,100 | 530 | 1,900 | 480 | 1,200 | 230 | 1,000 | 130 |
| 18 | 2,500 | 1,000 | 1,900 | 500 | 1,800 | 480 | 1,200 | 240 | 1,000 | 130 |
| 19 | 2,400 | 1,000 | 1,800 | 500 | 1,700 | 470 | 1,100 | 230 | 900 | 120 |
| 20 | 2,300 | 990 | 1,800 | 520 | 1,600 | 460 | 1,100 | 240 | 900 | 130 |

※2 上表はレギュラー刃及び3DCタイプの切削条件表です。ショート刃をご使用の場合回転数・送り速度を1.1倍程度を目安に調整してください。
5DCタイプをご使用の場合は回転数・送り速度を70%を目安に調整してください。

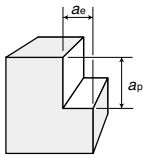
※2 The table above indicates cutting parameter for regular type and 3DC type, please reduce both rotation and feed rate to 1.1 times when using short type, please reduce both rotation and feed rate to 70% when using 5DC type

【注意】本工具のPNコーティングはその性質上、通電性が微小です。従って、通電方式の工具長測定装置をご使用の際にはご注意ください。
被削材、加工形状に合わせて、適切なクーラントを使用してください。
できるだけ高剛性、高精度の機械及びチャックをご使用ください。
この標準切削条件表は切削条件の目安を示すものです。実際の加工では、加工条件、目的、使用機械等により条件を調整してください。
ビビリや異常振動が発生する場合は条件を調整してください。

【Note】PN coating is less electro conductive. Therefore, electric transmitted measuring systems may not work.
Use the appropriate coolant for the work material and machining shape.
Use the high-rigidity and high accuracy machine as possible.
These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
Please adjust it if chatter or abnormal vibration occurs.

## 側面仕上げ切削条件 Side finishing conditions

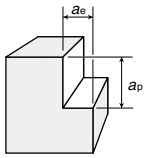
**EPSFM**
ミディアム刃長
Medium




| 外径 DC Tool dia. (mm) | 炭素鋼・合金鋼・鋳鉄 (～30HRC) Carbon steels, Alloy steels Cast irons | | 工具鋼・プリハードン鋼 (30～40HRC) Tool steels, Pre-hardened steels | | ステンレス鋼 Stainless steels | | チタン合金 Titanium alloys | | 超耐熱合金 Super heat-resistant alloys | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ap=2.5DC, ae=0.001DC～0.01DC | | ap=2.5DC, ae=0.001DC～0.01DC | | ap=2.5DC, ae=0.001DC～0.01DC | | ap=2.5DC, ae=0.001DC～0.01DC | | ap=2.5DC, ae=0.001DC～0.01DC | |
| | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| **3** | 7,070 | 480 | 4,060 | 250 | 4,830 | 290 | 4,830 | 180 | 2,940 | 71 |
| **4** | 5,320 | 510 | 3,080 | 260 | 3,640 | 310 | 3,640 | 190 | 2,240 | 77 |
| **5** | 4,200 | 530 | 2,450 | 280 | 2,870 | 320 | 2,870 | 190 | 1,750 | 79 |
| **6** | 3,500 | 530 | 2,030 | 270 | 2,380 | 320 | 2,380 | 190 | 1,470 | 79 |
| **7** | 3,010 | 530 | 1,750 | 280 | 2,100 | 330 | 2,100 | 200 | 1,260 | 79 |
| **8** | 2,660 | 530 | 1,540 | 280 | 1,820 | 330 | 1,820 | 200 | 1,120 | 81 |
| **9** | 2,380 | 540 | 1,330 | 270 | 1,610 | 330 | 1,610 | 200 | 980 | 79 |
| **10** | 2,100 | 530 | 1,260 | 280 | 1,470 | 330 | 1,470 | 200 | 910 | 82 |
| **11** | 1,890 | 490 | 1,120 | 260 | 1,330 | 310 | 1,330 | 190 | 840 | 79 |
| **12** | 1,750 | 470 | 1,050 | 260 | 1,190 | 290 | 1,190 | 170 | 770 | 75 |

## 側面仕上げ切削条件 Side finishing conditions

**EPSFL**
ロング刃長
Long




| 外径 DC Tool dia. (mm) | 炭素鋼・合金鋼・鋳鉄 (～30HRC) Carbon steels, Alloy steels Cast irons | | 工具鋼・プリハードン鋼 (30～40HRC) Tool steels, Pre-hardened steels | | ステンレス鋼 Stainless steels | | チタン合金 Titanium alloys | | 超耐熱合金 Super heat-resistant alloys | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ap=3DC, ae=0.001DC～0.01DC | | ap=3DC, ae=0.001DC～0.01DC | | ap=3DC, ae=0.001DC～0.01DC | | ap=3DC, ae=0.001DC～0.01DC | | ap=3DC, ae=0.001DC～0.01DC | |
| | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| **3** | 5,050 | 340 | 2,900 | 180 | 3,450 | 210 | 3,450 | 130 | 2,100 | 51 |
| **4** | 3,800 | 360 | 2,200 | 190 | 2,600 | 220 | 2,600 | 130 | 1,600 | 55 |
| **5** | 3,000 | 380 | 1,750 | 200 | 2,050 | 230 | 2,050 | 140 | 1,250 | 56 |
| **6** | 2,500 | 380 | 1,450 | 200 | 1,700 | 230 | 1,700 | 140 | 1,050 | 57 |
| **7** | 2,150 | 380 | 1,250 | 200 | 1,500 | 240 | 1,500 | 140 | 900 | 57 |
| **8** | 1,900 | 380 | 1,100 | 200 | 1,300 | 230 | 1,300 | 140 | 800 | 58 |
| **9** | 1,700 | 380 | 950 | 190 | 1,150 | 230 | 1,150 | 140 | 700 | 57 |
| **10** | 1,500 | 380 | 900 | 200 | 1,050 | 240 | 1,050 | 140 | 650 | 59 |
| **11** | 1,350 | 350 | 800 | 190 | 950 | 220 | 950 | 130 | 600 | 56 |
| **12** | 1,250 | 340 | 750 | 180 | 850 | 210 | 850 | 120 | 550 | 53 |

【注意】本工具のPNコーティングはその性質上、通電性が低いため、通電方式の工具長測定装置を使用の際には注意してください。
被削材、加工形状に合わせて、適切なクーラントを使用してください。
この切削条件表は切削条件の目安を示すものです。実際の加工では、加工条件、目的、使用機械等により条件を調整してください。

【Note】PN coating is less electro conductive. Therefore, electric transmitted measuring systems may not work.
Use the appropriate coolant for the work material and machining shape.
These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.

# Epoch TH Power Mill
# エポックTHパワーミル

高硬度材加工用。
切りくず排出性抜群で高能率が可能。
For machining of high-hardness materials. Excellent chip removal performance enables high efficiency.

ラジアスはA247頁を参照してください
Please refer to page A247 for Radius

## ショート刃長 Short

平面 Planing / 側面 Side Cutting / 溝 Slotting / 荒 Roughing / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance
φ3～φ6 : 0～−0.015
φ6.5～φ20 : 0～−0.02
h6
(mm)

### EPPS4○○○-TH

超硬 Carbide / TH / ねじれ43° Helix angle / 切削条件表 A329 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| EPPS4030-TH | ● | 3 | 4.5 | 60 | 6 | 10,420 |
| EPPS4035-TH | ● | 3.5 | 5.3 | 60 | 6 | 10,940 |
| EPPS4040-TH | ● | 4 | 6 | 60 | 6 | 10,940 |
| EPPS4045-TH | ● | 4.5 | 6.8 | 60 | 6 | 12,240 |
| EPPS4050-TH | ● | 5 | 7.5 | 60 | 6 | 12,240 |
| EPPS4055-TH | ● | 5.5 | 8.3 | 60 | 6 | 13,140 |
| EPPS4060-TH | ● | 6 | 9 | 60 | 6 | 13,140 |
| EPPS4065-TH | ● | 6.5 | 9.8 | 70 | 8 | 17,520 |
| EPPS4070-TH | ● | 7 | 10.5 | 70 | 8 | 17,520 |
| EPPS4075-TH | ● | 7.5 | 11.3 | 75 | 8 | 19,530 |
| EPPS4080-TH | ● | 8 | 12 | 75 | 8 | 16,160 |
| EPPS4085-TH | ● | 8.5 | 12.8 | 80 | 10 | 22,440 |
| EPPS4090-TH | ● | 9 | 13.5 | 80 | 10 | 22,440 |
| EPPS4095-TH | ● | 9.5 | 14.3 | 80 | 10 | 25,810 |
| EPPS4100-TH | ● | 10 | 15 | 80 | 10 | 21,770 |
| EPPS4120-TH | ● | 12 | 18 | 100 | 12 | 27,490 |
| EPPS4160-TH | ● | 16 | 24 | 110 | 16 | 63,230 |
| EPPS4200-TH | ● | 20 | 30 | 125 | 20 | 92,330 |

## レギュラー刃長 Regular

平面 Planing / 側面 Side Cutting / 溝 Slotting / 荒 Roughing / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance
φ3～φ6 : 0～−0.015
φ7～φ20 : 0～−0.02
h6
(mm)

### EPP4○○○-TH

超硬 Carbide / TH / ねじれ43° Helix angle / 切削条件表 A330 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| EPP4030-TH | ● | 3 | 8 | 60 | 6 | 10,940 |
| EPP4040-TH | ● | 4 | 11 | 60 | 6 | 11,470 |
| EPP4050-TH | ● | 5 | 13 | 60 | 6 | 12,800 |
| EPP4060-TH | ● | 6 | 13 | 60 | 6 | 14,030 |
| EPP4070-TH | ● | 7 | 16 | 70 | 8 | 18,410 |
| EPP4080-TH | ● | 8 | 19 | 75 | 8 | 17,180 |
| EPP4090-TH | ● | 9 | 19 | 80 | 10 | 23,570 |
| EPP4100-TH | ● | 10 | 22 | 80 | 10 | 23,130 |
| EPP4110-TH | ● | 11 | 22 | 100 | 12 | 31,200 |
| EPP4120-TH | ● | 12 | 26 | 100 | 12 | 28,960 |
| EPP4130-TH | ● | 13 | 26 | 100 | 12 | 34,380 |
| EPP4140-TH | ● | 14 | 26 | 110 | 16 | 52,440 |
| EPP4150-TH | ● | 15 | 26 | 110 | 16 | 55,720 |
| EPP4160-TH | ● | 16 | 32 | 110 | 16 | 66,640 |
| EPP4170-TH | ● | 17 | 32 | 110 | 16 | 90,680 |
| EPP4180-TH | ● | 18 | 32 | 125 | 20 | 88,220 |
| EPP4190-TH | ● | 19 | 32 | 125 | 20 | 109,810 |
| EPP4200-TH | ● | 20 | 38 | 125 | 20 | 97,250 |

## ミディアム刃長 Medium

側面 Side Cutting / 荒 Roughing / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance
φ3～φ6 : 0～−0.015
φ8～φ20 : 0～−0.02
h6
(mm)

### EPPM4○○○-TH

超硬 Carbide / TH / ねじれ43° Helix angle / 切削条件表 A331 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| EPPM4030-TH | ● | 3 | 15 | 60 | 6 | 13,080 |
| EPPM4040-TH | ● | 4 | 17 | 60 | 6 | 13,930 |
| EPPM4050-TH | ● | 5 | 20 | 60 | 6 | 15,490 |
| EPPM4060-TH | ● | 6 | 20 | 60 | 6 | 16,960 |
| EPPM4080-TH | ● | 8 | 25 | 75 | 8 | 20,760 |
| EPPM4100-TH | ● | 10 | 33 | 80 | 10 | 27,830 |
| EPPM4120-TH | ● | 12 | 37 | 100 | 12 | 35,020 |
| EPPM4160-TH | ● | 16 | 47 | 110 | 16 | 79,770 |
| EPPM4200-TH | ● | 20 | 55 | 125 | 20 | 116,600 |

## ロング刃長 Long

側面 Side Cutting / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance
φ6 : 0～−0.015
φ8～φ20 : 0～−0.02
h6
(mm)

### EPPL4○○○-TH

超硬 Carbide / TH / ねじれ43° Helix angle / 切削条件表 A331 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| EPPL4060-TH | ● | 6 | 25 | 70 | 6 | 24,920 |
| EPPL4080-TH | ● | 8 | 35 | 90 | 8 | 31,310 |
| EPPL4100-TH | ● | 10 | 45 | 100 | 10 | 42,080 |
| EPPL4120-TH | ● | 12 | 55 | 120 | 12 | 51,620 |
| EPPL4160-TH | ● | 16 | 65 | 135 | 16 | 120,820 |
| EPPL4200-TH | ● | 20 | 75 | 155 | 20 | 175,950 |

## EPPS-TH、EPP-TH、EPPM-TH、EPPL-THの対応被削材

Applicable work material of EPPS-TH, EPP-TH, EPPM-TH, EPPL-TH

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ |

## 再研磨対応外径範囲

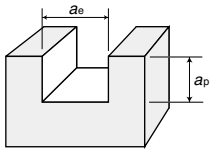
Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPPS-TH, EPP-TH, EPPM-TH | 6～20 | 3～20 |
| EPPL-TH | 6～20 | 6～20 |

●：標準在庫品です。●：Stocked items.

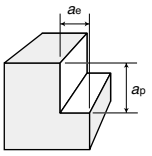
# 標準切削条件表 Recommended cutting conditions

## EPPS4-TH
ショート刃長
Short




## ＜溝切削＞ Slotting

| 被削材 Work material | 合金鋼 Alloy steels (200～250HB) SKD61,SKD11 | | | | 合金鋼 Alloy steels (25～35HRC) SCM440 | | | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80 | | | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61,SKT4 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 条件域 Cutting range | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | |
| 切込み Depth of cut (mm) | ap≦0.5DC ae=1DC | | ap≦1DC ae=1DC | | ap≦0.2DC ae=1DC | | ap≦0.5DC ae=1DC | | ap≦0.2DC ae=1DC | | ap≦0.5DC ae=1DC | | | | ap≦0.2DC ae=1DC | |
| 外径DC Tool dia. (mm) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) |
| φ3 | 15,900 | 1,260 | 11,100 | 900 | 9,600 | 570 | 7,950 | 480 | 9,280 | 550 | 7,690 | 460 | | | 3,990 | 200 |
| φ4 | 11,940 | 1,440 | 8,250 | 1,005 | 7,200 | 720 | 6,000 | 600 | 6,960 | 700 | 5,800 | 580 | | | 3,000 | 240 |
| φ5 | 9,540 | 1,530 | 6,840 | 1,050 | 5,700 | 810 | 4,800 | 690 | 5,510 | 780 | 4,640 | 670 | | | 2,430 | 300 |
| φ6 | 7,980 | 1,590 | 5,760 | 1,110 | 4,800 | 750 | 3,900 | 630 | 4,640 | 730 | 3,770 | 610 | | | 1,950 | 330 |
| φ8 | 5,940 | 1,650 | 4,320 | 1,170 | 3,600 | 720 | 3,000 | 600 | 3,480 | 700 | 2,900 | 580 | | | 1,500 | 300 |
| φ10 | 4,800 | 1,530 | 3,420 | 1,050 | 2,850 | 690 | 2,400 | 570 | 2,760 | 670 | 2,320 | 550 | | | 1,200 | 270 |
| φ12 | 3,750 | 1,410 | 2,850 | 990 | 2,400 | 660 | 1,950 | 540 | 2,320 | 640 | 1,890 | 520 | | | 1,020 | 240 |
| φ16 | 3,000 | 1,200 | 2,100 | 840 | 1,800 | 600 | 1,500 | 510 | 1,740 | 580 | 1,450 | 490 | | | 750 | 210 |
| φ20 | 2,340 | 1,140 | 1,650 | 780 | 1,500 | 570 | 1,200 | 480 | 1,450 | 550 | 1,160 | 460 | | | 600 | 180 |



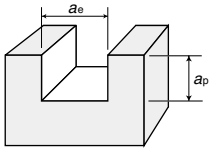

## ＜側面切削＞ Side milling

| 被削材 Work material | 合金鋼 Alloy steels (200～250HB) SKD61,SKD11 | | | | 合金鋼 Alloy steels (25～35HRC) SCM440 | | | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80 | | | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61,SKT4 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 条件域 Cutting range | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | |
| 切込み Depth of cut (mm) | ap=1.5DC ae=0.1DC | | ap=1.5DC ae=0.1DC | | ap=1.5DC ae=0.1DC | | ap=1.5DC ae=0.1DC | | ap=1.5DC ae=0.1DC | | ap=1.5DC ae=0.1DC | | ap=1.5DC ae=0.05DC | | ap=1.5DC ae=0.05DC | |
| 外径DC Tool dia. (mm) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) |
| φ3 | 19,100 | 1,530 | 15,900 | 1,280 | 17,400 | 960 | 12,500 | 780 | 15,900 | 900 | 10,400 | 650 | 12,700 | 600 | 9,560 | 440 |
| φ4 | 14,300 | 1,730 | 11,900 | 1,440 | 13,000 | 1,200 | 9,600 | 960 | 12,000 | 1,140 | 7,920 | 740 | 9,560 | 810 | 7,160 | 570 |
| φ5 | 11,500 | 1,830 | 9,600 | 1,530 | 10,400 | 1,350 | 7,500 | 1,050 | 9,560 | 1,280 | 6,300 | 780 | 7,640 | 920 | 5,730 | 690 |
| φ6 | 9,560 | 1,910 | 7,970 | 1,590 | 8,700 | 1,280 | 6,600 | 1,020 | 7,970 | 1,190 | 5,220 | 800 | 6,360 | 890 | 4,770 | 680 |
| φ8 | 7,160 | 2,010 | 5,970 | 1,650 | 6,480 | 1,200 | 4,950 | 960 | 5,970 | 1,140 | 3,960 | 870 | 4,770 | 860 | 3,590 | 650 |
| φ10 | 5,730 | 1,830 | 4,770 | 1,530 | 5,220 | 1,140 | 3,900 | 900 | 4,770 | 1,050 | 3,240 | 800 | 3,830 | 840 | 2,870 | 630 |
| φ12 | 4,770 | 1,710 | 3,750 | 1,440 | 4,320 | 1,110 | 3,300 | 870 | 3,750 | 1,020 | 2,700 | 720 | 3,180 | 770 | 2,390 | 570 |
| φ16 | 3,590 | 1,440 | 2,930 | 1,260 | 3,240 | 1,020 | 2,550 | 810 | 2,930 | 930 | 1,980 | 620 | 2,390 | 680 | 1,790 | 510 |
| φ20 | 2,870 | 1,380 | 2,400 | 1,140 | 2,520 | 960 | 1,950 | 750 | 2,400 | 870 | 1,620 | 600 | 1,910 | 620 | 1,500 | 470 |

【注意】 ①できるだけ高剛性、高精度の機械をご使用ください。
②被削材、加工形状に合わせて、適切なクーラントを使用してください。
③この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。

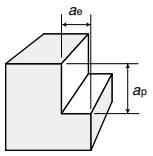
【Note】 ① Use a highly rigid and accurate machine as possible.
② Use the appropriate coolant for the work material and machining shape.
③ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

## EPP4-TH
レギュラー刃長
Regular




### ＜溝切削＞ Slotting

| 被削材 Work material | 合金鋼 Alloy steels (200～250HB) SKD61,SKD11 | | | | 合金鋼 Alloy steels (25～35HRC) SCM440 | | | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80 | | | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61,SKT4 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 条件域 Cutting range | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | |
| 切込み Depth of cut (mm) | ap≦0.5DC ae=1DC | | ap≦1DC ae=1DC | | | | ap≦0.5DC ae=1DC | | | | ap≦0.5DC ae=1DC | | | | ap≦0.2DC ae=1DC | |
| 外径DC Tool dia. (mm) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| φ3 | 8,500 | 820 | 6,400 | 490 | | | 6,400 | 440 | | | 5,800 | 360 | | | 5,300 | 240 |
| φ4 | 6,400 | 920 | 4,800 | 550 | | | 4,800 | 500 | | | 4,400 | 410 | | | 4,000 | 280 |
| φ5 | 5,100 | 980 | 3,800 | 580 | | | 3,800 | 530 | | | 3,500 | 430 | | | 3,200 | 290 |
| φ6 | 4,200 | 1,010 | 3,200 | 610 | | | 3,200 | 550 | | | 2,900 | 450 | | | 2,700 | 310 |
| φ8 | 3,200 | 1,090 | 2,400 | 650 | | | 2,400 | 590 | | | 2,200 | 480 | | | 2,000 | 330 |
| φ10 | 2,500 | 950 | 1,900 | 580 | | | 1,900 | 520 | | | 1,800 | 440 | | | 1,600 | 290 |
| φ12 | 2,100 | 880 | 1,600 | 540 | | | 1,600 | 480 | | | 1,500 | 400 | | | 1,300 | 260 |
| φ16 | 1,600 | 770 | 1,200 | 460 | | | 1,200 | 410 | | | 1,100 | 340 | | | 1,000 | 230 |
| φ20 | 1,300 | 750 | 1,000 | 460 | | | 1,000 | 420 | | | 900 | 330 | | | 800 | 200 |




### ＜側面切削＞ Side milling

| 被削材 Work material | 合金鋼 Alloy steels (200～250HB) SKD61,SKD11 | | | | 合金鋼 Alloy steels (25～35HRC) SCM440 | | | | プリハードン鋼 Pre-hardened steels (35～45HRC) CENA1,NAK80 | | | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61,SKT4 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 条件域 Cutting range | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | |
| 切込み Depth of cut (mm) | ap=1.5DC ae=0.1DC | | ap=1.5DC ae=0.15DC | | ap=1.5DC ae=0.05DC | | ap=1.5DC ae=0.1DC | | ap=1.5DC ae=0.05DC | | ap=1.5DC ae=0.07DC | | ap=1.5DC ae=0.02DC | | ap=1.5DC ae=0.05DC | |
| 外径DC Tool dia. (mm) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| φ3 | 16,000 | 1,800 | 9,600 | 860 | 14,000 | 1,400 | 9,600 | 770 | 12,000 | 1,100 | 8,500 | 610 | 11,000 | 860 | 7,400 | 460 |
| φ4 | 12,000 | 1,900 | 7,200 | 920 | 10,000 | 1,400 | 7,200 | 830 | 8,800 | 1,100 | 6,400 | 660 | 8,000 | 900 | 5,600 | 500 |
| φ5 | 9,600 | 2,100 | 5,700 | 1,000 | 8,300 | 1,600 | 5,700 | 900 | 7,000 | 1,200 | 5,100 | 720 | 6,400 | 990 | 4,500 | 550 |
| φ6 | 8,000 | 2,200 | 4,800 | 1,080 | 6,900 | 1,700 | 4,800 | 970 | 5,800 | 1,300 | 4,200 | 750 | 5,300 | 1,040 | 3,700 | 580 |
| φ8 | 6,000 | 2,400 | 3,600 | 1,150 | 5,200 | 1,900 | 3,600 | 1,040 | 4,400 | 1,400 | 3,200 | 820 | 4,000 | 1,120 | 2,800 | 630 |
| φ10 | 4,800 | 2,200 | 2,900 | 1,070 | 4,100 | 1,700 | 2,900 | 960 | 3,500 | 1,300 | 2,500 | 740 | 3,200 | 1,030 | 2,200 | 570 |
| φ12 | 4,000 | 2,100 | 2,400 | 1,000 | 3,500 | 1,600 | 2,400 | 900 | 2,900 | 1,200 | 2,100 | 700 | 2,700 | 980 | 1,900 | 550 |
| φ16 | 3,000 | 1,700 | 1,800 | 810 | 2,600 | 1,300 | 1,800 | 730 | 2,200 | 1,000 | 1,600 | 570 | 2,000 | 780 | 1,400 | 440 |
| φ20 | 2,400 | 1,400 | 1,400 | 670 | 2,100 | 1,100 | 1,400 | 600 | 1,800 | 860 | 1,300 | 500 | 1,590 | 670 | 1,110 | 370 |

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②被削材、加工形状に合わせて、適切なクーラントを使用してください。
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④機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。

【Note】 ① Use a highly rigid and accurate machine as possible.
② Use the appropriate coolant for the work material and machining shape.
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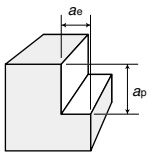
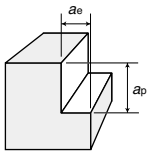
## EPPM4-TH
ミディアム刃長
Medium




### ＜側面切削＞ Side milling

| 被削材 Work material | 合金鋼 Alloy steels (200～250HB) SKD61,SKD11 | | 合金鋼 Alloy steels (25～35HRC) SCM440 | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61,SKT4 | |
|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | $a_p$=2.5DC $a_e$=0.02DC | | $a_p$=2.5DC $a_e$=0.02DC | | $a_p$=2.5DC $a_e$=0.02DC | | $a_p$=2.5DC $a_e$=0.01DC | |
| 外径DC Tool dia. (mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $Vf$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 送り速度 $Vf$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 送り速度 $Vf$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 送り速度 $Vf$ (mm/min) |
| **φ3** | 8,730 | 730 | 7,920 | 590 | 6,210 | 370 | 3,500 | 170 |
| **φ4** | 6,480 | 760 | 5,940 | 620 | 4,680 | 390 | 2,950 | 240 |
| **φ5** | 5,220 | 850 | 4,770 | 690 | 3,690 | 420 | 2,300 | 300 |
| **φ6** | 4,320 | 880 | 3,960 | 720 | 3,060 | 440 | 1,600 | 310 |
| **φ8** | 3,240 | 960 | 2,970 | 790 | 2,340 | 490 | 1,450 | 300 |
| **φ10** | 2,610 | 890 | 2,340 | 710 | 1,890 | 450 | 1,200 | 300 |
| **φ12** | 2,160 | 840 | 1,980 | 690 | 1,530 | 420 | 900 | 270 |
| **φ16** | 1,620 | 680 | 1,530 | 580 | 1,170 | 350 | 750 | 200 |
| **φ20** | 1,260 | 540 | 1,170 | 450 | 900 | 270 | 600 | 180 |

## EPPL4-TH
ロング刃長
Long




### ＜側面切削＞ Side milling

| 被削材 Work material | 合金鋼 Alloy steels (200～250HB) SKD61,SKD11 | | 合金鋼 Alloy steels (25～35HRC) SCM440 | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61,SKT4 | |
|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | $a_p$=3DC $a_e$=0.02DC | | $a_p$=3DC $a_e$=0.02DC | | $a_p$=3DC $a_e$=0.02DC | | $a_p$=3DC $a_e$=0.01DC | |
| 外径DC Tool dia. (mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $Vf$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 送り速度 $Vf$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 送り速度 $Vf$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 送り速度 $Vf$ (mm/min) |
| **φ6** | 3,840 | 740 | 2,940 | 530 | 2,400 | 380 | 1,590 | 230 |
| **φ8** | 2,880 | 700 | 2,200 | 500 | 1,800 | 350 | 1,200 | 220 |
| **φ10** | 2,280 | 690 | 1,750 | 480 | 1,400 | 330 | 960 | 210 |
| **φ12** | 1,920 | 640 | 1,500 | 450 | 1,200 | 320 | 800 | 200 |
| **φ16** | 1,440 | 550 | 1,100 | 420 | 900 | 300 | 600 | 170 |
| **φ20** | 1,200 | 500 | 900 | 380 | 700 | 250 | 500 | 150 |

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② Use the appropriate coolant for the work material and machining shape.
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# Epoch CS Power Mill
# エポックCSパワーミル

切りくず排出性抜群のパワーミルにCSコーティングで長寿命。
Power mill with excellent chip removal plus CS Coating for long life.

## レギュラー刃長 Regular

平面 Planing / 側面 Side Cutting / 溝 Slotting / 荒 Roughing / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance
φ3～φ6 : 0～−0.015
φ8～φ20 : 0～−0.02
h6
(mm)

超硬 Carbide / CS / なじれ角 43° Helix angle / 切削条件表 A333 Cutting Conditions

### EPP4○○○-CS

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| EPP4030-CS | ● | 3 | 8 | 60 | 6 | 10,940 |
| EPP4040-CS | ● | 4 | 11 | 60 | 6 | 11,470 |
| EPP4050-CS | ● | 5 | 13 | 60 | 6 | 12,800 |
| EPP4060-CS | ● | 6 | 13 | 60 | 6 | 14,030 |
| EPP4080-CS | ● | 8 | 19 | 75 | 8 | 17,180 |

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| EPP4100-CS | ● | 10 | 22 | 80 | 10 | 23,130 |
| EPP4120-CS | ● | 12 | 26 | 100 | 12 | 28,960 |
| EPP4160-CS | ● | 16 | 32 | 110 | 16 | 66,640 |
| EPP4200-CS | ● | 20 | 38 | 125 | 20 | 97,250 |

## ピンカド®・ショート刃長 PINKADO Short

平面 Planing / 側面 Side Cutting / 溝 Slotting / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance
φ1～φ6 : 0～−0.015
φ7～φ12 : 0～−0.02
h6
(mm)

超硬 Carbide / CS / なじれ角 43° Helix angle / 切削条件表 A335 Cutting Conditions

### EPPS4○○○-P-CS

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| EPPS4010-P-CS | ● | 1 | 1.5 | 50 | 6 | 11,470 |
| EPPS4015-P-CS | ● | 1.5 | 2.3 | 50 | 6 | 11,470 |
| EPPS4020-P-CS | ● | 2 | 3 | 50 | 6 | 10,940 |
| EPPS4025-P-CS | ● | 2.5 | 3.8 | 50 | 6 | 10,640 |
| EPPS4030-P-CS | ● | 3 | 4.5 | 50 | 6 | 10,420 |
| EPPS4035-P-CS | ● | 3.5 | 5.3 | 50 | 6 | 10,940 |
| EPPS4040-P-CS | ● | 4 | 6 | 50 | 6 | 10,940 |
| EPPS4045-P-CS | ● | 4.5 | 6.8 | 50 | 6 | 12,240 |
| EPPS4050-P-CS | ● | 5 | 7.5 | 50 | 6 | 12,240 |
| EPPS4060-P-CS | ● | 6 | 9 | 50 | 6 | 13,140 |
| EPPS4070-P-CS | ● | 7 | 10.5 | 60 | 8 | 17,520 |
| EPPS4080-P-CS | ● | 8 | 12 | 60 | 8 | 16,270 |
| EPPS4090-P-CS | ● | 9 | 13.5 | 65 | 10 | 22,440 |
| EPPS4100-P-CS | ● | 10 | 15 | 70 | 10 | 21,770 |
| EPPS4110-P-CS | ● | 11 | 16.5 | 75 | 12 | 24,130 |
| EPPS4120-P-CS | ● | 12 | 18 | 75 | 12 | 27,490 |

## ピンカド®・レギュラー刃長 PINKADO Regular

平面 Planing / 側面 Side Cutting / 溝 Slotting / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance
φ1～φ6 : 0～−0.015
φ8～φ20 : 0～−0.02
h6
(mm)

超硬 Carbide / CS / なじれ角 43° Helix angle / 切削条件表 A335 Cutting Conditions

### EPP4○○○-P-CS

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| EPP4010-P-CS | ● | 1 | 2.5 | 60 | 6 | 12,010 |
| EPP4015-P-CS | ● | 1.5 | 4 | 60 | 6 | 12,010 |
| EPP4020-P-CS | ● | 2 | 6 | 60 | 6 | 11,580 |
| EPP4025-P-CS | ● | 2.5 | 8 | 60 | 6 | 11,250 |
| EPP4030-P-CS | ● | 3 | 8 | 60 | 6 | 10,940 |
| EPP4040-P-CS | ● | 4 | 11 | 60 | 6 | 11,470 |
| EPP4050-P-CS | ● | 5 | 13 | 60 | 6 | 12,800 |
| EPP4060-P-CS | ● | 6 | 13 | 60 | 6 | 14,030 |
| EPP4080-P-CS | ● | 8 | 19 | 75 | 8 | 17,180 |
| EPP4100-P-CS | ● | 10 | 22 | 80 | 10 | 23,130 |
| EPP4120-P-CS | ● | 12 | 26 | 100 | 12 | 28,960 |
| EPP4160-P-CS | ● | 16 | 32 | 110 | 16 | 66,640 |
| EPP4200-P-CS | ● | 20 | 38 | 125 | 20 | 97,250 |

## EPP4-CS、EPPS4-P-CS、EPP4-P-CSの対応被削材

Applicable work material of EPP4-CS, EPPS4-P-CS, EPP4-P-CS

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ○ | | ◎ | ◎ | ◎ | ◎ |

●印：標準在庫品です。　● : Stocked items.

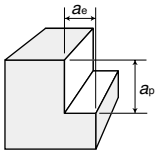
## 再研磨対応外径範囲

Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPP4-CS | 6～20 | 3～20 |
| EPPS4-P-CS | 6～12 | 2～12 |
| EPP4-P-CS | 6～20 | 2～20 |

# 標準切削条件表 Recommended cutting conditions

## EPP4-CS
レギュラー刃長
Regular




## ＜側面切削＞ Side milling

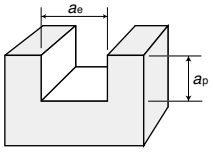
| 被削材 Work material | | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) SUS304、SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) CENA1、NAK80 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT | | チタン合金 Titanium alloys Ti-6Al-4V | | 超耐熱合金 Super heat-resistant alloys Inconel Hasteloy | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 高速条件 High speed | 切込み Depth of cut (mm) | ap=1.5DC ae=0.1DC | | ap=1.5DC ae=0.1DC | | ap=1.5DC ae=0.1DC | | ap=1.5DC ae=0.05DC | | ap=1.5DC ae=0.05DC | | ap=1.5DC ae=0.02DC | | ap=1.5DC ae=0.05DC | | ap=1.5DC ae=0.02DC | |
| | 外径DC Tool dia. (mm) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| | φ3 | 13,000 | 1,660 | 13,000 | 1,660 | 11,000 | 1,200 | 9,600 | 920 | 8,500 | 920 | 6,400 | 570 | 9,600 | 980 | 8,500 | 540 |
| | φ4 | 9,600 | 1,730 | 9,600 | 1,730 | 8,000 | 1,220 | 7,200 | 970 | 6,400 | 980 | 4,800 | 600 | 7,200 | 1,040 | 6,400 | 580 |
| | φ5 | 7,600 | 1,820 | 7,600 | 1,820 | 6,400 | 1,310 | 5,700 | 1,030 | 5,100 | 1,040 | 3,800 | 640 | 5,700 | 1,090 | 5,100 | 610 |
| | φ6 | 6,400 | 1,870 | 6,400 | 1,870 | 5,300 | 1,320 | 4,800 | 1,050 | 4,200 | 1,040 | 3,200 | 650 | 4,800 | 1,120 | 4,200 | 610 |
| | φ8 | 4,800 | 1,920 | 4,800 | 1,920 | 4,000 | 1,360 | 3,600 | 1,080 | 3,200 | 1,090 | 2,400 | 670 | 3,600 | 1,150 | 3,200 | 640 |
| | φ10 | 3,800 | 1,820 | 3,800 | 1,820 | 3,200 | 1,310 | 2,900 | 1,040 | 2,500 | 1,020 | 1,900 | 640 | 2,900 | 1,110 | 2,500 | 600 |
| | φ12 | 3,200 | 1,660 | 3,200 | 1,660 | 2,700 | 1,190 | 2,400 | 940 | 2,100 | 930 | 1,600 | 580 | 2,400 | 1,000 | 2,100 | 550 |
| | φ16 | 2,400 | 1,390 | 2,400 | 1,390 | 2,000 | 990 | 1,800 | 780 | 1,600 | 790 | 1,200 | 490 | 1,800 | 840 | 1,600 | 460 |
| | φ20 | 1,900 | 1,220 | 1,900 | 1,220 | 1,600 | 870 | 1,400 | 670 | 1,300 | 710 | 960 | 430 | 1,400 | 720 | 1,300 | 420 |
| 汎用条件 General | 切込み Depth of cut (mm) | ap=1.5DC ae=0.2DC | | ap=1.5DC ae=0.2DC | | ap=1.5DC ae=0.15DC | | ap=1.5DC ae=0.1DC | | ap=1.5DC ae=0.07DC | | ap=1.5DC ae=0.05DC | | ap=1.5DC ae=0.1DC | | ap=1.5DC ae=0.05DC | |
| | 外径DC Tool dia. (mm) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| | φ3 | 9,000 | 810 | 9,000 | 810 | 8,000 | 740 | 6,400 | 520 | 5,300 | 430 | 4,200 | 260 | 6,400 | 460 | 3,200 | 140 |
| | φ4 | 6,800 | 860 | 6,800 | 860 | 6,000 | 780 | 4,800 | 550 | 4,000 | 460 | 3,200 | 280 | 4,800 | 480 | 2,400 | 150 |
| | φ5 | 5,400 | 910 | 5,400 | 910 | 4,800 | 830 | 3,800 | 580 | 3,200 | 490 | 2,500 | 290 | 3,800 | 510 | 1,900 | 160 |
| | φ6 | 4,500 | 920 | 4,500 | 920 | 4,000 | 840 | 3,200 | 600 | 2,700 | 500 | 2,100 | 300 | 3,200 | 520 | 1,600 | 160 |
| | φ8 | 3,400 | 950 | 3,400 | 950 | 3,000 | 870 | 2,400 | 610 | 2,000 | 510 | 1,600 | 310 | 2,400 | 540 | 1,200 | 170 |
| | φ10 | 2,700 | 910 | 2,700 | 910 | 2,400 | 830 | 1,900 | 580 | 1,600 | 490 | 1,300 | 310 | 1,900 | 510 | 960 | 160 |
| | φ12 | 2,300 | 840 | 2,300 | 840 | 2,000 | 750 | 1,600 | 530 | 1,300 | 430 | 1,100 | 280 | 1,600 | 470 | 800 | 150 |
| | φ16 | 1,700 | 690 | 1,700 | 690 | 1,500 | 630 | 1,200 | 440 | 1,000 | 370 | 800 | 230 | 1,200 | 390 | 600 | 120 |
| | φ20 | 1,400 | 630 | 1,400 | 630 | 1,200 | 550 | 960 | 390 | 800 | 330 | 640 | 200 | 960 | 340 | 480 | 110 |

【注意】 ①できるだけ高剛性、高精度の機械をご使用ください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③機械の回転数が足りない場合、回転数と送り速度を同じ比率で下げてください。
④ステンレス鋼・耐熱鋼には、切削液をご使用ください。（防火対策を必ず行ってください。）

【Note】 ① Use a highly rigid and accurate machine as possible.
② These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
③ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.
④ For stainless steel and heat resistant alloys please use cutting fluid. (Please provide adequate fire prevention.)

# Epoch CS Power Mill
# エポック CS パワーミル

## EPP4-CS
レギュラー刃長
Regular




## ＜溝切削＞ Slotting

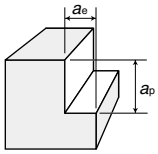
| 被削材 Work material | | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) SUS304、SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) CENA1、NAK80 | | チタン合金 Titanium alloys Ti-6Al-4V | | 超耐熱合金 Super heat-resistant alloys Inconel Hasteloy | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 高速条件 High Speed | 切込み Depth of cut (mm) | ap≦0.5DC ae=1DC | | ap≦0.5DC ae=1DC | | ap≦0.5DC ae=1DC | | | | | | | | | |
| | 外径DC Tool dia. (mm) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| | φ3 | 5,300 | 420 | 9,600 | 920 | 7,400 | 710 | | | | | | | | |
| | φ4 | 4,000 | 480 | 7,200 | 1,040 | 5,600 | 810 | | | | | | | | |
| | φ5 | 3,200 | 510 | 5,700 | 1,090 | 4,500 | 860 | | | | | | | | |
| | φ6 | 2,700 | 540 | 4,800 | 1,150 | 3,700 | 890 | | | | | | | | |
| | φ8 | 2,000 | 560 | 3,600 | 1,210 | 2,800 | 940 | | | | | | | | |
| | φ10 | 1,600 | 510 | 2,900 | 1,110 | 2,200 | 840 | | | | | | | | |
| | φ12 | 1,300 | 470 | 2,400 | 1,040 | 1,900 | 820 | | | | | | | | |
| | φ16 | 1,000 | 400 | 1,790 | 860 | 1,400 | 670 | | | | | | | | |
| | φ20 | 800 | 380 | 1,430 | 820 | 1,100 | 630 | | | | | | | | |
| 汎用条件 General | 切込み Depth of cut (mm) | ap≦1DC ae=1DC | | ap≦1DC ae=1DC | | ap≦1DC ae=1DC | | ap≦0.5DC ae=1DC | | ap≦0.5DC ae=1DC | | ap≦0.2DC ae=1DC | | ap≦0.2DC ae=1DC | |
| | 外径DC Tool dia. (mm) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| | φ3 | 3,200 | 230 | 7,400 | 570 | 5,300 | 410 | 5,300 | 380 | 5,300 | 380 | 4,200 | 300 | 1,600 | 80 |
| | φ4 | 2,400 | 290 | 5,600 | 650 | 4,000 | 460 | 4,000 | 430 | 4,000 | 430 | 3,200 | 350 | 1,200 | 90 |
| | φ5 | 1,900 | 300 | 4,500 | 690 | 3,200 | 490 | 3,200 | 460 | 3,200 | 460 | 2,500 | 360 | 1,000 | 100 |
| | φ6 | 1,600 | 320 | 3,700 | 710 | 2,700 | 520 | 2,700 | 490 | 2,700 | 490 | 2,100 | 380 | 800 | 100 |
| | φ8 | 1,200 | 340 | 2,800 | 750 | 2,000 | 540 | 2,000 | 500 | 2,000 | 500 | 1,600 | 400 | 600 | 100 |
| | φ10 | 1,000 | 320 | 2,200 | 680 | 1,600 | 490 | 1,600 | 460 | 1,600 | 460 | 1,300 | 370 | 480 | 90 |
| | φ12 | 800 | 290 | 1,900 | 660 | 1,300 | 450 | 1,300 | 420 | 1,300 | 420 | 1,100 | 360 | 400 | 90 |
| | φ16 | 600 | 240 | 1,400 | 540 | 1,000 | 380 | 1,000 | 360 | 1,000 | 360 | 800 | 290 | 300 | 70 |
| | φ20 | 480 | 230 | 1,100 | 510 | 800 | 370 | 800 | 350 | 800 | 350 | 640 | 280 | 240 | 70 |

【注意】 ①できるだけ高剛性、高精度の機械をご使用ください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③機械の回転数が足りない場合、回転数と送り速度を同じ比率で下げてください。
④ステンレス鋼・耐熱鋼には、切削液をご使用ください。(防火対策を必ず行ってください。)

【Note】 ① Use a highly rigid and accurate machine as possible.
② These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
③ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.
④ For stainless steel and heat resistant alloys please use cutting fluid. (Please provide adequate fire prevention.)

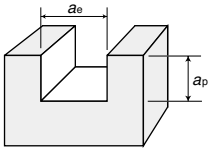
**EPPS-P-CS**
ショート刃長・ピンカド
Short, Pinkado

**EPP-P-CS**
レギュラー刃長・ピンカド
Regular, Pinkado




## ＜側面切削＞ Side milling

| 被削材 Work material | 炭素鋼・鋳鉄 Carbon steels, Cast irons (150～200HB) S45C, SS400, FC200 | | 合金鋼・工具鋼・プリハードン鋼 Alloy steels, Tool steels, Pre-hardened steels (25～35HRC) SCM, SKD, HPM | | ステンレス鋼・耐熱鋼 Stainless steels Heat-resistant alloy steels SUS304, SUH61 | | 調質鋼・焼入れ鋼 Hardened steels (40～50HRC) SKD, SKT | | アルミ展伸材 Aluminum alloy wrought A7075, A5052等 | | アルミ鋳物 Aluminum alloy casting AC, ADC | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | ap≦1DC ae≦0.01DC | | ap≦1DC ae≦0.01DC | | ap≦1DC ae≦0.01DC | | ap≦1DC ae≦0.01DC | | ap＝1DC ae≦0.1DC | | ap＝1DC ae≦0.1DC | |
| 外径DC Tool dia. (mm) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) |
| ϕ1 | 27,000 | 540 | 17,500 | 270 | 16,000 | 250 | 11,000 | 220 | 50,000 | 2,000 | 50,000 | 1,650 |
| ϕ2 | 13,500 | 650 | 8,800 | 320 | 8,000 | 260 | 5,500 | 240 | 50,000 | 3,000 | 43,000 | 2,600 |
| ϕ3 | 9,000 | 720 | 5,800 | 400 | 5,300 | 300 | 3,700 | 300 | 42,000 | 5,000 | 29,000 | 3,400 |
| ϕ4 | 6,500 | 710 | 4,400 | 400 | 4,000 | 300 | 2,800 | 300 | 32,000 | 5,100 | 21,000 | 3,400 |
| ϕ6 | 4,800 | 900 | 2,900 | 450 | 2,650 | 320 | 2,000 | 300 | 21,000 | 5,000 | 14,000 | 3,300 |
| ϕ8 | 3,600 | 800 | 2,200 | 480 | 2,000 | 360 | 1,500 | 270 | 16,000 | 5,100 | 11,000 | 3,500 |
| ϕ10 | 2,800 | 720 | 1,750 | 420 | 1,600 | 320 | 1,200 | 240 | 13,000 | 5,200 | 8,600 | 3,450 |
| ϕ12 | 2,400 | 720 | 1,460 | 410 | 1,300 | 310 | 1,000 | 240 | 10,000 | 4,400 | 7,200 | 3,200 |




## ＜溝切削＞ Slotting

| 被削材 Work material | 炭素鋼・鋳鉄 Carbon steels, Cast irons (150～200HB) S45C, SS400, FC200 | | 合金鋼・工具鋼・プリハードン鋼 Alloy steels, Tool steels, Pre-hardened steels (25～35HRC) SCM, SKD, HPM | | ステンレス鋼・耐熱鋼 Stainless steels Heat-resistant alloy steels SUS304, SUH61 | | 調質鋼・焼入れ鋼 Hardened steels (40～50HRC) SKD, SKT | | アルミ展伸材 Aluminum alloy wrought A7075, A5052等 | | アルミ鋳物 Aluminum alloy casting AC, ADC | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | ap≦0.2DC ae=1DC | | ap≦0.2DC ae=1DC | | ap≦0.2DC ae=1DC | | ap≦0.2DC ae=1DC | | ap≦0.5DC ae=1DC | | ap≦0.5DC ae=1DC | |
| 外径DC Tool dia. (mm) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) |
| ϕ1 | 22,000 | 700 | 16,000 | 400 | 11,000 | 250 | 8,000 | 160 | 50,000 | 1,600 | 50,000 | 1,300 |
| ϕ2 | 11,000 | 450 | 8,000 | 300 | 5,500 | 170 | 4,000 | 120 | 48,000 | 2,000 | 32,000 | 1,350 |
| ϕ3 | 7,500 | 450 | 5,300 | 260 | 3,700 | 160 | 2,600 | 110 | 32,000 | 2,600 | 21,000 | 1,700 |
| ϕ4 | 6,000 | 480 | 4,400 | 290 | 2,800 | 160 | 2,000 | 110 | 24,000 | 3,400 | 16,000 | 2,300 |
| ϕ6 | 4,000 | 550 | 2,900 | 350 | 1,900 | 150 | 1,300 | 130 | 16,000 | 2,900 | 11,000 | 2,000 |
| ϕ8 | 3,000 | 600 | 2,200 | 350 | 1,400 | 150 | 1,000 | 150 | 12,000 | 2,800 | 8,000 | 1,900 |
| ϕ10 | 2,400 | 530 | 1,750 | 330 | 1,100 | 150 | 750 | 150 | 10,000 | 2,800 | 6,400 | 1,800 |
| ϕ12 | 2,000 | 460 | 1,450 | 290 | 900 | 160 | 660 | 160 | 8,000 | 2,400 | 5,300 | 1,600 |

【注意】 ①できるだけ高剛性、高精度の機械およびチャックをご使用ください。
②水溶性切削液を必ずご使用ください。
③この標準切削条件表は切削条件の目安を示すものです。ビビリや異常振動が発生する場合は条件を調整してください。
④Z方向の突っ込みは行わないでください。必ずヘリカル切削（傾斜角度＝1°くらいが適当です。）で加工してください。

【Note】 ① Use a highly rigid and accurate machine as possible.
② Be sure to use water-soluble cutting fluid.
③ The cutting conditions shown in the above table are only general recommendations. If chatter or abnormal vibration occurs, adjust the condition.
④ Please using helical ramping to enter the work-piece. (ramp angle of 1.)

# Epoch Power Mill
# エポックパワーミル

切りくず排出性抜群で高能率が可能。
Excellent chip removal enables high efficiency.

ラジアスはA249頁を参照してください
Please refer to page A249 for Radius

**ショート刃長** | Short

平面 Planing | 側面 Side Cutting | 溝 Slotting | 荒 Roughing | 中仕上 Semi Finishing | 仕上 Finishing

外径公差 Dia.tolerance
φ1～φ6　：0～−0.015
φ6.1～φ25：0～−0.02

h6

(mm)

超硬 Carbide | C | ねじれ43° Helix angle | 切削条件表 A339 Cutting Conditions

## EPPS4○○○

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| EPPS4010 | □ | 1 | 1.5 | 60 | 6 | — |
| EPPS4011 | □ | 1.1 | 1.7 | 60 | 6 | — |
| EPPS4012 | □ | 1.2 | 1.8 | 60 | 6 | — |
| EPPS4013 | □ | 1.3 | 2 | 60 | 6 | — |
| EPPS4014 | □ | 1.4 | 2.1 | 60 | 6 | — |
| EPPS4015 | □ | 1.5 | 2.3 | 60 | 6 | — |
| EPPS4016 | □ | 1.6 | 2.4 | 60 | 6 | — |
| EPPS4017 | □ | 1.7 | 2.6 | 60 | 6 | — |
| EPPS4018 | □ | 1.8 | 2.7 | 60 | 6 | — |
| EPPS4019 | □ | 1.9 | 2.9 | 60 | 6 | — |
| EPPS4020 | □ | 2 | 3 | 60 | 6 | — |
| EPPS4021 | □ | 2.1 | 3.2 | 60 | 6 | — |
| EPPS4022 | □ | 2.2 | 3.3 | 60 | 6 | — |
| EPPS4023 | □ | 2.3 | 3.5 | 60 | 6 | — |
| EPPS4024 | □ | 2.4 | 3.6 | 60 | 6 | — |
| EPPS4025 | □ | 2.5 | 3.8 | 60 | 6 | — |
| EPPS4026 | □ | 2.6 | 3.9 | 60 | 6 | — |
| EPPS4027 | □ | 2.7 | 4.1 | 60 | 6 | — |
| EPPS4028 | □ | 2.8 | 4.2 | 60 | 6 | — |
| EPPS4029 | □ | 2.9 | 4.4 | 60 | 6 | — |
| EPPS4030 | ● | 3 | 4.5 | 60 | 6 | 9,480 |
| EPPS4031 | □ | 3.1 | 4.7 | 60 | 6 | — |
| EPPS4032 | □ | 3.2 | 4.8 | 60 | 6 | — |
| EPPS4033 | □ | 3.3 | 5 | 60 | 6 | — |
| EPPS4034 | □ | 3.4 | 5.1 | 60 | 6 | — |
| EPPS4035 | ● | 3.5 | 5.3 | 60 | 6 | 9,960 |
| EPPS4036 | □ | 3.6 | 5.4 | 60 | 6 | — |
| EPPS4037 | □ | 3.7 | 5.6 | 60 | 6 | — |
| EPPS4038 | □ | 3.8 | 5.7 | 60 | 6 | — |
| EPPS4039 | □ | 3.9 | 5.9 | 60 | 6 | — |
| EPPS4040 | ● | 4 | 6 | 60 | 6 | 9,960 |
| EPPS4041 | □ | 4.1 | 6.2 | 60 | 6 | — |
| EPPS4042 | □ | 4.2 | 6.3 | 60 | 6 | — |
| EPPS4043 | □ | 4.3 | 6.5 | 60 | 6 | — |
| EPPS4044 | □ | 4.4 | 6.6 | 60 | 6 | — |
| EPPS4045 | ● | 4.5 | 6.8 | 60 | 6 | 11,100 |
| EPPS4046 | □ | 4.6 | 6.9 | 60 | 6 | — |
| EPPS4047 | □ | 4.7 | 7.1 | 60 | 6 | — |
| EPPS4048 | □ | 4.8 | 7.2 | 60 | 6 | — |
| EPPS4049 | □ | 4.9 | 7.4 | 60 | 6 | — |
| EPPS4050 | ● | 5 | 7.5 | 60 | 6 | 11,100 |
| EPPS4051 | □ | 5.1 | 7.7 | 60 | 6 | — |
| EPPS4052 | □ | 5.2 | 7.8 | 60 | 6 | — |
| EPPS4053 | □ | 5.3 | 8 | 60 | 6 | — |
| EPPS4054 | □ | 5.4 | 8.1 | 60 | 6 | — |
| EPPS4055 | ● | 5.5 | 8.3 | 60 | 6 | 11,910 |
| EPPS4056 | □ | 5.6 | 8.4 | 60 | 6 | — |

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| EPPS4057 | □ | 5.7 | 8.6 | 60 | 6 | — |
| EPPS4058 | □ | 5.8 | 8.7 | 60 | 6 | — |
| EPPS4059 | □ | 5.9 | 8.9 | 60 | 6 | — |
| EPPS4060 | ● | 6 | 9 | 60 | 6 | 11,910 |
| EPPS4061 | □ | 6.1 | 9.2 | 60 | 6 | — |
| EPPS4062 | □ | 6.2 | 9.3 | 60 | 6 | — |
| EPPS4063 | □ | 6.3 | 9.5 | 60 | 6 | — |
| EPPS4064 | □ | 6.4 | 9.6 | 60 | 6 | — |
| EPPS4065 | ● | 6.5 | 9.8 | 70 | 8 | 15,940 |
| EPPS4066 | □ | 6.6 | 9.9 | 70 | 8 | — |
| EPPS4067 | □ | 6.7 | 10.1 | 70 | 8 | — |
| EPPS4068 | □ | 6.8 | 10.2 | 70 | 8 | — |
| EPPS4069 | □ | 6.9 | 10.4 | 70 | 8 | — |
| EPPS4070 | ● | 7 | 10.5 | 70 | 8 | 15,940 |
| EPPS4071 | □ | 7.1 | 10.7 | 70 | 8 | — |
| EPPS4072 | □ | 7.2 | 10.8 | 70 | 8 | — |
| EPPS4073 | □ | 7.3 | 11 | 70 | 8 | — |
| EPPS4074 | □ | 7.4 | 11.1 | 70 | 8 | — |
| EPPS4075 | ● | 7.5 | 11.3 | 75 | 8 | 17,740 |
| EPPS4076 | □ | 7.6 | 11.4 | 75 | 8 | — |
| EPPS4077 | □ | 7.7 | 11.6 | 75 | 8 | — |
| EPPS4078 | □ | 7.8 | 11.7 | 75 | 8 | — |
| EPPS4079 | □ | 7.9 | 11.9 | 75 | 8 | — |
| EPPS4080 | ● | 8 | 12 | 75 | 8 | 14,710 |
| EPPS4081 | □ | 8.1 | 12.2 | 75 | 8 | — |
| EPPS4082 | □ | 8.2 | 12.3 | 75 | 8 | — |
| EPPS4083 | □ | 8.3 | 12.5 | 75 | 8 | — |
| EPPS4084 | □ | 8.4 | 12.6 | 75 | 8 | — |
| EPPS4085 | ● | 8.5 | 12.8 | 80 | 10 | 20,430 |
| EPPS4086 | □ | 8.6 | 12.9 | 80 | 10 | — |
| EPPS4087 | □ | 8.7 | 13.1 | 80 | 10 | — |
| EPPS4088 | □ | 8.8 | 13.2 | 80 | 10 | — |
| EPPS4089 | □ | 8.9 | 13.4 | 80 | 10 | — |
| EPPS4090 | ● | 9 | 13.5 | 80 | 10 | 20,430 |
| EPPS4091 | □ | 9.1 | 13.7 | 80 | 10 | — |
| EPPS4092 | □ | 9.2 | 13.8 | 80 | 10 | — |
| EPPS4093 | □ | 9.3 | 14 | 80 | 10 | — |
| EPPS4094 | □ | 9.4 | 14.1 | 80 | 10 | — |
| EPPS4095 | ● | 9.5 | 14.3 | 80 | 10 | 23,460 |
| EPPS4096 | □ | 9.6 | 14.4 | 80 | 10 | — |
| EPPS4097 | □ | 9.7 | 14.6 | 80 | 10 | — |
| EPPS4098 | □ | 9.8 | 14.7 | 80 | 10 | — |
| EPPS4099 | □ | 9.9 | 14.9 | 80 | 10 | — |
| EPPS4100 | ● | 10 | 15 | 80 | 10 | 19,760 |
| EPPS4105 | □ | 10.5 | 15.8 | 100 | 12 | — |
| EPPS4110 | □ | 11 | 16.5 | 100 | 12 | — |
| EPPS4115 | □ | 11.5 | 17.3 | 100 | 12 | — |

●印：標準在庫品です。　□印：特定代理店在庫です。弊社営業へお問合せください。
●：Stocked items.　□：Stocked by specified distributor. Contact with our sales department.

## レギュラー刃長 Regular

平面 Planing / 側面 Side Cutting / 溝 Slotting / 荒 Roughing / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance
φ2～φ6　：0～−0.015
φ6.5～φ25：0～−0.02

h6

(mm)

## EPPS4○○○

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| EPPS4120 | ● | 12 | 18 | 100 | 12 | 25,030 |
| EPPS4125 | □ | 12.5 | 18.8 | 100 | 12 | — |
| EPPS4130 | □ | 13 | 19.5 | 100 | 12 | — |
| EPPS4135 | □ | 13.5 | 20.3 | 100 | 12 | — |
| EPPS4140 | □ | 14 | 21 | 100 | 12 | — |
| EPPS4145 | □ | 14.5 | 21.8 | 110 | 16 | — |
| EPPS4150 | □ | 15 | 22.5 | 110 | 16 | — |
| EPPS4155 | □ | 15.5 | 23.3 | 110 | 16 | — |
| EPPS4160 | ● | 16 | 24 | 110 | 16 | 57,480 |
| EPPS4170 | □ | 17 | 25.5 | 110 | 16 | — |
| EPPS4180 | □ | 18 | 27 | 110 | 16 | — |
| EPPS4190 | □ | 19 | 28.5 | 125 | 20 | — |
| EPPS4200 | ● | 20 | 30 | 125 | 20 | 83,870 |
| EPPS4210 | □ | 21 | 31.5 | 125 | 20 | — |
| EPPS4220 | □ | 22 | 33 | 125 | 20 | — |
| EPPS4230 | □ | 23 | 34.5 | 130 | 25 | — |
| EPPS4240 | □ | 24 | 36 | 130 | 25 | — |
| EPPS4250 | □ | 25 | 37.5 | 130 | 25 | — |

## EPP4○○○

超硬 Carbide / C / ねじれ43° Helix angle / 切削条件表A341 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| EPP4020 | □ | 2 | 6 | 60 | 6 | — |
| EPP4025 | □ | 2.5 | 8 | 60 | 6 | — |
| EPP4030 | ● | 3 | 8 | 60 | 6 | 9,970 |
| EPP4035 | □ | 3.5 | 10 | 60 | 6 | — |
| EPP4040 | ● | 4 | 11 | 60 | 6 | 10,480 |
| EPP4045 | □ | 4.5 | 11 | 60 | 6 | — |
| EPP4050 | ● | 5 | 13 | 60 | 6 | 11,680 |
| EPP4055 | □ | 5.5 | 13 | 60 | 6 | — |
| EPP4060 | ● | 6 | 13 | 60 | 6 | 12,690 |
| EPP4065 | □ | 6.5 | 16 | 70 | 8 | — |
| EPP4070 | ● | 7 | 16 | 70 | 8 | 16,720 |
| EPP4075 | □ | 7.5 | 16 | 70 | 8 | — |
| EPP4080 | ● | 8 | 19 | 75 | 8 | 15,710 |
| EPP4085 | □ | 8.5 | 19 | 80 | 10 | — |
| EPP4090 | ● | 9 | 19 | 80 | 10 | 21,440 |
| EPP4095 | □ | 9.5 | 19 | 80 | 10 | — |
| EPP4100 | ● | 10 | 22 | 80 | 10 | 20,990 |
| EPP4110 | ● | 11 | 22 | 100 | 12 | 28,400 |
| EPP4120 | ● | 12 | 26 | 100 | 12 | 26,370 |
| EPP4130 | ● | 13 | 26 | 100 | 12 | 31,220 |
| EPP4140 | ● | 14 | 26 | 110 | 16 | 47,640 |
| EPP4150 | ● | 15 | 26 | 110 | 16 | 50,690 |
| EPP4160 | ● | 16 | 32 | 110 | 16 | 60,540 |
| EPP4170 | ● | 17 | 32 | 110 | 16 | 82,470 |
| EPP4180 | ● | 18 | 32 | 125 | 20 | 80,240 |
| EPP4190 | ● | 19 | 32 | 125 | 20 | 99,840 |
| EPP4200 | ● | 20 | 38 | 125 | 20 | 88,450 |
| EPP4210 | □ | 21 | 38 | 125 | 20 | — |
| EPP4220 | □ | 22 | 38 | 125 | 20 | — |
| EPP4230 | □ | 23 | 45 | 140 | 25 | — |
| EPP4240 | □ | 24 | 45 | 140 | 25 | — |
| EPP4250 | □ | 25 | 63 | 140 | 25 | — |

## EPPS、EPPの対応被削材

Applicable work material of EPPS, EPP

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ |

## 再研磨対応外径範囲

Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPPS | 6～25 | 2～25 |
| EPP | 6～25 | 2～25 |

●印：標準在庫品です。　□印：特定代理店在庫です。弊社営業へお問合せください。
●：Stocked items.　□：Stocked by specified distributor. Contact with our sales department.

# Epoch Power Mill
# エポックパワーミル

切りくず排出性抜群で高能率が可能。
Excellent chip removal enables high efficiency.

ラジアスはA249頁を参照してください
Please refer to page A249 for Radius

## ミディアム刃長 Medium

側面 Side Cutting / 荒 Roughing / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance
φ3～φ6 ：0～−0.015
φ7～φ20：0～−0.02

h6

(mm)

## EPPM4○○○

超硬 Carbide / C / ねじれ43° Helix angle / 切削条件表 A343 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| EPPM4030 | ● | 3 | 15 | 60 | 6 | 11,900 |
| EPPM4040 | ● | 4 | 17 | 60 | 6 | 12,650 |
| EPPM4050 | ● | 5 | 20 | 60 | 6 | 14,030 |
| EPPM4060 | ● | 6 | 20 | 60 | 6 | 15,380 |
| EPPM4070 | □ | 7 | 23 | 75 | 8 | — |
| EPPM4080 | ● | 8 | 25 | 75 | 8 | 18,860 |
| EPPM4090 | □ | 9 | 30 | 80 | 10 | — |
| EPPM4100 | ● | 10 | 33 | 80 | 10 | 25,250 |
| EPPM4110 | □ | 11 | 33 | 100 | 12 | — |
| EPPM4120 | ● | 12 | 37 | 100 | 12 | 31,870 |
| EPPM4130 | □ | 13 | 43 | 100 | 12 | — |
| EPPM4140 | □ | 14 | 43 | 110 | 16 | — |
| EPPM4150 | □ | 15 | 47 | 110 | 16 | — |
| EPPM4160 | ● | 16 | 47 | 110 | 16 | 72,500 |
| EPPM4170 | □ | 17 | 47 | 110 | 16 | — |
| EPPM4180 | □ | 18 | 55 | 125 | 20 | — |
| EPPM4190 | □ | 19 | 55 | 125 | 20 | — |
| EPPM4200 | ● | 20 | 55 | 125 | 20 | 106,050 |

## ロング刃長 Long

側面 Side Cutting / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance
φ3～φ6 ：0～−0.015
φ7～φ20：0～−0.02

h6

(mm)

## EPPL4○○○

超硬 Carbide / C / ねじれ43° Helix angle / 切削条件表 A343 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| EPPL4030 | □ | 3 | 18 | 65 | 6 | — |
| EPPL4040 | □ | 4 | 20 | 65 | 6 | — |
| EPPL4050 | □ | 5 | 25 | 70 | 6 | — |
| EPPL4060 | ● | 6 | 25 | 70 | 6 | 22,680 |
| EPPL4070 | □ | 7 | 35 | 90 | 8 | — |
| EPPL4080 | ● | 8 | 35 | 90 | 8 | 28,510 |
| EPPL4090 | □ | 9 | 45 | 100 | 10 | — |
| EPPL4100 | ● | 10 | 45 | 100 | 10 | 38,270 |
| EPPL4110 | □ | 11 | 55 | 120 | 12 | — |
| EPPL4120 | ● | 12 | 55 | 120 | 12 | 46,910 |
| EPPL4130 | □ | 13 | 55 | 120 | 12 | — |
| EPPL4140 | □ | 14 | 55 | 125 | 16 | — |
| EPPL4150 | □ | 15 | 65 | 135 | 16 | — |
| EPPL4160 | ● | 16 | 65 | 135 | 16 | 109,450 |
| EPPL4170 | □ | 17 | 65 | 145 | 20 | — |
| EPPL4180 | □ | 18 | 65 | 145 | 20 | — |
| EPPL4190 | □ | 19 | 75 | 155 | 20 | — |
| EPPL4200 | ● | 20 | 75 | 155 | 20 | 159,530 |

## ロングシャンク Long Shank

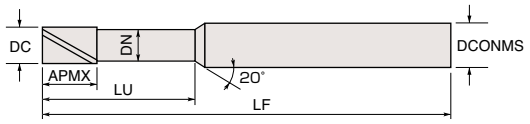
側面 Side Cutting / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance
φ3～φ6 ：0～−0.015
φ7～φ20：0～−0.02

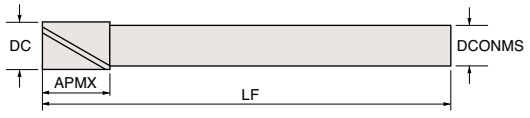
h6

(mm)

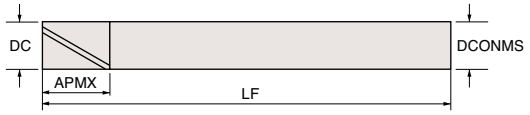
Aタイプ A type




Bタイプ B type




Cタイプ C type




## EPPLS4○○○

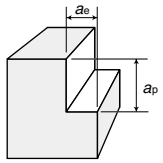
超硬 Carbide / C / ねじれ43° Helix angle / 切削条件表 A343 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 首径 Neck dia. DN | 首下長 Under neck length. LU | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 形状 Shape | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|
| EPPLS4030 | ● | 3 | 4.5 | 2.9 | 10.5 | 80 | 6 | A | 12,010 |
| EPPLS4040 | ● | 4 | 6 | 3.8 | 14 | 80 | 6 | A | 12,650 |
| EPPLS4050 | ● | 5 | 7.5 | 4.8 | 17.5 | 100 | 6 | A | 15,150 |
| EPPLS4060 | ● | 6 | 9 | — | — | 120 | 5 | B | 17,180 |
| EPPLS4070 | ● | 7 | 9 | — | — | 120 | 6 | B | 17,180 |
| EPPLS4080 | ● | 8 | 12 | — | — | 135 | 7 | B | 21,210 |
| EPPLS4090 | ● | 9 | 12 | — | — | 135 | 8 | B | 21,210 |
| EPPLS4100 | ● | 10 | 15 | — | — | 150 | 9 | B | 28,400 |
| EPPLS4110 | ● | 11 | 15 | — | — | 150 | 10 | B | 28,400 |

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 形状 Shape | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|
| EPPLS4120 | ● | 12 | 18 | 160 | 11 | B | 35,690 |
| EPPLS4130 | ● | 13 | 18 | 160 | 12 | B | 42,230 |
| EPPLS4140 | □ | 14 | 18 | 160 | 13 | B | — |
| EPPLS4150 | □ | 15 | 22 | 180 | 14 | B | — |
| EPPLS4160 | ● | 16 | 24 | 180 | 15 | B | 78,720 |
| EPPLS4170 | ● | 17 | 24 | 180 | 16 | B | 78,720 |
| EPPLS4180 | □ | 18 | 27 | 180 | 16 | B | — |
| EPPLS4190 | □ | 19 | 30 | 200 | 18 | B | — |
| EPPLS4200 | □ | 20 | 30 | 200 | 20 | C | — |

# 標準切削条件表 Recommended cutting conditions

**EPPS**
ショート刃長
Short




## ＜側面切削＞ Side milling

| 被削材 Work material | | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) SUS304、SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | | チタン合金 Titanium alloys Ti-6Al-4V | | 超耐熱合金 Super heat-resistant alloys Inconel Hasteloy | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | | ap＝1.5DC ae＝0.1DC | | ap＝1.5DC ae＝0.1DC | | ap＝1.5DC ae＝0.1DC | | ap＝1.5DC ae＝0.1DC | | ap＝1.5DC ae＝0.1DC | | ap＝1.5DC ae＝0.05DC | | ap＝1.5DC ae＝0.05DC | | ap＝1.5DC ae＝0.05DC | |
| | 外径DC Tool dia. (mm) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) |
| 高速条件 High speed | φ3 | 15,900 | 1,270 | 15,900 | 1,270 | 12,700 | 1,020 | 10,600 | 640 | 10,600 | 640 | 8,490 | 340 | 8,490 | 340 | 3,180 | 130 |
| | φ4 | 11,900 | 1,430 | 11,900 | 1,430 | 9,550 | 1,150 | 7,960 | 800 | 7,960 | 800 | 6,370 | 510 | 6,370 | 510 | 2,390 | 190 |
| | φ5 | 9,550 | 1,530 | 9,550 | 1,530 | 7,640 | 1,220 | 6,370 | 890 | 6,370 | 890 | 5,090 | 610 | 5,090 | 610 | 1,910 | 230 |
| | φ6 | 7,960 | 1,590 | 7,960 | 1,590 | 6,370 | 1,270 | 5,310 | 850 | 5,310 | 850 | 4,240 | 590 | 4,240 | 590 | 1,590 | 220 |
| | φ8 | 5,970 | 1,670 | 5,970 | 1,670 | 4,770 | 1,340 | 3,980 | 800 | 3,980 | 800 | 3,180 | 570 | 3,180 | 570 | 1,190 | 210 |
| | φ10 | 4,770 | 1,530 | 4,770 | 1,530 | 3,820 | 1,220 | 3,180 | 760 | 3,180 | 760 | 2,550 | 560 | 2,550 | 560 | 950 | 210 |
| | φ12 | 3,980 | 1,430 | 3,980 | 1,430 | 3,180 | 1,140 | 2,650 | 740 | 2,650 | 740 | 2,120 | 510 | 2,120 | 510 | 800 | 190 |
| | φ16 | 2,980 | 1,190 | 2,980 | 1,190 | 2,390 | 960 | 1,990 | 680 | 1,990 | 680 | 1,590 | 450 | 1,590 | 450 | 600 | 170 |
| | φ20 | 2,390 | 1,150 | 2,390 | 1,150 | 1,910 | 920 | 1,590 | 640 | 1,590 | 640 | 1,270 | 410 | 1,270 | 410 | 480 | 150 |
| 汎用条件 General | φ3 | 12,700 | 1,020 | 12,700 | 1,020 | 10,600 | 850 | 8,490 | 510 | 8,490 | 510 | 6,370 | 250 | 6,370 | 250 | 2,650 | 110 |
| | φ4 | 9,550 | 1,150 | 9,550 | 1,150 | 7,960 | 960 | 6,370 | 640 | 6,370 | 640 | 4,770 | 380 | 4,770 | 380 | 1,990 | 160 |
| | φ5 | 7,640 | 1,220 | 7,640 | 1,220 | 6,370 | 1,020 | 5,090 | 710 | 5,090 | 710 | 3,820 | 460 | 3,820 | 460 | 1,590 | 190 |
| | φ6 | 6,370 | 1,270 | 6,370 | 1,270 | 5,310 | 1,060 | 4,240 | 680 | 4,240 | 680 | 3,180 | 450 | 3,180 | 450 | 1,330 | 190 |
| | φ8 | 4,770 | 1,340 | 4,770 | 1,340 | 3,980 | 1,110 | 3,180 | 640 | 3,180 | 640 | 2,390 | 430 | 2,390 | 430 | 990 | 180 |
| | φ10 | 3,820 | 1,220 | 3,820 | 1,220 | 3,180 | 1,020 | 2,550 | 610 | 2,550 | 610 | 1,910 | 420 | 1,910 | 420 | 800 | 180 |
| | φ12 | 3,180 | 1,140 | 3,180 | 1,140 | 2,650 | 950 | 2,120 | 590 | 2,120 | 590 | 1,590 | 380 | 1,590 | 380 | 660 | 160 |
| | φ16 | 2,390 | 960 | 2,390 | 960 | 1,990 | 800 | 1,590 | 540 | 1,590 | 540 | 1,190 | 330 | 1,190 | 330 | 500 | 140 |
| | φ20 | 1,910 | 920 | 1,910 | 920 | 1,590 | 760 | 1,270 | 510 | 1,270 | 510 | 950 | 300 | 950 | 300 | 400 | 130 |

【注意】
①切削方法は、ダウンカットで使用ください。
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③ステンレス鋼および超耐熱合金には、不水溶性切削油のご使用が適しています。
④安定した切削を行うため、剛性の高い機械とセットアップでご使用ください。
⑤機械の回転数が足りない場合は、主軸回転数とテーブル送り速度を同比率で下げてください。
⑥加工形状、機械の剛性、工具突き出し量等、ご使用の状況により、主軸回転数とテーブル送り速度の調整を行ってください。

【Note】
① Down-cutting is recommended.
② Use generally dry (air-blow) or oil-mist coolant, especially at the high-speed machining.
③ Oil base coolant is recommended for machining stainless steels and heat-resistant alloys.
④ Use a machine tool with rigidity and rigid set-up, to machine stably.
⑤ When the revolution speed is not enough, reduce the revolution speed and table speed at the same ratio.
⑥ Adjust the revolution speed and table speed, according to cutting conditions such as machining shape, rigidity of machine tool, over-hang and so on.

## EPPM、EPPL、EPPLSの対応被削材

Applicable work material of EPPM, EPPL, EPPLS

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ |

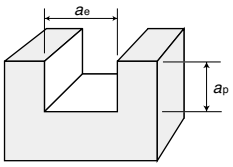
## 再研磨対応外径範囲

Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPPM | 6～20 | 3～20 |
| EPPL | 6～20 | 3～20 |
| EPPLS | 6～20 | 3～20 |

# Epoch Power Mill
# エポックパワーミル

**EPPS**
ショート刃長
Short




## ＜溝切削＞ Slotting

| 被削材 Work material | | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) SUS304、SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | | チタン合金 Titanium alloys Ti-6Al-4V | | 超耐熱合金 Super heat-resistant alloys Inconel Hasteloy | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 高速条件 High speed | 切込み Depth of cut (mm) | ap≦0.5DC ae＝1DC | | ap≦0.5DC ae＝1DC | | ap≦0.5DC ae＝1DC | | ap≦0.2DC ae＝1DC | | ap≦0.2DC ae＝1DC | | | | | | | |
| | 外径DC Tool dia. (mm) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| | φ3 | 6,370 | 510 | 12,700 | 1,020 | 10,600 | 850 | 6,370 | 380 | 6,370 | 380 | | | | | | |
| | φ4 | 4,770 | 570 | 9,550 | 1,150 | 7,960 | 960 | 4,770 | 480 | 4,770 | 480 | | | | | | |
| | φ5 | 3,820 | 610 | 7,640 | 1,220 | 6,370 | 1,020 | 3,820 | 530 | 3,820 | 530 | | | | | | |
| | φ6 | 3,180 | 640 | 6,370 | 1,270 | 5,310 | 1,060 | 3,180 | 510 | 3,180 | 510 | | | | | | |
| | φ8 | 2,390 | 670 | 4,770 | 1,340 | 3,980 | 1,110 | 2,390 | 480 | 2,390 | 480 | | | | | | |
| | φ10 | 1,910 | 610 | 3,820 | 1,220 | 3,180 | 1,020 | 1,910 | 460 | 1,910 | 460 | | | | | | |
| | φ12 | 1,590 | 570 | 3,180 | 1,140 | 2,650 | 950 | 1,590 | 450 | 1,590 | 450 | | | | | | |
| | φ16 | 1,190 | 480 | 2,390 | 960 | 1,990 | 800 | 1,190 | 400 | 1,190 | 400 | | | | | | |
| | φ20 | 950 | 460 | 1,910 | 920 | 1,590 | 760 | 950 | 380 | 950 | 380 | | | | | | |
| 汎用条件 General | 切込み Depth of cut (mm) | ap≦1DC ae＝1DC | | ap≦1DC ae＝1DC | | ap≦1DC ae＝1DC | | ap≦0.5DC ae＝1DC | | ap≦0.5DC ae＝1DC | | ap≦0.2DC ae＝1DC | | ap≦0.2DC ae＝1DC | | ap≦0.2DC ae＝1DC | |
| | 外径DC Tool dia. (mm) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| | φ3 | 5,310 | 420 | 8,490 | 680 | 7,430 | 590 | 5,310 | 320 | 5,310 | 320 | 2,650 | 110 | 4,240 | 170 | 2,120 | 85 |
| | φ4 | 3,980 | 480 | 6,370 | 760 | 5,570 | 670 | 3,980 | 400 | 3,980 | 400 | 1,990 | 160 | 3,180 | 250 | 1,590 | 130 |
| | φ5 | 3,180 | 510 | 5,090 | 810 | 4,460 | 710 | 3,180 | 450 | 3,180 | 450 | 1,590 | 190 | 2,550 | 310 | 1,270 | 150 |
| | φ6 | 2,650 | 530 | 4,240 | 850 | 3,710 | 740 | 2,650 | 420 | 2,650 | 420 | 1,330 | 190 | 2,120 | 300 | 1,060 | 150 |
| | φ8 | 1,990 | 560 | 3,180 | 890 | 2,790 | 780 | 1,990 | 400 | 1,990 | 400 | 990 | 180 | 1,590 | 290 | 800 | 140 |
| | φ10 | 1,590 | 510 | 2,550 | 820 | 2,230 | 710 | 1,590 | 380 | 1,590 | 380 | 800 | 180 | 1,270 | 280 | 640 | 140 |
| | φ12 | 1,330 | 480 | 2,120 | 760 | 1,860 | 670 | 1,330 | 370 | 1,330 | 370 | 660 | 160 | 1,060 | 250 | 530 | 130 |
| | φ16 | 990 | 400 | 1,590 | 640 | 1,390 | 560 | 990 | 340 | 990 | 340 | 500 | 140 | 800 | 220 | 400 | 110 |
| | φ20 | 800 | 380 | 1,270 | 610 | 1,110 | 530 | 800 | 320 | 800 | 320 | 400 | 130 | 640 | 200 | 320 | 100 |

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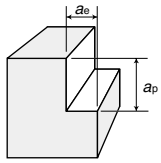
**EPP**
レギュラー刃長
Regular




## ＜側面切削＞ Side milling

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | | ap＝1.5DC ae＝0.1DC | | ap＝1.5DC ae＝0.1DC | | ap＝1.5DC ae＝0.1DC | | ap＝1.5DC ae＝0.1DC | | ap＝1.5DC ae＝0.1DC | | ap＝1.5DC ae＝0.05DC | | ap＝1.5DC ae＝0.05DC | | ap＝1.5DC ae＝0.05DC | |
| 外径DC Tool dia. (mm) | | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| 高速条件 High speed | φ3 | 12,700 | 1,020 | 12,700 | 1,020 | 10,600 | 850 | 8,490 | 510 | 8,490 | 510 | 6,370 | 250 | 6,370 | 250 | 2,650 | 110 |
| | φ4 | 9,550 | 1,150 | 9,550 | 1,150 | 7,960 | 960 | 6,370 | 640 | 6,370 | 640 | 4,770 | 380 | 4,770 | 380 | 1,990 | 160 |
| | φ5 | 7,640 | 1,220 | 7,640 | 1,220 | 6,370 | 1,020 | 5,090 | 710 | 5,090 | 710 | 3,820 | 460 | 3,820 | 460 | 1,590 | 190 |
| | φ6 | 6,370 | 1,270 | 6,370 | 1,270 | 5,310 | 1,060 | 4,240 | 680 | 4,240 | 680 | 3,180 | 450 | 3,180 | 450 | 1,330 | 190 |
| | φ8 | 4,770 | 1,340 | 4,770 | 1,340 | 3,980 | 1,110 | 3,180 | 640 | 3,180 | 640 | 2,390 | 430 | 2,390 | 430 | 990 | 180 |
| | φ10 | 3,820 | 1,220 | 3,820 | 1,220 | 3,180 | 1,020 | 2,550 | 610 | 2,550 | 610 | 1,910 | 420 | 1,910 | 420 | 800 | 180 |
| | φ12 | 3,180 | 1,140 | 3,180 | 1,140 | 2,650 | 950 | 2,120 | 590 | 2,120 | 590 | 1,590 | 380 | 1,590 | 380 | 660 | 160 |
| | φ16 | 2,390 | 960 | 2,390 | 960 | 1,990 | 800 | 1,590 | 540 | 1,590 | 540 | 1,190 | 330 | 1,190 | 330 | 500 | 140 |
| | φ20 | 1,910 | 920 | 1,910 | 920 | 1,590 | 760 | 1,270 | 510 | 1,270 | 510 | 950 | 300 | 950 | 300 | 400 | 130 |
| 汎用条件 General | φ3 | 10,600 | 850 | 10,600 | 850 | 8,490 | 680 | 6,370 | 380 | 6,370 | 380 | 4,240 | 170 | 4,240 | 170 | 2,120 | 85 |
| | φ4 | 7,960 | 960 | 7,960 | 960 | 6,370 | 760 | 4,770 | 480 | 4,770 | 480 | 3,180 | 250 | 3,180 | 250 | 1,590 | 130 |
| | φ5 | 6,370 | 1,020 | 6,370 | 1,020 | 5,090 | 810 | 3,820 | 530 | 3,820 | 530 | 2,550 | 310 | 2,550 | 310 | 1,270 | 150 |
| | φ6 | 5,310 | 1,060 | 5,310 | 1,060 | 4,240 | 850 | 3,180 | 510 | 3,180 | 510 | 2,120 | 300 | 2,120 | 300 | 1,060 | 150 |
| | φ8 | 3,980 | 1,110 | 3,980 | 1,110 | 3,180 | 890 | 2,390 | 480 | 2,390 | 480 | 1,590 | 290 | 1,590 | 290 | 800 | 140 |
| | φ10 | 3,180 | 1,020 | 3,180 | 1,020 | 2,550 | 820 | 1,910 | 460 | 1,910 | 460 | 1,270 | 280 | 1,270 | 280 | 640 | 140 |
| | φ12 | 2,650 | 950 | 2,650 | 950 | 2,120 | 760 | 1,590 | 450 | 1,590 | 450 | 1,060 | 250 | 1,060 | 250 | 530 | 130 |
| | φ16 | 1,990 | 800 | 1,990 | 800 | 1,590 | 640 | 1,190 | 400 | 1,190 | 400 | 800 | 220 | 800 | 220 | 400 | 110 |
| | φ20 | 1,590 | 760 | 1,590 | 760 | 1,270 | 610 | 950 | 380 | 950 | 380 | 640 | 200 | 640 | 200 | 320 | 100 |

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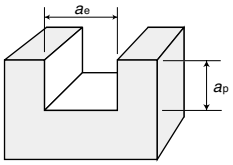
# Epoch Power Mill
# エポックパワーミル

**EPP**
レギュラー刃長
Regular



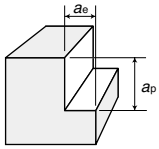

## ＜溝切削＞ Slotting

| 被削材 Work material | | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) SUS304、SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | | チタン合金 Titanium alloys Ti-6Al-4V | | 超耐熱合金 Super heat-resistant alloys Inconel Hasteloy | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 高速条件 High speed | 切込み Depth of cut (mm) | ap≦0.5DC ae＝1DC | | ap≦0.5DC ae＝1DC | | ap≦0.5DC ae＝1DC | | ap≦0.2DC ae＝1DC | | ap≦0.2DC ae＝1DC | | | | | | | |
| | 外径DC Tool dia. (mm) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| | φ3 | 5,310 | 420 | 8,490 | 680 | 7,430 | 590 | 5,310 | 320 | 5,310 | 320 | | | | | | |
| | φ4 | 3,980 | 480 | 6,370 | 760 | 5,570 | 670 | 3,980 | 400 | 3,980 | 400 | | | | | | |
| | φ5 | 3,180 | 510 | 5,090 | 810 | 4,460 | 710 | 3,180 | 450 | 3,180 | 450 | | | | | | |
| | φ6 | 2,650 | 530 | 4,240 | 850 | 3,710 | 740 | 2,650 | 420 | 2,650 | 420 | | | | | | |
| | φ8 | 1,990 | 560 | 3,180 | 890 | 2,790 | 780 | 1,990 | 400 | 1,990 | 400 | | | | | | |
| | φ10 | 1,590 | 510 | 2,550 | 820 | 2,230 | 710 | 1,590 | 380 | 1,590 | 380 | | | | | | |
| | φ12 | 1,330 | 480 | 2,120 | 760 | 1,860 | 670 | 1,330 | 370 | 1,330 | 370 | | | | | | |
| | φ16 | 990 | 400 | 1,590 | 640 | 1,390 | 560 | 990 | 340 | 990 | 340 | | | | | | |
| | φ20 | 800 | 380 | 1,270 | 610 | 1,110 | 530 | 800 | 320 | 800 | 320 | | | | | | |
| 汎用条件 General | 切込み Depth of cut (mm) | ap≦1DC ae＝1DC | | ap≦1DC ae＝1DC | | ap≦1DC ae＝1DC | | ap≦0.5DC ae＝1DC | | ap≦0.5DC ae＝1DC | | ap≦0.2DC ae＝1DC | | ap≦0.2DC ae＝1DC | | ap≦0.2DC ae＝1DC | |
| | 外径DC Tool dia. (mm) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| | φ3 | 3,180 | 250 | 7,430 | 590 | 5,310 | 420 | 4,240 | 250 | 4,240 | 250 | 2,120 | 85 | 3,180 | 130 | 1,590 | 65 |
| | φ4 | 2,390 | 290 | 5,570 | 670 | 3,980 | 480 | 3,180 | 320 | 3,180 | 320 | 1,590 | 130 | 2,390 | 190 | 1,190 | 95 |
| | φ5 | 1,910 | 310 | 4,460 | 710 | 3,180 | 510 | 2,550 | 360 | 2,550 | 360 | 1,270 | 150 | 1,910 | 230 | 950 | 110 |
| | φ6 | 1,590 | 320 | 3,710 | 740 | 2,650 | 530 | 2,120 | 340 | 2,120 | 340 | 1,060 | 150 | 1,590 | 220 | 800 | 110 |
| | φ8 | 1,190 | 330 | 2,790 | 780 | 1,990 | 560 | 1,590 | 320 | 1,590 | 320 | 800 | 140 | 1,190 | 210 | 600 | 110 |
| | φ10 | 950 | 300 | 2,230 | 710 | 1,590 | 510 | 1,270 | 300 | 1,270 | 300 | 640 | 140 | 950 | 210 | 480 | 110 |
| | φ12 | 800 | 290 | 1,860 | 670 | 1,330 | 480 | 1,060 | 300 | 1,060 | 300 | 530 | 130 | 800 | 190 | 400 | 95 |
| | φ16 | 600 | 240 | 1,390 | 560 | 990 | 400 | 800 | 270 | 800 | 270 | 400 | 110 | 600 | 170 | 300 | 85 |
| | φ20 | 480 | 230 | 1,110 | 530 | 800 | 380 | 640 | 260 | 640 | 260 | 320 | 100 | 480 | 150 | 240 | 75 |

【注意】
①一般材、とくに高速切削は、乾式（エアブロー）またはオイルミストクーラントにてご使用ください。
②ステンレス鋼および超耐熱合金には、不水溶性切削油のご使用が適しています。
③安定した切削を行うため、剛性の高い機械とセットアップでご使用ください。
④機械の回転数が足りない場合は、主軸回転数とテーブル送り速度を同比率で下げてください。
⑤加工形状、機械の剛性、工具突き出し量等、ご使用の状況により、主軸回転数とテーブル送り速度の調整を行ってください。

【Note】
① Use generally dry (air-blow) or oil-mist coolant, especially at the high-speed machining.
② Oil base coolant is recommended for machining stainless steels and heat-resistant alloys.
③ Use a machine tool with rigidity and rigid set-up, to machine stably.
④ When the revolution speed is not enough, reduce the revolution speed and table speed at the same ratio.
⑤ Adjust the revolution speed and table speed, according to cutting conditions such as machining shape, rigidity of machine tool, over-hang and so on.

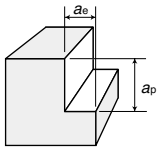
## EPPM
ミディアム刃長
Medium




### ＜側面切削＞ Side milling

| 被削材 Work material | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) SUS304、SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | | チタン合金 Titanium alloys Ti-6Al-4V | | 超耐熱合金 Super heat-resistant alloys Inconel Hasteloy | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | ap=2.5DC ae=0.02DC | | ap=2.5DC ae=0.02DC | | ap=2.5DC ae=0.02DC | | ap=2.5DC ae=0.02DC | | ap=2.5DC ae=0.02DC | | ap=2.5DC ae=0.01DC | | ap=2.5DC ae=0.01DC | | ap=2.5DC ae=0.01DC | |
| 外径DC Tool dia. (mm) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) |
| φ3 | 7,430 | 590 | 7,430 | 590 | 5,840 | 470 | 4,240 | 250 | 4,240 | 250 | 2,650 | 110 | 2,650 | 110 | 1,590 | 65 |
| φ4 | 5,570 | 670 | 5,570 | 670 | 4,380 | 530 | 3,180 | 320 | 3,180 | 320 | 1,990 | 160 | 1,990 | 160 | 1,190 | 95 |
| φ5 | 4,460 | 710 | 4,460 | 710 | 3,500 | 560 | 2,550 | 360 | 2,550 | 360 | 1,590 | 190 | 1,590 | 190 | 950 | 110 |
| φ6 | 3,710 | 740 | 3,710 | 740 | 2,920 | 580 | 2,120 | 340 | 2,120 | 340 | 1,330 | 190 | 1,330 | 190 | 800 | 110 |
| φ8 | 2,790 | 780 | 2,790 | 780 | 2,190 | 610 | 1,590 | 320 | 1,590 | 320 | 990 | 180 | 990 | 180 | 600 | 110 |
| φ10 | 2,230 | 710 | 2,230 | 710 | 1,750 | 560 | 1,270 | 300 | 1,270 | 300 | 800 | 180 | 800 | 180 | 480 | 110 |
| φ12 | 1,860 | 670 | 1,860 | 670 | 1,460 | 530 | 1,060 | 300 | 1,060 | 300 | 660 | 160 | 660 | 160 | 400 | 95 |
| φ16 | 1,390 | 560 | 1,390 | 560 | 1,090 | 440 | 800 | 270 | 800 | 270 | 500 | 140 | 500 | 140 | 300 | 85 |
| φ20 | 1,110 | 530 | 1,110 | 530 | 880 | 420 | 640 | 260 | 640 | 260 | 400 | 130 | 400 | 130 | 240 | 75 |

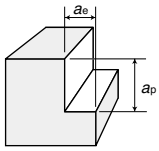
## EPPL
ロング刃長
Long




### ＜側面切削＞ Side milling

| 被削材 Work material | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) SUS304、SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | | チタン合金 Titanium alloys Ti-6Al-4V | | 超耐熱合金 Super heat-resistant alloys Inconel Hasteloy | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | ap＝3DC ae＝0.02DC | | ap＝3DC ae＝0.02DC | | ap＝3DC ae＝0.02DC | | ap＝3DC ae＝0.02DC | | ap＝3DC ae＝0.02DC | | ap＝3DC ae＝0.01DC | | ap＝3DC ae＝0.01DC | | ap＝3DC ae＝0.01DC | |
| 外径DC Tool dia. (mm) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) |
| φ6 | 2,650 | 530 | 2,650 | 530 | 2,120 | 420 | 1,590 | 250 | 1,590 | 250 | 1,060 | 150 | 1,060 | 150 | 530 | 75 |
| φ8 | 1,990 | 560 | 1,990 | 560 | 1,590 | 450 | 1,190 | 240 | 1,190 | 240 | 800 | 140 | 800 | 140 | 400 | 70 |
| φ10 | 1,590 | 510 | 1,590 | 510 | 1,270 | 410 | 950 | 230 | 950 | 230 | 640 | 140 | 640 | 140 | 320 | 70 |
| φ12 | 1,330 | 480 | 1,330 | 480 | 1,060 | 380 | 800 | 220 | 800 | 220 | 530 | 130 | 530 | 130 | 270 | 65 |
| φ16 | 990 | 400 | 990 | 400 | 800 | 320 | 600 | 200 | 600 | 200 | 400 | 110 | 400 | 110 | 200 | 55 |
| φ20 | 800 | 380 | 800 | 380 | 640 | 310 | 480 | 190 | 480 | 190 | 320 | 100 | 320 | 100 | 160 | 50 |

## EPPLS
ロングシャンク
Long Shank




### ＜側面切削＞ Side milling

| 被削材 Work material | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) SUS304、SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | | チタン合金 Titanium alloys Ti-6Al-4V | | 超耐熱合金 Super heat-resistant alloys Inconel Hasteloy | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | ap＝1.5DC ae＝0.1DC | | ap＝1.5DC ae＝0.1DC | | ap＝1.5DC ae＝0.1DC | | ap＝1.5DC ae＝0.1DC | | ap＝1.5DC ae＝0.1DC | | ap＝1.5DC ae＝0.05DC | | ap＝1.5DC ae＝0.05DC | | ap＝1.5DC ae＝0.05DC | |
| 外径DC Tool dia. (mm) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) |
| φ3 | 5,310 | 420 | 5,310 | 420 | 4,240 | 340 | 3,180 | 190 | 3,180 | 190 | 2,120 | 85 | 2,120 | 85 | 1,060 | 42 |
| φ4 | 3,980 | 480 | 3,980 | 480 | 3,180 | 380 | 2,390 | 240 | 2,390 | 240 | 1,590 | 130 | 1,590 | 130 | 800 | 65 |
| φ5 | 3,180 | 510 | 3,180 | 510 | 2,550 | 410 | 1,910 | 270 | 1,910 | 270 | 1,270 | 150 | 1,270 | 150 | 640 | 75 |
| φ6 | 2,650 | 530 | 2,650 | 530 | 2,120 | 420 | 1,590 | 250 | 1,590 | 250 | 1,060 | 150 | 1,060 | 150 | 530 | 75 |
| φ8 | 1,990 | 560 | 1,990 | 560 | 1,590 | 450 | 1,190 | 240 | 1,190 | 240 | 800 | 140 | 800 | 140 | 400 | 70 |
| φ10 | 1,590 | 510 | 1,590 | 510 | 1,270 | 410 | 950 | 230 | 950 | 230 | 640 | 140 | 640 | 140 | 320 | 70 |
| φ12 | 1,330 | 480 | 1,330 | 480 | 1,060 | 380 | 800 | 220 | 800 | 220 | 530 | 130 | 530 | 130 | 270 | 65 |
| φ16 | 990 | 400 | 990 | 400 | 800 | 320 | 600 | 200 | 600 | 200 | 400 | 110 | 400 | 110 | 200 | 55 |

【注意】
①切削方法は、ダウンカットで使用ください。
②一般材、とくに高速切削は、乾式（エアブロー）またはオイルミストクーラントにてご使用ください。
③ステンレス鋼および超耐熱合金には、不水溶性切削油のご使用が適しています。
④安定した切削を行うため、剛性の高い機械とセットアップでご使用ください。
⑤機械の回転数が足りない場合は、主軸回転数とテーブル送り速度を同比率で下げてください。
⑥加工形状、機械の剛性、工具突き出し量等、ご使用の状況により、主軸回転数とテーブル送り速度の調整を行ってください。

【Note】
(1) Down-cutting is recommended.
(2) Use generally dry (air-blow) or oil-mist coolant, especially at the high-speed machining.
(3) Oil base coolant is recommended for machining stainless steels and heat-resistant alloys.
(4) Use a machine tool with rigidity and rigid set-up, to machine stably.
(5) When the revolution speed is not enough, reduce the revolution speed and table speed at the same ratio.
(6) Adjust the revolution speed and table speed, according to cutting conditions such as machining shape, rigidity of machine tool, over-hang and so on.

# 8-flutes End Mill for Vertical Wall/Bottom Face Finishing
# 立壁／底面仕上げ用8枚刃エンドミル

YouTube 動画公開中

平面 Planing / 側面 Side Cutting / 溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance
φ6 : 0～−0.015
φ7～φ12 : 0～−0.02

h5 φ6,8,10,12 / h6 φ7,9,11

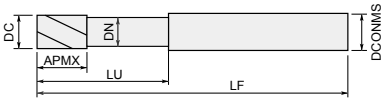
(mm)

立壁と底面の仕上げ加工の”極” これ1本で立壁と底面を仕上げる!!
The Zenith of Milling for Vertical Wall and Bottom Face Finishing
Vertical wall and bottom face finishing with a single tool!

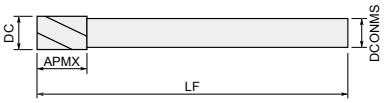
ラジアスはA254頁を参照してください
Please refer to page A254 for Radius

8枚刃
8 Flutes

Aタイプ A type




Bタイプ B type




## ES8WB○○○○LN(LS)-○○-ATH

超硬 Carbide / ATH / ねじれ角 38° Helix angle / 切削条件表 A345 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 首下長 Under neck length LU | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 形状 Shape | 希望小売価格 Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|
| ES8WB0600LN-20-ATH | ● | 6 | 6 | 20 | 5.88 | 70 | 6 | A | 14,500 |
| ES8WB0600LN-30-ATH | ● | | 6 | 30 | 5.88 | 80 | 6 | A | 15,090 |
| ES8WB0600LN-40-ATH | ● | | 6 | 40 | 5.88 | 90 | 6 | A | 15,690 |
| ES8WB0600LN-50-ATH | ● | | 6 | 50 | 5.88 | 100 | 6 | A | 16,310 |
| ES8WB0700LS-ATH | ● | 7 | 7 | – | – | 90 | 6 | B | 21,800 |
| ES8WB0800LN-30-ATH | ● | 8 | 8 | 30 | 7.84 | 75 | 8 | A | 16,040 |
| ES8WB0800LN-40-ATH | ● | | 8 | 40 | 7.84 | 90 | 8 | A | 17,010 |
| ES8WB0800LN-50-ATH | ● | | 8 | 50 | 7.84 | 100 | 8 | A | 17,760 |
| ES8WB0800LN-60-ATH | ● | | 8 | 60 | 7.84 | 110 | 8 | A | 19,000 |
| ES8WB0900LS-ATH | ● | 9 | 9 | – | – | 100 | 8 | B | 24,840 |
| ES8WB1000LN-35-ATH | ● | 10 | 10 | 35 | 9.8 | 80 | 10 | A | 19,060 |
| ES8WB1000LN-50-ATH | ● | | 10 | 50 | 9.8 | 100 | 10 | A | 20,890 |
| ES8WB1000LN-60-ATH | ● | | 10 | 60 | 9.8 | 110 | 10 | A | 22,220 |
| ES8WB1000LN-80-ATH | ● | | 10 | 80 | 9.8 | 130 | 10 | A | 24,220 |
| ES8WB1100LS-ATH | ● | 11 | 11 | – | – | 110 | 10 | B | 29,690 |
| ES8WB1200LN-40-ATH | ● | 12 | 12 | 40 | 11.8 | 90 | 12 | A | 23,270 |
| ES8WB1200LN-60-ATH | ● | | 12 | 60 | 11.8 | 110 | 12 | A | 25,790 |
| ES8WB1200LN-80-ATH | ● | | 12 | 80 | 11.8 | 130 | 12 | A | 28,020 |
| ES8WB1200LN-100-ATH | ● | | 12 | 100 | 11.8 | 150 | 12 | A | 30,270 |

### 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ○ | ◎ | ◎ | | | | | | |

### 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| ES8WB-ATH | 6～12 | 6～12 |

●：標準在庫品です。 ●：Stocked items.

# 標準切削条件表 Recommended cutting conditions ES8WB-ATH

## 立壁仕上げ Vertical wall finishing

| 被削材 Work material | | | 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 工具鋼 Tool steels (25～35HRC) | | プリハードン鋼 Pre-hardened steels (35～45HRC) | | 焼入れ鋼 Hardened steels (45～55HRC) | | 焼入れ鋼 Hardened steels (55～62HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 商品コード Item code | 軸切込み $a_p$ (mm) | 径切込み $a_e$ (mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) |
| **ES8WB0600LN-20-ATH** | 3 | ≦0.1 | 7960 | 1910 | 6370 | 1530 | 4770 | 1140 | 3180 | 760 | 2650 | 640 |
| **ES8WB0600LN-30-ATH** | 3 | ≦0.1 | 6630 | 1590 | 5310 | 1270 | 3980 | 960 | 2650 | 640 | 2120 | 510 |
| **ES8WB0600LN-40-ATH** | 3 | ≦0.1 | 4640 | 780 | 3710 | 620 | 2790 | 470 | 1860 | 310 | 1490 | 250 |
| **ES8WB0600LN-50-ATH** | 3 | ≦0.1 | 3320 | 400 | 2650 | 320 | 1990 | 240 | 1330 | 160 | 1060 | 130 |
| **ES8WB0700LS-ATH** | 3.5 | ≦0.1 | 5680 | 1590 | 4550 | 1270 | 3410 | 950 | 2270 | 640 | 1820 | 510 |
| **ES8WB0800LN-30-ATH** | 4 | ≦0.1 | 5970 | 1910 | 4770 | 1530 | 3580 | 1150 | 2390 | 760 | 1990 | 640 |
| **ES8WB0800LN-40-ATH** | 4 | ≦0.1 | 4970 | 1590 | 3980 | 1270 | 2980 | 950 | 1990 | 640 | 1590 | 510 |
| **ES8WB0800LN-50-ATH** | 4 | ≦0.1 | 3480 | 890 | 2790 | 620 | 2090 | 540 | 1390 | 360 | 1110 | 280 |
| **ES8WB0800LN-60-ATH** | 4 | ≦0.1 | 2490 | 400 | 1990 | 320 | 1490 | 240 | 990 | 160 | 800 | 130 |
| **ES8WB0900LS-ATH** | 4.5 | ≦0.1 | 4420 | 1590 | 3540 | 1270 | 2650 | 950 | 1770 | 640 | 1410 | 510 |
| **ES8WB1000LN-35-ATH** | 5 | ≦0.1 | 4770 | 1910 | 3820 | 1530 | 2860 | 1140 | 1910 | 760 | 1590 | 640 |
| **ES8WB1000LN-50-ATH** | 5 | ≦0.1 | 3980 | 1590 | 3180 | 1270 | 2390 | 960 | 1590 | 640 | 1270 | 510 |
| **ES8WB1000LN-60-ATH** | 5 | ≦0.1 | 2790 | 890 | 2230 | 620 | 1670 | 530 | 1110 | 360 | 890 | 280 |
| **ES8WB1000LN-80-ATH** | 5 | ≦0.1 | 1990 | 400 | 1590 | 320 | 1190 | 240 | 800 | 160 | 640 | 130 |
| **ES8WB1100LS-ATH** | 5.5 | ≦0.1 | 3620 | 1510 | 2890 | 1210 | 2170 | 910 | 1450 | 610 | 1160 | 480 |
| **ES8WB1200LN-40-ATH** | 6 | ≦0.1 | 3980 | 1720 | 3180 | 1370 | 2390 | 1030 | 1590 | 690 | 1330 | 570 |
| **ES8WB1200LN-60-ATH** | 6 | ≦0.1 | 3320 | 1430 | 2650 | 1140 | 1990 | 860 | 1330 | 570 | 1060 | 460 |
| **ES8WB1200LN-80-ATH** | 6 | ≦0.1 | 2320 | 700 | 1860 | 560 | 1390 | 420 | 930 | 280 | 740 | 220 |
| **ES8WB1200LN-100-ATH** | 6 | ≦0.1 | 1660 | 360 | 1330 | 290 | 990 | 210 | 660 | 140 | 530 | 110 |

※ロングシャンクタイプ(ø7,9,11)の切削条件は工具突き出し量が5DC(工具径×5倍)時の条件です。突き出し量を変更する場合は下記補正値を参考に条件を設定ください。
* Cutting conditions for the long-shank type (⌀7/9/11) are for a tool projection of 5DC (tool diameter × 5). Modify the conditions using the following correction factors if the projection amount changes:

### ロングシャンクタイプの切削条件補正値 Cutting condition correction factors for long-shank type (%)

| 被削材 Work material | | | 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 工具鋼 Tool steels (25～35HRC) | | プリハードン鋼 Pre-hardened steels (35～45HRC) | | 焼入れ鋼 Hardened steels (45～55HRC) | | 焼入れ鋼 Hardened steels (55～62HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 突出し量 Projection | 軸切込み $a_p$ (mm) | 径切込み $a_e$ (mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) |
| **5DC** | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| **6DC** | 100% | 100% | 70% | 60% | 70% | 60% | 70% | 60% | 70% | 60% | 70% | 60% |
| **7DC** | 100% | 100% | 70% | 50% | 70% | 50% | 70% | 50% | 70% | 50% | 70% | 50% |

【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②できるだけ高剛性、高精度の機械をご使用ください。
③この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

【Note】① Use the appropriate coolant for the work material and machining shape.
② Use a highly rigid and accurate machine as possible.
③ These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

# Epoch Mirus Type R
# エポックミルス タイプ R

YouTube 動画公開中

## 4枚刃・スクエア・ストレート　4 flutes, Square, Straight

平面 Planing / 側面 Side Cutting / 溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical / 座ぐり Spot Facing / 取りのこし Rest Material Machining / 荒 Roughing / 中仕上 Semi Finishing

外径公差 Dia.tolerance　0～−0.05 (mm)　h5 φ6～12　h6 φ16,φ20

高切り込み&高送りにより驚異の加工能率を実現。
Achieves amazing machining efficiency with high cutting depth and high feed rate.

ラジアスはA259頁を参照してください
Please refer to page A259 for Radius

4枚刃 4Flutes

## EMXR4○○○-TH

超硬 Carbide / ATH / なじれ45° Helix angle / 切削条件表 A348 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 近似R※ Approx radius | 刃数 No. of flutes | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|
| EMXR4060-TH | ● | 6 | 9 | 60 | 6 | 0.4 | 4 | 15,940 |
| EMXR4080-TH | ● | 8 | 12 | 75 | 8 | 0.5 | 4 | 19,530 |
| EMXR4100-TH | ● | 10 | 15 | 80 | 10 | 0.5 | 4 | 26,260 |
| EMXR4120-TH | ● | 12 | 18 | 100 | 12 | 0.5 | 4 | 33,330 |
| EMXR4160-TH | ● | 16 | 24 | 110 | 16 | 0.7 | 4 | 81,070 |
| EMXR4200-TH | ● | 20 | 30 | 125 | 20 | 0.7 | 4 | 118,480 |

## 4枚刃・スクエア・セミロングシャンク　4 flutes, Square, Semi long shank

平面 Planing / 側面 Side Cutting / 溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical / 座ぐり Spot Facing / 取りのこし Rest Material Machining / 荒 Roughing / 中仕上 Semi Finishing

外径公差 Dia.tolerance　0～−0.05 (mm)　h6

4枚刃 4Flutes

## EMXR4○○○-SR-TH

超硬 Carbide / ATH / なじれ45° Helix angle / 切削条件表 A349 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 近似R※ Approx radius | 刃数 No. of flutes | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|
| EMXR4070-SR-TH | ● | 7 | 9 | 90 | 6 | 0.4 | 4 | 19,080 |
| EMXR4090-SR-TH | ● | 9 | 12 | 100 | 8 | 0.5 | 4 | 23,460 |
| EMXR4110-SR-TH | ● | 11 | 15 | 110 | 10 | 0.5 | 4 | 31,540 |
| EMXR4130-SR-TH | ● | 13 | 18 | 120 | 12 | 0.7 | 4 | 55,720 |

※スクエアタイプのエンド刃先はチッピング防止のため、特殊形状になっています。CAM設定の際に、コーナRサイズを近似Rで設定してください。
Special geometry is adopted on tip of square type, for chipping resistance. please set up tool corner R with approx R for both type.

### EMXR-TH、EMXR-SR-THの対応被削材

Applicable work material of EMXR-TH, EMXR-SR-TH

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | | | | | ○ | ○ |

### 再研磨対応外径範囲

Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EMXR-TH | 6～20 | 6～20 |
| EMXR-SR-TH | 7～13 | 7～13 |

●印：標準在庫品です。　●：Stocked items.

# Epoch Mirus Type N
# エポックミルス タイプ N

高切り込み&高送りにより驚異の加工能率を実現。
Achieves amazing machining efficiency with high cutting depth and high feed rate.

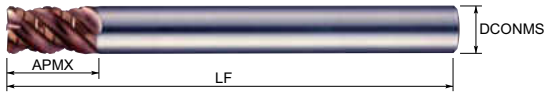
ラジアスはA260頁を参照してください
Please refer to page A260 for Radius

## 4枚刃・スクエア・ストレート　4 flutes, Square, Straight

平面 Planing / 側面 Side Cutting / 溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical / 座ぐり Spot Facing / 取りのこし Rest Material Machining / 荒 Roughing / 中仕上 Semi Finishing

外径公差 Dia.tolerance　0～−0.03　h5 φ6～12　h6 φ16, φ20　(mm)

4枚刃 4Flutes




### EMXN4○○○-TH

超硬 Carbide / ATH / ねじれ45° Helix angle / 切削条件表 A348 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 近似R※ Approx radius | 刃数 No. of flutes | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|
| EMXN4060-TH | ● | 6 | 9 | 60 | 6 | 0.4 | 4 | 15,940 |
| EMXN4080-TH | ● | 8 | 12 | 75 | 8 | 0.5 | 4 | 19,530 |
| EMXN4100-TH | ● | 10 | 15 | 80 | 10 | 0.5 | 4 | 26,260 |
| EMXN4120-TH | ● | 12 | 18 | 100 | 12 | 0.5 | 4 | 33,330 |
| EMXN4160-TH | ● | 16 | 24 | 110 | 16 | 0.7 | 4 | 81,070 |
| EMXN4200-TH | ● | 20 | 30 | 125 | 20 | 0.7 | 4 | 118,480 |

## 4枚刃・スクエア・セミロングシャンク　4 flutes, Square, Semi long shank

平面 Planing / 側面 Side Cutting / 溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical / 座ぐり Spot Facing / 取りのこし Rest Material Machining / 荒 Roughing / 中仕上 Semi Finishing

外径公差 Dia.tolerance　0～−0.03　h6　(mm)

4枚刃 4Flutes

### EMXN4○○○-SR-TH

超硬 Carbide / ATH / ねじれ45° Helix angle / 切削条件表 A349 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 近似R※ Approx radius | 刃数 No. of flutes | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|
| EMXN4070-SR-TH | ● | 7 | 9 | 90 | 6 | 0.4 | 4 | 19,080 |
| EMXN4090-SR-TH | ● | 9 | 12 | 100 | 8 | 0.5 | 4 | 23,460 |
| EMXN4110-SR-TH | ● | 11 | 15 | 110 | 10 | 0.5 | 4 | 31,540 |
| EMXN4130-SR-TH | ● | 13 | 18 | 120 | 12 | 0.5 | 4 | 55,720 |

※スクエアタイプのエンド刃先はチッピング防止のため、特殊形状になっています。CAM設定の際に、コーナRサイズを近似Rで設定してください。
Special geometry is adopted on tip of square type, for chipping resistance. please set up tool corner R with approx R for both type.

## EMXN-TH、EMXN-SR-THの対応被削材

Applicable work material of EMXN-TH, EMXN-SR-TH

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | | | | | ○ | ○ |

## 再研磨対応外径範囲

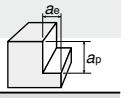
Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EMXN-TH | 6～20 | 6～20 |
| EMXN-SR-TH | 7～13 | 7～13 |

# 標準切削条件表 Recommended cutting conditions

## EMXR-TH EMXN-TH 4枚刃・スクエア・ストレート 4 flutes, Square, Straight

### 側面切削 Side milling



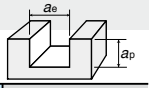

タイプR Type R

| 外径DC Tool dia.(mm) | 鋳鉄・炭素鋼・合金鋼 Cast irons, Carbon steels, Alloy steels (150～250HB) FC、S50C、SCM 切込み Depth of cut (mm) | | 工具鋼 Tool steels (25～35HRC) SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80、CENA1 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | |
|---|---|---|---|---|---|---|---|---|
| | ap=1.0DC ae=0.5DC | | ap=1.0DC ae=0.375DC | | ap=1.0DC ae=0.25DC | | ap=1.0DC ae=0.125DC | |
| | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min |
| φ6 | 8,000 | 1,380 | 7,200 | 1,000 | 6,400 | 710 | 5,600 | 500 |
| φ8 | 6,000 | 1,460 | 5,400 | 1,050 | 4,800 | 750 | 4,200 | 520 |
| φ10 | 4,800 | 1,460 | 4,300 | 1,050 | 3,800 | 740 | 3,300 | 510 |
| φ12 | 4,000 | 1,380 | 3,600 | 1,000 | 3,200 | 710 | 2,800 | 500 |
| φ16 | 3,000 | 1,310 | 2,700 | 940 | 2,400 | 670 | 2,100 | 470 |
| φ20 | 2,400 | 1,150 | 2,100 | 810 | 1,900 | 580 | 1,700 | 420 |

タイプN Type N

| 外径DC Tool dia.(mm) | 鋳鉄・炭素鋼・合金鋼 Cast irons, Carbon steels, Alloy steels (150～250HB) FC、S50C、SCM 切込み Depth of cut (mm) | | 工具鋼 Tool steels (25～35HRC) SKD | | ステンレス鋼 Stainless steels SUS | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80、CENA1 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ap=1.0DC ae=0.5DC | | ap=1.0DC ae=0.375DC | | ap=1.0DC ae=0.375DC | | ap=1.0DC ae=0.25DC | | ap=1.0DC ae=0.125DC | |
| | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min |
| φ6 | 7,400 | 1,280 | 6,600 | 910 | 6,600 | 270 | 5,800 | 640 | 5,000 | 440 |
| φ8 | 5,600 | 1,360 | 5,000 | 970 | 5,000 | 290 | 4,400 | 680 | 3,800 | 470 |
| φ10 | 4,500 | 1,370 | 4,000 | 970 | 4,000 | 290 | 3,500 | 680 | 3,000 | 470 |
| φ12 | 3,700 | 1,280 | 3,300 | 910 | 3,300 | 270 | 2,900 | 640 | 2,500 | 440 |
| φ16 | 2,800 | 1,220 | 2,500 | 870 | 2,500 | 260 | 2,200 | 610 | 1,900 | 420 |
| φ20 | 2,200 | 1,060 | 2,000 | 770 | 2,000 | 230 | 1,800 | 550 | 1,500 | 370 |

### 溝 切 削 Slotting




タイプR Type R

| 外径DC Tool dia.(mm) | 鋳鉄・炭素鋼・合金鋼 Cast irons, Carbon steels, Alloy steels (150～250HB) FC、S50C、SCM 切込み Depth of cut (mm) | | 工具鋼 Tool steels (25～35HRC) SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80、CENA1 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | |
|---|---|---|---|---|---|---|---|---|
| | ap=1.0DC | | ap=0.8DC | | ap=0.5DC | | ap=0.2DC | |
| | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min |
| φ6 | 6,900 | 950 | 6,100 | 670 | 5,300 | 470 | 4,500 | 320 |
| φ8 | 5,200 | 1,010 | 4,600 | 720 | 4,000 | 500 | 3,400 | 340 |
| φ10 | 4,100 | 1,000 | 3,700 | 720 | 3,200 | 500 | 2,700 | 340 |
| φ12 | 3,400 | 940 | 3,100 | 690 | 2,700 | 480 | 2,300 | 330 |
| φ16 | 2,600 | 910 | 2,300 | 640 | 2,000 | 450 | 1,700 | 300 |
| φ20 | 2,100 | 810 | 1,800 | 550 | 1,600 | 390 | 1,400 | 280 |

タイプN Type N

| 外径DC Tool dia.(mm) | 鋳鉄・炭素鋼・合金鋼 Cast irons, Carbon steels, Alloy steels (150～250HB) FC、S50C、SCM 切込み Depth of cut (mm) | | 工具鋼 Tool steels (25～35HRC) SKD | | ステンレス鋼 Stainless steels SUS | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80、CENA1 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ap=1.0DC | | ap=0.8DC | | ap=0.8DC | | ap=0.5DC | | ap=0.2DC | |
| | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min |
| φ6 | 6,400 | 880 | 5,600 | 620 | 5,600 | 190 | 4,800 | 420 | 4,000 | 280 |
| φ8 | 4,800 | 930 | 4,200 | 650 | 4,200 | 200 | 3,600 | 450 | 3,000 | 300 |
| φ10 | 3,800 | 920 | 3,300 | 640 | 3,300 | 190 | 2,900 | 450 | 2,400 | 300 |
| φ12 | 3,200 | 880 | 2,800 | 620 | 2,800 | 190 | 2,400 | 420 | 2,000 | 280 |
| φ16 | 2,400 | 840 | 2,100 | 580 | 2,100 | 170 | 1,800 | 400 | 1,500 | 270 |
| φ20 | 1,900 | 730 | 1,700 | 520 | 1,700 | 160 | 1,400 | 340 | 1,200 | 240 |

### 傾斜切削 Ramping

タイプR Type R

| 外径DC Tool dia.(mm) | 鋳鉄・炭素鋼・合金鋼 Cast irons, Carbon steels, Alloy steels (150～250HB) FC、S50C、SCM 最大傾斜角 Max. ramping angle | | 工具鋼 Tool steels (25～35HRC) SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80、CENA1 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | |
|---|---|---|---|---|---|---|---|---|
| | 30°以下 30° or less | | 15°以下 15° or less | | 15°以下 15° or less | | 5°以下 5° or less | |
| | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min |
| φ6 | 6,900 | 750 | 6,100 | 530 | 5,300 | 370 | 4,500 | 250 |
| φ8 | 5,200 | 790 | 4,600 | 560 | 4,000 | 390 | 3,400 | 260 |
| φ10 | 4,100 | 780 | 3,700 | 560 | 3,200 | 390 | 2,700 | 260 |
| φ12 | 3,400 | 730 | 3,100 | 540 | 2,700 | 370 | 2,300 | 250 |
| φ16 | 2,600 | 710 | 2,300 | 500 | 2,000 | 350 | 1,700 | 240 |
| φ20 | 2,100 | 630 | 1,800 | 430 | 1,600 | 310 | 1,400 | 220 |

タイプN Type N

| 外径DC Tool dia.(mm) | 鋳鉄・炭素鋼・合金鋼 Cast irons, Carbon steels, Alloy steels (150～250HB) FC、S50C、SCM 最大傾斜角 Max. ramping angle | | 工具鋼 Tool steels (25～35HRC) SKD | | ステンレス鋼 Stainless steels SUS | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80、CENA1 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 20°以下 20° or less | | 10°以下 10° or less | | 5°以下 5° or less | | 10°以下 10° or less | | 5°以下 5° or less | |
| | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min | 回転数 n min⁻¹ | 送り速度 Vf mm/min |
| φ6 | 6,400 | 690 | 5,600 | 480 | 5,600 | 140 | 4,800 | 330 | 4,000 | 220 |
| φ8 | 4,800 | 730 | 4,200 | 510 | 4,200 | 150 | 3,600 | 350 | 3,000 | 230 |
| φ10 | 3,800 | 720 | 3,300 | 500 | 3,300 | 150 | 2,900 | 350 | 2,400 | 230 |
| φ12 | 3,200 | 690 | 2,800 | 480 | 2,800 | 140 | 2,400 | 330 | 2,000 | 220 |
| φ16 | 2,400 | 650 | 2,100 | 460 | 2,100 | 140 | 1,800 | 310 | 1,500 | 210 |
| φ20 | 1,900 | 570 | 1,700 | 410 | 1,700 | 120 | 1,400 | 270 | 1,200 | 180 |

※タイプRはステンレス鋼及びチタン合金に推奨できません。

【注意】
①Z突込み切削は＜溝切削＞条件の回転数で、送り速度のみ1/3程度に下げてご使用ください。
②できるだけ高剛性、高精度の機械をご使用ください。
③この切削条件表は切削条件の目安を示すものです。
実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。
⑤エアーブローやクーラントの位置に十分ご注意ください。
⑥使用条件(コレット等)によっては、工具が抜ける恐れがありますので、機械・ホルダーの種類によって、条件を調整してください。

※Type R is not recommendable for milling stainless steel or Ti alloy.

Note
① Please use rpm and 1/3 those of slotting cutting conditions respectively for Z plunging.
② Use a highly rigid and accurate machine as possible.
③ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.
⑤Please ensure that air blow or coolant is correctly positioned in order to remove the chip immediately.
⑥In order to avoid clamping looseness, Please adjust cutting conditions according to type of machine center and holder.

# EMXR-TH EMXN-TH 4枚刃・スクエア・ストレート 4 flutes, Square, Straight

## 往復倣い加工 Two-way profiling

タイプR Type R

タイプN Type N

図① Fig.1

| | 鋳鉄・炭素鋼・合金鋼 Cast irons, Carbon steels, Alloy steels (150～250HB) FC、S50C、SCM | | 工具鋼 Tool steels (25～35HRC) SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80、CENA1 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | | 鋳鉄・炭素鋼・合金鋼 Cast irons, Carbon steels, Alloy steels (150～250HB) FC、S50C、SCM | | 工具鋼 Tool steels (25～35HRC) SKD | | ステンレス鋼 Stainless steels SUS | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80、CENA1 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | 最大max. ae=0.5DC | | 最大max. ae=0.375DC | | 最大max. ae=0.25DC | | 最大max. ae=0.125DC | | 最大max. ae=0.5DC | | 最大max. ae=0.375DC | | 最大max. ae=0.375DC | | 最大max. ae=0.25DC | | 最大max. ae=0.125DC | |
| 外径DC Tool dia.(mm) | 回転数 n min⁻¹ | 送り速度 vf mm/min | 回転数 n min⁻¹ | 送り速度 vf mm/min | 回転数 n min⁻¹ | 送り速度 vf mm/min | 回転数 n min⁻¹ | 送り速度 vf mm/min | 回転数 n min⁻¹ | 送り速度 vf mm/min | 回転数 n min⁻¹ | 送り速度 vf mm/min | 回転数 n min⁻¹ | 送り速度 vf mm/min | 回転数 n min⁻¹ | 送り速度 vf mm/min | 回転数 n min⁻¹ | 送り速度 vf mm/min |
| φ6 | 8,000 | 1,730 | 7,200 | 1,240 | 6,400 | 880 | 5,600 | 620 | 7,400 | 1,600 | 6,600 | 1,140 | 6,600 | 340 | 5,800 | 800 | 5,000 | 550 |
| φ8 | 6,000 | 1,820 | 5,400 | 1,310 | 4,800 | 930 | 4,200 | 650 | 5,600 | 1,700 | 5,000 | 1,220 | 5,000 | 370 | 4,400 | 860 | 3,800 | 590 |
| φ10 | 4,800 | 1,820 | 4,300 | 1,310 | 3,800 | 920 | 3,300 | 640 | 4,500 | 1,710 | 4,000 | 1,220 | 4,000 | 370 | 3,500 | 850 | 3,000 | 580 |
| φ12 | 4,000 | 1,730 | 3,600 | 1,240 | 3,200 | 880 | 2,800 | 620 | 3,700 | 1,600 | 3,300 | 1,140 | 3,300 | 340 | 2,900 | 800 | 2,500 | 550 |
| φ16 | 3,000 | 1,630 | 2,700 | 1,180 | 2,400 | 840 | 2,100 | 580 | 2,800 | 1,520 | 2,500 | 1,090 | 2,500 | 330 | 2,200 | 770 | 1,900 | 530 |
| φ20 | 2,400 | 1,440 | 2,100 | 1,010 | 1,900 | 730 | 1,700 | 520 | 2,200 | 1,320 | 2,000 | 960 | 2,000 | 290 | 1,800 | 690 | 1,500 | 460 |

※タイプRはステンレス鋼及びチタン合金に推奨できません。

【特長】 本工具を用いると、図①に示すような形状から、往復倣い加工を行うことが可能です。
図①形状の切削条件は側面切削条件を参照ください。

【注意】 前ページ下段を参照してください。

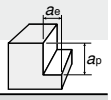
※Type R is not recommendable for milling stainless steel or Ti alloy.

Features MIRUS has the capability of two-way profiling a work from geometry as figure 1 shown. Please refer to side milling cutting conditions for previous process.

Note Please refer to the precautions in previous page.

# EMXR-SR-TH EMXN-SR-TH 4枚刃・スクエア・セミロングシャンク 4 flutes, Square, Semi long shank

## 側面切削 Side milling




タイプR Type R

タイプN Type N

| | | | 鋳鉄・炭素鋼・合金鋼 Cast irons, Carbon steels, Alloy steels (150～250HB) FC、S50C、SCM | | 工具鋼 Tool steels (25～35HRC) SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80、CENA1 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | | 鋳鉄・炭素鋼・合金鋼 Cast irons, Carbon steels, Alloy steels (150～250HB) FC、S50C、SCM | | 工具鋼 Tool steels (25～35HRC) SKD | | ステンレス鋼 Stainless steels SUS | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80、CENA1 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | | | ap=1.0DC×切込み比率 ae=0.5DC×切込み比率 ×Ratio to standard depth of cut | | ap=1.0DC×切込み比率 ae=0.375DC×切込み比率 ×Ratio to standard depth of cut | | ap=1.0DC×切込み比率 ae=0.25DC×切込み比率 ×Ratio to standard depth of cut | | ap=1.0DC×切込み比率 ae=0.125DC×切込み比率 ×Ratio to standard depth of cut | | ap=1.0DC×切込み比率 ae=0.5DC×切込み比率 ×Ratio to standard depth of cut | | ap=1.0DC×切込み比率 ae=0.375DC×切込み比率 ×Ratio to standard depth of cut | | ap=1.0DC×切込み比率 ae=0.375DC×切込み比率 ×Ratio to standard depth of cut | | ap=1.0DC×切込み比率 ae=0.25DC×切込み比率 ×Ratio to standard depth of cut | | ap=1.0DC×切込み比率 ae=0.125DC×切込み比率 ×Ratio to standard depth of cut | |
| 外径DC Tool dia. (mm) | L/D | 切込み比率 Ratio to standard depth of cut | 回転数 n min⁻¹ | 送り速度 vf mm/min | 回転数 n min⁻¹ | 送り速度 vf mm/min | 回転数 n min⁻¹ | 送り速度 vf mm/min | 回転数 n min⁻¹ | 送り速度 vf mm/min | 回転数 n min⁻¹ | 送り速度 vf mm/min | 回転数 n min⁻¹ | 送り速度 vf mm/min | 回転数 n min⁻¹ | 送り速度 vf mm/min | 回転数 n min⁻¹ | 送り速度 vf mm/min | 回転数 n min⁻¹ | 送り速度 vf mm/min |
| φ7 | 4 | 100% | 6,800 | 1,370 | 6,100 | 980 | 5,500 | 710 | 4,800 | 500 | 6,400 | 1,290 | 5,700 | 920 | 5,700 | 280 | 5,000 | 650 | 4,300 | 440 |
| | 5 | 70% | 4,800 | 960 | 4,300 | 690 | 3,900 | 500 | 3,400 | 350 | 4,500 | 900 | 4,000 | 640 | 4,000 | 190 | 3,500 | 460 | 3,000 | 310 |
| | 6 | 50% | 3,400 | 690 | 3,100 | 490 | 2,800 | 360 | 2,400 | 250 | 3,200 | 650 | 2,900 | 460 | 2,900 | 140 | 2,500 | 330 | 2,200 | 220 |
| φ9 | 4 | 100% | 5,300 | 1,450 | 4,800 | 1,050 | 4,200 | 740 | 3,700 | 520 | 5,000 | 1,370 | 4,400 | 960 | 4,400 | 290 | 3,900 | 680 | 3,400 | 480 |
| | 5 | 70% | 3,700 | 1,020 | 3,400 | 740 | 2,900 | 520 | 2,600 | 360 | 3,500 | 960 | 3,100 | 670 | 3,100 | 200 | 2,700 | 480 | 2,400 | 340 |
| | 6 | 50% | 2,700 | 730 | 2,400 | 530 | 2,100 | 370 | 1,900 | 260 | 2,500 | 690 | 2,200 | 480 | 2,200 | 140 | 2,000 | 340 | 1,700 | 240 |
| φ11 | 4 | 100% | 4,300 | 1,440 | 3,900 | 1,040 | 3,500 | 750 | 3,000 | 510 | 4,100 | 1,370 | 3,600 | 960 | 3,600 | 290 | 3,200 | 680 | 2,700 | 460 |
| | 5 | 70% | 3,000 | 1,010 | 2,700 | 730 | 2,500 | 530 | 2,100 | 360 | 2,900 | 960 | 2,500 | 670 | 2,500 | 200 | 2,200 | 480 | 1,900 | 320 |
| | 6 | 50% | 2,200 | 720 | 2,000 | 520 | 1,800 | 380 | 1,500 | 260 | 2,100 | 690 | 1,800 | 480 | 1,800 | 140 | 1,600 | 340 | 1,400 | 230 |
| φ13 | 4 | 100% | 3,700 | 1,390 | 3,300 | 990 | 2,900 | 690 | 2,600 | 500 | 3,400 | 1,270 | 3,100 | 930 | 3,100 | 280 | 2,700 | 650 | 2,300 | 440 |
| | 5 | 70% | 2,600 | 970 | 2,300 | 690 | 2,000 | 480 | 1,800 | 350 | 2,400 | 890 | 2,200 | 650 | 2,200 | 200 | 1,900 | 460 | 1,600 | 310 |
| | 6 | 50% | 1,900 | 700 | 1,700 | 500 | 1,500 | 350 | 1,300 | 250 | 1,700 | 640 | 1,600 | 470 | 1,600 | 140 | 1,400 | 330 | 1,200 | 220 |

※タイプRはステンレス鋼及びチタン合金に推奨できません。

【注意】
①Z突込み切削は<溝切削>条件の回転数で、送り速度のみ1/3程度に下げてご使用ください。
②できるだけ高剛性、高精度の機械をご使用ください。
③この切削条件表は切削条件の目安を示すものです。
実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。
⑤エアーブローやクーラントの位置に十分ご注意ください。
⑥使用条件(コレット等)によっては、工具が抜ける恐れがありますので、機械・ホルダーの種類によって、条件を調整してください。
7.突出し量が4DCを超える場合の切込み量は、切込み比率を目安に調整してください。

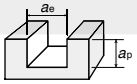
※Type R is not recommendable for milling stainless steel or Ti alloy.

