YU13
AMERICA

Registered
ISO 9001:2008 / ISO 14001:2004

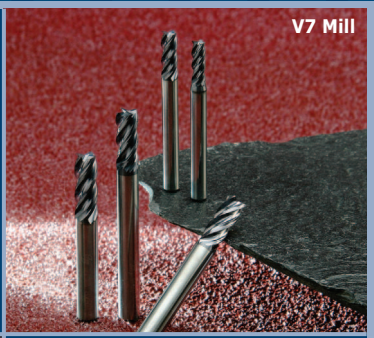
# CUTTING TOOLS

DRILLING TOOLS / THREADING TOOLS/ MILLING TOOLS / OTHER TOOLS

www.yg1usa.com

YG-1 CO., LTD.

CBN End Mill


V7 Mill

X5070 End Mill

D-Power End Mill

Multi-1 Drill

Dream Drill

Tank-Power End Mill

HSS End Mill

i-Xmill

i-Dream Drill

Spade Drill Inserts

Combo Tap

# GUIDE LINE TO ICONS

## Tool Material

- CBN — Cubic Boron Nitride
- NG HM — Nano Grain Carbide
- MG HM — Micro Grain Carbide
- YPM — YG-1 Premium Powder Metallurgy HSS
- PREMIUM HSS-PM — Premium Powder Metallurgy HSS
- HSS Co8 — 8% Cobalt HSS
- HSS EX — High Vanadium HSS
- HSS-E — 5% Cobalt HSS
- HSS — High Speed Steel

## Standard of Tools

- ANSI — ANSI Standard
- DIN 338 — Number of DIN Standard

## The Type of Shank

- PLAIN — Plain shank
- FLAT — Flat shank
- 1 ~ 5 — Range of Morse Taper Shank

## No. of Flute

- 1, 2, 3 — 1,2,3 Flutes
- 4-6 — 4~6 Flutes
- 3&4 — 3&4 Flutes

## Helix Angle

- 30° 30° — End Mills
- N 30° N ≈ 30° — Drills
- R40° L20° — Taps

## Point Angle

- 120° 135°

## Tolerance of Dimension

- h6 h8 — Tolerance of Outside Diameter
- h6 h8 — Tolerance of Shank Diameter

## Tolerance of Radius

- R ±.0002 R ±.0004 — Tolerance of Ball Radius ±.0002″, ±.0004″
- R ±.0002 — Tolerance of Corner Radius ±.0002″

## The Type of Periphery

- COARSE — Roughing, Coarse Pitch
- FINE — Roughing, Fine Pitch
- ALU — Roughing for Aluminium
- NF — Roughing & Finishing type

# GUIDE LINE TO ICONS

**Thread Angle**

**Chamfer Lead**

**Class of Thread**

**Cutting Condition**

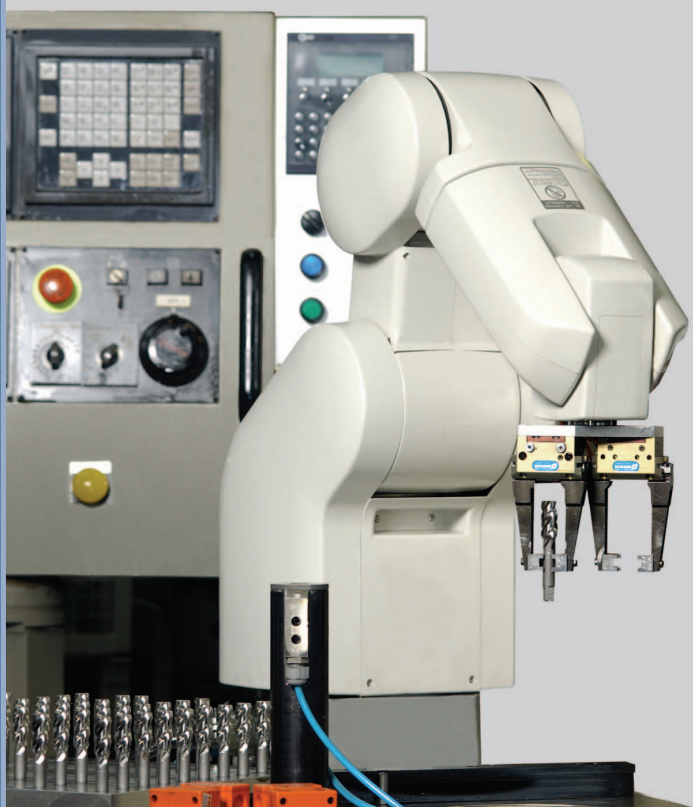
Cutting Condition of Tool
See the Page 000

**Surface Treatment**

| | |
|---|---|
| Bright | Bright Finish |
| TiCN | Titanium Carbon Nitride Coating |
| Hardslick | TiAlN+WC/C Coating |
| Steam Oxide | Steam Tempered |
| TiN | Titanium Nitride Coating |
| TiAlN | Titanium Aluminum Nitride Coating |
| BLUE | Blue-Coating |

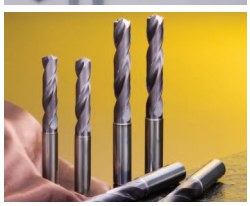
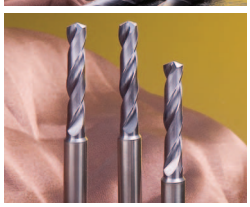
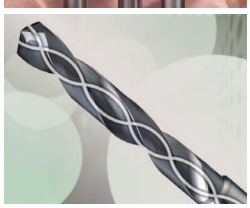
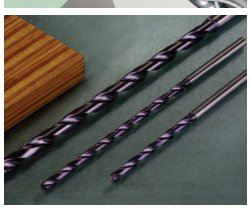
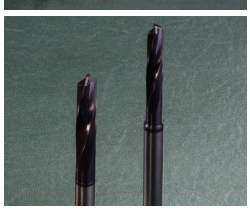
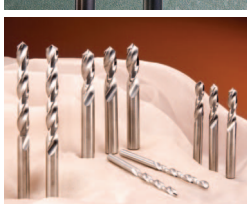
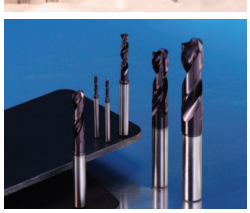
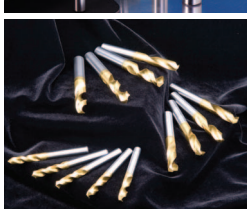
# Another name for our product is No.1

It would be a disgrace to the name of YG-1, if the No.1 doesn't have any significance.
To become the No.1 in technology and quality, the 24 hours of YG-1 does not stop to rest.

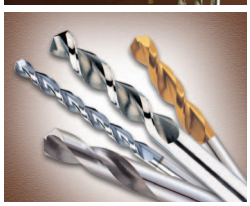
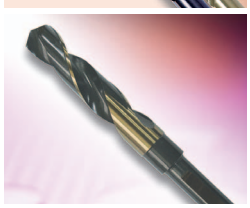
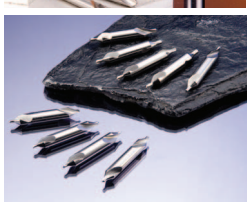


# CUTTING TOOLS

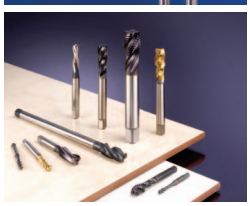
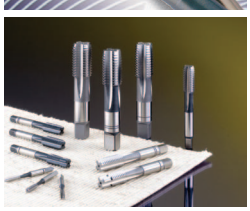
# DRILLING


| | PRODUCTS | DESCRIPTION | PAGE |
|---|---|---|---|
| | **i-DREAM DRILLS, CARBIDE INSERT** | - For Steels and Stainless Steel Alloys | **29** |
|  | **SOLID CARBIDE DREAM DRILLS (with & without Coolant Holes)** | - With & without Coolant Holes<br>General Purpose HRc30 to HRc50 | **43** |
|  | **SOLID CARBIDE DREAM DRILLS - INOX (with Coolant Holes)** | - with Coolant Holes<br>Stainless Steels, Nickel Alloys and Titanium up to HRc35. | **61** |
|  | **SOLID CARBIDE DREAM DRILLS - ALU (with Coolant Holes)** | - with Coolant Holes<br>for Aluminum & Aluminum Alloys | **73** |
|  | **SOLID CARBIDE DREAM DRILLS - MQL TYPE (with Coolant Holes)** | - with Coolant Holes<br>Minimum Quantity Lubrication. Drilling Deep Holes, 10D, 15D & 20D | **81** |
|  | **SOLID CARBIDE DREAM DRILLS - For HIGH HARDENED STEELS** | - High Hardened Steels, HRc50~HRc70 | **87** |
|  | **STANDARD CARBIDE DRILLS** | - General Purpose<br>118° Point | **95** |
|  | **HSS-PM MULTI-1 DRILLS** | - HSS-PM MULTI-1 DRILLS<br>Multi Purpose Drilling. Particularly for Stainless Steels | **103** |
|  | **HPD DRILLS** | - HSS-EX HPD STRAIGHT SHANK DRILLS<br>for Stainless Steels | **111** |

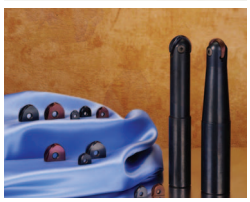
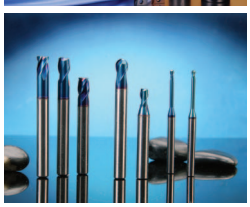
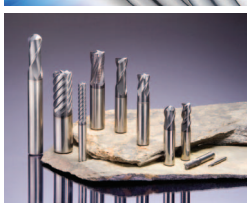
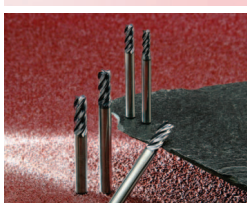
# DRILLING


| | PRODUCTS | DESCRIPTION | PAGE |
|---|---|---|---|
| | **HSS GOLD-P DRILLS** | - Gold-P Coating | **121** |
|  | **HSS STRAIGHT SHANK DRILLS** | - General Purpose | **141** |
| | **AIRCRAFT DRILLS** | - 6 and 12 inch Length Drills | **163** |
|  | **SILVER & DEMING DRILLS** | - 118° Split Point<br>3 Flats Black and Gold | **173** |
| | **HSS MORSE TAPER SHANK DRILLS** | - General Purpose<br>Standard Length | **179** |
| | **HSS (8% Cobalt) NC-SPOTTING DRILLS** | - HSS(8% Cobalt)<br>Centering and Chamfering of Holes | **185** |
|  | **HSS CENTER DRILLS** | - Regular and Long Length | **191** |
| | **CARBIDE & HSS-PM SPADE DRILLS** | - Carbide for Long Tool Life, and HSS-PM for General Machines and Large Diameters Higher Productivity than Other Drilling Tools | **195** |
| | **TECHNICAL DATA** | | **237** |

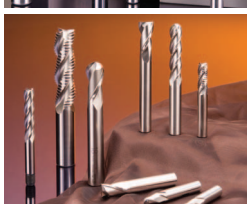
# THREADING


| | PRODUCTS | DESCRIPTION | PAGE |
|---|---|---|---|
| | **HSS COMBO TAPS (Spiral Point & Spiral Flute)** | - Spiral Point and Spiral Flute Taps Multi Purpose tapping, YG-1's Patent, HSS-EX for Prevention of Oversize Threads | **261** |
|  | **HSS SPIRAL FLUTE TAPS** | - Tapping Blind Holes, HSS-E & HSS-PM | **269** |
| | **HSS SPIRAL POINT TAPS** | - Tapping Through Holes, HSS-E & HSS-PM | **293** |
| | **HSS TAPER PIPE TAPS** | - Tapping NPT and NPTF Pipe threads | **313** |
| | **HSS FORMING TAPS** | - Tapping by Forming Soft Materials, HSS-E & HSS-PM | **319** |
| | **HSS STANDARD TAPS** | - Spiral Point and Spiral Flute Taps | **325** |
|  | **HSS HAND TAPS** | | **329** |
| | **TECHNICAL DATA** | | **333** |

# MILLING


| | PRODUCTS | DESCRIPTION | PAGE |
|---|---|---|---|
| | **CBN END MILLS** | - Cubic Boron Nitride, Machining High Hardened Steels up to HRc70, Mirror Finish | **375** |
|  | **i-Xmills, CARBIDE INSERT END MILLS** | - Available for General Steels and for Hardened Steels up to HRc65 | **381** |
|  | **X5070 NANO SOLID CARBIDE END MILLS** | - High Hardened Steels HRc45 to HRc70, High Speed Machining, Dry Cutting | **397** |
| | **X-SPEED ROUGHER SOLID CARBIDE END MILLS** | - Carbide Roughing End Mills for High-Feed Machining with reduced vibrations | **431** |
|  | **X-POWER SOLID CARBIDE END MILLS** | - Medium Steels to High Hardened Steels up to HRc70 | **441** |
| | **JET-POWER SOLID CARBIDE & HSS-PM END MILLS** | - Exotic materials like Stainless Steels, Nickel alloys and Titanium | **529** |
| | **V7 Mill STEEL SOLID CARBIDE END MILLS** | - Silent Cutting of Steels up to HRc40. Designed as Unequal Leads. | **551** |
|  | **V7 Mill INOX SOLID CARBIDE END MILLS** | - Silent Cutting of Stainless Steels up to HRc40. Designed as Variable Leads, YG-1's Patent. | **563** |
| | **ALU-POWER SOLID CARBIDE & HSS-PM END MILLS** | - Silent Cutting of Aluminium Alloys Mirror Surface. | **581** |

# MILLING


| | PRODUCTS | DESCRIPTION | PAGE |
|---|---|---|---|
| | **D-POWER DIAMOND COATED SOLID CARBIDE END MILLS** | - Diamond Coated Carbide End Mills for Graphite | **625** |
| | **GENERAL SOLID CARBIDE END MILLS** | - General Purpose, Non-coated, Many Coatings Available | **641** |
| | **TANK-POWER HSS-PM END MILLS** | - Next Generation of Powered Metal End Mills<br>Higher Edge Strength & Feed Rates | **685** |
|  | **COBALT & HSS END MILLS** | - General Purpose, Non-coated, Many Coatings Available | **703** |
| | **TECHNICAL DATA** | | **787** |


# OTHER TOOLS


| | PRODUCTS | DESCRIPTION | PAGE |
|---|---|---|---|
| | **TOOL HOLDERS** | - According to CAT + BT Standards | **797** |

## i-DREAM DRILL - GENERAL

### TOOL

| | |
|---|---|
| HOLDER | ZB0302 |
| INSERT | Y03B07 |

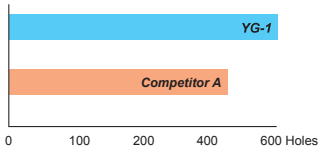
### WORKPIECE - Structural Steels

| | |
|---|---|
| ASTM | A36 |
| DIN | St37-2 |
| JIS | SS400 |

### CONDITIONS

| | |
|---|---|
| Cutting Speed | 262 ft/min. |
| Feed | .0094 inch/rev. |
| Feedrate | 16.59 inch/min. |
| RPM | 1756 rev./min. |
| Drilling | 1.89″ |
| Coolant | Internal |
| Machine type | Vertical Machining Center |

### RESULT




### YG-1 (Total Drilling 600 Holes)

### Competitor A (Total Drilling 470 Holes)

## i-DREAM DRILL - INOX

### TOOL

| | |
|---|---|
| HOLDER | ZB0301 |
| INSERT | YI3B01 |

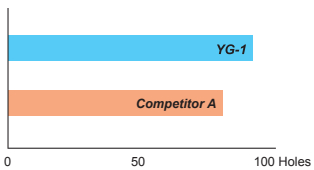
### WORKPIECE - Stainless Steels

| | |
|---|---|
| AISI | 304 |
| DIN | X5CrNi189 |
| JIS | SUS304 |

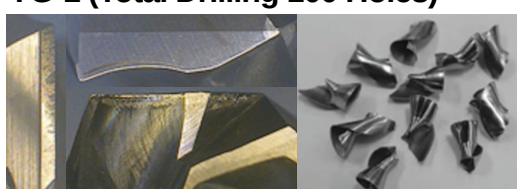
### CONDITIONS

| | |
|---|---|
| Cutting Speed | 180 ft/min. |
| Feed | .0059 inch/rev. |
| Feedrate | 7.402 inch/min. |
| RPM | 1250 rev./min. |
| Drilling | 1.97″ |
| Coolant | Internal |
| Machine type | Vertical Machining Center |

### RESULT

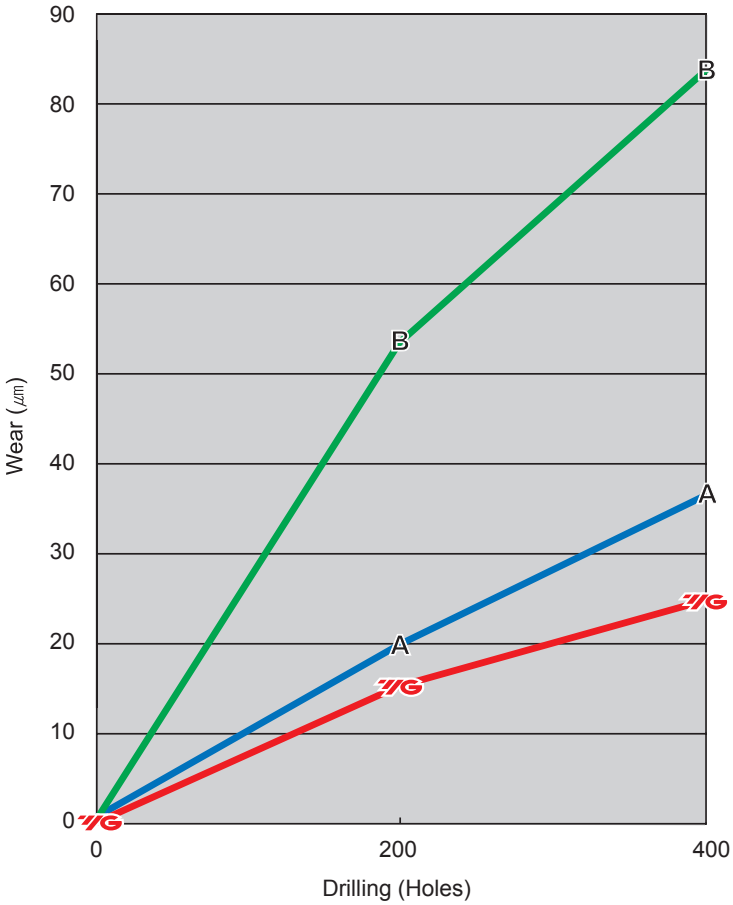



### YG-1 (Total Drilling 100 Holes)



### Competitor A (Total Drilling 80 Holes)

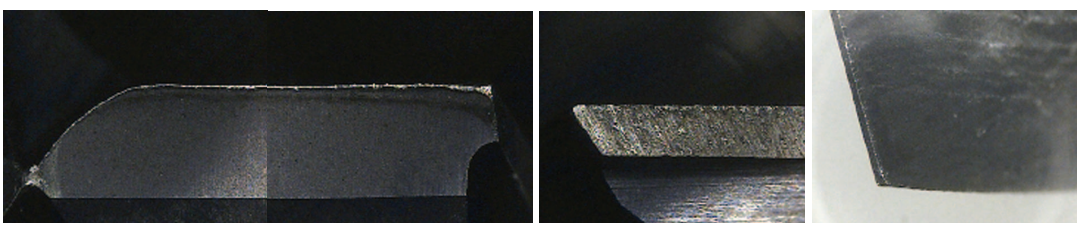
# CASE STUDY ◆ DREAM DRILLS INOX (Reference page : p.61 ~ p.72)



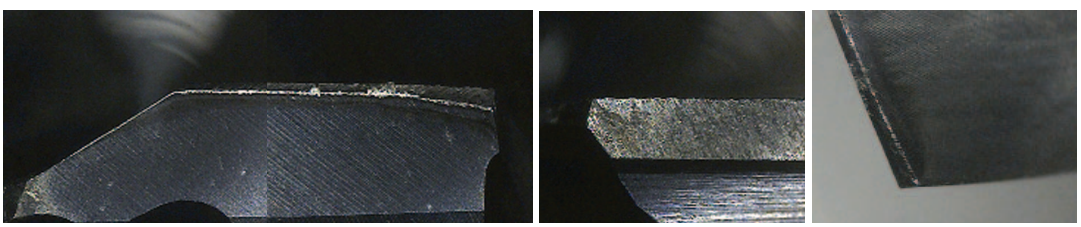

## CUTTING CONDITION

**Tools** : DREAM DRILLS-INOX
**Size** : ∅6 x ∅6 x 44 x 82
**Work Material** : • JIS:SUS304
• DIN:X5CrNi1810
(X4CrNi18-10)
• WR:1.4301
**R.P.M** : 3700 rev./min.
**SFM** : 229 ft/min.
**Feed** : .0028 inch/rev.
**Drilling Depth** : .94″
**Coolant** : Wet Cut

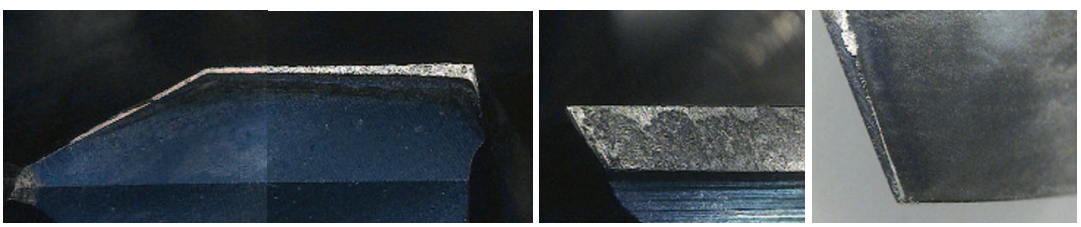
### YG-1 (Total Drilling 400 Holes)



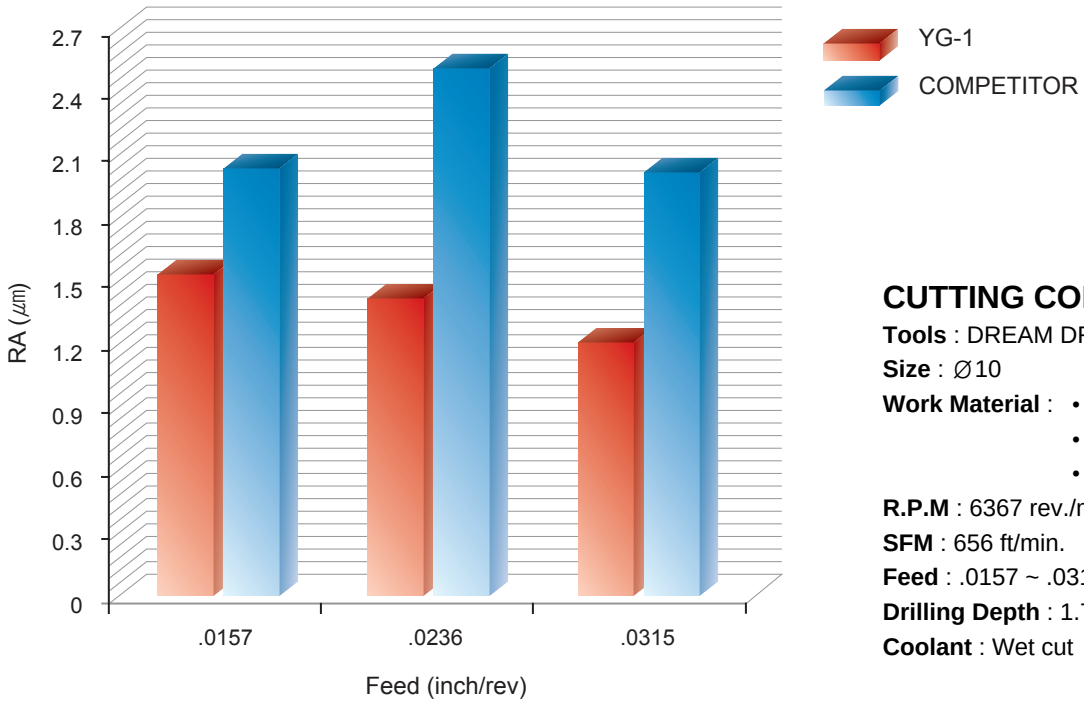
### Competitor A (Total Drilling 400 Holes)



### Competitor B (Total Drilling 400 Holes)



## Surface Roughness of Work Piece

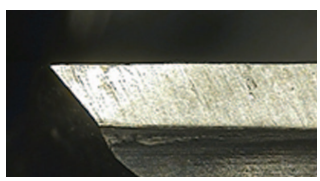



### CUTTING CONDITION

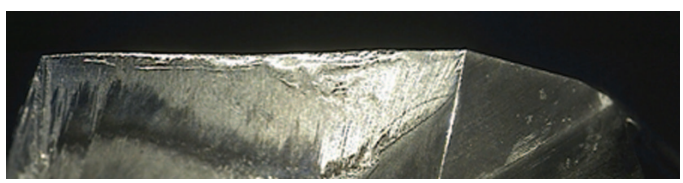
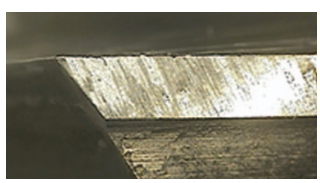
**Tools** : DREAM DRILL ALU
**Size** : ∅10
**Work Material** :
- Al(6061)
- JIS:A6061
- DIN:AlMgSiCu

**R.P.M** : 6367 rev./min.
**SFM** : 656 ft/min.
**Feed** : .0157 ~ .0315 inch/rev.
**Drilling Depth** : 1.77″
**Coolant** : Wet cut

## YG-1 (Total Drilling 820 Holes)



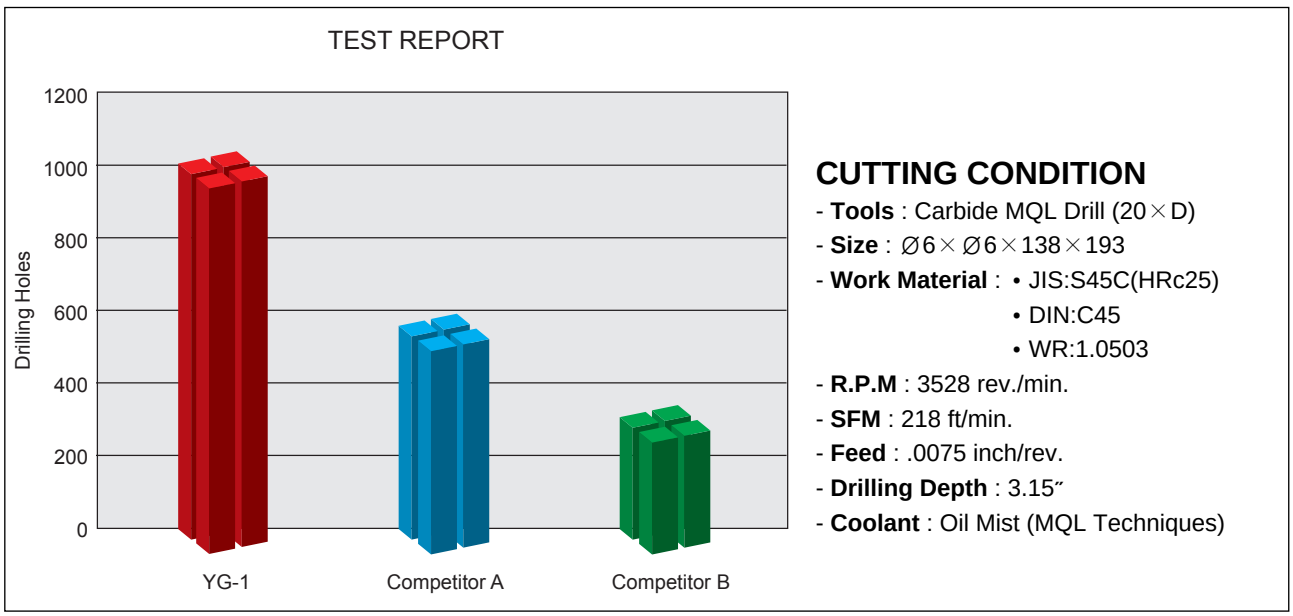
## COMPETITOR (Total Drilling 820 Holes)

## FEATURES OF DREAM DRILLS MQL TYPE

- Flute Shape and Point Shape allowing better chip evacuation in deep hole drilling
- Excellent Coating and Surface Treatment for better performance and chip evacuation

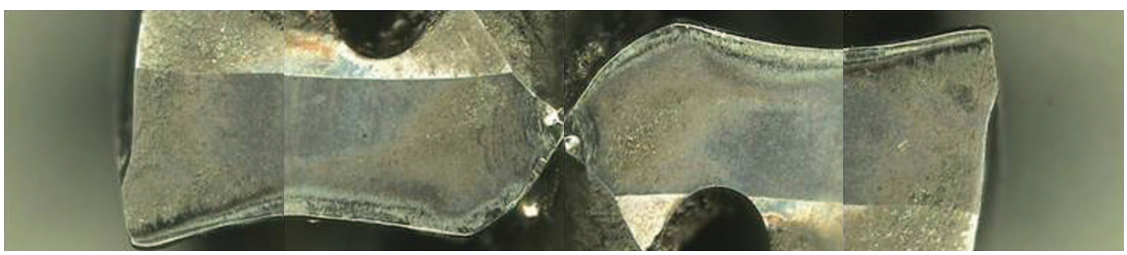
## TEST RESULT AGAINST COMPETITOR's DRILLS



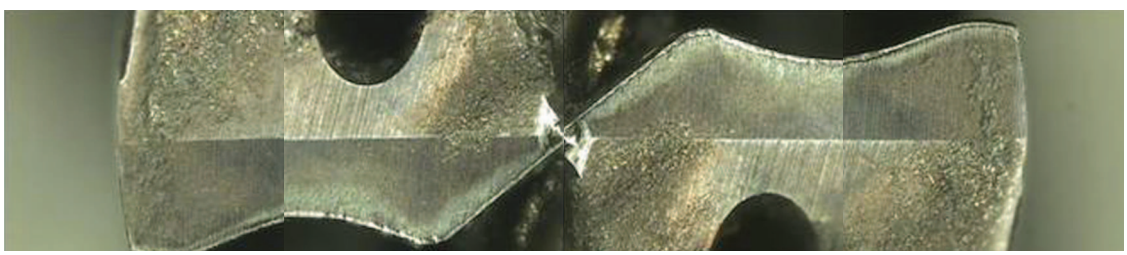

### CUTTING CONDITION

- **Tools** : Carbide MQL Drill (20×D)
- **Size** : Ø6×Ø6×138×193
- **Work Material** : • JIS:S45C(HRc25)
  • DIN:C45
  • WR:1.0503
- **R.P.M** : 3528 rev./min.
- **SFM** : 218 ft/min.
- **Feed** : .0075 inch/rev.
- **Drilling Depth** : 3.15″
- **Coolant** : Oil Mist (MQL Techniques)

**YG-1 (After Drilling 1,000 Holes)**



**Competitor A (After Drilling 546 Holes)**

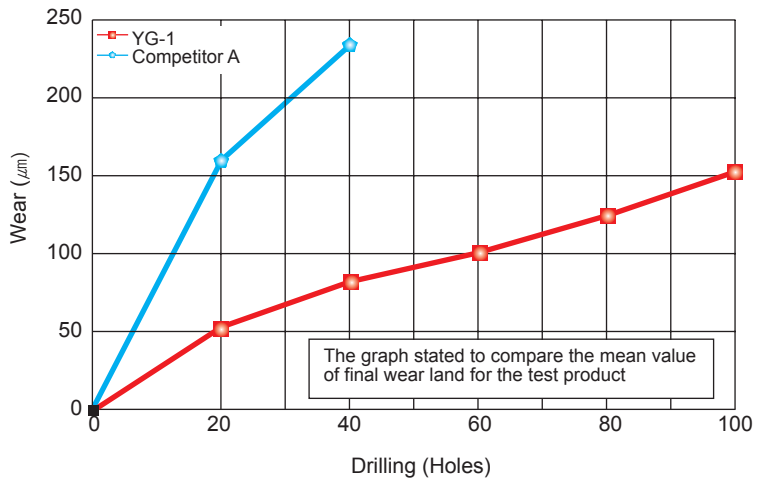


## FEATURES OF DREAM DRILLS HARDENED STEELS

- Low Helix Angle to maximize tools' rigidity.
- Special Point Thinning to improve chip evacuation.
- Excellent Coating and Surface Treatment for improved surface and better chip evacuation.

## TEST RESULT AGAINST COMPETITOR's DRILLS

TEST REPORT

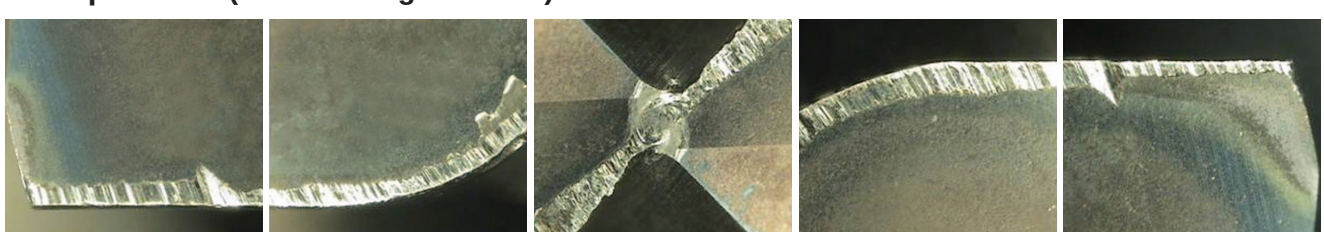



### CUTTING CONDITION

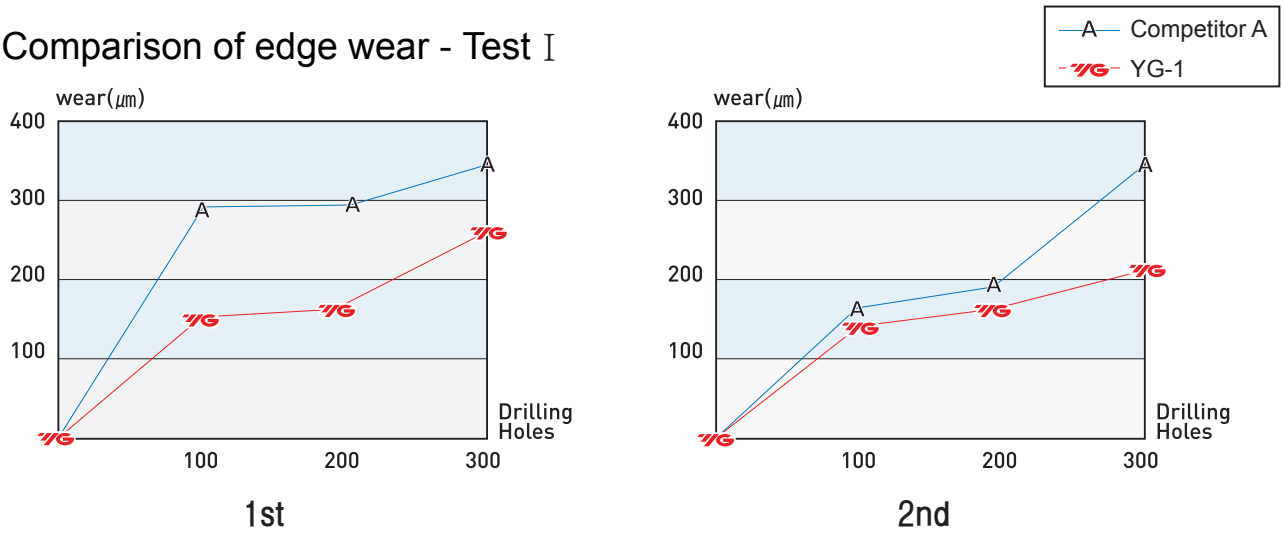
- **Tools** : Dream Drill for High Hardened Steels
- **Size** : Ø10 × Ø10 × 63 × 111
- **Work Material** : • JIS:SKD11(HRc60)
  • DIN:X155CrV-Mo12-1
  • WR:1.2379
- **R.P.M** :380 rev./min.
- **SFM** : 39 ft/min.
- **Feed** : .0016 inch/rev.
- **Drilling Depth** : .98″ (2.5D)
- **Coolent** : Wet Cut

### YG-1 (After Drilling 100 Holes)

### Competitor A (After Drilling 40 Holes)



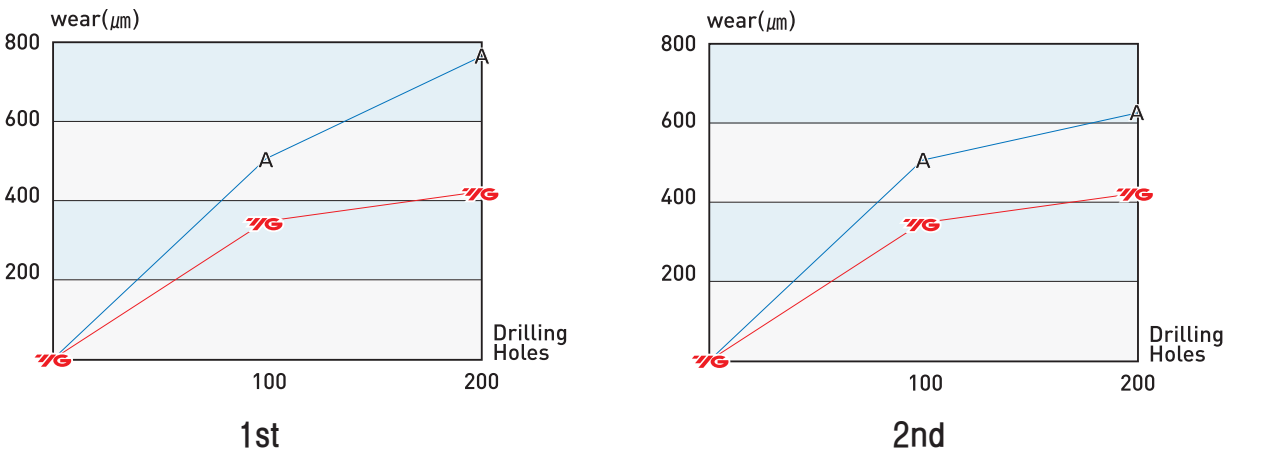
## Comparison of edge wear - Test Ⅰ




CUTTING CONDITION

- **Work material** : • JIS:SUS316
  • DIN:X3CrNiMo17-13-3
  • WR:1.4436
- **Drilling Depth** : .94″
- **Total Drilling(hole)** : 300 Holes
- **R.P.M** : 600 rev./min.
- **Feed** : 4.3307 inch/min.

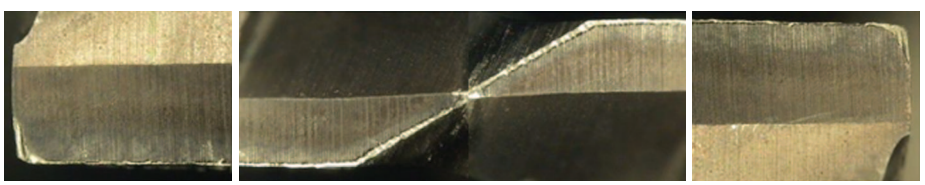
## Comparison of edge wear - Test Ⅱ



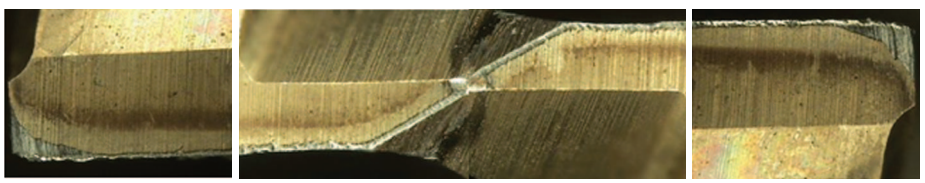

CUTTING CONDITION

- **Work material** : • JIS:SKD11
  • DIN:X155CrVMo12-1
  • WR:1.4436
- **Drilling Depth** : .94″
- **Total Drilling(hole)** : 200 Holes
- **R.P.M** : 600 rev./min.
- **Feed** : 4.3307 inch/min.

**YG-1**



**Competitor A**



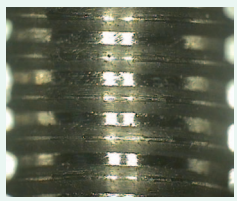
## COMBO - SPIRAL FLUTE

### *Cutting Condition*

- **Tools** : Combo Spiral Flute Tap
- **Size** : M8×1.25
- Work Material : • JIS:S45C(HRc35)
  • DIN:C45
  • WR:1.0503
- Tapping Depth : .79″
- Coolant : Water Soluble Oil
- SFM (Tapping Speed) : 33 ft/min.

**YG-1(Total Tapping 204 Holes)**

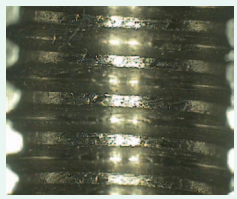
Surface Roughness of Work Piece



204 Holes ▶

**Competitor A (Total Tapping 159 Holes)**

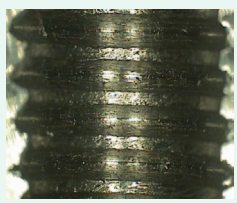
Surface Roughness of Work Piece



159 Holes ▶

**Competitor B (Total Tapping 204 Holes)**

Surface Roughness of Work Piece



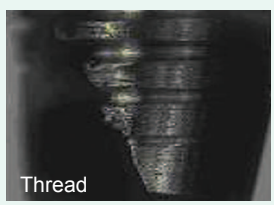
204 Holes ▶

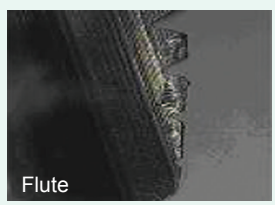
## COMBO - SPIRAL POINT

### *Cutting Condition*

- **Tools** : Combo Spiral Point Tap
- **Size** : M2×0.4
- Work Material : • JIS:S45C(HRc35)
  • DIN:C45
  • WR:1.0503
- Tapping Depth : .24″
- Coolant : Tapping Oil
- SFM (Tapping Speed) : 33 ft/min.

**YG-1(Total Tapping 450 Holes)**




**Competitor A (Total Tapping 318 Holes)**

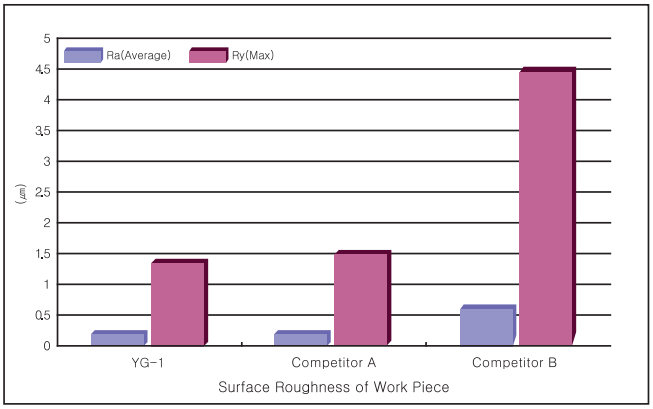
Tool was broken after 318 holes tapping

**Competitor B (Total Tapping 103 Holes)**

Tool was broken after 103 holes tapping

# TEST I (Total Milling Length : 787 ft)

## ▶ Surface Roughness of Work Piece

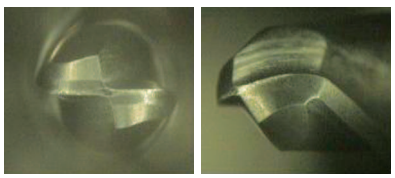



### CUTTING CONDITION (Ø1mm)

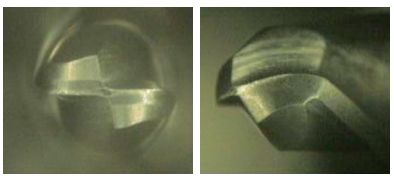
**Tools** : 2Flute, CBN Ball Nose End mill
**Size** : Ø1 × Ø4 × 0.6 × 50
**Work Material** : • JIS:SKD11(HRc60)
• DIN:X155CrV-Mo12-1
• WR:1.2379
**Cutting Speed** :**309** ft/min.
**R.P.M** : 30000 rev./min.
**Feed** : 59.06 inch/min.
**Milling Depth** : .0004″
**Coolant** : Oil Mist
**Machine** : Machining Center

## ▶ Maximum Wear (㎛)

**YG-1 (19.611㎛)**



**Competitor A (32.249㎛)**

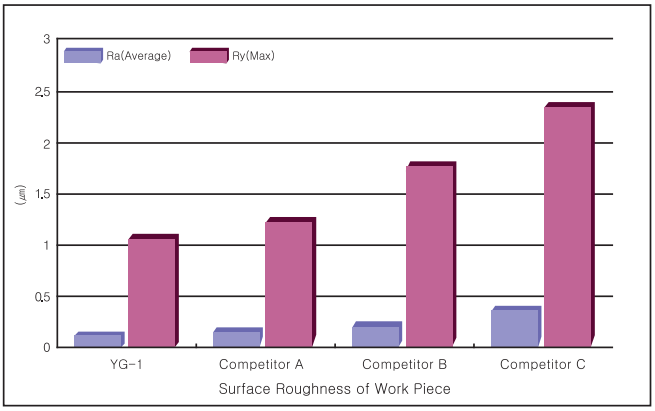


**Competitor B**

**Tool was broken after 100 meter milling**

# TEST II (Total Milling Length : 2.460 ft)

## ▶ Surface Roughness of Work Piece

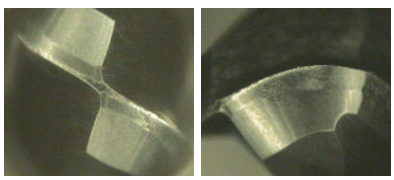



### CUTTING CONDITION (Ø2mm)

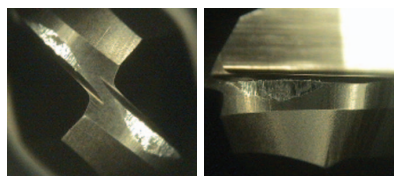
**Tools** : 2Flute, CBN Ball Nose End mill
**Size** : Ø2 × Ø4 × 1.8 × 50
**Work Material** : • JIS:SKD11(HRc60)
• DIN:X155CrV-Mo12-1
• WR:1.2379
**Cutting Speed** : 618 ft/min.
**R.P.M** : 30000 rev./min.
**Feed** : 78.74 inch/min.
**Milling Depth** : .0004″
**Coolant** : Oil Mist
**Machine** : Machining Center

## ▶ Maximum Wear (㎛)

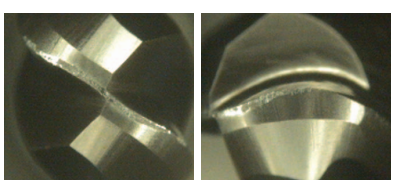
**YG-1 (57.630㎛)**



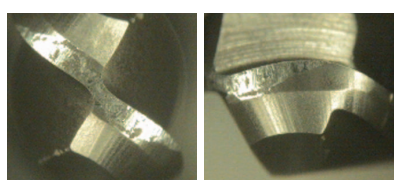
**Competitor A (100.314㎛)**



**Competitor B (71.471㎛)**

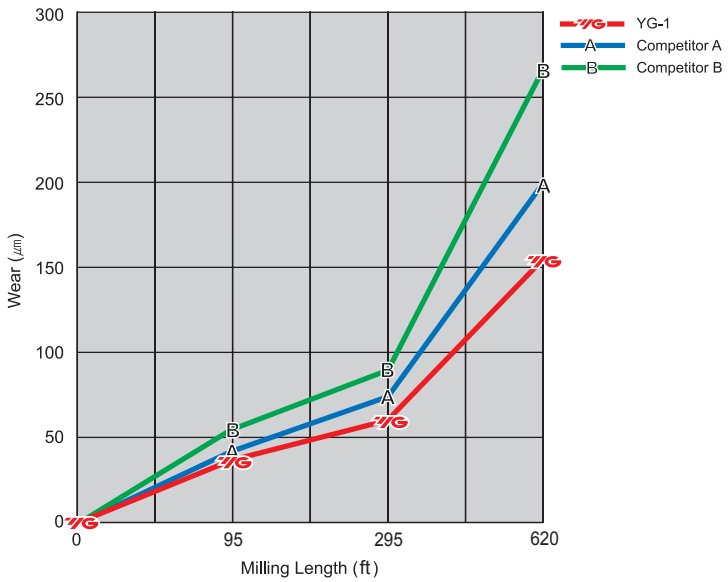


**Competitor C (170.200㎛)**

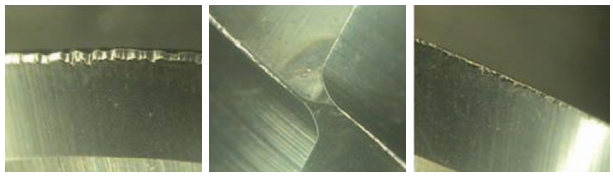


# CASE STUDY ◆ i-Xmill (Reference page : p.381 ~ p.396)

## i-Xmill - BALL

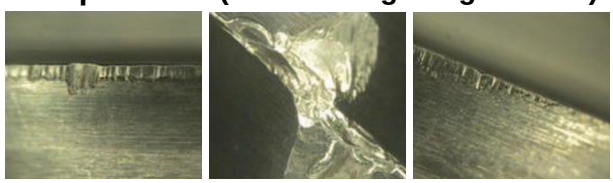



### YG-1 *i*-Xmill (Total Milling Length 620 ft)



### Competitor A (Total Milling Length 620 ft)

### Competitor B (Total Milling Length 620 ft)



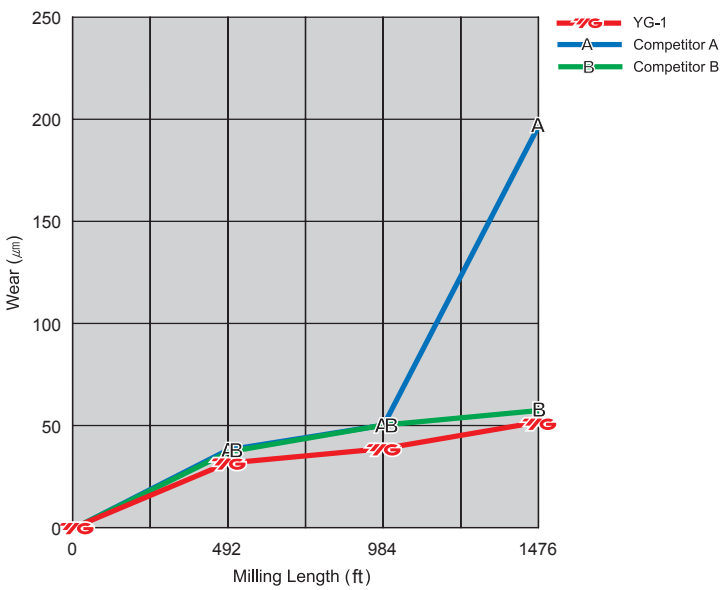
### CUTTING CONDITION

**Tools** : i -Xmill Ball
**Size** : ∅16×R8.0
**Work Material** : JIS : SKD61 (HRc50),
DIN : X40GrMoV51(1.2344)
AISI : H13