Note
① Please use rpm and 1/3 those of slotting cutting conditions respectively for Z plunging.
② Use a highly rigid and accurate machine as possible.
③ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.
⑤ Please ensure that air blow or coolant is correctly positioned in order to remove the chip immediately.
⑥ In order to avoid clamping looseness, Please adjust cutting conditions according to type of machine center and holder.
⑦ Please change ratio to standard depth of cut in the appllication with more than 4DCc tool overhang.

# Epoch Mirus Type R/Type N
# エポックミルス タイプR／タイプN

## EMXR-SR-TH EMXN-SR-TH 4枚刃・スクエア・セミロングシャンク 4 flutes, Square, Semi long shank

### 溝 切 削 Slotting




タイプR Type R

| 外径DC Tool dia. (mm) | L/D | 切込み比率 Ratio to standard depth of cut | 鋳鉄・炭素鋼・合金鋼 Cast irons, Carbon steels, Alloy steels (150～250HB) FC、S50C、SCM ap=1.0DC×切込み比率 ×Ratio to standard depth of cut 回転数 n min⁻¹ | 送り速度 Vf mm/min | 工具鋼 Tool steels (25～35HRC) SKD ap=0.8DC×切込み比率 ×Ratio to standard depth of cut 回転数 n min⁻¹ | 送り速度 Vf mm/min | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80、CENA1 ap=0.5DC×切込み比率 ×Ratio to standard depth of cut 回転数 n min⁻¹ | 送り速度 Vf mm/min | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 ap=0.2DC×切込み比率 ×Ratio to standard depth of cut 回転数 n min⁻¹ | 送り速度 Vf mm/min |
|---|---|---|---|---|---|---|---|---|---|---|
| | 4 | 100% | 5,900 | 950 | 5,200 | 670 | 4,500 | 460 | 3,900 | 320 |
| φ7 | 5 | 70% | 3,500 | 570 | 3,100 | 400 | 2,700 | 280 | 2,300 | 190 |
| | 6 | 50% | 1,800 | 290 | 1,600 | 200 | 1,400 | 140 | 1,200 | 100 |
| | 4 | 100% | 4,600 | 1,010 | 4,100 | 720 | 3,500 | 490 | 3,000 | 340 |
| φ9 | 5 | 70% | 2,800 | 610 | 2,500 | 430 | 2,100 | 290 | 1,800 | 200 |
| | 6 | 50% | 1,400 | 300 | 1,200 | 220 | 1,100 | 150 | 900 | 100 |
| | 4 | 100% | 3,800 | 1,020 | 3,300 | 710 | 2,900 | 500 | 2,500 | 340 |
| φ11 | 5 | 70% | 2,300 | 610 | 2,000 | 430 | 1,700 | 300 | 1,500 | 200 |
| | 6 | 50% | 1,100 | 310 | 1,000 | 210 | 900 | 150 | 800 | 100 |
| | 4 | 100% | 3,200 | 960 | 2,800 | 670 | 2,400 | 460 | 2,100 | 320 |
| φ13 | 5 | 70% | 1,900 | 580 | 1,700 | 400 | 1,400 | 280 | 1,300 | 190 |
| | 6 | 50% | 1,000 | 290 | 800 | 200 | 700 | 140 | 600 | 100 |

タイプN Type N

| 外径DC Tool dia. (mm) | L/D | 鋳鉄・炭素鋼・合金鋼 Cast irons, Carbon steels, Alloy steels (150～250HB) FC、S50C、SCM ap=1.0DC×切込み比率 ×Ratio to standard depth of cut 回転数 n min⁻¹ | 送り速度 Vf mm/min | 工具鋼 Tool steels (25～35HRC) SKD ap=0.8DC×切込み比率 ×Ratio to standard depth of cut 回転数 n min⁻¹ | 送り速度 Vf mm/min | ステンレス鋼 Stainless steels SUS ap=0.8DC×切込み比率 ×Ratio to standard depth of cut 回転数 n min⁻¹ | 送り速度 Vf mm/min | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80、CENA1 ap=0.5DC×切込み比率 ×Ratio to standard depth of cut 回転数 n min⁻¹ | 送り速度 Vf mm/min | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 ap=0.2DC×切込み比率 ×Ratio to standard depth of cut 回転数 n min⁻¹ | 送り速度 Vf mm/min |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 4 | 5,500 | 890 | 4,800 | 620 | 4,800 | 190 | 4,100 | 420 | 3,400 | 280 |
| φ7 | 5 | 3,300 | 530 | 2,900 | 370 | 2,900 | 110 | 2,500 | 250 | 2,000 | 170 |
| | 6 | 1,700 | 270 | 1,400 | 190 | 1,400 | 60 | 1,200 | 130 | 1,000 | 80 |
| | 4 | 4,200 | 920 | 3,700 | 650 | 3,700 | 200 | 3,200 | 450 | 2,700 | 300 |
| φ9 | 5 | 2,500 | 550 | 2,200 | 390 | 2,200 | 120 | 1,900 | 270 | 1,600 | 180 |
| | 6 | 1,300 | 280 | 1,100 | 200 | 1,100 | 60 | 1,000 | 140 | 800 | 90 |
| | 4 | 3,500 | 940 | 3,000 | 640 | 3,000 | 190 | 2,600 | 450 | 2,200 | 300 |
| φ11 | 5 | 2,100 | 560 | 1,800 | 380 | 1,800 | 110 | 1,600 | 270 | 1,300 | 180 |
| | 6 | 1,100 | 280 | 900 | 190 | 900 | 60 | 800 | 140 | 700 | 90 |
| | 4 | 2,900 | 870 | 2,600 | 620 | 2,600 | 190 | 2,200 | 420 | 1,800 | 280 |
| φ13 | 5 | 1,700 | 520 | 1,600 | 370 | 1,600 | 110 | 1,300 | 250 | 1,100 | 170 |
| | 6 | 900 | 260 | 800 | 190 | 800 | 60 | 700 | 130 | 500 | 80 |

### 傾斜切削 Ramping

タイプR Type R

| 外径DC Tool dia. (mm) | L/D | 鋳鉄・炭素鋼・合金鋼 Cast irons, Carbon steels, Alloy steels (150～250HB) FC、S50C、SCM 最大傾斜角 Max. ramping angle 30°以下 30° or less 回転数 n min⁻¹ | 送り速度 Vf mm/min | 工具鋼 Tool steels (25～35HRC) SKD 15°以下 15° or less 回転数 n min⁻¹ | 送り速度 Vf mm/min | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80、CENA1 15°以下 15° or less 回転数 n min⁻¹ | 送り速度 Vf mm/min | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 5°以下 5° or less 回転数 n min⁻¹ | 送り速度 Vf mm/min |
|---|---|---|---|---|---|---|---|---|---|
| | 4 | 5,900 | 740 | 5,200 | 520 | 4,500 | 360 | 3,900 | 250 |
| φ7 | 5 | 4,100 | 520 | 3,600 | 360 | 3,200 | 250 | 2,700 | 180 |
| | 6 | 3,000 | 370 | 2,600 | 260 | 2,300 | 180 | 2,000 | 130 |
| | 4 | 4,600 | 790 | 4,100 | 560 | 3,500 | 380 | 3,000 | 260 |
| φ9 | 5 | 3,200 | 550 | 2,900 | 390 | 2,500 | 270 | 2,100 | 180 |
| | 6 | 2,300 | 400 | 2,100 | 280 | 1,800 | 190 | 1,500 | 130 |
| | 4 | 3,800 | 790 | 3,300 | 550 | 2,900 | 390 | 2,500 | 270 |
| φ11 | 5 | 2,700 | 550 | 2,300 | 390 | 2,000 | 270 | 1,800 | 190 |
| | 6 | 1,900 | 400 | 1,700 | 280 | 1,500 | 200 | 1,300 | 140 |
| | 4 | 3,200 | 750 | 2,800 | 520 | 2,400 | 360 | 2,100 | 250 |
| φ13 | 5 | 2,200 | 530 | 2,000 | 360 | 1,700 | 250 | 1,500 | 180 |
| | 6 | 1,600 | 380 | 1,400 | 260 | 1,200 | 180 | 1,100 | 130 |

タイプN Type N

| 外径DC Tool dia. (mm) | L/D | 鋳鉄・炭素鋼・合金鋼 Cast irons, Carbon steels, Alloy steels (150～250HB) FC、S50C、SCM 最大傾斜角 Max. ramping angle 20°以下 20° or less 回転数 n min⁻¹ | 送り速度 Vf mm/min | 工具鋼 Tool steels (25～35HRC) SKD 10°以下 10° or less 回転数 n min⁻¹ | 送り速度 Vf mm/min | ステンレス鋼 Stainless steels SUS 5°以下 5° or less 回転数 n min⁻¹ | 送り速度 Vf mm/min | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80、CENA1 10°以下 10° or less 回転数 n min⁻¹ | 送り速度 Vf mm/min | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 5°以下 5° or less 回転数 n min⁻¹ | 送り速度 Vf mm/min |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 4 | 5,500 | 690 | 4,800 | 480 | 4,800 | 140 | 4,100 | 330 | 3,400 | 220 |
| φ7 | 5 | 3,900 | 480 | 3,400 | 340 | 3,400 | 100 | 2,900 | 230 | 2,400 | 150 |
| | 6 | 2,800 | 350 | 2,400 | 240 | 2,400 | 70 | 2,100 | 170 | 1,700 | 110 |
| | 4 | 4,200 | 720 | 3,700 | 510 | 3,700 | 150 | 3,200 | 350 | 2,700 | 240 |
| φ9 | 5 | 2,900 | 500 | 2,600 | 360 | 2,600 | 110 | 2,200 | 250 | 1,900 | 170 |
| | 6 | 2,100 | 360 | 1,900 | 260 | 1,900 | 80 | 1,600 | 180 | 1,400 | 120 |
| | 4 | 3,500 | 730 | 3,000 | 500 | 3,000 | 150 | 2,600 | 350 | 2,200 | 240 |
| φ11 | 5 | 2,500 | 510 | 2,100 | 350 | 2,100 | 110 | 1,800 | 250 | 1,500 | 170 |
| | 6 | 1,800 | 370 | 1,500 | 250 | 1,500 | 80 | 1,300 | 180 | 1,100 | 120 |
| | 4 | 2,900 | 680 | 2,600 | 490 | 2,600 | 150 | 2,200 | 330 | 1,800 | 220 |
| φ13 | 5 | 2,000 | 480 | 1,800 | 340 | 1,800 | 100 | 1,500 | 230 | 1,300 | 150 |
| | 6 | 1,500 | 340 | 1,300 | 250 | 1,300 | 80 | 1,100 | 170 | 900 | 110 |

※タイプRはステンレス鋼及びチタン合金に推奨できません。

【注意】
①Z突込み切削は<溝切削>条件の回転数で、送り速度のみ1/3程度に下げてご使用ください。
②できるだけ高剛性、高精度の機械をご使用ください。
③この切削条件表は切削条件の目安を示すものです。
実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。
⑤エアーブローやクーラントの位置に十分ご注意ください。
⑥使用条件(コレット等)によっては、工具が抜ける恐れがありますので、機械・ホルダーの種類によって、条件を調整してください。
⑦突出し量が4DCを超える場合の切込み量は、切込み比率を目安に調整してください。

※Type R is not recommendable for milling stainless steel or Ti alloy.

Note
① Please use rpm and 1/3 those of slotting cutting conditions respectively for Z plunging.
② Use a highly rigid and accurate machine as possible.
③ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.
⑤ Please ensure that air blow or coolant is correctly positioned in order to remove the chip immediately.
⑥ In order to avoid clamping looseness, Please adjust cutting conditions according to type of machine center and holder.
⑦ Please change ratio to standard depth of cut in the appllication with more than 4DC tool overhang.

## EMXR-SR-TH EMXN-SR-TH 4枚刃・スクエア・セミロングシャンク 4 flutes, Square, Semi long shank

### 往復倣い加工 Two-way profiling

タイプR Type R

タイプN Type N

図① Fig.1

| 外径DC Tool dia. (mm) | L/D | 切込み比率 Ratio to standard depth of cut | 切込み Depth of cut (mm) | 鋳鉄・炭素鋼・合金鋼 Cast irons, Carbon steels, Alloy steels (150～250HB) FC、S50C、SCM 最大max. ae=0.5DC ×切込み比率 × Ratio to standard depth of cut | | 工具鋼 Tool steels (25～35HRC) SKD 最大max. ae=0.375DC ×切込み比率 × Ratio to standard depth of cut | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80、CENA1 最大max. ae=0.25DC ×切込み比率 × Ratio to standard depth of cut | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 最大max. ae=0.125DC ×切込み比率 × Ratio to standard depth of cut | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 回転数 n min⁻¹ | 送り速度 vf mm/min | 回転数 n min⁻¹ | 送り速度 vf mm/min | 回転数 n min⁻¹ | 送り速度 vf mm/min | 回転数 n min⁻¹ | 送り速度 vf mm/min |
| φ7 | 4 | 100% | | 6,800 | 1,710 | 6,100 | 1,230 | 5,500 | 890 | 4,800 | 620 |
| | 5 | 70% | | 4,800 | 1,200 | 4,300 | 860 | 3,900 | 620 | 3,400 | 430 |
| | 6 | 50% | | 3,400 | 860 | 3,100 | 620 | 2,800 | 450 | 2,400 | 310 |
| φ9 | 4 | 100% | | 5,300 | 1,810 | 4,800 | 1,310 | 4,200 | 920 | 3,700 | 650 |
| | 5 | 70% | | 3,700 | 1,270 | 3,400 | 920 | 2,900 | 640 | 2,600 | 460 |
| | 6 | 50% | | 2,700 | 910 | 2,400 | 660 | 2,100 | 460 | 1,900 | 330 |
| φ11 | 4 | 100% | | 4,300 | 1,800 | 3,900 | 1,300 | 3,500 | 940 | 3,000 | 640 |
| | 5 | 70% | | 3,000 | 1,260 | 2,700 | 910 | 2,500 | 660 | 2,100 | 450 |
| | 6 | 50% | | 2,200 | 900 | 2,000 | 650 | 1,800 | 470 | 1,500 | 320 |
| φ13 | 4 | 100% | | 3,700 | 1,730 | 3,300 | 1,240 | 2,900 | 870 | 2,600 | 620 |
| | 5 | 70% | | 2,600 | 1,210 | 2,300 | 870 | 2,000 | 610 | 1,800 | 430 |
| | 6 | 50% | | 1,900 | 870 | 1,700 | 620 | 1,500 | 440 | 1,300 | 310 |

| 外径DC Tool dia. (mm) | L/D | 切込み比率 Ratio to standard depth of cut | 切込み Depth of cut (mm) | 鋳鉄・炭素鋼・合金鋼 Cast irons, Carbon steels, Alloy steels (150～250HB) FC、S50C、SCM 最大max. ae=0.5DC ×切込み比率 × Ratio to standard depth of cut | | 工具鋼 Tool steels (25～35HRC) SKD 最大max. ae=0.375DC ×切込み比率 × Ratio to standard depth of cut | | ステンレス鋼 Stainless steels SUS 最大max. ae=0.375DC ×切込み比率 × Ratio to standard depth of cut | | プリハードン鋼 Pre-hardened steels (35～45HRC) NAK80、CENA1 最大max. ae=0.25DC ×切込み比率 × Ratio to standard depth of cut | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 最大max. ae=0.125DC ×切込み比率 × Ratio to standard depth of cut | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 回転数 n min⁻¹ | 送り速度 vf mm/min | 回転数 n min⁻¹ | 送り速度 vf mm/min | 回転数 n min⁻¹ | 送り速度 vf mm/min | 回転数 n min⁻¹ | 送り速度 vf mm/min | 回転数 n min⁻¹ | 送り速度 vf mm/min |
| φ7 | 4 | 100% | | 6,400 | 1,610 | 5,700 | 1,150 | 5,700 | 350 | 5,000 | 810 | 4,300 | 550 |
| | 5 | 70% | | 4,500 | 1,130 | 4,000 | 810 | 4,000 | 240 | 3,500 | 570 | 3,000 | 390 |
| | 6 | 50% | | 3,200 | 810 | 2,900 | 580 | 2,900 | 170 | 2,500 | 410 | 2,200 | 280 |
| φ9 | 4 | 100% | | 5,000 | 1,710 | 4,400 | 1,200 | 4,400 | 360 | 3,900 | 850 | 3,400 | 600 |
| | 5 | 70% | | 3,500 | 1,200 | 3,100 | 840 | 3,100 | 250 | 2,700 | 600 | 2,400 | 420 |
| | 6 | 50% | | 2,500 | 860 | 2,200 | 600 | 2,200 | 180 | 2,000 | 430 | 1,700 | 300 |
| φ11 | 4 | 100% | | 4,100 | 1,710 | 3,600 | 1,200 | 3,600 | 360 | 3,200 | 860 | 2,700 | 580 |
| | 5 | 70% | | 2,900 | 1,200 | 2,500 | 840 | 2,500 | 250 | 2,200 | 600 | 1,900 | 410 |
| | 6 | 50% | | 2,100 | 860 | 1,800 | 600 | 1,800 | 180 | 1,600 | 430 | 1,400 | 290 |
| φ13 | 4 | 100% | | 3,400 | 1,590 | 3,100 | 1,160 | 3,100 | 350 | 2,700 | 810 | 2,300 | 550 |
| | 5 | 70% | | 2,400 | 1,110 | 2,200 | 810 | 2,200 | 240 | 1,900 | 570 | 1,600 | 390 |
| | 6 | 50% | | 1,700 | 800 | 1,600 | 580 | 1,600 | 170 | 1,400 | 410 | 1,200 | 280 |

※タイプRはステンレス鋼及びチタン合金に推奨できません。

【特長】 本工具を用いると、図①に示すような形状から、往復倣い加工を行うことが可能です。
図①形状の切削条件は側面切削条件を参照ください。

【注意】 前ページ下段を参照してください。

※Type R is not recommendable for milling stainless steel or Ti alloy.

Features MIRUS has the capability of two-way profiling a work from geometry as figure 1 shown. Please refer to side milling cutting conditions for previous process.

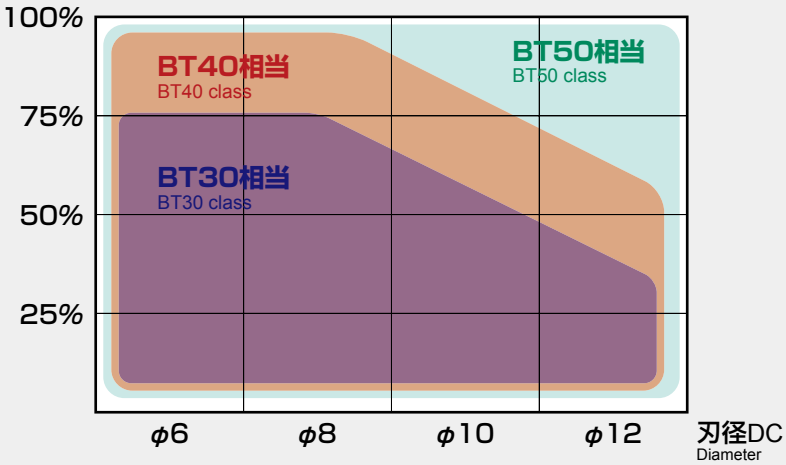
Note Please refer to the precautions in previous page.

## 主軸別 使用領域概念図

Cutting condition adjustment based on spindle type

**標準切削条件はBT50相当の主軸での切削条件です。主軸剛性の弱い機械では右記の図を参考に切り込み量を調整してください。**

Standard cutting condition is for BT50 class spindle situation.
Please adjust the step according to right chart.



# Epoch TH Hard
# エポックTHハード

高硬度材加工用スクエアエンドミル。
Square end mill for machining high-hardness materials.

ラジアスはA265頁を参照してください
Please refer to page A265 for Radius

## ショート刃長 Short

外径公差 Dia.tolerance　0～−0.015　h6

(mm)

## CEPS○○○○-TH

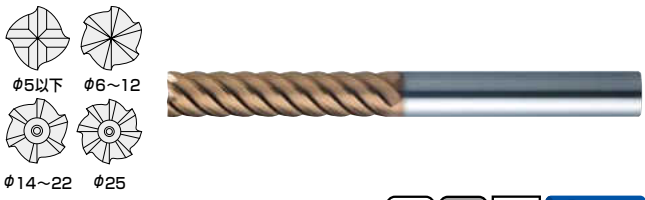
超硬 Carbide　TH　なじれ46° Helix angle　切削条件表 A353 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 刃数 No. of Flutes | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|
| CEPS4010-TH | ● | 1 | 2 | 60 | 6 | 4 | 13,930 |
| CEPS4015-TH | ● | 1.5 | 3 | 60 | 6 | 4 | 13,930 |
| CEPS4020-TH | ● | 2 | 4 | 60 | 6 | 4 | 13,390 |
| CEPS4025-TH | ● | 2.5 | 5 | 60 | 6 | 4 | 12,440 |
| CEPS4030-TH | ● | 3 | 6 | 60 | 6 | 4 | 10,940 |
| CEPS4040-TH | ● | 4 | 8 | 60 | 6 | 4 | 11,680 |
| CEPS4050-TH | ● | 5 | 10 | 60 | 6 | 4 | 13,030 |
| CEPS6060-TH | ● | 6 | 12 | 60 | 6 | 6 | 14,030 |

## ロング刃長 Long

外径公差 Dia.tolerance　φ3～φ6　：0～−0.015
φ7～φ25：0～−0.02　h6

(mm)




## CEPL○○○○-TH

超硬 Carbide　TH　なじれ46° Helix angle　切削条件表 A354 Cutting Conditions

| | 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 刃数 No. of Flutes | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|
| | CEPL4030-TH | ● | 3 | 15 | 60 | 6 | 4 | 17,570 |
| | CEPL4040-TH | ● | 4 | 20 | 65 | 6 | 4 | 18,330 |
| | CEPL4050-TH | ● | 5 | 25 | 70 | 6 | 4 | 20,540 |
| | CEPL6060-TH | ● | 6 | 25 | 70 | 6 | 6 | 24,920 |
| | CEPL6070-TH | ● | 7 | 35 | 90 | 8 | 6 | 28,050 |
| | CEPL6080-TH | ● | 8 | 35 | 90 | 8 | 6 | 31,310 |
| | CEPL6090-TH | ● | 9 | 45 | 100 | 10 | 6 | 36,140 |
| | CEPL6100-TH | ● | 10 | 45 | 100 | 10 | 6 | 42,200 |
| | CEPL6110-TH | ● | 11 | 55 | 120 | 12 | 6 | 46,690 |
| | CEPL6120-TH | ● | 12 | 55 | 120 | 12 | 6 | 51,620 |
| * | CEPL6140-TH | ● | 14 | 55 | 125 | 16 | 6 | 79,070 |
| * | CEPL6160-TH | ● | 16 | 65 | 135 | 16 | 6 | 120,820 |
| * | CEPL6180-TH | ● | 18 | 65 | 145 | 20 | 6 | 159,530 |
| * | CEPL6200-TH | ● | 20 | 75 | 155 | 20 | 6 | 175,950 |
| * | CEPL6220-TH | ● | 22 | 75 | 165 | 20 | 6 | 208,800 |
| * | CEPL8250-TH | ● | 25 | 90 | 180 | 25 | 8 | 294,430 |

## レギュラー刃長 Regular

外径公差 Dia.tolerance　φ1～φ6　：0～−0.015
φ6.5～φ32：0～−0.02　h6

(mm)

## CEPR○○○○-TH

超硬 Carbide　TH　なじれ46° Helix angle　切削条件表 A353 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 刃数 No. of Flutes | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|
| CEPR4010-TH | ● | 1 | 3.5 | 60 | 6 | 4 | 13,930 |
| CEPR4015-TH | ● | 1.5 | 5 | 60 | 6 | 4 | 13,930 |
| CEPR4020-TH | ● | 2 | 7 | 60 | 6 | 4 | 13,390 |
| CEPR4025-TH | ● | 2.5 | 8 | 60 | 6 | 4 | 12,440 |
| CEPR4030-TH | ● | 3 | 10 | 60 | 6 | 4 | 10,940 |
| CEPR4035-TH | ● | 3.5 | 12 | 60 | 6 | 4 | 11,680 |
| CEPR4040-TH | ● | 4 | 12 | 60 | 6 | 4 | 11,680 |
| CEPR4045-TH | ● | 4.5 | 15 | 60 | 6 | 4 | 13,030 |
| CEPR4050-TH | ● | 5 | 15 | 60 | 6 | 4 | 13,030 |
| CEPR4055-TH | ● | 5.5 | 15 | 60 | 6 | 4 | 14,030 |
| CEPR6060-TH | ● | 6 | 15 | 60 | 6 | 6 | 14,030 |
| CEPR6065-TH | ● | 6.5 | 20 | 75 | 8 | 6 | 18,520 |
| CEPR6070-TH | ● | 7 | 20 | 75 | 8 | 6 | 18,520 |
| CEPR6075-TH | ● | 7.5 | 20 | 75 | 8 | 6 | 20,540 |
| CEPR6080-TH | ● | 8 | 20 | 75 | 8 | 6 | 17,180 |
| CEPR6085-TH | ● | 8.5 | 25 | 80 | 10 | 6 | 23,690 |
| CEPR6090-TH | ● | 9 | 25 | 80 | 10 | 6 | 23,690 |
| CEPR6095-TH | ● | 9.5 | 25 | 80 | 10 | 6 | 27,270 |
| CEPR6100-TH | ● | 10 | 25 | 80 | 10 | 6 | 23,130 |
| CEPR6105-TH | ● | 10.5 | 30 | 100 | 12 | 6 | 31,310 |
| CEPR6110-TH | ● | 11 | 30 | 100 | 12 | 6 | 31,310 |
| CEPR6115-TH | ● | 11.5 | 30 | 100 | 12 | 6 | 34,460 |
| CEPR6120-TH | ● | 12 | 30 | 100 | 12 | 6 | 29,180 |
| CEPR6130-TH | ● | 13 | 35 | 105 | 16 | 6 | 46,810 |
| CEPR6140-TH | ● | 14 | 35 | 105 | 16 | 6 | 52,560 |
| CEPR6150-TH | ● | 15 | 40 | 110 | 16 | 6 | 55,960 |
| CEPR6160-TH | ● | 16 | 40 | 110 | 16 | 6 | 66,750 |
| CEPR6170-TH | ● | 17 | 40 | 120 | 20 | 6 | 91,040 |
| CEPR6180-TH | ● | 18 | 40 | 120 | 20 | 6 | 88,690 |
| CEPR6190-TH | ● | 19 | 45 | 125 | 20 | 6 | 110,390 |
| CEPR6200-TH | ● | 20 | 45 | 125 | 20 | 6 | 97,020 |
| CEPR6220-TH | ● | 22 | 45 | 135 | 20 | 6 | 129,030 |
| CEPR6240-TH | ● | 24 | 50 | 140 | 25 | 6 | 167,740 |
| CEPR8250-TH | ● | 25 | 50 | 140 | 25 | 8 | 187,680 |
| CEPR8260-TH | ● | 26 | 50 | 140 | 25 | 8 | 190,030 |
| CEPR8280-TH | ● | 28 | 55 | 145 | 25 | 8 | 208,800 |
| CEPR8300-TH | ● | 30 | 60 | 165 | 32 | 8 | 236,950 |
| CEPR8320-TH | ● | 32 | 70 | 175 | 32 | 8 | 265,100 |

●印：標準在庫品です。● : Stocked items.　＊：センタ穴付き　＊ : Center eyed

## CEPS-TH、CEPR-TH、CEPL-THの対応被削材

Applicable work material of CEPS-TH, CEPR-TH, CEPL-TH, CEPL-TH

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | | |

## 再研磨対応外径範囲

Re-grinding compatibility range

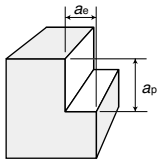
| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| CEPS-TH | × (N/A) | 2～6 |
| CEPR-TH | 8～32 | 2～32 |
| CEPL-TH | 8～25 | 3～25 |



## 標準切削条件表 Recommended cutting conditions

**CEPS-TH** ショート刃長 Short

**CEPR-TH** レギュラー刃長 Regular




### ＜側面切削＞ Side milling

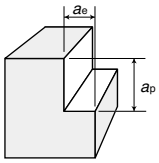
| | 被削材 Work material | 工具鋼 Tool steels (25～35HRC) SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) CENA1,NAK80 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | | 焼入れ鋼 Hardened steels (55～65HRC) SKD11, SKH51 | | 焼入れ鋼 Hardened steels (65～70HRC) SKH, HAP | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 高速条件 High speed | 切込み Depth of cut (mm) | ap=1.5DC | ae=0.1DC | ap=1.5DC | ae=0.05DC | ap=1.5DC | ae=0.03DC | ap=1.5DC | ae=0.02DC | ap=1.5DC | ae=0.02DC |
| | 外径DC Tool dia. (mm) | 回転数n (min-1) | 送り速度vf (mm/min) | 回転数n (min-1) | 送り速度vf (mm/min) | 回転数n (min-1) | 送り速度vf (mm/min) | 回転数n (min-1) | 送り速度vf (mm/min) | 回転数n (min-1) | 送り速度vf (mm/min) |
| | ϕ1 | 50,000 | 1,680 | 50,000 | 1,500 | 50,000 | 1,320 | 48,000 | 1,150 | 32,000 | 690 |
| | ϕ2 | 40,000 | 2,910 | 40,000 | 2,600 | 32,000 | 1,830 | 24,000 | 1,250 | 16,000 | 750 |
| | ϕ3 | 27,000 | 3,180 | 27,000 | 2,840 | 21,000 | 1,940 | 16,000 | 1,340 | 11,000 | 830 |
| | ϕ4 | 20,000 | 3,360 | 20,000 | 3,000 | 16,000 | 2,110 | 12,000 | 1,440 | 8,000 | 860 |
| | ϕ6 | 13,000 | 4,910 | 13,000 | 4,390 | 11,000 | 3,270 | 8,000 | 2,160 | 5,300 | 1,290 |
| | ϕ8 | 10,000 | 5,040 | 10,000 | 4,500 | 8,000 | 3,170 | 6,000 | 2,160 | 4,000 | 1,300 |
| | ϕ10 | 8,000 | 4,840 | 8,000 | 4,320 | 6,400 | 3,040 | 4,800 | 2,070 | 3,200 | 1,240 |
| | ϕ12 | 6,600 | 4,440 | 6,600 | 3,960 | 5,300 | 2,800 | 4,000 | 1,920 | 2,700 | 1,170 |
| | ϕ16 | 5,000 | 4,200 | 5,000 | 3,750 | 4,000 | 2,640 | 3,000 | 1,800 | 2,000 | 1,080 |
| | ϕ20 | 4,000 | 4,030 | 4,000 | 3,600 | 3,200 | 2,530 | 2,400 | 1,730 | 1,600 | 1,040 |
| | ϕ25 | 3,200 | 4,590 | 3,200 | 4,100 | 2,500 | 2,820 | 1,900 | 1,950 | 1,300 | 1,200 |
| | ϕ30 | 2,700 | 4,110 | 2,700 | 3,670 | 2,100 | 2,510 | 1,600 | 1,740 | 1,100 | 1,080 |
| 汎用条件 General | 切込み Depth of cut (mm) | ap=1.5DC | ae=0.1DC | ap=1.5DC | ae=0.1DC | ap=1.5DC | ae=0.06DC | ap=1.5DC | ae=0.04DC | ap=1.5DC | ae=0.04DC |
| | 外径DC Tool dia. (mm) | 回転数n (min-1) | 送り速度vf (mm/min) | 回転数n (min-1) | 送り速度vf (mm/min) | 回転数n (min-1) | 送り速度vf (mm/min) | 回転数n (min-1) | 送り速度vf (mm/min) | 回転数n (min-1) | 送り速度vf (mm/min) |
| | ϕ1 | 15,000 | 500 | 15,000 | 320 | 15,000 | 280 | 15,000 | 250 | 13,000 | 200 |
| | ϕ2 | 15,000 | 1,090 | 15,000 | 680 | 13,000 | 520 | 9,600 | 350 | 6,400 | 210 |
| | ϕ3 | 13,000 | 1,530 | 11,000 | 810 | 8,000 | 520 | 6,400 | 380 | 4,200 | 220 |
| | ϕ4 | 10,000 | 1,680 | 8,000 | 840 | 6,000 | 550 | 4,800 | 400 | 3,200 | 240 |
| | ϕ6 | 6,400 | 2,420 | 5,300 | 1,250 | 4,200 | 870 | 3,200 | 600 | 2,100 | 360 |
| | ϕ8 | 4,800 | 2,420 | 4,000 | 1,260 | 3,200 | 890 | 2,400 | 600 | 1,600 | 360 |
| | ϕ10 | 3,800 | 2,300 | 3,200 | 1,210 | 2,500 | 830 | 1,900 | 570 | 1,300 | 350 |
| | ϕ12 | 3,200 | 2,150 | 2,700 | 1,130 | 2,100 | 780 | 1,600 | 540 | 1,100 | 330 |
| | ϕ16 | 2,400 | 2,070 | 2,000 | 1,080 | 1,600 | 760 | 1,200 | 520 | 800 | 310 |
| | ϕ20 | 1,900 | 1,920 | 1,600 | 1,010 | 1,300 | 720 | 1,000 | 500 | 600 | 270 |
| | ϕ25 | 1,500 | 2,110 | 1,300 | 1,140 | 1,000 | 770 | 800 | 560 | 510 | 320 |
| | ϕ30 | 1,300 | 2,000 | 1,100 | 1,060 | 800 | 670 | 600 | 460 | 420 | 290 |

【注意】 ①できるだけ高剛性、高精度の機械をご使用ください。
②被削材、加工形状に合わせて、適切なクーラントを使用してください。
③この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。

【Note】 ① Use a highly rigid and accurate machine as possible.
② Use the appropriate coolant for the work material and machining shape.
③ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

# Epoch TH Hard
# エポックTHハード

## CEPL-TH
ロング刃長
Long




## ＜側面仕上げ切削＞ Side milling (Finishing)

| 被削材 Work material | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) SUS304、SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | | 焼入れ鋼 Hardened steels (55～65HRC) SKD11、SKH51 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | ap=3DC ae=0.01DC | | ap=3DC ae=0.01DC | | ap=3DC ae=0.01DC | | ap=3DC ae=0.01DC | | ap=3DC ae=0.01DC | | ap=3DC ae=0.01DC | | ap=3DC ae=0.01DC | |
| 外径DC Tool dia. (mm) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| 3 | 7,960 | 960 | 7,960 | 960 | 6,370 | 760 | 6,370 | 760 | 5,310 | 420 | 5,310 | 320 | 4,240 | 250 |
| 4 | 5,970 | 1,190 | 5,970 | 1,190 | 4,770 | 950 | 4,770 | 950 | 3,980 | 400 | 3,980 | 320 | 3,180 | 250 |
| 5 | 4,700 | 1,220 | 4,700 | 1,220 | 3,820 | 990 | 3,820 | 990 | 3,180 | 380 | 3,180 | 320 | 2,550 | 260 |
| 6 | 3,980 | 1,910 | 3,980 | 1,910 | 3,180 | 1,530 | 3,180 | 1,530 | 2,650 | 640 | 2,650 | 480 | 2,120 | 380 |
| 8 | 2,980 | 1,880 | 2,980 | 1,880 | 2,390 | 1,510 | 2,390 | 1,510 | 1,990 | 600 | 1,990 | 480 | 1,590 | 380 |
| 10 | 2,390 | 1,720 | 2,390 | 1,720 | 1,910 | 1,380 | 1,910 | 1,380 | 1,590 | 570 | 1,590 | 480 | 1,270 | 380 |
| 12 | 1,990 | 1,550 | 1,990 | 1,550 | 1,590 | 1,240 | 1,590 | 1,240 | 1,320 | 550 | 1,320 | 480 | 1,060 | 380 |
| 16 | 1,490 | 1,300 | 1,490 | 1,300 | 1,190 | 1,040 | 1,190 | 1,040 | 990 | 480 | 990 | 420 | 800 | 340 |
| 20 | 1,190 | 1,140 | 1,190 | 1,140 | 950 | 910 | 950 | 910 | 800 | 430 | 800 | 380 | 640 | 310 |
| 25 | 950 | 1,200 | 950 | 1,200 | 760 | 970 | 760 | 970 | 640 | 460 | 640 | 410 | 510 | 330 |

【注意】 ①できるだけ高剛性、高精度の機械をご使用ください。
②被削材、加工形状に合わせて、適切なクーラントを使用してください。
③この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。

【Note】 ① Use a highly rigid and accurate machine as possible.
② Use the appropriate coolant for the work material and machining shape.
③ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

# Epoch End Mill
# エポックエンドミル

高硬度材加工用スクエアエンドミル。
Square end mill for machining high-hardness materials.

ラジアスはA267頁を参照してください
Please refer to page A267 for Radius

## エポック21・レギュラー刃長 Epoch 21, Regular

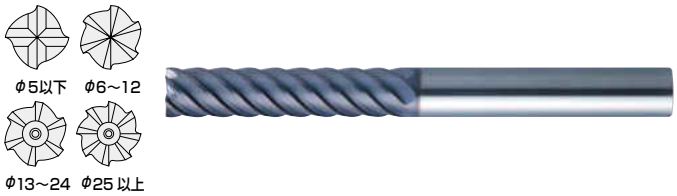
高能率側面切削 Adaptive milling / 側面 Side Cutting / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance
φ1～φ6 : 0～−0.015
φ6.5～φ32 : 0～−0.02
h6
(mm)

## エポック21・ロング刃長 Epoch 21, Long

側面 Side Cutting / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance
φ3～φ6 : 0～−0.015
φ7～φ32 : 0～−0.02
h6
(mm)




## CEPR○○○○

超硬 Carbide / C / ねじれ46° Helix angle / 切削条件表 A357 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 刃数 No. of Flutes | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|
| CEPR4010 | ● | 1 | 3.5 | 60 | 6 | 4 | 12,010 |
| CEPR4015 | ● | 1.5 | 5 | 60 | 6 | 4 | 12,010 |
| CEPR4020 | ● | 2 | 7 | 60 | 6 | 4 | 11,470 |
| CEPR4025 | ● | 2.5 | 8 | 60 | 6 | 4 | 10,650 |
| CEPR4030 | ● | 3 | 10 | 60 | 6 | 4 | 9,490 |
| CEPR4035 | ● | 3.5 | 12 | 60 | 6 | 4 | 9,970 |
| CEPR4040 | ● | 4 | 12 | 60 | 6 | 4 | 9,970 |
| CEPR4045 | ● | 4.5 | 15 | 60 | 6 | 4 | 11,110 |
| CEPR4050 | ● | 5 | 15 | 60 | 6 | 4 | 11,110 |
| CEPR4055 | ● | 5.5 | 15 | 60 | 6 | 4 | 12,020 |
| CEPR6060 | ● | 6 | 15 | 60 | 6 | 6 | 12,020 |
| CEPR6065 | ● | 6.5 | 20 | 75 | 8 | 6 | 15,940 |
| CEPR6070 | ● | 7 | 20 | 75 | 8 | 6 | 15,940 |
| CEPR6075 | ● | 7.5 | 20 | 75 | 8 | 6 | 17,740 |
| CEPR6080 | ● | 8 | 20 | 75 | 8 | 6 | 14,820 |
| CEPR6085 | ● | 8.5 | 25 | 80 | 10 | 6 | 20,430 |
| CEPR6090 | ● | 9 | 25 | 80 | 10 | 6 | 20,430 |
| CEPR6095 | ● | 9.5 | 25 | 80 | 10 | 6 | 23,460 |
| CEPR6100 | ● | 10 | 25 | 80 | 10 | 6 | 19,870 |
| CEPR6105 | ● | 10.5 | 30 | 100 | 12 | 6 | 26,930 |
| CEPR6110 | ● | 11 | 30 | 100 | 12 | 6 | 26,930 |
| CEPR6115 | ● | 11.5 | 30 | 100 | 12 | 6 | 29,740 |
| CEPR6120 | ● | 12 | 30 | 100 | 12 | 6 | 25,140 |
| CEPR6130 | ● | 13 | 35 | 105 | 16 | 6 | 40,360 |
| CEPR6140 | ● | 14 | 35 | 105 | 16 | 6 | 45,290 |
| CEPR6150 | ● | 15 | 40 | 110 | 16 | 6 | 48,220 |
| CEPR6160 | ● | 16 | 40 | 110 | 16 | 6 | 57,610 |
| CEPR6170 | ● | 17 | 40 | 120 | 20 | 6 | 78,480 |
| CEPR6180 | ● | 18 | 40 | 120 | 20 | 6 | 76,380 |
| CEPR6190 | ● | 19 | 45 | 125 | 20 | 6 | 95,140 |
| CEPR6200 | ● | 20 | 45 | 125 | 20 | 6 | 84,000 |
| CEPR6220 | ● | 22 | 45 | 135 | 20 | 6 | 117,070 |
| CEPR6240 | ● | 24 | 50 | 140 | 25 | 6 | 152,490 |
| CEPR8250 | ● | 25 | 50 | 140 | 25 | 8 | 170,090 |
| CEPR8260 | ● | 26 | 50 | 140 | 25 | 8 | 171,260 |
| CEPR8280 | ● | 28 | 55 | 145 | 25 | 8 | 190,030 |
| CEPR8300 | ● | 30 | 60 | 165 | 32 | 8 | 215,840 |
| CEPR8320 | ● | 32 | 70 | 175 | 32 | 8 | 240,470 |

## CEPL○○○○

超硬 Carbide / C / ねじれ46° Helix angle / 切削条件表 A358 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 刃数 No. of Flutes | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|
| CEPL4030 | ● | 3 | 15 | 60 | 6 | 4 | 15,960 |
| CEPL4040 | ● | 4 | 20 | 65 | 6 | 4 | 16,610 |
| CEPL4050 | ● | 5 | 25 | 70 | 6 | 4 | 18,640 |
| CEPL6060 | ● | 6 | 25 | 70 | 6 | 6 | 22,680 |
| CEPL6070 | ● | 7 | 35 | 90 | 8 | 6 | 25,480 |
| CEPL6080 | ● | 8 | 35 | 90 | 8 | 6 | 28,510 |
| CEPL6090 | ● | 9 | 45 | 100 | 10 | 6 | 32,880 |
| CEPL6100 | ● | 10 | 45 | 100 | 10 | 6 | 38,270 |
| CEPL6110 | ● | 11 | 55 | 120 | 12 | 6 | 42,420 |
| CEPL6120 | ● | 12 | 55 | 120 | 12 | 6 | 46,910 |
| ＊CEPL6130 | □ | 13 | 55 | 125 | 16 | 6 | — |
| ＊CEPL6140 | ● | 14 | 55 | 125 | 16 | 6 | 71,910 |
| ＊CEPL6150 | ● | 15 | 65 | 135 | 16 | 6 | 91,270 |
| ＊CEPL6160 | ● | 16 | 65 | 135 | 16 | 6 | 109,450 |
| ＊CEPL6170 | □ | 17 | 65 | 145 | 20 | 6 | — |
| ＊CEPL6180 | ● | 18 | 65 | 145 | 20 | 6 | 145,460 |
| ＊CEPL6190 | □ | 19 | 75 | 155 | 20 | 6 | — |
| ＊CEPL6200 | ● | 20 | 75 | 155 | 20 | 6 | 159,530 |
| ＊CEPL6220 | ● | 22 | 75 | 165 | 20 | 6 | 190,030 |
| ＊CEPL6240 | □ | 24 | 90 | 180 | 25 | 6 | — |
| ＊CEPL8250 | ● | 25 | 90 | 180 | 25 | 8 | 267,450 |
| ＊CEPL8260 | □ | 26 | 90 | 180 | 25 | 8 | — |
| ＊CEPL8280 | ● | 28 | 90 | 180 | 25 | 8 | 310,850 |
| ＊CEPL8300 | ● | 30 | 90 | 195 | 32 | 8 | 348,390 |
| ＊CEPL8320 | □ | 32 | 95 | 195 | 32 | 8 | — |

## CEPR、CEPLの対応被削材 Applicable work material of CEPR, CEPL

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | ○ | | ○ | ○ | | |

## 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| CEPR | 8 ～ 32 | 2 ～ 32 |
| CEPL | 8 ～ 32 | 3 ～ 32 |

●印：標準在庫品です。 □印：特定代理店在庫です。弊社営業へお問合せください。 ＊：センタ穴付き
● : Stocked items. □ : Stocked by specified distributor. Contact with our sales department. ＊ : Center eyed

# Epoch End Mill
# エポックエンドミル

高硬度材加工用スクエアエンドミル。
Square end mill for machining high-hardness materials.

## エポック21・ロングシャンク　Epoch 21, Long Shank

側面 Side Cutting　仕上 Finishing

外径公差 Dia.tolerance　φ6 : 0～−0.015
φ8～φ32 : 0～−0.02　h6

(mm)

φ12以下　φ16～22　φ25 以上

## CEPLS○○○○(-○○)

超硬 Carbide　C　ねじれ46° Helix angle　切削条件表 A358 Cutting Conditions

| | 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 刃数 No. of Flutes | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|
| | CEPLS6060 | ● | 6 | 12 | 70 | 6 | 6 | 16,500 |
| | CEPLS6080 | ● | 8 | 16 | 90 | 8 | 6 | 20,760 |
| | CEPLS6100 | ● | 10 | 20 | 100 | 10 | 6 | 27,720 |
| | CEPLS6120-10 | ● | 12 | 24 | 120 | 10 | 6 | 33,900 |
| | CEPLS6120 | ● | 12 | 24 | 120 | 12 | 6 | 33,900 |
| * | CEPLS6160-12 | ● | 16 | 32 | 135 | 12 | 6 | 78,480 |
| * | CEPLS6160 | ● | 16 | 32 | 135 | 16 | 6 | 78,480 |
| * | CEPLS6180 | ● | 18 | 36 | 145 | 16 | 6 | 104,530 |
| * | CEPLS6200-16 | ● | 20 | 40 | 155 | 16 | 6 | 114,730 |
| * | CEPLS6200 | ● | 20 | 40 | 155 | 20 | 6 | 114,730 |
| * | CEPLS6220 | ● | 22 | 45 | 165 | 20 | 6 | 137,250 |
| * | CEPLS8250-20 | ● | 25 | 45 | 180 | 20 | 8 | 197,070 |
| * | CEPLS8250 | ● | 25 | 45 | 180 | 25 | 8 | 197,070 |
| * | CEPLS8280 | □ | 28 | 50 | 180 | 25 | 8 | — |
| * | CEPLS8300 | □ | 30 | 50 | 195 | 25 | 8 | — |
| * | CEPLS8320-25 | □ | 32 | 55 | 195 | 25 | 8 | — |
| * | CEPLS8320 | □ | 32 | 55 | 195 | 32 | 8 | — |

## CEPLS、CEPHの対応被削材

Applicable work material of CEPR, CEPL. CEPLS, CEPH

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | ○ | | ○ | ○ | | |

## CEPUの対応被削材　Applicable work material of CEPU

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ |

## 再研磨対応外径範囲

Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| CEPLS | 8～32 | 6～32 |
| CEPH | 8～20 | 3～20 |
| CEPU | 6～20 | 4～20 |

## エポックハード　Epoch Hard

側面 Side Cutting　中仕上 Semi Finishing　仕上 Finishing

外径公差 Dia.tolerance　φ3～φ6 : 0～−0.015
φ8～φ20 : 0～−0.02　h6

(mm)

φ5以下　φ6以上

## CEPH○○○○

超硬 Carbide　C　ねじれ46° Helix angle　切削条件表 A359 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 刃数 No. of Flutes | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|
| CEPH4030 | ● | 3 | 6 | 60 | 6 | 4 | 9,970 |
| CEPH4040 | ● | 4 | 8 | 60 | 6 | 4 | 10,610 |
| CEPH4050 | ● | 5 | 10 | 60 | 6 | 4 | 11,790 |
| CEPH6060 | ● | 6 | 12 | 60 | 6 | 6 | 12,690 |
| CEPH6080 | ● | 8 | 16 | 75 | 8 | 6 | 15,710 |
| CEPH6100 | ● | 10 | 20 | 80 | 10 | 6 | 20,990 |
| CEPH6120 | ● | 12 | 24 | 100 | 12 | 6 | 26,490 |
| CEPH6160 | ● | 16 | 32 | 110 | 16 | 6 | 60,660 |
| CEPH6200 | ● | 20 | 40 | 125 | 20 | 6 | 88,220 |

# Epoch Universal
# エポックユニバーサル

側面 Side Cutting　溝 Slotting　中仕上 Semi Finishing　仕上 Finishing

外径公差 Dia.tolerance　φ4～φ6 : 0～−0.015
φ8～φ20 : 0～−0.02　h6

(mm)

2段刃溝により溝切削から側面切削まで高能率加工が可能。能率重視。
2-step flute groove enables high-efficiency machining from grooving to side cutting. Focus on efficiency.

## CEPU4○○○

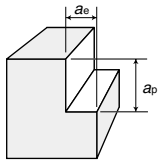
超硬 Carbide　C　ねじれ52° Helix angle　切削条件表 A360 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| CEPU4040 | ● | 4 | 12 | 60 | 6 | 11,150 |
| CEPU4060 | ● | 6 | 15 | 60 | 6 | 13,360 |
| CEPU4080 | ● | 8 | 20 | 75 | 8 | 16,390 |
| CEPU4100 | ● | 10 | 25 | 80 | 10 | 21,880 |
| CEPU4120 | ● | 12 | 30 | 100 | 12 | 27,720 |
| CEPU4160 | ● | 16 | 40 | 110 | 16 | 63,350 |
| CEPU4200 | ● | 20 | 45 | 125 | 20 | 92,670 |

●印：標準在庫品です。　□印：特定代理店在庫です。弊社営業へお問合せください。　＊：センタ穴付き
● : Stocked items.　□ : Stocked by specified distributor. Contact with our sales department.　＊ : Center eyed

# 標準切削条件表 Recommended cutting conditions

## CEPR
エポック21・レギュラー刃長
Epoch21, Regular




## ＜側面切削＞ Side milling

| 被削材 Work material | | 鋳鉄 Cast Iron (150～200HB) FC250 | | 炭素鋼 Carbon Steels (180～220HB) SS400、S50C | | 合金鋼 Alloy Steels (200～250HB) SCM440、SNCM | | ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) SUS304、SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened Steels (45～55HRC) SKD61、SKT4 | | 焼入れ鋼 Hardened Steels (55～65HRC) SKD11、SKH51 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | | ap＝1.5DC ae≦0.1DC | | ap＝1.5DC ae≦0.1DC | | ap＝1.5DC ae≦0.05DC | | ap＝1.5DC ae≦0.05DC | | ap＝1.5DC ae≦0.02DC | | ap＝1.5DC ae≦0.01DC | | ap＝1.5DC ae≦0.01DC | |
| | 外径DC Tool Dia. (mm) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) |
| 高速条件 High Speed | φ3 | 33,300 | 4,660 | 32,000 | 3,200 | 30,000 | 3,000 | 27,600 | 2,200 | 26,500 | 2,120 | 12,700 | 1,000 | 10,600 | 850 |
| | φ4 | 25,000 | 4,500 | 24,000 | 4,700 | 22,300 | 3,100 | 20,700 | 2,500 | 19,900 | 2,400 | 9,500 | 1,140 | 8,000 | 960 |
| | φ5 | 20,000 | 5,200 | 19,000 | 4,560 | 17,800 | 4,300 | 16,600 | 3,300 | 16,000 | 3,200 | 7,600 | 1,520 | 6,400 | 1,280 |
| | φ6 | 16,660 | 7,980 | 16,000 | 6,700 | 15,000 | 6,300 | 13,800 | 5,000 | 13,300 | 4,800 | 6,400 | 2,300 | 5,300 | 1,900 |
| | φ8 | 12,500 | 7,860 | 12,000 | 7,200 | 11,100 | 6,700 | 10,300 | 4,330 | 9,950 | 4,180 | 4,800 | 2,000 | 4,000 | 1,680 |
| | φ10 | 10,000 | 6,900 | 9,550 | 6,300 | 8,900 | 5,800 | 8,300 | 4,000 | 8,000 | 3,840 | 3,800 | 1,800 | 3,200 | 1,500 |
| | φ12 | 8,330 | 6,250 | 8,000 | 5,760 | 7,400 | 5,300 | 6,900 | 4,140 | 6,600 | 3,900 | 3,200 | 1,920 | 2,650 | 1,590 |
| | φ16 | 6,250 | 5,060 | 6,000 | 4,680 | 5,600 | 4,400 | 5,200 | 3,750 | 5,000 | 3,600 | 2,400 | 1,730 | 2,000 | 1,440 |
| | φ20 | 5,000 | 4,200 | 4,770 | 3,720 | 4,460 | 3,500 | 4,140 | 3,000 | 4,000 | 2,880 | 1,900 | 1,400 | 1,600 | 1,150 |
| | φ25 | 4,000 | 4,480 | 3,800 | 4,000 | 3,560 | 3,700 | 3,300 | 3,170 | 3,200 | 3,070 | 1,500 | 1,440 | 1,270 | 1,200 |
| | φ30 | 3,330 | 3,700 | 3,200 | 3,330 | 3,000 | 3,120 | 2,760 | 2,650 | 2,650 | 2,540 | 1,300 | 1,250 | 1,060 | 1,000 |
| 汎用条件 General | φ3 | 16,700 | 2,340 | 16,700 | 1,670 | 12,700 | 1,270 | 11,700 | 940 | 9,500 | 760 | 4,200 | 340 | 2,700 | 220 |
| | φ4 | 12,700 | 2,300 | 12,700 | 1,800 | 9,550 | 1,340 | 8,800 | 1,060 | 7,200 | 865 | 3,200 | 380 | 2,000 | 240 |
| | φ5 | 10,200 | 2,600 | 10,200 | 2,500 | 7,600 | 1,800 | 7,000 | 1,400 | 5,700 | 1,140 | 2,550 | 510 | 1,600 | 320 |
| | φ6 | 8,500 | 3,250 | 8,500 | 3,570 | 6,400 | 2,700 | 5,850 | 2,100 | 4,800 | 1,730 | 2,100 | 750 | 1,300 | 470 |
| | φ8 | 6,400 | 4,000 | 6,400 | 3,840 | 4,770 | 2,860 | 4,400 | 1,850 | 3,600 | 1,500 | 1,600 | 670 | 1,000 | 420 |
| | φ10 | 5,100 | 3,500 | 5,100 | 3,350 | 3,800 | 2,500 | 3,500 | 1,680 | 2,900 | 1,400 | 1,300 | 625 | 800 | 380 |
| | φ12 | 4,200 | 3,150 | 4,200 | 3,000 | 3,200 | 2,300 | 2,920 | 1,750 | 2,400 | 1,440 | 1,060 | 640 | 660 | 400 |
| | φ16 | 3,200 | 2,600 | 3,200 | 2,500 | 2,400 | 1,870 | 2,200 | 1,600 | 1,800 | 1,300 | 800 | 580 | 500 | 360 |
| | φ20 | 2,550 | 1,800 | 2,550 | 2,000 | 1,900 | 1,500 | 1,750 | 1,260 | 1,450 | 1,040 | 640 | 460 | 400 | 290 |
| | φ25 | 2,040 | 2,300 | 2,040 | 2,120 | 1,530 | 1,600 | 1,400 | 1,340 | 1,150 | 1,100 | 510 | 490 | 320 | 300 |
| | φ30 | 1,700 | 1,900 | 1,700 | 1,770 | 1,270 | 1,320 | 1,170 | 1,120 | 950 | 910 | 420 | 400 | 265 | 254 |

【注意】
①切削方法は、ダウンカットで使用ください。
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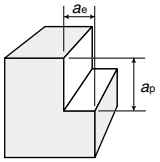
③ステンレス鋼および超耐熱合金には、不水溶性切削油のご使用が適しています。
④安定した切削を行うため、剛性の高い機械とセットアップでご使用ください。
⑤機械の回転数が足りない場合は、主軸回転数とテーブル送り速度を同比率で下げてください。
⑥加工形状、機械の剛性、工具突き出し量等、ご使用の状況により、主軸回転数とテーブル送り速度の調整を行ってください。

【Note】
① Down-cutting is recommended.
② Use generally dry (air-blow) or oil-mist coolant, especially at the high-speed machining.
③ Oil base coolant is recommended for machining stainless steels and heat-resistant alloys.
④ Use a machine tool with rigidity and rigid set-up, to machine stably.
⑤ When the revolution speed is not enough, reduce the revolution speed and table speed at the same ratio.
⑥ Adjust the revolution speed and table speed, according to cutting conditions such as machining shape, rigidity of machine tool, over-hang and so on.

# Epoch End Mill
# エポックエンドミル

## CEPL
エポック21・ロング刃長
Epoch21, Long




### ＜側面仕上げ加工＞ Side finishing

| 被削材 Work material | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) SUS304、SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | | 焼入れ鋼 Hardened steels (55～65HRC) SKD11、SKH51 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | ap=3DC ae=0.01DC | | ap=3DC ae=0.01DC | | ap=3DC ae=0.01DC | | ap=3DC ae=0.01DC | | ap=3DC ae=0.01DC | | ap=3DC ae=0.01DC | | ap=3DC ae=0.01DC | |
| 外径DC Tool dia. (mm) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| φ3 | 7,960 | 960 | 7,960 | 960 | 6,370 | 760 | 6,370 | 760 | 5,310 | 420 | 5,310 | 320 | 4,240 | 250 |
| φ4 | 5,970 | 1,190 | 5,970 | 1,190 | 4,770 | 950 | 4,770 | 950 | 3,980 | 400 | 3,980 | 320 | 3,180 | 250 |
| φ5 | 4,700 | 1,220 | 4,700 | 1,220 | 3,820 | 990 | 3,820 | 990 | 3,180 | 380 | 3,180 | 320 | 2,550 | 260 |
| φ6 | 3,980 | 1,910 | 3,980 | 1,910 | 3,180 | 1,530 | 3,180 | 1,530 | 2,650 | 640 | 2,650 | 480 | 2,120 | 380 |
| φ8 | 2,980 | 1,880 | 2,980 | 1,880 | 2,390 | 1,510 | 2,390 | 1,510 | 1,990 | 600 | 1,990 | 480 | 1,590 | 380 |
| φ10 | 2,390 | 1,720 | 2,390 | 1,720 | 1,910 | 1,380 | 1,910 | 1,380 | 1,590 | 570 | 1,590 | 480 | 1,270 | 380 |
| φ12 | 1,990 | 1,550 | 1,990 | 1,550 | 1,590 | 1,240 | 1,590 | 1,240 | 1,320 | 550 | 1,320 | 480 | 1,060 | 380 |
| φ16 | 1,490 | 1,300 | 1,490 | 1,300 | 1,190 | 1,040 | 1,190 | 1,040 | 990 | 480 | 990 | 420 | 800 | 340 |
| φ20 | 1,190 | 1,140 | 1,190 | 1,140 | 950 | 910 | 950 | 910 | 800 | 430 | 800 | 380 | 640 | 310 |
| φ25 | 950 | 1,200 | 950 | 1,200 | 760 | 970 | 760 | 970 | 640 | 460 | 640 | 410 | 510 | 330 |
| φ30 | 800 | 1,020 | 800 | 1,020 | 640 | 820 | 640 | 820 | 530 | 380 | 530 | 340 | 420 | 270 |

【注意】
①切削方法は、ダウンカットで使用ください。
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⑤機械の回転数が足りない場合は、主軸回転数とテーブル送り速度を同比率で下げてください。
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【Note】
①Down-cutting is recommended.
②Use generally dry (air-blow) or oil-mist coolant, especially at the high-speed machining.
③Oil base coolant is recommended for machining stainless steels and heat-resistant steels.
④Use a machine tool with rigidity and rigid set-up, to machine stably.
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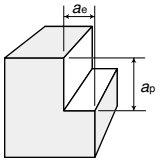
## CEPLS
エポック21・ロングシャンク
Epoch21, Long Shank




### ＜側面切削＞ Side milling

| 被削材 Work material | 鋳鉄 Cast Irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) SUS304、SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | | 焼入れ鋼 Hardened steels (55～65HRC) SKD11、SKH51 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | ap=1.5DC ae=0.1DC | | ap=1.5DC ae=0.1DC | | ap=1.5DC ae=0.1DC | | ap=1.5DC ae=0.05DC | | ap=1.5DC ae=0.05DC | | ap=1.5DC ae=0.05DC | | ap=1.5DC ae=0.05DC | |
| 外径DC Tool dia. (mm) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| φ6 | 3,980 | 1,910 | 3,980 | 1,910 | 3,180 | 1,530 | 3,180 | 1,530 | 2,650 | 640 | 2,650 | 480 | 2,120 | 380 |
| φ8 | 2,980 | 1,880 | 2,980 | 1,880 | 2,390 | 1,510 | 2,390 | 1,510 | 1,990 | 600 | 1,990 | 480 | 1,590 | 380 |
| φ10 | 2,390 | 1,720 | 2,390 | 1,720 | 1,910 | 1,380 | 1,910 | 1,380 | 1,590 | 570 | 1,590 | 480 | 1,270 | 380 |
| φ12 | 1,990 | 1,550 | 1,990 | 1,550 | 1,590 | 1,240 | 1,590 | 1,240 | 1,320 | 550 | 1,320 | 480 | 1,060 | 380 |
| φ16 | 1,490 | 1,300 | 1,490 | 1,300 | 1,190 | 1,040 | 1,190 | 1,040 | 990 | 480 | 990 | 420 | 800 | 340 |
| φ20 | 1,190 | 1,140 | 1,190 | 1,140 | 950 | 910 | 950 | 910 | 800 | 430 | 800 | 380 | 640 | 310 |
| φ25 | 950 | 1,220 | 950 | 1,220 | 760 | 970 | 760 | 970 | 640 | 460 | 640 | 410 | 510 | 330 |
| φ30 | 800 | 1,020 | 800 | 1,020 | 640 | 820 | 640 | 820 | 530 | 380 | 530 | 340 | 420 | 270 |

【注意】
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【Note】
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②Use generally dry (air-blow) or oil-mist coolant, especially at the high-speed machining.
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④Use a machine tool with rigidity and rigid set-up, to machine stably.
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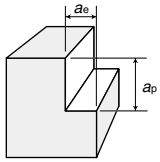
**CEPH**
ハード
Hard




## ＜側面切削＞ Side milling

| 被削材 Work material | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) SUS304、SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | | 焼入れ鋼 Hardened steels (55～65HRC) SKD11 | | 焼入れ鋼 Hardened steels (65～70HRC) SKH、HAP | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | | ap＝1.5DC ae≦0.1DC | | ap＝1.5DC ae≦0.05DC | | ap＝1.5DC ae≦0.05DC | | ap＝1.5DC ae≦0.02DC | | ap＝1.5DC ae≦0.01DC | | ap＝1.5DC ae≦0.01DC | | ap＝1.5DC ae≦0.01DC | |
| | 外径DC Tool dia. (mm) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) |
| 高速条件 High speed | φ3 | 26,500 | 2,650 | 26,500 | 2,650 | 26,500 | 2,120 | 26,500 | 2,120 | 21,200 | 1,700 | 16,000 | 1,280 | 10,600 | 850 |
| | φ4 | 19,900 | 2,790 | 19,900 | 2,790 | 19,900 | 2,400 | 19,900 | 2,400 | 15,900 | 1,900 | 12,000 | 1,440 | 8,000 | 960 |
| | φ5 | 16,000 | 4,160 | 16,000 | 4,160 | 16,000 | 3,200 | 16,000 | 3,200 | 12,700 | 2,540 | 9,500 | 1,900 | 6,400 | 1,280 |
| | φ6 | 13,300 | 6,400 | 13,300 | 6,400 | 13,300 | 4,800 | 13,300 | 4,800 | 10,600 | 3,800 | 8,000 | 2,880 | 5,300 | 1,900 |
| | φ8 | 9,950 | 6,270 | 9,950 | 6,270 | 9,950 | 4,200 | 9,950 | 4,200 | 8,000 | 3,360 | 6,000 | 2,520 | 4,000 | 1,680 |
| | φ10 | 8,000 | 5,520 | 8,000 | 5,520 | 8,000 | 3,840 | 8,000 | 3,840 | 6,400 | 3,050 | 4,800 | 2,300 | 3,200 | 1,580 |
| | φ12 | 6,600 | 4,950 | 6,600 | 4,950 | 6,600 | 3,960 | 6,600 | 3,960 | 5,300 | 3,180 | 4,000 | 2,400 | 2,600 | 1,560 |
| | φ16 | 5,000 | 4,000 | 5,000 | 4,000 | 5,000 | 3,600 | 5,000 | 3,600 | 4,000 | 2,880 | 3,000 | 2,160 | 2,000 | 1,440 |
| | φ20 | 4,000 | 3,360 | 4,000 | 3,360 | 4,000 | 2,880 | 4,000 | 2,880 | 3,200 | 2,300 | 2,400 | 1,730 | 1,600 | 1,150 |
| 汎用条件 General | φ3 | 16,000 | 1,600 | 16,000 | 1,600 | 11,700 | 940 | 8,000 | 640 | 4,800 | 385 | 3,200 | 256 | 2,100 | 170 |
| | φ4 | 11,200 | 1,570 | 11,200 | 1,570 | 8,800 | 1,060 | 6,000 | 720 | 3,600 | 430 | 2,400 | 290 | 1,600 | 190 |
| | φ5 | 9,550 | 2,500 | 9,550 | 2,500 | 7,000 | 1,400 | 4,800 | 960 | 2,900 | 580 | 1,900 | 380 | 1,300 | 260 |
| | φ6 | 8,000 | 3,840 | 8,000 | 3,840 | 5,850 | 2,100 | 3,000 | 1,080 | 2,400 | 860 | 1,600 | 580 | 1,060 | 380 |
| | φ8 | 6,000 | 3,780 | 6,000 | 3,780 | 4,400 | 1,850 | 3,000 | 1,260 | 1,800 | 760 | 1,200 | 500 | 800 | 330 |
| | φ10 | 4,800 | 3,200 | 4,800 | 3,200 | 3,500 | 1,680 | 2,400 | 1,150 | 1,430 | 690 | 950 | 220 | 640 | 300 |
| | φ12 | 4,000 | 3,000 | 4,000 | 3,000 | 2,920 | 1,750 | 2,000 | 1,200 | 1,200 | 720 | 800 | 480 | 530 | 320 |
| | φ16 | 3,000 | 2,400 | 3,000 | 2,400 | 2,200 | 1,580 | 1,500 | 1,080 | 900 | 650 | 600 | 430 | 400 | 290 |
| | φ20 | 2,400 | 2,000 | 2,400 | 2,000 | 1,750 | 1,260 | 1,200 | 860 | 720 | 520 | 480 | 350 | 320 | 230 |

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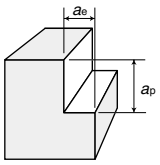
# Epoch Universal
# エポックユニバーサル

**CEPU**
ユニバーサル
Universal

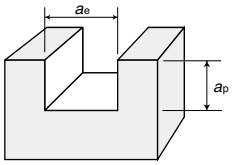



## ＜側面切削＞ Side milling

| 被削材 Work material | | 鋳鉄 Cast Iron (150～200HB) FC250 | | 炭素鋼 Carbon Steels (180～220HB) SS400、S50C | | 合金鋼 Alloy Steels (200～250HB) SCM440、SNCM | | ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) SUS304、SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened Steels (45～55HRC) SKD61、SKT4 | | 焼入れ鋼 Hardened Steels (55～65HRC) SKD11、SKH51 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | | ap＝1.5DC ae≦0.1DC | | ap＝1.5DC ae≦0.1DC | | ap＝1.5DC ae≦0.05DC | | ap＝1.5DC ae≦0.05DC | | ap＝1.5DC ae≦0.02DC | | ap＝1.5DC ae≦0.01DC | | ap＝1.5DC ae≦0.01DC | |
| 外径DC Tool Dia. (mm) | | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| 高速条件 High Speed | φ4 | 25,000 | 4,500 | 23,900 | 3,350 | 22,300 | 3,100 | 20,700 | 2,400 | 19,900 | 2,400 | 9,500 | 1,140 | 8,000 | 960 |
| | φ6 | 16,660 | 5,300 | 16,000 | 4,500 | 14,900 | 4,200 | 13,700 | 3,300 | 13,300 | 3,200 | 6,400 | 1,500 | 5,300 | 1,300 |
| | φ8 | 12,500 | 5,250 | 12,000 | 4,800 | 11,100 | 4,400 | 10,350 | 2,900 | 9,950 | 2,800 | 4,800 | 1,350 | 4,000 | 1,120 |
| | φ10 | 10,000 | 4,600 | 9,550 | 4,200 | 8,900 | 3,900 | 8,300 | 2,650 | 8,000 | 2,560 | 3,800 | 1,200 | 3,200 | 1,000 |
| | φ12 | 8,330 | 4,170 | 8,000 | 3,800 | 7,400 | 3,550 | 6,900 | 2,760 | 6,600 | 2,640 | 3,200 | 1,280 | 2,650 | 1,060 |
| | φ16 | 6,250 | 3,400 | 6,000 | 3,100 | 5,600 | 2,900 | 5,200 | 2,500 | 5,000 | 2,400 | 2,400 | 1,150 | 2,000 | 960 |
| | φ20 | 5,000 | 2,800 | 4,770 | 2,500 | 4,450 | 2,300 | 4,100 | 1,970 | 4,000 | 1,920 | 1,900 | 910 | 1,600 | 770 |
| 汎用条件 General | φ4 | 12,700 | 2,300 | 12,700 | 1,780 | 9,500 | 1,330 | 8,800 | 1,060 | 7,200 | 865 | 3,200 | 380 | 2,700 | 240 |
| | φ6 | 8,500 | 2,720 | 8,500 | 2,400 | 6,400 | 1,800 | 5,850 | 1,400 | 4,800 | 1,150 | 2,100 | 500 | 1,300 | 310 |
| | φ8 | 6,400 | 2,700 | 6,400 | 2,600 | 4,800 | 1,900 | 4,400 | 1,230 | 3,600 | 1,000 | 1,600 | 450 | 1,000 | 280 |
| | φ10 | 5,100 | 2,350 | 5,100 | 2,200 | 3,800 | 1,680 | 3,500 | 1,120 | 2,900 | 930 | 1,300 | 420 | 800 | 260 |
| | φ12 | 4,200 | 2,100 | 4,200 | 2,000 | 3,200 | 1,500 | 2,920 | 1,170 | 2,400 | 960 | 1,060 | 420 | 660 | 260 |
| | φ16 | 3,200 | 1,720 | 3,200 | 1,660 | 2,400 | 1,250 | 2,200 | 1,060 | 1,800 | 860 | 800 | 380 | 500 | 240 |
| | φ20 | 2,550 | 1,400 | 2,500 | 1,300 | 1,900 | 1,000 | 1,750 | 840 | 1,400 | 670 | 640 | 300 | 400 | 190 |

【注意】
①切削方法は、ダウンカットで使用ください。
②一般材、とくに高速切削は、乾式（エアブロー）またはオイルミストクーラントにてご使用ください。
③ステンレス鋼および超耐熱合金には、不水溶性切削油のご使用が適しています。
④安定した切削を行うため、剛性の高い機械とセットアップでご使用ください。
⑤機械の回転数が足りない場合は、主軸回転数とテーブル送り速度を同比率で下げてください。
⑥加工形状、機械の剛性、工具突き出し量等、ご使用の状況により、主軸回転数とテーブル送り速度の調整を行ってください。

【Note】
① Down-cutting is recommended.
② Use generally dry (air-blow) or oil-mist coolant, especially at the high-speed machining.
③ Oil base coolant is recommended for machining stainless steels and heat-resistant alloys.
④ Use a machine tool with rigidity and rigid set-up, to machine stably.
⑤ When the revolution speed is not enough, reduce the revolution speed and table speed at the same ratio.
⑥ Adjust the revolution speed and table speed, according to cutting conditions such as machining shape, rigidity of machine tool, over-hang and so on.




## ＜溝切削＞ Slotting

| 被削材 Work material | | 鋳鉄 Cast Iron (150～200HB) FC250 | | 炭素鋼 Carbon Steels (180～220HB) SS400、S50C | | 合金鋼 Alloy Steels (200～250HB) SCM440、SNCM | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened Steels (45～55HRC) SKD61、SKT4 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | | | | ap≦0.5DC, ae＝1DC | | ap≦0.5DC, ae＝1DC | | ap≦0.2DC, ae＝1DC | | | |
| 外径DC Tool dia. (mm) | | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| 高速条件 High Speed | φ4 | | | 9,550 | 1,530 | 7,960 | 960 | 3,980 | 400 | | |
| | φ6 | | | 6,370 | 1,530 | 5,310 | 1,060 | 2,650 | 420 | | |
| | φ8 | | | 4,770 | 1,530 | 3,980 | 1,030 | 1,990 | 400 | | |
| | φ10 | | | 3,820 | 1,530 | 3,180 | 1,020 | 1,590 | 380 | | |
| | φ12 | | | 3,180 | 1,400 | 2,650 | 950 | 1,330 | 350 | | |
| | φ16 | | | 2,390 | 1,150 | 1,990 | 800 | 990 | 320 | | |
| | φ20 | | | 1,910 | 920 | 1,590 | 640 | 800 | 260 | | |
| 切込み Depth of cut (mm) | | ap≦1DC, ae＝1DC | | ap≦1DC, ae＝1DC | | ap≦1DC, ae＝1DC | | ap≦0.5DC, ae＝1DC | | ap≦0.2DC ,ae＝1DC | |
| 外径DC Tool dia. (mm) | | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| 汎用条件 General | φ4 | 2,390 | 380 | 6,370 | 1,020 | 5,570 | 670 | 3,180 | 320 | 1,590 | 130 |
| | φ6 | 1,590 | 380 | 4,240 | 1,020 | 3,710 | 740 | 2,120 | 340 | 1,060 | 130 |
| | φ8 | 1,190 | 380 | 3,180 | 1,020 | 2,790 | 730 | 1,590 | 320 | 800 | 130 |
| | φ10 | 950 | 380 | 2,550 | 1,020 | 2,230 | 710 | 1,270 | 300 | 640 | 130 |
| | φ12 | 800 | 350 | 2,120 | 930 | 1,860 | 670 | 1,060 | 280 | 530 | 120 |
| | φ16 | 600 | 290 | 1,590 | 760 | 1,390 | 560 | 800 | 260 | 400 | 100 |
| | φ20 | 480 | 230 | 1,270 | 610 | 1,110 | 440 | 640 | 200 | 320 | 80 |

【注意】
①一般材、とくに高速切削は、乾式（エアブロー）またはオイルミストクーラントにてご使用ください。
②安定した切削を行うため、剛性の高い機械とセットアップでご使用ください。
③機械の回転数が足りない場合は、主軸回転数とテーブル送り速度を同比率で下げてください。
④加工形状、機械の剛性、工具突き出し量等、ご使用の状況により、主軸回転数とテーブル送り速度の調整を行ってください。

【Note】
① Use generally dry (air-blow) or oil-mist coolant, especially at the high-speed machining.
② Use a machine tool with rigidity and rigid set-up, to machine stably.
③ When the revolution speed is not enough, reduce the revolution speed and table speed at the same ratio.
④ Adjust the revolution speed and table speed, according to cutting conditions such as machining shape, rigidity of machine tool, over-hang and so on.

# Epoch SUS Wave
# エポックSUSウェーブ

YouTube 動画公開中

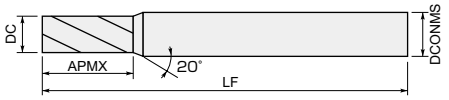
**レギュラー刃長** | Regular

平面 Planing | 側面 Side Cutting | 溝 Slotting | 彫込み Die-sinking | 曲面 Profiling | R Radius | ヘリカル Helical | 座ぐり Spot Facing | 荒 Roughing | 中仕上 Semi Finishing

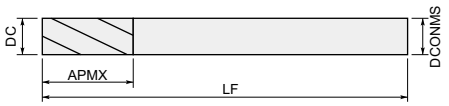
外径公差 Dia.tolerance 0～−0.05 | h5 φ6～12 | h6 φ16, φ20 | (mm)

ステンレス鋼の低剛性マシンや・弱クランプ環境での安定加工へ対応。
For stable cutting of stainless steel in environments using low-rigidity machines and weak clamps.

Aタイプ A type




Bタイプ B type




## EPSW□□□□-PN

超硬 Carbide | PN | ねじれ30° Helix angle | 不等分割 Unequal pitch | 切削条件表 A364 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | コーナ面取り幅 Corner chamfering width | 刃数 No. of flutes | 形状 Shape | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|
| EPSW3040-PN | ● | 4 | 10 | 56 | 6 | 0.3 | 3 | A | 10,690 |
| EPSW3045-PN | □ | 4.5 | 11.3 | 56 | 6 | 0.3 | 3 | A | – |
| EPSW3050-PN | ● | 5 | 12.5 | 56 | 6 | 0.3 | 3 | A | 12,020 |
| EPSW3055-PN | □ | 5.5 | 13.8 | 56 | 6 | 0.3 | 3 | A | – |
| EPSW4060-PN | ● | 6 | 15 | 56 | 6 | 0.4 | 4 | B | 13,030 |
| EPSW4065-PN | □ | 6.5 | 16.3 | 63 | 8 | 0.4 | 4 | A | – |
| EPSW4070-PN | ● | 7 | 17.5 | 63 | 8 | 0.4 | 4 | A | 15,150 |
| EPSW4075-PN | □ | 7.5 | 18.8 | 63 | 8 | 0.4 | 4 | A | – |
| EPSW4080-PN | ● | 8 | 20 | 63 | 8 | 0.5 | 4 | B | 15,150 |
| EPSW4085-PN | □ | 8.5 | 21.3 | 74 | 10 | 0.5 | 4 | A | – |
| EPSW4090-PN | ● | 9 | 22.5 | 74 | 10 | 0.5 | 4 | A | 17,290 |
| EPSW4095-PN | □ | 9.5 | 23.8 | 74 | 10 | 0.5 | 4 | A | – |
| EPSW4100-PN | ● | 10 | 25 | 74 | 10 | 0.5 | 4 | B | 17,290 |
| EPSW4105-PN | □ | 10.5 | 26.3 | 86 | 12 | 0.5 | 4 | A | – |
| EPSW4110-PN | ● | 11 | 27.5 | 86 | 12 | 0.5 | 4 | A | 21,100 |
| EPSW4115-PN | □ | 11.5 | 28.8 | 86 | 12 | 0.5 | 4 | A | – |
| EPSW4120-PN | ● | 12 | 30 | 86 | 12 | 0.5 | 4 | B | 21,100 |
| EPSW4130-PN | □ | 13 | 32.5 | 105 | 16 | 0.7 | 4 | A | – |
| EPSW4140-PN | □ | 14 | 35 | 105 | 16 | 0.7 | 4 | A | – |
| EPSW4150-PN | □ | 15 | 37.5 | 110 | 16 | 0.7 | 4 | A | – |
| EPSW4160-PN | ● | 16 | 40 | 110 | 16 | 0.7 | 4 | B | 47,280 |
| EPSW4170-PN | □ | 17 | 42.5 | 120 | 20 | 0.7 | 4 | A | – |
| EPSW4180-PN | □ | 18 | 45 | 120 | 20 | 0.7 | 4 | A | – |
| EPSW4190-PN | □ | 19 | 47.5 | 125 | 20 | 0.7 | 4 | A | – |
| EPSW4200-PN | ● | 20 | 50 | 125 | 20 | 0.7 | 4 | B | 68,750 |

### 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | | | | ◎ | ◎ | ◎ | ◎ |

### 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPSW-PN | 6～20 | 6～20 |

●印：標準在庫品です。 □印：特定代理店在庫です。弊社営業へお問合せください。
●：Stocked items. □：Stocked by specified distributor. Contact with our sales department.

# Epoch SUS Wave
# エポックSUSウェーブ

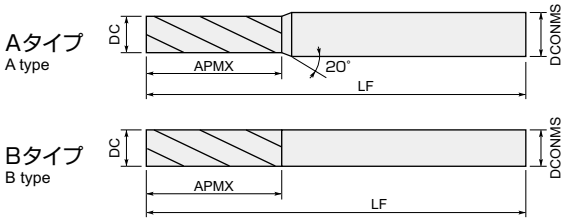
YouTube 動画公開中

**ロング刃長** | Long

側面 Side Cutting　荒 Roughing

外径公差 Dia.tolerance 0～−0.05　h5 φ6～12　h6 φ16,φ20　(mm)

ステンレス鋼の低剛性マシンや・弱クランプ環境での安定加工へ対応。
For stable cuttiing of stainless steel in environments using low-rigidity machines and weak clamps.




## EPSWL4○○○-PN

超硬 Carbide　PN　なじれ30° Helix angle　不等分割 Unequal pitch　切削条件表 A368 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | コーナ面取り幅 Corner chamfering width | 刃数 No. of flutes | 形状 Shape | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|
| EPSWL4060-PN | ● | 6 | 30 | 70 | 6 | 0.4 | 4 | B | 22,110 |
| EPSWL4070-PN | □ | 7 | 35 | 80 | 8 | 0.4 | 4 | A | – |
| EPSWL4080-PN | ● | 8 | 40 | 80 | 8 | 0.5 | 4 | B | 25,810 |
| EPSWL4090-PN | □ | 9 | 45 | 100 | 10 | 0.5 | 4 | A | – |
| EPSWL4100-PN | ● | 10 | 50 | 100 | 10 | 0.5 | 4 | B | 29,410 |
| EPSWL4110-PN | □ | 11 | 55 | 120 | 12 | 0.5 | 4 | A | – |
| EPSWL4120-PN | ● | 12 | 60 | 120 | 12 | 0.5 | 4 | B | 35,910 |
| EPSWL4130-PN | □ | 13 | 65 | 130 | 16 | 0.7 | 4 | A | – |
| EPSWL4140-PN | □ | 14 | 70 | 130 | 16 | 0.7 | 4 | A | – |
| EPSWL4150-PN | □ | 15 | 75 | 130 | 16 | 0.7 | 4 | A | – |
| EPSWL4160-PN | ● | 16 | 80 | 135 | 16 | 0.7 | 4 | B | 80,360 |
| EPSWL4170-PN | □ | 17 | 85 | 135 | 20 | 0.7 | 4 | A | – |
| EPSWL4180-PN | □ | 18 | 90 | 145 | 20 | 0.7 | 4 | A | – |
| EPSWL4190-PN | □ | 19 | 95 | 145 | 20 | 0.7 | 4 | A | – |
| EPSWL4200-PN | ● | 20 | 100 | 155 | 20 | 0.7 | 4 | B | 116,840 |

### 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | | | | ◎ | ◎ | ◎ | ◎ |

### 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPSWL-PN | 6 ～ 20 | 6 ～ 20 |

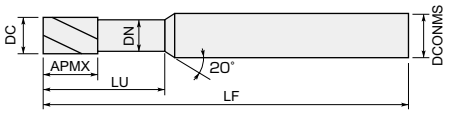
●印：標準在庫品です。　□印：特定代理店在庫です。弊社営業へお問合せください。
●：Stocked items.　□：Stocked by specified distributor. Contact with our sales department.

## 首下3DC　Under neck 3DC type

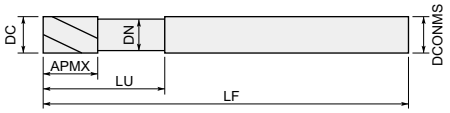
平面 Planing / 側面 Side Cutting / 溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical / 座ぐり Spot Facing / 荒 Roughing / 中仕上 Semi Finishing

外径公差 Dia.tolerance　0～−0.05　h5 φ6～12　h6 φ16,φ20　(mm)

Aタイプ A type




Bタイプ B type




## EPSW○○○○-○○-PN

超硬 Carbide / PN / ねじれ30° Helix angle / 不等分割 Unequal pitch / 切削条件表 A364 Cutting Conditions

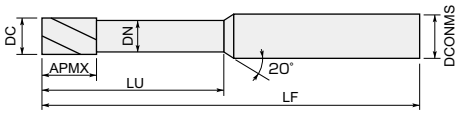
| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 首下長 Under neck length LU | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | コーナ面取り幅 Corner chamfering width | 刃数 No. of flutes | 形状 Shape | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EPSW3040-12-PN | ● | 4 | 6 | 12 | 3.7 | 56 | 6 | 0.3 | 3 | A | 10,690 |
| EPSW3050-15-PN | ● | 5 | 7.5 | 15 | 4.6 | 56 | 6 | 0.3 | 3 | A | 12,020 |
| EPSW4060-18-PN | ● | 6 | 9 | 18 | 5.5 | 56 | 6 | 0.4 | 4 | B | 13,030 |
| EPSW4070-21-PN | ● | 7 | 10.5 | 21 | 6.4 | 63 | 8 | 0.4 | 4 | A | 15,150 |
| EPSW4080-24-PN | ● | 8 | 12 | 24 | 7.3 | 63 | 8 | 0.5 | 4 | B | 15,150 |
| EPSW4090-27-PN | ● | 9 | 13.5 | 27 | 8.3 | 74 | 10 | 0.5 | 4 | A | 17,290 |
| EPSW4100-30-PN | ● | 10 | 15 | 30 | 9.1 | 74 | 10 | 0.5 | 4 | B | 17,290 |
| EPSW4110-33-PN | ● | 11 | 16.5 | 33 | 10.2 | 86 | 12 | 0.5 | 4 | A | 21,100 |
| EPSW4120-36-PN | ● | 12 | 18 | 36 | 11 | 86 | 12 | 0.5 | 4 | B | 21,100 |
| EPSW4160-48-PN | ● | 16 | 24 | 48 | 14.5 | 110 | 16 | 0.7 | 4 | B | 47,280 |
| EPSW4200-60-PN | ● | 20 | 30 | 60 | 18.2 | 125 | 20 | 0.7 | 4 | B | 68,750 |

## 首下5DC　Under neck 5DC

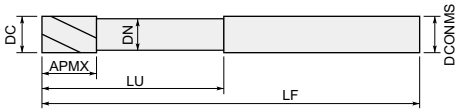
平面 Planing / 側面 Side Cutting / 溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical / 座ぐり Spot Facing / 荒 Roughing / 中仕上 Semi Finishing

外径公差 Dia.tolerance　0～−0.05　h5 φ6～12　h6 φ16,φ20　(mm)

Aタイプ A type




Bタイプ B type




## EPSW○○○○-○○○-PN

超硬 Carbide / PN / ねじれ30° Helix angle / 不等分割 Unequal pitch / 切削条件表 A366 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 首下長 Under neck length LU | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | コーナ面取り幅 Corner chamfering width | 刃数 No. of flutes | 形状 Shape | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EPSW3040-20-PN | ● | 4 | 6 | 20 | 3.7 | 68 | 6 | 0.3 | 3 | A | 11,790 |
| EPSW3050-25-PN | ● | 5 | 7.5 | 25 | 4.6 | 68 | 6 | 0.3 | 3 | A | 13,250 |
| EPSW4060-30-PN | ● | 6 | 9 | 30 | 5.5 | 68 | 6 | 0.4 | 4 | B | 14,370 |
| EPSW4070-35-PN | ● | 7 | 10.5 | 35 | 6.4 | 80 | 8 | 0.4 | 4 | A | 16,720 |
| EPSW4080-40-PN | ● | 8 | 12 | 40 | 7.3 | 80 | 8 | 0.5 | 4 | B | 16,720 |
| EPSW4090-45-PN | ● | 9 | 13.5 | 45 | 8.3 | 94 | 10 | 0.5 | 4 | A | 18,970 |
| EPSW4100-50-PN | ● | 10 | 15 | 50 | 9.1 | 94 | 10 | 0.5 | 4 | B | 18,970 |
| EPSW4110-55-PN | ● | 11 | 16.5 | 55 | 10.2 | 110 | 12 | 0.5 | 4 | A | 23,240 |
| EPSW4120-60-PN | ● | 12 | 18 | 60 | 11 | 110 | 12 | 0.5 | 4 | B | 23,240 |
| EPSW4160-80-PN | ● | 16 | 24 | 80 | 14.5 | 135 | 16 | 0.7 | 4 | B | 51,970 |
| EPSW4200-100-PN | ● | 20 | 30 | 100 | 18.2 | 155 | 20 | 0.7 | 4 | B | 75,660 |

### EPSW-3DC-PN、EPSW-5DC-PN の対応被削材

Applicable work material of EPSW-3DC-PN, EPSW-5DC-PN

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | | | | ◎ | ◎ | ◎ | ◎ |

### 再研磨対応外径範囲

Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPSW-3DC-PN | 6 ～ 20 | 6 ～ 20 |
| EPSW-5DC-PN | 6 ～ 20 | 6 ～ 20 |

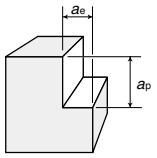
# Epoch SUS Wave
# エポックSUSウェーブ

## 標準切削条件表 Recommended cutting conditions

### 汎用 側面切削条件 General Side milling conditions

**EPSW** レギュラー刃長・ラフィング Regular, Roughing

**EPSW-3DC** 首下3DCタイプ・ラフィング Under neck 3DC, Roughing




| 外径 DC Tool dia. | 炭素鋼・合金鋼・鋳鉄（～30HRC） Carbon steels, Alloy steels Cast irons | | 工具鋼・プリハードン鋼（30～40HRC） Tool steels, Pre-hardened steels | | ステンレス鋼 Stainless steels | | チタン合金 Titanium alloys | | 超耐熱合金 Super heat-resistant alloys | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ap=1DC, ae=0.5DC | | ap=1DC, ae=0.5DC | | ap=1DC, ae=0.5DC | | ap=1DC, ae=0.1DC | | ap=1DC, ae=0.05DC | |
| | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 1 | 31,800 | 760 | 22,300 | 360 | 19,100 | 310 | 12,700 | 150 | 9,500 | 76 |
| 1.5 | 21,200 | 780 | 14,900 | 370 | 12,700 | 310 | 8,500 | 160 | 6,400 | 79 |
| 2 | 15,900 | 810 | 11,100 | 380 | 9,500 | 320 | 6,400 | 160 | 4,800 | 82 |
| 2.5 | 12,700 | 830 | 8,900 | 390 | 7,600 | 330 | 5,100 | 170 | 3,800 | 83 |
| 3 | 10,600 | 860 | 7,400 | 400 | 6,400 | 350 | 4,200 | 170 | 3,200 | 86 |
| 3.5 | 9,100 | 880 | 6,400 | 410 | 5,500 | 350 | 3,600 | 170 | 2,700 | 87 |
| 4 | 8,000 | 910※ | 5,600 | 430※ | 4,800 | 360※ | 3,200 | 180※ | 2,400 | 91※ |
| 4.5 | 7,100 | 930※ | 5,000 | 440※ | 4,200 | 370※ | 2,800 | 180※ | 2,100 | 92※ |
| 5 | 6,400 | 960※ | 4,500 | 450※ | 3,800 | 380※ | 2,500 | 190※ | 1,900 | 95※ |
| 5.5 | 5,800 | 960※ | 4,100 | 450※ | 3,500 | 380※ | 2,300 | 190※ | 1,700 | 93※ |
| 6 | 5,300 | 950 | 3,700 | 440 | 3,200 | 380 | 2,100 | 190 | 1,600 | 96 |
| 6.5 | 4,900 | 960 | 3,400 | 440 | 2,900 | 380 | 2,000 | 200 | 1,500 | 97 |
| 7 | 4,500 | 940 | 3,200 | 450 | 2,700 | 380 | 1,800 | 190 | 1,400 | 98 |
| 7.5 | 4,200 | 940 | 3,000 | 450 | 2,500 | 370 | 1,700 | 190 | 1,300 | 97 |
| 8 | 4,000 | 960 | 2,800 | 450 | 2,400 | 380 | 1,600 | 190 | 1,200 | 96 |
| 8.5 | 3,700 | 940 | 2,600 | 440 | 2,200 | 370 | 1,500 | 190 | 1,100 | 93 |
| 9 | 3,500 | 940 | 2,500 | 450 | 2,100 | 380 | 1,400 | 190 | 1,100 | 99 |
| 9.5 | 3,400 | 970 | 2,300 | 440 | 2,000 | 380 | 1,300 | 190 | 1,000 | 95 |
| 10 | 3,200 | 960 | 2,200 | 440 | 1,900 | 380 | 1,300 | 200 | 1,000 | 100 |
| 10.5 | 3,000 | 920 | 2,100 | 430 | 1,800 | 370 | 1,200 | 180 | 900 | 92 |
| 11 | 2,900 | 910 | 2,000 | 420 | 1,700 | 360 | 1,200 | 190 | 900 | 94 |
| 11.5 | 2,800 | 890 | 1,900 | 400 | 1,700 | 360 | 1,100 | 170 | 800 | 85 |
| 12 | 2,700 | 870 | 1,900 | 410 | 1,600 | 350 | 1,100 | 180 | 800 | 86 |
| 13 | 2,400 | 820 | 1,700 | 390 | 1,500 | 340 | 1,000 | 170 | 700 | 80 |
| 14 | 2,300 | 840 | 1,600 | 390 | 1,400 | 340 | 900 | 160 | 700 | 85 |
| 15 | 2,100 | 810 | 1,500 | 390 | 1,300 | 340 | 800 | 150 | 600 | 77 |
| 16 | 2,000 | 820 | 1,400 | 380 | 1,200 | 330 | 800 | 160 | 600 | 82 |
| 17 | 1,900 | 800 | 1,300 | 370 | 1,100 | 310 | 700 | 150 | 600 | 85 |
| 18 | 1,800 | 800 | 1,200 | 350 | 1,100 | 320 | 700 | 150 | 500 | 74 |
| 19 | 1,700 | 780 | 1,200 | 370 | 1,000 | 310 | 700 | 160 | 500 | 77 |
| 20 | 1,600 | 770 | 1,100 | 350 | 1,000 | 320 | 600 | 140 | 500 | 80 |

※ φ4、φ4.5、φ5、φ5.5 の EPSW（エポックSUSウェーブ）は3枚刃のため、送り速度のみを75%に設定してください。
※2 上表はレギュラー刃及び3DCタイプの切削条件表です。ショート刃をご使用の場合回転数・送り速度を1.1倍程度を目安に調整してください。

※ Please reduce feed rate to 75% because EPSW with dia. 4, 4,5, 5 and 5.5 are 3 flutes type.
※2 The table above indicates cutting parameter for regular type and 3DC type, please reduce both rotation and feed rate to 1.1 times when using short type.

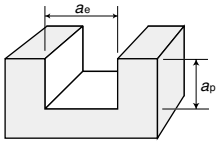
【注意】本工具のPNコーティングはその性質上、通電性が微小です。従って、通電方式の工具長測定装置をご使用の際にはご注意ください。
被削材、加工形状に合わせて、適切なクーラントを使用してください。
できるだけ高剛性、高精度の機械及びチャックをご使用ください。
この標準切削条件表は切削条件の目安を示すものです。実際の加工では、加工条件、目的、使用機械等により条件を調整してください。
ビビリや異常振動が発生する場合は条件を調整してください。

【Note】PN coating is less electro conductive. Therefore, electric transmitted measuring systems may not work.
Use the appropriate coolant for the work material and machining shape.
Use the high-rigidity and high accuracy machine as possible.
These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
Please adjust it if chatter or abnormal vibration occurs.

## 汎用 溝切削条件 General Slotting conditions

**EPSW** レギュラー刃長・ラフィング Regular, Roughing

**EPSW-3DC** 首下3DCタイプ・ラフィング Under neck 3DC, Roughing




| 外径 DC Tool dia. | 炭素鋼・合金鋼・鋳鉄（～30HRC） Carbon steels, Alloy steels Cast irons | | 工具鋼・プリハードン鋼（30～40HRC） Tool steels, Pre-hardened steels | | ステンレス鋼 Stainless steels | | チタン合金 Titanium alloys | | 超耐熱合金 Super heat-resistant alloys | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ap=1DC | | ap=1DC | | ap=1DC | | ap=0.5DC | | ap=0.5DC | |
| | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min |
| 1 | 28,600 | 360 | 19,100 | 190 | 17,500 | 130 | 11,100 | 60 | 6,400 | 19 |
| 1.5 | 19,100 | 390 | 12,700 | 210 | 11,700 | 140 | 7,400 | 60 | 4,200 | 21 |
| 2 | 14,300 | 430 | 9,500 | 230 | 8,800 | 160 | 5,600 | 70 | 3,200 | 23 |
| 2.5 | 11,500 | 470 | 7,600 | 250 | 7,000 | 170 | 4,500 | 70 | 2,500 | 24 |
| 3 | 9,500 | 500 | 6,400 | 270 | 5,800 | 180 | 3,700 | 80 | 2,100 | 26 |
| 3.5 | 8,200 | 540 | 5,500 | 290 | 5,000 | 200 | 3,200 | 80 | 1,800 | 28 |
| 4 | 7,200 | 580※ | 4,800 | 310※ | 4,400 | 210※ | 2,800 | 90※ | 1,600 | 31※ |
| 4.5 | 6,400 | 610※ | 4,200 | 320※ | 3,900 | 220※ | 2,500 | 100※ | 1,400 | 32※ |
| 5 | 5,700 | 640※ | 3,800 | 340※ | 3,500 | 240※ | 2,200 | 100※ | 1,300 | 35※ |
| 5.5 | 5,200 | 680※ | 3,500 | 370※ | 3,200 | 250※ | 2,000 | 100※ | 1,200 | 38※ |
| 6 | 4,800 | 720 | 3,200 | 380 | 2,900 | 260 | 1,900 | 110 | 1,100 | 40 |
| 6.5 | 4,400 | 710 | 2,900 | 380 | 2,700 | 260 | 1,700 | 110 | 1,000 | 39 |
| 7 | 4,100 | 720 | 2,700 | 380 | 2,500 | 260 | 1,600 | 110 | 900 | 38 |
| 7.5 | 3,800 | 710 | 2,500 | 370 | 2,300 | 260 | 1,500 | 110 | 800 | 36 |
| 8 | 3,600 | 720 | 2,400 | 380 | 2,200 | 260 | 1,400 | 110 | 800 | 38 |
| 8.5 | 3,400 | 720 | 2,200 | 370 | 2,100 | 270 | 1,300 | 110 | 700 | 36 |
| 9 | 3,200 | 720 | 2,100 | 380 | 1,900 | 260 | 1,200 | 110 | 700 | 38 |
| 9.5 | 3,000 | 710 | 2,000 | 380 | 1,800 | 260 | 1,200 | 110 | 700 | 40 |
| 10 | 2,900 | 730 | 1,900 | 380 | 1,800 | 270 | 1,100 | 110 | 600 | 36 |
| 10.5 | 2,700 | 690 | 1,800 | 370 | 1,700 | 260 | 1,100 | 110 | 600 | 37 |
| 11 | 2,600 | 680 | 1,700 | 360 | 1,600 | 250 | 1,000 | 100 | 600 | 38 |
| 11.5 | 2,500 | 660 | 1,700 | 360 | 1,500 | 240 | 1,000 | 110 | 600 | 38 |
| 12 | 2,400 | 650 | 1,600 | 350 | 1,500 | 240 | 900 | 100 | 500 | 32 |
| 13 | 2,200 | 630 | 1,500 | 340 | 1,300 | 220 | 900 | 100 | 500 | 34 |
| 14 | 2,000 | 610 | 1,400 | 340 | 1,300 | 240 | 800 | 100 | 500 | 37 |
| 15 | 1,900 | 610 | 1,300 | 340 | 1,200 | 230 | 700 | 90 | 400 | 31 |
| 16 | 1,800 | 610 | 1,200 | 330 | 1,100 | 220 | 700 | 100 | 400 | 33 |
| 17 | 1,700 | 600 | 1,100 | 310 | 1,000 | 210 | 700 | 100 | 400 | 34 |
| 18 | 1,600 | 590 | 1,100 | 320 | 1,000 | 220 | 600 | 90 | 400 | 35 |
| 19 | 1,500 | 580 | 1,000 | 310 | 900 | 210 | 600 | 90 | 300 | 28 |
| 20 | 1,400 | 560 | 1,000 | 320 | 900 | 220 | 600 | 100 | 300 | 29 |

※ φ4、φ4.5、φ5、φ5.5 の EPSW（エポックSUSウェーブ）は3枚刃のため、送り速度のみを75%に設定してください。
※2 上表はレギュラー刃及び3DCタイプの切削条件表です。ショート刃をご使用の場合回転数・送り速度を1.1倍程度を目安に調整してください。

※ Please reduce feed rate to 75% because EPSW with dia. 4, 4,5, 5 and 5.5 are 3 flutes type.
※2 The table above indicates cutting parameter for regular type and 3DC type, please reduce both rotation and feed rate to 1.1 times when using short type.

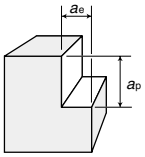
【注意】 本工具のPNコーティングはその性質上、通電性が微小です。従って、通電方式の工具長測定装置をご使用の際にはご注意ください。
被削材、加工形状に合わせて、適切なクーラントを使用してください。
できるだけ高剛性、高精度の機械及びチャックをご使用ください。
この標準切削条件表は切削条件の目安を示すものです。実際の加工では、加工条件、目的、使用機械等により条件を調整してください。
ビビリや異常振動が発生する場合は条件を調整してください。
座繰り加工を行う際に、送り速度を溝条件の1/5に、0.01DCのステップに設定してください。
傾斜進入加工を行う際に、進入角度を3°以下、送り速度を溝条件の70%送りに設定してください。

【Note】 PN coating is less electro conductive. Therefore, electric transmitted measuring systems may not work.
Use the appropriate coolant for the work material and machining shape.
Use the high-rigidity and high accuracy machine as possible.
These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
Please adjust it if chatter or abnormal vibration occurs.
Please setup feed 1/5 that of slotting parameter and step 0.01DC for drilling application.
Please setup feed 70% of slotting parameter and ramping angle 3° for ramping application.

Epoch SUS Wave
# エポックSUSウェーブ

## 汎用 側面切削条件 General Side milling conditions

### EPSW-5DC
首下5DCタイプ・ラフィング
Under neck 5DC, Roughing




| 外径 DC Tool dia. | 炭素鋼・合金鋼・鋳鉄（～30HRC） Carbon steels, Alloy steels Cast irons | | 工具鋼・プリハードン鋼（30～40HRC） Tool steels, Pre-hardened steels | | ステンレス鋼 Stainless steels | | チタン合金 Titanium alloys | | 超耐熱合金 Super heat-resistant alloys | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ap=0.5DC, ae=0.25DC | | ap=0.5DC, ae=0.25DC | | ap=0.5DC, ae=0.25DC | | ap=0.5DC, ae=0.1DC | | ap=0.5DC, ae=0.05DC | |
| | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 1 | 28,600 | 690 | 19,100 | 310 | 15,900 | 250 | 12,700 | 150 | 9,500 | 76 |
| 1.5 | 19,100 | 710 | 12,700 | 320 | 10,600 | 260 | 8,500 | 160 | 6,400 | 80 |
| 2 | 14,300 | 730 | 9,500 | 320 | 8,000 | 270 | 6,400 | 160 | 4,800 | 82 |
| 2.5 | 11,500 | 760 | 7,600 | 330 | 6,400 | 280 | 5,100 | 170 | 3,800 | 84 |
| 3 | 9,500 | 770 | 6,400 | 350 | 5,300 | 290 | 4,200 | 170 | 3,200 | 86 |
| 3.5 | 8,200 | 800 | 5,500 | 360 | 4,500 | 290 | 3,600 | 180 | 2,700 | 88 |
| 4 | 7,200 | 820※ | 4,800 | 360※ | 4,000 | 300※ | 3,200 | 180※ | 2,400 | 91※ |
| 4.5 | 6,400 | 850 | 4,200 | 370 | 3,500 | 310 | 2,800 | 190 | 2,100 | 93 |
| 5 | 5,700 | 860※ | 3,800 | 380※ | 3,200 | 320※ | 2,500 | 190※ | 1,900 | 95※ |
| 5.5 | 5,200 | 860 | 3,500 | 390 | 2,900 | 320 | 2,300 | 190 | 1,700 | 94 |
| 6 | 4,800 | 860 | 3,200 | 380 | 2,700 | 320 | 2,100 | 190 | 1,600 | 96 |
| 6.5 | 4,400 | 860 | 2,900 | 380 | 2,400 | 310 | 2,000 | 200 | 1,500 | 98 |
| 7 | 4,100 | 860 | 2,700 | 380 | 2,300 | 320 | 1,800 | 190 | 1,400 | 98 |
| 7.5 | 3,800 | 860 | 2,500 | 380 | 2,100 | 320 | 1,700 | 190 | 1,300 | 98 |
| 8 | 3,600 | 860 | 2,400 | 380 | 2,000 | 320 | 1,600 | 190 | 1,200 | 96 |
| 8.5 | 3,400 | 870 | 2,200 | 370 | 1,900 | 320 | 1,500 | 190 | 1,100 | 94 |
| 9 | 3,200 | 860 | 2,100 | 380 | 1,800 | 320 | 1,400 | 190 | 1,100 | 99 |
| 9.5 | 3,000 | 860 | 2,000 | 380 | 1,700 | 320 | 1,300 | 190 | 1,000 | 95 |
| 10 | 2,900 | 870 | 1,900 | 380 | 1,600 | 320 | 1,300 | 200 | 1,000 | 100 |
| 10.5 | 2,700 | 830 | 1,800 | 370 | 1,500 | 310 | 1,200 | 190 | 900 | 93 |
| 11 | 2,600 | 820 | 1,700 | 360 | 1,400 | 290 | 1,200 | 190 | 900 | 94 |
| 11.5 | 2,500 | 800 | 1,700 | 360 | 1,400 | 300 | 1,100 | 180 | 800 | 86 |
| 12 | 2,400 | 780 | 1,600 | 350 | 1,300 | 280 | 1,100 | 180 | 800 | 86 |
| 13 | 2,200 | 760 | 1,500 | 350 | 1,200 | 280 | 1,000 | 170 | 700 | 81 |
| 14 | 2,000 | 740 | 1,400 | 340 | 1,100 | 270 | 900 | 170 | 700 | 86 |
| 15 | 1,900 | 740 | 1,300 | 340 | 1,100 | 280 | 800 | 150 | 600 | 77 |
| 16 | 1,800 | 730 | 1,200 | 330 | 1,000 | 270 | 800 | 160 | 600 | 82 |
| 17 | 1,700 | 730 | 1,100 | 310 | 900 | 260 | 700 | 150 | 600 | 86 |
| 18 | 1,600 | 720 | 1,100 | 330 | 900 | 270 | 700 | 160 | 500 | 75 |
| 19 | 1,500 | 690 | 1,000 | 310 | 800 | 250 | 700 | 160 | 500 | 77 |
| 20 | 1,400 | 670 | 1,000 | 320 | 800 | 260 | 600 | 140 | 500 | 80 |

※ φ4、φ5 の EPSW（エポックSUSウェーブ）は3枚刃のため、送り速度のみを75%に設定してください。
※4 上表は5DCタイプおよび5DC突出した際の切削条件表です。工具突出し量により条件を調整してください。
※ Please reduce feed rate to 75% because EPSW with dia. 4, and 5 are 3 flutes type.
※4 The above table shows cutting conditions for 5DC type tools with a 5DC overhang. Adjust conditions according to the tool overhang amount.

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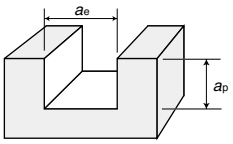
被削材、加工形状に合わせて、適切なクーラントを使用してください。
できるだけ高剛性、高精度の機械及びチャックをご使用ください。
この標準切削条件表は切削条件の目安を示すものです。実際の加工では、加工条件、目的、使用機械等により条件を調整してください。
ビビリや異常振動が発生する場合は条件を調整してください。

【Note】PN coating is less electro conductive. Therefore, electric transmitted measuring systems may not work.
Use the appropriate coolant for the work material and machining shape.
Use the high-rigidity and high accuracy machine as possible
These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
Please adjust it if chatter or abnormal vibration occurs.

## 汎用 溝切削条件 General Slotting conditions

**EPSW-5DC**
首下5Dタイプ・ラフィング
Under neck 5DC, Roughing




| 外径 DC Tool dia. | 炭素鋼・合金鋼・鋳鉄（～30HRC） Carbon steels, Alloy steels Cast irons | | 工具鋼・プリハードン鋼（30～40HRC） Tool steels, Pre-hardened steels | | ステンレス鋼 Stainless steels | | チタン合金 Titanium alloys | | 超耐熱合金 Super heat-resistant alloys | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ap=0.5DC | | ap=0.5DC | | ap=0.5DC | | ap=0.25DC | | ap=0.25DC | |
| | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min | 回転数 n min-1 | 送り速度 vf mm/min |
| 1 | 25,500 | 320 | 15,900 | 160 | 14,300 | 110 | 9,500 | 50 | 4,800 | 14 |
| 1.5 | 17,000 | 350 | 10,600 | 170 | 9,500 | 120 | 6,400 | 50 | 3,200 | 16 |
| 2 | 12,700 | 380 | 8,000 | 190 | 7,200 | 130 | 4,800 | 60 | 2,400 | 17 |
| 2.5 | 10,200 | 410 | 6,400 | 210 | 5,700 | 140 | 3,800 | 60 | 1,900 | 19 |
| 3 | 8,500 | 450 | 5,300 | 220 | 4,800 | 150 | 3,200 | 70 | 1,600 | 20 |
| 3.5 | 7,300 | 480 | 4,500 | 240 | 4,100 | 160 | 2,700 | 70 | 1,400 | 22 |
| 4 | 6,400 | 510※ | 4,000 | 260※ | 3,600 | 170※ | 2,400 | 80※ | 1,200 | 23※ |
| 4.5 | 5,700 | 550 | 3,500 | 270 | 3,200 | 180 | 2,100 | 80 | 1,100 | 25 |
| 5 | 5,100 | 570※ | 3,200 | 290※ | 2,900 | 200※ | 1,900 | 90※ | 1,000 | 27※ |
| 5.5 | 4,600 | 600 | 2,900 | 300 | 2,600 | 200 | 1,700 | 90 | 900 | 28 |
| 6 | 4,200 | 630 | 2,700 | 320 | 2,400 | 220 | 1,600 | 100 | 800 | 29 |
| 6.5 | 3,900 | 630 | 2,400 | 310 | 2,200 | 210 | 1,500 | 100 | 700 | 27 |
| 7 | 3,600 | 630 | 2,300 | 320 | 2,000 | 210 | 1,400 | 100 | 700 | 29 |
| 7.5 | 3,400 | 640 | 2,100 | 320 | 1,900 | 210 | 1,300 | 100 | 600 | 27 |
| 8 | 3,200 | 640 | 2,000 | 320 | 1,800 | 220 | 1,200 | 100 | 600 | 29 |
| 8.5 | 3,000 | 640 | 1,900 | 320 | 1,700 | 220 | 1,100 | 90 | 600 | 31 |
| 9 | 2,800 | 630 | 1,800 | 320 | 1,600 | 220 | 1,100 | 100 | 500 | 27 |
| 9.5 | 2,700 | 640 | 1,700 | 320 | 1,500 | 210 | 1,000 | 100 | 500 | 29 |
| 10 | 2,500 | 630 | 1,600 | 320 | 1,400 | 210 | 1,000 | 100 | 500 | 30 |
| 10.5 | 2,400 | 620 | 1,500 | 310 | 1,400 | 220 | 900 | 90 | 500 | 31 |
| 11 | 2,300 | 600 | 1,400 | 290 | 1,300 | 200 | 900 | 90 | 400 | 25 |
| 11.5 | 2,200 | 590 | 1,400 | 300 | 1,200 | 190 | 800 | 90 | 400 | 26 |
| 12 | 2,100 | 570 | 1,300 | 280 | 1,200 | 190 | 800 | 90 | 400 | 26 |
| 13 | 2,000 | 580 | 1,200 | 280 | 1,100 | 190 | 700 | 80 | 400 | 28 |
| 14 | 1,800 | 550 | 1,100 | 270 | 1,000 | 180 | 700 | 90 | 300 | 22 |
| 15 | 1,700 | 550 | 1,100 | 280 | 1,000 | 190 | 600 | 80 | 300 | 23 |
| 16 | 1,600 | 540 | 1,000 | 270 | 900 | 180 | 600 | 80 | 300 | 24 |
| 17 | 1,500 | 540 | 900 | 260 | 800 | 170 | 600 | 90 | 300 | 26 |
| 18 | 1,400 | 520 | 900 | 270 | 800 | 180 | 500 | 70 | 300 | 27 |
| 19 | 1,300 | 500 | 800 | 250 | 800 | 180 | 500 | 80 | 300 | 28 |
| 20 | 1,300 | 520 | 800 | 260 | 700 | 170 | 500 | 80 | 200 | 19 |

※φ4、φ5 の EPSW（エポックSUSウェーブ）は3枚刃のため、送り速度のみを75%に設定してください。
※Please reduce feed rate to 75% because EPSW with dia. 4, and 5 are 3 flutes type.

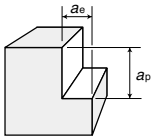
【注意】本工具のPNコーティングはその性質上、通電性が微小です。従って、通電方式の工具長測定装置をご使用の際にはご注意ください。
被削材、加工形状に合わせて、適切なクーラントを使用してください。
できるだけ高剛性、高精度の機械及びチャックをご使用ください。
この標準切削条件表は切削条件の目安を示すものです。実際の加工では、加工条件、目的、使用機械等により条件を調整してください。
ビビリや異常振動が発生する場合は条件を調整してください。
座繰り加工を行う際に、送り速度を溝条件の1/5に、0.01DCのステップに設定してください。
傾斜進入加工を行う際に、進入角度を3°以下、送り速度を溝条件の70%送りに設定してください。

【Note】PN coating is less electro conductive. Therefore, electric transmitted measuring systems may not work.
Use the appropriate coolant for the work material and machining shape.
Use the high-rigidity and high accuracy machine as possible
These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
Please adjust it if chatter or abnormal vibration occurs.
Please setup feed 1/5 that of slotting parameter and step 0.01DC for drilling application.
Please setup feed 70% of slotting parameter and ramping angle 3° for ramping application.

# Epoch SUS Wave
# エポックSUSウェーブ

## 汎用 側面切削条件
**General Side milling conditions**

**EPSWL**
ロング刃長・ラフィング
Long, Roughing




| 外径 DC Tool dia. | 炭素鋼・合金鋼・鋳鉄（～30HRC） Carbon steels, Alloy steels, Cast irons | | 工具鋼・プリハードン鋼（30～40HRC） Tool steels, Pre-hardened steels | | ステンレス鋼 Stainless steels | | チタン合金 Titanium alloys | | 超耐熱合金 Super heat-resistant alloys | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ap=3DC, ae=0.05DC | | ap=3DC, ae=0.05DC | | ap=3DC, ae=0.05DC | | ap=3DC, ae=0.02DC | | ap=3DC, ae=0.01DC | |
| | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 6 | 2,700 | 490 | 1,900 | 230 | 1,600 | 190 | 1,100 | 100 | 800 | 48 |
| 8 | 2,000 | 480 | 1,400 | 220 | 1,200 | 190 | 800 | 100 | 600 | 48 |
| 10 | 1,600 | 480 | 1,100 | 220 | 1,000 | 200 | 600 | 90 | 500 | 50 |
| 12 | 1,300 | 420 | 900 | 190 | 800 | 170 | 500 | 80 | 400 | 43 |
| 16 | 1,000 | 410 | 700 | 190 | 600 | 160 | 400 | 80 | 300 | 41 |
| 20 | 800 | 380 | 600 | 190 | 500 | 160 | 300 | 70 | 200 | 32 |

【注意】本工具のPNコーティングはその性質上、通電性が微小です。従って、通電方式の工具長測定装置をご使用の際にはご注意ください。
被削材、加工形状に合わせて、適切なクーラントを使用してください。
できるだけ高剛性、高精度の機械及びチャックをご使用ください。
この標準切削条件表は切削条件の目安を示すものです。実際の加工では、加工条件、目的、使用機械等により条件を調整してください。
ビビリや異常振動が発生する場合は条件を調整してください。

【Note】PN coating is less electro conductive. Therefore, electric transmitted measuring systems may not work.
Use the appropriate coolant for the work material and machining shape.
Use the high-rigidity and high accuracy machine as possible
These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
Please adjust it if chatter or abnormal vibration occurs.

# Epoch Roughing
# エポックラフィング

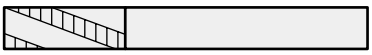
ステンレスなどの難削材荒加工に適したラフィングエンドミル。
Ideal roughing end mill for roughing of difficult-to-cut materials such as stainless steel, etc.

## レギュラー刃長 Regular

側面 Side Cutting　溝 Slotting　荒 Roughing

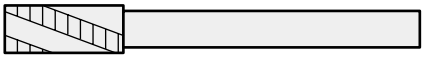
外径公差 Dia.tolerance　0～−0.05　h6　(mm)

4枚刃 4Flutes



Aタイプ A type

Bタイプ B type



Cタイプ C type

## EPQR4○○○-CS

超硬 Carbide　CS　ねじれ30° Helix angle　切削条件表A370 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | コーナ面取り幅 Corner chamfering width | 形状 Shape | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|
| EPQR4060-CS | ● | 6 | 15 | 55 | 6 | 0.4 | A | 15,490 |
| EPQR4070-CS | ● | 7 | 20 | 65 | 8 | 0.4 | B | 20,200 |
| EPQR4080-CS | ● | 8 | 20 | 70 | 8 | 0.5 | A | 18,860 |
| EPQR4090-CS | ● | 9 | 25 | 75 | 10 | 0.5 | B | 25,930 |
| EPQR4100-CS | ● | 10 | 25 | 80 | 10 | 0.5 | A | 25,480 |
| EPQR4110-CS | ● | 11 | 30 | 85 | 12 | 0.5 | B | 34,350 |
| EPQR4120-CS | ● | 12 | 30 | 90 | 12 | 0.5 | A | 31,870 |
| EPQR4130-CS | □ | 13 | 35 | 100 | 16 | 0.7 | B | — |
| EPQR4140-CS | □ | 14 | 35 | 100 | 16 | 0.7 | B | — |
| EPQR4150-CS | □ | 15 | 35 | 100 | 16 | 0.7 | B | — |
| EPQR4160-CS | ● | 16 | 40 | 110 | 16 | 0.7 | A | 77,550 |
| EPQR4170-CS | □ | 17 | 40 | 110 | 20 | 0.7 | B | — |
| EPQR4180-CS | □ | 18 | 45 | 120 | 20 | 0.7 | B | — |
| EPQR4190-CS | □ | 19 | 45 | 120 | 20 | 0.7 | B | — |
| EPQR4200-CS | ● | 20 | 50 | 125 | 20 | 0.7 | A | 113,330 |

## ロング刃長 Long

側面 Side Cutting　荒 Roughing

外径公差 Dia.tolerance　0～−0.05　h6　(mm)

4枚刃 4Flutes

## EPQL4○○○-CS

超硬 Carbide　CS　ねじれ30° Helix angle　切削条件表A370 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | コーナ面取り幅 Corner chamfering width | 形状 Shape | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|
| EPQL4060-CS | ● | 6 | 30 | 70 | 6 | 0.4 | A | 27,380 |
| EPQL4070-CS | □ | 7 | 40 | 80 | 8 | 0.4 | B | — |
| EPQL4080-CS | ● | 8 | 40 | 80 | 8 | 0.5 | A | 34,460 |
| EPQL4090-CS | □ | 9 | 50 | 100 | 10 | 0.5 | B | — |
| EPQL4100-CS | ● | 10 | 50 | 100 | 10 | 0.5 | A | 46,350 |
| EPQL4110-CS | □ | 11 | 60 | 120 | 12 | 0.5 | B | — |
| EPQL4120-CS | ● | 12 | 60 | 120 | 12 | 0.5 | A | 56,790 |
| EPQL4130-CS | □ | 13 | 70 | 130 | 16 | 0.7 | B | — |
| EPQL4140-CS | □ | 14 | 70 | 130 | 16 | 0.7 | B | — |
| EPQL4150-CS | □ | 15 | 70 | 130 | 16 | 0.7 | B | — |
| EPQL4160-CS | ● | 16 | 75 | 135 | 16 | 0.7 | A | 140,760 |
| EPQL4170-CS | □ | 17 | 75 | 135 | 20 | 0.7 | B | — |
| EPQL4180-CS | □ | 18 | 80 | 145 | 20 | 0.7 | B | — |
| EPQL4190-CS | □ | 19 | 80 | 145 | 20 | 0.7 | B | — |
| EPQL4200-CS | ● | 20 | 90 | 155 | 20 | 0.7 | A | 204,110 |

## EPQR、EPQL の対応被削材

Applicable work material of EPQR, EPQL

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | | | ◎ | ◎ | ◎ | ◎ |

## 再研磨対応外径範囲

Re-grinding compatibility range

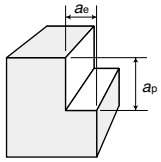
| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPQR-CS | 6 ～ 20 | 6 ～ 20 |
| EPQL-CS | 6 ～ 20 | 6 ～ 20 |

●印：標準在庫品です。　□印：特定代理店在庫です。弊社営業へお問合せください。
● : Stocked items.　□ : Stocked by specified distributor. Contact with our sales department.

# Epoch Roughing
# エポックラフィング

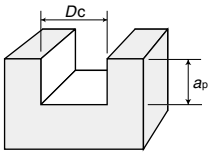
## 標準切削条件表 Recommended cutting conditions

**EPQR-CS** レギュラー刃長 Regular
**EPQL-CS** ロング刃長 Long
**EPQS-CS** ショート刃長 Short
**EPQM-CS** ミディアム刃長 Medium
**EPQLS-CS** ロングシャンク Long shank




### 〈側面切削〉 Side milling

| 被削材 Work material | 炭素鋼・合金鋼・鋳鉄 Carbon steels, Alloy steels, Cast irons (～30HRC) | | 工具鋼・プリハードン鋼 Tool steels, Pre-hardened steels (30～40HRC) | | ステンレス鋼 Stainless steels | | 超耐熱合金 Super heat-resistant alloys | |
|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | ap≦1.5DC ae≦0.5DC | | ap≦1.5DC ae≦0.5DC | | ap≦1.5DC ae≦0.5DC | | ap≦1.0DC ae≦0.2DC | |
| 外径 DC Tool dia.(mm) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| φ6 | 6,400 | 800 | 3,700 | 410 | 3,200 | 330 | 2,100 | 80 |
| φ8 | 4,800 | 820 | 2,800 | 440 | 2,400 | 380 | 1,600 | 100 |
| φ10 | 3,800 | 830 | 2,200 | 440 | 1,900 | 380 | 1,300 | 110 |
| φ12 | 3,200 | 830 | 1,900 | 430 | 1,600 | 330 | 1,100 | 115 |
| φ16 | 2,400 | 810 | 1,400 | 400 | 1,200 | 340 | 800 | 115 |
| φ20 | 2,000 | 800 | 1,100 | 390 | 1,000 | 320 | 600 | 105 |




### 〈溝切削〉 Slotting

| 被削材 Work material | 炭素鋼・合金鋼・鋳鉄 Carbon steels, Alloy steels, Cast irons (～30HRC) | | 工具鋼・プリハードン鋼 Tool steels, Pre-hardened steels (30～40HRC) | | ステンレス鋼 Stainless steels | | 超耐熱合金 Super heat-resistant alloys | |
|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | ap≦1.0DC | | ap≦1.0DC | | ap≦1.0DC | | ap≦0.5DC | |
| 外径 DC Tool dia.(mm) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| φ6 | 5,300 | 590 | 3,500 | 300 | 2,800 | 210 | 1,100 | 32 |
| φ8 | 4,000 | 610 | 2,600 | 320 | 2,100 | 230 | 800 | 37 |
| φ10 | 3,200 | 610 | 2,000 | 320 | 1,700 | 230 | 600 | 37 |
| φ12 | 2,700 | 610 | 1,700 | 320 | 1,400 | 230 | 500 | 41 |
| φ16 | 2,000 | 580 | 1,300 | 330 | 1,000 | 190 | 400 | 46 |
| φ20 | 1,600 | 560 | 1,100 | 300 | 800 | 170 | 300 | 41 |

## 【注意】

①上記条件は、レギュラー刃の条件を示します。
②ショート刃長をご使用の場合、上記条件の1.3倍の送り速度で加工してください。
③ミディアム刃長をご使用の場合、上記条件の回転数・送り速度の80%を目安にしてください。
④ロング刃長をご使用の場合、上記条件の回転数・送り速度の50%を目安とし、切込み(ae)も0.1DC～0.2DCを目安にしてください。
また、ロング刃長は溝切削には適しません。
⑤ロングシャンクをご使用の場合、上記条件の回転数・送り速度の50%を目安とし、切込み(ae)も0.1DC～0.3DCを目安にしてください。
ロングシャンクは溝切削には適しません。
⑥被削材、加工形状に合わせて、適切なクーラントを使用してください。
⑦この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。

## 【Note】

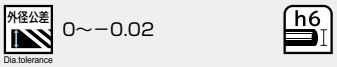
①The above conditions are conditions for regular flutes.
②When using short-length flutes, perform machining at feed rates of 1.3 times the conditions stated above.
③When using medium-length flutes, in general rotation speed and feed rate should be 80% of the conditions stated above.
④When using long-length flutes, in general rotation speed and feed rate should be 50% of the conditions stated above, and the cutting depth (*ae*) should also be 0.1DC to 0.2DC in general. Further, long-length flutes are not suitable for slotting.
⑤When using long shank tools, in general rotation speed and feed rate should be 50% of the conditions stated above, and the cutting depth (*ae*) should also be 0.1DC to 0.3DC in general. Long shanks are not suitable for slotting.
⑥Use the appropriate coolant for the work material and machining shape.
⑦These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.

# Epoch Aero Power Mill
# エポックエアロパワーミル

耐熱鋼、チタン合金などの難削材に適しています。
Ideal for difficult-to-cut materials such as heat-resistant steel, titanium alloys, etc.