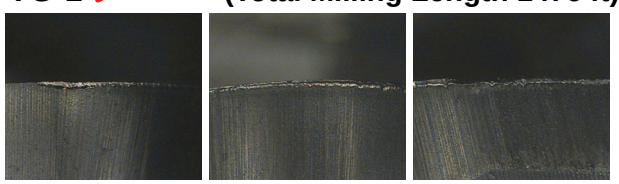
**Cutting Speed** : 264 ft/min.
**R.P.M** : 1,600 rev./min.
**Feed** : 15.35 inch/min.
**Feed per tooth** : .0047 inch/tooth
**Milling Method** : Side Cutting

**Milling Depth** : Axial : .0315″
Radial : .0630″
**Coolant** : Oil Mist
**Overhang** : YG-1, Competitor B : 1.89″
Competitor A : 2.20″
**Machine** : Machining Center

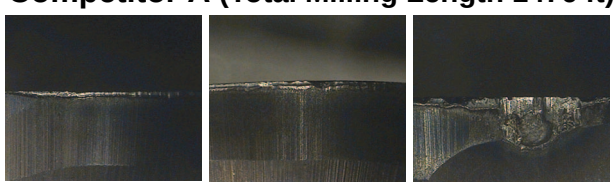
## i-Xmill - CORNER RADIUS



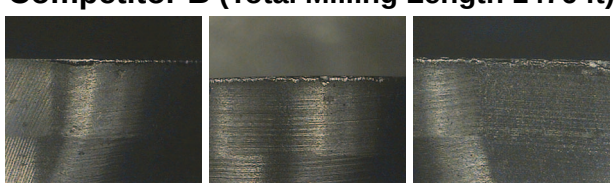

### YG-1 *i*-Xmill (Total Milling Length 1476 ft)



### Competitor A (Total Milling Length 1476 ft)



### Competitor B (Total Milling Length 1476 ft)



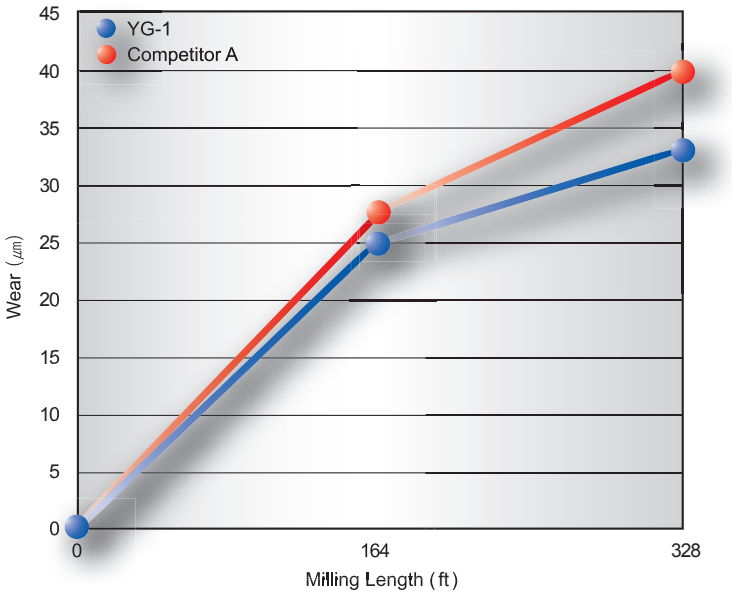
### CUTTING CONDITION

**Tools** : i-Xmill Corner Radius
**Size** : ∅16 x R2.0
**Work Material** : KS : KP4M (Mold steels HRc35)
DIN : 40CrMnNiMo8-6-4(1.2738)
AISI : P20+Ni

**Cutting Speed** : 918 ft/min.
**R.P.M** : 5,570 rev./min.
**Feed** : 87.80 inch/min.
**Feed per tooth** : .0079 inch/tooth
**Milling Method** : Side Cutting

**Milling Depth** : Axial : .1181″
Radial : .0079″
**Coolant** : Oil Mist
**Overhang** : 2.76″
**Machine** : Machining Center

## Carbide 6 Flute 45° Helix End Mill for Hardened Steel

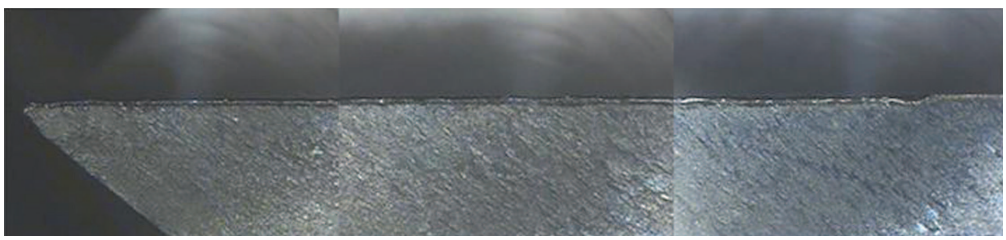



### CUTTING CONDITION

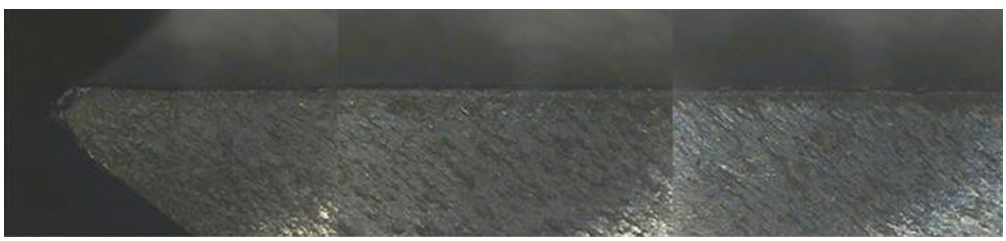
**Tools** : 6Flute, X5070 45° Helix
**Size** : Ø16 × Ø16 × 40 × 110
**Work Material** :
- JIS:SKD61(HRc50)
- DIN:X40CrMoV5-1(1.2344)
- AISI:H13

**Cutting Speed** : 317 ft/min.
**R.P.M** : 1,920 rev./min.
**Feed** : 35.91
**Milling Method** : Down & Side Cutting
**Milling Depth** : Axial : .9449
Radial : .0378
**Coolant** : Dry Cut
**Overhang** : 2.05
**Machine** : Machining Center

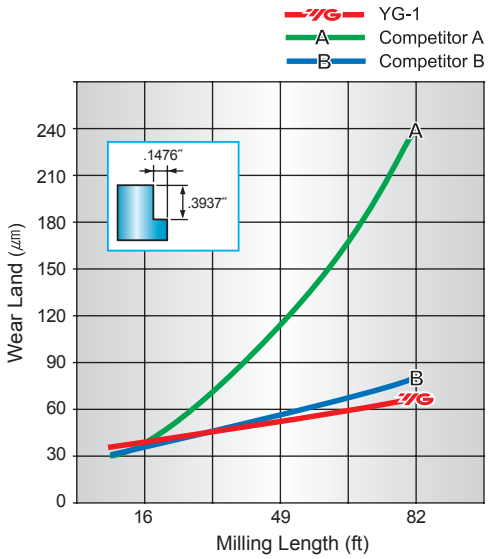
### YG-1
**(Total Milling Length 328 ft)**



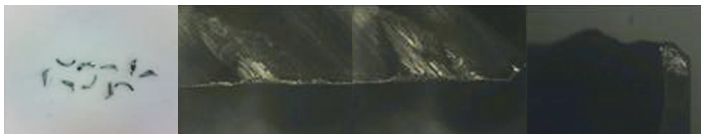
### Competitor A
**(Total Milling Length 328 ft)**



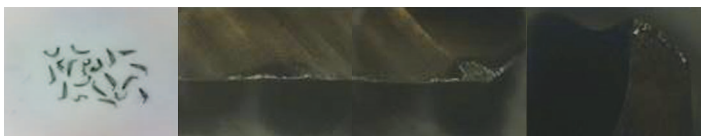
## TEST REPORT (DOWN & SIDE CUTTING)



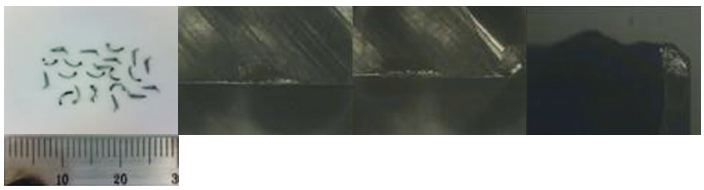

**COMPETITOR A**



**COMPETITOR B**



**X-SPEED ROUGHER**

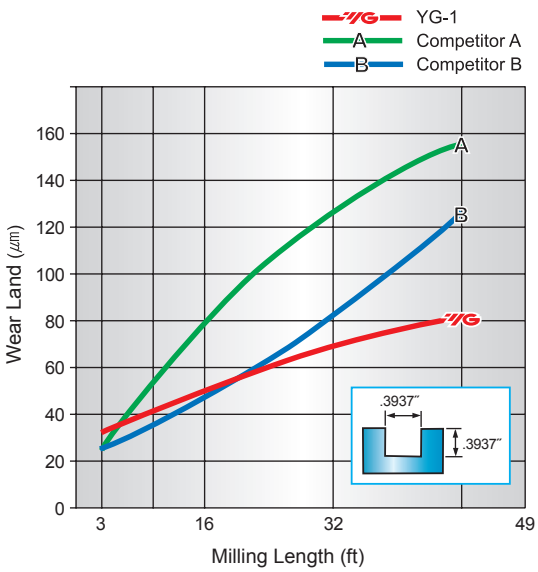


### CUTTING CONDITION

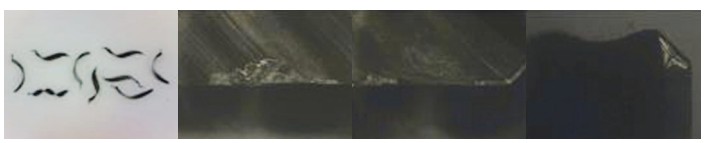
**SIZE** : X-SPEED ROUGHER : Ø10×10×15×72
COMPETITOR A : Ø10×10×20×72
COMPETITOR B : Ø10×10×15×80
**Work Material** : DIN : X40CrMoV51(1.2344)
JIS : SKD61 (HRc30)
AISI : H13

**R.P.M** : 5,000 rev./min. (515 ft/min.)
**FEED** : 51.18 inch/min.
**Milling Method** : Down & Side Cutting
**Coolant** : Wet Cut
**Overhang** : 1.26
**Machine** : Machining Center

## TEST REPORT (SLOTTING)

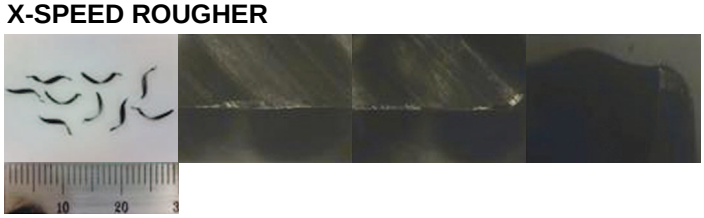



**COMPETITOR A**



**COMPETITOR B**

**X-SPEED ROUGHER**

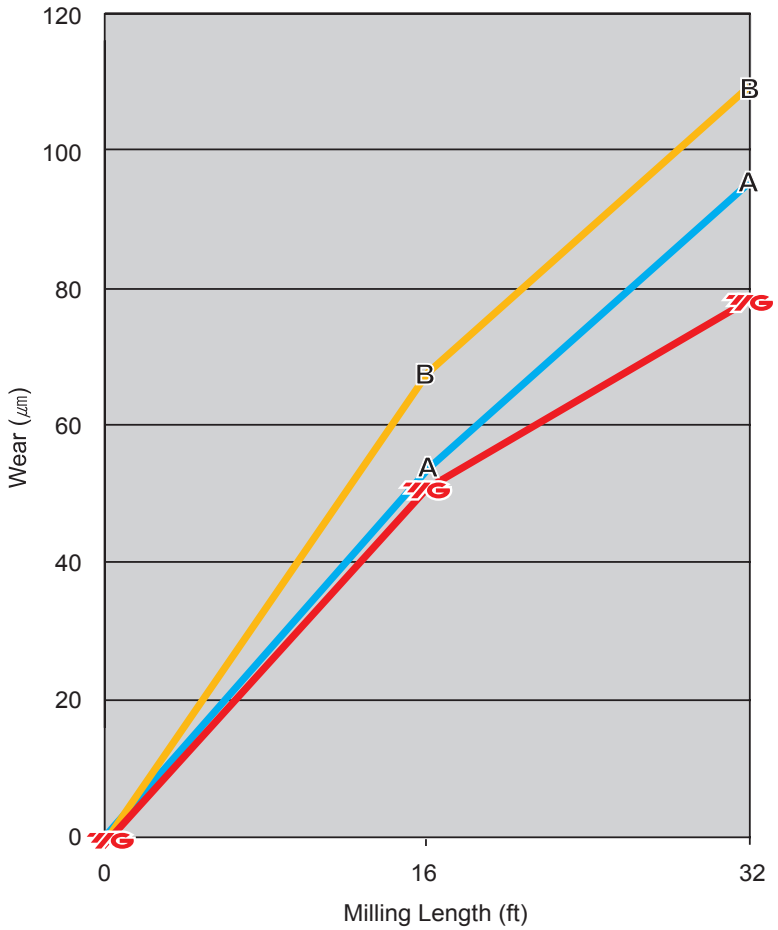


### CUTTING CONDITION

**SIZE** : X-SPEED ROUGHER : Ø10×10×15×72
COMPETITOR A : Ø10×10×20×72
COMPETITOR B : Ø10×10×15×80
**Work Material** : DIN : X40CrMoV51(1.2344)
JIS : SKD61 (HRc20)
AISI : H13

**R.P.M** : 4,000rev./min. (412 ft/min.)
**FEED** : 39.37 inch/min.
**Milling Method** : Slotting
**Coolant** : Wet Cut
**Overhang** : 1.26
**Machine** : Machining Center

# CASE STUDY ◆ V7 STEELS END MILLS (Reference page : p.551 ~ p.562)




## CUTTING CONDITION

**Tools**: V7 STEELS, 4Flute
**Size** : Ø12 × Ø12 × 26 × 83
**Work Material** : • JIS : SKD61 (HRc30)
• DIN : X40GrMoV51(1.2344)
• AISI : H13
**Cutting Speed** : 456 ft/min.
**R.P.M** : 3,688 rev./min.
**Feed** : 27.153 inch/min.
**Milling Method** : Down & Side Cutting
**Milling Depth** : Axial : .71
Radial : .23
**Coolant** : Wet Cut
**Overhang** : 1.57
**Machine** : Machining Center

**YG-1**
**(Total Milling Length 32 ft)**

**Competitor A**
**(Total Milling Length 32 ft)**

**Competitor B**
**(Total Milling Length 32 ft)**

# DRILLING TOOLS


i-DREAM DRILLS, CARBIDE INSERT

SOLID CARBIDE DREAM DRILLS
(with & without coolant Holes)

SOLID CARBIDE DREAM DRILLS - INOX
(with coolant Holes)

SOLID CARBIDE DREAM DRILLS - ALU
(with coolant Holes)

SOLID CARBIDE DREAM DRILLS - MQL TYPE
(with coolant Holes)

SOLID CARBIDE DREAM DRILLS FOR HIGH HARDENED STEELS

STANDARD CARBIDE DRILLS

HSS-PM MULTI-1 DRILLS

PREMIUM HSS HPD STRAIGHT SHANK DRILLS

HSS GOLD-P DRILLS

HSS STRAIGHT SHANK DRILLS

HSS AIRCRAFT DRILLS

HSS SILVER & DEMING DRILLS

HSS MORSE TAPER SHANK DRILLS

HSS (8% Cobalt) NC SPOTTING DRILLS

HSS CENTER DRILLS

CARBIDE & HSS-PM SPADE DRILLS

TECHNICAL DATA



YG-1 CO., LTD.

# Contents

## DRILLING TOOLS


CARBIDE INSERT DRILLS

SOLID CARBIDE DRILLS

HSS DRILLS

CARBIDE & HSS-PM SPADE DRILLS

TECHNICAL DATA


YG-1 CO., LTD.

# Contents / DRILLING TOOLS


i-DREAM DRILLS
for Steels and Stainless Steel Alloys — i-DREAM DRILLS

SOLID CARBIDE DREAM DRILLS (with & without Coolant Holes)
General Purpose HRc30 to HRc50 — DREAM DRILLS

SOLID CARBIDE DREAM DRILLS - INOX (with Coolant Holes)
Stainless Steels, Nickel Alloys and Titanium up to HRc35. — DREAM DRILLS -INOX

SOLID CARBIDE DREAM DRILLS - ALU (with Coolant Holes)
for Aluminum & Aluminum Alloy — DREAM DRILLS -ALU

SOLID CARBIDE DREAM DRILLS - MQL TYPE (with Coolant Holes)
Minimum Quantity Lubrication. Drilling Deep Holes, 10D, 15D & 20D — DREAM DRILLS -MQL TYPE

SOLID CARBIDE DREAM DRILLS - For HIGH HARDENED STEELS
High Hardened Steels, HRc50~HRc70 — DREAM DRILLS for HARDENED STEELS

STANDARD CARBIDE DRILLS
General Purpose, 118° Point — STANDARD CARBIDE DRILLS

HSS-PM MULTI-1 DRILLS
Multi Purpose Drilling. Particularly for Stainless Steels, Titanium — MULTI-1 DRILLS

HPD DRILLS
for Stainless Steels — HPD DRILLS

HSS GOLD-P DRILLS
Gold-P Coating — GOLD-P DRILLS

HSS STRAIGHT SHANK DRILLS
General Purpose — STRAIGHT SHANK DRILLS

AIRCRAFT DRILLS
6 and 12 inch Length Drills — AIRCRAFT DRILLS

SILVER & DEMING DRILLS
118° Split Point, 3 Flat Black and Gold — SILVER & DEAMING DRILLS

HSS MORSE TAPER SHANK DRILLS
General Purpose, Standard Length — TAPER SHANK DRILLS

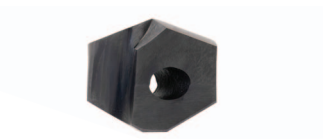
HSS (8% Cobalt) NC-SPOTTING DRILLS
Centering and Chamfering of Holes — NC SPOTTING DRILLS

HSS CENTER DRILLS
Regular and Long Length — CENTER DRILLS

CARBIDE & HSS-PM SPADE DRILLS
Carbide for Long Tool Life, and HSS-PM for General Machines and Large Diameters
Higher Productivity than Other Drilling Tools — SPADE DRILLS

TECHNICAL DATA — TECHNICAL DATA

# DRILLING TOOLS **APPLICATION TABLE**

| | ITEM | MODEL | DESCRIPTION | SIZE MIN | SIZE MAX | PAGE |
|---|---|---|---|---|---|---|
| **i-Dream Drills** | Y03 * |  | Insert for General Purpose | .4724 (#A) | 1.2500 (#J) | **32~37** |
| | YI3 * | | Insert for Stainless Steels | .4724 (#A) | 1.2500 (#J) | **32~37** |
| **Spade Drills** | S01~S04 | | HSS M4 Insert | .7031 (#1) | 4.5000 (#8) | **198~201** |
| | S06~S09 (SM08) | | Super Cobalt T15 Insert | .3740 (#Y) | 4.5000 (#8) | **202~208 218~221** |
| | S11~S14 | | Primium HSS M48 Insert | .3740 (#Y) | 1.3780 (#2) | **209~211** |
| | S21~S23 | | Carbide C2 Insert (K20) | .3740 (#Y) | 1.8750 (#3) | **212~216** |
| | S26~S28 (SM28) | | Carbide C5 Insert (P40) | .3740 (#Y) | 1.8750 (#3) | **212~216 222~223** |
| | S16~S18 | | Carbide C3 Insert (K10) | .3740 (#Y) | 1.3780 (#2) | **212~215** |
| | SF05 SF15 | | Super Cobalt T15 Flat Bottom | .3750 (#Y) | 1.3750 (#2) | **224** |

| | ITEM | MODEL | INCH / METRIC | LENGTH | SIZE MIN | SIZE MAX | PAGE |
|---|---|---|---|---|---|---|---|
| **DREAM DRILLS** | DH414 | | Inch | Short(3XD) | D1/8 | D5/8 | **46** |
| | DH416 | | Inch | Short(3XD) | D1/8 | D5/8 | **47** |
| | DH418 | | Inch | Long(5XD) | D13/64 | D1/2 | **48** |
| | DH404 | | Metric | Stub(3XD) | D3.0 | D20.0 | **49** |
| | DH406 | | Metric | Short(3XD) | D3.0 | D20.0 | **51** |
| | DH424 | | Metric | Long(5XD) | D1.0 | D2.9 | **53** |
| | DH408 | | Metric | Long(5XD) | D1.0 | D20.0 | **54** |
| | DH421 | | Metric | Extra Long(8XD) | D3.0 | D14.0 | **57** |

# INSERT

◎ : Excellent
○ : Good

| Non-alloyed Steels, Free Machining Steels | Carbon Steels | | Alloy Steels | | High Alloyed steels | | Structural Steels | | Tool Steels | | Stainless Steels | Cast Iron | | Aluminum | Copper Alloy |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc24 (~HB250) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc37 (~HB350) | HRc37~ (HB350~) | ~HRc24 (~HB250) | HRc24~ (HB250~) | ~HRc13 (~HB200) | HRc13~ (HB200~) | ~HRc28 (~HB275) | ~HRc19 (~HB220) | HRc19~ (HB220~) | ~HRc8 (~HB180) | ~HB110 |
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| ○ | ○ | ○ | ○ | | ○ | | ○ | ○ | | | ◎ | ◎ | ○ | ◎ | ◎ |
| ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ◎ | ○ | ○ | ○ | ○ | ◎ | ○ | ○ |
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ |
| ○ | ○ | ○ | ○ | ○ | ◎ | ◎ | ○ | ○ | ○ | ○ | ◎ | ○ | ○ | ◎ | ◎ |
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ○ | ○ |
| | | | | | | | | | | | | ◎ | ◎ | | |
| ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ◎ | ○ | ○ | ○ | ○ | ◎ | ○ | ○ |

# SOLID

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ○ | ◎ | ◎ | | | ○ | | ○ | | | | |
| ○ | ◎ | ◎ | | | ○ | | ○ | | | | |
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| ○ | ◎ | ◎ | | | ○ | | ○ | | | | |

# DRILLING TOOLS **APPLICATION TABLE**

| | ITEM | MODEL | INCH / METRIC | LENGTH | SIZE | | PAGE |
|---|---|---|---|---|---|---|---|
| | | | | | MIN | MAX | |
| **DREAM DRILLS-INOX** | DH463 | | Inch | Short(3XD) | D1/8 | D5/8 | **64** |
| | DH464 | | Inch | Long(5XD) | D13/64 | D1/2 | **65** |
| | DH451 | | Metric | Short(3XD) | D3.0 | D20.0 | **66** |
| | DH452 | | Metric | Long(5XD) | D3.0 | D20.0 | **68** |
| | DH453 | | Metric | Extra Long(8XD) | D3.0 | D14.0 | **70** |
| **DREAM DRILLS-ALU** | DGE466 | | Inch | Long(5XD) | D13/64 | D1/2 | **76** |
| | DGE433 | | Metric | Long(5XD) | D3.0 | D20.0 | **77** |
| **DREAM DRILLS-MQL TYPE** | DH510 |  | Metric | Extra Long(10XD) | D3.0 | D14.0 | **84** |
| | DH515 |  | Metric | Extra Long(15XD) | D3.0 | D12.0 | **85** |
| | DH520 |  | Metric | Extra Long(20XD) | D3.0 | D12.0 | **85** |
| **DREAM DRILLS - For HIGH HARDENED STEELS** | DH501 | | Inch | | D1/8 | D3/4 | **90** |
| | DH500 | | Metric | | D2.6 | D14.0 | **92** |
| **STANDARD CARBIDE DRILLS** | D5412 | | Inch | Jobber | #56 | #1 | **98** |
| | D5413 | | Inch | Jobber | A | Z | **99** |
| | D5417 | | Inch | Jobber | D3/64 | D1/2 | **100** |
| **MULTI-1 DRILLS** | CDRA05 | | Inch | | D3/32 | D1/2 | **106** |
| | CDRA06 | | Inch | | #45 | #1 | **107** |
| | CDRA07 | | Inch | | B | Z | **108** |
| **HPD DRILLS** | DJ543 | | Metric | Stub | D2.0 | D13.0 | **114** |
| | DJ544 | | Metric | Jobber | D2.0 | D20.0 | **116** |
| **GOLD-P DRILLS** | D1GP182 D8182 | | Inch | Jobber | D3/64 | D3/4 | **124** |
| | D1GP139 | | Inch | Jobber | A | Z | **125** |
| | D1GP138 | | Inch | Jobber | #56 | #1 | **126** |
| | D2GP185 | | Inch | Jobber | D3/64 | D1/2 | **127** |
| | D2GP186 | | Inch | Jobber | A | Z | **128** |
| | D2GP187 | | Inch | Jobber | #56 | #1 | **129** |
| | DLGP511 | | Inch | Jobber | D5/64 | D1/2 | **130** |
| | DLGP513 | | Inch | Jobber | A | Z | **131** |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
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# DRILLING TOOLS **APPLICATION TABLE**

| | ITEM | MODEL | INCH / METRIC | LENGTH | SIZE | | PAGE |
|---|---|---|---|---|---|---|---|
| | | | | | MIN | MAX | |
| **GOLD-P DRILLS** | DLGP512 | | Inch | Jobber | #47 | #1 | **132** |
| | DLGP195 | | Metric | Jobber | D1.0 | D13.0 | **133** |
| | DLGP506 | | Metric | Jobber | D2.0 | D13.0 | **135** |
| **STRAIGHT SHANK DRILLS** | D1118 | | Inch | Screw Machine | D3/64 | D1/2 | **144** |
| | D1115 | | Inch | Screw Machine | A | Z | **145** |
| | D1119 | | Inch | Screw Machine | #60 | #1 | **146** |
| | D2146<br>D4146 | | Inch | Screw Machine | D3/64 | D1/2 | **147** |
| | D2147<br>D4147 | | Inch | Screw Machine | A | Z | **148** |
| | D2148<br>D4148 | | Inch | Screw Machine | #60 | #1 | **149** |
| | DN514 | | Inch | Screw Machine | D3/32 | D1/2 | **151** |
| | DN516 | | Inch | Screw Machine | A | Z | **152** |
| | DN515 | | Inch | Screw Machine | #47 | #1 | **153** |
| | DX517<br>DL517 | | Inch | Taper Length | D5/64 | D1/2 | **154** |
| | D4107 | | Metric | Screw Machine | D1.0 | D31.0 | **155** |
| **AIRCRAFT DRILLS** | DL601<br>DL604 | | Inch | Extension Length | D5/64 | D1/2 | **166** |
| | DL602<br>DL605 | | Inch | Extension Length | A | Z | **167** |
| | DL603<br>DL606 | | Inch | Extension Length | #43 | #1 | **168** |
| | D1631<br>D1634 | | Inch | Extension Length | D5/64 | D1/2 | **169** |
| | D1632<br>D1635 | | Inch | Extension Length | A | Z | **170** |
| | D1633<br>D1636 | | Inch | Extension Length | #43 | #1 | **171** |
| **SILVER & DEMING DRILLS** | D1191 | | Inch | — | D1/2 | D1-1/2 | **176** |
| **MORSE TAPER SHANK DRILLS** | D1211 | | Inch | — | D1/2 | D2-1/2 | **182** |
| **NC-SPOTTING DRILLS** | D2N90(90˚) | | Inch | | D1/8 | D1 | **188** |
| | D2N90(120˚) | | Inch | | D1/8 | D1 | **188** |
| **CENTER DRILLS** | D1C90 | | Inch | — | D3/64 | D7/32 | **194** |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | ○ | ○ | | | ○ | | |
| ◎ | ◎ | | | | | ○ | ○ | ○ | ○ | | |
| ◎ | ◎ | | | | ○ | ○ | | | ○ | | |
| ◎ | ◎ | | | | ○ | ○ | ○ | ○ | ○ | | |
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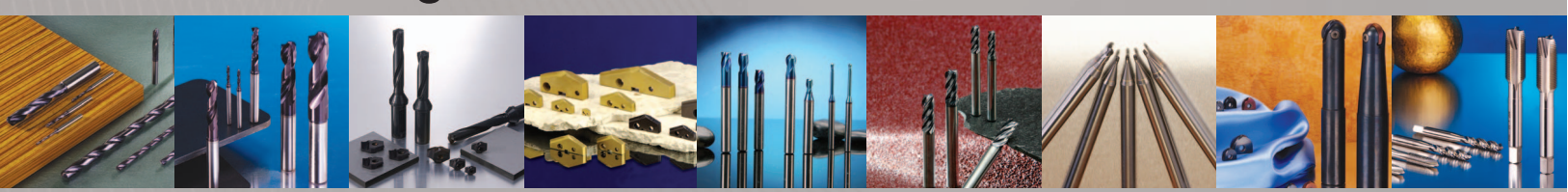
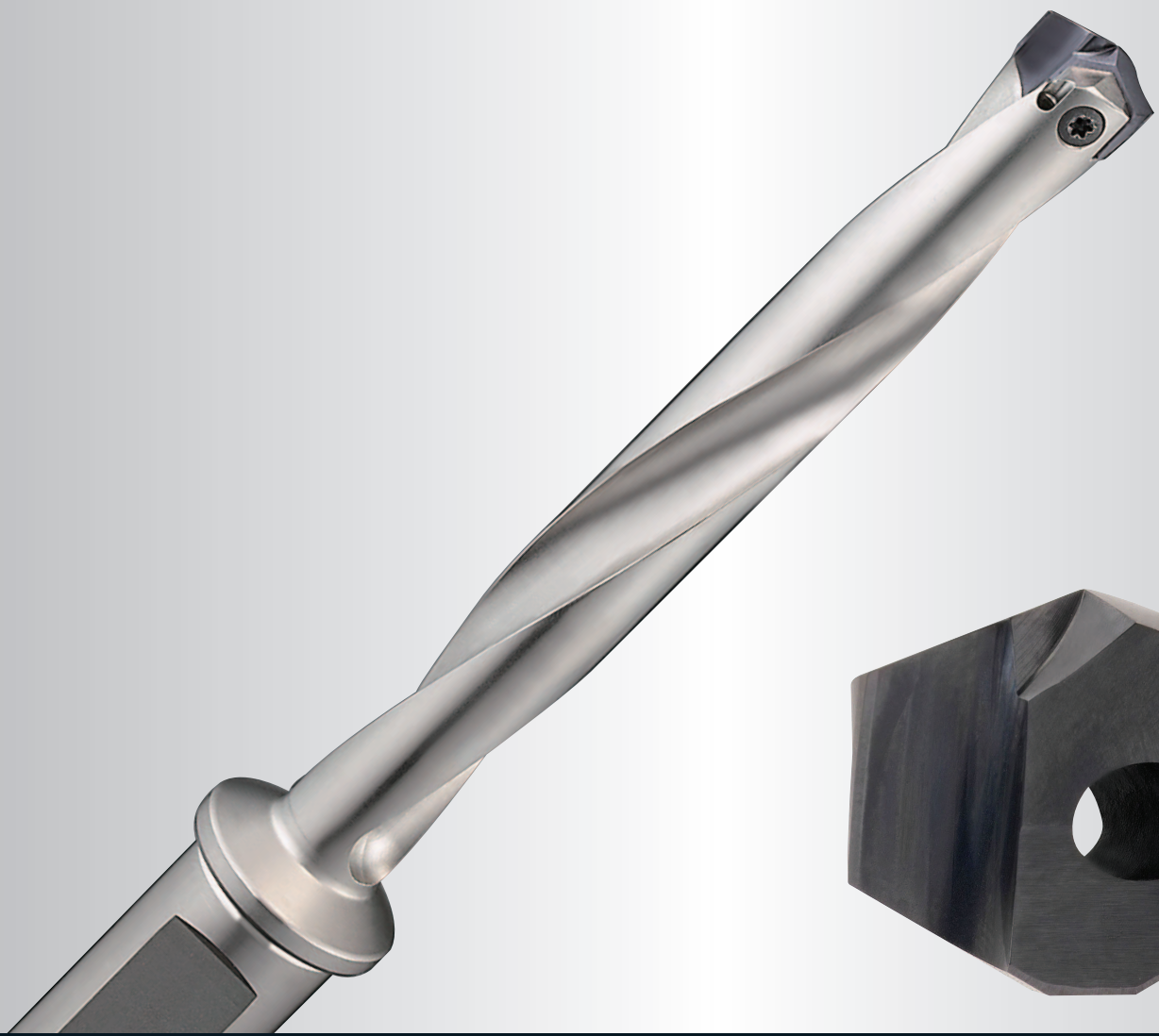
| ◎ | ◎ | | | | | ○ | ○ | | ○ | | ○ |
| ◎ | ◎ | | | | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

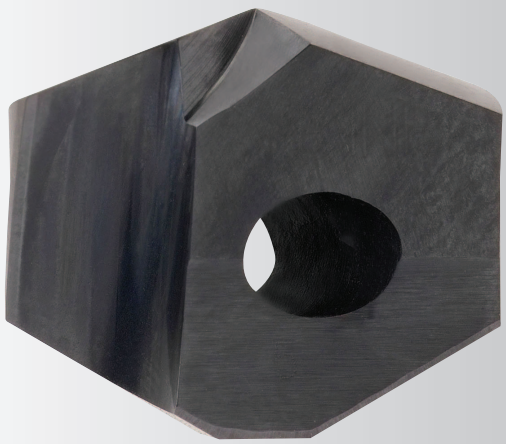
Global Cutting Tool Leader **YG-1**



# CARBIDE INSERT

Being the best through innovation





# i-Dream Drills

- For Steels and Stainless Steel Alloys

# SELECTION GUIDE

| ITEM | MODEL | DESCRIPTION | PAGE |
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| YI3A / YI3B | | *i*-*Dream Drills* INOX | |
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## Comparison with Split Point Drill, Spade Drill & Dream Drill

◎ : Excellent
○ : Good

| Non-alloyed Steels, Free Machining Steels | Carbon Steels | | Alloy Steels | | High Alloyed steels | | Structural Steels | | Tool Steels | | Stainless Steels | Cast Iron | | Aluminum | Copper Alloys |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc24 (~HB250) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc37 (~HB350) | HRc37~ (HB350~) | ~HRc24 (~HB250) | HRc24~ (HB250~) | ~HRc13 (~HB200) | HRc13~ (HB200~) | ~HRc28 (~HB275) | ~HRc19 (~HB220) | HRc19~ (HB220~) | ~HRc8 (~HB180) | ~HB110 |
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | | ◎ | ◎ | | |
| ○ | ○ | | ○ | | | | ○ | | ○ | | ◎ | | | ○ | ○ |
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | | ◎ | ◎ | | |
| ○ | ○ | | ○ | | | | ○ | | ○ | | ◎ | | | ○ | ○ |
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | | ◎ | ◎ | | |
| ○ | ○ | | ○ | | | | ○ | | ○ | | ◎ | | | ○ | ○ |
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | | ◎ | ◎ | | |
| ○ | ○ | | ○ | | | | ○ | | ○ | | ◎ | | | ○ | ○ |
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | | ◎ | ◎ | | |
| ○ | ○ | | ○ | | | | ○ | | ○ | | ◎ | | | ○ | ○ |
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | | ◎ | ◎ | | |
| ○ | ○ | | ○ | | | | ○ | | ○ | | ◎ | | | ○ | ○ |

YG *i*-Dream Drills

**Y03A / YI3A**
**Y03B / YI3B**

# i-DREAM DRILL INSERTS & HOLDERS

**- Features of *i*-*Dream Drill* Inserts**

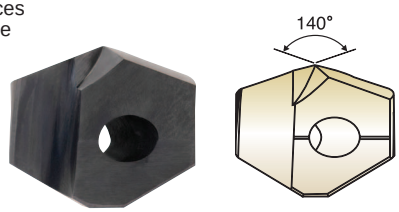
▶ Secure and accurate seating resulting in accurate repeatability and concentricity.

*i-Dream Drill* ***General***

▶ For most steels materials

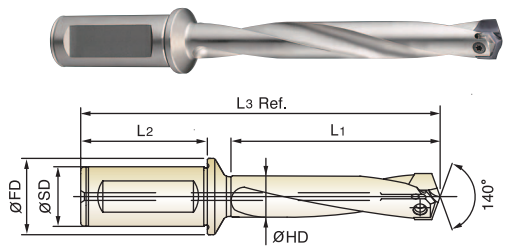
*i-Dream Drill* ***INOX***

▶ For tough,ductile materials and stainless steels
▶ Light,sharp cutting edge
▶ Minimize cutting forces
▶ Reduce built-up edge




**- Features of *i*-*Dream Drill* Holders**

▶ Special Alloy Steels that maintains its hardness and toughness under high temperatures with generous coolant holes for effective coolant flow.
▶ Innovative surface treatment that improves wear resistance and reduces corrosion.
▶ High Performance flute design allowing maximum chip evacuation and minimum interference.




cutting conditions : p.38~39

Unit : inch

| Series Range | Insert EDP No. | | Insert O.D. | | Length | Holder EDP No. | Diameter HD | Shank Dia. | Shank Length | Flange Dia. | Drilling Depth | Overall Length | Torx Screw No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TiAlN | TiCN | h7 | | | | | | | | | | |
| (mm) | General | INOX | dec. | inch / mm | | | | SD | L2 | FD | L1 | L3 Ref. | |
| A Ø12.00 to Ø13.99 3.6mm Thick | Y03A01 | YI3A01 | .4724 | 12.00 | 3D<br>5D<br>7D | ZA0301<br>ZA0501<br>ZA0701 | .4528 | 3/4 | 2 | 1 | 1-27/64<br>2-23/64<br>3-5/16 | 4-29/64<br>5-13/32<br>6-11/32 | TA1213 |
| | Y03A02 | YI3A02 | .4764 | 12.10 | | | | | | | | | |
| | Y03A03 | YI3A03 | .4803 | 12.20 | | | | | | | | | |
| | Y03A04 | YI3A04 | .4844 | 31/64 | | | | | | | | | |
| | Y03A05 | YI3A05 | .4921 | 12.50 | 3D<br>5D<br>7D | ZA0302<br>ZA0502<br>ZA0702 | .4724 | 3/4 | 2 | 1 | 1-15/32<br>2-29/64<br>3-7/16 | 4-1/2<br>5-31/64<br>6-15/32 | |
| | Y03A06 | YI3A06 | .4961 | 12.60 | | | | | | | | | |
| | Y03A07 | YI3A07 | .5000 | 1/2 | | | | | | | | | |
| | Y03A08 | YI3A08 | .5039 | 12.80 | | | | | | | | | |
| | Y03A09 | YI3A09 | .5079 | 12.90 | | | | | | | | | |
| | Y03A10 | YI3A10 | .5118 | 13.00 | 3D<br>5D<br>7D | ZA0303<br>ZA0503<br>ZA0703 | .4921 | 3/4 | 2 | 1 | 1-17/32<br>2-9/16<br>3-37/64 | 4-37/64<br>5-19/32<br>6-5/8 | TA1314 |
| | Y03A11 | YI3A11 | .5156 | 33/64 | | | | | | | | | |
| | Y03A12 | YI3A12 | .5197 | 13.20 | | | | | | | | | |
| | Y03A13 | YI3A13 | .5312 | 17/32 | | | | | | | | | |
| | Y03A14 | YI3A14 | .5315 | 13.50 | 3D<br>5D<br>7D | ZA0304<br>ZA0504<br>ZA0704 | .5118 | 3/4 | 2 | 1 | 1-19/32<br>2-21/32<br>3-23/32 | 4-39/64<br>5-43/64<br>6-47/64 | |
| | Y03A15 | YI3A15 | .5354 | 13.60 | | | | | | | | | |
| | Y03A16 | YI3A16 | .5394 | 13.70 | | | | | | | | | |
| | Y03A17 | YI3A17 | .5433 | 13.80 | | | | | | | | | |
| | Y03A18 | YI3A18 | .5469 | 35/64 | | | | | | | | | |
| B Ø14.00 to Ø15.99 4mm Thick | Y03B01 | YI3B01 | .5512 | 14.00 | 3D<br>5D<br>7D | ZB0301<br>ZB0501<br>ZB0701 | .5315 | 3/4 | 2 | 1 | 1-21/32<br>2-3/4<br>3-55/64 | 4-23/32<br>5-13/16<br>6-59/64 | TB1415 |
| | Y03B02 | YI3B02 | .5551 | 14.10 | | | | | | | | | |
| | Y03B03 | YI3B03 | .5591 | 14.20 | | | | | | | | | |
| | Y03B04 | YI3B04 | .5625 | 9/16 | | | | | | | | | |
| | Y03B05 | YI3B05 | .5630 | 14.30 | | | | | | | | | |
| | Y03B06 | YI3B06 | .5669 | 14.40 | | | | | | | | | |

**Coating :** TiN, TiCN, TiAlN & Hardslick are available on your request.

◎ : Excellent ○ : Good

| | Non-alloyed Steels, Free Machining Steels | Carbon Steels | | Alloy Steels | | High Alloyed steels | | Structural Steels | | Tool Steels | | Stainless Steels | Cast Iron | | Aluminum | Copper Alloys |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ~HRc24 (~HB250) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc37 (~HB350) | HRc37~ (HB350~) | ~HRc24 (~HB250) | HRc24~ (HB250~) | ~HRc13 (~HB200) | HRc13~ (HB200~) | ~HRc28 (~HB275) | ~HRc19 (~HB220) | HRc19~ (HB220~) | ~HRc8 (~HB180) | ~HB110 |
| Y03 * | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | | ◎ | ◎ | | |
| YI3 * | ○ | ○ | | ○ | | | | ○ | | ○ | | ◎ | | | ○ | ○ |

YG *i*-Dream Drills

**Y03B / YI3B**
**Y03C / YI3C**

# i-DREAM DRILL INSERTS & HOLDERS

**- Features of *i*-*Dream Drill* Inserts**

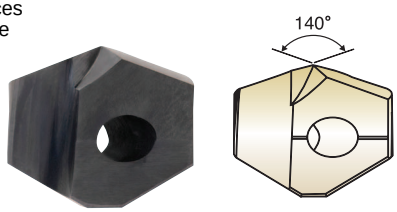
▶ Secure and accurate seating resulting in accurate repeatability and concentricity.

*i-Dream Drill* ***General***

▶ For most steels materials

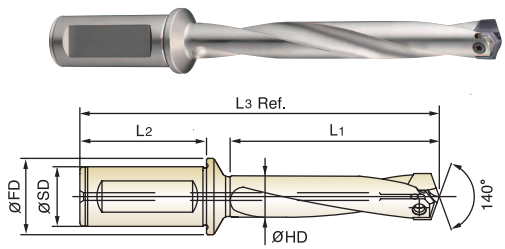
*i-Dream Drill* ***INOX***

▶ For tough,ductile materials and stainless steels
▶ Light,sharp cutting edge
▶ Minimize cutting forces
▶ Reduce built-up edge




**- Features of *i*-*Dream Drill* Holders**

▶ Special Alloy Steels that maintains its hardness and toughness under high temperatures with generous coolant holes for effective coolant flow.
▶ Innovative surface treatment that improves wear resistance and reduces corrosion.
▶ High Performance flute design allowing maximum chip evacuation and minimum interference.




cutting conditions : p.38~39

Unit : inch

| Series Range | Insert EDP No. | | Insert O.D. | | Length | Holder EDP No. | Diameter HD | Shank Dia. | Shank Length | Flange Dia. | Drilling Depth | Overall Length | Torx Screw No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TiAlN | TiCN | h7 | | | | | | | | | | |
| (mm) | General | INOX | dec. | inch / mm | | | | SD | L2 | FD | L1 | L3 Ref. | |
| B Ø14.00 to Ø15.99 4mm Thick | Y03B07 | YI3B07 | .5709 | 14.50 | 3D<br>5D<br>7D | ZB0302<br>ZB0502<br>ZB0702 | .5512 | 3/4 | 2 | 1 | 1-23/32<br>2-55/64<br>4 | 4-51/64<br>5-15/16<br>7-5/64 | TB1415 |
| | Y03B08 | YI3B08 | .5748 | 14.60 | | | | | | | | | |
| | Y03B09 | YI3B09 | .5781 | 37/64 | | | | | | | | | |
| | Y03B10 | YI3B10 | .5827 | 14.80 | | | | | | | | | |
| | Y03B11 | YI3B11 | .5906 | 15.00 | 3D<br>5D<br>7D | ZB0303<br>ZB0503<br>ZB0703 | .5709 | 3/4 | 2 | 1 | 1-49/64<br>2-61/64<br>4-9/64 | 4-7/8<br>6-3/64<br>7-15/64 | TB1516 |
| | Y03B12 | YI3B12 | .5938 | 19/32 | | | | | | | | | |
| | Y03B13 | YI3B13 | .5945 | 15.10 | | | | | | | | | |
| | Y03B14 | YI3B14 | .5984 | 15.20 | | | | | | | | | |
| | Y03B15 | YI3B15 | .6024 | 15.30 | | | | | | | | | |
| | Y03B16 | YI3B16 | .6094 | 39/64 | | | | | | | | | |
| | Y03B17 | YI3B17 | .6102 | 15.50 | 3D<br>5D<br>7D | ZB0304<br>ZB0504<br>ZB0704 | .5906 | 3/4 | 2 | 1 | 1-53/64<br>3-3/64<br>4-17/64 | 4-29/32<br>6-1/8<br>7-11/32 | |
| | Y03B18 | YI3B18 | .6142 | 15.60 | | | | | | | | | |
| | Y03B19 | YI3B19 | .6181 | 15.70 | | | | | | | | | |
| | Y03B20 | YI3B20 | .6220 | 15.80 | | | | | | | | | |
| | Y03B21 | YI3B21 | .6250 | 5/8 | | | | | | | | | |
| C Ø16.00 to Ø17.99 4.5mm Thick | Y03C01 | YI3C01 | .6299 | 16.00 | 3D<br>5D<br>7D | ZC0301<br>ZC0501<br>ZC0701 | .6102 | 3/4 | 2 | 1 | 1-57/64<br>3-5/32<br>4-13/32 | 4-61/64<br>6-7/32<br>7-15/32 | TC1617 |
| | Y03C02 | YI3C02 | .6335 | 16.09 | | | | | | | | | |
| | Y03C03 | YI3C03 | .6378 | 16.20 | | | | | | | | | |
| | Y03C04 | YI3C04 | .6406 | 41/64 | | | | | | | | | |
| | Y03C05 | YI3C05 | .6417 | 16.30 | | | | | | | | | |
| | Y03C06 | YI3C06 | .6496 | 16.50 | 3D<br>5D<br>7D | ZC0302<br>ZC0502<br>ZC0702 | .6299 | 3/4 | 2 | 1 | 1-61/64<br>3-1/4<br>4-35/64 | 5-1/32<br>6-21/64<br>7-5/8 | |
| | Y03C07 | YI3C07 | .6562 | 21/32 | | | | | | | | | |
| | Y03C08 | YI3C08 | .6614 | 16.80 | | | | | | | | | |

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◎ : Excellent ○ : Good

| | Non-alloyed Steels, Free Machining Steels | Carbon Steels | | Alloy Steels | | High Alloyed steels | | Structural Steels | | Tool Steels | | Stainless Steels | Cast Iron | | Aluminum | Copper Alloys |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ~HRc24 (~HB250) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc37 (~HB350) | HRc37~ (HB350~) | ~HRc24 (~HB250) | HRc24~ (HB250~) | ~HRc13 (~HB200) | HRc13~ (HB200~) | ~HRc28 (~HB275) | ~HRc19 (~HB220) | HRc19~ (HB220~) | ~HRc8 (~HB180) | ~HB110 |
| Y03 * | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | | ◎ | ◎ | | |
| YI3 * | ○ | ○ | | ○ | | | | ○ | | ○ | | ◎ | | | ○ | ○ |

YG *i*-Dream Drills

**Y03C / YI3C**
**Y03D / YI3D**

# i-DREAM DRILL INSERTS & HOLDERS

**- Features of *i*-*Dream Drill* Inserts**

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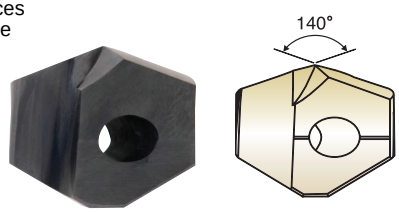
▶ For most steels materials

*i-Dream Drill* ***INOX***

▶ For tough,ductile materials and stainless steels
▶ Light,sharp cutting edge
▶ Minimize cutting forces
▶ Reduce built-up edge




**- Features of *i*-*Dream Drill* Holders**

▶ Special Alloy Steels that maintains its hardness and toughness under high temperatures with generous coolant holes for effective coolant flow.
▶ Innovative surface treatment that improves wear resistance and reduces corrosion.
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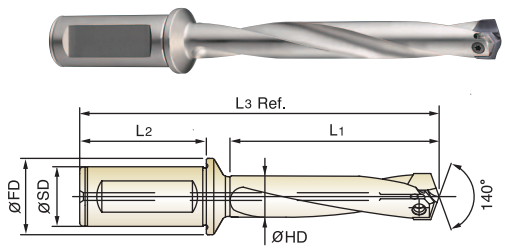


cutting conditions : p.38~39

Unit : inch

| Series Range | Insert EDP No. | | Insert O.D. | | Length | Holder EDP No. | Diameter HD | Shank Dia. | Shank Length | Flange Dia. | Drilling Depth | Overall Length | Torx Screw No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TiAlN | TiCN | h7 | | | | | | | | | | |
| (mm) | General | INOX | dec. | inch / mm | | | | SD | L2 | FD | L1 | L3 Ref. | |
| **C** Ø16.00 to Ø17.99 4.5mm Thick | Y03C09 | YI3C09 | .6693 | 17.00 | 3D | ZC0303 | .6496 | 3/4 | 2 | 1 | 2-1/64 | 5-5/64 | TC1718 |
| | Y03C10 | YI3C10 | .6919 | 43/64 | 5D | ZC0503 | | | | | 3-11/32 | 6-13/32 | |
| | Y03C11 | YI3C11 | .6875 | 11/16 | 7D | ZC0703 | | | | | 4-11/16 | 7-3/4 | |
| | Y03C12 | YI3C12 | .6890 | 17.50 | 3D | ZC0304 | .6693 | 3/4 | 2 | 1 | 2-1/16 | 5-5/32 | |
| | Y03C13 | YI3C13 | .7008 | 17.80 | 5D | ZC0504 | | | | | 3-7/16 | 6-17/32 | |
| | Y03C14 | YI3C14 | .7031 | 45/64 | 7D | ZC0704 | | | | | 4-53/64 | 7-29/32 | |
| **D** Ø18.00 to Ø19.99 5mm Thick | Y03D01 | YI3D01 | .7087 | 18.00 | 3D | ZD0301 | .6890 | 1 | 2-3/16 | 1-1/4 | 2-1/8 | 5-1/2 | TD1819 |
| | Y03D02 | YI3D02 | .7188 | 23/32 | 5D | ZD0501 | | | | | 3-35/64 | 6-59/64 | |
| | | | | | 7D | ZD0701 | | | | | 4-61/64 | 8-11/32 | |
| | Y03D03 | YI3D03 | .7283 | 18.50 | 3D | ZD0302 | .7087 | 1 | 2-3/16 | 1-1/4 | 2-3/16 | 5-35/64 | |
| | Y03D04 | YI3D04 | .7344 | 47/64 | 5D | ZD0502 | | | | | 3-41/64 | 7 | |
| | Y03D05 | YI3D05 | .7402 | 18.80 | 7D | ZD0702 | | | | | 5-3/32 | 8-29/64 | |
| | Y03D06 | YI3D06 | .7480 | 19.00 | 3D | ZD0303 | .7283 | 1 | 2-3/16 | 1-1/4 | 2-1/4 | 5-43/64 | TD1920 |
| | Y03D07 | YI3D07 | .7500 | 3/4 | 5D | ZD0503 | | | | | 3-47/64 | 7-5/32 | |
| | Y03D08 | YI3D08 | .7587 | 19.27 | 7D | ZD0703 | | | | | 5-15/64 | 8-21/32 | |
| | Y03D09 | YI3D09 | .7656 | 49/64 | | | | | | | | | |
| | Y03D10 | YI3D10 | .7677 | 19.50 | 3D | ZD0304 | .7480 | 1 | 2-3/16 | 1-1/4 | 2-19/64 | 5-45/64 | |
| | Y03D11 | YI3D11 | .7795 | 19.80 | 5D | ZD0504 | | | | | 3-27/32 | 7-15/64 | |
| | Y03D12 | YI3D12 | .7812 | 25/32 | 7D | ZD0704 | | | | | 5-3/8 | 8-25/32 | |

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| | Non-alloyed Steels, Free Machining Steels | Carbon Steels | | Alloy Steels | | High Alloyed steels | | Structural Steels | | Tool Steels | | Stainless Steels | Cast Iron | | Aluminum | Copper Alloys |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ~HRc24 (~HB250) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc37 (~HB350) | HRc37~ (HB350~) | ~HRc24 (~HB250) | HRc24~ (HB250~) | ~HRc13 (~HB200) | HRc13~ (HB200~) | ~HRc28 (~HB275) | ~HRc19 (~HB220) | HRc19~ (HB220~) | ~HRc8 (~HB180) | ~HB110 |
| Y03 * | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | | ◎ | ◎ | | |
| YI3 * | ○ | ○ | | ○ | | | | ○ | | ○ | | ◎ | | | ○ | ○ |

YG *i*-Dream Drills

**Y03E / YI3E**
**Y03F / YI3F**

# i-DREAM DRILL INSERTS & HOLDERS

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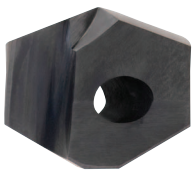
▶ Secure and accurate seating resulting in accurate repeatability and concentricity.