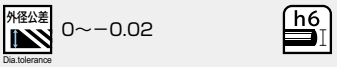
ラジアスはA269頁を参照してください
Please refer to page A269 for Radius

## 4枚刃・スクエア　4 flutes, Square




(mm)

## 6枚刃・スクエア　6 flutes, Square




(mm)

## EAP4○○○-TH

超硬 Carbide　TH　ねじれ43° Helix angle　不等分割 Unequal pitch　切削条件表 A372 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|
| EAP4060-TH | ◎ | 6 | 15 | 60 | 6 |
| EAP4080-TH | ◎ | 8 | 20 | 75 | 8 |
| EAP4100-TH | ◎ | 10 | 25 | 80 | 10 |
| EAP4120-TH | ◎ | 12 | 30 | 100 | 12 |
| EAP4160-TH | ◎ | 16 | 40 | 110 | 16 |
| EAP4200-TH | ◎ | 20 | 45 | 125 | 20 |

## EAP6○○○-TH

超硬 Carbide　TH　ねじれ43° Helix angle　不等分割 Unequal pitch　切削条件表 A373 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|
| EAP6060-TH | ◎ | 6 | 15 | 60 | 6 |
| EAP6080-TH | ◎ | 8 | 20 | 75 | 8 |
| EAP6100-TH | ◎ | 10 | 25 | 80 | 10 |
| EAP6120-TH | ◎ | 12 | 30 | 100 | 12 |
| EAP6160-TH | ◎ | 16 | 40 | 110 | 16 |
| EAP6200-TH | ◎ | 20 | 45 | 125 | 20 |

## EAP4-TH、EAP6-THの対応被削材

Applicable work material of EAP4-TH, EAP6-TH

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ○ | | | | | ◎ | ◎ | | |

## 再研磨対応外径範囲

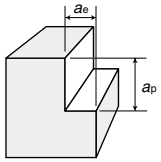
Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EAP4-TH | 6 ～ 20 | 6 ～ 20 |
| EAP6-TH | 8 ～ 20 | 6 ～ 20 |

◎印：メーカー在庫品です。弊社営業へお問い合せください。◎ : Manufacturer stocked items. Contact with our sales department.

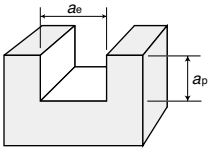
## 標準切削条件表 Recommended cutting conditions

### EAP4-TH
4枚刃・レギュラー刃長
4ft, Regular




〈側面切削〉 Side milling

| 被削材 Work material | 合金鋼 Alloy steels SCM, SNCM | | ステンレス鋼・耐熱鋼 Stainless steels, Heat resistant steels SUS, SUH | | チタン・チタン合金 Titanium Titanium alloys Ti-6Al-4V | | 超耐熱合金 Super heat resistant alloys Inconel718 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61,SKT4 |
|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | ap= 1.5DC ae＜0.1DC | | ap= 1DC ae＜0.05DC | | ap= 1DC ae＜0.05DC | | ap= 1DC ae＜0.05DC | | |
| 外径 DC Tool dia.(mm) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | |
| φ6 | 5,300 | 1,060 | 3,700 | 590 | 3,700 | 590 | 2,100 | 230 | 適していません Unsuitable for high hardness material. |
| φ8 | 4,000 | 1,110 | 2,800 | 560 | 2,800 | 560 | 1,600 | 220 | |
| φ10 | 3,200 | 1,020 | 2,200 | 540 | 2,200 | 540 | 1,300 | 200 | |
| φ12 | 2,700 | 960 | 1,900 | 520 | 1,850 | 520 | 1,100 | 170 | |
| φ16 | 2,000 | 800 | 1,400 | 450 | 1,400 | 450 | 800 | 130 | |
| φ20 | 1,600 | 760 | 1,100 | 450 | 1,100 | 450 | 640 | 100 | |




〈溝切削〉 Slotting

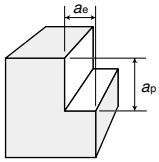
| 被削材 Work material | 合金鋼 Alloy steels SCM, SNCM | | ステンレス鋼・耐熱鋼 Stainless steels, Heat resistant steels SUS, SUH | | チタン・チタン合金 Titanium Titanium alloys Ti-6Al-4V | | 超耐熱合金 Super heat resistant alloys Inconel718 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61,SKT4 |
|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | ap＜1DC ae=1DC | | ap= 0.5DC ae=1DC | | ap= 0.2DC ae=1DC | | ap= 0.2DC ae=1DC | | |
| 外径 DC Tool dia.(mm) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | |
| φ6 | 2,650 | 420 | 2,400 | 380 | 2,100 | 340 | 1,000 | 100 | 適していません Unsuitable for high hardness material. |
| φ8 | 2,000 | 400 | 1,800 | 360 | 1,600 | 320 | 720 | 90 | |
| φ10 | 1,600 | 380 | 1,450 | 340 | 1,300 | 310 | 600 | 85 | |
| φ12 | 1,300 | 370 | 1,200 | 330 | 1,050 | 300 | 500 | 70 | |
| φ16 | 1,000 | 320 | 900 | 290 | 800 | 250 | 360 | 50 | |
| φ20 | 800 | 320 | 700 | 290 | 650 | 250 | 290 | 40 | |

【注意】 ①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②できるだけ高剛性、高精度の機械及びチャックをご使用ください。
③この標準切削条件表は切削条件の目安を示すものです。ビビリや異常振動が発生する場合は条件を調整してください。

【Note】 ①Use the appropriate coolant for the work material and machining shape.
②Use the high-rigidity and high accuracy machine as possible
③Cutting parameters in shown table are general recommendation. Please adjust it if chatter or abnormal vibration occurs.

## EAP6-TH

6枚刃・レギュラー刃長
6ft, Regular




〈側面切削〉 Side milling

| 被削材 Work material | 合金鋼 Alloy steels SCM, SNCM | | ステンレス鋼・耐熱鋼 Stainless steels, Heat resistant steels SUS, SUH | | チタン・チタン合金 Titanium Titanium alloys Ti-6Al-4V | | 超耐熱合金 Super heat resistant alloys Inconel718 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61,SKT4 |
|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | ap= 1.5DC ae＜0.1DC | | ap= 1DC ae＜0.05DC | | ap= 1DC ae＜0.05DC | | ap= 1DC ae＜0.05DC | | |
| 外径 DC Tool dia.(mm) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | |
| φ6 | 7,950 | 1,910 | 4,250 | 920 | 3,700 | 800 | 2,100 | 320 | 適していません Unsuitable for high hardness material. |
| φ8 | 6,000 | 1,970 | 3,200 | 900 | 2,800 | 790 | 1,600 | 300 | |
| φ10 | 4,800 | 2,010 | 2,550 | 760 | 2,200 | 670 | 1,300 | 260 | |
| φ12 | 4,000 | 1,910 | 2,100 | 840 | 1,850 | 740 | 1,100 | 230 | |
| φ16 | 3,000 | 1,610 | 1,600 | 740 | 1,400 | 640 | 800 | 180 | |
| φ20 | 2,400 | 1,430 | 1,300 | 690 | 1,100 | 600 | 640 | 150 | |

【注意】 ①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②できるだけ高剛性、高精度の機械及びチャックをご使用ください。
③この標準切削条件表は切削条件の目安を示すものです。ビビリや異常振動が発生する場合は条件を調整してください。

【Note】 ①Use the appropriate coolant for the work material and machining shape.
②Use the high-rigidity and high accuracy machine as possible
③Cutting parameters in shown table are general recommendation. Please adjust it if chatter or abnormal vibration occurs.

## 加工上の注意点

### Cautions

❶ 高硬度材の切削には不適です。硬さが45HRCを超える材料の場合には、CEPR-THあるいはEPP-THを推奨いたします。
When handling the work with hardness more than 45HRC, please use our CEPR-TH or EPP-TH.

❷ 必ず十分なクーラントをかけて、切削を行ってください。
Coolant is necessary for machining heat resistant materials.

❸ 板材のような剛性の弱いワーク形状の溝切削の場合には、トロコイド加工を推奨します。
In the case of slotting in a plate, We recommend using a trochoidal cutting.

❹ 耐熱鋼と超耐熱合金の穴加工には、4枚刃仕様でのヘリカル加工あるいは弊社のノンステップボーラーを推奨いたします。
When hole machining is needed on heat resistant material, We recommend performing a helical boring by Adopting EAP4, or using our NSB borer for higher efficiency.

❺ 耐熱鋼と超耐熱合金の切削においては、加工硬化面を切削する事を避けるために、0.1mm以上の径方向切込み量を推奨いたします。
In order to avoid constant cutting work-hardened layer, We recommend to set up width of cut more than 0.1mm.

# Epoch Mirus Type A for Aluminium
# エポックミルス タイプA（アルミ用）

**メーカー在庫品** Manufacture stocked items

平面 Planing / 側面 Side Cutting / 溝 Slotting / 彫込み Die-sinking / ヘリカル Helical / 座ぐり Spot Facing / 荒 Roughing / 中仕上 Semi Finishing / 仕上 Finishing

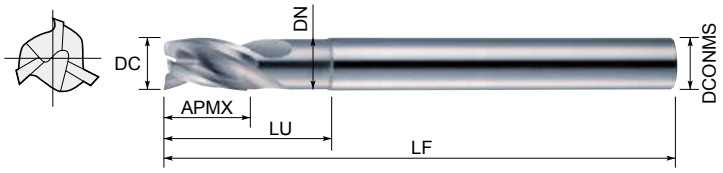
外径公差 Dia.tolerance 0～−0.02　h5

(mm)

超高能率アルミ加工用エンドミル
Ultra high efficiency end mill for aliminium.

ラジアスはA272頁を参照してください
Please refer to page A272 for Radius

## 3枚刃タイプ 3Flutes type




## EMXA3○○○-○○ ノンコーティング Non Coating

超硬 Carbide / ねじれ角 30° Helix angle / 切削条件表 A376 Cutting Conditions

| タイプ Type | 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 首下長 Under neck length LU | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS |
|---|---|---|---|---|---|---|---|---|
| スクエア Square | EMXA3030-9 | ◎ | 3 | 4.5 | 9 | 2.9 | 60 | 6 |
| | EMXA3040-12 | ◎ | 4 | 6 | 12 | 3.75 | 60 | 6 |
| | EMXA3050-15 | ◎ | 5 | 7.5 | 15 | 4.75 | 80 | 6 |
| | EMXA3060-18 | ◎ | 6 | 9 | 18 | 5.75 | 80 | 6 |
| | EMXA3080-24 | ◎ | 8 | 12 | 24 | 7.5 | 90 | 8 |
| | EMXA3100-30 | ◎ | 10 | 15 | 30 | 9.5 | 100 | 10 |
| | EMXA3120-36 | ◎ | 12 | 18 | 36 | 11.5 | 120 | 12 |
| | EMXA3160-45 | ◎ | 16 | 19 | 45 | 15.5 | 90 | 16 |

**受注生産品（フルオーダー）** Made-to-order items (Full-order)

平面 Planing / 側面 Side Cutting / 溝 Slotting / 彫込み Die-sinking / ヘリカル Helical / 座ぐり Spot Facing / 荒 Roughing / 中仕上 Semi Finishing / 仕上 Finishing / 切削条件表 A376 Cutting Conditions

上記以外のラインナップにつきましては、下記範囲にて受注生産品として承ります。
For the lineup of products other than above-mentioned list, made-to-order products within the following ranges are available.

## ご注文方法 Ordering method

ご注文コード Order code：**EMXA○○○○-(A)-(C)**

刃数 No. of flutes　外径 Tool dia.　首下長 Under neck length　コーティング Coating

外径・刃数　：2枚刃タイプ：φ10～φ25
　　3枚刃タイプ：φ3～φ16
首下長　：10DC以下
　　（ただし、全長によってはお受け出来ない場合があります。）
コーティング：ノンコーティング／PNコーティング／SDコーティング

Mill dia., No.of flutes : 2Flutes type : φ10～φ25
　　: 3Flutes type : φ3～φ16
Under neck length : 10DC or less (However, orders cannot be accepted in some cases depending on the overall length.)
Coating : Non Coating PN Coating / SD Coating

## EMXA2、EMXA3の対応被削材

Applicable work material of EMXA2, EMXA3

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | ◎ | ◎ |

## 再研磨対応外径範囲

Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EMXA3 | 6～16 | 3～16 |
| EMXA2 | 10～25 | 10～25 |

◎印：メーカー在庫品です。弊社営業へお問い合せください。　◎: Manufacturer stocked items. Contact with our sales department.

## 受注生産品（セミオーダー） Made-to-order items (Semi-order)

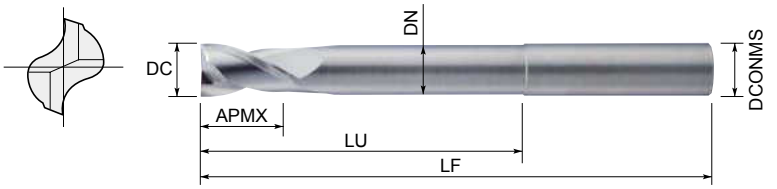
平面 Planing / 側面 Side Cutting / 溝 Slotting / 彫込み Die-sinking / ヘリカル Helical / 座ぐり Spot Facing / 荒 Roughing / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance　0～−0.02　h5

(mm)

## 2枚刃タイプ 2Flutes type

コーティングをご指定ください。
Please specify the desired coating.



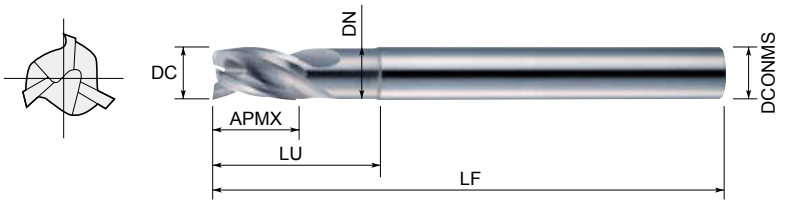

# EMXA2○○○-○○○-(C)

超硬 Carbide　SD　PN　ねじれ30° Helix angle　切削条件表A376 Cutting Conditions

| タイプ Type | ご注文コード Order code | コーティングの種類 Kind of coating (C) | 寸法 Size(mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 首下長 Under neck length LU | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS |
|---|---|---|---|---|---|---|---|---|
| スクエア Square | EMXA2100-45-(C) | 無し Non-coat/PN/SD | 10 | 8 | 45 | 9.5 | 80 | 10 |
| | EMXA2100-60-(C) | 無し Non-coat/PN/SD | | 8 | 60 | 9.5 | 95 | 10 |
| | EMXA2120-45-(C) | 無し Non-coat/PN/SD | 12 | 10 | 45 | 11.5 | 85 | 12 |
| | EMXA2120-60-(C) | 無し Non-coat/PN/SD | | 10 | 60 | 11.5 | 100 | 12 |
| | EMXA2160-45-(C) | 無し Non-coat/PN/SD | 16 | 13 | 45 | 15.5 | 90 | 16 |
| | EMXA2160-60-(C) | 無し Non-coat/PN/SD | | 13 | 60 | 15.5 | 105 | 16 |
| | EMXA2160-75-(C) | 無し Non-coat/PN/SD | | 13 | 75 | 15.5 | 120 | 16 |
| | EMXA2200-45-(C) | 無し Non-coat/PN/SD | 20 | 16 | 45 | 19.5 | 90 | 20 |
| | EMXA2200-60-(C) | 無し Non-coat/PN/SD | | 16 | 60 | 19.5 | 105 | 20 |
| | EMXA2200-80-(C) | 無し Non-coat/PN/SD | | 16 | 80 | 19.5 | 125 | 20 |
| | EMXA2200-100-(C) | 無し Non-coat/PN/SD | | 16 | 100 | 19.5 | 145 | 20 |
| | EMXA2250-45-(C) | 無し Non-coat/PN/SD | 25 | 20 | 45 | 24.5 | 95 | 25 |
| | EMXA2250-60-(C) | 無し Non-coat/PN/SD | | 20 | 60 | 24.5 | 110 | 25 |
| | EMXA2250-80-(C) | 無し Non-coat/PN/SD | | 20 | 80 | 24.5 | 130 | 25 |
| | EMXA2250-100-(C) | 無し Non-coat/PN/SD | | 20 | 100 | 24.5 | 150 | 25 |

## 3枚刃タイプ 3Flutes type

首下長さ、コーティングをご指定ください。
Please specify the desired under neck length and coating.




# EMXA3○○○-(A)-(C)

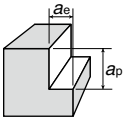
超硬 Carbide　SD　PN　ねじれ30° Helix angle　切削条件表A376 Cutting Conditions

| タイプ Type | ご注文コード Order code | コーティングの種類 Kind of coating (C) | 寸法 Size(mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 首下長 Under neck length (A) LU | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS |
|---|---|---|---|---|---|---|---|---|
| スクエア Square | EMXA3030-(A)-(C) | 無し Non-coat/PN/SD | 3 | 4.5 | 8DC以下の長さでご指定下さい Please specify a length of 8Dc or less. | 2.9 | 60 | 6 |
| | EMXA3040-(A)-(C) | 無し Non-coat/PN/SD | 4 | 6 | | 3.75 | 60 | 6 |
| | EMXA3050-(A)-(C) | 無し Non-coat/PN/SD | 5 | 7.5 | | 4.75 | 80 | 6 |
| | EMXA3060-(A)-(C) | 無し Non-coat/PN/SD | 6 | 9 | | 5.75 | 80 | 6 |
| | EMXA3080-(A)-(C) | 無し Non-coat/PN/SD | 8 | 12 | 5DC以下の長さでご指定下さい Please specify a length of 5Dc or less. | 7.5 | 90 | 8 |
| | EMXA3100-(A)-(C) | 無し Non-coat/PN/SD | 10 | 15 | | 9.5 | 100 | 10 |
| | EMXA3120-(A)-(C) | 無し Non-coat/PN/SD | 12 | 18 | | 11.5 | 120 | 12 |
| | EMXA3160-45-(C) | 無し Non-coat/PN/SD | 16 | 19 | 45 | 15.5 | 90 | 16 |
| | EMXA3160-75-(C) | 無し Non-coat/PN/SD | | 19 | 75 | 15.5 | 120 | 16 |

# Epoch Mirus Type A for Aluminium
# エポックミルス タイプA（アルミ用）

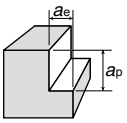
## 参考切削条件表 Refference cutting conditions

### ＜側面切削＞ Side milling 2枚刃タイプ 2Flutes type




| 被削材 Work material | | | アルミ合金(A7075等) Aluminum alloys | | | | アルミ合金鋳物(AC4A等) Cast Aluminum alloys | | | | 銅･銅合金(C1100等) Copper, Copper alloys | | | | 樹脂等 Rasin etc. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 外径DC Tool dia. (mm) | 首下長 Under neck length (mm) | 切込み Depth of cut ap,ae (mm) | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | |
| | | | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min |
| 10 | 45 | ap≦0.5DC ae≦0.8DC | 22,000 | 3,300 | 6,000 | 1,600 | 18,500 | 2,300 | 5,100 | 1,200 | 10,000 | 1,500 | 3,500 | 750 | 10,120 | 1,650 | 3,500 | 800 |
| | 60 | | 20,000 | 3,000 | 5,500 | 1,500 | 17,000 | 2,100 | 4,700 | 1,000 | 9,200 | 1,400 | 3,200 | 700 | 9,200 | 1,500 | 3,200 | 750 |
| 12 | 45 | | 24,000 | 6,600 | 7,700 | 2,200 | 21,000 | 4,600 | 6,500 | 1,500 | 11,000 | 3,000 | 3,500 | 1,000 | 11,040 | 3,300 | 3,500 | 1,100 |
| | 60 | | 22,000 | 6,000 | 7,000 | 2,000 | 18,500 | 4,200 | 5,800 | 1,400 | 10,000 | 2,700 | 3,200 | 920 | 10,120 | 3,000 | 3,200 | 1,000 |
| 16 | 45 | | 29,000 | 7,200 | 11,000 | 2,400 | 24,500 | 5,000 | 9,200 | 1,700 | 13,000 | 3,300 | 5,000 | 1,100 | 13,340 | 3,600 | 5,000 | 1,200 |
| | 60 | | 26,000 | 6,600 | 9,900 | 2,200 | 22,000 | 4,600 | 8,300 | 1,500 | 12,000 | 3,000 | 4,500 | 1,000 | 11,960 | 3,300 | 4,500 | 1,100 |
| | 75 | | 24,000 | 6,000 | 9,000 | 2,000 | 20,000 | 4,200 | 7,500 | 1,400 | 11,000 | 2,700 | 4,100 | 900 | 11,040 | 3,000 | 4,100 | 1,000 |
| 20 | 45 | | 30,000 | 8,000 | 9,300 | 1,300 | 25,000 | 5,600 | 7,800 | 900 | 14,000 | 3,700 | 4,300 | 600 | 13,800 | 4,000 | 4,300 | 650 |
| | 60 | | 27,000 | 7,300 | 8,500 | 1,200 | 23,000 | 5,100 | 7,100 | 850 | 12,500 | 3,300 | 3,900 | 550 | 12,420 | 3,650 | 3,900 | 600 |
| | 80 | | 24,000 | 6,600 | 7,700 | 1,100 | 20,000 | 4,600 | 6,500 | 750 | 11,000 | 3,000 | 3,500 | 500 | 11,040 | 3,300 | 3,500 | 550 |
| | 100 | | 22,000 | 6,000 | 7,000 | 1,000 | 18,500 | 4,200 | 5,800 | 700 | 10,000 | 2,700 | 3,200 | 450 | 10,120 | 3,000 | 3,200 | 500 |
| 25 | 45 | | 24,000 | 8,000 | 11,000 | 1,300 | 20,000 | 5,600 | 9,200 | 900 | 11,000 | 3,700 | 5,000 | 600 | 11,040 | 4,000 | 5,000 | 650 |
| | 60 | | 22,000 | 7,300 | 10,000 | 1,200 | 18,500 | 5,100 | 8,400 | 850 | 10,000 | 3,300 | 4,600 | 550 | 10,120 | 3,650 | 4,600 | 600 |
| | 80 | | 20,000 | 6,600 | 8,800 | 1,100 | 16,800 | 4,600 | 7,400 | 750 | 9,200 | 3,000 | 4,000 | 500 | 9,200 | 3,300 | 4,000 | 550 |
| | 100 | | 18,000 | 6,000 | 8,000 | 1,000 | 15,000 | 4,200 | 6,700 | 700 | 8,300 | 2,700 | 3,700 | 460 | 8,280 | 3,000 | 3,700 | 500 |

### ＜側面切削＞ Side milling 3枚刃タイプ 3Flutes type

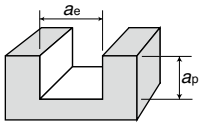



| 被削材 Work material | | | アルミ合金(A7075等) Aluminum alloys | | | | アルミ合金鋳物(AC4A等) Cast Aluminum alloys | | | | 銅･銅合金(C1100等) Copper, Copper alloys | | | | 樹脂等 Rasin etc. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 外径DC Tool dia. (mm) | 首下長 Under neck length (mm) | 切込み Depth of cut ap,ae (mm) | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | |
| | | | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min |
| 3 | 3DC以下 | ap≦1.0DC ae≦0.2DC | 26,000 | 9,000 | 20,800 | 4,500 | 21,000 | 6,000 | 16,800 | 3,000 | 21,000 | 4,000 | 16,800 | 2,000 | 21,000 | 4,400 | 16,800 | 2,200 |
| | 3DC～5DC | | 19,500 | 6,300 | 15,600 | 3,150 | 15,500 | 4,200 | 12,400 | 2,100 | 15,500 | 2,800 | 12,400 | 1,400 | 15,500 | 3,100 | 12,400 | 1,550 |
| | 5DC～8DC | | 14,000 | 3,000 | 11,200 | 1,500 | 12,000 | 2,940 | 9,600 | 1,500 | 12,000 | 2,100 | 9,600 | 1,100 | 12,000 | 2,300 | 9,600 | 1,150 |
| 4 | 3DC以下 | | 24,000 | 8,100 | 19,200 | 4,050 | 19,000 | 6,000 | 15,200 | 3,000 | 18,000 | 4,050 | 14,400 | 2,050 | 18,000 | 4,450 | 14,400 | 2,250 |
| | 3DC～5DC | | 18,000 | 5,700 | 14,400 | 2,850 | 14,250 | 4,200 | 11,400 | 2,100 | 13,500 | 2,800 | 10,800 | 1,400 | 13,500 | 3,100 | 10,800 | 1,550 |
| | 5DC～8DC | | 13,500 | 3,900 | 10,800 | 1,950 | 10,500 | 2,940 | 8,400 | 1,500 | 10,125 | 2,100 | 8,100 | 1,100 | 10,125 | 2,300 | 8,100 | 1,150 |
| 5 | 3DC以下 | | 20,000 | 8,500 | 16,000 | 4,250 | 16,000 | 6,000 | 12,800 | 3,000 | 15,000 | 4,200 | 12,000 | 2,100 | 15,000 | 4,600 | 12,000 | 2,300 |
| | 3DC～5DC | | 15,000 | 6,000 | 12,000 | 3,000 | 12,000 | 4,200 | 9,600 | 2,100 | 11,250 | 2,950 | 9,000 | 1,500 | 11,250 | 3,250 | 9,000 | 1,650 |
| | 5DC～8DC | | 11,250 | 4,200 | 9,000 | 2,100 | 9,000 | 2,940 | 7,200 | 1,500 | 8,438 | 2,100 | 6,750 | 1,100 | 8,438 | 2,300 | 6,750 | 1,150 |
| 6 | 3DC以下 | | 20,000 | 9,000 | 16,000 | 4,500 | 13,000 | 6,000 | 10,400 | 3,000 | 12,000 | 4,500 | 9,600 | 2,250 | 12,000 | 4,950 | 9,600 | 2,500 |
| | 3DC～5DC | | 15,000 | 6,300 | 12,000 | 3,150 | 9,750 | 4,200 | 7,800 | 2,100 | 9,000 | 3,150 | 7,200 | 1,600 | 9,000 | 3,450 | 7,200 | 1,750 |
| | 5DC～8DC | | 11,250 | 4,400 | 9,000 | 2,200 | 7,300 | 3,000 | 5,850 | 1,500 | 6,750 | 2,200 | 5,400 | 1,100 | 6,750 | 2,400 | 5,400 | 1,200 |
| 8 | 3DC以下 | | 18,000 | 9,000 | 14,400 | 4,500 | 10,000 | 4,300 | 8,000 | 2,150 | 9,600 | 3,800 | 7,700 | 1,900 | 9,600 | 4,200 | 7,680 | 2,100 |
| | 3DC～5DC | | 13,500 | 6,300 | 10,800 | 3,150 | 7,500 | 3,100 | 6,000 | 1,550 | 7,200 | 2,650 | 5,750 | 1,350 | 7,200 | 2,900 | 5,760 | 1,450 |
| | 5DC～8DC | | 10,125 | 4,400 | 8,100 | 2,200 | 5,650 | 2,300 | 4,500 | 1,150 | 5,400 | 1,850 | 4,350 | 950 | 5,400 | 2,000 | 4,320 | 1,000 |
| 10 | 3DC以下 | | 17,000 | 9,000 | 13,600 | 4,500 | 10,000 | 4,300 | 8,000 | 2,150 | 9,600 | 3,800 | 7,700 | 1,900 | 9,600 | 4,200 | 7,680 | 2,100 |
| | 3DC～5DC | | 12,750 | 6,300 | 10,200 | 3,150 | 7,500 | 3,100 | 6,000 | 1,550 | 7,200 | 2,650 | 5,750 | 1,350 | 7,200 | 2,900 | 5,760 | 1,450 |
| | 5DC～8DC | | 9,550 | 4,400 | 7,640 | 2,200 | 5,650 | 2,300 | 4,500 | 1,150 | 5,400 | 1,850 | 4,350 | 950 | 5,400 | 2,000 | 4,320 | 1,000 |
| 12 | 3DC以下 | | 17,000 | 9,000 | 13,600 | 4,500 | 10,000 | 4,300 | 8,000 | 2,150 | 9,600 | 3,800 | 7,700 | 1,900 | 9,600 | 4,200 | 7,680 | 2,100 |
| | 3DC～5DC | | 12,750 | 6,300 | 10,200 | 3,150 | 7,500 | 3,100 | 6,000 | 1,550 | 7,200 | 2,650 | 5,750 | 1,350 | 7,200 | 2,900 | 5,760 | 1,450 |
| | 5DC～8DC | | 9,550 | 4,400 | 7,650 | 2,200 | 5,650 | 2,300 | 4,500 | 1,150 | 5,400 | 1,850 | 4,350 | 950 | 5,400 | 2,050 | 4,320 | 1,050 |
| 16 | 3DC以下 | | 17,000 | 9,000 | 13,600 | 4,500 | 10,000 | 4,300 | 8,000 | 2,150 | 9,600 | 3,800 | 7,700 | 1,900 | 9,600 | 4,200 | 7,680 | 2,100 |
| | 3DC～5DC | | 12,750 | 6,300 | 10,200 | 3,150 | 7,500 | 3,100 | 6,000 | 1,550 | 7,200 | 2,650 | 5,750 | 1,350 | 7,200 | 2,900 | 5,760 | 1,450 |
| | 5DC～8DC | | 9,550 | 4,400 | 7,650 | 2,200 | 5,625 | 2,300 | 4,500 | 1,150 | 5,400 | 1,850 | 4,350 | 950 | 5,400 | 2,050 | 4,320 | 1,050 |

【注意】
①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③切込み量apは目安です。機械剛性、ワーク剛性により調節してください。apを小さくすれば送りはさらに上がります。
④水溶性切削液のご使用を推奨いたします。
⑤機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

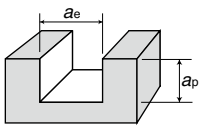
【Note】
①Use the appropriate coolant for the work material and machining shape.
②These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
③The recommended ap (depth of cut) is a genaral recommend. Please adjust basing on your machine and work piece rigidity. If ap is reduced, higher feed should be possible.
④Please apply water base coolant, when using EMXA series.
⑤If the machine rotation speed is insufficient , reduce the rotation speed and feed rage by the same ratio.

## ＜溝切削＞ Slotting 2枚刃タイプ 2Flutes type




| 被削材 Work material | | | アルミ合金(A7075等) Aluminum alloys | | | | アルミ合金鋳物(AC4A等) Cast Aluminum alloys | | | | 銅･銅合金(C1100等) Copper, Copper alloys | | | | 樹脂等 Rasin etc. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 外径DC Tool dia. (mm) | 首下長 Under neck length (mm) | 切込み Depth of cut ap,ae (mm) | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | |
| | | | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min |
| 10 | 45 | ap≦0.5DC ae≦1.0DC | 22,000 | 2,640 | 6,000 | 1,280 | 18,500 | 1,840 | 5,100 | 960 | 10,000 | 1,200 | 3,500 | 600 | 10,120 | 1,320 | 3,500 | 640 |
| | 60 | | 20,000 | 2,400 | 5,500 | 1,200 | 17,000 | 1,680 | 4,700 | 800 | 9,200 | 1,120 | 3,200 | 560 | 9,200 | 1,200 | 3,200 | 600 |
| 12 | 45 | | 24,000 | 5,280 | 7,700 | 1,760 | 21,000 | 3,680 | 6,500 | 1,200 | 11,000 | 2,400 | 3,500 | 800 | 11,040 | 2,640 | 3,500 | 880 |
| | 60 | | 22,000 | 4,800 | 7,000 | 1,600 | 18,500 | 3,360 | 5,800 | 1,120 | 10,000 | 2,160 | 3,200 | 736 | 10,120 | 2,400 | 3,200 | 800 |
| 16 | 45 | | 29,000 | 5,760 | 11,000 | 1,920 | 24,500 | 4,000 | 9,200 | 1,360 | 13,000 | 2,640 | 5,000 | 880 | 13,340 | 2,880 | 5,000 | 960 |
| | 60 | | 26,000 | 5,280 | 9,900 | 1,760 | 22,000 | 3,680 | 8,300 | 1,200 | 12,000 | 2,400 | 4,500 | 800 | 11,960 | 2,640 | 4,500 | 880 |
| | 75 | | 24,000 | 4,800 | 9,000 | 1,600 | 20,000 | 3,360 | 7,500 | 1,120 | 11,000 | 2,160 | 4,100 | 720 | 11,040 | 2,400 | 4,100 | 800 |
| 20 | 45 | | 30,000 | 6,400 | 9,300 | 1,040 | 25,000 | 4,480 | 7,800 | 720 | 14,000 | 2,960 | 4,300 | 480 | 13,800 | 3,200 | 4,300 | 520 |
| | 60 | | 27,000 | 5,840 | 8,500 | 960 | 23,000 | 4,080 | 7,100 | 680 | 12,500 | 2,640 | 3,900 | 440 | 12,420 | 2,920 | 3,900 | 480 |
| | 80 | | 24,000 | 5,280 | 7,700 | 880 | 20,000 | 3,680 | 6,500 | 600 | 11,000 | 2,400 | 3,500 | 400 | 11,040 | 2,640 | 3,500 | 440 |
| | 100 | | 22,000 | 4,800 | 7,000 | 800 | 18,500 | 3,360 | 5,800 | 560 | 10,000 | 2,160 | 3,200 | 360 | 10,120 | 2,400 | 3,200 | 400 |
| 25 | 45 | | 24,000 | 6,400 | 11,000 | 1,040 | 20,000 | 4,480 | 9,200 | 720 | 11,000 | 2,960 | 5,000 | 480 | 11,040 | 3,200 | 5,000 | 520 |
| | 60 | | 22,000 | 5,840 | 10,000 | 960 | 18,500 | 4,080 | 8,400 | 680 | 10,000 | 2,640 | 4,600 | 440 | 10,120 | 2,920 | 4,600 | 480 |
| | 80 | | 20,000 | 5,280 | 8,800 | 880 | 16,800 | 3,680 | 7,400 | 600 | 9,200 | 2,400 | 4,000 | 400 | 9,200 | 2,640 | 4,000 | 440 |
| | 100 | | 18,000 | 4,800 | 8,000 | 800 | 15,000 | 3,360 | 6,700 | 560 | 8,300 | 2,160 | 3,700 | 370 | 8,280 | 2,400 | 3,700 | 400 |

## ＜溝切削＞ Slotting 3枚刃タイプ 3Flutes type




| 被削材 Work material | | | アルミ合金(A7075等) Aluminum alloys | | | | アルミ合金鋳物(AC4A等) Cast Aluminum alloys | | | | 銅･銅合金(C1100等) Copper, Copper alloys | | | | 樹脂等 Rasin etc. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 外径DC Tool dia. (mm) | 首下長 Under neck length (mm) | 切込み Depth of cut ap,ae (mm) | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | | 高速条件 High speed | | 汎用条件 General | |
| | | | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min | 回転数 min-1 | 送り mm/min |
| 3 | 3DC以下 | ap≦0.5DC ae=1.0DC | 20,000 | 3,000 | 16,000 | 1,800 | 17,000 | 2,200 | 13,600 | 1,350 | 16,000 | 2,000 | 8,000 | 1,000 | 16,000 | 2,200 | 8,000 | 1,100 |
| | 3DC～5DC | | 15,000 | 2,300 | 12,000 | 1,350 | 12,750 | 1,700 | 10,200 | 1,050 | 12,000 | 1,500 | 6,000 | 750 | 12,000 | 1,650 | 6,000 | 850 |
| | 5DC～8DC | | 11,250 | 1,700 | 9,000 | 1,050 | 9,500 | 1,200 | 7,600 | 750 | 9,000 | 1,125 | 4,500 | 550 | 9,000 | 1,250 | 4,500 | 650 |
| 4 | 3DC以下 | | 19,000 | 3,300 | 15,200 | 2,000 | 16,000 | 2,250 | 12,800 | 1,350 | 15,000 | 2,050 | 7,500 | 1,050 | 15,000 | 2,250 | 7,500 | 1,150 |
| | 3DC～5DC | | 14,250 | 2,400 | 11,400 | 1,450 | 12,000 | 1,700 | 9,600 | 1,050 | 11,250 | 1,500 | 5,650 | 750 | 11,250 | 1,650 | 5,650 | 850 |
| | 5DC～8DC | | 10,700 | 1,900 | 8,650 | 1,150 | 9,000 | 1,300 | 7,200 | 750 | 8,450 | 1,150 | 4,250 | 550 | 8,450 | 1,250 | 4,250 | 650 |
| 5 | 3DC以下 | | 16,000 | 3,400 | 12,800 | 2,050 | 14,000 | 2,400 | 11,200 | 1,450 | 13,500 | 2,050 | 6,750 | 1,025 | 13,500 | 2,250 | 6,750 | 1,150 |
| | 3DC～5DC | | 12,000 | 2,500 | 9,600 | 1,500 | 10,500 | 1,800 | 8,400 | 1,050 | 10,125 | 1,500 | 5,050 | 750 | 10,125 | 1,650 | 5,050 | 850 |
| | 5DC～8DC | | 9,000 | 2,000 | 7,200 | 1,200 | 7,850 | 1,300 | 6,280 | 750 | 7,600 | 1,150 | 3,800 | 550 | 7,600 | 1,250 | 3,800 | 650 |
| 6 | 3DC以下 | | 13,000 | 3,600 | 10,400 | 2,150 | 11,000 | 2,550 | 8,800 | 1,550 | 10,500 | 2,000 | 5,250 | 1,000 | 10,500 | 2,200 | 5,250 | 1,100 |
| | 3DC～5DC | | 9,750 | 2,700 | 7,800 | 1,600 | 8,250 | 1,900 | 6,600 | 1,150 | 7,900 | 1,500 | 3,950 | 750 | 7,900 | 1,650 | 3,950 | 850 |
| | 5DC～8DC | | 7,300 | 2,000 | 5,840 | 1,200 | 6,200 | 1,400 | 4,960 | 850 | 5,950 | 1,150 | 3,000 | 550 | 5,950 | 1,250 | 3,000 | 650 |
| 8 | 3DC以下 | | 9,500 | 3,900 | 7,600 | 2,350 | 8,000 | 2,700 | 6,400 | 1,650 | 7,500 | 2,250 | 3,750 | 1,150 | 7,500 | 2,500 | 3,750 | 1,250 |
| | 3DC～5DC | | 7,150 | 3,000 | 5,700 | 1,800 | 6,000 | 2,000 | 4,800 | 1,200 | 5,650 | 1,700 | 2,850 | 850 | 5,650 | 1,900 | 2,850 | 950 |
| | 5DC～8DC | | 5,350 | 2,200 | 4,250 | 1,350 | 4,500 | 1,500 | 3,600 | 900 | 4,250 | 1,250 | 2,150 | 650 | 4,250 | 1,400 | 2,150 | 700 |
| 10 | 3DC以下 | | 7,600 | 3,900 | 6,050 | 2,350 | 6,400 | 2,700 | 5,150 | 1,650 | 6,000 | 2,250 | 3,000 | 1,150 | 6,000 | 2,500 | 3,000 | 1,250 |
| | 3DC～5DC | | 5,700 | 3,000 | 4,550 | 1,800 | 4,800 | 2,000 | 3,850 | 1,200 | 4,500 | 1,700 | 2,250 | 850 | 4,500 | 1,900 | 2,250 | 950 |
| | 5DC～8DC | | 4,250 | 2,200 | 3,400 | 1,350 | 3,600 | 1,500 | 2,850 | 900 | 3,400 | 1,250 | 1,700 | 650 | 3,400 | 1,400 | 1,700 | 700 |
| 12 | 3DC以下 | | 7,600 | 3,900 | 6,050 | 2,350 | 6,400 | 2,700 | 5,150 | 1,650 | 6,000 | 2,250 | 3,000 | 1,150 | 6,000 | 2,500 | 3,000 | 1,250 |
| | 3DC～5DC | | 5,700 | 3,000 | 4,550 | 1,800 | 4,800 | 2,000 | 3,850 | 1,200 | 4,500 | 1,700 | 2,250 | 850 | 4,500 | 1,900 | 2,250 | 950 |
| | 5DC～8DC | | 4,250 | 2,200 | 3,400 | 1,350 | 3,600 | 1,500 | 2,850 | 900 | 3,400 | 1,250 | 1,700 | 650 | 3,400 | 1,400 | 1,700 | 700 |
| 16 | 3DC以下 | | 7,600 | 3,900 | 6,050 | 2,350 | 6,400 | 2,700 | 5,150 | 1,650 | 6,000 | 2,250 | 3,000 | 1,150 | 6,000 | 2,500 | 3,000 | 1,250 |
| | 3DC～5DC | | 5,700 | 3,000 | 4,550 | 1,800 | 4,800 | 2,000 | 3,850 | 1,200 | 4,500 | 1,700 | 2,250 | 850 | 4,500 | 1,900 | 2,250 | 950 |
| | 5DC～8DC | | 4,250 | 2,200 | 3,400 | 1,350 | 3,600 | 1,500 | 2,850 | 900 | 3,400 | 1,250 | 1,700 | 650 | 3,400 | 1,400 | 1,700 | 700 |

【注意】①この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
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③水溶性切削液のご使用を推奨いたします。
④機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

【Note】①These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
②The recommended ap (depth of cut) is a genaral recommend. Please adjust basing on your machine and work piece rigidity.
If ap is reduced, higher feed should be possible.
③Please apply water base coolant, when using EMXA series.
④If the machine rotation speed is insufficient , reduce the rotation speed and feed rage by the same ratio.

# Epoch SD(S-DLC) Deep Square
# エポック SD(S-DLC) ディープスクエア

側面 Side Cutting / 溝 Slotting / 細部 Miniature / 仕上 Finishing / リブ・細部 Rib Miniature

高い耐溶着性、アルミ合金・銅の加工に適しています。DLCコーティング。
High welding resistance makes it ideal for machining aluminum alloys and copper. DLC Coating.

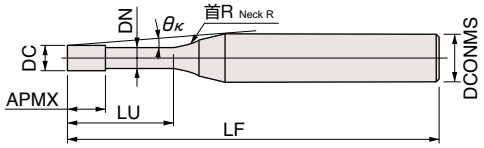
外径公差 Dia.tolerance

DC≦0.5：0～−0.007
0.5<DC<1：0～−0.010
1≦DC：0～−0.015

h5

(mm)

2枚刃
2Flutes

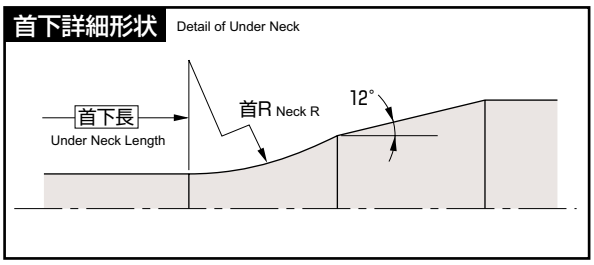



## EPDS2○○○-○○-SD

超硬 Carbide / SD / ねじれ30° Helix angle / 切削条件表 A379 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. DC | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度 Interference angle (°) θκ | 勾配角に対する実有効首下長 Effective under neck length with respect to draft angle 0.5° | 1° | 1.5° | 2° | 3° | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDS2005-2-SD | ● | 0.5 | 2 | 0.75 | 0.47 | 50 | 4 | 10 | 9.64 | 2.89 | 3.18 | 3.44 | 3.69 | 4.14 | 7,920 |
| EPDS2005-4-SD | ● | | 4 | 0.75 | 0.47 | 50 | 4 | 10 | 8.1 | 5.08 | 5.48 | 5.82 | 6.12 | 6.67 | 7,920 |
| EPDS2005-6-SD | ● | | 6 | 0.75 | 0.47 | 50 | 4 | 10 | 6.98 | 7.27 | 7.72 | 8.12 | 8.47 | 9.09 | 7,920 |
| EPDS2006-2-SD | ● | 0.6 | 2 | 0.9 | 0.57 | 50 | 4 | 10 | 9.59 | 2.89 | 3.18 | 3.44 | 3.69 | 4.14 | 7,920 |
| EPDS2006-4-SD | ● | | 4 | 0.9 | 0.57 | 50 | 4 | 10 | 8.02 | 5.08 | 5.48 | 5.82 | 6.12 | 6.67 | 7,920 |
| EPDS2006-6-SD | ● | | 6 | 0.9 | 0.57 | 50 | 4 | 10 | 6.9 | 7.24 | 7.72 | 8.12 | 8.47 | 9.09 | 7,920 |
| EPDS2008-4-SD | ● | 0.8 | 4 | 1.2 | 0.77 | 50 | 4 | 10 | 7.86 | 5.08 | 5.48 | 5.82 | 6.12 | 6.67 | 7,920 |
| EPDS2008-6-SD | ● | | 6 | 1.2 | 0.77 | 50 | 4 | 10 | 6.72 | 7.24 | 7.72 | 8.12 | 8.47 | 9.09 | 7,920 |
| EPDS2008-8-SD | ● | | 8 | 1.2 | 0.77 | 50 | 4 | 10 | 5.86 | 9.38 | 9.93 | 10.37 | 10.76 | 11.45 | 7,920 |
| EPDS2010-4-SD | ● | 1 | 4 | 1.5 | 0.96 | 50 | 4 | 10 | 7.67 | 5.13 | 5.52 | 5.85 | 6.15 | 6.69 | 7,920 |
| EPDS2010-8-SD | ● | | 8 | 1.5 | 0.96 | 50 | 4 | 10 | 5.66 | 9.42 | 9.95 | 10.4 | 10.78 | 11.46 | 7,920 |
| EPDS2010-12-SD | ● | | 12 | 1.5 | 0.96 | 55 | 4 | 10 | 4.48 | 13.66 | 14.3 | 14.82 | 15.28 | 16.06 | 7,920 |
| EPDS2015-6-SD | ● | 1.5 | 6 | 2.25 | 1.44 | 50 | 4 | 10 | 5.94 | 7.37 | 7.81 | 8.19 | 8.54 | 9.15 | 7,920 |
| EPDS2015-12-SD | ● | | 12 | 2.25 | 1.44 | 55 | 4 | 10 | 3.97 | 13.72 | 14.35 | 14.86 | 15.31 | 16.11 | 7,920 |
| EPDS2015-18-SD | ● | | 18 | 2.25 | 1.44 | 60 | 4 | 10 | 2.98 | 20.01 | 20.77 | 21.38 | 21.9 | 干渉なし | 7,920 |
| EPDS2020-8-SD | ● | 2 | 8 | 3 | 1.92 | 50 | 4 | 10 | 4.44 | 9.56 | 10.06 | 10.48 | 10.86 | 11.53 | 7,920 |
| EPDS2020-16-SD | ● | | 16 | 3 | 1.92 | 55 | 4 | 10 | 2.75 | 17.97 | 18.68 | 19.25 | 19.75 | 干渉なし | 7,920 |
| EPDS2020-24-SD | ● | | 24 | 3 | 1.92 | 60 | 4 | 10 | 1.99 | 26.3 | 27.16 | 27.84 | 干渉なし | 干渉なし | 7,920 |
| EPDS2030-12-SD | ● | 3 | 12 | 4.5 | 2.88 | 60 | 6 | 10 | 4.44 | 13.89 | 14.48 | 14.97 | 15.4 | 16.3 | 11,150 |
| EPDS2030-24-SD | ● | | 24 | 4.5 | 2.88 | 65 | 6 | 10 | 2.75 | 26.39 | 27.22 | 27.89 | 29.05 | 干渉なし | 11,150 |
| EPDS2030-36-SD | ● | | 36 | 4.5 | 2.88 | 80 | 6 | 10 | 1.99 | 38.79 | 39.81 | 41.38 | 干渉なし | 干渉なし | 14,890 |
| EPDS2040-16-SD | ● | 4 | 16 | 6 | 3.85 | 60 | 6 | 10 | 2.72 | 18.14 | 18.81 | 19.36 | 19.84 | 干渉なし | 11,900 |
| EPDS2040-32-SD | ● | | 32 | 6 | 3.85 | 80 | 6 | 10 | 1.55 | 34.72 | 35.66 | 36.89 | 干渉なし | 干渉なし | 11,900 |
| EPDS2040-48-SD | ● | | 48 | 6 | 3.85 | 90 | 6 | 10 | 1.08 | 51.18 | 52.67 | 干渉なし | 干渉なし | 干渉なし | 15,430 |

### 首下詳細形状 Detail of Under Neck

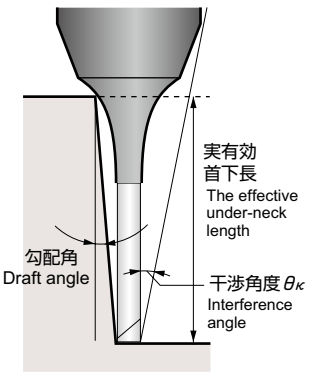



### 【注意】

加工物に勾配がついている場合、干渉領域は、首下長さよりも長くなります。それぞれの勾配角に対する実有効首下長をご参照ください。
また、工具が加工物に干渉する角度を干渉角度θκで表示していますので合わせてご参照ください。

### 【Note】

If the workpiece has draft angle, the interference length will be longer than the under-neck length.Please refer to the effective under-neck length for the various draft angles.
In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle θκ", and should also be referred to.




### 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦45HRC | 高硬度 Hardened steel >45HRC ≦55HRC | 高硬度 Hardened steel >55HRC ≦65HRC | 高硬度 Hardened steel >65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | ◎ | ◎ |

### 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPDS-SD | × (N/A) | 2～4 |

【注意】首下長／外径が10DCを超える工具の再研磨可否については、弊社営業にお問い合わせください。
【Note】Contact our sales office regarding whether or not regrinding is possible for tools where under neck length/tool diameter more than 10DC

●：標準在庫品です。●：Stocked items.　干渉なし：No interference

# 標準切削条件表 Recommended cutting conditions

## EPDS-SD

### ＜溝切削＞ Slotting

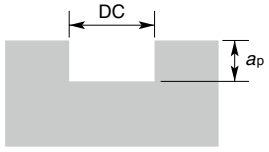
| 被削材 Work material | | | | 1 アルミニウム合金展伸材 A5052,A7075等, etc. Expanded aluminum alloy materials | | 2 アルミニウム合金鋳物 ダイキャスト Si 10%未満 Cast aluminum alloy materials Die-casting, Si less than 10% | | 3 銅合金 C1100等, etc. Pure coppers | | 4 樹脂 アクリル等 Resin, Acrylic, etc. | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 商品コード Item code | 外径DC Tool dia. (mm) | 首下長LU Under neck Length (mm) | 軸方向切り込み量 Axial direction cutting depth (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| EPDS2005-2-SD | 0.5 | 2 | 0.15 | 50,000 | 1,180 | 50,000 | 1,150 | 38,400 | 850 | 38,400 | 1,280 |
| EPDS2005-4-SD | | 4 | 0.09 | 50,000 | 1,080 | 46,660 | 980 | 34,560 | 700 | 34,560 | 1,050 |
| EPDS2005-6-SD | | 6 | 0.06 | 46,080 | 860 | 41,470 | 760 | 30,720 | 540 | 30,720 | 810 |
| EPDS2006-2-SD | 0.6 | 2 | 0.18 | 50,000 | 1,680 | 50,000 | 1,535 | 38,400 | 1,210 | 38,400 | 1,820 |
| EPDS2006-4-SD | | 4 | 0.11 | 50,000 | 1,535 | 46,660 | 1,390 | 34,560 | 995 | 34,560 | 1,490 |
| EPDS2006-6-SD | | 6 | 0.06 | 50,000 | 1,535 | 46,660 | 1,390 | 34,560 | 995 | 34,560 | 1,490 |
| EPDS2008-4-SD | 0.8 | 4 | 0.24 | 50,000 | 1,680 | 50,000 | 1,535 | 38,400 | 1,210 | 38,400 | 1,820 |
| EPDS2008-6-SD | | 6 | 0.14 | 50,000 | 1,535 | 46,660 | 1,390 | 34,560 | 995 | 34,560 | 1,490 |
| EPDS2008-8-SD | | 8 | 0.09 | 50,000 | 1,535 | 46,660 | 1,390 | 34,560 | 995 | 34,560 | 1,490 |
| EPDS2010-4-SD | 1 | 4 | 0.3 | 50,000 | 2,500 | 46,660 | 2,280 | 34,560 | 1,628 | 34,560 | 2,440 |
| EPDS2010-8-SD | | 8 | 0.17 | 46,650 | 2,140 | 41,990 | 1,880 | 31,100 | 1,340 | 31,100 | 2,010 |
| EPDS2010-12-SD | | 12 | 0.11 | 41,480 | 1,670 | 37,330 | 1,460 | 27,650 | 1,045 | 27,650 | 1,570 |
| EPDS2015-6-SD | 1.5 | 6 | 0.45 | 40,320 | 2,030 | 36,290 | 1,780 | 26,880 | 1,270 | 26,880 | 1,910 |
| EPDS2015-12-SD | | 12 | 0.25 | 36,290 | 1,670 | 32,660 | 1,460 | 24,190 | 1,045 | 24,190 | 1,570 |
| EPDS2015-18-SD | | 18 | 0.16 | 32,250 | 1,300 | 29,030 | 1,130 | 21,500 | 810 | 21,500 | 1,220 |
| EPDS2020-8-SD | 2 | 8 | 0.6 | 30,240 | 2,030 | 27,220 | 1,780 | 20,160 | 1,270 | 20,160 | 1,910 |
| EPDS2020-16-SD | | 16 | 0.35 | 27,150 | 1,670 | 24,440 | 1,460 | 18,100 | 1,045 | 18,100 | 1,570 |
| EPDS2020-24-SD | | 24 | 0.21 | 24,200 | 1,300 | 21,780 | 1,130 | 16,130 | 810 | 16,130 | 1,220 |
| EPDS2030-12-SD | 3 | 12 | 0.9 | 23,040 | 1,940 | 20,740 | 1,690 | 15,360 | 1,210 | 15,360 | 1,820 |
| EPDS2030-24-SD | | 24 | 0.36 | 20,730 | 1,600 | 18,660 | 1,390 | 13,820 | 995 | 13,820 | 1,490 |
| EPDS2030-36-SD | | 36 | 0.26 | 18,450 | 1,400 | 16,610 | 1,230 | 12,300 | 880 | 12,300 | 1,320 |
| EPDS2040-16-SD | 4 | 16 | 1.2 | 17,250 | 3,680 | 15,530 | 3,220 | 11,500 | 2,300 | 11,500 | 2,300 |
| EPDS2040-32-SD | | 32 | 0.64 | 15,530 | 2,980 | 13,970 | 2,600 | 10,350 | 1,860 | 10,350 | 1,860 |
| EPDS2040-48-SD | | 48 | 0.35 | 13,650 | 2,640 | 12,290 | 2,300 | 9,100 | 1,640 | 9,100 | 1,640 |

【備考】①樹脂の材質によってはエアブローを推奨致します。
②この標準切削条件表は切削条件の目安を示したものです。
実際の加工形状・使用機械・加工目的により条件を調整してください。
③機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

【Note】① An air blower is recommended for some resin materials.
② The cutting conditions shown in the table above are reference cutting conditions, and should be adjusted according to the actual shape to be machined, the machine used, and purpose for machining.
③If the machine rotation speed is insufficient, reduce the rotation speed and feed rate by the same ratio.

$a_p$：軸方向切り込み（mm）
DC：外径（mm）

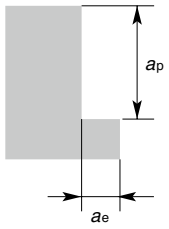
$a_p$ : Axial direction cutting depth (mm)
DC : Outer diameter(mm)




### ＜側面仕上げ切削＞ Side Finishing

| 被削材 Work material | 1 アルミニウム合金展伸材 A5052,A7075等, etc. Expanded aluminum alloy materials | | 2 樹脂 アクリル等 Resin, Acrylic, etc. | |
|---|---|---|---|---|
| 外径DC Tool dia.(mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 0.5 | 50,000 | 2,000 | 50,000 | 2,000 |
| 0.6 | 48,000 | 1,920 | 48,000 | 1,920 |
| 0.8 | 44,000 | 2,200 | 44,000 | 2,200 |
| 1 | 40,000 | 2,400 | 40,000 | 2,400 |
| 1.5 | 34,000 | 2,400 | 34,000 | 2,400 |
| 2 | 30,000 | 2,400 | 30,000 | 2,400 |
| 3 | 26,000 | 2,080 | 26,000 | 2,080 |
| 4 | 24,000 | 1,920 | 24,000 | 1,920 |

切り込み Depth of Cut（㎜）




$a_p \leqq 1DC$
$a_e \leqq 0.02mm \sim 0.05mm$

# Epoch SD(S-DLC) Square
# エポック SD(S-DLC) スクエア

側面 Side Cutting / 溝 Slotting / 座ぐり Spot Facing / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance
φ3～φ6 ：0～−0.015
φ7～φ12：0～−0.02

h5

(mm)

高い耐溶着性、アルミ合金・銅の加工に適しています。DLCコーティング。
High welding resistance makes it ideal for machining aluminum alloys and copper. DLC Coating.

2枚刃
2Flutes

超硬 Carbide / SD / ねじれ角 30° Helix angle / 切削条件表 A380 Cutting Conditions

## EPAS2○○○-SD

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| EPAS2030-SD | ● | 3 | 8 | 60 | 6 | 10,940 |
| EPAS2040-SD | ● | 4 | 11 | 60 | 6 | 11,470 |
| EPAS2050-SD | ● | 5 | 13 | 60 | 6 | 12,800 |
| EPAS2060-SD | ● | 6 | 13 | 70 | 6 | 14,030 |
| EPAS2070-SD | ● | 7 | 20 | 70 | 8 | 18,410 |

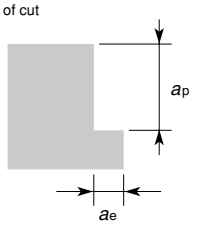
| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| EPAS2080-SD | ● | 8 | 20 | 75 | 8 | 17,180 |
| EPAS2090-SD | ● | 9 | 20 | 80 | 10 | 23,570 |
| EPAS2100-SD | ● | 10 | 25 | 80 | 10 | 23,130 |
| EPAS2110-SD | ● | 11 | 25 | 100 | 12 | 31,200 |
| EPAS2120-SD | ● | 12 | 25 | 100 | 12 | 28,960 |

## 標準切削条件表 Recommended cutting conditions EPAS-SD

### ＜側面切削＞ Side Milling

| 被削材 Work material | 1 アルミニウム合金展伸材 A5052,A7075等, etc. Expanded aluminum alloy materials | | 2 アルミニウム合金鋳物 AC4A,ADC12等, etc. Cast aluminum alloy materiasl | | 3 銅合金 C1100等, etc. Pure coppers | | 4 樹脂 アクリル等 Resin, Acrylic, etc. | |
|---|---|---|---|---|---|---|---|---|
| 外径DC Tool dia. (mm) | 回転数 n min⁻¹ | 送り速度Vf mm/min | 回転数 n min⁻¹ | 送り速度Vf mm/min | 回転数 n min⁻¹ | 送り速度Vf mm/min | 回転数 n min⁻¹ | 送り速度Vf mm/min |
| 4 | 24,000 | 1,800 | 19,000 | 1,300 | 12,000 | 900 | 12,000 | 1,020 |
| 6 | 16,000 | 2,000 | 13,000 | 1,400 | 8,000 | 1,000 | 8,000 | 1,120 |
| 8 | 12,000 | 2,000 | 9,500 | 1,500 | 6,000 | 1,000 | 6,000 | 1,120 |
| 10 | 9,500 | 2,000 | 7,600 | 1,500 | 4,700 | 1,000 | 4,700 | 1,120 |
| 12 | 8,000 | 2,000 | 6,400 | 1,500 | 4,000 | 1,000 | 4,000 | 1,120 |

切込み Depth of cut (mm)




ap≦1.5DC
ae≦0.2DC

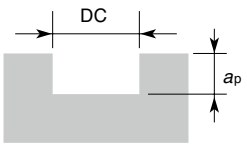
【注意】①樹脂の材質によってはエアブローを推奨致します。
②この標準切削条件表は切削条件の目安を示したものです。
実際の加工形状・使用機械・加工目的により条件を調整して下さい。
③機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

【Note】① An air blower is recommended for some resin materials.
② The cutting conditions shown in the table above are reference cutting conditions, and should be adjusted according to the actual shape to be machined, the machine used, and purpose for machining.
③If the machine rotation speed is insufficient, reduce the rotation speed and feed rate by the same ratio.

### ＜溝切削＞ Slotting

| 被削材 Work material | 1 アルミニウム合金展伸材 A5052,A7075等, etc. Expanded aluminum alloy materials | | 2 アルミニウム合金鋳物 AC4A,ADC12等, etc. Cast aluminum alloy materials | | 3 銅合金 C1100等, etc. Pure coppers | | 4 樹脂 アクリル等 Resin, Acrylic, etc. | |
|---|---|---|---|---|---|---|---|---|
| 外径DC Tool dia. (mm) | 回転数 n min⁻¹ | 送り速度Vf mm/min | 回転数 n min⁻¹ | 送り速度Vf mm/min | 回転数 n min⁻¹ | 送り速度Vf mm/min | 回転数 n min⁻¹ | 送り速度Vf mm/min |
| 4 | 19,000 | 1,100 | 16,000 | 750 | 8,750 | 550 | 8,750 | 650 |
| 6 | 13,000 | 1,200 | 11,000 | 850 | 5,800 | 530 | 5,800 | 580 |
| 8 | 9,500 | 1,300 | 8,000 | 900 | 4,300 | 600 | 4,300 | 620 |
| 10 | 7,600 | 1,300 | 6,400 | 900 | 3,500 | 600 | 3,500 | 620 |
| 12 | 6,400 | 1,300 | 5,300 | 900 | 3,000 | 610 | 3,000 | 660 |

切込み Depth of cut (mm)




WET切削：ap≦1DC
DRY切削：ap≦0.5DC

【注意】①樹脂の材質によってはエアブローを推奨致します。
②この標準切削条件表は切削条件の目安を示したものです。
実際の加工形状・使用機械・加工目的により条件を調整して下さい。
③機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

【Note】① An air blower is recommended for some resin materials.
② The cutting conditions shown in the table above are reference cutting conditions, and should be adjusted according to the actual shape to be machined, the machine used, and purpose for machining.
③If the machine rotation speed is insufficient, reduce the rotation speed and feed rate by the same ratio.

## 対応被削材 Applicable work materia

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | ◎ | ◎ |

## 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPAS-SD | 6～12 | 3～12 |

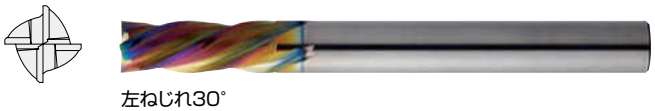
●：標準在庫品です。●：Stocked items.

# Epoch CFRP End Mill
# エポックCFRPエンドミル

## タイプH　Type H

外径公差 Dia.tolerance　0～−0.025　h5　(mm)

仕上げ用工具（面粗さ重視）（ハニカム材等）
Finishing tool (priority on surface roughness) (honeycomb materials, etc.)



左ねじれ30°
Left helix 30°

## ECH○○○○-SD

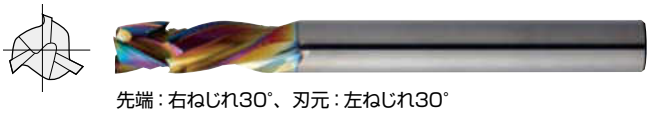
SD　切削条件表 A381 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 刃数 No. of flutes | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|
| ECH4060-SD | ● | 6 | 15 | 70 | 6 | 4 | 16,390 |
| ECH4080-SD | ● | 8 | 20 | 75 | 8 | 4 | 18,410 |
| ECH4100-SD | ● | 10 | 25 | 100 | 10 | 4 | 22,110 |
| ECH4120-SD | ● | 12 | 30 | 110 | 12 | 4 | 32,430 |

## タイプX　Type X

外径公差 Dia.tolerance　0～−0.03　h5　(mm)

厚物材、上下面品位の重視（ハニカム材等）
Thick materials, priority on upper and lower surface quality (honeycomb materials, etc.)



先端：右ねじれ30°、刃元：左ねじれ30°
Tip: 30° Right helix; Flute base: 30° Left helix

## ECX○○○○-SD

SD　切削条件表 A381 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | 交互点 Switchover point | シャンク径 Shank dia. | 刃数 No. of flutes | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|
| ECX3060-SD | ● | 6 | 15 | 70 | 6 | 6 | 3 | 18,970 |
| ECX3080-SD | ● | 8 | 20 | 75 | 8 | 8 | 3 | 22,110 |
| ECX3100-SD | ● | 10 | 25 | 100 | 10 | 10 | 3 | 28,620 |
| ECX3120-SD | ● | 12 | 30 | 110 | 12 | 12 | 3 | 38,940 |

## 標準切削条件表 Recommended cutting conditions

### ECH-SD　Type H

| 外径 Tool dia. DC | $a_p$=1.0DC, $a_e$=1.0DC 回転数 $n$ min$^{-1}$ | 切削速度 $v_c$ m/min | 送り速度 $v_f$ mm/min | 1回転送り量 $f$ mm/rev |
|---|---|---|---|---|
| 6 | 8,000 | 100 ～ 200 | 840 | 0.04 ～ 0.15 |
| 8 | 6,000 | | 840 | 0.05 ～ 0.17 |
| 10 | 4,800 | | 756 | |
| 12 | 4,000 | | 756 | 0.06 ～ 0.20 |

### ECX-SD　Type X

| 外径 Tool dia. DC | $a_p$=1.0DC, $a_e$=1.0DC 回転数 $n$ min$^{-1}$ | 切削速度 $v_c$ m/min | 送り速度 $v_f$ mm/min | 1回転送り量 $f$ mm/rev |
|---|---|---|---|---|
| 6 | 8,000 | 100 ～ 200 | 600 | 0.03 ～ 0.12 |
| 8 | 6,000 | | 600 | 0.04 ～ 0.15 |
| 10 | 4,800 | | 540 | |
| 12 | 4,000 | | 540 | 0.05 ～ 0.17 |

【注意】①この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
②切込み量$a_p$は目安です。機械剛性、ワーク剛性により調節してください。$a_p$を小さくすれば送りはさらに上がります。
③機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

【Note】①These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
②The recommended $a_p$ (depth of cut) is a genaral recommend. Please adjust basing on your machine and work piece rigidity. If $a_p$ is reduced, higher feed should be possible.
③If the machine rotation speed is insufficient , reduce the rotation speed and feed rage by the same ratio.

## ECH-SD、ECX-SDの対応被削材

Applicable work material of ECH-SD, ECX-SD

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| CFRP、GFRPなど for CFRP, GFRP etc. | | | | | | | | |

## 再研磨対応外径範囲

Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| ECH-SD | 6 ～ 12 | 6 ～ 12 |
| ECX-SD | 6 ～ 12 | 6 ～ 12 |

# Epoch CFRP Trim Cutter
# エポックCFRPトリムカッタ

## タイプN Type N

(mm)

汎用工具(粗～仕上げまでを想定)
General-purpose tools (For roughing to finishing)

底刃2枚刃
End cutting edge 2 flutes

右ねじれ15°
Right helix 15°

### ECN○○○○○-HD

HD 切削条件表 A382 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 刃数 No. of flutes | 底刃数 No. of bottom flutes |
|---|---|---|---|---|---|---|---|
| ECN08060-HD | ◎ | 6 | 18 | 75 | 6 | 8 | 2 |
| ECN080635-HD | ◎ | 6.35 | 18 | 75 | 6.35 | 8 | 2 |
| ECN10080-HD | ◎ | 8 | 24 | 90 | 8 | 10 | 2 |
| ECN12100-HD | ◎ | 10 | 30 | 100 | 10 | 12 | 2 |
| ECN12120-HD | ◎ | 12 | 36 | 110 | 12 | 12 | 2 |

## タイプW Type W

(mm)

高能率工具(送り速度向上)
High-efficiency tools (Improved feed rate)

底刃2枚刃
End cutting edge 2 flutes

右ねじれ25°、左ねじれ25°
Right helix 25° , Left helix 25°

### ECW○○○○○-HD

HD 切削条件表 A382 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 底刃数 No. of bottom flutes |
|---|---|---|---|---|---|---|
| ECW09060-HD | ◎ | 6 | 18 | 75 | 6 | 2 |
| ECW090635-HD | ◎ | 6.35 | 18 | 75 | 6.35 | 2 |
| ECW11080-HD | ◎ | 8 | 24 | 90 | 8 | 2 |
| ECW13100-HD | ◎ | 10 | 30 | 100 | 10 | 2 |
| ECW13120-HD | ◎ | 12 | 36 | 110 | 12 | 2 |

## 標準切削条件表 Recommended cutting conditions

### ECN-HD Type N

| 外径 Tool dia. DC | $a_p$=1.0DC, $a_e$=1.0DC 回転数 $n$ min$^{-1}$ | 切削速度 $v_c$ m/min | 送り速度 $v_f$ mm/min | 1回転送り量 $f$ mm/rev |
|---|---|---|---|---|
| 6 | 8,000 | 100 ～ 200 | 1,200 | 0.08 ～ 0.3 |
| 6.35 | 7,500 | | 1,200 | |
| 8 | 6,000 | | 1,080 | 0.1 ～ 0.32 |
| 10 | 4,800 | | 1,080 | |
| 12 | 4,000 | | 800 | 0.12 ～ 0.36 |

### ECW-HD Type W

| 外径 Tool dia. DC | $a_p$=1.0DC, $a_e$=1.0DC 回転数 $n$ min$^{-1}$ | 切削速度 $v_c$ m/min | 送り速度 $v_f$ mm/min | 1回転送り量 $f$ mm/rev |
|---|---|---|---|---|
| 6 | 8,000 | 100 ～ 200 | 1,600 | 0.15 ～ 0.5 |
| 6.35 | 7,500 | | 1,600 | |
| 8 | 6,000 | | 1,400 | 0.175 ～ 0.55 |
| 10 | 4,800 | | 1,400 | |
| 12 | 4,000 | | 1,200 | 0.2 ～ 0.6 |

【注意】①この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
②切込み量$a_p$は目安です。機械剛性、ワーク剛性により調節してください。$a_p$を小さくすれば送りはさらに上がります。
③機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

【Note】①These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
②The recommended $a_p$ (depth of cut) is a genaral recommend. Please adjust basing on your machine and work piece rigidity. If $a_p$ is reduced, higher feed should be possible.
③If the machine rotation speed is insufficient , reduce the rotation speed and feed rage by the same ratio.

## ECN-HD、ECW-HDの対応被削材

Applicable work material of ECN-HD, ECW-HD

| 炭素鋼 合金鋼 Carbon steel Alloy steel | 炭素鋼 合金鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| CFRP、GFRPなど for CFRP, GFRP etc. | | | | | | | | |

## 再研磨対応外径範囲

Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| ECN-HD | × (N/A) | × (N/A) |
| ECW-HD | × (N/A) | × (N/A) |

◎印：メーカー在庫品です。弊社営業へお問い合せください。　◎: Manufacturer stocked items. Contact with our sales department.

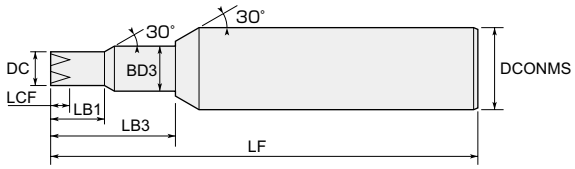
# Epoch Shining Square
# エポック シャイニングスクエア

平面 Planing　仕上 Finishing

外径公差 Dia.tolerance　0～−0.01　h4　(mm)

切れ味と刃先剛性を両立した刃形状により、鏡面加工が可能。
Flute shape that provides good cutting performance and flute tip rigidity enables mirror-surface cutting.

Includes actual measured mill diameter value. 外径実測値付き




## EPCDS○○○○

※外径実測値をケースに表示しています
Actual measured mill diameter value is shown on case.

再研磨は当社の営業までお問い合わせ下さい。
Please contact our sales department for regrinding.

多結晶機能ダイヤモンド Poly Crystalline Diamond　ねじれ0° Helix angle　切削条件表A383 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. DC | 溝長 Flute length LCF | 有効長 Effective length LB1 | 首下長 Under neck length LB3 | 首径 Neck dia. BD3 | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 刃数 No. of Flutes | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Display of actual measured tool dia. for all tools 全数外径実測値表示 | | | | | | | | |
| EPCDS4001 | ● | 0.1 | 0.01 | 0.1 | 3 | 1.3 | 40 | 4 | 4 | 75,410 |
| EPCDS4002 | ● | 0.2 | 0.02 | 0.2 | 3 | 1.3 | 40 | 4 | 4 | 75,410 |
| EPCDS4003 | ● | 0.3 | 0.04 | 0.3 | 3 | 1.3 | 40 | 4 | 4 | 64,700 |
| EPCDS6004 | ● | 0.4 | 0.04 | 0.4 | 3 | 1.3 | 40 | 4 | 6 | 64,700 |
| EPCDS6005 | ● | 0.5 | 0.05 | 0.5 | 3 | 1.3 | 40 | 4 | 6 | 64,700 |
| EPCDS6006 | ● | 0.6 | 0.07 | 0.6 | 3 | 1.3 | 40 | 4 | 6 | 53,880 |
| EPCDS6008 | ● | 0.8 | 0.1 | 0.8 | 3 | 1.3 | 40 | 4 | 6 | 53,880 |
| EPCDS6010 | ● | 1.0 | 0.1 | 1.0 | 3 | 1.3 | 40 | 4 | 6 | 53,880 |

## 標準切削条件表 Recommended cutting conditions EPCDS

| 被削材 Work material | 超硬合金 Cemented carbide | | |
|---|---|---|---|
| 外径DC Tool dia. (mm) | 回転数 $n$ $min^{-1}$ | 送り速度 $v_f$ mm/min | 切込み量 $a_p$ mm |
| 0.1 | 40,000 | 10～30 | 0.0005～0.001 |
| 0.2 | 40,000 | 10～30 | 0.0005～0.001 |
| 0.3 | 40,000 | 10～30 | 0.0005～0.001 |
| 0.4 | 40,000 | 20～50 | 0.0005～0.002 |
| 0.5 | 40,000 | 20～50 | 0.0005～0.002 |
| 0.6 | 40,000 | 20～50 | 0.0005～0.002 |
| 0.8 | 40,000 | 20～80 | 0.0005～0.002 |
| 1 | 40,000 | 20～80 | 0.0005～0.002 |

【注意】①加工精度の低下、工具の欠損または折損に繋がるため、工具の回転振れ量を最小に抑えてください。
②極めて微細な加工のため、機械の変位量などの機械特性を把握してから加工してください。
③機械の回転数が足りない場合は、主軸回転数とテーブル送り速度を同比率で下げてください。
④不水溶性切削液または水溶性切削液を推奨します。
⑤切りくずの詰まりを抑制するため切削油剤が工具切れ刃に供給されるようにノズルの位置を調整してください。
⑥この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、機械の剛性またはご使用の目的等、ご使用の状況により、切削条件の調整を行ってください。

【Note】1) Tool rotation runout should be minimized, since it could lead to reduced cutting accuracy or tool chipping or breakage.
2) For extremely detailed cutting, the machinery characteristics such as machinery displacement, etc. should be understood before performing cutting.
3) If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.
4) Non-water-soluble cutting fluid or water-soluble cutting fluid is recommended.
5) To suppress chip clogging, adjust the cutting fluid nozzle so that the cutting fluid is supplied to the tool cutting flutes.
6) These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | 炭素鋼 合金鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| 超硬合金用 for Cemented carbide | | | | | | | | |

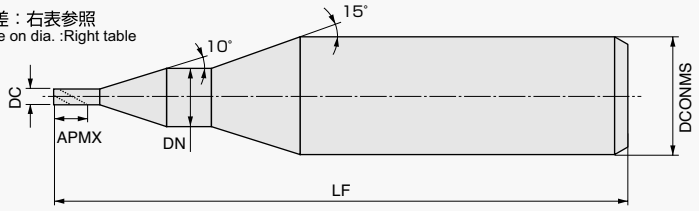
## 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EPCDS | × (N/A) | 0.1 ～ 1 |

【注意】首下長／外径が10DCを超える工具の再研磨可否については、弊社営業にお問い合わせください。
【Note】Contact our sales office regarding whether or not regrinding is possible for tools where under neck length/tool diameter more than 10DC

●：標準在庫品です。●：Stocked items.

# Epoch Micro End Mill
# エポックマイクロエンドミル




シャンク真円度：0.2μm以下
Shank Roundness : under 0.2μm
シャンク円筒度：0.5μm以下
Shank Cyrindrical profile : under 0.5μm
シャンク公差：$^{0}_{-0.004}$
Tolerance on shank : $^{0}_{-0.004}$

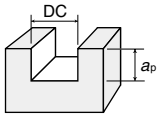
| 外径 Tool dia. | 外径公差 Tolerance on dia. |
|---|---|
| 0.03≦DC≦0.1 | ±0.002 |
| 0.2≦DC | $^{0}_{-0.007}$ |

## EMM200□□ (-TH) (Total 24 items) Micro-TH

切削条件表 A384 Cutting Conditions

| ノンコーティング Non coating | | THコーティング TH Coating | | 寸法 Size(mm) | | | | | 希望小売価格(円) Suggested retail price(¥) | |
|---|---|---|---|---|---|---|---|---|---|---|
| 商品コード Item code | 在庫 Stock | 商品コード Item code | 在庫 Stock | 外径 Tool dia. DC | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | ノンコーティング Non coating | THコーティング TH Coating |
| EMM20003 | ● | EMM20003-TH | ● | 0.03 | 0.045 | 0.5 | 40 | 4 | 30,110 | 33,100 |
| EMM20004 | ● | EMM20004-TH | ● | 0.04 | 0.06 | 0.5 | 40 | 4 | 25,070 | 27,540 |
| EMM20005 | ● | EMM20005-TH | ● | 0.05 | 0.075 | 0.5 | 40 | 4 | 22,610 | 24,860 |
| EMM20006 | ● | EMM20006-TH | ● | 0.06 | 0.09 | 0.5 | 40 | 4 | 20,040 | 22,080 |
| EMM20007 | | EMM20007-TH | | 0.07 | 0.105 | 0.5 | 40 | 4 | — | — |
| EMM20008 | ● | EMM20008-TH | ● | 0.08 | 0.12 | 0.5 | 40 | 4 | 15,110 | 16,610 |
| EMM20009 | | EMM20009-TH | | 0.09 | 0.135 | 0.5 | 40 | 4 | — | — |
| EMM20010 | ● | EMM20010-TH | ● | 0.1 | 0.15 | 0.5 | 40 | 4 | 11,790 | 12,970 |
| EMM20020 | ● | EMM20020-TH | ● | 0.2 | 0.3 | 0.625 | 40 | 4 | 7,480 | 8,240 |
| EMM20030 | ● | EMM20030-TH | ● | 0.3 | 0.45 | 0.75 | 40 | 4 | 6,430 | 7,080 |
| EMM20040 | ● | EMM20040-TH | ● | 0.4 | 0.6 | 0.875 | 40 | 4 | 6,430 | 7,080 |
| EMM20050 | ● | EMM20050-TH | ● | 0.5 | 0.75 | 1 | 40 | 4 | 6,040 | 6,640 |

## 標準切削条件表 Recommended cutting conditions EMM EMM-TH




| 推奨領域 Recommended range | ノンコーティング Non Coating | | THコーティング TH Coating | | | |
|---|---|---|---|---|---|---|
| | 1 | | 2 | | 3 | |
| 被削材 Work material | アルミ合金、非鉄金属、樹脂等 Aluminum alloys、Non-ferrous、Resins | | 軟鋼材・ステンレス鋼 Mild steel material、Staineless steels | | プリハードン鋼・焼入れ鋼(35HRC～) Pre-hardened steels、Hardened steels | |
| 切込み $a_p$(㎜) Depth of cut | $a_p$≦0.1DC | | $a_p$≦0.05DC | | $a_p$≦0.05DC | |
| 外径DC Tool dia. (mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (㎜/min) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (㎜/min) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (㎜/min) |
| 0.03, 0.04 | 50,000 | 380 | 50,000 | 190 | 50,000 | 130 |
| 0.05, 0.06 | 50,000 | 520 | 50,000 | 260 | 50,000 | 170 |
| 0.07, 0.08 | 50,000 | 660 | 50,000 | 330 | 50,000 | 220 |
| 0.09, 0.1 | 50,000 | 800 | 50,000 | 400 | 50,000 | 270 |
| 0.2 | 50,000 | 940 | 50,000 | 470 | 50,000 | 310 |
| 0.3 | 50,000 | 1,080 | 50,000 | 540 | 50,000 | 360 |
| 0.4 | 50,000 | 1,220 | 50,000 | 610 | 50,000 | 410 |
| 0.5 | 50,000 | 1,360 | 50,000 | 680 | 50,000 | 450 |

【注意】
①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。
④溝切削でのみご使用ください。側面切削は推奨いたしません。

【Note】
1. Use the appropriate coolant for the work material and machining shape.
2. These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
3. If the rpm of the machine is low, lower the feed rate also to put the rpm and feed rate in the same ratio.
4. Please use slotting only. This is not recommended for side milling.

## EMM、EMM-THの対応被削材 Applicable work material of EMM, EMM-TH

| 商品コード Item code | 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦45HRC | 高硬度 Hardened steel | | | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|---|
| | | | >45HRC ≦55HRC | >55HRC ≦65HRC | >65HRC | | | | |
| EMM | ◎ | ◎ | ○ | | | ○ | ○ | ○ | ○ |
| EMM-TH | ◎ | ◎ | ◎ | ○ | | ○ | ○ | ○ | ○ |

## 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EMM | × (N/A) | × (N/A) |
| EMM-TH | × (N/A) | × (N/A) |

●印：標準在庫品です。 ●：Stocked items. 無印：受注生産品です。No Mark : Manufactured upon request only.

# Epoch Precision Miniature End Mill
# エポック精密小径エンドミル

小径精密加工用スクエアエンドミル。
Square end mill for small-diameter high-precision machining.

## レギュラーネック Regular neck

溝 Slotting / 彫込み Die-sinking / 細部 Miniature / 仕上 Finishing

外径公差 Dia.tolerance 0～−0.015　シャンク径公差 Shank tolerance 0～−0.005 (mm)

### HYPS2○○○-C

超硬 Carbide / C / ねじれ30° Helix angle / 切削条件表 A385 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 首径 Neck dia. | 首下長 Under neck length | 全長 Overall length | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|
| HYPS2002-C | ● | 0.2 | 0.3 | — | 首ぬすみ無し Without neck escape | 50 | 9,620 |
| HYPS2003-C | ● | 0.3 | 0.4 | — | | 50 | 8,690 |
| HYPS2004-C | ● | 0.4 | 0.5 | — | | 50 | 8,690 |
| HYPS2005-C | ● | 0.5 | 0.6 | 0.45 | 1.6 | 50 | 8,240 |
| HYPS2006-C | ● | 0.6 | 0.7 | 0.55 | 1.7 | 50 | 8,240 |
| HYPS2008-C | ● | 0.8 | 1 | 0.75 | 2.5 | 50 | 7,830 |
| HYPS2010-C | ● | 1 | 1.3 | 0.95 | 3.3 | 50 | 6,400 |
| HYPS2012-C | ● | 1.2 | 1.5 | 1.15 | 3.5 | 50 | 7,000 |
| HYPS2014-C | ● | 1.4 | 1.8 | 1.35 | 3.8 | 50 | 7,000 |
| HYPS2015-C | ● | 1.5 | 1.9 | 1.45 | 4.9 | 50 | 6,400 |
| HYPS2016-C | ● | 1.6 | 2 | 1.55 | 5 | 50 | 7,000 |
| HYPS2018-C | ● | 1.8 | 2.3 | 1.75 | 5.3 | 50 | 7,000 |
| HYPS2020-C | ● | 2 | 2.5 | 1.95 | 5.5 | 50 | 6,400 |
| HYPS2025-C | ● | 2.5 | 3 | 2.4 | 6 | 50 | 6,400 |
| HYPS2030-C | ● | 3 | 4 | 2.9 | 8 | 50 | 7,580 |
| HYPS2035-C | ● | 3.5 | 4.5 | 3.4 | 8.5 | 50 | 7,880 |
| HYPS2040-C | ● | 4 | 5 | 3.9 | 10 | 50 | 7,880 |
| HYPS2050-C | ● | 5 | 6 | 4.9 | 11 | 50 | 8,940 |
| HYPS2060-C | ● | 6 | 7.5 | 5.9 | 12.5 | 50 | 9,260 |

## ロングネック Long neck

溝 Slotting / 彫込み Die-sinking / 細部 Miniature / 仕上 Finishing

外径公差 Dia.tolerance 0～−0.015　シャンク径公差 Shank tolerance 0～−0.005 (mm)

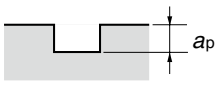
### HPSLN2○○○-C

超硬 Carbide / C / ねじれ30° Helix angle / 切削条件表 A385 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 首径 Neck dia. | 首下長 Under neck length | 全長 Overall length | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|
| HPSLN2005-C | ● | 0.5 | 0.6 | 0.45 | 2.5 | 60 | 9,890 |
| HPSLN2006-C | ● | 0.6 | 0.7 | 0.55 | 3 | 60 | 9,890 |
| HPSLN2008-C | ● | 0.8 | 1 | 0.75 | 4 | 60 | 9,390 |
| HPSLN2010-C | ● | 1 | 1.3 | 0.95 | 5 | 60 | 7,690 |
| HPSLN2012-C | ● | 1.2 | 1.5 | 1.15 | 6 | 60 | 8,390 |
| HPSLN2014-C | ● | 1.4 | 1.8 | 1.35 | 7 | 60 | 8,390 |
| HPSLN2015-C | ● | 1.5 | 1.9 | 1.45 | 7.5 | 60 | 7,690 |
| HPSLN2016-C | ● | 1.6 | 2 | 1.55 | 8 | 60 | 8,390 |
| HPSLN2018-C | ● | 1.8 | 2.3 | 1.75 | 9 | 60 | 8,390 |
| HPSLN2020-C | ● | 2 | 2.5 | 1.95 | 10 | 60 | 7,690 |
| HPSLN2025-C | ● | 2.5 | 3 | 2.4 | 12.5 | 60 | 7,690 |
| HPSLN2030-C | ● | 3 | 4 | 2.9 | 15 | 80 | 9,080 |
| HPSLN2035-C | ● | 3.5 | 4.5 | 3.4 | 17.5 | 80 | 9,450 |
| HPSLN2040-C | ● | 4 | 5 | 3.9 | 20 | 80 | 9,450 |
| HPSLN2050-C | ● | 5 | 6 | 4.9 | 25 | 80 | 10,740 |
| HPSLN2060-C | ● | 6 | 7.5 | 5.9 | 30 | 80 | 11,100 |

## 標準切削条件表 Recommended cutting conditions

HYPS-C レギュラーネック Regular neck　HPSLN-C ロングネック Long neck

| 外径DC Tool dia. (mm) | 回転数 (n) Revolution min⁻¹ | 送り速度 (Vf) mm/min Table speed Vf | 被削材 (50HRC以下) Work material (Under 50HRC) |
|---|---|---|---|
| | | スケア刃 (HYPS) Square end (HYPS) | 炭素鋼、合金鋼、工具鋼、プリハードン鋼 Carbon steels, Alloy steels, Tool steels, Pre-hardened steels S50C、SCM、SKD、HPM1、NAK55 |
| 0.2 | 20,000 ～50,000 | 100～500 | 切込み Depth of Cut ap＝(0.1～0.3)×DC  |
| 0.4 | | | |
| 0.6 | | | |
| 1.0 | | | |
| 2.0 | 10,000 ～30,000 | 300～800 | |
| 3.0 | | | |
| 4.0 | 5,000 ～15,000 | 400～1,000 | |
| 6.0 | | | |



### ■ 使用方法と注意点

①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③自動切込みが可能な、剛性のあるNC機の利用を推奨します。切込み回数が多いので手動機は適しません。
④回転数が不足する場合は適当な増速装置を準備してください。増速装置は長時間耐える機種を推奨します。
⑤能率を問わない場合(例、夜間無人加工など)は、2000min⁻¹程度の低速でも使用できます。
⑥工具径が小さいため、振れはできるだけ小さく押さえてください。
⑦ロングネックタイプをご使用の場合は、切込み量を少なくするか、送り速度を上表の低い数値でご使用ください。

### Notes on Applications

1) Use the appropriate coolant for the work material and machining shape.
2) These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, thecondition should be adjusted according to the machining shape, purpose and the machine type.
3) Rigid N/C with automatic depth feeder is recommended. Manualmachines are not recommended for multi-feed applications.
4) High-revolution spindle attachments are recommended.
5) Lower revolutions of about 2,000 r/min are applicable, in case ofoperation in night without an operator, with efficiency not required.
6) Set-up runout of end mills as small as possible, because of miniature end mills.

## HYPS-C、HPSLN-C の対応被削材

Applicable work material of HYPS-C, HPSLN-C

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | > 55HRC ≦ 65HRC | > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ |

## 再研磨対応外径範囲

Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| HYPS-C | 6 | 2～6 |
| HPSLN-C | 6 | 2～6 |

# Carbide End Mills for Aluminium
# 超硬アルミ用エンドミル

側面 Side Cutting / 溝 Slotting / 座ぐり Spot Facing / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance 0～−0.02　h6　(mm)

アルミ加工用エンドミル。
End mill for machining of aluminum

2枚刃
2Flutes

超硬 Carbide / ねじれ45° Helix angle / 切削条件表 A386 Cutting Conditions

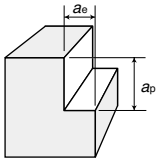
## AES2○○○

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| AES2010 | ● | 1 | 2.5 | 40 | 4 | 6,030 |
| AES2020 | ● | 2 | 6 | 40 | 4 | 6,030 |
| AES2030 | ● | 3 | 8 | 45 | 6 | 6,630 |
| AES2040 | ● | 4 | 11 | 45 | 6 | 7,010 |
| AES2050 | ● | 5 | 13 | 50 | 6 | 8,060 |
| AES2060 | ● | 6 | 13 | 50 | 6 | 8,790 |
| AES2070 | ● | 7 | 20 | 60 | 8 | 10,550 |
| AES2080 | ● | 8 | 20 | 60 | 8 | 11,790 |
| AES2090 | ● | 9 | 20 | 65 | 10 | 14,370 |

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| AES2100 | ● | 10 | 25 | 70 | 10 | 16,390 |
| AES2110 | ● | 11 | 25 | 75 | 12 | 17,740 |
| AES2120 | ● | 12 | 25 | 75 | 12 | 19,530 |
| AES2130 | ● | 13 | 25 | 75 | 12 | 26,170 |
| AES2140 | ● | 14 | 35 | 90 | 12 | 37,080 |
| AES2150 | ● | 15 | 35 | 90 | 16 | 38,710 |
| AES2160 | ● | 16 | 35 | 90 | 16 | 40,130 |
| AES2180 | ● | 18 | 40 | 105 | 16 | 59,370 |
| AES2200 | ● | 20 | 40 | 105 | 20 | 68,870 |

## 標準切削条件表 Recommended cutting conditions

### AES




〈側面切削〉 Side milling

| 被削材 Work material | 純アルミニウム Pure aluminums 1070 | | アルミ合金 Aluminum alloys Cu-Mg系 2014 | | アルミ合金 Aluminum alloys Si系 4032 | | アルミ合金 Aluminum alloys Mg系 5052 | | アルミ合金 Aluminum alloys Mg-Si系 6061 | | アルミ合金 Aluminum alloys Zn-Mg系 7075 | | 鋳造アルミ Cast Iron aluminums AC8C | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | ap=1.5DC ae=0.2DC | | ap=1.5DC ae=0.2DC | | ap=1.5DC ae=0.2DC | | ap=1.5DC ae=0.2DC | | ap=1.5DC ae=0.2DC | | ap=1.5DC ae=0.2DC | | ap=1.5DC ae=0.2DC | |
| 外径DC Tool dia.(mm) | 回転数n (min⁻¹) | 送り速度vf (mm/min) | 回転数n (min⁻¹) | 送り速度vf (mm/min) | 回転数n (min⁻¹) | 送り速度vf (mm/min) | 回転数n (min⁻¹) | 送り速度vf (mm/min) | 回転数n (min⁻¹) | 送り速度vf (mm/min) | 回転数n (min⁻¹) | 送り速度vf (mm/min) | 回転数n (min⁻¹) | 送り速度vf (mm/min) |
| φ2 | 48,000 | 800 | 40,000 | 800 | 8,000 | 200 | 20,000 | 400 | 9,600 | 250 | 40,000 | 400 | 24,000 | 500 |
| φ3 | 32,000 | 800 | 27,000 | 800 | 5,300 | 200 | 13,000 | 400 | 6,400 | 250 | 27,000 | 400 | 16,000 | 500 |
| φ4 | 24,000 | 1,000 | 20,000 | 1,000 | 4,000 | 250 | 10,000 | 500 | 4,800 | 300 | 20,000 | 500 | 12,000 | 600 |
| φ6 | 16,000 | 1,000 | 13,500 | 1,000 | 2,650 | 250 | 6,500 | 500 | 3,200 | 300 | 13,500 | 500 | 8,000 | 600 |
| φ8 | 12,000 | 1,000 | 10,000 | 1,000 | 2,000 | 300 | 5,000 | 600 | 2,400 | 350 | 10,000 | 600 | 6,000 | 700 |
| φ10 | 9,600 | 1,200 | 8,000 | 1,200 | 1,600 | 300 | 4,000 | 600 | 1,900 | 350 | 8,000 | 600 | 4,800 | 700 |
| φ12 | 8,000 | 1,200 | 6,600 | 1,200 | 1,300 | 350 | 3,300 | 700 | 1,600 | 400 | 6,600 | 700 | 4,000 | 800 |

【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。

【Note】① Use the appropriate coolant for the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | ○ | ◎ |

## 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| AES | 6～20 | 2～20 |

●印：標準在庫品です。　□印：特定代理店在庫です。弊社営業へお問合せください。
●：Stocked items.　□：Stocked by specified distributor. Contact with our sales department.

## C Coating Carbide End Mills

# 超硬・Cコートエンドミル

**レギュラー刃長** | Regular

側面 Side Cutting / 溝 Slotting / 座ぐり Spot Facing / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance
φ0.1～φ6 ：0～−0.02
φ6.1～φ30：0～−0.025
h6
(mm)

2枚刃
2Flutes

超硬 Carbide / C / ねじれ角 30° Helix angle / 切削条件表 A389 Cutting Conditions

## HES2○○○-C

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| HES2001-C | □ | 0.1 | 0.2 | 38 | 3 | — |
| HES2002-C | □ | 0.2 | 0.4 | 38 | 3 | — |
| HES2003-C | □ | 0.3 | 1 | 38 | 3 | — |
| HES2004-C | □ | 0.4 | 1 | 38 | 3 | — |
| HES2005-C | □ | 0.5 | 1.5 | 38 | 3 | — |
| HES2006-C | □ | 0.6 | 1.5 | 38 | 3 | — |
| HES2007-C | □ | 0.7 | 1.5 | 38 | 3 | — |
| HES2008-C | □ | 0.8 | 2 | 38 | 3 | — |
| HES2009-C | □ | 0.9 | 2 | 38 | 3 | — |
| HES2010-C | ● | 1 | 2.5 | 40 | 4 | 6,400 |
| HES2011-C | □ | 1.1 | 3 | 40 | 4 | — |
| HES2012-C | □ | 1.2 | 3 | 40 | 4 | — |
| HES2013-C | □ | 1.3 | 4 | 40 | 4 | — |
| HES2014-C | □ | 1.4 | 4 | 40 | 4 | — |
| HES2015-C | ● | 1.5 | 4 | 40 | 4 | 6,400 |
| HES2016-C | □ | 1.6 | 5 | 40 | 4 | — |
| HES2017-C | □ | 1.7 | 5 | 40 | 4 | — |
| HES2018-C | □ | 1.8 | 5 | 40 | 4 | — |
| HES2019-C | □ | 1.9 | 6 | 40 | 4 | — |
| HES2020-C | ● | 2 | 6 | 40 | 4 | 6,400 |
| HES2021-C | □ | 2.1 | 8 | 40 | 4 | — |
| HES2022-C | □ | 2.2 | 8 | 40 | 4 | — |
| HES2023-C | □ | 2.3 | 8 | 40 | 4 | — |
| HES2024-C | □ | 2.4 | 8 | 40 | 4 | — |
| HES2025-C | ● | 2.5 | 8 | 40 | 4 | 6,400 |
| HES2026-C | □ | 2.6 | 10 | 45 | 6 | — |
| HES2027-C | □ | 2.7 | 10 | 45 | 6 | — |
| HES2028-C | □ | 2.8 | 10 | 45 | 6 | — |
| HES2029-C | □ | 2.9 | 10 | 45 | 6 | — |
| HES2030-C | ● | 3 | 10 | 45 | 6 | 7,580 |
| HES2031-C | □ | 3.1 | 11 | 45 | 6 | — |
| HES2032-C | □ | 3.2 | 11 | 45 | 6 | — |
| HES2033-C | □ | 3.3 | 11 | 45 | 6 | — |
| HES2034-C | □ | 3.4 | 11 | 45 | 6 | — |
| HES2035-C | ● | 3.5 | 11 | 45 | 6 | 7,880 |
| HES2036-C | □ | 3.6 | 12 | 45 | 6 | — |
| HES2037-C | □ | 3.7 | 12 | 45 | 6 | — |
| HES2038-C | □ | 3.8 | 12 | 45 | 6 | — |

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| HES2039-C | □ | 3.9 | 12 | 45 | 6 | — |
| HES2040-C | ● | 4 | 12 | 45 | 6 | 7,880 |
| HES2041-C | □ | 4.1 | 14 | 45 | 6 | — |
| HES2042-C | □ | 4.2 | 14 | 45 | 6 | — |
| HES2043-C | □ | 4.3 | 14 | 45 | 6 | — |
| HES2044-C | □ | 4.4 | 14 | 45 | 6 | — |
| HES2045-C | ● | 4.5 | 14 | 45 | 6 | 8,940 |
| HES2046-C | □ | 4.6 | 15 | 50 | 6 | — |
| HES2047-C | □ | 4.7 | 15 | 50 | 6 | — |
| HES2048-C | □ | 4.8 | 15 | 50 | 6 | — |
| HES2049-C | □ | 4.9 | 15 | 50 | 6 | — |
| HES2050-C | ● | 5 | 15 | 50 | 6 | 8,940 |
| HES2051-C | □ | 5.1 | 15 | 50 | 6 | — |
| HES2052-C | □ | 5.2 | 15 | 50 | 6 | — |
| HES2053-C | □ | 5.3 | 15 | 50 | 6 | — |
| HES2054-C | □ | 5.4 | 15 | 50 | 6 | — |
| HES2055-C | ● | 5.5 | 15 | 50 | 6 | 9,600 |
| HES2056-C | □ | 5.6 | 15 | 50 | 6 | — |
| HES2057-C | □ | 5.7 | 15 | 50 | 6 | — |
| HES2058-C | □ | 5.8 | 15 | 50 | 6 | — |
| HES2059-C | □ | 5.9 | 15 | 50 | 6 | — |
| HES2060-C | ● | 6 | 15 | 50 | 6 | 9,260 |
| HES2061-C | □ | 6.1 | 15 | 50 | 6 | — |
| HES2062-C | □ | 6.2 | 15 | 50 | 6 | — |
| HES2063-C | □ | 6.3 | 15 | 50 | 6 | — |
| HES2064-C | □ | 6.4 | 15 | 50 | 6 | — |
| HES2065-C | ● | 6.5 | 15 | 50 | 6 | 11,030 |
| HES2066-C | □ | 6.6 | 20 | 60 | 8 | — |
| HES2067-C | □ | 6.7 | 20 | 60 | 8 | — |
| HES2068-C | □ | 6.8 | 20 | 60 | 8 | — |
| HES2069-C | □ | 6.9 | 20 | 60 | 8 | — |
| HES2070-C | ● | 7 | 20 | 60 | 8 | 11,030 |
| HES2071-C | □ | 7.1 | 20 | 60 | 8 | — |
| HES2072-C | □ | 7.2 | 20 | 60 | 8 | — |
| HES2073-C | □ | 7.3 | 20 | 60 | 8 | — |
| HES2074-C | □ | 7.4 | 20 | 60 | 8 | — |
| HES2075-C | ● | 7.5 | 20 | 60 | 8 | 12,020 |
| HES2076-C | □ | 7.6 | 20 | 60 | 8 | — |

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| HES2077-C | □ | 7.7 | 20 | 60 | 8 | — |
| HES2078-C | □ | 7.8 | 20 | 60 | 8 | — |
| HES2079-C | □ | 7.9 | 20 | 60 | 8 | — |
| HES2080-C | ● | 8 | 20 | 60 | 8 | 12,020 |
| HES2081-C | □ | 8.1 | 20 | 60 | 8 | — |
| HES2082-C | □ | 8.2 | 20 | 60 | 8 | — |
| HES2083-C | □ | 8.3 | 20 | 60 | 8 | — |
| HES2084-C | □ | 8.4 | 20 | 60 | 8 | — |
| HES2085-C | ● | 8.5 | 20 | 60 | 8 | 14,480 |
| HES2086-C | □ | 8.6 | 20 | 65 | 10 | — |
| HES2087-C | □ | 8.7 | 20 | 65 | 10 | — |
| HES2088-C | □ | 8.8 | 20 | 65 | 10 | — |
| HES2089-C | □ | 8.9 | 20 | 65 | 10 | — |
| HES2090-C | ● | 9 | 20 | 65 | 10 | 14,480 |
| HES2091-C | □ | 9.1 | 20 | 65 | 10 | — |
| HES2092-C | □ | 9.2 | 20 | 65 | 10 | — |
| HES2093-C | □ | 9.3 | 20 | 65 | 10 | — |
| HES2094-C | □ | 9.4 | 20 | 65 | 10 | — |
| HES2095-C | ● | 9.5 | 20 | 65 | 10 | 16,160 |
| HES2096-C | □ | 9.6 | 25 | 70 | 10 | — |
| HES2097-C | □ | 9.7 | 25 | 70 | 10 | — |
| HES2098-C | □ | 9.8 | 25 | 70 | 10 | — |
| HES2099-C | □ | 9.9 | 25 | 70 | 10 | — |
| HES2100-C | ● | 10 | 25 | 70 | 10 | 14,820 |
| HES2105-C | ● | 10.5 | 25 | 70 | 10 | 17,740 |
| HES2110-C | ● | 11 | 25 | 75 | 12 | 17,740 |
| HES2120-C | ● | 12 | 25 | 75 | 12 | 20,090 |
| HES2130-C | ● | 13 | 25 | 75 | 12 | 28,630 |
| HES2140-C | ● | 14 | 35 | 90 | 16 | 31,920 |
| HES2150-C | ● | 15 | 35 | 90 | 16 | 40,360 |
| HES2160-C | ● | 16 | 35 | 90 | 16 | 40,830 |
| HES2170-C | □ | 17 | 35 | 90 | 16 | — |
| HES2180-C | ● | 18 | 40 | 105 | 20 | 63,350 |
| HES2190-C | □ | 19 | 40 | 105 | 20 | — |
| HES2200-C | ● | 20 | 40 | 105 | 20 | 69,210 |
| HES2220-C | ● | 22 | 45 | 115 | 20 | 80,710 |
| HES2250-C | ● | 25 | 50 | 120 | 25 | 119,650 |
| HES2300-C | □ | 30 | 55 | 130 | 32 | — |

## HES2-Cの対応被削材

Applicable work material of HES2-C

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ |

## 再研磨対応外径範囲

Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| HES2-C | 6～30 | 2～30 |

# C Coating Carbide End Mills
# 超硬・Cコートエンドミル

## ミディアム刃長 Medium

側面 Side Cutting / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance
φ3～φ6 ：0～−0.02
φ7～φ25：0～−0.025

h6

(mm)

2枚刃 2Flutes

### HESM2○○○-C

超硬 Carbide / C / ねじれ30° Helix angle

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| HESM2030-C | ● | 3 | 15 | 50 | 6 | 8,760 |
| HESM2040-C | ● | 4 | 17 | 50 | 6 | 9,080 |
| HESM2050-C | ● | 5 | 20 | 53 | 6 | 10,360 |
| HESM2060-C | ● | 6 | 20 | 60 | 6 | 11,200 |
| HESM2070-C | ● | 7 | 25 | 63 | 8 | 11,910 |
| HESM2080-C | ● | 8 | 25 | 75 | 8 | 12,580 |
| HESM2100-C | ● | 10 | 33 | 80 | 10 | 18,640 |
| HESM2120-C | ● | 12 | 37 | 90 | 12 | 23,010 |
| HESM2140-C | □ | 14 | 42 | 100 | 16 | — |
| HESM2150-C | □ | 15 | 42 | 110 | 16 | — |
| HESM2160-C | ● | 16 | 47 | 110 | 16 | 49,040 |
| HESM2180-C | □ | 18 | 50 | 120 | 20 | — |
| HESM2200-C | ● | 20 | 55 | 120 | 20 | 71,680 |
| HESM2250-C | □ | 25 | 65 | 140 | 25 | — |

## ロング刃長 Long

側面 Side Cutting / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance
φ1～φ6 ：0～−0.02
φ7～φ25：0～−0.025

h6

(mm)

2枚刃 2Flutes

### HESL2○○○-C

超硬 Carbide / C / ねじれ30° Helix angle / 切削条件表 A389 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| HESL2010-C | ● | 1 | 6 | 50 | 4 | 11,680 |
| HESL2015-C | ● | 1.5 | 8 | 50 | 4 | 11,680 |
| HESL2020-C | ● | 2 | 14 | 50 | 4 | 11,680 |
| HESL2025-C | ● | 2.5 | 16 | 50 | 4 | 11,680 |
| HESL2030-C | ● | 3 | 20 | 55 | 6 | 12,860 |
| HESL2040-C | ● | 4 | 24 | 57 | 6 | 13,610 |
| HESL2050-C | ● | 5 | 30 | 65 | 6 | 15,600 |
| HESL2060-C | ● | 6 | 30 | 65 | 6 | 16,720 |
| HESL2070-C | ● | 7 | 40 | 80 | 8 | 19,530 |
| HESL2080-C | ● | 8 | 40 | 80 | 8 | 21,440 |
| HESL2090-C | ● | 9 | 40 | 85 | 10 | 26,370 |
| HESL2100-C | ● | 10 | 50 | 95 | 10 | 29,520 |
| HESL2120-C | ● | 12 | 50 | 100 | 12 | 35,020 |
| HESL2140-C | □ | 14 | 70 | 125 | 16 | — |
| HESL2150-C | □ | 15 | 70 | 125 | 16 | — |
| HESL2160-C | ● | 16 | 70 | 125 | 16 | 67,220 |
| HESL2180-C | □ | 18 | 75 | 135 | 20 | — |
| HESL2200-C | ● | 20 | 75 | 140 | 20 | 111,210 |
| HESL2250-C | □ | 25 | 80 | 150 | 25 | — |

## HESM2-C、HESL2-Cの対応被削材

Applicable work material of HES2-C, HESM2-C

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ |

## 再研磨対応外径範囲

Re-grinding compatibility range

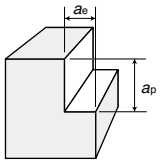
| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| HESM2-C | 6～25 | 3～25 |
| HESL2-C | 6～25 | 2～25 |

●印：標準在庫品です。 □印：特定代理店在庫です。弊社営業へお問合せください。
● : Stocked items. □ : Stocked by specified distributor. Contact with our sales department.

# 標準切削条件表 Recommended cutting conditions

**HES2-C** 2枚刃・レギュラー刃長 2ft, Regular

**HESL2-C** (注②) 2枚刃・ロング刃長 2ft, Long




## 〈側面切削〉 Side milling

| 被削材 Work material | 鋳鉄 炭素鋼 Cast irons Carbon steels (200HB以下) FC200、SS400、S45C | | 合金鋼 Alloy steels (200～250HB) SCM、SNCM | | 工具鋼 ステンレス鋼 Tool steels Stainless steels (25～35HRC) SKD、SKT、SUS304 | | 焼入れ鋼 プリハードン鋼 Hardened steels Pre-hardened steels (35～45HRC) SKD、SKT、HPM1、NAK55 | | 耐熱鋼 チタン合金 Heat-resistant steels Titanium alloys Inconel Ti-6Al-4V | | アルミ合金 非鉄金属 Aluminum alloys Non-Ferrous | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | ap=1.5DC ae=0.1DC | | ap=1.5DC ae=0.1DC | | ap=1.5DC ae=0.1DC | | ap=1.5DC ae=0.1DC | | ap=1.5DC ae=0.1DC | | ap=1.5DC ae=0.1DC | |
| 外径DC Tool dia. (mm) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| φ3 | 9,500 | 280 | 7,400 | 220 | 5,800 | 170 | 4,700 | 90 | 2,100 | 40 | 21,000 | 750 |
| φ4 | 7,100 | 280 | 5,500 | 220 | 4,300 | 170 | 3,500 | 90 | 1,500 | 40 | 16,000 | 800 |
| φ6 | 4,700 | 280 | 3,700 | 220 | 2,900 | 170 | 2,300 | 90 | 1,000 | 40 | 10,600 | 800 |
| φ8 | 3,500 | 280 | 2,700 | 220 | 2,100 | 170 | 1,700 | 100 | 790 | 45 | 8,000 | 900 |
| φ10 | 2,800 | 280 | 2,200 | 220 | 1,700 | 170 | 1,400 | 100 | 630 | 45 | 6,400 | 950 |
| φ12 | 2,300 | 280 | 1,800 | 220 | 1,400 | 170 | 1,100 | 100 | 530 | 45 | 5,300 | 950 |
| φ16 | 1,700 | 280 | 1,300 | 220 | 1,000 | 170 | 890 | 100 | 390 | 45 | 4,000 | 950 |
| φ20 | 1,400 | 280 | 1,100 | 220 | 870 | 170 | 710 | 100 | 310 | 45 | 3,200 | 800 |
| φ25 | 1,100 | 220 | 890 | 180 | 700 | 140 | 570 | 85 | 250 | 40 | 2,500 | 800 |

【注意】 ①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③上記の切削条件は2枚刃の場合を示します。4枚刃は、送り速度を1.5倍にしてください。
④ロング刃の場合は回転数、送り速度とも約50%以下にしてください。

【Note】 ① Use the appropriate coolant for the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
③ The cutting conditions given above is applied to 2-flute type end mills. As for 4-flute type, increase the feed speed by 1.5 times.
④ As for the long length type end mills, decrease the revolution number and the feed speed to not more than 50%.

# Carbide End Mills
# 超硬ソリッドエンドミル

## レギュラー刃長 Regular

側面 Side Cutting / 溝 Slotting / 座ぐり Spot Facing / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance
φ0.1～φ6 ：0～−0.02
φ6.1～φ30：0～−0.025
h6
(mm)

2枚刃
2Flutes

超硬 Carbide / ねじれ30° Helix angle / 切削条件表 A392 Cutting Conditions

## HES2○○○

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| HES2001 | ● | 0.1 | 0.2 | 38 | 3 | 13,080 |
| HES2002 | ● | 0.2 | 0.4 | 38 | 3 | 8,100 |
| HES2003 | ● | 0.3 | 1 | 38 | 3 | 7,160 |
| HES2004 | ● | 0.4 | 1 | 38 | 3 | 7,160 |
| HES2005 | ● | 0.5 | 1.5 | 38 | 3 | 6,700 |
| HES2006 | ● | 0.6 | 1.5 | 38 | 3 | 6,700 |
| HES2007 | ● | 0.7 | 1.5 | 38 | 3 | 6,290 |
| HES2008 | ● | 0.8 | 2 | 38 | 3 | 6,290 |
| HES2009 | ● | 0.9 | 2 | 38 | 3 | 6,040 |
| HES2010 | ● | 1 | 2.5 | 40 | 4 | 4,890 |
| HES2011 | ● | 1.1 | 3 | 40 | 4 | 5,460 |
| HES2012 | ● | 1.2 | 3 | 40 | 4 | 5,460 |
| HES2013 | ● | 1.3 | 4 | 40 | 4 | 5,460 |
| HES2014 | ● | 1.4 | 4 | 40 | 4 | 5,460 |
| HES2015 | ● | 1.5 | 4 | 40 | 4 | 4,890 |
| HES2016 | ● | 1.6 | 5 | 40 | 4 | 5,460 |
| HES2017 | ● | 1.7 | 5 | 40 | 4 | 5,460 |
| HES2018 | ● | 1.8 | 5 | 40 | 4 | 5,460 |
| HES2019 | ● | 1.9 | 6 | 40 | 4 | 5,460 |
| HES2020 | ● | 2 | 6 | 40 | 4 | 4,890 |
| HES2021 | ● | 2.1 | 8 | 40 | 4 | 6,030 |
| HES2022 | ● | 2.2 | 8 | 40 | 4 | 6,030 |
| HES2023 | ● | 2.3 | 8 | 40 | 4 | 6,030 |
| HES2024 | ● | 2.4 | 8 | 40 | 4 | 6,030 |
| HES2025 | ● | 2.5 | 8 | 40 | 4 | 4,890 |
| HES2026 | ● | 2.6 | 10 | 45 | 6 | 6,030 |
| HES2027 | ● | 2.7 | 10 | 45 | 6 | 6,030 |
| HES2028 | ● | 2.8 | 10 | 45 | 6 | 6,030 |
| HES2029 | ● | 2.9 | 10 | 45 | 6 | 6,030 |
| HES2030 | ● | 3 | 10 | 45 | 6 | 6,040 |
| HES2031 | ● | 3.1 | 11 | 45 | 6 | 6,360 |
| HES2032 | ● | 3.2 | 11 | 45 | 6 | 6,360 |
| HES2033 | ● | 3.3 | 11 | 45 | 6 | 6,360 |
| HES2034 | ● | 3.4 | 11 | 45 | 6 | 6,360 |
| HES2035 | ● | 3.5 | 11 | 45 | 6 | 6,360 |
| HES2036 | ● | 3.6 | 12 | 45 | 6 | 6,360 |
| HES2037 | ● | 3.7 | 12 | 45 | 6 | 6,360 |
| HES2038 | ● | 3.8 | 12 | 45 | 6 | 6,360 |
| HES2039 | ● | 3.9 | 12 | 45 | 6 | 6,360 |
| HES2040 | ● | 4 | 12 | 45 | 6 | 6,360 |
| HES2041 | ● | 4.1 | 14 | 45 | 6 | 7,340 |
| HES2042 | ● | 4.2 | 14 | 45 | 6 | 7,340 |
| HES2043 | ● | 4.3 | 14 | 45 | 6 | 7,340 |
| HES2044 | ● | 4.4 | 14 | 45 | 6 | 7,340 |
| HES2045 | ● | 4.5 | 14 | 45 | 6 | 7,340 |
| HES2046 | ● | 4.6 | 15 | 50 | 6 | 7,340 |

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| HES2047 | ● | 4.7 | 15 | 50 | 6 | 7,340 |
| HES2048 | ● | 4.8 | 15 | 50 | 6 | 7,340 |
| HES2049 | ● | 4.9 | 15 | 50 | 6 | 7,340 |
| HES2050 | ● | 5 | 15 | 50 | 6 | 7,340 |
| HES2051 | ● | 5.1 | 15 | 50 | 6 | 8,000 |
| HES2052 | ● | 5.2 | 15 | 50 | 6 | 8,000 |
| HES2053 | ● | 5.3 | 15 | 50 | 6 | 8,000 |
| HES2054 | ● | 5.4 | 15 | 50 | 6 | 8,000 |
| HES2055 | ● | 5.5 | 15 | 50 | 6 | 8,000 |
| HES2056 | ● | 5.6 | 15 | 50 | 6 | 8,000 |
| HES2057 | ● | 5.7 | 15 | 50 | 6 | 8,000 |
| HES2058 | ● | 5.8 | 15 | 50 | 6 | 8,000 |
| HES2059 | ● | 5.9 | 15 | 50 | 6 | 8,000 |
| HES2060 | ● | 6 | 15 | 50 | 6 | 7,650 |
| HES2061 | ● | 6.1 | 15 | 50 | 6 | 9,420 |
| HES2062 | ● | 6.2 | 15 | 50 | 6 | 9,420 |
| HES2063 | ● | 6.3 | 15 | 50 | 6 | 9,420 |
| HES2064 | ● | 6.4 | 15 | 50 | 6 | 9,420 |
| HES2065 | ● | 6.5 | 15 | 50 | 6 | 9,420 |
| HES2066 | ● | 6.6 | 20 | 60 | 8 | 9,420 |
| HES2067 | ● | 6.7 | 20 | 60 | 8 | 9,420 |
| HES2068 | ● | 6.8 | 20 | 60 | 8 | 9,420 |
| HES2069 | ● | 6.9 | 20 | 60 | 8 | 9,420 |
| HES2070 | ● | 7 | 20 | 60 | 8 | 9,420 |
| HES2071 | □ | 7.1 | 20 | 60 | 8 | − |
| HES2072 | □ | 7.2 | 20 | 60 | 8 | − |
| HES2073 | □ | 7.3 | 20 | 60 | 8 | − |
| HES2074 | □ | 7.4 | 20 | 60 | 8 | − |
| HES2075 | ● | 7.5 | 20 | 60 | 8 | 10,330 |
| HES2076 | □ | 7.6 | 20 | 60 | 8 | − |
| HES2077 | □ | 7.7 | 20 | 60 | 8 | − |
| HES2078 | □ | 7.8 | 20 | 60 | 8 | − |
| HES2079 | □ | 7.9 | 20 | 60 | 8 | − |
| HES2080 | ● | 8 | 20 | 60 | 8 | 10,330 |
| HES2081 | □ | 8.1 | 20 | 60 | 8 | − |
| HES2082 | □ | 8.2 | 20 | 60 | 8 | − |
| HES2083 | □ | 8.3 | 20 | 60 | 8 | − |
| HES2084 | □ | 8.4 | 20 | 60 | 8 | − |
| HES2085 | ● | 8.5 | 20 | 60 | 8 | 12,690 |
| HES2086 | □ | 8.6 | 20 | 65 | 10 | − |
| HES2087 | □ | 8.7 | 20 | 65 | 10 | − |
| HES2088 | □ | 8.8 | 20 | 65 | 10 | − |
| HES2089 | □ | 8.9 | 20 | 65 | 10 | − |
| HES2090 | ● | 9 | 20 | 65 | 10 | 12,690 |
| HES2091 | □ | 9.1 | 20 | 65 | 10 | − |
| HES2092 | □ | 9.2 | 20 | 65 | 10 | − |

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| HES2093 | □ | 9.3 | 20 | 65 | 10 | − |
| HES2094 | □ | 9.4 | 20 | 65 | 10 | − |
| HES2095 | ● | 9.5 | 20 | 65 | 10 | 14,370 |
| HES2096 | □ | 9.6 | 25 | 70 | 10 | − |
| HES2097 | □ | 9.7 | 25 | 70 | 10 | − |
| HES2098 | □ | 9.8 | 25 | 70 | 10 | − |
| HES2099 | □ | 9.9 | 25 | 70 | 10 | − |
| HES2100 | ● | 10 | 25 | 70 | 10 | 13,030 |
| HES2101 | □ | 10.1 | 25 | 70 | 10 | − |
| HES2102 | □ | 10.2 | 25 | 70 | 10 | − |
| HES2103 | □ | 10.3 | 25 | 70 | 10 | − |
| HES2104 | □ | 10.4 | 25 | 70 | 10 | − |
| HES2105 | ● | 10.5 | 25 | 70 | 10 | 17,070 |
| HES2106 | □ | 10.6 | 25 | 75 | 12 | − |
| HES2107 | □ | 10.7 | 25 | 75 | 12 | − |
| HES2108 | □ | 10.8 | 25 | 75 | 12 | − |
| HES2109 | □ | 10.9 | 25 | 75 | 12 | − |
| HES2110 | ● | 11 | 25 | 75 | 12 | 17,070 |
| HES2111 | □ | 11.1 | 25 | 75 | 12 | − |
| HES2112 | □ | 11.2 | 25 | 75 | 12 | − |
| HES2113 | □ | 11.3 | 25 | 75 | 12 | − |
| HES2114 | □ | 11.4 | 25 | 75 | 12 | − |
| HES2115 | □ | 11.5 | 25 | 75 | 12 | − |
| HES2116 | □ | 11.6 | 25 | 75 | 12 | − |
| HES2117 | □ | 11.7 | 25 | 75 | 12 | − |
| HES2118 | □ | 11.8 | 25 | 75 | 12 | − |
| HES2119 | □ | 11.9 | 25 | 75 | 12 | − |
| HES2120 | ● | 12 | 25 | 75 | 12 | 17,960 |
| HES2130 | ● | 13 | 25 | 75 | 12 | 25,940 |
| HES2140 | ● | 14 | 35 | 90 | 16 | 29,210 |
| HES2150 | ● | 15 | 35 | 90 | 16 | 36,950 |
| HES2160 | ● | 16 | 35 | 90 | 16 | 37,540 |
| HES2170 | □ | 17 | 35 | 90 | 16 | − |
| HES2180 | ● | 18 | 40 | 105 | 20 | 59,240 |
| HES2190 | □ | 19 | 40 | 105 | 20 | − |
| HES2200 | ● | 20 | 40 | 105 | 20 | 64,170 |
| HES2210 | □ | 21 | 40 | 105 | 20 | − |
| HES2220 | ● | 22 | 45 | 115 | 20 | 75,660 |
| HES2230 | □ | 23 | 45 | 115 | 20 | − |
| HES2240 | □ | 24 | 50 | 120 | 20 | − |
| HES2250 | ● | 25 | 50 | 120 | 25 | 93,030 |
| HES2260 | □ | 26 | 50 | 120 | 25 | − |
| HES2270 | □ | 27 | 55 | 130 | 25 | − |
| HES2280 | □ | 28 | 55 | 130 | 25 | − |
| HES2290 | □ | 29 | 55 | 130 | 25 | − |
| HES2300 | □ | 30 | 55 | 130 | 32 | − |

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦45HRC | 高硬度 Hardened steel >45HRC ≦55HRC | 高硬度 Hardened steel >55HRC ≦65HRC | 高硬度 Hardened steel >65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ○ | ○ | | | | ○ | ○ | ◎ | ◎ |

## 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| HES2 | 6～30 | 2～30 |

●印：標準在庫品です。 □印：特定代理店在庫です。弊社営業へお問合せください。
●：Stocked items. □：Stocked by specified distributor. Contact with our sales department.

## ミディアム刃長 Medium

側面 Side Cutting / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance
φ3～φ6 ：0～−0.02
φ7～φ30：0～−0.025

h6

(mm)

2枚刃 2Flutes

## ロング刃長 Long

側面 Side Cutting / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance
φ1～φ6 ：0～−0.02
φ7～φ25：0～−0.025

h6

(mm)

2枚刃 2Flutes

## HESM2○○○

超硬 Carbide / ねじれ30° Helix angle

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| HESM2030 | ● | 3 | 15 | 50 | 6 | 7,240 |
| HESM2040 | ● | 4 | 17 | 50 | 6 | 7,580 |
| HESM2050 | ● | 5 | 20 | 53 | 6 | 8,760 |
| HESM2060 | ● | 6 | 20 | 60 | 6 | 9,620 |
| HESM2070 | ● | 7 | 25 | 63 | 8 | 10,120 |
| HESM2080 | ● | 8 | 25 | 75 | 8 | 10,950 |
| HESM2090 | □ | 9 | 28 | 75 | 10 | — |
| HESM2100 | ● | 10 | 33 | 80 | 10 | 16,830 |
| HESM2110 | □ | 11 | 33 | 90 | 12 | — |
| HESM2120 | ● | 12 | 37 | 90 | 12 | 21,100 |
| HESM2130 | □ | 13 | 37 | 100 | 12 | — |
| HESM2140 | □ | 14 | 42 | 100 | 16 | — |
| HESM2150 | □ | 15 | 42 | 110 | 16 | — |
| HESM2160 | ● | 16 | 47 | 110 | 16 | 45,880 |
| HESM2170 | □ | 17 | 47 | 110 | 16 | — |
| HESM2180 | □ | 18 | 50 | 120 | 20 | — |
| HESM2190 | □ | 19 | 50 | 120 | 20 | — |
| HESM2200 | ● | 20 | 55 | 120 | 20 | 66,750 |
| HESM2210 | □ | 21 | 55 | 130 | 20 | — |
| HESM2220 | □ | 22 | 60 | 130 | 20 | — |
| HESM2230 | □ | 23 | 60 | 130 | 20 | — |
| HESM2240 | □ | 24 | 65 | 140 | 20 | — |
| HESM2250 | □ | 25 | 65 | 140 | 25 | — |
| HESM2260 | □ | 26 | 65 | 140 | 25 | — |
| HESM2270 | □ | 27 | 70 | 145 | 25 | — |
| HESM2280 | □ | 28 | 70 | 145 | 25 | — |
| HESM2290 | □ | 29 | 70 | 145 | 25 | — |
| HESM2300 | □ | 30 | 70 | 145 | 32 | — |

## HESL2○○○

超硬 Carbide / ねじれ30° Helix angle / 切削条件表 A393 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| HESL2010 | ● | 1 | 6 | 50 | 4 | 10,160 |
| HESL2015 | ● | 1.5 | 8 | 50 | 4 | 10,160 |
| HESL2020 | ● | 2 | 14 | 50 | 4 | 10,160 |
| HESL2025 | ● | 2.5 | 16 | 50 | 4 | 10,160 |
| HESL2030 | ● | 3 | 20 | 55 | 6 | 11,250 |
| HESL2040 | ● | 4 | 24 | 57 | 6 | 12,010 |
| HESL2050 | ● | 5 | 30 | 65 | 6 | 13,920 |
| HESL2060 | ● | 6 | 30 | 65 | 6 | 15,040 |
| HESL2070 | ● | 7 | 40 | 80 | 8 | 17,960 |
| HESL2080 | ● | 8 | 40 | 80 | 8 | 20,090 |
| HESL2090 | ● | 9 | 40 | 85 | 10 | 24,580 |
| HESL2100 | ● | 10 | 50 | 95 | 10 | 27,720 |
| HESL2110 | □ | 11 | 50 | 95 | 12 | — |
| HESL2120 | ● | 12 | 50 | 100 | 12 | 32,990 |
| HESL2130 | □ | 13 | 50 | 100 | 12 | — |
| HESL2140 | □ | 14 | 70 | 125 | 16 | — |
| HESL2150 | □ | 15 | 70 | 125 | 16 | — |
| HESL2160 | ● | 16 | 70 | 125 | 16 | 63,930 |
| HESL2170 | □ | 17 | 70 | 135 | 16 | — |
| HESL2180 | □ | 18 | 75 | 135 | 20 | — |
| HESL2190 | □ | 19 | 75 | 140 | 20 | — |
| HESL2200 | ● | 20 | 75 | 140 | 20 | 106,290 |
| HESL2210 | □ | 21 | 75 | 140 | 20 | — |
| HESL2220 | □ | 22 | 80 | 150 | 20 | — |
| HESL2230 | □ | 23 | 80 | 150 | 20 | — |
| HESL2240 | □ | 24 | 80 | 150 | 20 | — |
| HESL2250 | □ | 25 | 80 | 150 | 25 | — |

## HESM2、HESL2の対応被削材

Applicable work material of HESM2, HESL2

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ○ | ○ | | | | ○ | ○ | ◎ | ◎ |

## 再研磨対応外径範囲

Re-grinding compatibility range

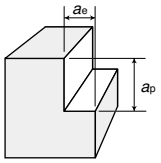
| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| HESM2 | 6 ～ 30 | 3 ～ 30 |
| HESL2 | 6 ～ 25 | 2 ～ 25 |

Carbide End Mills

# 超硬ソリッドエンドミル

## 標準切削条件表 Recommended cutting conditions

### HES2
2枚刃・レギュラー刃長
2ft, Regular



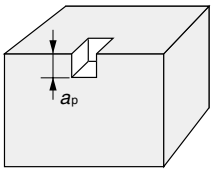

### 〈側面切削〉 Side milling

| 被削材 Work material | 鋳鉄 炭素鋼 Cast irons Carbon steels (200HB以下) FC200、SS400、S45C | | 合金鋼 Alloy steels (200～250HB) SCM、SNCM | | 工具鋼 ステンレス鋼 Tool steels Stainless steels (25～35HRC) SKD、SKT、SUS304 | | 焼入れ鋼 プリハードン鋼 Hardened steels Pre-hardened steels (35～45HRC) SKD、SKT、HPM1、NAK55 | | 耐熱鋼 チタン合金 Heat-resistant steels Titanium alloys Inconel Ti-6Al-4V | | アルミ合金 非鉄金属 Aluminum alloys Non-ferrous | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | ap=1.5DC ae=0.1DC | | ap=1.5DC ae=0.1DC | | ap=1.5DC ae=0.1DC | | ap=1.5DC ae=0.1DC | | ap=1.5DC ae=0.1DC | | ap=1.5DC ae=0.1DC | |
| 外径DC Tool dia.(mm) | 回転数n (min-1) | 送り速度Vf (mm/min) | 回転数n (min-1) | 送り速度Vf (mm/min) | 回転数n (min-1) | 送り速度Vf (mm/min) | 回転数n (min-1) | 送り速度Vf (mm/min) | 回転数n (min-1) | 送り速度Vf (mm/min) | 回転数n (min-1) | 送り速度Vf (mm/min) |
| φ3 | 4,750 | 140 | 3,700 | 80 | 3,200 | 60 | 2,650 | 30 | 1,600 | 20 | 21,000 | 750 |
| φ4 | 3,600 | 140 | 2,750 | 110 | 2,400 | 60 | 2,000 | 30 | 1,200 | 25 | 16,000 | 800 |
| φ6 | 2,400 | 150 | 1,850 | 110 | 1,600 | 60 | 1,320 | 40 | 800 | 25 | 10,600 | 800 |
| φ8 | 1,800 | 150 | 1,400 | 110 | 1,200 | 90 | 1,000 | 50 | 600 | 30 | 8,000 | 900 |
| φ10 | 1,450 | 150 | 1,100 | 110 | 950 | 90 | 800 | 50 | 480 | 30 | 6,400 | 950 |
| φ12 | 1,200 | 180 | 930 | 110 | 800 | 90 | 660 | 50 | 400 | 30 | 5,300 | 950 |
| φ16 | 900 | 180 | 700 | 110 | 600 | 90 | 500 | 50 | 300 | 30 | 4,000 | 950 |
| φ20 | 720 | 180 | 560 | 110 | 480 | 90 | 400 | 50 | 240 | 30 | 3,200 | 800 |
| φ25 | 570 | 140 | 450 | 100 | 380 | 90 | 320 | 50 | 190 | 30 | 2,500 | 800 |
| φ30 | 480 | 120 | 370 | 80 | 320 | 90 | 270 | 50 | 160 | 30 | 2,100 | 650 |

【注意】
①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③上記の切削条件は2枚刃の場合を示します。4枚刃は、送り速度を 1.5倍にしてください。
④ロング刃の場合は回転数、送り速度とも約 50%以下にしてください。

【Note】
① Use the appropriate coolant for the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
③ The cutting conditions given above is applied to 2-flute type end mills. As for 4-flute type, increase the feed speed by 1.5 times.
④ As for the long length type end mills, decrease the revolution number and the feed speed to not more than 50%.

### HES2 [φ0.1～φ2.0]
2枚刃
2ft



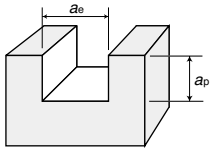

### ＜小径サイズ＞ Miniature

| 被削材（硬さ） Work material (Hardness) | | 鋳鉄・炭素鋼・合金鋼 Cast irons, Carbon steels, Alloy steels (250HB 以下) | |
|---|---|---|---|
| 切削方法 Conditions / 外径 DC Tool dia. (mm) | 切込み Depth of Cut ap mm / 回 | 切削速度 Cutting speed vc=10 ～ 32m/min | 1 刃送り Feed rate fz=0.001 ～ 0.01 mm /t |
| | | 回転数 Revolution min-1 | 送り速度 Table speed mm /min |
| 0.1 | 0.03 ～ 0.06 | 32,000 ～ 102,000 | 40 |
| 0.2 | 0.03 ～ 0.06 | 16,000 ～ 51,000 | 40 |
| 0.3 | 0.03 ～ 0.06 | 10,600 ～ 34,000 | 40 |
| 0.4 | 0.04 ～ 0.08 | 8,000 ～ 25,500 | 40 |
| 0.5 | 0.05 ～ 0.10 | 6,400 ～ 20,000 | 50 |
| 0.6 | 0.05 ～ 0.12 | 5,300 ～ 17,000 | 50 |
| 0.7 | 0.05 ～ 0.14 | 4,550 ～ 14,600 | 50 |
| 0.8 | 0.05 ～ 0.20 | 4,000 ～ 12,700 | 50 |
| 0.9 | 0.05 ～ 0.20 | 3,500 ～ 11,300 | 50 |
| 1.0 | 0.05 ～ 0.20 | 3,200 ～ 10,000 | 60 |
| 1.2 | 0.05 ～ 0.20 | 2,650 ～ 8,500 | 60 |
| 1.5 | 0.05 ～ 0.30 | 2,100 ～ 6,800 | 60 |
| 2.0 | 0.10 ～ 0.40 | 1,600 ～ 5,100 | 80 |

【注意】
①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③送り速度は、上表の切込みの大きい方で示しています。この表より大きい切込みの場合は、送り速度を落してください。
④回転数はできるだけ上表の高い方でお使いください。

【Note】
① Use the appropriate coolant for the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
③ The feed speeds in this table represent the value when the depth of cut takes the maximum value in the range. When the depth of cut is beyond the range,slow down the feed speed.
② Select as high revolution number as possible given in this table.

## HES2
2枚刃・レギュラー刃長
2ft, Regular



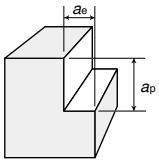

### 〈溝切削〉 Slotting

| 被削材 Work material | 鋳鉄 炭素鋼 Cast irons Carbon steels (200HB以下) FC200、SS400、S45C | | 合金鋼 Alloy steels (200～250HB) SCM、SNCM | | 工具鋼 ステンレス鋼 Tool steels Stainless steels (25～35HRC) SKD、SKT、SUS304 | | 焼入れ鋼 プリハードン鋼 Hardened steels Pre-hardened steels (35～45HRC) SKD、SKT、HPM1、NAK55 | | 耐熱鋼 チタン合金 Heat-resistant steels Titanium alloys Inconel Ti-6Al-4V | | アルミ合金 非鉄金属 Aluminum alloys Non-ferrous | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | $a_p$=0.5DC $a_e$=1DC | | $a_p$=0.5DC $a_e$=1DC | | $a_p$=0.5DC $a_e$=1DC | | $a_p$=0.5DC $a_e$=1DC | | $a_p$=0.5DC $a_e$=1DC | | $a_p$=0.5DC $a_e$=1DC | |
| 外径DC Tool dia.(mm) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) |
| **ϕ3** | 3,700 | 80 | 3,200 | 50 | 2,650 | 30 | 2,100 | 22 | 1,250 | 15 | 11,000 | 300 |
| **ϕ4** | 2,750 | 85 | 2,400 | 50 | 2,000 | 30 | 1,590 | 22 | 950 | 15 | 8,000 | 300 |
| **ϕ6** | 1,850 | 85 | 1,600 | 50 | 1,320 | 30 | 1,060 | 22 | 640 | 15 | 5,300 | 300 |
| **ϕ8** | 1,400 | 90 | 1,200 | 60 | 1,000 | 40 | 800 | 33 | 480 | 20 | 4,000 | 300 |
| **ϕ10** | 1,100 | 90 | 950 | 60 | 800 | 40 | 640 | 33 | 380 | 20 | 3,200 | 300 |
| **ϕ12** | 930 | 90 | 800 | 60 | 660 | 40 | 530 | 33 | 320 | 20 | 2,700 | 300 |
| **ϕ16** | 700 | 90 | 600 | 60 | 500 | 40 | 400 | 33 | 240 | 20 | 2,700 | 300 |
| **ϕ20** | 560 | 90 | 480 | 60 | 400 | 40 | 320 | 33 | 190 | 20 | 1,600 | 300 |
| **ϕ25** | 450 | 90 | 380 | 60 | 320 | 40 | 250 | 33 | 150 | 20 | 1,250 | 300 |
| **ϕ30** | 370 | 90 | 320 | 60 | 270 | 40 | 210 | 33 | 130 | 20 | 1,000 | 300 |

【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③ロング刃は溝切削に適しません。

【Note】① Use the appropriate coolant for the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
③ The long length type is not suited to slotting.

## HESL2
2枚刃・ロング刃長
2ft, Long




### 〈側面切削〉 Side milling

| 被削材 Work material | 鋳鉄 炭素鋼 Cast irons Carbon steels (200HB以下) FC200、SS400、S45C | | 合金鋼 Alloy steels (200～250HB) SCM、SNCM | | 工具鋼 ステンレス鋼 Tool steels Stainless steels (25～35HRC) SKD、SKT、SUS304 | | 焼入れ鋼 プリハードン鋼 Hardened steels Pre-hardened steels (35～45HRC) SKD、SKT、HPM1、NAK55 | | 耐熱鋼 チタン合金 Heat-resistant steels Titanium alloys Inconel Ti-6Al-4V | | アルミ合金 非鉄金属 Aluminum alloys Non-ferrous | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | $a_p$=1.5DC $a_e$=0.1DC | | $a_p$=1.5DC $a_e$=0.1DC | | $a_p$=1.5DC $a_e$=0.1DC | | $a_p$=1.5DC $a_e$=0.1DC | | $a_p$=1.5DC $a_e$=0.1DC | | $a_p$=1.5DC $a_e$=0.1DC | |
| 外径DC Tool dia.(mm) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) |
| **ϕ3** | 2,400 | 70 | 1,900 | 40 | 1,700 | 32 | 1,500 | 17 | 1,250 | 16 | 10,000 | 375 |
| **ϕ4** | 1,800 | 70 | 1,400 | 55 | 1,300 | 32 | 1,100 | 17 | 950 | 20 | 8,000 | 400 |
| **ϕ6** | 1,200 | 75 | 950 | 55 | 850 | 32 | 740 | 22 | 640 | 20 | 5,300 | 400 |
| **ϕ8** | 900 | 75 | 720 | 55 | 640 | 48 | 560 | 30 | 480 | 24 | 4,000 | 450 |
| **ϕ10** | 750 | 75 | 570 | 55 | 510 | 48 | 450 | 30 | 380 | 24 | 3,200 | 475 |
| **ϕ12** | 610 | 90 | 480 | 55 | 420 | 48 | 370 | 30 | 320 | 24 | 2,600 | 475 |
| **ϕ16** | 450 | 90 | 360 | 55 | 320 | 48 | 280 | 30 | 240 | 24 | 2,000 | 400 |
| **ϕ20** | 365 | 90 | 290 | 55 | 250 | 48 | 220 | 30 | 190 | 24 | 1,600 | 400 |
| **ϕ25** | 300 | 60 | 230 | 40 | 200 | 48 | 180 | 30 | 150 | 24 | 1,300 | 325 |

【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③上記の切削条件は2枚刃の場合を示します。4枚刃は、送り速度を1.5倍にしてください。
④ロング刃は溝切削に適しません。

【Note】① Use the appropriate coolant for the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
③ The cutting conditions given above is applied to 2-flute type end mills. As for 4-flute type, increase the feed speed by 1.5 times.
④ The long length type is not suited to slotting.

# C Coating Carbide End Mills
# 超硬・Cコートエンドミル

## レギュラー刃長 Regular

側面 Side Cutting / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance
φ2～φ6 ：0～−0.02
φ6.5～φ30：0～−0.025
h6
(mm)

超硬 Carbide / C / ねじれ30° Helix angle / 切削条件表 A395 Cutting Conditions

4枚刃 4Flutes

### HES4○○○-C

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| HES4020-C | ● | 2 | 6 | 40 | 4 | 8,500 |
| HES4025-C | ● | 2.5 | 8 | 40 | 4 | 8,680 |
| HES4030-C | ● | 3 | 10 | 45 | 6 | 8,680 |
| HES4035-C | ● | 3.5 | 11 | 45 | 6 | 9,000 |
| HES4040-C | ● | 4 | 12 | 45 | 6 | 9,000 |
| HES4045-C | ● | 4.5 | 14 | 45 | 6 | 10,050 |
| HES4050-C | ● | 5 | 15 | 50 | 6 | 10,050 |
| HES4055-C | ● | 5.5 | 15 | 50 | 6 | 10,920 |
| HES4060-C | ● | 6 | 15 | 50 | 6 | 10,920 |
| HES4065-C | ● | 6.5 | 15 | 50 | 6 | 12,240 |
| HES4070-C | ● | 7 | 20 | 60 | 8 | 12,240 |
| HES4075-C | ● | 7.5 | 20 | 60 | 8 | 13,590 |
| HES4080-C | ● | 8 | 20 | 60 | 8 | 13,590 |
| HES4085-C | ● | 8.5 | 20 | 60 | 8 | 15,710 |
| HES4090-C | ● | 9 | 20 | 65 | 10 | 15,710 |
| HES4095-C | ● | 9.5 | 20 | 65 | 10 | 18,080 |
| HES4100-C | ● | 10 | 25 | 70 | 10 | 18,080 |
| HES4110-C | ● | 11 | 25 | 75 | 12 | 20,760 |
| HES4120-C | ● | 12 | 25 | 75 | 12 | 22,790 |
| HES4130-C | ● | 13 | 25 | 75 | 12 | 31,090 |
| HES4140-C | ● | 14 | 35 | 90 | 16 | 34,730 |
| HES4150-C | ● | 15 | 35 | 90 | 16 | 43,880 |
| HES4160-C | ● | 16 | 35 | 90 | 16 | 52,330 |
| HES4180-C | ● | 18 | 40 | 105 | 20 | 69,450 |
| HES4200-C | ● | 20 | 40 | 105 | 20 | 76,380 |
| HES4250-C | ● | 25 | 50 | 120 | 25 | 130,210 |
| HES4300-C | □ | 30 | 55 | 130 | 32 | − |

## ミディアム刃長 Medium

側面 Side Cutting / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance
φ3～φ6 ：0～−0.02
φ7～φ30：0～−0.025
h6
(mm)

超硬 Carbide / C / ねじれ30° Helix angle

4枚刃 4Flutes

### HESM4○○○-C

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| HESM4030-C | ● | 3 | 15 | 50 | 6 | 9,080 |
| HESM4040-C | ● | 4 | 17 | 50 | 6 | 9,890 |
| HESM4050-C | ● | 5 | 20 | 53 | 6 | 11,570 |
| HESM4060-C | ● | 6 | 20 | 60 | 6 | 12,470 |
| HESM4070-C | ● | 7 | 25 | 63 | 8 | 13,250 |
| HESM4080-C | ● | 8 | 25 | 75 | 8 | 14,150 |
| HESM4090-C | ● | 9 | 28 | 75 | 10 | 18,640 |
| HESM4100-C | ● | 10 | 33 | 80 | 10 | 20,650 |
| HESM4120-C | ● | 12 | 37 | 90 | 12 | 25,370 |
| HESM4130-C | □ | 13 | 37 | 100 | 12 | − |
| HESM4140-C | □ | 14 | 42 | 100 | 16 | − |
| HESM4150-C | □ | 15 | 42 | 110 | 16 | − |
| HESM4160-C | ● | 16 | 47 | 110 | 16 | 53,730 |
| HESM4180-C | □ | 18 | 50 | 120 | 20 | − |
| HESM4190-C | □ | 19 | 50 | 120 | 20 | − |
| HESM4200-C | ● | 20 | 55 | 120 | 20 | 78,370 |
| HESM4250-C | □ | 25 | 65 | 140 | 25 | − |
| HESM4300-C | □ | 30 | 70 | 145 | 32 | − |

## ロング刃長 Long

側面 Side Cutting / 仕上 Finishing

外径公差 Dia.tolerance
φ3～φ6 ：0～−0.02
φ7～φ25：0～−0.025
h6
(mm)

超硬 Carbide / C / ねじれ30° Helix angle / 切削条件表 A395 Cutting Conditions

4枚刃 4Flutes

### HESL4○○○-C

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| HESL4030-C | ● | 3 | 20 | 55 | 6 | 14,250 |
| HESL4040-C | ● | 4 | 24 | 57 | 6 | 15,000 |
| HESL4050-C | ● | 5 | 30 | 65 | 6 | 17,070 |
| HESL4060-C | ● | 6 | 30 | 65 | 6 | 18,300 |
| HESL4070-C | ● | 7 | 40 | 80 | 8 | 21,660 |
| HESL4080-C | ● | 8 | 40 | 80 | 8 | 23,690 |
| HESL4090-C | ● | 9 | 40 | 85 | 10 | 28,850 |
| HESL4100-C | ● | 10 | 50 | 95 | 10 | 32,430 |
| HESL4120-C | ● | 12 | 50 | 100 | 12 | 38,490 |
| HESL4130-C | □ | 13 | 50 | 100 | 12 | − |
| HESL4140-C | □ | 14 | 70 | 125 | 16 | − |
| HESL4150-C | □ | 15 | 70 | 125 | 16 | − |
| HESL4160-C | ● | 16 | 70 | 125 | 16 | 86,460 |
| HESL4180-C | □ | 18 | 75 | 135 | 20 | − |
| HESL4200-C | ● | 20 | 75 | 140 | 20 | 125,520 |
| HESL4250-C | □ | 25 | 80 | 150 | 25 | − |

## HES4-C、HESM4-C、HESL4-Cの対応被削材

Applicable work material of HES4-C, HESM4-C, HESL4-C

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ |

## 再研磨対応外径範囲

Re-grinding compatibility range

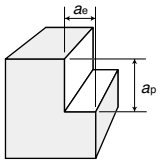
| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| HES4-C | 6～30 | 2～30 |
| HESM4-C | 6～30 | 3～30 |
| HESL4-C | 6～25 | 3～35 |

●印：標準在庫品です。 □印：特定代理店在庫です。弊社営業へお問合せください。
●：Stocked items. □：Stocked by specified distributor. Contact with our sales department.

# 標準切削条件表 Recommended cutting conditions

**HES4-C** (注①)
4枚刃・レギュラー刃長
4ft, Regular

**HESL4-C** (注①②)
4枚刃・ロング刃長
4ft, Long




## 〈側面切削〉 Side milling

| 被削材 Work material | 鋳鉄 炭素鋼 Cast irons Carbon steels (200HB以下) FC200、SS400、S45C | | 合金鋼 Alloy steels (200～250HB) SCM、SNCM | | 工具鋼 ステンレス鋼 Tool steels Stainless steels (25～35HRC) SKD、SKT、SUS304 | | 焼入れ鋼 プリハードン鋼 Hardened steels Pre-hardened steels (35～45HRC) SKD、SKT、HPM1、NAK55 | | 耐熱鋼 チタン合金 Heat-resistant steels Titanium alloys Inconel Ti-6Al-4V | | アルミ合金 非鉄金属 Aluminum alloys Non-Ferrous | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | $a_p$=1.5DC $a_e$=0.1DC | | $a_p$=1.5DC $a_e$=0.1DC | | $a_p$=1.5DC $a_e$=0.1DC | | $a_p$=1.5DC $a_e$=0.1DC | | $a_p$=1.5DC $a_e$=0.1DC | | $a_p$=1.5DC $a_e$=0.1DC | |
| 外径DC Tool dia. (mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $Vf$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 送り速度 $Vf$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 送り速度 $Vf$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 送り速度 $Vf$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 送り速度 $Vf$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 送り速度 $Vf$ (mm/min) |
| **φ3** | 9,500 | 280 | 7,400 | 220 | 5,800 | 170 | 4,700 | 90 | 2,100 | 40 | 21,000 | 750 |
| **φ4** | 7,100 | 280 | 5,500 | 220 | 4,300 | 170 | 3,500 | 90 | 1,500 | 40 | 16,000 | 800 |
| **φ6** | 4,700 | 280 | 3,700 | 220 | 2,900 | 170 | 2,300 | 90 | 1,000 | 40 | 10,600 | 800 |
| **φ8** | 3,500 | 280 | 2,700 | 220 | 2,100 | 170 | 1,700 | 100 | 790 | 45 | 8,000 | 900 |
| **φ10** | 2,800 | 280 | 2,200 | 220 | 1,700 | 170 | 1,400 | 100 | 630 | 45 | 6,400 | 950 |
| **φ12** | 2,300 | 280 | 1,800 | 220 | 1,400 | 170 | 1,100 | 100 | 530 | 45 | 5,300 | 950 |
| **φ16** | 1,700 | 280 | 1,300 | 220 | 1,000 | 170 | 890 | 100 | 390 | 45 | 4,000 | 950 |
| **φ20** | 1,400 | 280 | 1,100 | 220 | 870 | 170 | 710 | 100 | 310 | 45 | 3,200 | 800 |
| **φ25** | 1,100 | 220 | 890 | 180 | 700 | 140 | 570 | 85 | 250 | 40 | 2,500 | 800 |

【注意】
①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③上記の切削条件は2枚刃の場合を示します。4枚刃は、送り速度を1.5倍にしてください。
④ロング刃の場合は回転数、送り速度とも約50%以下にしてください。

【Note】
① Use the appropriate coolant for the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
③ The cutting conditions given above is applied to 2-flute type end mills. As for 4-flute type, increase the feed speed by 1.5 times.
④ As for the long length type end mills, decrease the revolution number and the feed speed to not more than 50%.

# Carbide End Mills
# 超硬ソリッドエンドミル

## レギュラー刃長 Regular

側面 Side Cutting / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance
φ2～φ6 : 0～−0.02
φ6.5～φ30 : 0～−0.025
h6
(mm)

超硬 Carbide / ねじれ30° Helix angle / 切削条件表 A397 Cutting Conditions

4枚刃 4Flutes

### HES4○○○

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| HES4020 | ● | 2 | 6 | 40 | 4 | 6,970 |
| HES4025 | ● | 2.5 | 8 | 40 | 4 | 7,160 |
| HES4030 | ● | 3 | 10 | 45 | 6 | 7,160 |
| HES4035 | ● | 3.5 | 11 | 45 | 6 | 7,480 |
| HES4040 | ● | 4 | 12 | 45 | 6 | 7,480 |
| HES4045 | ● | 4.5 | 14 | 45 | 6 | 8,450 |
| HES4050 | ● | 5 | 15 | 50 | 6 | 8,450 |
| HES4055 | ● | 5.5 | 15 | 50 | 6 | 9,320 |
| HES4060 | ● | 6 | 15 | 50 | 6 | 9,320 |
| HES4065 | ● | 6.5 | 15 | 50 | 6 | 10,610 |
| HES4070 | ● | 7 | 20 | 60 | 8 | 10,610 |
| HES4075 | ● | 7.5 | 20 | 60 | 8 | 12,020 |
| HES4080 | ● | 8 | 20 | 60 | 8 | 12,020 |
| HES4085 | ● | 8.5 | 20 | 60 | 8 | 13,810 |
| HES4090 | ● | 9 | 20 | 65 | 10 | 13,810 |
| HES4095 | ● | 9.5 | 20 | 65 | 10 | 16,160 |
| HES4100 | ● | 10 | 25 | 70 | 10 | 16,160 |
| HES4105 | □ | 10.5 | 25 | 70 | 10 | − |
| HES4110 | ● | 11 | 25 | 75 | 12 | 18,640 |
| HES4115 | □ | 11.5 | 25 | 75 | 12 | − |
| HES4120 | ● | 12 | 25 | 75 | 12 | 20,650 |
| HES4130 | ● | 13 | 25 | 75 | 12 | 28,280 |
| HES4140 | ● | 14 | 35 | 90 | 16 | 31,920 |
| HES4150 | ● | 15 | 35 | 90 | 16 | 40,360 |
| HES4160 | ● | 16 | 35 | 90 | 16 | 48,810 |
| HES4170 | □ | 17 | 35 | 90 | 16 | − |
| HES4180 | ● | 18 | 40 | 105 | 20 | 65,230 |
| HES4190 | □ | 19 | 40 | 105 | 20 | − |
| HES4200 | ● | 20 | 40 | 105 | 20 | 71,330 |
| HES4210 | □ | 21 | 40 | 105 | 20 | − |
| HES4220 | □ | 22 | 45 | 115 | 20 | − |
| HES4230 | □ | 23 | 45 | 115 | 20 | − |
| HES4240 | □ | 24 | 50 | 120 | 20 | − |
| HES4250 | ● | 25 | 50 | 120 | 25 | 103,000 |
| HES4260 | □ | 26 | 50 | 120 | 25 | − |
| HES4270 | □ | 27 | 55 | 130 | 25 | − |
| HES4280 | □ | 28 | 55 | 130 | 25 | − |
| HES4290 | □ | 29 | 55 | 130 | 25 | − |
| HES4300 | □ | 30 | 55 | 130 | 32 | − |

## ミディアム刃長 Medium

側面 Side Cutting / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance
φ3～φ6 : 0～−0.02
φ7～φ30 : 0～−0.025
h6
(mm)

超硬 Carbide / ねじれ30° Helix angle

4枚刃 4Flutes

### HESM4○○○

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| HESM4030 | ● | 3 | 15 | 50 | 6 | 7,580 |
| HESM4040 | ● | 4 | 17 | 50 | 6 | 8,360 |
| HESM4050 | ● | 5 | 20 | 53 | 6 | 9,940 |
| HESM4060 | ● | 6 | 20 | 60 | 6 | 10,800 |
| HESM4070 | ● | 7 | 25 | 63 | 8 | 11,460 |
| HESM4080 | ● | 8 | 25 | 75 | 8 | 12,470 |
| HESM4090 | ● | 9 | 28 | 75 | 10 | 16,720 |
| HESM4100 | ● | 10 | 33 | 80 | 10 | 18,860 |
| HESM4110 | □ | 11 | 33 | 90 | 12 | − |
| HESM4120 | ● | 12 | 37 | 90 | 12 | 23,350 |
| HESM4130 | □ | 13 | 37 | 100 | 12 | − |
| HESM4140 | □ | 14 | 42 | 100 | 16 | − |
| HESM4150 | □ | 15 | 42 | 110 | 16 | − |
| HESM4160 | ● | 16 | 47 | 110 | 16 | 50,440 |
| HESM4170 | □ | 17 | 47 | 110 | 16 | − |
| HESM4180 | □ | 18 | 50 | 120 | 20 | − |
| HESM4190 | □ | 19 | 50 | 120 | 20 | − |
| HESM4200 | ● | 20 | 55 | 120 | 20 | 73,560 |
| HESM4210 | □ | 21 | 55 | 130 | 20 | − |
| HESM4220 | □ | 22 | 60 | 130 | 20 | − |
| HESM4230 | □ | 23 | 60 | 130 | 20 | − |
| HESM4240 | □ | 24 | 65 | 140 | 20 | − |
| HESM4250 | □ | 25 | 65 | 140 | 25 | − |
| HESM4260 | □ | 26 | 65 | 140 | 25 | − |
| HESM4270 | □ | 27 | 70 | 145 | 25 | − |
| HESM4280 | □ | 28 | 70 | 145 | 25 | − |
| HESM4290 | □ | 29 | 70 | 145 | 25 | − |
| HESM4300 | □ | 30 | 70 | 145 | 32 | − |

## ロング刃長 Long

側面 Side Cutting / 仕上 Finishing

外径公差 Dia.tolerance
φ3～φ6 : 0～−0.02
φ7～φ25 : 0～−0.025
h6
(mm)

超硬 Carbide / ねじれ30° Helix angle / 切削条件表 A397 Cutting Conditions

4枚刃 4Flutes

### HESL4○○○

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| HESL4030 | ● | 3 | 20 | 55 | 6 | 12,750 |
| HESL4040 | ● | 4 | 24 | 57 | 6 | 13,390 |
| HESL4050 | ● | 5 | 30 | 65 | 6 | 15,600 |
| HESL4060 | ● | 6 | 30 | 65 | 6 | 16,830 |
| HESL4070 | ● | 7 | 40 | 80 | 8 | 20,090 |
| HESL4080 | ● | 8 | 40 | 80 | 8 | 22,110 |
| HESL4090 | ● | 9 | 40 | 85 | 10 | 27,160 |
| HESL4100 | ● | 10 | 50 | 95 | 10 | 30,640 |
| HESL4110 | □ | 11 | 50 | 100 | 12 | − |
| HESL4120 | ● | 12 | 50 | 100 | 12 | 36,590 |
| HESL4130 | □ | 13 | 50 | 100 | 12 | − |
| HESL4140 | □ | 14 | 70 | 125 | 16 | − |
| HESL4150 | □ | 15 | 70 | 125 | 16 | − |
| HESL4160 | ● | 16 | 70 | 125 | 16 | 82,940 |
| HESL4170 | □ | 17 | 70 | 135 | 16 | − |
| HESL4180 | □ | 18 | 75 | 135 | 20 | − |
| HESL4190 | □ | 19 | 75 | 140 | 20 | − |
| HESL4200 | ● | 20 | 75 | 140 | 20 | 120,820 |
| HESL4250 | □ | 25 | 80 | 150 | 25 | − |

## HES4、HESM4、HESL4の対応被削材

Applicable work material of HES4, HESM4, HESL4

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ○ | ○ | | | | ○ | ○ | ◎ | ◎ |

## 再研磨対応外径範囲 Re-grinding compatibility range

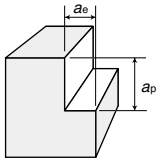
| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| HES4 | 6～30 | 2～30 |
| HESM4 | 6～30 | 3～30 |
| HESL4 | 6～25 | 3～25 |

●印：標準在庫品です。
●：Stocked items.
□印：特定代理店在庫です。弊社営業へお問合せください。
□：Stocked by specified distributor. Contact with our sales department.

# 標準切削条件表 Recommended cutting conditions

## HES4 (注①)

4枚刃・レギュラー刃長
4ft, Regular




### 〈側面切削〉 Side milling

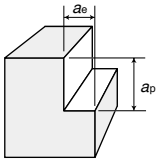
| 被削材 Work material | 鋳鉄 炭素鋼 Cast irons Carbon steels (200HB以下) FC200、SS400、S45C | | 合金鋼 Alloy steels (200～250HB) SCM、SNCM | | 工具鋼 ステンレス鋼 Tool steels Stainless steels (25～35HRC) SKD、SKT、SUS304 | | 焼入れ鋼 プリハードン鋼 Hardened steels Pre-hardened steels (35～45HRC) SKD、SKT、HPM1、NAK55 | | 耐熱鋼 チタン合金 Heat-resistant steels Titanium alloys Inconel Ti-6Al-4V | | アルミ合金 非鉄金属 Aluminum alloys Non-ferrous | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | $a_p$=1.5DC $a_e$=0.1DC | | $a_p$=1.5DC $a_e$=0.1DC | | $a_p$=1.5DC $a_e$=0.1DC | | $a_p$=1.5DC $a_e$=0.1DC | | $a_p$=1.5DC $a_e$=0.1DC | | $a_p$=1.5DC $a_e$=0.1DC | |
| 外径DC Tool dia.(mm) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) |
| φ3 | 4,750 | 140 | 3,700 | 80 | 3,200 | 60 | 2,650 | 30 | 1,600 | 20 | 21,000 | 750 |
| φ4 | 3,600 | 140 | 2,750 | 110 | 2,400 | 60 | 2,000 | 30 | 1,200 | 25 | 16,000 | 800 |
| φ6 | 2,400 | 150 | 1,850 | 110 | 1,600 | 60 | 1,320 | 40 | 800 | 25 | 10,600 | 800 |
| φ8 | 1,800 | 150 | 1,400 | 110 | 1,200 | 90 | 1,000 | 50 | 600 | 30 | 8,000 | 900 |
| φ10 | 1,450 | 150 | 1,100 | 110 | 950 | 90 | 800 | 50 | 480 | 30 | 6,400 | 950 |
| φ12 | 1,200 | 180 | 930 | 110 | 800 | 90 | 660 | 50 | 400 | 30 | 5,300 | 950 |
| φ16 | 900 | 180 | 700 | 110 | 600 | 90 | 500 | 50 | 300 | 30 | 4,000 | 950 |
| φ20 | 720 | 180 | 560 | 110 | 480 | 90 | 400 | 50 | 240 | 30 | 3,200 | 800 |
| φ25 | 570 | 140 | 450 | 100 | 380 | 90 | 320 | 50 | 190 | 30 | 2,500 | 800 |
| φ30 | 480 | 120 | 370 | 80 | 320 | 90 | 270 | 50 | 160 | 30 | 2,100 | 650 |

【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③上記の切削条件は２枚刃の場合を示します。4枚刃は、送り速度を 1.5倍にしてください。
④ロング刃の場合は回転数、送り速度とも約 50%以下にしてください。

【Note】① Use the appropriate coolant for the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
③ The cutting conditions given above is applied to 2-flute type end mills. As for 4-flute type, increase the feed speed by 1.5 times.
④ As for the long length type end mills, decrease the revolution number and the feed speed to not more than 50%.

## HESL4 (注①)

4枚刃・ロング刃長
4ft, Long




### 〈側面切削〉 Side milling

| 被削材 Work material | 鋳鉄 炭素鋼 Cast irons Carbon steels (200HB以下) FC200、SS400、S45C | | 合金鋼 Alloy steels (200～250HB) SCM、SNCM | | 工具鋼 ステンレス鋼 Tool steels Stainless steels (25～35HRC) SKD、SKT、SUS304 | | 焼入れ鋼 プリハードン鋼 Hardened steels Pre-hardened steels (35～45HRC) SKD、SKT、HPM1、NAK55 | | 耐熱鋼 チタン合金 Heat-resistant steels Titanium alloys Inconel Ti-6Al-4V | | アルミ合金 非鉄金属 Aluminum alloys Non-ferrous | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | $a_p$=1.5DC $a_e$=0.1DC | | $a_p$=1.5DC $a_e$=0.1DC | | $a_p$=1.5DC $a_e$=0.1DC | | $a_p$=1.5DC $a_e$=0.1DC | | $a_p$=1.5DC $a_e$=0.1DC | | $a_p$=1.5DC $a_e$=0.1DC | |
| 外径DC Tool dia.(mm) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) |
| φ3 | 2,400 | 70 | 1,900 | 40 | 1,700 | 32 | 1,500 | 17 | 1,250 | 16 | 10,000 | 375 |
| φ4 | 1,800 | 70 | 1,400 | 55 | 1,300 | 32 | 1,100 | 17 | 950 | 20 | 8,000 | 400 |
| φ6 | 1,200 | 75 | 950 | 55 | 850 | 32 | 740 | 22 | 640 | 20 | 5,300 | 400 |
| φ8 | 900 | 75 | 720 | 55 | 640 | 48 | 560 | 30 | 480 | 24 | 4,000 | 450 |
| φ10 | 750 | 75 | 570 | 55 | 510 | 48 | 450 | 30 | 380 | 24 | 3,200 | 475 |
| φ12 | 610 | 90 | 480 | 55 | 420 | 48 | 370 | 30 | 320 | 24 | 2,600 | 475 |
| φ16 | 450 | 90 | 360 | 55 | 320 | 48 | 280 | 30 | 240 | 24 | 2,000 | 400 |
| φ20 | 365 | 90 | 290 | 55 | 250 | 48 | 220 | 30 | 190 | 24 | 1,600 | 400 |
| φ25 | 300 | 60 | 230 | 40 | 200 | 48 | 180 | 30 | 150 | 24 | 1,300 | 325 |

【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③上記の切削条件は2枚刃の場合を示します。4枚刃は、送り速度を1.5倍にしてください。
④ロング刃は溝切削に適しません。

【Note】① Use the appropriate coolant for the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
③ The cutting conditions given above is applied to 2-flute type end mills. As for 4-flute type, increase the feed speed by 1.5 times.
④ The long length type is not suited to slotting.

# 金型加工用ヘッド交換式エンドミル EHXエンドミルシリーズ

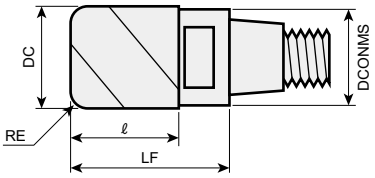
YouTube 動画公開中



## 刃先形状：エポックターボミル　Head type : Epoch Turbo Mill

彫込み Die-sinking　曲面 Profiling　R Radius　荒 Roughing　中仕上 Semi Finishing

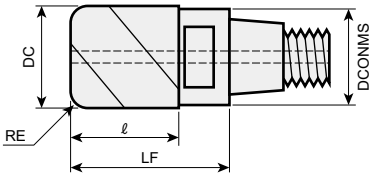
外径公差 Dia.tolerance
φ12　：0～−0.02
φ16、20：0～−0.03
(mm)




超硬 Carbide　ATH　ねじれ45° Helix angle　切削条件表 A402 Cutting Conditions

### EHX○○-ETM4○○○-○○-TH

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 刃長 Flute length ℓ | 全長 Overall length LF | 首径 Neck dia. DCONMS | 刃数 No. of flutes | オイルホール Oil hole | 希望小売価格（円）Suggested retail price(￥) |
|---|---|---|---|---|---|---|---|---|---|
| EHX12-ETM4120-20-TH | ● | 12 | 2 | 12 | 19 | 11.7 | 4 | — | 18,860 |
| EHX16-ETM4160-30-TH | ● | 16 | 3 | 16 | 24 | 15.5 | 4 | — | 30,270 |
| EHX20-ETM4200-30-TH | ● | 20 | 3 | 20 | 30 | 19.5 | 4 | — | 40,130 |




### EHX○○H-ETM4○○○-○○-TH

オイルホール付き With oil hole

超硬 Carbide　ATH　ねじれ45° Helix angle　切削条件表 A402 Cutting Conditions

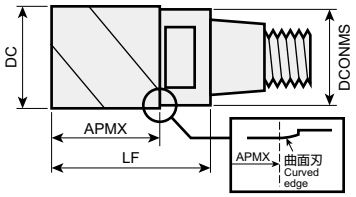
| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 刃長 Flute length ℓ | 全長 Overall length LF | 首径 Neck dia. DCONMS | 刃数 No. of flutes | オイルホール Oil hole | 希望小売価格（円）Suggested retail price(￥) |
|---|---|---|---|---|---|---|---|---|---|
| EHX12H-ETM4120-20-TH | ● | 12 | 2 | 12 | 19 | 11.7 | 4 | ○ | 21,660 |
| EHX16H-ETM4160-30-TH | ● | 16 | 3 | 16 | 24 | 15.5 | 4 | ○ | 34,850 |
| EHX20H-ETM4200-30-TH | ● | 20 | 3 | 20 | 30 | 19.5 | 4 | ○ | 46,110 |

## 刃先形状：エポック21　Head type : Epoch21

高硬度材の高速切削
High-speed cutting for high hardness materials is possible

高能率側面切削 Adaptive milling　側面 Side Cutting　中仕上 Semi Finishing　仕上 Finishing

外径公差 Dia.tolerance
φ12　：0～−0.02
φ16、20：0～−0.03
(mm)




超硬 Carbide　ATH　ねじれ46° Helix angle　切削条件表 A403 Cutting Conditions

### EHX○○-CEPR6○○○-TH

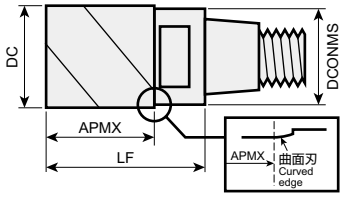
| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 刃長 Flute length APMX | 全長 Overall length LF | 首径 Neck dia. DCONMS | 刃数 No. of flutes | オイルホール Oil hole | 希望小売価格（円）Suggested retail price(￥) |
|---|---|---|---|---|---|---|---|---|---|
| EHX12-CEPR6120-TH | ● | 12 | — | 12 | 19 | 11.7 | 6 | — | 18,860 |
| EHX16-CEPR6160-TH | ● | 16 | — | 16 | 24 | 15.5 | 6 | — | 29,330 |
| EHX20-CEPR6200-TH | ● | 20 | — | 20 | 30 | 19.5 | 6 | — | 41,770 |

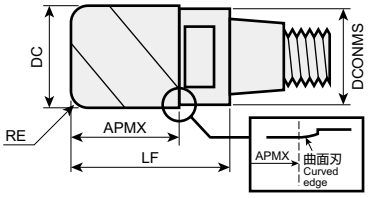
●：標準在庫品です。　●：Stocked items.

## 刃先形状：エポックパワーミル　Head type : Epoch Power Mill

平面 Planing　側面 Side Cutting　溝 Slotting　荒 Roughing　中仕上 Semi Finishing　仕上 Finishing

外径公差 Dia.tolerance
φ12　：0～−0.02
φ16、20：0～−0.03
(mm)




# EHX○○-EPP4○○○-○○-TH

超硬 Carbide　ATH　ねじれ46° Helix angle　切削条件表 A404 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 刃長 Flute length APMX | 全長 Overall length LF | 首径 Neck dia. DCONMS | 刃数 No. of flutes | オイルホール Oil hole | 希望小売価格（円） Suggested retail price(￥) |
|---|---|---|---|---|---|---|---|---|---|
| EHX12-EPP4120-TH | ● | 12 | — | 9.6 | 19 | 11.7 | 4 | — | 16,390 |
| EHX12-EPP4120-05-TH | ● | | 0.5 | 9.6 | 19 | 11.7 | 4 | — | 19,530 |
| EHX12-EPP4120-10-TH | ● | | 1 | 9.6 | 19 | 11.7 | 4 | — | 19,530 |
| EHX12-EPP4120-15-TH | ● | | 1.5 | 9.6 | 19 | 11.7 | 4 | — | 19,530 |
| EHX12-EPP4120-20-TH | ● | | 2 | 9.6 | 19 | 11.7 | 4 | — | 19,530 |
| EHX12-EPP4120-30-TH | ● | | 3 | 9.6 | 19 | 11.7 | 4 | — | 19,530 |
| EHX16-EPP4160-TH | ● | 16 | — | 12.8 | 24 | 15.5 | 4 | — | 28,510 |
| EHX16-EPP4160-10-TH | ● | | 1 | 12.8 | 24 | 15.5 | 4 | — | 30,500 |
| EHX16-EPP4160-15-TH | ● | | 1.5 | 12.8 | 24 | 15.5 | 4 | — | 30,500 |
| EHX16-EPP4160-20-TH | ● | | 2 | 12.8 | 24 | 15.5 | 4 | — | 30,500 |
| EHX16-EPP4160-30-TH | ● | | 3 | 12.8 | 24 | 15.5 | 4 | — | 30,500 |
| EHX20-EPP4200-TH | ● | 20 | — | 16 | 30 | 19.5 | 4 | — | 39,190 |
| EHX20-EPP4200-10-TH | ● | | 1 | 16 | 30 | 19.5 | 4 | — | 41,190 |
| EHX20-EPP4200-15-TH | ● | | 1.5 | 16 | 30 | 19.5 | 4 | — | 41,190 |
| EHX20-EPP4200-20-TH | ● | | 2 | 16 | 30 | 19.5 | 4 | — | 41,190 |
| EHX20-EPP4200-30-TH | ● | | 3 | 16 | 30 | 19.5 | 4 | — | 41,190 |

## EHX(H)-ETM、EHX-EPPの対応被削材

Applicable work material of EHX(H)-ETM, EHX-EPP

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ |

## EHX-CEPRの対応被削材

Applicable work material of EHX-CEPR

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | | |

## 再研磨対応外径範囲

Re-grinding compatibility range

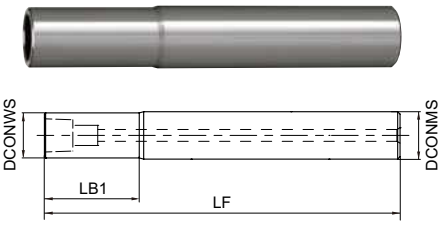
| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| EHX-ETM-TH | × (N/A) | 12～20 |
| EHX-H-ETM-TH | × (N/A) | 12～20 |
| EHX-CEPR-TH | 12～20 | 12～20 |
| EHX-EPP-TH | 12～20 | 12～20 |

Exchangeable head End Mill for Die & mold making : EHX End Mill series

# 金型加工用ヘッド交換式エンドミル EHXエンドミルシリーズ

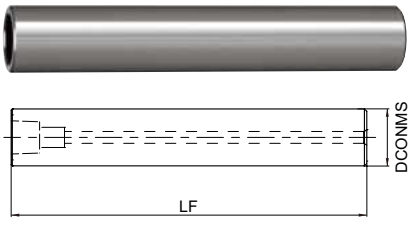
## 超硬ホルダ Carbide Holder

### アンダーカットタイプ
Under cut type



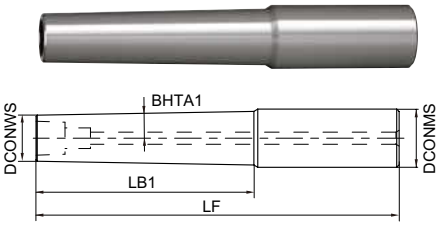

Aタイプ type

### ストレートタイプ
Straight type




Bタイプ type

### ペンシルネックタイプ
Pencil neck type



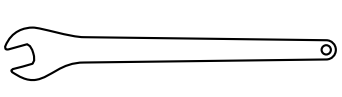

Cタイプ type

## EHX○○-○○-○○○-○○-ASC

h6

| 商品コード Item code | 在庫 Stock | 対応ヘッド Head | 首角度 Neck angle (°) BHTA1 | 首下長 Under neck length (mm) LB1 | 先端首径 Tip neck angle (mm) DCONWS | 全長 Overall length (mm) LF | シャンク径 Shank dia. (mm) DCONMS | 形状 Shape | スパナ Spanner | 希望小売価格（円） Suggested retail price(￥) |
|---|---|---|---|---|---|---|---|---|---|---|
| EHX12-12-80-17-ASC | ● | EHX12 | — | 17 | 11.7 | 80 | 12 | A | EHX12-SN | 67,580 |
| EHX12-12-100-ASC | ● | | — | — | — | 100 | 12 | B | | 74,380 |
| EHX12-12-100-41-ASC | ● | | — | 41 | 11.7 | 100 | 12 | A | | 74,380 |
| EHX12-12-130-ASC | ● | | — | — | — | 130 | 12 | B | | 85,050 |
| EHX12-12-130-65-ASC | ● | | — | 65 | 11.7 | 130 | 12 | A | | 85,050 |
| EHX12-12-150-89-ASC | ● | | — | 89 | 11.7 | 150 | 12 | A | | 94,790 |
| EHX12-16-130-65-ASC | ● | | 1° | 65 | 11.7 | 130 | 16 | C | | 98,310 |
| EHX12-16-150-91-ASC | ● | | 1° | 91 | 11.7 | 150 | 16 | C | | 109,220 |
| EHX16-16-80-24-ASC | ● | EHX16 | — | 24 | 15.5 | 80 | 16 | A | EHX16-SN | 79,180 |
| EHX16-16-110-ASC | ● | | — | — | — | 110 | 16 | B | | 89,390 |
| EHX16-16-110-56-ASC | ● | | — | 56 | 15.5 | 110 | 16 | A | | 89,390 |
| EHX16-16-150-ASC | ● | | — | — | — | 150 | 16 | B | | 101,240 |
| EHX16-16-150-88-ASC | ● | | — | 88 | 15.5 | 150 | 16 | A | | 101,240 |
| EHX16-20-150-88-ASC | ● | | 1° | 88 | 15.5 | 150 | 20 | C | | 119,650 |
| EHX16-20-180-116-ASC | ● | | 1° | 116 | 15.5 | 180 | 20 | C | | 132,550 |
| EHX20-20-90-30-ASC | ● | EHX20 | — | 30 | 19.5 | 90 | 20 | A | EHX20-SN | 91,970 |
| EHX20-20-130-ASC | ● | | — | — | — | 130 | 20 | B | | 106,520 |
| EHX20-20-130-70-ASC | ● | | — | 70 | 19.5 | 130 | 20 | A | | 106,520 |
| EHX20-20-180-ASC | ● | | — | — | — | 180 | 20 | B | | 126,690 |
| EHX20-20-180-110-ASC | ● | | — | 110 | 19.5 | 180 | 20 | A | | 126,690 |
| EHX20-25-180-110-ASC | ● | | 1° | 110 | 19.5 | 180 | 25 | C | | 150,150 |

※超硬ホルダにはスパナが付属しています。また、スパナ単体でも販売しております。
A spanner is attached to the carbide holder. Can be sold even by spanner only.

| 商品コード Item code | 在庫 Stock | スパナ Spanner | | 締付けトルク Fastening torque | 希望小売価格（円） Suggested retail price(￥) |
|---|---|---|---|---|---|
| EHX12-SN | ● |  | EHX12用スパナ Spanner for EHX12 | 15N·m | 2,940 |
| EHX16-SN | ● | | EHX16用スパナ Spanner for EHX16 | 30N·m | 3,060 |
| EHX20-SN | ● | | EHX20用スパナ Spanner for EHX20 | 50N·m | 3,440 |

●：標準在庫品です。　●：Stocked items.

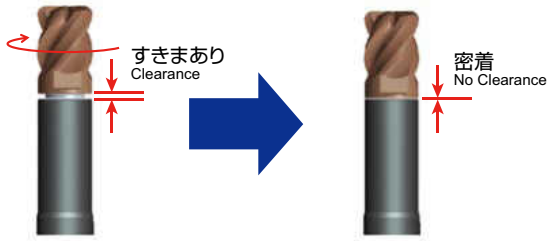
## ヘッド取付け要領 How to Install the Head

**1** **きれいなウエスなどで、ヘッド／ホルダのテーパ面／端面の油分・ほこりなどを取り除いてください。**

Using a clean cloth, wipe away oil and dust from the taper and end surfaces of the head and holder.

**2** **締め付ける際、刃先に直接素手で触れるとけがをする可能性があるので、保護手袋など保護具を使用してください。すきまが残った状態から付属のスパナを使用して、ヘッドとホルダの端面が密着するまで締め付けてください。**

Be careful to avoid the possibility of cutting hands when fastening with bare hands directly near the blade tip. Securely fasten the head and holder end surfaces using the enclosed spanner to close off any remaining gap.

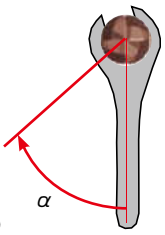



**3** **必要となる推奨トルクに達する角度は右表を参考にしてください。より厳密に管理する場合はトルクレンチを使って、右表のトルクで締め付けてください。**

Refer to the table at right regarding angles for recommended torque when necessary. For stricter usage, refer to the table right for torque wrench fastening.

| 対応ヘッド Suitable head | 参考締付け角α Reference tightening angle α | 推奨締付けトルク Recommended fastening Torque |
|---|---|---|
| EHX12 | 50° | 15N·m |
| EHX16 | 50° | 30N·m |
| EHX20 | 40° | 50N·m |

注）付属のスパナをご使用ください。
（一般のスパナとは厚みが異なります）
(Note) Use the enclosed spanner only. (Typical spanners differ in thickness.)



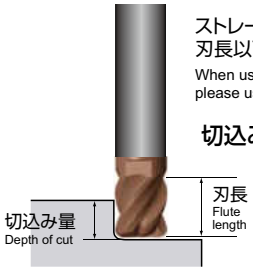

## 振れ精度・ヘッド交換精度 Run-out accuracy and head exchange accuracy

| 外周刃の振れ Run-out accuracy for the peripheral cutting edge | ヘッド交換精度（軸方向） Head exchange accuracy (Axial) |
|---|---|
| 0.015mm | ±0.02mm |

※超硬ホルダを使用した場合
ヘッド交換精度とはヘッド全長(L)の公差を表します
※Use the carbide holder
Head exchange accuracy is the tolerance of the overall length for the head (L).

## EHX超硬ホルダの使い分け How to Select EHX Holders

### ストレートタイプ Straight type



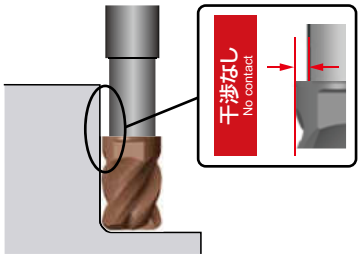

ストレートホルダと標準ヘッドをご使用の場合は刃長以下の切込み量でご使用ください。
When using straight holder + standard head, please use at smaller depth of cut than length of cut.

**切込み量＜刃長** Depth of cut < Flute length

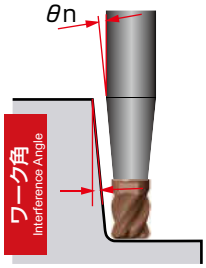
- ストレートタイプは、ホルダ径=ヘッド径のため、刃長以上の切込み量では干渉が発生します。
- アンダーカットタイプは、首ぬすみが付いているので立壁の加工に適しています。
- ペンシルネックは、首径が太くなっているので剛性が高く、深彫り加工において安定加工が可能です。

- When using straight holder + standard head, interference will occur in cases where the depth of cut is larger than the length of cut of the head.
- Under cut type with relieved neck is suitable for vertical wall machining.
- The large diameter of the pencil neck holder provides stability in long overhang applications.

### アンダーカットタイプ Under cut type




### ペンシルネックタイプ Pencil neck type



## 標準切削条件表 Recommended cutting conditions

### EHX-ETM-TH　EHX-H-ETM-TH

### ■ 一般条件（低速・高送り） Standard condition (Low speed, High feed)

| 被削材 Work material | 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | | | 工具鋼 Tool steels (25～35HRC) | | | | プリハードン鋼 Pre-hardened steels (35～45HRC) | | | | 焼入れ鋼 Hardened steels (45～55HRC) | | | | 焼入れ鋼 Hardened steels (55～60HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切削速度 Cutting speed | $v_c$=75m/min | | | | $v_c$=70m/min | | | | $v_c$=65m/min | | | | $v_c$=50m/min | | | | $v_c$=50m/min | | | |
| 外径DC×コーナ半径RE Tool dia.(mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | $a_p$ (mm) | $a_e$ (mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | $a_p$ (mm) | $a_e$ (mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | $a_p$ (mm) | $a_e$ (mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | $a_p$ (mm) | $a_e$ (mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | $a_p$ (mm) | $a_e$ (mm) |
| **ϕ12×RE2** | 2,000 | 6,380 | 0.48 | ≦6 | 1,900 | 5,540 | 0.48 | ≦6 | 1,700 | 3,880 | 0.48 | ≦6 | 1,300 | 2,960 | 0.34 | ≦6 | 1,300 | 1,190 | 0.24 | ≦6 |
| **ϕ16×RE3** | 1,500 | 5,380 | 0.72 | ≦8 | 1,400 | 4,590 | 0.72 | ≦8 | 1,300 | 3,330 | 0.72 | ≦8 | 1,000 | 2,560 | 0.5 | ≦8 | 1,000 | 1,020 | 0.36 | ≦8 |
| **ϕ20×RE3** | 1,200 | 4,370 | 0.72 | ≦10 | 1,100 | 3,660 | 0.72 | ≦10 | 1,000 | 2,600 | 0.72 | ≦10 | 800 | 2,080 | 0.5 | ≦10 | 800 | 830 | 0.36 | ≦10 |

### ■ 高速条件（高速・高送り） High speed condition (High speed, High feed)

| 被削材 Work material | 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | | | 工具鋼 Tool steels (25～35HRC) | | | | プリハードン鋼 Pre-hardened steels (35～45HRC) | | | | 焼入れ鋼 Hardened steels (45～55HRC) | | | | 焼入れ鋼 Hardened steels (55～60HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切削速度 Cutting speed | $v_c$=125m/min | | | | $v_c$=110m/min | | | | $v_c$=100m/min | | | | $v_c$=80m/min | | | | $v_c$=70m/min | | | |
| 外径DC×コーナ半径RE Tool dia.(mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | $a_p$ (mm) | $a_e$ (mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | $a_p$ (mm) | $a_e$ (mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | $a_p$ (mm) | $a_e$ (mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | $a_p$ (mm) | $a_e$ (mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | $a_p$ (mm) | $a_e$ (mm) |
| **ϕ12×RE2** | 3,300 | 10,530 | 0.38 | ≦6 | 2,900 | 8,460 | 0.38 | ≦6 | 2,700 | 6,160 | 0.34 | ≦6 | 2,100 | 4,790 | 0.29 | ≦6 | 1,900 | 1,730 | 0.19 | ≦6 |
| **ϕ16×RE3** | 2,500 | 8,960 | 0.57 | ≦8 | 2,200 | 7,210 | 0.57 | ≦8 | 2,000 | 5,120 | 0.51 | ≦8 | 1,600 | 4,100 | 0.44 | ≦8 | 1,400 | 1,430 | 0.29 | ≦8 |
| **ϕ20×RE3** | 2,000 | 7,280 | 0.57 | ≦10 | 1,800 | 5,990 | 0.57 | ≦10 | 1,600 | 4,160 | 0.51 | ≦10 | 1,300 | 3,380 | 0.44 | ≦10 | 1,100 | 1,140 | 0.29 | ≦10 |

【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②できるだけ高剛性、高精度の機械をご使用ください。
③この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

【Note】① Use the appropriate coolant for the work material and machining shape.
② Use a highly rigid and accurate machine as possible.
③ These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

| | 5DC | 6DC | 7DC | 8DC | 9DC | 10DC |
|---|---|---|---|---|---|---|
| 切削速度 Cutting speed | 100% | 100% | 100% | 100% | 100% | 100% |
| 1刃送り Feed per tooth | 100% | 100% | 100% | 100% | 100% | 100% |
| $a_p$ | 100% | 90% | 83% | 77% | 63% | 50% |
| $a_e$ | 100% | 100% | 100% | 100% | 100% | 100% |

突き出し長が長いホルダをご使用の場合は、上表の補正率を加味してご使用ください。
When using a holder with a long overhang length, please use the correction factor of the above table in consideration.

# EHX-CEPR-TH

## ■ 側面切削 Side milling

| 被削材 Work material | 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | | | 工具鋼 Tool steels (25～35HRC) | | | | プリハードン鋼 Pre-hardened steels (35～45HRC) | | | | 焼入れ鋼 Hardened steels (45～55HRC) | | | | 焼入れ鋼 Hardened steels (55～60HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切削速度 Cutting speed | $v_c$=250m/min | | | | $v_c$=250m/min | | | | $v_c$=250m/min | | | | $v_c$=200m/min | | | | $v_c$=150m/min | | | |
| 外径DC Tool dia. (mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | $a_p$ (mm) | $a_e$ (mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | $a_p$ (mm) | $a_e$ (mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | $a_p$ (mm) | $a_e$ (mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | $a_p$ (mm) | $a_e$ (mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | $a_p$ (mm) | $a_e$ (mm) |
| **ϕ12** | 6,600 | 5,420 | 12 | 1.2 | 6,600 | 4,510 | 12 | 1.2 | 6,600 | 4,060 | 12 | 0.6 | 5,300 | 2,900 | 12 | 0.36 | 4,000 | 1,920 | 12 | 0.24 |
| **ϕ16** | 5,000 | 5,180 | 16 | 1.6 | 5,000 | 4,320 | 16 | 1.6 | 5,000 | 3,890 | 16 | 0.8 | 4,000 | 2,760 | 16 | 0.48 | 3,000 | 1,810 | 16 | 0.32 |
| **ϕ20** | 4,000 | 4,900 | 20 | 2 | 4,000 | 4,080 | 20 | 2 | 4,000 | 3,670 | 20 | 1 | 3,200 | 2,610 | 20 | 0.6 | 2,400 | 1,710 | 20 | 0.4 |

【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②できるだけ高剛性、高精度の機械をご使用ください。
③この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

【Note】① Use the appropriate coolant for the work material and machining shape.
② Use a highly rigid and accurate machine as possible.
③ These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

| | 4DC以下 4DC or less | 6DC以下 6DC or less | 8DC以下 8DC or less | 10DC以下 10DC or less |
|---|---|---|---|---|
| 切削速度 Cutting speed | 100% | 100～70% | 70～50% | 50～30% |
| 1刃送り Feed per tooth | 100% | 100～90% | 90～80% | 80～70% |
| $a_p$ | 100% | 100% | 100% | 100% |
| $a_e$ | 100% | 90～50% | 50～30% | 30～10% |

突き出し長が長いホルダをご使用の場合は、上表の補正率を加味してご使用ください。
When using a holder with a long overhang length, please use the correction factor of the above table in consideration.

## EHX-EPP-TH

### ■ 側面切削 Side milling

| 被削材 Work material | 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | | | 工具鋼 Tool steels (25～35HRC) | | | | プリハードン鋼 Pre-hardened steels (35～45HRC) | | | | 焼入れ鋼 Hardened steels (45～55HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切削速度 Cutting speed | $v_c$=180m/min | | | | $v_c$=165m/min | | | | $v_c$=140m/min | | | | $v_c$=120m/min | | | |
| 外径DC Tool dia. (mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | $a_p$ (mm) | $a_e$ (mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | $a_p$ (mm) | $a_e$ (mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | $a_p$ (mm) | $a_e$ (mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | $a_p$ (mm) | $a_e$ (mm) |
| **φ12** | 4,800 | 1,750 | 9.6 | 1.2 | 4,400 | 1,200 | 9.6 | 1.2 | 3,700 | 1,010 | 9.6 | 0.9 | 3,200 | 730 | 9.6 | 0.6 |
| **φ16** | 3,600 | 1,470 | 12.8 | 1.6 | 3,300 | 1,010 | 12.8 | 1.6 | 2,800 | 860 | 12.8 | 1.2 | 2,400 | 610 | 12.8 | 0.8 |
| **φ20** | 2,900 | 1,580 | 16 | 2 | 2,600 | 1,060 | 16 | 2 | 2,200 | 900 | 16 | 1.5 | 1,900 | 650 | 16 | 1 |

| | 4DC以下 4DC or less | 6DC以下 6DC or less | 8DC以下 8DC or less | 10DC以下 10DC or less |
|---|---|---|---|---|
| 切削速度 Cutting speed | 100% | 100～70% | 70～50% | 50～30% |
| 1刃送り Feed per tooth | 100% | 100～90% | 90～80% | 80～70% |
| $a_p$ | 100% | 100% | 100% | 100% |
| $a_e$ | 100% | 90～50% | 50～30% | 30～10% |

突き出し長が長いホルダをご使用の場合は、上表の補正率を加味してご使用ください。
When using a holder with a long overhang length, please use the correction factor of the above table in consideration.

### ■ 溝切削 Slotting

| 被削材 Work material | 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | | | 工具鋼 Tool steels (25～35HRC) | | | | プリハードン鋼 Pre-hardened steels (35～45HRC) | | | | 焼入れ鋼 Hardened steels (45～55HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切削速度 Cutting speed | $v_c$=60m/min | | | | $v_c$=60m/min | | | | $v_c$=55m/min | | | | $v_c$=50m/min | | | |
| 外径DC Tool dia. (mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | $a_p$ (mm) | $a_e$ (mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | $a_p$ (mm) | $a_e$ (mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | $a_p$ (mm) | $a_e$ (mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | $a_p$ (mm) | $a_e$ (mm) |
| **φ12** | 1,600 | 580 | 6 | 12 | 1,600 | 440 | 6 | 12 | 1,500 | 410 | 4.8 | 12 | 1,300 | 240 | 2.4 | 12 |
| **φ16** | 1,200 | 490 | 8 | 16 | 1,200 | 370 | 8 | 16 | 1,100 | 340 | 6.4 | 16 | 1,000 | 200 | 3.2 | 16 |
| **φ20** | 1,000 | 540 | 10 | 20 | 1,000 | 410 | 10 | 20 | 900 | 370 | 8 | 20 | 800 | 220 | 4 | 20 |

| | 4DC以下 4DC or less | 6DC以下 6DC or less | 8DC以下 8DC or less | 10DC以下 10DC or less |
|---|---|---|---|---|
| 切削速度 Cutting speed | 100% | 100～70% | 70～50% | 50～30% |
| 1刃送り Feed per tooth | 100% | 100～90% | 90～80% | 80～70% |
| $a_p$ | 100% | 90～50% | 50～30% | 30～10% |

突き出し長が長いホルダをご使用の場合は、上表の補正率を加味してご使用ください。
When using a holder with a long overhang length, please use the correction factor of the above table in consideration.

【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②できるだけ高剛性、高精度の機械をご使用ください。
③この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

【Note】① Use the appropriate coolant for the work material and machining shape.
② Use a highly rigid and accurate machine as possible.
③ These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

# Epoch Deep Ball
# エポックディープボール

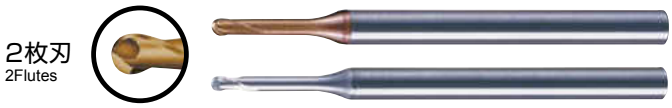
**ストレートネック** | Straight neck

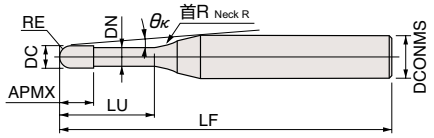
溝 Slotting | 彫込み Die-sinking | 曲面 Profiling | R Radius | 細部 Miniature | 中仕上 Semi Finishing | 仕上 Finishing | リブ・細部 Rib Miniature

RE公差 RE tolerance: RE≦0.25：±0.003 / 0.25＜RE：±0.005

h5

(mm)




## EPDB2○○○-○○(-TH)

超硬 Carbide | CS | TH | ねじれ20° Helix angle | 切削条件表 A407 Cutting Conditions

| CSコーティング CS Coating | | THコーティング TH Coating | | 寸法 Size(mm) | | | | | | | | 干渉角度 Interference angle (°) | 勾配角に対する実有効首下長 The effective under-neck length for the various draft angles | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 商品コード Item code | 在庫 Stock | 商品コード Item code | 在庫 Stock | ボール半径 Ball radius RE | 外径 Tool dia. DC | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | θκ | 0.5° | 1° | 1.5° | 2° | 3° |
| EPDB2001-0.2 | □ | EPDB2001-0.2-TH | □ | 0.05 | 0.1 | 0.2 | 0.08 | 0.08 | 45 | 4 | 1 | 11.76 | 0.35 | 0.37 | 0.39 | 0.41 | 0.44 |
| EPDB2001-0.3 | □ | EPDB2001-0.3-TH | □ | | | 0.3 | 0.08 | 0.08 | 45 | 4 | 1 | 11.64 | 0.46 | 0.48 | 0.5 | 0.53 | 0.57 |
| EPDB2001-0.5 | □ | EPDB2001-0.5-TH | □ | | | 0.5 | 0.08 | 0.08 | 45 | 4 | 1 | 11.4 | 0.67 | 0.7 | 0.73 | 0.76 | 0.81 |
| EPDB2002-0.5 | □ | EPDB2002-0.5-TH | □ | 0.1 | 0.2 | 0.5 | 0.15 | 0.17 | 50 | 4 | 10 | 11.42 | 1.2 | 1.35 | 1.52 | 1.68 | 2.01 |
| EPDB2002-1 | □ | EPDB2002-1-TH | □ | | | 1 | 0.15 | 0.17 | 50 | 4 | 10 | 10.86 | 1.76 | 1.97 | 2.17 | 2.37 | 2.74 |
| EPDB2002-1.5 | □ | EPDB2002-1.5-TH | □ | | | 1.5 | 0.15 | 0.17 | 50 | 4 | 10 | 10.35 | 2.32 | 2.57 | 2.8 | 3.02 | 3.44 |
| EPDB2002-2 | □ | EPDB2002-2-TH | □ | | | 2 | 0.15 | 0.17 | 50 | 4 | 10 | 9.88 | 2.88 | 3.16 | 3.42 | 3.66 | 4.11 |
| EPDB2002-2.5 | □ | EPDB2002-2.5-TH | □ | | | 2.5 | 0.15 | 0.17 | 50 | 4 | 10 | 9.46 | 3.43 | 3.75 | 4.03 | 4.28 | 4.76 |
| EPDB2002-3 | □ | EPDB2002-3-TH | □ | | | 3 | 0.15 | 0.17 | 50 | 4 | 10 | 9.07 | 3.98 | 4.33 | 4.62 | 4.9 | 5.4 |
| EPDB2003-1 | □ | EPDB2003-1-TH | □ | 0.15 | 0.3 | 1 | 0.25 | 0.27 | 50 | 4 | 10 | 10.89 | 1.76 | 1.96 | 2.16 | 2.35 | 2.72 |
| EPDB2003-1.5 | □ | EPDB2003-1.5-TH | □ | | | 1.5 | 0.25 | 0.27 | 50 | 4 | 10 | 10.36 | 2.32 | 2.56 | 2.79 | 3.01 | 3.42 |
| EPDB2003-2 | □ | EPDB2003-2-TH | □ | | | 2 | 0.25 | 0.27 | 50 | 4 | 10 | 9.88 | 2.88 | 3.16 | 3.41 | 3.65 | 4.09 |
| EPDB2003-2.5 | □ | EPDB2003-2.5-TH | □ | | | 2.5 | 0.25 | 0.27 | 50 | 4 | 10 | 9.45 | 3.43 | 3.74 | 4.02 | 4.27 | 4.74 |
| EPDB2003-3 | □ | EPDB2003-3-TH | □ | | | 3 | 0.25 | 0.27 | 50 | 4 | 10 | 9.05 | 3.98 | 4.32 | 4.62 | 4.89 | 5.39 |
| EPDB2004-1 | □ | EPDB2004-1-TH | □ | 0.2 | 0.4 | 1 | 0.3 | 0.37 | 50 | 4 | 10 | 10.91 | 1.75 | 1.95 | 2.14 | 2.33 | 2.7 |
| EPDB2004-1.5 | □ | EPDB2004-1.5-TH | □ | | | 1.5 | 0.3 | 0.37 | 50 | 4 | 10 | 10.37 | 2.31 | 2.55 | 2.78 | 2.99 | 3.4 |
| EPDB2004-2 | □ | EPDB2004-2-TH | □ | | | 2 | 0.3 | 0.37 | 50 | 4 | 10 | 9.88 | 2.87 | 3.15 | 3.4 | 3.63 | 4.07 |
| EPDB2004-2.5 | □ | EPDB2004-2.5-TH | □ | | | 2.5 | 0.3 | 0.37 | 50 | 4 | 10 | 9.43 | 3.42 | 3.73 | 4.01 | 4.26 | 4.73 |
| EPDB2004-3 | □ | EPDB2004-3-TH | □ | | | 3 | 0.3 | 0.37 | 50 | 4 | 10 | 9.03 | 3.97 | 4.31 | 4.61 | 4.88 | 5.37 |
| EPDB2004-3.5 | □ | EPDB2004-3.5-TH | □ | | | 3.5 | 0.3 | 0.37 | 50 | 4 | 10 | 8.65 | 4.52 | 4.88 | 5.2 | 5.48 | 6 |
| EPDB2004-4 | □ | EPDB2004-4-TH | □ | | | 4 | 0.3 | 0.37 | 50 | 4 | 10 | 8.3 | 5.07 | 5.45 | 5.79 | 6.09 | 6.63 |
| EPDB2004-4.5 | □ | EPDB2004-4.5-TH | □ | | | 4.5 | 0.3 | 0.37 | 50 | 4 | 10 | 7.99 | 5.61 | 6.02 | 6.37 | 6.68 | 7.24 |
| EPDB2005-1 | □ | EPDB2005-1-TH | □ | 0.25 | 0.5 | 1 | 0.35 | 0.47 | 50 | 4 | 10 | 10.94 | 1.74 | 1.94 | 2.13 | 2.31 | 2.68 |
| EPDB2005-2 | □ | EPDB2005-2-TH | □ | | | 2 | 0.35 | 0.47 | 50 | 4 | 10 | 9.88 | 2.86 | 3.14 | 3.39 | 3.62 | 4.06 |
| EPDB2005-3 | □ | EPDB2005-3-TH | □ | | | 3 | 0.35 | 0.47 | 50 | 4 | 10 | 9 | 3.97 | 4.3 | 4.6 | 4.87 | 5.36 |
| EPDB2005-4 | □ | EPDB2005-4-TH | □ | | | 4 | 0.35 | 0.47 | 50 | 4 | 10 | 8.27 | 5.06 | 5.45 | 5.78 | 6.08 | 6.61 |
| EPDB2005-5 | □ | EPDB2005-5-TH | □ | | | 5 | 0.35 | 0.47 | 50 | 4 | 10 | 7.64 | 6.15 | 6.57 | 6.94 | 7.26 | 7.84 |
| EPDB2005-5.5 | □ | EPDB2005-5.5-TH | □ | | | 5.5 | 0.35 | 0.47 | 50 | 4 | 10 | 7.36 | 6.69 | 7.13 | 7.51 | 7.85 | 8.45 |
| EPDB2005-6 | □ | EPDB2005-6-TH | □ | | | 6 | 0.35 | 0.47 | 50 | 4 | 10 | 7.1 | 7.23 | 7.69 | 8.08 | 8.43 | 9.05 |
| EPDB2005-8 | □ | EPDB2005-8-TH | □ | | | 8 | 0.35 | 0.47 | 50 | 4 | 10 | 6.23 | 9.37 | 9.9 | 10.34 | 10.73 | 11.41 |
| EPDB2006-1 | □ | EPDB2006-1-TH | □ | 0.3 | 0.6 | 1 | 0.4 | 0.57 | 50 | 4 | 10 | 10.98 | 1.74 | 1.93 | 2.11 | 2.3 | 2.66 |
| EPDB2006-2 | □ | EPDB2006-2-TH | □ | | | 2 | 0.4 | 0.57 | 50 | 4 | 10 | 9.88 | 2.86 | 3.13 | 3.38 | 3.61 | 4.04 |
| EPDB2006-3 | □ | EPDB2006-3-TH | □ | | | 3 | 0.4 | 0.57 | 50 | 4 | 10 | 8.98 | 3.96 | 4.3 | 4.59 | 4.85 | 5.35 |
| EPDB2006-4 | □ | EPDB2006-4-TH | □ | | | 4 | 0.4 | 0.57 | 50 | 4 | 10 | 8.22 | 5.06 | 5.44 | 5.77 | 6.07 | 6.6 |
| EPDB2006-5 | □ | EPDB2006-5-TH | □ | | | 5 | 0.4 | 0.57 | 50 | 4 | 10 | 7.59 | 6.14 | 6.57 | 6.93 | 7.25 | 7.83 |
| EPDB2006-6 | □ | EPDB2006-6-TH | □ | | | 6 | 0.4 | 0.57 | 50 | 4 | 10 | 7.04 | 7.22 | 7.69 | 8.08 | 8.42 | 9.04 |
| EPDB2006-7 | □ | EPDB2006-7-TH | □ | | | 7 | 0.4 | 0.57 | 50 | 4 | 10 | 6.57 | 8.3 | 8.8 | 9.21 | 9.58 | 10.22 |
| EPDB2006-8 | □ | EPDB2006-8-TH | □ | | | 8 | 0.4 | 0.57 | 50 | 4 | 10 | 6.16 | 9.36 | 9.9 | 10.34 | 10.72 | 11.4 |
| EPDB2006-9 | □ | EPDB2006-9-TH | □ | | | 9 | 0.4 | 0.57 | 50 | 4 | 10 | 5.79 | 10.43 | 10.99 | 11.46 | 11.86 | 12.56 |
| EPDB2006-10 | □ | EPDB2006-10-TH | □ | | | 10 | 0.4 | 0.57 | 50 | 4 | 10 | 5.47 | 11.49 | 12.09 | 12.57 | 12.99 | 13.72 |
| EPDB2006-12 | □ | EPDB2006-12-TH | □ | | | 12 | 0.4 | 0.57 | 50 | 4 | 10 | 4.92 | 13.61 | 14.26 | 14.78 | 15.23 | 16 |
| EPDB2008-2 | □ | EPDB2008-2-TH | □ | 0.4 | 0.8 | 2 | 0.5 | 0.77 | 50 | 4 | 10 | 9.87 | 2.85 | 3.11 | 3.35 | 3.58 | 4.01 |
| EPDB2008-4 | □ | EPDB2008-4-TH | □ | | | 4 | 0.5 | 0.77 | 50 | 4 | 10 | 8.14 | 5.05 | 5.43 | 5.75 | 6.05 | 6.58 |
| EPDB2008-5 | □ | EPDB2008-5-TH | □ | | | 5 | 0.5 | 0.77 | 50 | 4 | 10 | 7.48 | 6.13 | 6.56 | 6.91 | 7.24 | 7.81 |
| EPDB2008-6 | □ | EPDB2008-6-TH | □ | | | 6 | 0.5 | 0.77 | 50 | 4 | 10 | 6.92 | 7.21 | 7.68 | 8.06 | 8.41 | 9.02 |
| EPDB2008-8 | □ | EPDB2008-8-TH | □ | | | 8 | 0.5 | 0.77 | 50 | 4 | 10 | 6.01 | 9.36 | 9.89 | 10.33 | 10.71 | 11.38 |
| EPDB2008-10 | □ | EPDB2008-10-TH | □ | | | 10 | 0.5 | 0.77 | 50 | 4 | 10 | 5.32 | 11.49 | 12.08 | 12.56 | 12.98 | 13.7 |
| EPDB2010-2 | □ | EPDB2010-2-TH | □ | 0.5 | 1 | 2 | 0.8 | 0.96 | 50 | 4 | 10 | 9.84 | 2.9 | 3.15 | 3.37 | 3.59 | 4.01 |
| EPDB2010-3 | □ | EPDB2010-3-TH | □ | | | 3 | 0.8 | 0.96 | 50 | 4 | 10 | 8.84 | 4 | 4.31 | 4.59 | 4.84 | 5.32 |
| EPDB2010-4 | □ | EPDB2010-4-TH | □ | | | 4 | 0.8 | 0.96 | 50 | 4 | 10 | 8.02 | 5.09 | 5.45 | 5.77 | 6.06 | 6.58 |
| EPDB2010-5 | □ | EPDB2010-5-TH | □ | | | 5 | 0.8 | 0.96 | 50 | 4 | 10 | 7.34 | 6.17 | 6.58 | 6.93 | 7.24 | 7.81 |
| EPDB2010-6 | □ | EPDB2010-6-TH | □ | | | 6 | 0.8 | 0.96 | 50 | 4 | 10 | 6.77 | 7.25 | 7.7 | 8.08 | 8.41 | 9.02 |
| EPDB2010-7 | □ | EPDB2010-7-TH | □ | | | 7 | 0.8 | 0.96 | 50 | 4 | 10 | 6.28 | 8.32 | 8.81 | 9.21 | 9.57 | 10.21 |
| EPDB2010-8 | □ | EPDB2010-8-TH | □ | | | 8 | 0.8 | 0.96 | 50 | 4 | 10 | 5.85 | 9.39 | 9.91 | 10.34 | 10.72 | 11.38 |
| EPDB2010-9 | □ | EPDB2010-9-TH | □ | | | 9 | 0.8 | 0.96 | 50 | 4 | 10 | 5.48 | 10.45 | 11 | 11.45 | 11.85 | 12.55 |
| EPDB2010-10 | □ | EPDB2010-10-TH | □ | | | 10 | 0.8 | 0.96 | 50 | 4 | 10 | 5.15 | 11.52 | 12.09 | 12.57 | 12.98 | 13.7 |
| EPDB2010-12 | □ | EPDB2010-12-TH | □ | | | 12 | 0.8 | 0.96 | 55 | 4 | 10 | 4.6 | 13.63 | 14.26 | 14.78 | 15.22 | 15.99 |
| EPDB2010-14 | □ | EPDB2010-14-TH | □ | | | 14 | 0.8 | 0.96 | 55 | 4 | 10 | 4.16 | 15.74 | 16.42 | 16.97 | 17.44 | 18.54 |
| EPDB2010-16 | □ | EPDB2010-16-TH | □ | | | 16 | 0.8 | 0.96 | 55 | 4 | 10 | 3.79 | 17.84 | 18.56 | 19.14 | 19.64 | 21.2 |
| EPDB2010-18 | □ | EPDB2010-18-TH | □ | | | 18 | 0.8 | 0.96 | 60 | 4 | 10 | 3.49 | 19.93 | 20.7 | 21.31 | 21.83 | 23.85 |
| EPDB2010-20 | □ | EPDB2010-20-TH | □ | | | 20 | 0.8 | 0.96 | 60 | 4 | 10 | 3.23 | 22.02 | 22.83 | 23.47 | 24.01 | 26.51 |
| EPDB2012-8 | □ | EPDB2012-8-TH | □ | 0.6 | 1.2 | 8 | 1.1 | 1.15 | 50 | 4 | 10 | 5.67 | 9.42 | 9.93 | 10.35 | 10.72 | 11.38 |
| EPDB2012-12 | □ | EPDB2012-12-TH | □ | | | 12 | 1.1 | 1.15 | 55 | 4 | 10 | 4.43 | 13.66 | 14.28 | 14.78 | 15.23 | 15.99 |

□印：特定代理店在庫です。弊社営業へお問合せください。
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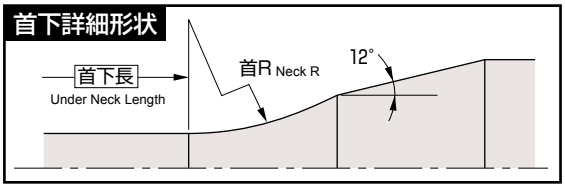
Stocked by Specified distributor

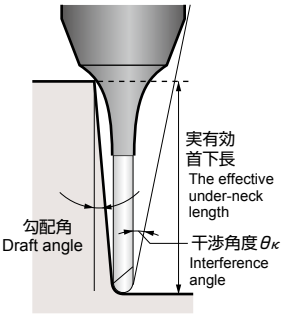
# Epoch Deep Ball
# エポックディープボール

**首下詳細形状**




【注意】加工物に勾配がついている場合、干渉領域は、首下長さよりも長くなります。それぞれの勾配角に対する実有効首下長をご参照ください。
また、工具が加工物に干渉する角度を干渉角度θκで表示していますので合わせてご参照ください。

【Note】If the workpiece has draft angle, the interference length will be longer than the under-neck length.Please refer to the effective under-neck length for the various draft angles.
In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle θκ", and should also be referred to.




## EPDB2○○○-○○(-TH)

| CSコーティング CS Coating 商品コード Item code | 在庫 Stock | THコーティング TH Coating 商品コード Item code | 在庫 Stock | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度 Interference angle (°) θκ | 勾配角に対する実有効首下長 The effective under-neck length for the various draft angles 0.5° | 1° | 1.5° | 2° | 3° |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDB2014-8 | □ | EPDB2014-8-TH | □ | 0.7 | 1.4 | 8 | 1.3 | 1.34 | 50 | 4 | 10 | 5.48 | 9.45 | 9.94 | 10.36 | 10.73 | 11.38 |
| EPDB2014-12 | □ | EPDB2014-12-TH | □ | | | 12 | 1.3 | 1.34 | 55 | 4 | 10 | 4.24 | 13.68 | 14.29 | 14.79 | 15.23 | 15.99 |
| EPDB2014-16 | □ | EPDB2014-16-TH | □ | | | 16 | 1.3 | 1.34 | 55 | 4 | 10 | 3.46 | 17.88 | 18.59 | 19.16 | 19.65 | 21.2 |
| EPDB2015-4 | □ | EPDB2015-4-TH | □ | 0.75 | 1.5 | 4 | 1.35 | 1.44 | 50 | 4 | 10 | 7.68 | 5.16 | 5.49 | 5.79 | 6.06 | 6.57 |
| EPDB2015-6 | □ | EPDB2015-6-TH | □ | | | 6 | 1.35 | 1.44 | 50 | 4 | 10 | 6.33 | 7.31 | 7.73 | 8.09 | 8.42 | 9.01 |
| EPDB2015-8 | □ | EPDB2015-8-TH | □ | | | 8 | 1.35 | 1.44 | 50 | 4 | 10 | 5.39 | 9.45 | 9.94 | 10.35 | 10.72 | 11.37 |
| EPDB2015-10 | □ | EPDB2015-10-TH | □ | | | 10 | 1.35 | 1.44 | 50 | 4 | 10 | 4.68 | 11.57 | 12.12 | 12.58 | 12.99 | 13.7 |
| EPDB2015-12 | □ | EPDB2015-12-TH | □ | | | 12 | 1.35 | 1.44 | 55 | 4 | 10 | 4.14 | 13.68 | 14.29 | 14.79 | 15.23 | 15.98 |
| EPDB2015-16 | □ | EPDB2015-16-TH | □ | | | 16 | 1.35 | 1.44 | 55 | 4 | 10 | 3.37 | 17.88 | 18.59 | 19.16 | 19.65 | 21.18 |
| EPDB2015-20 | □ | EPDB2015-20-TH | □ | | | 20 | 1.35 | 1.44 | 60 | 4 | 10 | 2.84 | 22.06 | 22.85 | 23.48 | 24.01 | 干渉なし |
| EPDB2016-8 | □ | EPDB2016-8-TH | □ | 0.8 | 1.6 | 8 | 1.4 | 1.54 | 50 | 4 | 10 | 5.28 | 9.44 | 9.93 | 10.35 | 10.71 | 11.37 |
| EPDB2016-12 | □ | EPDB2016-12-TH | □ | | | 12 | 1.4 | 1.54 | 55 | 4 | 10 | 4.05 | 13.68 | 14.28 | 14.78 | 15.22 | 15.98 |
| EPDB2016-16 | □ | EPDB2016-16-TH | □ | | | 16 | 1.4 | 1.54 | 55 | 4 | 10 | 3.28 | 17.88 | 18.58 | 19.15 | 19.64 | 21.16 |
| EPDB2016-20 | □ | EPDB2016-20-TH | □ | | | 20 | 1.4 | 1.54 | 60 | 4 | 10 | 2.75 | 22.06 | 22.85 | 23.47 | 24.01 | 干渉なし |
| EPDB2018-8 | □ | EPDB2018-8-TH | □ | 0.9 | 1.8 | 8 | 1.6 | 1.73 | 50 | 4 | 10 | 5.06 | 9.47 | 9.95 | 10.36 | 10.72 | 11.37 |
| EPDB2018-12 | □ | EPDB2018-12-TH | □ | | | 12 | 1.6 | 1.73 | 55 | 4 | 10 | 3.83 | 13.7 | 14.3 | 14.79 | 15.22 | 15.98 |
| EPDB2018-16 | □ | EPDB2018-16-TH | □ | | | 16 | 1.6 | 1.73 | 55 | 4 | 10 | 3.09 | 17.9 | 18.6 | 19.16 | 19.65 | 21.16 |
| EPDB2018-20 | □ | EPDB2018-20-TH | □ | | | 20 | 1.6 | 1.73 | 60 | 4 | 10 | 2.58 | 22.08 | 22.86 | 23.48 | 24.01 | 干渉なし |
| EPDB2020-3 | □ | EPDB2020-3-TH | □ | 1 | 2 | 3 | 1.7 | 1.92 | 50 | 4 | 10 | 8.26 | 4.16 | 4.4 | 4.64 | 4.86 | 5.29 |
| EPDB2020-4 | □ | EPDB2020-4-TH | □ | | | 4 | 1.7 | 1.92 | 50 | 4 | 10 | 7.23 | 5.23 | 5.54 | 5.81 | 6.07 | 6.55 |
| EPDB2020-6 | □ | EPDB2020-6-TH | □ | | | 6 | 1.7 | 1.92 | 50 | 4 | 10 | 5.78 | 7.38 | 7.77 | 8.11 | 8.43 | 9 |
| EPDB2020-8 | □ | EPDB2020-8-TH | □ | | | 8 | 1.7 | 1.92 | 50 | 4 | 10 | 4.81 | 9.5 | 9.97 | 10.37 | 10.73 | 11.37 |
| EPDB2020-10 | □ | EPDB2020-10-TH | □ | | | 10 | 1.7 | 1.92 | 50 | 4 | 10 | 4.12 | 11.62 | 12.15 | 12.6 | 12.99 | 13.69 |
| EPDB2020-12 | □ | EPDB2020-12-TH | □ | | | 12 | 1.7 | 1.92 | 55 | 4 | 10 | 3.61 | 13.73 | 14.31 | 14.8 | 15.23 | 15.98 |
| EPDB2020-14 | □ | EPDB2020-14-TH | □ | | | 14 | 1.7 | 1.92 | 55 | 4 | 10 | 3.2 | 15.83 | 16.47 | 16.99 | 17.45 | 18.51 |
| EPDB2020-16 | □ | EPDB2020-16-TH | □ | | | 16 | 1.7 | 1.92 | 55 | 4 | 10 | 2.88 | 17.92 | 18.61 | 19.17 | 19.65 | 干渉なし |
| EPDB2020-18 | □ | EPDB2020-18-TH | □ | | | 18 | 1.7 | 1.92 | 60 | 4 | 10 | 2.62 | 20.01 | 20.74 | 21.33 | 21.84 | 干渉なし |
| EPDB2020-20 | □ | EPDB2020-20-TH | □ | | | 20 | 1.7 | 1.92 | 60 | 4 | 10 | 2.4 | 22.1 | 22.87 | 23.49 | 24.02 | 干渉なし |
| EPDB2020-22 | □ | EPDB2020-22-TH | □ | | | 22 | 1.7 | 1.92 | 60 | 4 | 10 | 2.22 | 24.18 | 24.99 | 25.63 | 26.35 | 干渉なし |
| EPDB2020-25 | □ | EPDB2020-25-TH | □ | | | 25 | 1.7 | 1.92 | 65 | 4 | 10 | 1.99 | 27.3 | 28.16 | 28.84 | 干渉なし | 干渉なし |
| EPDB2020-30 | □ | EPDB2020-30-TH | □ | | | 30 | 1.7 | 1.92 | 70 | 4 | 10 | 1.7 | 32.49 | 33.42 | 34.29 | 干渉なし | 干渉なし |
| EPDB2020-35 | □ | EPDB2020-35-TH | □ | | | 35 | 1.7 | 1.92 | 75 | 4 | 10 | 1.48 | 37.65 | 38.67 | 干渉なし | 干渉なし | 干渉なし |
| EPDB2020-40 | □ | EPDB2020-40-TH | □ | | | 40 | 1.7 | 1.92 | 80 | 4 | 10 | 1.31 | 42.81 | 43.89 | 干渉なし | 干渉なし | 干渉なし |
| EPDB2030-8 | □ | EPDB2030-8-TH | □ | 1.5 | 3 | 8 | 2.5 | 2.88 | 55 | 6 | 10 | 6.19 | 9.61 | 10.03 | 10.4 | 10.74 | 11.35 |
| EPDB2030-10 | □ | EPDB2030-10-TH | □ | | | 10 | 2.5 | 2.88 | 55 | 6 | 10 | 5.41 | 11.72 | 12.21 | 12.63 | 13 | 13.67 |
| EPDB2030-13 | □ | EPDB2030-13-TH | □ | | | 13 | 2.5 | 2.88 | 60 | 6 | 10 | 4.56 | 14.87 | 15.44 | 15.92 | 16.35 | 17.15 |
| EPDB2030-16 | □ | EPDB2030-16-TH | □ | | | 16 | 2.5 | 2.88 | 60 | 6 | 10 | 3.93 | 18.01 | 18.65 | 19.19 | 19.66 | 21.13 |
| EPDB2030-20 | □ | EPDB2030-20-TH | □ | | | 20 | 2.5 | 2.88 | 65 | 6 | 10 | 3.33 | 22.18 | 22.91 | 23.51 | 24.02 | 26.44 |
| EPDB2030-25 | □ | EPDB2030-25-TH | □ | | | 25 | 2.5 | 2.88 | 70 | 6 | 10 | 2.79 | 27.37 | 28.2 | 28.86 | 29.96 | 干渉なし |
| EPDB2030-30 | □ | EPDB2030-30-TH | □ | | | 30 | 2.5 | 2.88 | 75 | 6 | 10 | 2.4 | 32.55 | 33.46 | 34.32 | 35.94 | 干渉なし |
| EPDB2030-35 | □ | EPDB2030-35-TH | □ | | | 35 | 2.5 | 2.88 | 80 | 6 | 10 | 2.11 | 37.71 | 38.7 | 40.03 | 41.92 | 干渉なし |
| EPDB2040-10 | □ | EPDB2040-10-TH | □ | 2 | 4 | 10 | 3 | 3.9 | 55 | 6 | 10 | 4.42 | 11.63 | 12.11 | 12.53 | 12.9 | 13.57 |
| EPDB2040-13 | □ | EPDB2040-13-TH | □ | | | 13 | 3 | 3.9 | 60 | 6 | 10 | 3.59 | 14.79 | 15.36 | 15.84 | 16.26 | 17.01 |
| EPDB2040-16 | □ | EPDB2040-16-TH | □ | | | 16 | 3 | 3.9 | 60 | 6 | 10 | 3.03 | 17.93 | 18.58 | 19.11 | 19.58 | 20.91 |
| EPDB2040-20 | □ | EPDB2040-20-TH | □ | | | 20 | 3 | 3.9 | 65 | 6 | 10 | 2.5 | 22.11 | 22.84 | 23.44 | 23.96 | 干渉なし |
| EPDB2040-25 | □ | EPDB2040-25-TH | □ | | | 25 | 3 | 3.9 | 70 | 6 | 10 | 2.05 | 27.31 | 28.14 | 28.8 | 29.81 | 干渉なし |
| EPDB2040-30 | □ | EPDB2040-30-TH | □ | | | 30 | 3 | 3.9 | 75 | 6 | 10 | 1.74 | 32.49 | 33.4 | 34.2 | 干渉なし | 干渉なし |
| EPDB2040-35 | □ | EPDB2040-35-TH | □ | | | 35 | 3 | 3.9 | 80 | 6 | 10 | 1.51 | 37.66 | 38.65 | 39.9 | 干渉なし | 干渉なし |
| EPDB2040-40 | □ | EPDB2040-40-TH | □ | | | 40 | 3 | 3.9 | 80 | 6 | 10 | 1.34 | 42.82 | 43.87 | 干渉なし | 干渉なし | 干渉なし |
| EPDB2040-45 | □ | EPDB2040-45-TH | □ | | | 45 | 3 | 3.9 | 90 | 6 | 10 | 1.2 | 47.97 | 49.1 | 干渉なし | 干渉なし | 干渉なし |
| EPDB2040-50 | □ | EPDB2040-50-TH | □ | | | 50 | 3 | 3.9 | 100 | 6 | 10 | 1.09 | 53.11 | 54.55 | 干渉なし | 干渉なし | 干渉なし |
| EPDB2050-20 | □ | EPDB2050-20-TH | □ | 2.5 | 5 | 20 | 3.5 | 4.9 | 65 | 6 | 10 | 1.38 | 22.09 | 22.81 | 干渉なし | 干渉なし | 干渉なし |
| EPDB2050-25 | □ | EPDB2050-25-TH | □ | | | 25 | 3.5 | 4.9 | 70 | 6 | 10 | 1.12 | 27.29 | 28.11 | 干渉なし | 干渉なし | 干渉なし |
| EPDB2050-30 | □ | EPDB2050-30-TH | □ | | | 30 | 3.5 | 4.9 | 75 | 6 | 10 | 0.94 | 32.47 | 干渉なし | 干渉なし | 干渉なし | 干渉なし |
| EPDB2050-40 | □ | EPDB2050-40-TH | □ | | | 40 | 3.5 | 4.9 | 80 | 6 | 10 | 0.71 | 42.8 | 干渉なし | 干渉なし | 干渉なし | 干渉なし |
| EPDB2060-30 | □ | EPDB2060-30-TH | □ | 3 | 6 | 30 | 6 | 5.9 | 75 | 6 | 10 | 0 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし |
| EPDB2060-50 | □ | EPDB2060-50-TH | □ | | | 50 | 6 | 5.9 | 100 | 6 | 10 | 0 | 干渉なし | 干渉なし | 干渉なし | 干渉なし | 干渉なし |

THコーティング品を注文される場合は商品コードの末尾に-THをつけてください。
When you want to order TH Coating items from us, please add the suffix -TH at the end of the item code.

干渉なし：No interference

□印：特定代理店在庫です。弊社営業へお問合せください。
□：Stocked by specified distributor. Contact with our sales department.

### 対応被削材 Applicable work material

| コーティング Coating | 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|---|
| CS | ◎ | ◎ | ◎ | ○ | | ◎ | ◎ | ◎ | ◎ |
| TH | ○ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ |

# 標準切削条件表 Recommended cutting conditions

## EPDB EPDB-TH

※CSシリーズは被削材グループ1～4を推奨 For details about the CS series, refer to work groups 1 - 4.
THシリーズは被削材グループ4～6を推奨 For details about the TH series, refer to work groups 4 - 6.

| 推奨領域 Recommended range | | | | CSシリーズ | | | | | | THシリーズ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 被削材 Work material | | | | 1 銅 Coppers | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼入れ鋼 Hardened steels (45～55HRC) | | 6 焼入れ鋼 Hardened steels (55～65HRC) | |
| 切り込み比率 Ratio to standard depth of cut | | | | 120% | | 100% | | 90% | | 80% | | 65% | | 60% | |
| ボール半径RE Ball radius (mm) | 外径DC Tool dia. (mm) | 首下長LU Under neck length (mm) | ※基本切り込み Standard depth of cut (mm) | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 0.05 | 0.1 | 0.2 | 0.008 | 50,000 | 300 | 50,000 | 250 | 50,000 | 250 | 50,000 | 225 | 50,000 | 200 | 50,000 | 188 |
| | | 0.3 | 0.006 | 50,000 | 300 | 50,000 | 250 | 50,000 | 250 | 50,000 | 225 | 50,000 | 200 | 50,000 | 188 |
| | | 0.5 | 0.004 | 50,000 | 300 | 50,000 | 250 | 50,000 | 250 | 50,000 | 225 | 50,000 | 200 | 50,000 | 188 |
| 0.1 | 0.2 | 0.5 | 0.02 | 50,000 | 420 | 50,000 | 350 | 50,000 | 350 | 50,000 | 325 | 45,500 | 273 | 42,000 | 210 |
| | | 1 | 0.014 | 50,000 | 420 | 50,000 | 350 | 50,000 | 350 | 50,000 | 325 | 45,500 | 273 | 42,000 | 210 |
| | | 1.5 | 0.008 | 50,000 | 378 | 50,000 | 315 | 48,600 | 306 | 45,900 | 269 | 40,500 | 219 | 37,800 | 170 |
| | | 2 | 0.008 | 50,000 | 378 | 50,000 | 315 | 48,600 | 306 | 45,900 | 269 | 40,500 | 219 | 37,800 | 170 |
| | | 2.5 | 0.006 | 48,000 | 323 | 48,000 | 269 | 43,200 | 242 | 40,800 | 212 | 36,000 | 173 | 33,600 | 134 |
| | | 3 | 0.004 | 48,000 | 323 | 48,000 | 269 | 43,200 | 242 | 40,800 | 212 | 36,000 | 173 | 33,600 | 134 |
| 0.15 | 0.3 | 1 | 0.021 | 50,000 | 600 | 50,000 | 500 | 50,000 | 500 | 50,000 | 450 | 45,000 | 383 | 42,000 | 336 |
| | | 1.5 | 0.016 | 50,000 | 600 | 50,000 | 500 | 50,000 | 500 | 50,000 | 450 | 45,000 | 383 | 42,000 | 336 |
| | | 2 | 0.012 | 50,000 | 540 | 50,000 | 450 | 48,600 | 437 | 45,900 | 372 | 40,500 | 310 | 37,800 | 272 |
| | | 2.5 | 0.01 | 50,000 | 540 | 50,000 | 450 | 48,600 | 437 | 45,900 | 372 | 40,500 | 310 | 37,800 | 272 |
| | | 3 | 0.008 | 50,000 | 540 | 50,000 | 450 | 48,600 | 437 | 45,900 | 372 | 40,500 | 310 | 37,800 | 272 |
| 0.2 | 0.4 | 1 | 0.04 | 50,000 | 691 | 48,000 | 576 | 43,200 | 518 | 40,800 | 449 | 36,000 | 360 | 33,600 | 336 |
| | | 1.5 | 0.034 | 50,000 | 691 | 48,000 | 576 | 43,200 | 518 | 40,800 | 449 | 36,000 | 360 | 33,600 | 336 |
| | | 2 | 0.028 | 50,000 | 691 | 48,000 | 576 | 43,200 | 518 | 40,800 | 449 | 36,000 | 360 | 33,600 | 336 |
| | | 2.5 | 0.022 | 50,000 | 560 | 43,200 | 467 | 38,880 | 420 | 36,720 | 364 | 32,400 | 292 | 30,240 | 272 |
| | | 3 | 0.016 | 50,000 | 560 | 43,200 | 467 | 38,880 | 420 | 36,720 | 364 | 32,400 | 292 | 30,240 | 272 |
| | | 3.5 | 0.012 | 50,000 | 560 | 43,200 | 467 | 38,880 | 420 | 36,720 | 364 | 32,400 | 292 | 30,240 | 272 |
| | | 4 | 0.01 | 50,000 | 560 | 43,200 | 467 | 38,880 | 420 | 36,720 | 364 | 32,400 | 292 | 30,240 | 272 |
| | | 4.5 | 0.008 | 46,080 | 470 | 38,400 | 392 | 34,560 | 353 | 32,640 | 305 | 28,800 | 245 | 26,880 | 228 |
| 0.25 | 0.5 | 1 | 0.045 | 48,000 | 960 | 40,000 | 800 | 36,000 | 720 | 34,000 | 612 | 30,000 | 540 | 28,000 | 476 |
| | | 2 | 0.035 | 48,000 | 960 | 40,000 | 800 | 36,000 | 720 | 34,000 | 612 | 30,000 | 540 | 28,000 | 476 |
| | | 3 | 0.03 | 43,200 | 778 | 36,000 | 648 | 32,400 | 583 | 30,600 | 496 | 27,000 | 437 | 25,200 | 386 |
| | | 4 | 0.02 | 43,200 | 778 | 36,000 | 648 | 32,400 | 583 | 30,600 | 496 | 27,000 | 437 | 25,200 | 386 |
| | | 5 | 0.018 | 43,200 | 778 | 36,000 | 648 | 32,400 | 583 | 30,600 | 496 | 27,000 | 437 | 25,200 | 386 |
| | | 5.5 | 0.015 | 38,400 | 653 | 32,000 | 544 | 28,800 | 490 | 27,200 | 416 | 24,000 | 367 | 22,400 | 324 |
| | | 6 | 0.013 | 38,400 | 653 | 32,000 | 544 | 28,800 | 490 | 27,200 | 416 | 24,000 | 367 | 22,400 | 324 |
| | | 8 | 0.008 | 38,400 | 653 | 32,000 | 544 | 28,800 | 490 | 27,200 | 416 | 24,000 | 367 | 22,400 | 324 |
| 0.3 | 0.6 | 1 | 0.05 | 48,000 | 1,440 | 40,000 | 1,200 | 36,000 | 1,080 | 34,000 | 884 | 30,000 | 720 | 28,000 | 560 |
| | | 2 | 0.042 | 48,000 | 1,440 | 40,000 | 1,200 | 36,000 | 1,080 | 34,000 | 884 | 30,000 | 720 | 28,000 | 560 |
| | | 3 | 0.034 | 48,000 | 1,440 | 40,000 | 1,200 | 36,000 | 1,080 | 34,000 | 884 | 30,000 | 720 | 28,000 | 560 |
| | | 4 | 0.024 | 43,200 | 1,231 | 36,000 | 1,026 | 32,400 | 923 | 30,600 | 756 | 27,000 | 616 | 25,200 | 479 |
| | | 5 | 0.02 | 43,200 | 1,166 | 36,000 | 972 | 32,400 | 875 | 30,600 | 716 | 27,000 | 583 | 25,200 | 454 |
| | | 6 | 0.015 | 43,200 | 1,166 | 36,000 | 972 | 32,400 | 875 | 30,600 | 716 | 27,000 | 583 | 25,200 | 454 |
| | | 7 | 0.015 | 38,400 | 979 | 32,000 | 816 | 28,800 | 734 | 27,200 | 601 | 24,000 | 490 | 22,400 | 381 |
| | | 8 | 0.015 | 38,400 | 979 | 32,000 | 816 | 28,800 | 734 | 27,200 | 601 | 24,000 | 490 | 22,400 | 381 |
| | | 9 | 0.012 | 38,400 | 979 | 32,000 | 816 | 28,800 | 734 | 27,200 | 601 | 24,000 | 490 | 22,400 | 381 |
| | | 10 | 0.009 | 33,600 | 857 | 28,000 | 714 | 25,200 | 643 | 23,800 | 526 | 21,000 | 428 | 19,600 | 333 |
| | | 12 | 0.007 | 28,800 | 691 | 24,000 | 576 | 21,600 | 518 | 20,400 | 424 | 18,000 | 346 | 16,800 | 269 |
| 0.4 | 0.8 | 2 | 0.08 | 48,000 | 1,728 | 40,000 | 1,440 | 36,000 | 1,296 | 34,000 | 1,088 | 30,000 | 900 | 28,000 | 784 |
| | | 4 | 0.056 | 48,000 | 1,728 | 40,000 | 1,440 | 36,000 | 1,296 | 34,000 | 1,088 | 30,000 | 900 | 28,000 | 784 |
| | | 5 | 0.045 | 43,200 | 1,400 | 36,000 | 1,166 | 32,400 | 1,050 | 30,600 | 881 | 27,000 | 729 | 25,200 | 635 |
| | | 6 | 0.032 | 43,200 | 1,400 | 36,000 | 1,166 | 32,400 | 1,050 | 30,600 | 881 | 27,000 | 729 | 25,200 | 635 |
| | | 8 | 0.02 | 38,400 | 1,244 | 32,000 | 1,037 | 28,800 | 933 | 27,200 | 783 | 24,000 | 648 | 22,400 | 564 |
| | | 10 | 0.02 | 38,400 | 1,175 | 32,000 | 979 | 28,800 | 881 | 27,200 | 740 | 24,000 | 612 | 22,400 | 533 |
| 0.5 | 1 | 2 | 0.1 | 43,200 | 2,160 | 36,000 | 1,800 | 32,400 | 1,620 | 30,600 | 1,377 | 27,000 | 1,134 | 25,200 | 1,008 |
| | | 3 | 0.1 | 43,200 | 2,160 | 36,000 | 1,800 | 32,400 | 1,620 | 30,600 | 1,377 | 27,000 | 1,134 | 25,200 | 1,008 |
| | | 4 | 0.07 | 43,200 | 2,160 | 36,000 | 1,800 | 32,400 | 1,620 | 30,600 | 1,377 | 27,000 | 1,134 | 25,200 | 1,008 |
| | | 5 | 0.06 | 43,200 | 2,160 | 36,000 | 1,800 | 32,400 | 1,620 | 30,600 | 1,377 | 27,000 | 1,134 | 25,200 | 1,008 |
| | | 6 | 0.04 | 38,880 | 1,750 | 32,400 | 1,458 | 29,160 | 1,312 | 27,540 | 1,115 | 24,300 | 919 | 22,680 | 816 |
| | | 7 | 0.04 | 38,880 | 1,750 | 32,400 | 1,458 | 29,160 | 1,312 | 27,540 | 1,115 | 24,300 | 919 | 22,680 | 816 |
| | | 8 | 0.04 | 38,880 | 1,750 | 32,400 | 1,458 | 29,160 | 1,312 | 27,540 | 1,115 | 24,300 | 919 | 22,680 | 816 |
| | | 9 | 0.03 | 38,880 | 1,750 | 32,400 | 1,458 | 29,160 | 1,312 | 27,540 | 1,115 | 24,300 | 919 | 22,680 | 816 |
| | | 10 | 0.025 | 38,880 | 1,750 | 32,400 | 1,458 | 29,160 | 1,312 | 27,540 | 1,115 | 24,300 | 919 | 22,680 | 816 |
| | | 12 | 0.025 | 34,560 | 1,469 | 28,800 | 1,224 | 25,920 | 1,102 | 24,480 | 936 | 21,600 | 771 | 20,160 | 685 |
| | | 14 | 0.02 | 34,560 | 1,469 | 28,800 | 1,224 | 25,920 | 1,102 | 24,480 | 936 | 21,600 | 771 | 20,160 | 685 |
| | | 16 | 0.015 | 34,560 | 1,469 | 28,800 | 1,224 | 25,920 | 1,102 | 24,480 | 936 | 21,600 | 771 | 20,160 | 685 |
| | | 18 | 0.012 | 30,240 | 1,210 | 25,200 | 1,008 | 22,680 | 907 | 21,420 | 771 | 18,900 | 635 | 17,640 | 564 |
| | | 20 | 0.01 | 25,920 | 1,037 | 21,600 | 864 | 19,440 | 778 | 18,360 | 661 | 16,200 | 544 | 15,120 | 484 |
| 0.6 | 1.2 | 8 | 0.04 | 34,560 | 1,797 | 28,800 | 1,498 | 25,920 | 1,348 | 24,480 | 1,224 | 21,600 | 950 | 20,160 | 806 |
| | | 12 | 0.03 | 34,560 | 1,617 | 28,800 | 1,348 | 25,920 | 1,213 | 24,480 | 1,102 | 21,600 | 855 | 20,160 | 726 |
| 0.7 | 1.4 | 8 | 0.055 | 30,240 | 1,814 | 25,200 | 1,512 | 22,680 | 1,361 | 21,420 | 1,157 | 18,900 | 983 | 17,640 | 882 |
| | | 12 | 0.035 | 30,240 | 1,633 | 25,200 | 1,361 | 22,680 | 1,225 | 21,420 | 1,041 | 18,900 | 885 | 17,640 | 794 |
| | | 16 | 0.035 | 26,880 | 1,371 | 22,400 | 1,142 | 20,160 | 1,028 | 19,040 | 874 | 16,800 | 743 | 15,680 | 666 |
| 0.75 | 1.5 | 4 | 0.1 | 33,600 | 2,218 | 28,000 | 1,848 | 25,200 | 1,663 | 23,800 | 1,428 | 21,000 | 1,134 | 19,600 | 980 |
| | | 6 | 0.1 | 33,600 | 2,218 | 28,000 | 1,848 | 25,200 | 1,663 | 23,800 | 1,428 | 21,000 | 1,134 | 19,600 | 980 |
| | | 8 | 0.06 | 30,240 | 1,796 | 25,200 | 1,497 | 22,680 | 1,347 | 21,420 | 1,157 | 18,900 | 919 | 17,640 | 794 |
| | | 10 | 0.06 | 30,240 | 1,796 | 25,200 | 1,497 | 22,680 | 1,347 | 21,420 | 1,157 | 18,900 | 919 | 17,640 | 794 |
| | | 12 | 0.06 | 30,240 | 1,796 | 25,200 | 1,497 | 22,680 | 1,347 | 21,420 | 1,157 | 18,900 | 919 | 17,640 | 794 |
| | | 16 | 0.038 | 26,880 | 1,508 | 22,400 | 1,257 | 20,160 | 1,131 | 19,040 | 971 | 16,800 | 771 | 15,680 | 666 |
| | | 20 | 0.038 | 26,880 | 1,508 | 22,400 | 1,257 | 20,160 | 1,131 | 19,040 | 971 | 16,800 | 771 | 15,680 | 666 |

【注意】ご使用にあたっては、A408ページの表下の項目と注意を参照してください。 【Note】Upon usage, please refer to comments and notes below table on page A408.

# Epoch Deep Ball
# エポックディープボール

## EPDB　EPDB-TH

※CSシリーズは被削材グループ1～4を推奨　For details about the CS series, refer to work groups 1 - 4.
THシリーズは被削材グループ4～6を推奨　For details about the TH series, refer to work groups 4 - 6.

| 推奨領域 Recommended range | | | | CSシリーズ | | | | | | | | THシリーズ | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 被削材 Work material | | | | 1 銅 Coppers | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼入れ鋼 Hardened steels (45～55HRC) | | 6 焼入れ鋼 Hardened steels (55～65HRC) | |
| 切り込み比率 Ratio to standard depth of cut | | | | 120% | | 100% | | 90% | | 80% | | 65% | | 60% | |
| ボール半径RE Ball radius (mm) | 外径DC Tool dia. (mm) | 首下長LU Under neck length (mm) | ※基本切り込み Standard depth of cut (mm) | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min | 回転数 n min-1 | 送り速度 Vf mm/min |
| 0.8 | 1.6 | 8 | 0.11 | 31,200 | 2,184 | 26,000 | 1,820 | 23,400 | 1,638 | 22,100 | 1,370 | 19,500 | 1,170 | 18,200 | 1,019 |
| | | 12 | 0.065 | 28,080 | 1,769 | 23,400 | 1,474 | 21,060 | 1,327 | 19,890 | 1,110 | 17,550 | 948 | 16,380 | 826 |
| | | 16 | 0.04 | 28,080 | 1,769 | 23,400 | 1,474 | 21,060 | 1,327 | 19,890 | 1,110 | 17,550 | 948 | 16,380 | 826 |
| | | 20 | 0.04 | 24,960 | 1,485 | 20,800 | 1,238 | 18,720 | 1,114 | 17,680 | 932 | 15,600 | 796 | 14,560 | 693 |
| 0.9 | 1.8 | 8 | 0.13 | 31,200 | 2,496 | 26,000 | 2,080 | 23,400 | 1,872 | 22,100 | 1,547 | 19,500 | 1,287 | 18,200 | 1,092 |
| | | 12 | 0.07 | 28,080 | 2,022 | 23,400 | 1,685 | 21,060 | 1,516 | 19,890 | 1,253 | 17,550 | 1,042 | 16,380 | 885 |
| | | 16 | 0.045 | 28,080 | 2,022 | 23,400 | 1,685 | 21,060 | 1,516 | 19,890 | 1,253 | 17,550 | 1,042 | 16,380 | 885 |
| | | 20 | 0.045 | 24,960 | 1,697 | 20,800 | 1,414 | 18,720 | 1,273 | 17,680 | 1,052 | 15,600 | 875 | 14,560 | 743 |
| 1 | 2 | 3 | 0.2 | 25,200 | 2,520 | 21,000 | 2,100 | 18,900 | 1,890 | 17,850 | 1,607 | 15,750 | 1,355 | 14,700 | 1,176 |
| | | 4 | 0.2 | 25,200 | 2,520 | 21,000 | 2,100 | 18,900 | 1,890 | 17,850 | 1,607 | 15,750 | 1,355 | 14,700 | 1,176 |
| | | 6 | 0.2 | 25,200 | 2,268 | 21,000 | 1,890 | 18,900 | 1,701 | 17,850 | 1,428 | 15,750 | 1,197 | 14,700 | 1,058 |
| | | 8 | 0.14 | 25,200 | 2,268 | 21,000 | 1,890 | 18,900 | 1,701 | 17,850 | 1,428 | 15,750 | 1,197 | 14,700 | 1,058 |
| | | 10 | 0.14 | 25,200 | 2,016 | 21,000 | 1,680 | 18,900 | 1,512 | 17,850 | 1,285 | 15,750 | 1,071 | 14,700 | 941 |
| | | 12 | 0.08 | 22,680 | 1,814 | 18,900 | 1,512 | 17,010 | 1,361 | 16,065 | 1,157 | 14,175 | 964 | 13,230 | 847 |
| | | 14 | 0.08 | 22,680 | 1,814 | 18,900 | 1,512 | 17,010 | 1,361 | 16,065 | 1,157 | 14,175 | 964 | 13,230 | 847 |
| | | 16 | 0.08 | 22,680 | 1,633 | 18,900 | 1,361 | 17,010 | 1,225 | 16,065 | 1,041 | 14,175 | 868 | 13,230 | 762 |
| | | 18 | 0.06 | 22,680 | 1,633 | 18,900 | 1,361 | 17,010 | 1,225 | 16,065 | 1,041 | 14,175 | 868 | 13,230 | 762 |
| | | 20 | 0.05 | 22,680 | 1,633 | 18,900 | 1,361 | 17,010 | 1,225 | 16,065 | 1,041 | 14,175 | 868 | 13,230 | 762 |
| | | 22 | 0.05 | 21,420 | 1,457 | 17,850 | 1,214 | 16,065 | 1,092 | 15,173 | 929 | 13,388 | 774 | 12,495 | 680 |
| | | 25 | 0.05 | 20,160 | 1,371 | 16,800 | 1,142 | 15,120 | 1,028 | 14,280 | 874 | 12,600 | 728 | 11,760 | 640 |
| | | 30 | 0.03 | 20,160 | 1,371 | 16,800 | 1,142 | 15,120 | 1,028 | 14,280 | 874 | 12,600 | 728 | 11,760 | 640 |
| | | 35 | 0.025 | 17,640 | 1,129 | 14,700 | 941 | 13,230 | 847 | 12,495 | 720 | 11,025 | 600 | 10,290 | 527 |
| | | 40 | 0.022 | 15,120 | 968 | 12,600 | 806 | 11,340 | 726 | 10,710 | 617 | 9,450 | 514 | 8,820 | 452 |
| 1.5 | 3 | 8 | 0.3 | 19,200 | 2,880 | 16,000 | 2,400 | 14,400 | 2,160 | 13,600 | 1,822 | 12,000 | 1,512 | 11,200 | 1,344 |
| | | 10 | 0.21 | 19,200 | 2,880 | 16,000 | 2,400 | 14,400 | 2,160 | 13,600 | 1,822 | 12,000 | 1,512 | 11,200 | 1,344 |
| | | 13 | 0.21 | 19,200 | 2,880 | 16,000 | 2,400 | 14,400 | 2,160 | 13,600 | 1,822 | 12,000 | 1,512 | 11,200 | 1,344 |
| | | 16 | 0.21 | 19,200 | 2,592 | 16,000 | 2,160 | 14,400 | 1,944 | 13,600 | 1,640 | 12,000 | 1,361 | 11,200 | 1,210 |
| | | 20 | 0.12 | 17,280 | 2,333 | 14,400 | 1,944 | 12,960 | 1,750 | 12,240 | 1,476 | 10,800 | 1,225 | 10,080 | 1,089 |
| | | 25 | 0.08 | 17,280 | 2,333 | 14,400 | 1,944 | 12,960 | 1,750 | 12,240 | 1,476 | 10,800 | 1,225 | 10,080 | 1,089 |
| | | 30 | 0.08 | 17,280 | 2,333 | 14,400 | 1,944 | 12,960 | 1,750 | 12,240 | 1,476 | 10,800 | 1,225 | 10,080 | 1,089 |
| | | 35 | 0.08 | 15,360 | 1,958 | 12,800 | 1,632 | 11,520 | 1,469 | 10,880 | 1,239 | 9,600 | 1,028 | 8,960 | 914 |
| 2 | 4 | 10 | 0.4 | 13,800 | 2,760 | 11,500 | 2,300 | 10,350 | 2,070 | 9,775 | 1,760 | 8,625 | 1,466 | 8,050 | 1,288 |
| | | 13 | 0.32 | 13,800 | 2,760 | 11,500 | 2,300 | 10,350 | 2,070 | 9,775 | 1,760 | 8,625 | 1,466 | 8,050 | 1,288 |
| | | 16 | 0.28 | 13,800 | 2,760 | 11,500 | 2,300 | 10,350 | 2,070 | 9,775 | 1,760 | 8,625 | 1,466 | 8,050 | 1,288 |
| | | 20 | 0.28 | 13,800 | 2,760 | 11,500 | 2,300 | 10,350 | 2,070 | 9,775 | 1,760 | 8,625 | 1,466 | 8,050 | 1,288 |
| | | 25 | 0.16 | 12,420 | 2,236 | 10,350 | 1,863 | 9,315 | 1,677 | 8,798 | 1,425 | 7,763 | 1,188 | 7,245 | 1,043 |
| | | 30 | 0.16 | 12,420 | 2,236 | 10,350 | 1,863 | 9,315 | 1,677 | 8,798 | 1,425 | 7,763 | 1,188 | 7,245 | 1,043 |
| | | 35 | 0.1 | 12,420 | 2,236 | 10,350 | 1,863 | 9,315 | 1,677 | 8,798 | 1,425 | 7,763 | 1,188 | 7,245 | 1,043 |
| | | 40 | 0.1 | 12,420 | 2,236 | 10,350 | 1,863 | 9,315 | 1,677 | 8,798 | 1,425 | 7,763 | 1,188 | 7,245 | 1,043 |
| | | 45 | 0.1 | 11,040 | 1,877 | 9,200 | 1,564 | 8,280 | 1,408 | 7,820 | 1,196 | 6,900 | 997 | 6,440 | 876 |
| | | 50 | 0.1 | 11,040 | 1,877 | 9,200 | 1,564 | 8,280 | 1,408 | 7,820 | 1,196 | 6,900 | 997 | 6,440 | 876 |
| 2.5 | 5 | 20 | 0.35 | 10,800 | 2,592 | 9,000 | 2,160 | 8,100 | 1,944 | 7,650 | 1,530 | 6,750 | 1,350 | 6,300 | 1,134 |
| | | 25 | 0.35 | 10,800 | 2,592 | 9,000 | 2,160 | 8,100 | 1,944 | 7,650 | 1,530 | 6,750 | 1,350 | 6,300 | 1,134 |
| | | 30 | 0.2 | 9,720 | 2,333 | 8,100 | 1,944 | 7,290 | 1,750 | 6,885 | 1,377 | 6,075 | 1,215 | 5,670 | 1,021 |
| | | 40 | 0.2 | 9,720 | 2,100 | 8,100 | 1,750 | 7,290 | 1,575 | 6,885 | 1,239 | 6,075 | 1,094 | 5,670 | 919 |
| 3 | 6 | 30 | 0.42 | 9,600 | 2,304 | 8,000 | 1,920 | 7,200 | 1,728 | 6,800 | 1,360 | 6,000 | 1,200 | 5,600 | 1,008 |
| | | 50 | 0.15 | 8,640 | 1,866 | 7,200 | 1,555 | 6,480 | 1,400 | 6,120 | 1,102 | 5,400 | 972 | 5,040 | 816 |

※(1) 基本切込みは被削材グループ2での目安を示しています。その他のグループの場合は、上表の切込み比率を目安に調整して下さい。
※(2) リブ加工や止まり溝など、切りくずがつまりやすい切削の場合、切込み設定は基本切込みに切込み比率をかけて算出した切込み量を、さらにその80%まで小さくして使用してください。

※(1) Standard cutting depth is shown as the criteria for Group 2 workpieces. For other groups, adjust the cutting depth according to the cutting depth factors in the above table.
※(2) When performing cutting where cutting chips may cause clogging, such as for rib cutting, blind grooves, etc., cutting depth setting should be set by multiplying a cutting depth factor to calculate the cutting depth amount, and this amount should then be reduced to 80% of the calculated value.

【切込み設定例】 EPDB2020-10-THの工具で焼き入れ鋼(50HRC)をリブ溝等高線切削する場合、
切込み=0.14(基本切込み)×0.65(焼き入れ鋼グループ5の切込み比率)×0.8(閉鎖域の切削)=0.073

Cutting depth setting example: When cutting rib groove contours in quenched steel (50HRC) using an EPDB2020-10-TH tool:
Cutting depth = 0.14 (standard cutting depth) × 0.65 (cutting depth factor for Group 5 quenched steel) × 0.8 (for closed-area cutting) = 0.073mm

【注意】 ①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

【Note】 ① Use the appropriate coolant for the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
③ If the rpm of the machine is low, lower the feed rate also to put the rpm and feed rate in the same ratio.

# Epoch CS Power Ball
# エポック CS パワーボール

彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical / 中仕上 Semi Finishing / 仕上 Finishing

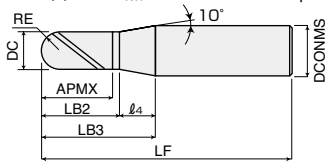
RE公差 RE tolerance
RE0.5～RE6 ：±0.005
RE8～RE10 ：±0.01

h5

(mm)

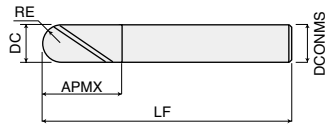
※首ぬすみ無し Without neck escape

Aタイプ A type




2枚刃 2Flutes

Bタイプ B type




## EPBC2○○○(-○)

超硬 Carbide / CS / ねじれ30° Helix angle / 切削条件表 A410 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 刃長 Flute length APMX | 首下長 Under neck length LB2 | LB3 | 首テーパ長 Neck taper length ℓ4 | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 形状 Shape |
|---|---|---|---|---|---|---|---|---|---|---|
| EPBC2010 | □ | 0.5 | 1 | 2.5 | 3.5 | 12 | 8.5 | 50 | 4 | A |
| EPBC2015 | □ | 0.75 | 1.5 | 4 | 5 | 12.1 | 7.1 | 50 | 4 | A |
| EPBC2020 | □ | 1 | 2 | 5 | 6 | 17.3 | 11.3 | 50 | 6 | A |
| EPBC2025 | □ | 1.25 | 2.5 | 7 | 8 | 17.9 | 9.9 | 50 | 6 | A |
| EPBC2030 | □ | 1.5 | 3 | 8 | 9 | 17.5 | 8.5 | 70 | 6 | A |
| EPBC2040-4 | □ | 2 | 4 | 8 | – | – | – | 70 | 4 | B |
| EPBC2040 | □ | | | 8 | 9 | 14.7 | 5.7 | 70 | 6 | A |
| EPBC2050 | □ | 2.5 | 5 | 10 | 11 | 13.8 | 2.8 | 80 | 6 | A |
| EPBC2060 | □ | 3 | 6 | 12 | – | – | – | 90 | 6 | B |
| EPBC2080 | □ | 4 | 8 | 14 | – | – | – | 100 | 8 | B |
| EPBC2100 | □ | 5 | 10 | 18 | – | – | – | 100 | 10 | B |
| EPBC2120 | □ | 6 | 12 | 22 | – | – | – | 110 | 12 | B |
| EPBC2160 | □ | 8 | 16 | 30 | – | – | – | 140 | 16 | B |
| EPBC2200 | □ | 10 | 20 | 38 | – | – | – | 160 | 20 | B |

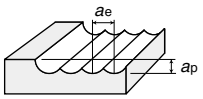
### ○ 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ○ | | ◎ | ◎ | ◎ | ◎ |

□印：特定代理店在庫です。弊社営業へお問合せください。 □：Stocked by specified distributor. Contact with our sales department.