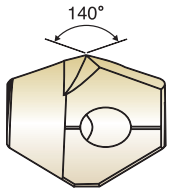
*i-Dream Drill* ***General***

▶ For most steels materials

*i-Dream Drill* ***INOX***

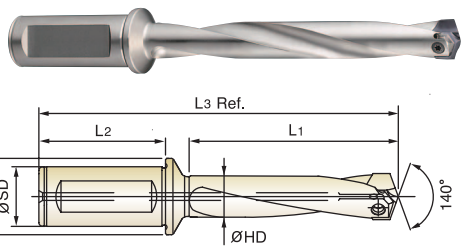
▶ For tough,ductile materials and stainless steels
▶ Light,sharp cutting edge
▶ Minimize cutting forces
▶ Reduce built-up edge






**- Features of *i*-*Dream Drill* Holders**

▶ Special Alloy Steels that maintains its hardness and toughness under high temperatures with generous coolant holes for effective coolant flow.
▶ Innovative surface treatment that improves wear resistance and reduces corrosion.
▶ High Performance flute design allowing maximum chip evacuation and minimum interference.




cutting conditions : p.38~39

Unit : inch

| Series Range | Insert EDP No. | | Insert O.D. | | Length | Holder EDP No. | Diameter HD | Shank Dia. | Shank Length | Flange Dia. | Drilling Depth | Overall Length | Torx Screw No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TiAlN | TiCN | h7 | | | | | | | | | | |
| (mm) | General | INOX | dec. | inch / mm | | | | SD | L2 | FD | L1 | L3 Ref. | |
| E Ø20.00 to Ø21.99 5.5mm Thick | Y03E01 | YI3E01 | .7874 | 20.00 | 3D | ZE0301 | .7638 | 1 | 2-3/16 | 1-1/4 | 2-23/64 | 5-23/32 | TE2021 |
| | Y03E02 | YI3E02 | .7969 | 51/64 | 5D | ZE0501 | | | | | 3-15/16 | 7-9/32 | |
| | | | | | 7D | ZE0701 | | | | | 5-33/64 | 8-55/64 | |
| | Y03E03 | YI3E03 | .8071 | 20.50 | 3D | ZE0302 | .7835 | 1 | 2-3/16 | 1-1/4 | 2-27/64 | 5-51/64 | |
| | Y03E04 | YI3E04 | .8125 | 13/16 | 5D | ZE0502 | | | | | 4-1/32 | 7-13/32 | |
| | Y03E05 | YI3E05 | .8150 | 20.70 | 7D | ZE0702 | | | | | 5-21/32 | 9-1/64 | |
| | Y03E06 | YI3E06 | .8268 | 21.00 | 3D | ZE0303 | .8031 | 1 | 2-3/16 | 1-1/4 | 2-31/64 | 5-7/8 | TE2122 |
| | Y03E07 | YI3E07 | .8281 | 53/64 | 5D | ZE0503 | | | | | 4-9/64 | 7-33/64 | |
| | Y03E08 | YI3E08 | .8438 | 27/32 | 7D | ZE0703 | | | | | 5-25/32 | 9-11/64 | |
| | Y03E09 | YI3E09 | .8465 | 21.50 | 3D | ZE0304 | .8228 | 1 | 2-3/16 | 1-1/4 | 2-35/64 | 5-29/32 | |
| | Y03E10 | YI3E10 | .8543 | 21.70 | 5D | ZE0504 | | | | | 4-15/64 | 7-19/32 | |
| | Y03E11 | YI3E11 | .8594 | 55/64 | 7D | ZE0704 | | | | | 5-59/64 | 9-19/64 | |
| F Ø22.00 to Ø23.99 6mm Thick | Y03F01 | YI3F01 | .8661 | 22.00 | 3D | ZF0301 | .8425 | 1 | 2-3/16 | 1-1/4 | 2-19/32 | 5-63/64 | TF2223 |
| | Y03F02 | YI3F02 | .8750 | 7/8 | 5D | ZF0501 | | | | | 4-21/64 | 7-23/32 | |
| | | | | | 7D | ZF0701 | | | | | 6-1/16 | 9-29/64 | |
| | Y03F03 | YI3F03 | .8858 | 22.50 | 3D | ZF0302 | .8622 | 1 | 2-3/16 | 1-1/4 | 2-21/32 | 6-1/32 | |
| | Y03F04 | YI3F04 | .8906 | 57/64 | 5D | ZF0502 | | | | | 4-27/64 | 7-51/64 | |
| | Y03F05 | YI3F05 | .8937 | 22.70 | 7D | ZF0702 | | | | | 6-13/64 | 9-9/16 | |
| | Y03F06 | YI3F06 | .9055 | 23.00 | 3D | ZF0303 | .8819 | 1 | 2-3/16 | 1-1/4 | 2-23/32 | 6-7/64 | TF2324 |
| | Y03F07 | YI3F07 | .9062 | 29/32 | 5D | ZF0503 | | | | | 4-17/32 | 7-29/32 | |
| | Y03F08 | YI3F08 | .9219 | 59/64 | 7D | ZF0703 | | | | | 6-11/32 | 9-23/32 | |
| | Y03F09 | YI3F09 | .9252 | 23.50 | 3D | ZF0304 | .9016 | 1 | 2-3/16 | 1-1/4 | 2-25/32 | 6-3/16 | |
| | Y03F10 | YI3F10 | .9331 | 23.70 | 5D | ZF0504 | | | | | 4-5/8 | 8-1/32 | |
| | Y03F11 | YI3F11 | .9375 | 15/16 | 7D | ZF0704 | | | | | 6-15/32 | 9-7/8 | |

**Coating :** TiN, TiCN, TiAlN & Hardslick are available on your request.

◎ : Excellent ○ : Good

| | Non-alloyed Steels, Free Machining Steels | Carbon Steels | | Alloy Steels | | High Alloyed steels | | Structural Steels | | Tool Steels | | Stainless Steels | Cast Iron | | Aluminum | Copper Alloys |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ~HRc24 (~HB250) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc37 (~HB350) | HRc37~ (HB350~) | ~HRc24 (~HB250) | HRc24~ (HB250~) | ~HRc13 (~HB200) | HRc13~ (HB200~) | ~HRc28 (~HB275) | ~HRc19 (~HB220) | HRc19~ (HB220~) | ~HRc8 (~HB180) | ~HB110 |
| Y03 * | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | | ◎ | ◎ | | |
| YI3 * | ○ | ○ | | ○ | | | | ○ | | ○ | | ◎ | | | ○ | ○ |

# i-Dream Drills

**Y03G / YI3G**
**Y03H / YI3H**

## i-DREAM DRILL INSERTS & HOLDERS

**- Features of *i-Dream Drill* Inserts**

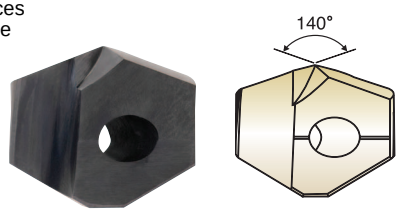
▶ Secure and accurate seating resulting in accurate repeatability and concentricity.

*i-Dream Drill* ***General***

▶ For most steels materials

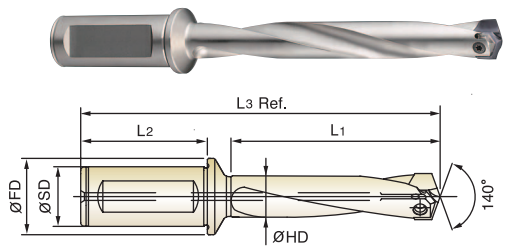
*i-Dream Drill* ***INOX***

▶ For tough,ductile materials and stainless steels
▶ Light,sharp cutting edge
▶ Minimize cutting forces
▶ Reduce built-up edge




**- Features of *i-Dream Drill* Holders**

▶ Special Alloy Steels that maintains its hardness and toughness under high temperatures with generous coolant holes for effective coolant flow.
▶ Innovative surface treatment that improves wear resistance and reduces corrosion.
▶ High Performance flute design allowing maximum chip evacuation and minimum interference.




cutting conditions : p.38~39

Unit : inch

| Series Range | Insert EDP No. | | Insert O.D. | | Length | Holder EDP No. | Diameter HD | Shank Dia. | Shank Length | Flange Dia. | Drilling Depth | Overall Length | Torx Screw No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TiAlN | TiCN | h7 | | | | | | | | | | |
| (mm) | General | INOX | dec. | inch / mm | | | | SD | L2 | FD | L1 | L3 Ref. | |
| G Ø24.00 to Ø25.99 6.5mm Thick | Y03G01 | YI3G01 | .9449 | 24.00 | 3D | ZG0301 | .9213 | 1-1/4 | 2-3/8 | 1-15/32 | 2-53/64 | 6-1/2 | TG2425 |
| | | | | | 5D | ZG0501 | | | | | 4-23/32 | 8-25/64 | |
| | Y03G02 | YI3G02 | .9531 | 61/64 | 7D | ZG0701 | | | | | 6-39/64 | 10-9/32 | |
| | Y03G03 | YI3G03 | .9646 | 24.50 | 3D | ZG0302 | .9409 | 1-1/4 | 2-3/8 | 1-15/32 | 2-57/64 | 6-17/32 | |
| | Y03G04 | YI3G04 | .9688 | 31/32 | 5D | ZG0502 | | | | | 4-53/64 | 8-15/32 | |
| | Y03G05 | YI3G05 | .9724 | 24.70 | 7D | ZG0702 | | | | | 6-3/4 | 10-25/64 | |
| | Y03G06 | YI3G06 | .9843 | 63/64 | 3D | ZG0303 | .9606 | 1-1/4 | 2-3/8 | 1-15/32 | 2-61/64 | 6-39/64 | TG2526 |
| | Y03G07 | YI3G07 | 1.0000 | 1 | 5D | ZG0503 | | | | | 4-59/64 | 8-37/64 | |
| | | | | | 7D | ZG0703 | | | | | 6-57/64 | 10-35/64 | |
| | Y03G08 | YI3G08 | 1.0039 | 25.50 | 3D | ZG0304 | .9803 | 1-1/4 | 2-3/8 | 1-15/32 | 3-1/64 | 6-47/64 | |
| | Y03G09 | YI3G09 | 1.0106 | 25.67 | 5D | ZG0504 | | | | | 5-1/64 | 8-47/64 | |
| | Y03G10 | YI3G10 | 1.0118 | 25.70 | 7D | ZG0704 | | | | | 7-1/32 | 10-3/4 | |
| | Y03G11 | YI3G11 | 1.0156 | 1-1/64 | | | | | | | | | |
| H Ø26.00 to Ø27.99 7.1mm Thick | Y03H01 | YI3H01 | 1.0236 | 26.00 | 3D | ZH0301 | 1.0000 | 1-1/4 | 2-3/8 | 1-15/32 | 3-5/64 | 6-3/4 | TH2627 |
| | | | | | 5D | ZH0501 | | | | | 5-1/8 | 8-51/64 | |
| | Y03H02 | YI3H02 | 1.0312 | 1-1/32 | 7D | ZH0701 | | | | | 7-11/64 | 10-27/32 | |
| | Y03H03 | YI3H03 | 1.0433 | 26.50 | 3D | ZH0302 | 1.0197 | 1-1/4 | 2-3/8 | 1-15/32 | 3-1/8 | 6-51/64 | |
| | Y03H04 | YI3H04 | 1.0469 | 1-3/64 | 5D | ZH0502 | | | | | 5- 7/32 | 8-7/8 | |
| | Y03H05 | YI3H05 | 1.0625 | 1-1/16 | 7D | ZH0702 | | | | | 7-19/64 | 10-31/32 | |
| | Y03H06 | YI3H06 | 1.0630 | 27.00 | 3D | ZH0303 | 1.0394 | 1-1/4 | 2-3/8 | 1-15/32 | 3-3/16 | 6-7/8 | TH2728 |
| | | | | | 5D | ZH0503 | | | | | 5-5/16 | 9 | |
| | | | | | 7D | ZH0703 | | | | | 7-7/16 | 11-1/8 | |
| | Y03H07 | YI3H07 | 1.0827 | 27.50 | 3D | ZH0304 | 1.0591 | 1-1/4 | 2-3/8 | 1-15/32 | 3-1/4 | 6-29/32 | |
| | | | | | 5D | ZH0504 | | | | | 5-13/32 | 9-5/64 | |
| | Y03H08 | YI3H08 | 1.0938 | 1-3/32 | 7D | ZH0704 | | | | | 7-37/64 | 11-15/64 | |

**Coating :** TiN, TiCN, TiAlN & Hardslick are available on your request.

◎ : Excellent ○ : Good

| | Non-alloyed Steels, Free Machining Steels | Carbon Steels | | Alloy Steels | | High Alloyed steels | | Structural Steels | | Tool Steels | | Stainless Steels | Cast Iron | | Aluminum | Copper Alloys |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ~HRc24 (~HB250) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc37 (~HB350) | HRc37~ (HB350~) | ~HRc24 (~HB250) | HRc24~ (HB250~) | ~HRc13 (~HB200) | HRc13~ (HB200~) | ~HRc28 (~HB275) | ~HRc19 (~HB220) | HRc19~ (HB220~) | ~HRc8 (~HB180) | ~HB110 |
| Y03 * | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | | ◎ | ◎ | | |
| YI3 * | ○ | ○ | | ○ | | | | ○ | | ○ | | ◎ | | | ○ | ○ |

YG *i*-Dream Drills

**Y03I / YI3I**
**Y03J / YI3J**

# i-DREAM DRILL INSERTS & HOLDERS

**- Features of *i*-*Dream Drill* Inserts**

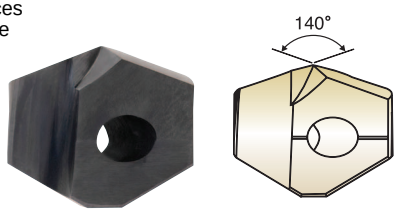
▶ Secure and accurate seating resulting in accurate repeatability and concentricity.

*i-Dream Drill* ***General***

▶ For most steels materials

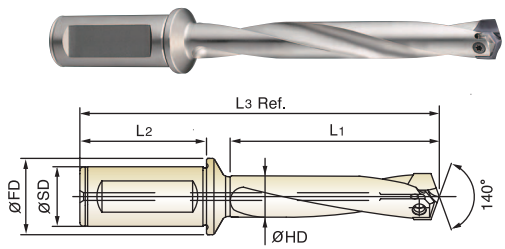
*i-Dream Drill* ***INOX***

▶ For tough,ductile materials and stainless steels
▶ Light,sharp cutting edge
▶ Minimize cutting forces
▶ Reduce built-up edge




**- Features of *i*-*Dream Drill* Holders**

▶ Special Alloy Steels that maintains its hardness and toughness under high temperatures with generous coolant holes for effective coolant flow.
▶ Innovative surface treatment that improves wear resistance and reduces corrosion.
▶ High Performance flute design allowing maximum chip evacuation and minimum interference.




cutting conditions : p.38~39

Unit : inch

| Series Range | Insert EDP No. | | Insert O.D. | | Length | Holder EDP No. | Diameter HD | Shank Dia. | Shank Length | Flange Dia. | Drilling Depth | Overall Length | Torx Screw No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TiAlN | TiCN | h7 | | | | | | | | | | |
| (mm) | General | INOX | dec. | inch / mm | | | | SD | L2 | FD | L1 | L3 Ref. | |
| I Ø28.00 to Ø29.99 7.7mm Thick | Y03I01 | YI3I01 | 1.1024 | 28.00 | 3D | ZI0301 | 1.0748 | 1-1/4 | 2-3/8 | 1-15/32 | 3-5/16 | 7 | TI2829 |
| | | | | | 5D | ZI0501 | | | | | 5-33/64 | 9-15/64 | |
| | Y03I02 | YI3I02 | 1.1094 | 1*7/64 | 7D | ZI0701 | | | | | 7-23/32 | 11-7/16 | |
| | Y03I03 | YI3I03 | 1.1220 | 28.50 | 3D | ZI0302 | 1.0945 | 1-1/4 | 2-3/8 | 1-15/32 | 3-23/64 | 7-1/16 | |
| | | | | | 5D | ZI0502 | | | | | 5-39/64 | 9-5/16 | |
| | Y03I04 | YI3I04 | 1.1250 | 1*1/8 | 7D | ZI0702 | | | | | 7-55/64 | 11-9/16 | |
| | Y03I05 | YI3I05 | 1.1417 | 29.00 | 3D | ZI0303 | 1.1142 | 1-1/4 | 2-3/8 | 1-15/32 | 3-27/64 | 7-3/16 | TI2930 |
| | | | | | 5D | ZI0503 | | | | | 5-45/64 | 9-15/32 | |
| | Y03I06 | YI3I06 | 1.1562 | 1*5/32 | 7D | ZI0703 | | | | | 7-63/64 | 11-3/4 | |
| | Y03I07 | YI3I07 | 1.1614 | 29.50 | 3D | ZI0304 | 1.1339 | 1-1/4 | 2-3/8 | 1-15/32 | 3-31/64 | 7-7/32 | |
| | | | | | 5D | ZI0504 | | | | | 5-13/16 | 9-35/64 | |
| | Y03I08 | YI3I08 | 1.1719 | 1*11/64 | 7D | ZI0704 | | | | | 8-1/8 | 11-7/8 | |
| J Ø30.00 to Ø31.99 8mm Thick | Y03J01 | YI3J01 | 1.1811 | 30.00 | 3D | ZJ0301 | 1.1535 | 1-1/4 | 2-3/8 | 1-15/32 | 3-35/64 | 7-21/64 | TJ2831 |
| | | | | | 5D | ZJ0501 | | | | | 5-29/32 | 9-45/64 | |
| | Y03J02 | YI3J02 | 1.1875 | 1*3/16 | 7D | ZJ0701 | | | | | 8-17/64 | 12-1/16 | |
| | Y03J03 | YI3J03 | 1.2008 | 30.50 | 3D | ZJ0302 | 1.1732 | 1-1/4 | 2-3/8 | 1-15/32 | 3-39/64 | 7-3/8 | |
| | Y03J04 | YI3J04 | 1.2031 | 1*11/64 | 5D | ZJ0502 | | | | | 6 | 9-25/32 | |
| | Y03J05 | YI3J05 | 1.2188 | 1*7/32 | 7D | ZJ0702 | | | | | 8-13/32 | 12-11/64 | |
| | Y03J06 | YI3J06 | 1.2205 | 31.00 | 3D | ZJ0303 | 1.1929 | 1-1/4 | 2-3/8 | 1-15/32 | 3-21/32 | 7-13/32 | TJ3132 |
| | | | | | 5D | ZJ0503 | | | | | 6-7/64 | 9-55/64 | |
| | | | | | 7D | ZJ0703 | | | | | 8-35/64 | 12-19/64 | |
| | Y03J07 | YI3J07 | 1.2402 | 31.50 | 3D | ZJ0304 | 1.2126 | 1-1/4 | 2-3/8 | 1-15/32 | 3-23/32 | 7-17/32 | |
| | | | | | 5D | ZJ0504 | | | | | 6-13/64 | 10-1/64 | |
| | Y03J08 | YI3J08 | 1.2500 | 1*1/4 | 7D | ZJ0704 | | | | | 8-11/16 | 12-31/64 | |

**Coating :** TiN, TiCN, TiAlN & Hardslick are available on your request.

◎ : Excellent ○ : Good

| | Non-alloyed Steels, Free Machining Steels | Carbon Steels | | Alloy Steels | | High Alloyed steels | | Structural Steels | | Tool Steels | | Stainless Steels | Cast Iron | | Aluminum | Copper Alloys |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ~HRc24 (~HB250) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc37 (~HB350) | HRc37~ (HB350~) | ~HRc24 (~HB250) | HRc24~ (HB250~) | ~HRc13 (~HB200) | HRc13~ (HB200~) | ~HRc28 (~HB275) | ~HRc19 (~HB220) | HRc19~ (HB220~) | ~HRc8 (~HB180) | ~HB110 |
| Y03 * | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | | ◎ | ◎ | | |
| YI3 * | ○ | ○ | | ○ | | | | ○ | | ○ | | ◎ | | | ○ | ○ |

# METRIC

| Material | | | Tensile Strength | Hardness | | Cutting Speed | Feed [mm/rev] | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | [N/mm²] | HB | HRc | Vc [M/min] | Ø12.0 ~Ø14.9 | Ø15.0 ~Ø17.9 | Ø18.0 ~Ø21.9 | Ø22.0 ~Ø26.9 | Ø27.0 ~Ø31.9 |
| Non-alloyed steels, Cast steels Free-machining steels | 9SMn28, 9SMnPb28, 10SPb20 etc | Y03□ / Y13□ | ~500 | 100~150 | | 95~120 | 0.16~0.28 | 0.21~0.35 | 0.27~0.40 | 0.34~0.52 | 0.37~0.55 |
| | | | 500~850 | 150~250 | ~24 | 80~105 | 0.14~0.24 | 0.21~0.35 | 0.27~0.40 | 0.34~0.52 | 0.37~0.55 |
| Low-alloyed steels, Cast steels(<5% ) Carbon steels | C15, C22, 20Mn5, Ck45, C45 etc | | ~450 | 85~125 | | 90~115 | 0.14~0.25 | 0.20~0.33 | 0.25~0.39 | 0.31~0.47 | 0.34~0.50 |
| | | | 450~755 | 125~225 | ~19 | 70~90 | 0.12~0.20 | 0.17~0.28 | 0.22~0.32 | 0.30~0.46 | 0.33~0.49 |
| | | | 755~900 | 225~265 | 19~27 | 60~80 | 0.12~0.20 | 0.17~0.28 | 0.22~0.32 | 0.30~0.46 | 0.33~0.49 |
| | | | 900~1200 | 265~350 | 27~37 | 55~70 | 0.10~0.16 | 0.15~0.25 | 0.21~0.30 | 0.25~0.38 | 0.29~0.43 |
| Alloyed steels | 45CrMo4, 42CrMo4, 16MnCr5, Ck75, 35CrMo4, 16MnCr5 etc | | ~600 | 125~175 | ~7 | 80~100 | 0.14~0.24 | 0.17~0.28 | 0.22~0.32 | 0.30~0.46 | 0.34~0.50 |
| | | | 600~800 | 175~235 | 7~22 | 70~90 | 0.12~0.20 | 0.17~0.28 | 0.22~0.32 | 0.30~0.46 | 0.34~0.50 |
| | | | 800~950 | 235~280 | 22~29 | 60~80 | 0.12~0.20 | 0.15~0.25 | 0.22~0.32 | 0.30~0.46 | 0.34~0.50 |
| | | | 950~1110 | 280~330 | 29~35 | 55~70 | 0.10~0.16 | 0.13~0.21 | 0.21~0.30 | 0.25~0.38 | 0.29~0.43 |
| | | | 1110~1230 | 330~360 | 35~39 | 45~60 | 0.08~0.12 | 0.13~0.21 | 0.21~0.30 | 0.25~0.38 | 0.29~0.43 |
| High-alloyed steels | 36CrNiMo4, 41CrAlMo7 etc | | 600~1020 | 225~300 | 19~32 | 45~60 | 0.12~0.20 | 0.15~0.25 | 0.21~0.30 | 0.20~0.31 | 0.24~0.35 |
| | | | 1020~1200 | 300~355 | 32~38 | 40~55 | 0.10~0.16 | 0.11~0.18 | 0.21~0.30 | 0.20~0.31 | 0.24~0.35 |
| | | | 1200~1330 | 355~390 | 38~42 | 40~50 | 0.08~0.12 | 0.09~0.14 | 0.18~0.26 | 0.19~0.29 | 0.23~0.34 |
| Structural steels | St33, St37-2, St44-2, St52, St60 etc | | 350~500 | 100~150 | | 75~95 | 0.14~0.24 | 0.21~0.35 | 0.27~0.39 | 0.29~0.44 | 0.32~0.47 |
| | | | 500~850 | 150~250 | ~24 | 60~75 | 0.12~0.20 | 0.20~0.33 | 0.22~0.32 | 0.25~0.38 | 0.29~0.43 |
| | | | 850~1200 | 250~355 | 24~38 | 50~65 | 0.10~0.16 | 0.17~0.28 | 0.21~0.30 | 0.21~0.32 | 0.26~0.38 |
| Tool steels | 102Cr6, 105WCr6, C75W etc | | 500~705 | 150~210 | ~16 | 50~65 | 0.10~0.16 | 0.13~0.21 | 0.18~0.26 | 0.20~0.31 | 0.24~0.35 |
| | | | 705~950 | 210~280 | 16~29 | 40~50 | 0.10~0.16 | 0.13~0.21 | 0.18~0.26 | 0.20~0.31 | 0.24~0.35 |
| Grey cast iron | Pearlitic, Ferritic | | 500~700 | 150~210 | ~16 | 100~125 | 0.15~0.26 | 0.20~0.37 | 0.27~0.42 | 0.36~0.51 | 0.40~0.55 |
| | Pearlitic | | 700~850 | 210~250 | 16~24 | 75~95 | 0.11~0.20 | 0.16~0.29 | 0.20~0.30 | 0.25~0.35 | 0.29~0.40 |
| Cast iron nodular | Ferritic | | 540 | 165 | 4 | 95~120 | 0.13~0.22 | 0.17~0.31 | 0.21~0.32 | 0.28~0.40 | 0.32~0.44 |
| | Pearlitic | | 850 | 250 | 24 | 75~95 | 0.11~0.20 | 0.14~0.26 | 0.19~0.29 | 0.25~0.35 | 0.29~0.40 |
| Malleable cast iron | Ferritic | | 450 | 125 | | 100~125 | 0.13~0.22 | 0.17~0.31 | 0.21~0.32 | 0.28~0.40 | 0.32~0.44 |
| | Pearlitic | | 780 | 230 | 21 | 75~95 | 0.11~0.18 | 0.14~0.26 | 0.19~0.29 | 0.25~0.35 | 0.29~0.40 |
| Aluminum alloys (Wrought) | not heat treatable | | | 65 | | 250~330 | 0.30~0.40 | 0.35~0.45 | 0.40~0.50 | 0.45~0.55 | 0.50~0.60 |
| | hardened | | | 150 | | 200~250 | 0.30~0.40 | 0.35~0.45 | 0.40~0.50 | 0.45~0.55 | 0.50~0.60 |
| Aluminum alloys (Cast) | ≤12% Si, not heat treatable | | | 75 | | 200~50 | 0.25~0.35 | 0.30~0.40 | 0.35~0.45 | 0.40~0.50 | 0.45~0.55 |
| | ≤12% Si, hardened | | | 90 | | 150~220 | 0.25~0.35 | 0.30~0.40 | 0.35~0.45 | 0.40~0.50 | 0.45~0.55 |
| | >12% Si, not heat treatable | | | 130 | | 100~200 | 0.20~0.30 | 0.25~0.35 | 0.30~0.40 | 0.35~0.45 | 0.40~0.50 |
| Copper alloys | Free machining(Pb>1%) | | | 110 | | 115~145 | 0.16~0.28 | 0.23~0.36 | 0.29~0.36 | 0.37~0.45 | 0.41~0.48 |
| | Brass | | | 90 | | 145~185 | 0.17~0.29 | 0.24~0.37 | 0.30~0.38 | 0.38~0.46 | 0.42~0.49 |
| | Electrolitic copper | | | 100 | | 95~120 | 0.06~0.09 | 0.09~0.13 | 0.11~0.13 | 0.15~0.18 | 0.19~0.22 |
| Non ferrous material | Duroplastics | | | | | | | | | | |
| | Fiber plastics | | | | | | | | | | |
| | Hard rubber | | | | | | | | | | |
| Stainless steels | Austenitic and Austenitic/ferritic | Y13□ | 450~610 | 135~185 | ~9 | 45~60 | 0.10~0.16 | 0.12~0.18 | 0.14~0.20 | 0.15~0.26 | 0.18~0.28 |
| | | | 610~930 | 185~275 | 9~28 | 30~45 | 0.08~0.14 | 0.09~0.15 | 0.10~0.16 | 0.12~0.20 | 0.14~0.22 |

RPM = revolution per minute (rev/min)
M/min = surface meter per minute(M/min)
DIA. = diameter of drill (mm)
mm/rev = feed rate(mm/rev)

*Formulas :

$$\text{M/min} = \frac{(\text{RPM}) \cdot \pi \cdot (\text{DIA.})}{1000}$$

$$\text{mm/min} = (\text{RPM}) \cdot (\text{mm/rev})$$

$$\text{RPM} = \frac{(\text{M/min}) \cdot 1000}{(\pi) \cdot (\text{DIA.})}$$

▶ The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.
Speed and feed reductions (20% reduction in speed and 10% reduction in feed) are recommended.
▶ Recommend you to reduce the feed rate to 85%,70% when you use 5xD,7xD holders.
▶ For use of 7xD holder, we recommend to drill a centering pre-hole with equal to or larger than 140 ° point angle to min. 2/3 cutting diameter.
The use of the centering pre-hole improves hole location , roundness and surface finish.

# INCH

| Material | | | Tensile Strength | Hardness | | Cutting Speed | Feed [IPR] | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | MPa | HB | HRc | Vc [SFM] | Ø31/64 ~Ø37/64 | Ø19/32 ~Ø45/64 | Ø23/32 ~Ø55/64 | Ø7/8 ~Ø1-1/16 | Ø1-3/32 ~Ø1-1/4 |
| Non-alloyed steels, Cast steels Free-machining steels | 9SMn28, 9SMnPb28, 10SPb20 etc | Y03□ / Y13□ | ~500 | 100~150 | | 312~394 | .006~.011 | .008~.014 | .011~.016 | .013~.020 | .015~.022 |
| | | | 500~850 | 150~250 | ~24 | 262~344 | .006~.009 | .008~.014 | .011~.016 | .013~.020 | .015~.022 |
| Low-alloyed steels, Cast steels(<5% ) Carbon steels | C15, C22, 20Mn5, Ck45, C45 etc | | ~450 | 85~125 | | 295~377 | .006~.010 | .008~.013 | .010~.015 | .012~.019 | .013~.020 |
| | | | 450~755 | 125~225 | ~19 | 230~295 | .005~.008 | .007~.011 | .009~.013 | .012~.018 | .013~.019 |
| | | | 755~900 | 225~265 | 19~27 | 197~262 | .005~.008 | .007~.011 | .009~.013 | .012~.018 | .013~.019 |
| | | | 900~1200 | 265~350 | 27~37 | 180~230 | .004~.006 | .006~.010 | .008~.012 | .010~.015 | .011~.017 |
| Alloyed steels | 45CrMo4, 42CrMo4, 16MnCr5, Ck75, 35CrMo4, 16MnCr5 etc | | ~600 | 125~175 | ~7 | 262~328 | .006~.009 | .007~.011 | .009~.013 | .012~.018 | .013~.020 |
| | | | 600~800 | 175~235 | 7~22 | 230~295 | .005~.008 | .007~.011 | .009~.013 | .012~.018 | .013~.020 |
| | | | 800~950 | 235~280 | 22~29 | 197~262 | .005~.008 | .006~.010 | .009~.013 | .012~.018 | .013~.020 |
| | | | 950~1110 | 280~330 | 29~35 | 180~230 | .004~.006 | .005~.008 | .008~.012 | .010~.015 | .011~.017 |
| | | | 1110~1230 | 330~360 | 35~39 | 148~197 | .003~.005 | .005~.008 | .008~.012 | .010~.015 | .011~.017 |
| High-alloyed steels | 36CrNiMo4, 41CrAlMo7 etc | | 600~1020 | 225~300 | 19~32 | 148~197 | .005~.008 | .006~.010 | .008~.012 | .008~.012 | .009~.014 |
| | | | 1020~1200 | 300~355 | 32~38 | 131~180 | .004~.006 | .004~.007 | .008~.012 | .008~.012 | .009~.014 |
| | | | 1200~1330 | 355~390 | 38~42 | 131~164 | .003~.005 | .004~.006 | .007~.010 | .007~.011 | .009~.013 |
| Structural steels | St33, St37-2, St44-2, St52, St60 etc | | 350~500 | 100~150 | | 246~312 | .006~.009 | .008~.014 | .011~.015 | .011~.017 | .013~.019 |
| | | | 500~850 | 150~250 | ~24 | 197~246 | .005~.008 | .008~.013 | .009~.013 | .010~.015 | .011~.017 |
| | | | 850~1200 | 250~355 | 24~38 | 164~213 | .004~.006 | .007~.011 | .008~.012 | .008~.013 | .010~.015 |
| Tool steels | 102Cr6, 105WCr6, C75W etc | | 500~705 | 150~210 | ~16 | 164~213 | .004~.006 | .005~.008 | .007~.010 | .008~.012 | .009~.014 |
| | | | 705~950 | 210~280 | 16~29 | 131~164 | .004~.006 | .005~.008 | .007~.010 | .008~.012 | .009~.014 |
| Grey cast iron | Pearlitic, Ferritic | | 500~700 | 150~210 | ~16 | 328~410 | .006~.010 | .008~.015 | .011~.017 | .014~.020 | .016~.022 |
| | Pearlitic | | 700~850 | 210~250 | 16~24 | 246~312 | .004~.008 | .006~.011 | .008~.012 | .010~.014 | .011~.016 |
| Cast iron nodular | Ferritic | | 540 | 165 | 4 | 312~394 | .005~.009 | .007~.012 | .008~.013 | .011~.016 | .013~.017 |
| | Pearlitic | | 850 | 250 | 24 | 246~312 | .004~.008 | .006~.010 | .007~.011 | .010~.014 | .011~.016 |
| Malleable cast iron | Ferritic | | 450 | 125 | | 328~410 | .005~.009 | .007~.012 | .008~.013 | .011~.016 | .013~.017 |
| | Pearlitic | | 780 | 230 | 21 | 246~312 | .004~.007 | .006~.010 | .007~.011 | .010~.014 | .011~.016 |
| Aluminum alloys (Wrought) | not heat treatable | | | 65 | | 820~1083 | .0118~.0157 | .0138~.0177 | .0157~.0197 | .0177~.0217 | .0197~.0236 |
| | hardened | | | 150 | | 656~820 | .0118~.0157 | .0138~.0177 | .0157~.0197 | .0177~.0217 | .0197~.0236 |
| Aluminum alloys (Cast) | ≤12% Si, not heat treatable | | | 75 | | 656~820 | .0098~.0138 | .0118~.0157 | .0138~.0177 | .0157~.0197 | .0177~.0217 |
| | ≤12% Si, hardened | | | 90 | | 492~722 | .0098~.0138 | .0118~.0157 | .0138~.0177 | .0157~.0197 | .0177~.0217 |
| | >12% Si, not heat treatable | | | 130 | | 328~656 | .0079~.0118 | .0098~.0138 | .0118~.0157 | .0138~.0177 | .0157~.0197 |
| Copper alloys | Free machining(Pb>1%) | | | 110 | | 377~476 | .006~.011 | .009~.014 | .011~.014 | .015~.018 | .016~.019 |
| | Brass | | | 90 | | 476~607 | .007~.011 | .009~.015 | .012~.015 | .015~.018 | .017~.019 |
| | Electrolitic copper | | | 100 | | 312~394 | .002~.004 | .004~.005 | .004~.005 | .006~.007 | .007~.009 |
| Non ferrous material | Duroplastics | | | | | | | | | | |
| | Fiber plastics | | | | | | | | | | |
| | Hard rubber | | | | | | | | | | |
| Stainless steels | Austenitic and Austenitic/ferritic | Y13□ | 450~610 | 135~185 | ~9 | 145~197 | .004~.006 | .005~.007 | .006~.008 | .006~.011 | .007~.011 |
| | | | 610~930 | 185~275 | 9~28 | 89~145 | .003~.005 | .004~.006 | .004~.006 | .005~.008 | .006~.009 |

RPM = revolution per minute (rev/min)
SFM = surface feet per minute (ft/min)
DIA. = diameter of drill (inch)
IPR = feed rate (inch/rev)
IPM = inch per minute penetration rate

*Formulas :

$$SFM = \frac{(RPM) \cdot \pi \cdot (DIA.)}{12}$$

$$IPM = (RPM) \cdot (IPR)$$

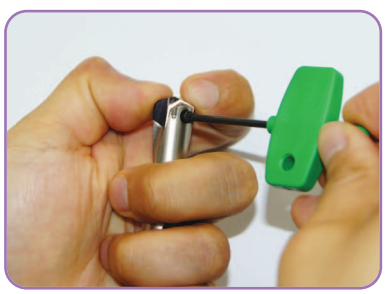
$$RPM = \frac{(SFM) \cdot 12}{(\pi) \cdot (DIA.)}$$

▶ The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.
Speed and feed reductions (20% reduction in speed and 10% reduction in feed) are recommended.
▶ Recommend you to reduce the feed rate to 85%,70% when you use 5xD,7xD holders.
▶ For use of 7xD holder, we recommend to drill a centering pre-hole with equal to or larger than 140 ° point angle to min. 2/3 cutting diameter.
The use of the centering pre-hole improves hole location , roundness and surface finish.

## Assembly of *i*-Dream Drills

Make sure to clean the insert and insert seat.

Slide the drill insert into the slot of the holder and press down the insert to touch the bottom of the slot.



After confirming the insert is pressed down to the bottom of the slot, tighten the screw using anti-seize compound.

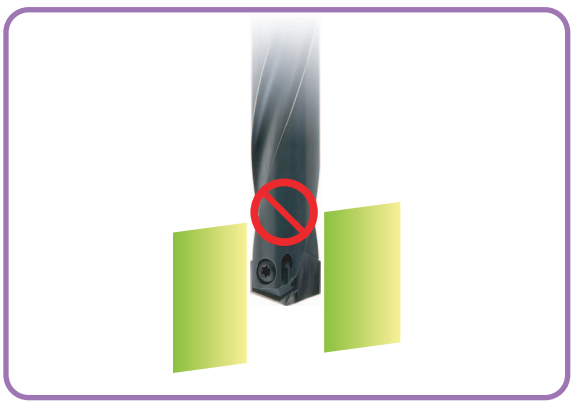
| WRENCH TYPE | PRODUCT No. | T-HANDLE No. | SERIES |
|---|---|---|---|
| WING TYPE | TWWT08 | — | A |
| | | | B |
| | | | C |
| TORX BIT TYPE | TWBT15 | TWH600 | D |
| | TWBT20 | | E, F, G |
| | TWBT25 | | H, I, J |

Use the wing type or T-type wrench.

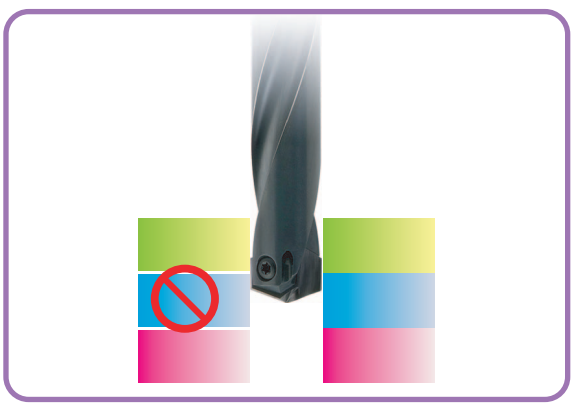
- ▶ Need to use appropriate wrenches and screws as indicated.
- ▶ It's important to tighten up the screw properly.

## CAUTION-NOT RECOMMENDABLE APPLICATION

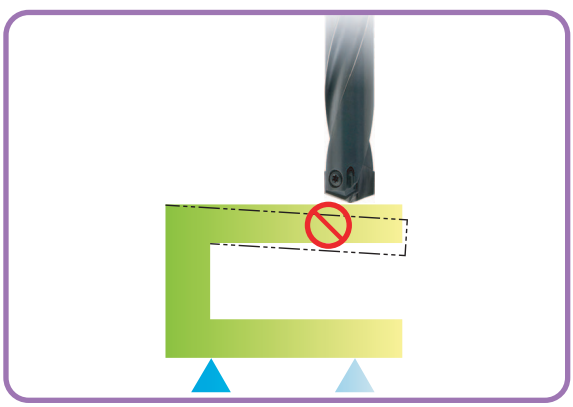
**Intersecting cross hole is bigger than the drill insert's Margin Length.**



**Material with slanting entrance and exit over 7 degree. (If drilling 7 degree or under slanting surface, reduce the feed about 30-50 %)**

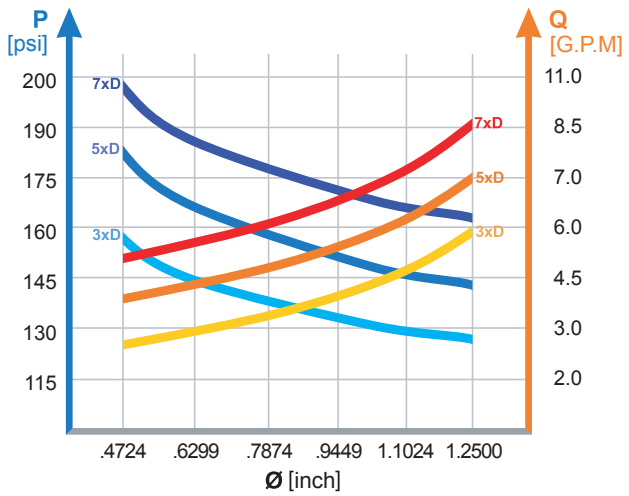


**For drilling stacked plates, minimize the space between the plates.**
**The space stacked plates can cause insert breakage or poor chip control.**



**The material needs to be fixtured securely before drilling.**

## RECOMMENDED COOLANT PRESSURE AND FLOW RATE ON VERTICAL DRILLING



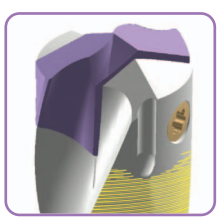

- Recommended emulsion mix is 6% - 8%.
- For Drilling in Stainless and High Strength steels, a mix of 10% is recommended.
- For horizontal drilling, 30% reduction on the coolant pressure and flow rate is possible.
- Dry drilling is possible for 1-2xD drilling. But not recommended.

## TROUBLE SHOOTING

**1) Heavy flank wear / Fast flank wear**
- Reduce cutting speed
- Increase feed

**3) Build up on cutting edge**
- Increase cutting speed
- Use a coated insert

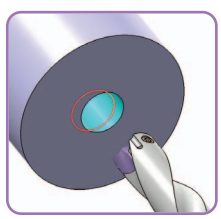
**5) Wear of land margin**
- Rigid clamping of workpiece
- Reduce cutting speed
- Increase coolant flow



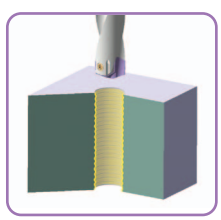
**7) Scratching on holder**
- Rigid clamping of workpiece
- Reduce feed
- Increase coolant flow

**2) Chipping on cutting edge**
- Reduce feed
- Check the rigidity of spindle and chuck
- Rigid clamping of workpiece

**4) Chipping or break down on outer corner**
- Reduce feed
- Rigid clamping of workpiece



**6) Unsatisfactory positioning of the hole**
- Rigid clamping of workpiece
- Reduce feed during entrance or exit



**8) Unsatisfactory surface finish**
- Rigid clamping of workpiece
- Increase coolant flow and pressure

# CARBIDE

YG

Being the best through innovation

# DREAM DRILLS

- **WITH & WITHOUT COOLANT HOLES**
  **General Purpose 30Rc to 50Rc Alloys**

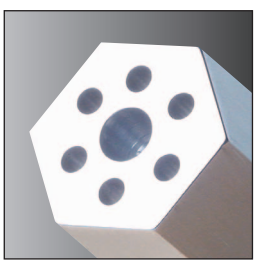
## SOLID CARBIDE DREAM DRILLS (with & without Coolant Holes)

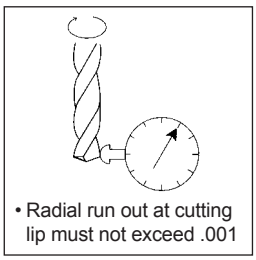
General Purpose 30Rc to 50Rc Alloys


| ITEM | MODEL | DESCRIPTION | | SIZE MIN | SIZE MAX | PAGE |
|---|---|---|---|---|---|---|
| **INCH** | | | | | | |
| 3XD | DH414 | | CARBIDE, DREAM DRILLS without COOLANT HOLES | *SHORT* | D1/8 | D5/8 | **46** |
| 3XD | DH416 | | CARBIDE, DREAM DRILLS with COOLANT HOLES | *SHORT* | D1/8 | D5/8 | **47** |
| 5XD | DH418 | | CARBIDE, DREAM DRILLS with COOLANT HOLES | *LONG* | D13/64 | D1/2 | **48** |
| **METRIC** | | | | | | |
| 3XD | DH404 | | CARBIDE, DREAM DRILLS without COOLANT HOLES | *STUB* | D3.0 | D20.0 | **49** |
| 3XD | DH406 | | CARBIDE, DREAM DRILLS with COOLANT HOLES | *SHORT* | D3.0 | D20.0 | **51** |
| 5XD | DH424 | | CARBIDE, DREAM DRILLS without COOLANT HOLES | *LONG* | D1.0 | D2.9 | **53** |
| 5XD | DH408 | | CARBIDE, DREAM DRILLS with COOLANT HOLES | *LONG* | D1.0 | D20.0 | **54** |
| 8XD | DH421 | | CARBIDE, DREAM DRILLS with COOLANT HOLES | *EXTRA LONG* | D3.0 | D14.0 | **57** |
| | | RECOMMENDED CUTTING CONDITIONS | | | | | **59** |

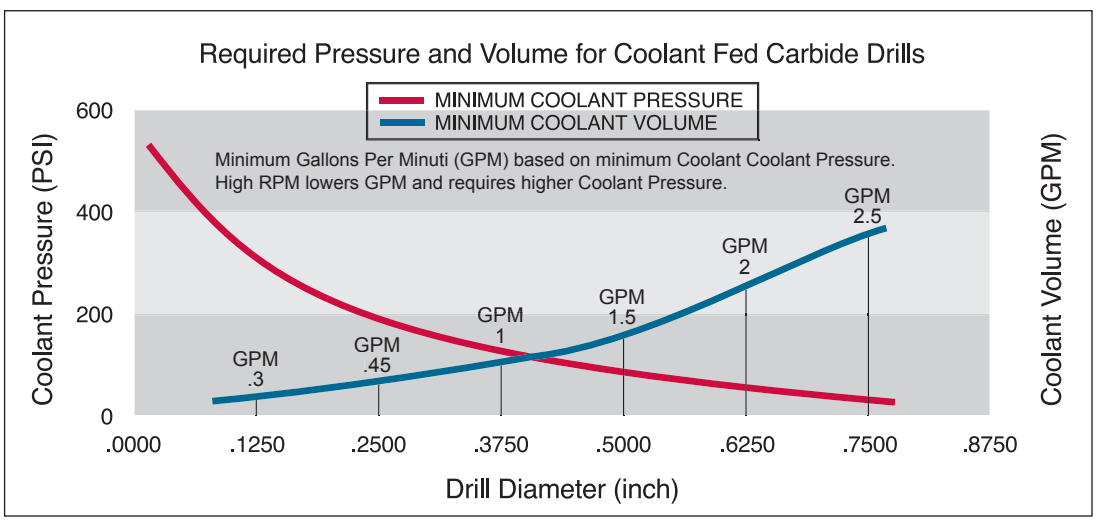
◎ : Excellent
○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ○ | ◎ | ◎ | | | ○ | | ○ | | | | |
| ○ | ◎ | ◎ | | | ○ | | ○ | | | | |
| ○ | ◎ | ◎ | | | ○ | | ○ | | | | |
| ○ | ◎ | ◎ | | | ○ | | ○ | | | | |
| ○ | ◎ | ◎ | | | ○ | | ○ | | | | |
| ○ | ◎ | ◎ | | | ○ | | ○ | | | | |
| ○ | ◎ | ◎ | | | ○ | | ○ | | | | |
| ○ | ◎ | ◎ | | | ○ | | ○ | | | | |





• Radial run out at cutting lip must not exceed .001

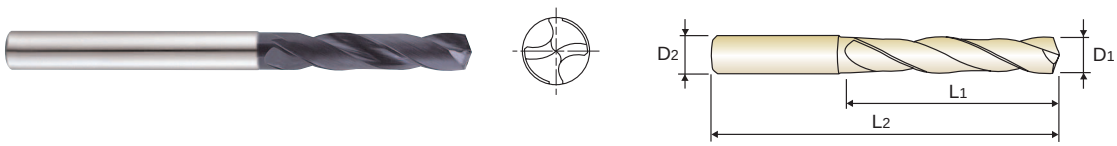


# YG DREAM DRILLS

**DH414 SERIES**

## CARBIDE, DREAM DRILLS without COOLANT HOLES — *SHORT*

- **Application** : Steel, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.
- **Advantages** : Self centering - center drilling is not required
  Excellent positioning - bushing is not necessary
  Special Design - reaming is not required
  - good chip removal
  - powerful drilling
- **Tolerance** : Dia. Tolerance ∅D1: See page 247, Shank Tolerance ∅D2: -.0001 -.0005




MG | h6 | 140° | P.59

$D_1 = D_2$
3 × D

Unit : Inch

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Fractional | Decimal | | |
| TiAlN | $D_1 = D_2$ | | $L_1$ | $L_2$ |
| 0081ATF | 1/8 | .1250 | 45/64 | 1-59/64 |
| 0091ATF | 9/64 | .1406 | 25/32 | 2-3/64 |
| 0101ATF | 5/32 | .1562 | 7/8 | 2-3/16 |
| 0111ATF | 11/64 | .1719 | 15/16 | 2-9/32 |
| 0121ATF | 3/16 | .1875 | 1 | 2-7/16 |
| 0131ATF | 13/64 | .2031 | 1 | 2-7/16 |
| 0141ATF | 7/32 | .2188 | 1-1/8 | 2-5/8 |
| 0151ATF | 15/64 | .2344 | 1-1/8 | 2-5/8 |
| 0161ATF | 1/4 | .2500 | 1-5/8 | 3-3/16 |
| 2061ATF | F | .2570 | 1-11/16 | 3-17/64 |
| 0171ATF | 17/64 | .2656 | 1-11/16 | 3-17/64 |
| 2091ATF | I | .2720 | 1-11/16 | 3-17/64 |
| 0181ATF | 9/32 | .2812 | 1-3/4 | 3-7/16 |
| 0191ATF | 19/64 | .2969 | 1-7/8 | 3-9/16 |
| 0201ATF | 5/16 | .3125 | 1-7/8 | 3-9/16 |
| 0211ATF | 21/64 | .3281 | 2-1/16 | 3-3/4 |
| 2171ATF | Q | .3320 | 2-1/16 | 3-3/4 |

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Fractional | Decimal | | |
| TiAlN | $D_1 = D_2$ | | $L_1$ | $L_2$ |
| 0221ATF | 11/32 | .3438 | 2-3/16 | 3-7/8 |
| 0231ATF | 23/64 | .3594 | 2-9/32 | 4 |
| 2211ATF | U | .3680 | 2-9/32 | 4 |
| 0241ATF | 3/8 | .3750 | 2-3/8 | 4-1/8 |
| 0251ATF | 25/64 | .3906 | 2-3/8 | 4-1/8 |
| 0261ATF | 13/32 | .4062 | 2-5/8 | 4-13/32 |
| 0271ATF | 27/64 | .4219 | 2-11/16 | 4-1/2 |
| 0281ATF | 7/16 | .4375 | 2-13/16 | 4-5/8 |
| 0291ATF | 29/64 | .4531 | 2-7/8 | 4-3/4 |
| 0301ATF | 15/32 | .4688 | 2-7/8 | 4-3/4 |
| 0311ATF | 31/64 | .4844 | 3 | 5-5/16 |
| 0321ATF | 1/2 | .5000 | 3-1/16 | 5-3/8 |
| 0331ATF | 33/64 | .5156 | 3-11/32 | 5-11/16 |
| 0341ATF | 17/32 | .5312 | 3-11/32 | 5-11/16 |
| 0361ATF | 9/16 | .5625 | 3-1/2 | 5-15/16 |
| 0371ATF | 37/64 | .5781 | 3-37/64 | 6 |
| 0401ATF | 5/8 | .6250 | 3-25/3 | 6-19/64 |

▶ Other shank types are available on your request.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ○ | ◎ | ◎ | | | ○ | | ○ | | | | |

# DREAM DRILLS

**DH416 SERIES**

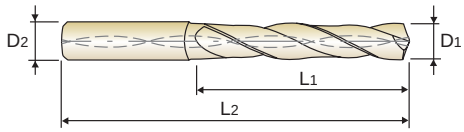
## CARBIDE, DREAM DRILLS with COOLANT HOLES

***SHORT***

▶ **Application** : Steel, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.

▶ **Advantages** : Self centering - center drilling is not required
Excellent positioning - bushing is not necessary
Special Design - reaming is not required
- good chip removal
- powerful drilling

▶ **Tolerance** : Dia. Tolerance ∅D1: See page 247, Shank Tolerance ∅D2: -.0001 -.0005




MG | h6 | 140° | P.59

3 × D

Unit : Inch

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Fractional | Decimal | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| 0081BTF | 1/8 | .1250 | 15/64 | 1.102 | 2.992 |
| 0111BTF | 11/64 | .1719 | 15/64 | 1.417 | 3.386 |
| 0121BTF | 3/16 | .1875 | 15/64 | 1.575 | 3.543 |
| 0131BTF | 13/64 | .2031 | 15/64 | 1.082 | 3.228 |
| 0141BTF | 7/32 | .2188 | 15/64 | 1.181 | 3.228 |
| 0151BTF | 15/64 | .2344 | 15/64 | 1.181 | 3.228 |
| 0161BTF | 1/4 | .2500 | 17/64 | 1.279 | 3.465 |
| 2061BTF | F | .2570 | 17/64 | 1.279 | 3.465 |
| 0171BTF | 17/64 | .2656 | 17/64 | 1.378 | 3.465 |
| 2091BTF | I | .2720 | .2720 | 1.378 | 3.465 |
| 0181BTF | 9/32 | .2812 | 5/16 | 1.476 | 3.701 |
| 0191BTF | 19/64 | .2969 | 5/16 | 1.476 | 3.701 |
| 0201BTF | 5/16 | .3125 | 5/16 | 1.575 | 3.701 |
| 0211BTF | 21/64 | .3281 | 11/32 | 1.673 | 3.937 |
| 2171BTF | Q | .3320 | 11/32 | 1.673 | 3.937 |
| 0221BTF | 11/32 | .3438 | 11/32 | 1.772 | 3.937 |
| 0231BTF | 23/64 | .3594 | 25/64 | 1.870 | 4.174 |
| 2211BTF | U | .3680 | 25/64 | 1.870 | 4.174 |

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Fractional | Decimal | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| 0241BTF | 3/8 | .3750 | 25/64 | 1.969 | 4.174 |
| 0251BTF | 25/64 | .3906 | 25/64 | 1.969 | 4.174 |
| 0261BTF | 13/32 | .4062 | 27/64 | 2.067 | 4.567 |
| 0271BTF | 27/64 | .4219 | 27/64 | 2.165 | 4.567 |
| 0281BTF | 7/16 | .4375 | 15/32 | 2.264 | 4.803 |
| 0291BTF | 29/64 | .4531 | 15/32 | 2.264 | 4.803 |
| 0301BTF | 15/32 | .4688 | 15/32 | 2.362 | 4.803 |
| 0311BTF | 31/64 | .4844 | 1/2 | 2.461 | 5.039 |
| 0321BTF | 1/2 | .5000 | 1/2 | 2.559 | 5.039 |
| 0331BTF | 33/64 | .5156 | 35/64 | 2.657 | 5.276 |
| 0341BTF | 17/32 | .5312 | 35/64 | 2.756 | 5.276 |
| 0351BTF | 35/64 | .5469 | 35/64 | 2.756 | 5.276 |
| 0361BTF | 9/16 | .5625 | 37/64 | 2.854 | 5.512 |
| 0371BTF | 37/64 | .5781 | 37/64 | 2.953 | 5.512 |
| 0381BTF | 19/32 | .5937 | 5/8 | 3.051 | 5.709 |
| 0391BTF | 39/64 | .6094 | 5/8 | 3.051 | 5.709 |
| 0401BTF | 5/8 | .6250 | 5/8 | 3.150 | 5.709 |

▶ Other shank types are available on your request.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ○ | ◎ | ◎ | | | ○ | | ○ | | | | |

# YG DREAM DRILLS

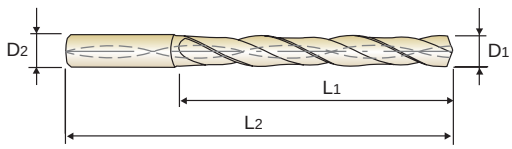
**DH418 SERIES**

## CARBIDE, DREAM DRILLS with COOLANT HOLES — *LONG*

▶ **Application** : Steel, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.

▶ **Advantages** : Self centering - center drilling is not required
Excellent positioning - bushing is not necessary
Special Design - reaming is not required
- good chip removal
- powerful drilling

▶ **Tolerance** : Dia. Tolerance ∅D1: See page 247, Shank Tolerance ∅D2: -.0001 -.0005




MG | h6 | 140° | P.59

5 × D

Unit : Inch

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Fractional | Decimal | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| 0131CTF | 13/64 | .2031 | 15/64 | 1-3/4 | 3-15/16 |
| 0141CTF | 7/32 | .2188 | 15/64 | 1-57/64 | 3-15/16 |
| 0151CTF | 15/64 | .2344 | 15/64 | 1-57/64 | 3-15/16 |
| 0161CTF | 1/4 | .2500 | 17/64 | 2-3/64 | 4-19/64 |
| 2061CTF | F | .2570 | 17/64 | 2-13/64 | 4-19/64 |
| 0171CTF | 17/64 | .2656 | 17/64 | 2-13/64 | 4-19/64 |
| 2091CTF | I | .2720 | .2720 | 2-13/64 | 4-19/64 |
| 0181CTF | 9/32 | .2812 | 5/16 | 2-23/64 | 4-41/64 |
| 0191CTF | 19/64 | .2969 | 5/16 | 2-33/64 | 4-41/64 |
| 0201CTF | 5/16 | .3125 | 5/16 | 2-33/64 | 4-41/64 |
| 0211CTF | 21/64 | .3281 | 11/32 | 2-43/64 | 5 |
| 2171CTF | Q | .3320 | 11/32 | 2-43/64 | 5 |

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Fractional | Decimal | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| 0221CTF | 11/32 | .3438 | 11/32 | 2-27/32 | 5 |
| 0231CTF | 23/64 | .3594 | 25/64 | 3 | 5-23/64 |
| 2211CTF | U | .3680 | 25/64 | 3 | 5-23/64 |
| 0241CTF | 3/8 | .3750 | 25/64 | 3-5/32 | 5-23/64 |
| 0251CTF | 25/64 | .3906 | 25/64 | 3-5/32 | 5-23/64 |
| 0261CTF | 13/32 | .4062 | 27/64 | 3-5/16 | 5-7/8 |
| 0271CTF | 27/64 | .4219 | 27/64 | 3-15/32 | 5-7/8 |
| 0281CTF | 7/16 | .4375 | 15/32 | 3-5/8 | 6-7/32 |
| 0291CTF | 29/64 | .4531 | 15/32 | 3-25/32 | 6-7/32 |
| 0301CTF | 15/32 | .4688 | 15/32 | 3-25/32 | 6-7/32 |
| 0311CTF | 31/64 | .4844 | 1/2 | 3-15/16 | 6-37/64 |
| 0321CTF | 1/2 | .5000 | 1/2 | 4-3/32 | 6-37/64 |

▶ Other shank types are available on your request.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ○ | ◎ | ◎ | | | ○ | | ○ | | | | |

# DREAM DRILLS

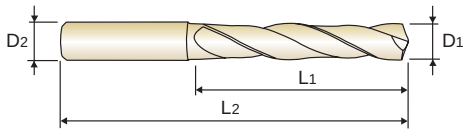
**DH404 SERIES**

## CARBIDE, DREAM DRILLS without COOLANT HOLES

***STUB***

▶ **Application** : Steel, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.

▶ **Advantages** : Self centering - center drilling is not required
Excellent positioning - bushing is not necessary
Special design - reaming is not required
- good chip removal
- powerful drilling




DIN 6539 | MG | h6 | h7 | 140° | P.60

$D_1 = D_2$

3 × D

Unit : mm

| EDP No. | Diameter | | Flute Length | Overall Length | EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|---|---|---|---|---|
| | Metric | Inch | | | | Metric | Inch | | |
| TiAlN | $D_1 = D_2$ | | $L_1$ | $L_2$ | TiAlN | $D_1 = D_2$ | | $L_1$ | $L_2$ |
| DH404030 | 3.0 | .1181 | 16 | 46 | DH404057 | 5.7 | .2244 | 28 | 66 |
| DH404031 | 3.1 | .1220 | 18 | 49 | DH404058 | 5.8 | .2283 | 28 | 66 |
| DH404032 | 3.2 | .1260 | 18 | 49 | DH404059 | 5.9 | .2323 | 28 | 66 |
| DH404033 | 3.3 | .1299 | 18 | 49 | DH404060 | 6.0 | .2362 | 28 | 66 |
| DH404034 | 3.4 | .1339 | 20 | 52 | DH404061 | 6.1 | .2402 | 31 | 70 |
| DH404035 | 3.5 | .1378 | 20 | 52 | DH404062 | 6.2 | .2441 | 31 | 70 |
| DH404036 | 3.6 | .1417 | 20 | 52 | DH404063 | 6.3 | .2480 | 31 | 70 |
| DH404037 | 3.7 | .1457 | 20 | 52 | DH404064 | 6.4 | .2520 | 31 | 70 |
| DH404038 | 3.8 | .1496 | 22 | 55 | DH404065 | 6.5 | .2559 | 31 | 70 |
| DH404039 | 3.9 | .1535 | 22 | 55 | DH404066 | 6.6 | .2598 | 31 | 70 |
| DH404040 | 4.0 | .1575 | 22 | 55 | DH404067 | 6.7 | .2638 | 31 | 70 |
| DH404041 | 4.1 | .1614 | 22 | 55 | DH404068 | 6.8 | .2677 | 34 | 74 |
| DH404042 | 4.2 | .1654 | 22 | 55 | DH404069 | 6.9 | .2717 | 34 | 74 |
| DH404043 | 4.3 | .1693 | 24 | 58 | DH404070 | 7.0 | .2756 | 34 | 74 |
| DH404044 | 4.4 | .1732 | 24 | 58 | DH404071 | 7.1 | .2795 | 34 | 74 |
| DH404045 | 4.5 | .1772 | 24 | 58 | DH404072 | 7.2 | .2835 | 34 | 74 |
| DH404046 | 4.6 | .1811 | 24 | 58 | DH404073 | 7.3 | .2874 | 34 | 74 |
| DH404047 | 4.7 | .1850 | 24 | 58 | DH404074 | 7.4 | .2913 | 34 | 74 |
| DH404048 | 4.8 | .1890 | 26 | 62 | DH404075 | 7.5 | .2953 | 34 | 74 |
| DH404049 | 4.9 | .1929 | 26 | 62 | DH404076 | 7.6 | .2992 | 37 | 79 |
| DH404050 | 5.0 | .1969 | 26 | 62 | DH404077 | 7.7 | .3031 | 37 | 79 |
| DH404051 | 5.1 | .2008 | 26 | 62 | DH404078 | 7.8 | .3071 | 37 | 79 |
| DH404052 | 5.2 | .2047 | 26 | 62 | DH404079 | 7.9 | .3110 | 37 | 79 |
| DH404053 | 5.3 | .2087 | 26 | 62 | DH404080 | 8.0 | .3150 | 37 | 79 |
| DH404054 | 5.4 | .2126 | 28 | 66 | DH404081 | 8.1 | .3189 | 37 | 79 |
| DH404055 | 5.5 | .2165 | 28 | 66 | DH404082 | 8.2 | .3228 | 37 | 79 |
| DH404056 | 5.6 | .2205 | 28 | 66 | DH404083 | 8.3 | .3268 | 37 | 79 |

▶ Other shank types are available on your request.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ○ | ◎ | ◎ | | | ○ | | ○ | | | | |

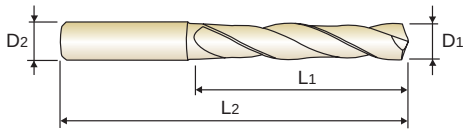
# YG DREAM DRILLS

**DH404 SERIES**

## CARBIDE, DREAM DRILLS without COOLANT HOLES — *STUB*

▶ **Application** : Steel, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.

▶ **Advantages** : Self centering - center drilling is not required
Excellent positioning - bushing is not necessary
Special design - reaming is not required
- good chip removal
- powerful drilling




DIN 6539 | MG | h6 | h7 | 140° | P.60

$D_1 = D_2$

3 × D

Unit : mm

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Metric | Inch | | |
| TiAlN | $D_1 = D_2$ | | $L_1$ | $L_2$ |
| DH404084 | 8.4 | .3307 | 37 | 79 |
| DH404085 | 8.5 | .3346 | 37 | 79 |
| DH404086 | 8.6 | .3386 | 40 | 84 |
| DH404087 | 8.7 | .3425 | 40 | 84 |
| DH404088 | 8.8 | .3465 | 40 | 84 |
| DH404089 | 8.9 | .3504 | 40 | 84 |
| DH404090 | 9.0 | .3543 | 40 | 84 |
| DH404091 | 9.1 | .3583 | 40 | 84 |
| DH404092 | 9.2 | .3622 | 40 | 84 |
| DH404093 | 9.3 | .3661 | 40 | 84 |
| DH404094 | 9.4 | .3701 | 40 | 84 |
| DH404095 | 9.5 | .3740 | 40 | 84 |
| DH404096 | 9.6 | .3780 | 43 | 89 |
| DH404097 | 9.7 | .3819 | 43 | 89 |
| DH404098 | 9.8 | .3858 | 43 | 89 |
| DH404099 | 9.9 | .3898 | 43 | 89 |
| DH404100 | 10.0 | .3937 | 43 | 89 |
| DH404102 | 10.2 | .4016 | 43 | 89 |
| DH404105 | 10.5 | .4134 | 43 | 89 |

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Metric | Inch | | |
| TiAlN | $D_1 = D_2$ | | $L_1$ | $L_2$ |
| DH404110 | 11.0 | .4331 | 47 | 95 |
| DH404115 | 11.5 | .4528 | 47 | 95 |
| DH404120 | 12.0 | .4724 | 51 | 102 |
| DH404130 | 13.0 | .5118 | 51 | 102 |
| DH404135 | 13.5 | .5314 | 54 | 107 |
| DH404140 | 14.0 | .5512 | 54 | 107 |
| DH404145 | 14.5 | .5708 | 56 | 111 |
| DH404150 | 15.0 | .5905 | 56 | 111 |
| DH404155 | 15.5 | .6102 | 58 | 115 |
| DH404160 | 16.0 | .6299 | 58 | 115 |
| DH404165 | 16.5 | .6495 | 60 | 119 |
| DH404170 | 17.0 | .6692 | 60 | 119 |
| DH404175 | 17.5 | .6889 | 62 | 123 |
| DH404180 | 18.0 | .7087 | 62 | 123 |
| DH404185 | 18.5 | .7283 | 64 | 127 |
| DH404190 | 19.0 | .7480 | 64 | 127 |
| DH404195 | 19.5 | .7676 | 66 | 131 |
| DH404200 | 20.0 | .7874 | 66 | 131 |

▶ Other shank types are available on your request.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ○ | ◎ | ◎ | | | ○ | | ○ | | | | |

# DREAM DRILLS

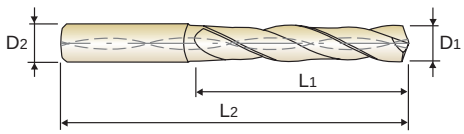
**DH406 SERIES**

## CARBIDE, DREAM DRILLS with COOLANT HOLES

***SHORT***

▶ **Application** : Steel, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.

▶ **Advantages** : Self centering - center drilling is not required
Excellent positioning - bushing is not necessary
Special Design - reaming is not required
- good chip removal
- powerful drilling




DIN 6537 | MG | h6 | m7 | 140° | P.60

3 × D

Unit : mm

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| DH406030 | 3.0 | .1181 | 6 | 20 | 62 |
| DH406031 | 3.1 | .1220 | 6 | 20 | 62 |
| DH406032 | 3.2 | .1260 | 6 | 20 | 62 |
| DH406033 | 3.3 | .1299 | 6 | 20 | 62 |
| DH406034 | 3.4 | .1339 | 6 | 20 | 62 |
| DH406035 | 3.5 | .1378 | 6 | 20 | 62 |
| DH406036 | 3.6 | .1417 | 6 | 20 | 62 |
| DH406037 | 3.7 | .1457 | 6 | 20 | 62 |
| DH406038 | 3.8 | .1496 | 6 | 24 | 66 |
| DH406039 | 3.9 | .1535 | 6 | 24 | 66 |
| DH406040 | 4.0 | .1575 | 6 | 24 | 66 |
| DH406041 | 4.1 | .1614 | 6 | 24 | 66 |
| DH406042 | 4.2 | .1654 | 6 | 24 | 66 |
| DH406043 | 4.3 | .1693 | 6 | 24 | 66 |
| DH406044 | 4.4 | .1732 | 6 | 24 | 66 |
| DH406045 | 4.5 | .1772 | 6 | 24 | 66 |
| DH406046 | 4.6 | .1811 | 6 | 24 | 66 |
| DH406047 | 4.7 | .1850 | 6 | 24 | 66 |
| DH406048 | 4.8 | .1890 | 6 | 28 | 66 |
| DH406049 | 4.9 | .1929 | 6 | 28 | 66 |
| DH406050 | 5.0 | .1969 | 6 | 28 | 66 |
| DH406051 | 5.1 | .2008 | 6 | 28 | 66 |
| DH406052 | 5.2 | .2047 | 6 | 28 | 66 |
| DH406053 | 5.3 | .2087 | 6 | 28 | 66 |
| DH406054 | 5.4 | .2126 | 6 | 28 | 66 |
| DH406055 | 5.5 | .2165 | 6 | 28 | 66 |
| DH406056 | 5.6 | .2205 | 6 | 28 | 66 |

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| DH406057 | 5.7 | .2244 | 6 | 28 | 66 |
| DH406058 | 5.8 | .2283 | 6 | 28 | 66 |
| DH406059 | 5.9 | .2323 | 6 | 28 | 66 |
| DH406060 | 6.0 | .2362 | 6 | 28 | 66 |
| DH406061 | 6.1 | .2402 | 8 | 34 | 79 |
| DH406062 | 6.2 | .2441 | 8 | 34 | 79 |
| DH406063 | 6.3 | .2480 | 8 | 34 | 79 |
| DH406064 | 6.4 | .2520 | 8 | 34 | 79 |
| DH406065 | 6.5 | .2559 | 8 | 34 | 79 |
| DH406066 | 6.6 | .2598 | 8 | 34 | 79 |
| DH406067 | 6.7 | .2638 | 8 | 34 | 79 |
| DH406068 | 6.8 | .2677 | 8 | 34 | 79 |
| DH406069 | 6.9 | .2717 | 8 | 34 | 79 |
| DH406070 | 7.0 | .2756 | 8 | 34 | 79 |
| DH406071 | 7.1 | .2795 | 8 | 41 | 79 |
| DH406072 | 7.2 | .2835 | 8 | 41 | 79 |
| DH406073 | 7.3 | .2874 | 8 | 41 | 79 |
| DH406074 | 7.4 | .2913 | 8 | 41 | 79 |
| DH406075 | 7.5 | .2953 | 8 | 41 | 79 |
| DH406076 | 7.6 | .2992 | 8 | 41 | 79 |
| DH406077 | 7.7 | .3031 | 8 | 41 | 79 |
| DH406078 | 7.8 | .3071 | 8 | 41 | 79 |
| DH406079 | 7.9 | .3110 | 8 | 41 | 79 |
| DH406080 | 8.0 | .3150 | 8 | 41 | 79 |
| DH406081 | 8.1 | .3189 | 10 | 47 | 89 |
| DH406082 | 8.2 | .3228 | 10 | 47 | 89 |
| DH406083 | 8.3 | .3268 | 10 | 47 | 89 |

▶ Other shank types are available on your request.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ○ | ◎ | ◎ | | | ○ | | ○ | | | | |

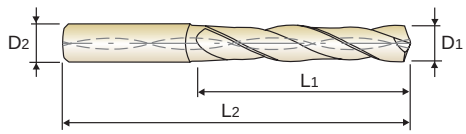
# YG DREAM DRILLS

**DH406 SERIES**

## CARBIDE, DREAM DRILLS with COOLANT HOLES — *SHORT*

▶ **Application** : Steel, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.

▶ **Advantages** : Self centering - center drilling is not required
Excellent positioning - bushing is not necessary
Special Design - reaming is not required
- good chip removal
- powerful drilling




DIN 6537 | MG | h6 | m7 | 140° P.60

3 × D

Unit : mm

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| TiAlN | $D_1$ | | $D_2$ | $L_1$ | $L_2$ |
| DH406084 | 8.4 | .3307 | 10 | 47 | 89 |
| DH406085 | 8.5 | .3346 | 10 | 47 | 89 |
| DH406086 | 8.6 | .3386 | 10 | 47 | 89 |
| DH406087 | 8.7 | .3425 | 10 | 47 | 89 |
| DH406088 | 8.8 | .3465 | 10 | 47 | 89 |
| DH406089 | 8.9 | .3504 | 10 | 47 | 89 |
| DH406090 | 9.0 | .3543 | 10 | 47 | 89 |
| DH406091 | 9.1 | .3583 | 10 | 47 | 89 |
| DH406092 | 9.2 | .3622 | 10 | 47 | 89 |
| DH406093 | 9.3 | .3661 | 10 | 47 | 89 |
| DH406094 | 9.4 | .3701 | 10 | 47 | 89 |
| DH406095 | 9.5 | .3740 | 10 | 47 | 89 |
| DH406096 | 9.6 | .3780 | 10 | 47 | 89 |
| DH406097 | 9.7 | .3819 | 10 | 47 | 89 |
| DH406098 | 9.8 | .3858 | 10 | 47 | 89 |
| DH406099 | 9.9 | .3898 | 10 | 47 | 89 |
| DH406100 | 10.0 | .3937 | 10 | 47 | 89 |
| DH406101 | 10.1 | .3976 | 12 | 55 | 102 |
| DH406102 | 10.2 | .4016 | 12 | 55 | 102 |
| DH406103 | 10.3 | .4055 | 12 | 55 | 102 |
| DH406104 | 10.4 | .4094 | 12 | 55 | 102 |
| DH406105 | 10.5 | .4134 | 12 | 55 | 102 |
| DH406106 | 10.6 | .4173 | 12 | 55 | 102 |
| DH406107 | 10.7 | .4212 | 12 | 55 | 102 |
| DH406108 | 10.8 | .4252 | 12 | 55 | 102 |
| DH406109 | 10.9 | .4291 | 12 | 55 | 102 |
| DH406110 | 11.0 | .4330 | 12 | 55 | 102 |

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| TiAlN | $D_1$ | | $D_2$ | $L_1$ | $L_2$ |
| DH406111 | 11.1 | .4370 | 12 | 55 | 102 |
| DH406112 | 11.2 | .4409 | 12 | 55 | 102 |
| DH406113 | 11.3 | .4448 | 12 | 55 | 102 |
| DH406114 | 11.4 | .4488 | 12 | 55 | 102 |
| DH406115 | 11.5 | .4527 | 12 | 55 | 102 |
| DH406116 | 11.6 | .4566 | 12 | 55 | 102 |
| DH406117 | 11.7 | .4606 | 12 | 55 | 102 |
| DH406118 | 11.8 | .4645 | 12 | 55 | 102 |
| DH406119 | 11.9 | .4685 | 12 | 55 | 102 |
| DH406120 | 12.0 | .4724 | 12 | 55 | 102 |
| DH406125 | 12.5 | .4921 | 14 | 60 | 107 |
| DH406130 | 13.0 | .5118 | 14 | 60 | 107 |
| DH406135 | 13.5 | .5314 | 14 | 60 | 107 |
| DH406140 | 14.0 | .5512 | 14 | 60 | 107 |
| DH406145 | 14.5 | .5708 | 16 | 65 | 115 |
| DH406150 | 15.0 | .5905 | 16 | 65 | 115 |
| DH406155 | 15.5 | .6102 | 16 | 65 | 115 |
| DH406160 | 16.0 | .6299 | 16 | 65 | 115 |
| DH406165 | 16.5 | .6495 | 18 | 73 | 123 |
| DH406170 | 17.0 | .6692 | 18 | 73 | 123 |
| DH406175 | 17.5 | .6889 | 18 | 73 | 123 |
| DH406180 | 18.0 | .7087 | 18 | 73 | 123 |
| DH406185 | 18.5 | .7283 | 20 | 79 | 131 |
| DH406190 | 19.0 | .7480 | 20 | 79 | 131 |
| DH406195 | 19.5 | .7676 | 20 | 79 | 131 |
| DH406200 | 20.0 | .7874 | 20 | 79 | 131 |

▶ Other shank types are available on your request.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ○ | ◎ | ◎ | | | ○ | | ○ | | | | |

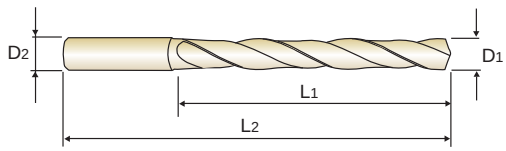
# DREAM DRILLS

**DH424 SERIES**

## CARBIDE, DREAM DRILLS without COOLANT HOLES — *LONG*

▶ **Application** : Steel, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.

▶ **Advantages** : Self centering - center drilling is not required
Excellent positioning - bushing is not necessary
Special design - reaming is not required
- good chip removal
- powerful drilling




DIN 6537 | MG | h6 | m7 | 140° | P.60

5 × D

Unit : mm

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| TiAlN | $D_1$ | | $D_2$ | $L_1$ | $L_2$ |
| DH424010 | 1.0 | .0394 | 3 | 8 | 55 |
| DH424011 | 1.1 | .0433 | 3 | 12 | 55 |
| DH424012 | 1.2 | .0472 | 3 | 12 | 55 |
| DH424013 | 1.3 | .0512 | 3 | 12 | 55 |
| DH424014 | 1.4 | .0551 | 3 | 12 | 55 |
| DH424015 | 1.5 | .0591 | 3 | 16 | 55 |
| DH424016 | 1.6 | .0630 | 3 | 16 | 55 |
| DH424017 | 1.7 | .0669 | 3 | 16 | 55 |
| DH424018 | 1.8 | .0709 | 3 | 16 | 55 |
| DH424019 | 1.9 | .0748 | 3 | 16 | 55 |

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| TiAlN | $D_1$ | | $D_2$ | $L_1$ | $L_2$ |
| DH424020 | 2.0 | .0787 | 4 | 21 | 57 |
| DH424021 | 2.1 | .0827 | 4 | 21 | 57 |
| DH424022 | 2.2 | .0866 | 4 | 21 | 57 |
| DH424023 | 2.3 | .0906 | 4 | 21 | 57 |
| DH424024 | 2.4 | .0945 | 4 | 21 | 57 |
| DH424025 | 2.5 | .0984 | 4 | 21 | 57 |
| DH424026 | 2.6 | .1024 | 4 | 21 | 57 |
| DH424027 | 2.7 | .1063 | 4 | 21 | 57 |
| DH424028 | 2.8 | .1102 | 4 | 21 | 57 |
| DH424029 | 2.9 | .1142 | 4 | 21 | 57 |

▶ Other shank types are available on your request.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ○ | ◎ | ◎ | | | ○ | | ○ | | | | |

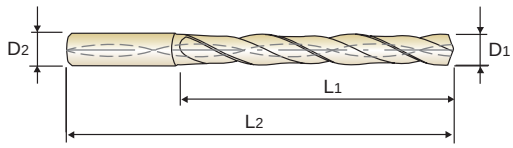
# YG DREAM DRILLS

**DH408 SERIES**

## CARBIDE, DREAM DRILLS with COOLANT HOLES — *LONG*

▶ **Application** : Steel, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.

▶ **Advantages** : Self centering - center drilling is not required
Excellent positioning - bushing is not necessary
Special Design - reaming is not required
- good chip removal
- powerful drilling




DIN 6537 | MG | h6 | m7 | 140° | P.60

5 × D

Unit : mm

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| TiAlN | $D_1$ | | $D_2$ | $L_1$ | $L_2$ |
| DH408010 | 1.0 | .0394 | 3 | 8 | 55 |
| DH408011 | 1.1 | .0433 | 3 | 12 | 55 |
| DH408012 | 1.2 | .0472 | 3 | 12 | 55 |
| DH408013 | 1.3 | .0512 | 3 | 12 | 55 |
| DH408014 | 1.4 | .0551 | 3 | 12 | 55 |
| DH408015 | 1.5 | .0591 | 3 | 16 | 55 |
| DH408016 | 1.6 | .0630 | 3 | 16 | 55 |
| DH408017 | 1.7 | .0669 | 3 | 16 | 55 |
| DH408018 | 1.8 | .0709 | 3 | 16 | 55 |
| DH408019 | 1.9 | .0748 | 3 | 16 | 55 |
| DH408020 | 2.0 | .0787 | 4 | 21 | 57 |
| DH408021 | 2.1 | .0827 | 4 | 21 | 57 |
| DH408022 | 2.2 | .0866 | 4 | 21 | 57 |
| DH408023 | 2.3 | .0906 | 4 | 21 | 57 |
| DH408024 | 2.4 | .0945 | 4 | 21 | 57 |
| DH408025 | 2.5 | .0984 | 4 | 21 | 57 |
| DH408026 | 2.6 | .1024 | 4 | 21 | 57 |
| DH408027 | 2.7 | .1063 | 4 | 21 | 57 |
| DH408028 | 2.8 | .1102 | 4 | 21 | 57 |
| DH408029 | 2.9 | .1142 | 4 | 21 | 57 |
| DH408030 | 3.0 | .1181 | 6 | 28 | 66 |
| DH408031 | 3.1 | .1220 | 6 | 28 | 66 |
| DH408032 | 3.2 | .1260 | 6 | 28 | 66 |

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| TiAlN | $D_1$ | | $D_2$ | $L_1$ | $L_2$ |
| DH408033 | 3.3 | .1299 | 6 | 28 | 66 |
| DH408034 | 3.4 | .1339 | 6 | 28 | 66 |
| DH408035 | 3.5 | .1378 | 6 | 28 | 66 |
| DH408036 | 3.6 | .1417 | 6 | 28 | 66 |
| DH408037 | 3.7 | .1457 | 6 | 28 | 66 |
| DH408038 | 3.8 | .1496 | 6 | 36 | 74 |
| DH408039 | 3.9 | .1535 | 6 | 36 | 74 |
| DH408040 | 4.0 | .1575 | 6 | 36 | 74 |
| DH408041 | 4.1 | .1614 | 6 | 36 | 74 |
| DH408042 | 4.2 | .1654 | 6 | 36 | 74 |
| DH408043 | 4.3 | .1693 | 6 | 36 | 74 |
| DH408044 | 4.4 | .1732 | 6 | 36 | 74 |
| DH408045 | 4.5 | .1772 | 6 | 36 | 74 |
| DH408046 | 4.6 | .1811 | 6 | 36 | 74 |
| DH408047 | 4.7 | .1850 | 6 | 36 | 74 |
| DH408048 | 4.8 | .1890 | 6 | 44 | 82 |
| DH408049 | 4.9 | .1929 | 6 | 44 | 82 |
| DH408050 | 5.0 | .1969 | 6 | 44 | 82 |
| DH408051 | 5.1 | .2008 | 6 | 44 | 82 |
| DH408052 | 5.2 | .2047 | 6 | 44 | 82 |
| DH408053 | 5.3 | .2087 | 6 | 44 | 82 |
| DH408054 | 5.4 | .2126 | 6 | 44 | 82 |
| DH408055 | 5.5 | .2165 | 6 | 44 | 82 |

▶ Other shank types are available on your request.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ○ | ◎ | ◎ | | | ○ | | ○ | | | | |

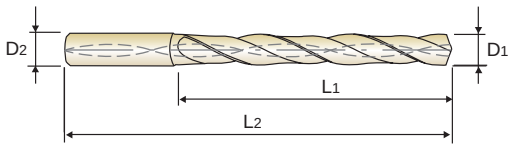
# DREAM DRILLS

**DH408 SERIES**

## CARBIDE, DREAM DRILLS with COOLANT HOLES — *LONG*

▶ **Application** : Steel, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.

▶ **Advantages** : Self centering - center drilling is not required
Excellent positioning - bushing is not necessary
Special Design - reaming is not required
- good chip removal
- powerful drilling




DIN 6537 | MG | h6 | m7 | 140° | P.60

5 × D

Unit : mm

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| DH408056 | 5.6 | .2205 | 6 | 44 | 82 |
| DH408057 | 5.7 | .2244 | 6 | 44 | 82 |
| DH408058 | 5.8 | .2283 | 6 | 44 | 82 |
| DH408059 | 5.9 | .2323 | 6 | 44 | 82 |
| DH408060 | 6.0 | .2362 | 6 | 44 | 82 |
| DH408061 | 6.1 | .2402 | 8 | 53 | 91 |
| DH408062 | 6.2 | .2441 | 8 | 53 | 91 |
| DH408063 | 6.3 | .2480 | 8 | 53 | 91 |
| DH408064 | 6.4 | .2520 | 8 | 53 | 91 |
| DH408065 | 6.5 | .2559 | 8 | 53 | 91 |
| DH408066 | 6.6 | .2598 | 8 | 53 | 91 |
| DH408067 | 6.7 | .2638 | 8 | 53 | 91 |
| DH408068 | 6.8 | .2677 | 8 | 53 | 91 |
| DH408069 | 6.9 | .2717 | 8 | 53 | 91 |
| DH408070 | 7.0 | .2756 | 8 | 53 | 91 |
| DH408071 | 7.1 | .2795 | 8 | 53 | 91 |
| DH408072 | 7.2 | .2835 | 8 | 53 | 91 |
| DH408073 | 7.3 | .2874 | 8 | 53 | 91 |
| DH408074 | 7.4 | .2913 | 8 | 53 | 91 |
| DH408075 | 7.5 | .2953 | 8 | 53 | 91 |
| DH408076 | 7.6 | .2992 | 8 | 53 | 91 |
| DH408077 | 7.7 | .3031 | 8 | 53 | 91 |
| DH408078 | 7.8 | .3071 | 8 | 53 | 91 |

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| DH408079 | 7.9 | .3110 | 8 | 53 | 91 |
| DH408080 | 8.0 | .3150 | 8 | 53 | 91 |
| DH408081 | 8.1 | .3189 | 10 | 61 | 103 |
| DH408082 | 8.2 | .3228 | 10 | 61 | 103 |
| DH408083 | 8.3 | .3268 | 10 | 61 | 103 |
| DH408084 | 8.4 | .3307 | 10 | 61 | 103 |
| DH408085 | 8.5 | .3346 | 10 | 61 | 103 |
| DH408086 | 8.6 | .3386 | 10 | 61 | 103 |
| DH408087 | 8.7 | .3425 | 10 | 61 | 103 |
| DH408088 | 8.8 | .3465 | 10 | 61 | 103 |
| DH408089 | 8.9 | .3504 | 10 | 61 | 103 |
| DH408090 | 9.0 | .3543 | 10 | 61 | 103 |
| DH408091 | 9.1 | .3583 | 10 | 61 | 103 |
| DH408092 | 9.2 | .3622 | 10 | 61 | 103 |
| DH408093 | 9.3 | .3661 | 10 | 61 | 103 |
| DH408094 | 9.4 | .3701 | 10 | 61 | 103 |
| DH408095 | 9.5 | .3740 | 10 | 61 | 103 |
| DH408096 | 9.6 | .3780 | 10 | 61 | 103 |
| DH408097 | 9.7 | .3819 | 10 | 61 | 103 |
| DH408098 | 9.8 | .3858 | 10 | 61 | 103 |
| DH408099 | 9.9 | .3898 | 10 | 61 | 103 |
| DH408100 | 10.0 | .3937 | 10 | 61 | 103 |
| DH408101 | 10.1 | .3976 | 12 | 71 | 118 |

▶ Other shank types are available on your request.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ○ | ◎ | ◎ | | | ○ | | ○ | | | | |

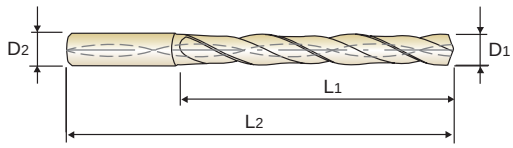
# YG DREAM DRILLS

**DH408 SERIES**

## CARBIDE, DREAM DRILLS with COOLANT HOLES — *LONG*

▶ **Application** : Steel, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.

▶ **Advantages** : Self centering - center drilling is not required
Excellent positioning - bushing is not necessary
Special Design - reaming is not required
- good chip removal
- powerful drilling




DIN 6537 | MG | h6 | m7 | 140° | P.60

5 × D

Unit : mm

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| TiAlN | $D_1$ | | $D_2$ | $L_1$ | $L_2$ |
| DH408102 | 10.2 | .4016 | 12 | 71 | 118 |
| DH408103 | 10.3 | .4055 | 12 | 71 | 118 |
| DH408104 | 10.4 | .4094 | 12 | 71 | 118 |
| DH408105 | 10.5 | .4134 | 12 | 71 | 118 |
| DH408106 | 10.6 | .4173 | 12 | 71 | 118 |
| DH408107 | 10.7 | .4212 | 12 | 71 | 118 |
| DH408108 | 10.8 | .4252 | 12 | 71 | 118 |
| DH408109 | 10.9 | .4291 | 12 | 71 | 118 |
| DH408110 | 11.0 | .4330 | 12 | 71 | 118 |
| DH408111 | 11.1 | .4370 | 12 | 71 | 118 |
| DH408112 | 11.2 | .4409 | 12 | 71 | 118 |
| DH408113 | 11.3 | .4448 | 12 | 71 | 118 |
| DH408114 | 11.4 | .4488 | 12 | 71 | 118 |
| DH408115 | 11.5 | .4527 | 12 | 71 | 118 |
| DH408116 | 11.6 | .4566 | 12 | 71 | 118 |
| DH408117 | 11.7 | .4606 | 12 | 71 | 118 |
| DH408118 | 11.8 | .4645 | 12 | 71 | 118 |
| DH408119 | 11.9 | .4685 | 12 | 71 | 118 |

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| TiAlN | $D_1$ | | $D_2$ | $L_1$ | $L_2$ |
| DH408120 | 12.0 | .4724 | 12 | 71 | 118 |
| DH408125 | 12.5 | .4921 | 14 | 77 | 124 |
| DH408130 | 13.0 | .5118 | 14 | 77 | 124 |
| DH408135 | 13.5 | .5314 | 14 | 77 | 124 |
| DH408140 | 14.0 | .5512 | 14 | 77 | 124 |
| DH408145 | 14.5 | .5708 | 16 | 83 | 133 |
| DH408150 | 15.0 | .5905 | 16 | 83 | 133 |
| DH408155 | 15.5 | .6102 | 16 | 83 | 133 |
| DH408160 | 16.0 | .6299 | 16 | 83 | 133 |
| DH408165 | 16.5 | .6495 | 18 | 93 | 143 |
| DH408170 | 17.0 | .6692 | 18 | 93 | 143 |
| DH408175 | 17.5 | .6889 | 18 | 93 | 143 |
| DH408180 | 18.0 | .7087 | 18 | 93 | 143 |
| DH408185 | 18.5 | .7283 | 20 | 101 | 153 |
| DH408190 | 19.0 | .7480 | 20 | 101 | 153 |
| DH408195 | 19.5 | .7676 | 20 | 101 | 153 |
| DH408200 | 20.0 | .7874 | 20 | 101 | 153 |

▶ Other shank types are available on your request.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ○ | ◎ | ◎ | | | ○ | | ○ | | | | |

# DREAM DRILLS

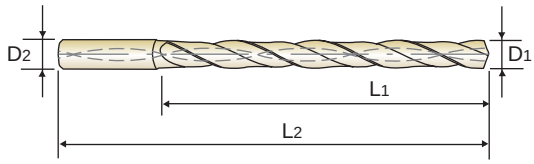
**DH421 SERIES**

## CARBIDE, DREAM DRILLS with COOLANT HOLES

***EXTRA LONG***

▶ **Application** : Steel, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.

▶ **Advantages** : Self centering - center drilling is not required
Excellent positioning - bushing is not necessary
Special Design - reaming is not required
- good chip removal
- powerful drilling




DIN 6537 | MG | h6 | m7 | 140° | P.60

8 × D

Unit : mm

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| DH421030 | 3.0 | .1181 | 6 | 34 | 72 |
| DH421031 | 3.1 | .1220 | 6 | 34 | 72 |
| DH421032 | 3.2 | .1260 | 6 | 34 | 72 |
| DH421033 | 3.3 | .1299 | 6 | 34 | 72 |
| DH421034 | 3.4 | .1339 | 6 | 34 | 72 |
| DH421035 | 3.5 | .1378 | 6 | 34 | 72 |
| DH421036 | 3.6 | .1417 | 6 | 34 | 72 |
| DH421037 | 3.7 | .1457 | 6 | 34 | 72 |
| DH421038 | 3.8 | .1496 | 6 | 43 | 81 |
| DH421039 | 3.9 | .1535 | 6 | 43 | 81 |
| DH421040 | 4.0 | .1575 | 6 | 43 | 81 |
| DH421041 | 4.1 | .1614 | 6 | 43 | 81 |
| DH421042 | 4.2 | .1654 | 6 | 43 | 81 |
| DH421043 | 4.3 | .1693 | 6 | 43 | 81 |
| DH421044 | 4.4 | .1732 | 6 | 43 | 81 |
| DH421045 | 4.5 | .1772 | 6 | 43 | 81 |
| DH421046 | 4.6 | .1811 | 6 | 43 | 81 |
| DH421047 | 4.7 | .1850 | 6 | 43 | 81 |
| DH421048 | 4.8 | .1890 | 6 | 57 | 95 |
| DH421049 | 4.9 | .1929 | 6 | 57 | 95 |
| DH421050 | 5.0 | .1969 | 6 | 57 | 95 |
| DH421051 | 5.1 | .2008 | 6 | 57 | 95 |
| DH421052 | 5.2 | .2047 | 6 | 57 | 95 |
| DH421053 | 5.3 | .2087 | 6 | 57 | 95 |
| DH421054 | 5.4 | .2126 | 6 | 57 | 95 |
| DH421055 | 5.5 | .2165 | 6 | 57 | 95 |
| DH421056 | 5.6 | .2205 | 6 | 57 | 95 |

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| DH421057 | 5.7 | .2244 | 6 | 57 | 95 |
| DH421058 | 5.8 | .2283 | 6 | 57 | 95 |
| DH421059 | 5.9 | .2323 | 6 | 57 | 95 |
| DH421060 | 6.0 | .2362 | 6 | 57 | 95 |
| DH421061 | 6.1 | .2402 | 8 | 76 | 114 |
| DH421062 | 6.2 | .2441 | 8 | 76 | 114 |
| DH421063 | 6.3 | .2480 | 8 | 76 | 114 |
| DH421064 | 6.4 | .2520 | 8 | 76 | 114 |
| DH421065 | 6.5 | .2559 | 8 | 76 | 114 |
| DH421066 | 6.6 | .2598 | 8 | 76 | 114 |
| DH421067 | 6.7 | .2638 | 8 | 76 | 114 |
| DH421068 | 6.8 | .2677 | 8 | 76 | 114 |
| DH421069 | 6.9 | .2717 | 8 | 76 | 114 |
| DH421070 | 7.0 | .2756 | 8 | 76 | 114 |
| DH421071 | 7.1 | .2795 | 8 | 76 | 114 |
| DH421072 | 7.2 | .2835 | 8 | 76 | 114 |
| DH421073 | 7.3 | .2874 | 8 | 76 | 114 |
| DH421074 | 7.4 | .2913 | 8 | 76 | 114 |
| DH421075 | 7.5 | .2953 | 8 | 76 | 114 |
| DH421076 | 7.6 | .2992 | 8 | 76 | 114 |
| DH421077 | 7.7 | .3031 | 8 | 76 | 114 |
| DH421078 | 7.8 | .3071 | 8 | 76 | 114 |
| DH421079 | 7.9 | .3110 | 8 | 76 | 114 |
| DH421080 | 8.0 | .3150 | 8 | 76 | 114 |
| DH421081 | 8.1 | .3189 | 10 | 95 | 142 |
| DH421082 | 8.2 | .3228 | 10 | 95 | 142 |
| DH421083 | 8.3 | .3268 | 10 | 95 | 142 |

▶ Other shank types are available on your request.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ○ | ◎ | ◎ | | | ○ | | ○ | | | | |

# YG DREAM DRILLS

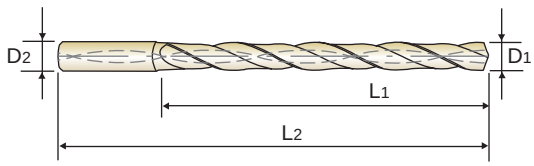
**DH421 SERIES**

## CARBIDE, DREAM DRILLS with COOLANT HOLES

***EXTRA LONG***

▶ **Application** : Steel, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.