# Epoch CS Power Ball
# エポック CS パワーボール

## 標準切削条件表 Recommended cutting conditions EPBC




### <荒加工> Roughing

| 被削材 Work material | 鋳　鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400,S50C | | 合金鋼 Alloy steels (200～250HB) SCM440,SNCM | | 工具鋼 Tool steels (25～35HRC) SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) CENA1,NAK80 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 条件域 Cutting range | 高速条件 High speed | 汎用条件 General | 高速条件 High speed | 汎用条件 General | 高速条件 High speed | 汎用条件 General | 高速条件 High speed | 汎用条件 General | 高速条件 High speed | 汎用条件 General |
| 切込み Depth of cut (mm) | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | |

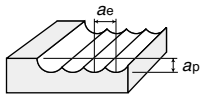
| ボール半径RE ×外径DC Tool dia.(mm) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RE0.5×1 | 50,000 | 1,600 | 20,000 | 640 | 50,000 | 1,800 | 20,000 | 720 | 50,000 | 1,800 | 20,000 | 720 | 50,000 | 1,800 | 20,000 | 720 | 50,000 | 1,600 | 20,000 | 640 |
| RE1×2 | 41,000 | 2,380 | 20,000 | 1,160 | 48,000 | 3,170 | 20,000 | 1,320 | 48,000 | 3,170 | 20,000 | 1,320 | 41,000 | 2,710 | 20,000 | 1,320 | 37,000 | 2,150 | 20,000 | 1,160 |
| RE1.5×3 | 28,000 | 2,520 | 16,000 | 1,440 | 32,000 | 3,260 | 20,000 | 2,040 | 32,000 | 3,260 | 20,000 | 2,040 | 28,000 | 2,860 | 16,000 | 1,630 | 24,000 | 2,160 | 14,000 | 1,260 |
| RE2×4 | 21,000 | 2,560 | 12,000 | 1,460 | 24,000 | 3,360 | 16,000 | 2,240 | 24,000 | 3,360 | 16,000 | 2,240 | 21,000 | 2,940 | 12,000 | 1,680 | 18,000 | 2,200 | 10,400 | 1,270 |
| RE3×6 | 14,000 | 2,580 | 8,000 | 1,470 | 16,000 | 3,360 | 11,000 | 2,310 | 16,000 | 3,360 | 11,000 | 2,310 | 14,000 | 2,940 | 8,000 | 1,680 | 12,000 | 2,210 | 6,900 | 1,270 |
| RE4×8 | 10,000 | 2,600 | 6,000 | 1,510 | 12,000 | 3,600 | 8,000 | 2,400 | 12,000 | 3,600 | 8,000 | 2,400 | 10,000 | 3,000 | 6,000 | 1,800 | 9,200 | 2,320 | 5,200 | 1,310 |
| RE5×10 | 8,300 | 2,590 | 4,800 | 1,500 | 9,600 | 3,460 | 6,400 | 2,300 | 9,600 | 3,460 | 6,400 | 2,300 | 8,300 | 2,990 | 4,800 | 1,730 | 7,300 | 2,280 | 4,100 | 1,280 |
| RE6×12 | 6,900 | 2,320 | 4,000 | 1,340 | 8,000 | 3,100 | 5,300 | 2,060 | 8,000 | 3,100 | 5,300 | 2,060 | 6,900 | 2,680 | 4,000 | 1,550 | 6,100 | 2,050 | 3,500 | 1,180 |
| RE8×16 | 5,200 | 1,980 | 3,000 | 1,140 | 6,000 | 2,580 | 4,000 | 1,720 | 6,000 | 2,580 | 4,000 | 1,720 | 5,200 | 2,240 | 3,000 | 1,290 | 4,600 | 1,750 | 2,600 | 990 |
| RE10×20 | 4,100 | 1,560 | 2,400 | 910 | 4,800 | 2,060 | 3,200 | 1,380 | 4,800 | 2,080 | 3,200 | 1,380 | 4,100 | 1,760 | 2,400 | 1,030 | 3,700 | 1,410 | 2,100 | 800 |

【注意】①できるだけ高剛性、高精度の機械をご使用ください。
②被削材、加工形状に合わせて、適切なクーラントを使用してください。
③この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。

【Note】① Use a highly rigid and accurate machine as possible.
② Use the appropriate coolant for the work material and machining shape.
③ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

### <仕上げ加工> Finishing

ap:仕上げ代 Finishing cut amount
ae:ピックフィード Pick feed




| 被削材 Work material | 鋳　鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400,S50C | | 合金鋼 Alloy steels (200～250HB) SCM440,SNCM | | 工具鋼 Tool steels (25～35HRC) SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) CENA1,NAK80 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 条件域 Cutting range | 高速条件 High speed | 汎用条件 General | 高速条件 High speed | 汎用条件 General | 高速条件 High speed | 汎用条件 General | 高速条件 High speed | 汎用条件 General | 高速条件 High speed | 汎用条件 General |
| 切込み Depth of cut (mm) | ap=0.05～0.2 ae=0.03DC | | ap=0.05～0.2 ae=0.03DC | | ap=0.05～0.2 ae=0.03DC | | ap=0.05～0.1 ae=0.02DC | | ap=0.05～0.1 ae=0.02DC | |

| ボール半径RE ×外径DC Tool dia.(mm) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RE0.5×1 | 50,000 | 5,500 | 20,000 | 2,200 | 50,000 | 5,500 | 20,000 | 2,200 | 50,000 | 5,500 | 20,000 | 2,200 | 50,000 | 5,000 | 20,000 | 2,000 | 50,000 | 5,000 | 20,000 | 2,000 |
| RE1×2 | 48,000 | 6,340 | 20,000 | 2,640 | 48,000 | 6,340 | 20,000 | 2,640 | 48,000 | 6,340 | 20,000 | 2,640 | 48,000 | 5,760 | 20,000 | 2,400 | 48,000 | 5,760 | 20,000 | 2,400 |
| RE1.5×3 | 32,000 | 4,930 | 20,000 | 3,080 | 32,000 | 4,930 | 20,000 | 3,080 | 32,000 | 4,930 | 20,000 | 3,080 | 32,000 | 4,480 | 17,000 | 2,380 | 32,000 | 4,480 | 17,000 | 2,380 |
| RE2×4 | 24,000 | 4,510 | 15,900 | 2,990 | 24,000 | 4,510 | 15,900 | 2,990 | 24,000 | 4,510 | 16,000 | 3,010 | 24,000 | 4,080 | 13,000 | 2,210 | 24,000 | 4,080 | 13,000 | 2,210 |
| RE3×6 | 16,000 | 3,870 | 10,600 | 2,570 | 16,000 | 3,870 | 10,600 | 2,570 | 16,000 | 3,870 | 10,600 | 2,570 | 16,000 | 3,520 | 8,500 | 1,870 | 16,000 | 3,520 | 8,500 | 1,870 |
| RE4×8 | 12,000 | 3,170 | 8,000 | 2,110 | 12,000 | 3,360 | 8,000 | 2,240 | 12,000 | 3,360 | 8,000 | 2,240 | 12,000 | 2,880 | 6,400 | 1,540 | 12,000 | 2,880 | 6,400 | 1,540 |
| RE5×10 | 9,600 | 2,750 | 6,400 | 1,830 | 9,600 | 2,980 | 6,400 | 1,980 | 9,600 | 2,980 | 6,400 | 1,980 | 10,000 | 2,600 | 5,100 | 1,330 | 10,000 | 2,600 | 5,100 | 1,330 |
| RE6×12 | 8,000 | 2,380 | 5,300 | 1,580 | 8,000 | 2,720 | 5,300 | 1,800 | 8,000 | 2,720 | 5,300 | 1,800 | 8,000 | 2,160 | 4,200 | 1,130 | 8,000 | 2,160 | 4,200 | 1,130 |
| RE8×16 | 6,000 | 1,870 | 4,000 | 1,250 | 6,000 | 2,100 | 4,000 | 1,400 | 6,000 | 2,100 | 4,000 | 1,400 | 6,000 | 1,680 | 3,200 | 900 | 6,000 | 1,680 | 3,200 | 900 |
| RE10×20 | 4,800 | 1,500 | 3,200 | 1,000 | 4,800 | 1,680 | 3,200 | 1,120 | 4,800 | 1,680 | 3,200 | 1,120 | 4,800 | 1,340 | 2,500 | 700 | 4,800 | 1,340 | 2,500 | 700 |

【注意】①できるだけ高剛性、高精度の機械をご使用ください。
②上表のae(ピックフィード)は目安です。実際にはA131頁のカスプハイトを参考に選定してくだい。
③被削材、加工形状に合わせて、適切なクーラントを使用してください。
④この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
⑤機械の回転数が足りない場合には、回転数と送り速度を同じ比率で下げてください。

【Note】① Use a highly rigid and accurate machine as possible.
② The pick feed in the table is a general condition; please select the $a_e$ according to the cusp height requested (page A131).
③ Use the appropriate coolant for the work material and machining shape.
④ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
⑤ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

# Epoch Ball End Mill
# エポックボールエンドミル



## 2枚刃・レギュラー刃長　2 Flutes, Regular

彫込み Die-sinking　曲面 Profiling　R Radius　ヘリカル Helical　中仕上 Semi Finishing　仕上 Finishing

RE公差 RE tolerance　±0.01　h6

(mm)

2枚刃 2Flutes

## CEPB2○○○

超硬 Carbide　C　ねじれ30° Helix angle　切削条件表 A412 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius | 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|---|
| CEPB2010 | □ | 0.5 | 1 | 1.5 | 50 | 4 |
| CEPB2015 | □ | 0.75 | 1.5 | 2.5 | 50 | 4 |
| CEPB2020 | □ | 1 | 2 | 3 | 50 | 6 |
| CEPB2025 | □ | 1.25 | 2.5 | 4 | 50 | 6 |
| CEPB2030 | □ | 1.5 | 3 | 4.5 | 70 | 6 |
| CEPB2040 | □ | 2 | 4 | 6 | 70 | 6 |
| CEPB2050 | □ | 2.5 | 5 | 7.5 | 80 | 6 |
| CEPB2060 | □ | 3 | 6 | 9 | 90 | 6 |
| CEPB2070 | □ | 3.5 | 7 | 11 | 90 | 6 |
| CEPB2080 | □ | 4 | 8 | 12 | 100 | 8 |
| CEPB2100 | □ | 5 | 10 | 15 | 100 | 10 |
| CEPB2120 | □ | 6 | 12 | 18 | 110 | 12 |
| CEPB2160 | □ | 8 | 16 | 24 | 140 | 16 |
| CEPB2200 | □ | 10 | 20 | 30 | 160 | 20 |
| CEPB2250 | □ | 12.5 | 25 | 38 | 180 | 25 |

## 2枚刃・ロングシャンク　2 Flutes, Long Shank

彫込み Die-sinking　曲面 Profiling　R Radius　ヘリカル Helical　取りのこし Rest Material Machining　玉プチ Corner Recessing　仕上 Finishing

RE公差 RE tolerance　RE0.5～RE6 ：±0.015
RE8～RE12.5：±0.02　h6

(mm)

2枚刃ロングシャンクボールエンドミル。2-flute long-shank ball end mill

2枚刃 2Flutes

## CEPBLS2○○○

超硬 Carbide　C　ねじれ30° Helix angle　切削条件表 A413 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius | 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|---|
| CEPBLS2010 | □ | 0.5 | 1 | 1.5 | 80 | 4 |
| CEPBLS2015 | □ | 0.75 | 1.5 | 2.5 | 80 | 4 |
| CEPBLS2020 | □ | 1 | 2 | 3 | 90 | 6 |
| CEPBLS2025 | □ | 1.25 | 2.5 | 4 | 90 | 6 |
| CEPBLS2030 | □ | 1.5 | 3 | 4.5 | 100 | 6 |
| CEPBLS2040 | □ | 2 | 4 | 6 | 100 | 6 |
| CEPBLS2050 | □ | 2.5 | 5 | 7.5 | 125 | 6 |
| CEPBLS2060 | □ | 3 | 6 | 9 | 150 | 6 |
| CEPBLS2070 | □ | 3.5 | 7 | 11 | 150 | 6 |
| CEPBLS2080 | □ | 4 | 8 | 12 | 180 | 8 |
| CEPBLS2100 | □ | 5 | 10 | 15 | 200 | 10 |
| CEPBLS2120 | □ | 6 | 12 | 18 | 220 | 12 |
| CEPBLS2160 | □ | 8 | 16 | 24 | 250 | 16 |
| CEPBLS2200 | □ | 10 | 20 | 30 | 280 | 20 |
| CEPBLS2250 | □ | 12.5 | 25 | 38 | 300 | 25 |

## 4枚刃・レギュラー刃長　4 Flutes, Regular

曲面 Profiling　R Radius　ヘリカル Helical　中仕上 Semi Finishing　仕上 Finishing

RE公差 RE tolerance　±0.02　h6

(mm)

4枚刃 4Flutes

## CEPB4○○○

超硬 Carbide　C　ねじれ30° Helix angle　切削条件表 A414 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius | 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|
| CEPB4060 | | 3 | 6 | 9 | 90 | 6 | — |
| CEPB4080 | △ | 4 | 8 | 12 | 100 | 8 | 23,570 |
| CEPB4100 | | 5 | 10 | 15 | 100 | 10 | — |
| CEPB4120 | △ | 6 | 12 | 18 | 110 | 12 | 38,940 |

## ◎ CEPB2、CEPBLS、CEPB4の対応被削材

Applicable work material of CEPB2, CEPBLS, CEPB4

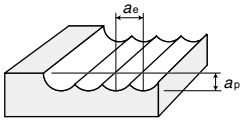
| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ |

△印：在庫が無くなり次第受注生産品となるものです。　□印：特定代理店在庫です。弊社営業へお問合せください。　無印：受注生産品です。
△：When the Stock is out, will become to produce on request.　□：Stocked by specified distributor. Contact with our sales department.　No Mark:Manufactured upon request only.

# Epoch Ball End Mill
# エポックボールエンドミル

## 標準切削条件表 Recommended cutting conditions

**CEPB2**
2枚刃・レギュラー刃長
2ft, Regular




### <荒加工> Roughing

| 被削材 Work material | | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | 工具鋼 Tool steels (25～35HRC) SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | | 焼入れ鋼 Hardened steels (55～65HRC) SKD11、SKH51 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | | ap=0.1DC, ae=0.3DC | | ap=0.1DC, ae=0.3DC | | ap=0.1DC, ae=0.3DC | | ap=0.1DC, ae=0.3DC | | ap=0.1DC, ae=0.3DC | | ap=0.1DC, ae=0.3DC | | ap=0.1DC, ae=0.3DC | |
| | ボール半径RE×外径DC Tool dia.(mm) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| 高速条件 High speed | RE0.5×1 | 50,000 | 4,000 | 50,000 | 4,000 | 50,000 | 4,000 | 50,000 | 4,000 | 50,000 | 2,500 | 50,000 | 2,500 | 47,700 | 2,390 |
| | RE1×2 | 47,700 | 5,720 | 47,700 | 5,720 | 39,800 | 4,780 | 39,800 | 4,780 | 39,800 | 3,180 | 31,800 | 2,540 | 23,900 | 1,910 |
| | RE1.5×3 | 31,800 | 5,090 | 31,800 | 5,090 | 26,500 | 4,240 | 26,500 | 4,240 | 26,500 | 2,920 | 21,200 | 2,330 | 15,900 | 1,750 |
| | RE2×4 | 23,900 | 4,780 | 23,900 | 4,780 | 19,900 | 3,980 | 19,900 | 3,980 | 19,900 | 2,790 | 15,900 | 2,230 | 11,900 | 1,670 |
| | RE3×6 | 15,900 | 4,450 | 15,900 | 4,450 | 13,300 | 3,720 | 13,300 | 3,720 | 13,300 | 2,390 | 10,600 | 1,910 | 7,960 | 1,430 |
| | RE4×8 | 11,900 | 3,810 | 11,900 | 3,810 | 9,950 | 3,180 | 9,950 | 3,180 | 9,950 | 2,190 | 7,960 | 1,750 | 5,970 | 1,310 |
| | RE5×10 | 9,550 | 3,440 | 9,550 | 3,440 | 7,960 | 2,870 | 7,960 | 2,870 | 7,960 | 2,070 | 6,370 | 1,660 | 4,770 | 1,240 |
| | RE6×12 | 7,960 | 3,180 | 7,960 | 3,180 | 6,630 | 2,650 | 6,630 | 2,650 | 6,630 | 1,990 | 5,310 | 1,590 | 3,980 | 1,190 |
| | RE8×16 | 5,970 | 2,690 | 5,970 | 2,690 | 4,970 | 2,240 | 4,970 | 2,240 | 4,970 | 1,690 | 3,980 | 1,350 | 2,980 | 1,010 |
| | RE10×20 | 4,770 | 2,150 | 4,770 | 2,150 | 3,980 | 1,790 | 3,980 | 1,790 | 3,980 | 1,350 | 3,180 | 1,080 | 2,390 | 810 |
| | RE12.5×25 | 3,820 | 1,720 | 3,820 | 1,720 | 3,180 | 1,430 | 3,180 | 1,430 | 3,180 | 1,080 | 2,550 | 870 | 1,910 | 650 |
| 汎用条件 General | RE0.5×1 | 50,000 | 4,000 | 50,000 | 4,000 | 47,700 | 3,820 | 47,700 | 3,820 | 47,700 | 2,390 | 38,200 | 1,910 | 28,700 | 1,440 |
| | RE1×2 | 31,800 | 3,800 | 31,800 | 3,800 | 23,900 | 2,870 | 23,900 | 2,870 | 23,900 | 1,910 | 19,100 | 1,530 | 14,300 | 1,140 |
| | RE1.5×3 | 21,200 | 3,400 | 21,200 | 3,400 | 15,900 | 2,550 | 15,900 | 2,550 | 15,900 | 1,750 | 12,700 | 1,400 | 9,550 | 1,050 |
| | RE2×4 | 15,900 | 3,200 | 15,900 | 3,200 | 11,900 | 2,390 | 11,900 | 2,390 | 11,900 | 1,670 | 9,550 | 1,340 | 7,170 | 1,000 |
| | RE3×6 | 10,600 | 2,970 | 10,600 | 2,970 | 7,960 | 2,230 | 7,960 | 2,230 | 7,960 | 1,430 | 6,370 | 1,150 | 4,780 | 860 |
| | RE4×8 | 7,960 | 2,550 | 7,960 | 2,550 | 5,970 | 1,910 | 5,970 | 1,910 | 5,970 | 1,310 | 4,780 | 1,050 | 3,580 | 790 |
| | RE5×10 | 6,370 | 2,290 | 6,370 | 2,290 | 4,770 | 1,720 | 4,770 | 1,720 | 4,770 | 1,240 | 3,820 | 990 | 2,870 | 750 |
| | RE6×12 | 5,310 | 2,120 | 5,310 | 2,120 | 3,980 | 1,590 | 3,960 | 1,590 | 3,980 | 1,190 | 3,180 | 960 | 2,390 | 720 |
| | RE8×16 | 3,980 | 1,790 | 3,980 | 1,790 | 2,980 | 1,340 | 2,980 | 1,340 | 2,980 | 1,010 | 2,390 | 810 | 1,790 | 610 |
| | RE10×20 | 3,180 | 1,430 | 3,180 | 1,430 | 2,390 | 1,070 | 2,390 | 1,070 | 2,390 | 810 | 1,910 | 650 | 1,430 | 490 |
| | RE12.5×25 | 2,550 | 1,150 | 2,550 | 1,150 | 1,910 | 860 | 1,910 | 860 | 1,910 | 650 | 1,530 | 520 | 1,150 | 390 |

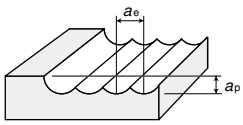
### <仕上げ加工> Finishing

| 被削材 Work material | | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | 工具鋼 Tool steels (25～35HRC) SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | | 焼入れ鋼 Hardened steels (55～65HRC) SKD11、SKH51 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | | ap=0.05DC, ae=0.05DC | | ap=0.05DC, ae=0.05DC | | ap=0.05DC, ae=0.05DC | | ap=0.05DC, ae=0.05DC | | ap=0.05DC, ae=0.05DC | | ap=0.05DC, ae=0.05DC | | ap=0.05DC, ae=0.05DC | |
| | ボール半径RE×外径DC Tool dia.(mm) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| 高速条件 High speed | RE0.5×1 | 50,000 | 4,000 | 50,000 | 4,000 | 50,000 | 4,000 | 50,000 | 4,000 | 50,000 | 2,500 | 50,000 | 2,500 | 50,000 | 2,500 |
| | RE1×2 | 47,700 | 5,720 | 47,700 | 5,720 | 47,700 | 5,720 | 47,700 | 5,720 | 47,700 | 3,820 | 39,800 | 3,180 | 31,800 | 2,540 |
| | RE1.5×3 | 31,800 | 5,090 | 31,800 | 5,090 | 31,800 | 5,090 | 31,800 | 5,090 | 31,800 | 3,500 | 26,500 | 2,920 | 21,200 | 2,330 |
| | RE2×4 | 23,900 | 4,780 | 23,900 | 4,780 | 23,900 | 4,780 | 23,900 | 4,780 | 23,900 | 3,350 | 19,900 | 2,790 | 15,900 | 2,230 |
| | RE3×6 | 15,900 | 4,450 | 15,900 | 4,450 | 15,900 | 4,450 | 15,900 | 4,450 | 15,900 | 2,860 | 13,300 | 2,390 | 10,600 | 1,910 |
| | RE4×8 | 11,900 | 3,810 | 11,900 | 3,810 | 11,900 | 3,810 | 11,900 | 3,810 | 11,900 | 2,620 | 9,950 | 2,190 | 7,960 | 1,750 |
| | RE5×10 | 9,550 | 3,440 | 9,550 | 3,440 | 9,550 | 3,440 | 9,550 | 3,440 | 9,550 | 2,480 | 7,960 | 2,070 | 6,370 | 1,660 |
| | RE6×12 | 7,960 | 3,180 | 7,960 | 3,180 | 7,960 | 3,180 | 7,960 | 3,180 | 7,960 | 2,390 | 6,630 | 1,990 | 5,310 | 1,590 |
| | RE8×16 | 5,970 | 2,690 | 5,970 | 2,690 | 5,970 | 2,690 | 5,970 | 2,690 | 5,970 | 2,030 | 4,970 | 1,690 | 3,980 | 1,350 |
| | RE10×20 | 4,770 | 2,150 | 4,770 | 2,150 | 4,770 | 2,150 | 4,770 | 2,150 | 4,770 | 1,620 | 3,980 | 1,350 | 3,180 | 1,080 |
| | RE12.5×25 | 3,820 | 1,720 | 3,820 | 1,720 | 3,820 | 1,720 | 3,820 | 1,720 | 3,820 | 1,300 | 3,180 | 1,080 | 2,550 | 870 |
| 汎用条件 General | RE0.5×1 | 50,000 | 4,000 | 50,000 | 4,000 | 50,000 | 4,000 | 50,000 | 4,000 | 50,000 | 2,500 | 47,700 | 2,390 | 38,200 | 1,910 |
| | RE1×2 | 31,800 | 3,800 | 31,800 | 3,800 | 31,800 | 3,800 | 31,800 | 3,800 | 31,800 | 2,540 | 23,900 | 1,910 | 19,100 | 1,530 |
| | RE1.5×3 | 21,200 | 3,400 | 21,200 | 3,400 | 21,200 | 3,400 | 21,200 | 3,400 | 21,200 | 2,330 | 15,900 | 1,750 | 12,700 | 1,400 |
| | RE2×4 | 15,900 | 3,200 | 15,900 | 3,200 | 15,900 | 3,200 | 15,900 | 3,200 | 15,900 | 2,230 | 11,900 | 1,670 | 9,550 | 1,340 |
| | RE3×6 | 10,600 | 2,970 | 10,600 | 2,970 | 10,600 | 2,970 | 10,600 | 2,970 | 10,600 | 1,910 | 7,960 | 1,430 | 6,370 | 1,150 |
| | RE4×8 | 7,960 | 2,550 | 7,960 | 2,550 | 7,960 | 2,550 | 7,960 | 2,550 | 7,960 | 1,750 | 5,970 | 1,310 | 4,780 | 1,050 |
| | RE5×10 | 6,370 | 2,290 | 6,370 | 2,290 | 6,370 | 2,290 | 6,370 | 2,290 | 6,370 | 1,660 | 4,770 | 1,240 | 3,820 | 990 |
| | RE6×12 | 5,310 | 2,120 | 5,310 | 2,120 | 5,310 | 2,120 | 5,310 | 2,120 | 5,310 | 1,590 | 3,980 | 1,190 | 3,180 | 960 |
| | RE8×16 | 3,980 | 1,790 | 3,980 | 1,790 | 3,980 | 1,790 | 3,980 | 1,790 | 3,980 | 1,350 | 2,980 | 1,010 | 2,390 | 810 |
| | RE10×20 | 3,180 | 1,430 | 3,180 | 1,430 | 3,180 | 1,430 | 3,180 | 1,430 | 3,180 | 1,080 | 2,390 | 810 | 1,910 | 650 |
| | RE12.5×25 | 2,550 | 1,150 | 2,550 | 1,150 | 2,550 | 1,150 | 2,550 | 1,150 | 2,550 | 870 | 1,910 | 650 | 1,530 | 520 |

【注意】
①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③切削方法は、ダウンカットで使用ください。
④一般材、とくに高速切削は、乾式（エアブロー）またはオイルミストクーラントにてご使用ください。
⑤安定した切削を行うため、剛性の高い機械とセットアップでご使用ください。
⑥機械の回転数が足りない場合は、主軸回転数とテーブル送り速度を同比率で下げてください。
⑦加工形状、機械の剛性、工具突き出し量等、ご使用の状況により、主軸回転数とテーブル送り速度の調整を行ってください。

# CEPBLS

2枚刃・ロングシャンク
2ft, Long Shank




## <荒加工> Roughing

| 被削材 Work material | | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | 工具鋼 Tool steels (25～35HRC) SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | | 焼入れ鋼 Hardened steels (55～65HRC) SKD11、SKH51 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | | ap=0.1DC, ae=0.3DC | | ap=0.1DC, ae=0.3DC | | ap=0.1DC, ae=0.3DC | | ap=0.1DC, ae=0.3DC | | ap=0.1DC, ae=0.3DC | | ap=0.1DC, ae=0.3DC | | ap=0.1DC, ae=0.3DC | |
| ボール半径RE ×外径DC Tool dia.(mm) | | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| 高速条件 High speed | RE0.5×1 | 47,700 | 3,820 | 47,700 | 3,820 | 39,800 | 3,180 | 39,800 | 3,180 | 39,800 | 1,990 | 31,800 | 1,590 | 23,900 | 1,200 |
| | RE1×2 | 23,900 | 2,870 | 23,900 | 2,870 | 19,900 | 2,390 | 19,900 | 2,390 | 19,900 | 1,590 | 15,900 | 1,270 | 11,900 | 950 |
| | RE1.5×3 | 15,900 | 2,550 | 15,900 | 2,550 | 13,300 | 2,130 | 13,300 | 2,130 | 13,300 | 1,460 | 10,600 | 1,170 | 7,960 | 880 |
| | RE2×4 | 11,900 | 2,390 | 11,900 | 2,390 | 9,950 | 1,990 | 9,950 | 1,990 | 9,950 | 1,390 | 7,960 | 1,110 | 5,970 | 840 |
| | RE3×6 | 7,960 | 2,230 | 7,960 | 2,230 | 6,630 | 1,860 | 6,630 | 1,860 | 6,630 | 1,190 | 5,300 | 950 | 3,980 | 720 |
| | RE4×8 | 5,970 | 1,910 | 5,970 | 1,910 | 4,980 | 1,590 | 4,980 | 1,590 | 4,980 | 1,100 | 3,980 | 880 | 2,980 | 660 |
| | RE5×10 | 4,770 | 1,720 | 4,770 | 1,720 | 3,980 | 1,430 | 3,980 | 1,430 | 3,980 | 1,030 | 3,180 | 830 | 2,390 | 620 |
| | RE6×12 | 3,980 | 1,590 | 3,980 | 1,590 | 3,320 | 1,330 | 3,320 | 1,330 | 3,320 | 1,000 | 2,650 | 800 | 1,990 | 600 |
| | RE8×16 | 2,980 | 1,340 | 2,980 | 1,340 | 2,490 | 1,120 | 2,490 | 1,120 | 2,490 | 850 | 1,990 | 680 | 1,490 | 510 |
| | RE10×20 | 2,390 | 1,070 | 2,390 | 1,070 | 1,990 | 900 | 1,990 | 900 | 1,990 | 680 | 1,590 | 540 | 1,190 | 400 |
| | RE12.5×25 | 1,910 | 860 | 1,910 | 860 | 1,590 | 720 | 1,590 | 720 | 1,590 | 540 | 1,270 | 430 | 950 | 320 |
| 汎用条件 General | RE0.5×1 | 31,800 | 2,540 | 31,800 | 2,540 | 23,900 | 1,910 | 23,900 | 1,910 | 23,900 | 1,200 | 19,100 | 960 | 14,300 | 720 |
| | RE1×2 | 15,900 | 1,910 | 15,900 | 1,910 | 11,900 | 1,430 | 11,900 | 1,430 | 11,900 | 950 | 9,550 | 760 | 7,160 | 570 |
| | RE1.5×3 | 10,600 | 1,700 | 10,600 | 1,700 | 7,960 | 1,270 | 7,960 | 1,270 | 7,960 | 880 | 6,370 | 700 | 4,770 | 520 |
| | RE2×4 | 7,960 | 1,590 | 7,960 | 1,590 | 5,970 | 1,190 | 5,970 | 1,190 | 5,970 | 840 | 4,770 | 670 | 3,580 | 500 |
| | RE3×6 | 5,310 | 1,490 | 5,310 | 1,490 | 3,980 | 1,110 | 3,980 | 1,110 | 3,980 | 720 | 3,180 | 570 | 2,390 | 430 |
| | RE4×8 | 3,980 | 1,270 | 3,980 | 1,270 | 2,980 | 950 | 2,980 | 950 | 2,980 | 660 | 2,390 | 530 | 1,790 | 390 |
| | RE5×10 | 3,180 | 1,140 | 3,180 | 1,140 | 2,390 | 860 | 2,390 | 860 | 2,390 | 620 | 1,910 | 500 | 1,430 | 370 |
| | RE6×12 | 2,650 | 1,060 | 2,650 | 1,060 | 1,990 | 800 | 1,990 | 800 | 1,990 | 600 | 1,590 | 480 | 1,190 | 360 |
| | RE8×16 | 1,990 | 900 | 1,990 | 900 | 1,490 | 670 | 1,490 | 670 | 1,490 | 510 | 1,190 | 400 | 900 | 310 |
| | RE10×20 | 1,590 | 720 | 1,590 | 720 | 1,190 | 540 | 1,190 | 540 | 1,190 | 400 | 950 | 320 | 720 | 240 |
| | RE12.5×25 | 1,270 | 570 | 1,270 | 570 | 950 | 430 | 950 | 430 | 950 | 320 | 760 | 260 | 570 | 190 |

## <仕上げ加工> Finishing

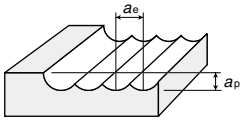
| 被削材 Work material | | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | 工具鋼 Tool steels (25～35HRC) SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | | 焼入れ鋼 Hardened steels (55～65HRC) SKD11、SKH51 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | | ap=0.05DC, ae=0.05DC | | ap=0.05DC, ae=0.05DC | | ap=0.05DC, ae=0.05DC | | ap=0.05DC, ae=0.05DC | | ap=0.05DC, ae=0.05DC | | ap=0.05DC, ae=0.05DC | | ap=0.05DC, ae=0.05DC | |
| ボール半径RE ×外径DC Tool dia.(mm) | | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| 高速条件 High speed | RE0.5×1 | 47,700 | 3,820 | 47,700 | 3,820 | 47,700 | 3,820 | 47,700 | 3,820 | 47,700 | 2,390 | 39,800 | 1,990 | 31,800 | 1,590 |
| | RE1×2 | 23,900 | 2,870 | 23,900 | 2,870 | 23,900 | 2,870 | 23,900 | 2,870 | 23,900 | 1,910 | 19,900 | 1,590 | 15,900 | 1,270 |
| | RE1.5×3 | 15,900 | 2,550 | 15,900 | 2,550 | 15,900 | 2,550 | 15,900 | 2,550 | 15,900 | 1,750 | 13,300 | 1,460 | 10,600 | 1,170 |
| | RE2×4 | 11,900 | 2,390 | 11,900 | 2,390 | 11,900 | 2,390 | 11,900 | 2,390 | 11,900 | 1,670 | 9,950 | 1,390 | 7,960 | 1,110 |
| | RE3×6 | 7,960 | 2,230 | 7,960 | 2,230 | 7,960 | 2,230 | 7,960 | 2,230 | 7,960 | 1,430 | 6,630 | 1,190 | 5,300 | 950 |
| | RE4×8 | 5,970 | 1,910 | 5,970 | 1,910 | 5,970 | 1,910 | 5,970 | 1,910 | 5,970 | 1,310 | 4,980 | 1,100 | 3,980 | 880 |
| | RE5×10 | 4,770 | 1,720 | 4,770 | 1,720 | 4,770 | 1,720 | 4,770 | 1,720 | 4,770 | 1,240 | 3,980 | 1,030 | 3,180 | 830 |
| | RE6×12 | 3,980 | 1,590 | 3,980 | 1,590 | 3,980 | 1,590 | 3,980 | 1,590 | 3,980 | 1,190 | 3,320 | 1,000 | 2,650 | 800 |
| | RE8×16 | 2,980 | 1,340 | 2,980 | 1,340 | 2,980 | 1,340 | 2,980 | 1,340 | 2,980 | 1,010 | 2,490 | 850 | 1,990 | 680 |
| | RE10×20 | 2,390 | 1,070 | 2,390 | 1,070 | 2,390 | 1,070 | 2,390 | 1,070 | 2,390 | 810 | 1,990 | 680 | 1,590 | 540 |
| | RE12.5×25 | 1,910 | 860 | 1,910 | 860 | 1,910 | 860 | 1,910 | 860 | 1,910 | 650 | 1,590 | 540 | 1,270 | 430 |
| 汎用条件 General | RE0.5×1 | 31,800 | 2,540 | 31,800 | 2,540 | 31,800 | 2,540 | 31,800 | 2,540 | 31,800 | 1,590 | 23,900 | 1,200 | 19,100 | 960 |
| | RE1×2 | 15,900 | 1,910 | 15,900 | 1,910 | 15,900 | 1,910 | 15,900 | 1,910 | 15,900 | 1,270 | 11,900 | 950 | 9,550 | 760 |
| | RE1.5×3 | 10,600 | 1,700 | 10,600 | 1,700 | 10,600 | 1,700 | 10,600 | 1,700 | 10,600 | 1,170 | 7,960 | 880 | 6,370 | 700 |
| | RE2×4 | 7,960 | 1,590 | 7,960 | 1,590 | 7,960 | 1,590 | 7,960 | 1,590 | 7,960 | 1,110 | 5,970 | 840 | 4,770 | 670 |
| | RE3×6 | 5,310 | 1,490 | 5,310 | 1,490 | 5,310 | 1,490 | 5,310 | 1,490 | 5,300 | 950 | 3,980 | 720 | 3,180 | 570 |
| | RE4×8 | 3,980 | 1,270 | 3,980 | 1,270 | 3,980 | 1,270 | 3,980 | 1,270 | 3,980 | 880 | 2,980 | 660 | 2,390 | 530 |
| | RE5×10 | 3,180 | 1,140 | 3,180 | 1,140 | 3,180 | 1,140 | 3,180 | 1,140 | 3,180 | 830 | 2,390 | 620 | 1,910 | 500 |
| | RE6×12 | 2,650 | 1,060 | 2,650 | 1,060 | 2,650 | 1,060 | 2,650 | 1,060 | 2,650 | 800 | 1,990 | 600 | 1,590 | 480 |
| | RE8×16 | 1,990 | 900 | 1,990 | 900 | 1,990 | 900 | 1,990 | 900 | 1,990 | 680 | 1,490 | 510 | 1,190 | 400 |
| | RE10×20 | 1,590 | 720 | 1,590 | 720 | 1,590 | 720 | 1,590 | 720 | 1,590 | 540 | 1,190 | 400 | 950 | 320 |
| | RE12.5×25 | 1,270 | 570 | 1,270 | 570 | 1,270 | 570 | 1,270 | 570 | 1,270 | 430 | 950 | 320 | 760 | 260 |

【Note】

① Use the appropriate coolant for the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
③ Down-cutting is recommended.
④ Use generally dry (air-blow) or oil-mist coolant, especially at the high-speed machining.
⑤ Use a machine tool with rigidity and rigid set-up, to machine stably.
⑥ When the revolution speed is not enough, reduce the revolution speed and table speed at the same ratio.
⑦ Adjust the revolution speed and table speed, according to cutting conditions such as machining shape, rigidity of machine tool, over-hang and so on.

# Epoch Ball End Mill
# エポックボールエンドミル

## CEPB4
4枚刃・レギュラー刃長
4ft, Regular




### <荒加工> Roughing

| 被削材 Work material | | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | 工具鋼 Tool steels (25～35HRC) SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | | 焼入れ鋼 Hardened steels (55～65HRC) SKD11、SKH51 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | |
| ボール半径RE×外径DC Tool dia.(mm) | | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| 高速条件 High speed | RE3×6 | 15,900 | 6,680 | 15,900 | 6,680 | 13,300 | 5,580 | 13,300 | 5,580 | 13,300 | 3,590 | 10,600 | 2,870 | 7,960 | 2,150 |
| | RE4×8 | 11,900 | 5,720 | 11,900 | 5,720 | 9,950 | 4,770 | 9,950 | 4,770 | 9,950 | 3,290 | 7,960 | 2,630 | 5,970 | 1,970 |
| | RE5×10 | 9,550 | 5,160 | 9,550 | 5,160 | 7,960 | 4,310 | 7,960 | 4,310 | 7,960 | 3,110 | 6,370 | 2,490 | 4,770 | 1,860 |
| | RE6×12 | 7,960 | 4,770 | 7,960 | 4,770 | 6,630 | 3,980 | 6,630 | 3,980 | 6,630 | 2,990 | 5,310 | 2,390 | 3,980 | 1,790 |
| 汎用条件 General | RE3×6 | 10,600 | 4,460 | 10,600 | 4,460 | 7,960 | 3,350 | 7,960 | 3,350 | 7,960 | 2,150 | 6,370 | 1,730 | 4,780 | 1,290 |
| | RE4×8 | 7,960 | 3,830 | 7,960 | 3,830 | 5,970 | 2,870 | 5,970 | 2,870 | 5,970 | 1,970 | 4,780 | 1,580 | 3,580 | 1,190 |
| | RE5×10 | 6,370 | 3,440 | 6,370 | 3,440 | 4,770 | 2,580 | 4,770 | 2,580 | 4,770 | 1,860 | 3,820 | 1,490 | 2,870 | 1,130 |
| | RE6×12 | 5,310 | 3,180 | 5,310 | 3,180 | 3,980 | 2,390 | 3,980 | 2,390 | 3,980 | 1,790 | 3,180 | 1,440 | 2,390 | 1,080 |

### <仕上げ加工> Finishing

| 被削材 Work material | | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | 工具鋼 Tool steels (25～35HRC) SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | | 焼入れ鋼 Hardened steels (55～65HRC) SKD11、SKH51 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | |
| ボール半径RE×外径DC Tool dia.(mm) | | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| 高速条件 High speed | RE3×6 | 15,900 | 6,680 | 15,900 | 6,680 | 15,900 | 6,680 | 15,900 | 6,680 | 15,900 | 4,290 | 13,300 | 3,590 | 10,600 | 2,870 |
| | RE4×8 | 11,900 | 5,720 | 11,900 | 5,720 | 11,900 | 5,720 | 11,900 | 5,720 | 11,900 | 3,930 | 9,950 | 3,290 | 7,960 | 2,630 |
| | RE5×10 | 9,550 | 5,160 | 9,550 | 5,160 | 9,550 | 5,160 | 9,550 | 5,160 | 9,550 | 3,720 | 7,960 | 3,110 | 6,370 | 2,490 |
| | RE6×12 | 7,960 | 4,770 | 7,960 | 4,770 | 7,960 | 4,770 | 7,960 | 4,770 | 7,960 | 3,590 | 6,630 | 2,990 | 5,310 | 2,390 |
| 汎用条件 General | RE3×6 | 10,600 | 4,460 | 10,600 | 4,460 | 10,600 | 4,460 | 10,600 | 4,460 | 10,600 | 2,870 | 7,960 | 2,150 | 6,370 | 1,730 |
| | RE4×8 | 7,960 | 3,830 | 7,960 | 3,830 | 7,960 | 3,830 | 7,960 | 3,830 | 7,960 | 2,630 | 5,970 | 1,970 | 4,780 | 1,580 |
| | RE5×10 | 6,370 | 3,440 | 6,370 | 3,440 | 6,370 | 3,440 | 6,370 | 3,440 | 6,370 | 2,490 | 4,770 | 1,860 | 3,820 | 1,490 |
| | RE6×12 | 5,310 | 3,180 | 5,310 | 3,180 | 5,310 | 3,180 | 5,310 | 3,180 | 5,310 | 2,390 | 3,980 | 1,790 | 3,180 | 1,440 |

【注意】
①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③切削方法は、ダウンカットで使用ください。
④一般材、とくに高速切削は、乾式（エアブロー）またはオイルミストクーラントにてご使用ください。
⑤安定した切削を行うため、剛性の高い機械とセットアップでご使用ください。
⑥機械の回転数が足りない場合は、主軸回転数とテーブル送り速度を同比率で下げてください。
⑦加工形状、機械の剛性、工具突き出し量等、ご使用の状況により、主軸回転数とテーブル送り速度の調整を行ってください。

【Note】
① Use the appropriate coolant for the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
③ Down-cutting is recommended.
④ Use generally dry (air-blow) or oil-mist coolant, especially at the high-speed machining.
⑤ Use a machine tool with rigidity and rigid set-up, to machine stably.
⑥ When the revolution speed is not enough, reduce the revolution speed and table speed at the same ratio.
⑦ Adjust the revolution speed and table speed, according to cutting conditions such as machining shape, rigidity of machine tool, over-hang and so on.

# 超硬・Cコートボールエンドミル



## 強力形・ショート刃長 Powerful type, Short

彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical / 中仕上 Semi Finishing / 仕上 Finishing

RE公差 RE tolerance
RE0.15～RE0.4：±0.007
RE0.5～RE5　：±0.005
RE5.5～RE10　：±0.01

h6

(mm)

2枚刃 2Flutes

### BEK2○○○-C

超硬 Carbide / C / ねじれ30° Helix angle / 切削条件表 A416 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius | 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|---|
| BEK2003-C | □ | 0.15 | 0.3 | 0.6 | 50 | 3 |
| BEK2004-C | □ | 0.2 | 0.4 | 0.8 | 50 | 3 |
| BEK2005-C | □ | 0.25 | 0.5 | 1 | 50 | 3 |
| BEK2006-C | □ | 0.3 | 0.6 | 1.2 | 50 | 3 |
| BEK2008-C | □ | 0.4 | 0.8 | 1.6 | 50 | 3 |
| BEK2010-C | □ | 0.5 | 1 | 2.5 | 50 | 4 |
| BEK2015-C | □ | 0.75 | 1.5 | 4 | 50 | 4 |
| BEK2020-C | □ | 1 | 2 | 5 | 50 | 6 |
| BEK2025-C | □ | 1.25 | 2.5 | 7 | 50 | 6 |
| BEK2030-C | □ | 1.5 | 3 | 8 | 70 | 6 |
| BEK2040-C | □ | 2 | 4 | 8 | 70 | 6 |
| BEK2050-C | □ | 2.5 | 5 | 10 | 80 | 6 |
| BEK2060-C | □ | 3 | 6 | 12 | 90 | 6 |
| BEK2070-C | □ | 3.5 | 7 | 14 | 90 | 6 |
| BEK2080-C | □ | 4 | 8 | 14 | 100 | 8 |
| BEK2090-C | □ | 4.5 | 9 | 18 | 100 | 8 |
| BEK2100-C | □ | 5 | 10 | 18 | 100 | 10 |
| BEK2110-C | □ | 5.5 | 11 | 18 | 110 | 10 |
| BEK2120-C | □ | 6 | 12 | 22 | 110 | 12 |
| BEK2130-C | □ | 6.5 | 13 | 22 | 110 | 12 |
| BEK2140-C | □ | 7 | 14 | 26 | 120 | 12 |
| BEK2160-C | □ | 8 | 16 | 30 | 140 | 16 |
| BEK2180-C | □ | 9 | 18 | 34 | 140 | 16 |
| BEK2200-C | □ | 10 | 20 | 38 | 160 | 20 |

## 強力形・ロングシャンク Powerful type, Long shank

彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical / 取りのこし Rest Material Machining / 玉プチ Corner Recessing / 仕上 Finishing

RE公差 RE tolerance
RE0.5～RE6　：±0.015
RE8～RE12.5：±0.02

h6

(mm)

2枚刃 2Flutes

### BEKLS2○○○-C

超硬 Carbide / C / ねじれ30° Helix angle / 切削条件表 A417 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius | 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|---|
| BEKLS2010-C | □ | 0.5 | 1 | 2.5 | 80 | 4 |
| BEKLS2015-C | □ | 0.75 | 1.5 | 4 | 80 | 4 |
| BEKLS2020-C | □ | 1 | 2 | 5 | 90 | 6 |
| BEKLS2025-C | □ | 1.25 | 2.5 | 7 | 90 | 6 |
| BEKLS2030-C | □ | 1.5 | 3 | 8 | 100 | 6 |
| BEKLS2040-C | □ | 2 | 4 | 8 | 100 | 6 |
| BEKLS2050-C | □ | 2.5 | 5 | 10 | 125 | 6 |
| BEKLS2060-C | □ | 3 | 6 | 12 | 150 | 6 |
| BEKLS2070-C | □ | 3.5 | 7 | 14 | 150 | 6 |
| BEKLS2080-C | □ | 4 | 8 | 14 | 180 | 8 |
| BEKLS2100-C | □ | 5 | 10 | 18 | 200 | 10 |
| BEKLS2120-C | □ | 6 | 12 | 22 | 220 | 12 |
| BEKLS2160-C | □ | 8 | 16 | 30 | 250 | 16 |
| BEKLS2200-C | □ | 10 | 20 | 38 | 280 | 20 |
| BEKLS2250-C | □ | 12.5 | 25 | 50 | 300 | 25 |

彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical / 中仕上 Semi Finishing / 仕上 Finishing

RE公差 RE tolerance ±0.01

h6

(mm)

2枚刃 2Flutes

### BES2○○○-C

超硬 Carbide / C / ねじれ30° Helix angle

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius | 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|---|
| BES2010-C | □ | 0.5 | 1 | 2.5 | 50 | 4 |
| BES2020-C | □ | 1 | 2 | 5 | 50 | 6 |
| BES2030-C | □ | 1.5 | 3 | 8 | 70 | 6 |
| BES2040-C | □ | 2 | 4 | 12 | 70 | 6 |
| BES2050-C | □ | 2.5 | 5 | 15 | 80 | 6 |
| BES2060-C | □ | 3 | 6 | 15 | 90 | 6 |
| BES2070-C | □ | 3.5 | 7 | 20 | 90 | 6 |
| BES2080-C | □ | 4 | 8 | 20 | 100 | 8 |
| BES2100-C | □ | 5 | 10 | 25 | 100 | 10 |
| BES2120-C | □ | 6 | 12 | 30 | 110 | 12 |
| BES2140-C | □ | 7 | 14 | 35 | 120 | 12 |
| BES2160-C | □ | 8 | 16 | 40 | 140 | 16 |
| BES2180-C | □ | 9 | 18 | 40 | 140 | 16 |
| BES2200-C | □ | 10 | 20 | 45 | 160 | 20 |
| BES2250-C | □ | 12.5 | 25 | 50 | 180 | 25 |

## BEK-C、BEKLS-C、BES-Cの対応被削材

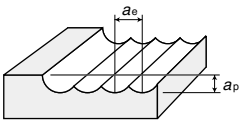
Applicable work material of BEK-C, BEKLS-C, BES-C

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ |

□印：特定代理店在庫です。弊社営業へお問合せください。　□：Stocked by specified distributor. Contact with our sales department.

## 標準切削条件表 Recommended cutting conditions

**BEK-C**
強力形・レギュラー刃長
Powerful type, Regular




### ＜荒加工＞ Roughing

| 被削材 Work material | | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | 工具鋼 Tool steels (25～35HRC) SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | | ap=0.1DC | ae=0.3DC | ap=0.1DC | ae=0.3DC | ap=0.1DC | ae=0.3DC | ap=0.1DC | ae=0.3DC | ap=0.1DC | ae=0.3DC | ap=0.1DC | ae=0.3DC |
| ボール半径RE×外径DC Tool dia.(mm) | | 回転数n (min⁻¹) | 送り速度vf (mm/min) | 回転数n (min⁻¹) | 送り速度vf (mm/min) | 回転数n (min⁻¹) | 送り速度vf (mm/min) | 回転数n (min⁻¹) | 送り速度vf (mm/min) | 回転数n (min⁻¹) | 送り速度vf (mm/min) | 回転数n (min⁻¹) | 送り速度vf (mm/min) |
| 高速条件 High speed | RE0.5×1 | 50,000 | 4,000 | 50,000 | 4,000 | 50,000 | 4,000 | 50,000 | 4,000 | 50,000 | 2,500 | 38,200 | 1,910 |
| | RE1×2 | 47,700 | 5,720 | 47,700 | 5,720 | 39,800 | 4,780 | 39,800 | 4,780 | 39,800 | 3,180 | 19,100 | 1,530 |
| | RE1.5×3 | 31,800 | 5,090 | 31,800 | 5,090 | 26,500 | 4,240 | 26,500 | 4,240 | 26,500 | 2,920 | 12,700 | 1,400 |
| | RE2×4 | 23,900 | 4,780 | 23,900 | 4,780 | 19,900 | 3,980 | 19,900 | 3,980 | 19,900 | 2,790 | 9,550 | 1,340 |
| | RE3×6 | 15,900 | 4,450 | 15,900 | 4,450 | 13,300 | 3,720 | 13,300 | 3,720 | 13,300 | 2,390 | 6,370 | 1,150 |
| | RE4×8 | 11,900 | 3,810 | 11,900 | 3,810 | 9,950 | 3,180 | 9,950 | 3,180 | 9,950 | 2,190 | 4,780 | 1,050 |
| | RE5×10 | 9,550 | 3,440 | 9,550 | 3,440 | 7,960 | 2,870 | 7,960 | 2,870 | 7,960 | 2,070 | 3,820 | 990 |
| | RE6×12 | 7,960 | 3,180 | 7,960 | 3,180 | 6,630 | 2,650 | 6,630 | 2,650 | 6,630 | 1,990 | 3,180 | 960 |
| | RE8×16 | 5,970 | 2,690 | 5,970 | 2,690 | 4,970 | 2,240 | 4,970 | 2,240 | 4,970 | 1,690 | 2,390 | 810 |
| | RE10×20 | 4,770 | 2,150 | 4,770 | 2,150 | 3,980 | 1,790 | 3,980 | 1,790 | 3,980 | 1,350 | 1,910 | 650 |
| 汎用条件 General | RE0.5×1 | 50,000 | 4,000 | 50,000 | 4,000 | 47,700 | 3,820 | 47,700 | 3,820 | 47,700 | 2,390 | 25,500 | 1,280 |
| | RE1×2 | 31,800 | 3,800 | 31,800 | 3,800 | 23,900 | 2,870 | 23,900 | 2,870 | 23,900 | 1,910 | 12,700 | 1,020 |
| | RE1.5×3 | 21,200 | 3,400 | 21,200 | 3,400 | 15,900 | 2,550 | 15,900 | 2,550 | 15,900 | 1,750 | 8,490 | 930 |
| | RE2×4 | 15,900 | 3,200 | 15,900 | 3,200 | 11,900 | 2,390 | 11,900 | 2,390 | 11,900 | 1,670 | 6,370 | 890 |
| | RE3×6 | 10,600 | 2,970 | 10,600 | 2,970 | 7,960 | 2,230 | 7,960 | 2,230 | 7,960 | 1,430 | 4,240 | 760 |
| | RE4×8 | 7,960 | 2,550 | 7,960 | 2,550 | 5,970 | 1,910 | 5,970 | 1,910 | 5,970 | 1,310 | 3,180 | 700 |
| | RE5×10 | 6,370 | 2,290 | 6,370 | 2,290 | 4,770 | 1,720 | 4,770 | 1,720 | 4,770 | 1,240 | 2,550 | 660 |
| | RE6×12 | 5,310 | 2,120 | 5,310 | 2,120 | 3,980 | 1,590 | 3,960 | 1,590 | 3,980 | 1,190 | 2,120 | 640 |
| | RE8×16 | 3,980 | 1,790 | 3,980 | 1,790 | 2,980 | 1,340 | 2,980 | 1,340 | 2,980 | 1,010 | 1,590 | 540 |
| | RE10×20 | 3,180 | 1,430 | 3,180 | 1,430 | 2,390 | 1,070 | 2,390 | 1,070 | 2,390 | 810 | 1,270 | 430 |

### ＜仕上げ加工＞ Finishing

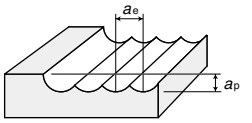
| 被削材 Work material | | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | 工具鋼 Tool steels (25～35HRC) SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | | ap=0.05DC | ae=0.05DC | ap=0.05DC | ae=0.05DC | ap=0.05DC | ae=0.05DC | ap=0.05DC | ae=0.05DC | ap=0.05DC | ae=0.05DC | ap=0.05DC | ae=0.05DC |
| ボール半径RE×外径DC Tool dia.(mm) | | 回転数n (min⁻¹) | 送り速度vf (mm/min) | 回転数n (min⁻¹) | 送り速度vf (mm/min) | 回転数n (min⁻¹) | 送り速度vf (mm/min) | 回転数n (min⁻¹) | 送り速度vf (mm/min) | 回転数n (min⁻¹) | 送り速度vf (mm/min) | 回転数n (min⁻¹) | 送り速度vf (mm/min) |
| 高速条件 High speed | RE0.5×1 | 50,000 | 4,000 | 50,000 | 4,000 | 50,000 | 4,000 | 50,000 | 4,000 | 50,000 | 2,500 | 47,700 | 2,390 |
| | RE1×2 | 47,700 | 5,720 | 47,700 | 5,720 | 47,700 | 5,720 | 47,700 | 5,720 | 47,700 | 3,820 | 23,900 | 1,910 |
| | RE1.5×3 | 31,800 | 5,090 | 31,800 | 5,090 | 31,800 | 5,090 | 31,800 | 5,090 | 31,800 | 3,500 | 15,900 | 1,750 |
| | RE2×4 | 23,900 | 4,780 | 23,900 | 4,780 | 23,900 | 4,780 | 23,900 | 4,780 | 23,900 | 3,350 | 11,900 | 1,670 |
| | RE3×6 | 15,900 | 4,450 | 15,900 | 4,450 | 15,900 | 4,450 | 15,900 | 4,450 | 15,900 | 2,860 | 7,960 | 1,430 |
| | RE4×8 | 11,900 | 3,810 | 11,900 | 3,810 | 11,900 | 3,810 | 11,900 | 3,810 | 11,900 | 2,620 | 5,970 | 1,310 |
| | RE5×10 | 9,550 | 3,440 | 9,550 | 3,440 | 9,550 | 3,440 | 9,550 | 3,440 | 9,550 | 2,480 | 4,770 | 1,240 |
| | RE6×12 | 7,960 | 3,180 | 7,960 | 3,180 | 7,960 | 3,180 | 7,960 | 3,180 | 7,960 | 2,390 | 3,980 | 1,190 |
| | RE8×16 | 5,970 | 2,690 | 5,970 | 2,690 | 5,970 | 2,690 | 5,970 | 2,690 | 5,970 | 2,030 | 2,980 | 1,010 |
| | RE10×20 | 4,770 | 2,150 | 4,770 | 2,150 | 4,770 | 2,150 | 4,770 | 2,150 | 4,770 | 1,620 | 2,390 | 810 |
| 汎用条件 General | RE0.5×1 | 50,000 | 4,000 | 50,000 | 4,000 | 50,000 | 4,000 | 50,000 | 4,000 | 50,000 | 2,500 | 31,800 | 1,590 |
| | RE1×2 | 31,800 | 3,800 | 31,800 | 3,800 | 31,800 | 3,800 | 31,800 | 3,800 | 31,800 | 2,540 | 15,900 | 1,270 |
| | RE1.5×3 | 21,200 | 3,400 | 21,200 | 3,400 | 21,200 | 3,400 | 21,200 | 3,400 | 21,200 | 2,330 | 10,600 | 1,170 |
| | RE2×4 | 15,900 | 3,200 | 15,900 | 3,200 | 15,900 | 3,200 | 15,900 | 3,200 | 15,900 | 2,230 | 7,960 | 1,110 |
| | RE3×6 | 10,600 | 2,970 | 10,600 | 2,970 | 10,600 | 2,970 | 10,600 | 2,970 | 10,600 | 1,910 | 5,310 | 960 |
| | RE4×8 | 7,960 | 2,550 | 7,960 | 2,550 | 7,960 | 2,550 | 7,960 | 2,550 | 7,960 | 1,750 | 3,980 | 880 |
| | RE5×10 | 6,370 | 2,290 | 6,370 | 2,290 | 6,370 | 2,290 | 6,370 | 2,290 | 6,370 | 1,660 | 3,180 | 830 |
| | RE6×12 | 5,310 | 2,120 | 5,310 | 2,120 | 5,310 | 2,120 | 5,310 | 2,120 | 5,310 | 1,590 | 2,650 | 800 |
| | RE8×16 | 3,980 | 1,790 | 3,980 | 1,790 | 3,980 | 1,790 | 3,980 | 1,790 | 3,980 | 1,350 | 1,990 | 680 |
| | RE10×20 | 3,180 | 1,430 | 3,180 | 1,430 | 3,180 | 1,430 | 3,180 | 1,430 | 3,180 | 1,080 | 1,590 | 540 |

【注意】
①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③切削方法は、ダウンカットで使用ください。
④一般材、とくに高速切削は、乾式（エアブロー）またはオイルミストクーラントにてご使用ください。
⑤安定した切削を行うため、剛性の高い機械とセットアップでご使用ください。
⑥機械の回転数が足りない場合は、主軸回転数とテーブル送り速度を同比率で下げてください。
⑦加工形状、機械の剛性、工具突き出し量等、ご使用の状況により、主軸回転数とテーブル送り速度の調整を行ってください。

【Note】
① Use the appropriate coolant for the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
③ Down-cutting is recommended.
④ Use generally dry (air-blow) or oil-mist coolant, especially at the high-speed machining.
⑤ Use a machine tool with rigidity and rigid set-up, to machine stably.
⑥ When the revolution speed is not enough, reduce the revolution speed and table speed at the same ratio.
⑦ Adjust the revolution speed and table speed, according to cutting conditions such as machining shape, rigidity of machine tool, over-hang and so on.

# BEKLS-C

強力形・ロングシャンク
Powerful type, Long Shank




## ＜荒加工＞ Roughing

| 被削材 Work material | | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | ステンレス鋼・工具鋼 Stainless steels,Tool steels (25～35HRC) SUS304、SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | |
| ボール半径RE×外径DC Tool dia.(mm) | | 回転数n (min-1) | 送り速度Vf (mm/min) | 回転数n (min-1) | 送り速度Vf (mm/min) | 回転数n (min-1) | 送り速度Vf (mm/min) | 回転数n (min-1) | 送り速度Vf (mm/min) | 回転数n (min-1) | 送り速度Vf (mm/min) | 回転数n (min-1) | 送り速度Vf (mm/min) |
| 高速条件 High speed | RE0.5×1 | 47,700 | 3,820 | 47,700 | 3,820 | 39,800 | 3,180 | 39,800 | 3,180 | 39,800 | 1,990 | 31,800 | 1,590 |
| | RE1×2 | 23,900 | 2,870 | 23,900 | 2,870 | 19,900 | 2,390 | 19,900 | 2,390 | 19,900 | 1,590 | 15,900 | 1,270 |
| | RE1.5×3 | 15,900 | 2,550 | 15,900 | 2,550 | 13,300 | 2,130 | 13,300 | 2,130 | 13,300 | 1,460 | 10,600 | 1,170 |
| | RE2×4 | 11,900 | 2,390 | 11,900 | 2,390 | 9,950 | 1,990 | 9,950 | 1,990 | 9,950 | 1,390 | 7,960 | 1,110 |
| | RE3×6 | 7,960 | 2,230 | 7,960 | 2,230 | 6,630 | 1,860 | 6,630 | 1,860 | 6,630 | 1,190 | 5,300 | 950 |
| | RE4×8 | 5,970 | 1,910 | 5,970 | 1,910 | 4,980 | 1,590 | 4,980 | 1,590 | 4,980 | 1,100 | 3,980 | 880 |
| | RE5×10 | 4,770 | 1,720 | 4,770 | 1,720 | 3,980 | 1,430 | 3,980 | 1,430 | 3,980 | 1,030 | 3,180 | 830 |
| | RE6×12 | 3,980 | 1,590 | 3,980 | 1,590 | 3,320 | 1,330 | 3,320 | 1,330 | 3,320 | 1,000 | 2,650 | 800 |
| | RE8×16 | 2,980 | 1,340 | 2,980 | 1,340 | 2,490 | 1,120 | 2,490 | 1,120 | 2,490 | 850 | 1,990 | 680 |
| | RE10×20 | 2,390 | 1,070 | 2,390 | 1,070 | 1,990 | 900 | 1,990 | 900 | 1,990 | 680 | 1,590 | 540 |
| | RE12.5×25 | 1,910 | 860 | 1,910 | 860 | 1,590 | 720 | 1,590 | 720 | 1,590 | 540 | 1,270 | 430 |
| 汎用条件 General | RE0.5×1 | 31,800 | 2,540 | 31,800 | 2,540 | 23,900 | 1,910 | 23,900 | 1,910 | 23,900 | 1,200 | 19,100 | 960 |
| | RE1×2 | 15,900 | 1,910 | 15,900 | 1,910 | 11,900 | 1,430 | 11,900 | 1,430 | 11,900 | 950 | 9,550 | 760 |
| | RE1.5×3 | 10,600 | 1,700 | 10,600 | 1,700 | 7,960 | 1,270 | 7,960 | 1,270 | 7,960 | 800 | 6,370 | 700 |
| | RE2×4 | 7,960 | 1,590 | 7,960 | 1,590 | 5,970 | 1,190 | 5,970 | 1,190 | 5,970 | 840 | 4,770 | 670 |
| | RE3×6 | 5,310 | 1,490 | 5,310 | 1,490 | 3,980 | 1,110 | 3,980 | 1,110 | 3,980 | 720 | 3,180 | 570 |
| | RE4×8 | 3,980 | 1,270 | 3,980 | 1,270 | 2,980 | 950 | 2,980 | 950 | 2,980 | 660 | 2,390 | 530 |
| | RE5×10 | 3,180 | 1,140 | 3,180 | 1,140 | 2,390 | 860 | 2,390 | 860 | 2,390 | 620 | 1,910 | 500 |
| | RE6×12 | 2,650 | 1,060 | 2,650 | 1,060 | 1,990 | 800 | 1,990 | 800 | 1,990 | 600 | 1,590 | 480 |
| | RE8×16 | 1,990 | 900 | 1,990 | 900 | 1,490 | 670 | 1,490 | 670 | 1,490 | 510 | 1,190 | 400 |
| | RE10×20 | 1,590 | 720 | 1,590 | 720 | 1,190 | 540 | 1,190 | 540 | 1,190 | 400 | 950 | 320 |
| | RE12.5×25 | 1,270 | 570 | 1,270 | 570 | 950 | 430 | 950 | 430 | 950 | 320 | 760 | 260 |

## ＜仕上げ加工＞ Finishing

| 被削材 Work material | | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | ステンレス鋼・工具鋼 Stainless steels,Tool steels (25～35HRC) SUS304、SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | |
| ボール半径RE×外径DC Tool dia.(mm) | | 回転数n (min-1) | 送り速度Vf (mm/min) | 回転数n (min-1) | 送り速度Vf (mm/min) | 回転数n (min-1) | 送り速度Vf (mm/min) | 回転数n (min-1) | 送り速度Vf (mm/min) | 回転数n (min-1) | 送り速度Vf (mm/min) | 回転数n (min-1) | 送り速度Vf (mm/min) |
| 高速条件 High speed | RE0.5×1 | 47,700 | 3,820 | 47,700 | 3,820 | 47,700 | 3,820 | 47,700 | 3,820 | 47,700 | 2,390 | 39,800 | 1,990 |
| | RE1×2 | 23,900 | 2,870 | 23,900 | 2,870 | 23,900 | 2,870 | 23,900 | 2,870 | 23,900 | 1,910 | 19,900 | 1,590 |
| | RE1.5×3 | 15,900 | 2,550 | 15,900 | 2,550 | 15,900 | 2,550 | 15,900 | 2,550 | 15,900 | 1,750 | 13,300 | 1,460 |
| | RE2×4 | 11,900 | 2,390 | 11,900 | 2,390 | 11,900 | 2,390 | 11,900 | 2,390 | 11,900 | 1,670 | 9,950 | 1,390 |
| | RE3×6 | 7,960 | 2,230 | 7,960 | 2,230 | 7,960 | 2,230 | 7,960 | 2,230 | 7,960 | 1,430 | 6,630 | 1,190 |
| | RE4×8 | 5,970 | 1,910 | 5,970 | 1,910 | 5,970 | 1,910 | 5,970 | 1,910 | 5,970 | 1,310 | 4,980 | 1,100 |
| | RE5×10 | 4,770 | 1,720 | 4,770 | 1,720 | 4,770 | 1,720 | 4,770 | 1,720 | 4,770 | 1,240 | 3,980 | 1,030 |
| | RE6×12 | 3,980 | 1,590 | 3,980 | 1,590 | 3,980 | 1,590 | 3,980 | 1,590 | 3,980 | 1,190 | 3,320 | 1,000 |
| | RE8×16 | 2,980 | 1,340 | 2,980 | 1,340 | 2,980 | 1,340 | 2,980 | 1,340 | 2,980 | 1,010 | 2,490 | 850 |
| | RE10×20 | 2,390 | 1,070 | 2,390 | 1,070 | 2,390 | 1,070 | 2,390 | 1,070 | 2,390 | 810 | 1,990 | 680 |
| | RE12.5×25 | 1,910 | 860 | 1,910 | 860 | 1,910 | 860 | 1,910 | 860 | 1,910 | 650 | 1,590 | 540 |
| 汎用条件 General | RE0.5×1 | 31,800 | 2,540 | 31,800 | 2,540 | 31,800 | 2,540 | 31,800 | 2,540 | 31,800 | 1,590 | 23,900 | 1,200 |
| | RE1×2 | 15,900 | 1,910 | 15,900 | 1,910 | 15,900 | 1,910 | 15,900 | 1,910 | 15,900 | 1,270 | 11,900 | 950 |
| | RE1.5×3 | 10,600 | 1,700 | 10,600 | 1,700 | 10,600 | 1,700 | 10,600 | 1,700 | 10,600 | 1,170 | 7,960 | 880 |
| | RE2×4 | 7,960 | 1,590 | 7,960 | 1,590 | 7,960 | 1,590 | 7,960 | 1,590 | 7,960 | 1,110 | 5,970 | 840 |
| | RE3×6 | 5,310 | 1,490 | 5,310 | 1,490 | 5,310 | 1,490 | 5,310 | 1,490 | 5,300 | 950 | 3,980 | 720 |
| | RE4×8 | 3,980 | 1,270 | 3,980 | 1,270 | 3,980 | 1,270 | 3,980 | 1,270 | 3,980 | 880 | 2,980 | 660 |
| | RE5×10 | 3,180 | 1,140 | 3,180 | 1,140 | 3,180 | 1,140 | 3,180 | 1,140 | 3,180 | 830 | 2,390 | 620 |
| | RE6×12 | 2,650 | 1,060 | 2,650 | 1,060 | 2,650 | 1,060 | 2,650 | 1,060 | 2,650 | 800 | 1,990 | 600 |
| | RE8×16 | 1,990 | 900 | 1,990 | 900 | 1,990 | 900 | 1,990 | 900 | 1,990 | 680 | 1,490 | 510 |
| | RE10×20 | 1,590 | 720 | 1,590 | 720 | 1,590 | 720 | 1,590 | 720 | 1,590 | 540 | 1,190 | 400 |
| | RE12.5×25 | 1,270 | 570 | 1,270 | 570 | 1,270 | 570 | 1,270 | 570 | 1,270 | 430 | 950 | 320 |

【注意】
①被削材、加工形状に合わせて、適切なクーラントを使用してください。
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⑤安定した切削を行うため、剛性の高い機械とセットアップでご使用ください。
⑥機械の回転数が足りない場合は、主軸回転数とテーブル送り速度を同比率で下げてください。
⑦加工形状、機械の剛性、工具突き出し量等、ご使用の状況により、主軸回転数とテーブル送り速度の調整を行ってください。

【Note】
① Use the appropriate coolant for the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
③ Down-cutting is recommended.
④ Use generally dry (air-blow) or oil-mist coolant, especially at the high-speed machining.
⑤ Use a machine tool with rigidity and rigid set-up, to machine stably.
⑥ When the revolution speed is not enough, reduce the revolution speed and table speed at the same ratio.
⑦ Adjust the revolution speed and table speed, according to cutting conditions such as machining shape, rigidity of machine tool, over-hang and so on.

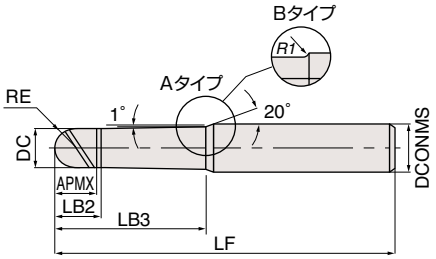
# C Coating Carbide Ball End Mills for Long Reach Die Sinking
# 超硬・Cコート深彫り用ボールエンドミル

## テーパネック　Taper Neck

彫込み Die-sinking　曲面 Profiling　R Radius　ヘリカル Helical　取りのこし Rest Material Machining　玉プチ Corner Recessing　中仕上 Semi Finishing　仕上 Finishing

RE公差 RE tolerance　±0.02　h6

(mm)




2枚刃 2Flutes

### BESL2○○○-C

超硬 Carbide　C　なじれ30° Helix angle　切削条件表 A419 Cutting Conditions

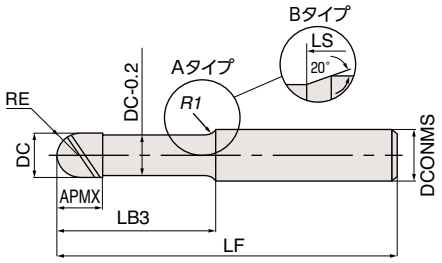
| 商品コード Item Code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball Radius RE | 外径 Tool dia. DC | 刃長 Flute length APMX | LB2 | LB3 | 全長 Overall length LF | シャンク径 Flute length DCONMS | 形状 shape | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|---|
| BESL2030-C | | 1.5 | 3 | 4 | 5 | 35 | 100 | 6 | A | — |
| BESL2040-C | | 2 | 4 | 6 | 7 | 35 | 100 | 6 | A | — |
| BESL2050-C | | 2.5 | 5 | 7 | 8 | 40 | 115 | 8 | A | — |
| BESL2060-C | | 3 | 6 | 8 | 9 | 45 | 115 | 8 | A | — |
| BESL2070-C | △ | 3.5 | 7 | 10 | 11 | 45 | 125 | 10 | A | 26,040 |
| BESL2080-C | | 4 | 8 | 12 | 13 | 55 | 125 | 10 | A | — |
| BESL2100-C | | 5 | 10 | 15 | 16 | 65 | 140 | 12 | B | — |
| BESL2120-C | | 6 | 12 | 18 | 19 | 75 | 150 | 16 | A | — |

## ストレートネック　Straight Neck

彫込み Die-sinking　曲面 Profiling　R Radius　ヘリカル Helical　取りのこし Rest Material Machining　玉プチ Corner Recessing　中仕上 Semi Finishing　仕上 Finishing

RE公差 RE tolerance　±0.02　h6

(mm)




2枚刃 2Flutes

### BESL2○○○-S-C

超硬 Carbide　C　なじれ30° Helix angle　切削条件表 A420 Cutting Conditions

| 商品コード Item Code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball Radius RE | 外径 Tool dia. DC | 刃長 Flute length APMX | LB3 | 全長 Overall length LF | シャンク径 Flute length DCONMS | 形状 Shape | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|
| BESL2030-S-C | | 1.5 | 3 | 4 | 35 | 100 | 6 | B | — |
| BESL2040-S-C | | 2 | 4 | 6 | 35 | 100 | 6 | B | — |
| BESL2050-S-C | | 2.5 | 5 | 7 | 40 | 115 | 6 | B | — |
| BESL2060-S-C | | 3 | 6 | 8 | 45 | 115 | 6 | A | — |
| BESL2070-S-C | △ | 3.5 | 7 | 10 | 45 | 125 | 8 | B | 26,040 |
| BESL2080-S-C | | 4 | 8 | 12 | 55 | 125 | 8 | A | — |
| BESL2100-S-C | | 5 | 10 | 15 | 65 | 140 | 10 | A | — |
| BESL2120-S-C | | 6 | 12 | 18 | 75 | 150 | 12 | A | — |
| BESL2160-S-C | △ | 8 | 16 | 24 | 80 | 150 | 16 | A | 85,290 |
| BESL2200-S-C | | 10 | 20 | 30 | 90 | 150 | 20 | A | — |
| BESL2250-S-C | | 12.5 | 25 | 37 | 110 | 180 | 25 | A | — |

## ○ BESL-C、BESL-S-C の対応被削材

Applicable work material of BESL-C, BESL-S-C

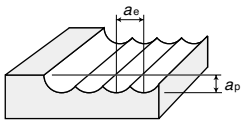
| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ |

△印：在庫が無くなり次第受注生産品となるものです。
△：When the Stock is out, will become to produce on request.

無印：受注生産品です。
No Mark:Manufactured upon request only.

# 標準切削条件表 Recommended cutting conditions

## BESL-C
テーパネック
Taper neck




### <荒加工> Roughing

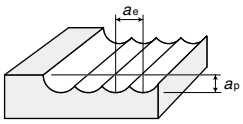
| 被削材 Work material | | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | ステンレス鋼・工具鋼 Stainless steels,Tool steels (25～35HRC) SUS304、SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | |
| ボール半径RE×外径DC Tool dia.(mm) | | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| 高速条件 High speed | RE1.5×3 | 15,900 | 2,550 | 15,900 | 2,550 | 13,300 | 2,130 | 13,300 | 2,130 | 13,300 | 1,460 | 10,600 | 1,170 |
| | RE2×4 | 11,900 | 2,390 | 11,900 | 2,390 | 9,950 | 1,990 | 9,950 | 1,990 | 9,950 | 1,390 | 7,960 | 1,110 |
| | RE3×6 | 7,960 | 2,230 | 7,960 | 2,230 | 6,630 | 1,860 | 6,630 | 1,860 | 6,630 | 1,190 | 5,300 | 950 |
| | RE4×8 | 5,970 | 1,910 | 5,970 | 1,910 | 4,980 | 1,590 | 4,980 | 1,590 | 4,980 | 1,100 | 3,980 | 880 |
| | RE5×10 | 4,770 | 1,720 | 4,770 | 1,720 | 3,980 | 1,430 | 3,980 | 1,430 | 3,980 | 1,030 | 3,180 | 830 |
| | RE6×12 | 3,980 | 1,590 | 3,980 | 1,590 | 3,320 | 1,330 | 3,320 | 1,330 | 3,320 | 1,000 | 2,650 | 800 |
| 汎用条件 General | RE1.5×3 | 10,600 | 1,700 | 10,600 | 1,700 | 7,960 | 1,270 | 7,960 | 1,270 | 7,960 | 800 | 6,370 | 700 |
| | RE2×4 | 7,960 | 1,590 | 7,960 | 1,590 | 5,970 | 1,190 | 5,970 | 1,190 | 5,970 | 840 | 4,770 | 670 |
| | RE3×6 | 5,310 | 1,490 | 5,310 | 1,490 | 3,980 | 1,110 | 3,980 | 1,110 | 3,980 | 720 | 3,180 | 570 |
| | RE4×8 | 3,980 | 1,270 | 3,980 | 1,270 | 2,980 | 950 | 2,980 | 950 | 2,980 | 660 | 2,390 | 530 |
| | RE5×10 | 3,180 | 1,140 | 3,180 | 1,140 | 2,390 | 860 | 2,390 | 860 | 2,390 | 620 | 1,910 | 500 |
| | RE6×12 | 2,650 | 1,060 | 2,650 | 1,060 | 1,990 | 800 | 1,990 | 800 | 1,990 | 600 | 1,590 | 480 |

### <仕上げ加工> Finishing

| 被削材 Work material | | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | ステンレス鋼・工具鋼 Stainless steels,Tool steels (25～35HRC) SUS304、SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | |
| ボール半径RE×外径DC Tool dia.(mm) | | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| 高速条件 High speed | RE1.5×3 | 15,900 | 2,550 | 15,900 | 2,550 | 15,900 | 2,550 | 15,900 | 2,550 | 15,900 | 1,750 | 13,300 | 1,460 |
| | RE2×4 | 11,900 | 2,390 | 11,900 | 2,390 | 11,900 | 2,390 | 11,900 | 2,390 | 11,900 | 1,670 | 9,950 | 1,390 |
| | RE3×6 | 7,960 | 2,230 | 7,960 | 2,230 | 7,960 | 2,230 | 7,960 | 2,230 | 7,960 | 1,430 | 6,630 | 1,190 |
| | RE4×8 | 5,970 | 1,910 | 5,970 | 1,910 | 5,970 | 1,910 | 5,970 | 1,910 | 5,970 | 1,310 | 4,980 | 1,100 |
| | RE5×10 | 4,770 | 1,720 | 4,770 | 1,720 | 4,770 | 1,720 | 4,770 | 1,720 | 4,770 | 1,240 | 3,980 | 1,030 |
| | RE6×12 | 3,980 | 1,590 | 3,980 | 1,590 | 3,980 | 1,590 | 3,980 | 1,590 | 3,980 | 1,190 | 3,320 | 1,000 |
| 汎用条件 General | RE1.5×3 | 10,600 | 1,700 | 10,600 | 1,700 | 10,600 | 1,700 | 10,600 | 1,700 | 10,600 | 1,170 | 7,960 | 880 |
| | RE2×4 | 7,960 | 1,590 | 7,960 | 1,590 | 7,960 | 1,590 | 7,960 | 1,590 | 7,960 | 1,110 | 5,970 | 840 |
| | RE3×6 | 5,310 | 1,490 | 5,310 | 1,490 | 5,310 | 1,490 | 5,310 | 1,490 | 5,300 | 950 | 3,980 | 720 |
| | RE4×8 | 3,980 | 1,270 | 3,980 | 1,270 | 3,980 | 1,270 | 3,980 | 1,270 | 3,980 | 880 | 2,980 | 660 |
| | RE5×10 | 3,180 | 1,140 | 3,180 | 1,140 | 3,180 | 1,140 | 3,180 | 1,140 | 3,180 | 830 | 2,390 | 620 |
| | RE6×12 | 2,650 | 1,060 | 2,650 | 1,060 | 2,650 | 1,060 | 2,650 | 1,060 | 2,650 | 800 | 1,990 | 600 |

# C Coating Carbide Ball End Mills for Long Reach Die Sinking
# 超硬・Cコート深彫り用ボールエンドミル

## BESL-S-C
ストレートネック
Straight neck




### <荒加工> Roughing

| 被削材 Work material | | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | ステンレス鋼・工具鋼 Stainless steels,Tool steels (25～35HRC) SUS304、SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | |
| ボール半径RE×外径DC Tool dia.(mm) | | 回転数n (min-1) | 送り速度Vf (mm/min) | 回転数n (min-1) | 送り速度Vf (mm/min) | 回転数n (min-1) | 送り速度Vf (mm/min) | 回転数n (min-1) | 送り速度Vf (mm/min) | 回転数n (min-1) | 送り速度Vf (mm/min) | 回転数n (min-1) | 送り速度Vf (mm/min) |
| 高速条件 High speed | RE1.5×3 | 15,900 | 2,550 | 15,900 | 2,550 | 13,300 | 2,130 | 13,300 | 2,130 | 13,300 | 1,460 | 10,600 | 1,170 |
| | RE2×4 | 11,900 | 2,390 | 11,900 | 2,390 | 9,950 | 1,990 | 9,950 | 1,990 | 9,950 | 1,390 | 7,960 | 1,110 |
| | RE3×6 | 7,960 | 2,230 | 7,960 | 2,230 | 6,630 | 1,860 | 6,630 | 1,860 | 6,630 | 1,190 | 5,300 | 950 |
| | RE4×8 | 5,970 | 1,910 | 5,970 | 1,910 | 4,980 | 1,590 | 4,980 | 1,590 | 4,980 | 1,100 | 3,980 | 880 |
| | RE5×10 | 4,770 | 1,720 | 4,770 | 1,720 | 3,980 | 1,430 | 3,980 | 1,430 | 3,980 | 1,030 | 3,180 | 830 |
| | RE6×12 | 3,980 | 1,590 | 3,980 | 1,590 | 3,320 | 1,330 | 3,320 | 1,330 | 3,320 | 1,000 | 2,650 | 800 |
| | RE8×16 | 2,980 | 1,340 | 2,980 | 1,340 | 2,490 | 1,120 | 2,490 | 1,120 | 2,490 | 850 | 1,990 | 680 |
| | RE10×20 | 2,390 | 1,070 | 2,390 | 1,070 | 1,990 | 900 | 1,990 | 900 | 1,990 | 680 | 1,590 | 540 |
| | RE12.5×25 | 1,910 | 860 | 1,910 | 860 | 1,590 | 720 | 1,590 | 720 | 1,590 | 540 | 1,270 | 430 |
| 汎用条件 General | RE1.5×3 | 10,600 | 1,700 | 10,600 | 1,700 | 7,960 | 1,270 | 7,960 | 1,270 | 7,960 | 800 | 6,370 | 700 |
| | RE2×4 | 7,960 | 1,590 | 7,960 | 1,590 | 5,970 | 1,190 | 5,970 | 1,190 | 5,970 | 840 | 4,770 | 670 |
| | RE3×6 | 5,310 | 1,490 | 5,310 | 1,490 | 3,980 | 1,110 | 3,980 | 1,110 | 3,980 | 720 | 3,180 | 570 |
| | RE4×8 | 3,980 | 1,270 | 3,980 | 1,270 | 2,980 | 950 | 2,980 | 950 | 2,980 | 660 | 2,390 | 530 |
| | RE5×10 | 3,180 | 1,140 | 3,180 | 1,140 | 2,390 | 860 | 2,390 | 860 | 2,390 | 620 | 1,910 | 500 |
| | RE6×12 | 2,650 | 1,060 | 2,650 | 1,060 | 1,990 | 800 | 1,990 | 800 | 1,990 | 600 | 1,590 | 480 |
| | RE8×16 | 1,990 | 900 | 1,990 | 900 | 1,490 | 670 | 1,490 | 670 | 1,490 | 510 | 1,190 | 400 |
| | RE10×20 | 1,590 | 720 | 1,590 | 720 | 1,190 | 540 | 1,190 | 540 | 1,190 | 400 | 950 | 320 |
| | RE12.5×25 | 1,270 | 570 | 1,270 | 570 | 950 | 430 | 950 | 430 | 950 | 320 | 760 | 260 |

### <仕上げ加工> Finishing

| 被削材 Work material | | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | ステンレス鋼・工具鋼 Stainless steels,Tool steels (25～35HRC) SUS304、SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | |
| ボール半径RE×外径DC Tool dia.(mm) | | 回転数n (min-1) | 送り速度Vf (mm/min) | 回転数n (min-1) | 送り速度Vf (mm/min) | 回転数n (min-1) | 送り速度Vf (mm/min) | 回転数n (min-1) | 送り速度Vf (mm/min) | 回転数n (min-1) | 送り速度Vf (mm/min) | 回転数n (min-1) | 送り速度Vf (mm/min) |
| 高速条件 High speed | RE1.5×3 | 15,900 | 2,550 | 15,900 | 2,550 | 15,900 | 2,550 | 15,900 | 2,550 | 15,900 | 1,750 | 13,300 | 1,460 |
| | RE2×4 | 11,900 | 2,390 | 11,900 | 2,390 | 11,900 | 2,390 | 11,900 | 2,390 | 11,900 | 1,670 | 9,950 | 1,390 |
| | RE3×6 | 7,960 | 2,230 | 7,960 | 2,230 | 7,960 | 2,230 | 7,960 | 2,230 | 7,960 | 1,430 | 6,630 | 1,190 |
| | RE4×8 | 5,970 | 1,910 | 5,970 | 1,910 | 5,970 | 1,910 | 5,970 | 1,910 | 5,970 | 1,310 | 4,980 | 1,100 |
| | RE5×10 | 4,770 | 1,720 | 4,770 | 1,720 | 4,770 | 1,720 | 4,770 | 1,720 | 4,770 | 1,240 | 3,980 | 1,030 |
| | RE6×12 | 3,980 | 1,590 | 3,980 | 1,590 | 3,980 | 1,590 | 3,980 | 1,590 | 3,980 | 1,190 | 3,320 | 1,000 |
| | RE8×16 | 2,980 | 1,340 | 2,980 | 1,340 | 2,980 | 1,340 | 2,980 | 1,340 | 2,980 | 1,010 | 2,490 | 850 |
| | RE10×20 | 2,390 | 1,070 | 2,390 | 1,070 | 2,390 | 1,070 | 2,390 | 1,070 | 2,390 | 810 | 1,990 | 680 |
| | RE12.5×25 | 1,910 | 860 | 1,910 | 860 | 1,910 | 860 | 1,910 | 860 | 1,910 | 650 | 1,590 | 540 |
| 汎用条件 General | RE1.5×3 | 10,600 | 1,700 | 10,600 | 1,700 | 10,600 | 1,700 | 10,600 | 1,700 | 10,600 | 1,170 | 7,960 | 880 |
| | RE2×4 | 7,960 | 1,590 | 7,960 | 1,590 | 7,960 | 1,590 | 7,960 | 1,590 | 7,960 | 1,110 | 5,970 | 840 |
| | RE3×6 | 5,310 | 1,490 | 5,310 | 1,490 | 5,310 | 1,490 | 5,310 | 1,490 | 5,300 | 950 | 3,980 | 720 |
| | RE4×8 | 3,980 | 1,270 | 3,980 | 1,270 | 3,980 | 1,270 | 3,980 | 1,270 | 3,980 | 880 | 2,980 | 660 |
| | RE5×10 | 3,180 | 1,140 | 3,180 | 1,140 | 3,180 | 1,140 | 3,180 | 1,140 | 3,180 | 830 | 2,390 | 620 |
| | RE6×12 | 2,650 | 1,060 | 2,650 | 1,060 | 2,650 | 1,060 | 2,650 | 1,060 | 2,650 | 800 | 1,990 | 600 |
| | RE8×16 | 1,990 | 900 | 1,990 | 900 | 1,990 | 900 | 1,990 | 900 | 1,990 | 680 | 1,490 | 510 |
| | RE10×20 | 1,590 | 720 | 1,590 | 720 | 1,590 | 720 | 1,590 | 720 | 1,590 | 540 | 1,190 | 400 |
| | RE12.5×25 | 1,270 | 570 | 1,270 | 570 | 1,270 | 570 | 1,270 | 570 | 1,270 | 430 | 950 | 320 |

【注意】
①切削方法は、ダウンカットで使用ください。
②一般材、とくに高速切削は、乾式（エアブロー）またはオイルミストクーラントにてご使用ください。
③ステンレス鋼および超耐熱合金には、不水溶性切削油のご使用が適しています。
④安定した切削を行うため、剛性の高い機械とセットアップでご使用ください。
⑤機械の回転数が足りない場合は、主軸回転数とテーブル送り速度を同比率で下げてください。
⑥加工形状、機械の剛性、工具突き出し量等、ご使用の状況により、主軸回転数とテーブル送り速度の調整を行ってください。

【Note】
① Down-cutting is recommended.
② Use generally dry (air-blow) or oil-mist coolant, especially at the high-speed machining.
③ Oil base coolant is recommended for machining stainless steels and heat-resistant alloys.
④ Use a machine tool with rigidity and rigid set-up, to machine stably.
⑤ When the revolution speed is not enough, reduce the revolution speed and table speed at the same ratio.
⑥ Adjust the revolution speed and table speed, according to cutting conditions such as machining shape, rigidity of machine tool, over-hang and so on.

# 超硬ボールエンドミル

## ミニチュア　Miniature type

彫込み Die-sinking　曲面 Profiling　R Radius　ヘリカル Helical　細部 Miniature　中仕上 Semi Finishing　仕上 Finishing

RE公差 RE tolerance　±0.01　h6　(mm)

2枚刃 2Flutes

### BESS2○○○

超硬 Carbide　ねじれ30° Helix angle

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius | 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|---|
| BESS2003 | □ | 0.15 | 0.3 | 0.45 | 50 | 3 |
| BESS2004 | □ | 0.2 | 0.4 | 0.6 | 50 | 3 |
| BESS2005 | □ | 0.25 | 0.5 | 0.75 | 50 | 3 |
| BESS2006 | □ | 0.3 | 0.6 | 0.9 | 50 | 3 |
| BESS2007 | □ | 0.35 | 0.7 | 1 | 50 | 3 |
| BESS2008 | □ | 0.4 | 0.8 | 1.2 | 50 | 3 |
| BESS2009 | □ | 0.45 | 0.9 | 1.3 | 50 | 3 |
| BESS2010 | □ | 0.5 | 1 | 1.5 | 50 | 4 |
| BESS2011 | □ | 0.55 | 1.1 | 1.7 | 50 | 4 |
| BESS2012 | □ | 0.6 | 1.2 | 1.8 | 50 | 4 |
| BESS2013 | □ | 0.65 | 1.3 | 2 | 50 | 4 |
| BESS2014 | □ | 0.7 | 1.4 | 2.1 | 50 | 4 |
| BESS2015 | □ | 0.75 | 1.5 | 2.3 | 50 | 4 |
| BESS2016 | □ | 0.8 | 1.6 | 2.4 | 50 | 4 |
| BESS2017 | □ | 0.85 | 1.7 | 2.6 | 50 | 4 |
| BESS2018 | □ | 0.9 | 1.8 | 2.7 | 50 | 4 |
| BESS2019 | □ | 0.95 | 1.9 | 2.9 | 50 | 4 |
| BESS2020 | □ | 1 | 2 | 3 | 50 | 4 |
| BESS2021 | □ | 1.05 | 2.1 | 3.2 | 50 | 4 |
| BESS2022 | □ | 1.1 | 2.2 | 3.3 | 50 | 4 |
| BESS2023 | □ | 1.15 | 2.3 | 3.5 | 50 | 4 |
| BESS2024 | □ | 1.2 | 2.4 | 3.6 | 50 | 4 |
| BESS2025 | □ | 1.25 | 2.5 | 3.8 | 50 | 4 |
| BESS2026 | □ | 1.3 | 2.6 | 3.9 | 55 | 6 |
| BESS2027 | □ | 1.35 | 2.7 | 4.1 | 55 | 6 |
| BESS2028 | □ | 1.4 | 2.8 | 4.2 | 55 | 6 |
| BESS2029 | □ | 1.45 | 2.9 | 4.4 | 55 | 6 |
| BESS2030 | □ | 1.5 | 3 | 4.5 | 55 | 6 |

## BESS、BES、BES-Mの対応被削材

Applicable work material of BESS, BES, BES-M

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ○ | ○ | | | | ○ | ○ | ◎ | ◎ |

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□：Stocked by specified distributor. Contact with our sales department.

## 彫込み Die-sinking　曲面 Profiling　R Radius　ヘリカル Helical　中仕上 Semi Finishing　仕上 Finishing

RE公差 RE tolerance　±0.02　h6　(mm)

2枚刃 2Flutes

### BES2○○○

超硬 Carbide　ねじれ30° Helix angle

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius | 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|---|
| BES2010 | □ | 0.5 | 1 | 2.5 | 50 | 4 |
| BES2020 | □ | 1 | 2 | 5 | 50 | 6 |
| BES2030 | □ | 1.5 | 3 | 8 | 70 | 6 |
| BES2040 | □ | 2 | 4 | 12 | 70 | 6 |
| BES2050 | □ | 2.5 | 5 | 15 | 80 | 6 |
| BES2060 | □ | 3 | 6 | 15 | 90 | 6 |
| BES2070 | □ | 3.5 | 7 | 20 | 90 | 6 |
| BES2080 | □ | 4 | 8 | 20 | 100 | 8 |
| BES2100 | □ | 5 | 10 | 25 | 100 | 10 |
| BES2120 | □ | 6 | 12 | 30 | 110 | 12 |
| BES2140 | □ | 7 | 14 | 35 | 120 | 12 |
| BES2160 | □ | 8 | 16 | 40 | 140 | 16 |
| BES2180 | □ | 9 | 18 | 40 | 140 | 16 |
| BES2200 | □ | 10 | 20 | 45 | 160 | 20 |
| BES2250 | □ | 12.5 | 25 | 50 | 180 | 25 |

## プラ型用　for Plastic Mold

彫込み Die-sinking　曲面 Profiling　R Radius　ヘリカル Helical　中仕上 Semi Finishing　仕上 Finishing

RE公差 RE tolerance　±0.02　h6　(mm)

2枚刃 2Flutes

### BES2○○○M

超硬 Carbide　ねじれ30° Helix angle

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius | 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|---|
| BES2010M | □ | 0.5 | 1 | 2.5 | 50 | 4 |
| BES2020M | □ | 1 | 2 | 5 | 50 | 4 |
| BES2030M | □ | 1.5 | 3 | 8 | 70 | 6 |
| BES2040M | □ | 2 | 4 | 12 | 70 | 6 |
| BES2050M | □ | 2.5 | 5 | 15 | 80 | 6 |
| BES2060M | □ | 3 | 6 | 15 | 80 | 6 |
| BES2070M | □ | 3.5 | 7 | 20 | 90 | 8 |
| BES2080M | □ | 4 | 8 | 20 | 90 | 8 |
| BES2100M | □ | 5 | 10 | 25 | 100 | 10 |
| BES2120M | □ | 6 | 12 | 30 | 110 | 12 |
| BES2140M | □ | 7 | 14 | 35 | 120 | 12 |
| BES2160M | □ | 8 | 16 | 40 | 120 | 16 |
| BES2180M | □ | 9 | 18 | 40 | 130 | 16 |
| BES2200M | □ | 10 | 20 | 45 | 130 | 20 |

# CS Coating Carbide End Mill Ball / Jet Ball
# CSコート超硬エンドミル ボール / ジェットボール®

彫込み Die-sinking | 曲面 Profiling | R Radius | ヘリカル Helical | 中仕上 Semi Finishing | 仕上 Finishing

RE公差 RE tolerance: RE≦6：±0.005, 6<RE：±0.01 | h5 | (mm)

超硬 Carbide | CS | ねじれ30° Helix angle | 切削条件表 A422 Cutting Conditions

2枚刃 2Flutes

## YB2○○○-CS

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|
| YB2010-CS | □ | 0.5 | 1.5 | 50 | 4 |
| YB2015-CS | □ | 0.75 | 2.3 | 50 | 4 |
| YB2020-CS | □ | 1 | 3 | 60 | 6 |
| YB2030-CS | □ | 1.5 | 4.5 | 60 | 6 |
| YB2040-CS | □ | 2 | 6 | 70 | 6 |
| YB2050-CS | □ | 2.5 | 7.5 | 80 | 6 |
| YB2060-CS | □ | 3 | 9 | 90 | 6 |
| YB2080-CS | □ | 4 | 12 | 100 | 8 |
| YB2100-CS | □ | 5 | 15 | 100 | 10 |
| YB2120-CS | □ | 6 | 18 | 110 | 12 |
| YB2160-CS | □ | 8 | 24 | 140 | 16 |
| YB2200-CS | □ | 10 | 30 | 160 | 20 |

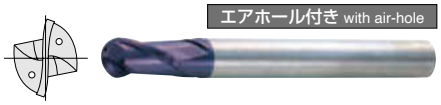
## レギュラー刃長 Regular

彫込み Die-sinking | 曲面 Profiling | R Radius | ヘリカル Helical | 中仕上 Semi Finishing | 仕上 Finishing

RE公差 RE tolerance: ±0.01 | h6 | (mm)

超硬 Carbide | C | ねじれ30° Helix angle | 切削条件表 A423 Cutting Conditions

エアホール付き with air-hole



## JBER2○○○

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|
| JBER2060 | □ | 3 | 9 | 90 | 6 |
| JBER2080 | □ | 4 | 12 | 100 | 8 |
| JBER2100 | □ | 5 | 15 | 100 | 10 |
| JBER2120 | □ | 6 | 18 | 110 | 12 |
| JBER2160 | □ | 8 | 24 | 140 | 16 |
| JBER2200 | □ | 10 | 30 | 160 | 20 |

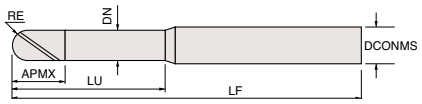
## 深彫り用・ストレートネック for Long-Reach Die Sinking, Straight neck

彫込み Die-sinking | 曲面 Profiling | R Radius | ヘリカル Helical | 取りのこし Rest Material Machining | 玉プチ Corner Recessing | 中仕上 Semi Finishing | 仕上 Finishing

RE公差 RE tolerance: ±0.015 | h6 | (mm)

超硬 Carbide | C | ねじれ30° Helix angle | 切削条件表 A424 Cutting Conditions

エアホール付き with air-hole



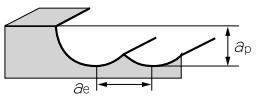

## JBELS2○○○

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius RE | 刃長 Flute length APMX | 首径 Neck dia. DN | 首下長 Under neck length LU | 全長 Overall length LF | シャンク径 Shank dia. DCONMS |
|---|---|---|---|---|---|---|---|
| JBELS2060 | □ | 3 | 8 | 5.8 | 45 | 115 | 6 |
| JBELS2080 | □ | 4 | 12 | 7.8 | 55 | 125 | 8 |
| JBELS2100 | □ | 5 | 15 | 9.8 | 65 | 140 | 10 |
| JBELS2120 | □ | 6 | 18 | 11.8 | 80 | 160 | 12 |
| JBELS2160 | □ | 8 | 24 | 15.8 | 115 | 200 | 16 |
| JBELS2200 | □ | 10 | 30 | 19.8 | 115 | 200 | 20 |

## 標準切削条件表 Recommended cutting conditions

### YB-CS

切込み Depth of cut (mm)




| RE | ap | ae |
|---|---|---|
| RE≦1.0 | 0.05×RE以下 | 0.2×RE以下 |
| 1.0<RE | 0.1×RE以下 | 0.2×RE以下 |

| 被削材 Work material | | 銅合金・アルミ合金 Copper alloys, Aluminum alloys | | 鋳鉄・炭素鋼 Cast irons, Carbon steels FC200、SS400、S50C | | 合金鋼・工具鋼 Alloy steels, Tool steels SCM、SKD、ARK1 | | プリハードン鋼・焼入れ鋼 Pre-hardened steels, Hardened steels CENA1、NAK80、SKD | | 焼入れ鋼 Hardened steels SKD1、HPM38、Stavax | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 硬度 Hardness | | — | | ～250HB | | 25～35HRC | | 35～45HRC | | 45～55HRC | |
| 切削条件 Conditions | | vc=150～250m/min | | vc=150～250m/min | | vc=125～225m/min | | vc=100～200m/min | | vc=75～175m/min | |
| ボール半径 RE mm | 外径 DC mm | 回転数n Revolution min-1 | 送り速度vf Table Speed mm/min | 回転数n Revolution min-1 | 送り速度vf Table Speed mm/min | 回転数n Revolution min-1 | 送り速度vf Table Speed mm/min | 回転数n Revolution min-1 | 送り速度vf Table Speed mm/min | 回転数n Revolution min-1 | 送り速度vf Table Speed mm/min |
| RE0.5 | 1.0 | 50,000 | 3,350 | 31,800 | 572 | 27,900 | 502 | 23,900 | 430 | 19,900 | 358 |
| RE1 | 2 | 35,000 | 3,350 | 31,800 | 1,910 | 27,900 | 1,670 | 23,900 | 1,430 | 19,900 | 1,190 |
| RE2 | 4 | 17,500 | 4,080 | 15,900 | 1,910 | 13,900 | 1,670 | 11,900 | 1,430 | 9,950 | 1,190 |
| RE3 | 6 | 11,700 | 5,160 | 10,600 | 1,910 | 9,280 | 1,670 | 7,960 | 1,430 | 6,630 | 1,190 |
| RE4 | 8 | 8,760 | 3,840 | 7,960 | 1,910 | 6,960 | 1,670 | 5,970 | 1,430 | 4,970 | 1,190 |
| RE5 | 10 | 7,100 | 3,120 | 6,370 | 1,780 | 5,570 | 1,560 | 4,770 | 1,340 | 3,980 | 1,110 |
| RE6 | 12 | 5,850 | 2,580 | 5,310 | 1,590 | 4,640 | 1,390 | 3,980 | 1,190 | 3,320 | 996 |
| RE8 | 16 | 4,400 | 1,550 | 4,000 | 1,300 | 3,500 | 1,050 | 3,000 | 900 | 2,500 | 750 |
| RE10 | 20 | 3,520 | 1,240 | 3,200 | 1,000 | 2,800 | 840 | 2,400 | 720 | 2,000 | 600 |

【注意】
①切削方法はダウンカットでご使用ください。
②乾式切削の場合はエアブローを推奨いたします。
③安定した切削を行うため、剛性の高い機械とホルダでセットアップし、ご使用ください。
④突出し長さ、切込み量、機械の剛性等の使用状況により、回転数と送り速度の調整を行って下さい。
⑤回転数が不足する場合は、回転数と送り速度を同比率で下げてください。

【Note】
① Please use down-cutting . Air-blow is recommended in case of dry-machining.
② Please use a machine with high rigidity and perfect set-up to perform stable machining.
③ The table shows starting conditions. Please adjust revolution speed and feed speed according to over -hang, depth of cut and conditions of machine.
④ Please reduce feed speed at the same rate in case of lower spindle revolution.

## YB-CS の対応被削材

Applicable work material of YB-CS

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦45HRC | 高硬度 Hardened steel >45HRC ≦55HRC | 高硬度 Hardened steel >55HRC ≦65HRC | 高硬度 Hardened steel >65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ○ | | | | ○ | ○ | ◎ | ◎ |

## JBER、JBELS の対応被削材

Applicable work material of JBER, JBELS

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦45HRC | 高硬度 Hardened steel >45HRC ≦55HRC | 高硬度 Hardened steel >55HRC ≦65HRC | 高硬度 Hardened steel >65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ |

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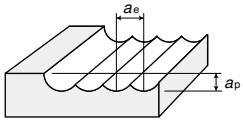
# 標準切削条件表 Recommended cutting conditions

**JBER**
レギュラー刃長
Regular




## <荒加工> Roughing

| 被削材 Work material | | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | 工具鋼 Tool steels (25～35HRC) SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | | 焼入れ鋼 Hardened steels (55～65HRC) SKD11、SKH51 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | |
| ボール半径RE×外径DC Tool dia.(mm) | | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) |
| 高速条件 High speed | RE3×6 | 15,900 | 4,450 | 15,900 | 4,450 | 13,300 | 3,720 | 13,300 | 3,720 | 13,300 | 2,390 | 10,600 | 1,910 | 7,960 | 1,430 |
| | RE4×8 | 11,900 | 3,810 | 11,900 | 3,810 | 9,950 | 3,180 | 9,950 | 3,180 | 9,950 | 2,190 | 7,960 | 1,750 | 5,970 | 1,310 |
| | RE5×10 | 9,550 | 3,440 | 9,550 | 3,440 | 7,960 | 2,870 | 7,960 | 2,870 | 7,960 | 2,070 | 6,370 | 1,660 | 4,770 | 1,240 |
| | RE6×12 | 7,960 | 3,180 | 7,960 | 3,180 | 6,630 | 2,650 | 6,630 | 2,650 | 6,630 | 1,990 | 5,310 | 1,590 | 3,980 | 1,190 |
| | RE8×16 | 5,970 | 2,690 | 5,970 | 2,690 | 4,970 | 2,240 | 4,970 | 2,240 | 4,970 | 1,690 | 3,980 | 1,350 | 2,980 | 1,010 |
| | RE10×20 | 4,770 | 2,150 | 4,770 | 2,150 | 3,980 | 1,790 | 3,980 | 1,790 | 3,980 | 1,350 | 3,180 | 1,080 | 2,390 | 810 |
| 汎用条件 General | RE3×6 | 10,600 | 2,970 | 10,600 | 2,970 | 7,960 | 2,230 | 7,960 | 2,230 | 7,960 | 1,430 | 6,370 | 1,150 | 4,780 | 860 |
| | RE4×8 | 7,960 | 2,550 | 7,960 | 2,550 | 5,970 | 1,910 | 5,970 | 1,910 | 5,970 | 1,310 | 4,780 | 1,050 | 3,580 | 790 |
| | RE5×10 | 6,370 | 2,290 | 6,370 | 2,290 | 4,770 | 1,720 | 4,770 | 1,720 | 4,770 | 1,240 | 3,820 | 990 | 2,870 | 750 |
| | RE6×12 | 5,310 | 2,120 | 5,310 | 2,120 | 3,980 | 1,590 | 3,980 | 1,590 | 3,980 | 1,190 | 3,180 | 960 | 2,390 | 720 |
| | RE8×16 | 3,980 | 1,790 | 3,980 | 1,790 | 2,980 | 1,340 | 2,980 | 1,340 | 2,980 | 1,010 | 2,390 | 810 | 1,790 | 610 |
| | RE10×20 | 3,180 | 1,430 | 3,180 | 1,430 | 2,390 | 1,070 | 2,390 | 1,070 | 2,390 | 810 | 1,910 | 650 | 1,430 | 490 |

## <仕上げ加工> Finishing

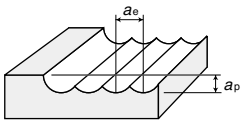
| 被削材 Work material | | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | 工具鋼 Tool steels (25～35HRC) SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | | 焼入れ鋼 Hardened steels (55～65HRC) SKD11、SKH51 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | |
| ボール半径RE×外径DC Tool dia.(mm) | | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) |
| 高速条件 High speed | RE3×6 | 15,900 | 4,450 | 15,900 | 4,450 | 15,900 | 4,450 | 15,900 | 4,450 | 15,900 | 2,860 | 13,300 | 2,390 | 10,600 | 1,910 |
| | RE4×8 | 11,900 | 3,810 | 11,900 | 3,810 | 11,900 | 3,810 | 11,900 | 3,810 | 11,900 | 2,620 | 9,950 | 2,190 | 7,960 | 1,750 |
| | RE5×10 | 9,550 | 3,440 | 9,550 | 3,440 | 9,550 | 3,440 | 9,550 | 3,440 | 9,550 | 2,480 | 7,960 | 2,070 | 6,370 | 1,660 |
| | RE6×12 | 7,960 | 3,180 | 7,960 | 3,180 | 7,960 | 3,180 | 7,960 | 3,180 | 7,960 | 2,390 | 6,630 | 1,990 | 5,310 | 1,590 |
| | RE8×16 | 5,970 | 2,690 | 5,970 | 2,690 | 5,970 | 2,690 | 5,970 | 2,690 | 5,970 | 2,030 | 4,970 | 1,690 | 3,980 | 1,350 |
| | RE10×20 | 4,770 | 2,150 | 4,770 | 2,150 | 4,770 | 2,150 | 4,770 | 2,150 | 4,770 | 1,620 | 3,980 | 1,350 | 3,180 | 1,080 |
| 汎用条件 General | RE3×6 | 10,600 | 2,970 | 10,600 | 2,970 | 10,600 | 2,970 | 10,600 | 2,970 | 10,600 | 1,910 | 7,960 | 1,430 | 6,370 | 1,150 |
| | RE4×8 | 7,960 | 2,550 | 7,960 | 2,550 | 7,960 | 2,550 | 7,960 | 2,550 | 7,960 | 1,750 | 5,970 | 1,310 | 4,780 | 1,050 |
| | RE5×10 | 6,370 | 2,290 | 6,370 | 2,290 | 6,370 | 2,290 | 6,370 | 2,290 | 6,370 | 1,660 | 4,770 | 1,240 | 3,820 | 990 |
| | RE6×12 | 5,310 | 2,120 | 5,310 | 2,120 | 5,310 | 2,120 | 5,310 | 2,120 | 5,310 | 1,590 | 3,980 | 1,190 | 3,180 | 960 |
| | RE8×16 | 3,980 | 1,790 | 3,980 | 1,790 | 3,980 | 1,790 | 3,980 | 1,790 | 3,980 | 1,350 | 2,980 | 1,010 | 2,390 | 810 |
| | RE10×20 | 3,180 | 1,430 | 3,180 | 1,430 | 3,180 | 1,430 | 3,180 | 1,430 | 3,180 | 1,080 | 2,390 | 810 | 1,910 | 650 |

【注意】
①切削方法は、ダウンカットで使用ください。
②一般材、とくに高速切削は、乾式（エアブロー）またはオイルミストクーラントにてご使用ください。
③安定した切削を行うため、剛性の高い機械とセットアップでご使用ください。
④機械の回転数が足りない場合は、主軸回転数とテーブル送り速度を同比率で下げてください。
⑤加工形状、機械の剛性、工具突き出し量等、ご使用の状況により、主軸回転数とテーブル送り速度の調整を行ってください。

【Note】
① Down-cutting is recommended.
② Use generally dry (air-blow) or oil-mist coolant, especially at the high-speed machining.
③ Use a machine tool with rigidity and rigid set-up, to machine stably.
④ When the revolution speed is not enough, reduce the revolution speed and table speed at the same ratio.
⑤ Adjust the revolution speed and table speed, according to cutting conditions such as machining shape, rigidity of machine tool, over-hang and so on.

Jet Ball
# ジェットボール®

## JBELS
深彫り用・ストレートネック
for Long-Reach Die Sinking, Straight neck




### <荒加工> Roughing

| 被削材 Work material | | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | ステンレス鋼・工具鋼 Stainless steel, Tool steels (25～35HRC) SUS304、SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | | 焼入れ鋼 Hardened steels (55～65HRC) SKD11、SKH51 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | | ap=0.1DC ae=0.3DC | |
| ボール半径RE×外径DC Tool dia.(mm) | | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| 高速条件 High speed | RE3×6 | 7,960 | 2,230 | 7,960 | 2,230 | 6,630 | 1,860 | 6,630 | 1,860 | 6,630 | 1,190 | 5,300 | 950 | 3,980 | 720 |
| | RE4×8 | 5,970 | 1,910 | 5,970 | 1,910 | 4,980 | 1,590 | 4,980 | 1,590 | 4,980 | 1,100 | 3,980 | 880 | 2,980 | 660 |
| | RE5×10 | 4,770 | 1,720 | 4,770 | 1,720 | 3,980 | 1,430 | 3,980 | 1,430 | 3,980 | 1,030 | 3,180 | 830 | 2,390 | 620 |
| | RE6×12 | 3,980 | 1,590 | 3,980 | 1,590 | 3,320 | 1,330 | 3,320 | 1,330 | 3,320 | 1,000 | 2,650 | 800 | 1,990 | 600 |
| | RE8×16 | 2,980 | 1,340 | 2,980 | 1,340 | 2,490 | 1,120 | 2,490 | 1,120 | 2,490 | 850 | 1,990 | 680 | 1,490 | 510 |
| | RE10×20 | 2,390 | 1,070 | 2,390 | 1,070 | 1,990 | 900 | 1,990 | 900 | 1,990 | 680 | 1,590 | 540 | 1,190 | 400 |
| 汎用条件 General | RE3×6 | 5,310 | 1,490 | 5,310 | 1,490 | 3,980 | 1,110 | 3,980 | 1,110 | 3,980 | 720 | 3,180 | 570 | 2,390 | 430 |
| | RE4×8 | 3,980 | 1,270 | 3,980 | 1,270 | 2,980 | 950 | 2,980 | 950 | 2,980 | 660 | 2,390 | 530 | 1,790 | 390 |
| | RE5×10 | 3,180 | 1,140 | 3,180 | 1,140 | 2,390 | 860 | 2,390 | 860 | 2,390 | 620 | 1,910 | 500 | 1,430 | 370 |
| | RE6×12 | 2,650 | 1,060 | 2,650 | 1,060 | 1,990 | 800 | 1,990 | 800 | 1,990 | 600 | 1,590 | 480 | 1,190 | 360 |
| | RE8×16 | 1,990 | 900 | 1,990 | 900 | 1,490 | 670 | 1,490 | 670 | 1,490 | 510 | 1,190 | 400 | 900 | 310 |
| | RE10×20 | 1,590 | 720 | 1,590 | 720 | 1,190 | 540 | 1,190 | 540 | 1,190 | 400 | 950 | 320 | 720 | 240 |

### <仕上げ加工> Finishing

| 被削材 Work material | | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | ステンレス鋼・工具鋼 Stainless steel, Tool steels (25～35HRC) SUS304、SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | | 焼入れ鋼 Hardened steels (55～65HRC) SKD11、SKH51 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | |
| ボール半径RE×外径DC Tool dia.(mm) | | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) | 回転数 n (min-1) | 送り速度 Vf (mm/min) |
| 高速条件 High speed | RE3×6 | 7,960 | 2,230 | 7,960 | 2,230 | 7,960 | 2,230 | 7,960 | 2,230 | 7,960 | 1,430 | 6,630 | 1,190 | 5,300 | 950 |
| | RE4×8 | 5,970 | 1,910 | 5,970 | 1,910 | 5,970 | 1,910 | 5,970 | 1,910 | 5,970 | 1,310 | 4,980 | 1,100 | 3,980 | 880 |
| | RE5×10 | 4,770 | 1,720 | 4,770 | 1,720 | 4,770 | 1,720 | 4,770 | 1,720 | 4,770 | 1,240 | 3,980 | 1,030 | 3,180 | 830 |
| | RE6×12 | 3,980 | 1,590 | 3,980 | 1,590 | 3,980 | 1,590 | 3,980 | 1,590 | 3,980 | 1,190 | 3,320 | 1,000 | 2,650 | 800 |
| | RE8×16 | 2,980 | 1,340 | 2,980 | 1,340 | 2,980 | 1,340 | 2,980 | 1,340 | 2,980 | 1,010 | 2,490 | 850 | 1,990 | 680 |
| | RE10×20 | 2,390 | 1,070 | 2,390 | 1,070 | 2,390 | 1,070 | 2,390 | 1,070 | 2,390 | 810 | 1,990 | 680 | 1,590 | 540 |
| 汎用条件 General | RE3×6 | 5,310 | 1,490 | 5,310 | 1,490 | 5,310 | 1,490 | 5,310 | 1,490 | 5,300 | 950 | 3,980 | 720 | 3,180 | 570 |
| | RE4×8 | 3,980 | 1,270 | 3,980 | 1,270 | 3,980 | 1,270 | 3,980 | 1,270 | 3,980 | 880 | 2,980 | 660 | 2,390 | 530 |
| | RE5×10 | 3,180 | 1,140 | 3,180 | 1,140 | 3,180 | 1,140 | 3,180 | 1,140 | 3,180 | 830 | 2,390 | 620 | 1,910 | 500 |
| | RE6×12 | 2,650 | 1,060 | 2,650 | 1,060 | 2,650 | 1,060 | 2,650 | 1,060 | 2,650 | 800 | 1,990 | 600 | 1,590 | 480 |
| | RE8×16 | 1,990 | 900 | 1,990 | 900 | 1,990 | 900 | 1,990 | 900 | 1,990 | 680 | 1,490 | 510 | 1,190 | 400 |
| | RE10×20 | 1,590 | 720 | 1,590 | 720 | 1,590 | 720 | 1,590 | 720 | 1,590 | 540 | 1,190 | 400 | 950 | 320 |

【注意】
①切削方法は、ダウンカットで使用ください。
②一般材、とくに高速切削は、乾式（エアブロー）またはオイルミストクーラントにてご使用ください。
③ステンレス鋼および超耐熱合金には、不水溶性切削油のご使用が適しています。
④安定した切削を行うため、剛性の高い機械とセットアップでご使用ください。
⑤機械の回転数が足りない場合は、主軸回転数とテーブル送り速度を同比率で下げてください。
⑥加工形状、機械の剛性、工具突き出し量等、ご使用の状況により、主軸回転数とテーブル送り速度の調整を行ってください。

【Note】
① Down-cutting is recommended.
② Use generally dry (air-blow) or oil-mist coolant, especially at the high-speed machining.
③ Oil base coolant is recommended for machining stainless steels and heat-resistant alloys.
④ Use a machine tool with rigidity and rigid set-up, to machine stably.
⑤ When the revolution speed is not enough, reduce the revolution speed and table speed at the same ratio.
⑥ Adjust the revolution speed and table speed, according to cutting conditions such as machining shape, rigidity of machine tool, over-hang and so on.

# Carbide Ball End Mills for Mold
# 超硬型彫用ボールエンドミル

彫込み Die-sinking / 曲面 Profiling / R Radius / 中仕上 Semi Finishing / 仕上 Finishing

h6

(mm)

超硬 Carbide / ねじれ0° Helix angle

直刃 Straight flute

2枚刃 2Flutes

## FE6○○

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|
| FE604 | □ | 2 | 20 | 65 | 4 |
| FE606 | □ | 3 | 25 | 80 | 6 |
| FE608 | □ | 4 | 25 | 80 | 8 |
| FE610 | □ | 5 | 25 | 80 | 10 |
| FE612 | □ | 6 | 30 | 80 | 12 |
| FE614 | □ | 7 | 30 | 80 | 14 |
| FE616 | □ | 8 | 35 | 110 | 16 |
| FE618 | □ | 9 | 35 | 110 | 18 |
| FE620 | □ | 10 | 35 | 110 | 20 |

# Carbide Ball End Mills for Graphite
# 超硬グラファイト用ボールエンドミル

## レギュラー刃長 Regular

溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical / 荒 Roughing / 中仕上 Semi Finishing / 仕上 Finishing

RE公差 RE tolerance ±0.02

h6

(mm)

超硬 Carbide / ねじれ30° Helix angle / 切削条件表 A425 Cutting Conditions

汎用機用 エアホールなし For General without air-hole

2、4枚刃 2,4Flutes

## GBR○○○○

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 刃数 No. of flutes |
|---|---|---|---|---|---|---|
| GBR2020 | □ | 1 | 10 | 80 | 6 | 2 |
| GBR2025 | □ | 1.25 | 10 | 80 | 6 | 2 |
| GBR2030 | □ | 1.5 | 15 | 80 | 6 | 2 |
| GBR2040 | □ | 2 | 20 | 80 | 6 | 2 |
| GBR2045 | □ | 2.25 | 25 | 100 | 6 | 2 |
| GBR2050 | □ | 2.5 | 25 | 100 | 6 | 2 |
| GBR2060 | □ | 3 | 30 | 100 | 6 | 2 |
| GBR2065 | □ | 3.25 | 35 | 100 | 6 | 2 |
| GBR2070 | □ | 3.5 | 35 | 100 | 6 | 2 |
| GBR2080 | □ | 4 | 40 | 110 | 8 | 2 |
| GBR2085 | □ | 4.25 | 45 | 110 | 8 | 2 |
| GBR2090 | □ | 4.5 | 45 | 110 | 8 | 2 |
| GBR2100 | □ | 5 | 50 | 120 | 10 | 2 |
| GBR2105 | □ | 5.25 | 50 | 120 | 10 | 2 |
| GBR2110 | □ | 5.5 | 50 | 120 | 10 | 2 |
| GBR2120 | □ | 6 | 55 | 130 | 12 | 2 |
| GBR2125 | □ | 6.25 | 55 | 130 | 12 | 2 |
| GBR2130 | □ | 6.5 | 55 | 130 | 12 | 2 |
| GBR4140 | □ | 7 | 60 | 140 | 12 | 4 |
| GBR4150 | □ | 7.5 | 60 | 140 | 12 | 4 |
| GBR4160 | □ | 8 | 65 | 150 | 16 | 4 |
| GBR4170 | □ | 8.5 | 65 | 150 | 16 | 4 |
| GBR4180 | □ | 9 | 65 | 160 | 16 | 4 |
| GBR4200 | □ | 10 | 75 | 160 | 20 | 4 |

## ロング刃長 Long

溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / 仕上 Finishing

RE公差 RE tolerance ±0.02

h6

(mm)

超硬 Carbide / ねじれ30° Helix angle / 切削条件表 A425 Cutting Conditions

2、4枚刃 2,4Flutes

## GBL○○○○

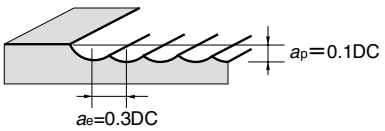
| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 刃数 No. of flutes |
|---|---|---|---|---|---|---|
| GBL2020 | □ | 1 | 20 | 100 | 6 | 2 |
| GBL2030 | □ | 1.5 | 30 | 100 | 6 | 2 |
| GBL2040 | □ | 2 | 60 | 110 | 6 | 2 |
| GBL2050 | □ | 2.5 | 70 | 125 | 6 | 2 |
| GBL2060 | □ | 3 | 80 | 130 | 6 | 2 |
| GBL2070 | □ | 3.5 | 90 | 140 | 6 | 2 |
| GBL2080 | □ | 4 | 100 | 150 | 8 | 2 |
| GBL2090 | □ | 4.5 | 110 | 160 | 8 | 2 |
| GBL2100 | □ | 5 | 120 | 170 | 10 | 2 |
| GBL2110 | □ | 5.5 | 120 | 170 | 10 | 2 |
| GBL2120 | □ | 6 | 130 | 190 | 12 | 2 |
| GBL2130 | □ | 6.5 | 130 | 190 | 12 | 2 |
| GBL4140 | □ | 7 | 140 | 210 | 12 | 4 |
| GBL4150 | □ | 7.5 | 140 | 210 | 12 | 4 |
| GBL4160 | □ | 8 | 150 | 230 | 16 | 4 |
| GBL4170 | □ | 8.5 | 150 | 230 | 16 | 4 |
| GBL4180 | □ | 9 | 160 | 250 | 16 | 4 |
| GBL4200 | □ | 10 | 180 | 250 | 20 | 4 |

## 標準切削条件表 Recommended cutting conditions

**GBR** レギュラー刃長 Regular / **GBL** ロング刃長 Long / **GXB** ロングシャンク Long Shank

| 被削材 Work material | | グラファイト Graphite | | 鋳鉄 Cast irons FC, FCD | | 非鉄金属、アルミ、銅合金 Non-ferrous-metal, Aluminum, Cu-alloy | |
|---|---|---|---|---|---|---|---|
| 硬さ Hardness | | | | 150～200HB | | | |
| 切削条件 Conditions / ボール半径 RE mm | 外径 DC mm | 切削速度 Cutting speed $v_c$=200～250m/min 回転数 Revolution min$^{-1}$ | 送り速度 Table speed mm/min | 切削速度 Cutting speed $v_c$=50～100m/min 回転数 Revolution min$^{-1}$ | 送り速度 Table speed mm/min | 切削速度 Cutting speed $v_c$=150～100m/min 回転数 Revolution min$^{-1}$ | 送り速度 Table speed mm/min |
| RE1 | 2 | 44,000 | 800～1,000 | 11,000 | 250～300 | 25,000 | 500～600 |
| RE2 | 4 | 22,000 | 1,000～1,300 | 5,600 | 300～400 | 12,500 | 600～800 |
| RE3 | 6 | 15,000 | 1,200～1,500 | 3,700 | 350～450 | 8,500 | 700～900 |
| RE4 | 8 | 11,000 | 1,800～2,000 | 2,800 | 550～600 | 6,400 | 1,100～1,200 |
| RE5 | 10 | 8,800 | 2,000～2,500 | 2,200 | 600～700 | 5,100 | 1,200～1,400 |
| RE6 | 12 | 7,300 | 2,000～2,500 | 1,800 | 600～700 | 4,200 | 1,200～1,400 |
| RE7.5 | 15 | 5,800 | 1,800～2,000 | 1,500 | 550～600 | 3,400 | 1,100～1,200 |
| RE8 | 16 | 5,500 | 1,600～1,800 | 1,400 | 500～600 | 3,200 | 1,000～1,200 |
| RE9 | 18 | 4,900 | 1,600～1,700 | 1,200 | 400～500 | 2,800 | 800～1,000 |
| RE10 | 20 | 4,400 | 1,200～1,400 | 1,100 | 350～450 | 2,500 | 700～900 |

**切り込み** Depth of cut (mm)




**【注意】**
①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②上記に切削条件を示しますが、被削材の硬さ、切込み、ツーリング、機械の状態により条件を増減してください。
③汎用機、NCフライス盤で加工される場合は、切りくずの飛散防止のため、吸引機のご使用、または湿式切削を推奨します。乾式と湿式の寿命差はありません。
④回転数が不足する場合は、増速スピンドルのご使用を推奨します。

**【Note】**
①Use the appropriate coolant for the work material and machining shape.
②Standard cutting conditions are described above, but allowance should be made for these conditions according to hardness of work materials, deph of cut, tooling, and conditions of machines.
③When machining with a general purpose machine or an NC milling machine, it is recommended to use an aspirator or to perform wet cutting in order to prevent chips from scattering. There is no difference in life of end mills between dry cutting and wet cutting.
④In the case of insufficient revolution speed, it is recommended to use a high speed milling attachment.

## FE6の対応被削材 Applicable work material of FE6

| 炭素鋼合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦45HRC | 高硬度 Hardened steel >45HRC ≦55HRC | 高硬度 Hardened steel >55HRC ≦65HRC | 高硬度 Hardened steel >65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ○ | ○ | | | | ○ | ○ | ◎ | ◎ |

## グラファイト用エンドミルの対応被削材 Applicable work material of End mill for Graphite

| 炭素鋼合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦45HRC | 高硬度 Hardened steel >45HRC ≦55HRC | 高硬度 Hardened steel >55HRC ≦65HRC | 高硬度 Hardened steel >65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| グラファイト用 for Graphite | | | | | | | | |

□印：特定代理店在庫です。弊社営業へお問合せください。 □：Stocked by specified distributor. Contact with our sales department.

# Carbide Ball End Mills for Graphite
# 超硬グラファイト用ボールエンドミル

## ロングシャンク Long Shank

溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / 仕上 Finishing

RE公差 RE tolerance ±0.02　h6　(mm)

超硬 Carbide / ねじれ30° Helix angle / 切削条件表 A425 Cutting Conditions

汎用機用　エアホールなし
For General without air-hole

2、4枚刃
2,4Flutes

### GXB

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 刃数 No. of flutes |
|---|---|---|---|---|---|---|
| GXB2020 | □ | 1 | 10 | 100 | 6 | 2 |
| GXB2030 | □ | 1.5 | 15 | 100 | 6 | 2 |
| GXB2040 | □ | 2 | 20 | 110 | 6 | 2 |
| GXB2050 | □ | 2.5 | 25 | 125 | 6 | 2 |
| GXB2060 | □ | 3 | 30 | 130 | 6 | 2 |
| GXB2070 | □ | 3.5 | 35 | 140 | 6 | 2 |
| GXB2080 | □ | 4 | 40 | 150 | 8 | 2 |
| GXB2090 | □ | 4.5 | 45 | 160 | 8 | 2 |
| GXB2100 | □ | 5 | 50 | 170 | 10 | 2 |
| GXB2110 | □ | 5.5 | 50 | 170 | 10 | 2 |
| GXB2120 | □ | 6 | 55 | 190 | 12 | 2 |
| GXB2130 | □ | 6.5 | 55 | 190 | 12 | 2 |
| GXB4140 | □ | 7 | 60 | 210 | 12 | 4 |
| GXB4150 | □ | 7.5 | 60 | 210 | 12 | 4 |
| GXB4160 | □ | 8 | 65 | 230 | 16 | 4 |
| GXB4170 | □ | 8.5 | 65 | 230 | 16 | 4 |
| GXB4180 | □ | 9 | 65 | 250 | 16 | 4 |
| GXB4200 | □ | 10 | 75 | 250 | 20 | 4 |

## レギュラー刃長 Regular

溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical / 荒 Roughing / 中仕上 Semi Finishing / 仕上 Finishing

RE公差 RE tolerance ±0.02　h6　(mm)

超硬 Carbide / ねじれ15° Helix angle / 切削条件表 A426 Cutting Conditions

専用機用
エアホール付き
For Custom with air-hole

2、4枚刃
2,4Flutes

### GBS

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 刃数 No. of flutes |
|---|---|---|---|---|---|---|
| ※ GBS2020 | □ | 1 | 10 | 80 | 4 | 2 |
| ※ GBS2030 | □ | 1.5 | 15 | 80 | 4 | 2 |
| ※ GBS2040 | □ | 2 | 20 | 80 | 4 | 2 |
| GBS2050 | □ | 2.5 | 30 | 100 | 6 | 2 |
| GBS2060 | □ | 3 | 30 | 100 | 6 | 2 |
| GBS2070 | □ | 3.5 | 30 | 100 | 6 | 2 |
| GBS2080 | □ | 4 | 40 | 110 | 8 | 2 |
| GBS2090 | □ | 4.5 | 40 | 110 | 8 | 2 |
| GBS2100 | □ | 5 | 50 | 120 | 10 | 2 |
| GBS2110 | □ | 5.5 | 50 | 120 | 10 | 2 |
| GBS2120 | □ | 6 | 55 | 130 | 12 | 2 |
| GBS2130 | □ | 6.5 | 55 | 130 | 12 | 2 |
| GBS4160 | □ | 8 | 60 | 150 | 16 | 4 |
| GBS4170 | □ | 8.5 | 60 | 150 | 16 | 4 |
| GBS4180 | □ | 9 | 60 | 150 | 20 | 4 |
| GBS4200 | □ | 10 | 60 | 150 | 20 | 4 |
| GBS4210 | □ | 10.5 | 60 | 150 | 20 | 4 |
| GBS4220 | □ | 11 | 60 | 150 | 20 | 4 |
| GBS4250 | □ | 12.5 | 60 | 180 | 25 | 4 |

## ロングシャンク Long Shank

溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical / 仕上 Finishing

RE公差 RE tolerance ±0.02　h6　(mm)

ねじれ15° Helix angle / 超硬 Carbide / 切削条件表 A426 Cutting Conditions

専用機用
エアホール付き
For Custom with air-hole

2、4枚刃
2,4Flutes

### GBD

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 刃数 No. of flutes |
|---|---|---|---|---|---|---|
| ※ GBD2020 | □ | 1 | 10 | 100 | 4 | 2 |
| ※ GBD2030 | □ | 1.5 | 15 | 100 | 4 | 2 |
| ※ GBD2040 | □ | 2 | 20 | 100 | 4 | 2 |
| GBD2050 | □ | 2.5 | 30 | 120 | 6 | 2 |
| GBD2060 | □ | 3 | 30 | 150 | 6 | 2 |
| GBD2070 | □ | 3.5 | 30 | 150 | 6 | 2 |
| GBD2080 | □ | 4 | 40 | 150 | 8 | 2 |
| GBD2090 | □ | 4.5 | 40 | 150 | 8 | 2 |
| GBD2100 | □ | 5 | 50 | 180 | 10 | 2 |
| GBD2110 | □ | 5.5 | 50 | 180 | 10 | 2 |
| GBD2120 | □ | 6 | 55 | 200 | 12 | 2 |
| GBD2130 | □ | 6.5 | 55 | 200 | 12 | 2 |
| GBD4160 | □ | 8 | 60 | 250 | 16 | 4 |
| GBD4170 | □ | 8.5 | 60 | 250 | 16 | 4 |
| GBD4180 | □ | 9 | 60 | 250 | 20 | 4 |
| GBD4200 | □ | 10 | 60 | 250 | 20 | 4 |
| GBD4210 | □ | 10.5 | 60 | 250 | 20 | 4 |
| GBD4220 | □ | 11 | 60 | 250 | 20 | 4 |
| GBD4250 | □ | 12.5 | 60 | 250 | 25 | 4 |

## 標準切削条件表 Recommended cutting conditions

**GBS** レギュラー刃長 Regular

| 商品コード Item code | 切削条件 Conditions 回転数 Revolution (min⁻¹) | 送り速度 Table speed (mm/min) |
|---|---|---|
| GBS2020 | 15,000 | 300 |
| GBS2030 | 15,000 | 450 |
| GBS2040 | 15,000 | 600 |
| GBS2050 | 15,000 | 750 |
| GBS2060 | 15,000 | 900 |
| GBS2070 | 15,000 | 1,000 |
| GBS2080 | 13,900 | 1,100 |
| GBS2090 | 12,400 | 1,100 |
| GBS2100 | 11,100 | 1,100 |
| GBS2110 | 10,100 | 1,100 |
| GBS2120 | 9,300 | 1,100 |
| GBS2130 | 8,600 | 1,100 |
| GBS4160 | 7,000 | 2,200 |
| GBS4170 | 6,600 | 2,200 |
| GBS4180 | 6,200 | 2,200 |
| GBS4200 | 5,600 | 2,200 |
| GBS4210 | 5,300 | 2,200 |
| GBS4220 | 5,100 | 2,200 |
| GBS4250 | 4,500 | 2,200 |

**GBD** ロングシャンク Long Shank

| 商品コード Item code | 切削条件 Conditions 回転数 Revolution (min⁻¹) | 送り速度 Table speed (mm/min) |
|---|---|---|
| GBD2020 | 15,000 | 150 |
| GBD2030 | 15,000 | 200 |
| GBD2040 | 15,000 | 300 |
| GBD2050 | 15,000 | 400 |
| GBD2060 | 15,000 | 450 |
| GBD2070 | 15,000 | 500 |
| GBD2080 | 13,900 | 550 |
| GBD2090 | 12,400 | 550 |
| GBD2100 | 11,100 | 550 |
| GBD2110 | 10,100 | 550 |
| GBD2120 | 9,300 | 550 |
| GBD2130 | 8,600 | 550 |
| GBD4160 | 7,000 | 1,100 |
| GBD4170 | 6,600 | 1,100 |
| GBD4180 | 6,200 | 1,100 |
| GBD4200 | 5,600 | 1,100 |
| GBD4210 | 5,300 | 1,000 |
| GBD4220 | 5,100 | 1,000 |
| GBD4250 | 4,500 | 1,100 |

【注意】
①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②上記に切削条件を示しますが、被削材の硬さ、切込み、ツーリング、機械の状態により条件を増減してください。
③汎用機、NCフライス盤で加工される場合は、切りくずの飛散防止のため、吸引機のご使用、または湿式切削を推奨します。乾式と湿式の寿命差はありません。
④回転数が不足する場合は、増速スピンドルのご使用を推奨します。

【Note】
①Use the appropriate coolant for the work material and machining shape.
②Standard cutting conditions are described above, but allowance should be made for these conditions according to hardness of work materials, deph of cut, tooling, and conditions of machines.
③When machining with a general purpose machine or an NC milling machine, it is recommended to use an aspirator or to perform wet cutting in order to prevent chips from scattering.
There is no difference in life of end mills between dry cutting and wet cutting.
④In the case of insufficient revolution speed, it is recommended to use a high speed milling attachment.