▶ **Advantages** : Self centering - center drilling is not required
Excellent positioning - bushing is not necessary
Special Design - reaming is not required
- good chip removal
- powerful drilling




DIN 6537 | MG | h6 | m7 | 140° | P.60

8 × D

Unit : mm

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| TiAlN | $D_1$ | | $D_2$ | $L_1$ | $L_2$ |
| DH421084 | 8.4 | .3307 | 10 | 95 | 142 |
| DH421085 | 8.5 | .3346 | 10 | 95 | 142 |
| DH421086 | 8.6 | .3386 | 10 | 95 | 142 |
| DH421087 | 8.7 | .3425 | 10 | 95 | 142 |
| DH421088 | 8.8 | .3465 | 10 | 95 | 142 |
| DH421089 | 8.9 | .3504 | 10 | 95 | 142 |
| DH421090 | 9.0 | .3543 | 10 | 95 | 142 |
| DH421091 | 9.1 | .3583 | 10 | 95 | 142 |
| DH421092 | 9.2 | .3622 | 10 | 95 | 142 |
| DH421093 | 9.3 | .3661 | 10 | 95 | 142 |
| DH421094 | 9.4 | .3701 | 10 | 95 | 142 |
| DH421095 | 9.5 | .3740 | 10 | 95 | 142 |
| DH421096 | 9.6 | .3780 | 10 | 95 | 142 |
| DH421097 | 9.7 | .3819 | 10 | 95 | 142 |
| DH421098 | 9.8 | .3858 | 10 | 95 | 142 |
| DH421099 | 9.9 | .3898 | 10 | 95 | 142 |
| DH421100 | 10.0 | .3937 | 10 | 95 | 142 |
| DH421101 | 10.1 | .3976 | 12 | 114 | 162 |
| DH421102 | 10.2 | .4016 | 12 | 114 | 162 |
| DH421103 | 10.3 | .4055 | 12 | 114 | 162 |
| DH421104 | 10.4 | .4094 | 12 | 114 | 162 |

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| TiAlN | $D_1$ | | $D_2$ | $L_1$ | $L_2$ |
| DH421105 | 10.5 | .4134 | 12 | 114 | 162 |
| DH421106 | 10.6 | .4173 | 12 | 114 | 162 |
| DH421107 | 10.7 | .4212 | 12 | 114 | 162 |
| DH421108 | 10.8 | .4252 | 12 | 114 | 162 |
| DH421109 | 10.9 | .4291 | 12 | 114 | 162 |
| DH421110 | 11.0 | .4330 | 12 | 114 | 162 |
| DH421111 | 11.1 | .4370 | 12 | 114 | 162 |
| DH421112 | 11.2 | .4409 | 12 | 114 | 162 |
| DH421113 | 11.3 | .4448 | 12 | 114 | 162 |
| DH421114 | 11.4 | .4488 | 12 | 114 | 162 |
| DH421115 | 11.5 | .4527 | 12 | 114 | 162 |
| DH421116 | 11.6 | .4566 | 12 | 114 | 162 |
| DH421117 | 11.7 | .4606 | 12 | 114 | 162 |
| DH421118 | 11.8 | .4645 | 12 | 114 | 162 |
| DH421119 | 11.9 | .4685 | 12 | 114 | 162 |
| DH421120 | 12.0 | .4724 | 12 | 114 | 162 |
| DH421125 | 12.5 | .4921 | 14 | 133 | 178 |
| DH421130 | 13.0 | .5118 | 14 | 133 | 178 |
| DH421135 | 13.5 | .5314 | 14 | 133 | 178 |
| DH421140 | 14.0 | .5512 | 14 | 133 | 178 |

▶ Other shank types are available on your request.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ○ | ◎ | ◎ | | | ○ | | ○ | | | | |

## CARBIDE, DREAM DRILLS without COOLANT HOLES, TiAlN COATED

### DH414 SERIES

| WORK MATERIAL | CAST IRON | | CAST IRON | | CARBON STEELS | | ALLOY STEELS | |
|---|---|---|---|---|---|---|---|---|
| STRENGTH | < HRc24 | | > HRc24 | | < HRc30 | | HRc30 - 42 | |
| DIAMETER | N | S | N | S | N | S | N | S |
| 1/8 ~ 3/16 | 13120 | .006 | 8750 | .005 | 7880 | .005 | 7000 | .005 |
| 3/16 ~ 5/16 | 8200 | .008 | 5470 | .006 | 4920 | .006 | 4370 | .006 |
| 5/16 ~ 3/8 | 5970 | .011 | 3980 | .009 | 3560 | .009 | 3190 | .009 |
| 3/8 ~ 1/2 | 4690 | .014 | 3120 | .011 | 2810 | .011 | 2500 | .011 |
| 1/2 ~ 9/16 | 3860 | .016 | 2570 | .012 | 2310 | .012 | 2060 | .012 |
| 9/16 ~ 13/16 | 2980 | .018 | 1990 | .014 | 1790 | .014 | 1590 | .014 |

▶ Recommend to reduce the feed rate as following
**Feed 100%** : DH414(3×D)

N = R.P.M
S = Inch per Revolution(inch/rev.)

## CARBIDE, DREAM DRILLS with COOLANT HOLES, TiAlN COATED

### DH416, DH418 SERIES

| WORK MATERIAL | CAST IRON | | CAST IRON | | CARBON STEELS | | ALLOY STEELS | |
|---|---|---|---|---|---|---|---|---|
| STRENGTH | < HRc24 | | > HRc24 | | < HRc30 | | HRc30 - 42 | |
| DIAMETER | N | S | N | S | N | S | N | S |
| 1/8 ~ 3/16 | 14870 | .006 | 9620 | .006 | 8750 | .006 | 7880 | .005 |
| 3/16 ~ 5/16 | 8200 | .008 | 6010 | .008 | 5470 | .008 | 4920 | .006 |
| 5/16 ~ 3/8 | 6760 | .011 | 4370 | .011 | 3980 | .011 | 3580 | .009 |
| 3/8 ~ 1/2 | 5310 | .014 | 3440 | .014 | 3120 | .014 | 2810 | .011 |
| 1/2 ~ 9/16 | 4370 | .016 | 2830 | .016 | 2570 | .016 | 2310 | .012 |
| 9/16 ~ 13/16 | 3380 | .018 | 2190 | .018 | 1990 | .018 | 1790 | .014 |

▶ Recommend to reduce the feed rate as following
**Feed 100%** : DH416(3×D)
**Feed 85%** : DH418(5×D)

N = R.P.M
S = Inch per Revolution(inch/rev.)

# DREAM DRILLS RECOMMENDED CUTTING CONDITIONS

## CARBIDE, DREAM DRILLS without COOLANT HOLES, TiAlN COATED

### DH404, DH424 SERIES

| WORK MATERIAL | | NON-ALLOY STEELS | | ALLOY STEELS | | SOFT GREY CAST IRON | | HARD GREY CAST IRON | |
|---|---|---|---|---|---|---|---|---|---|
| STRENGTH | | < HRc 20 | | > HRc 20 | | < 240 BHN | | < 300 BHN | |
| DIAMETER | | N | S | N | S | N | S | N | S |
| METRIC | INCH | | | | | | | | |
| 1.0 | .0394 | 13000 | .002 | 11250 | .002 | 21300 | .002 | 14200 | .002 |
| 2.0 | .0787 | 13000 | .002 | 11250 | .002 | 21300 | .002 | 14200 | .002 |
| 3.0 | .1181 | 13000 | .005 | 11000 | .005 | 21000 | .005 | 14000 | .005 |
| 4.0 | .1575 | 9500 | .006 | 8400 | .006 | 16000 | .006 | 10500 | .006 |
| 5.0 | .1969 | 7600 | .006 | 6700 | .006 | 13000 | .006 | 8300 | .006 |
| 6.0 | .2362 | 6400 | .007 | 5600 | .007 | 11000 | .007 | 6900 | .007 |
| 7.0 | .2756 | 5500 | .007 | 4800 | .007 | 9100 | .007 | 5900 | .007 |
| 8.0 | .3150 | 4800 | .008 | 4200 | .008 | 8000 | .008 | 5200 | .008 |
| 9.0 | .3543 | 4200 | .009 | 3700 | .009 | 7100 | .009 | 4600 | .009 |
| 10.0 | .3937 | 3800 | .010 | 3350 | .010 | 6400 | .010 | 4150 | .010 |
| 12.0 | .4724 | 3200 | .011 | 2800 | .011 | 5300 | .011 | 3450 | .011 |
| 14.0 | .5512 | 2750 | .011 | 2400 | .011 | 4550 | .011 | 3000 | .011 |
| 16.0 | .6299 | 2400 | .012 | 2100 | .012 | 4000 | .012 | 2600 | .012 |
| 18.0 | .7087 | 2100 | .013 | 1850 | .013 | 3550 | .013 | 2300 | .013 |
| 20.0 | .7874 | 1900 | .014 | 1650 | .014 | 3200 | .014 | 2100 | .014 |

▶ Recommend to reduce the feed rate as following
**Feed 100%** : DH404(3×D)

N = R.P.M
S = Inch per Revolution(inch/rev.)

## CARBIDE, DREAM DRILLS with COOLANT HOLES, TiAlN COATED

### DH406, DH408, DH421 SERIES

| WORK MATERIAL | | NON-ALLOY STEELS | | ALLOY STEELS | | SOFT GREY CAST IRON | | HARD GREY CAST IRON | |
|---|---|---|---|---|---|---|---|---|---|
| STRENGTH | | < HRc 20 | | > HRc 20 | | < 240 BHN | | < 300 BHN | |
| DIAMETER | | N | S | N | S | N | S | N | S |
| METRIC | INCH | | | | | | | | |
| 1.0 | .0394 | 16250 | .002 | 14800 | .002 | 26600 | .002 | 17300 | .002 |
| 2.0 | .0787 | 16250 | .003 | 14800 | .003 | 26600 | .003 | 17300 | .003 |
| 3.0 | .1181 | 16000 | .006 | 14500 | .006 | 26000 | .006 | 17000 | .006 |
| 4.0 | .1575 | 12000 | .007 | 11000 | .007 | 20000 | .007 | 13000 | .007 |
| 5.0 | .1969 | 9550 | .007 | 8600 | .007 | 16000 | .007 | 10000 | .007 |
| 6.0 | .2362 | 8000 | .008 | 7200 | .008 | 13000 | .008 | 8500 | .008 |
| 7.0 | .2756 | 6800 | .009 | 6100 | .009 | 11500 | .009 | 7300 | .009 |
| 8.0 | .3150 | 6000 | .009 | 5400 | .009 | 9900 | .009 | 6400 | .009 |
| 9.0 | .3543 | 5300 | .011 | 4800 | .011 | 8800 | .011 | 5700 | .011 |
| 10.0 | .3937 | 4800 | .012 | 4300 | .012 | 8000 | .012 | 5100 | .012 |
| 12.0 | .4724 | 4000 | .013 | 3600 | .013 | 6600 | .013 | 4250 | .013 |
| 14.0 | .5512 | 3400 | .014 | 3050 | .014 | 5700 | .014 | 3650 | .014 |
| 16.0 | .6299 | 3000 | .015 | 2700 | .015 | 5000 | .015 | 3200 | .015 |
| 18.0 | .7087 | 2650 | .017 | 2400 | .017 | 4400 | .017 | 2850 | .017 |
| 20.0 | .7874 | 2400 | .018 | 2150 | .018 | 4000 | .018 | 2550 | .018 |

▶ Recommend to reduce the feed rate as following
**Feed 100%** : DH406(3×D), **Feed 85%** : DH408(5×D),
**Feed 70%** : DH421(8×D)

N = R.P.M
S = Inch per Revolution(inch/rev.)

# CARBIDE

Being the best through innovation

# DREAM DRILLS -INOX

- **WITH COOLANT HOLES**
  **Stainless Steels, Nickel Alloys and Titanium up to HRc35.**

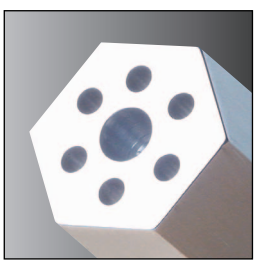
## SOLID CARBIDE DREAM DRILLS - INOX (with Coolant Holes)

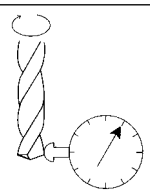
Stainless Steels, Nickel Alloys and Titanium up to HRc35.


| ITEM | MODEL | DESCRIPTION | | SIZE MIN | SIZE MAX | PAGE |
|---|---|---|---|---|---|---|
| **INCH** | | | | | | |
| 3XD | **DH463** | | CARBIDE, DREAM DRILLS - INOX with COOLANT HOLES | *SHORT* | D1/8 | D5/8 | **64** |
| 5XD | **DH464** | | CARBIDE, DREAM DRILLS - INOX with COOLANT HOLES | *LONG* | D13/64 | D1/2 | **65** |
| **METRIC** | | | | | | |
| 3XD | **DH451** | | CARBIDE, DREAM DRILLS - INOX with COOLANT HOLES | *SHORT* | D3.0 | D20.0 | **66** |
| 5XD | **DH452** | | CARBIDE, DREAM DRILLS - INOX with COOLANT HOLES | *LONG* | D3.0 | D20.0 | **68** |
| 8XD | **DH453** | | CARBIDE, DREAM DRILLS - INOX with COOLANT HOLES | *EXTRA LONG* | D3.0 | D14.0 | **70** |
| | | | RECOMMENDED CUTTING CONDITIONS | | | | **72** |

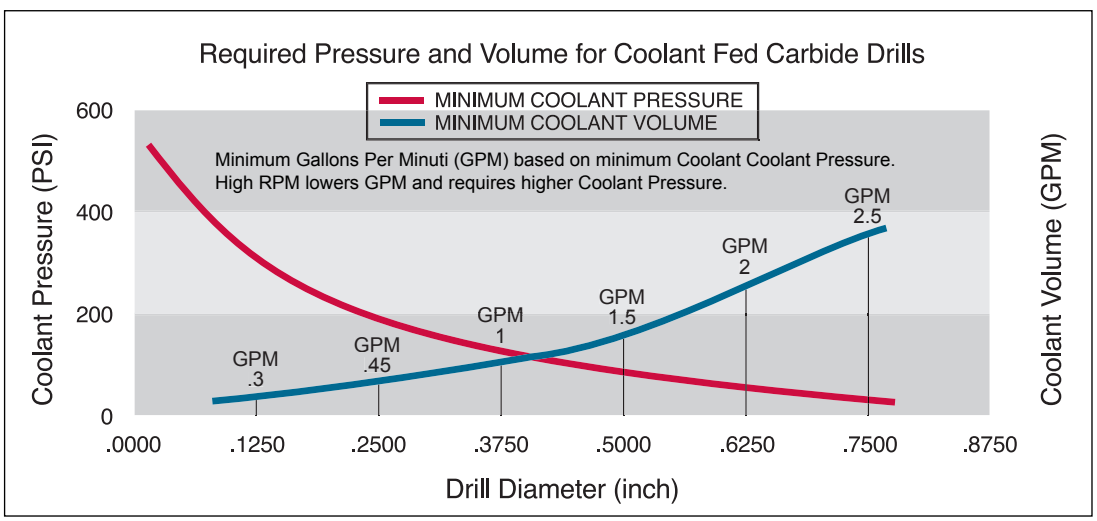
◎ : Excellent
○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | ◎ | ○ | ○ | | |
| ◎ | ◎ | ○ | | | | ○ | ◎ | ○ | ○ | | |
| ◎ | ◎ | ○ | | | | ○ | ◎ | ○ | ○ | | |
| ◎ | ◎ | ○ | | | | ○ | ◎ | ○ | ○ | | |
| ◎ | ◎ | ○ | | | | ○ | ◎ | ○ | ○ | | |





• Radial run out at cutting lip must not exceed .001



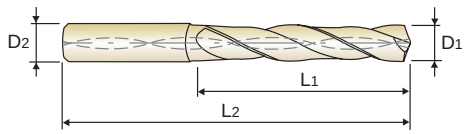
# DREAM DRILLS -INOX

**DH463 SERIES**

## CARBIDE, DREAM DRILLS - INOX with COOLANT HOLES

***SHORT***

- The tool has the special flute shape and geometry for suitable machining of stainless steel.
- Excellent chip evacuation due to better surface treatment.
- Point R-thinning makes the superior centering and chip curl.
- TiAlN coating achieves the better surface finishes and longer tool life.
- Tolerance : Dia. Tolerance ØD1: See page 218, Shank Tolerance ØD2: -.0001 -.0005




MG 140° P.72

**▶ for stainless steel** 3 × D

Unit : Inch

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Fractional | Decimal | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| DH463008 | 1/8 | .1250 | 15/64 | 1.102 | 2.992 |
| DH463011 | 11/64 | .1719 | 15/64 | 1.417 | 3.386 |
| DH463012 | 3/16 | .1875 | 15/64 | 1.575 | 3.543 |
| DH463013 | 13/64 | .2031 | 15/64 | 1.082 | 3.228 |
| DH463014 | 7/32 | .2188 | 15/64 | 1.181 | 3.228 |
| DH463015 | 15/64 | .2344 | 15/64 | 1.181 | 3.228 |
| DH463016 | 1/4 | .2500 | 17/64 | 1.279 | 3.465 |
| DH463206 | F | .2570 | 17/64 | 1.279 | 3.465 |
| DH463017 | 17/64 | .2656 | 17/64 | 1.378 | 3.465 |
| DH463209 | I | .2720 | .2720 | 1.378 | 3.465 |
| DH463018 | 9/32 | .2812 | 5/16 | 1.476 | 3.701 |
| DH463019 | 19/64 | .2969 | 5/16 | 1.476 | 3.701 |
| DH463020 | 5/16 | .3125 | 5/16 | 1.575 | 3.701 |
| DH463021 | 21/64 | .3281 | 11/32 | 1.673 | 3.937 |
| DH463217 | Q | .3320 | 11/32 | 1.673 | 3.937 |
| DH463022 | 11/32 | .3438 | 11/32 | 1.772 | 3.937 |
| DH463023 | 23/64 | .3594 | 25/64 | 1.870 | 4.174 |
| DH463221 | U | .3680 | 25/64 | 1.870 | 4.174 |

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Fractional | Decimal | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| DH463024 | 3/8 | .3750 | 25/64 | 1.969 | 4.174 |
| DH463025 | 25/64 | .3906 | 25/64 | 1.969 | 4.174 |
| DH463026 | 13/32 | .4062 | 27/64 | 2.067 | 4.567 |
| DH463027 | 27/64 | .4219 | 27/64 | 2.165 | 4.567 |
| DH463028 | 7/16 | .4375 | 15/32 | 2.264 | 4.803 |
| DH463029 | 29/64 | .4531 | 15/32 | 2.264 | 4.803 |
| DH463030 | 15/32 | .4688 | 15/32 | 2.362 | 4.803 |
| DH463031 | 31/64 | .4844 | 1/2 | 2.461 | 5.039 |
| DH463032 | 1/2 | .5000 | 1/2 | 2.559 | 5.039 |
| DH463033 | 33/64 | .5156 | 35/64 | 2.657 | 5.276 |
| DH463034 | 17/32 | .5312 | 35/64 | 2.756 | 5.276 |
| DH463035 | 35/64 | .5469 | 35/64 | 2.756 | 5.276 |
| DH463036 | 9/16 | .5625 | 37/64 | 2.854 | 5.512 |
| DH463037 | 37/64 | .5781 | 37/64 | 2.953 | 5.512 |
| DH463038 | 19/32 | .5937 | 5/8 | 3.051 | 5.709 |
| DH463039 | 39/64 | .6094 | 5/8 | 3.051 | 5.709 |
| DH463040 | 5/8 | .6250 | 5/8 | 3.150 | 5.709 |

▶ Other shank types are available on your request.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | ◎ | ○ | ○ | | |

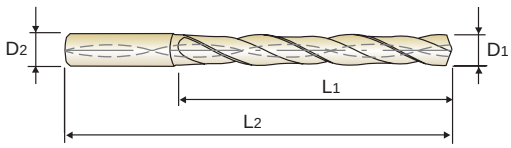
# DREAM DRILLS -INOX

**DH464 SERIES**

## CARBIDE, DREAM DRILLS - INOX with COOLANT HOLES

***LONG***

- ▶ The tool has the special flute shape and geometry for suitable machining of stainless steel.
- ▶ Excellent chip evacuation due to better surface treatment.
- ▶ Point R-thinning makes the superior centering and chip curl.
- ▶ TiAlN coating achieves the better surface finishes and longer tool life.
- ▶ Tolerance : Dia. Tolerance ØD1: See page 218, Shank Tolerance ØD2: -.0001 -.0005




MG | 140° | P.72

▶ **for stainless steel** | 5 × D

Unit : Inch

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Fractional | Decimal | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| DH464013 | 13/64 | .2031 | 15/64 | 1-3/4 | 3-15/16 |
| DH464014 | 7/32 | .2188 | 15/64 | 1-57/64 | 3-15/16 |
| DH464015 | 15/64 | .2344 | 15/64 | 1-57/64 | 3-15/16 |
| DH464016 | 1/4 | .2500 | 17/64 | 2-3/64 | 4-19/64 |
| DH464206 | F | .2570 | 17/64 | 2-13/64 | 4-19/64 |
| DH464017 | 17/64 | .2656 | 17/64 | 2-13/64 | 4-19/64 |
| DH464209 | I | .2720 | .2720 | 2-13/64 | 4-19/64 |
| DH464018 | 9/32 | .2812 | 5/16 | 2-23/64 | 4-41/64 |
| DH464019 | 19/64 | .2969 | 5/16 | 2-33/64 | 4-41/64 |
| DH464020 | 5/16 | .3125 | 5/16 | 2-33/64 | 4-41/64 |
| DH464021 | 21/64 | .3281 | 11/32 | 2-43/64 | 5 |
| DH464217 | Q | .3320 | 11/32 | 2-43/64 | 5 |

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Fractional | Decimal | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| DH464022 | 11/32 | .3438 | 11/32 | 2-27/32 | 5 |
| DH464023 | 23/64 | .3594 | 25/64 | 3 | 5-23/64 |
| DH464221 | U | .3680 | 25/64 | 3 | 5-23/64 |
| DH464024 | 3/8 | .3750 | 25/64 | 3-5/32 | 5-23/64 |
| DH464025 | 25/64 | .3906 | 25/64 | 3-5/32 | 5-23/64 |
| DH464026 | 13/32 | .4062 | 27/64 | 3-5/16 | 5-7/8 |
| DH464027 | 27/64 | .4219 | 27/64 | 3-15/32 | 5-7/8 |
| DH464028 | 7/16 | .4375 | 15/32 | 3-5/8 | 6-7/32 |
| DH464029 | 29/64 | .4531 | 15/32 | 3-25/32 | 6-7/32 |
| DH464030 | 15/32 | .4688 | 15/32 | 3-25/32 | 6-7/32 |
| DH464031 | 31/64 | .4844 | 1/2 | 3-15/16 | 6-37/64 |
| DH464032 | 1/2 | .5000 | 1/2 | 4-3/32 | 6-37/64 |

▶ Other shank types are available on your request.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | ◎ | ○ | ○ | | |

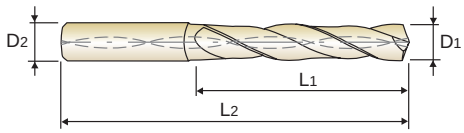
# DREAM DRILLS -INOX

**DH451 SERIES**

## CARBIDE, DREAM DRILLS - INOX with COOLANT HOLES

***SHORT***

- The tool has the special flute shape and geometry for suitable machining of stainless steel.
- Excellent chip evacuation due to better surface treatment.
- Point R-thinning makes the superior centering and chip curl.
- TiAlN coating achieves the better surface finishes and longer tool life.
- Tolerance : Dia. Tolerance ØD1:m7, Shank Tolerance ØD2: h6




DIN 6537 | MG | h6 | m7 | 140° P.72

**▶ for stainless steel** 3 × D

Unit : mm

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| DH451030 | 3.0 | .1181 | 6 | 20 | 62 |
| DH451031 | 3.1 | .1220 | 6 | 20 | 62 |
| DH451032 | 3.2 | .1260 | 6 | 20 | 62 |
| DH451033 | 3.3 | .1299 | 6 | 20 | 62 |
| DH451034 | 3.4 | .1339 | 6 | 20 | 62 |
| DH451035 | 3.5 | .1378 | 6 | 20 | 62 |
| DH451036 | 3.6 | .1417 | 6 | 20 | 62 |
| DH451037 | 3.7 | .1457 | 6 | 20 | 62 |
| DH451038 | 3.8 | .1496 | 6 | 24 | 66 |
| DH451039 | 3.9 | .1535 | 6 | 24 | 66 |
| DH451040 | 4.0 | .1575 | 6 | 24 | 66 |
| DH451041 | 4.1 | .1614 | 6 | 24 | 66 |
| DH451042 | 4.2 | .1654 | 6 | 24 | 66 |
| DH451043 | 4.3 | .1693 | 6 | 24 | 66 |
| DH451044 | 4.4 | .1732 | 6 | 24 | 66 |
| DH451045 | 4.5 | .1772 | 6 | 24 | 66 |
| DH451046 | 4.6 | .1811 | 6 | 24 | 66 |
| DH451047 | 4.7 | .1850 | 6 | 24 | 66 |
| DH451048 | 4.8 | .1890 | 6 | 28 | 66 |
| DH451049 | 4.9 | .1929 | 6 | 28 | 66 |
| DH451050 | 5.0 | .1969 | 6 | 28 | 66 |
| DH451051 | 5.1 | .2008 | 6 | 28 | 66 |
| DH451052 | 5.2 | .2047 | 6 | 28 | 66 |
| DH451053 | 5.3 | .2087 | 6 | 28 | 66 |
| DH451054 | 5.4 | .2126 | 6 | 28 | 66 |
| DH451055 | 5.5 | .2165 | 6 | 28 | 66 |
| DH451056 | 5.6 | .2205 | 6 | 28 | 66 |

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| DH451057 | 5.7 | .2244 | 6 | 28 | 66 |
| DH451058 | 5.8 | .2283 | 6 | 28 | 66 |
| DH451059 | 5.9 | .2323 | 6 | 28 | 66 |
| DH451060 | 6.0 | .2362 | 6 | 28 | 66 |
| DH451061 | 6.1 | .2402 | 8 | 34 | 79 |
| DH451062 | 6.2 | .2441 | 8 | 34 | 79 |
| DH451063 | 6.3 | .2480 | 8 | 34 | 79 |
| DH451064 | 6.4 | .2520 | 8 | 34 | 79 |
| DH451065 | 6.5 | .2559 | 8 | 34 | 79 |
| DH451066 | 6.6 | .2598 | 8 | 34 | 79 |
| DH451067 | 6.7 | .2638 | 8 | 34 | 79 |
| DH451068 | 6.8 | .2677 | 8 | 34 | 79 |
| DH451069 | 6.9 | .2717 | 8 | 34 | 79 |
| DH451070 | 7.0 | .2756 | 8 | 34 | 79 |
| DH451071 | 7.1 | .2795 | 8 | 41 | 79 |
| DH451072 | 7.2 | .2835 | 8 | 41 | 79 |
| DH451073 | 7.3 | .2874 | 8 | 41 | 79 |
| DH451074 | 7.4 | .2913 | 8 | 41 | 79 |
| DH451075 | 7.5 | .2953 | 8 | 41 | 79 |
| DH451076 | 7.6 | .2992 | 8 | 41 | 79 |
| DH451077 | 7.7 | .3031 | 8 | 41 | 79 |
| DH451078 | 7.8 | .3071 | 8 | 41 | 79 |
| DH451079 | 7.9 | .3110 | 8 | 41 | 79 |
| DH451080 | 8.0 | .3150 | 8 | 41 | 79 |
| DH451081 | 8.1 | .3189 | 10 | 47 | 89 |
| DH451082 | 8.2 | .3228 | 10 | 47 | 89 |
| DH451083 | 8.3 | .3268 | 10 | 47 | 89 |

▶ Other shank types are available on your request.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | ◎ | ○ | ○ | | |

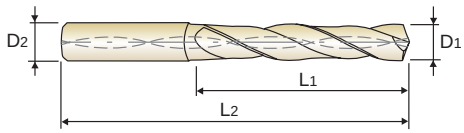
# DREAM DRILLS -INOX

**DH451 SERIES**

## CARBIDE, DREAM DRILLS - INOX with COOLANT HOLES

***SHORT***

- The tool has the special flute shape and geometry for suitable machining of stainless steel.
- Excellent chip evacuation due to better surface treatment.
- Point R-thinning makes the superior centering and chip curl.
- TiAlN coating achieves the better surface finishes and longer tool life.
- Tolerance : Dia. Tolerance ØD1:m7, Shank Tolerance ØD2: h6




DIN 6537 | MG | h6 | m7 | 140° | P.72

**▶ for stainless steel** 3 × D

Unit : mm

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| DH451084 | 8.4 | .3307 | 10 | 47 | 89 |
| DH451085 | 8.5 | .3346 | 10 | 47 | 89 |
| DH451086 | 8.6 | .3386 | 10 | 47 | 89 |
| DH451087 | 8.7 | .3425 | 10 | 47 | 89 |
| DH451088 | 8.8 | .3465 | 10 | 47 | 89 |
| DH451089 | 8.9 | .3504 | 10 | 47 | 89 |
| DH451090 | 9.0 | .3543 | 10 | 47 | 89 |
| DH451091 | 9.1 | .3583 | 10 | 47 | 89 |
| DH451092 | 9.2 | .3622 | 10 | 47 | 89 |
| DH451093 | 9.3 | .3661 | 10 | 47 | 89 |
| DH451094 | 9.4 | .3701 | 10 | 47 | 89 |
| DH451095 | 9.5 | .3740 | 10 | 47 | 89 |
| DH451096 | 9.6 | .3780 | 10 | 47 | 89 |
| DH451097 | 9.7 | .3819 | 10 | 47 | 89 |
| DH451098 | 9.8 | .3858 | 10 | 47 | 89 |
| DH451099 | 9.9 | .3898 | 10 | 47 | 89 |
| DH451100 | 10.0 | .3937 | 10 | 47 | 89 |
| DH451101 | 10.1 | .3976 | 12 | 55 | 102 |
| DH451102 | 10.2 | .4016 | 12 | 55 | 102 |
| DH451103 | 10.3 | .4055 | 12 | 55 | 102 |
| DH451104 | 10.4 | .4094 | 12 | 55 | 102 |
| DH451105 | 10.5 | .4134 | 12 | 55 | 102 |
| DH451106 | 10.6 | .4173 | 12 | 55 | 102 |
| DH451107 | 10.7 | .4212 | 12 | 55 | 102 |
| DH451108 | 10.8 | .4252 | 12 | 55 | 102 |
| DH451109 | 10.9 | .4291 | 12 | 55 | 102 |
| DH451110 | 11.0 | .4330 | 12 | 55 | 102 |

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| DH451111 | 11.1 | .4370 | 12 | 55 | 102 |
| DH451112 | 11.2 | .4409 | 12 | 55 | 102 |
| DH451113 | 11.3 | .4448 | 12 | 55 | 102 |
| DH451114 | 11.4 | .4488 | 12 | 55 | 102 |
| DH451115 | 11.5 | .4527 | 12 | 55 | 102 |
| DH451116 | 11.6 | .4566 | 12 | 55 | 102 |
| DH451117 | 11.7 | .4606 | 12 | 55 | 102 |
| DH451118 | 11.8 | .4645 | 12 | 55 | 102 |
| DH451119 | 11.9 | .4685 | 12 | 55 | 102 |
| DH451120 | 12.0 | .4724 | 12 | 55 | 102 |
| DH451125 | 12.5 | .4921 | 14 | 60 | 107 |
| DH451130 | 13.0 | .5118 | 14 | 60 | 107 |
| DH451135 | 13.5 | .5314 | 14 | 60 | 107 |
| DH451140 | 14.0 | .5512 | 14 | 60 | 107 |
| DH451145 | 14.5 | .5708 | 16 | 65 | 115 |
| DH451150 | 15.0 | .5905 | 16 | 65 | 115 |
| DH451155 | 15.5 | .6102 | 16 | 65 | 115 |
| DH451160 | 16.0 | .6299 | 16 | 65 | 115 |
| DH451165 | 16.5 | .6495 | 18 | 73 | 123 |
| DH451170 | 17.0 | .6692 | 18 | 73 | 123 |
| DH451175 | 17.5 | .6889 | 18 | 73 | 123 |
| DH451180 | 18.0 | .7087 | 18 | 73 | 123 |
| DH451185 | 18.5 | .7283 | 20 | 79 | 131 |
| DH451190 | 19.0 | .7480 | 20 | 79 | 131 |
| DH451195 | 19.5 | .7676 | 20 | 79 | 131 |
| DH451200 | 20.0 | .7874 | 20 | 79 | 131 |

▶ Other shank types are available on your request.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | ◎ | ○ | ○ | | |

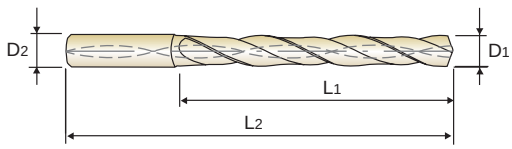
# DREAM DRILLS -INOX

**DH452 SERIES**

## CARBIDE, DREAM DRILLS - INOX with COOLANT HOLES

***LONG***

- The tool has the special flute shape and geometry for suitable machining of stainless steel.
- Excellent chip evacuation due to better surface treatment.
- Point R-thinning makes the superior centering and chip curl.
- TiAlN coating achieves the better surface finishes and longer tool life.
- Tolerance : Dia. Tolerance ØD1:m7, Shank Tolerance ØD2: h6




DIN 6537 | MG | h6 | m7 | 140° P.72

**▶ for stainless steel** 5 × D

Unit : mm

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| DH452030 | 3.0 | .1181 | 6 | 28 | 66 |
| DH452031 | 3.1 | .1220 | 6 | 28 | 66 |
| DH452032 | 3.2 | .1260 | 6 | 28 | 66 |
| DH452033 | 3.3 | .1299 | 6 | 28 | 66 |
| DH452034 | 3.4 | .1339 | 6 | 28 | 66 |
| DH452035 | 3.5 | .1378 | 6 | 28 | 66 |
| DH452036 | 3.6 | .1417 | 6 | 28 | 66 |
| DH452037 | 3.7 | .1457 | 6 | 28 | 66 |
| DH452038 | 3.8 | .1496 | 6 | 36 | 74 |
| DH452039 | 3.9 | .1535 | 6 | 36 | 74 |
| DH452040 | 4.0 | .1575 | 6 | 36 | 74 |
| DH452041 | 4.1 | .1614 | 6 | 36 | 74 |
| DH452042 | 4.2 | .1654 | 6 | 36 | 74 |
| DH452043 | 4.3 | .1693 | 6 | 36 | 74 |
| DH452044 | 4.4 | .1732 | 6 | 36 | 74 |
| DH452045 | 4.5 | .1772 | 6 | 36 | 74 |
| DH452046 | 4.6 | .1811 | 6 | 36 | 74 |
| DH452047 | 4.7 | .1850 | 6 | 36 | 74 |
| DH452048 | 4.8 | .1890 | 6 | 44 | 82 |
| DH452049 | 4.9 | .1929 | 6 | 44 | 82 |
| DH452050 | 5.0 | .1969 | 6 | 44 | 82 |
| DH452051 | 5.1 | .2008 | 6 | 44 | 82 |
| DH452052 | 5.2 | .2047 | 6 | 44 | 82 |
| DH452053 | 5.3 | .2087 | 6 | 44 | 82 |
| DH452054 | 5.4 | .2126 | 6 | 44 | 82 |
| DH452055 | 5.5 | .2165 | 6 | 44 | 82 |
| DH452056 | 5.6 | .2205 | 6 | 44 | 82 |

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| DH452057 | 5.7 | .2244 | 6 | 44 | 82 |
| DH452058 | 5.8 | .2283 | 6 | 44 | 82 |
| DH452059 | 5.9 | .2323 | 6 | 44 | 82 |
| DH452060 | 6.0 | .2362 | 6 | 44 | 82 |
| DH452061 | 6.1 | .2402 | 8 | 53 | 91 |
| DH452062 | 6.2 | .2441 | 8 | 53 | 91 |
| DH452063 | 6.3 | .2480 | 8 | 53 | 91 |
| DH452064 | 6.4 | .2520 | 8 | 53 | 91 |
| DH452065 | 6.5 | .2559 | 8 | 53 | 91 |
| DH452066 | 6.6 | .2598 | 8 | 53 | 91 |
| DH452067 | 6.7 | .2638 | 8 | 53 | 91 |
| DH452068 | 6.8 | .2677 | 8 | 53 | 91 |
| DH452069 | 6.9 | .2717 | 8 | 53 | 91 |
| DH452070 | 7.0 | .2756 | 8 | 53 | 91 |
| DH452071 | 7.1 | .2795 | 8 | 53 | 91 |
| DH452072 | 7.2 | .2835 | 8 | 53 | 91 |
| DH452073 | 7.3 | .2874 | 8 | 53 | 91 |
| DH452074 | 7.4 | .2913 | 8 | 53 | 91 |
| DH452075 | 7.5 | .2953 | 8 | 53 | 91 |
| DH452076 | 7.6 | .2992 | 8 | 53 | 91 |
| DH452077 | 7.7 | .3031 | 8 | 53 | 91 |
| DH452078 | 7.8 | .3071 | 8 | 53 | 91 |
| DH452079 | 7.9 | .3110 | 8 | 53 | 91 |
| DH452080 | 8.0 | .3150 | 8 | 53 | 91 |
| DH452081 | 8.1 | .3189 | 10 | 61 | 103 |
| DH452082 | 8.2 | .3228 | 10 | 61 | 103 |
| DH452083 | 8.3 | .3268 | 10 | 61 | 103 |

▶ Other shank types are available on your request.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | ◎ | ○ | ○ | | |

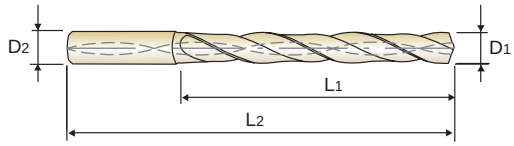
# DREAM DRILLS -INOX

**DH452 SERIES**

## CARBIDE, DREAM DRILLS - INOX with COOLANT HOLES

***LONG***

- ▶ The tool has the special flute shape and geometry for suitable machining of stainless steel.
- ▶ Excellent chip evacuation due to better surface treatment.
- ▶ Point R-thinning makes the superior centering and chip curl.
- ▶ TiAlN coating achieves the better surface finishes and longer tool life.
- ▶ Tolerance : Dia. Tolerance ∅D1:m7, Shank Tolerance ∅D2: h6




DIN 6537 | MG | h6 | m7 | 140° | P.72

▶ **for stainless steel**

5 × D

Unit : mm

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| DH452084 | 8.4 | .3307 | 10 | 61 | 103 |
| DH452085 | 8.5 | .3346 | 10 | 61 | 103 |
| DH452086 | 8.6 | .3386 | 10 | 61 | 103 |
| DH452087 | 8.7 | .3425 | 10 | 61 | 103 |
| DH452088 | 8.8 | .3465 | 10 | 61 | 103 |
| DH452089 | 8.9 | .3504 | 10 | 61 | 103 |
| DH452090 | 9.0 | .3543 | 10 | 61 | 103 |
| DH452091 | 9.1 | .3583 | 10 | 61 | 103 |
| DH452092 | 9.2 | .3622 | 10 | 61 | 103 |
| DH452093 | 9.3 | .3661 | 10 | 61 | 103 |
| DH452094 | 9.4 | .3701 | 10 | 61 | 103 |
| DH452095 | 9.5 | .3740 | 10 | 61 | 103 |
| DH452096 | 9.6 | .3780 | 10 | 61 | 103 |
| DH452097 | 9.7 | .3819 | 10 | 61 | 103 |
| DH452098 | 9.8 | .3858 | 10 | 61 | 103 |
| DH452099 | 9.9 | .3898 | 10 | 61 | 103 |
| DH452100 | 10.0 | .3937 | 10 | 61 | 103 |
| DH452101 | 10.1 | .3976 | 12 | 71 | 118 |
| DH452102 | 10.2 | .4016 | 12 | 71 | 118 |
| DH452103 | 10.3 | .4055 | 12 | 71 | 118 |
| DH452104 | 10.4 | .4094 | 12 | 71 | 118 |
| DH452105 | 10.5 | .4134 | 12 | 71 | 118 |
| DH452106 | 10.6 | .4173 | 12 | 71 | 118 |
| DH452107 | 10.7 | .4212 | 12 | 71 | 118 |
| DH452108 | 10.8 | .4252 | 12 | 71 | 118 |
| DH452109 | 10.9 | .4291 | 12 | 71 | 118 |
| DH452110 | 11.0 | .4330 | 12 | 71 | 118 |

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| DH452111 | 11.1 | .4370 | 12 | 71 | 118 |
| DH452112 | 11.2 | .4409 | 12 | 71 | 118 |
| DH452113 | 11.3 | .4448 | 12 | 71 | 118 |
| DH452114 | 11.4 | .4488 | 12 | 71 | 118 |
| DH452115 | 11.5 | .4527 | 12 | 71 | 118 |
| DH452116 | 11.6 | .4566 | 12 | 71 | 118 |
| DH452117 | 11.7 | .4606 | 12 | 71 | 118 |
| DH452118 | 11.8 | .4645 | 12 | 71 | 118 |
| DH452119 | 11.9 | .4685 | 12 | 71 | 118 |
| DH452120 | 12.0 | .4724 | 12 | 71 | 118 |
| DH452125 | 12.5 | .4921 | 14 | 77 | 124 |
| DH452130 | 13.0 | .5118 | 14 | 77 | 124 |
| DH452135 | 13.5 | .5314 | 14 | 77 | 124 |
| DH452140 | 14.0 | .5512 | 14 | 77 | 124 |
| DH452145 | 14.5 | .5708 | 16 | 83 | 133 |
| DH452150 | 15.0 | .5905 | 16 | 83 | 133 |
| DH452155 | 15.5 | .6102 | 16 | 83 | 133 |
| DH452160 | 16.0 | .6299 | 16 | 83 | 133 |
| DH452165 | 16.5 | .6495 | 18 | 93 | 143 |
| DH452170 | 17.0 | .6692 | 18 | 93 | 143 |
| DH452175 | 17.5 | .6889 | 18 | 93 | 143 |
| DH452180 | 18.0 | .7087 | 18 | 93 | 143 |
| DH452185 | 18.5 | .7283 | 20 | 101 | 153 |
| DH452190 | 19.0 | .7480 | 20 | 101 | 153 |
| DH452195 | 19.5 | .7676 | 20 | 101 | 153 |
| DH452200 | 20.0 | .7874 | 20 | 101 | 153 |

▶ Other shank types are available on your request.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | ◎ | ○ | ○ | | |

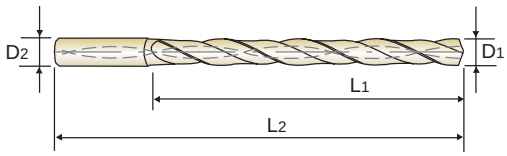
# DREAM DRILLS -INOX

**DH453 SERIES**

## CARBIDE, DREAM DRILLS - INOX with COOLANT HOLES

***EXTRA LONG***

- The tool has the special flute shape and geometry for suitable machining of stainless steel.
- Excellent chip evacuation due to better surface treatment.
- Point R-thinning makes the superior centering and chip curl.
- TiAlN coating achieves the better surface finishes and longer tool life.
- Tolerance : Dia. Tolerance ØD1:m7, Shank Tolerance ØD2: h6




DIN 6537 | MG | h6 | m7 | 140° P.72

**for stainless steel** 8 × D

Unit : mm

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| DH453030 | 3.0 | .1181 | 6 | 34 | 72 |
| DH453031 | 3.1 | .1220 | 6 | 34 | 72 |
| DH453032 | 3.2 | .1260 | 6 | 34 | 72 |
| DH453033 | 3.3 | .1299 | 6 | 34 | 72 |
| DH453034 | 3.4 | .1339 | 6 | 34 | 72 |
| DH453035 | 3.5 | .1378 | 6 | 34 | 72 |
| DH453036 | 3.6 | .1417 | 6 | 34 | 72 |
| DH453037 | 3.7 | .1457 | 6 | 34 | 72 |
| DH453038 | 3.8 | .1496 | 6 | 43 | 81 |
| DH453039 | 3.9 | .1535 | 6 | 43 | 81 |
| DH453040 | 4.0 | .1575 | 6 | 43 | 81 |
| DH453041 | 4.1 | .1614 | 6 | 43 | 81 |
| DH453042 | 4.2 | .1654 | 6 | 43 | 81 |
| DH453043 | 4.3 | .1693 | 6 | 43 | 81 |
| DH453044 | 4.4 | .1732 | 6 | 43 | 81 |
| DH453045 | 4.5 | .1772 | 6 | 43 | 81 |
| DH453046 | 4.6 | .1811 | 6 | 43 | 81 |
| DH453047 | 4.7 | .1850 | 6 | 43 | 81 |
| DH453048 | 4.8 | .1890 | 6 | 57 | 95 |
| DH453049 | 4.9 | .1929 | 6 | 57 | 95 |
| DH453050 | 5.0 | .1969 | 6 | 57 | 95 |
| DH453051 | 5.1 | .2008 | 6 | 57 | 95 |
| DH453052 | 5.2 | .2047 | 6 | 57 | 95 |
| DH453053 | 5.3 | .2087 | 6 | 57 | 95 |
| DH453054 | 5.4 | .2126 | 6 | 57 | 95 |
| DH453055 | 5.5 | .2165 | 6 | 57 | 95 |
| DH453056 | 5.6 | .2205 | 6 | 57 | 95 |

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| DH453057 | 5.7 | .2244 | 6 | 57 | 95 |
| DH453058 | 5.8 | .2283 | 6 | 57 | 95 |
| DH453059 | 5.9 | .2323 | 6 | 57 | 95 |
| DH453060 | 6.0 | .2362 | 6 | 57 | 95 |
| DH453061 | 6.1 | .2402 | 8 | 76 | 114 |
| DH453062 | 6.2 | .2441 | 8 | 76 | 114 |
| DH453063 | 6.3 | .2480 | 8 | 76 | 114 |
| DH453064 | 6.4 | .2520 | 8 | 76 | 114 |
| DH453065 | 6.5 | .2559 | 8 | 76 | 114 |
| DH453066 | 6.6 | .2598 | 8 | 76 | 114 |
| DH453067 | 6.7 | .2638 | 8 | 76 | 114 |
| DH453068 | 6.8 | .2677 | 8 | 76 | 114 |
| DH453069 | 6.9 | .2717 | 8 | 76 | 114 |
| DH453070 | 7.0 | .2756 | 8 | 76 | 114 |
| DH453071 | 7.1 | .2795 | 8 | 76 | 114 |
| DH453072 | 7.2 | .2835 | 8 | 76 | 114 |
| DH453073 | 7.3 | .2874 | 8 | 76 | 114 |
| DH453074 | 7.4 | .2913 | 8 | 76 | 114 |
| DH453075 | 7.5 | .2953 | 8 | 76 | 114 |
| DH453076 | 7.6 | .2992 | 8 | 76 | 114 |
| DH453077 | 7.7 | .3031 | 8 | 76 | 114 |
| DH453078 | 7.8 | .3071 | 8 | 76 | 114 |
| DH453079 | 7.9 | .3110 | 8 | 76 | 114 |
| DH453080 | 8.0 | .3150 | 8 | 76 | 114 |
| DH453081 | 8.1 | .3189 | 10 | 95 | 142 |
| DH453082 | 8.2 | .3228 | 10 | 95 | 142 |
| DH453083 | 8.3 | .3268 | 10 | 95 | 142 |

- Other shank types are available on your request.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | ◎ | ○ | ○ | | |

# DREAM DRILLS -INOX

**DH453 SERIES**

## CARBIDE, DREAM DRILLS - INOX with COOLANT HOLES

***EXTRA LONG***

- The tool has the special flute shape and geometry for suitable machining of stainless steel.
- Excellent chip evacuation due to better surface treatment.
- Point R-thinning makes the superior centering and chip curl.
- TiAlN coating achieves the better surface finishes and longer tool life.
- Tolerance : Dia. Tolerance ∅D1:m7, Shank Tolerance ∅D2: h6

DIN 6537 | MG | h6 | m7 | 140° | P.72

**▶ for stainless steel** 8 × D

Unit : mm

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| TiAlN | $D_1$ | | $D_2$ | $L_1$ | $L_2$ |
| DH453084 | 8.4 | .3307 | 10 | 95 | 142 |
| DH453085 | 8.5 | .3346 | 10 | 95 | 142 |
| DH453086 | 8.6 | .3386 | 10 | 95 | 142 |
| DH453087 | 8.7 | .3425 | 10 | 95 | 142 |
| DH453088 | 8.8 | .3465 | 10 | 95 | 142 |
| DH453089 | 8.9 | .3504 | 10 | 95 | 142 |
| DH453090 | 9.0 | .3543 | 10 | 95 | 142 |
| DH453091 | 9.1 | .3583 | 10 | 95 | 142 |
| DH453092 | 9.2 | .3622 | 10 | 95 | 142 |
| DH453093 | 9.3 | .3661 | 10 | 95 | 142 |
| DH453094 | 9.4 | .3701 | 10 | 95 | 142 |
| DH453095 | 9.5 | .3740 | 10 | 95 | 142 |
| DH453096 | 9.6 | .3780 | 10 | 95 | 142 |
| DH453097 | 9.7 | .3819 | 10 | 95 | 142 |
| DH453098 | 9.8 | .3858 | 10 | 95 | 142 |
| DH453099 | 9.9 | .3898 | 10 | 95 | 142 |
| DH453100 | 10.0 | .3937 | 10 | 95 | 142 |
| DH453101 | 10.1 | .3976 | 12 | 114 | 162 |
| DH453102 | 10.2 | .4016 | 12 | 114 | 162 |
| DH453103 | 10.3 | .4055 | 12 | 114 | 162 |
| DH453104 | 10.4 | .4094 | 12 | 114 | 162 |

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| TiAlN | $D_1$ | | $D_2$ | $L_1$ | $L_2$ |
| DH453105 | 10.5 | .4134 | 12 | 114 | 162 |
| DH453106 | 10.6 | .4173 | 12 | 114 | 162 |
| DH453107 | 10.7 | .4212 | 12 | 114 | 162 |
| DH453108 | 10.8 | .4252 | 12 | 114 | 162 |
| DH453109 | 10.9 | .4291 | 12 | 114 | 162 |
| DH453110 | 11.0 | .4330 | 12 | 114 | 162 |
| DH453111 | 11.1 | .4370 | 12 | 114 | 162 |
| DH453112 | 11.2 | .4409 | 12 | 114 | 162 |
| DH453113 | 11.3 | .4448 | 12 | 114 | 162 |
| DH453114 | 11.4 | .4488 | 12 | 114 | 162 |
| DH453115 | 11.5 | .4527 | 12 | 114 | 162 |
| DH453116 | 11.6 | .4566 | 12 | 114 | 162 |
| DH453117 | 11.7 | .4606 | 12 | 114 | 162 |
| DH453118 | 11.8 | .4645 | 12 | 114 | 162 |
| DH453119 | 11.9 | .4685 | 12 | 114 | 162 |
| DH453120 | 12.0 | .4724 | 12 | 114 | 162 |
| DH453125 | 12.5 | .4921 | 14 | 133 | 178 |
| DH453130 | 13.0 | .5118 | 14 | 133 | 178 |
| DH453135 | 13.5 | .5314 | 14 | 133 | 178 |
| DH453140 | 14.0 | .5512 | 14 | 133 | 178 |

▶ Other shank types are available on your request.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | ◎ | ○ | ○ | | |

# DREAM DRILLS -INOX

**RECOMMENDED CUTTING CONDITIONS**

## CARBIDE, DREAM DRILLS - INOX with COOLANT HOLES, TiAlN COATED

### DH463, DH464, DH451, DH452, DH453 SERIES

| WORK MATERIAL | | | STAINLESS STEELS 400Series | | STAINLESS STEELS 300Series | | ALUMINUM | | ALUMINUM | |
|---|---|---|---|---|---|---|---|---|---|---|
| STRENGTH | | | < 800 N/mm² | | > 800 N/mm² | | < 10% Si | | > 10% Si | |
| DIAMETER | | | N | S | N | S | N | S | N | S |
| Metric(mm) | Fractional | Decimal | | | | | | | | |
| 3.0 | 1/8 | .1181 | 7400 | .002 | 4700 | .001 | 23000 | .005 | 18500 | .004 |
| 4.0 | 5/32 | .1575 | 5600 | .002 | 3600 | .001 | 17500 | .007 | 13900 | .006 |
| 5.0 | 13/64 | .1969 | 4400 | .002 | 2800 | .001 | 14000 | .008 | 11000 | .007 |
| 6.0 | 15/64 | .2362 | 3700 | .002 | 2400 | .002 | 11700 | .010 | 9300 | .010 |
| 8.0 | 5/16 | .3150 | 2800 | .003 | 1800 | .002 | 8800 | .012 | 7000 | .012 |
| 10.0 | 25/64 | .3937 | 2200 | .004 | 1400 | .003 | 7000 | .016 | 5600 | .014 |
| 12.0 | 15/32 | .4724 | 1900 | .005 | 1200 | .004 | 5800 | .020 | 4600 | .016 |
| 14.0 | 35/64 | .5512 | 1600 | .006 | 1000 | .005 | 5000 | .024 | 4000 | .020 |
| 16.0 | 5/8 | .6299 | 1400 | .008 | 900 | .006 | 4380 | .031 | 3500 | .024 |
| 18.0 | 45/64 | .7087 | 1250 | .009 | 800 | .007 | 3900 | .039 | 3100 | .028 |
| 20.0 | 25/32 | .7874 | 1120 | .009 | 720 | .007 | 3500 | .047 | 2800 | .031 |

| WORK MATERIAL | | | TITANIUM Ti ALLOY | | CARBON STEEL ALLOY STEEL | | NON FRERROUS | |
|---|---|---|---|---|---|---|---|---|
| STRENGTH | | | | | | | | |
| DIAMETER | | | N | S | N | S | N | S |
| Metric(mm) | Fractional | Decimal | | | | | | |
| 3.0 | 1/8 | .1181 | 5300 | .001 | 13000 | .002 | 16000 | .003 |
| 4.0 | 5/32 | .1575 | 4000 | .002 | 10000 | .002 | 11900 | .004 |
| 5.0 | 13/64 | .1969 | 3200 | .002 | 8000 | .002 | 9500 | .005 |
| 6.0 | 15/64 | .2362 | 2650 | .002 | 6600 | .002 | 8000 | .006 |
| 8.0 | 5/16 | .3150 | 2000 | .003 | 5000 | .003 | 6000 | .007 |
| 10.0 | 25/64 | .3937 | 1600 | .003 | 4000 | .004 | 4800 | .009 |
| 12.0 | 15/32 | .4724 | 1300 | .004 | 3300 | .005 | 4000 | .010 |
| 14.0 | 35/64 | .5512 | 1100 | .005 | 2800 | .006 | 3400 | .012 |
| 16.0 | 5/8 | .6299 | 1000 | .006 | 2500 | .008 | 3000 | .016 |
| 18.0 | 45/64 | .7087 | 900 | .006 | 2200 | .009 | 2650 | .018 |
| 20.0 | 25/32 | .7874 | 800 | .007 | 2000 | .009 | 2400 | .020 |

▶ Recommend to reduce the feed rate as following

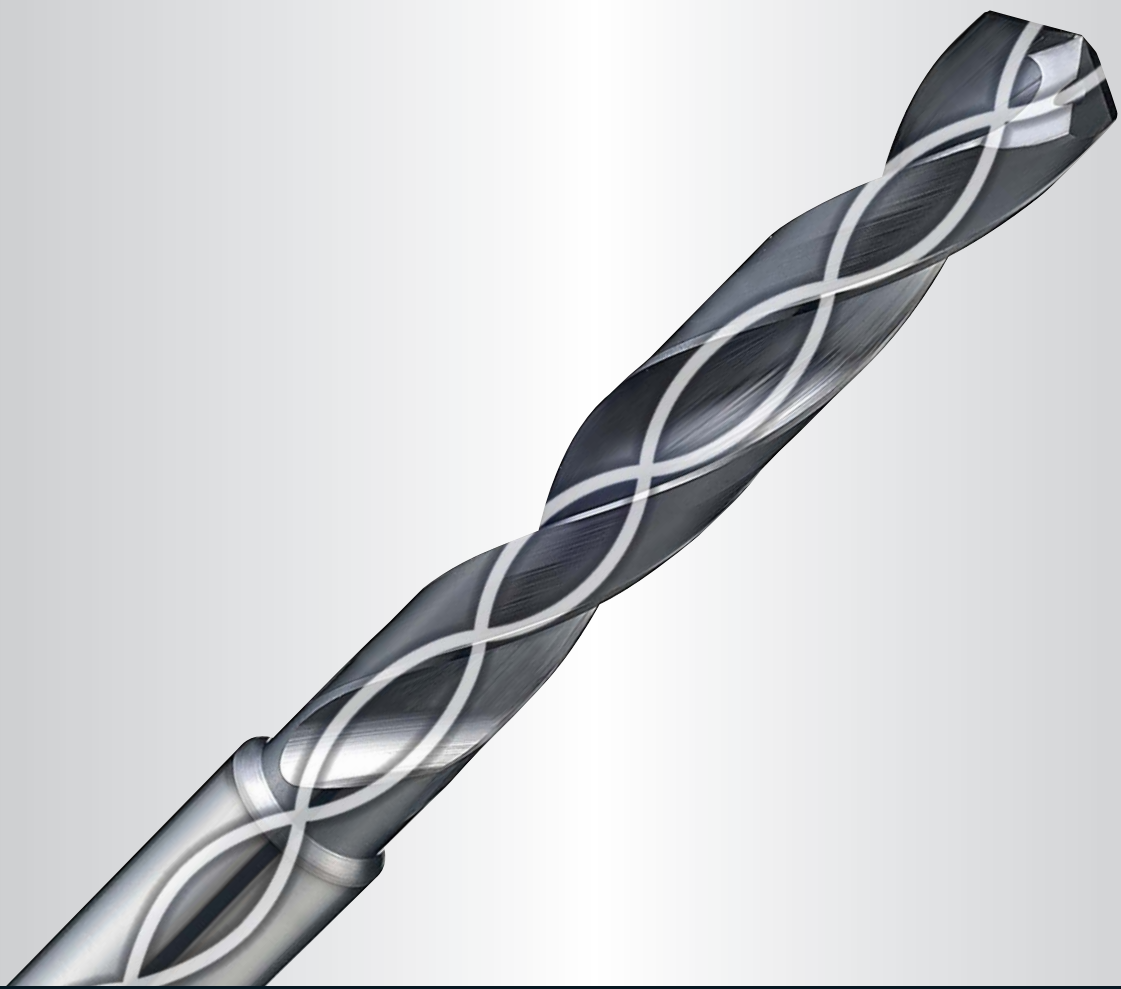
**Feed 100%** : DH463(3×D), DH464(5×D)
DH451(3×D), DH452(5×D)

**Feed 85%** : DH453(8×D)

N = R.P.M
S = Inch per Revolution(inch/rev.)

# CARBIDE

Being the best through innovation



# DREAM DRILLS -ALU

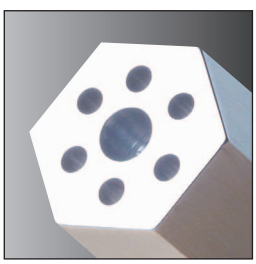
- WITH COOLANT HOLES
  for Aluminum & Aluminum Alloys

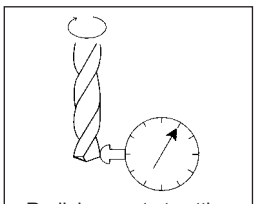
## SOLID CARBIDE DREAM DRILLS - ALU (with Coolant Holes)


| ITEM | MODEL | DESCRIPTION | | SIZE MIN | SIZE MAX | PAGE |
|---|---|---|---|---|---|---|
| **INCH** | | | | | | |
| 5XD | DGE466 | CARBIDE, DREAM DRILLS - ALU with COOLANT HOLES | *LONG* | D13/64 | D1/2 | **76** |
| **METRIC** | | | | | | |
| 5XD | DGE433 | CARBIDE, DREAM DRILLS - ALU with COOLANT HOLES | *LONG* | D3.0 | D20.0 | **77** |
| | | RECOMMENDED CUTTING CONDITIONS | | | | **79** |

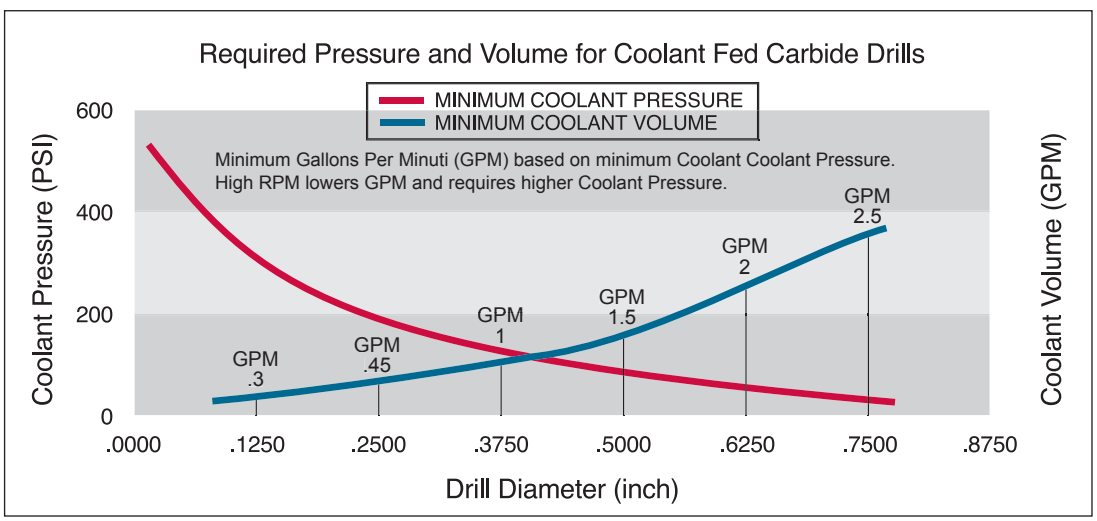
◎ : Excellent
○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| | | | | | | ◎ | | | | | |
| | | | | | | ◎ | | | | | |





• Radial run out at cutting lip must not exceed .001



# DREAM DRILLS -ALU

**DGE466 SERIES**

## CARBIDE, DREAM DRILLS - ALU with COOLANT HOLES — *LONG*

▶Wider and deeper flute gullets for maximum chip removal
▶Special geometry and smooth coating reduces built up edge and improves finishes

MG | h6 | 118° | P.79

5 × D

Unit : Inch

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Fractional | Decimal | | | |
| DLC | D1 | | D2 | L1 | L2 |
| DGE466013 | 13/64 | .2031 | 15/64 | 1-3/4 | 3-15/16 |
| DGE466014 | 7/32 | .2188 | 15/64 | 1-57/64 | 3-15/16 |
| DGE466015 | 15/64 | .2344 | 15/64 | 1-57/64 | 3-15/16 |
| DGE466016 | 1/4 | .2500 | 17/64 | 2-3/64 | 4-19/64 |
| DGE466206 | F | .2570 | 17/64 | 2-13/64 | 4-19/64 |
| DGE466017 | 17/64 | .2656 | 17/64 | 2-13/64 | 4-19/64 |
| DGE466209 | I | .2720 | 0.272 | 2-13/64 | 4-19/64 |
| DGE466018 | 9/32 | .2812 | 5/16 | 2-23/64 | 4-41/64 |
| DGE466019 | 19/64 | .2969 | 5/16 | 2-33/64 | 4-41/64 |
| DGE466020 | 5/16 | .3125 | 5/16 | 2-33/64 | 4-41/64 |
| DGE466021 | 21/64 | .3281 | 11/32 | 2-43/64 | 5 |
| DGE466217 | Q | .3320 | 11/32 | 2-43/64 | 5 |
| DGE466022 | 11/32 | .3438 | 11/32 | 2-27/32 | 5 |
| DGE466023 | 23/64 | .3594 | 25/64 | 3 | 5-23/64 |
| DGE466221 | U | .3680 | 25/64 | 3 | 5-23/64 |
| DGE466024 | 3/8 | .3750 | 25/64 | 3-5/32 | 5-23/64 |
| DGE466025 | 25/64 | .3906 | 25/64 | 3-5/32 | 5-23/64 |
| DGE466026 | 13/32 | .4062 | 27/64 | 3-5/16 | 5-7/8 |
| DGE466027 | 27/64 | .4219 | 27/64 | 3-15/32 | 5-7/8 |
| DGE466028 | 7/16 | .4375 | 15/32 | 3-5/8 | 6-7/32 |
| DGE466029 | 29/64 | .4531 | 15/32 | 3-25/32 | 6-7/32 |
| DGE466030 | 15/32 | .4688 | 15/32 | 3-25/32 | 6-7/32 |
| DGE466031 | 31/64 | .4844 | 1/2 | 3-15/16 | 6-37/64 |
| DGE466032 | 1/2 | .5000 | 1/2 | 4-3/32 | 6-37/64 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| | | | | | | ◎ | | | | | |

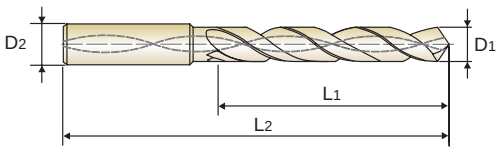
# DREAM DRILLS -ALU

**DGE433 SERIES**

## CARBIDE, DREAM DRILLS - ALU with COOLANT HOLES

***LONG***

- ▶Wider and deeper flute gullets for maximum chip removal
- ▶Special geometry and smooth coating reduces built up edge and improves finishes




DIN 6537 | MG | h6 | m7 | 118° | P.79

5 × D

Unit : mm

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| DLC | D1 | | D2 | L1 | L2 |
| DGE433030 | 3.0 | .1181 | 6 | 28 | 66 |
| DGE433031 | 3.1 | .1220 | 6 | 28 | 66 |
| DGE433032 | 3.2 | .1260 | 6 | 28 | 66 |
| DGE433033 | 3.3 | .1299 | 6 | 28 | 66 |
| DGE433034 | 3.4 | .1339 | 6 | 28 | 66 |
| DGE433035 | 3.5 | .1378 | 6 | 28 | 66 |
| DGE433036 | 3.6 | .1417 | 6 | 28 | 66 |
| DGE433037 | 3.7 | .1457 | 6 | 28 | 66 |
| DGE433038 | 3.8 | .1496 | 6 | 36 | 74 |
| DGE433039 | 3.9 | .1535 | 6 | 36 | 74 |
| DGE433040 | 4.0 | .1575 | 6 | 36 | 74 |
| DGE433041 | 4.1 | .1614 | 6 | 36 | 74 |
| DGE433042 | 4.2 | .1654 | 6 | 36 | 74 |
| DGE433043 | 4.3 | .1693 | 6 | 36 | 74 |
| DGE433044 | 4.4 | .1732 | 6 | 36 | 74 |
| DGE433045 | 4.5 | .1772 | 6 | 36 | 74 |
| DGE433046 | 4.6 | .1811 | 6 | 36 | 74 |
| DGE433047 | 4.7 | .1850 | 6 | 36 | 74 |
| DGE433048 | 4.8 | .1890 | 6 | 44 | 82 |
| DGE433049 | 4.9 | .1929 | 6 | 44 | 82 |
| DGE433050 | 5.0 | .1969 | 6 | 44 | 82 |
| DGE433051 | 5.1 | .2008 | 6 | 44 | 82 |
| DGE433052 | 5.2 | .2047 | 6 | 44 | 82 |
| DGE433053 | 5.3 | .2087 | 6 | 44 | 82 |
| DGE433054 | 5.4 | .2126 | 6 | 44 | 82 |
| DGE433055 | 5.5 | .2165 | 6 | 44 | 82 |
| DGE433056 | 5.6 | .2205 | 6 | 44 | 82 |

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| DLC | D1 | | D2 | L1 | L2 |
| DGE433057 | 5.7 | .2244 | 6 | 44 | 82 |
| DGE433058 | 5.8 | .2283 | 6 | 44 | 82 |
| DGE433059 | 5.9 | .2323 | 6 | 44 | 82 |
| DGE433060 | 6.0 | .2362 | 6 | 44 | 82 |
| DGE433061 | 6.1 | .2402 | 8 | 53 | 91 |
| DGE433062 | 6.2 | .2441 | 8 | 53 | 91 |
| DGE433063 | 6.3 | .2480 | 8 | 53 | 91 |
| DGE433064 | 6.4 | .2520 | 8 | 53 | 91 |
| DGE433065 | 6.5 | .2559 | 8 | 53 | 91 |
| DGE433066 | 6.6 | .2598 | 8 | 53 | 91 |
| DGE433067 | 6.7 | .2638 | 8 | 53 | 91 |
| DGE433068 | 6.8 | .2677 | 8 | 53 | 91 |
| DGE433069 | 6.9 | .2717 | 8 | 53 | 91 |
| DGE433070 | 7.0 | .2756 | 8 | 53 | 91 |
| DGE433071 | 7.1 | .2795 | 8 | 53 | 91 |
| DGE433072 | 7.2 | .2835 | 8 | 53 | 91 |
| DGE433073 | 7.3 | .2874 | 8 | 53 | 91 |
| DGE433074 | 7.4 | .2913 | 8 | 53 | 91 |
| DGE433075 | 7.5 | .2953 | 8 | 53 | 91 |
| DGE433076 | 7.6 | .2992 | 8 | 53 | 91 |
| DGE433077 | 7.7 | .3031 | 8 | 53 | 91 |
| DGE433078 | 7.8 | .3071 | 8 | 53 | 91 |
| DGE433079 | 7.9 | .3110 | 8 | 53 | 91 |
| DGE433080 | 8.0 | .3150 | 8 | 53 | 91 |
| DGE433081 | 8.1 | .3189 | 10 | 61 | 103 |
| DGE433082 | 8.2 | .3228 | 10 | 61 | 103 |
| DGE433083 | 8.3 | .3268 | 10 | 61 | 103 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| | | | | | | ◎ | | | | | |

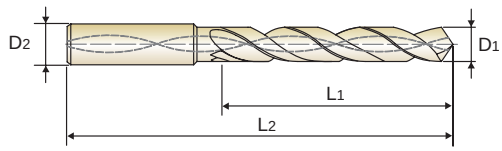
# DREAM DRILLS -ALU

**DGE433 SERIES**

## CARBIDE, DREAM DRILLS - ALU with COOLANT HOLES

***LONG***

▶Wider and deeper flute gullets for maximum chip removal
▶Special geometry and smooth coating reduces built up edge and improves finishes




DIN 6537 | MG | h6 | m7 | 118° P.79

5 × D

Unit : mm

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| DLC | D1 | | D2 | L1 | L2 |
| DGE433084 | 8.4 | .3307 | 10 | 61 | 103 |
| DGE433085 | 8.5 | .3346 | 10 | 61 | 103 |
| DGE433086 | 8.6 | .3386 | 10 | 61 | 103 |
| DGE433087 | 8.7 | .3425 | 10 | 61 | 103 |
| DGE433088 | 8.8 | .3465 | 10 | 61 | 103 |
| DGE433089 | 8.9 | .3504 | 10 | 61 | 103 |
| DGE433090 | 9.0 | .3543 | 10 | 61 | 103 |
| DGE433091 | 9.1 | .3583 | 10 | 61 | 103 |
| DGE433092 | 9.2 | .3622 | 10 | 61 | 103 |
| DGE433093 | 9.3 | .3661 | 10 | 61 | 103 |
| DGE433094 | 9.4 | .3701 | 10 | 61 | 103 |
| DGE433095 | 9.5 | .3740 | 10 | 61 | 103 |
| DGE433096 | 9.6 | .3780 | 10 | 61 | 103 |
| DGE433097 | 9.7 | .3819 | 10 | 61 | 103 |
| DGE433098 | 9.8 | .3858 | 10 | 61 | 103 |
| DGE433099 | 9.9 | .3898 | 10 | 61 | 103 |
| DGE433100 | 10.0 | .3937 | 10 | 61 | 103 |
| DGE433101 | 10.1 | .3976 | 12 | 71 | 118 |
| DGE433102 | 10.2 | .4016 | 12 | 71 | 118 |
| DGE433103 | 10.3 | .4055 | 12 | 71 | 118 |
| DGE433104 | 10.4 | .4094 | 12 | 71 | 118 |
| DGE433105 | 10.5 | .4134 | 12 | 71 | 118 |
| DGE433106 | 10.6 | .4173 | 12 | 71 | 118 |
| DGE433107 | 10.7 | .4212 | 12 | 71 | 118 |
| DGE433108 | 10.8 | .4252 | 12 | 71 | 118 |
| DGE433109 | 10.9 | .4291 | 12 | 71 | 118 |
| DGE433110 | 11.0 | .4330 | 12 | 71 | 118 |

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| DLC | D1 | | D2 | L1 | L2 |
| DGE433111 | 11.1 | .4370 | 12 | 71 | 118 |
| DGE433112 | 11.2 | .4409 | 12 | 71 | 118 |
| DGE433113 | 11.3 | .4448 | 12 | 71 | 118 |
| DGE433114 | 11.4 | .4488 | 12 | 71 | 118 |
| DGE433115 | 11.5 | .4527 | 12 | 71 | 118 |
| DGE433116 | 11.6 | .4566 | 12 | 71 | 118 |
| DGE433117 | 11.7 | .4606 | 12 | 71 | 118 |
| DGE433118 | 11.8 | .4645 | 12 | 71 | 118 |
| DGE433119 | 11.9 | .4685 | 12 | 71 | 118 |
| DGE433120 | 12.0 | .4724 | 12 | 71 | 118 |
| DGE433125 | 12.5 | .4921 | 14 | 77 | 124 |
| DGE433130 | 13.0 | .5118 | 14 | 77 | 124 |
| DGE433135 | 13.5 | .5314 | 14 | 77 | 124 |
| DGE433140 | 14.0 | .5512 | 14 | 77 | 124 |
| DGE433145 | 14.5 | .5708 | 16 | 83 | 133 |
| DGE433150 | 15.0 | .5905 | 16 | 83 | 133 |
| DGE433155 | 15.5 | .6102 | 16 | 83 | 133 |
| DGE433160 | 16.0 | .6299 | 16 | 83 | 133 |
| DGE433165 | 16.5 | .6495 | 18 | 93 | 143 |
| DGE433170 | 17.0 | .6692 | 18 | 93 | 143 |
| DGE433175 | 17.5 | .6889 | 18 | 93 | 143 |
| DGE433180 | 18.0 | .7087 | 18 | 93 | 143 |
| DGE433185 | 18.5 | .7283 | 20 | 101 | 153 |
| DGE433190 | 19.0 | .7480 | 20 | 101 | 153 |
| DGE433195 | 19.5 | .7676 | 20 | 101 | 153 |
| DGE433200 | 20.0 | .7874 | 20 | 101 | 153 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| | | | | | | ◎ | | | | | |

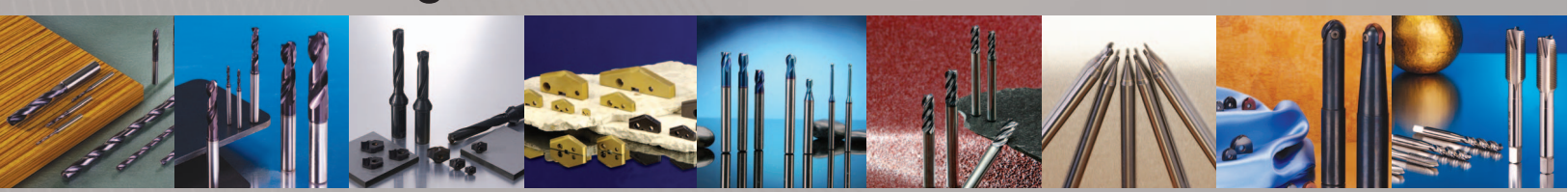
## CARBIDE, DREAM DRILLS - ALU with COOLANT HOLES, DLC COATED

### DGE466, DGE433 SERIES

| WORK MATERIAL | | ALUMINUM ALLOY CASTING ALUMINUM DIE CASTING | | WROUGHT ALUMINUM ALLOY | |
|---|---|---|---|---|---|
| DIAMETER | | N | S | N | S |
| METRIC | INCH | | | | |
| 3.0 ~ 6.0 | .1181 ~ .2362 | 8000 ~ 15000 | .008 ~ .020 | 8000 ~ 15000 | .006 ~ .012 |
| 10.0 | ~ .3937 | 6000 ~ 10500 | .012 ~ .039 | 6000 ~ 10500 | .008 ~ .016 |
| 14.0 | ~ .5512 | 4500 ~ 5800 | .012 ~ .039 | 4500 ~ 5800 | .008 ~ .016 |
| 20.0 | ~ .7874 | 3200 ~ 4600 | .012 ~ .039 | 3200 ~ 4600 | .008 ~ .016 |

N = R.P.M
S = Inch per Revolution(inch/rev.)

Global Cutting Tool Leader **YG-1**



# CARBIDE

Being the best through innovation

# DREAM DRILLS -MQL TYPE

- **WITH COOLANT HOLES**
  **Minimum Quantity Lubrication. Drilling Deep Holes, 10D, 15D & 20D**

## SOLID CARBIDE DREAM DRILLS - MQL TYPE (with Coolant Holes)

Minimum Quantity Lubrication. Drilling Deep Holes, 10D, 15D & 20D


| ITEM | MODEL | DESCRIPTION | | SIZE MIN | SIZE MAX | PAGE |
|---|---|---|---|---|---|---|
| **METRIC** | | | | | | |
| 10XD |  | CARBIDE, DREAM DRILLS MQL TYPE with COOLANT HOLES | *EXTRA LONG* | D3.0 | D14.0 | **84** |
| **DH510** | | | | | | |
| 15XD |  | CARBIDE, DREAM DRILLS MQL TYPE with COOLANT HOLES | *EXTRA LONG* | D3.0 | D12.0 | **85** |
| **DH515** | | | | | | |
| 20XD |  | CARBIDE, DREAM DRILLS MQL TYPE with COOLANT HOLES | *EXTRA LONG* | D3.0 | D12.0 | **85** |
| **DH520** | | | | | | |
| | | RECOMMENDED CUTTING CONDITIONS | | | | **86** |

◎ : Excellent
○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | ○ | | | ○ | | | | ○ | | |
| ◎ | ◎ | ○ | | | ○ | | | | ○ | | |
| ◎ | ◎ | ○ | | | ○ | | | | ○ | | |

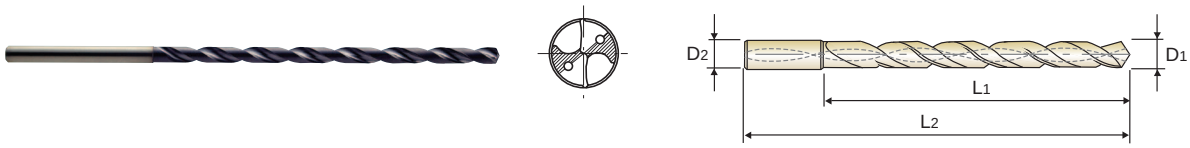
# DREAM DRILLS -MQL TYPE

**DH510 SERIES**

## CARBIDE, DREAM DRILLS MQL TYPE with COOLANT HOLES

***EXTRA LONG***

- Non step drilling up to 10 times of drill diameter
- Available for processing MQL(Minimum Quantity Lubrication)
- Excellent positioning – Bush is not necessary
- Special design – Good chip removal
- Powerful drilling




MG | 30° | h6 | h7 | 140° P.86

10 × D

Unit : mm

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| TiAlN | $D_1$ | | $D_2$ | $L_1$ | $L_2$ |
| DH510030 | 3.0 | .1181 | 3 | 39 | 90 |
| DH510033 | 3.3 | .1299 | 4 | 46 | 97 |
| DH510035 | 3.5 | .1378 | 4 | 46 | 97 |
| DH510040 | 4.0 | .1575 | 4 | 52 | 103 |
| DH510042 | 4.2 | .1654 | 5 | 59 | 112 |
| DH510045 | 4.5 | .1772 | 5 | 59 | 112 |
| DH510050 | 5.0 | .1969 | 5 | 65 | 118 |
| DH510055 | 5.5 | .2165 | 6 | 72 | 127 |
| DH510060 | 6.0 | .2362 | 6 | 78 | 133 |
| DH510065 | 6.5 | .2559 | 7 | 85 | 141 |
| DH510068 | 6.8 | .2677 | 7 | 91 | 147 |
| DH510070 | 7.0 | .2756 | 7 | 91 | 147 |
| DH510075 | 7.5 | .2953 | 8 | 98 | 155 |

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| TiAlN | $D_1$ | | $D_2$ | $L_1$ | $L_2$ |
| DH510080 | 8.0 | .3150 | 8 | 104 | 161 |
| DH510085 | 8.5 | .3346 | 9 | 111 | 169 |
| DH510090 | 9.0 | .3543 | 9 | 117 | 175 |
| DH510095 | 9.5 | .3740 | 10 | 124 | 182 |
| DH510100 | 10.0 | .3937 | 10 | 130 | 188 |
| DH510105 | 10.5 | .4134 | 11 | 137 | 201 |
| DH510110 | 11.0 | .4330 | 11 | 143 | 207 |
| DH510115 | 11.5 | .4527 | 12 | 150 | 215 |
| DH510120 | 12.0 | .4724 | 12 | 156 | 221 |
| DH510125 | 12.5 | .4921 | 13 | 163 | 229 |
| DH510130 | 13.0 | .5118 | 13 | 169 | 235 |
| DH510135 | 13.5 | .5314 | 14 | 176 | 243 |
| DH510140 | 14.0 | .5512 | 14 | 182 | 249 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | ○ | | | ○ | | | | ○ | | |

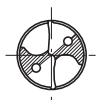
# DREAM DRILLS -MQL TYPE

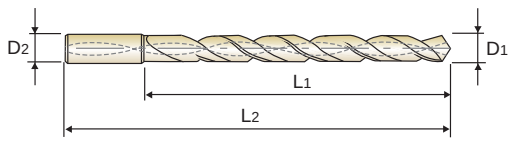
DH515 SERIES
DH520 SERIES

## CARBIDE, DREAM DRILLS MQL TYPE with COOLANT HOLES

***EXTRA LONG***

- ▶Non step drilling up to 15 times (20 times) of drill diameter
- ▶Available for processing MQL(Minimum Quantity Lubrication)
- ▶Excellent positioning – Bush is not necessary
- ▶Special design – Good chip removal
- ▶Powerful drilling






MG | 30° | h6 | h7 | 140° P.86

15 × D (DH515) | 20 × D (DH520)

Unit : mm

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| TiAlN | $D_1$ | | $D_2$ | $L_1$ | $L_2$ |
| DH515030 | 3.0 | .1181 | 3 | 54 | 105 |
| DH515035 | 3.5 | .1378 | 4 | 63 | 114 |
| DH515040 | 4.0 | .1575 | 4 | 72 | 123 |
| DH515045 | 4.5 | .1772 | 5 | 81 | 134 |
| DH515050 | 5.0 | .1969 | 5 | 90 | 143 |
| DH515055 | 5.5 | .2165 | 6 | 99 | 154 |
| DH515060 | 6.0 | .2362 | 6 | 108 | 163 |
| DH515070 | 7.0 | .2756 | 7 | 126 | 182 |
| DH515080 | 8.0 | .3150 | 8 | 144 | 201 |
| DH515090 | 9.0 | .3543 | 9 | 162 | 220 |
| DH515100 | 10.0 | .3937 | 10 | 180 | 238 |
| DH515110 | 11.0 | .4330 | 11 | 198 | 262 |
| DH515120 | 12.0 | .4724 | 12 | 216 | 281 |

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| TiAlN | $D_1$ | | $D_2$ | $L_1$ | $L_2$ |
| DH520030 | 3.0 | .1181 | 3 | 69 | 120 |
| DH520035 | 3.5 | .1378 | 4 | 81 | 132 |
| DH520040 | 4.0 | .1575 | 4 | 92 | 143 |
| DH520045 | 4.5 | .1772 | 5 | 104 | 157 |
| DH520050 | 5.0 | .1969 | 5 | 115 | 168 |
| DH520055 | 5.5 | .2165 | 6 | 127 | 182 |
| DH520060 | 6.0 | .2362 | 6 | 138 | 193 |
| DH520070 | 7.0 | .2756 | 7 | 161 | 217 |
| DH520080 | 8.0 | .3150 | 8 | 184 | 241 |
| DH520090 | 9.0 | .3543 | 9 | 207 | 265 |
| DH520100 | 10.0 | .3937 | 10 | 230 | 288 |
| DH520120 | 12.0 | .4724 | 12 | 276 | 341 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | ○ | | | ○ | | | | ○ | | |

# DREAM DRILLS -MQL TYPE

**RECOMMENDED CUTTING CONDITIONS**

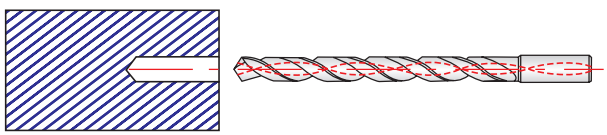
## CARBIDE, DREAM DRILLS MQL TYPE with COOLANT HOLES, TiAlN COATED

### DH510, DH515, DH520 SERIES

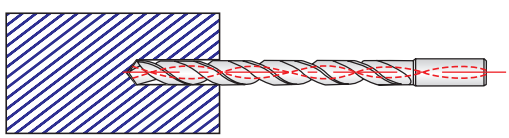
| WORK MATERIAL | | CARBON STEELS ALLOY STEELS ~ 1060 N/mm² | | CAST IRON 250 ~ 350 N/mm² | | DUCTILE CAST IRON 400 ~ 500 N/mm² | | DUCTILE CAST IRON | |
|---|---|---|---|---|---|---|---|---|---|
| STRENGTH | | < HRc 25 | | < HRc 10 | | > HRc 10 | | | |
| DIAMETER | | N | S | N | S | N | S | N | S |
| METRIC | INCH | | | | | | | | |
| 3.0 | .1181 | 7500 | .0023~.0047 | 7500 | .0023~.0047 | 7500 | .0023~.0047 | 5300 | .0023~.0047 |
| 4.0 | .1575 | 6400 | .0031~.0063 | 6400 | .0031~.0063 | 5600 | .0031~.0063 | 5000 | .0031~.0063 |
| 5.0 | .1969 | 5800 | .0039~.0078 | 5800 | .0039~.0078 | 4500 | .0039~.0078 | 4500 | .0039~.0078 |
| 6.0 | .2362 | 4800 | .0047~.0094 | 4800 | .0047~.0094 | 3800 | .0047~.0094 | 3800 | .0047~.0094 |
| 8.0 | .3150 | 3600 | .0063~.0110 | 3600 | .0063~.0110 | 2800 | .0063~.0110 | 2800 | .0063~.0110 |
| 10.0 | .3937 | 2900 | .0078~.0137 | 2900 | .0078~.0137 | 2300 | .0078~.0137 | 2300 | .0078~.0137 |
| 12.0 | .4724 | 2400 | .0094~.0165 | 2400 | .0094~.0165 | 1900 | .0094~.0165 | 1900 | .0094~.0165 |

▶ **Coolant Pressure : 900 PSI**

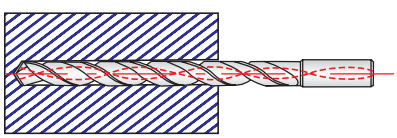
N = R.P.M
S = Inch per Revolution(inch/rev)



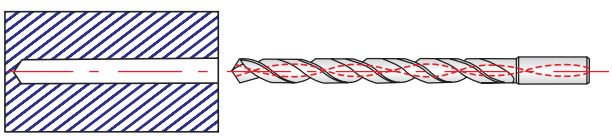
1. Use a YG 3xD Drill to produce a guide hole no larger than .004 over the required drill size. Drill the pilot hole 2xD deep hole.



2. Enter the guide hole at 50 SFM surface and .010 feed rate / per rev.



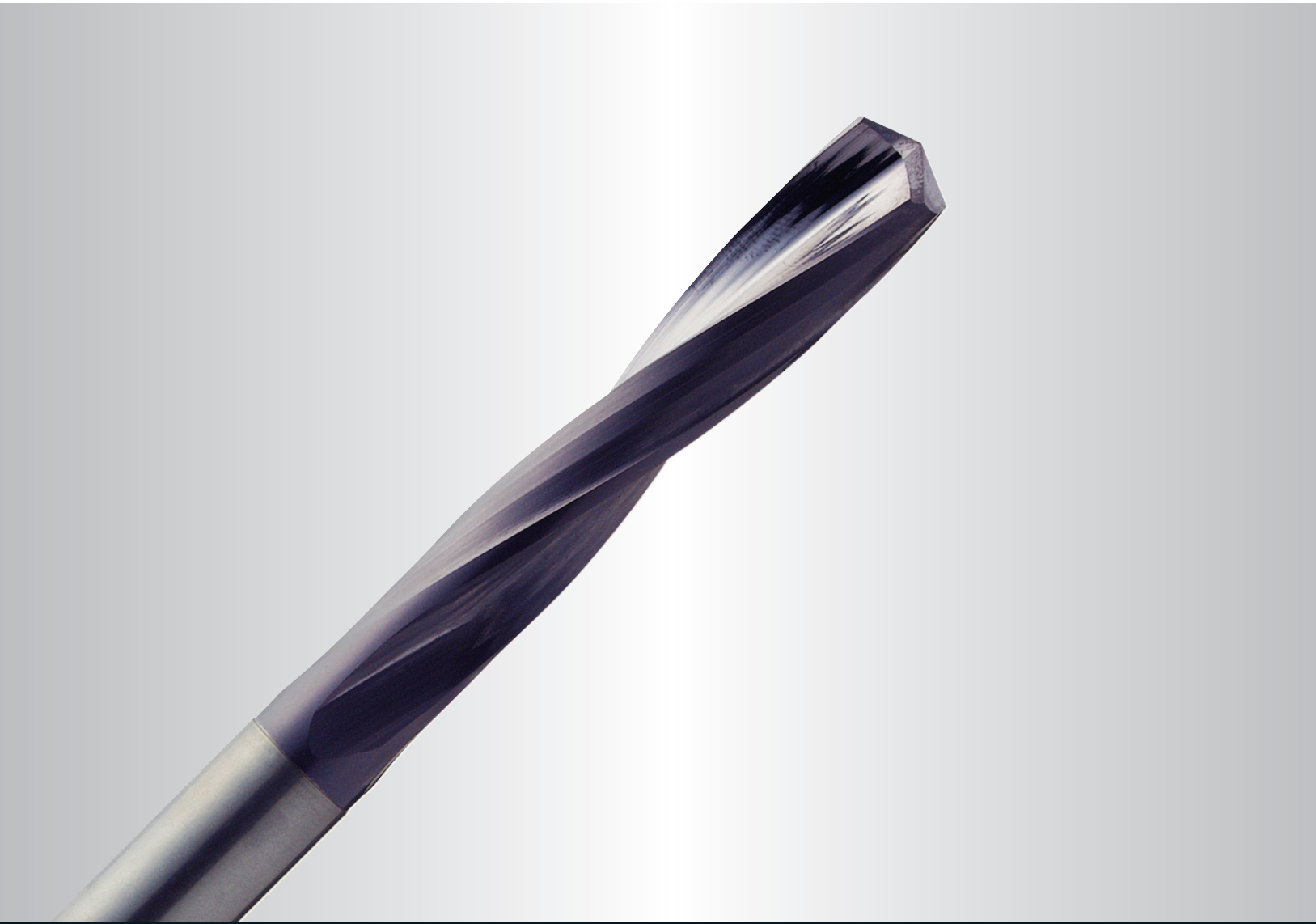
3. Before hitting the bottom of the guide hole, Increase SFM and feed rate for normal drilling.