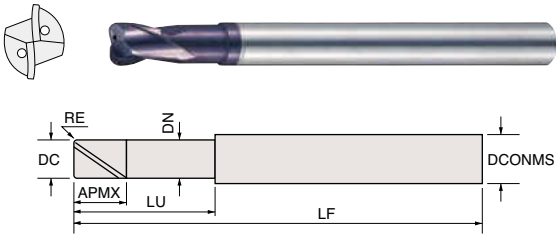
※印：エアホールなしとなっています。
※：Without air-hole.

# エポックじゅうおう -J

## レギュラー刃長・コーナR付き　Regular, Corner radius

側面 Side Cutting　溝 Slotting　彫込み Die-sinking　曲面 Profiling　R Radius　ヘリカル Helical　中仕上 Semi Finishing　仕上 Finishing

外径公差 Dia.tolerance　0～−0.02　h6　(mm)




切削条件表 A428 Cutting Conditions

### EPJS2○○○-○○-J

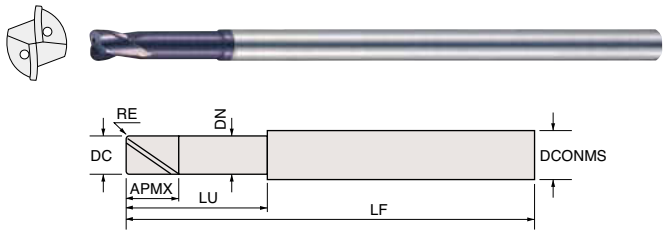
超硬 Carbide　C　ねじれ30° Helix angle

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 刃長 Flute length APMX | 首径 Neck dia. DN | 首下長 Under neck length LU | 全長 Overall length LF | シャンク径 Shank dia. DCONMS |
|---|---|---|---|---|---|---|---|---|
| EPJS2040-03-J | □ | 4 | 0.3 | 6 | 3.8 | 14 | 70 | 4 |
| EPJS2060-05-J | □ | 6 | 0.5 | 9 | 5.8 | 21 | 90 | 6 |
| EPJS2060-10-J | □ | | 1 | 9 | 5.8 | 21 | 90 | 6 |
| EPJS2080-05-J | □ | 8 | 0.5 | 12 | 7.7 | 28 | 100 | 8 |
| EPJS2080-10-J | □ | | 1 | 12 | 7.7 | 28 | 100 | 8 |
| EPJS2100-05-J | □ | 10 | 0.5 | 15 | 9.7 | 35 | 100 | 10 |
| EPJS2100-10-J | □ | | 1 | 15 | 9.7 | 35 | 100 | 10 |
| EPJS2100-20-J | □ | | 2 | 15 | 9.7 | 35 | 100 | 10 |
| EPJS2120-05-J | □ | 12 | 0.5 | 18 | 11.7 | 42 | 110 | 12 |
| EPJS2120-10-J | □ | | 1 | 18 | 11.7 | 42 | 110 | 12 |
| EPJS2120-20-J | □ | | 2 | 18 | 11.7 | 42 | 110 | 12 |

## ロングシャンク・コーナR付き　Long Shank, Corner radius

彫込み Die-sinking　曲面 Profiling　R Radius　ヘリカル Helical　中仕上 Semi Finishing　仕上 Finishing

外径公差 Dia.tolerance　0～−0.02　h6　(mm)




切削条件表 A428 Cutting Conditions

### EPJSLS2○○○-○○-J

超硬 Carbide　C　ねじれ30° Helix angle

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 刃長 Flute length APMX | 首径 Neck dia. DN | 首下長 Under neck length LU | 全長 Overall length LF | シャンク径 Shank dia. DCONMS |
|---|---|---|---|---|---|---|---|---|
| EPJSLS2040-03-J | □ | 4 | 0.3 | 6 | 3.8 | 24 | 100 | 4 |
| EPJSLS2060-05-J | □ | 6 | 0.5 | 9 | 5.8 | 36 | 120 | 6 |
| EPJSLS2060-10-J | □ | | 1 | 9 | 5.8 | 36 | 120 | 6 |
| EPJSLS2080-05-J | □ | 8 | 0.5 | 12 | 7.7 | 48 | 135 | 8 |
| EPJSLS2080-10-J | □ | | 1 | 12 | 7.7 | 48 | 135 | 8 |
| EPJSLS2100-05-J | □ | 10 | 0.5 | 15 | 9.7 | 60 | 150 | 10 |
| EPJSLS2100-10-J | □ | | 1 | 15 | 9.7 | 60 | 150 | 10 |
| EPJSLS2100-20-J | □ | | 2 | 15 | 9.7 | 60 | 150 | 10 |
| EPJSLS2120-05-J | □ | 12 | 0.5 | 18 | 11.7 | 72 | 160 | 12 |
| EPJSLS2120-10-J | □ | | 1 | 18 | 11.7 | 72 | 160 | 12 |
| EPJSLS2120-20-J | □ | | 2 | 18 | 11.7 | 72 | 160 | 12 |

## EPJS-J、EPJSLS-J の対応被削材

Applicable work material of EPJS-J, EPJSLS-J

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ |

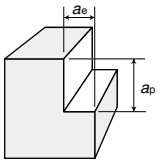
□印：特定代理店在庫です。弊社営業へお問合せください。　□：Stocked by specified distributor. Contact with our sales department.

Epoch Juoh-J

# エポックじゅうおう -J

## 標準切削条件表 Recommended cutting conditions

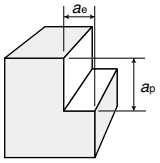
### EPJS-J
レギュラー刃長
Regular




＜肩切削＞ Side cutting　レギュラー刃　OH量＝3.5DC Regular Over Hang OH=3.5DC

| 被削材 Work material | | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) SUS304、SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | | チタン合金 Titanium alloy Ti-6Al-4V | | 超耐熱合金 Super heat-resistant alloy Inconel Hasteloy | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 高速条件 High speed | 切込み Depth of cut (mm) | ap=0.1DC ae=0.1DC | | ap=0.1DC ae=0.1DC | | ap=0.1DC ae=0.1DC | | ap=0.1DC ae=0.1DC | | ap=0.1DC ae=0.1DC | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | |
| | 外径DC Tool dia. (mm) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) |
| | ϕ4 | 19,900 | 1,190 | 19,900 | 1,190 | 15,900 | 950 | 11,900 | 600 | 11,900 | 600 | 11,900 | 600 | 9,550 | 380 | 2,390 | 95 |
| | ϕ6 | 13,300 | 1,330 | 13,300 | 1,330 | 10,600 | 1,060 | 7,960 | 640 | 7,960 | 640 | 7,960 | 640 | 6,370 | 450 | 1,590 | 110 |
| | ϕ8 | 9,950 | 1,390 | 9,950 | 1,390 | 7,960 | 1,110 | 5,970 | 600 | 5,970 | 600 | 5,970 | 600 | 4,780 | 430 | 1,190 | 110 |
| | ϕ10 | 7,960 | 1,270 | 7,960 | 1,270 | 6,370 | 1,020 | 4,770 | 570 | 4,770 | 570 | 4,770 | 570 | 3,820 | 420 | 950 | 100 |
| | ϕ12 | 6,630 | 1,190 | 6,630 | 1,190 | 5,310 | 960 | 3,980 | 560 | 3,980 | 560 | 3,980 | 560 | 3,180 | 380 | 800 | 95 |
| 汎用条件 General | 切込み Depth of cut (mm) | ap=0.2DC ae=0.3DC | | ap=0.2DC ae=0.3DC | | ap=0.2DC ae=0.3DC | | ap=0.2DC ae=0.3DC | | ap=0.2DC ae=0.3DC | | ap=0.1DC ae=0.15DC | | ap=0.1DC ae=0.15DC | | ap=0.1DC ae=0.15DC | |
| | 外径DC Tool dia. (mm) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) |
| | ϕ4 | 7,960 | 480 | 7,960 | 480 | 6,370 | 380 | 4,770 | 240 | 4,770 | 240 | 4,770 | 240 | 3,180 | 130 | 1,990 | 80 |
| | ϕ6 | 5,310 | 530 | 5,310 | 530 | 4,240 | 420 | 3,180 | 250 | 3,180 | 250 | 3,180 | 250 | 2,120 | 150 | 1,330 | 95 |
| | ϕ8 | 3,980 | 560 | 3,980 | 560 | 3,180 | 450 | 2,390 | 240 | 2,390 | 240 | 2,390 | 240 | 1,590 | 140 | 990 | 90 |
| | ϕ10 | 3,180 | 510 | 3,180 | 510 | 2,550 | 410 | 1,910 | 230 | 1,910 | 230 | 1,910 | 230 | 1,270 | 140 | 800 | 90 |
| | ϕ12 | 2,650 | 480 | 2,650 | 480 | 2,120 | 380 | 1,590 | 220 | 1,590 | 220 | 1,590 | 220 | 1,060 | 130 | 660 | 80 |

### EPJSLS-J
ロングシャンク
Long Shank




＜肩切削＞ Side cutting　ロングシャンク　OH量＝6DC Long shank Over Hang OH=6DC

| 被削材 Work material | | 鋳鉄 Cast irons (150～200HB) FC250 | | 炭素鋼 Carbon steels (180～220HB) SS400、S50C | | 合金鋼 Alloy steels (200～250HB) SCM440、SNCM | | ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) SUS304、SKD | | プリハードン鋼 Pre-hardened steels (35～45HRC) HPM1、NAK55 | | 焼入れ鋼 Hardened steels (45～55HRC) SKD61、SKT4 | | チタン合金 Titanium alloys Ti-6Al-4V | | 超耐熱合金 Super heat-resistant alloys Inconel Hasteloy | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 高速条件 High speed | 切込み Depth of cut (mm) | ap=0.1DC ae=0.1DC | | ap=0.1DC ae=0.1DC | | ap=0.1DC ae=0.1DC | | ap=0.1DC ae=0.1DC | | ap=0.1DC ae=0.1DC | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | | ap=0.05DC ae=0.05DC | |
| | 外径DC Tool dia. (mm) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) |
| | ϕ4 | 9,550 | 570 | 9,550 | 570 | 6,370 | 380 | 4,770 | 240 | 4,770 | 240 | 4,770 | 240 | 3,980 | 160 | 1,590 | 65 |
| | ϕ6 | 6,370 | 640 | 6,370 | 640 | 4,240 | 420 | 3,180 | 250 | 3,180 | 250 | 3,180 | 250 | 2,650 | 190 | 1,060 | 75 |
| | ϕ8 | 4,770 | 670 | 4,770 | 670 | 3,180 | 450 | 2,390 | 240 | 2,390 | 240 | 2,390 | 240 | 1,990 | 180 | 800 | 70 |
| | ϕ10 | 3,820 | 610 | 3,820 | 610 | 2,550 | 410 | 1,910 | 230 | 1,910 | 230 | 1,910 | 230 | 1,590 | 170 | 640 | 70 |
| | ϕ12 | 3,180 | 570 | 3,180 | 570 | 2,120 | 380 | 1,590 | 220 | 1,590 | 220 | 1,590 | 220 | 1,330 | 160 | 530 | 65 |
| 汎用条件 General | 切込み Depth of cut (mm) | ap=0.2DC ae=0.3DC | | ap=0.2DC ae=0.3DC | | ap=0.2DC ae=0.3DC | | ap=0.2DC ae=0.3DC | | ap=0.2DC ae=0.3DC | | ap=0.1DC ae=0.15DC | | ap=0.1DC ae=0.15DC | | ap=0.1DC ae=0.15DC | |
| | 外径DC Tool dia. (mm) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) |
| | ϕ4 | 3,980 | 240 | 3,980 | 240 | 3,180 | 190 | 2,390 | 120 | 2,390 | 120 | 2,390 | 120 | 1,590 | 65 | 1,190 | 50 |
| | ϕ6 | 2,650 | 270 | 2,650 | 270 | 2,120 | 210 | 1,590 | 130 | 1,590 | 130 | 1,590 | 130 | 1,060 | 75 | 800 | 55 |
| | ϕ8 | 1,990 | 280 | 1,990 | 280 | 1,590 | 220 | 1,190 | 120 | 1,190 | 120 | 1,190 | 120 | 800 | 70 | 600 | 55 |
| | ϕ10 | 1,590 | 250 | 1,590 | 250 | 1,270 | 200 | 950 | 110 | 950 | 110 | 950 | 110 | 640 | 70 | 480 | 55 |
| | ϕ12 | 1,330 | 240 | 1,330 | 240 | 1,060 | 190 | 800 | 110 | 800 | 110 | 800 | 110 | 530 | 65 | 400 | 50 |

【注意】①切削方法は、ダウンカットで使用ください。
②一般材、とくに高速切削は、乾式（エアブロー）またはオイルミストクーラントにてご使用ください。
③ステンレス鋼および超耐熱合金には、不水溶性切削油のご使用が適しています。
④安定した切削を行うため、剛性の高い機械とセットアップでご使用ください。
⑤機械の回転数が足りない場合は、主軸回転数とテーブル送り速度を同比率で下げてください。
⑥加工形状、機械の剛性、工具突き出し量等、ご使用の状況により、主軸回転数とテーブル送り速度の調整を行ってください。

【Note】① Down-cutting is recommended.
② Use generally dry (air-blow) or oil-mist coolant, especially at the high-speed machining.
③ Oil base coolant is recommended for machining stainless steels and heat-resistant alloys.
④ Use a machine tool with rigidity and rigid set-up, to machine stably.
⑤ When the revolution speed is not enough, reduce the revolution speed and table speed at the same ratio.
⑥ Adjust the revolution speed and table speed, according to cutting conditions such as machining shape, rigidity of machine tool, over-hang and so on.

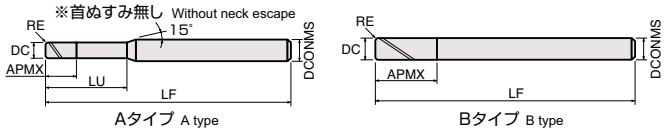
# Epoch High Feed Radius
# エポックハイフィードラジアス

## ストレートネック・コーナR付き Straight neck, Corner radius

彫込み Die-sinking / 曲面 Profiling / R Radius / 荒 Roughing / 中仕上 Semi Finishing

RE公差 RE tolerance ±0.015　h5　(mm)

3枚刃 3Flutes

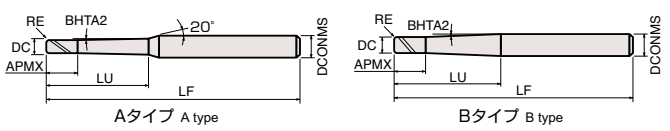



## ペンシルネック・コーナR付き Pencil neck, Corner radius

彫込み Die-sinking / 曲面 Profiling / R Radius / 荒 Roughing / 中仕上 Semi Finishing

RE公差 RE tolerance ±0.015　h5　(mm)

3枚刃 3Flutes




超硬 Carbide / TH / ねじれ45° Helix angle / 切削条件表 A429 Cutting Conditions

## EPR3○○○-○○

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 刃長 Flute length APMX | 首下長 Under neck length LU | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 形状 Shape |
|---|---|---|---|---|---|---|---|---|
| EPR3020-05 | □ | 2 | 0.5 | 4 | 6 | 70 | 6 | A |
| EPR3030-08 | □ | 3 | 0.8 | 6 | 9 | 70 | 6 | A |
| EPR3040-10 | □ | 4 | 1.0 | 8 | 12 | 70 | 6 | A |
| EPR3050-12 | □ | 5 | 1.2 | 10 | 15 | 70 | 6 | A |
| EPR3060-15 | □ | 6 | 1.5 | 12 | – | 90 | 6 | B |
| EPR3080-20 | □ | 8 | 2.0 | 16 | – | 100 | 8 | B |
| EPR3100-20 | □ | 10 | 2.0 | 20 | – | 110 | 10 | B |
| EPR3120-20 | □ | 12 | 2.0 | 24 | – | 120 | 12 | B |
| EPR3160-30 | □ | 16 | 3.0 | 32 | – | 140 | 16 | B |
| EPR3200-30 | □ | 20 | 3.0 | 40 | – | 150 | 20 | B |

## EPRPN3○○○-○○-○○

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. DC | コーナ半径 Corner radius RE | 刃長 Flute length APMX | 首下長 Under neck length LU | 首部テーパ半角 Neck angle BHTA2 | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 形状 Shape |
|---|---|---|---|---|---|---|---|---|---|
| EPRPN3020-12-05 | □ | 2 | 0.5 | 3 | 12 | 1° | 70 | 6 | A |
| EPRPN3020-16-05 | □ | | | 3 | 16 | 1° | 70 | 6 | A |
| EPRPN3020-20-05 | □ | | | 3 | 20 | 1° | 70 | 6 | A |
| EPRPN3030-18-08 | □ | 3 | 0.8 | 4.5 | 18 | 1° | 80 | 6 | A |
| EPRPN3030-24-08 | □ | | | 4.5 | 24 | 1° | 80 | 6 | A |
| EPRPN3030-30-08 | □ | | | 4.5 | 30 | 1° | 80 | 6 | A |
| EPRPN3040-24-10 | □ | 4 | 1.0 | 6 | 24 | 1° | 90 | 6 | A |
| EPRPN3040-32-10 | □ | | | 6 | 32 | 1° | 90 | 6 | A |
| EPRPN3040-40-10 | □ | | | 6 | 40 | 1° | 90 | 6 | A |
| EPRPN3050-30-12 | □ | 5 | 1.2 | 7.5 | 30 | 1° | 90 | 6 | A |
| EPRPN3050-40-12 | □ | | | 7.5 | 40 | 1° | 100 | 8 | A |
| EPRPN3050-50-12 | □ | | | 7.5 | 50 | 1° | 110 | 8 | A |
| EPRPN3060-40-15 | □ | 6 | 1.5 | 9 | 40 | 1° | 100 | 8 | A |
| EPRPN3060-55-15 | □ | | | 9 | 55 | 1° | 110 | 8 | A |
| EPRPN3060-67-15 | □ | | | 9 | 67 | 1° | 125 | 8 | B |
| EPRPN3080-55-20 | □ | 8 | 2.0 | 12 | 55 | 1° | 110 | 10 | A |
| EPRPN3080-70-20 | □ | | | 12 | 70 | 1° | 130 | 10 | B |
| EPRPN3080-90-20 | □ | | | 12 | 90 | 1° | 145 | 12 | A |
| EPRPN3100-73-20 | □ | 10 | 2.0 | 15 | 73 | 1° | 135 | 12 | B |
| EPRPN3100-95-20 | □ | | | 15 | 95 | 1° | 150 | 16 | A |
| EPRPN3100-115-20 | □ | | | 15 | 115 | 1° | 170 | 16 | A |
| EPRPN3120-80-20 | □ | 12 | 2.0 | 18 | 80 | 1° | 135 | 16 | A |
| EPRPN3120-105-20 | □ | | | 18 | 105 | 1° | 160 | 16 | A |
| EPRPN3160-105-30 | □ | 16 | 3.0 | 24 | 105 | 1° | 160 | 20 | A |
| EPRPN3160-140-30 | □ | | | 24 | 140 | 1° | 200 | 20 | B |

## EPR、EPRPNの対応被削材

Applicable work material of EPR, EPRPN

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦45HRC | 高硬度 Hardened steel > 45HRC ≦55HRC | 高硬度 Hardened steel > 55HRC ≦65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ |

## 標準切削条件表 Recommended cutting conditions　EPR　EPRPN

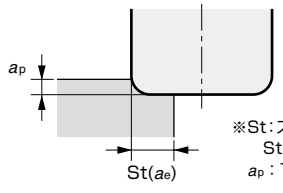
| 被削材 Work material | 鋳鉄・炭素鋼・合金鋼 Cast irons, Carbon steels, Alloy steels (150~250HB) FC, S50C, SCM | | | 工具鋼 Tool steels (25~35HRC) SUS304, SKD | | | プリハードン鋼 Pre-hardened steels (35~45HRC) NAK80, CENA1 | | | 焼入れ鋼※ Hardened steels (45~55HRC) SKD61,SKT4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 外径DC×コーナ半径RE Tool dia.(mm) | 回転数 n (min⁻¹) | 1刃送り fz (mm/t) | 送り速度 vf (mm/min) | 回転数 n (min⁻¹) | 1刃送り fz (mm/t) | 送り速度 vf (mm/min) | 回転数 n (min⁻¹) | 1刃送り fz (mm/t) | 送り速度 vf (mm/min) | 回転数 n (min⁻¹) | 1刃送り fz (mm/t) | 送り速度 vf (mm/min) |
| 2×RE0.5 | 12,000 | 0.11 | 3,960 | 11,000 | 0.1 | 3,300 | 10,000 | 0.08 | 2,400 | 8,000 | 0.08 | 1,920 |
| 3×RE0.8 | 8,000 | 0.19 | 4,560 | 7,400 | 0.17 | 3,770 | 6,900 | 0.13 | 2,690 | 5,300 | 0.13 | 2,070 |
| 4×RE1 | 6,000 | 0.27 | 4,860 | 5,600 | 0.25 | 4,200 | 5,200 | 0.19 | 2,960 | 4,000 | 0.19 | 2,280 |
| 5×RE1.2 | 4,800 | 0.33 | 4,750 | 4,500 | 0.3 | 4,050 | 4,100 | 0.24 | 2,950 | 3,200 | 0.24 | 2,300 |
| 6×RE1.5 | 4,000 | 0.42 | 5,040 | 3,700 | 0.38 | 4,220 | 3,500 | 0.3 | 3,150 | 2,700 | 0.3 | 2,430 |
| 8×RE2 | 3,000 | 0.56 | 5,040 | 2,800 | 0.51 | 4,280 | 2,600 | 0.4 | 3,120 | 2,000 | 0.4 | 2,400 |
| 10×RE2 | 2,400 | 0.7 | 5,040 | 2,200 | 0.64 | 4,220 | 2,100 | 0.5 | 3,150 | 1,600 | 0.5 | 2,400 |
| 12×RE2 | 2,000 | 0.8 | 4,800 | 1,900 | 0.75 | 4,280 | 1,700 | 0.58 | 2,960 | 1,300 | 0.58 | 2,260 |
| 16×RE3 | 1,500 | 0.85 | 3,830 | 1,400 | 0.8 | 3,360 | 1,300 | 0.66 | 2,570 | 1,000 | 0.66 | 1,980 |
| 20×RE3 | 1,200 | 0.85 | 3,060 | 1,100 | 0.8 | 2,640 | 1,000 | 0.66 | 1,980 | 800 | 0.66 | 1,580 |

### 【注意 Note】

①工具突き出し比率6DC以上の加工にはペンシルネックタイプのご使用を推奨いたします。
②等高線加工のダウンカットでご使用ください。Z切込みは傾斜切込み(傾斜角1°)とし、この際の送り速度は上記条件表の70~60%に下げてください。
③この切削条件表は切削条件の目安を示すものです。実際の切削状態により切削条件の調整を行ってください。
④基本的に乾式切削またはセミドライ切削(共にエアブローは必要)を推奨いたします。
⑤できるだけ高剛性、高精度の機械をご使用ください。

① In the case of cutting with overhang 6DC or over, we'll recommend pencil-neck type (EPRPN)
② Please use Z-constant & down cut. In the down cut processing, please process lamping (lamping angle = 1dig) and please down the feed rate 70~60% as above condition.
③ Please understand above condition is only as general one. Please regulate it is each case.
④ We recommended dry or semidry cutting. (Please use Air-blow)
⑤ We recommend you to use the machining as much rigidity, accuracy as you can.

### ■切込み量と工具突き出し比率 Relation between the depth of cut and overhung.




※St：ステップ幅 Step width（ae径方向切込み）
St＝フラット部の半径＝外径／2－RE値 tool dia. (mm)
ap：下表

| 工具突き出し比率 Overhang | ap：Z切込み量 Z pick mm | 工具突き出し比率 Overhang | ap：Z切込み量 Z pick mm |
|---|---|---|---|
| 5DC以下 | 0.30×RE | 8DC | 0.23×RE |
| 6DC | 0.27×RE | 9DC | 0.19×RE |
| 7DC | 0.25×RE | 10DC | 0.15×RE |

※焼入れ鋼(45~55HRC)の加工ではZ方向切込み量apを上記よりも30%程度小さく設定してください。
In case of hardened steel cutting, please decrease ap 0.7 times as above.

□印：特定代理店在庫です。弊社営業へお問合せください。　□：Stocked by specified distributor. Contact with our sales department.

Stocked by Specified distributor

# Epoch Deep Square
# エポックディープスクエア

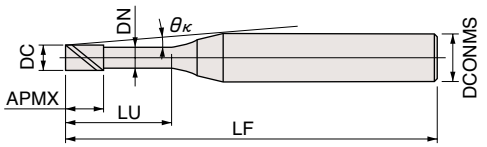
側面 Side Cutting | 溝 Slotting | 細部 Miniature | 仕上 Finishing | リブ・細部 Rib Miniature

外径公差 Dia.tolerance
φ0.1～φ0.5 : 0～−0.007
φ0.6～φ0.9 : 0～−0.01
φ1～φ4 : 0～−0.015

h5

(mm)

2枚刃
2Flutes

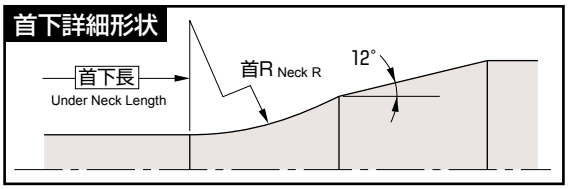



## EPDS2○○○-○○(-TH)

超硬 Carbide | CS | TH | ねじれ30° Helix angle | 切削条件表 A432 Cutting Conditions

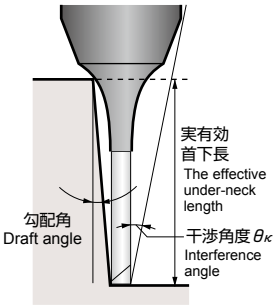
| CSコーティング CS Coating | | THコーティング TH Coating | | 寸法 Size(mm) | | | | | | | 干渉角度 Interference angle (°) | 勾配角に対する実有効首下長 The effective under-neck length for the various draft angles | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 商品コード Item code | 在庫 Stock | 商品コード Item code | 在庫 Stock | 外径 Tool dia. DC | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | θκ | 0.5° | 1° | 1.5° | 2° | 3° |
| EPDS2001-0.3 | □ | EPDS2001-0.3-TH | □ | 0.1 | 0.3 | 0.15 | 0.08 | 45 | 4 | 1 | 11.58 | 0.46 | 0.49 | 0.51 | 0.53 | 0.58 |
| EPDS2001-0.5 | □ | EPDS2001-0.5-TH | □ | | 0.5 | 0.15 | 0.08 | 45 | 4 | 1 | 11.35 | 0.67 | 0.71 | 0.74 | 0.76 | 0.82 |
| EPDS2001-1 | □ | EPDS2001-1-TH | □ | | 1 | 0.15 | 0.08 | 45 | 4 | 1 | 10.81 | 1.2 | 1.25 | 1.29 | 1.33 | 1.4 |
| EPDS2002-0.5 | □ | EPDS2002-0.5-TH | □ | 0.2 | 0.5 | 0.3 | 0.17 | 50 | 4 | 10 | 11.3 | 1.21 | 1.38 | 1.55 | 1.72 | 2.06 |
| EPDS2002-1 | □ | EPDS2002-1-TH | □ | | 1 | 0.3 | 0.17 | 50 | 4 | 10 | 10.75 | 1.78 | 1.99 | 2.2 | 2.4 | 2.78 |
| EPDS2002-1.5 | □ | EPDS2002-1.5-TH | □ | | 1.5 | 0.3 | 0.17 | 50 | 4 | 10 | 10.25 | 2.34 | 2.59 | 2.83 | 3.05 | 3.47 |
| EPDS2003-1 | □ | EPDS2003-1-TH | □ | 0.3 | 1 | 0.45 | 0.27 | 50 | 4 | 10 | 10.72 | 1.78 | 1.99 | 2.2 | 2.4 | 2.78 |
| EPDS2003-1.5 | □ | EPDS2003-1.5-TH | □ | | 1.5 | 0.45 | 0.27 | 50 | 4 | 10 | 10.21 | 2.34 | 2.59 | 2.83 | 3.05 | 3.47 |
| EPDS2003-2 | □ | EPDS2003-2-TH | □ | | 2 | 0.45 | 0.27 | 50 | 4 | 10 | 9.75 | 2.89 | 3.18 | 3.44 | 3.69 | 4.14 |
| EPDS2003-2.5 | □ | EPDS2003-2.5-TH | □ | | 2.5 | 0.45 | 0.27 | 50 | 4 | 10 | 9.32 | 3.44 | 3.76 | 4.05 | 4.31 | 4.79 |
| EPDS2003-3 | □ | EPDS2003-3-TH | □ | | 3 | 0.45 | 0.27 | 50 | 4 | 10 | 8.93 | 3.99 | 4.34 | 4.64 | 4.92 | 5.42 |
| EPDS2004-1 | □ | EPDS2004-1-TH | □ | 0.4 | 1 | 0.6 | 0.37 | 50 | 4 | 10 | 10.69 | 1.78 | 1.99 | 2.2 | 2.4 | 2.78 |
| EPDS2004-1.5 | □ | EPDS2004-1.5-TH | □ | | 1.5 | 0.6 | 0.37 | 50 | 4 | 10 | 10.17 | 2.34 | 2.59 | 2.83 | 3.05 | 3.47 |
| EPDS2004-2 | □ | EPDS2004-2-TH | □ | | 2 | 0.6 | 0.37 | 50 | 4 | 10 | 9.7 | 2.89 | 3.18 | 3.44 | 3.69 | 4.14 |
| EPDS2004-2.5 | □ | EPDS2004-2.5-TH | □ | | 2.5 | 0.6 | 0.37 | 50 | 4 | 10 | 9.27 | 3.44 | 3.76 | 4.05 | 4.31 | 4.79 |
| EPDS2004-3 | □ | EPDS2004-3-TH | □ | | 3 | 0.6 | 0.37 | 50 | 4 | 10 | 8.87 | 3.99 | 4.34 | 4.64 | 4.92 | 5.42 |
| EPDS2004-3.5 | □ | EPDS2004-3.5-TH | □ | | 3.5 | 0.6 | 0.37 | 50 | 4 | 10 | 8.51 | 4.54 | 4.91 | 5.23 | 5.52 | 6.05 |
| EPDS2004-4 | □ | EPDS2004-4-TH | □ | | 4 | 0.6 | 0.37 | 50 | 4 | 10 | 8.17 | 5.08 | 5.48 | 5.82 | 6.12 | 6.67 |
| EPDS2004-5 | □ | EPDS2004-5-TH | □ | | 5 | 0.6 | 0.37 | 50 | 4 | 10 | 7.58 | 6.17 | 6.6 | 6.97 | 7.3 | 7.89 |
| EPDS2004-6 | □ | EPDS2004-6-TH | □ | | 6 | 0.6 | 0.37 | 50 | 4 | 10 | 7.06 | 7.24 | 7.72 | 8.12 | 8.47 | 9.09 |
| EPDS2005-1 | □ | EPDS2005-1-TH | □ | 0.5 | 1 | 0.75 | 0.47 | 50 | 4 | 10 | 10.66 | 1.78 | 1.99 | 2.2 | 2.4 | 2.78 |
| EPDS2005-1.5 | □ | EPDS2005-1.5-TH | □ | | 1.5 | 0.75 | 0.47 | 50 | 4 | 10 | 10.13 | 2.34 | 2.59 | 2.83 | 3.05 | 3.47 |
| EPDS2005-2 | □ | EPDS2005-2-TH | □ | | 2 | 0.75 | 0.47 | 50 | 4 | 10 | 9.64 | 2.89 | 3.18 | 3.44 | 3.69 | 4.14 |
| EPDS2005-2.5 | □ | EPDS2005-2.5-TH | □ | | 2.5 | 0.75 | 0.47 | 50 | 4 | 10 | 9.21 | 3.44 | 3.76 | 4.05 | 4.31 | 4.79 |
| EPDS2005-3 | □ | EPDS2005-3-TH | □ | | 3 | 0.75 | 0.47 | 50 | 4 | 10 | 8.81 | 3.99 | 4.34 | 4.64 | 4.92 | 5.42 |
| EPDS2005-4 | □ | EPDS2005-4-TH | □ | | 4 | 0.75 | 0.47 | 50 | 4 | 10 | 8.1 | 5.08 | 5.48 | 5.82 | 6.12 | 6.67 |
| EPDS2005-5 | □ | EPDS2005-5-TH | □ | | 5 | 0.75 | 0.47 | 50 | 4 | 10 | 7.5 | 6.17 | 6.6 | 6.97 | 7.3 | 7.89 |
| EPDS2005-6 | □ | EPDS2005-6-TH | □ | | 6 | 0.75 | 0.47 | 50 | 4 | 10 | 6.98 | 7.24 | 7.72 | 8.12 | 8.47 | 9.09 |
| EPDS2005-8 | □ | EPDS2005-8-TH | □ | | 8 | 0.75 | 0.47 | 50 | 4 | 10 | 6.13 | 9.38 | 9.93 | 10.37 | 10.76 | 11.45 |
| EPDS2006-2 | □ | EPDS2006-2-TH | □ | 0.6 | 2 | 0.9 | 0.57 | 50 | 4 | 10 | 9.59 | 2.89 | 3.18 | 3.44 | 3.69 | 4.14 |
| EPDS2006-4 | □ | EPDS2006-4-TH | □ | | 4 | 0.9 | 0.57 | 50 | 4 | 10 | 8.02 | 5.08 | 5.48 | 5.82 | 6.12 | 6.67 |
| EPDS2006-6 | □ | EPDS2006-6-TH | □ | | 6 | 0.9 | 0.57 | 50 | 4 | 10 | 6.9 | 7.24 | 7.72 | 8.12 | 8.47 | 9.09 |
| EPDS2006-8 | □ | EPDS2006-8-TH | □ | | 8 | 0.9 | 0.57 | 50 | 4 | 10 | 6.04 | 9.38 | 9.93 | 10.37 | 10.76 | 11.45 |
| EPDS2006-10 | □ | EPDS2006-10-TH | □ | | 10 | 0.9 | 0.57 | 50 | 4 | 10 | 5.38 | 11.51 | 12.11 | 12.6 | 13.03 | 13.76 |
| EPDS2007-2 | □ | EPDS2007-2-TH | □ | 0.7 | 2 | 1.05 | 0.67 | 50 | 4 | 10 | 9.53 | 2.89 | 3.18 | 3.44 | 3.69 | 4.14 |
| EPDS2007-4 | □ | EPDS2007-4-TH | □ | | 4 | 1.05 | 0.67 | 50 | 4 | 10 | 7.94 | 5.08 | 5.48 | 5.82 | 6.12 | 6.67 |
| EPDS2007-6 | □ | EPDS2007-6-TH | □ | | 6 | 1.05 | 0.67 | 50 | 4 | 10 | 6.81 | 7.24 | 7.72 | 8.12 | 8.47 | 9.09 |
| EPDS2007-8 | □ | EPDS2007-8-TH | □ | | 8 | 1.05 | 0.67 | 50 | 4 | 10 | 5.95 | 9.38 | 9.93 | 10.37 | 10.76 | 11.45 |
| EPDS2007-10 | □ | EPDS2007-10-TH | □ | | 10 | 1.05 | 0.67 | 50 | 4 | 10 | 5.29 | 11.51 | 12.11 | 12.6 | 13.03 | 13.76 |
| EPDS2008-4 | □ | EPDS2008-4-TH | □ | 0.8 | 4 | 1.2 | 0.77 | 50 | 4 | 10 | 7.86 | 5.08 | 5.48 | 5.82 | 6.12 | 6.67 |
| EPDS2008-6 | □ | EPDS2008-6-TH | □ | | 6 | 1.2 | 0.77 | 50 | 4 | 10 | 6.72 | 7.24 | 7.72 | 8.12 | 8.47 | 9.09 |
| EPDS2008-8 | □ | EPDS2008-8-TH | □ | | 8 | 1.2 | 0.77 | 50 | 4 | 10 | 5.86 | 9.38 | 9.93 | 10.37 | 10.76 | 11.45 |
| EPDS2008-10 | □ | EPDS2008-10-TH | □ | | 10 | 1.2 | 0.77 | 50 | 4 | 10 | 5.2 | 11.51 | 12.11 | 12.6 | 13.03 | 13.76 |
| EPDS2008-12 | □ | EPDS2008-12-TH | □ | | 12 | 1.2 | 0.77 | 55 | 4 | 10 | 4.67 | 13.63 | 14.28 | 14.81 | 15.26 | 16.04 |
| EPDS2009-6 | □ | EPDS2009-6-TH | □ | 0.9 | 6 | 1.35 | 0.86 | 50 | 4 | 10 | 6.61 | 7.29 | 7.75 | 8.14 | 8.49 | 9.11 |
| EPDS2009-8 | □ | EPDS2009-8-TH | □ | | 8 | 1.35 | 0.86 | 50 | 4 | 10 | 5.76 | 9.42 | 9.95 | 10.4 | 10.78 | 11.46 |
| EPDS2009-10 | □ | EPDS2009-10-TH | □ | | 10 | 1.35 | 0.86 | 50 | 4 | 10 | 5.1 | 11.55 | 12.14 | 12.62 | 13.04 | 13.78 |
| EPDS2009-12 | □ | EPDS2009-12-TH | □ | | 12 | 1.35 | 0.86 | 55 | 4 | 10 | 4.58 | 13.66 | 14.3 | 14.82 | 15.28 | 16.06 |
| EPDS2010-2 | □ | EPDS2010-2-TH | □ | 1 | 2 | 1.5 | 0.96 | 50 | 4 | 10 | 9.31 | 2.95 | 3.23 | 3.48 | 3.72 | 4.17 |
| EPDS2010-4 | □ | EPDS2010-4-TH | □ | | 4 | 1.5 | 0.96 | 50 | 4 | 10 | 7.67 | 5.13 | 5.52 | 5.85 | 6.15 | 6.69 |
| EPDS2010-6 | □ | EPDS2010-6-TH | □ | | 6 | 1.5 | 0.96 | 50 | 4 | 10 | 6.51 | 7.29 | 7.75 | 8.14 | 8.49 | 9.11 |
| EPDS2010-8 | □ | EPDS2010-8-TH | □ | | 8 | 1.5 | 0.96 | 50 | 4 | 10 | 5.66 | 9.42 | 9.95 | 10.4 | 10.78 | 11.46 |
| EPDS2010-10 | □ | EPDS2010-10-TH | □ | | 10 | 1.5 | 0.96 | 50 | 4 | 10 | 5 | 11.55 | 12.14 | 12.62 | 13.04 | 13.78 |
| EPDS2010-12 | □ | EPDS2010-12-TH | □ | | 12 | 1.5 | 0.96 | 55 | 4 | 10 | 4.48 | 13.66 | 14.3 | 14.82 | 15.28 | 16.06 |
| EPDS2010-14 | □ | EPDS2010-14-TH | □ | | 14 | 1.5 | 0.96 | 55 | 4 | 10 | 4.06 | 15.76 | 16.46 | 17.01 | 17.49 | 18.7 |
| EPDS2010-16 | □ | EPDS2010-16-TH | □ | | 16 | 1.5 | 0.96 | 60 | 4 | 10 | 3.71 | 17.86 | 18.6 | 19.19 | 19.69 | 21.36 |
| EPDS2012-6 | □ | EPDS2012-6-TH | □ | 1.2 | 6 | 1.8 | 1.15 | 50 | 4 | 10 | 6.29 | 7.33 | 7.78 | 8.17 | 8.51 | 9.13 |
| EPDS2012-8 | □ | EPDS2012-8-TH | □ | | 8 | 1.8 | 1.15 | 50 | 4 | 10 | 5.44 | 9.46 | 9.98 | 10.42 | 10.8 | 11.48 |
| EPDS2012-10 | □ | EPDS2012-10-TH | □ | | 10 | 1.8 | 1.15 | 50 | 4 | 10 | 4.8 | 11.58 | 12.16 | 12.64 | 13.06 | 13.79 |
| EPDS2012-12 | □ | EPDS2012-12-TH | □ | | 12 | 1.8 | 1.15 | 55 | 4 | 10 | 4.29 | 13.69 | 14.33 | 14.84 | 15.29 | 16.08 |
| EPDS2012-16 | □ | EPDS2012-16-TH | □ | | 16 | 1.8 | 1.15 | 55 | 4 | 10 | 3.53 | 17.89 | 18.62 | 19.2 | 19.7 | 21.39 |

## 首下詳細形状




【注意】加工物に勾配がついている場合、干渉領域は、首下長さよりも長くなります。それぞれの勾配角に対する実有効首下長をご参照ください。
また、工具が加工物に干渉する角度を干渉角度$\theta_K$で表示していますので合わせてご参照ください。

【Note】If the workpiece has draft angle, the interference length will be longer than the under-neck length.Please refer to the effective under-neck length for the various draft angles.
In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle $\theta_K$", and should also be referred to.




# EPDS2○○○-○○(-TH)

| CSコーティング CS Coating 商品コード Item code | 在庫 Stock | THコーティング TH Coating 商品コード Item code | 在庫 Stock | 外径 Tool dia. DC | 首下長 Under neck length LU | 刃長 Flute length APMX | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS | 首R Neck R | 干渉角度 Interference angle (°) $\theta_K$ | 勾配角に対する実有効首下長 The effective under-neck length for the various draft angles 0.5° | 1° | 1.5° | 2° | 3° |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EPDS2014-6 | □ | EPDS2014-6-TH | □ | 1.4 | 6 | 2.1 | 1.34 | 50 | 4 | 10 | 6.06 | 7.37 | 7.81 | 8.19 | 8.54 | 9.15 |
| EPDS2014-8 | □ | EPDS2014-8-TH | □ | | 8 | 2.1 | 1.34 | 50 | 4 | 10 | 5.21 | 9.49 | 10.01 | 10.44 | 10.82 | 11.5 |
| EPDS2014-10 | □ | EPDS2014-10-TH | □ | | 10 | 2.1 | 1.34 | 50 | 4 | 10 | 4.58 | 11.61 | 12.19 | 12.66 | 13.08 | 13.8 |
| EPDS2014-12 | □ | EPDS2014-12-TH | □ | | 12 | 2.1 | 1.34 | 55 | 4 | 10 | 4.08 | 13.72 | 14.35 | 14.86 | 15.31 | 16.11 |
| EPDS2014-14 | □ | EPDS2014-14-TH | □ | | 14 | 2.1 | 1.34 | 55 | 4 | 10 | 3.68 | 15.82 | 16.5 | 17.05 | 17.52 | 18.76 |
| EPDS2014-16 | □ | EPDS2014-16-TH | □ | | 16 | 2.1 | 1.34 | 55 | 4 | 10 | 3.35 | 17.92 | 18.64 | 19.22 | 19.72 | 21.42 |
| EPDS2015-4 | □ | EPDS2015-4-TH | □ | 1.5 | 4 | 2.25 | 1.44 | 50 | 4 | 10 | 7.11 | 5.22 | 5.59 | 5.91 | 6.2 | 6.74 |
| EPDS2015-6 | □ | EPDS2015-6-TH | □ | | 6 | 2.25 | 1.44 | 50 | 4 | 10 | 5.94 | 7.37 | 7.81 | 8.19 | 8.54 | 9.15 |
| EPDS2015-8 | □ | EPDS2015-8-TH | □ | | 8 | 2.25 | 1.44 | 50 | 4 | 10 | 5.1 | 9.49 | 10.01 | 10.44 | 10.82 | 11.5 |
| EPDS2015-10 | □ | EPDS2015-10-TH | □ | | 10 | 2.25 | 1.44 | 50 | 4 | 10 | 4.47 | 11.61 | 12.19 | 12.66 | 13.08 | 13.8 |
| EPDS2015-12 | □ | EPDS2015-12-TH | □ | | 12 | 2.25 | 1.44 | 55 | 4 | 10 | 3.97 | 13.72 | 14.35 | 14.86 | 15.31 | 16.11 |
| EPDS2015-14 | □ | EPDS2015-14-TH | □ | | 14 | 2.25 | 1.44 | 55 | 4 | 10 | 3.58 | 15.82 | 16.5 | 17.05 | 17.52 | 18.76 |
| EPDS2015-16 | □ | EPDS2015-16-TH | □ | | 16 | 2.25 | 1.44 | 55 | 4 | 10 | 3.25 | 17.92 | 18.64 | 19.22 | 19.72 | 21.42 |
| EPDS2015-18 | □ | EPDS2015-18-TH | □ | | 18 | 2.25 | 1.44 | 60 | 4 | 10 | 2.98 | 20.01 | 20.77 | 21.38 | 21.9 | 干渉なし |
| EPDS2015-20 | □ | EPDS2015-20-TH | □ | | 20 | 2.25 | 1.44 | 60 | 4 | 10 | 2.76 | 22.09 | 22.9 | 23.53 | 24.1 | 干渉なし |
| EPDS2015-25 | □ | EPDS2015-25-TH | □ | | 25 | 2.25 | 1.44 | 65 | 4 | 10 | 2.31 | 27.3 | 28.18 | 28.88 | 30.08 | 干渉なし |
| EPDS2016-6 | □ | EPDS2016-6-TH | □ | 1.6 | 6 | 2.4 | 1.54 | 50 | 4 | 10 | 5.82 | 7.37 | 7.81 | 8.19 | 8.54 | 9.15 |
| EPDS2016-8 | □ | EPDS2016-8-TH | □ | | 8 | 2.4 | 1.54 | 50 | 4 | 10 | 4.98 | 9.49 | 10.01 | 10.44 | 10.82 | 11.5 |
| EPDS2016-10 | □ | EPDS2016-10-TH | □ | | 10 | 2.4 | 1.54 | 50 | 4 | 10 | 4.35 | 11.61 | 12.19 | 12.66 | 13.08 | 13.8 |
| EPDS2016-12 | □ | EPDS2016-12-TH | □ | | 12 | 2.4 | 1.54 | 55 | 4 | 10 | 3.86 | 13.72 | 14.35 | 14.86 | 15.31 | 16.11 |
| EPDS2016-14 | □ | EPDS2016-14-TH | □ | | 14 | 2.4 | 1.54 | 55 | 4 | 10 | 3.48 | 15.82 | 16.5 | 17.05 | 17.52 | 18.76 |
| EPDS2016-16 | □ | EPDS2016-16-TH | □ | | 16 | 2.4 | 1.54 | 55 | 4 | 10 | 3.16 | 17.92 | 18.64 | 19.22 | 19.72 | 21.42 |
| EPDS2016-18 | □ | EPDS2016-18-TH | □ | | 18 | 2.4 | 1.54 | 60 | 4 | 10 | 2.89 | 20.01 | 20.77 | 21.38 | 21.9 | 干渉なし |
| EPDS2016-20 | □ | EPDS2016-20-TH | □ | | 20 | 2.4 | 1.54 | 60 | 4 | 10 | 2.67 | 22.09 | 22.9 | 23.53 | 24.1 | 干渉なし |
| EPDS2018-6 | □ | EPDS2018-6-TH | □ | 1.8 | 6 | 2.7 | 1.73 | 50 | 4 | 10 | 5.55 | 7.4 | 7.84 | 8.22 | 8.56 | 9.16 |
| EPDS2018-8 | □ | EPDS2018-8-TH | □ | | 8 | 2.7 | 1.73 | 50 | 4 | 10 | 4.72 | 9.53 | 10.04 | 10.46 | 10.84 | 11.51 |
| EPDS2018-10 | □ | EPDS2018-10-TH | □ | | 10 | 2.7 | 1.73 | 50 | 4 | 10 | 4.11 | 11.64 | 12.21 | 12.68 | 13.09 | 13.82 |
| EPDS2018-12 | □ | EPDS2018-12-TH | □ | | 12 | 2.7 | 1.73 | 55 | 4 | 10 | 3.63 | 13.75 | 14.37 | 14.88 | 15.32 | 16.14 |
| EPDS2018-14 | □ | EPDS2018-14-TH | □ | | 14 | 2.7 | 1.73 | 55 | 4 | 10 | 3.26 | 15.85 | 16.52 | 17.06 | 17.54 | 18.8 |
| EPDS2018-16 | □ | EPDS2018-16-TH | □ | | 16 | 2.7 | 1.73 | 55 | 4 | 10 | 2.96 | 17.94 | 18.66 | 19.23 | 19.73 | 干渉なし |
| EPDS2018-18 | □ | EPDS2018-18-TH | □ | | 18 | 2.7 | 1.73 | 60 | 4 | 10 | 2.7 | 20.03 | 20.79 | 21.39 | 21.92 | 干渉なし |
| EPDS2018-20 | □ | EPDS2018-20-TH | □ | | 20 | 2.7 | 1.73 | 60 | 4 | 10 | 2.49 | 22.12 | 22.91 | 23.55 | 24.12 | 干渉なし |
| EPDS2020-4 | □ | EPDS2020-4-TH | □ | 2 | 4 | 3 | 1.92 | 50 | 4 | 10 | 6.42 | 5.31 | 5.66 | 5.97 | 6.25 | 6.78 |
| EPDS2020-6 | □ | EPDS2020-6-TH | □ | | 6 | 3 | 1.92 | 50 | 4 | 10 | 5.25 | 7.44 | 7.87 | 8.24 | 8.58 | 9.18 |
| EPDS2020-8 | □ | EPDS2020-8-TH | □ | | 8 | 3 | 1.92 | 50 | 4 | 10 | 4.44 | 9.56 | 10.06 | 10.48 | 10.86 | 11.53 |
| EPDS2020-10 | □ | EPDS2020-10-TH | □ | | 10 | 3 | 1.92 | 50 | 4 | 10 | 3.85 | 11.67 | 12.23 | 12.7 | 13.11 | 13.83 |
| EPDS2020-12 | □ | EPDS2020-12-TH | □ | | 12 | 3 | 1.92 | 55 | 4 | 10 | 3.39 | 13.78 | 14.39 | 14.9 | 15.34 | 16.17 |
| EPDS2020-14 | □ | EPDS2020-14-TH | □ | | 14 | 3 | 1.92 | 55 | 4 | 10 | 3.03 | 15.88 | 16.54 | 17.08 | 17.55 | 18.83 |
| EPDS2020-16 | □ | EPDS2020-16-TH | □ | | 16 | 3 | 1.92 | 55 | 4 | 10 | 2.75 | 17.97 | 18.68 | 19.25 | 19.75 | 干渉なし |
| EPDS2020-18 | □ | EPDS2020-18-TH | □ | | 18 | 3 | 1.92 | 60 | 4 | 10 | 2.51 | 20.06 | 20.81 | 21.41 | 21.93 | 干渉なし |
| EPDS2020-20 | □ | EPDS2020-20-TH | □ | | 20 | 3 | 1.92 | 60 | 4 | 10 | 2.31 | 22.14 | 22.93 | 23.56 | 24.15 | 干渉なし |
| EPDS2020-25 | □ | EPDS2020-25-TH | □ | | 25 | 3 | 1.92 | 65 | 4 | 10 | 1.92 | 27.34 | 28.22 | 28.91 | 干渉なし | 干渉なし |
| EPDS2020-30 | □ | EPDS2020-30-TH | □ | | 30 | 3 | 1.92 | 70 | 4 | 10 | 1.65 | 32.52 | 33.47 | 34.43 | 干渉なし | 干渉なし |
| EPDS2025-8 | □ | EPDS2025-8-TH | □ | 2.5 | 8 | 3.75 | 2.4 | 50 | 4 | 10 | 3.61 | 9.63 | 10.11 | 10.53 | 10.9 | 11.56 |
| EPDS2025-12 | □ | EPDS2025-12-TH | □ | | 12 | 3.75 | 2.4 | 55 | 4 | 10 | 2.7 | 13.84 | 14.43 | 14.93 | 15.37 | 干渉なし |
| EPDS2025-16 | □ | EPDS2025-16-TH | □ | | 16 | 3.75 | 2.4 | 55 | 4 | 10 | 2.16 | 18.02 | 18.71 | 19.28 | 19.77 | 干渉なし |
| EPDS2025-20 | □ | EPDS2025-20-TH | □ | | 20 | 3.75 | 2.4 | 60 | 4 | 10 | 1.8 | 22.19 | 22.96 | 23.59 | 干渉なし | 干渉なし |
| EPDS2030-8 | □ | EPDS2030-8-TH | □ | 3 | 8 | 4.5 | 2.88 | 55 | 6 | 10 | 5.59 | 9.69 | 10.16 | 10.57 | 10.94 | 11.59 |
| EPDS2030-12 | □ | EPDS2030-12-TH | □ | | 12 | 4.5 | 2.88 | 60 | 6 | 10 | 4.44 | 13.89 | 14.48 | 14.97 | 15.4 | 16.3 |
| EPDS2030-16 | □ | EPDS2030-16-TH | □ | | 16 | 4.5 | 2.88 | 60 | 6 | 10 | 3.68 | 18.07 | 18.75 | 19.31 | 19.8 | 21.61 |
| EPDS2030-20 | □ | EPDS2030-20-TH | □ | | 20 | 4.5 | 2.88 | 65 | 6 | 10 | 3.15 | 22.24 | 23 | 23.62 | 24.26 | 26.92 |
| EPDS2030-25 | □ | EPDS2030-25-TH | □ | | 25 | 4.5 | 2.88 | 70 | 6 | 10 | 2.66 | 27.42 | 28.28 | 28.96 | 30.25 | 干渉なし |
| EPDS2030-30 | □ | EPDS2030-30-TH | □ | | 30 | 4.5 | 2.88 | 75 | 6 | 10 | 2.31 | 32.6 | 33.53 | 34.53 | 36.23 | 干渉なし |
| EPDS2030-40 | □ | EPDS2030-40-TH | □ | | 40 | 4.5 | 2.88 | 90 | 6 | 10 | 1.82 | 42.91 | 43.98 | 45.94 | 干渉なし | 干渉なし |
| EPDS2040-12 | □ | EPDS2040-12-TH | □ | 4 | 12 | 6 | 3.85 | 60 | 6 | 10 | 3.36 | 13.97 | 14.54 | 15.02 | 15.45 | 16.39 |
| EPDS2040-16 | □ | EPDS2040-16-TH | □ | | 16 | 6 | 3.85 | 60 | 6 | 10 | 2.72 | 18.14 | 18.81 | 19.36 | 19.84 | 干渉なし |
| EPDS2040-20 | □ | EPDS2040-20-TH | □ | | 20 | 6 | 3.85 | 70 | 6 | 10 | 2.29 | 22.3 | 23.05 | 23.66 | 24.35 | 干渉なし |
| EPDS2040-25 | □ | EPDS2040-25-TH | □ | | 25 | 6 | 3.85 | 70 | 6 | 10 | 1.91 | 27.49 | 28.32 | 28.99 | 干渉なし | 干渉なし |
| EPDS2040-30 | □ | EPDS2040-30-TH | □ | | 30 | 6 | 3.85 | 80 | 6 | 10 | 1.64 | 32.65 | 33.57 | 34.61 | 干渉なし | 干渉なし |
| EPDS2040-35 | □ | EPDS2040-35-TH | □ | | 35 | 6 | 3.85 | 80 | 6 | 10 | 1.44 | 37.81 | 38.8 | 干渉なし | 干渉なし | 干渉なし |
| EPDS2040-40 | □ | EPDS2040-40-TH | □ | | 40 | 6 | 3.85 | 90 | 6 | 10 | 1.28 | 42.96 | 44.01 | 干渉なし | 干渉なし | 干渉なし |

THコーティング品を注文される場合は商品コードの末尾に-THをつけてください。
When you want to order TH Coating items from us, please add the suffix -TH at the end of the item code.

干渉なし：No interference
□印：特定代理店在庫です。弊社営業へお問合せください。
□：Stocked by specified distributor. Contact with our sales department.

## 対応被削材 Applicable work material

| コーティング Coating | 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|---|
| CS | ◎ | ◎ | ◎ | ○ | | ◎ | ◎ | ◎ | ◎ |
| TH | ○ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ |

# Epoch Deep Square
# エポックディープスクエア

## 標準切削条件表 Recommended cutting conditions EPDS EPDS-TH

※CSシリーズは被削材グループ1～4を推奨、 THシリーズは被削材グループ4～6を推奨 For details about the CS series, refer to work groups 1 - 4. For details about the TH series, refer to work groups 4 - 6.

| 推奨領域 Recommended range | | | CSシリーズ | | | | | | THシリーズ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 被削材 Work material | | | 1 銅 Coppers | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼入れ鋼 Hardened steels (45～55HRC) | | 6 焼入れ鋼 Hardened steels (55～65HRC) | |
| 切り込み比率 Ratio to standard depth of cut | | | 120% | | 100% | | 90% | | 70% | | 50% | | 45% | |
| 外径DC Tool dia. (mm) | 首下長LU Under neck length (mm) | ※基本切り込み Standard depth of cut (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 0.1 | 0.3 | 0.006 | 50,000 | 500 | 50,000 | 500 | 50,000 | 475 | 48,600 | 346 | 42,750 | 255 | 40,050 | 206 |
| | 0.5 | 0.004 | 50,000 | 500 | 50,000 | 500 | 50,000 | 475 | 48,600 | 346 | 42,750 | 255 | 40,050 | 206 |
| | 1 | 0.003 | 50,000 | 455 | 50,000 | 455 | 48,600 | 430 | 43,700 | 315 | 38,500 | 232 | 36,050 | 187 |
| 0.2 | 0.5 | 0.02 | 50,000 | 708 | 45,000 | 638 | 40,500 | 574 | 38,250 | 403 | 33,750 | 301 | 31,500 | 242 |
| | 1 | 0.014 | 50,000 | 708 | 45,000 | 638 | 40,500 | 574 | 38,250 | 403 | 33,750 | 301 | 31,500 | 242 |
| | 1.5 | 0.008 | 48,600 | 630 | 40,500 | 525 | 36,450 | 472 | 34,425 | 362 | 30,375 | 271 | 28,350 | 218 |
| 0.3 | 1 | 0.021 | 48,000 | 680 | 40,000 | 567 | 36,000 | 510 | 34,000 | 358 | 30,000 | 267 | 28,000 | 215 |
| | 1.5 | 0.021 | 48,000 | 680 | 40,000 | 567 | 36,000 | 510 | 34,000 | 358 | 30,000 | 267 | 28,000 | 215 |
| | 2 | 0.012 | 43,200 | 560 | 36,000 | 467 | 32,400 | 420 | 30,600 | 322 | 27,000 | 241 | 25,200 | 194 |
| | 2.5 | 0.01 | 43,200 | 560 | 36,000 | 467 | 32,400 | 420 | 30,600 | 322 | 27,000 | 241 | 25,200 | 194 |
| | 3 | 0.008 | 43,200 | 560 | 36,000 | 467 | 32,400 | 420 | 30,600 | 322 | 27,000 | 241 | 25,200 | 194 |
| 0.4 | 1 | 0.04 | 38,400 | 847 | 32,000 | 706 | 28,800 | 635 | 27,200 | 446 | 24,000 | 333 | 22,400 | 268 |
| | 1.5 | 0.028 | 38,400 | 847 | 32,000 | 706 | 28,800 | 635 | 27,200 | 446 | 24,000 | 333 | 22,400 | 268 |
| | 2 | 0.028 | 38,400 | 847 | 32,000 | 706 | 28,800 | 635 | 27,200 | 446 | 24,000 | 333 | 22,400 | 268 |
| | 2.5 | 0.022 | 34,560 | 697 | 28,800 | 581 | 25,920 | 523 | 24,480 | 401 | 21,600 | 299 | 20,160 | 241 |
| | 3 | 0.016 | 34,560 | 697 | 28,800 | 581 | 25,920 | 523 | 24,480 | 401 | 21,600 | 299 | 20,160 | 241 |
| | 3.5 | 0.012 | 34,560 | 697 | 28,800 | 581 | 25,920 | 523 | 24,480 | 401 | 21,600 | 299 | 20,160 | 241 |
| | 4 | 0.01 | 34,560 | 697 | 28,800 | 581 | 25,920 | 523 | 24,480 | 401 | 21,600 | 299 | 20,160 | 241 |
| | 5 | 0.01 | 30,720 | 542 | 25,600 | 452 | 23,040 | 406 | 21,760 | 260 | 19,200 | 230 | 17,920 | 181 |
| | 6 | 0.006 | 30,720 | 542 | 25,600 | 452 | 23,040 | 406 | 21,760 | 260 | 19,200 | 230 | 17,920 | 181 |
| 0.5 | 1 | 0.05 | 38,400 | 847 | 32,000 | 706 | 28,800 | 635 | 27,200 | 446 | 24,000 | 333 | 22,400 | 268 |
| | 1.5 | 0.05 | 38,400 | 847 | 32,000 | 706 | 28,800 | 635 | 27,200 | 446 | 24,000 | 333 | 22,400 | 268 |
| | 2 | 0.035 | 38,400 | 847 | 32,000 | 706 | 28,800 | 635 | 27,200 | 446 | 24,000 | 333 | 22,400 | 268 |
| | 2.5 | 0.03 | 34,560 | 697 | 28,800 | 581 | 25,920 | 523 | 24,480 | 401 | 21,600 | 299 | 20,160 | 241 |
| | 3 | 0.02 | 34,560 | 697 | 28,800 | 581 | 25,920 | 523 | 24,480 | 401 | 21,600 | 299 | 20,160 | 241 |
| | 4 | 0.02 | 34,560 | 697 | 28,800 | 581 | 25,920 | 523 | 24,480 | 401 | 21,600 | 299 | 20,160 | 241 |
| | 5 | 0.013 | 34,560 | 697 | 28,800 | 581 | 25,920 | 523 | 24,480 | 401 | 21,600 | 299 | 20,160 | 241 |
| | 6 | 0.013 | 30,720 | 542 | 25,600 | 452 | 23,040 | 406 | 21,760 | 260 | 19,200 | 230 | 17,920 | 181 |
| | 8 | 0.008 | 30,720 | 464 | 25,600 | 387 | 23,040 | 348 | 21,760 | 247 | 19,200 | 194 | 17,920 | 147 |
| 0.6 | 2 | 0.042 | 38,400 | 1,210 | 32,000 | 1,008 | 28,800 | 907 | 27,200 | 636 | 24,000 | 475 | 22,400 | 383 |
| | 4 | 0.024 | 34,560 | 995 | 28,800 | 829 | 25,920 | 746 | 24,480 | 573 | 21,600 | 428 | 20,160 | 345 |
| | 6 | 0.015 | 34,560 | 995 | 28,800 | 829 | 25,920 | 746 | 24,480 | 573 | 21,600 | 428 | 20,160 | 345 |
| | 8 | 0.015 | 30,720 | 774 | 25,600 | 645 | 23,040 | 581 | 21,760 | 372 | 19,200 | 328 | 17,920 | 258 |
| | 10 | 0.009 | 30,720 | 774 | 25,600 | 645 | 23,040 | 581 | 21,760 | 372 | 19,200 | 328 | 17,920 | 258 |
| 0.7 | 2 | 0.07 | 38,400 | 1,210 | 32,000 | 1,008 | 28,800 | 907 | 27,200 | 636 | 24,000 | 475 | 22,400 | 383 |
| | 4 | 0.049 | 34,560 | 995 | 28,800 | 829 | 25,920 | 746 | 24,480 | 573 | 21,600 | 428 | 20,160 | 345 |
| | 6 | 0.018 | 34,560 | 995 | 28,800 | 829 | 25,920 | 746 | 24,480 | 573 | 21,600 | 428 | 20,160 | 345 |
| | 8 | 0.018 | 30,720 | 774 | 25,600 | 645 | 23,040 | 581 | 21,760 | 372 | 19,200 | 328 | 17,920 | 258 |
| | 10 | 0.018 | 30,720 | 774 | 25,600 | 645 | 23,040 | 581 | 21,760 | 372 | 19,200 | 328 | 17,920 | 258 |
| 0.8 | 4 | 0.056 | 38,400 | 1,210 | 32,000 | 1,008 | 28,800 | 907 | 27,200 | 636 | 24,000 | 475 | 22,400 | 383 |
| | 6 | 0.032 | 34,560 | 995 | 28,800 | 829 | 25,920 | 746 | 24,480 | 573 | 21,600 | 428 | 20,160 | 345 |
| | 8 | 0.02 | 34,560 | 995 | 28,800 | 829 | 25,920 | 746 | 24,480 | 573 | 21,600 | 428 | 20,160 | 345 |
| | 10 | 0.02 | 30,720 | 774 | 25,600 | 645 | 23,040 | 581 | 21,760 | 372 | 19,200 | 328 | 17,920 | 258 |
| | 12 | 0.012 | 30,720 | 774 | 25,600 | 645 | 23,040 | 581 | 21,760 | 372 | 19,200 | 328 | 17,920 | 258 |
| 0.9 | 6 | 0.036 | 34,560 | 995 | 28,800 | 829 | 25,920 | 746 | 24,480 | 573 | 21,600 | 428 | 20,160 | 345 |
| | 8 | 0.023 | 34,560 | 995 | 28,800 | 829 | 25,920 | 746 | 24,480 | 573 | 21,600 | 428 | 20,160 | 345 |
| | 10 | 0.023 | 30,720 | 774 | 25,600 | 645 | 23,040 | 581 | 21,760 | 372 | 19,200 | 328 | 17,920 | 258 |
| | 12 | 0.023 | 30,720 | 774 | 25,600 | 645 | 23,040 | 581 | 21,760 | 372 | 19,200 | 328 | 17,920 | 258 |
| 1 | 2 | 0.1 | 34,560 | 1,628 | 28,800 | 1,356 | 25,920 | 1,220 | 24,480 | 936 | 21,600 | 699 | 20,160 | 563 |
| | 4 | 0.07 | 34,560 | 1,628 | 28,800 | 1,356 | 25,920 | 1,220 | 24,480 | 936 | 21,600 | 699 | 20,160 | 563 |
| | 6 | 0.04 | 31,104 | 1,344 | 25,920 | 1,120 | 23,328 | 1,008 | 22,032 | 773 | 19,440 | 577 | 18,144 | 465 |
| | 8 | 0.04 | 31,104 | 1,344 | 25,920 | 1,120 | 23,328 | 1,008 | 22,032 | 773 | 19,440 | 577 | 18,144 | 465 |
| | 10 | 0.025 | 31,104 | 1,344 | 25,920 | 1,120 | 23,328 | 1,008 | 22,032 | 773 | 19,440 | 577 | 18,144 | 465 |
| | 12 | 0.025 | 27,648 | 1,045 | 23,040 | 871 | 20,736 | 784 | 19,584 | 502 | 17,280 | 443 | 16,128 | 348 |
| | 14 | 0.025 | 27,648 | 1,045 | 23,040 | 871 | 20,736 | 784 | 19,584 | 502 | 17,280 | 443 | 16,128 | 348 |
| | 16 | 0.015 | 27,648 | 896 | 23,040 | 746 | 20,736 | 672 | 19,584 | 476 | 17,280 | 373 | 16,128 | 283 |
| 1.2 | 6 | 0.084 | 30,720 | 1,452 | 25,600 | 1,210 | 23,040 | 1,089 | 21,760 | 764 | 19,200 | 570 | 17,920 | 460 |
| | 8 | 0.048 | 27,648 | 1,194 | 23,040 | 995 | 20,736 | 896 | 19,584 | 687 | 17,280 | 513 | 16,128 | 414 |
| | 10 | 0.03 | 27,648 | 1,194 | 23,040 | 995 | 20,736 | 896 | 19,584 | 687 | 17,280 | 513 | 16,128 | 414 |
| | 12 | 0.03 | 27,648 | 1,194 | 23,040 | 995 | 20,736 | 896 | 19,584 | 687 | 17,280 | 513 | 16,128 | 414 |
| | 16 | 0.02 | 24,576 | 1,061 | 20,480 | 884 | 18,432 | 796 | 17,408 | 611 | 15,360 | 456 | 14,336 | 368 |
| 1.4 | 6 | 0.1 | 26,880 | 1,270 | 22,400 | 1,058 | 20,160 | 953 | 19,040 | 668 | 16,800 | 499 | 15,680 | 402 |
| | 8 | 0.084 | 24,192 | 1,045 | 20,160 | 871 | 18,144 | 784 | 17,136 | 601 | 15,120 | 449 | 14,112 | 362 |
| | 10 | 0.056 | 24,192 | 1,045 | 20,160 | 871 | 18,144 | 784 | 17,136 | 601 | 15,120 | 449 | 14,112 | 362 |
| | 12 | 0.035 | 24,192 | 1,045 | 20,160 | 871 | 18,144 | 784 | 17,136 | 601 | 15,120 | 449 | 14,112 | 362 |
| | 14 | 0.035 | 24,192 | 1,045 | 20,160 | 871 | 18,144 | 784 | 17,136 | 601 | 15,120 | 449 | 14,112 | 362 |
| | 16 | 0.035 | 21,504 | 813 | 17,920 | 677 | 16,128 | 610 | 15,232 | 391 | 13,440 | 345 | 12,544 | 271 |

※CSシリーズは被削材グループ1～4を推奨、 THシリーズは被削材グループ4～6を推奨 For details about the CS series, refer to work groups 1 - 4. For details about the TH series, refer to work groups 4 - 6.

| 推奨領域 Recommended range | | | CSシリーズ | | | | | | THシリーズ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 被削材 Work material | | | 1 銅 Coppers | | 2 炭素鋼・合金鋼 Carbon steels, Alloy steels (180～250HB) | | 3 ステンレス鋼・工具鋼 Stainless steels, Tool steels (25～35HRC) | | 4 プリハードン鋼 Pre-hardened steels (35～45HRC) | | 5 焼入れ鋼 Hardened steels (45～55HRC) | | 6 焼入れ鋼 Hardened steels (55～65HRC) | |
| 切り込み比率 Ratio to standard depth of cut | | | 120% | | 100% | | 90% | | 70% | | 50% | | 45% | |
| 外径DC Tool dia. (mm) | 首下長LU Under neck length (mm) | ※基本切り込み Standard depth of cut (mm) | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min | 回転数 $n$ min$^{-1}$ | 送り速度 $v_f$ mm/min |
| 1.5 | 4 | 0.11 | 26,880 | 1,270 | 22,400 | 1,058 | 20,160 | 953 | 19,040 | 668 | 16,800 | 499 | 15,680 | 402 |
| | 6 | 0.11 | 26,880 | 1,270 | 22,400 | 1,058 | 20,160 | 953 | 19,040 | 668 | 16,800 | 499 | 15,680 | 402 |
| | 8 | 0.06 | 24,192 | 1,045 | 20,160 | 871 | 18,144 | 784 | 17,136 | 601 | 15,120 | 449 | 14,112 | 362 |
| | 10 | 0.06 | 24,192 | 1,045 | 20,160 | 871 | 18,144 | 784 | 17,136 | 601 | 15,120 | 449 | 14,112 | 362 |
| | 12 | 0.06 | 24,192 | 1,045 | 20,160 | 871 | 18,144 | 784 | 17,136 | 601 | 15,120 | 449 | 14,112 | 362 |
| | 14 | 0.038 | 24,192 | 1,045 | 20,160 | 871 | 18,144 | 784 | 17,136 | 601 | 15,120 | 449 | 14,112 | 362 |
| | 16 | 0.038 | 21,504 | 813 | 17,920 | 677 | 16,128 | 610 | 15,232 | 391 | 13,440 | 345 | 12,544 | 271 |
| | 18 | 0.038 | 21,504 | 813 | 17,920 | 677 | 16,128 | 610 | 15,232 | 391 | 13,440 | 345 | 12,544 | 271 |
| | 20 | 0.038 | 21,504 | 813 | 17,920 | 677 | 16,128 | 610 | 15,232 | 391 | 13,440 | 345 | 12,544 | 271 |
| | 25 | 0.023 | 16,128 | 523 | 13,440 | 435 | 12,096 | 392 | 11,424 | 278 | 10,080 | 218 | 9,408 | 165 |
| 1.6 | 6 | 0.11 | 24,960 | 1,310 | 20,800 | 1,092 | 18,720 | 983 | 17,680 | 690 | 15,600 | 515 | 14,560 | 415 |
| | 8 | 0.11 | 24,960 | 1,310 | 20,800 | 1,092 | 18,720 | 983 | 17,680 | 690 | 15,600 | 515 | 14,560 | 415 |
| | 10 | 0.064 | 22,464 | 1,078 | 18,720 | 899 | 16,848 | 809 | 15,912 | 621 | 14,040 | 463 | 13,104 | 373 |
| | 12 | 0.064 | 22,464 | 1,078 | 18,720 | 899 | 16,848 | 809 | 15,912 | 621 | 14,040 | 463 | 13,104 | 373 |
| | 14 | 0.04 | 22,464 | 1,078 | 18,720 | 899 | 16,848 | 809 | 15,912 | 621 | 14,040 | 463 | 13,104 | 373 |
| | 16 | 0.04 | 22,464 | 1,078 | 18,720 | 899 | 16,848 | 809 | 15,912 | 621 | 14,040 | 463 | 13,104 | 373 |
| | 18 | 0.04 | 19,968 | 839 | 16,640 | 699 | 14,976 | 629 | 14,144 | 403 | 12,480 | 356 | 11,648 | 280 |
| | 20 | 0.04 | 19,968 | 839 | 16,640 | 699 | 14,976 | 629 | 14,144 | 403 | 12,480 | 356 | 11,648 | 280 |
| 1.8 | 6 | 0.13 | 24,960 | 1,310 | 20,800 | 1,092 | 18,720 | 983 | 17,680 | 690 | 15,600 | 515 | 14,560 | 415 |
| | 8 | 0.13 | 24,960 | 1,310 | 20,800 | 1,092 | 18,720 | 983 | 17,680 | 690 | 15,600 | 515 | 14,560 | 415 |
| | 10 | 0.072 | 22,464 | 1,078 | 18,720 | 899 | 16,848 | 809 | 15,912 | 621 | 14,040 | 463 | 13,104 | 373 |
| | 12 | 0.072 | 22,464 | 1,078 | 18,720 | 899 | 16,848 | 809 | 15,912 | 621 | 14,040 | 463 | 13,104 | 373 |
| | 14 | 0.072 | 22,464 | 1,078 | 18,720 | 899 | 16,848 | 809 | 15,912 | 621 | 14,040 | 463 | 13,104 | 373 |
| | 16 | 0.045 | 22,464 | 1,078 | 18,720 | 899 | 16,848 | 809 | 15,912 | 621 | 14,040 | 463 | 13,104 | 373 |
| | 18 | 0.045 | 22,464 | 1,078 | 18,720 | 899 | 16,848 | 809 | 15,912 | 621 | 14,040 | 463 | 13,104 | 373 |
| | 20 | 0.045 | 19,968 | 839 | 16,640 | 699 | 14,976 | 629 | 14,144 | 403 | 12,480 | 356 | 11,648 | 280 |
| 2 | 4 | 0.2 | 20,160 | 1,270 | 16,800 | 1,058 | 15,120 | 953 | 14,280 | 668 | 12,600 | 499 | 11,760 | 402 |
| | 6 | 0.2 | 20,160 | 1,270 | 16,800 | 1,058 | 15,120 | 953 | 14,280 | 668 | 12,600 | 499 | 11,760 | 402 |
| | 8 | 0.14 | 20,160 | 1,270 | 16,800 | 1,058 | 15,120 | 953 | 14,280 | 668 | 12,600 | 499 | 11,760 | 402 |
| | 10 | 0.14 | 20,160 | 1,270 | 16,800 | 1,058 | 15,120 | 953 | 14,280 | 668 | 12,600 | 499 | 11,760 | 402 |
| | 12 | 0.08 | 18,144 | 1,045 | 15,120 | 871 | 13,608 | 784 | 12,852 | 601 | 11,340 | 449 | 10,584 | 362 |
| | 14 | 0.08 | 18,144 | 1,045 | 15,120 | 871 | 13,608 | 784 | 12,852 | 601 | 11,340 | 449 | 10,584 | 362 |
| | 16 | 0.08 | 18,144 | 1,045 | 15,120 | 871 | 13,608 | 784 | 12,852 | 601 | 11,340 | 449 | 10,584 | 362 |
| | 18 | 0.05 | 18,144 | 1,045 | 15,120 | 871 | 13,608 | 784 | 12,852 | 601 | 11,340 | 449 | 10,584 | 362 |
| | 20 | 0.05 | 18,144 | 1,045 | 15,120 | 871 | 13,608 | 784 | 12,852 | 601 | 11,340 | 449 | 10,584 | 362 |
| | 25 | 0.05 | 16,128 | 813 | 13,440 | 677 | 12,096 | 610 | 11,424 | 391 | 10,080 | 345 | 9,408 | 271 |
| | 30 | 0.03 | 16,128 | 813 | 13,440 | 677 | 12,096 | 610 | 11,424 | 391 | 10,080 | 345 | 9,408 | 271 |
| 2.5 | 8 | 0.18 | 17,280 | 1,361 | 14,400 | 1,134 | 12,960 | 1,021 | 12,240 | 716 | 10,800 | 535 | 10,080 | 431 |
| | 12 | 0.18 | 17,280 | 1,361 | 14,400 | 1,134 | 12,960 | 1,021 | 12,240 | 716 | 10,800 | 535 | 10,080 | 431 |
| | 16 | 0.1 | 15,552 | 1,120 | 12,960 | 933 | 11,664 | 840 | 11,016 | 644 | 9,720 | 481 | 9,072 | 388 |
| | 20 | 0.1 | 15,552 | 1,120 | 12,960 | 933 | 11,664 | 840 | 11,016 | 644 | 9,720 | 481 | 9,072 | 388 |
| 3 | 8 | 0.3 | 15,360 | 1,210 | 12,800 | 1,008 | 11,520 | 907 | 10,880 | 636 | 9,600 | 475 | 8,960 | 383 |
| | 12 | 0.21 | 15,360 | 1,210 | 12,800 | 1,008 | 11,520 | 907 | 10,880 | 636 | 9,600 | 475 | 8,960 | 383 |
| | 16 | 0.12 | 13,824 | 995 | 11,520 | 829 | 10,368 | 746 | 9,792 | 573 | 8,640 | 428 | 8,064 | 345 |
| | 20 | 0.12 | 13,824 | 995 | 11,520 | 829 | 10,368 | 746 | 9,792 | 573 | 8,640 | 428 | 8,064 | 345 |
| | 25 | 0.08 | 13,824 | 995 | 11,520 | 829 | 10,368 | 746 | 9,792 | 573 | 8,640 | 428 | 8,064 | 345 |
| | 30 | 0.08 | 13,824 | 995 | 11,520 | 829 | 10,368 | 746 | 9,792 | 573 | 8,640 | 428 | 8,064 | 345 |
| | 40 | 0.05 | 12,288 | 884 | 10,240 | 737 | 9,216 | 663 | 8,704 | 509 | 7,680 | 380 | 7,168 | 307 |
| 4 | 12 | 0.4 | 11,500 | 2,300 | 9,400 | 1,880 | 8,460 | 1,523 | 7,990 | 1,358 | 7,050 | 902 | 6,580 | 727 |
| | 16 | 0.28 | 11,500 | 2,300 | 9,400 | 1,880 | 8,460 | 1,523 | 7,990 | 1,358 | 7,050 | 902 | 6,580 | 727 |
| | 20 | 0.28 | 10,350 | 2,070 | 8,460 | 1,692 | 7,614 | 1,371 | 7,191 | 1,222 | 6,345 | 812 | 5,922 | 654 |
| | 25 | 0.16 | 10,350 | 1,863 | 8,460 | 1,523 | 7,614 | 1,233 | 7,191 | 1,100 | 6,345 | 812 | 5,922 | 654 |
| | 30 | 0.16 | 10,350 | 1,863 | 8,460 | 1,523 | 7,614 | 1,233 | 7,191 | 1,100 | 6,345 | 812 | 5,922 | 654 |
| | 35 | 0.1 | 9,137 | 1,645 | 7,614 | 1,371 | 6,853 | 1,110 | 6,472 | 990 | 5,711 | 731 | 5,330 | 589 |
| | 40 | 0.1 | 9,137 | 1,645 | 7,614 | 1,371 | 6,853 | 1,110 | 6,472 | 990 | 5,711 | 731 | 5,330 | 589 |

※基本切込みは被削材グループ2での目安を示しています。その他のグループの場合は、上表の切込み比率を目安に調整して下さい。
※Standard cutting depth is shown as the criteria for Group 2 workpieces. For other groups, adjust the cutting depth according to the cutting depth factors in the above table.

【注意】 ①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

【Note】
1. Use the appropriate coolant for the work material and machining shape.
2. These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
3. If the rpm of the machine is low, lower the feed rate also to put the rpm and feed rate in the same ratio.

Carbide End Mills

# 超硬ソリッドエンドミル

## ピンカド®・ショート刃長 Pinkado, Short

側面 Side Cutting / 溝 Slotting / 座ぐり Spot Facing / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance 0～−0.01 h6 (mm)

超硬 Carbide / C / ねじれ30° Helix angle / 切削条件表 A436 Cutting Conditions

2枚刃 2Flutes

### PESS2○○○-C

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|
| PESS2010-C | □ | 1 | 2 | 40 | 4 |
| PESS2015-C | □ | 1.5 | 3 | 40 | 4 |
| PESS2020-C | □ | 2 | 4 | 40 | 4 |
| PESS2025-C | □ | 2.5 | 5 | 40 | 4 |
| PESS2030-C | □ | 3 | 7 | 45 | 6 |
| PESS2035-C | □ | 3.5 | 8 | 45 | 6 |
| PESS2040-C | □ | 4 | 8 | 45 | 6 |
| PESS2045-C | □ | 4.5 | 10 | 45 | 6 |
| PESS2050-C | □ | 5 | 10 | 50 | 6 |
| PESS2055-C | □ | 5.5 | 12 | 50 | 6 |
| PESS2060-C | □ | 6 | 12 | 50 | 6 |
| PESS2065-C | □ | 6.5 | 14 | 50 | 6 |
| PESS2070-C | □ | 7 | 14 | 60 | 8 |
| PESS2075-C | □ | 7.5 | 14 | 60 | 8 |
| PESS2080-C | □ | 8 | 16 | 60 | 8 |
| PESS2085-C | □ | 8.5 | 16 | 60 | 8 |
| PESS2090-C | □ | 9 | 18 | 65 | 10 |
| PESS2095-C | □ | 9.5 | 18 | 65 | 10 |
| PESS2100-C | □ | 10 | 18 | 70 | 10 |
| PESS2110-C | □ | 11 | 22 | 75 | 12 |
| PESS2120-C | □ | 12 | 22 | 75 | 12 |
| PESS2130-C | □ | 13 | 22 | 75 | 12 |
| PESS2140-C | □ | 14 | 27 | 90 | 16 |
| PESS2150-C | □ | 15 | 27 | 90 | 16 |
| PESS2160-C | □ | 16 | 27 | 90 | 16 |
| PESS2180-C | □ | 18 | 30 | 105 | 20 |
| PESS2200-C | □ | 20 | 35 | 105 | 20 |

## ピンカド®・レギュラー刃長 Pinkado, Regular

側面 Side Cutting / 溝 Slotting / 座ぐり Spot Facing / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance 0～−0.01 h6 (mm)

超硬 Carbide / C / ねじれ30° Helix angle / 切削条件表 A436 Cutting Conditions

2枚刃 2Flutes

### PESR2○○○-C

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|
| PESR2010-C | □ | 1 | 2.5 | 40 | 4 |
| PESR2015-C | □ | 1.5 | 4 | 40 | 4 |
| PESR2020-C | □ | 2 | 6 | 40 | 4 |
| PESR2025-C | □ | 2.5 | 8 | 40 | 4 |
| PESR2030-C | □ | 3 | 10 | 45 | 6 |
| PESR2035-C | □ | 3.5 | 11 | 45 | 6 |
| PESR2040-C | □ | 4 | 12 | 45 | 6 |
| PESR2045-C | □ | 4.5 | 14 | 45 | 6 |
| PESR2050-C | □ | 5 | 15 | 50 | 6 |
| PESR2055-C | □ | 5.5 | 15 | 50 | 6 |
| PESR2060-C | □ | 6 | 15 | 50 | 6 |
| PESR2065-C | □ | 6.5 | 15 | 50 | 6 |
| PESR2070-C | □ | 7 | 20 | 60 | 8 |
| PESR2075-C | □ | 7.5 | 20 | 60 | 8 |
| PESR2080-C | □ | 8 | 20 | 60 | 8 |
| PESR2085-C | □ | 8.5 | 20 | 60 | 8 |
| PESR2090-C | □ | 9 | 20 | 65 | 10 |
| PESR2095-C | □ | 9.5 | 20 | 65 | 10 |
| PESR2100-C | □ | 10 | 25 | 70 | 10 |
| PESR2110-C | □ | 11 | 25 | 75 | 12 |
| PESR2120-C | □ | 12 | 25 | 75 | 12 |
| PESR2130-C | □ | 13 | 25 | 75 | 12 |
| PESR2140-C | □ | 14 | 35 | 90 | 16 |
| PESR2150-C | □ | 15 | 35 | 90 | 16 |
| PESR2160-C | □ | 16 | 35 | 90 | 16 |
| PESR2180-C | □ | 18 | 40 | 105 | 20 |
| PESR2200-C | □ | 20 | 40 | 105 | 20 |

## ピンカド®・レギュラー刃長 Pinkado, Regular

側面 Side Cutting / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance 0～−0.01 h6 (mm)

超硬 Carbide / C / ねじれ30° Helix angle / 切削条件表 A436 Cutting Conditions

4枚刃 4Flutes

### PESR4○○○-C

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|
| PESR4020-C | □ | 2 | 6 | 40 | 4 |
| PESR4025-C | □ | 2.5 | 8 | 40 | 4 |
| PESR4030-C | □ | 3 | 10 | 45 | 6 |
| PESR4035-C | □ | 3.5 | 11 | 45 | 6 |
| PESR4040-C | □ | 4 | 12 | 45 | 6 |
| PESR4045-C | □ | 4.5 | 14 | 45 | 6 |
| PESR4050-C | □ | 5 | 15 | 50 | 6 |
| PESR4055-C | □ | 5.5 | 15 | 50 | 6 |
| PESR4060-C | □ | 6 | 15 | 50 | 6 |
| PESR4065-C | □ | 6.5 | 15 | 50 | 6 |
| PESR4070-C | □ | 7 | 20 | 60 | 8 |
| PESR4075-C | □ | 7.5 | 20 | 60 | 8 |
| PESR4080-C | □ | 8 | 20 | 60 | 8 |
| PESR4085-C | □ | 8.5 | 20 | 60 | 8 |
| PESR4090-C | □ | 9 | 20 | 65 | 10 |
| PESR4095-C | □ | 9.5 | 20 | 65 | 10 |
| PESR4100-C | □ | 10 | 25 | 70 | 10 |
| PESR4110-C | □ | 11 | 25 | 75 | 12 |
| PESR4120-C | □ | 12 | 25 | 75 | 12 |
| PESR4130-C | □ | 13 | 25 | 75 | 12 |
| PESR4140-C | □ | 14 | 35 | 90 | 16 |
| PESR4150-C | □ | 15 | 35 | 90 | 16 |
| PESR4160-C | □ | 16 | 35 | 90 | 16 |
| PESR4180-C | □ | 18 | 40 | 105 | 20 |
| PESR4200-C | □ | 20 | 40 | 105 | 20 |

## ○ PESS-C、PESR2-C、PESR4-C の対応被削材

| 炭素鋼 合金鋼 Carbon steel Alloy steel | 炭素鋼 合金鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ |

□印：特定代理店在庫です。弊社営業へお問合せください。　□：Stocked by specified distributor. Contact with our sales department.

## ピンカド®・ショート刃長 Pinkado, Short

側面 Side Cutting / 溝 Slotting / 座ぐり Spot Facing / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance −0.005～−0.015 h6 (mm)

超硬 Carbide / ねじれ30° Helix angle / 切削条件表 A436 Cutting Conditions

2枚刃 2Flutes

### PESS2○○○

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|
| PESS2010 | □ | 1 | 2 | 40 | 4 |
| PESS2015 | □ | 1.5 | 3 | 40 | 4 |
| PESS2020 | □ | 2 | 4 | 40 | 4 |
| PESS2025 | □ | 2.5 | 5 | 40 | 4 |
| PESS2030 | □ | 3 | 7 | 45 | 6 |
| PESS2035 | □ | 3.5 | 8 | 45 | 6 |
| PESS2040 | □ | 4 | 8 | 45 | 6 |
| PESS2045 | □ | 4.5 | 10 | 45 | 6 |
| PESS2050 | □ | 5 | 10 | 50 | 6 |
| PESS2055 | □ | 5.5 | 12 | 50 | 6 |
| PESS2060 | □ | 6 | 12 | 50 | 6 |
| PESS2065 | □ | 6.5 | 14 | 50 | 6 |
| PESS2070 | □ | 7 | 14 | 60 | 8 |
| PESS2075 | □ | 7.5 | 14 | 60 | 8 |
| PESS2080 | □ | 8 | 16 | 60 | 8 |
| PESS2085 | □ | 8.5 | 16 | 60 | 8 |
| PESS2090 | □ | 9 | 18 | 65 | 10 |
| PESS2095 | □ | 9.5 | 18 | 65 | 10 |
| PESS2100 | □ | 10 | 18 | 70 | 10 |
| PESS2105 | □ | 10.5 | 22 | 70 | 10 |
| PESS2110 | □ | 11 | 22 | 75 | 12 |
| PESS2115 | □ | 11.5 | 22 | 75 | 12 |
| PESS2120 | □ | 12 | 22 | 75 | 12 |
| PESS2130 | □ | 13 | 22 | 75 | 12 |
| PESS2140 | □ | 14 | 27 | 90 | 16 |
| PESS2150 | □ | 15 | 27 | 90 | 16 |
| PESS2160 | □ | 16 | 27 | 90 | 16 |
| PESS2170 | □ | 17 | 30 | 90 | 16 |
| PESS2180 | □ | 18 | 30 | 105 | 20 |
| PESS2190 | □ | 19 | 30 | 105 | 20 |
| PESS2200 | □ | 20 | 35 | 105 | 20 |

## ピンカド®・レギュラー刃長 Pinkado, Regular

側面 Side Cutting / 溝 Slotting / 座ぐり Spot Facing / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance −0.005～−0.015 h6 (mm)

超硬 Carbide / ねじれ30° Helix angle / 切削条件表 A436 Cutting Conditions

2枚刃 2Flutes

### PESR2○○○

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|
| PESR2010 | □ | 1 | 2.5 | 40 | 4 |
| PESR2015 | □ | 1.5 | 4 | 40 | 4 |
| PESR2020 | □ | 2 | 6 | 40 | 4 |
| PESR2025 | □ | 2.5 | 8 | 40 | 4 |
| PESR2030 | □ | 3 | 10 | 45 | 6 |
| PESR2035 | □ | 3.5 | 11 | 45 | 6 |
| PESR2040 | □ | 4 | 12 | 45 | 6 |
| PESR2045 | □ | 4.5 | 14 | 45 | 6 |
| PESR2050 | □ | 5 | 15 | 50 | 6 |
| PESR2055 | □ | 5.5 | 15 | 50 | 6 |
| PESR2060 | □ | 6 | 15 | 50 | 6 |
| PESR2065 | □ | 6.5 | 15 | 50 | 6 |
| PESR2070 | □ | 7 | 20 | 60 | 8 |
| PESR2075 | □ | 7.5 | 20 | 60 | 8 |
| PESR2080 | □ | 8 | 20 | 60 | 8 |
| PESR2085 | □ | 8.5 | 20 | 60 | 8 |
| PESR2090 | □ | 9 | 20 | 65 | 10 |
| PESR2095 | □ | 9.5 | 20 | 65 | 10 |
| PESR2100 | □ | 10 | 25 | 70 | 10 |
| PESR2105 | □ | 10.5 | 25 | 70 | 10 |
| PESR2110 | □ | 11 | 25 | 75 | 12 |
| PESR2115 | □ | 11.5 | 25 | 75 | 12 |
| PESR2120 | □ | 12 | 25 | 75 | 12 |

## ピンカド®・レギュラー刃長 Pinkado, Regular

側面 Side Cutting / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance −0.005～−0.015 h6 (mm)

超硬 Carbide / ねじれ30° Helix angle / 切削条件表 A436 Cutting Conditions

4枚刃 4Flutes

### PESR4○○○

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|
| PESR4020 | □ | 2 | 6 | 40 | 4 |
| PESR4025 | □ | 2.5 | 8 | 40 | 4 |
| PESR4030 | □ | 3 | 10 | 45 | 6 |
| PESR4035 | □ | 3.5 | 11 | 45 | 6 |
| PESR4040 | □ | 4 | 12 | 45 | 6 |
| PESR4045 | □ | 4.5 | 14 | 45 | 6 |
| PESR4050 | □ | 5 | 15 | 50 | 6 |
| PESR4055 | □ | 5.5 | 15 | 50 | 6 |
| PESR4060 | □ | 6 | 15 | 50 | 6 |
| PESR4065 | □ | 6.5 | 15 | 50 | 6 |
| PESR4070 | □ | 7 | 20 | 60 | 8 |
| PESR4075 | □ | 7.5 | 20 | 60 | 8 |
| PESR4080 | □ | 8 | 20 | 60 | 8 |
| PESR4085 | □ | 8.5 | 20 | 60 | 8 |
| PESR4090 | □ | 9 | 20 | 65 | 10 |
| PESR4095 | □ | 9.5 | 20 | 65 | 10 |
| PESR4100 | □ | 10 | 25 | 70 | 10 |
| PESR4105 | □ | 10.5 | 25 | 70 | 10 |
| PESR4110 | □ | 11 | 25 | 75 | 12 |
| PESR4115 | □ | 11.5 | 25 | 75 | 12 |
| PESR4120 | □ | 12 | 25 | 75 | 12 |

## PESS、PESR2、PESR4 の対応被削材

| 炭素鋼 合金鋼 Carbon steel Alloy steel | 炭素鋼 合金鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ○ | ○ | | | | ○ | ○ | ○ | ○ |

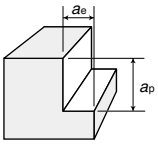
□印：特定代理店在庫です。弊社営業へお問合せください。 □：Stocked by specified distributor. Contact with our sales department.

Carbide End Mills

# 超硬ソリッドエンドミル

## 標準切削条件表 Recommended cutting conditions

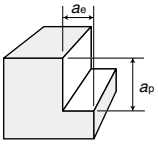
**PESS2-C** 2枚刃・ショート刃長・ピンカド 2ft, Short, Pinkado
**PESR2-C** 2枚刃・レギュラー刃長・ピンカド 2ft, Regular, Pinkado
**PESR4-C** (注③) 4枚刃・レギュラー刃長・ピンカド 4ft, Regular, Pinkado




### 〈側面切削〉 Side milling

| 被削材 Work material | 鋳鉄・炭素鋼 Cast irons, Carbon steels (200HB以下) FC200、SS400、S45C | | 合金鋼 Alloy steels (200～250HB) SCM、SNCM | | 工具鋼・ステンレス鋼 Tool steels, Stainless steels (25～35HRC) SKD、SKT、SUS304 | | 焼入れ鋼・プリハードン鋼 Hardened steels, Pre-hardened steels (35～45HRC) SKD、SKT、HPM1、NAK55 | | 耐熱鋼・チタン合金 Heat-resistant steels, Titanium alloys Inconel Ti-6Al-4V | | アルミ合金・非鉄金属 Aluminum alloys Non-Ferrous | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み(mm) Depth of cut | $a_p$=1.5DC, $a_e$=0.1DC | | $a_p$=1.5DC、$a_e$=0.1DC | | $a_p$=1.5DC, $a_e$=0.1DC | | $a_p$=1.5DC, $a_e$=0.1DC | | $a_p$=1.5DC, $a_e$=0.1DC | | $a_p$=1.5DC, $a_e$=0.1DC | |
| 外径DC Tool dia. (mm) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) |
| φ3 | 9,500 | 280 | 7,400 | 220 | 5,800 | 170 | 4,700 | 90 | 2,100 | 40 | 21,000 | 750 |
| φ4 | 7,100 | 280 | 5,500 | 220 | 4,300 | 170 | 3,500 | 90 | 1,500 | 40 | 16,000 | 800 |
| φ6 | 4,700 | 280 | 3,700 | 220 | 2,900 | 170 | 2,300 | 90 | 1,000 | 40 | 10,600 | 800 |
| φ8 | 3,500 | 280 | 2,700 | 220 | 2,100 | 170 | 1,700 | 100 | 790 | 45 | 8,000 | 900 |
| φ10 | 2,800 | 280 | 2,200 | 220 | 1,700 | 170 | 1,400 | 100 | 630 | 45 | 6,400 | 950 |
| φ12 | 2,300 | 280 | 1,800 | 220 | 1,400 | 170 | 1,100 | 100 | 530 | 45 | 5,300 | 950 |
| φ16 | 1,700 | 280 | 1,300 | 220 | 1,000 | 170 | 890 | 100 | 390 | 45 | 4,000 | 950 |
| φ20 | 1,400 | 280 | 1,100 | 220 | 870 | 170 | 710 | 100 | 310 | 45 | 3,200 | 800 |
| φ25 | 1,100 | 220 | 890 | 180 | 700 | 140 | 570 | 85 | 250 | 40 | 2,500 | 800 |

**PESS2** 2枚刃・ショート刃長・ピンカド
**PESR2** 2枚刃・レギュラー刃長・ピンカド
**PESR4** (注③) 4枚刃・レギュラー刃長・ピンカド



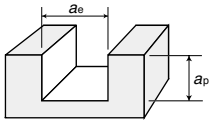

### 〈側面切削〉 Side milling

| 被削材 Work material | 鋳鉄・炭素鋼 Cast irons, Carbon steels (200HB以下) FC200、SS400、S45C | | 合金鋼 Alloy steels (200～250HB) SCM、SNCM | | 工具鋼・ステンレス鋼 Tool steels, Stainless steels (25～35HRC) SKD、SKT、SUS304 | | 焼入れ鋼・プリハードン鋼 Hardened steels, Pre-hardened steels (35～45HRC) SKD、SKT、HPM1、NAK55 | | 耐熱鋼・チタン合金 Heat-resistant steels, Titanium alloys Inconel Ti-6Al-4V | | アルミ合金・非鉄金属 Aluminum alloys Non-Ferrous | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み(mm) Depth of cut | $a_p$=1.5DC, $a_e$=0.1DC | | $a_p$=1.5DC, $a_e$=0.1DC | | $a_p$=1.5DC, $a_e$=0.1DC | | $a_p$=1.5DC, $a_e$=0.1DC | | $a_p$=1.5DC, $a_e$=0.1DC | | $a_p$=1.5DC, $a_e$=0.1DC | |
| 外径DC Tool dia. (mm) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) |
| φ3 | 4,750 | 140 | 3,700 | 80 | 3,200 | 60 | 2,650 | 30 | 1,600 | 20 | 21,000 | 750 |
| φ4 | 3,600 | 140 | 2,750 | 110 | 2,400 | 60 | 2,000 | 30 | 1,200 | 25 | 16,000 | 800 |
| φ6 | 2,400 | 150 | 1,850 | 110 | 1,600 | 60 | 1,320 | 40 | 800 | 25 | 10,600 | 800 |
| φ8 | 1,800 | 150 | 1,400 | 110 | 1,200 | 90 | 1,000 | 50 | 600 | 30 | 8,000 | 900 |
| φ10 | 1,450 | 150 | 1,100 | 110 | 950 | 90 | 800 | 50 | 480 | 30 | 6,400 | 950 |
| φ12 | 1,200 | 180 | 930 | 110 | 800 | 90 | 660 | 50 | 400 | 30 | 5,300 | 950 |
| φ16 | 900 | 180 | 700 | 110 | 600 | 90 | 500 | 50 | 300 | 30 | 4,000 | 950 |
| φ20 | 720 | 180 | 560 | 110 | 480 | 90 | 400 | 50 | 240 | 30 | 3,200 | 800 |
| φ25 | 570 | 140 | 450 | 100 | 380 | 90 | 320 | 50 | 190 | 30 | 2,500 | 800 |
| φ30 | 480 | 120 | 370 | 80 | 320 | 90 | 270 | 50 | 160 | 30 | 2,100 | 650 |

【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③上記の切削条件は2枚刃の場合を示します。4枚刃は送り速度を1.5倍にしてください。

【Note】① Use the appropriate coolant for the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
③ The cutting conditions given above is applied to 2-flute type end mills. As for 4-flute type, increase the feed speed by 1.5 times.

**PESS2** 2枚刃・ショート刃長・ピンカド 2ft, Short, Pinkado
**PESR2** 2枚刃・レギュラー刃長・ピンカド 2ft, Regular, Pinkado




### 〈溝切削〉 Slotting

| 被削材 Work material | 鋳鉄・炭素鋼 Cast irons, Carbon steels (200HB以下) FC200、SS400、S45C | | 合金鋼 Alloy steels (200～250HB) SCM、SNCM | | 工具鋼・ステンレス鋼 Tool steels, Stainless steels (25～35HRC) SKD、SKT、SUS304 | | 焼入れ鋼・プリハードン鋼 Hardened steels, Pre-hardened steels (35～45HRC) SKD、SKT、HPM1、NAK55 | | 耐熱鋼・チタン合金 Heat-resistant steels, Titanium alloys Inconel Ti-6Al-4V | | アルミ合金・非鉄金属 Aluminum alloy Non-Ferrous | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 切込み(mm) Depth of cut | $a_p$=0.5DC, $a_e$=1DC | | $a_p$=0.5DC, $a_e$=1DC | | $a_p$=0.5DC, $a_e$=1DC | | $a_p$=0.5DC, $a_e$=1DC | | $a_p$=0.5DC, $a_e$=1DC | | $a_p$=0.5DC, $a_e$=1DC | |
| 外径DC Tool dia. (mm) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) | 回転数$n$ ($min^{-1}$) | 送り速度$v_f$ (mm/min) |
| φ3 | 3,700 | 80 | 3,200 | 50 | 2,650 | 30 | 2,100 | 22 | 1,250 | 15 | 11,000 | 300 |
| φ4 | 2,750 | 85 | 2,400 | 50 | 2,000 | 30 | 1,590 | 22 | 950 | 15 | 8,000 | 300 |
| φ6 | 1,850 | 85 | 1,600 | 50 | 1,320 | 30 | 1,060 | 22 | 640 | 15 | 5,300 | 300 |
| φ8 | 1,400 | 90 | 1,200 | 60 | 1,000 | 40 | 800 | 33 | 480 | 20 | 4,000 | 300 |
| φ10 | 1,100 | 90 | 950 | 60 | 800 | 40 | 640 | 33 | 380 | 20 | 3,200 | 300 |
| φ12 | 930 | 90 | 800 | 60 | 660 | 40 | 530 | 33 | 320 | 20 | 2,700 | 300 |
| φ16 | 700 | 90 | 600 | 60 | 500 | 40 | 400 | 33 | 240 | 20 | 2,700 | 300 |
| φ20 | 560 | 90 | 480 | 60 | 400 | 40 | 320 | 33 | 190 | 20 | 1,600 | 300 |
| φ25 | 450 | 90 | 380 | 60 | 320 | 40 | 250 | 33 | 150 | 20 | 1,250 | 300 |
| φ30 | 370 | 90 | 320 | 60 | 270 | 40 | 210 | 33 | 130 | 20 | 1,000 | 300 |

【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。

【Note】① Use the appropriate coolant for the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.

# CS Coating Carbide End Mill Squar
# CSコート超硬エンドミル スクエア

## ピンカド®・ショート刃長 Pinkado, Short

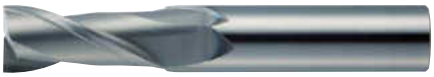
側面 Side Cutting / 溝 Slotting / 座ぐり Spot Facing / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance
φ0.2～φ0.9：0～−0.015
φ1～φ20　：0～−0.02

h5

(mm)

2枚刃 2Flutes



### YS2○○○-CS

超硬 Carbide / CS / ねじれ30° Helix angle / 切削条件表 A438 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|
| YS2002-CS | □ | 0.2 | 0.4 | 40 | 4 |
| YS2003-CS | □ | 0.3 | 0.6 | 40 | 4 |
| YS2004-CS | □ | 0.4 | 0.8 | 40 | 4 |
| YS2005-CS | □ | 0.5 | 1 | 40 | 4 |
| YS2006-CS | □ | 0.6 | 1.2 | 40 | 4 |
| YS2007-CS | □ | 0.7 | 1.4 | 40 | 4 |
| YS2008-CS | □ | 0.8 | 1.6 | 40 | 4 |
| YS2009-CS | □ | 0.9 | 1.8 | 40 | 4 |
| YS2010-CS | □ | 1 | 2 | 40 | 4 |
| YS2015-CS | □ | 1.5 | 3 | 40 | 4 |
| YS2020-CS | □ | 2 | 6 | 40 | 4 |
| YS2025-CS | □ | 2.5 | 8 | 40 | 4 |
| YS2030-CS | □ | 3 | 8 | 45 | 6 |
| YS2035-CS | □ | 3.5 | 10 | 45 | 6 |
| YS2040-CS | □ | 4 | 11 | 45 | 6 |
| YS2045-CS | □ | 4.5 | 11 | 45 | 6 |
| YS2050-CS | □ | 5 | 13 | 50 | 6 |
| YS2055-CS | □ | 5.5 | 13 | 50 | 6 |
| YS2060-CS | □ | 6 | 13 | 50 | 6 |
| YS2070-CS | □ | 7 | 16 | 60 | 8 |
| YS2080-CS | □ | 8 | 19 | 60 | 8 |
| YS2090-CS | □ | 9 | 19 | 70 | 10 |
| YS2100-CS | □ | 10 | 22 | 70 | 10 |
| YS2120-CS | □ | 12 | 26 | 75 | 12 |
| YS2160-CS | □ | 16 | 35 | 90 | 16 |
| YS2200-CS | □ | 20 | 40 | 105 | 20 |

## ピンカド®・レギュラー刃長 Pinkado, Regular

側面 Side Cutting / 中仕上 Semi Finishing / 仕上 Finishing

外径公差 Dia.tolerance
0～−0.02

h5

(mm)

4枚刃 4Flutes

### YR4○○○-CS

超硬 Carbide / CS / ねじれ30° Helix angle / 切削条件表 A438 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|
| YR4010-CS | □ | 1 | 2.5 | 40 | 4 |
| YR4015-CS | □ | 1.5 | 4 | 40 | 4 |
| YR4020-CS | □ | 2 | 6 | 40 | 4 |
| YR4025-CS | □ | 2.5 | 8 | 40 | 4 |
| YR4030-CS | □ | 3 | 10 | 45 | 6 |
| YR4040-CS | □ | 4 | 12 | 45 | 6 |
| YR4050-CS | □ | 5 | 15 | 50 | 6 |
| YR4060-CS | □ | 6 | 15 | 50 | 6 |
| YR4080-CS | □ | 8 | 20 | 60 | 8 |
| YR4100-CS | □ | 10 | 25 | 70 | 10 |
| YR4120-CS | □ | 12 | 30 | 75 | 12 |
| YR4160-CS | □ | 16 | 35 | 90 | 16 |
| YR4200-CS | □ | 20 | 40 | 105 | 20 |

## YS-CS、YR-CS の対応被削材

Applicable work material of YS-CS, YR-CS

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ○ | | | | ○ | ○ | ◎ | ◎ |

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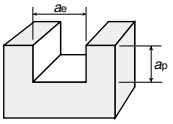
CS Coating Carbide End Mill Squar

# CSコート超硬エンドミル スクエア

## 標準切削条件表 Recommended cutting conditions

### YS-CS
2枚刃・ショート刃長・ピンカド
2ft, Short, Pinkado

切込み
Depth of Cut (mm)




| | ap |
|---|---|
| DC＜φ1 | 0.1DC |
| φ1≦DC＜φ3 | 0.3DC |
| φ3≦DC | 0.5DC |

### ＜溝切削＞ Slotting

| 被削材 Work material | 銅合金・アルミ合金 Copper alloys, Aluminum alloys | | 鋳鉄・炭素鋼 Cast irons, Carbon steels FC200、SS400、S50C | | ステンレス鋼 Stainless steels SUS304、SUS316 | | 合金鋼・工具鋼 Alloy steels, Tool steels SCM、SKD、ARK1 | | プリハードン鋼・焼入れ鋼 Pre-hardened steels, Hardened steels CENA1、NAK80、SKD | |
|---|---|---|---|---|---|---|---|---|---|---|
| 硬度 Hardness | — | | ～250HB | | — | | 25～35HRC | | 35～45HRC | |
| 切削条件 Conditions / 外径 DC mm | vc＝90～110m/min | | vc＝40～50m/min | | vc＝25～35m/min | | vc＝25～35m/min | | vc＝20～30m/min | |
| | 回転数n Revolition min-1 | 送り速度vf Table Speed mm/min | 回転数n Revolition min-1 | 送り速度vf Table Speed mm/min | 回転数n Revolition min-1 | 送り速度vf Table Speed mm/min | 回転数n Revolition min-1 | 送り速度vf Table Speed mm/min | 回転数n Revolition min-1 | 送り速度vf Table Speed mm/min |
| 0.2<br>0.5<br>0.8 | 30,000～50,000 | 300～500 | 20,000～50,000 | 100～500 | 10,000～30,000 | 70～300 | 10,000～30,000 | 70～300 | 10,000～30,000 | 50～200 |
| 1 | 32,000 | 300 | 14,000 | 100 | 9,000 | 67 | 9,500 | 70 | 8,000 | 50 |
| 1.5 | 20,000 | 300 | 9,500 | 120 | 5,700 | 76 | 6,000 | 80 | 5,000 | 50 |
| 2 | 16,000 | 300 | 7,100 | 120 | 4,600 | 76 | 4,800 | 80 | 4,000 | 50 |
| 3 | 11,000 | 300 | 4,700 | 140 | 2,900 | 86 | 3,100 | 90 | 2,600 | 55 |
| 4 | 8,000 | 300 | 3,500 | 140 | 2,200 | 86 | 2,300 | 90 | 1,900 | 55 |
| 5 | 6,400 | 300 | 2,800 | 140 | 1,800 | 86 | 1,900 | 90 | 1,600 | 55 |
| 6 | 5,300 | 300 | 2,300 | 140 | 1,400 | 86 | 1,500 | 90 | 1,300 | 55 |
| 8 | 4,000 | 300 | 1,700 | 140 | 1,000 | 86 | 1,100 | 90 | 990 | 60 |
| 10 | 3,200 | 300 | 1,400 | 140 | 900 | 90 | 950 | 95 | 790 | 60 |
| 12 | 2,700 | 300 | 1,100 | 140 | 750 | 90 | 790 | 95 | 660 | 60 |
| 16 | 2,000 | 300 | 800 | 140 | 500 | 90 | 550 | 95 | 450 | 60 |
| 20 | 1,600 | 300 | 650 | 140 | 400 | 90 | 450 | 95 | 350 | 60 |

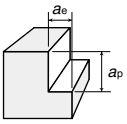
【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③4枚刃は溝切削に適しません。

【Note】①Use the appropriate coolant for the work material and machining shape.
②These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
③4-Flutes type is not suited to slotting.

### YS-CS
2枚刃・ショート刃長・ピンカド
2ft, Short, Pinkado

### YR-CS
4枚刃・レギュラー刃長・ピンカド
4ft, Regular, Pinkado

切込み
Depth of Cut (mm)




| | ae | ap |
|---|---|---|
| DC＜φ3 | 0.05DC以下 | 1.5DC以下 |
| φ3≦DC | 0.1DC以下 | |

### ＜側面切削＞ Side Milling

| 被削材 Work material | 銅合金・アルミ合金 Copper alloys, Aluminum alloys | | 鋳鉄・炭素鋼 Cast irons, Carbon steels FC200、SS400、S50C | | ステンレス鋼 Stainless steels SUS304、SUS316 | | 合金鋼・工具鋼 Alloy steels, Tool steels SCM、SKD、ARK1 | | プリハードン鋼・焼入れ鋼 Pre-hardened steels, Hardened steels CENA1、NAK80、SKD | |
|---|---|---|---|---|---|---|---|---|---|---|
| 硬度 Hardness | — | | ～250HB | | — | | 25～35HRC | | 35～45HRC | |
| 切削条件 Conditions / 外径 DC mm | vc＝180～200m/min | | vc＝80～90m/min | | vc＝25～35m/min | | vc＝50～60m/min | | vc＝40～50m/min | |
| | 回転数n Revolition min-1 | 送り速度vf Table Speed mm/min | 回転数n Revolition min-1 | 送り速度vf Table Speed mm/min | 回転数n Revolition min-1 | 送り速度vf Table Speed mm/min | 回転数n Revolition min-1 | 送り速度vf Table Speed mm/min | 回転数n Revolition min-1 | 送り速度vf Table Speed mm/min |
| 0.2<br>0.5<br>0.8 | 30,000～50,000 | 600～1,000 | 30,000～50,000 | 220～1,000 | 25,000～40,000 | 160～700 | 25,000～40,000 | 160～700 | 20,000～38,000 | 60～240 |
| 1 | 20,000 | 600 | 20,000 | 220 | 15,200 | 150 | 16,000 | 160 | 12,000 | 60 |
| 2 | 20,000 | 700 | 12,000 | 250 | 7,600 | 190 | 8,000 | 200 | 6,500 | 80 |
| 3 | 20,000 | 750 | 9,500 | 280 | 5,500 | 210 | 5,800 | 220 | 4,700 | 90 |
| 4 | 16,000 | 800 | 7,100 | 280 | 4,100 | 210 | 4,300 | 220 | 3,500 | 90 |
| 5 | 12,500 | 800 | 5,600 | 280 | 3,300 | 210 | 3,500 | 220 | 2,800 | 90 |
| 6 | 10,600 | 900 | 4,700 | 280 | 2,800 | 210 | 2,900 | 220 | 2,300 | 90 |
| 8 | 8,000 | 950 | 3,500 | 280 | 2,000 | 210 | 2,100 | 220 | 1,700 | 100 |
| 10 | 6,400 | 950 | 2,800 | 280 | 1,600 | 210 | 1,700 | 220 | 1,400 | 100 |
| 12 | 5,300 | 950 | 2,300 | 280 | 1,300 | 210 | 1,400 | 220 | 1,100 | 100 |
| 16 | 4,000 | 950 | 1,700 | 280 | 950 | 210 | 1,000 | 220 | 800 | 100 |
| 20 | 3,200 | 950 | 1,400 | 280 | 760 | 210 | 800 | 220 | 650 | 100 |

【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③上記の切削条件は2枚刃の場合を示します。4枚刃は送り速度を1.5倍にしてください。

【Note】①Use the appropriate coolant for the work material and machining shape.
②These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
③The cutting conditions given above is applied to 2-flute type end mills. As for 4-flute type, increase the feed by 1.5 times.

# Carbide Super Helical End Mills
# 超硬スーパーヘリカルエンドミル

## Cコーティング C Coating

側面 Side Cutting / 溝 Slotting / 仕上 Finishing / 超硬 Carbide / C / ねじれ60° Helix angle / 切削条件表 A439 Cutting Conditions

外径公差 Dia.tolerance: φ2～φ5 : 0～−0.04, φ6～φ20 : 0～−0.05 / h6 / (mm)

2,3 枚刃 2,3Flutes

### SES○○○○-C 強ねじれ Super Helix

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 刃数 No. of flutes |
|---|---|---|---|---|---|---|
| SES2020-C | □ | 2 | 4 | 40 | 4 | 2 |
| SES2030-C | □ | 3 | 6 | 45 | 6 | 2 |
| SES2040-C | □ | 4 | 8 | 45 | 6 | 2 |
| SES2050-C | □ | 5 | 10 | 50 | 6 | 2 |
| SES3060-C | □ | 6 | 12 | 50 | 6 | 3 |
| SES3070-C | □ | 7 | 14 | 60 | 8 | 3 |
| SES3080-C | □ | 8 | 16 | 60 | 8 | 3 |
| SES3100-C | □ | 10 | 25 | 70 | 10 | 3 |
| SES3120-C | □ | 12 | 25 | 75 | 12 | 3 |
| SES3140-C | □ | 14 | 35 | 90 | 16 | 3 |
| SES3150-C | □ | 15 | 35 | 90 | 16 | 3 |
| SES3160-C | □ | 16 | 35 | 90 | 16 | 3 |
| SES3200-C | □ | 20 | 45 | 110 | 20 | 3 |

## ノンコーティング Non Coating

側面 Side Cutting / 溝 Slotting / 仕上 Finishing / 超硬 Carbide / ねじれ60° Helix angle / 切削条件表 A439 Cutting Conditions

外径公差 Dia.tolerance: φ2～φ5 : 0～−0.04, φ6～φ30 : 0～−0.05 / h6 / (mm)

2,3,4 枚刃 2,3,4Flutes

### SES○○○○ 強ねじれ Super Helix

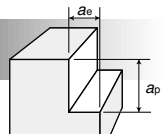
| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 刃数 No. of flutes |
|---|---|---|---|---|---|---|
| SES2020 | □ | 2 | 4 | 40 | 4 | 2 |
| SES2030 | □ | 3 | 6 | 45 | 6 | 2 |
| SES2040 | □ | 4 | 8 | 45 | 6 | 2 |
| SES2050 | □ | 5 | 10 | 50 | 6 | 2 |
| SES3060 | □ | 6 | 12 | 50 | 6 | 3 |
| SES3070 | □ | 7 | 14 | 60 | 8 | 3 |
| SES3080 | □ | 8 | 16 | 60 | 8 | 3 |
| SES3090 | □ | 9 | 20 | 65 | 10 | 3 |
| SES3100 | □ | 10 | 25 | 70 | 10 | 3 |
| SES3110 | □ | 11 | 25 | 75 | 12 | 3 |

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 刃数 No. of flutes |
|---|---|---|---|---|---|---|
| SES3120 | □ | 12 | 25 | 75 | 12 | 3 |
| SES3130 | □ | 13 | 25 | 75 | 12 | 3 |
| SES3140 | □ | 14 | 35 | 90 | 16 | 3 |
| SES3150 | □ | 15 | 35 | 90 | 16 | 3 |
| SES3160 | □ | 16 | 35 | 90 | 16 | 3 |
| SES3180 | □ | 18 | 40 | 105 | 20 | 3 |
| SES3200 | □ | 20 | 45 | 110 | 20 | 3 |
| SES4250 | □ | 25 | 50 | 120 | 25 | 4 |
| SES4300 | □ | 30 | 55 | 130 | 32 | 4 |

## 対応被削材 Applicable work material

| 商品コード Item code | 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|---|
| SES-C | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ |
| SES | ○ | ○ | | | | ○ | ○ | ◎ | ◎ |

## 標準切削条件表 Recommended cutting conditions SES-C SES




### ＜側面切削＞ Side milling

| コーティング Coating | 被削材 Work material | 鋳鉄・炭素鋼 Cast irons, Carbon steels (200HB以下) FC200、SS400、S45C | | 合金鋼 Alloy steels (200～250HB) SCM、SNCM | | 工具鋼・ステンレス鋼 Tool steels, Stainless steels (25～35HRC) SKD、SKT、SUS304 | | 焼入れ鋼・プリハードン鋼 Hardened steels, Pre-hardened steels (35～45HRC) SKD、SKT、HPM1、NAK55 | | 耐熱鋼・チタン合金 Heat-resistant steels, Titanium alloys Inconel Ti-6Al-4V | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 切込み (mm) Depth of cut | ap=1.5DC, ae=0.3DC | | ap=1.5DC, ae=0.3DC | | ap=1.5DC, ae=0.3DC | | ap=1.5DC, ae=0.3DC | | ap=1.5DC, ae=0.3DC | |
| | 外径DC Tool dia. (mm) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) | 回転数 n (min⁻¹) | 送り速度 Vf (mm/min) |
| Cコーティング C Coating SES-C | φ3 | 5,000 | 130 | 4,200 | 100 | 3,700 | 65 | 2,900 | 50 | 2,600 | 40 |
| | φ4 | 4,000 | 140 | 3,200 | 110 | 2,800 | 70 | 2,200 | 50 | 2,000 | 40 |
| | φ6 | 2,600 | 180 | 2,100 | 150 | 1,800 | 100 | 1,500 | 60 | 1,300 | 55 |
| | φ8 | 2,000 | 180 | 1,600 | 150 | 1,400 | 100 | 1,100 | 60 | 1,000 | 55 |
| | φ10 | 1,600 | 180 | 1,300 | 150 | 1,100 | 100 | 900 | 60 | 800 | 55 |
| | φ12 | 1,300 | 180 | 1,000 | 150 | 930 | 100 | 750 | 60 | 650 | 55 |
| | φ16 | 1,000 | 200 | 800 | 150 | 700 | 100 | 550 | 60 | 500 | 55 |
| | φ20 | 800 | 200 | 650 | 150 | 560 | 100 | 450 | 60 | 400 | 55 |
| ノンコーティング Non Coating SES | φ3 | 4,000 | 100 | 3,400 | 80 | 3,000 | 50 | 2,300 | 40 | 2,000 | 30 |
| | φ4 | 3,000 | 110 | 2,500 | 90 | 2,000 | 60 | 1,700 | 40 | 1,500 | 30 |
| | φ6 | 2,000 | 160 | 1,700 | 120 | 1,400 | 80 | 1,100 | 50 | 1,000 | 45 |
| | φ8 | 1,500 | 160 | 1,200 | 120 | 1,000 | 80 | 900 | 60 | 800 | 45 |
| | φ10 | 1,200 | 160 | 1,000 | 120 | 900 | 90 | 700 | 60 | 650 | 45 |
| | φ12 | 1,000 | 160 | 900 | 120 | 750 | 90 | 600 | 60 | 530 | 45 |
| | φ16 | 750 | 170 | 600 | 120 | 500 | 90 | 400 | 60 | 360 | 45 |
| | φ20 | 630 | 170 | 500 | 120 | 450 | 90 | 350 | 60 | 300 | 45 |
| | φ25 | 500 | 180 | 400 | 140 | 350 | 100 | 280 | 70 | 250 | 55 |
| | φ30 | 400 | 160 | 350 | 130 | 300 | 90 | 230 | 60 | 200 | 45 |

【注意】①切削油は、鋼切削の場合は油性切削液、鋳鉄・非鉄金属切削の場合は乾式または水溶性切削液をお使いください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③超硬スーパーヘリカルエンドミルは溝切削には適当ではありません。

【Note】① In cutting steel, be sure to use oily cutting fluid, and in cutting cast iron and non-iron metals, use dry or water-soluble cutting fluid.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
③ Carbide Super Helical End Mill is not suited to slotting.

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## Carbide End Mills for Key-way
# 超硬キー溝用エンドミル

### プラス公差 Plus Tolerance

溝 Slotting　仕上 Finishing

外径公差 Dia.tolerance　φ2～φ10 ：+0.01～0
φ11～φ16：+0.015～+0.005　h6　(mm)

2枚刃 2Flutes

### KES2○○○

超硬 Carbide　ねじれ30° Helix angle

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|
| KES2020 | □ | 2 | 3 | 50 | 6 |
| KES2030 | □ | 3 | 4.5 | 50 | 6 |
| KES2040 | □ | 4 | 6 | 55 | 8 |
| KES2050 | □ | 5 | 7.5 | 55 | 8 |
| KES2060 | □ | 6 | 9 | 55 | 8 |
| KES2070 | □ | 7 | 10.5 | 60 | 10 |
| KES2080 | □ | 8 | 12 | 60 | 10 |
| KES2090 | □ | 9 | 13.5 | 65 | 12 |
| KES2100 | □ | 10 | 15 | 65 | 12 |
| KES2110 | □ | 11 | 16.5 | 65 | 12 |
| KES2120 | □ | 12 | 18 | 65 | 12 |
| KES2130 | □ | 13 | 19.5 | 70 | 16 |
| KES2140 | □ | 14 | 21 | 70 | 16 |
| KES2150 | □ | 15 | 22.5 | 70 | 16 |
| KES2160 | □ | 16 | 24 | 70 | 16 |

### マイナス公差 Minus Tolerance

溝 Slotting　仕上 Finishing

外径公差 Dia.tolerance　φ2～φ3 ：−0.01～−0.018
φ4～φ6 ：−0.01～−0.02
φ7～φ10：−0.015～−0.025
φ11～φ16：−0.018～−0.028　h6　(mm)

2枚刃 2Flutes

### KESU2○○○

超硬 Carbide　ねじれ30° Helix angle

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|
| KESU2020 | □ | 2 | 3 | 50 | 6 |
| KESU2030 | □ | 3 | 4.5 | 50 | 6 |
| KESU2040 | □ | 4 | 6 | 55 | 8 |
| KESU2050 | □ | 5 | 7.5 | 55 | 8 |
| KESU2060 | □ | 6 | 9 | 55 | 8 |
| KESU2070 | □ | 7 | 10.5 | 60 | 10 |
| KESU2080 | □ | 8 | 12 | 60 | 10 |
| KESU2090 | □ | 9 | 13.5 | 65 | 12 |
| KESU2100 | □ | 10 | 15 | 65 | 12 |
| KESU2110 | □ | 11 | 16.5 | 65 | 12 |
| KESU2120 | □ | 12 | 18 | 65 | 12 |
| KESU2130 | □ | 13 | 19.5 | 70 | 16 |
| KESU2140 | □ | 14 | 21 | 70 | 16 |
| KESU2150 | □ | 15 | 22.5 | 70 | 16 |
| KESU2160 | □ | 16 | 24 | 70 | 16 |

## Carbide End Mills for High Hardened Steel
# 超硬高硬度材用エンドミル

側面 Side Cutting　中仕上 Semi Finishing　仕上 Finishing

外径公差 Dia.tolerance　0～−0.02　h6　(mm)

2枚刃 2Flutes

### TES2○○○

超硬 Carbide　ねじれ45° Helix angle

| 商品コード Item code | 在庫 Stocks | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|
| TES2020 | □ | 2 | 3 | 40 | 4 |
| TES2030 | □ | 3 | 5 | 45 | 6 |
| TES2040 | □ | 4 | 7 | 45 | 6 |
| TES2050 | □ | 5 | 9 | 50 | 6 |
| TES2060 | □ | 6 | 10 | 50 | 6 |
| TES2070 | □ | 7 | 12 | 60 | 8 |
| TES2080 | □ | 8 | 14 | 60 | 8 |
| TES2090 | □ | 9 | 16 | 65 | 10 |
| TES2100 | □ | 10 | 18 | 70 | 10 |
| TES2110 | □ | 11 | 20 | 75 | 12 |
| TES2120 | □ | 12 | 22 | 75 | 12 |

## Carbide End Mills for Mold
# 超硬型彫用エンドミル

### スケア刃 Square

溝 Slotting　中仕上 Semi Finishing　仕上 Finishing

h7　(mm)

直刃 Straight flute

### FE7○○

超硬 Carbide　ねじれ0° Helix angle

| 商品コード Item code | 在庫 Stocks | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|
| FE704 | □ | 4 | 20 | 65 | 4 |
| FE706 | □ | 6 | 25 | 80 | 6 |
| FE708 | □ | 8 | 25 | 80 | 8 |
| FE710 | □ | 10 | 30 | 80 | 10 |
| FE712 | □ | 12 | 30 | 80 | 12 |
| FE714 | □ | 14 | 35 | 80 | 14 |
| FE716 | □ | 16 | 35 | 110 | 16 |
| FE718 | □ | 18 | 40 | 110 | 18 |
| FE720 | □ | 20 | 40 | 110 | 20 |

### ○ KES、KESU、TES、FE7の対応被削材

Applicable work material of KES, KESU, TES, FE7

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦45HRC | 高硬度 Hardened steel > 45HRC ≦55HRC | 高硬度 Hardened steel > 55HRC ≦65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ○ | ○ | | | | ○ | ○ | ◎ | ◎ |

□印：特定代理店在庫です。弊社営業へお問合せください。
□：Stocked by specified distributor. Contact with our sales department.

# 超硬グラファイト用エンドミル



## レギュラー刃長 Regular

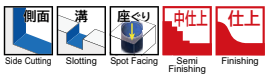
外径公差 Dia.tolerance　DC<6：0～−0.03　6≦DC：0～−0.04　h6　(mm)

超硬 Carbide　ねじれ30° Helix angle　切削条件表 A441 Cutting Conditions

汎用機用　エアホールなし
For General without air-hole

2、4枚刃 2,4Flutes

## ロング刃長 Long



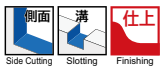

外径公差 Dia.tolerance　DC<6：0～−0.03　6≦DC：0～−0.04　h6　(mm)

超硬 Carbide　ねじれ30° Helix angle　切削条件表 A441 Cutting Conditions

汎用機用　エアホールなし
For General without air-hole

2、4枚刃 2,4Flutes

## ロングシャンク Long Shank




外径公差 Dia.tolerance　0～−0.03　h6　(mm)

超硬 Carbide　ねじれ30° Helix angle　切削条件表 A441 Cutting Conditions

汎用機用　エアホールなし
For General without air-hole

2、4枚刃 2,4Flutes

## GSR○○○○

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 刃数 No. of flutes |
|---|---|---|---|---|---|---|
| GSR2020 | □ | 2 | 10 | 80 | 6 | 2 |
| GSR2030 | □ | 3 | 15 | 80 | 6 | 2 |
| GSR2040 | □ | 4 | 20 | 80 | 6 | 2 |
| GSR2050 | □ | 5 | 25 | 100 | 6 | 2 |
| GSR2060 | □ | 6 | 30 | 100 | 6 | 2 |
| GSR2070 | □ | 7 | 35 | 100 | 6 | 2 |
| GSR2080 | □ | 8 | 40 | 110 | 8 | 2 |
| GSR2090 | □ | 9 | 45 | 110 | 8 | 2 |
| GSR2100 | □ | 10 | 50 | 120 | 10 | 2 |
| GSR2110 | □ | 11 | 50 | 120 | 10 | 2 |
| GSR2120 | □ | 12 | 55 | 130 | 12 | 2 |
| GSR2130 | □ | 13 | 55 | 130 | 12 | 2 |
| GSR4140 | □ | 14 | 60 | 140 | 12 | 4 |
| GSR4150 | □ | 15 | 60 | 140 | 12 | 4 |
| GSR4160 | □ | 16 | 65 | 150 | 16 | 4 |
| GSR4170 | □ | 17 | 65 | 150 | 16 | 4 |
| GSR4180 | □ | 18 | 65 | 160 | 16 | 4 |
| GSR4200 | □ | 20 | 75 | 160 | 20 | 4 |

## GSL○○○○

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 刃数 No. of flutes |
|---|---|---|---|---|---|---|
| GSL2020 | □ | 2 | 20 | 100 | 6 | 2 |
| GSL2030 | □ | 3 | 30 | 100 | 6 | 2 |
| GSL2040 | □ | 4 | 60 | 110 | 6 | 2 |
| GSL2050 | □ | 5 | 70 | 125 | 6 | 2 |
| GSL2060 | □ | 6 | 80 | 130 | 6 | 2 |
| GSL2070 | □ | 7 | 90 | 140 | 6 | 2 |
| GSL2080 | □ | 8 | 100 | 150 | 8 | 2 |
| GSL2090 | □ | 9 | 110 | 160 | 8 | 2 |
| GSL2100 | □ | 10 | 120 | 170 | 10 | 2 |
| GSL2110 | □ | 11 | 120 | 170 | 10 | 2 |
| GSL2120 | □ | 12 | 130 | 190 | 12 | 2 |
| GSL2130 | □ | 13 | 130 | 190 | 12 | 2 |
| GSL4140 | □ | 14 | 140 | 210 | 12 | 4 |
| GSL4150 | □ | 15 | 140 | 210 | 12 | 4 |
| GSL4160 | □ | 16 | 150 | 230 | 16 | 4 |
| GSL4170 | □ | 17 | 150 | 230 | 16 | 4 |
| GSL4180 | □ | 18 | 160 | 250 | 16 | 4 |
| GSL4200 | □ | 20 | 180 | 250 | 20 | 4 |

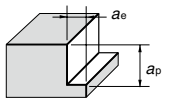
## GXR○○○○

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 刃数 No. of flutes |
|---|---|---|---|---|---|---|
| GXR2020 | □ | 2 | 10 | 100 | 6 | 2 |
| GXR2030 | □ | 3 | 15 | 100 | 6 | 2 |
| GXR2040 | □ | 4 | 20 | 110 | 6 | 2 |
| GXR2050 | □ | 5 | 25 | 125 | 6 | 2 |
| GXR2060 | □ | 6 | 30 | 130 | 6 | 2 |
| GXR2070 | □ | 7 | 35 | 140 | 6 | 2 |
| GXR2080 | □ | 8 | 40 | 150 | 8 | 2 |
| GXR2090 | □ | 9 | 45 | 160 | 8 | 2 |
| GXR2100 | □ | 10 | 50 | 170 | 10 | 2 |
| GXR2110 | □ | 11 | 50 | 170 | 10 | 2 |
| GXR2120 | □ | 12 | 55 | 190 | 12 | 2 |
| GXR2130 | □ | 13 | 55 | 190 | 12 | 2 |
| GXR4140 | □ | 14 | 60 | 210 | 12 | 4 |
| GXR4150 | □ | 15 | 60 | 210 | 12 | 4 |
| GXR4160 | □ | 16 | 65 | 230 | 16 | 4 |
| GXR4170 | □ | 17 | 65 | 230 | 16 | 4 |
| GXR4180 | □ | 18 | 65 | 250 | 16 | 4 |
| GXR4200 | □ | 20 | 75 | 250 | 20 | 4 |

## 標準切削条件表 Recommended cutting conditions

**GSR** レギュラー刃長 Regular　**GSL** ロング刃長 Long　**GXR** ロングシャンク Long Shank

切込み Depth of Cut (mm)




$a_p$=0.5DC
$a_e$=0.05DC

| 被削材 Work material | グラファイト Graphite | | 鋳　鉄 Cast irons FC, FCD | | 非鉄金属、アルミ、銅合金 Non-ferrous-metals, Aluminium, Cu-alloys | |
|---|---|---|---|---|---|---|
| 硬度 Hardness | | | 150～200HB | | | |
| 切削条件 Conditions / 外径DC Tool dia. (mm) | 切削速度 Cutting speed $v_c$=200～250m/min | | 切削速度 Cutting speed $v_c$=50～100m/min | | 切削速度 Cutting speed $v_c$=150～100m/min | |
| | 回転数 Revolution $min^{-1}$ | 送り速度 Table Speed mm/min | 回転数 Revolution $min^{-1}$ | 送り速度 Table Speed mm/min | 回転数 Revolution $min^{-1}$ | 送り速度 Table Speed mm/min |
| 2 | 36,000 | 1,000 ～1,200 | 11,000 | 300 ～350 | 25,000 | 600 ～ 700 |
| 4 | 18,000 | 1,200 ～1,500 | 5,600 | 350 ～450 | 12,000 | 700 ～ 900 |
| 6 | 12,000 | 1,400 ～1,800 | 3,700 | 400 ～500 | 8,500 | 800 ～1,000 |
| 8 | 9,000 | 2,000 ～2,500 | 2,800 | 600 ～700 | 6,400 | 1,200 ～1,400 |
| 10 | 7,200 | 2,500 ～3,000 | 2,200 | 700 ～800 | 5,100 | 1,400 ～1,600 |
| 12 | 6,000 | 2,500 ～3,000 | 1,800 | 700 ～800 | 4,200 | 1,400 ～1,600 |
| 15 | 4,800 | 2,000 ～2,500 | 1,500 | 600 ～700 | 3,400 | 1,200 ～1,400 |
| 16 | 4,500 | 2,000 ～2,500 | 1,400 | 600 ～700 | 3,200 | 1,200 ～1,400 |
| 18 | 4,000 | 1,600 ～2,000 | 1,200 | 500 ～600 | 2,800 | 1,000 ～1,200 |
| 20 | 3,600 | 1,400 ～1,700 | 1,100 | 400 ～500 | 2,500 | 800 ～1,000 |

【注意】①上記に切削条件を示しますが、被削材の硬さ、切込み、ツーリング、機械の状態により条件を増減してください。
②汎用機、NCフライス盤で加工される場合は、切りくずの飛散防止のため、吸引機のご使用、または湿式切削を推奨します。乾式と湿式の寿命差はありません。
③回転数が不足する場合は、増速スピンドルのご使用を推奨します。

【Note】①Standard cutting conditions are described above, but allowance should be made for these conditions according to hardness of work materials, deph of cut, tooling, and conditions of machines.
②When machining with a general purpose machine or an NC milling machine, it is recommended to use an aspirator or to perform wet cutting in order to prevent chips from scattering. There is no difference in life of end mills between dry cutting and wet cutting.
③In the case of insufficient revolution speed, it is recommended to use a high speed milling attachment.

## GSR、GSL、GXRの対応被削材

Applicable work material of GSR, GSL, GXR

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦45HRC | 高硬度 Hardened steel > 45HRC ≦55HRC | 高硬度 Hardened steel > 55HRC ≦65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| グラファイト用 for Graphite | | | | | | | | |

# Carbide End Mills for Graphite
# 超硬グラファイト用エンドミル

## レギュラー刃長 Regular

側面 Side Cutting / 溝 Slotting / 座ぐり Spot Facing / 荒 Roughing / 中仕上 Semi Finishing / 仕上 Finishing

専用機用　エアホール付き
For Custom with air-hole

外径公差 Dia.tolerance
DC<6：0～−0.03
6≦DC　：0～−0.04

h6

(mm)

4枚刃 4Flutes

## GSE4○○○

超硬 Carbide / ねじれ30° Helix angle / 切削条件表 A442 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|
| ※ GSE4020 | □ | 2 | 10 | 80 | 4 |
| ※ GSE4030 | □ | 3 | 15 | 80 | 4 |
| ※ GSE4040 | □ | 4 | 20 | 80 | 4 |
| GSE4050 | □ | 5 | 30 | 100 | 6 |
| GSE4060 | □ | 6 | 30 | 100 | 6 |
| GSE4070 | □ | 7 | 30 | 100 | 6 |
| GSE4080 | □ | 8 | 40 | 110 | 8 |
| GSE4090 | □ | 9 | 40 | 110 | 8 |
| GSE4100 | □ | 10 | 50 | 120 | 10 |
| GSE4110 | □ | 11 | 50 | 120 | 10 |
| GSE4120 | □ | 12 | 55 | 130 | 12 |
| GSE4130 | □ | 13 | 55 | 130 | 12 |
| GSE4160 | □ | 16 | 60 | 150 | 16 |
| GSE4200 | □ | 20 | 60 | 150 | 20 |
| GSE4210 | □ | 21 | 60 | 150 | 20 |
| GSE4250 | □ | 25 | 60 | 180 | 25 |
| GSE4300 | □ | 30 | 60 | 200 | 32 |

## ロングシャンク Long Shank

側面 Side Cutting / 溝 Slotting / 座ぐり Spot Facing / 荒 Roughing / 中仕上 Semi Finishing / 仕上 Finishing

専用機用　エアホール付き
For Custom with air-hole

外径公差 Dia.tolerance
DC<6：0～−0.03
6≦DC　：0～−0.04

h6

(mm)

4枚刃 4Flutes

## GSD4○○○

超硬 Carbide / ねじれ30° Helix angle / 切削条件表 A442 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|
| ※ GSD4020 | □ | 2 | 10 | 100 | 4 |
| ※ GSD4030 | □ | 3 | 15 | 100 | 4 |
| ※ GSD4040 | □ | 4 | 20 | 100 | 4 |
| GSD4050 | □ | 5 | 30 | 120 | 6 |
| GSD4060 | □ | 6 | 30 | 150 | 6 |
| GSD4070 | □ | 7 | 30 | 150 | 6 |
| GSD4080 | □ | 8 | 40 | 150 | 8 |
| GSD4090 | □ | 9 | 40 | 150 | 8 |
| GSD4100 | □ | 10 | 50 | 180 | 10 |
| GSD4110 | □ | 11 | 50 | 180 | 10 |
| GSD4120 | □ | 12 | 55 | 200 | 12 |
| GSD4130 | □ | 13 | 55 | 200 | 12 |
| GSD4160 | □ | 16 | 60 | 250 | 16 |
| GSD4200 | □ | 20 | 60 | 250 | 20 |
| GSD4210 | □ | 21 | 60 | 250 | 20 |
| GSD4250 | □ | 25 | 60 | 250 | 25 |
| GSD4300 | □ | 30 | 60 | 250 | 32 |

## 標準切削条件表 Recommended cutting conditions

**GSE** レギュラー刃長 Regular

| 商品コード Item Code | 切削条件 Conditions 回転数 Revolution (min⁻¹) | 送り速度 Table speed (mm/min) |
|---|---|---|
| GSE4020 | 15,000 | 600 |
| GSE4030 | 15,000 | 900 |
| GSE4040 | 15,000 | 1,200 |
| GSE4050 | 15,000 | 1,500 |
| GSE4060 | 15,000 | 1,800 |
| GSE4070 | 15,000 | 2,100 |
| GSE4080 | 13,900 | 2,200 |
| GSE4090 | 12,400 | 2,200 |
| GSE4100 | 11,100 | 2,200 |
| GSE4110 | 10,100 | 2,200 |
| GSE4120 | 9,300 | 2,200 |
| GSE4130 | 8,600 | 2,200 |
| GSE4160 | 7,000 | 2,200 |
| GSE4200 | 5,600 | 2,200 |
| GSE4210 | 5,300 | 2,200 |
| GSE4250 | 4,500 | 2,200 |
| GSE4300 | 3,700 | 2,200 |

**GSD** ロングシャンク Long Shank

| 商品コード Item Code | 切削条件 Conditions 回転数 Revolution (min⁻¹) | 送り速度 Table speed (mm/min) |
|---|---|---|
| GSD4020 | 15,000 | 300 |
| GSD4030 | 15,000 | 450 |
| GSD4040 | 15,000 | 600 |
| GSD4050 | 15,000 | 750 |
| GSD4060 | 15,000 | 900 |
| GSD4070 | 15,000 | 1,000 |
| GSD4080 | 13,900 | 1,100 |
| GSD4090 | 12,400 | 1,100 |
| GSD4100 | 11,100 | 1,100 |
| GSD4110 | 10,100 | 1,100 |
| GSD4120 | 9,300 | 1,100 |
| GSD4130 | 8,600 | 1,100 |
| GSD4160 | 7,000 | 1,100 |
| GSD4200 | 5,600 | 1,100 |
| GSD4210 | 5,300 | 1,100 |
| GSD4250 | 4,500 | 1,100 |
| GSD4300 | 3,700 | 1,100 |

## GSE、GSDの対応被削材 Applicable work material of GSE, GSD

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦45HRC | 高硬度 Hardened steel >45HRC ≦55HRC | 高硬度 Hardened steel >55HRC ≦65HRC | 高硬度 Hardened steel >65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| グラファイト用 for Graphite | | | | | | | | |

□印：特定代理店在庫です。弊社営業へお問合せください。
□：Stocked by specified distributor. Contact with our sales department.

※印：エアーホールなしとなっています。
※：Without air hole.

# Epoch Taper
# エポックテーパ

**2枚刃 2 Flutes**

テーパ Taper / 中仕上 Semi Finishing / 仕上 Finishing / 超硬 C Carbide / ねじれ30° Helix angle / 切削条件表 A443 Cutting Conditions

外径公差 Dia.tolerance 0 −0.03 / h6 / (mm)

片角公差：± 5′
Tolerance on angle

2枚刃 2Flutes

**4枚刃 4 Flutes**

テーパ Taper / 仕上 Finishing / 超硬 C Carbide / ねじれ30° Helix angle / 切削条件表 A443 Cutting Conditions

外径公差 Dia.tolerance 0 −0.03 / h6 / (mm)

片角公差：± 5′
Tolerance on Angle

4枚刃 4Flutes

## HTE2○○○-○○-C

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃部テーパ半角 Taper angle on side | 刃長 Flute length | 大端径 Large side dia. | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|---|---|
| HTE2010-05-C | □ | 1 | 30′ | 4 | 1.07 | 50 | 4 |
| HTE2010-10-C | □ | 1 | 1° | 4 | 1.14 | 50 | 4 |
| HTE2010-15-C | □ | 1 | 1°30′ | 4 | 1.21 | 50 | 4 |
| HTE2010-20-C | □ | 1 | 2° | 4 | 1.28 | 50 | 4 |
| HTE2010-30-C | □ | 1 | 3° | 4 | 1.42 | 50 | 4 |
| HTE2010-50-C | □ | 1 | 5° | 4 | 1.7 | 50 | 4 |
| HTE2015-05-C | □ | 1.5 | 30′ | 5 | 1.59 | 50 | 4 |
| HTE2015-10-C | □ | 1.5 | 1° | 5 | 1.67 | 50 | 4 |
| HTE2015-15-C | □ | 1.5 | 1°30′ | 5 | 1.76 | 50 | 4 |
| HTE2015-20-C | □ | 1.5 | 2° | 5 | 1.85 | 50 | 4 |
| HTE2015-30-C | □ | 1.5 | 3° | 5 | 2.02 | 50 | 4 |
| HTE2015-50-C | □ | 1.5 | 5° | 5 | 2.37 | 50 | 4 |
| HTE2020-05-C | □ | 2 | 30′ | 6 | 2.1 | 50 | 4 |
| HTE2020-10-C | □ | 2 | 1° | 6 | 2.21 | 50 | 4 |
| HTE2020-15-C | □ | 2 | 1°30′ | 6 | 2.31 | 50 | 4 |
| HTE2020-20-C | □ | 2 | 2° | 6 | 2.42 | 50 | 4 |
| HTE2020-30-C | □ | 2 | 3° | 6 | 2.63 | 50 | 4 |
| HTE2020-50-C | □ | 2 | 5° | 6 | 3.05 | 50 | 4 |
| HTE2025-05-C | □ | 2.5 | 30′ | 8 | 2.64 | 50 | 4 |
| HTE2025-10-C | □ | 2.5 | 1° | 8 | 2.78 | 50 | 4 |
| HTE2025-15-C | □ | 2.5 | 1°30′ | 8 | 2.92 | 50 | 4 |
| HTE2025-20-C | □ | 2.5 | 2° | 8 | 3.06 | 50 | 4 |
| HTE2025-30-C | □ | 2.5 | 3° | 8 | 3.34 | 50 | 4 |
| HTE2025-50-C | □ | 2.5 | 5° | 8 | 3.9 | 50 | 4 |
| HTE2030-05-C | □ | 3 | 30′ | 13 | 3.23 | 60 | 6 |
| HTE2030-10-C | □ | 3 | 1° | 13 | 3.45 | 60 | 6 |
| HTE2030-15-C | □ | 3 | 1°30′ | 13 | 3.68 | 60 | 6 |
| HTE2030-20-C | □ | 3 | 2° | 18 | 4.26 | 60 | 6 |
| HTE2030-30-C | □ | 3 | 3° | 18 | 4.89 | 60 | 6 |
| HTE2030-50-C | □ | 3 | 5° | 17.1 | 6 | 60 | 6 |

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃部テーパ半角 Taper angle on side | 刃長 Flute length | 大端径 Large side dia. | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|---|---|
| HTE2040-05-C | □ | 4 | 30′ | 16 | 4.28 | 60 | 6 |
| HTE2040-10-C | □ | 4 | 1° | 16 | 4.56 | 60 | 6 |
| HTE2040-15-C | □ | 4 | 1°30′ | 16 | 4.84 | 60 | 6 |
| HTE2040-20-C | □ | 4 | 2° | 21 | 5.47 | 60 | 6 |
| HTE2040-30-C | □ | 4 | 3° | 21 | 6.2 | 70 | 6 |
| HTE2040-50-C | □ | 4 | 5° | 21 | 7.67 | 70 | 6 |
| HTE2050-05-C | □ | 5 | 30′ | 19 | 5.33 | 70 | 6 |
| HTE2050-10-C | □ | 5 | 1° | 19 | 5.66 | 70 | 6 |
| HTE2050-15-C | □ | 5 | 1°30′ | 19.1 | 6 | 70 | 6 |
| HTE2050-20-C | □ | 5 | 2° | 25 | 6.75 | 70 | 6 |
| HTE2050-30-C | □ | 5 | 3° | 25 | 7.62 | 70 | 6 |
| HTE2050-50-C | □ | 5 | 5° | 25 | 9.37 | 75 | 8 |
| HTE2060-05-C | □ | 6 | 30′ | 19 | 6.33 | 70 | 6 |
| HTE2060-10-C | □ | 6 | 1° | 19 | 6.66 | 70 | 6 |
| HTE2060-15-C | □ | 6 | 1°30′ | 19 | 6.99 | 70 | 6 |
| HTE2060-20-C | □ | 6 | 2° | 25 | 7.75 | 70 | 6 |
| HTE2060-30-C | □ | 6 | 3° | 25 | 8.62 | 75 | 8 |
| HTE2060-50-C | □ | 6 | 5° | 25 | 10.37 | 90 | 10 |
| HTE2080-05-C | □ | 8 | 30′ | 22 | 8.38 | 75 | 8 |
| HTE2080-10-C | □ | 8 | 1° | 22 | 8.77 | 75 | 8 |
| HTE2080-15-C | □ | 8 | 1°30′ | 22 | 9.15 | 75 | 8 |
| HTE2080-20-C | □ | 8 | 2° | 30 | 10.1 | 90 | 10 |
| HTE2080-30-C | □ | 8 | 3° | 30 | 11.14 | 90 | 10 |
| HTE2080-50-C | □ | 8 | 5° | 30 | 13.25 | 90 | 12 |
| HTE2100-05-C | □ | 10 | 30′ | 22 | 10.38 | 90 | 10 |
| HTE2100-10-C | □ | 10 | 1° | 22 | 10.77 | 90 | 10 |
| HTE2100-15-C | □ | 10 | 1°30′ | 22 | 11.15 | 90 | 10 |
| HTE2100-20-C | □ | 10 | 2° | 30 | 12.1 | 90 | 10 |
| HTE2100-30-C | □ | 10 | 3° | 30 | 13.14 | 90 | 12 |
| HTE2100-50-C | □ | 10 | 5° | 30 | 15.25 | 90 | 12 |

## HTE4○○○-○○-C

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃部テーパ半角 Taper angle on side | 刃長 Flute length | 大端径 Large side dia. | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|---|---|
| HTE4030-05-C | □ | 3 | 30′ | 13 | 3.23 | 60 | 6 |
| HTE4030-10-C | □ | 3 | 1° | 13 | 3.45 | 60 | 6 |
| HTE4030-15-C | □ | 3 | 1°30′ | 13 | 3.68 | 60 | 6 |
| HTE4030-20-C | □ | 3 | 2° | 18 | 4.26 | 60 | 6 |
| HTE4030-30-C | □ | 3 | 3° | 18 | 4.89 | 60 | 6 |
| HTE4030-50-C | □ | 3 | 5° | 17.1 | 6 | 60 | 6 |
| HTE4040-05-C | □ | 4 | 30′ | 16 | 4.28 | 60 | 6 |
| HTE4040-10-C | □ | 4 | 1° | 16 | 4.56 | 60 | 6 |
| HTE4040-15-C | □ | 4 | 1°30′ | 16 | 4.84 | 60 | 6 |
| HTE4040-20-C | □ | 4 | 2° | 21 | 5.47 | 60 | 6 |
| HTE4040-30-C | □ | 4 | 3° | 21 | 6.2 | 70 | 6 |
| HTE4040-50-C | □ | 4 | 5° | 21 | 7.67 | 70 | 6 |
| HTE4050-05-C | □ | 5 | 30′ | 19 | 5.33 | 70 | 6 |
| HTE4050-10-C | □ | 5 | 1° | 19 | 5.66 | 70 | 6 |
| HTE4050-15-C | □ | 5 | 1°30′ | 19.1 | 6 | 70 | 6 |
| HTE4050-20-C | □ | 5 | 2° | 25 | 6.75 | 70 | 6 |
| HTE4050-30-C | □ | 5 | 3° | 25 | 7.62 | 70 | 6 |
| HTE4050-50-C | □ | 5 | 5° | 25 | 9.37 | 75 | 8 |
| HTE4060-05-C | □ | 6 | 30′ | 19 | 6.33 | 70 | 6 |
| HTE4060-10-C | □ | 6 | 1° | 19 | 6.66 | 70 | 6 |
| HTE4060-15-C | □ | 6 | 1°30′ | 19 | 6.99 | 70 | 6 |
| HTE4060-20-C | □ | 6 | 2° | 25 | 7.75 | 70 | 6 |
| HTE4060-30-C | □ | 6 | 3° | 25 | 8.62 | 75 | 8 |
| HTE4060-50-C | □ | 6 | 5° | 25 | 10.37 | 90 | 10 |
| HTE4080-05-C | □ | 8 | 30′ | 22 | 8.38 | 75 | 8 |
| HTE4080-10-C | □ | 8 | 1° | 22 | 8.77 | 75 | 8 |
| HTE4080-15-C | □ | 8 | 1°30′ | 22 | 9.15 | 75 | 8 |
| HTE4080-20-C | □ | 8 | 2° | 30 | 10.1 | 90 | 10 |
| HTE4080-30-C | □ | 8 | 3° | 30 | 11.14 | 90 | 10 |
| HTE4080-50-C | □ | 8 | 5° | 30 | 13.25 | 90 | 12 |
| HTE4100-05-C | □ | 10 | 30′ | 22 | 10.38 | 90 | 10 |
| HTE4100-10-C | □ | 10 | 1° | 22 | 10.77 | 90 | 10 |
| HTE4100-15-C | □ | 10 | 1°30′ | 22 | 11.15 | 90 | 10 |
| HTE4100-20-C | □ | 10 | 2° | 30 | 12.1 | 90 | 10 |
| HTE4100-30-C | □ | 10 | 3° | 30 | 13.14 | 90 | 12 |
| HTE4100-50-C | □ | 10 | 5° | 30 | 15.25 | 90 | 12 |

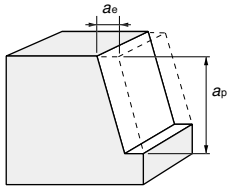
## HTE2-C、HTE4-Cの対応被削材 Applicable work material of HTE2-C, HTE4-C

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ |

## 標準切削条件表 Recommended cutting conditions HTE2-C HTE4-C (注①)

### ＜側面切削＞ Side milling

| 被削材 Work material | 炭素鋼・合金鋼 Carbon steels, Alloy steels (～30HRC) | | 工具鋼・プリハードン鋼 Tool steels, Pre-hardened steels (30～40HRC) | | プリハードン鋼・焼入れ鋼 Pre-hardened steels, Hardened steels (40～50HRC) | |
|---|---|---|---|---|---|---|
| 切込み Depth of cut (mm) | $a_p$=2.5DC以下 or less | $a_e$=0.05DC以下 or less | $a_p$=2.5DC以下 or less | $a_e$=0.05DC以下 or less | $a_p$=2.5DC以下 or less | $a_e$=0.05DC以下 or less |
| 外径DC Tool dia.(mm) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) | 回転数 $n$ ($min^{-1}$) | 送り速度 $v_f$ (mm/min) |
| φ1 | 13,000 | 65 | 9,500 | 50 | 6,400 | 30 |
| φ2 | 6,400 | 65 | 4,800 | 50 | 3,200 | 30 |
| φ3 | 4,200 | 65 | 3,200 | 50 | 2,100 | 30 |
| φ4 | 3,200 | 65 | 2,400 | 50 | 1,600 | 30 |
| φ5 | 2,500 | 75 | 1,900 | 55 | 1,300 | 35 |
| φ6 | 2,100 | 80 | 1,600 | 60 | 1,100 | 40 |
| φ8 | 1,600 | 80 | 1,200 | 60 | 800 | 35 |
| φ10 | 1,300 | 75 | 950 | 55 | 640 | 30 |




【注意】
①上表は2枚刃、側面仕上げ切削時の条件表です。4枚刃の場合は、送り速度を２倍にしてください。
②被削材、加工形状に合わせて、適切なクーラントを使用してください。
③機械剛性等により、びびり等が発生する場合は、回転数と送り速度を同じ比率で下げてください。

【Note】
①The above table shows the cutting conditions for side finish milling using 2 flutes. For 4 flutes, the feed rate should be doubled.
②Use the appropriate coolant for the work material and machining shape.
③Depending on the machine rigidity, etc., if chattering occurs, reduce both the rotation speed and feed rate by the same ratio.

# Carbide Taper End Mills
# 超硬テーパエンドミル

## レギュラー刃長 Regular

テーパ Taper / 仕上 Finishing / 超硬 Carbide / ねじれ30° Helix angle

h6 (mm)

### HTS○○○○-○

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃部テーパ半角 Taper angle on side | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 刃数 No. of flutes |
|---|---|---|---|---|---|---|---|
| HTS2030-1 | □ | 3 | 30′ | 8 | 45 | 4 | 2 |
| HTS2030-2 | □ | 3 | 1° | 8 | 45 | 4 | 2 |
| HTS2030-3 | □ | 3 | 1° 30′ | 8 | 45 | 4 | 2 |
| HTS2030-4 | □ | 3 | 2° | 8 | 45 | 4 | 2 |
| HTS2030-5 | □ | 3 | 2° 30′ | 8 | 45 | 4 | 2 |
| HTS2030-6 | □ | 3 | 3° | 8 | 45 | 4 | 2 |
| HTS2040-1 | □ | 4 | 30′ | 12 | 45 | 4 | 2 |
| HTS2040-2 | □ | 4 | 1° | 12 | 45 | 4 | 2 |
| HTS2040-3 | □ | 4 | 1° 30′ | 12 | 45 | 4 | 2 |
| HTS2040-4 | □ | 4 | 2° | 12 | 45 | 4 | 2 |
| HTS2040-5 | □ | 4 | 2° 30′ | 12 | 45 | 4 | 2 |
| HTS2040-6 | □ | 4 | 3° | 12 | 45 | 4 | 2 |
| HTS2050-1 | □ | 5 | 30′ | 15 | 50 | 6 | 2 |
| HTS2050-2 | □ | 5 | 1° | 15 | 50 | 6 | 2 |
| HTS2050-3 | □ | 5 | 1° 30′ | 15 | 50 | 6 | 2 |
| HTS2050-4 | □ | 5 | 2° | 15 | 50 | 6 | 2 |
| HTS2050-5 | □ | 5 | 2° 30′ | 15 | 50 | 6 | 2 |
| HTS2050-6 | □ | 5 | 3° | 15 | 50 | 6 | 2 |
| HTS2060-1 | □ | 6 | 30′ | 18 | 60 | 6 | 2 |
| HTS2060-2 | □ | 6 | 1° | 18 | 60 | 6 | 2 |
| HTS2060-3 | □ | 6 | 1° 30′ | 18 | 60 | 6 | 2 |
| HTS2060-4 | □ | 6 | 2° | 18 | 60 | 6 | 2 |
| HTS2060-5 | □ | 6 | 2° 30′ | 18 | 60 | 6 | 2 |
| HTS2060-6 | □ | 6 | 3° | 18 | 60 | 6 | 2 |
| HTS2080-1 | □ | 8 | 30′ | 24 | 70 | 8 | 2 |
| HTS2080-2 | □ | 8 | 1° | 24 | 70 | 8 | 2 |
| HTS2080-3 | □ | 8 | 1° 30′ | 24 | 70 | 8 | 2 |
| HTS2080-4 | □ | 8 | 2° | 24 | 70 | 8 | 2 |
| HTS2080-5 | □ | 8 | 2° 30′ | 24 | 70 | 10 | 2 |
| HTS2080-6 | □ | 8 | 3° | 24 | 70 | 10 | 2 |
| HTS4100-1 | □ | 10 | 30′ | 30 | 75 | 10 | 4 |
| HTS4100-2 | □ | 10 | 1° | 30 | 75 | 10 | 4 |
| HTS4100-3 | □ | 10 | 1° 30′ | 30 | 75 | 10 | 4 |
| HTS4100-4 | □ | 10 | 2° | 30 | 75 | 10 | 4 |
| HTS4100-5 | □ | 10 | 2° 30′ | 30 | 75 | 12 | 4 |
| HTS4100-6 | □ | 10 | 3° | 30 | 75 | 12 | 4 |
| HTS4120-1 | □ | 12 | 30′ | 36 | 90 | 12 | 4 |
| HTS4120-2 | □ | 12 | 1° | 36 | 90 | 12 | 4 |
| HTS4120-3 | □ | 12 | 1° 30′ | 36 | 90 | 12 | 4 |
| HTS4120-4 | □ | 12 | 2° | 36 | 90 | 12 | 4 |
| HTS4120-5 | □ | 12 | 2° 30′ | 36 | 90 | 12 | 4 |
| HTS4120-6 | □ | 12 | 3° | 36 | 90 | 12 | 4 |

## ロング刃長 Long

テーパ Taper / 仕上 Finishing / 超硬 Carbide / ねじれ30° Helix angle

h6 (mm)

### HTSL○○○○-○

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃部テーパ半角 Taper angle on side | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|---|
| HTSL2010-1 | □ | 1 | 30′ | 7 | 55 | 4 |
| HTSL2010-2 | □ | 1 | 1° | 7 | 55 | 4 |
| HTSL2010-3 | □ | 1 | 1° 30′ | 7 | 55 | 4 |
| HTSL2010-4 | □ | 1 | 2° | 7 | 55 | 4 |
| HTSL2010-5 | □ | 1 | 2° 30′ | 7 | 55 | 4 |
| HTSL2010-6 | □ | 1 | 3° | 7 | 55 | 4 |
| HTSL2015-1 | □ | 1.5 | 30′ | 10 | 55 | 4 |
| HTSL2015-2 | □ | 1.5 | 1° | 10 | 55 | 4 |
| HTSL2015-3 | □ | 1.5 | 1° 30′ | 10 | 55 | 4 |
| HTSL2015-4 | □ | 1.5 | 2° | 10 | 55 | 4 |
| HTSL2015-5 | □ | 1.5 | 2° 30′ | 10 | 55 | 4 |
| HTSL2015-6 | □ | 1.5 | 3° | 10 | 55 | 4 |
| HTSL2020-1 | □ | 2 | 30′ | 14 | 55 | 4 |
| HTSL2020-2 | □ | 2 | 1° | 14 | 55 | 4 |
| HTSL2020-3 | □ | 2 | 1° 30′ | 14 | 55 | 4 |
| HTSL2020-4 | □ | 2 | 2° | 14 | 55 | 4 |
| HTSL2020-5 | □ | 2 | 2° 30′ | 14 | 55 | 4 |
| HTSL2020-6 | □ | 2 | 3° | 14 | 55 | 4 |
| HTSL2025-1 | □ | 2.5 | 30′ | 17 | 60 | 4 |
| HTSL2025-2 | □ | 2.5 | 1° | 17 | 60 | 4 |
| HTSL2025-3 | □ | 2.5 | 1° 30′ | 17 | 60 | 4 |
| HTSL2025-4 | □ | 2.5 | 2° | 17 | 60 | 4 |
| HTSL2025-5 | □ | 2.5 | 2° 30′ | 17 | 60 | 4 |
| HTSL2025-6 | □ | 2.5 | 3° | 17 | 60 | 6 |
| HTSL2030-1 | □ | 3 | 30′ | 20 | 65 | 4 |
| HTSL2030-2 | □ | 3 | 1° | 20 | 65 | 4 |
| HTSL2030-3 | □ | 3 | 1° 30′ | 20 | 65 | 6 |
| HTSL2030-4 | □ | 3 | 2° | 20 | 65 | 6 |
| HTSL2030-5 | □ | 3 | 2° 30′ | 20 | 65 | 6 |
| HTSL2030-6 | □ | 3 | 3° | 20 | 65 | 6 |

## テーパボール Taper Ball

テーパボール Radius Taper / 仕上 Finishing / 超硬 Carbide / ねじれ25° Helix angle

h6 (mm)

### HTSB○○○○-○

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃部テーパ半角 Taper angle on side | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | 刃数 No. of flutes |
|---|---|---|---|---|---|---|---|
| HTSB2030-1 | □ | 3 | 30′ | 8 | 45 | 4 | 2 |
| HTSB2030-2 | □ | 3 | 1° | 8 | 45 | 4 | 2 |
| HTSB2030-3 | □ | 3 | 1° 30′ | 8 | 45 | 4 | 2 |
| HTSB2030-4 | □ | 3 | 2° | 8 | 45 | 4 | 2 |
| HTSB2030-5 | □ | 3 | 2° 30′ | 8 | 45 | 4 | 2 |
| HTSB2030-6 | □ | 3 | 3° | 8 | 45 | 4 | 2 |
| HTSB2040-1 | □ | 4 | 30′ | 12 | 45 | 4 | 2 |
| HTSB2040-2 | □ | 4 | 1° | 12 | 45 | 4 | 2 |
| HTSB2040-3 | □ | 4 | 1° 30′ | 12 | 45 | 4 | 2 |
| HTSB2040-4 | □ | 4 | 2° | 12 | 45 | 4 | 2 |
| HTSB2040-5 | □ | 4 | 2° 30′ | 12 | 45 | 4 | 2 |
| HTSB2040-6 | □ | 4 | 3° | 12 | 45 | 4 | 2 |
| HTSB2050-1 | □ | 5 | 30′ | 15 | 50 | 6 | 2 |
| HTSB2050-2 | □ | 5 | 1° | 15 | 50 | 6 | 2 |
| HTSB2050-3 | □ | 5 | 1° 30′ | 15 | 50 | 6 | 2 |
| HTSB2050-4 | □ | 5 | 2° | 15 | 50 | 6 | 2 |
| HTSB2050-5 | □ | 5 | 2° 30′ | 15 | 50 | 6 | 2 |
| HTSB2050-6 | □ | 5 | 3° | 15 | 50 | 6 | 2 |
| HTSB2060-1 | □ | 6 | 30′ | 18 | 60 | 6 | 2 |
| HTSB2060-2 | □ | 6 | 1° | 18 | 60 | 6 | 2 |
| HTSB2060-3 | □ | 6 | 1° 30′ | 18 | 60 | 6 | 2 |
| HTSB2060-4 | □ | 6 | 2° | 18 | 60 | 6 | 2 |
| HTSB2060-5 | □ | 6 | 2° 30′ | 18 | 60 | 6 | 2 |
| HTSB2060-6 | □ | 6 | 3° | 18 | 60 | 6 | 2 |
| HTSB2080-1 | □ | 8 | 30′ | 24 | 70 | 8 | 2 |
| HTSB2080-2 | □ | 8 | 1° | 24 | 70 | 8 | 2 |
| HTSB2080-3 | □ | 8 | 1° 30′ | 24 | 70 | 8 | 2 |
| HTSB2080-4 | □ | 8 | 2° | 24 | 70 | 8 | 2 |
| HTSB2080-5 | □ | 8 | 2° 30′ | 24 | 70 | 10 | 2 |
| HTSB2080-6 | □ | 8 | 3° | 24 | 70 | 10 | 2 |
| HTSB4100-1 | □ | 10 | 30′ | 30 | 75 | 10 | 4 |
| HTSB4100-2 | □ | 10 | 1° | 30 | 75 | 10 | 4 |
| HTSB4100-3 | □ | 10 | 1° 30′ | 30 | 75 | 10 | 4 |
| HTSB4100-4 | □ | 10 | 2° | 30 | 75 | 10 | 4 |
| HTSB4100-5 | □ | 10 | 2° 30′ | 30 | 75 | 12 | 4 |
| HTSB4100-6 | □ | 10 | 3° | 30 | 75 | 12 | 4 |
| HTSB4120-1 | □ | 12 | 30′ | 36 | 90 | 12 | 4 |
| HTSB4120-2 | □ | 12 | 1° | 36 | 90 | 12 | 4 |
| HTSB4120-3 | □ | 12 | 1° 30′ | 36 | 90 | 12 | 4 |
| HTSB4120-4 | □ | 12 | 2° | 36 | 90 | 12 | 4 |
| HTSB4120-5 | □ | 12 | 2° 30′ | 36 | 90 | 12 | 4 |
| HTSB4120-6 | □ | 12 | 3° | 36 | 90 | 12 | 4 |

## HTS、HTSL、HTSB、FE4の対応被削材

Applicable work material of HTS, HTSL, HTSB, FE4

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ○ | ○ | | | | ○ | ○ | ◎ | ◎ |

## GTBの対応被削材

Applicable work material of GTB

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| グラファイト用 for Graphite | | | | | | | | |

□印：特定代理店在庫です。弊社営業へお問合せください。□：Stocked by specified distributor. Contact with our sales department.

# Carbide End Mills for Mold
# 超硬型彫用エンドミル

テーパボール刃 Taper Ball End

テーパボール Radius Taper / 中仕上 Semi Finishing / 仕上 Finishing / 超硬 Carbide / ねじれ0° Helix angle

h7

(mm)

直刃 Straight Flute

2枚刃 2Flutes

## FE4○○-○(○°)

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius | 刃部テーパ半角 Taper angle on side | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|---|
| FE406-2(5°) | □ | 1 | 5° | 22 | 70 | 6 |
| FE406-3(5°) | □ | 1.5 | 5° | 18 | 70 | 6 |
| FE406-4(5°) | □ | 2 | 5° | 12 | 70 | 6 |
| FE408-2(5°) | □ | 1 | 5° | 34 | 70 | 8 |
| FE408-3(5°) | □ | 1.5 | 5° | 29 | 70 | 8 |
| FE408-4(5°) | □ | 2 | 5° | 24 | 70 | 8 |
| FE410-3(5°) | □ | 1.5 | 5° | 40 | 80 | 10 |
| FE410-4(5°) | □ | 2 | 5° | 36 | 80 | 10 |
| FE410-5(5°) | □ | 2.5 | 5° | 30 | 80 | 10 |
| FE412-3(5°) | □ | 1.5 | 5° | 50 | 100 | 12 |
| FE412-4(5°) | □ | 2 | 5° | 45 | 100 | 12 |
| FE412-6(5°) | □ | 3 | 5° | 36 | 100 | 12 |
| FE406-2(7°) | □ | 1 | 7° | 16 | 70 | 6 |
| FE406-3(7°) | □ | 1.5 | 7° | 13 | 70 | 6 |
| FE406-4(7°) | □ | 2 | 7° | 9 | 70 | 6 |
| FE408-2(7°) | □ | 1 | 7° | 24 | 70 | 8 |
| FE408-3(7°) | □ | 1.5 | 7° | 21 | 70 | 8 |
| FE408-4(7°) | □ | 2 | 7° | 17 | 70 | 8 |
| FE410-3(7°) | □ | 1.5 | 7° | 29 | 80 | 10 |
| FE410-4(7°) | □ | 2 | 7° | 25 | 80 | 10 |
| FE410-5(7°) | □ | 2.5 | 7° | 22 | 80 | 10 |
| FE412-3(7°) | □ | 1.5 | 7° | 37 | 100 | 12 |
| FE412-4(7°) | □ | 2 | 7° | 33 | 100 | 12 |
| FE412-6(7°) | □ | 3 | 7° | 26 | 100 | 12 |

# Carbide End Mills for Graphite
# 超硬グラファイト用エンドミル

ショート刃長 Short

溝 Slotting / 彫込み Die-sinking / 曲面 Profiling / R Radius / ヘリカル Helical / 荒 Roughing / 中仕上 Semi Finishing / 仕上 Finishing / 超硬 Carbide / ねじれ25° Helix angle / 切削条件表 A445 Cutting Conditions

h6

(mm)

2枚刃 2Flutes

汎用機用　エアホールなし
For General without air-hole

## GTB2○○○-○○

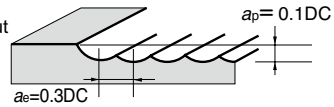
| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃部テーパ半角 Taper angle on side | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|---|
| GTB2020-05 | □ | 2 | 30′ | 12 | 100 | 4 |
| GTB2020-10 | □ | 2 | 1° | 12 | 100 | 4 |
| GTB2020-15 | □ | 2 | 1°30′ | 12 | 100 | 4 |
| GTB2020-20 | □ | 2 | 2° | 12 | 100 | 4 |
| GTB2020-25 | □ | 2 | 2°30′ | 12 | 100 | 4 |
| GTB2020-30 | □ | 2 | 3° | 12 | 100 | 4 |
| GTB2020-50 | □ | 2 | 5° | 12 | 100 | 4 |
| GTB2020-70 | □ | 2 | 7° | 12 | 100 | 4 |
| GTB2030-05 | □ | 3 | 30′ | 18 | 100 | 4 |
| GTB2030-10 | □ | 3 | 1° | 18 | 100 | 4 |
| GTB2030-15 | □ | 3 | 1°30′ | 18 | 100 | 4 |
| GTB2030-20 | □ | 3 | 2° | 18 | 100 | 4 |
| GTB2030-25 | □ | 3 | 2°30′ | 18 | 100 | 4 |
| GTB2030-30 | □ | 3 | 3° | 18 | 100 | 4 |
| GTB2030-50 | □ | 3 | 5° | 18 | 100 | 6 |
| GTB2030-70 | □ | 3 | 7° | 18 | 100 | 6 |
| GTB2040-05 | □ | 4 | 30′ | 25 | 120 | 4 |
| GTB2040-10 | □ | 4 | 1° | 25 | 120 | 4 |
| GTB2040-15 | □ | 4 | 1°30′ | 25 | 120 | 4 |
| GTB2040-20 | □ | 4 | 2° | 25 | 120 | 4 |
| GTB2040-25 | □ | 4 | 2°30′ | 25 | 120 | 6 |
| GTB2040-30 | □ | 4 | 3° | 25 | 120 | 6 |
| GTB2040-50 | □ | 4 | 5° | 25 | 120 | 8 |
| GTB2040-70 | □ | 4 | 7° | 25 | 120 | 8 |
| GTB2050-05 | □ | 5 | 30′ | 30 | 140 | 6 |
| GTB2050-10 | □ | 5 | 1° | 30 | 140 | 6 |
| GTB2050-15 | □ | 5 | 1°30′ | 30 | 140 | 6 |
| GTB2050-20 | □ | 5 | 2° | 30 | 140 | 6 |
| GTB2050-25 | □ | 5 | 2°30′ | 30 | 140 | 6 |
| GTB2050-30 | □ | 5 | 3° | 30 | 140 | 6 |
| GTB2050-50 | □ | 5 | 5° | 30 | 140 | 10 |
| GTB2050-70 | □ | 5 | 7° | 30 | 140 | 12 |
| GTB2060-05 | □ | 6 | 30′ | 35 | 140 | 6 |
| GTB2060-10 | □ | 6 | 1° | 35 | 140 | 6 |
| GTB2060-15 | □ | 6 | 1°30′ | 35 | 140 | 6 |
| GTB2060-20 | □ | 6 | 2° | 35 | 140 | 8 |
| GTB2060-25 | □ | 6 | 2°30′ | 35 | 140 | 8 |
| GTB2060-30 | □ | 6 | 3° | 35 | 140 | 8 |
| GTB2060-50 | □ | 6 | 5° | 35 | 140 | 10 |
| GTB2060-70 | □ | 6 | 7° | 35 | 140 | 12 |

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃部テーパ半角 Taper angle on side | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|---|
| GTB2080-05 | □ | 8 | 30′ | 40 | 150 | 8 |
| GTB2080-10 | □ | 8 | 1° | 40 | 150 | 8 |
| GTB2080-15 | □ | 8 | 1°30′ | 40 | 150 | 8 |
| GTB2080-20 | □ | 8 | 2° | 40 | 150 | 10 |
| GTB2080-25 | □ | 8 | 2°30′ | 40 | 150 | 10 |
| GTB2080-30 | □ | 8 | 3° | 40 | 150 | 10 |
| GTB2080-50 | □ | 8 | 5° | 40 | 150 | 12 |
| GTB2080-70 | □ | 8 | 7° | 40 | 150 | 16 |
| GTB2100-05 | □ | 10 | 30′ | 50 | 180 | 10 |
| GTB2100-10 | □ | 10 | 1° | 50 | 180 | 10 |
| GTB2100-15 | □ | 10 | 1°30′ | 50 | 180 | 12 |
| GTB2100-20 | □ | 10 | 2° | 50 | 180 | 12 |
| GTB2100-25 | □ | 10 | 2°30′ | 50 | 180 | 12 |
| GTB2100-30 | □ | 10 | 3° | 50 | 180 | 12 |
| GTB2100-50 | □ | 10 | 5° | 50 | 180 | 16 |
| GTB2100-70 | □ | 10 | 7° | 50 | 180 | 20 |
| GTB2120-05 | □ | 12 | 30′ | 60 | 200 | 12 |
| GTB2120-10 | □ | 12 | 1° | 60 | 200 | 12 |
| GTB2120-15 | □ | 12 | 1°30′ | 60 | 200 | 12 |
| GTB2120-20 | □ | 12 | 2° | 60 | 200 | 16 |
| GTB2120-25 | □ | 12 | 2°30′ | 60 | 200 | 16 |
| GTB2120-30 | □ | 12 | 3° | 60 | 200 | 16 |
| GTB2120-50 | □ | 12 | 5° | 60 | 200 | 20 |
| GTB2120-70 | □ | 12 | 7° | 60 | 200 | 25 |
| GTB2140-05 | □ | 14 | 30′ | 70 | 220 | 12 |
| GTB2140-10 | □ | 14 | 1° | 70 | 220 | 16 |
| GTB2140-15 | □ | 14 | 1°30′ | 70 | 220 | 16 |
| GTB2140-20 | □ | 14 | 2° | 70 | 220 | 16 |
| GTB2140-25 | □ | 14 | 2°30′ | 70 | 220 | 16 |
| GTB2140-30 | □ | 14 | 3° | 70 | 220 | 20 |
| GTB2140-50 | □ | 14 | 5° | 70 | 220 | 25 |
| GTB2140-70 | □ | 14 | 7° | 70 | 220 | 25 |
| GTB2160-05 | □ | 16 | 30′ | 80 | 230 | 16 |
| GTB2160-10 | □ | 16 | 1° | 80 | 230 | 16 |
| GTB2160-15 | □ | 16 | 1°30′ | 80 | 230 | 16 |
| GTB2160-20 | □ | 16 | 2° | 80 | 230 | 20 |
| GTB2160-25 | □ | 16 | 2°30′ | 80 | 230 | 20 |
| GTB2160-30 | □ | 16 | 3° | 80 | 230 | 20 |
| GTB2160-50 | □ | 16 | 5° | 80 | 230 | 25 |
| GTB2160-70 | □ | 16 | 7° | 80 | 230 | 32 |

## 標準切削条件表 Recommended cutting conditions　GTB

| 被削材 Work material | | グラファイト Graphite | | 鋳　鉄 Cast irons FC, FCD | | 非鉄金属、アルミ、銅合金 Non-ferrous-metal, Aluminium, Cu-alloys | |
|---|---|---|---|---|---|---|---|
| 硬　度 | | | | 150～200HB | | | |
| 切削条件 Conditions / ボール半径 RE(mm) | 外径 DC(mm) | 切削速度 Cutting speed $v_c$=200～250m/min 回転数 Revolution min⁻¹ | 送り速度 Table Speed mm/min | 切削速度 Cutting speed $v_c$=50～100m/min 回転数 Revolution min⁻¹ | 送り速度 Table Speed mm/min | 切削速度 Cutting speed $v_c$=150～100m/min 回転数 Revolution min⁻¹ | 送り速度 Table Speed mm/min |
| RE1 | 2 | 44,000 | 800～1,000 | 11,000 | 250～300 | 25,000 | 500～600 |
| RE2 | 4 | 22,000 | 1,000～1,300 | 5,600 | 300～400 | 12,500 | 600～800 |
| RE3 | 6 | 15,000 | 1,200～1,500 | 3,700 | 350～450 | 8,500 | 700～900 |
| RE4 | 8 | 11,000 | 1,800～2,000 | 2,800 | 550～600 | 6,400 | 1,100～1,200 |
| RE5 | 10 | 8,800 | 2,000～2,500 | 2,200 | 600～700 | 5,100 | 1,200～1,400 |
| RE6 | 12 | 7,300 | 2,000～2,500 | 1,800 | 600～700 | 4,200 | 1,200～1,400 |
| RE7.5 | 15 | 5,800 | 1,800～2,000 | 1,500 | 550～600 | 3,400 | 1,100～1,200 |
| RE8 | 16 | 5,500 | 1,600～1,800 | 1,400 | 500～600 | 3,200 | 1,000～1,200 |
| RE9 | 18 | 4,900 | 1,600～1,700 | 1,200 | 400～500 | 2,800 | 800～1,000 |
| RE10 | 20 | 4,400 | 1,200～1,400 | 1,100 | 350～450 | 2,500 | 700～900 |

切込み Depth of cut (mm)




【注意】
①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②上記に切削条件を示しますが、被削材の硬さ、切込み、ツーリング、機械の状態により条件を増減してください。
③汎用機、NCフライス盤で加工される場合は、切りくずの飛散防止のため、吸引機のご使用、または湿式切削を推奨します。乾式と湿式の寿命差はありません。
④回転数が不足する場合は、増速スピンドルのご使用を推奨します。

【Note】
①Use the appropriate coolant for the work material and machining shape.
②Standard cutting conditions are described above, but allowance should be made for these conditions according to hardness of work materials, deph of cut, tooling, and conditions of machines.
③When machining with a general purpose machine or an NC milling machine, it is recommended to use an aspirator or to perform wet cutting in order to prevent chips from scattering. There is no difference in life of end mills between dry cutting and wet cutting.
④In the case of insufficient revolution speed, it is recommended to use a high speed milling attachment.

# Epoch Rib Ball
# エポック リブボール

テーパボール Radius Taper　細部 Miniature　仕上 Finishing　リブ・細部 Rib Miniature

h5

(mm)

4枚刃
4Flutes

片角公差：± 5′
Tolerance on angle

## EPRB○○○○-○○-C

超硬 Carbide　C　ねじれ角 25° Helix angle　切削条件表 A447 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径R Ball radius | 外径 Tool dia. | 刃部テーパ半角 Taper angle on side | 刃長 Flute length | 大端径 Large edge dia. | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|---|---|---|
| EPRB0604-05-C | □ | 0.3 | 0.6 | 30′ | 4 | 0.67 | 50 | 4 |
| EPRB0606-05-C | □ | | | 30′ | 6 | 0.7 | 50 | 4 |
| EPRB0604-07-C | □ | | | 45′ | 4 | 0.7 | 50 | 4 |
| EPRB0606-07-C | □ | | | 45′ | 6 | 0.75 | 50 | 4 |
| EPRB0604-10-C | □ | | | 1° | 4 | 0.73 | 50 | 4 |
| EPRB0606-10-C | □ | | | 1° | 6 | 0.8 | 50 | 4 |
| EPRB0604-15-C | □ | | | 1° 30′ | 4 | 0.79 | 50 | 4 |
| EPRB0606-15-C | □ | | | 1° 30′ | 6 | 0.9 | 50 | 4 |
| EPRB0604-20-C | □ | | | 2° | 4 | 0.86 | 50 | 4 |
| EPRB0606-20-C | □ | | | 2° | 6 | 1 | 50 | 4 |
| EPRB0806-05-C | □ | 0.4 | 0.8 | 30′ | 6 | 0.9 | 50 | 4 |
| EPRB0808-05-C | □ | | | 30′ | 8 | 0.93 | 50 | 4 |
| EPRB0810-05-C | □ | | | 30′ | 10 | 0.97 | 50 | 4 |
| EPRB0806-07-C | □ | | | 45′ | 6 | 0.95 | 50 | 4 |
| EPRB0808-07-C | □ | | | 45′ | 8 | 1 | 50 | 4 |
| EPRB0810-07-C | □ | | | 45′ | 10 | 1.05 | 50 | 4 |
| EPRB0806-10-C | □ | | | 1° | 6 | 1 | 50 | 4 |
| EPRB0808-10-C | □ | | | 1° | 8 | 1.07 | 50 | 4 |
| EPRB0810-10-C | □ | | | 1° | 10 | 1.14 | 50 | 4 |
| EPRB0806-15-C | □ | | | 1° 30′ | 6 | 1.09 | 50 | 4 |
| EPRB0808-15-C | □ | | | 1° 30′ | 8 | 1.2 | 50 | 4 |
| EPRB0810-15-C | □ | | | 1° 30′ | 10 | 1.3 | 50 | 4 |
| EPRB0806-20-C | □ | | | 2° | 6 | 1.19 | 50 | 4 |
| EPRB0808-20-C | □ | | | 2° | 8 | 1.33 | 50 | 4 |
| EPRB0810-20-C | □ | | | 2° | 10 | 1.47 | 50 | 4 |
| EPRB1008-05-C | □ | 0.5 | 1 | 30′ | 8 | 1.13 | 50 | 4 |
| EPRB1010-05-C | □ | | | 30′ | 10 | 1.17 | 50 | 4 |
| EPRB1012-05-C | □ | | | 30′ | 12 | 1.2 | 50 | 4 |
| EPRB1016-05-C | □ | | | 30′ | 16 | 1.27 | 50 | 4 |
| EPRB1008-07-C | □ | | | 45′ | 8 | 1.2 | 50 | 4 |
| EPRB1010-07-C | □ | | | 45′ | 10 | 1.25 | 50 | 4 |
| EPRB1012-07-C | □ | | | 45′ | 12 | 1.3 | 50 | 4 |
| EPRB1008-10-C | □ | | | 1° | 8 | 1.26 | 50 | 4 |
| EPRB1010-10-C | □ | | | 1° | 10 | 1.33 | 50 | 4 |
| EPRB1012-10-C | □ | | | 1° | 12 | 1.4 | 50 | 4 |
| EPRB1016-10-C | □ | | | 1° | 16 | 1.54 | 50 | 4 |
| EPRB1008-15-C | □ | | | 1° 30′ | 8 | 1.39 | 50 | 4 |
| EPRB1010-15-C | □ | | | 1° 30′ | 10 | 1.5 | 50 | 4 |
| EPRB1012-15-C | □ | | | 1° 30′ | 12 | 1.6 | 50 | 4 |
| EPRB1016-15-C | □ | | | 1° 30′ | 16 | 1.81 | 50 | 4 |
| EPRB1008-20-C | □ | | | 2° | 8 | 1.53 | 50 | 4 |
| EPRB1010-20-C | □ | | | 2° | 10 | 1.66 | 50 | 4 |
| EPRB1012-20-C | □ | | | 2° | 12 | 1.8 | 50 | 4 |
| EPRB1016-20-C | □ | | | 2° | 16 | 2.08 | 50 | 4 |
| EPRB1206-05-C | □ | 0.6 | 1.2 | 30′ | 6 | 1.29 | 50 | 4 |
| EPRB1208-05-C | □ | | | 30′ | 8 | 1.33 | 50 | 4 |
| EPRB1210-05-C | □ | | | 30′ | 10 | 1.37 | 50 | 4 |
| EPRB1212-05-C | □ | | | 30′ | 12 | 1.4 | 50 | 4 |
| EPRB1216-05-C | □ | | | 30′ | 16 | 1.47 | 50 | 4 |
| EPRB1220-05-C | □ | | | 30′ | 20 | 1.54 | 60 | 4 |
| EPRB1208-07-C | □ | | | 45′ | 8 | 1.39 | 50 | 4 |
| EPRB1210-07-C | □ | | | 45′ | 10 | 1.45 | 50 | 4 |
| EPRB1212-07-C | □ | | | 45′ | 12 | 1.5 | 50 | 4 |
| EPRB1216-07-C | □ | | | 45′ | 16 | 1.6 | 50 | 4 |
| EPRB1206-10-C | □ | | | 1° | 6 | 1.39 | 50 | 4 |
| EPRB1208-10-C | □ | | | 1° | 8 | 1.46 | 50 | 4 |
| EPRB1210-10-C | □ | | | 1° | 10 | 1.53 | 50 | 4 |
| EPRB1212-10-C | □ | | | 1° | 12 | 1.6 | 50 | 4 |
| EPRB1216-10-C | □ | | | 1° | 16 | 1.74 | 50 | 4 |
| EPRB1220-10-C | □ | | | 1° | 20 | 1.88 | 60 | 4 |
| EPRB1206-15-C | □ | | | 1° 30′ | 6 | 1.48 | 50 | 4 |
| EPRB1208-15-C | □ | | | 1° 30′ | 8 | 1.59 | 50 | 4 |
| EPRB1210-15-C | □ | | | 1° 30′ | 10 | 1.69 | 50 | 4 |
| EPRB1212-15-C | □ | | | 1° 30′ | 12 | 1.8 | 50 | 4 |

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径R Ball radius | 外径 Tool dia. | 刃部テーパ半角 Taper angle on side | 刃長 Flute length | 大端径 Large edge dia. | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|---|---|---|
| EPRB1216-15-C | □ | 0.6 | 1.2 | 1° 30′ | 16 | 2.01 | 50 | 4 |
| EPRB1206-20-C | □ | | | 2° | 6 | 1.58 | 50 | 4 |
| EPRB1208-20-C | □ | | | 2° | 8 | 1.72 | 50 | 4 |
| EPRB1210-20-C | □ | | | 2° | 10 | 1.86 | 50 | 4 |
| EPRB1212-20-C | □ | | | 2° | 12 | 2 | 50 | 4 |
| EPRB1216-20-C | □ | | | 2° | 16 | 2.28 | 50 | 4 |
| EPRB1220-20-C | □ | | | 2° | 20 | 2.56 | 60 | 4 |
| EPRB1508-05-C | □ | 0.75 | 1.5 | 30′ | 8 | 1.63 | 50 | 4 |
| EPRB1510-05-C | □ | | | 30′ | 10 | 1.66 | 50 | 4 |
| EPRB1512-05-C | □ | | | 30′ | 12 | 1.7 | 50 | 4 |
| EPRB1516-05-C | □ | | | 30′ | 16 | 1.77 | 50 | 4 |
| EPRB1520-05-C | □ | | | 30′ | 20 | 1.84 | 60 | 4 |
| EPRB1508-07-C | □ | | | 45′ | 8 | 1.69 | 50 | 4 |
| EPRB1510-07-C | □ | | | 45′ | 10 | 1.74 | 50 | 4 |
| EPRB1512-07-C | □ | | | 45′ | 12 | 1.8 | 50 | 4 |
| EPRB1516-07-C | □ | | | 45′ | 16 | 1.9 | 50 | 4 |
| EPRB1520-07-C | □ | | | 45′ | 20 | 2 | 60 | 4 |
| EPRB1508-10-C | □ | | | 1° | 8 | 1.75 | 50 | 4 |
| EPRB1510-10-C | □ | | | 1° | 10 | 1.82 | 50 | 4 |
| EPRB1512-10-C | □ | | | 1° | 12 | 1.9 | 50 | 4 |
| EPRB1516-10-C | □ | | | 1° | 16 | 2.03 | 50 | 4 |
| EPRB1520-10-C | □ | | | 1° | 20 | 2.17 | 60 | 4 |
| EPRB1508-15-C | □ | | | 1° 30′ | 8 | 1.88 | 50 | 4 |
| EPRB1510-15-C | □ | | | 1° 30′ | 10 | 1.99 | 50 | 4 |
| EPRB1512-15-C | □ | | | 1° 30′ | 12 | 2.09 | 50 | 4 |
| EPRB1516-15-C | □ | | | 1° 30′ | 16 | 2.3 | 50 | 4 |
| EPRB1520-15-C | □ | | | 1° 30′ | 20 | 2.51 | 60 | 4 |
| EPRB1508-20-C | □ | | | 2° | 8 | 2.01 | 50 | 4 |
| EPRB1510-20-C | □ | | | 2° | 10 | 2.15 | 50 | 4 |
| EPRB1512-20-C | □ | | | 2° | 12 | 2.29 | 50 | 4 |
| EPRB1516-20-C | □ | | | 2° | 16 | 2.57 | 50 | 4 |
| EPRB1520-20-C | □ | | | 2° | 20 | 2.85 | 60 | 4 |
| EPRB1608-05-C | □ | 0.8 | 1.6 | 30′ | 8 | 1.73 | 50 | 4 |
| EPRB1610-05-C | □ | | | 30′ | 10 | 1.76 | 50 | 4 |
| EPRB1612-05-C | □ | | | 30′ | 12 | 1.8 | 50 | 4 |
| EPRB1616-05-C | □ | | | 30′ | 16 | 1.87 | 50 | 4 |
| EPRB1620-05-C | □ | | | 30′ | 20 | 1.94 | 60 | 4 |
| EPRB1608-07-C | □ | | | 45′ | 8 | 1.79 | 50 | 4 |
| EPRB1610-07-C | □ | | | 45′ | 10 | 1.84 | 50 | 4 |
| EPRB1612-07-C | □ | | | 45′ | 12 | 1.89 | 50 | 4 |
| EPRB1616-07-C | □ | | | 45′ | 16 | 2 | 50 | 4 |
| EPRB1620-07-C | □ | | | 45′ | 20 | 2.1 | 60 | 4 |
| EPRB1608-10-C | □ | | | 1° | 8 | 1.85 | 50 | 4 |
| EPRB1610-10-C | □ | | | 1° | 10 | 1.92 | 50 | 4 |
| EPRB1612-10-C | □ | | | 1° | 12 | 1.99 | 50 | 4 |
| EPRB1616-10-C | □ | | | 1° | 16 | 2.13 | 50 | 4 |
| EPRB1620-10-C | □ | | | 1° | 20 | 2.27 | 60 | 4 |
| EPRB1608-15-C | □ | | | 1° 30′ | 8 | 1.98 | 50 | 4 |
| EPRB1610-15-C | □ | | | 1° 30′ | 10 | 2.08 | 50 | 4 |
| EPRB1612-15-C | □ | | | 1° 30′ | 12 | 2.19 | 50 | 4 |
| EPRB1616-15-C | □ | | | 1° 30′ | 16 | 2.4 | 50 | 4 |
| EPRB1620-15-C | □ | | | 1° 30′ | 20 | 2.61 | 60 | 4 |
| EPRB1608-20-C | □ | | | 2° | 8 | 2.1 | 50 | 4 |
| EPRB1610-20-C | □ | | | 2° | 10 | 2.24 | 50 | 4 |
| EPRB1612-20-C | □ | | | 2° | 12 | 2.38 | 50 | 4 |
| EPRB1616-20-C | □ | | | 2° | 16 | 2.66 | 50 | 4 |
| EPRB1620-20-C | □ | | | 2° | 20 | 2.94 | 60 | 4 |
| EPRB1808-05-C | □ | 0.9 | 1.8 | 30′ | 8 | 1.92 | 50 | 4 |
| EPRB1810-05-C | □ | | | 30′ | 10 | 1.96 | 50 | 4 |
| EPRB1812-05-C | □ | | | 30′ | 12 | 1.99 | 50 | 4 |
| EPRB1816-05-C | □ | | | 30′ | 16 | 2.06 | 50 | 4 |
| EPRB1820-05-C | □ | | | 30′ | 20 | 2.13 | 60 | 4 |
| EPRB1808-07-C | □ | | | 45′ | 8 | 1.99 | 50 | 4 |
| EPRB1810-07-C | □ | | | 45′ | 10 | 2.04 | 50 | 4 |

□印：特定代理店在庫です。弊社営業へお問合せください。□：Stocked by specified distributor. Contact with our sales department.

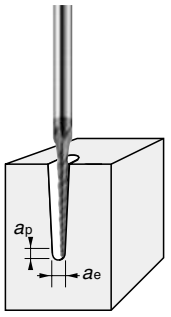
# EPRB○○○○-○○-C

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径R Ball radius | 外径 Tool dia. | 刃部テーパ半角 Taper angle on side | 刃長 Flute length | 大端径 Large edge dia. | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|---|---|---|
| EPRB1812-07-C | □ | 0.9 | 1.8 | 45′ | 12 | 2.09 | 50 | 4 |
| EPRB1816-07-C | □ | | | 45′ | 16 | 2.2 | 50 | 4 |
| EPRB1820-07-C | □ | | | 45′ | 20 | 2.3 | 60 | 4 |
| EPRB1808-10-C | □ | | | 1° | 8 | 2.05 | 50 | 4 |
| EPRB1810-10-C | □ | | | 1° | 10 | 2.12 | 50 | 4 |
| EPRB1812-10-C | □ | | | 1° | 12 | 2.19 | 50 | 4 |
| EPRB1816-10-C | □ | | | 1° | 16 | 2.34 | 50 | 4 |
| EPRB1820-10-C | □ | | | 1° | 20 | 2.47 | 60 | 4 |
| EPRB1808-15-C | □ | | | 1° 30′ | 8 | 2.17 | 50 | 4 |
| EPRB1810-15-C | □ | | | 1° 30′ | 10 | 2.28 | 50 | 4 |
| EPRB1812-15-C | □ | | | 1° 30′ | 12 | 2.38 | 50 | 4 |
| EPRB1816-15-C | □ | | | 1° 30′ | 16 | 2.59 | 50 | 4 |
| EPRB1820-15-C | □ | | | 1° 30′ | 20 | 2.8 | 60 | 4 |
| EPRB1808-20-C | □ | | | 2° | 8 | 2.3 | 50 | 4 |
| EPRB1810-20-C | □ | | | 2° | 10 | 2.44 | 50 | 4 |
| EPRB1812-20-C | □ | | | 2° | 12 | 2.58 | 50 | 4 |
| EPRB1816-20-C | □ | | | 2° | 16 | 2.86 | 50 | 4 |
| EPRB1820-20-C | □ | | | 2° | 20 | 3.14 | 60 | 4 |
| EPRB2010-05-C | □ | 1 | 2 | 30′ | 10 | 2.16 | 50 | 4 |
| EPRB2012-05-C | □ | | | 30′ | 12 | 2.19 | 50 | 4 |
| EPRB2016-05-C | □ | | | 30′ | 16 | 2.26 | 50 | 4 |
| EPRB2020-05-C | □ | | | 30′ | 20 | 2.33 | 60 | 4 |
| EPRB2025-05-C | □ | | | 30′ | 25 | 2.42 | 60 | 4 |
| EPRB2010-07-C | □ | | | 45′ | 10 | 2.24 | 50 | 4 |
| EPRB2012-07-C | □ | | | 45′ | 12 | 2.29 | 50 | 4 |
| EPRB2016-07-C | □ | | | 45′ | 16 | 2.39 | 50 | 4 |
| EPRB2020-07-C | □ | | | 45′ | 20 | 2.5 | 60 | 4 |
| EPRB2025-07-C | □ | | | 45′ | 25 | 2.63 | 60 | 4 |
| EPRB2010-10-C | □ | | | 1° | 10 | 2.31 | 50 | 4 |
| EPRB2012-10-C | □ | | | 1° | 12 | 2.38 | 50 | 4 |
| EPRB2016-10-C | □ | | | 1° | 16 | 2.52 | 50 | 4 |
| EPRB2020-10-C | □ | | | 1° | 20 | 2.66 | 60 | 4 |
| EPRB2025-10-C | □ | | | 1° | 25 | 2.84 | 60 | 4 |
| EPRB2010-15-C | □ | | | 1° 30′ | 10 | 2.47 | 50 | 4 |
| EPRB2012-15-C | □ | | | 1° 30′ | 12 | 2.58 | 50 | 4 |
| EPRB2016-15-C | □ | | | 1° 30′ | 16 | 2.79 | 50 | 4 |
| EPRB2020-15-C | □ | | | 1° 30′ | 20 | 3 | 60 | 4 |
| EPRB2025-15-C | □ | | | 1° 30′ | 25 | 3.26 | 60 | 4 |
| EPRB2010-20-C | □ | | | 2° | 10 | 2.63 | 50 | 4 |
| EPRB2012-20-C | □ | | | 2° | 12 | 2.77 | 50 | 4 |
| EPRB2016-20-C | □ | | | 2° | 16 | 3.05 | 50 | 4 |
| EPRB2020-20-C | □ | | | 2° | 20 | 3.33 | 60 | 4 |
| EPRB2025-20-C | □ | | | 2° | 25 | 3.68 | 60 | 4 |

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径R Ball radius | 外径 Tool dia. | 刃部テーパ半角 Taper angle on side | 刃長 Flute length | 大端径 Large edge dia. | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|---|---|---|
| EPRB2510-05-C | □ | 1.25 | 2.5 | 30′ | 10 | 2.65 | 50 | 4 |
| EPRB2512-05-C | □ | | | 30′ | 12 | 2.69 | 50 | 4 |
| EPRB2516-05-C | □ | | | 30′ | 16 | 2.76 | 50 | 4 |
| EPRB2520-05-C | □ | | | 30′ | 20 | 2.83 | 60 | 6 |
| EPRB2525-05-C | □ | | | 30′ | 25 | 2.91 | 60 | 6 |
| EPRB2530-05-C | □ | | | 30′ | 30 | 3 | 75 | 6 |
| EPRB2510-07-C | □ | | | 45′ | 10 | 2.73 | 50 | 4 |
| EPRB2512-07-C | □ | | | 45′ | 12 | 2.78 | 50 | 4 |
| EPRB2516-07-C | □ | | | 45′ | 16 | 2.89 | 50 | 4 |
| EPRB2520-07-C | □ | | | 45′ | 20 | 2.99 | 60 | 6 |
| EPRB2525-07-C | □ | | | 45′ | 25 | 3.12 | 60 | 6 |
| EPRB2530-07-C | □ | | | 45′ | 30 | 3.25 | 75 | 6 |
| EPRB2510-10-C | □ | | | 1° | 10 | 2.81 | 50 | 4 |
| EPRB2512-10-C | □ | | | 1° | 12 | 2.88 | 50 | 4 |
| EPRB2516-10-C | □ | | | 1° | 16 | 3.02 | 50 | 4 |
| EPRB2520-10-C | □ | | | 1° | 20 | 3.16 | 60 | 6 |
| EPRB2525-10-C | □ | | | 1° | 25 | 3.33 | 60 | 6 |
| EPRB2530-10-C | □ | | | 1° | 30 | 3.5 | 75 | 6 |
| EPRB2510-15-C | □ | | | 1° 30′ | 10 | 2.96 | 50 | 4 |
| EPRB2512-15-C | □ | | | 1° 30′ | 12 | 3.06 | 50 | 4 |
| EPRB2516-15-C | □ | | | 1° 30′ | 16 | 3.27 | 50 | 4 |
| EPRB2520-15-C | □ | | | 1° 30′ | 20 | 3.48 | 60 | 6 |
| EPRB2525-15-C | □ | | | 1° 30′ | 25 | 3.74 | 60 | 6 |
| EPRB2530-15-C | □ | | | 1° 30′ | 30 | 4.01 | 75 | 6 |
| EPRB2510-20-C | □ | | | 2° | 10 | 3.11 | 50 | 4 |
| EPRB2512-20-C | □ | | | 2° | 12 | 3.25 | 50 | 4 |
| EPRB2516-20-C | □ | | | 2° | 16 | 3.53 | 50 | 4 |
| EPRB2520-20-C | □ | | | 2° | 20 | 3.81 | 60 | 6 |
| EPRB2525-20-C | □ | | | 2° | 25 | 4.16 | 60 | 6 |
| EPRB2530-20-C | □ | | | 2° | 30 | 4.51 | 75 | 6 |
| EPRB2520-30-C | □ | | | 3° | 20 | 4.47 | 60 | 6 |
| EPRB2530-30-C | □ | | | 3° | 30 | 5.51 | 75 | 6 |
| EPRB3025-05-C | □ | 1.5 | 3 | 30′ | 25 | 3.41 | 60 | 6 |
| EPRB3040-05-C | □ | | | 30′ | 40 | 3.67 | 75 | 6 |
| EPRB3025-07-C | □ | | | 45′ | 25 | 3.61 | 60 | 6 |
| EPRB3025-10-C | □ | | | 1° | 25 | 3.81 | 60 | 6 |
| EPRB3040-10-C | □ | | | 1° | 40 | 4.34 | 75 | 6 |
| EPRB3025-15-C | □ | | | 1° 30′ | 25 | 4.23 | 60 | 6 |
| EPRB3040-15-C | □ | | | 1° 30′ | 40 | 5.02 | 75 | 6 |
| EPRB3025-20-C | □ | | | 2° | 25 | 4.64 | 60 | 6 |
| EPRB3040-20-C | □ | | | 2° | 40 | 5.69 | 75 | 6 |
| EPRB3025-30-C | □ | | | 3° | 25 | 5.46 | 60 | 6 |
| EPRB3040-30-C | □ | | | 3° | 40 | 7.04 | 80 | 8 |

## 標準切削条件表 Recommended cutting conditions EPRB-C

| 切削条件 Cutting conditions / ボール半径R ×外径DC mm | 切込み($a_p$) Depth of cut mm/pass | 切削速度($v_c$) 50～75m/min Cutting speed 回転数($n$) min$^{-1}$ Revolution | 送り速度($v_f$) Feed speed mm/min |
|---|---|---|---|
| RE0.3×0.6 | 0.01～0.05 | 20,000～30,000 | 200～ 800 |
| RE0.4×0.8 | 0.01～0.06 | 12,000～28,000 | 200～1,000 |
| RE0.5×1.0 | 0.03～0.08 | 10,000～22,000 | 300～1,000 |
| RE0.6×1.2 | 0.04～0.09 | 8,000～19,000 | 300～1,000 |
| RE0.75×1.5 | 0.06～0.12 | 6,400～15,000 | 300～1,000 |
| RE0.8×1.6 | 0.06～0.13 | 6,000～14,000 | 300～1,000 |
| RE0.9×1.8 | 0.07～0.15 | 5,300～12,400 | 400～1,000 |
| RE1×2.0 | 0.07～0.2 | 4,800～11,000 | 400～1,000 |
| RE1.25×2.5 | 0.08～0.25 | 3,800～ 8,900 | 400～1,000 |
| RE1.5×3.0 | 0.09～0.3 | 3,200～ 7,400 | 400～1,000 |




$a_e$＝DC
$a_p$＝表参照

【注意】①溝深さの浅い場合は刃長の短いエンドミルをご使用ください。
②コーナ部の加工は送り速度を約1/2に、軸方向送りは1/5以下を目安にしてください。
③この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④切削油（できるだけ油性切削油）をご使用ください。

【Note】① Use short length for shallow slots.
② Reduce the feed speed at the table to 50% at the corner and 1/5 at plunging.
③ These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
④ Oil base coolant is recommended.

## 対応被削材 Applicable work material

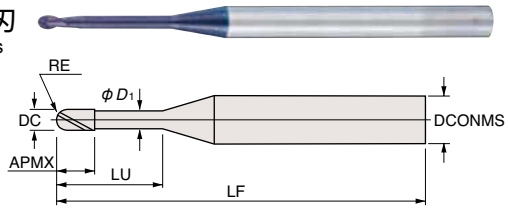
| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ |

# C Coating Carbide End Mills "RIB-CUT Ball"
# 超硬Cコートエンドミル”リブカットボール”

溝 Slotting | 彫込み Die-sinking | 曲面 Profiling | R Radius | 細部 Miniature | 仕上 Finishing | リブ・細部 Rib Miniature

RE公差 RE tolerance ±0.01　h5　(mm)

2枚刃 2Flutes




## DEB2○○○-○○-C

超硬 Carbide | C | ねじれ角 30° Helix angle | 切削条件表 A448 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 刃長 Flute length APMX | 首径 Neck dia. DN | 首下長 Under neck length LU | 全長 Overall length LF | シャンク径 Shank dia. DCONMS |
|---|---|---|---|---|---|---|---|---|
| DEB2006-6-C | □ | 0.3 | 0.6 | 1.2 | 0.58 | 6 | 55 | 4 |
| DEB2008-6-C | □ | 0.4 | 0.8 | 1.2 | 0.77 | 6 | 55 | 4 |
| DEB2008-8-C | □ | | | 1.2 | 0.77 | 8 | 55 | 4 |
| DEB2010-8-C | □ | 0.5 | 1 | 1.5 | 0.95 | 8 | 55 | 4 |
| DEB2010-12-C | □ | | | 1.5 | 0.95 | 12 | 55 | 4 |
| DEB2012-8-C | □ | 0.6 | 1.2 | 1.6 | 1.15 | 8 | 55 | 4 |
| DEB2012-12-C | □ | | | 1.6 | 1.15 | 12 | 55 | 4 |
| DEB2014-12-C | □ | 0.7 | 1.4 | 1.6 | 1.34 | 12 | 55 | 4 |
| DEB2015-8-C | □ | 0.75 | 1.5 | 1.8 | 1.44 | 8 | 55 | 4 |
| DEB2015-12-C | □ | | | 1.8 | 1.44 | 12 | 55 | 4 |
| DEB2015-16-C | □ | | | 1.8 | 1.44 | 16 | 55 | 4 |
| DEB2016-16-C | □ | 0.8 | 1.6 | 1.8 | 1.54 | 16 | 55 | 4 |
| DEB2018-16-C | □ | 0.9 | 1.8 | 2 | 1.73 | 16 | 55 | 4 |
| DEB2020-8-C | □ | 1 | 2 | 2 | 1.92 | 8 | 55 | 4 |
| DEB2020-12-C | □ | | | 2 | 1.92 | 12 | 55 | 4 |
| DEB2020-16-C | □ | | | 2 | 1.92 | 16 | 55 | 4 |
| DEB2020-20-C | □ | | | 2 | 1.92 | 20 | 55 | 4 |

## 標準切削条件表 Recommended cutting conditions

**DEB-C**
リブカットボール
Rib Cut Ball

＜溝切削＞ Slotting　被削材：一般構造用炭素鋼、合金鋼 Carbon steels, Alloy steels

| 切削条件 Cutting conditions / ボール半径RE ×外径DC (mm) | 切込み ($a_p$) Depth of cut mm/pass | 切削速度 ($v_c$) 30~50m/min 回転数 ($n$) min$^{-1}$ | 送り速度 ($v_f$) mm/min |
|---|---|---|---|
| RE0.3 × 0.6 | 0.01 ~ 0.02 | 16,000 ~ 26,000 | 150 ~ 300 |
| RE0.4 × 0.8 | 0.03 ~ 0.05 | 12,000 ~ 20,000 | 150 ~ 300 |
| RE0.5 × 1.0 | 0.05 ~ 0.08 | 9,500 ~ 16,000 | 150 ~ 300 |
| RE0.6 × 1.2 | 0.06 ~ 0.10 | 8,000 ~ 13,000 | 150 ~ 300 |
| RE0.7 × 1.4 | 0.07 ~ 0.12 | 7,000 ~ 11,000 | 150 ~ 300 |
| RE0.75 × 1.5 | 0.08 ~ 0.12 | 6,500 ~ 10,000 | 150 ~ 300 |
| RE0.8 × 1.6 | 0.10 ~ 0.15 | 6,000 ~ 10,000 | 150 ~ 300 |
| RE0.9 × 1.8 | 0.15 ~ 0.20 | 5,000 ~ 9,000 | 150 ~ 300 |
| RE1.0 × 2.0 | 0.15 ~ 0.30 | 5,000 ~ 8,000 | 150 ~ 300 |

【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。

【Note】① Use the appropriate coolant for the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | 炭素鋼 合金鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ |

□印：特定代理店在庫です。弊社営業へお問合せください。　□：Stocked by specified distributor. Contact with our sales department.

# C Coating Carbide End Mills "RIB STAR"
# 超硬Cコートエンドミル”リブスター”

**コーナR付き** | Corner radius

テーパ Taper | 細部 Miniature | 仕上 Finishing | リブ・細部 Rib Miniature

外径公差 Dia.tolerance 0～−0.05 | h5 | (mm)

6枚刃 6Flutes

片角公差 : 0 / −15′ Tolerance on angle



## RIB6○○○○-○○CR-C

超硬 Carbide | C | ねじれ10° (左) Helix angle (Left) | 切削条件表 A449 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃部テーパ半角 Taper angle on side | コーナ半径 Corner radius | 刃長 Flute length | 大端径 Large edge dia. | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|---|---|---|
| RIB61012-05CR-C | □ | 1 | 30′ | 0.3 | 12 | 1.21 | 45 | 4 |
| RIB61012-10CR-C | □ | | 1° | | 12 | 1.42 | 45 | 4 |
| RIB61012-15CR-C | □ | | 1°30′ | | 12 | 1.63 | 45 | 4 |
| RIB61012-20CR-C | □ | | 2° | | 12 | 1.84 | 45 | 4 |
| RIB61012-30CR-C | □ | | 3° | | 12 | 2.26 | 45 | 4 |
| RIB61216-05CR-C | □ | 1.2 | 30′ | 0.3 | 16 | 1.48 | 45 | 4 |
| RIB61216-10CR-C | □ | | 1° | | 16 | 1.76 | 45 | 4 |
| RIB61216-15CR-C | □ | | 1°30′ | | 16 | 2.04 | 45 | 4 |
| RIB61216-20CR-C | □ | | 2° | | 16 | 2.32 | 45 | 4 |
| RIB61216-30CR-C | □ | | 3° | | 16 | 2.88 | 45 | 4 |
| RIB61520-05CR-C | □ | 1.5 | 30′ | 0.4 | 20 | 1.85 | 50 | 4 |
| RIB61520-10CR-C | □ | | 1° | | 20 | 2.20 | 50 | 4 |
| RIB61520-15CR-C | □ | | 1°30′ | | 20 | 2.55 | 50 | 4 |
| RIB61520-20CR-C | □ | | 2° | | 20 | 2.90 | 50 | 4 |
| RIB61520-30CR-C | □ | | 3° | | 20 | 3.60 | 50 | 4 |
| RIB61820-05CR-C | □ | 1.8 | 30′ | 0.4 | 20 | 2.15 | 50 | 4 |
| RIB61820-10CR-C | □ | | 1° | | 20 | 2.50 | 50 | 4 |
| RIB61820-15CR-C | □ | | 1°30′ | | 20 | 2.85 | 50 | 4 |
| RIB61820-20CR-C | □ | | 2° | | 20 | 3.20 | 50 | 4 |
| RIB61820-30CR-C | □ | | 3° | | 20 | 3.90 | 50 | 4 |

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃部テーパ半角 Taper angle on side | コーナ半径 Corner radius | 刃長 Flute length | 大端径 Large edge dia. | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|---|---|---|
| RIB62025-05CR-C | □ | 2 | 30′ | 0.5 | 25 | 2.44 | 50 | 4 |
| RIB62025-10CR-C | □ | | 1° | | 25 | 2.87 | 50 | 4 |
| RIB62025-15CR-C | □ | | 1°30′ | | 25 | 3.31 | 50 | 4 |
| RIB62025-20CR-C | □ | | 2° | | 25 | 3.75 | 50 | 4 |
| RIB62025-30CR-C | □ | | 3° | | 25 | 4.62 | 70 | 6 |
| RIB62530-05CR-C | □ | 2.5 | 30′ | 0.5 | 30 | 3.02 | 70 | 6 |
| RIB62530-10CR-C | □ | | 1° | | 30 | 3.55 | 70 | 6 |
| RIB62530-15CR-C | □ | | 1°30′ | | 30 | 4.07 | 70 | 6 |
| RIB62530-20CR-C | □ | | 2° | | 30 | 4.60 | 70 | 6 |
| RIB62530-30CR-C | □ | | 3° | | 30 | 5.64 | 70 | 6 |
| RIB63040-05CR-C | □ | 3 | 30′ | 0.5 | 40 | 3.70 | 70 | 6 |
| RIB63040-10CR-C | □ | | 1° | | 40 | 4.40 | 70 | 6 |
| RIB63040-15CR-C | □ | | 1°30′ | | 40 | 5.09 | 70 | 6 |
| RIB63040-20CR-C | □ | | 2° | | 40 | 5.79 | 70 | 6 |

## 標準切削条件表 Recommended cutting conditions RIB-CR-C

＜溝切削＞ Slotting

| 被削材 Work material | | 一般構造用炭素鋼 Mild carbon Steels | | 合金鋼 Alloy steels | | アルミ合金 Aluminum alloys | |
|---|---|---|---|---|---|---|---|
| 外径 Tool dia. mm | 切込み ($a_p$) Depth of cut mm /pass | 回転数 $min^{-1}$ | 送り速度 mm /min | 回転数 $min^{-1}$ | 送り速度 mm /min | 回転数 $min^{-1}$ | 送り速度 mm /min |
| 0.6 | 0.01 ～ 0.02 | 32,000 | 400 | 22,000 | 250 | 50,000 | 500 |
| 0.8 | 0.01 ～ 0.03 | 24,000 | 400 | 16,000 | 300 | 32,000 | 600 |
| 1.0 | 0.03 ～ 0.05 | 19,000 | 450 | 13,000 | 300 | 28,000 | 600 |
| 1.5 | 0.03 ～ 0.08 | 12,700 | 500 | 8,500 | 300 | 24,000 | 600 |
| 2.0 | 0.05 ～ 0.15 | 9,600 | 500 | 6,400 | 400 | 19,000 | 800 |
| 2.5 | 0.07 ～ 0.20 | 7,600 | 600 | 5,000 | 400 | 12,000 | 800 |
| 3.0 | 0.09 ～ 0.25 | 6,300 | 600 | 4,200 | 400 | 10,000 | 800 |

【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。

【Note】① Use the appropriate coolant for the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ |

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特定代理店在庫品

# Epoch Rib
# エポックリブ

テーパ Taper　細部 Miniature　仕上 Finishing　リブ・細部 Rib Miniature

外径公差 Dia.tolerance　0～−0.03　h5　(mm)

4枚刃
4Flutes

片角公差：±5′
Tolerance on angle

## EPRI○○○○-○○-C

超硬 Carbide　C　ねじれ角 25° Helix angle　切削条件表 A451 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃部テーパ半角 Taper angle on side | 刃長 Flute length | 大端径 Large side dia. | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|---|---|
| EPRI0504-05-C | □ | 0.5 | 30′ | 4 | 0.57 | 50 | 4 |
| EPRI0506-05-C | □ | | 30′ | 6 | 0.6 | 50 | 4 |
| EPRI0504-07-C | □ | | 45′ | 4 | 0.6 | 50 | 4 |
| EPRI0506-07-C | □ | | 45′ | 6 | 0.66 | 50 | 4 |
| EPRI0504-10-C | □ | | 1° | 4 | 0.64 | 50 | 4 |
| EPRI0506-10-C | □ | | 1° | 6 | 0.71 | 50 | 4 |
| EPRI0504-15-C | □ | | 1° 30′ | 4 | 0.71 | 50 | 4 |
| EPRI0506-15-C | □ | | 1° 30′ | 6 | 0.81 | 50 | 4 |
| EPRI0504-20-C | □ | | 2° | 4 | 0.78 | 50 | 4 |
| EPRI0506-20-C | □ | | 2° | 6 | 0.92 | 50 | 4 |
| EPRI0504-30-C | □ | | 3° | 4 | 0.92 | 50 | 4 |
| EPRI0604-05-C | □ | 0.6 | 30′ | 4 | 0.67 | 50 | 4 |
| EPRI0606-05-C | □ | | 30′ | 6 | 0.7 | 50 | 4 |
| EPRI0604-07-C | □ | | 45′ | 4 | 0.7 | 50 | 4 |
| EPRI0606-07-C | □ | | 45′ | 6 | 0.76 | 50 | 4 |
| EPRI0604-10-C | □ | | 1° | 4 | 0.74 | 50 | 4 |
| EPRI0606-10-C | □ | | 1° | 6 | 0.81 | 50 | 4 |
| EPRI0604-15-C | □ | | 1° 30′ | 4 | 0.81 | 50 | 4 |
| EPRI0606-15-C | □ | | 1° 30′ | 6 | 0.91 | 50 | 4 |
| EPRI0604-20-C | □ | | 2° | 4 | 0.88 | 50 | 4 |
| EPRI0606-20-C | □ | | 2° | 6 | 1.02 | 50 | 4 |
| EPRI0604-30-C | □ | | 3° | 4 | 1.02 | 50 | 4 |
| EPRI0704-05-C | □ | 0.7 | 30′ | 4 | 0.77 | 50 | 4 |
| EPRI0706-05-C | □ | | 30′ | 6 | 0.8 | 50 | 4 |
| EPRI0708-05-C | □ | | 30′ | 8 | 0.84 | 50 | 4 |
| EPRI0706-07-C | □ | | 45′ | 6 | 0.86 | 50 | 4 |
| EPRI0708-07-C | □ | | 45′ | 8 | 0.91 | 50 | 4 |
| EPRI0704-10-C | □ | | 1° | 4 | 0.84 | 50 | 4 |
| EPRI0706-10-C | □ | | 1° | 6 | 0.91 | 50 | 4 |
| EPRI0708-10-C | □ | | 1° | 8 | 0.98 | 50 | 4 |
| EPRI0704-15-C | □ | | 1° 30′ | 4 | 0.91 | 50 | 4 |
| EPRI0706-15-C | □ | | 1° 30′ | 6 | 1.01 | 50 | 4 |
| EPRI0708-15-C | □ | | 1° 30′ | 8 | 1.12 | 50 | 4 |
| EPRI0704-20-C | □ | | 2° | 4 | 0.98 | 50 | 4 |
| EPRI0706-20-C | □ | | 2° | 6 | 1.12 | 50 | 4 |
| EPRI0708-20-C | □ | | 2° | 8 | 1.26 | 50 | 4 |
| EPRI0706-30-C | □ | | 3° | 6 | 1.33 | 50 | 4 |
| EPRI0806-05-C | □ | 0.8 | 30′ | 6 | 0.91 | 50 | 4 |
| EPRI0808-05-C | □ | | 30′ | 8 | 0.94 | 50 | 4 |
| EPRI0810-05-C | □ | | 30′ | 10 | 0.98 | 50 | 4 |
| EPRI0806-07-C | □ | | 45′ | 6 | 0.96 | 50 | 4 |
| EPRI0808-07-C | □ | | 45′ | 8 | 1.01 | 50 | 4 |
| EPRI0810-07-C | □ | | 45′ | 10 | 1.06 | 50 | 4 |
| EPRI0806-10-C | □ | | 1° | 6 | 1.01 | 50 | 4 |
| EPRI0808-10-C | □ | | 1° | 8 | 1.08 | 50 | 4 |
| EPRI0810-10-C | □ | | 1° | 10 | 1.15 | 50 | 4 |
| EPRI0806-15-C | □ | | 1° 30′ | 6 | 1.11 | 50 | 4 |
| EPRI0808-15-C | □ | | 1° 30′ | 8 | 1.22 | 50 | 4 |
| EPRI0810-15-C | □ | | 1° 30′ | 10 | 1.32 | 50 | 4 |
| EPRI0806-20-C | □ | | 2° | 6 | 1.22 | 50 | 4 |
| EPRI0808-20-C | □ | | 2° | 8 | 1.36 | 50 | 4 |
| EPRI0810-20-C | □ | | 2° | 10 | 1.5 | 50 | 4 |
| EPRI0806-30-C | □ | | 3° | 6 | 1.43 | 50 | 4 |
| EPRI0810-30-C | □ | | 3° | 10 | 1.85 | 50 | 4 |
| EPRI0906-05-C | □ | 0.9 | 30′ | 6 | 1 | 50 | 4 |
| EPRI0908-05-C | □ | | 30′ | 8 | 1.04 | 50 | 4 |
| EPRI0910-05-C | □ | | 30′ | 10 | 1.07 | 50 | 4 |
| EPRI0906-07-C | □ | | 45′ | 6 | 1.06 | 50 | 4 |
| EPRI0908-07-C | □ | | 45′ | 8 | 1.11 | 50 | 4 |
| EPRI0910-07-C | □ | | 45′ | 10 | 1.16 | 50 | 4 |
| EPRI0906-10-C | □ | | 1° | 6 | 1.11 | 50 | 4 |
| EPRI0908-10-C | □ | | 1° | 8 | 1.18 | 50 | 4 |
| EPRI0910-10-C | □ | | 1° | 10 | 1.25 | 50 | 4 |

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃部テーパ半角 Taper angle on side | 刃長 Flute length | 大端径 Large side dia. | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|---|---|
| EPRI0906-15-C | □ | 0.9 | 1° 30′ | 6 | 1.21 | 50 | 4 |
| EPRI0908-15-C | □ | | 1° 30′ | 8 | 1.32 | 50 | 4 |
| EPRI0910-15-C | □ | | 1° 30′ | 10 | 1.42 | 50 | 4 |
| EPRI0906-20-C | □ | | 2° | 6 | 1.32 | 50 | 4 |
| EPRI0908-20-C | □ | | 2° | 8 | 1.46 | 50 | 4 |
| EPRI0910-20-C | □ | | 2° | 10 | 1.6 | 50 | 4 |
| EPRI0908-30-C | □ | | 3° | 8 | 1.74 | 50 | 4 |
| EPRI1006-05-C | □ | 1 | 30′ | 6 | 1.11 | 50 | 4 |
| EPRI1008-05-C | □ | | 30′ | 8 | 1.14 | 50 | 4 |
| EPRI1010-05-C | □ | | 30′ | 10 | 1.17 | 50 | 4 |
| EPRI1012-05-C | □ | | 30′ | 12 | 1.21 | 50 | 4 |
| EPRI1016-05-C | □ | | 30′ | 16 | 1.28 | 50 | 4 |
| EPRI1008-07-C | □ | | 45′ | 8 | 1.21 | 50 | 4 |
| EPRI1010-07-C | □ | | 45′ | 10 | 1.26 | 50 | 4 |
| EPRI1012-07-C | □ | | 45′ | 12 | 1.31 | 50 | 4 |
| EPRI1006-10-C | □ | | 1° | 6 | 1.21 | 50 | 4 |
| EPRI1008-10-C | □ | | 1° | 8 | 1.28 | 50 | 4 |
| EPRI1010-10-C | □ | | 1° | 10 | 1.35 | 50 | 4 |
| EPRI1012-10-C | □ | | 1° | 12 | 1.42 | 50 | 4 |
| EPRI1016-10-C | □ | | 1° | 16 | 1.56 | 50 | 4 |
| EPRI1006-15-C | □ | | 1° 30′ | 6 | 1.31 | 50 | 4 |
| EPRI1008-15-C | □ | | 1° 30′ | 8 | 1.42 | 50 | 4 |
| EPRI1010-15-C | □ | | 1° 30′ | 10 | 1.52 | 50 | 4 |
| EPRI1012-15-C | □ | | 1° 30′ | 12 | 1.63 | 50 | 4 |
| EPRI1016-15-C | □ | | 1° 30′ | 16 | 1.84 | 50 | 4 |
| EPRI1006-20-C | □ | | 2° | 6 | 1.42 | 50 | 4 |
| EPRI1008-20-C | □ | | 2° | 8 | 1.56 | 50 | 4 |
| EPRI1010-20-C | □ | | 2° | 10 | 1.7 | 50 | 4 |
| EPRI1012-20-C | □ | | 2° | 12 | 1.84 | 50 | 4 |
| EPRI1016-20-C | □ | | 2° | 16 | 2.12 | 50 | 4 |
| EPRI1008-30-C | □ | | 3° | 8 | 1.84 | 50 | 4 |
| EPRI1012-30-C | □ | | 3° | 12 | 2.26 | 50 | 4 |
| EPRI1206-05-C | □ | 1.2 | 30′ | 6 | 1.31 | 50 | 4 |
| EPRI1208-05-C | □ | | 30′ | 8 | 1.34 | 50 | 4 |
| EPRI1210-05-C | □ | | 30′ | 10 | 1.38 | 50 | 4 |
| EPRI1212-05-C | □ | | 30′ | 12 | 1.41 | 50 | 4 |
| EPRI1216-05-C | □ | | 30′ | 16 | 1.48 | 50 | 4 |
| EPRI1220-05-C | □ | | 30′ | 20 | 1.55 | 60 | 4 |
| EPRI1208-07-C | □ | | 45′ | 8 | 1.41 | 50 | 4 |
| EPRI1210-07-C | □ | | 45′ | 10 | 1.46 | 50 | 4 |
| EPRI1212-07-C | □ | | 45′ | 12 | 1.51 | 50 | 4 |
| EPRI1216-07-C | □ | | 45′ | 16 | 1.62 | 50 | 4 |
| EPRI1206-10-C | □ | | 1° | 6 | 1.41 | 50 | 4 |
| EPRI1208-10-C | □ | | 1° | 8 | 1.48 | 50 | 4 |
| EPRI1210-10-C | □ | | 1° | 10 | 1.55 | 50 | 4 |
| EPRI1212-10-C | □ | | 1° | 12 | 1.62 | 50 | 4 |
| EPRI1216-10-C | □ | | 1° | 16 | 1.76 | 50 | 4 |
| EPRI1220-10-C | □ | | 1° | 20 | 1.9 | 60 | 4 |
| EPRI1206-15-C | □ | | 1° 30′ | 6 | 1.51 | 50 | 4 |
| EPRI1208-15-C | □ | | 1° 30′ | 8 | 1.62 | 50 | 4 |
| EPRI1210-15-C | □ | | 1° 30′ | 10 | 1.72 | 50 | 4 |
| EPRI1212-15-C | □ | | 1° 30′ | 12 | 1.83 | 50 | 4 |
| EPRI1216-15-C | □ | | 1° 30′ | 16 | 2.04 | 50 | 4 |
| EPRI1206-20-C | □ | | 2° | 6 | 1.62 | 50 | 4 |
| EPRI1208-20-C | □ | | 2° | 8 | 1.76 | 50 | 4 |
| EPRI1210-20-C | □ | | 2° | 10 | 1.9 | 50 | 4 |
| EPRI1212-20-C | □ | | 2° | 12 | 2.04 | 50 | 4 |
| EPRI1216-20-C | □ | | 2° | 16 | 2.32 | 50 | 4 |
| EPRI1210-30-C | □ | | 3° | 10 | 2.25 | 50 | 4 |
| EPRI1216-30-C | □ | | 3° | 16 | 2.88 | 50 | 4 |
| EPRI1508-05-C | □ | 1.5 | 30′ | 8 | 1.64 | 50 | 4 |
| EPRI1510-05-C | □ | | 30′ | 10 | 1.67 | 50 | 4 |
| EPRI1512-05-C | □ | | 30′ | 12 | 1.71 | 50 | 4 |

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|---|---|---|---|---|---|---|---|
| EPRI1516-05-C | □ | 1.5 | 30′ | 16 | 1.78 | 50 | 4 |
| EPRI1520-05-C | □ | | 30′ | 20 | 1.85 | 60 | 4 |
| EPRI1508-07-C | □ | | 45′ | 8 | 1.71 | 50 | 4 |
| EPRI1510-07-C | □ | | 45′ | 10 | 1.76 | 50 | 4 |
| EPRI1512-07-C | □ | | 45′ | 12 | 1.81 | 50 | 4 |
| EPRI1516-07-C | □ | | 45′ | 16 | 1.92 | 50 | 4 |
| EPRI1520-07-C | □ | | 45′ | 20 | 2.02 | 60 | 4 |
| EPRI1508-10-C | □ | | 1° | 8 | 1.78 | 50 | 4 |
| EPRI1510-10-C | □ | | 1° | 10 | 1.85 | 50 | 4 |
| EPRI1512-10-C | □ | | 1° | 12 | 1.92 | 50 | 4 |
| EPRI1516-10-C | □ | | 1° | 16 | 2.06 | 50 | 4 |
| EPRI1520-10-C | □ | | 1° | 20 | 2.2 | 60 | 4 |
| EPRI1508-15-C | □ | | 1° 30′ | 8 | 1.92 | 50 | 4 |
| EPRI1510-15-C | □ | | 1° 30′ | 10 | 2.02 | 50 | 4 |
| EPRI1512-15-C | □ | | 1° 30′ | 12 | 2.13 | 50 | 4 |
| EPRI1516-15-C | □ | | 1° 30′ | 16 | 2.34 | 50 | 4 |
| EPRI1520-15-C | □ | | 1° 30′ | 20 | 2.55 | 60 | 4 |
| EPRI1508-20-C | □ | | 2° | 8 | 2.06 | 50 | 4 |
| EPRI1510-20-C | □ | | 2° | 10 | 2.2 | 50 | 4 |
| EPRI1512-20-C | □ | | 2° | 12 | 2.34 | 50 | 4 |
| EPRI1516-20-C | □ | | 2° | 16 | 2.62 | 50 | 4 |
| EPRI1520-20-C | □ | | 2° | 20 | 2.9 | 60 | 4 |
| EPRI1512-30-C | □ | | 3° | 12 | 2.76 | 50 | 4 |
| EPRI1520-30-C | □ | | 3° | 20 | 3.6 | 60 | 4 |
| EPRI1608-05-C | □ | 1.6 | 30′ | 8 | 1.74 | 50 | 4 |
| EPRI1610-05-C | □ | | 30′ | 10 | 1.77 | 50 | 4 |
| EPRI1612-05-C | □ | | 30′ | 12 | 1.81 | 50 | 4 |
| EPRI1616-05-C | □ | | 30′ | 16 | 1.88 | 50 | 4 |
| EPRI1620-05-C | □ | | 30′ | 20 | 1.95 | 60 | 4 |
| EPRI1608-07-C | □ | | 45′ | 8 | 1.81 | 50 | 4 |
| EPRI1610-07-C | □ | | 45′ | 10 | 1.86 | 50 | 4 |
| EPRI1612-07-C | □ | | 45′ | 12 | 1.91 | 50 | 4 |
| EPRI1616-07-C | □ | | 45′ | 16 | 2.02 | 50 | 4 |
| EPRI1620-07-C | □ | | 45′ | 20 | 2.12 | 60 | 4 |
| EPRI1608-10-C | □ | | 1° | 8 | 1.88 | 50 | 4 |
| EPRI1610-10-C | □ | | 1° | 10 | 1.95 | 50 | 4 |
| EPRI1612-10-C | □ | | 1° | 12 | 2.02 | 50 | 4 |
| EPRI1616-10-C | □ | | 1° | 16 | 2.16 | 50 | 4 |
| EPRI1620-10-C | □ | | 1° | 20 | 2.3 | 60 | 4 |
| EPRI1608-15-C | □ | | 1° 30′ | 8 | 2.02 | 50 | 4 |
| EPRI1610-15-C | □ | | 1° 30′ | 10 | 2.12 | 50 | 4 |
| EPRI1612-15-C | □ | | 1° 30′ | 12 | 2.23 | 50 | 4 |
| EPRI1616-15-C | □ | | 1° 30′ | 16 | 2.44 | 50 | 4 |
| EPRI1620-15-C | □ | | 1° 30′ | 20 | 2.65 | 60 | 4 |
| EPRI1608-20-C | □ | | 2° | 8 | 2.16 | 50 | 4 |
| EPRI1610-20-C | □ | | 2° | 10 | 2.3 | 50 | 4 |
| EPRI1612-20-C | □ | | 2° | 12 | 2.44 | 50 | 4 |
| EPRI1616-20-C | □ | | 2° | 16 | 2.72 | 50 | 4 |
| EPRI1620-20-C | □ | | 2° | 20 | 3 | 60 | 4 |
| EPRI1612-30-C | □ | | 3° | 12 | 2.86 | 50 | 4 |
| EPRI1620-30-C | □ | | 3° | 20 | 3.7 | 60 | 4 |
| EPRI1808-05-C | □ | 1.8 | 30′ | 8 | 1.94 | 50 | 4 |
| EPRI1810-05-C | □ | | 30′ | 10 | 1.97 | 50 | 4 |
| EPRI1812-05-C | □ | | 30′ | 12 | 2.01 | 50 | 4 |
| EPRI1816-05-C | □ | | 30′ | 16 | 2.08 | 50 | 4 |
| EPRI1820-05-C | □ | | 30′ | 20 | 2.15 | 60 | 4 |
| EPRI1808-07-C | □ | | 45′ | 8 | 2.01 | 50 | 4 |
| EPRI1810-07-C | □ | | 45′ | 10 | 2.06 | 50 | 4 |
| EPRI1812-07-C | □ | | 45′ | 12 | 2.11 | 50 | 4 |
| EPRI1816-07-C | □ | | 45′ | 16 | 2.22 | 50 | 4 |
| EPRI1820-07-C | □ | | 45′ | 20 | 2.32 | 60 | 4 |
| EPRI1808-10-C | □ | | 1° | 8 | 2.08 | 50 | 4 |
| EPRI1810-10-C | □ | | 1° | 10 | 2.15 | 50 | 4 |

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# EPRI○○○○-○○-C

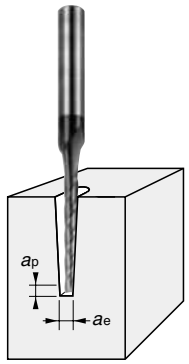
| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃部テーパ半角 Taper angle on side | 刃長 Flute length | 大端径 Large side dia. | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|---|---|
| EPRI1812-10-C | □ | 1.8 | 1° | 12 | 2.22 | 50 | 4 |
| EPRI1816-10-C | □ | | 1° | 16 | 2.36 | 50 | 4 |
| EPRI1820-10-C | □ | | 1° | 20 | 2.5 | 60 | 4 |
| EPRI1808-15-C | □ | | 1° 30′ | 8 | 2.22 | 50 | 4 |
| EPRI1810-15-C | □ | | 1° 30′ | 10 | 2.32 | 50 | 4 |
| EPRI1812-15-C | □ | | 1° 30′ | 12 | 2.43 | 50 | 4 |
| EPRI1816-15-C | □ | | 1° 30′ | 16 | 2.64 | 50 | 4 |
| EPRI1820-15-C | □ | | 1° 30′ | 20 | 2.85 | 60 | 4 |
| EPRI1808-20-C | □ | | 2° | 8 | 2.36 | 50 | 4 |
| EPRI1810-20-C | □ | | 2° | 10 | 2.5 | 50 | 4 |
| EPRI1812-20-C | □ | | 2° | 12 | 2.64 | 50 | 4 |
| EPRI1816-20-C | □ | | 2° | 16 | 2.92 | 50 | 4 |
| EPRI1820-20-C | □ | | 2° | 20 | 3.2 | 60 | 4 |
| EPRI1812-30-C | □ | | 3° | 12 | 3.06 | 50 | 4 |
| EPRI1820-30-C | □ | | 3° | 20 | 3.9 | 60 | 4 |
| EPRI2010-05-C | □ | 2 | 30′ | 10 | 2.17 | 50 | 4 |
| EPRI2012-05-C | □ | | 30′ | 12 | 2.21 | 50 | 4 |
| EPRI2016-05-C | □ | | 30′ | 16 | 2.28 | 50 | 4 |
| EPRI2020-05-C | □ | | 30′ | 20 | 2.35 | 60 | 4 |
| EPRI2025-05-C | □ | | 30′ | 25 | 2.44 | 60 | 4 |
| EPRI2010-07-C | □ | | 45′ | 10 | 2.26 | 50 | 4 |
| EPRI2012-07-C | □ | | 45′ | 12 | 2.31 | 50 | 4 |
| EPRI2016-07-C | □ | | 45′ | 16 | 2.42 | 50 | 4 |
| EPRI2020-07-C | □ | | 45′ | 20 | 2.52 | 60 | 4 |
| EPRI2025-07-C | □ | | 45′ | 25 | 2.65 | 60 | 4 |
| EPRI2010-10-C | □ | | 1° | 10 | 2.35 | 50 | 4 |
| EPRI2012-10-C | □ | | 1° | 12 | 2.42 | 50 | 4 |
| EPRI2016-10-C | □ | | 1° | 16 | 2.56 | 50 | 4 |
| EPRI2020-10-C | □ | | 1° | 20 | 2.7 | 60 | 4 |
| EPRI2025-10-C | □ | | 1° | 25 | 2.87 | 60 | 4 |
| EPRI2010-15-C | □ | | 1° 30′ | 10 | 2.52 | 50 | 4 |

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃部テーパ半角 Taper angle on side | 刃長 Flute length | 大端径 Large side dia. | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|---|---|
| EPRI2012-15-C | □ | 2 | 1° 30′ | 12 | 2.63 | 50 | 4 |
| EPRI2016-15-C | □ | | 1° 30′ | 16 | 2.84 | 50 | 4 |
| EPRI2020-15-C | □ | | 1° 30′ | 20 | 3.05 | 60 | 4 |
| EPRI2025-15-C | □ | | 1° 30′ | 25 | 3.31 | 60 | 4 |
| EPRI2010-20-C | □ | | 2° | 10 | 2.7 | 50 | 4 |
| EPRI2012-20-C | □ | | 2° | 12 | 2.87 | 50 | 4 |
| EPRI2016-20-C | □ | | 2° | 16 | 3.12 | 50 | 4 |
| EPRI2020-20-C | □ | | 2° | 20 | 3.4 | 60 | 4 |
| EPRI2025-20-C | □ | | 2° | 25 | 3.75 | 60 | 4 |
| EPRI2016-30-C | □ | | 3° | 16 | 3.68 | 50 | 4 |
| EPRI2025-30-C | □ | | 3° | 25 | 4.62 | 60 | 6 |
| EPRI2510-05-C | □ | 2.5 | 30′ | 10 | 2.67 | 50 | 4 |
| EPRI2512-05-C | □ | | 30′ | 12 | 2.71 | 50 | 4 |
| EPRI2516-05-C | □ | | 30′ | 16 | 2.78 | 50 | 4 |
| EPRI2520-05-C | □ | | 30′ | 20 | 2.85 | 60 | 6 |
| EPRI2525-05-C | □ | | 30′ | 25 | 2.94 | 60 | 6 |
| EPRI2530-05-C | □ | | 30′ | 30 | 3.02 | 75 | 6 |
| EPRI2510-07-C | □ | | 45′ | 10 | 2.76 | 50 | 4 |
| EPRI2512-07-C | □ | | 45′ | 12 | 2.81 | 50 | 4 |
| EPRI2516-07-C | □ | | 45′ | 16 | 2.92 | 50 | 4 |
| EPRI2520-07-C | □ | | 45′ | 20 | 3.02 | 60 | 6 |
| EPRI2525-07-C | □ | | 45′ | 25 | 3.15 | 60 | 6 |
| EPRI2530-07-C | □ | | 45′ | 30 | 3.29 | 75 | 6 |
| EPRI2510-10-C | □ | | 1° | 10 | 2.85 | 50 | 4 |
| EPRI2512-10-C | □ | | 1° | 12 | 2.92 | 50 | 4 |
| EPRI2516-10-C | □ | | 1° | 16 | 3.06 | 50 | 4 |
| EPRI2520-10-C | □ | | 1° | 20 | 3.2 | 60 | 6 |
| EPRI2525-10-C | □ | | 1° | 25 | 3.37 | 60 | 6 |
| EPRI2530-10-C | □ | | 1° | 30 | 3.55 | 75 | 6 |
| EPRI2510-15-C | □ | | 1° 30′ | 10 | 3.02 | 50 | 4 |

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃部テーパ半角 Taper angle on side | 刃長 Flute length | 大端径 Large side dia. | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|---|---|
| EPRI2512-15-C | □ | 2.5 | 1° 30′ | 12 | 3.13 | 50 | 4 |
| EPRI2516-15-C | □ | | 1° 30′ | 16 | 3.34 | 50 | 4 |
| EPRI2520-15-C | □ | | 1° 30′ | 20 | 3.55 | 60 | 6 |
| EPRI2525-15-C | □ | | 1° 30′ | 25 | 3.81 | 60 | 6 |
| EPRI2530-15-C | □ | | 1° 30′ | 30 | 4.12 | 75 | 6 |
| EPRI2510-20-C | □ | | 2° | 10 | 3.2 | 50 | 4 |
| EPRI2512-20-C | □ | | 2° | 12 | 3.34 | 50 | 4 |
| EPRI2516-20-C | □ | | 2° | 16 | 3.62 | 50 | 4 |
| EPRI2520-20-C | □ | | 2° | 20 | 3.9 | 60 | 6 |
| EPRI2525-20-C | □ | | 2° | 25 | 4.25 | 60 | 6 |
| EPRI2530-20-C | □ | | 2° | 30 | 4.6 | 75 | 6 |
| EPRI2520-30-C | □ | | 3° | 20 | 4.6 | 60 | 6 |
| EPRI2525-30-C | □ | | 3° | 25 | 5.12 | 60 | 6 |
| EPRI2530-30-C | □ | | 3° | 30 | 5.64 | 75 | 6 |
| EPRI3025-05-C | □ | 3 | 30′ | 25 | 3.44 | 60 | 6 |
| EPRI3030-05-C | □ | | 30′ | 30 | 3.52 | 75 | 6 |
| EPRI3040-05-C | □ | | 30′ | 40 | 3.7 | 75 | 6 |
| EPRI3025-07-C | □ | | 45′ | 25 | 3.65 | 60 | 6 |
| EPRI3040-07-C | □ | | 45′ | 40 | 4.05 | 75 | 6 |
| EPRI3020-10-C | □ | | 1° | 20 | 3.7 | 60 | 6 |
| EPRI3025-10-C | □ | | 1° | 25 | 3.87 | 60 | 6 |
| EPRI3030-10-C | □ | | 1° | 30 | 4.05 | 75 | 6 |
| EPRI3040-10-C | □ | | 1° | 40 | 4.4 | 75 | 6 |
| EPRI3025-15-C | □ | | 1° 30′ | 25 | 4.31 | 60 | 6 |
| EPRI3040-15-C | □ | | 1° 30′ | 40 | 5.09 | 75 | 6 |
| EPRI3025-20-C | □ | | 2° | 25 | 4.75 | 60 | 6 |
| EPRI3030-20-C | □ | | 2° | 30 | 5.1 | 75 | 6 |
| EPRI3040-20-C | □ | | 2° | 40 | 5.79 | 75 | 6 |
| EPRI3025-30-C | □ | | 3° | 25 | 5.62 | 60 | 6 |
| EPRI3040-30-C | □ | | 3° | 40 | 7.19 | 80 | 8 |

## 標準切削条件表 Recommended cutting conditions EPRI-C

| 切削条件 Cutting conditions / 外径DC Tool dia. mm | 切込み($a_p$) Depth of cut mm/pass | 切削速度($v_c$)50～75m/min 回転数($n$) min$^{-1}$ | 送り速度($v_f$) mm/min |
|---|---|---|---|
| 0.5 | 0.01～0.02 | 30,000～32,000 | 400～ 600 |
| 0.6 | 0.01～0.02 | 26,000～30,000 | 400～ 800 |
| 0.7 | 0.01～0.03 | 23,000～30,000 | 400～ 800 |
| 0.8 | 0.01～0.03 | 20,000～30,000 | 400～1,000 |
| 0.9 | 0.02～0.04 | 18,000～27,000 | 400～1,000 |
| 1.0 | 0.03～0.05 | 16,000～24,000 | 400～1,200 |
| 1.2 | 0.03～0.06 | 13,000～20,000 | 400～1,200 |
| 1.5 | 0.03～0.08 | 10,000～16,000 | 400～1,200 |
| 1.6 | 0.04～0.10 | 10,000～15,000 | 400～1,200 |
| 1.8 | 0.04～0.12 | 9,000～13,000 | 400～1,200 |
| 2.0 | 0.05～0.15 | 8,000～12,000 | 400～1,200 |
| 2.5 | 0.07～0.20 | 6,500～ 9,500 | 400～1,200 |
| 3.0 | 0.09～0.25 | 5,500～ 8,000 | 400～1,200 |




$a_e$＝DC
$a_p$＝表参照

【注意】①溝深さの浅い場合は刃長の短いエンドミルをご使用ください。
②コーナ部の加工は送り速度を約1/2に、軸方向送りは1/5以下を目安にしてください。
③この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④切削油（できるだけ油性切削油）をご使用ください。

【Note】① Use short length for shallow slots.
② Reduce the feed speed at the table to 50% at the corner and 1/5 at plunging.
③ These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions.
In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
④ Oil base coolant is recommended.