4. After drilling, to withdraw drill, reduce SFM to 50 @ 10 inches per minute.

# CARBIDE

Being the best through innovation



# DREAM DRILLS
## - For HIGH HARDENED STEELS

- HIGH HARDENED STEELS, HRc50~HRc70

## SOLID CARBIDE DREAM DRILLS for HIGH HARDENED STEELS

High Hardened Steels, HRc50~HRc70


| ITEM | MODEL | DESCRIPTION | SIZE MIN | SIZE MAX | PAGE |
|---|---|---|---|---|---|
| **INCH** | | | | | |
| | **DH501** | CARBIDE, DREAM DRILLS for HIGH HARDENED STEEL | D1/8 | D3/4 | **90** |
| **METRIC** | | | | | |
| | **DH500** | CARBIDE, DREAM DRILLS for HIGH HARDENED STEEL | D2.6 | D14.0 | **92** |
| | | RECOMMENDED CUTTING CONDITIONS | | | **93** |

◎ : Excellent
○ : Good

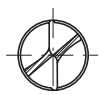
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| | | | ◎ | ◎ | | | | | | | |
| | | | ◎ | ◎ | | | | | | | |

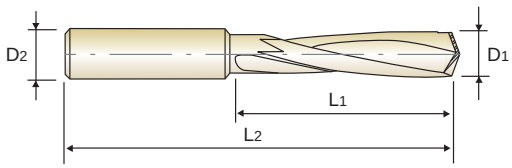
# DREAM DRILLS for HIGH HARDENED STEELS

**DH501 SERIES**

## CARBIDE, DREAM DRILLS for HIGH HARDENED STEEL (HRc50~70)

- **Application** : Drilling for High Hardened Steels[Quenched Steels, Tempered Steels (Under HRc 70)]
- **Advantage** : Special Design
  Minimum of cutting load through special thinning
  Good chip removal
  Powerful Drilling
- **Tolerance** : Dia. Tolerance ØD1: See page 247, Shank Tolerance ØD2: -.0001 -.0005






MG | 15° | h6 | 140° P.93

Unit : Inch

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Fractional | Decimal | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| DH501001 | 1/8 | .1250 | 1/8 | 21/32 | 2 |
| DH501002 | #30 | .1285 | 3/16 | 23/32 | 2 |
| DH501003 | #29 | .1360 | 3/16 | 13/16 | 2 |
| DH501004 | #28 | .1405 | 3/16 | 13/16 | 2 |
| DH501005 | 9/64 | .1406 | 3/16 | 13/16 | 2 |
| DH501006 | #27 | .1440 | 3/16 | 13/16 | 2 |
| DH501007 | #26 | .1470 | 3/16 | 13/16 | 2 |
| DH501008 | #25 | .1495 | 3/16 | 7/8 | 2-1/16 |
| DH501009 | #24 | .1520 | 3/16 | 7/8 | 2-1/16 |
| DH501010 | #23 | .1540 | 3/16 | 7/8 | 2-1/16 |
| DH501011 | 5/32 | .1562 | 3/16 | 7/8 | 2-1/16 |
| DH501012 | #22 | .1570 | 3/16 | 7/8 | 2-1/16 |
| DH501013 | #21 | .1590 | 3/16 | 7/8 | 2-1/16 |
| DH501014 | #20 | .1610 | 3/16 | 1 | 2-1/2 |
| DH501015 | #19 | .1660 | 3/16 | 1 | 2-1/2 |
| DH501016 | 11/64 | .1719 | 3/16 | 1-1/8 | 2-3/4 |
| DH501017 | #15 | .1800 | 3/16 | 1-1/8 | 2-3/4 |
| DH501018 | #14 | .1820 | 3/16 | 1-1/8 | 2-3/4 |
| DH501019 | 3/16 | .1875 | 3/16 | 1-1/8 | 2-3/4 |
| DH501020 | #10 | .1935 | 1/4 | 1-9/32 | 2-7/8 |
| DH501021 | #9 | .1960 | 1/4 | 1-9/32 | 2-7/8 |
| DH501022 | #8 | .1990 | 1/4 | 1-9/32 | 2-7/8 |
| DH501023 | #7 | .2010 | 1/4 | 1-9/32 | 2-7/8 |
| DH501024 | 13/64 | .2031 | 1/4 | 1-9/32 | 2-7/8 |
| DH501025 | #6 | .2040 | 1/4 | 1-9/32 | 2-7/8 |

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Fractional | Decimal | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| DH501026 | #5 | .2055 | 1/4 | 1-9/32 | 2-7/8 |
| DH501027 | #4 | .2090 | 1/4 | 1-9/32 | 2-7/8 |
| DH501028 | #3 | .2130 | 1/4 | 1-13/32 | 3 |
| DH501029 | 7/32 | .2188 | 1/4 | 1-13/32 | 3 |
| DH501030 | #2 | .2210 | 1/4 | 1-13/32 | 3 |
| DH501031 | #1 | .2280 | 1/4 | 1-13/32 | 3 |
| DH501032 | 15/64 | .2344 | 1/4 | 1-13/32 | 3 |
| DH501033 | B | .2380 | 1/4 | 1-19/32 | 3-1/8 |
| DH501034 | C | .2420 | 1/4 | 1-19/32 | 3-1/8 |
| DH501035 | D | .2460 | 1/4 | 1-19/32 | 3-1/8 |
| DH501036 | 1/4 | .2500 | 1/4 | 1-19/32 | 3-1/8 |
| DH501037 | F | .2570 | 3/8 | 1-19/32 | 3-1/8 |
| DH501038 | G | .2610 | 3/8 | 1-19/32 | 3-1/8 |
| DH501039 | 17/64 | .2656 | 3/8 | 1-19/32 | 3-1/8 |
| DH501040 | I | .2720 | 3/8 | 1-25/32 | 3-3/8 |
| DH501041 | J | .2770 | 3/8 | 1-25/32 | 3-3/8 |
| DH501042 | 9/32 | .2812 | 3/8 | 1-25/32 | 3-3/8 |
| DH501043 | L | .2900 | 3/8 | 1-25/32 | 3-3/8 |
| DH501044 | M | .2950 | 3/8 | 1-25/32 | 3-3/8 |
| DH501045 | 19/64 | .2969 | 3/8 | 1-25/32 | 3-3/8 |
| DH501046 | N | .3020 | 3/8 | 1-31/32 | 3-7/8 |
| DH501047 | 5/16 | .3125 | 3/8 | 1-31/32 | 3-7/8 |
| DH501048 | O | .3160 | 3/8 | 1-31/32 | 3-7/8 |
| DH501049 | 21/64 | .3281 | 3/8 | 1-31/32 | 3-7/8 |
| DH501050 | Q | .3320 | 3/8 | 1-31/32 | 3-7/8 |

◎ : Excellent ○ : Good

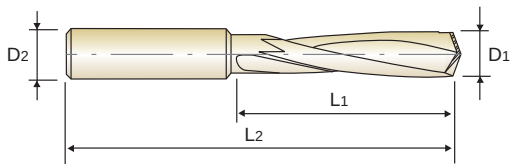
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| | | | ◎ | ◎ | | | | | | | |

# DREAM DRILLS for HIGH HARDENED STEELS

DH501 SERIES

## CARBIDE, DREAM DRILLS for HIGH HARDENED STEEL (HRc50~70)

- **Application** : Drilling for High Hardened Steels[Quenched Steels, Tempered Steels (Under HRc 70)]
- **Advantage** : Special Design
  Minimum of cutting load through special thinning
  Good chip removal
  Powerful Drilling
- **Tolerance** : Dia. Tolerance ∅D1: See page 247, Shank Tolerance ∅D2: -.0001 -.0005




MG | 15° | h6 | 140° P.93

Unit : Inch

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Fractional | Decimal | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| DH501051 | R | .3390 | 3/8 | 2-1/4 | 4-1/8 |
| DH501052 | 11/32 | .3438 | 3/8 | 2-1/4 | 4-1/8 |
| DH501053 | 23/64 | .3594 | 3/8 | 2-1/4 | 4-1/8 |
| DH501054 | U | .3680 | 3/8 | 2-1/4 | 4-1/8 |
| DH501055 | 3/8 | .3750 | 3/8 | 2-1/4 | 4-1/8 |
| DH501056 | V | .3770 | 1/2 | 2-1/2 | 4-3/8 |
| DH501057 | 25/64 | .3906 | 1/2 | 2-1/2 | 4-3/8 |
| DH501058 | X | .3970 | 1/2 | 2-1/2 | 4-3/8 |
| DH501059 | Y | .4040 | 1/2 | 2-1/2 | 4-3/8 |
| DH501060 | 13/32 | .4062 | 1/2 | 2-1/2 | 4-3/8 |
| DH501061 | Z | .4130 | 1/2 | 2-1/2 | 4-3/8 |
| DH501062 | 27/64 | .4219 | 1/2 | 2-13/16 | 4-5/8 |
| DH501063 | 7/16 | .4375 | 1/2 | 2-13/16 | 4-5/8 |
| DH501064 | 29/64 | .4531 | 1/2 | 2-13/16 | 4-5/8 |
| DH501065 | 15/32 | .4688 | 1/2 | 2-13/16 | 4-5/8 |
| DH501066 | 31/64 | .4844 | 1/2 | 2-13/16 | 4-5/8 |
| DH501067 | 1/2 | .5000 | 1/2 | 3-1/16 | 5 |

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Fractional | Decimal | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| DH501068 | 33/64 | .5156 | 5/8 | 3-1/16 | 5 |
| DH501069 | 17/32 | .5312 | 5/8 | 3-1/16 | 5 |
| DH501070 | 35/64 | .5469 | 5/8 | 3-1/16 | 5 |
| DH501071 | 9/16 | .5625 | 5/8 | 3-1/16 | 5 |
| DH501072 | 37/64 | .5781 | 5/8 | 3-9/32 | 5-1/4 |
| DH501073 | 19/32 | .5937 | 5/8 | 3-9/32 | 5-1/4 |
| DH501074 | 39/64 | .6094 | 5/8 | 3-9/32 | 5-1/4 |
| DH501075 | 5/8 | .6250 | 5/8 | 3-9/32 | 5-1/4 |
| DH501076 | 41/64 | .6406 | 3/4 | 3-9/32 | 5-1/4 |
| DH501077 | 21/32 | .6563 | 3/4 | 3-11/16 | 5-5/8 |
| DH501078 | 43/64 | .6719 | 3/4 | 3-11/16 | 5-5/8 |
| DH501079 | 11/16 | .6875 | 3/4 | 3-11/16 | 5-5/8 |
| DH501080 | 45/64 | .7031 | 3/4 | 3-11/16 | 5-5/8 |
| DH501081 | 23/32 | .7188 | 3/4 | 3-3/4 | 6 |
| DH501082 | 47/64 | .7344 | 3/4 | 3-3/4 | 6 |
| DH501083 | 3/4 | .7500 | 3/4 | 3-3/4 | 6 |

◎ : Excellent ○ : Good

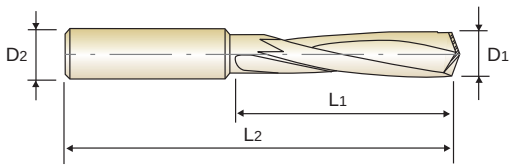
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| | | | ◎ | ◎ | | | | | | | |

# DREAM DRILLS for HIGH HARDENED STEELS

DH500 SERIES

## CARBIDE, DREAM DRILLS for HIGH HARDENED STEEL (HRc50~70)

▶ **Application** : Drilling for High Hardened Steels[Quenched Steels, Tempered Steels (Under HRc 70)]
▶ **Advantage** : Special Design
Minimum of cutting load through special thinning
Good chip removal
Powerful Drilling




MG | 15° | h6 | h7 | 140° P.93

Unit : mm

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| DH500010 | 1.0 | .0394 | 3 | 6 | 40 |
| DH500011 | 1.1 | .0433 | 3 | 6 | 40 |
| DH500012 | 1.2 | .0472 | 3 | 6 | 40 |
| DH500013 | 1.3 | .0512 | 3 | 8 | 40 |
| DH500014 | 1.4 | .0551 | 3 | 8 | 40 |
| DH500015 | 1.5 | .0591 | 3 | 8 | 40 |
| DH500016 | 1.6 | .0630 | 3 | 10 | 40 |
| DH500017 | 1.7 | .0669 | 3 | 10 | 40 |
| DH500018 | 1.8 | .0709 | 3 | 10 | 40 |
| DH500019 | 1.9 | .0748 | 3 | 10 | 40 |
| DH500020 | 2.0 | .0787 | 3 | 12 | 42 |
| DH500025 | 2.5 | .0984 | 3 | 14 | 44 |
| DH500026 | 2.6 | .1024 | 3 | 16 | 44 |
| DH500028 | 2.8 | .1102 | 3 | 16 | 46 |
| DH500030 | 3.0 | .1181 | 3 | 18 | 46 |
| DH500033 | 3.3 | .1299 | 4 | 18 | 48 |
| DH500034 | 3.4 | .1339 | 4 | 20 | 50 |
| DH500035 | 3.5 | .1378 | 4 | 20 | 50 |
| DH500038 | 3.8 | .1496 | 4 | 22 | 52 |
| DH500040 | 4.0 | .1575 | 4 | 22 | 52 |
| DH500041 | 4.1 | .1614 | 6 | 25 | 65 |
| DH500042 | 4.2 | .1654 | 6 | 25 | 65 |
| DH500043 | 4.3 | .1693 | 6 | 28 | 68 |
| DH500044 | 4.4 | .1732 | 6 | 28 | 68 |
| DH500045 | 4.5 | .1772 | 6 | 28 | 68 |
| DH500046 | 4.6 | .1811 | 6 | 28 | 68 |
| DH500048 | 4.8 | .1890 | 6 | 32 | 72 |
| DH500049 | 4.9 | .1929 | 6 | 32 | 72 |
| DH500050 | 5.0 | .1969 | 6 | 32 | 72 |

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| DH500051 | 5.1 | .2008 | 6 | 32 | 72 |
| DH500052 | 5.2 | .2047 | 6 | 32 | 72 |
| DH500053 | 5.3 | .2087 | 6 | 32 | 72 |
| DH500055 | 5.5 | .2165 | 6 | 35 | 75 |
| DH500060 | 6.0 | .2362 | 6 | 35 | 75 |
| DH500062 | 6.2 | .2441 | 8 | 40 | 80 |
| DH500065 | 6.5 | .2559 | 8 | 40 | 80 |
| DH500068 | 6.8 | .2677 | 8 | 45 | 85 |
| DH500069 | 6.9 | .2717 | 8 | 45 | 85 |
| DH500070 | 7.0 | .2756 | 8 | 45 | 85 |
| DH500075 | 7.5 | .2953 | 8 | 45 | 85 |
| DH500080 | 8.0 | .3150 | 8 | 50 | 98 |
| DH500085 | 8.5 | .3346 | 10 | 50 | 98 |
| DH500086 | 8.6 | .3386 | 10 | 57 | 105 |
| DH500088 | 8.8 | .3465 | 10 | 57 | 105 |
| DH500090 | 9.0 | .3543 | 10 | 57 | 105 |
| DH500093 | 9.3 | .3661 | 10 | 57 | 105 |
| DH500095 | 9.5 | .3740 | 10 | 57 | 105 |
| DH500100 | 10.0 | .3937 | 10 | 63 | 111 |
| DH500102 | 10.2 | .4016 | 12 | 63 | 111 |
| DH500103 | 10.3 | .4055 | 12 | 63 | 111 |
| DH500105 | 10.5 | .4134 | 12 | 71 | 111 |
| DH500108 | 10.8 | .4252 | 12 | 71 | 119 |
| DH500110 | 11.0 | .4331 | 12 | 71 | 119 |
| DH500115 | 11.5 | .4528 | 12 | 71 | 119 |
| DH500120 | 12.0 | .4724 | 12 | 71 | 119 |
| DH500121 | 12.1 | .4764 | 14 | 77 | 125 |
| DH500140 | 14.0 | .5512 | 14 | 77 | 125 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| | | | ◎ | ◎ | | | | | | | |

# CARBIDE, DREAM DRILLS for High HARDENED STEEL HRc50~HRc70, TiAlN COATED

## DH501 SERIES

| WORK MATERIAL | HARDENED STEELS | | | | | |
|---|---|---|---|---|---|---|
| | HRc 50 ~ 55 | | HRc 55 ~ 60 | | HRc 60 ~ 70 | |
| DRILLING SPEED | 45 ~ 72 SFM | | 32 ~ 52 SFM | | 26 ~ 42 SFM | |
| DIAMETER | N | S | N | S | N | S |
| 5/64 | 2860 | ~ .0015 | 2000 | ~ .0015 | 1900 | ~ .0011 |
| 1/8 | 1900 | ~ .0015 | 1330 | ~ .0015 | 1250 | ~ .0015 |
| 5/32 | 1430 | ~ .0015 | 1000 | ~ .0015 | 950 | ~ .0015 |
| 13/64 | 1150 | ~ .0015 | 800 | ~ .0015 | 750 | ~ .0015 |
| 15/64 | 960 | ~ .0015 | 670 | ~ .0015 | 630 | ~ .0015 |
| 5/16 | 720 | ~ .0015 | 500 | ~ .0015 | 480 | ~ .0015 |
| 25/64 | 570 | ~ .0015 | 400 | ~ .0015 | 380 | ~ .0015 |
| 15/32 | 480 | ~ .0015 | 330 | ~ .0015 | 320 | ~ .0015 |
| 9/16 | 435 | ~ .0015 | 280 | ~ .0015 | 270 | ~ .0015 |
| 41/64 | 380 | ~ .0015 | 250 | ~ .0015 | 240 | ~ .0015 |
| 11/16 | 325 | ~ .0015 | 235 | ~ .0015 | 190 | ~ .0015 |
| 47/64 | 310 | ~ .0015 | 220 | ~ .0015 | 180 | ~ .0015 |

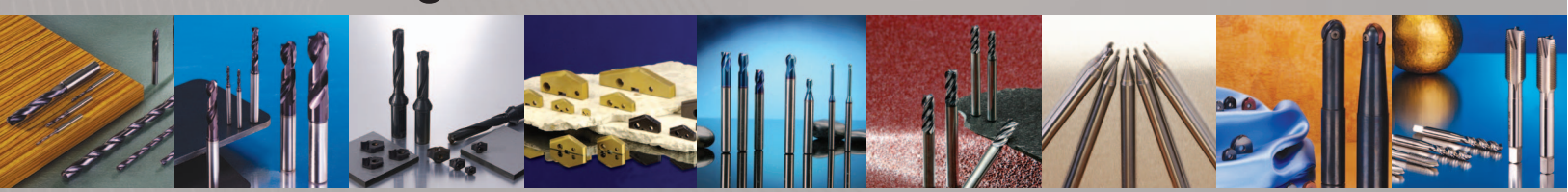
N = R.P.M
S = Inch per Revolution(inch/rev.)

## DH500 SERIES

| WORK MATERIAL | | HARDENED STEELS | | | | | |
|---|---|---|---|---|---|---|---|
| | | HRc 50 ~ 55 | | HRc 55 ~ 60 | | HRc 60 ~ 70 | |
| DRILLING SPEED | | 45 ~ 72 SFM | | 32 ~ 52 SFM | | 26 ~ 42 SFM | |
| DIAMETER | | N | S | N | S | N | S |
| METRIC | INCH | | | | | | |
| 3.0 | .1181 | 1900 | ~ .0015 | 1330 | ~ .0015 | 1250 | ~ .0015 |
| 4.0 | .1575 | 1430 | ~ .0015 | 1000 | ~ .0015 | 950 | ~ .0015 |
| 5.0 | .1969 | 1150 | ~ .0015 | 800 | ~ .0015 | 750 | ~ .0015 |
| 6.0 | .2362 | 960 | ~ .0015 | 670 | ~ .0015 | 630 | ~ .0015 |
| 8.0 | .3150 | 720 | ~ .0015 | 500 | ~ .0015 | 480 | ~ .0015 |
| 10.0 | .3937 | 570 | ~ .0015 | 400 | ~ .0015 | 380 | ~ .0015 |
| 12.0 | .4724 | 480 | ~ .0015 | 330 | ~ .0015 | 320 | ~ .0015 |
| 14.0 | .5512 | 438 | ~ .0015 | 282 | ~ .0015 | 272 | ~ .0015 |

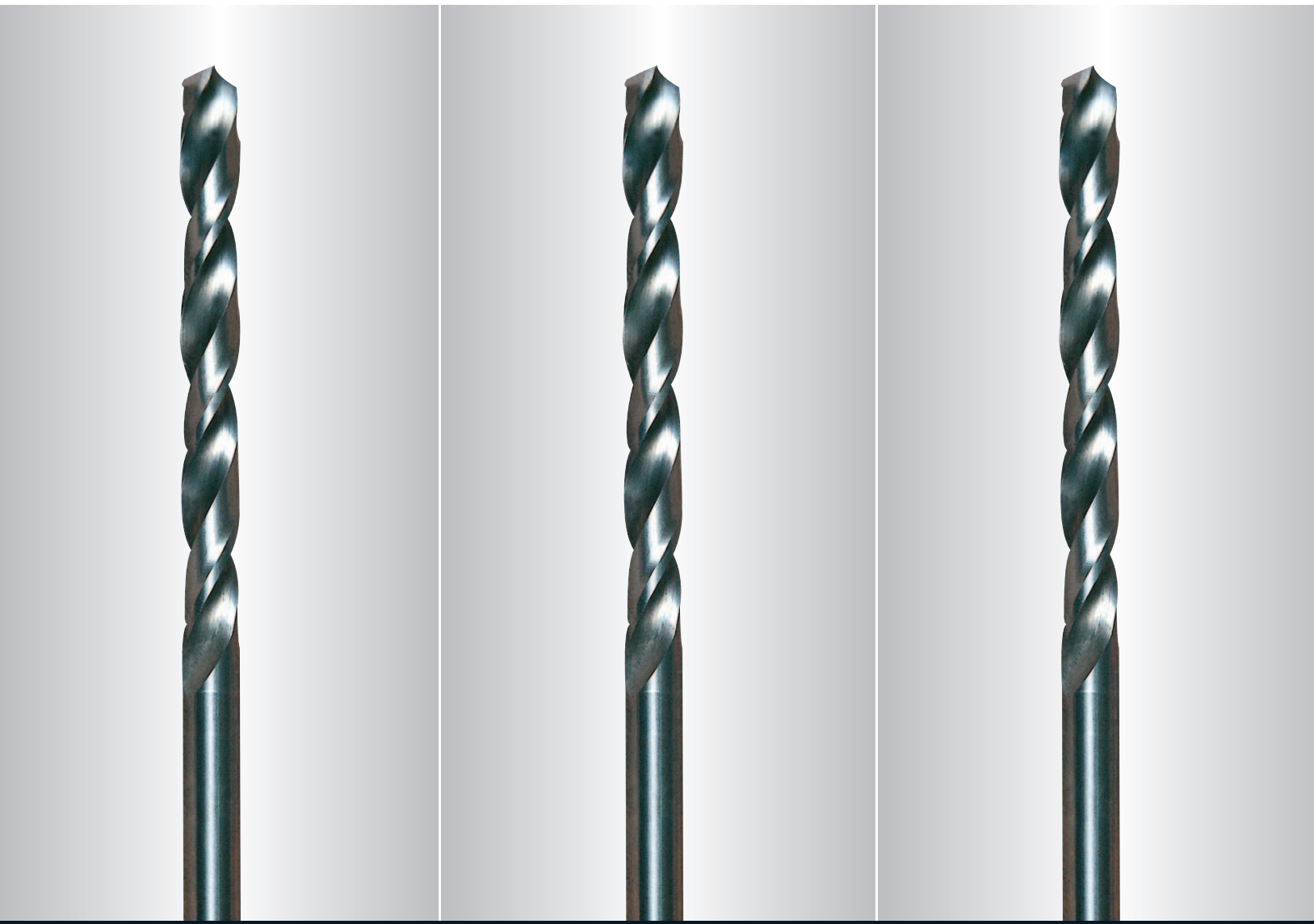
N = R.P.M
S = Inch per Revolution(inch/rev.)

Global Cutting Tool Leader **YG-1**



# CARBIDE

Being the best through innovation



# STANDARD CARBIDE DRILLS

- General Purpose
  118° Point

## STANDARD SOLID CARBIDE DRILLS

General Purpose
118° Point

| ITEM | MODEL | DESCRIPTION | | SIZE MIN | SIZE MAX | PAGE |
|---|---|---|---|---|---|---|
| **INCH** | | | | | | |
| **D5412** | | CARBIDE DRILLS / Wire gauge sizes | *JOBBER* | #56 | #1 | **98** |
| **D5413** | | CARBIDE DRILLS / Letter sizes | *JOBBER* | A | Z | **99** |
| **D5417** | | CARBIDE DRILLS / Fractional sizes | *JOBBER* | D3/64 | D1/2 | **100** |
| | | RECOMMENDED CUTTING CONDITIONS | | | | **101** |

◎ : Excellent
○ : Good

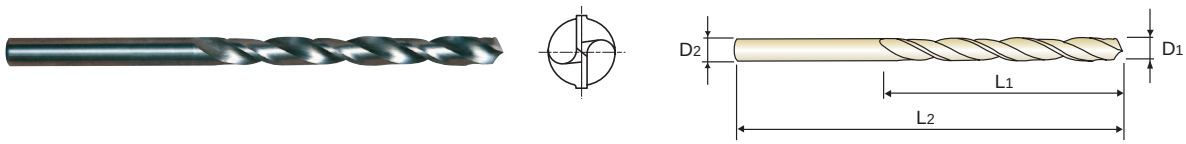
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | ○ | ○ | ○ | ○ | ◎ | | |
| ◎ | ◎ | | | | ○ | ○ | ○ | ○ | ◎ | | |
| ◎ | ◎ | | | | ○ | ○ | ○ | ○ | ◎ | | |

# STANDARD CARBIDE DRILLS

**D5412 SERIES**

## CARBIDE DRILLS

***JOBBER***




MG | N 30° | h6 | h7 | 118° | P.101

$D_1=D_2$

### ▶ Wire gauge sizes

Unit : Inch

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Wire gauge | Decimal | $D_1 = D_2$ | |
| | | | $L_1$ | $L_2$ |
| D5412101 | 1 | .2280 | 1-3/4 | 3 |
| D5412102 | 2 | .2210 | 1-3/4 | 3 |
| D5412103 | 3 | .2130 | 1-3/4 | 3 |
| D5412104 | 4 | .2090 | 1-3/4 | 3 |
| D5412105 | 5 | .2055 | 1-3/4 | 3 |
| D5412106 | 6 | .2040 | 1-3/4 | 3 |
| D5412107 | 7 | .2010 | 1-3/4 | 3 |
| D5412108 | 8 | .1990 | 1-3/4 | 3 |
| D5412109 | 9 | .1960 | 1-3/4 | 3 |
| D5412110 | 10 | .1935 | 1-5/8 | 2-3/4 |
| D5412111 | 11 | .1910 | 1-5/8 | 2-3/4 |
| D5412112 | 12 | .1890 | 1-5/8 | 2-3/4 |
| D5412113 | 13 | .1850 | 1-5/8 | 2-3/4 |
| D5412114 | 14 | .1820 | 1-5/8 | 2-3/4 |
| D5412115 | 15 | .1800 | 1-5/8 | 2-3/4 |
| D5412116 | 16 | .1770 | 1-5/8 | 2-3/4 |
| D5412117 | 17 | .1730 | 1-5/8 | 2-3/4 |
| D5412118 | 18 | .1695 | 1-5/8 | 2-3/4 |
| D5412119 | 19 | .1660 | 1-5/8 | 2-3/4 |
| D5412120 | 20 | .1610 | 1-3/8 | 2-1/2 |
| D5412121 | 21 | .1590 | 1-3/8 | 2-1/2 |
| D5412122 | 22 | .1570 | 1-3/8 | 2-1/2 |
| D5412123 | 23 | .1540 | 1-3/8 | 2-1/2 |
| D5412124 | 24 | .1520 | 1-3/8 | 2-1/2 |
| D5412125 | 25 | .1495 | 1-3/8 | 2-1/2 |
| D5412126 | 26 | .1470 | 1-3/8 | 2-1/2 |
| D5412127 | 27 | .1440 | 1-3/8 | 2-1/2 |
| D5412128 | 28 | .1405 | 1-3/8 | 2-1/2 |

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Wire gauge | Decimal | $D_1 = D_2$ | |
| | | | $L_1$ | $L_2$ |
| D5412129 | 29 | .1360 | 1-3/8 | 2-1/2 |
| D5412130 | 30 | .1285 | 1-1/4 | 2-1/4 |
| D5412131 | 31 | .1200 | 1-1/4 | 2-1/4 |
| D5412132 | 32 | .1160 | 1-1/4 | 2-1/4 |
| D5412133 | 33 | .1130 | 1-1/4 | 2-1/4 |
| D5412134 | 34 | .1110 | 1-1/4 | 2-1/4 |
| D5412135 | 35 | .1100 | 1-1/4 | 2-1/4 |
| D5412136 | 36 | .1065 | 1-1/4 | 2-1/4 |
| D5412137 | 37 | .1040 | 1-1/4 | 2-1/4 |
| D5412138 | 38 | .1015 | 1-1/4 | 2-1/4 |
| D5412139 | 39 | .0995 | 1-1/4 | 2-1/4 |
| D5412140 | 40 | .0980 | 1 | 2 |
| D5412141 | 41 | .0960 | 1 | 2 |
| D5412142 | 42 | .0935 | 1 | 2 |
| D5412143 | 43 | .0890 | 1 | 2 |
| D5412144 | 44 | .0860 | 1 | 2 |
| D5412145 | 45 | .0820 | 7/8 | 1-3/4 |
| D5412146 | 46 | .0810 | 7/8 | 1-3/4 |
| D5412147 | 47 | .0785 | 7/8 | 1-3/4 |
| D5412148 | 48 | .0760 | 7/8 | 1-3/4 |
| D5412149 | 49 | .0730 | 7/8 | 1-3/4 |
| D5412150 | 50 | .0700 | 7/8 | 1-3/4 |
| D5412151 | 51 | .0670 | 3/4 | 1-1/2 |
| D5412152 | 52 | .0635 | 3/4 | 1-1/2 |
| D5412153 | 53 | .0595 | 3/4 | 1-1/2 |
| D5412154 | 54 | .0550 | 3/4 | 1-1/2 |
| D5412155 | 55 | .0520 | 3/4 | 1-1/2 |
| D5412156 | 56 | .0465 | 3/4 | 1-1/2 |

◎ : Excellent ○ : Good

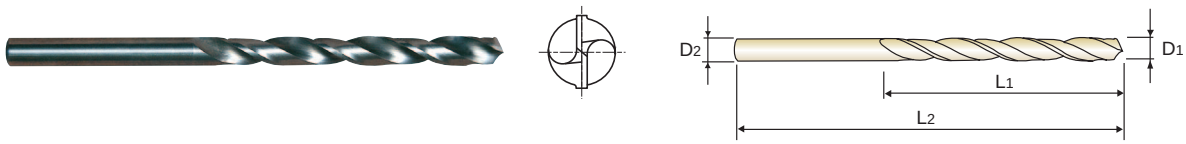
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | ○ | ○ | ○ | ○ | ◎ | | |

# STANDARD CARBIDE DRILLS

D5413 SERIES

## CARBIDE DRILLS

*JOBBER*




MG | N 30° | h6 | h7 | 118° | P.101

$D_1=D_2$

### ▶ Letter sizes

Unit : Inch

| EDP No. | Diameter Letter | Diameter Decimal | Flute Length | Overall Length |
|---|---|---|---|---|
| | $D_1 = D_2$ | | $L_1$ | $L_2$ |
| D5413201 | A | .2340 | 2 | 3-1/4 |
| D5413202 | B | .2380 | 2 | 3-1/4 |
| D5413203 | C | .2420 | 2 | 3-1/4 |
| D5413204 | D | .2460 | 2 | 3-1/4 |
| D5413205 | E | .2500 | 2 | 3-1/4 |
| D5413206 | F | .2570 | 2 | 3-1/4 |
| D5413207 | G | .2610 | 2-1/8 | 3-1/2 |
| D5413208 | H | .2660 | 2-1/8 | 3-1/2 |
| D5413209 | I | .2720 | 2-1/8 | 3-1/2 |
| D5413210 | J | .2770 | 2-1/8 | 3-1/2 |
| D5413211 | K | .2810 | 2-1/8 | 3-1/2 |
| D5413212 | L | .2900 | 2-1/8 | 3-1/2 |
| D5413213 | M | .2950 | 2-3/8 | 3-3/4 |

| EDP No. | Diameter Letter | Diameter Decimal | Flute Length | Overall Length |
|---|---|---|---|---|
| | $D_1 = D_2$ | | $L_1$ | $L_2$ |
| D5413214 | N | .3020 | 2-3/8 | 3-3/4 |
| D5413215 | O | .3160 | 2-3/8 | 3-3/4 |
| D5413216 | P | .3230 | 2-3/8 | 3-3/4 |
| D5413217 | Q | .3320 | 2-1/2 | 4 |
| D5413218 | R | .3390 | 2-1/2 | 4 |
| D5413219 | S | .3480 | 2-1/2 | 4 |
| D5413220 | T | .3580 | 2-3/4 | 4-1/4 |
| D5413221 | U | .3680 | 2-3/4 | 4-1/4 |
| D5413222 | V | .3770 | 2-3/4 | 4-1/4 |
| D5413223 | W | .3860 | 2-7/8 | 4-1/2 |
| D5413224 | X | .3970 | 2-7/8 | 4-1/2 |
| D5413225 | Y | .4040 | 2-7/8 | 4-1/2 |
| D5413226 | Z | .4130 | 2-7/8 | 4-1/2 |

◎ : Excellent ○ : Good

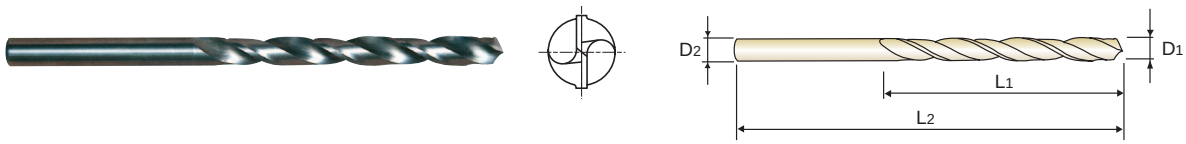
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | ○ | ○ | ○ | ○ | ◎ | | |

# STANDARD CARBIDE DRILLS

**D5417 SERIES**

## CARBIDE DRILLS

***JOBBER***




MG | N 30° | h6 | h7 | 118° | P.101

$D_1=D_2$

### ▶ Fractional sizes

Unit : Inch

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Fractional | Decimal | $D_1 = D_2$ | |
| | | | $L_1$ | $L_2$ |
| D5417003 | 3/64 | .0469 | 3/4 | 1-1/2 |
| D5417004 | 1/16 | .0625 | 3/4 | 1-1/2 |
| D5417005 | 5/64 | .0781 | 7/8 | 1-3/4 |
| D5417006 | 3/32 | .0938 | 1 | 2 |
| D5417007 | 7/64 | .1094 | 1-1/4 | 2-1/4 |
| D5417008 | 1/8 | .1250 | 1-1/4 | 2-1/4 |
| D5417009 | 9/64 | .1406 | 1-3/8 | 2-1/2 |
| D5417010 | 5/32 | .1563 | 1-3/8 | 2-1/2 |
| D5417011 | 11/64 | .1719 | 1-5/8 | 2-3/4 |
| D5417012 | 3/16 | .1875 | 1-5/8 | 2-3/4 |
| D5417013 | 13/64 | .2031 | 1-3/4 | 3 |
| D5417014 | 7/32 | .2188 | 1-3/4 | 3 |
| D5417015 | 15/64 | .2344 | 2 | 3-1/4 |
| D5417016 | 1/4 | .2500 | 2x | 3-1/4 |
| D5417017 | 17/64 | .2656 | 2-1/8 | 3-1/2 |

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Fractional | Decimal | $D_1 = D_2$ | |
| | | | $L_1$ | $L_2$ |
| D5417018 | 9/32 | .2813 | 2-1/8 | 3-1/2 |
| D5417019 | 19/64 | .2969 | 2-3/8 | 3-3/4 |
| D5417020 | 5/16 | .3125 | 2-3/8 | 3-3/4 |
| D5417021 | 21/64 | .3281 | 2-1/2 | 4 |
| D5417022 | 11/32 | .3438 | 2-1/2 | 4 |
| D5417023 | 23/64 | .3594 | 2-3/4 | 4-1/4 |
| D5417024 | 3/8 | .3750 | 2-3/4 | 4-1/4 |
| D5417025 | 25/64 | .3906 | 2-7/8 | 4-1/2 |
| D5417026 | 13/32 | .4063 | 2-7/8 | 4-1/2 |
| D5417027 | 27/64 | .4219 | 2-7/8 | 4-1/2 |
| D5417028 | 7/16 | .4375 | 2-7/8 | 4-1/2 |
| D5417029 | 29/64 | .4531 | 3 | 4-3/4 |
| D5417030 | 15/32 | .4688 | 3 | 4-3/4 |
| D5417031 | 31/64 | .4844 | 3 | 4-3/4 |
| D5417032 | 1/2 | .5000 | 3 | 4-3/4 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | ○ | ○ | ○ | ○ | ◎ | | |

## CARBIDE DRILLS

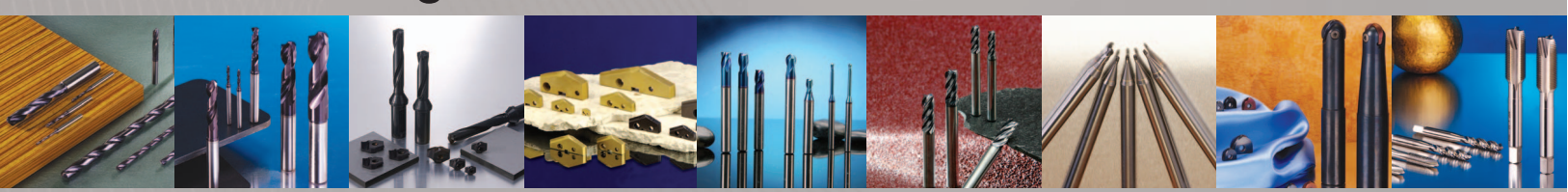
### D5412, D5413, D5417 SERIE

| WORK MATERIAL | NON-ALLOY STEELS | | ALLOY STEELS | | SOFT GREY CAST IRON | | HARD GREY CAST IRON | |
|---|---|---|---|---|---|---|---|---|
| DIAMETER | N | S | N | S | N | S | N | S |
| 3/64 | 23000 | .0012 | 17200 | .0012 | 32000 | .0016 | 23000 | .0016 |
| 5/64 | 11500 | .0016 | 8600 | .0016 | 16000 | .0020 | 11500 | .0020 |
| 1/8 | 7800 | .0020 | 5750 | .0020 | 10500 | .0024 | 7600 | .0024 |
| 5/32 | 5800 | .0024 | 4300 | .0024 | 7800 | .0028 | 5700 | .0028 |
| 13/64 | 4700 | .0028 | 3450 | .0028 | 6200 | .0031 | 4550 | .0031 |
| 15/64 | 3900 | .0031 | 2850 | .0031 | 5200 | .0035 | 3800 | .0035 |
| 9/32 | 3350 | .0035 | 2450 | .0035 | 4500 | .0039 | 3250 | .0039 |
| 5/16 | 2900 | .0039 | 2150 | .0039 | 3900 | .0047 | 2850 | .0047 |
| 23/64 | 2600 | .0043 | 1900 | .0043 | 3450 | .0055 | 2550 | .0055 |
| 25/64 | 2350 | .0047 | 1700 | .0047 | 3100 | .0063 | 2300 | .0063 |
| 7/16 | 2150 | .0051 | 1600 | .0051 | 2850 | .0071 | 2100 | .0071 |
| 15/32 | 1950 | .0055 | 1450 | .0055 | 2600 | .0079 | 1900 | .0079 |
| 33/64 | 1800 | .0063 | 1350 | .0063 | 2400 | .0079 | 1750 | .0079 |

| WORK MATERIAL | STAINLESS STEELS | | Al-Si ALLOY, Si<10% | | Al-Si ALLOY, Si>10% | | Ti, Ni ALLOY STEELS | |
|---|---|---|---|---|---|---|---|---|
| DIAMETER | N | S | N | S | N | S | N | S |
| 3/64 | 12000 | .0016 | 54000 | .0020 | 42000 | .0020 | 11800 | .0008 |
| 5/64 | 6000 | .0012 | 27000 | .0024 | 21000 | .0024 | 5900 | .0012 |
| 1/8 | 4000 | .0016 | 18000 | .0028 | 14000 | .0028 | 3900 | .0016 |
| 5/32 | 3000 | .0020 | 13000 | .0031 | 10500 | .0031 | 2950 | .0020 |
| 13/64 | 2400 | .0024 | 10500 | .0035 | 8500 | .0035 | 2350 | .0024 |
| 15/64 | 2000 | .0028 | 8800 | .0043 | 7100 | .0043 | 1950 | .0028 |
| 9/32 | 1700 | .0031 | 7600 | .0051 | 6100 | .0051 | 1700 | .0031 |
| 5/16 | 1500 | .0035 | 6600 | .0059 | 5350 | .0059 | 1450 | .0035 |
| 23/64 | 1350 | .0039 | 5900 | .0067 | 4750 | .0067 | 1300 | .0039 |
| 25/64 | 1200 | .0043 | 5300 | .0075 | 4250 | .0075 | 1200 | .0043 |
| 7/16 | 1100 | .0047 | 4850 | .0083 | 3900 | .0083 | 1050 | .0047 |
| 15/32 | 1000 | .0051 | 4450 | .0091 | 3550 | .0091 | 980 | .0051 |
| 33/64 | 950 | .0051 | 4100 | .0098 | 3300 | .0098 | 905 | .0051 |

N = R.P.M
S = Inch per Revolution(inch/rev.)

Global Cutting Tool Leader **YG-1**



# HSS

Being the best through innovation

# MULTI-1 DRILLS

- **HSS-PM MULTI-1 DRILLS**
  **Multi Purpose Drilling. Particularly for Stainless Steels, Titanium**

## PREMIUM HSS-PM MULTI-1 DRILLS

Premium HSS-PM Drills for wide range of applications
- Carbon Steels, Alloy Steels, Stainless steels, Titanium etc.


| ITEM | MODEL | DESCRIPTION | SIZE | | PAGE |
|---|---|---|---|---|---|
| | | | MIN | MAX | |
| **INCH** | | | | | |
| **CDRA05** | | PREMIUM HSS-PM MULTI-1 DRILLS / M15 Fractional sizes | D3/32 | D1/2 | **106** |
| **CDRA06** | | PREMIUM HSS-PM MULTI-1 DRILLS / M16 Wire gauge sizes | #45 | #1 | **107** |
| **CDRA07** | | PREMIUM HSS-PM MULTI-1 DRILLS / M17 Letter sizes | B | Z | **108** |
| | | RECOMMENDED CUTTING CONDITIONS | | | **109** |

◎ : Excellent
○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | ○ | | | ○ | ○ | ○ | ◎ | ◎ | | |
| ◎ | ◎ | ○ | | | ○ | ○ | ○ | ◎ | ◎ | | |
| ◎ | ◎ | ○ | | | ○ | ○ | ○ | ◎ | ◎ | | |

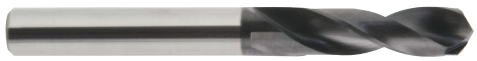
# MULTI-1 DRILLS

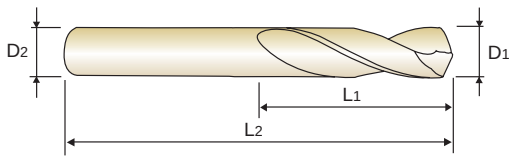
CDRA05 SERIES

## PREMIUM HSS-PM MULTI-1 DRILLS

▶ **Features** : Excellent wear resistance by using Premium powder metallurgy materials.
With special point geometry, no centering required.
Minimal drill wandering and improved hole tolerances.
Better tool life with excellent coating.

▶ **Application** : Applicable to various materials including aluminum and stainless steel, as well carbon steel and structural steel.






PREMIUM HSS-PM | N 30° | h6 | h7 | 135° P.109

### ▶ M15 / Fractional sizes

Unit : Inch

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Fractional | Decimal | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| M15006 | 3/32 | .0938 | 1/8 | 1/2 | 1-3/4 |
| M15007 | 7/64 | .1094 | 1/8 | 5/8 | 1-7/8 |
| M15008 | 1/8 | .1250 | 1/8 | 3/4 | 2 |
| M15009 | 9/64 | .1406 | 3/16 | 13/16 | 2-1/8 |
| M15010 | 5/32 | .1563 | 3/16 | 13/16 | 2-1/8 |
| M15011 | 11/64 | .1719 | 3/16 | 1 | 2-3/8 |
| M15012 | 3/16 | .1875 | 3/16 | 1 | 2-3/8 |
| M15013 | 13/64 | .2031 | 1/4 | 1-1/8 | 2-7/8 |
| M15014 | 7/32 | .2188 | 1/4 | 1-1/8 | 2-7/8 |
| M15015 | 15/64 | .2344 | 1/4 | 1-1/4 | 3 |
| M15016 | 1/4 | .2500 | 1/4 | 1-1/4 | 3 |
| M15017 | 17/64 | .2656 | 3/8 | 1-3/8 | 3-3/16 |
| M15018 | 9/32 | .2813 | 3/8 | 1-3/8 | 3-3/16 |
| M15019 | 19/64 | .2969 | 3/8 | 1-3/8 | 3-3/16 |

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Fractional | Decimal | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| M15020 | 5/16 | .3125 | 3/8 | 1-1/2 | 3-3/8 |
| M15021 | 21/64 | .3281 | 3/8 | 1-1/2 | 3-3/8 |
| M15022 | 11/32 | .3438 | 3/8 | 1-5/8 | 3-1/2 |
| M15023 | 23/64 | .3594 | 3/8 | 1-5/8 | 3-1/2 |
| M15024 | 3/8 | .3750 | 3/8 | 1-5/8 | 3-1/2 |
| M15025 | 25/64 | .3906 | 1/2 | 1-11/16 | 3-7/8 |
| M15026 | 13/32 | .4063 | 1/2 | 1-11/16 | 3-7/8 |
| M15027 | 27/64 | .4219 | 1/2 | 1-7/8 | 4-1/8 |
| M15028 | 7/16 | .4375 | 1/2 | 1-7/8 | 4-1/8 |
| M15029 | 29/64 | .4531 | 1/2 | 1-7/8 | 4-1/8 |
| M15030 | 15/32 | .4688 | 1/2 | 2 | 4-1/4 |
| M15031 | 31/64 | .4844 | 1/2 | 2 | 4-1/4 |
| M15032 | 1/2 | .5000 | 1/2 | 2 | 4-1/4 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | ○ | | | ○ | ○ | ○ | ◎ | ◎ | | |

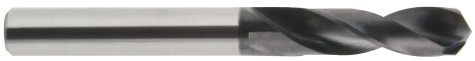
# MULTI-1 DRILLS

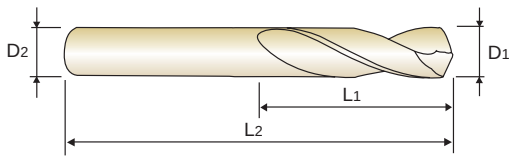
**CDRA06 SERIES**

## PREMIUM HSS-PM MULTI-1 DRILLS

▶ **Features** : Excellent wear resistance by using Premium powder metallurgy materials.
With special point geometry, no centering required.
Minimal drill wandering and improved hole tolerances.
Better tool life with excellent coating.

▶ **Application** : Applicable to various materials including aluminum and stainless steel, as well carbon steel and structural steel.






PREMIUM HSS-PM | N 30° | h6 | h7 | 135° P.109

### ▶ M16 / Wire gauge sizes

Unit : Inch

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Wire gauge | Decimal | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| M16045 | 45 | .0820 | 1/8 | 3/4 | 2 |
| M16044 | 44 | .0860 | 1/8 | 3/4 | 2 |
| M16043 | 43 | .0890 | 1/8 | 3/4 | 2 |
| M16042 | 42 | .0935 | 1/8 | 3/4 | 2 |
| M16041 | 41 | .0960 | 1/8 | 13/16 | 2-1/16 |
| M16040 | 40 | .0980 | 1/8 | 13/16 | 2-1/16 |
| M16039 | 39 | .0995 | 1/8 | 13/16 | 2-1/4 |
| M16038 | 38 | .1015 | 1/8 | 13/16 | 2-1/4 |
| M16037 | 37 | .1040 | 1/8 | 13/16 | 2-1/4 |
| M16036 | 36 | .1065 | 1/8 | 13/16 | 2-1/4 |
| M16035 | 35 | .1100 | 1/8 | 7/8 | 2-5/16 |
| M16034 | 34 | .1110 | 1/8 | 7/8 | 2-5/16 |
| M16033 | 33 | .1130 | 1/8 | 7/8 | 2-5/16 |
| M16032 | 32 | .1160 | 1/8 | 7/8 | 2-5/16 |
| M16031 | 31 | .1120 | 1/8 | 7/8 | 2-5/16 |
| M16030 | 30 | .1285 | 3/16 | 15/16 | 2-3/8 |
| M16029 | 29 | .1360 | 3/16 | 15/16 | 2-3/8 |
| M16028 | 28 | .1405 | 3/16 | 15/16 | 2-3/8 |
| M16027 | 27 | .1440 | 3/16 | 1 | 2-7/16 |
| M16026 | 26 | .1470 | 3/16 | 1 | 2-7/16 |
| M16025 | 25 | .1495 | 3/16 | 1 | 2-7/16 |
| M16024 | 24 | .1520 | 3/16 | 1 | 2-7/16 |
| M16023 | 23 | .1540 | 3/16 | 1 | 2-7/16 |

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Wire gauge | Decimal | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| M16022 | 22 | .1570 | 3/16 | 1-1/16 | 2-1/2 |
| M16021 | 21 | .1590 | 3/16 | 1-1/16 | 2-1/2 |
| M16020 | 20 | .1610 | 3/16 | 1-1/16 | 2-1/2 |
| M16019 | 19 | .1660 | 3/16 | 1-1/16 | 2-1/2 |
| M16018 | 18 | .1695 | 3/16 | 1-1/16 | 2-1/2 |
| M16017 | 17 | .1730 | 3/16 | 1-1/8 | 2-9/16 |
| M16016 | 16 | .1770 | 3/16 | 1-1/8 | 2-9/16 |
| M16015 | 15 | .1800 | 3/16 | 1-1/8 | 2-9/16 |
| M16014 | 14 | .1820 | 3/16 | 1-1/8 | 2-9/16 |
| M16013 | 13 | .1850 | 3/16 | 1-1/8 | 2-9/16 |
| M16012 | 12 | .1890 | 1/4 | 1-3/16 | 3 |
| M16011 | 11 | .1910 | 1/4 | 1-3/16 | 3 |
| M16010 | 10 | .1935 | 1/4 | 1-3/16 | 3 |
| M16009 | 9 | .1960 | 1/4 | 1-3/16 | 3 |
| M16008 | 8 | .1990 | 1/4 | 1-3/16 | 3 |
| M16007 | 7 | .2010 | 1/4 | 1-3/16 | 3 |
| M16006 | 6 | .2040 | 1/4 | 1-1/4 | 3-1/16 |
| M16005 | 5 | .2055 | 1/4 | 1-1/4 | 3-1/16 |
| M16004 | 4 | .2090 | 1/4 | 1-1/4 | 3-1/16 |
| M16003 | 3 | .2130 | 1/4 | 1-1/4 | 3-1/16 |
| M16002 | 2 | .2210 | 1/4 | 1-5/16 | 3-1/8 |
| M16001 | 1 | .2280 | 1/4 | 1-5/16 | 3-1/8 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | ○ | | | ○ | ○ | ○ | ◎ | ◎ | | |

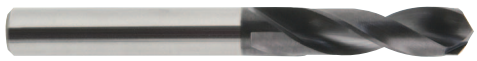
# MULTI-1 DRILLS

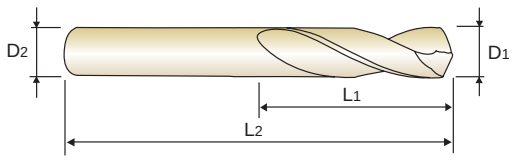
CDRA07 SERIES

## PREMIUM HSS-PM MULTI-1 DRILLS

▶ **Features** : Excellent wear resistance by using Premium powder metallurgy materials.
With special point geometry, no centering required.
Minimal drill wandering and improved hole tolerances.
Better tool life with excellent coating.

▶ **Application** : Applicable to various materials including aluminum and stainless steel, as well carbon steel and structural steel.






PREMIUM HSS-PM | N 30° | h6 | h7 | 135° P.109

### ▶ M17 / Letter sizes

Unit : Inch

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Fractional | Decimal | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| M1700B | B | .2380 | 1/4 | 1-3/8 | 3-3/16 |
| M1700C | C | .2420 | 1/4 | 1-3/8 | 3-3/16 |
| M1700D | D | .2460 | 1/4 | 1-3/8 | 3-3/16 |
| M1700F | F | .2570 | 3/8 | 1-7/16 | 3-1/4 |
| M1700G | G | .2610 | 3/8 | 1-7/16 | 3-1/4 |
| M1700I | I | .2720 | 3/8 | 1-1/2 | 3-5/16 |
| M1700J | J | .2770 | 3/8 | 1-1/2 | 3-5/16 |
| M1700L | L | .2900 | 3/8 | 1-9/16 | 3-3/8 |
| M1700M | M | .2950 | 3/8 | 1-9/16 | 3-3/8 |

| EDP No. | Diameter | | Shank Diameter | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | Fractional | Decimal | | | |
| TiAlN | D1 | | D2 | L1 | L2 |
| M1700N | N | .3020 | 3/8 | 1-5/8 | 3-7/16 |
| M1700O | O | .3160 | 3/8 | 1-11/16 | 3-1/2 |
| M1700Q | Q | .3320 | 3/8 | 1-11/16 | 3-1/2 |
| M1700R | R | .3390 | 3/8 | 1-11/16 | 3-1/2 |
| M1700U | U | .3680 | 3/8 | 1-13/16 | 3-5/8 |
| M1700V | V | .3770 | 1/2 | 1-7/8 | 3-31/32 |
| M1700X | X | .3970 | 1/2 | 1-15/16 | 4-1/32 |
| M1700Y | Y | .4040 | 1/2 | 1-15/16 | 4-1/32 |
| M1700Z | Z | .4130 | 1/2 | 2 | 4-1/32 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | ○ | | | ○ | ○ | ○ | ◎ | ◎ | | |

## PREMIUM HSS-PM MULTI-1 DRILLS

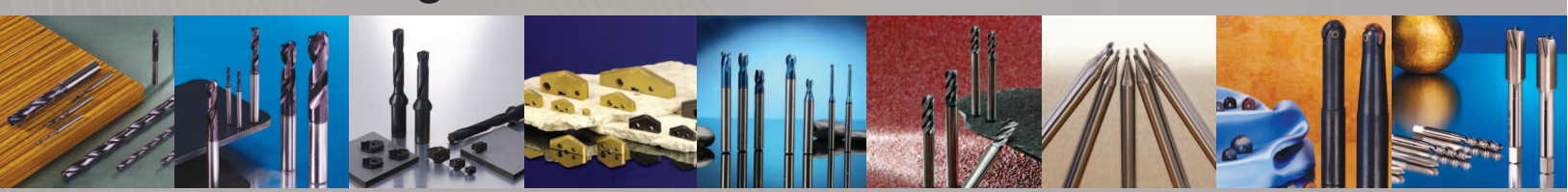
### CDRA05, CDRA06, CDRA07 SERIE

| WORK MATERIAL | STRUCTUAL STEEL CARBON STEEL | | | ALLOY STEEL | | | MOLD STEEL STAINLESS STEEL | | |
|---|---|---|---|---|---|---|---|---|---|
| DIAMETER | RPM | FEED (IPR) | FEED (inch/min) | RPM | FEED (IPR) | FEED (inch/min) | RPM | FEED (IPR) | FEED (inch/min) |
| 3/32 | 5000 | .0030 | 15.00 | 4000 | .0030 | 12.00 | 1800 | .0030 | 5.40 |
| 1/8 | 3800 | .0050 | 19.00 | 3000 | .0040 | 12.00 | 1400 | .0040 | 5.60 |
| 5/32 | 3000 | .0060 | 18.00 | 2400 | .0050 | 12.00 | 1100 | .0040 | 4.40 |
| 3/16 | 2500 | .0070 | 17.50 | 2000 | .0050 | 10.00 | 900 | .0040 | 3.60 |
| 1/4 | 1900 | .0080 | 15.20 | 1500 | .0070 | 10.50 | 700 | .0050 | 3.50 |
| 5/16 | 1500 | .0090 | 13.50 | 1200 | .0080 | 9.60 | 550 | .0070 | 3.85 |
| 3/8 | 1250 | .0100 | 12.50 | 1000 | .0090 | 9.00 | 450 | .0080 | 3.60 |
| 1/2 | 950 | .0110 | 10.45 | 750 | .0100 | 7.50 | 350 | .0090 | 3.15 |

| WORK MATERIAL | NICKEL ALLOY TITANIUM ALLOY | | | CAST IRON | | | ALUMINIUM ALLOY COPPER ALLOY NONFERROUS ALLOY | | |
|---|---|---|---|---|---|---|---|---|---|
| DIAMETER | RPM | FEED (IPR) | FEED (inch/min) | RPM | FEED (IPR) | FEED (inch/min) | RPM | FEED (IPR) | FEED (inch/min) |
| 3/32 | 800 | .0010 | 0.80 | 5700 | .0040 | 22.80 | 8700 | .0040 | 34.80 |
| 1/8 | 600 | .0020 | 1.20 | 4250 | .0060 | 25.50 | 6500 | .0060 | 39.00 |
| 5/32 | 500 | .0020 | 1.00 | 3400 | .0070 | 23.80 | 5200 | .0070 | 36.40 |
| 3/16 | 400 | .0020 | 0.80 | 2850 | .0080 | 22.80 | 4300 | .0080 | 34.40 |
| 1/4 | 300 | .0030 | 0.90 | 2100 | .0100 | 21.00 | 3200 | .0090 | 28.80 |
| 5/16 | 250 | .0030 | 0.75 | 1750 | .0120 | 21.00 | 2600 | .0110 | 28.60 |
| 3/8 | 200 | .0040 | 0.80 | 1450 | .0120 | 17.40 | 2200 | .0130 | 28.60 |
| 1/2 | 150 | .0050 | 0.75 | 1100 | .0150 | 16.50 | 1650 | .0150 | 24.75 |

N = R.P.M
S = Inch per Revolution(inch/rev.)