## 対応被削材 Applicable work material

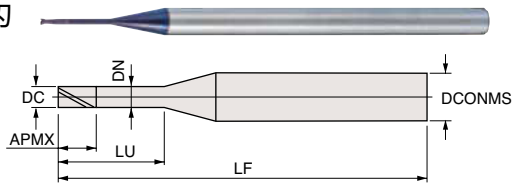
| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ |

# C Coating Carbide End Mills "RIB-CUT"
# 超硬Cコートエンドミル”リブカット”

側面 Side Cutting　溝 Slotting　細部 Miniature　仕上 Finishing　リブ・細部 Rib Miniature

外径公差 Dia.tolerance　0～−0.02　h5　(mm)

2枚刃
2Flutes




## DES2○○○-○○.○-C

超硬 Carbide　C　ねじれ30° Helix angle　切削条件表 A452 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 首径 Neck dia. DN | 首下長 Under neck length LU | 全長 Overall length LF | シャンク径 Shank dia. DCONMS |
|---|---|---|---|---|---|---|---|
| DES2005-4-C | □ | 0.5 | 0.8 | 0.48 | 2 | 55 | 4 |
| DES2005-7-C | □ | | 0.8 | 0.48 | 3.5 | 55 | 4 |
| DES2005-10-C | □ | | 0.8 | 0.48 | 5 | 55 | 4 |
| DES2006-4-C | □ | 0.6 | 1 | 0.58 | 2.4 | 55 | 4 |
| DES2006-7-C | □ | | 1 | 0.58 | 4.2 | 55 | 4 |
| DES2006-10-C | □ | | 1 | 0.58 | 6 | 55 | 4 |
| DES2007-4-C | □ | 0.7 | 1.1 | 0.67 | 2.8 | 55 | 4 |
| DES2007-7-C | □ | | 1.1 | 0.67 | 4.9 | 55 | 4 |
| DES2007-10-C | □ | | 1.1 | 0.67 | 7 | 55 | 4 |
| DES2008-5-C | □ | 0.8 | 1.3 | 0.77 | 4 | 55 | 4 |
| DES2008-6-C | □ | | 1.3 | 0.77 | 4.8 | 55 | 4 |
| DES2008-7-C | □ | | 1.3 | 0.77 | 5.6 | 55 | 4 |
| DES2008-8.5-C | □ | | 1.3 | 0.77 | 6.8 | 65 | 4 |
| DES2008-10-C | □ | | 1.3 | 0.77 | 8 | 65 | 4 |
| DES2009-7-C | □ | 0.9 | 1.4 | 0.86 | 6.3 | 55 | 4 |
| DES2009-8.5-C | □ | | 1.4 | 0.86 | 7.7 | 55 | 4 |
| DES2009-10-C | □ | | 1.4 | 0.86 | 9 | 55 | 4 |
| DES2010-5-C | □ | 1 | 1.6 | 0.95 | 5 | 55 | 4 |
| DES2010-6-C | □ | | 1.6 | 0.95 | 6 | 55 | 4 |
| DES2010-7-C | □ | | 1.6 | 0.95 | 7 | 55 | 4 |
| DES2010-8.5-C | □ | | 1.6 | 0.95 | 8.5 | 65 | 4 |
| DES2010-10-C | □ | | 1.6 | 0.95 | 10 | 65 | 4 |
| DES2012-5-C | □ | 1.2 | 1.9 | 1.15 | 6 | 55 | 4 |
| DES2012-6-C | □ | | 1.9 | 1.15 | 7.2 | 55 | 4 |
| DES2012-7-C | □ | | 1.9 | 1.15 | 8.4 | 55 | 4 |
| DES2012-8.5-C | □ | | 1.9 | 1.15 | 10.2 | 65 | 4 |
| DES2012-10-C | □ | | 1.9 | 1.15 | 12 | 65 | 4 |
| DES2014-5-C | □ | 1.4 | 2.2 | 1.34 | 7 | 55 | 4 |
| DES2014-6-C | □ | | 2.2 | 1.34 | 8.4 | 55 | 4 |

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 首径 Neck dia. DN | 首下長 Under neck length LU | 全長 Overall length LF | シャンク径 Shank dia. DCONMS |
|---|---|---|---|---|---|---|---|
| DES2014-7-C | □ | 1.4 | 2.2 | 1.34 | 9.8 | 55 | 4 |
| DES2014-8.5-C | □ | | 2.2 | 1.34 | 11.9 | 65 | 4 |
| DES2014-10-C | □ | | 2.2 | 1.34 | 14 | 65 | 4 |
| DES2015-5-C | □ | 1.5 | 2.4 | 1.44 | 7.5 | 55 | 4 |
| DES2015-6-C | □ | | 2.4 | 1.44 | 9 | 55 | 4 |
| DES2015-7-C | □ | | 2.4 | 1.44 | 10.5 | 55 | 4 |
| DES2015-8.5-C | □ | | 2.4 | 1.44 | 12.75 | 65 | 4 |
| DES2015-10-C | □ | | 2.4 | 1.44 | 15 | 65 | 4 |
| DES2016-5-C | □ | 1.6 | 2.6 | 1.54 | 8 | 55 | 4 |
| DES2016-6-C | □ | | 2.6 | 1.54 | 9.6 | 55 | 4 |
| DES2016-7-C | □ | | 2.6 | 1.54 | 11.2 | 55 | 4 |
| DES2016-8.5-C | □ | | 2.6 | 1.54 | 13.6 | 65 | 4 |
| DES2016-10-C | □ | | 2.6 | 1.54 | 16 | 65 | 4 |
| DES2018-5-C | □ | 1.8 | 2.9 | 1.73 | 9 | 55 | 4 |
| DES2018-6-C | □ | | 2.9 | 1.73 | 10.8 | 55 | 4 |
| DES2018-7-C | □ | | 2.9 | 1.73 | 12.6 | 55 | 4 |
| DES2018-8.5-C | □ | | 2.9 | 1.73 | 15.3 | 65 | 4 |
| DES2018-10-C | □ | | 2.9 | 1.73 | 18 | 65 | 4 |
| DES2020-3-C | □ | 2 | 3.2 | 1.92 | 6 | 55 | 4 |
| DES2020-4-C | □ | | 3.2 | 1.92 | 8 | 55 | 4 |
| DES2020-5-C | □ | | 3.2 | 1.92 | 10 | 55 | 4 |
| DES2020-6-C | □ | | 3.2 | 1.92 | 12 | 55 | 4 |
| DES2020-7-C | □ | | 3.2 | 1.92 | 14 | 55 | 4 |
| DES2020-8.5-C | □ | | 3.2 | 1.92 | 17 | 65 | 4 |
| DES2020-10-C | □ | | 3.2 | 1.92 | 20 | 65 | 4 |
| DES2025-3-C | □ | 2.5 | 4 | 2.40 | 7.5 | 55 | 4 |
| DES2025-5-C | □ | | 4 | 2.40 | 12.5 | 55 | 4 |
| DES2025-6-C | □ | | 4 | 2.40 | 15 | 55 | 4 |
| DES2025-7-C | □ | | 4 | 2.40 | 17.5 | 55 | 4 |

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 首径 Neck dia. DN | 首下長 Under neck length LU | 全長 Overall length LF | シャンク径 Shank dia. DCONMS |
|---|---|---|---|---|---|---|---|
| DES2025-8.5-C | □ | 2.5 | 4 | 2.40 | 21.3 | 55 | 4 |
| DES2030-3-C | □ | 3 | 4.8 | 2.88 | 9 | 80 | 6 |
| DES2030-4-C | □ | | 4.8 | 2.88 | 12 | 80 | 6 |
| DES2030-5-C | □ | | 4.8 | 2.88 | 15 | 80 | 6 |
| DES2030-6-C | □ | | 4.8 | 2.88 | 18 | 80 | 6 |
| DES2030-7-C | □ | | 4.8 | 2.88 | 21 | 80 | 6 |
| DES2030-8.5-C | □ | | 4.8 | 2.88 | 25.5 | 80 | 6 |
| DES2035-3-C | □ | 3.5 | 5.6 | 3.36 | 10.5 | 80 | 6 |
| DES2035-5-C | □ | | 5.6 | 3.36 | 17.5 | 80 | 6 |
| DES2035-6-C | □ | | 5.6 | 3.36 | 21 | 80 | 6 |
| DES2035-7-C | □ | | 5.6 | 3.36 | 24.5 | 80 | 6 |
| DES2035-8.5-C | □ | | 5.6 | 3.36 | 29.8 | 80 | 6 |
| DES2040-3-C | □ | 4 | 6.4 | 3.84 | 12 | 80 | 6 |
| DES2040-4-C | □ | | 6.4 | 3.84 | 16 | 80 | 6 |
| DES2040-5-C | □ | | 6.4 | 3.84 | 20 | 80 | 6 |
| DES2040-6-C | □ | | 6.4 | 3.84 | 24 | 80 | 6 |
| DES2040-7-C | □ | | 6.4 | 3.84 | 28 | 80 | 6 |
| DES2040-8.5-C | □ | | 6.4 | 3.84 | 34 | 80 | 6 |
| DES2045-7-C | □ | 4.5 | 7.2 | 4.32 | 31.5 | 80 | 6 |
| DES2050-3-C | □ | 5 | 8 | 4.80 | 15 | 80 | 6 |
| DES2050-4-C | □ | | 8 | 4.80 | 20 | 90 | 6 |
| DES2050-5-C | □ | | 8 | 4.80 | 25 | 90 | 6 |
| DES2050-6-C | □ | | 8 | 4.80 | 30 | 90 | 6 |
| DES2050-7-C | □ | | 8 | 4.80 | 35 | 90 | 6 |
| DES2050-8.5-C | □ | | 8 | 4.80 | 42.5 | 90 | 6 |
| DES2055-7-C | □ | 5.5 | 8.8 | 5.28 | 38.5 | 90 | 6 |
| DES2060-7-C | □ | 6 | 9.6 | 5.76 | 42 | 90 | 6 |

## 標準切削条件表 Recommended cutting conditions　DES-C

＜溝切削＞ Slotting　被削材：一般構造用炭素鋼、合金鋼 Carbon steels, Alloy steels

| 切削条件 Cutting conditions / 外径DC (mm) | 切込み ($a_p$) Depth of cut mm/pass | 切削速度($v_c$) 30～50m/min 回転数 ($n$) min$^{-1}$ | 送り速度 ($v_f$) mm/min |
|---|---|---|---|
| 0.6 | 0.01 ～ 0.02 | 16,000 ～ 26,000 | 150 ～ 300 |
| 0.8 | 0.03 ～ 0.05 | 12,000 ～ 20,000 | 150 ～ 300 |
| 1.0 | 0.05 ～ 0.08 | 9,500 ～ 16,000 | 150 ～ 300 |
| 1.2 | 0.06 ～ 0.10 | 8,000 ～ 13,000 | 150 ～ 300 |
| 1.4 | 0.07 ～ 0.12 | 7,000 ～ 11,000 | 150 ～ 300 |
| 1.5 | 0.08 ～ 0.12 | 6,500 ～ 10,000 | 150 ～ 300 |
| 1.6 | 0.10 ～ 0.15 | 6,000 ～ 10,000 | 150 ～ 300 |
| 1.8 | 0.15 ～ 0.20 | 5,000 ～ 9,000 | 150 ～ 300 |
| 2.0 | 0.15 ～ 0.30 | 5,000 ～ 8,000 | 150 ～ 300 |

【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。

【Note】① Use the appropriate coolant for the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ |

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# C Coating Carbide End Mills "RIB STAR"
# 超硬Cコートエンドミル”リブスター”

テーパ Taper　細部 Miniature　仕上 Finishing　リブ・細部 Rib Miniature

外径公差 Dia.tolerance　0～−0.05　h5　(mm)

6枚刃 6Flutes

片角公差： 0 / − 15′ Tolerance on angle

## RIB6○○○○-○○-C

超硬 Carbide　C　なしれ 10°(左) Helix angle (Left)　切削条件表 A454 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃部テーパ半角 Taper angle on side | 刃長 Flute length | 大端径 Large edge dia. | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|---|---|
| RIB60504-05-C | □ | 0.5 | 30′ | 4 | 0.57 | 45 | 4 |
| RIB60504-10-C | □ | | 1° | 4 | 0.64 | 45 | 4 |
| RIB60504-15-C | □ | | 1° 30′ | 4 | 0.71 | 45 | 4 |
| RIB60504-20-C | □ | | 2° | 4 | 0.78 | 45 | 4 |
| RIB60504-30-C | □ | | 3° | 4 | 0.92 | 45 | 4 |
| RIB60604-05-C | □ | 0.6 | 30′ | 4 | 0.67 | 45 | 4 |
| RIB60604-10-C | □ | | 1° | 4 | 0.74 | 45 | 4 |
| RIB60604-15-C | □ | | 1° 30′ | 4 | 0.81 | 45 | 4 |
| RIB60604-20-C | □ | | 2° | 4 | 0.88 | 45 | 4 |
| RIB60604-30-C | □ | | 3° | 4 | 1.02 | 45 | 4 |
| RIB60706-05-C | □ | 0.7 | 30′ | 6 | 0.80 | 45 | 4 |
| RIB60706-10-C | □ | | 1° | 6 | 0.91 | 45 | 4 |
| RIB60706-15-C | □ | | 1° 30′ | 6 | 1.01 | 45 | 4 |
| RIB60706-20-C | □ | | 2° | 6 | 1.12 | 45 | 4 |
| RIB60706-30-C | □ | | 3° | 6 | 1.33 | 45 | 4 |
| RIB60804-02-C | □ | 0.8 | 15′ | 4 | 0.83 | 45 | 4 |
| RIB60806-05-C | □ | | 30′ | 6 | 0.90 | 45 | 4 |
| RIB60810-05-C | □ | | 30′ | 10 | 0.97 | 45 | 4 |
| RIB60806-10-C | □ | | 1° | 6 | 1.01 | 45 | 4 |
| RIB60810-10-C | □ | | 1° | 10 | 1.15 | 45 | 4 |
| RIB60806-15-C | □ | | 1° 30′ | 6 | 1.11 | 45 | 4 |
| RIB60810-15-C | □ | | 1° 30′ | 10 | 1.32 | 45 | 4 |
| RIB60806-20-C | □ | | 2° | 6 | 1.22 | 45 | 4 |
| RIB60810-20-C | □ | | 2° | 10 | 1.50 | 45 | 4 |
| RIB60806-30-C | □ | | 3° | 6 | 1.43 | 45 | 4 |
| RIB60810-30-C | □ | | 3° | 10 | 1.85 | 45 | 4 |
| RIB60908-05-C | □ | 0.9 | 30′ | 8 | 1.04 | 45 | 4 |
| RIB60908-10-C | □ | | 1° | 8 | 1.18 | 45 | 4 |
| RIB60908-15-C | □ | | 1° 30′ | 8 | 1.32 | 45 | 4 |
| RIB60908-20-C | □ | | 2° | 8 | 1.46 | 45 | 4 |
| RIB60908-30-C | □ | | 3° | 8 | 1.74 | 45 | 4 |
| RIB61005-02-C | □ | 1 | 15′ | 5 | 1.04 | 45 | 4 |
| RIB61005-05-C | □ | | 30′ | 5 | 1.09 | 45 | 4 |
| RIB61008-05-C | □ | | 30′ | 8 | 1.14 | 45 | 4 |
| RIB61012-05-C | □ | | 30′ | 12 | 1.21 | 45 | 4 |
| RIB61005-10-C | □ | | 1° | 5 | 1.17 | 45 | 4 |
| RIB61008-10-C | □ | | 1° | 8 | 1.28 | 45 | 4 |
| RIB61012-10-C | □ | | 1° | 12 | 1.42 | 45 | 4 |
| RIB61005-15-C | □ | | 1° 30′ | 5 | 1.26 | 45 | 4 |
| RIB61008-15-C | □ | | 1° 30′ | 8 | 1.42 | 45 | 4 |
| RIB61012-15-C | □ | | 1° 30′ | 12 | 1.63 | 45 | 4 |
| RIB61005-20-C | □ | | 2° | 5 | 1.35 | 45 | 4 |
| RIB61008-20-C | □ | | 2° | 8 | 1.56 | 45 | 4 |
| RIB61012-20-C | □ | | 2° | 12 | 1.84 | 45 | 4 |
| RIB61005-30-C | □ | | 3° | 5 | 1.52 | 45 | 4 |
| RIB61008-30-C | □ | | 3° | 8 | 1.84 | 45 | 4 |
| RIB61012-30-C | □ | | 3° | 12 | 2.26 | 45 | 4 |

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃部テーパ半角 Taper angle on side | 刃長 Flute length | 大端径 Large edge dia. | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|---|---|
| RIB61110-05-C | □ | 1.1 | 30′ | 10 | 1.27 | 45 | 4 |
| RIB61110-10-C | □ | | 1° | 10 | 1.45 | 45 | 4 |
| RIB61110-15-C | □ | | 1° 30′ | 10 | 1.62 | 45 | 4 |
| RIB61110-20-C | □ | | 2° | 10 | 1.80 | 45 | 4 |
| RIB61110-30-C | □ | | 3° | 10 | 2.15 | 45 | 4 |
| RIB61206-02-C | □ | 1.2 | 15′ | 6 | 1.25 | 45 | 4 |
| RIB61206-05-C | □ | | 30′ | 6 | 1.30 | 45 | 4 |
| RIB61210-05-C | □ | | 30′ | 10 | 1.37 | 45 | 4 |
| RIB61216-05-C | □ | | 30′ | 16 | 1.48 | 45 | 4 |
| RIB61206-10-C | □ | | 1° | 6 | 1.41 | 45 | 4 |
| RIB61210-10-C | □ | | 1° | 10 | 1.55 | 45 | 4 |
| RIB61216-10-C | □ | | 1° | 16 | 1.76 | 45 | 4 |
| RIB61206-15-C | □ | | 1° 30′ | 6 | 1.51 | 45 | 4 |
| RIB61210-15-C | □ | | 1° 30′ | 10 | 1.72 | 45 | 4 |
| RIB61216-15-C | □ | | 1° 30′ | 16 | 2.04 | 45 | 4 |
| RIB61206-20-C | □ | | 2° | 6 | 1.62 | 45 | 4 |
| RIB61210-20-C | □ | | 2° | 10 | 1.90 | 45 | 4 |
| RIB61216-20-C | □ | | 2° | 16 | 2.32 | 45 | 4 |
| RIB61206-30-C | □ | | 3° | 6 | 1.83 | 45 | 4 |
| RIB61210-30-C | □ | | 3° | 10 | 2.25 | 45 | 4 |
| RIB61216-30-C | □ | | 3° | 16 | 2.88 | 45 | 4 |
| RIB61312-05-C | □ | 1.3 | 30′ | 12 | 1.51 | 45 | 4 |
| RIB61312-10-C | □ | | 1° | 12 | 1.72 | 45 | 4 |
| RIB61312-15-C | □ | | 1° 30′ | 12 | 1.93 | 45 | 4 |
| RIB61312-20-C | □ | | 2° | 12 | 2.14 | 45 | 4 |
| RIB61312-30-C | □ | | 3° | 12 | 2.56 | 45 | 4 |
| RIB61412-05-C | □ | 1.4 | 30′ | 12 | 1.61 | 45 | 4 |
| RIB61412-10-C | □ | | 1° | 12 | 1.82 | 45 | 4 |
| RIB61412-15-C | □ | | 1° 30′ | 12 | 2.03 | 45 | 4 |
| RIB61412-20-C | □ | | 2° | 12 | 2.24 | 45 | 4 |
| RIB61412-30-C | □ | | 3° | 12 | 2.66 | 45 | 4 |
| RIB61508-02-C | □ | 1.5 | 15′ | 8 | 1.57 | 45 | 4 |
| RIB61508-05-C | □ | | 30′ | 8 | 1.64 | 45 | 4 |
| RIB61508-10-C | □ | | 1° | 8 | 1.78 | 45 | 4 |
| RIB61508-15-C | □ | | 1° 30′ | 8 | 1.92 | 45 | 4 |
| RIB61508-20-C | □ | | 2° | 8 | 2.06 | 45 | 4 |
| RIB61508-30-C | □ | | 3° | 8 | 2.34 | 45 | 4 |
| RIB61512-05-C | □ | | 30′ | 12 | 1.71 | 45 | 4 |
| RIB61512-10-C | □ | | 1° | 12 | 1.92 | 45 | 4 |
| RIB61512-15-C | □ | | 1° 30′ | 12 | 2.13 | 45 | 4 |
| RIB61512-20-C | □ | | 2° | 12 | 2.34 | 45 | 4 |
| RIB61512-30-C | □ | | 3° | 12 | 2.76 | 45 | 4 |
| RIB61520-05-C | □ | | 30′ | 20 | 1.85 | 50 | 4 |
| RIB61520-10-C | □ | | 1° | 20 | 2.20 | 50 | 4 |
| RIB61520-15-C | □ | | 1° 30′ | 20 | 2.55 | 50 | 4 |
| RIB61520-20-C | □ | | 2° | 20 | 2.90 | 50 | 4 |
| RIB61520-30-C | □ | | 3° | 20 | 3.60 | 50 | 4 |

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# C Coating Carbide End Mills "RIB STAR"
# 超硬Cコートエンドミル”リブスター”

## RIB6○○○○-○○-C

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃部テーパ半角 Taper angle on side | 刃長 Flute length | 大端径 Large edge dia. | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|---|---|
| RIB61616-05-C | □ | 1.6 | 30′ | 16 | 1.88 | 50 | 4 |
| RIB61616-10-C | □ | | 1° | 16 | 2.16 | 50 | 4 |
| RIB61616-15-C | □ | | 1° 30′ | 16 | 2.44 | 50 | 4 |
| RIB61616-20-C | □ | | 2° | 16 | 2.72 | 50 | 4 |
| RIB61616-30-C | □ | | 3° | 16 | 3.28 | 50 | 4 |
| RIB61716-05-C | □ | 1.7 | 30′ | 16 | 1.98 | 50 | 4 |
| RIB61716-10-C | □ | | 1° | 16 | 2.26 | 50 | 4 |
| RIB61716-15-C | □ | | 1° 30′ | 16 | 2.54 | 50 | 4 |
| RIB61716-20-C | □ | | 2° | 16 | 2.82 | 50 | 4 |
| RIB61716-30-C | □ | | 3° | 16 | 3.38 | 50 | 4 |
| RIB61810-02-C | □ | 1.8 | 15′ | 10 | 1.89 | 50 | 4 |
| RIB61810-05-C | □ | | 30′ | 10 | 1.97 | 50 | 4 |
| RIB61816-05-C | □ | | 30′ | 16 | 2.08 | 50 | 4 |
| RIB61820-05-C | □ | | 30′ | 20 | 2.15 | 50 | 4 |
| RIB61810-10-C | □ | | 1° | 10 | 2.15 | 50 | 4 |
| RIB61816-10-C | □ | | 1° | 16 | 2.36 | 50 | 4 |
| RIB61820-10-C | □ | | 1° | 20 | 2.50 | 50 | 4 |
| RIB61810-15-C | □ | | 1° 30′ | 10 | 2.32 | 50 | 4 |
| RIB61816-15-C | □ | | 1° 30′ | 16 | 2.64 | 50 | 4 |
| RIB61820-15-C | □ | | 1° 30′ | 20 | 2.85 | 50 | 4 |
| RIB61810-20-C | □ | | 2° | 10 | 2.50 | 50 | 4 |
| RIB61816-20-C | □ | | 2° | 16 | 2.92 | 50 | 4 |
| RIB61820-20-C | □ | | 2° | 20 | 3.20 | 50 | 4 |
| RIB61810-30-C | □ | | 3° | 10 | 2.85 | 50 | 4 |
| RIB61816-30-C | □ | | 3° | 16 | 3.48 | 50 | 4 |
| RIB61820-30-C | □ | | 3° | 20 | 3.90 | 50 | 4 |
| RIB61920-05-C | □ | 1.9 | 30′ | 20 | 2.25 | 50 | 4 |
| RIB61920-10-C | □ | | 1° | 20 | 2.60 | 50 | 4 |
| RIB61920-15-C | □ | | 1° 30′ | 20 | 2.95 | 50 | 4 |
| RIB61920-20-C | □ | | 2° | 20 | 3.30 | 50 | 4 |
| RIB61920-30-C | □ | | 3° | 20 | 4.00 | 50 | 4 |
| RIB62012-02-C | □ | 2 | 15′ | 12 | 2.10 | 50 | 4 |
| RIB62012-05-C | □ | | 30′ | 12 | 2.21 | 50 | 4 |

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃部テーパ半角 Taper angle on side | 刃長 Flute length | 大端径 Large edge dia. | 全長 Overall length | シャンク径 Shank dia. |
|---|---|---|---|---|---|---|---|
| RIB62020-05-C | □ | 2 | 30′ | 20 | 2.35 | 50 | 4 |
| RIB62025-05-C | □ | | 30′ | 25 | 2.44 | 50 | 4 |
| RIB62012-10-C | □ | | 1° | 12 | 2.42 | 50 | 4 |
| RIB62020-10-C | □ | | 1° | 20 | 2.70 | 50 | 4 |
| RIB62025-10-C | □ | | 1° | 25 | 2.87 | 50 | 4 |
| RIB62012-15-C | □ | | 1° 30′ | 12 | 2.63 | 50 | 4 |
| RIB62020-15-C | □ | | 1° 30′ | 20 | 3.05 | 50 | 4 |
| RIB62025-15-C | □ | | 1° 30′ | 25 | 3.31 | 50 | 4 |
| RIB62012-20-C | □ | | 2° | 12 | 2.84 | 50 | 4 |
| RIB62020-20-C | □ | | 2° | 20 | 3.40 | 50 | 4 |
| RIB62025-20-C | □ | | 2° | 25 | 3.75 | 50 | 4 |
| RIB62012-30-C | □ | | 3° | 12 | 3.26 | 50 | 4 |
| RIB62020-30-C | □ | | 3° | 20 | 4.10 | 70 | 6 |
| RIB62025-30-C | □ | | 3° | 25 | 4.62 | 70 | 6 |
| RIB62520-05-C | □ | 2.5 | 30′ | 20 | 2.85 | 70 | 6 |
| RIB62530-05-C | □ | | 30′ | 30 | 3.02 | 70 | 6 |
| RIB62520-10-C | □ | | 1° | 20 | 3.20 | 70 | 6 |
| RIB62530-10-C | □ | | 1° | 30 | 3.55 | 70 | 6 |
| RIB62520-15-C | □ | | 1° 30′ | 20 | 3.55 | 70 | 6 |
| RIB62530-15-C | □ | | 1° 30′ | 30 | 4.07 | 70 | 6 |
| RIB62520-20-C | □ | | 2° | 20 | 3.90 | 70 | 6 |
| RIB62530-20-C | □ | | 2° | 30 | 4.60 | 70 | 6 |
| RIB62520-30-C | □ | | 3° | 20 | 4.60 | 70 | 6 |
| RIB62530-30-C | □ | | 3° | 30 | 5.64 | 70 | 6 |
| RIB63025-05-C | □ | 3 | 30′ | 25 | 3.44 | 70 | 6 |
| RIB63040-05-C | □ | | 30′ | 40 | 3.70 | 70 | 6 |
| RIB63025-10-C | □ | | 1° | 25 | 3.87 | 70 | 6 |
| RIB63040-10-C | □ | | 1° | 40 | 4.40 | 70 | 6 |
| RIB63025-15-C | □ | | 1° 30′ | 25 | 4.31 | 70 | 6 |
| RIB63040-15-C | □ | | 1° 30′ | 40 | 5.09 | 70 | 6 |
| RIB63025-20-C | □ | | 2° | 25 | 4.75 | 70 | 6 |
| RIB63040-20-C | □ | | 2° | 40 | 5.79 | 70 | 6 |
| RIB63025-30-C | □ | | 3° | 25 | 5.62 | 70 | 6 |

## 標準切削条件表 Recommended cutting conditions RIB-C

＜溝切削＞ Slotting

| 外径 DC mm | 切込み ($a_p$) Depth of cut mm /pass | 一般構造用炭素鋼 Mild carbon steels 回転数 min⁻¹ | 送り速度 mm /min | 合金鋼 Alloy steels 回転数 min⁻¹ | 送り速度 mm /min | アルミ合金 Aluminum alloys 回転数 min⁻¹ | 送り速度 mm /min |
|---|---|---|---|---|---|---|---|
| 0.6 | 0.01 ～ 0.02 | 32,000 | 400 | 22,000 | 250 | 50,000 | 500 |
| 0.8 | 0.01 ～ 0.03 | 24,000 | 400 | 16,000 | 300 | 32,000 | 600 |
| 1.0 | 0.03 ～ 0.05 | 19,000 | 450 | 13,000 | 300 | 28,000 | 600 |
| 1.5 | 0.03 ～ 0.08 | 12,700 | 500 | 8,500 | 300 | 24,000 | 600 |
| 2.0 | 0.05 ～ 0.15 | 9,600 | 500 | 6,400 | 400 | 19,000 | 800 |
| 2.5 | 0.07 ～ 0.20 | 7,600 | 600 | 5,000 | 400 | 12,000 | 800 |
| 3.0 | 0.09 ～ 0.25 | 6,300 | 600 | 4,200 | 400 | 10,000 | 800 |

【注意】
①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。

【Note】
① Use the appropriate coolant for the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | > 55HRC ≦ 65HRC | > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ |

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# Epoch Roughing
# エポックラフィング

ステンレスなどの難削材荒加工に適したラフィングエンドミル。
Ideal roughing end mill for roughing of difficult-to-cut materials such as stainless steel, etc.

## ショート刃長 Short

側面 Side Cutting　溝 Slotting　荒 Roughing

外径公差 Dia.tolerance　0～−0.05　h6　(mm)

4枚刃 4Flutes

### EPQS4○○○-CS

超硬 Carbide　CS　ねじれ30° Helix angle　切削条件表 A370 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | コーナ面取り幅 Corner chamfering width | 形状 Shape |
|---|---|---|---|---|---|---|---|
| EPQS4060-CS | □ | 6 | 12 | 50 | 6 | 0.4 | A |
| EPQS4080-CS | □ | 8 | 16 | 60 | 8 | 0.5 | A |
| EPQS4100-CS | □ | 10 | 18 | 70 | 10 | 0.5 | A |
| EPQS4120-CS | □ | 12 | 22 | 75 | 12 | 0.5 | A |
| EPQS4160-CS | □ | 16 | 27 | 90 | 16 | 0.7 | A |
| EPQS4200-CS | □ | 20 | 35 | 100 | 20 | 0.7 | A |

## ロングシャンク Long Shank

側面 Side Cutting　荒 Roughing

外径公差 Dia.tolerance　0～−0.05　h6　(mm)

4枚刃 4Flutes

### EPQLS4○○○-CS

超硬 Carbide　CS　ねじれ30° Helix angle　切削条件表 A370 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | コーナ面取り幅 Corner chamfering width | 形状 Shape |
|---|---|---|---|---|---|---|---|
| EPQLS4060-CS | □ | 6 | 9 | 120 | 5 | 0.4 | C |
| EPQLS4070-CS | □ | 7 | 9 | 120 | 6 | 0.4 | C |
| EPQLS4080-CS | □ | 8 | 12 | 135 | 7 | 0.5 | C |
| EPQLS4090-CS | □ | 9 | 12 | 135 | 8 | 0.5 | C |
| EPQLS4100-CS | □ | 10 | 15 | 150 | 9 | 0.5 | C |
| EPQLS4110-CS | □ | 11 | 15 | 150 | 10 | 0.5 | C |
| EPQLS4120-CS | □ | 12 | 18 | 160 | 11 | 0.5 | C |
| EPQLS4130-CS | □ | 13 | 18 | 160 | 12 | 0.7 | C |
| EPQLS4140-CS | □ | 14 | 18 | 160 | 13 | 0.7 | C |
| EPQLS4150-CS | □ | 15 | 22 | 180 | 14 | 0.7 | C |
| EPQLS4160-CS | □ | 16 | 24 | 180 | 15 | 0.7 | C |
| EPQLS4170-CS | □ | 17 | 24 | 180 | 16 | 0.7 | C |
| EPQLS4180-CS | □ | 18 | 27 | 180 | 16 | 0.7 | C |
| EPQLS4190-CS | □ | 19 | 30 | 200 | 18 | 0.7 | C |
| EPQLS4200-CS | □ | 20 | 30 | 200 | 18 | 0.7 | C |

## ミディアム刃長 Medium

側面 Side Cutting　溝 Slotting　荒 Roughing

外径公差 Dia.tolerance　0～−0.05　h6　(mm)

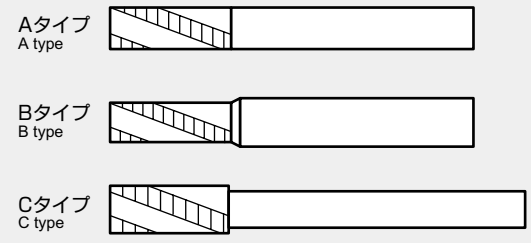
4枚刃 4Flutes

### EPQM4○○○-CS

超硬 Carbide　CS　ねじれ30° Helix angle　切削条件表 A370 Cutting Conditions

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 外径 Tool dia. | 刃長 Flute length | 全長 Overall length | シャンク径 Shank dia. | コーナ面取り幅 Corner chamfering width | 形状 Shape |
|---|---|---|---|---|---|---|---|
| EPQM4060-CS | □ | 6 | 20 | 60 | 6 | 0.4 | A |
| EPQM4070-CS | □ | 7 | 30 | 80 | 8 | 0.4 | B |
| EPQM4080-CS | □ | 8 | 30 | 80 | 8 | 0.5 | A |
| EPQM4090-CS | □ | 9 | 35 | 90 | 10 | 0.5 | B |
| EPQM4100-CS | □ | 10 | 35 | 90 | 10 | 0.5 | A |
| EPQM4110-CS | □ | 11 | 45 | 110 | 12 | 0.5 | B |
| EPQM4120-CS | □ | 12 | 45 | 110 | 12 | 0.5 | A |
| EPQM4130-CS | □ | 13 | 50 | 120 | 16 | 0.7 | B |
| EPQM4140-CS | □ | 14 | 50 | 120 | 16 | 0.7 | B |
| EPQM4150-CS | □ | 15 | 50 | 120 | 16 | 0.7 | B |
| EPQM4160-CS | □ | 16 | 55 | 125 | 16 | 0.7 | A |
| EPQM4170-CS | □ | 17 | 55 | 125 | 20 | 0.7 | B |
| EPQM4180-CS | □ | 18 | 65 | 135 | 20 | 0.7 | B |
| EPQM4190-CS | □ | 19 | 65 | 135 | 20 | 0.7 | B |
| EPQM4200-CS | □ | 20 | 70 | 145 | 20 | 0.7 | A |

### エポックラフィングの工具形状 Tool shape of Epoch Roughing




### EPQS-CS、EPQM-CS、EPQLS-CSの対応被削材

Applicable work material of EPQS-CS, EPQM-CS, EPQLS-CS

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | | | ◎ | ◎ | ◎ | ◎ |

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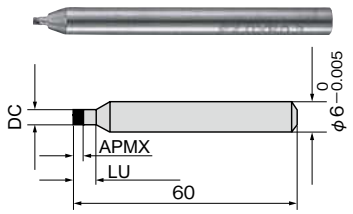
CBN Miniature End Mills

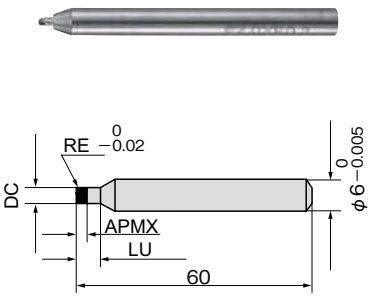
# CBN小径エンドミル

## ■スクエア刃　Square End



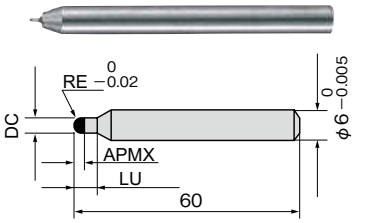

| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | 刃長 Flute length APMX | 首下長 Under neck length LU | 刃数 No. of Flutes |
|---|---|---|---|---|---|
| BHS2010 | □ | 1.0 | 0.5 | 2.5 | 2 |
| BHS2015 | □ | 1.5 | 0.75 | 2.5 | 2 |
| BHS2020 | □ | 2.0 | 1.0 | 2.5 | 2 |

## ■コーナR付　Radius End




| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) 外径 Tool dia. DC | 刃長 Flute length APMX | コーナ半径 Corner radius RE | 首下長 Under neck length LU | 刃数 No. of Flutes |
|---|---|---|---|---|---|---|
| BHSR2010-0.1 | □ | 1.0 | 0.5 | 0.1 | 2.5 | 2 |
| BHSR2010-0.2 | □ | 1.0 | 0.5 | 0.2 | 2.5 | 2 |
| BHSR2010-0.3 | □ | 1.0 | 0.5 | 0.3 | 2.5 | 2 |
| BHSR2015-0.1 | □ | 1.5 | 0.75 | 0.1 | 2.5 | 2 |
| BHSR2015-0.2 | □ | 1.5 | 0.75 | 0.2 | 2.5 | 2 |
| BHSR2015-0.3 | □ | 1.5 | 0.75 | 0.3 | 2.5 | 2 |
| BHSR2020-0.1 | □ | 2.0 | 1.0 | 0.1 | 2.5 | 2 |
| BHSR2020-0.2 | □ | 2.0 | 1.0 | 0.2 | 2.5 | 2 |
| BHSR2020-0.3 | □ | 2.0 | 1.0 | 0.3 | 2.5 | 2 |
| BHSR2020-0.5 | □ | 2.0 | 1.0 | 0.5 | 2.5 | 2 |

## ■ボール刃　Ball End




| 商品コード Item code | 在庫 Stock | 寸法 Size(mm) ボール半径 Ball radius RE | 外径 Tool dia. DC | 刃長 Flute length APMX | 首下長 Under neck length LU | 刃数 No. of Flutes |
|---|---|---|---|---|---|---|
| BHB2010 | □ | 0.5 | 1.0 | 0.5 | 2.5 | 2 |
| BHB2015 | □ | 0.75 | 1.5 | 0.75 | 2.5 | 2 |
| BHB2020 | □ | 1.0 | 2.0 | 1.0 | 2.5 | 2 |

【注意】先端刃部のCBNはシャンクにろう付されていますので、焼ばめ式のツーリングを使用される場合は先端が500℃以上にならないよう注意下さい。

【Note】CBN tip is brazed on a body. Please be careful to use shrink tooling not to heat up over 500℃ .

## ○ BHS、BHSR、BHBの対応被削材

Applicable work material of BHS, BHSR,BHB

| 炭素鋼 合金鋼 Carbon steel Alloy steel | プリハードン鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| | ○ | ○ | | | | | | |

□印：特定代理店在庫です。弊社営業へお問合せください。　□：Stocked by specified distributor. Contact with our sales department.

# ソリッドエンドミル用コーティング材種



## PVD Technology ATHコーティング ATH Coating

### 特長と機能 Features and characteristics

- THコーティングの硬度と耐酸化性をさらに改善。高硬度材切削加工の長寿命化、高能率化が可能になりました。
  （結晶粒子がさらに微細化したSi系ナノコンポジットコーティングです）
- 高硬度材料（55HRC以上）の切削加工に良好な性能を発揮します。
  冷間ダイス鋼、高速度鋼、工具鋼
- ドライでもウェットでも長寿命。

- Hardness and oxidation resistance of TH coatings is further improved. Enables longer life and higher efficient when cutting high-hardness materials.
  (Si nano composite coating with finer crystal particles)
- Exhibits amazing performance when cutting high-hardness materials (55HRC or higher)
  Cold-worked die steel, HSS, tool steel.
- Long life for both dry cutting and wet cutting

## PVD Technology TH3コーティング TH3 Coating

### 特長と機能 Features and characteristics

- 優れた耐摩耗性・耐熱性を有する高硬度皮膜
- 優れた耐衝撃性を有し、突発的な欠損を抑制
- 焼入れ鋼など50HRCを超える高硬度鋼の加工領域において長寿命

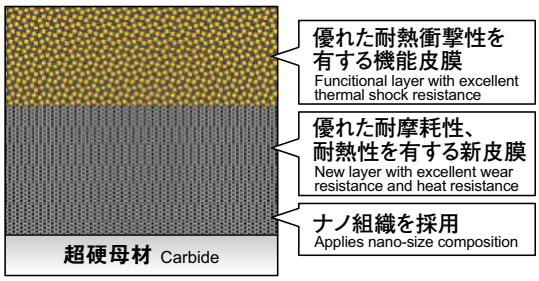
・High hardness coating with excellent wear resistance and heat resistance
・Has excellent thermal shock resistance enables to suppress sudden chipping
・Long tool life when cutting high-hardness materials (50HRC or higher) such as hardened steel

### ターゲットとなる鋼種 Target steel grade

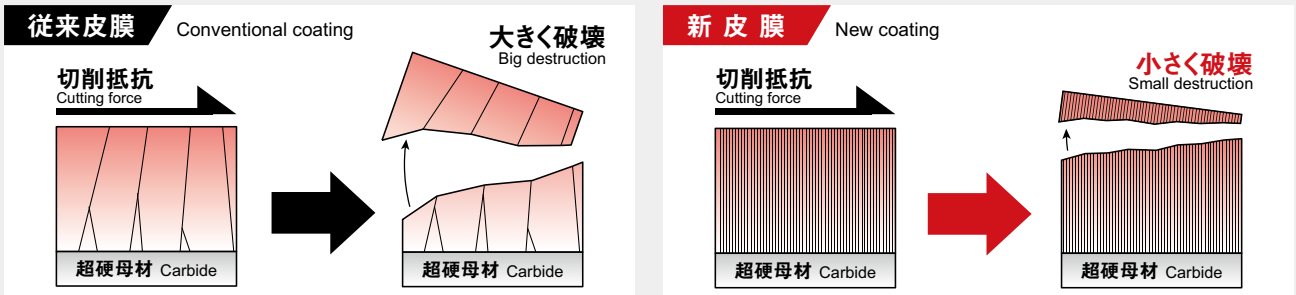
- 焼入れ鋼などの高硬度鋼（特に50HRC以上）、ハイス鋼

・Hardened steel (especially 50HRC or higher), high-speed steel

**皮膜構造** Coating structure




●新皮膜は“ナノ組織”の適用により、皮膜の破壊単位を小さくする事に成功！ New coating achieves to reduce destruction unit of layer by applying "nano-size composition".




## PVD Technology PNコーティング PN Coating

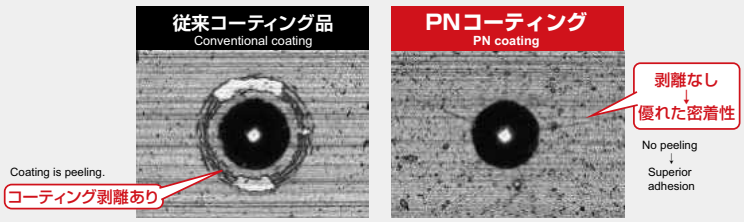
### 特長と機能 Features and characteristics

- Al含有量の調整により、特に工具母材との密着性に優れた耐熱コーティング材料です。
- プラスチック金型等の工具への溶着が起こりやすい材料の切削に対して、良好な切削寿命を示します。（従来対比切削寿命2倍）
  HPM-MAGICをはじめとしたプリハードン鋼、炭素鋼、合金鋼、SUS系、SKD61、SKD11等の切削加工で長寿命です。
- 耐熱性の向上により、ウェット切削及びドライ切削においても長寿命化が可能です。

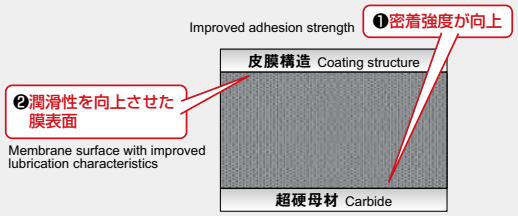
注）本工具のPNコーティングはその性質上、通電性が微小です。従って、通電方式の工具長測定装置をご使用の際にはご注意ください。

・A heat-resistant coating material with excellent adhesion to the tool substrate was achieved by optimizing the Al content.
・Exhibits excellent cutting life for cutting materials such as plastic molds, etc. where tool seizure often occurs. (2x the cutting life compared to conventional products.)
Provides the long life in cutting processing of materials starting with HPM-MAGIC and including prehardened steel, carbon steel, alloy steel, SUS, SKD61, SKD11, etc.
・By improving heat resistance, long life are possible for both wet cutting and dry cutting.
Note) This product obtains less electric conductivity. Therefore, Please caution of using electric transmitted measuring systems.

**PNコーティングの密着性** Adhesion of PN coating　母材：超硬合金 Substrate: Carbide alloy




**PNコーティングの皮膜断面組織と特性**
Cross-sectional structure and characteristics of PN coating membrane



# Coating materials for solid end mills
# ソリッドエンドミル用コーティング材種

PVD Technology

## SDコーティング SD Coating

### 特長と機能 Features and characteristics

●高硬度
ダイヤモンドに限りなく近い、水素フリーDLCコーティングです。

●高耐熱温度
不純物が少なく高耐熱性、高能率加工が可能です。

●高能率切削加工
アルミ合金や樹脂の切削加工に効果を発揮、発熱が少なくドライ切削に向いています。

●High hardness
The hydrogen-free DLC coating infinitely close to that of diamond.

●High heat-resistance temperature
Impurities are low, providing high heat resistance and enabling high-efficiency machining.

●High-efficiency cutting machining
Cutting machining of aluminum alloys or resins showcases the effects, with low heat generation making it ideal for dry cutting.

■超硬インサート工具の表面異常粒子の比較
Comparison of abnormal surface particles on carbide insert tools

High adhesion Diamond coating

## ダイヤモンドコーティング Diamond Coating HD

### 機能 Characteristics

●結晶性のよいダイヤモンドを採用。グラファイトや高Siアルミニウム合金、繊維強化プラスチック（FRP）の切削加工に適します。

● 独自の前処理技術を採用。アンカー効果により密着性向上

● 母材にはダイヤモンドコーティング専用材種を採用

●Uses diamond with good crystallization. Ideal for cutting of graphite, high-silicon aluminum alloys and fiber-reinforced plastics (FRP).
●Our exclusive pre-treatment technology is used to provide higher adhesion due to anchor effect.
●Special material for diamond coating is adopted for base metal.

# 異形工具 GALLEA
# Special Shape Tools

## 高能率仕上げ加工用 異形工具（ソリッドタイプ）
High Efficiency Finishing Special Shape Tool Series (Solid type)

GS4TN ……B2

## 高能率仕上げ加工用 刃先交換式異形工具シリーズ
High Efficiency Finishing Indexable Special Shape Tool Series

GF1 ……B4

GF2T ……B6

GF3L ……B8

GP1LB ……B10

GP1T ……B12


環境負荷低減への配慮により、既に一部の製品についてはドライバー、ねじ焼き付け防止剤は別売りとさせていただいております。今後、従来品についても一部製品を除き、同梱を取りやめ、別売りとさせていただきます。

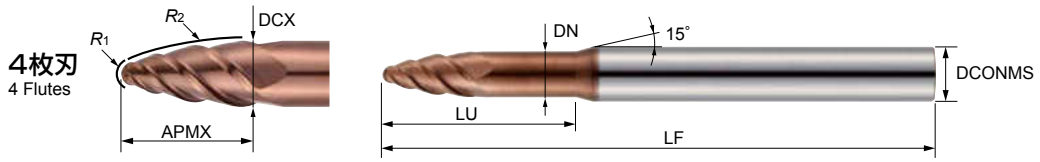
In consideration of reducing our environmental burden, we have already stopped bundling the screw driver and screw anti-seizure agent with certain products. They will no longer be supplied with conventional products (with certain exceptions), and will instead be sold separately.

# GALLEA GS4TN

●外周のバレルR刃は勾配面を高能率 ・ 高品位に！
●先端R刃は曲面の接続面を高品位に！
●独特な強ねじれ刃形状を採用、 低抵抗化を実現！
· Barrel R achieves high-efficiency and high-quality machining for tilted section
· Tip R can finish curved connecting faces to high quality
· Employs unique high helix shape and realizes low cutting force.

超硬 Carbide　TH3　ねじれ45° Helix angle　h5　フォーム公差：±0.01 Form tolerance　切削条件表 B3 Cutting Conditions






## GS4TN○○.○○-○○.○○R-TH3 ソリッドタイプ Solid type

| 商品コード Item code | 在庫 Stock | 寸法 Size (mm) 先端 R Tip R $R_1$ | バレルR Barrel R $R_2$ | 外径 Tool dia. DCX | 刃長 Flute length APMX | 首下長 Under neck length LU | 首径 Neck dia. DN | 全長 Overall length LF | シャンク径 Shank dia. DCONMS |
|---|---|---|---|---|---|---|---|---|---|
| GS4TN2.5-12.5R-TH3 | ◎ | 0.5 | 12.5 | 2.5 | 4.68 | 10 | 2.4 | 50 | 4 |
| GS4TN3.75-18.75R-TH3 | ◎ | 0.75 | 18.75 | 3.75 | 7.01 | 15 | 3.65 | 50 | 4 |
| GS4TN5-25R-TH3 | ◎ | 1 | 25 | 5 | 9.35 | 20 | 4.8 | 60 | 6 |
| GS4TN7.5-37.5R-TH3 | ◎ | 1.5 | 37.5 | 7.5 | 14.03 | 30 | 7.3 | 75 | 8 |
| GS4TN10-50R-TH3 | ◎ | 2 | 50 | 10 | 18.70 | 40 | 9.5 | 100 | 12 |

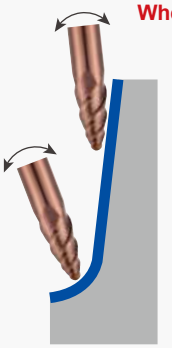
・本工具は再研磨対応しておりません。There is no regrinding compatibility for this tool.
・大径サイズは刃先交換式エンドミル「GP1T」をご使用ください。For the large diameter in size, use the indexable end mill "GP1T".

※工具の詳細形状についてはMOLDINOホームページよりDXFデータをダウンロードしてください。
（MOLDINO工具選定データベース TOOL SEARCH：http://data.moldino.com/toolsearch/）

※For information on the detailed tool shape, download the DXF data from the MOLDINO Tool Engineering home page. (MOLDINO Tool Engineering tool selection database TOOL SEARCH: http://data.moldino.com/toolsearch/)

## GS4TNの加工方法 Machining method of GS4TN

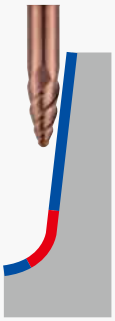
### 5軸加工機で使用する場合
When using with 5-axis machine



工具軸を傾斜し加工することでバレルR部を使用し、勾配面がピッチを大きく加工できます。
更に先端R部を使用することで加工段差の少ない切削が可能です。

By using the barrel R with tilted tool axis, tilted section can be cut with large pitch.
Furthermore, it is possible to cut with less machining steps by using the tip R.

### 3軸加工機で使用する場合
When using with 3-axis machine



バレルR部を使用し、立ち壁に近い勾配面をピッチを大きく加工できます。
但し、底部（隅部）等は別工具で加工する必要が有ります。

Barrel R enables to cut steep face with large pitch.
However, it is necessary to process the bottom corner section with a separate tool.

GS4TNで加工可能 Processable with GS4TN　別工具が必要 Needs separate tool

## 対応被削材 Applicable work material

| 炭素鋼 合金鋼 Carbon steel Alloy steel | 炭素鋼 合金鋼 Pre-hardened steel ≦ 45HRC | 高硬度 Hardened steel > 45HRC ≦ 55HRC | 高硬度 Hardened steel > 55HRC ≦ 65HRC | 高硬度 Hardened steel > 65HRC | ステンレス鋼 Stainless steel | チタン合金 耐熱合金 Titanium alloy Heat-resistant alloy | 銅合金 Copper alloy | アルミ合金 Aluminum alloy |
|---|---|---|---|---|---|---|---|---|
| ○ | ◎ | ◎ | ◎ | ◎ | | | | |

## 再研磨対応外径範囲 Re-grinding compatibility range

| 商品コード Item code | 外周 Outer dia. (mm) | エンド End (mm) |
|---|---|---|
| GS4TN | × (N/A) | × (N/A) |

◎印：メーカー在庫品です。弊社営業へお問い合わせください。　◎：Manufacturer stocked items. Contact with our sales office.

# 標準切削条件表 Recommended cutting conditions

## ●バレルR部　加工条件 Barrel R　cutting conditions

| 被削材 Work material | | 炭素鋼・合金鋼 Carbon steels, Alloy steels (<35HRC) | | | | プリハードン鋼 Pre-hardened steels (35～45HRC) | | | | 焼入れ鋼 Hardened steels (45～55HRC) | | | | 焼入れ鋼 Hardened steels (55～65HRC) | | | | 焼入れ鋼 Hardened steels (65～72HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 先端R Tip R $R_1$ (mm) | バレルR Barrel R $R_2$ (mm) | 回転数 $n$ $min^{-1}$ | 送り速度 $Vf$ mm/min | ap mm | ae mm | 回転数 $n$ $min^{-1}$ | 送り速度 $Vf$ mm/min | ap mm | ae mm | 回転数 $n$ $min^{-1}$ | 送り速度 $Vf$ mm/min | ap mm | ae mm | 回転数 $n$ $min^{-1}$ | 送り速度 $Vf$ mm/min | ap mm | ae mm | 回転数 $n$ $min^{-1}$ | 送り速度 $Vf$ mm/min | ap mm | ae mm |
| 0.5 | 12.5 | 23,550 | 3,060 | 0.22 | 0.05～0.1 | 19,100 | 2,480 | 0.22 | 0.05～0.1 | 17,830 | 1,960 | 0.22 | 0.05～0.1 | 16,550 | 1,820 | 0.22 | 0.01～0.05 | 12,730 | 1,400 | 0.22 | 0.01～0.05 |
| 0.75 | 18.75 | 15,700 | 2,670 | 0.27 | 0.05～0.1 | 13,840 | 2,460 | 0.27 | 0.05～0.1 | 11,880 | 1,780 | 0.27 | 0.05～0.1 | 11,370 | 1,640 | 0.27 | 0.01～0.05 | 8,570 | 1,230 | 0.27 | 0.01～0.05 |
| 1 | 25 | 11,780 | 2,540 | 0.32 | 0.05～0.1 | 10,500 | 2,260 | 0.32 | 0.05～0.1 | 9,130 | 1,670 | 0.32 | 0.05～0.1 | 7,040 | 1,440 | 0.32 | 0.01～0.05 | 6,490 | 1,100 | 0.32 | 0.01～0.05 |
| 1.5 | 37.5 | 7,850 | 1,990 | 0.39 | 0.05～0.1 | 6,930 | 1,780 | 0.39 | 0.05～0.1 | 6,190 | 1,390 | 0.39 | 0.05～0.1 | 4,460 | 1,230 | 0.39 | 0.01～0.05 | 4,290 | 920 | 0.39 | 0.01～0.05 |
| 2 | 50 | 5,890 | 1,680 | 0.45 | 0.05～0.1 | 5,100 | 1,460 | 0.45 | 0.05～0.1 | 4,510 | 1,130 | 0.45 | 0.05～0.1 | 3,520 | 1,000 | 0.45 | 0.01～0.05 | 3,190 | 770 | 0.45 | 0.01～0.05 |

## ●先端R部　加工条件 Tip R　cutting conditions

| 被削材 Work material | | 炭素鋼・合金鋼 Carbon steels, Alloy steels (<35HRC) | | | | プリハードン鋼 Pre-hardened steels (35～45HRC) | | | | 焼入れ鋼 Hardened steels (45～55HRC) | | | | 焼入れ鋼 Hardened steels (55～65HRC) | | | | 焼入れ鋼 Hardened steels (65～72HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 先端R Tip R $R_1$ (mm) | バレルR Barrel R $R_2$ (mm) | 回転数 $n$ $min^{-1}$ | 送り速度 $Vf$ mm/min | ap mm | ae mm | 回転数 $n$ $min^{-1}$ | 送り速度 $Vf$ mm/min | ap mm | ae mm | 回転数 $n$ $min^{-1}$ | 送り速度 $Vf$ mm/min | ap mm | ae mm | 回転数 $n$ $min^{-1}$ | 送り速度 $Vf$ mm/min | ap mm | ae mm | 回転数 $n$ $min^{-1}$ | 送り速度 $Vf$ mm/min | ap mm | ae mm |
| 0.5 | 12.5 | 34,320 | 2,580 | 0.09 | 0.29 | 28,600 | 2,060 | 0.08 | 0.24 | 26,000 | 1,870 | 0.06 | 0.18 | 24,700 | 1,600 | 0.06 | 0.18 | 20,800 | 1,120 | 0.05 | 0.15 |
| 0.75 | 18.75 | 25,680 | 2,890 | 0.10 | 0.31 | 21,400 | 2,310 | 0.09 | 0.26 | 19,500 | 2,110 | 0.07 | 0.21 | 18,500 | 1,800 | 0.07 | 0.21 | 15,600 | 1,260 | 0.06 | 0.18 |
| 1 | 25 | 22,080 | 3,310 | 0.19 | 0.58 | 18,400 | 2,650 | 0.16 | 0.48 | 16,700 | 2,400 | 0.13 | 0.39 | 15,900 | 2,060 | 0.12 | 0.36 | 13,400 | 1,450 | 0.10 | 0.30 |
| 1.5 | 37.5 | 20,400 | 3,280 | 0.28 | 0.86 | 17,000 | 2,620 | 0.24 | 0.72 | 15,400 | 1,850 | 0.20 | 0.60 | 14,300 | 1,720 | 0.19 | 0.57 | 11,000 | 1,320 | 0.15 | 0.45 |
| 2 | 50 | 15,600 | 3,040 | 0.38 | 1.15 | 13,000 | 2,430 | 0.32 | 0.96 | 11,000 | 1,760 | 0.27 | 0.81 | 10,560 | 1,580 | 0.25 | 0.75 | 7,920 | 1,190 | 0.20 | 0.60 |

## ●バレルR部・先端R部　共通加工条件 Cutting conditions for using both barrel R and tip R

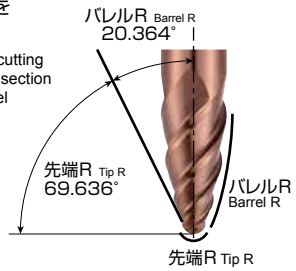
| 被削材 Work material | | 炭素鋼・合金鋼 Carbon steels, Alloy steels (<35HRC) | | プリハードン鋼 Pre-hardened steels (35～45HRC) | | 焼入れ鋼 Hardened steels (45～55HRC) | | 焼入れ鋼 Hardened steels (55～65HRC) | | 焼入れ鋼 Hardened steels (65～72HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 先端R Tip R $R_1$ (mm) | バレルR Barrel R $R_2$ (mm) | 回転数 $n$ $min^{-1}$ | 送り速度 $Vf$ mm/min | 回転数 $n$ $min^{-1}$ | 送り速度 $Vf$ mm/min | 回転数 $n$ $min^{-1}$ | 送り速度 $Vf$ mm/min | 回転数 $n$ $min^{-1}$ | 送り速度 $Vf$ mm/min | 回転数 $n$ $min^{-1}$ | 送り速度 $Vf$ mm/min |
| 0.5 | 12.5 | 28,940 | 2,820 | 23,850 | 2,270 | 21,920 | 1,920 | 20,630 | 1,710 | 16,770 | 1,260 |
| 0.75 | 18.75 | 20,690 | 2,780 | 17,620 | 2,390 | 15,690 | 1,950 | 14,940 | 1,720 | 12,090 | 1,250 |
| 1 | 25 | 16,930 | 2,930 | 14,450 | 2,460 | 12,920 | 2,040 | 11,470 | 1,750 | 9,950 | 1,280 |
| 1.5 | 37.5 | 14,130 | 2,640 | 11,970 | 2,200 | 10,800 | 1,620 | 9,380 | 1,480 | 7,650 | 1,120 |
| 2 | 50 | 10,750 | 2,360 | 9,050 | 1,950 | 7,760 | 1,450 | 7,040 | 1,290 | 5,560 | 980 |

※切込み (ap、ae) については上記各部の条件をご参照ください
For cutting depth (ap, ae), refer to the above conditions for each section.

## ■バレルRと先端Rの角度範囲
Angle range of barrel R and tip R

加工形状によって接触部がバレルR部・先端R部に分かれます。接触する箇所をご確認頂き、各箇所に応じた切削条件をご選定下さい。

Depending on the cutting shape, the contact section is divided into barrel R and tip R. Check the contact section and select the appropriate cutting conditions according to each section.



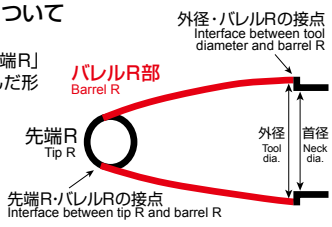

## ap値は所望のカスプハイトにより下記表より選択してください。
Determine the ap value based on the desired cusp height by selecting it from the table below.

| 使用工具 Tool | | カスプハイト Cusp height (mm) | | | | | |
|---|---|---|---|---|---|---|---|
| 商品コード Item code | バレルR Barrel R | 0.0001 | 0.0003 | 0.0005 | 0.001 | 0.003 | 0.005 |
| GS4TN2.5-12.5R-TH3 | 12.5 | 0.10 | 0.17 | 0.22 | 0.32 | 0.55 | 0.71 |
| GS4TN3.75-18.75R-TH3 | 18.75 | 0.12 | 0.21 | 0.27 | 0.39 | 0.67 | 0.87 |
| GS4TN5-25R-TH3 | 25 | 0.14 | 0.24 | 0.32 | 0.45 | 0.77 | 1.00 |
| GS4TN7.5-37.5R-TH3 | 37.5 | 0.17 | 0.30 | 0.39 | 0.55 | 0.95 | 1.22 |
| GS4TN10-50R-TH3 | 50 | 0.20 | 0.35 | 0.45 | 0.63 | 1.10 | 1.41 |

## ■ GS4TN 工具形状について
About tool shape

GS4TNの「バレルR」は「先端R」と「外径」を2接円弧で結んだ形状になっています。右図をご確認ください。

"Barrel R" of GS4TN has a shape that connects "tip R" and "tool diameter" with double arc. See the figure on the right.




## 【注意】
①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②できるだけ高剛性、高精度の機械をご使用ください
③この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

## 【Note】
①Use the appropriate coolant for the work material and machining shape.
②Use a machine having as high rigidity and high accuracy as possible.
③These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
④If the rpm of the machine is low, lower the feed rate also to put the rpm and feed rate in the same ratio.

# GALLEA GF1

YouTube 動画公開中

●仕上げ加工時間短縮に新提案。
●等高線Zピッチを大きく設定できる
・A new proposal for reducing finishing time.
・Contour Z pitch can be set to larger values.

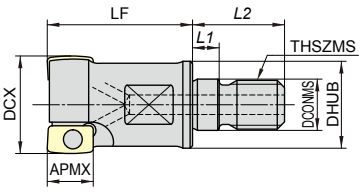
中仕上 Semi Finishing / 仕上 Finishing / 側面 Side Cutting / 切削条件表 B5 Cutting Conditions



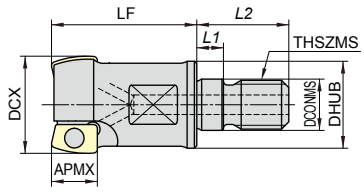
○は数字、□は英文字が入ります。Numeric figure in a circle ○ and Alphabetical character comes in a square □

## GF1□20○○M-○-M○○ モジュラータイプ Modular type

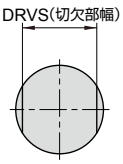
モジュラーミル用シャンクはD2頁を、締め付けトルクについてはD5頁を参照ください。
Refer page D2 about the shanks for Modular Mill, Refer page D5 about tightening torque




ベーシックタイプ Basic type




オフセットタイプ Offset type



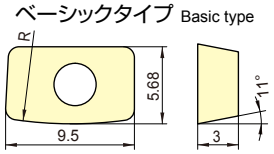

| タイプ Type | 商品コード Item code | 在庫 Stock | 刃数 No.of flutes | 寸法 Size (mm) DCX | LF | APMX | DCONMS | THSZMS | DHUB | L1 | L2 | DRVS | 使用インサート Insert | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ベーシックタイプ Basic type | GF1G2016M-2-M8 | ● | 2 | 16 | 25 | 9.5 | 8.5 | M8 | 14 | 5.5 | 17 | 10 | XPHW0903R-20 XPHW0903R-30 | 36,950 |
| | GF1G2020M-3-M10 | ● | 3 | 20 | 30 | 9.5 | 10.5 | M10 | 17.8 | 5.5 | 19 | 15 | | 47,640 |
| | ※1 GF1G2025M-4-M10 | ● | 4 | 25 | 30 | 9.5 | 10.5 | M10 | 17.8 | 5.5 | 19 | 15 | | 57,480 |
| | GF1G2025M-4-M12 | ● | 4 | 25 | 35 | 9.5 | 12.5 | M12 | 22.5 | 5.5 | 22 | 17 | | 57,480 |
| オフセットタイプ Offset type | GF1T2016M-2-M8 | ● | 2 | 16 | 25 | 9.5 | 8.5 | M8 | 14 | 5.5 | 17 | 10 | YPHW0903R-20 YPHW0903R-30 | 36,950 |
| | GF1T2020M-3-M10 | ● | 3 | 20 | 30 | 9.5 | 10.5 | M10 | 17.8 | 5.5 | 19 | 15 | | 47,640 |
| | GF1T2025M-4-M12 | ● | 4 | 25 | 35 | 9.5 | 12.5 | M12 | 22.5 | 5.5 | 22 | 17 | | 57,480 |

【注意】※1と超硬シャンクをセットで使用すると干渉がありません。
モジュラーミル及び専用シャンク、専用アーバの「工具端面」「モジュラーネジ部」にグリースなどの潤滑剤は塗布しないでください。
【Note】When ※1 and carbide shank are used together as a set, there is no interference.
Do not apply lubricants such as grease, etc. to the "contact faces" and "modular screws" of the "modular mill", "dedicated shanks" and "dedicated arbor".

※工具の詳細形状についてはMOLDINOホームページよりDXFデータをダウンロードしてください。(MOLDINO工具選定データベース TOOL SEARCH:http://data.moldino.com/toolsearch/)
※For information on the detailed tool shape, download the DXF data from the MOLDINO Tool Engineering home page. (MOLDINO Tool Engineering tool selection database TOOL SEARCH: http://data.moldino.com/toolsearch/)

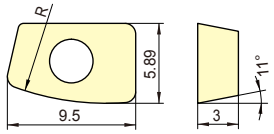
## ■インサート Inserts

ベーシックタイプ Basic type




XPHW0903R-○○

オフセットタイプ Offset type




YPHW0903R-○○

| | | | |
|---|---|---|---|
| P | 炭素鋼・合金鋼 Carbon steels, Alloy steels | ■ | ⊓ |
| M | SUS等 SUS, etc. | ■ | |
| K | FC・FCD Cast irons | ⊓ | ■ |
| H | 高硬度材 Hardened steels | | ■ |

■：一般切削・第一推奨 General cutting, First recommended
⊓：一般切削・第二推奨 General cutting, Second recommended

| タイプ Type | 商品コード Item code | 精度 Tolerance class | PN215 | TH315 | 寸法 Size (mm) R | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|
| ベーシックタイプ Basic type | XPHW0903R-20 | H | ● | ● | 20 | 1,430 |
| | XPHW0903R-30 | | ● | ● | 30 | 1,430 |
| オフセットタイプ Offset type | YPHW0903R-20 | | ● | ● | 20 | 1,430 |
| | YPHW0903R-30 | | ● | ● | 30 | 1,430 |

※工具の詳細形状についてはMOLDINOホームページよりDXFデータをダウンロードしてください。(MOLDINO工具選定データベース TOOL SEARCH:http://data.moldino.com/toolsearch/)
※For information on the detailed tool shape, download the DXF data from the MOLDINO Tool Engineering home page. (MOLDINO Tool Engineering tool selection database TOOL SEARCH: http://data.moldino.com/toolsearch/)

## ■部品番号 Parts

| 適用カッタ Cutter body / 形状 Shape | クランプねじ Clamp screw | 締付けトルク Fastening torque (N·m) | 希望小売価格(円) Suggested retail price (¥) | ドライバー Screw driver | 希望小売価格(円) Suggested retail price (¥) | ねじ焼き付き防止剤 Screw anti-seizure agent | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|
| GF1□20○○M-○-M○○ | 250-141 | 1.1 | 870 | 104-T8 | 1,800 | P-37 | 1,010 |

【注意】クランプねじは消耗品です。使用環境により交換寿命は変化しますので早めの交換をお願い致します。
【Note】The clamp screw is a consumable part. Since replacement life depends on the use environment, it is recommended that it be replaced at an early stage.

●印：標準在庫品です。 ●：Stocked items.

# 標準切削条件表 Recommended cutting conditions

※赤字は第一推奨材種です。Red indicates primary recommended grade.

| 被削材 Work material | 推奨材種 Recommended grade | 切削条件 Cutting condition | φ16 | φ20 | φ25 |
|---|---|---|---|---|---|
| 炭素鋼 Carbon steels<br>合金鋼 Alloy steels<br>(<30HRC) | ※ PN215 | n (min-1) | 11,950 | 9,560 | 7,650 |
| | | vc (m/min) | 600 | 600 | 600 |
| | | vf (mm/min) | 4,780 | 5,740 | 6,120 |
| | | fz (mm/t) | 0.2 | 0.2 | 0.2 |
| | | ap (mm) | 右表を参照ください。Refer right table | | |
| | | ae (mm) | ~0.1 | ~0.1 | ~0.1 |
| 炭素鋼 Carbon steels<br>合金鋼 Alloy steels<br>(30~45HRC) | PN215 TH315 | n (min-1) | 7,970 | 6,370 | 5,100 |
| | | vc (m/min) | 400 | 400 | 400 |
| | | vf (mm/min) | 3,190 | 3,830 | 4,080 |
| | | fz (mm/t) | 0.2 | 0.2 | 0.2 |
| | | ap (mm) | 右表を参照ください。Refer right table | | |
| | | ae (mm) | ~0.1 | ~0.1 | ~0.1 |
| ステンレス鋼 Stainless steels<br>SUS | PN215 | n (min-1) | 9,960 | 7,970 | 6,370 |
| | | vc (m/min) | 500 | 500 | 500 |
| | | vf (mm/min) | 3,990 | 4,790 | 5,100 |
| | | fz (mm/t) | 0.2 | 0.2 | 0.2 |
| | | ap (mm) | 右表を参照ください。Refer right table | | |
| | | ae (mm) | ~0.1 | ~0.1 | ~0.1 |
| 鋳鉄 Cast irons<br>FC<br>FCD | TH315 PN215 | n (min-1) | 11,950 | 9,560 | 7,650 |
| | | vc (m/min) | 600 | 600 | 600 |
| | | vf (mm/min) | 5,980 | 7,170 | 7,650 |
| | | fz (mm/t) | 0.25 | 0.25 | 0.25 |
| | | ap (mm) | 右表を参照ください。Refer right table | | |
| | | ae (mm) | ~0.1 | ~0.1 | ~0.1 |
| 焼入れ鋼 Hardened steels<br>(45~55HRC) | TH315 PN215 | n (min-1) | 4,980 | 3,990 | 3,190 |
| | | vc (m/min) | 250 | 250 | 250 |
| | | vf (mm/min) | 1,500 | 1,800 | 1,920 |
| | | fz (mm/t) | 0.15 | 0.15 | 0.15 |
| | | ap (mm) | 右表を参照ください。Refer right table | | |
| | | ae (mm) | ~0.08 | ~0.08 | ~0.08 |

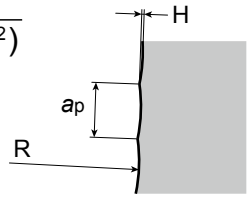
apの値は所望のカスプハイトにより下記表より選択または下記計算式より算出してください

Determine the ap value based on the desired cusp height by selecting it from the table below or by calculating it using the equation below.

| インサート Insert 商品コード Item code | R | カスプハイト (mm) Cusp height 0.001 | 0.002 | 0.003 | 0.004 | 0.005 | 0.01 |
|---|---|---|---|---|---|---|---|
| XPHW0903R-20 | 20 | 0.4 | 0.57 | 0.69 | 0.8 | 0.89 | 1.26 |
| XPHW0903R-30 | 30 | 0.49 | 0.69 | 0.85 | 0.98 | 1.1 | 1.55 |

$$ap = 2\sqrt{(R^2-(R-H)^2)}$$

R: 工具R Tool R　H：カスプハイト Cusp height




※突き出し長さ3DCX以上の場合は、左記の表をもとに下記表を参考に調整してください。

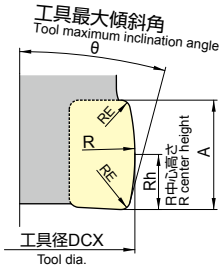
When overhang length is 3DCX or greater, adjust the values shown in the table at left according to the table below.

| 突き出し比率 Overhang ratio | vc (m/min) | vf (mm/min) |
|---|---|---|
| <3DCX | 100% | 100% |
| 3DCX ~ 5DCX | 70% | 70% |
| 5DCX ~ 6DCX | 60% | 60% |
| 6DCX ~ 7DCX | 50% | 50% |
| 7DCX~ | 45% | 45% |

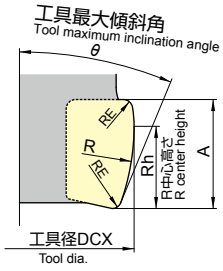
【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③切りくず噛み込みによる工具損傷防止のため、必ずエアーブロー等による切りくず除去を行ってください。
④インサートの交換は早めに行い、過度の使用による破損を防止してください。

【Note】①Use the appropriate coolant for the work material and machining shape.
②These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
③To prevent tool breakage due to chips clogging tool flutes, always be sure to use an air blower, etc. to remove chips.
④Ensure to index the insert at the correct time to ensure safety of the tool-body.

## プログラム上の刃先形状定義 Flute tip shape definitions for programing




ベーシックタイプ Basic type




オフセットタイプ Offset type

インサートと工具径の組み合わせにより回転軌跡形状が異なります。下記表を参照ください。

Rotation locus shape will be different depending on the combination of insert and tool diameter. Refer to the table below.

| | ベーシックタイプ Basic type | | | | | | オフセットタイプ Offset type | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| インサート型番 Insert item code | XPHW0903R-20 | | | XPHW0903R-30 | | | YPHW0903R-20 | | | YPHW0903R-30 | | |
| 工具径 DCX (mm) Tool dia. | φ16 | φ20 | φ25 | φ16 | φ20 | φ25 | φ16 | φ20 | φ25 | φ16 | φ20 | φ25 |
| R (mm) | 20.14 | 20 | 19.93 | 30.38 | 30 | 29.82 | 20.18 | 20 | 19.91 | 30.33 | 30 | 29.81 |
| Rh (mm) | 4.75 | 4.75 | 4.75 | 4.75 | 4.75 | 4.75 | 7.25 | 7.25 | 7.25 | 7.25 | 7.25 | 7.25 |
| RE (mm) | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| A (mm) | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 |
| θ | 11° | 11° | 11° | 7° | 7° | 7° | 19° | 19° | 19° | 12° | 12° | 12° |

【注意】小数点第三位以下を四捨五入した数値です。パラメトリックで形状定義する場合はDXFデータより必要寸法をご確認ください。

【Note】The numbers after the third decimal point are rounded off. When defining the shape parametrically, check the required dimensions from the DXF data.

# GALLEA GF2T

●高能率な傾斜壁面の仕上げ加工！ボールエンドミル、 ラジアスエンドミルに比べ大ピッチで加工可能です。
●大径側にシリーズ展開しました！
●経済的な2コーナ仕様！ユニークなインサート拘束面により2コーナ仕様を実現しました。
· High-performance tilted wall finishing! Enables machining at a larger pitch than ball end mills or radius end mills.
· Series expansion toward larger diameters
· Economical 2-corner specification. Unique insert holding surface enables realization of 2-corner specification

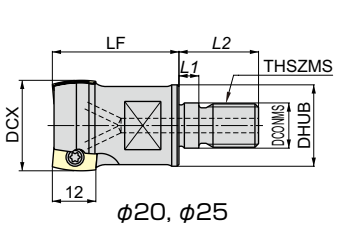
中仕上 Semi Finishing　仕上 Finishing　側面 Side Cutting　切削条件表 B7 Cutting Conditions



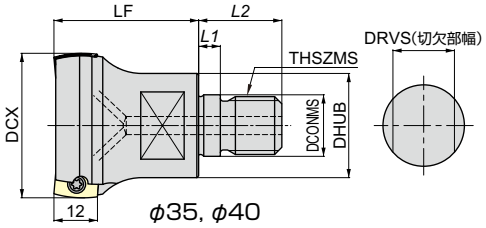
## GF2T□30○○M-○ モジュラータイプ Modular type

○は数字、□は英文字が入ります。Numeric figure in a circle ○ and Alphabetical character comes in a square□

モジュラーミル用シャンクはD2頁を、締め付けトルクについてはD5頁を参照ください。
Refer page D2 about the shanks for Modular Mill, Refer page D5 about tightening torque




φ20, φ25

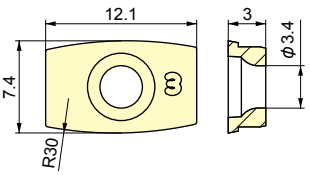



φ35, φ40

| タイプ Type | 商品コード Item code | 在庫 Stock | 刃数 No. of flutes | 寸法 Size (mm) DCX | LF | DCONMS | THSZMS | DHUB | L1 | L2 | DRVS | 使用インサート Insert | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| オフセットタイプ Offset type | GF2T3020M-3 | ● | 3 | 20 | 30 | 10.5 | M10 | 17.8 | 5.5 | 19 | 15 | YPHW1203R-30 | 47,640 |
| | GF2T3025M-4 | ● | 4 | 25 | 35 | 12.5 | M12 | 22.5 | 5.5 | 22 | 17 | | 57,480 |
| | ※1 GF2T3035M-5 | ● | 5 | 35 | 40 | 17 | M16 | 28.8 | 6 | 23 | 22 | | 68,750 |
| | ※1 GF2T3040M-6 | ● | 6 | 40 | 40 | 17 | M16 | 28.8 | 6 | 23 | 22 | | 79,310 |

【注意】※1と超硬シャンクをセットで使用すると干渉がありません。
モジュラーミル及び専用シャンク、専用アーバの「工具端面」「モジュラーネジ部」にグリースなどの潤滑剤は塗布しないでください。
【Note】When ※1 and carbide shank are used together as a set, there is no interference.
Do not apply lubricants such as grease, etc. to the “contact faces” and “modular screws” of the “modular mill”, “dedicated shanks” and “dedicated arbor”.
※工具の詳細形状についてはMOLDINOホームページよりDXFデータをダウンロードしてください。(MOLDINO工具選定データベース TOOL SEARCH：http://data.moldino.com/toolsearch/)
※For information on the detailed tool shape, download the DXF data from the MOLDINO Tool Engineering home page. (MOLDINO Tool Engineering tool selection database TOOL SEARCH: http://data.moldino.com/toolsearch/)

## ■インサート Inserts




| | | | | |
|---|---|---|---|---|
| P | 炭素鋼・合金鋼 Carbon steels Alloy steels | ■ | ⊔ | ■：一般切削・第一推奨 General cutting, First recommended |
| M | SUS等 SUS, etc. | ■ | | ⊔：一般切削・第二推奨 General cutting, Second recommended |
| K | FC・FCD Cast irons | ⊔ | ■ | |
| H | 高硬度材 Hardened steels | | ■ | |

| 商品コード Item code | 精度 Tolerance class | 材種 Grade PN215 | 材種 Grade TH315 | 寸法 Size (mm) R | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|
| YPHW1203R-30 | H | ● | ● | 30 | 1,920 |

※工具の詳細形状についてはMOLDINOホームページよりDXFデータをダウンロードしてください。(MOLDINO工具選定データベース TOOL SEARCH：http://data.moldino.com/toolsearch/)
※For information on the detailed tool shape, download the DXF data from the MOLDINO Tool Engineering home page. (MOLDINO Tool Engineering tool selection database TOOL SEARCH: http://data.moldino.com/toolsearch/)

## ■部品番号 Parts

○は数字が入ります。 Numeric figure in a circle ○

| 適用カッタ Cutter body ＼ 形状 Shape | クランプねじ Clamp screw | 締付けトルク Fastening torque (N·m) | 希望小売価格(円) Suggested retail price（¥） | ドライバー Screw driver | 希望小売価格(円) Suggested retail price（¥） | ねじ焼き付き防止剤 Screw anti-seizure agent | 希望小売価格(円) Suggested retail price（¥） |
|---|---|---|---|---|---|---|---|
| GF2T30○○M-○ | 265-143 | 2.0 | 870 | 104-T10 | 1,920 | P-37 | 1,010 |

【注意】クランプねじは消耗品です。使用環境により交換寿命は変化しますので早めの交換をお願い致します。
【Note】The clamp screw is a consumable part. Since replacement life depends on the use environment, it is recommended that it be replaced at an early stage.

●印：標準在庫品です。 ●：Stocked items.

## 標準切削条件表 Recommended cutting conditions

※赤字は第一推奨材種です。Red indicates primary recommended grade.

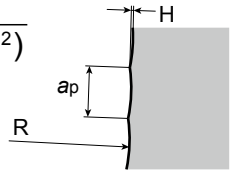
| 被削材 Work material | 推奨材種 Recommended grade | 切削条件 Cutting conditions | φ20 | φ25 | φ35 | φ40 |
|---|---|---|---|---|---|---|
| 炭素鋼<br>合金鋼<br>Carbon steels<br>Alloy steels<br>(<30HRC) | PN215 | n (min-1) | 9,560 | 7,650 | 5,460 | 4,780 |
| | | vc (m/min) | 600 | 600 | 600 | 600 |
| | | vf (mm/min) | 5,740 | 6,120 | 5,460 | 5,740 |
| | | fz (mm/t) | 0.2 | 0.2 | 0.2 | 0.2 |
| | | ap (mm) | 右表を参照ください。Refer to the table at right. | | | |
| | | ae (mm) | <0.1 | <0.1 | <0.1 | <0.1 |
| 炭素鋼<br>合金鋼<br>Carbon steels<br>Alloy steels<br>(30~45HRC) | PN215<br>TH315 | n (min-1) | 6,370 | 5,100 | 3,640 | 3,190 |
| | | vc (m/min) | 400 | 400 | 400 | 400 |
| | | vf (mm/min) | 3,830 | 4,080 | 3,640 | 3,830 |
| | | fz (mm/t) | 0.2 | 0.2 | 0.2 | 0.2 |
| | | ap (mm) | 右表を参照ください。Refer to the table at right. | | | |
| | | ae (mm) | <0.1 | <0.1 | <0.1 | <0.1 |
| ステンレス鋼<br>Stainless steels<br>SUS | PN215 | n (min-1) | 7,970 | 6,370 | 4,550 | 3,990 |
| | | vc (m/min) | 500 | 500 | 500 | 500 |
| | | vf (mm/min) | 4,790 | 5,100 | 4,550 | 4,790 |
| | | fz (mm/t) | 0.2 | 0.2 | 0.2 | 0.2 |
| | | ap (mm) | 右表を参照ください。Refer to the table at right. | | | |
| | | ae (mm) | <0.1 | <0.1 | <0.1 | <0.1 |
| 鋳鉄<br>Cast irons<br>FC<br>FCD | TH315<br>PN215 | n (min-1) | 9,560 | 7,650 | 5,460 | 4,780 |
| | | vc (m/min) | 600 | 600 | 600 | 600 |
| | | vf (mm/min) | 7,170 | 7,650 | 6,830 | 7,170 |
| | | fz (mm/t) | 0.25 | 0.25 | 0.25 | 0.25 |
| | | ap (mm) | 右表を参照ください。Refer to the table at right. | | | |
| | | ae (mm) | <0.1 | <0.1 | <0.1 | <0.1 |
| 焼入れ鋼<br>Hardened steels<br>(45~55HRC) | TH315<br>PN215 | n (min-1) | 3,990 | 3,190 | 2,280 | 2,000 |
| | | vc (m/min) | 250 | 250 | 250 | 250 |
| | | vf (mm/min) | 1,800 | 1,920 | 1,710 | 1,800 |
| | | fz (mm/t) | 0.15 | 0.15 | 0.15 | 0.15 |
| | | ap (mm) | 右表を参照ください。Refer to the table at right. | | | |
| | | ae (mm) | <0.08 | <0.08 | <0.08 | <0.08 |

ap値は所望のカスプハイトにより下記表より選択または下記計算式より算出してください
Determine the *ap* value based on the desired cusp height by selecting it from the table below or by calculating it using the equation below.

| インサート Insert | | カスプハイト Cusp height (mm) | | | | | |
|---|---|---|---|---|---|---|---|
| 商品コード Item code | R | 0.001 | 0.002 | 0.003 | 0.004 | 0.005 | 0.01 |
| YPHW1203R-30 | 30 | 0.49 | 0.69 | 0.85 | 0.98 | 1.1 | 1.55 |

$$ap = 2\sqrt{(R^2-(R-H)^2)}$$

R: 工具R　H：カスプハイト
R : Tool R　H : Cusp height



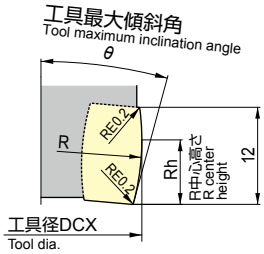

※突き出し長さ3DCX以上の場合は、左記の表をもとに下記表を参考に調整してください。
When overhang length is 3DCX or more, adjust the values shown in the table at left according to the table below.

| 突き出し比率 Overhang ratio | vc (m/min) | vf (mm/min) |
|---|---|---|
| <3DCX | 100% | 100% |
| 3DCX ～ 5DCX | 70% | 70% |
| 5DCX ～ 6DCX | 60% | 60% |
| 6DCX ～ 7DCX | 50% | 50% |
| 7DCX～ | 45% | 45% |

**【注意】**
①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③切りくず噛み込みによる工具損傷防止のため、必ずエアーブロー等による切りくず除去を行ってください。
④インサートの交換は早めに行い、過度の使用による破損を防止してください。

**【Note】**
①Use the appropriate coolant for the work material and machining shape.
②These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
③To prevent tool breakage due to chips clogging tool flutes, always be sure to use an air blower, etc. to remove chips.
④Ensure to index the insert at the correct time to ensure safety of the tool-body.

## プログラム上の刃先形状定義 Flute tip shape definitions for programing




オフセットタイプ Offset type

インサートと工具径の組み合わせにより回転軌跡形状が異なります。下記表を参照ください。
Rotation locus shape will be different depending on the combination of insert and tool diameter. Refer to the table below.

| | オフセットタイプ Offset type | | | |
|---|---|---|---|---|
| インサート型番 Insert item code | YPHW1203-R30 | | | |
| 工具径 Tool dia. DCX (mm) | φ20 | φ25 | φ35 | φ40 |
| R (mm) | 30.24 | 30 | 29.84 | 29.78 |
| Rh (mm) | 7.92 | 8 | 8 | 8 |
| θ | 14.9° | 15° | 15.2° | 15.3° |

【注意】小数点第三位以下を四捨五入した数値です。パラメトリックで形状定義する場合はDXFデータより必要寸法をご確認ください。
【Note】The numbers after the third decimal point are rounded off. When defining the shape parametrically, check the required dimensions from the DXF data.

# GALLEA GF3L

- GF3Lは緩曲面 ・ 緩斜面の中仕上～仕上加工用途のレンズ工具です。
- GALLEA シリーズ（GF3LとGP1LB）を合わせて使用することで中仕上げ～仕上げ加工の高能率化が図れます。
- 経済的な3コーナ仕様インサートを採用

· Lens tool for semi-finishing to finishing machining on gentle curved surfaces and gentle sloped surfeces.
· Using GALLEA series together it is possible to process from semi-finishing to finishing with high efficiency
· Economical three corner specification insert tip

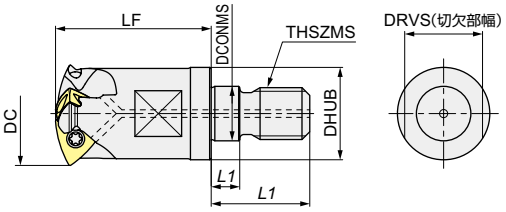
中仕上 Semi Finishing / 仕上 Finishing / 曲面 Profiling / 切削条件表 B9 Cutting Conditions



◌は数字が入ります。Numeric figure in a circle ◌

## GF3L◌◌M-3-M◌◌ モジュラータイプ Modular type

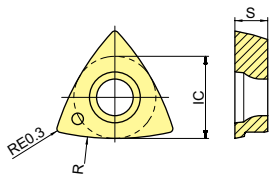
モジュラーミル用シャンクはD2頁を、締め付けトルクについてはD5頁を参照ください。
Refer page D2 about the shanks for Modular Mill, Refer page D5 about tightening torque




| 商品コード Item code | 在庫 Stock | 刃数 No. of flutes | 寸法 Size (mm) DC | LF | DCONMS | THSZMS | DHUB | L1 | L2 | DRVS | 使用インサート Insert | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GF3L20M-3-M10 | ● | 3 | 20 | 30 | 10.5 | M10 | 17.8 | 5.5 | 19 | 15 | TPHW0902-20 | 50,100 |
| GF3L25M-3-M12 | ● | 3 | 25 | 35 | 12.5 | M12 | 23 | 5.5 | 22 | 17 | TPHW1303-25 | 51,390 |
| GF3L30M-3-M16 | ● | 3 | 30 | 40 | 17 | M16 | 28.8 | 6 | 23 | 22 | TPHW1403-30 | 53,150 |

【注意】モジュラーミル及び専用シャンク、専用アーバの「工具端面」「モジュラーネジ部」にグリースなどの潤滑剤は塗布しないでください。
【Note】Do not apply lubricants such as grease, etc. to the “contact faces” and “modular screws” of the “modular mill”, “dedicated shanks” and “dedicated arbor”.
※工具の詳細形状についてはMOLDINOホームページよりDXFデータをダウンロードてください。（MOLDINO工具選定データベース TOOL SEARCH：http://data.moldino.com/toolsearch/）
※For information on the detailed tool shape, download the DXF data from the MOLDINO Tool Engineering home page. (MOLDINO Tool Engineering tool selection database TOOL SEARCH: http://data.moldino.com/toolsearch/)

## ■インサート Inserts




| | | | |
|---|---|---|---|
| P | 炭素鋼・合金鋼 Carbon steels Alloy steels | ■ | 凸 |
| M | SUS等 SUS, etc. | ■ | |
| K | FC・FCD Cast irons | 凸 | ■ |
| H | 高硬度材 Hardened steels | | ■ |

■：一般切削・第一推奨 General cutting, First recommended
凸：一般切削・第二推奨 General cutting, Second recommended

| 商品コード Item code | 精度 Tolerance class | 材種 Grade PN215 | TH315 | 寸法 Size (mm) IC | S | R | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|
| TPHW0902-20 | H | ● | ● | 6.5 | 2.6 | 20 | 2,120 |
| TPHW1303-25 | | ● | ● | 8.2 | 3.0 | 25 | 2,800 |
| TPHW1403-30 | | ● | ● | 9.8 | 3.2 | 30 | 3,150 |

※工具の詳細形状についてはMOLDINOホームページよりDXFデータをダウンロードしてください。
（MOLDINO工具選定データベース TOOL SEARCH：http://data.moldino.com/toolsearch/）
※For information on the detailed tool shape, download the DXF data from the MOLDINO Tool Engineering home page.
(MOLDINO Tool Engineering tool selection database TOOL SEARCH: http://data.moldino.com/toolsearch/)

## ■部品番号 Parts

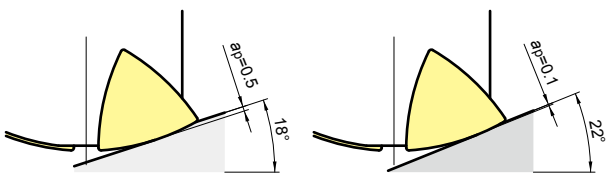
| 部品名 Parts / 形状 Shape / 適用カッタ Cutter body | クランプねじ Clamp screw | 締付けトルク Fastening torque (N·m) | 希望小売価格(円) Suggested retail price(¥) | レンチ Wrench | 希望小売価格(円) Suggested retail price(¥) | ねじ焼き付き防止剤 Screw anti-seizure agent | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|
| GF3L20M-3-M10 | 251-141 | 1.1 | 870 | 104-T8 | 1,800 | P-37 | 1,010 |
| GF3L25M-3-M12 | 265-143 | 2.0 | 870 | 104-T10 | 1,920 | | |
| GF3L30M-3-M16 | 412-141 | 2.9 | 540 | 104-T15 | 2,060 | | |

【注意】クランプねじは消耗品です。使用環境により交換寿命は変化しますので早めの交換をお願い致します。
【Note】The clamp screw is a consumable part. Since replacement life depends on the use environment, it is recommended that it be replaced at an early stage.

## GF3L形 切れ刃の切削可能範囲

Usable range of cutting edge for GF3L type

中仕上げ加工 Semi-finishing　仕上げ加工 Finishing



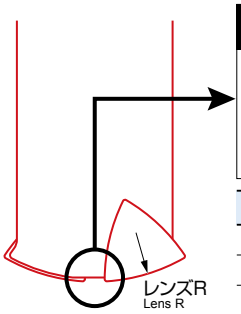

| | 最大$a_p$(仕上げ代) $a_p$ max finishing allowance | 切削可能範囲 Available cutting range |
|---|---|---|
| 中仕上げ加工 Semi-finishing | 0.5mm | 18° |
| 仕上げ加工 Finishing | 0.1mm | 22° |

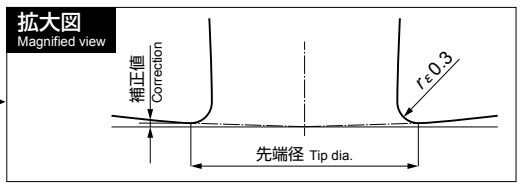
GF3L形は外周刃がないので、切削可能な範囲が切込量（$a_p$値）によって変化します。
Because of GF3L type does not have a peripheral cutting edge, cutting range changes according to cutting depth ($a_p$).

## 工具長測定値の補正

Correction of tool length measurement value

GF3L形には工具中心に切れ刃がありません。レンズ工具定義でツールパスを作成する場合、**工具長測定値**を補正してください。本工具形状の定義が可能なCAM及びDXFデータで工具定義が可能なCAMを使用する場合は**工具長測定値**の補正は不要です。
GF3L type does not have cutting edge in the tool center. When create toolpath with lens tool definition, correct the measurement value of tool length. When using a CAM that can define a tool shape with CAM and DXF data that can define a tool shape, it is unnecessary to correct the tool length measurement value.




| | 補正値Correction(mm) | 先端径Tip dia.(mm) |
|---|---|---|
| GF3L20M-3-M10 | 0.058 | 3.0 |
| GF3L25M-3-M12 | 0.056 | 3.3 |
| GF3L30M-3-M16 | 0.062 | 3.9 |

●印：標準在庫品です。　●：Stocked items.

## 標準切削条件表 Recommended cutting conditions

※赤字は第一推奨材種です。Red indicates primary recommended grade.

| 被削材 Work material | 推奨材種 Recommended grade | 切削条件 Cutting condition | 仕上げ加工 Finishing | | | 中仕上げ加工 Semi-finishing | | |
|---|---|---|---|---|---|---|---|---|
| | | | φ20 | φ25 | φ30 | φ20 | φ25 | φ30 |
| 炭素鋼 Carbon steels<br>合金鋼 Alloy steels<br>(<30HRC) | PN215 | *n* (min$^{-1}$) | 11,470 | 9,180 | 7,650 | 4,780 | 3,830 | 3,190 |
| | | *vc* (m/min) | 720 | 720 | 720 | 300 | 300 | 300 |
| | | *vf* (mm/min) | 6,890 | 5,510 | 4,590 | 7,170 | 5,750 | 4,790 |
| | | *fz* (mm/t) | 0.2 | 0.2 | 0.2 | 0.5 | 0.5 | 0.5 |
| | | *ap* (mm) | 0.1 | 0.1 | 0.1 | 0.5 | 0.5 | 0.5 |
| | | *ae* (mm) | 下記別表を参照ください。Refer below table | | | 下記別表を参照ください。Refer below table | | |
| 炭素鋼 Carbon steels<br>合金鋼 Alloy steels<br>(30～45HRC) | PN215<br>TH315 | *n* (min$^{-1}$) | 8,290 | 6,630 | 5,530 | 3,190 | 2,550 | 2,130 |
| | | *vc* (m/min) | 520 | 520 | 520 | 200 | 200 | 200 |
| | | *vf* (mm/min) | 4,980 | 3,980 | 3,320 | 4,790 | 3,830 | 3,200 |
| | | *fz* (mm/t) | 0.2 | 0.2 | 0.2 | 0.5 | 0.5 | 0.5 |
| | | *ap* (mm) | 0.1 | 0.1 | 0.1 | 0.5 | 0.5 | 0.5 |
| | | *ae* (mm) | 下記別表を参照ください。Refer below table | | | 下記別表を参照ください。Refer below table | | |
| ステンレス鋼 Stainless steels<br>SUS | PN215 | *n* (min$^{-1}$) | 7,970 | 6,370 | 5,310 | 4,780 | 3,830 | 3,190 |
| | | *vc* (m/min) | 500 | 500 | 500 | 300 | 300 | 300 |
| | | *vf* (mm/min) | 4,790 | 3,830 | 3,190 | 7,170 | 5,750 | 4,790 |
| | | *fz* (mm/t) | 0.2 | 0.2 | 0.2 | 0.5 | 0.5 | 0.5 |
| | | *ap* (mm) | 0.1 | 0.1 | 0.1 | 0.5 | 0.5 | 0.5 |
| | | *ae* (mm) | 下記別表を参照ください。Refer below table | | | 下記別表を参照ください。Refer below table | | |
| 鋳鉄 Cast irons<br>FC<br>FCD | TH315<br>PN215 | *n* (min$^{-1}$) | 10,360 | 8,290 | 6,910 | 6,370 | 5,100 | 4,250 |
| | | *vc* (m/min) | 650 | 650 | 650 | 400 | 400 | 400 |
| | | *vf* (mm/min) | 9,330 | 7,470 | 6,220 | 9,560 | 7,650 | 6,380 |
| | | *fz* (mm/t) | 0.3 | 0.3 | 0.3 | 0.5 | 0.5 | 0.5 |
| | | *ap* (mm) | 0.1 | 0.1 | 0.1 | 0.5 | 0.5 | 0.5 |
| | | *ae* (mm) | 下記別表を参照ください。Refer below table | | | 下記別表を参照ください。Refer below table | | |
| 焼入れ鋼 Hardened steels<br>(45～55HRC) | TH315 | *n* (min$^{-1}$) | 3,990 | 3,190 | 2,660 | 1,920 | 1,530 | 1,280 |
| | | *vc* (m/min) | 250 | 250 | 250 | 120 | 120 | 120 |
| | | *vf* (mm/min) | 2,400 | 1,920 | 1,600 | 580 | 460 | 390 |
| | | *fz* (mm/t) | 0.2 | 0.2 | 0.2 | 0.15 | 0.15 | 0.15 |
| | | *ap* (mm) | 0.08 | 0.08 | 0.08 | 0.2 | 0.2 | 0.2 |
| | | *ae* (mm) | 下記別表を参照ください。Refer below table | | | 下記別表を参照ください。Refer below table | | |

## aeの算出方法 How to calculate "ae"

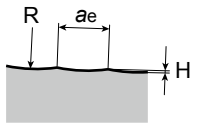
**ae 値は所望のカスプハイトにより下記表より選択、または下記計算式より算出してください。**

Determine the *ae* value based on the desired cusp height by selecting it from the table below or by calculating it using the equation below.

| 使用インサート Insert | R | カスプハイト Cusp height (mm) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 0.001 | 0.002 | 0.003 | 0.004 | 0.005 | 0.01 | 0.02 |
| TPHW0902-20 | 20 | 0.4 | 0.57 | 0.69 | 0.8 | 0.89 | 1.26 | 1.79 |
| TPHW1303-25 | 25 | 0.45 | 0.63 | 0.77 | 0.89 | 1 | 1.41 | 2 |
| TPHW1403-30 | 30 | 0.49 | 0.69 | 0.85 | 0.98 | 1.1 | 1.55 | 2.19 |

$$ae = 2\sqrt{(R^2-(R-H)^2)}$$

R: 工具R Tool R　H：カスプハイト Cusp height




【注意】①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③切りくず噛み込みによる工具損傷防止のため、必ずエアーブロー等による切りくず除去を行ってください。
④インサートの交換は早めに行い、過度の使用による破損を防止してください。

【Note】①Use the appropriate coolant for the work material and machining shape.
②These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
③To prevent tool breakage due to chips clogging tool flutes, always be sure to use an air blower, etc. to remove chips.
④Ensure to index the insert at the correct time to ensure safety of the tool-body.

## 突き出し長さに伴う標準切削条件の調整率 Ajustment ratio of cutting conditions by overhang length.

**突き出し長さが3DC以上の場合は上記切削条件表の数値を右表を参考に調整してください。**

When overhang length is 3DC or more, please adjust the values in the above cutting condition table referring to the right table.

| 突き出し比率 Overhang ratio | *Vc* (m/min) | *Vf* (mm/min) |
|---|---|---|
| <3DC | 100% | 100% |
| 3DC ～ 5DC | 70% | 70% |
| 5DC ～ 6DC | 60% | 60% |
| 6DC ～ 7DC | 50% | 50% |
| 7DC ～ | 45% | 45% |

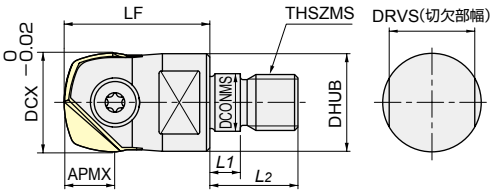
# GALLEA GP1LB

●レンズ工具とバレル工具の融合、 プレシジョンタイプ
●なだらかな曲面と壁面を１本で加工可能
· Combination of lens tool and barrel tool. Precision type
· Can be machined with a single tool for gently curved surface and wall surface.

仕上 Finishing / 平面 Planing / 側面 Side Cutting / 曲面 Profiling / 切削条件表 B11 Cutting Conditions

## GP1LB○○M-M○○ モジュラータイプ Modular type

○は数字が入ります。
Numeric figure in a circle ○.

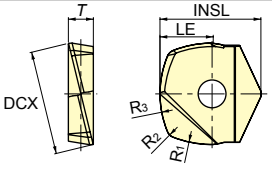



モジュラーミル用シャンクはD2頁を､締め付けトルクについてはD5頁を参照ください。
Refer page D2 about the shanks for Modular Mill, Refer page D5 about tightening torque

| 商品コード Item code | 在庫 Stock | インサート数 No. of Inserts | 寸法 Size (mm) DCX | LF | APMX | DCONMS | THSZMS | DHUB | $L_1$ | $L_2$ | DRVS | 使用インサート Insert | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GP1LB16M-M8 | ● | 1 | 16 | 32 | 8 | 8.5 | M8 | 12.8 | 5.5 | 17 | 10 | ZPHW160-LB16 | 23,350 |
| GP1LB20M-M10 | ● | 1 | 20 | 38 | 10 | 10.5 | M10 | 17.8 | 5.5 | 19 | 15 | ZPHW200-LB20 | 26,870 |
| GP1LB25M-M12 | ● | 1 | 25 | 38 | 12.5 | 12.5 | M12 | 20.8 | 5.5 | 22 | 17 | ZPHW250-LB25 | 41,060 |
| GP1LB30M-M16 | ● | 1 | 30 | 43 | 15 | 17 | M16 | 28.8 | 6 | 23 | 22 | ZPHW300-LB30 | 41,060 |

【注意】モジュラーミル及び専用シャンク、専用アーバの「工具端面」「モジュラーネジ部」にグリースなどの潤滑剤は塗布しないでください。
【Note】Do not apply lubricants such as grease, etc. to the “contact faces” and “modular screws” of the “modular mill”, “special shanks” and “special arbor”.
※工具の詳細形状についてはMOLDINOホームページよりDXFデータをダウンロードてください。(MOLDINO工具選定データベース TOOL SEARCH：http://data.moldino.com/toolsearch/)
※For information on the detailed tool shape, download the DXF data from the MOLDINO Tool Engineering home page. (MOLDINO Tool Engineering tool selection database TOOL SEARCH: http://data.moldino.com/toolsearch/)

## ■インサート Insert




| | | | |
|---|---|---|---|
| P | 炭素鋼･合金鋼 Carbon steels Alloy steels | ■ | ⌐ |
| M | SUS等 SUS, etc. | ■ | |
| K | FC･FCD Cast irons | ⌐ | ■ |
| H | 高硬度材 Hardened steels | | ■ |

■：一般切削・第一推奨 General cutting, First recommended
⌐：一般切削・第二推奨 General cutting, Second recommended

| 商品コード Item code | 精度 Tolerance class | 材種 Grade PN215 | TH308 | 寸法 Size (mm) $R_1$ | $R_2$ | $R_3$ | LE | INSL | DCX | $T$ | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ZPHW160-LB16 | H | ● | ● | 16 | 1.5 | 16 | 8 | 16.6 | 16 | 4.2 | 11,460 |
| ZPHW160-LB16-R5 | | ● | ● | 16 | 5 | 16 | 8 | 16.6 | 16 | 4.2 | 11,460 |
| ZPHW200-LB20 | | ● | ● | 20 | 1.9 | 20 | 10 | 20.3 | 20 | 5.2 | 12,130 |
| ZPHW200-LB20-R6 | | ● | ● | 20 | 6 | 20 | 10 | 20.3 | 20 | 5.2 | 12,130 |
| ZPHW250-LB25 | | ● | ● | 25 | 2.38 | 25 | 12.5 | 24.1 | 25 | 6.2 | 13,250 |
| ZPHW250-LB25-R8 | | ● | ● | 25 | 8 | 25 | 12.5 | 24.1 | 25 | 6.2 | 13,250 |
| ZPHW300-LB30 | | ● | ● | 30 | 2.85 | 30 | 15 | 29.1 | 30 | 7.2 | 16,610 |
| ZPHW300-LB30-R10 | | ● | ● | 30 | 10 | 30 | 15 | 29.1 | 30 | 7.2 | 16,610 |

## ■部品番号 Parts

| 部品名 Parts | クランプねじ Clamp screw | | | レンチ Wrench | | ねじ焼き付き防止剤 Screw anti-seizure agent | |
|---|---|---|---|---|---|---|---|
| 形状 Shape / 適用カッタ Cutter body | | 締付けトルク Fastening torque (N･m) | 希望小売価格(円) Suggested retail price(¥) | | 希望小売価格(円) Suggested retail price(¥) | | 希望小売価格(円) Suggested retail price(¥) |
| GP1LB16M-M8 | 581-144 | 4.9 | 1,490 | 105-T20 | 2,120 | P-37 | 1,010 |
| GP1LB20M-M10 | 581-145 | 6.9 | | 101-T25S | 1,440 | | |
| GP1LB25M-M12 | 581-146 | 9.8 | 1,710 | 105-T30A | 2,120 | | |
| GP1LB30M-M16 | 581-147 | 9.8 | | | | | |

※インサートはアルファポールプレシジョンF「ABPF形」ホルダに取り付け可能です。
※工具の詳細形状についてはMOLDINOホームページよりDXFデータをダウンロードしてください。(MOLDINO工具選定データベース TOOL SEARCH http://data.moldino.com/toolsearch/)
※The insert can be attached to Ball Precision F (ABPF type) holders.
※For information on the detailed tool shape, download the DXF data from the MOLDINO Tool Engineering home page. (MOLDINO Tool Engineering tool selection database TOOL SEARCH: http://data.moldino.com/toolsearch/)
【注意】クランプねじは消耗品です。使用環境により交換寿命は変化しますので早めの交換をお願い致します。
【Note】The clamp screw is a consumable part. Since replacement life depends on the use environment, it is recommended that it be replaced at an early stage.

【注意】小数点第三位以下を四捨五入した数値です。パラメトリックで形状定義する場合はDXFデータより必要寸法をご確認ください。
【Note】The numbers after the third decimal point are rounded off. When defining the shape parametrically, check the required dimensions from the DXF data.

●印：標準在庫品です。
●：Stocked items.

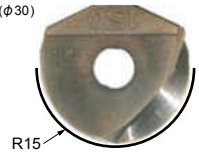
GP1LB形のインサートは最大2回までの再研磨が可能です。Insert of GP1LB, regrinding can be performed up to a maximum of 2 times.
インサートの再研磨&再コーティングも承っております。詳しくは弊社営業所までお問い合せください。Please inquire insert re-grinding / re-coating to sales office.

## GP1LBインサートの使い分け How to select GP1LB inserts

φ30工具による3軸加工の加工能率の比較 ※バレルR刃、レンズR刃、コーナ接続R刃のカスプハイトをボールエンドミルと同一に設定
Comparison of cutting efficiency of 3-axis machining with φ30 tool. ※Set the cusp-height of each edge of barrel R, lens R and corner-connected R same as ball end mill

### φ30ボールエンドミル

Ball end mill (φ30)



起伏が大きい形状ではボールエンドミルで加工
Ball end mill is recommended for shapes with large undulations

### GP1LB ZPHW300-LB30-R10

加工能率 ボールエンドミル比1.4倍
1.4 times cutting efficiency than ball end mill
加工能率 ボールエンドミル比0.8倍
Cutting efficiency Compared with the ball end mill 0.8 times

起伏のある曲面で高能率加工!!
High efficiency machining on undulating curved surface.
バレルR刃+レンズR刃が加工全体の47%以上使用できれば同一刃径のボールエンドミルより高能率
If the barrel R and lens R can be used more than 47% of the whole machining, more efficient than ball end mill of same diameter.

### GP1LB ZPHW300-LB30

加工能率 ボールエンドミル比1.4倍
1.4 times cutting efficiency than ball end mill
加工能率 ボールエンドミル比0.4倍
Cutting efficiency Compared with the ball end mill 0.4 times

起伏の少ない緩曲面で高能率加工!!
High efficiency machining with gentle curved surface with less undulation.
バレルR刃+レンズR刃が加工全体の84%以上使用できれば同一刃径のボールエンドミルより高能率
If the barrel R and lens R can be used more than 84% of the whole machining, more efficient than ball end mill of same diameter.

※加工するモデル形状のバレルR刃とレンズR刃の使用率を確認しインサートを使い分けることで、より高能率な加工が可能です。
Checking the usage rate of barrel R edge and lens R edge in model shape to be processed and choosing an insert, possible more efficient machining.

# 標準切削条件表 Recommended cutting conditions

※赤字は第一推奨材種です。Red indicates primary recommended grade.

| 被削材 Work material | 推奨材種 Recommended grade | 切削条件 Cutting condition | レンズ部 Lens part φ16 | φ20 | φ25 | φ30 | バレル部 Barrel part φ16 | φ20 | φ25 | φ30 |
|---|---|---|---|---|---|---|---|---|---|---|
| 炭素鋼 Carbon steels 合金鋼 Alloy steels (<30HRC) | PN215 | n (min-1) | 14,340 | 11,470 | 9,180 | 7,650 | 11,950 | 9,560 | 7,650 | 6,370 |
| | | vc (m/min) | 720 | 720 | 720 | 720 | 600 | 600 | 600 | 600 |
| | | vf (mm/min) | 7,170 | 5,740 | 4,590 | 3,830 | 4780 | 3,830 | 3,060 | 2,550 |
| | | fz (mm/t) | 0.25 | 0.25 | 0.25 | 0.25 | 0.2 | 0.2 | 0.2 | 0.2 |
| | | ap (mm) | 0.1 | 0.1 | 0.1 | 0.1 | 下表を参照ください。Refer below table | | | |
| | | ae (mm) | 下表を参照ください。Refer below table | | | | 0.1 | 0.1 | 0.1 | 0.1 |
| 炭素鋼 Carbon steels 合金鋼 Alloy steels (30~45HRC) | PN215 TH308 | n (min-1) | 10,360 | 8,290 | 6,630 | 5,530 | 7,970 | 6,370 | 5,100 | 4,250 |
| | | vc (m/min) | 520 | 520 | 520 | 520 | 400 | 400 | 400 | 400 |
| | | vf (mm/min) | 5,180 | 4,150 | 3,320 | 2,770 | 3,190 | 2,550 | 2,040 | 1,700 |
| | | fz (mm/t) | 0.25 | 0.25 | 0.25 | 0.25 | 0.2 | 0.2 | 0.2 | 0.2 |
| | | ap (mm) | 0.1 | 0.1 | 0.1 | 0.1 | 下表を参照ください。Refer below table | | | |
| | | ae (mm) | 下表を参照ください。Refer below table | | | | 0.1 | 0.1 | 0.1 | 0.1 |
| ステンレス鋼 Stainless steels SUS | PN215 | n (min-1) | 12,940 | 10,360 | 8,290 | 6,910 | 9,960 | 7,970 | 6,370 | 5,310 |
| | | vc (m/min) | 650 | 650 | 650 | 650 | 500 | 500 | 500 | 500 |
| | | vf (mm/min) | 6,470 | 5,180 | 4,150 | 3,460 | 3,990 | 3,190 | 2,550 | 2,130 |
| | | fz (mm/t) | 0.25 | 0.25 | 0.25 | 0.25 | 0.2 | 0.2 | 0.2 | 0.2 |
| | | ap (mm) | 0.1 | 0.1 | 0.1 | 0.1 | 下表を参照ください。Refer below table | | | |
| | | ae (mm) | 下表を参照ください。Refer below table | | | | 0.1 | 0.1 | 0.1 | 0.1 |
| 鋳鉄 Cast irons FC FCD | TH308 PN215 | n (min-1) | 14,340 | 11,470 | 9,180 | 7,650 | 11,950 | 9,560 | 7,650 | 6,370 |
| | | vc (m/min) | 720 | 720 | 720 | 720 | 600 | 600 | 600 | 600 |
| | | vf (mm/min) | 11,480 | 9,180 | 7,350 | 6,120 | 5,980 | 4,780 | 3,830 | 3,190 |
| | | fz (mm/t) | 0.4 | 0.4 | 0.4 | 0.4 | 0.25 | 0.25 | 0.25 | 0.25 |
| | | ap (mm) | 0.1 | 0.1 | 0.1 | 0.1 | 下表を参照ください。Refer below table | | | |
| | | ae (mm) | 下表を参照ください。Refer below table | | | | 0.1 | 0.1 | 0.1 | 0.1 |
| 焼入れ鋼 Hardened steels (45~55HRC) | TH308 | n (min-1) | 6,370 | 5,100 | 4,080 | 3,400 | 4,980 | 3,990 | 3,190 | 2,660 |
| | | vc (m/min) | 320 | 320 | 320 | 320 | 250 | 250 | 250 | 250 |
| | | vf (mm/min) | 2,550 | 2,040 | 1,640 | 1,360 | 1,500 | 1,200 | 960 | 800 |
| | | fz (mm/t) | 0.20 | 0.20 | 0.20 | 0.20 | 0.15 | 0.15 | 0.15 | 0.15 |
| | | ap (mm) | 0.08 | 0.08 | 0.08 | 0.08 | 下表を参照ください。Refer below table | | | |
| | | ae (mm) | 下表を参照ください。Refer below table | | | | 0.08 | 0.08 | 0.08 | 0.08 |
| 焼入れ鋼 Hardened steels (55~62HRC) | TH308 | n (min-1) | 5,580 | 4,460 | 3,570 | 2,980 | 4,380 | 3,510 | 2,810 | 2,340 |
| | | vc (m/min) | 280 | 280 | 280 | 280 | 220 | 220 | 220 | 220 |
| | | vf (mm/min) | 2,240 | 1,790 | 1,430 | 1,200 | 1,320 | 1,060 | 850 | 710 |
| | | fz (mm/t) | 0.20 | 0.20 | 0.20 | 0.20 | 0.15 | 0.15 | 0.15 | 0.15 |
| | | ap (mm) | 0.05 | 0.05 | 0.05 | 0.05 | 下表を参照ください。Refer below table | | | |
| | | ae (mm) | 下表を参照ください。Refer below table | | | | 0.05 | 0.05 | 0.05 | 0.05 |

バレルR(外周刃R) Barrel Radius (Peripheral edge Radius)

レンズR（底刃R） Lens Radius(Bottom edge Radius)

・レンズRを多用する加工形状では上記表の「レンズ部切削条件」を参照してください。
・バレルRを多用する加工形状では上記表の「バレル部切削条件」を参照してください。
・レンズR、バレルR両方使用する加工形状では割合の多い方の条件で設定してください。

・For machining shapes that make heavy use of lens R, refer to the "Lens part cutting conditions" in the above table.
・For machining shapes that make heavy use of barrel R, refer to the "Barrel part cutting conditions" in the above table.
・For machining shapes that use both lens R and barrel R, refer to the conditions for the higher usage ratio.

## 突き出し長さ3DCX以上の場合は、上記の表をもとに下記表を参考に調整してください。

When overhang length is 3DCX or more, adjust the values shown in the below table according to the above table.

| 突き出し比率 Overhang ratio | Vc (m/min) | Vf (mm/min) |
|---|---|---|
| <3DCX | 100% | 100% |
| 3DCX ~ 5DCX | 70% | 70% |
| 5DCX ~ 6DCX | 60% | 60% |
| 6DCX ~ 7DCX | 50% | 50% |
| 7DCX ~ | 45% | 45% |

## ap または ae 値は所望のカスプハイトにより下記表より選択、または下記計算式より算出してください。

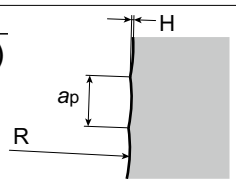
Determine the ap or ae value based on the desired cusp height by selecting it from the table below or by calculating it using the equation below.

| インサート Insert 商品コード Item code | R | カスプハイト Cusp height (mm) 0.001 | 0.002 | 0.003 | 0.004 | 0.005 | 0.01 |
|---|---|---|---|---|---|---|---|
| ZPHW160-LB16 | 16 | 0.36 | 0.51 | 0.62 | 0.72 | 0.8 | 1.13 |
| ZPHW200-LB20 | 20 | 0.4 | 0.57 | 0.69 | 0.8 | 0.89 | 1.26 |
| ZPHW250-LB25 | 25 | 0.45 | 0.63 | 0.77 | 0.89 | 1 | 1.41 |
| ZPHW300-LB30 | 30 | 0.49 | 0.69 | 0.85 | 0.98 | 1.1 | 1.55 |

$$ap = 2\sqrt{(R^2-(R-H)^2)}$$

(ae)

R: 工具R Tool R　H：カスプハイト Cusp height




【注意】
①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③切りくず噛み込みによる工具損傷防止のため、必ずエアーブロー等による切りくず除去を行ってください。
④インサートの交換は早めに行い、過度の使用による破損を防止してください。

【Note】
①Use the appropriate coolant for the work material and machining shape.
②These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
③To prevent tool breakage due to chips clogging tool flutes, always be sure to use an air blower, etc. to remove chips.
④Ensure to index the insert at the correct time to ensure safety of the tool-body.

インサート取り付け手順はB14ページを参照ください。Refer B14 for set-up procedures of inserts.

# GALLEA GP1T

YouTube 動画公開中

●5軸加工のメリットを最大限活かす1つの工具で2種類の加工
●工具交換無しで加工できるので、 加工段差が最小限に。
· Two types of process are possible with one tool that can fully utilize the merit of 5-axis machining
· Since it can work for 2 types of process without tool change, machining surface steps can be minimized.

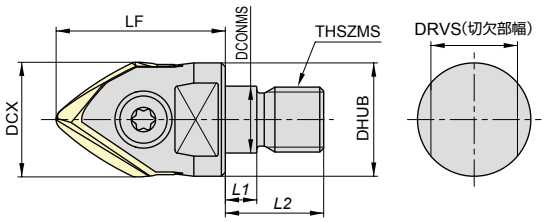
仕上 Finishing / 曲面 Profiling / 切削条件表 B13 Cutting Conditions



◌は数字が入ります。Numeric figure in a circle◌.

## GP1T◌◌M-M◌◌ モジュラータイプ Modular type

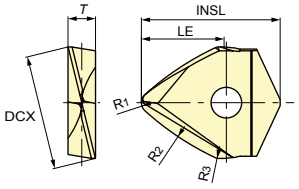
モジュラーミル用シャンクはD2頁を、締め付けトルクについてはD5頁を参照ください。
Refer page D2 about the shanks for Modular Mill, Refer page D5 about tightening torque




| 商品コード Item code | 在庫 Stock | インサート数 No. of Inserts | 寸法 Size (mm) DCX | LF | DCONMS | THSZMS | DHUB | L1 | L2 | DRVS | 使用インサート Insert | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GP1T12M-M6 | ● | 1 | 12 | 26 | 6.5 | M6 | 9.8 | 5.5 | 14.5 | 7 | ZDHW120-T43R1.2-30 | 22,060 |
| GP1T16M-M8 | ● | 1 | 16 | 32 | 8.5 | M8 | 12.8 | 5.5 | 17 | 10 | ZDHW160-T43R1.6-40 | 25,700 |
| GP1T20M-M10 | ● | 1 | 20 | 38 | 10.5 | M10 | 17.8 | 5.5 | 19 | 15 | ZDHW200-T43R2-50 | 29,570 |
| GP1T25M-M12 | ● | 1 | 25 | 38 | 12.5 | M12 | 20.8 | 5.5 | 22 | 17 | ZDHW250-T43R2.5-62.5 | 45,170 |
| GP1T30M-M16 | ● | 1 | 30 | 43 | 17 | M16 | 28.8 | 6 | 23 | 22 | ZDHW300-T43R3-75 | 45,170 |

【注意】モジュラーミル及び専用シャンク、専用アーバの「工具端面」「モジュラーネジ部」にグリースなどの潤滑剤は塗布しないでください。
【Note】Do not apply lubricants such as grease, etc. to the "contact faces" and "modular screws" of the "modular mill", "dedictaed shanks" and "dedictaed arbor".
※工具の詳細形状についてはMOLDINOホームページよりDXFデータをダウンロードしてください。(MOLDINO工具選定データベース TOOL SEARCH：http://data.moldino.com/toolsearch/)
※For information on the detailed tool shape, download the DXF data from the MOLDINO Tool Engineering home page. (MOLDINO Tool Engineering tool selection database TOOL SEARCH: http://data.moldino.com/toolsearch/)

## ■インサート Inserts




| | | | |
|---|---|---|---|
| P | 炭素鋼・合金鋼 Carbon steels, Alloy steels | ■ | 凵 |
| M | SUS等 SUS, etc. | ■ | |
| K | FC・FCD Cast irons | 凵 | ■ |
| H | 高硬度材 Hardened steels | | ■ |

■：一般切削・第一推奨 General cutting, First recommended
凵：一般切削・第二推奨 General cutting, Second recommended

| 商品コード Item code | 精度 Tolerance class | 材種 Grade PN215 | TH308 | 寸法 Size (mm) R1 | R2 | R3 | LE | INSL | DCX | T | 希望小売価格(円) Suggested retail price(¥) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ZDHW120-T43R1.2-30 | H | ● | ● | 1.2 | 30 | 0.98 | 8.6 | 17.6 | 12 | 3.2 | 11,150 |
| ZDHW160-T43R1.6-40 | | ● | ● | 1.6 | 40 | 1.3 | 11.3 | 20.6 | 16 | 4.2 | 11,460 |
| ZDHW200-T43R2-50 | | ● | ● | 2.0 | 50 | 1.63 | 14.3 | 25.4 | 20 | 5.2 | 12,130 |
| ZDHW250-T43R2.5-62.5 | | ● | ● | 2.5 | 62.5 | 2.04 | 17.9 | 30.1 | 25 | 6.2 | 13,250 |
| ZDHW300-T43R3-75 | | ● | ● | 3.0 | 75 | 2.45 | 21.6 | 36.3 | 30 | 7.2 | 16,610 |

・インサートはアルファボールプレシジョンF「ABPF形」ホルダに取り付け可能です。
・小径サイズはソリッドバレルエンドミル GS4TN をご使用ください。
・The insert can be set with "ABPF-type" cutter body
・Use solid barrel end mill, "GS4TN-type" for smaller diameter in size

【注意】小数点第三位以下を四捨五入した数値です。パラメトリックで形状定義する場合はDXFデータより必要寸法をご確認ください。
【Note】The numbers after the third decimal point are rounded off. When defining the shape parametrically, check the required dimensions from the DXF data.
※工具の詳細形状についてはMOLDINOホームページよりDXFデータをダウンロードしてください。(MOLDINO工具選定データベース TOOL SEARCH：http://data.moldino.com/toolsearch/)
※For information on the detailed tool shape, download the DXF data from the MOLDINO Tool Engineering home page. (MOLDINO Tool Engineering tool selection database TOOL SEARCH: http://data.moldino.com/toolsearch/)

## ■部品番号 Parts

| 部品名 Parts / 形状 Shape / 適用カッタ Cutter body | クランプねじ Clamp screw | 締付けトルク Fastening torque (N·m) | 希望小売価格(円) Suggested retail price (¥) | レンチ Wrench | 希望小売価格(円) Suggested retail price (¥) | ねじ焼き付き防止剤 Screw anti-seizure agent | 希望小売価格(円) Suggested retail price (¥) |
|---|---|---|---|---|---|---|---|
| GP1T12M-M6 | 581-143 | 4.9 | 1,490 | 105-T20 | 2,120 | P-37 | 1,010 |
| GP1T16M-M8 | 581-144 | 4.9 | | | | | |
| GP1T20M-M10 | 581-145 | 6.9 | | 101-T25S | 1,440 | | |
| GP1T25M-M12 | 581-146 | 9.8 | 1,710 | 105-T30A | 2,120 | | |
| GP1T30M-M16 | 581-147 | 9.8 | | | | | |

【注意】クランプねじは消耗品です。使用環境により交換寿命は変化しますので早めの交換をお願い致します。
【Note】The clamp screw is a consumable part. Since replacement life depends on the use environment, it is recommended that it be replaced at an early stage.

●印：標準在庫品です。 ●：Stocked items.

# 標準切削条件表 Recommended cutting conditions

※赤字は第一推奨材種です。Red indicates primary recommended grade.

| 被削材 Work material | 推奨材種 Recommended grade | 切削条件 Cutting conditions | 先端R Tip R | | | | | バレルR Barrel R | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | φ12(R1.2) | φ16(R1.6) | φ20(R2) | φ25(R2.5) | φ30(R3) | φ12 | φ16 | φ20 | φ25 | φ30 |
| 炭素鋼 合金鋼 Carbon steels Alloy steels (<30HRC) | PN215 | n (min-1) | 19,910 | 14,930 | 11,950 | 9,560 | 7,970 | 19,110 | 14,340 | 11,470 | 9,180 | 7,650 |
| | | vc (m/min) | 750(150) | 750(150) | 750(150) | 750(150) | 750(150) | 720 | 720 | 720 | 720 | 720 |
| | | vf (mm/min) | 1,600 | 1,500 | 1,440 | 1,340 | 1,280 | 5,740 | 4,310 | 3,450 | 2,760 | 2,300 |
| | | fz (mm/t) | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 |
| | | ap (mm) | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 下表を参照ください。Refer below table | | | | |
| | | ae (mm) | 下表を参照ください。Refer below table | | | | | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| 炭素鋼 合金鋼 Carbon steels Alloy steels (30～45HRC) | PN215 TH308 | n (min-1) | 18,580 | 13,940 | 11,150 | 8,920 | 7,440 | 13,810 | 10,360 | 8,290 | 6,630 | 5,530 |
| | | vc (m/min) | 700(140) | 700(140) | 700(140) | 700(140) | 700(140) | 520 | 520 | 520 | 520 | 520 |
| | | vf (mm/min) | 1,490 | 1,400 | 1,340 | 1,250 | 1,200 | 4,150 | 3,110 | 2,490 | 1,990 | 1,660 |
| | | fz (mm/t) | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 |
| | | ap (mm) | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 下表を参照ください。Refer below table | | | | |
| | | ae (mm) | 下表を参照ください。Refer below table | | | | | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| ステンレス鋼 Stainless steels SUS | PN215 | n (min-1) | 19,910 | 14,930 | 11,950 | 9,560 | 7,970 | 17,260 | 12,940 | 10,360 | 8,290 | 6,910 |
| | | vc (m/min) | 750(150) | 750(150) | 750(150) | 750(150) | 750(150) | 650 | 650 | 650 | 650 | 650 |
| | | vf (mm/min) | 1,600 | 1,500 | 1,440 | 1,340 | 1,280 | 5,180 | 3,890 | 3,110 | 2,490 | 2,080 |
| | | fz (mm/t) | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 |
| | | ap (mm) | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 下表を参照ください。Refer below table | | | | |
| | | ae (mm) | 下表を参照ください。Refer below table | | | | | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| 鋳鉄 Cast irons FC FCD | TH308 PN215 | n (min-1) | 19,910 | 14,930 | 11,950 | 9,560 | 7,970 | 19,110 | 14,340 | 11,470 | 9,180 | 7,650 |
| | | vc (m/min) | 750(150) | 750(150) | 750(150) | 750(150) | 750(150) | 720 | 720 | 720 | 720 | 720 |
| | | vf (mm/min) | 1,600 | 1,500 | 1,440 | 1,340 | 1,280 | 7,650 | 5,740 | 4,590 | 3,680 | 3,060 |
| | | fz (mm/t) | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| | | ap (mm) | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 下表を参照ください。Refer below table | | | | |
| | | ae (mm) | 下表を参照ください。Refer below table | | | | | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| 焼入れ鋼 Hardened steels (45～55HRC) | TH308 | n (min-1) | 13,270 | 9,960 | 7,970 | 6,370 | 5,310 | 8,500 | 6,370 | 5,100 | 4,080 | 3,400 |
| | | vc (m/min) | 500(100) | 500(100) | 500(100) | 500(100) | 500(100) | 320 | 320 | 320 | 320 | 320 |
| | | vf (mm/min) | 1,070 | 1,000 | 960 | 900 | 850 | 1,700 | 1,280 | 1,020 | 820 | 680 |
| | | fz (mm/t) | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| | | ap (mm) | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 下表を参照ください。Refer below table | | | | |
| | | ae (mm) | 下表を参照ください。Refer below table | | | | | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 |
| 焼入れ鋼 Hardened steels (55～62HRC) | TH308 | n (min-1) | 11,950 | 8,960 | 7,170 | 5,740 | 4,780 | 7,440 | 5,580 | 4,460 | 3,570 | 2,980 |
| | | vc (m/min) | 450(90) | 450(90) | 450(90) | 450(90) | 450(90) | 280 | 280 | 280 | 280 | 280 |
| | | vf (mm/min) | 960 | 900 | 870 | 810 | 770 | 1,490 | 1,120 | 900 | 720 | 600 |
| | | fz (mm/t) | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| | | ap (mm) | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 下表を参照ください。Refer below table | | | | |
| | | ae (mm) | 下表を参照ください。Refer below table | | | | | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |

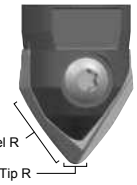
※vc の ( ) 値は先端小R部の切削速度を示します。The ( ) values of vc indicate the cutting speed of the tip R part.

**突き出し長さ3DCX以上の場合は、上記の表をもとに右記表を参考に調整してください。**

When overhang length is 3DCX or more, adjust the values shown in the table at right according to the above table.

| 突き出し比率 Overhang ratio | Vc (m/min) | Vf (mm/min) |
|---|---|---|
| <3DCX | 100% | 100% |
| 3DCX ～5DCX | 70% | 70% |
| 5DCX ～6DCX | 60% | 60% |

| 突き出し比率 Overhang ratio | Vc (m/min) | Vf (mm/min) |
|---|---|---|
| 6DCX ～7DCX | 50% | 50% |
| 7DCX ～ | 45% | 45% |



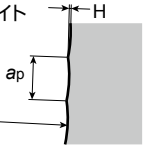

**apまたはae値は所望のカスプハイトにより下記表より選択、または下記計算式より算出してください。**

Determine the ap or ae value based on the desired cusp height by selecting it from the table below or by calculating it using the equation below.

| インサート Insert | バレルRの切込み Cutting depth using barrel R ap(mm) | | | | | | | | 先端Rの切込み Cutting depth using tip R ae(mm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 商品コード Item code | バレルR Barrel R | カスプハイト Cusp height (mm) | | | | | | | 先端R Tip R | カスプハイト Cusp height (mm) | | | | | | |
| | | 0.0005 | 0.001 | 0.002 | 0.003 | 0.004 | 0.005 | 0.01 | | 0.0005 | 0.001 | 0.002 | 0.003 | 0.004 | 0.005 | 0.01 |
| ZDHW120-T43R1.2-30 | 30 | 0.35 | 0.49 | 0.69 | 0.85 | 0.98 | 1.1 | 1.55 | 1.2 | 0.07 | 0.1 | 0.14 | 0.17 | 0.2 | 0.22 | 0.31 |
| ZDHW160-T43R1.6-40 | 40 | 0.4 | 0.57 | 0.8 | 0.98 | 1.13 | 1.26 | 1.79 | 1.6 | 0.08 | 0.11 | 0.16 | 0.2 | 0.23 | 0.25 | 0.36 |
| ZDHW200-T43R2-50 | 50 | 0.45 | 0.63 | 0.89 | 1.1 | 1.26 | 1.41 | 2 | 2 | 0.09 | 0.13 | 0.18 | 0.22 | 0.25 | 0.28 | 0.4 |
| ZDHW250-T43R2.5-62.5 | 62.5 | 0.5 | 0.71 | 1 | 1.22 | 1.41 | 1.58 | 2.24 | 2.5 | 0.1 | 0.14 | 0.2 | 0.24 | 0.28 | 0.32 | 0.45 |
| ZDHW300-T43R3-75 | 75 | 0.55 | 0.77 | 1.1 | 1.34 | 1.55 | 1.73 | 2.45 | 3 | 0.11 | 0.15 | 0.22 | 0.27 | 0.31 | 0.35 | 0.49 |

$$a_p = 2\sqrt{(R^2-(R-H)^2)}\ (a_e)$$

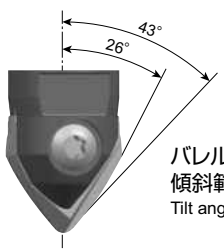
R: 工具R
H：カスプハイト
R : Tool R
H : Cusp height



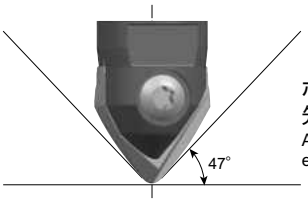

【注意】
①被削材、加工形状に合わせて、適切なクーラントを使用してください。
②この切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
③切りくず噛み込みによる工具損傷防止のため、必ずエアーブロー等による切りくず除去を行ってください。
④インサートの交換は早めに行い、過度の使用による破損を防止してください。

【Note】
①Use the appropriate coolant for the work material and machining shape.
②These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
③To prevent tool breakage due to chips clogging tool flutes, always be sure to use an air blower, etc. to remove chips.
④Ensure to index the insert at the correct time to ensure safety of the tool-body.

# バレルRと先端Rの角度範囲 Angle range of barrel R and tip R




バレルRを使用時の工具軸の傾斜範囲
Tilt angle range when barrel R is used




ボールエンドミルとして使用可能な先端Rの範囲
Angle range that can be used as a ball end mill

インサート取り付け手順はB14ページを参照ください。Refer B14 for set-up procedures of inserts.

# GALLEA GP1LB/GP1T



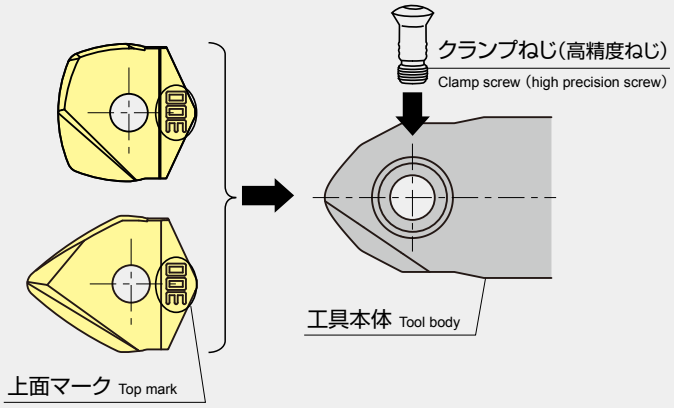
## インサート取付け手順 Set-up Procedures of Inserts

**1** インサート座面の清掃
エアブローなどで、インサート座面を清掃ください。
Clean the insert seat:
Using air-blow or alike, clean the seat.

**2** インサートは、上面を工具本体のねじ締め付け側に合わせ、挿入する。
Put in the insert with its top positioned to the screw-tightening side of the tool body.

**3** 専用レンチにてクランプねじを締め付ける。
この時インサートは押さえつけないでください。
Tighten the clamp screw with the special wrench.
Please do not press down the insert during this tightening process.

**4** 締め付け完了。
This is the end of insert set-up.




**ご注意 Attention**

インサートを挿入しない状態でのクランプねじ締結は、ホルダー本体の変形に繋がる恐れがあり、インサートの取り付け不良や取付精度の劣化につながる可能性があるため決して行わないでください。
Never tighten the clamp screw without putting the insert. The tool body may be deformed, resulting in improper insert mounting or deterioration of mounting accuracy.

**インサート未挿入での空締め禁止**
Do not tighten the screw without putting insert