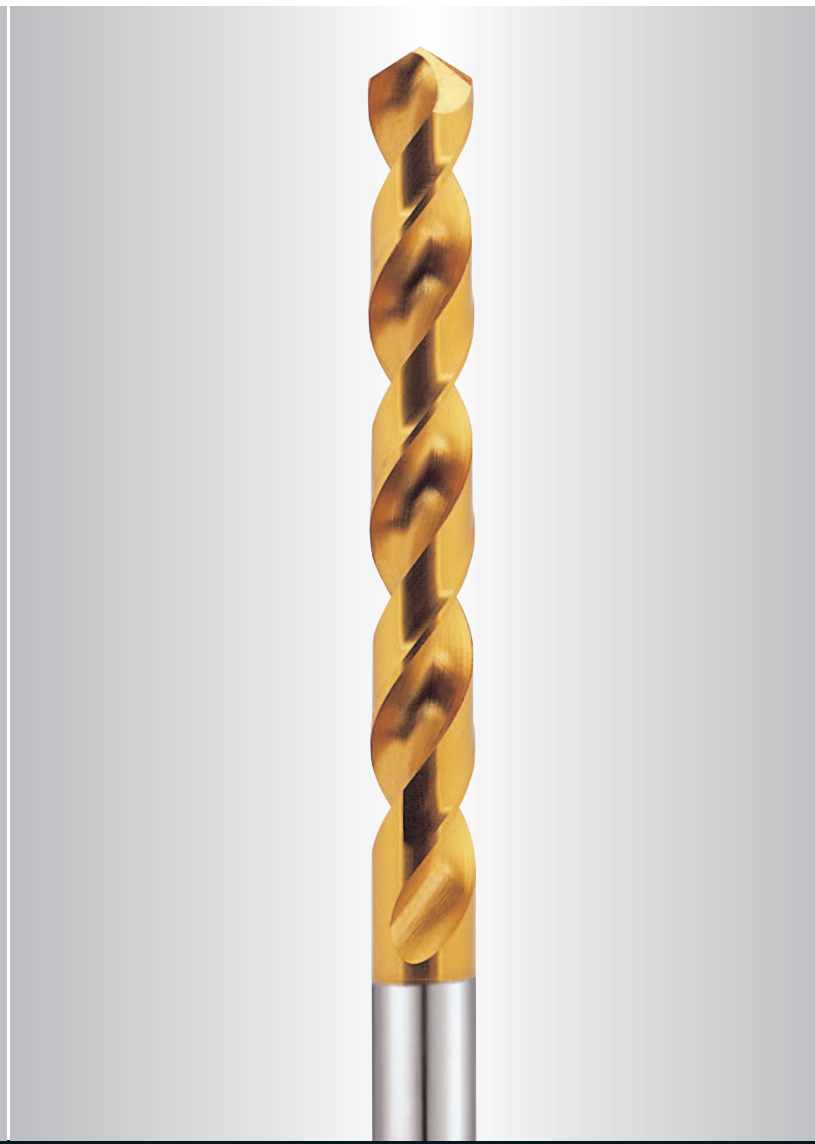
Global Cutting Tool Leader **YG-1**



# HSS

YG

Being the best through innovation



# HPD DRILLS

- **HSS-EX HPD STRAIGHT SHANK DRILLS for Stainless Steels**

## HPD - HIGH PERFORMANCE DRILLS

HPD-SUS Drills for High precision drilling in Stainless steels

| ITEM | MODEL | DESCRIPTION | | SIZE MIN | SIZE MAX | PAGE |
|---|---|---|---|---|---|---|
| **METRIC** | | | | | | |
| DJ543 | | HSS-EX, HPD-SUS DRILLS | *STUB* | D2.0 | D13.0 | **114** |
| DJ544 | | HSS-EX, HPD-SUS DRILLS | *JOBBER* | D2.0 | D20.0 | **116** |
| | | RECOMMENDED CUTTING CONDITIONS | | | | **119** |

◎ : Excellent
○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | | | | | | ○ | ◎ | ○ | ○ | ○ | |
| ◎ | | | | | | ○ | ◎ | ○ | ○ | ○ | |

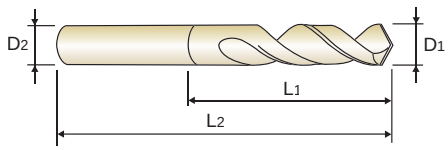
# HPD DRILLS

**DJ543 SERIES**

## HSS-EX, HPD-SUS DRILLS

***STUB***

- **Application** : Designed for drilling in stainless steels, mild steels, aluminum, aluminum alloy, aluminum die cast, copper, copper alloy, etc.
- **Advantage** : Self centering - center drilling is not required
  Excellent positioning - bush is not necessary
  Special Design - reaming is not required
  - good chip removal
  - powerful drilling
- **Plain Shank** : DIN6535-HA




HSS EX | W 38° | h7 | h8 | 130° | 120° | P.119

up to 4mm over 4mm

$D_1=D_2$

Unit : mm

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Metric | Inch | | |
| TiN | $D_1 = D_2$ | | $L_1$ | $L_2$ |
| 0201JCN | 2.0 | .0787 | 12 | 44 |
| 0211JCN | 2.1 | .0827 | 12 | 44 |
| 0221JCN | 2.2 | .0866 | 13 | 45 |
| 0231JCN | 2.3 | .0906 | 13 | 45 |
| 0241JCN | 2.4 | .0945 | 14 | 46 |
| 0251JCN | 2.5 | .0984 | 14 | 46 |
| 0261JCN | 2.6 | .1024 | 14 | 46 |
| 0271JCN | 2.7 | .1063 | 16 | 48 |
| 0281JCN | 2.8 | .1102 | 16 | 48 |
| 0291JCN | 2.9 | .1142 | 16 | 48 |
| 0301JCN | 3.0 | .1181 | 16 | 48 |
| 0311JCN | 3.1 | .1220 | 18 | 50 |
| 0321JCN | 3.2 | .1260 | 18 | 50 |
| 0331JCN | 3.3 | .1299 | 18 | 50 |
| 0341JCN | 3.4 | .1339 | 20 | 52 |
| 0351JCN | 3.5 | .1378 | 20 | 52 |
| 0361JCN | 3.6 | .1417 | 20 | 52 |
| 0371JCN | 3.7 | .1457 | 20 | 52 |
| 0381JCN | 3.8 | .1496 | 22 | 54 |
| 0391JCN | 3.9 | .1535 | 22 | 54 |
| 0401JCN | 4.0 | .1575 | 22 | 54 |
| 0411JCN | 4.1 | .1614 | 22 | 66 |
| 0421JCN | 4.2 | .1654 | 22 | 66 |
| 0431JCN | 4.3 | .1693 | 24 | 68 |
| 0441JCN | 4.4 | .1732 | 24 | 68 |
| 0451JCN | 4.5 | .1772 | 24 | 68 |
| 0461JCN | 4.6 | .1811 | 24 | 68 |
| 0471JCN | 4.7 | .1850 | 24 | 68 |

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Metric | Inch | | |
| TiN | $D_1 = D_2$ | | $L_1$ | $L_2$ |
| 0481JCN | 4.8 | .1890 | 26 | 70 |
| 0491JCN | 4.9 | .1929 | 26 | 70 |
| 0501JCN | 5.0 | .1969 | 26 | 70 |
| 0511JCN | 5.1 | .2008 | 26 | 70 |
| 0521JCN | 5.2 | .2047 | 26 | 70 |
| 0531JCN | 5.3 | .2087 | 26 | 70 |
| 0541JCN | 5.4 | .2126 | 28 | 72 |
| 0551JCN | 5.5 | .2165 | 28 | 72 |
| 0561JCN | 5.6 | .2205 | 28 | 72 |
| 0571JCN | 5.7 | .2244 | 28 | 72 |
| 0581JCN | 5.8 | .2283 | 28 | 72 |
| 0591JCN | 5.9 | .2323 | 28 | 72 |
| 0601JCN | 6.0 | .2362 | 28 | 72 |
| 0611JCN | 6.1 | .2402 | 31 | 75 |
| 0621JCN | 6.2 | .2441 | 31 | 75 |
| 0631JCN | 6.3 | .2480 | 31 | 75 |
| 0641JCN | 6.4 | .2520 | 31 | 75 |
| 0651JCN | 6.5 | .2559 | 31 | 75 |
| 0661JCN | 6.6 | .2598 | 31 | 75 |
| 0671JCN | 6.7 | .2638 | 31 | 75 |
| 0681JCN | 6.8 | .2677 | 34 | 78 |
| 0691JCN | 6.9 | .2717 | 34 | 78 |
| 0701JCN | 7.0 | .2756 | 34 | 78 |
| 0711JCN | 7.1 | .2795 | 34 | 78 |
| 0721JCN | 7.2 | .2835 | 34 | 78 |
| 0731JCN | 7.3 | .2874 | 34 | 78 |
| 0741JCN | 7.4 | .2913 | 34 | 78 |
| 0751JCN | 7.5 | .2953 | 34 | 78 |

* Individually packaged

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | | | | | | ○ | ◎ | ○ | ○ | ○ | |

# HPD DRILLS

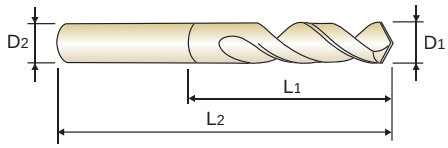
**DJ543 SERIES**

## HSS-EX, HPD-SUS DRILLS

***STUB***

- **Application** : Designed for drilling in stainless steels, mild steels, aluminum, aluminum alloy, aluminum die cast, copper, copper alloy, etc.
- **Advantage** : Self centering - center drilling is not required
  Excellent positioning - bush is not necessary
  Special Design - reaming is not required
  - good chip removal
  - powerful drilling
- **Plain Shank** : DIN6535-HA

four facet




HSS EX | W 38° | h7 | h8 | 130° | 120° | P.119

up to 4mm over 4mm

$D_1=D_2$

Unit : mm

| EDP No. | Diameter | | Flute Length | Overall Length | EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|---|---|---|---|---|
| | Metric | Inch | | | | Metric | Inch | | |
| TiN | $D_1 = D_2$ | | $L_1$ | $L_2$ | TiN | $D_1 = D_2$ | | $L_1$ | $L_2$ |
| 0761JCN | 7.6 | .2992 | 37 | 81 | 1041JCN | 10.4 | .4094 | 43 | 100 |
| 0771JCN | 7.7 | .3031 | 37 | 81 | 1051JCN | 10.5 | .4134 | 43 | 100 |
| 0781JCN | 7.8 | .3071 | 37 | 81 | 1061JCN | 10.6 | .4173 | 43 | 100 |
| 0791JCN | 7.9 | .3110 | 37 | 81 | 1071JCN | 10.7 | .4212 | 47 | 104 |
| 0801JCN | 8.0 | .3150 | 37 | 81 | 1081JCN | 10.8 | .4252 | 47 | 104 |
| 0811JCN | 8.1 | .3189 | 37 | 87 | 1091JCN | 10.9 | .4291 | 47 | 104 |
| 0821JCN | 8.2 | .3228 | 37 | 87 | 1101JCN | 11.0 | .4330 | 47 | 104 |
| 0831JCN | 8.3 | .3268 | 37 | 87 | 1111JCN | 11.1 | .4370 | 47 | 104 |
| 0841JCN | 8.4 | .3307 | 37 | 87 | 1121JCN | 11.2 | .4409 | 47 | 104 |
| 0851JCN | 8.5 | .3346 | 37 | 87 | 1131JCN | 11.3 | .4448 | 47 | 104 |
| 0861JCN | 8.6 | .3386 | 40 | 90 | 1141JCN | 11.4 | .4488 | 47 | 104 |
| 0871JCN | 8.7 | .3425 | 40 | 90 | 1151JCN | 11.5 | .4527 | 47 | 104 |
| 0881JCN | 8.8 | .3465 | 40 | 90 | 1161JCN | 11.6 | .4566 | 47 | 104 |
| 0891JCN | 8.9 | .3504 | 40 | 90 | 1171JCN | 11.7 | .4606 | 47 | 104 |
| 0901JCN | 9.0 | .3543 | 40 | 90 | 1181JCN | 11.8 | .4645 | 47 | 104 |
| 0911JCN | 9.1 | .3583 | 40 | 90 | 1191JCN | 11.9 | .4685 | 51 | 108 |
| 0921JCN | 9.2 | .3622 | 40 | 90 | 1201JCN | 12.0 | .4724 | 51 | 108 |
| 0931JCN | 9.3 | .3661 | 40 | 90 | 1211JCN | 12.1 | .4764 | 51 | 108 |
| 0941JCN | 9.4 | .3701 | 40 | 90 | 1221JCN | 12.2 | .4803 | 51 | 108 |
| 0951JCN | 9.5 | .3740 | 40 | 90 | 1231JCN | 12.3 | .4843 | 51 | 108 |
| 0961JCN | 9.6 | .3780 | 43 | 93 | 1241JCN | 12.4 | .4882 | 51 | 108 |
| 0971JCN | 9.7 | .3819 | 43 | 93 | 1251JCN | 12.5 | .4921 | 51 | 108 |
| 0981JCN | 9.8 | .3858 | 43 | 93 | 1261JCN | 12.6 | .4961 | 51 | 108 |
| 0991JCN | 9.9 | .3898 | 43 | 93 | 1271JCN | 12.7 | .5000 | 51 | 108 |
| 1001JCN | 10.0 | .3937 | 43 | 93 | 1281JCN | 12.8 | .5039 | 51 | 108 |
| 1011JCN | 10.1 | .3976 | 43 | 100 | 1291JCN | 12.9 | .5079 | 51 | 108 |
| 1021JCN | 10.2 | .4016 | 43 | 100 | 1301JCN | 13.0 | .5118 | 51 | 108 |
| 1031JCN | 10.3 | .4055 | 43 | 100 | | | | | |

* Individually packaged

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | | | | | | ○ | ◎ | ○ | ○ | ○ | |

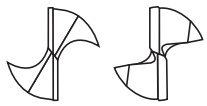
# HPD DRILLS

**DJ544 SERIES**

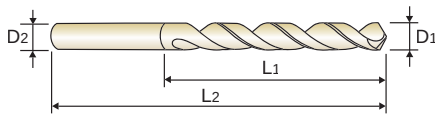
## HSS-EX, HPD-SUS DRILLS

***JOBBER***

▶ **Application** : Designed for drilling in stainless steels, mild steels, aluminum, aluminum alloy, aluminum die cast, copper, copper alloy, etc.
▶ **Advantage** : High helix-sharp cutting edges to avoid built-up and to be suitable for high performance drilling
Wide flute and stub length-increasing chip removal and reducing vibration and deflecton.
High vanadium HSS-EX material with superior TiN coating - higher speed and feed, longer service life
High quality-good surface finishes, high productivity.



up to 13mm over 13mm




HSS EX | W 38° | h7 | h8 | 130° | 120° | P.119

up to 4mm over 4mm

$D_1 = D_2$

Unit : mm

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Metric | Inch | | |
| TiN | $D_1 = D_2$ | | $L_1$ | $L_2$ |
| 0201KCN | 2.0 | .0787 | 24 | 56 |
| 0211KCN | 2.1 | .0827 | 24 | 56 |
| 0221KCN | 2.2 | .0866 | 27 | 59 |
| 0231KCN | 2.3 | .0906 | 27 | 59 |
| 0241KCN | 2.4 | .0945 | 30 | 62 |
| 0251KCN | 2.5 | .0984 | 30 | 62 |
| 0261KCN | 2.6 | .1024 | 30 | 62 |
| 0271KCN | 2.7 | .1063 | 33 | 65 |
| 0281KCN | 2.8 | .1102 | 33 | 65 |
| 0291KCN | 2.9 | .1142 | 33 | 65 |
| 0301KCN | 3.0 | .1181 | 33 | 65 |
| 0311KCN | 3.1 | .1220 | 36 | 68 |
| 0321KCN | 3.2 | .1260 | 36 | 68 |
| 0331KCN | 3.3 | .1299 | 36 | 68 |
| 0341KCN | 3.4 | .1339 | 39 | 71 |
| 0351KCN | 3.5 | .1378 | 39 | 71 |
| 0361KCN | 3.6 | .1417 | 39 | 71 |
| 0371KCN | 3.7 | .1457 | 39 | 71 |
| 0381KCN | 3.8 | .1496 | 43 | 75 |
| 0391KCN | 3.9 | .1535 | 43 | 75 |
| 0401KCN | 4.0 | .1575 | 43 | 75 |
| 0411KCN | 4.1 | .1614 | 43 | 87 |
| 0421KCN | 4.2 | .1654 | 43 | 87 |
| 0431KCN | 4.3 | .1693 | 47 | 91 |
| 0441KCN | 4.4 | .1732 | 47 | 91 |

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Metric | Inch | | |
| TiN | $D_1 = D_2$ | | $L_1$ | $L_2$ |
| 0451KCN | 4.5 | .1772 | 47 | 91 |
| 0461KCN | 4.6 | .1811 | 47 | 91 |
| 0471KCN | 4.7 | .1850 | 47 | 91 |
| 0481KCN | 4.8 | .1890 | 52 | 96 |
| 0491KCN | 4.9 | .1929 | 52 | 96 |
| 0501KCN | 5.0 | .1969 | 52 | 96 |
| 0511KCN | 5.1 | .2008 | 52 | 96 |
| 0521KCN | 5.2 | .2047 | 52 | 96 |
| 0531KCN | 5.3 | .2087 | 52 | 96 |
| 0541KCN | 5.4 | .2126 | 57 | 101 |
| 0551KCN | 5.5 | .2165 | 57 | 101 |
| 0561KCN | 5.6 | .2205 | 57 | 101 |
| 0571KCN | 5.7 | .2244 | 57 | 101 |
| 0581KCN | 5.8 | .2283 | 57 | 101 |
| 0591KCN | 5.9 | .2323 | 57 | 101 |
| 0601KCN | 6.0 | .2362 | 57 | 101 |
| 0611KCN | 6.1 | .2402 | 63 | 107 |
| 0621KCN | 6.2 | .2441 | 63 | 107 |
| 0631KCN | 6.3 | .2480 | 63 | 107 |
| 0641KCN | 6.4 | .2520 | 63 | 107 |
| 0651KCN | 6.5 | .2559 | 63 | 107 |
| 0661KCN | 6.6 | .2598 | 63 | 107 |
| 0671KCN | 6.7 | .2638 | 63 | 107 |
| 0681KCN | 6.8 | .2677 | 69 | 113 |
| 0691KCN | 6.9 | .2717 | 69 | 113 |

* Individually packaged

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | | | | | | ○ | ◎ | ○ | ○ | ○ | |

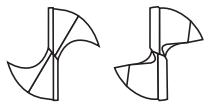
# HPD DRILLS

**DJ544 SERIES**

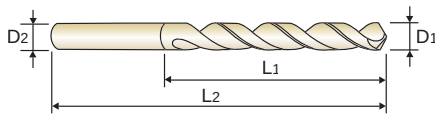
## HSS-EX, HPD-SUS DRILLS

***JOBBER***

▶ **Application** : Designed for drilling in stainless steels, mild steels, aluminum, aluminum alloy, aluminum die cast, copper, copper alloy, etc.
▶ **Advantage** : High helix-sharp cutting edges to avoid built-up and to be suitable for high performance drilling
Wide flute and stub length-increasing chip removal and reducing vibration and deflecton.
High vanadium HSS-EX material with superior TiN coating - higher speed and feed, longer service life
High quality-good surface finishes, high productivity.



up to 13mm over 13mm




HSS EX | W 38° | h7 | h8 | 130° | 120°

up to 4mm over 4mm

P.119

$D_1=D_2$

Unit : mm

| EDP No. | Diameter | | Flute Length | Overall Length | EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|---|---|---|---|---|
| | Metric | Inch | | | | Metric | Inch | | |
| TiN | $D_1 = D_2$ | | $L_1$ | $L_2$ | TiN | $D_1 = D_2$ | | $L_1$ | $L_2$ |
| 0701KCN | 7.0 | .2756 | 69 | 113 | 0951KCN | 9.5 | .3740 | 81 | 131 |
| 0711KCN | 7.1 | .2795 | 69 | 113 | 0961KCN | 9.6 | .3780 | 87 | 137 |
| 0721KCN | 7.2 | .2835 | 69 | 113 | 0971KCN | 9.7 | .3819 | 87 | 137 |
| 0731KCN | 7.3 | .2874 | 69 | 113 | 0981KCN | 9.8 | .3858 | 87 | 137 |
| 0741KCN | 7.4 | .2913 | 69 | 113 | 0991KCN | 9.9 | .3898 | 87 | 137 |
| 0751KCN | 7.5 | .2953 | 69 | 113 | 1001KCN | 10.0 | .3937 | 87 | 137 |
| 0761KCN | 7.6 | .2992 | 75 | 119 | 1011KCN | 10.1 | .3976 | 87 | 144 |
| 0771KCN | 7.7 | .3031 | 75 | 119 | 1021KCN | 10.2 | .4016 | 87 | 144 |
| 0781KCN | 7.8 | .3071 | 75 | 119 | 1031KCN | 10.3 | .4055 | 87 | 144 |
| 0791KCN | 7.9 | .3110 | 75 | 119 | 1041KCN | 10.4 | .4094 | 87 | 144 |
| 0801KCN | 8.0 | .3150 | 75 | 119 | 1051KCN | 10.5 | .4134 | 87 | 144 |
| 0811KCN | 8.1 | .3189 | 75 | 125 | 1061KCN | 10.6 | .4173 | 87 | 144 |
| 0821KCN | 8.2 | .3228 | 75 | 125 | 1071KCN | 10.7 | .4212 | 94 | 151 |
| 0831KCN | 8.3 | .3268 | 75 | 125 | 1081KCN | 10.8 | .4252 | 94 | 151 |
| 0841KCN | 8.4 | .3307 | 75 | 125 | 1091KCN | 10.9 | .4291 | 94 | 151 |
| 0851KCN | 8.5 | .3346 | 75 | 125 | 1101KCN | 11.0 | .4330 | 94 | 151 |
| 0861KCN | 8.6 | .3386 | 81 | 131 | 1111KCN | 11.1 | .4370 | 94 | 151 |
| 0871KCN | 8.7 | .3425 | 81 | 131 | 1121KCN | 11.2 | .4409 | 94 | 151 |
| 0881KCN | 8.8 | .3465 | 81 | 131 | 1131KCN | 11.3 | .4448 | 94 | 151 |
| 0891KCN | 8.9 | .3504 | 81 | 131 | 1141KCN | 11.4 | .4488 | 94 | 151 |
| 0901KCN | 9.0 | .3543 | 81 | 131 | 1151KCN | 11.5 | .4527 | 94 | 151 |
| 0911KCN | 9.1 | .3583 | 81 | 131 | 1161KCN | 11.6 | .4566 | 94 | 151 |
| 0921KCN | 9.2 | .3622 | 81 | 131 | 1171KCN | 11.7 | .4606 | 94 | 151 |
| 0931KCN | 9.3 | .3661 | 81 | 131 | 1181KCN | 11.8 | .4645 | 94 | 151 |
| 0941KCN | 9.4 | .3701 | 81 | 131 | 1191KCN | 11.9 | .4685 | 101 | 158 |

* Individually packaged

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | | | | | | ○ | ◎ | ○ | ○ | ○ | |

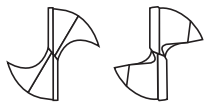
# HPD DRILLS

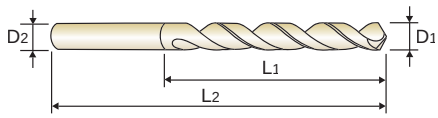
**DJ544 SERIES**

## HSS-EX, HPD-SUS DRILLS

***JOBBER***

▶ **Application** : Designed for drilling in stainless steels, mild steels, aluminum, aluminum alloy, aluminum die cast, copper, copper alloy, etc.
▶ **Advantage** : High helix-sharp cutting edges to avoid built-up and to be suitable for high performance drilling
Wide flute and stub length-increasing chip removal and reducing vibration and deflecton.
High vanadium HSS-EX material with superior TiN coating - higher speed and feed, longer service life
High quality-good surface finishes, high productivity.




HSS EX | W 38° | h7 | h8 | 130° | 120° | P.119

up to 4mm over 4mm

$D_1 = D_2$

Unit : mm

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Metric | Inch | | |
| TiN | $D_1 = D_2$ | | $L_1$ | $L_2$ |
| 1201KCN | 12.0 | .4724 | 101 | 158 |
| 1211KCN | 12.1 | .4764 | 101 | 158 |
| 1221KCN | 12.2 | .4803 | 101 | 158 |
| 1231KCN | 12.3 | .4843 | 101 | 158 |
| 1241KCN | 12.4 | .4882 | 101 | 158 |
| 1251KCN | 12.5 | .4921 | 101 | 158 |
| 1261KCN | 12.6 | .4961 | 101 | 158 |
| 1271KCN | 12.7 | .5000 | 101 | 158 |
| 1281KCN | 12.8 | .5039 | 101 | 158 |
| 1291KCN | 12.9 | .5079 | 101 | 158 |
| 1301KCN | 13.0 | .5118 | 101 | 158 |
| 1351KCN | 13.5 | .5314 | 106 | 166 |
| 1401KCN | 14.0 | .5512 | 106 | 166 |
| 1411KCN | 14.1 | .5551 | 109 | 169 |
| 1451KCN | 14.5 | .5708 | 109 | 169 |

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Metric | Inch | | |
| TiN | $D_1 = D_2$ | | $L_1$ | $L_2$ |
| 1501KCN | 15.0 | .5905 | 109 | 169 |
| 1551KCN | 15.5 | .6102 | 112 | 172 |
| 1561KCN | 15.6 | .6141 | 112 | 172 |
| 1601KCN | 16.0 | .6299 | 112 | 172 |
| 1651KCN | 16.5 | .6495 | 115 | 181 |
| 1701KCN | 17.0 | .6692 | 115 | 181 |
| 1751KCN | 17.5 | .6889 | 118 | 184 |
| 1761KCN | 17.6 | .6929 | 118 | 184 |
| 1801KCN | 18.0 | .7087 | 118 | 184 |
| 1851KCN | 18.5 | .7283 | 122 | 188 |
| 1901KCN | 19.0 | .7480 | 122 | 188 |
| 1951KCN | 19.5 | .7676 | 125 | 191 |
| 1961KCN | 19.6 | .7716 | 125 | 191 |
| 2001KCN | 20.0 | .7874 | 125 | 191 |

* Individually packaged

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | | | | | | ○ | ◎ | ○ | ○ | ○ | |

# HSS-EX, HPD-SUS TWIST DRILLS SPEED and FEED DATA

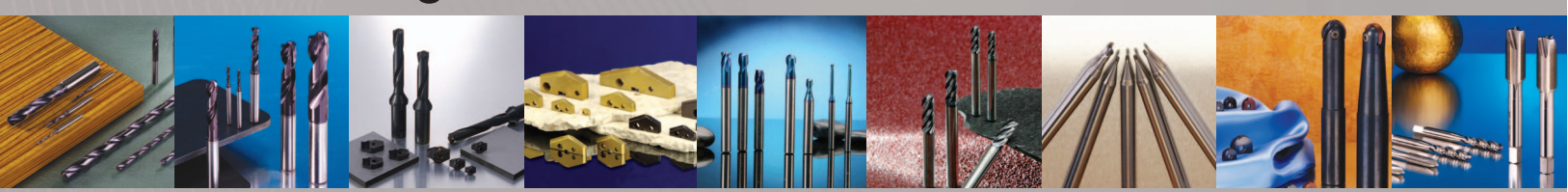
## DJ543, DJ544 SERIE

**Please decrease the feed rate 15% in JOBBERS SERIES.**
**Please decrease the feed and speed 20% for cast surface.**

| WORK MATERIAL | STAINLESS STEELS (SUS304, 200) | | STAINLESS STEELS (SUS420, 440) | | ALUMINUM & ALUMINUM ALLOY | | PLASTICS, COPPER, COPPER ALLOYS | | MILD STEELS, LOW CARBON STEELS | |
|---|---|---|---|---|---|---|---|---|---|---|
| DIAMETER | N | S | N | S | N | S | N | S | N | S |
| 2.0 | 2600 | 0.003 | 3100 | 0.003 | 11000 | 0.004 | 5600 | 0.002 | 6300 | 0.003 |
| 3.0 | 1800 | 0.003 | 2100 | 0.003 | 7350 | 0.005 | 3750 | 0.003 | 4200 | 0.005 |
| 4.0 | 1300 | 0.004 | 1600 | 0.004 | 7050 | 0.007 | 2800 | 0.004 | 3200 | 0.006 |
| 5.0 | 1050 | 0.006 | 1250 | 0.006 | 5500 | 0.009 | 2250 | 0.005 | 2500 | 0.006 |
| 6.0 | 900 | 0.007 | 1050 | 0.007 | 4600 | 0.010 | 1850 | 0.006 | 2100 | 0.007 |
| 8.0 | 650 | 0.009 | 800 | 0.009 | 3500 | 0.013 | 1350 | 0.008 | 1550 | 0.009 |
| 10.0 | 550 | 0.010 | 630 | 0.012 | 2800 | 0.016 | 1100 | 0.010 | 1250 | 0.010 |
| 12.0 | 450 | 0.013 | 530 | 0.014 | 2300 | 0.020 | 950 | 0.012 | 1050 | 0.013 |
| 14.0 | 400 | 0.014 | 450 | 0.017 | 2050 | 0.022 | 800 | 0.013 | 900 | 0.014 |
| 16.0 | 350 | 0.016 | 390 | 0.019 | 1750 | 0.024 | 700 | 0.014 | 790 | 0.016 |
| 18.0 | 300 | 0.017 | 350 | 0.020 | 1600 | 0.028 | 620 | 0.016 | 700 | 0.018 |
| 20.0 | 260 | 0.018 | 320 | 0.021 | 1450 | 0.030 | 560 | 0.016 | 620 | 0.019 |

N = R.P.M
S = Inch per Revolution(inch/rev.)

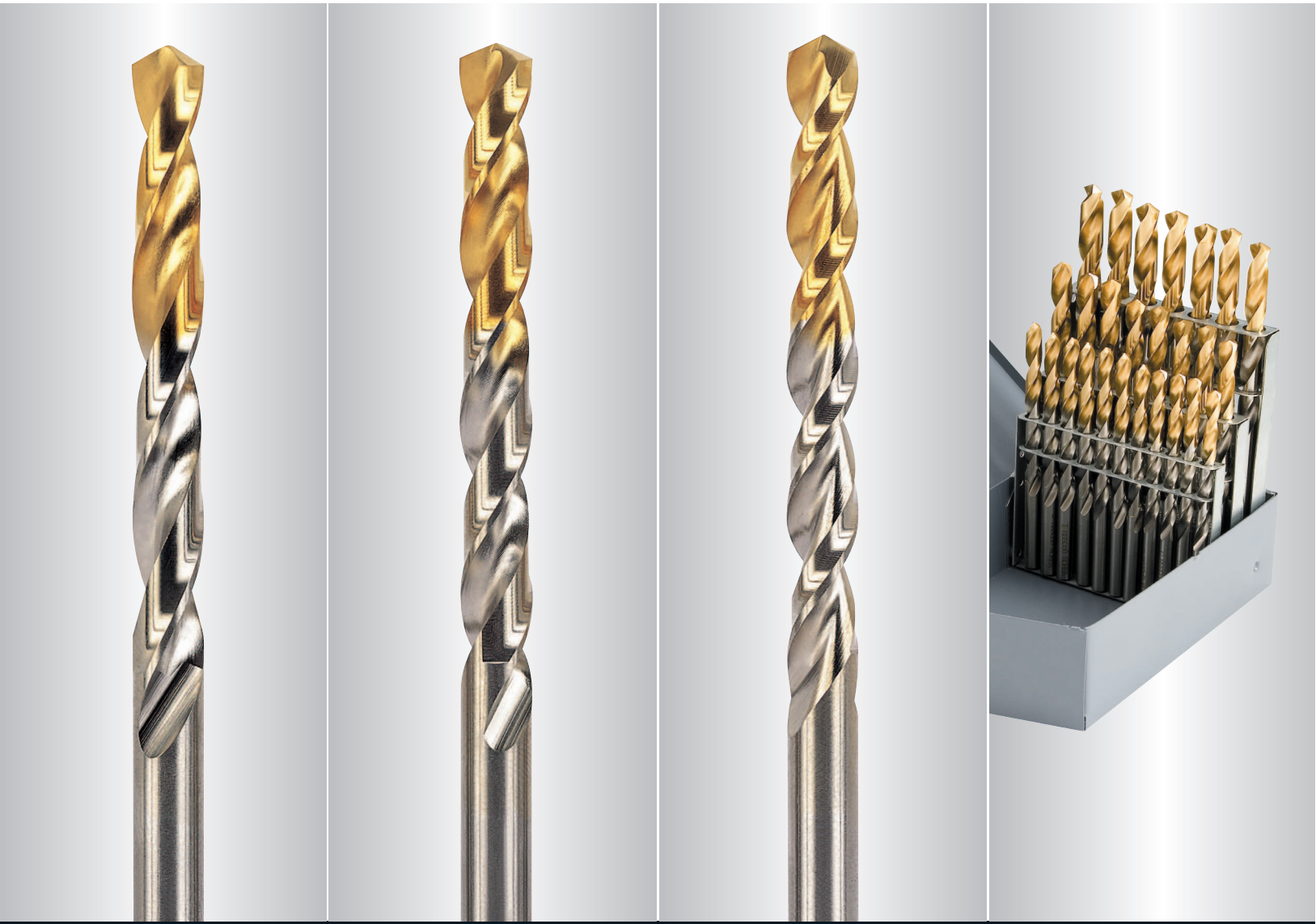
Global Cutting Tool Leader **YG-1**



# HSS

YG

Being the best through innovation



# GOLD-P DRILLS

- GOLD-P COATING

## GOLD-P DRILLS (GOLD-P COATED)

Competitive price and same performance as full TiN coating


| ITEM | MODEL | DESCRIPTION | | SIZE MIN | SIZE MAX | PAGE |
|---|---|---|---|---|---|---|
| **INCH** | | | | | | |
| D1GP182 D8182 | | HSS, STRAIGHT SHANK, GOLD-P COATED / Fractional sizes | *JOBBER* | D3/64 | D3/4 | **124** |
| D1GP139 | | HSS, STRAIGHT SHANK, GOLD-P COATED / Letter sizes | *JOBBER* | A | Z | **125** |
| D1GP138 | | HSS, STRAIGHT SHANK, GOLD-P COATED / Wire gauge sizes | *JOBBER* | #56 | #1 | **126** |
| D2GP185 | | HSSCo8, STRAIGHT SHANK, GOLD-P COATED / Fractional sizes | *JOBBER* | D3/64 | D1/2 | **127** |
| D2GP186 | | HSSCo8, STRAIGHT SHANK, GOLD-P COATED / Letter sizes | *JOBBER* | A | Z | **128** |
| D2GP187 | | HSSCo8, STRAIGHT SHANK, GOLD-P COATED / Wire gauge sizes | *JOBBER* | #56 | #1 | **129** |
| DLGP511 | | HSSCo5, STRAIGHT SHANK PARABOLIC FLUTE, GOLD-P COATED / Fractional sizes | *JOBBER* | D5/64 | D1/2 | **130** |
| DLGP513 | | HSSCo5, STRAIGHT SHANK PARABOLIC FLUTE, GOLD-P COATED / Letter sizes | *JOBBER* | A | Z | **131** |
| DLGP512 | | HSSCo5, STRAIGHT SHANK PARABOLIC FLUTE, GOLD-P COATED / Wire gauge sizes | *JOBBER* | #47 | #1 | **132** |
| **METRIC** | | | | | | |
| DLGP195 | | HSSCo5, STRAIGHT SHANK DRILLS, GOLD-P COATED | *JOBBER* | D1.0 | D13.0 | **133** |
| DLGP506 | | HSSCo5 DH100 STRAIGHT SHANK DRILLS for DEEP HOLES, GOLD-P COATED | *JOBBER* | D2.0 | D13.0 | **135** |
| | | RECOMMENDED CUTTING CONDITIONS | | | | **138** |

◎ : Excellent
○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | | ○ | ○ | ○ | ○ | | |
| ◎ | ◎ | | | | | ○ | ○ | ○ | ○ | | |
| ◎ | ◎ | | | | | ○ | ○ | ○ | ○ | | |
| ◎ | ◎ | | | | | ○ | ○ | ○ | ○ | | |
| ◎ | ◎ | | | | | ○ | ○ | ○ | ○ | | |
| ◎ | ◎ | | | | | ○ | ○ | ○ | ○ | | |
| ◎ | ◎ | | | | ○ | ○ | | | ○ | | |
| ◎ | ◎ | | | | ○ | ○ | | | ○ | | |
| ◎ | ◎ | | | | ○ | ○ | | | ○ | | |
| ◎ | ◎ | | | | | ○ | ○ | ○ | ○ | | |
| ◎ | ◎ | | | | ○ | ○ | | | ○ | | |

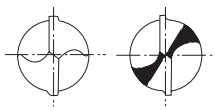
# GOLD-P DRILLS

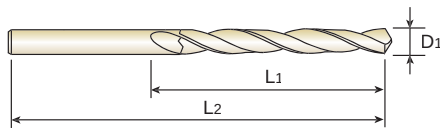
**D1GP182 SERIES**
**D8182 SERIES**

## HSS, STRAIGHT SHANK, GOLD-P COATED

***JOBBER***

- **Flute Geometry** : Right hand helix, wider flutes
- **Point Angle** : 135˚
  under 1/16 : Normal point
  1/16 & over : Split point
- **Surface treatment** : Bright body TiN coating on working part
  over TiN coating on flute length
- **Application** : Drilling in steel, cast steel alloyed and Non-alloyed, grey cast iron, graphite, malleable cast iron




ANSI HSS N 30° h8 135° P.138

## ▶ Fractional sizes

Unit : Inch

| EDP No. | Diameter Fractional D1 | Diameter Decimal D1 | Flute Length L1 | Overall Length L2 |
|---|---|---|---|---|
| * D1GP113003 | 3/64 | .0469 | 3/4 | 1-3/4 |
| * D1GP182004 | 1/16 | .0625 | 7/8 | 1-7/8 |
| * D1GP182005 | 5/64 | .0781 | 1 | 2 |
| * D1GP182006 | 3/32 | .0938 | 1-1/4 | 2-1/4 |
| * D1GP182007 | 7/64 | .1094 | 1-1/2 | 2-5/8 |
| * D1GP182008 | 1/8 | .1250 | 1-5/8 | 2-3/4 |
| * D1GP182009 | 9/64 | .1406 | 1-3/4 | 2-7/8 |
| * D1GP182010 | 5/32 | .1563 | 2 | 3-1/8 |
| * D1GP182011 | 11/64 | .1719 | 2-1/8 | 3-1/4 |
| * D1GP182012 | 3/16 | .1875 | 2-5/16 | 3-1/2 |
| * D1GP182013 | 13/64 | .2031 | 2-7/16 | 3-5/8 |
| * D1GP182014 | 7/32 | .2188 | 2-1/2 | 3-3/4 |
| * D1GP182015 | 15/64 | .2344 | 2-5/8 | 3-7/8 |
| * D1GP182016 | 1/4 | .2500 | 2-3/4 | 4 |
| * D1GP182017 | 17/64 | .2656 | 2-7/8 | 4-1/8 |
| * D1GP182018 | 9/32 | .2813 | 2-15/16 | 4-1/4 |
| * D1GP182019 | 19/64 | .2969 | 3-1/16 | 4-3/8 |
| * D1GP182020 | 5/16 | .3125 | 3-3/16 | 4-1/2 |
| ** D1GP182021 | 21/64 | .3281 | 3-5/16 | 4-5/8 |
| ** D1GP182022 | 11/32 | .3438 | 3-7/16 | 4-3/4 |
| ** D1GP182023 | 23/64 | .3594 | 3-1/2 | 4-7/8 |
| ** D1GP182024 | 3/8 | .3750 | 3-5/8 | 5 |
| ** D1GP182025 | 25/64 | .3906 | 3-3/4 | 5-1/8 |
| ** D1GP182026 | 13/32 | .4063 | 3-7/8 | 5-1/4 |
| ** D1GP182027 | 27/64 | .4219 | 3-15/16 | 5-3/8 |
| ** D1GP182028 | 7/16 | .4375 | 4-1/16 | 5-1/2 |
| ** D1GP182029 | 29/64 | .4531 | 4-3/16 | 5-5/8 |
| ** D1GP182030 | 15/32 | .4688 | 4-5/16 | 5-3/4 |
| ** D1GP182031 | 31/64 | .4844 | 4-3/8 | 5-7/8 |
| ** D1GP182032 | 1/2 | .5000 | 4-1/2 | 6 |
| ** D8182033 | 33/64 | .5156 | 4-13/16 | 6-5/8 |
| ** D8182034 | 17/32 | .5312 | 4-13/16 | 6-5/8 |
| ** D8182035 | 35/64 | .5469 | 4-13/16 | 6-5/8 |
| ** D8182036 | 9/16 | .5625 | 4-13/16 | 6-5/8 |
| ** D8182037 | 37/64 | .5781 | 4-13/16 | 6-5/8 |
| ⁂ D8182038 | 19/32 | .5937 | 5-3/16 | 7-1/8 |
| ⁂ D8182039 | 39/64 | .6094 | 5-3/16 | 7-1/8 |
| ⁂ D8182040 | 5/8 | .6250 | 5-3/16 | 7-1/8 |
| ⁂ D8182042 | 21/32 | .6563 | 5-3/16 | 7-1/8 |
| ⁂ D8182044 | 11/16 | .6875 | 5-5/8 | 7-5/8 |
| ⁂ D8182045 | 45/64 | .7031 | 5-5/8 | 9-1/2 |
| ⁂ D8182046 | 23/32 | .7188 | 5-5/8 | 9-1/2 |
| ⁂ D8182047 | 47/64 | .7344 | 5-5/8 | 9-3/4 |
| ⁂ D8182048 | 3/4 | .7500 | 5-7/8 | 9-3/4 |

* 10per package
** 5per package
⁂ 3per package

| Tolerance Diameter (Inch) | |
|---|---|
| up to 1/8(.1250) | 0 ~ −.0005 |
| over 1/8(.1250) up to 1/4(.2500) | 0 ~ −.0007 |
| over 1/4(.2500) up to 1/2(.5000) | 0 ~ −.0010 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | | ○ | ○ | ○ | ○ | | |

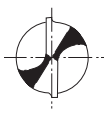
# GOLD-P DRILLS

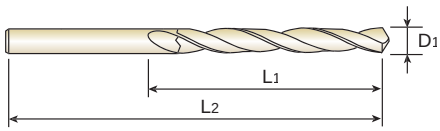
**D1GP139 SERIES**

## HSS, STRAIGHT SHANK, GOLD-P COATED

***JOBBER***

- ▶**Flute Geometry** : Right hand helix, wider flutes
- ▶**Point Angle** : 135°:Split point
- ▶**Surface treatment** : Bright body TiN coating on working part
- ▶**Application** : Drilling in steel, cast steel alloyed and Non-alloyed, grey cast iron, graphite, malleable cast iron






ANSI HSS N ≈30° h8 135° P.138

## ▶ Letter sizes

Unit : Inch

| EDP No. | Diameter Letter | Diameter Decimal | Flute Length | Overall Length |
|---|---|---|---|---|
| | D1 | | L1 | L2 |
| * D1GP139101 | A | .2340 | 2-5/8 | 3-7/8 |
| * D1GP139102 | B | .2380 | 2-3/4 | 4 |
| * D1GP139103 | C | .2420 | 2-3/4 | 4 |
| * D1GP139104 | D | .2460 | 2-3/4 | 4 |
| * D1GP139105 | E | .2500 | 2-3/4 | 4 |
| * D1GP139106 | F | .2570 | 2-7/8 | 4-1/8 |
| * D1GP139107 | G | .2610 | 2-7/8 | 4-1/8 |
| * D1GP139108 | H | .2660 | 2-7/8 | 4-1/8 |
| * D1GP139109 | I | .2720 | 2-7/8 | 4-1/8 |
| * D1GP139110 | J | .2770 | 2-7/8 | 4-1/8 |
| * D1GP139111 | K | .2810 | 2-15/16 | 4-1/4 |
| * D1GP139112 | L | .2900 | 2-15/16 | 4-1/4 |
| * D1GP139113 | M | .2950 | 3-1/16 | 4-3/8 |
| * D1GP139114 | N | .3020 | 3-1/16 | 4-3/8 |
| * D1GP139115 | O | .3160 | 3-3/16 | 4-1/2 |
| * D1GP139116 | P | .3230 | 3-5/16 | 4-5/8 |
| ** D1GP139117 | Q | .3320 | 3-7/16 | 4-3/4 |
| ** D1GP139118 | R | .3390 | 3-7/16 | 4-3/4 |
| ** D1GP139119 | S | .3480 | 3-1/2 | 4-7/8 |
| ** D1GP139120 | T | .3580 | 3-1/2 | 4-7/8 |
| ** D1GP139121 | U | .3680 | 3-5/8 | 5 |
| ** D1GP139122 | V | .3770 | 3-5/8 | 5 |
| ** D1GP139123 | W | .3860 | 3-3/4 | 5-1/8 |
| ** D1GP139124 | X | .3970 | 3-3/4 | 5-1/8 |
| ** D1GP139125 | Y | .4040 | 3-7/8 | 5-1/4 |
| ** D1GP139126 | Z | .4130 | 3-7/8 | 5-1/4 |

* 10per package
** 5per package

| Tolerance Diameter (Inch) | |
|---|---|
| up to 1/8(.1250) | 0 ~ −.0005 |
| over 1/8(.1250) up to 1/4(.2500) | 0 ~ −.0007 |
| over 1/4(.2500) up to 1/2(.5000) | 0 ~ −.0010 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | | ○ | ○ | ○ | ○ | | |

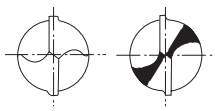
# GOLD-P DRILLS

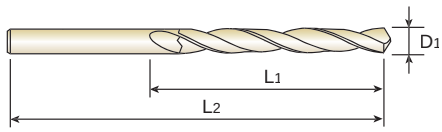
**D1GP138 SERIES**

## HSS, STRAIGHT SHANK, GOLD-P COATED

***JOBBER***

- **Flute Geometry** : Right hand helix, wider flutes
- **Point Angle** : 135°, Split point
  Wire gauge size #53~#56:Normal point
  Wire gauge size #1~#52:Split point
- **Surface treatment** : Bright body TiN coating on working part
- **Application** : Drilling in steel, cast steel alloyed and Non-alloyed, grey cast iron, graphite, malleable cast iron




ANSI HSS N 30° h8 135° 118°

#53~#56 #1~#52

P.138

## ▶ Wire gauge sizes

Unit : Inch

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Wire gauge | Decimal | D1 | |
| | | | L1 | L2 |
| * D1GP138256 | 1 | .2280 | 2-5/8 | 3-7/8 |
| * D1GP138255 | 2 | .2210 | 2-5/8 | 3-7/8 |
| * D1GP138254 | 3 | .2130 | 2-1/2 | 3-3/4 |
| * D1GP138253 | 4 | .2090 | 2-1/2 | 3-3/4 |
| * D1GP138252 | 5 | .2055 | 2-1/2 | 3-3/4 |
| * D1GP138251 | 6 | .2040 | 2-1/2 | 3-3/4 |
| * D1GP138250 | 7 | .2010 | 2-7/16 | 3-5/8 |
| * D1GP138249 | 8 | .1990 | 2-7/16 | 3-5/8 |
| * D1GP138248 | 9 | .1960 | 2-7/16 | 3-5/8 |
| * D1GP138247 | 10 | .1935 | 2-7/16 | 3-5/8 |
| * D1GP138246 | 11 | .1910 | 2-5/16 | 3-1/2 |
| * D1GP138245 | 12 | .1890 | 2-5/16 | 3-1/2 |
| * D1GP138244 | 13 | .1850 | 2-5/16 | 3-1/2 |
| * D1GP138243 | 14 | .1820 | 2-3/16 | 3-3/8 |
| * D1GP138242 | 15 | .1800 | 2-3/16 | 3-3/8 |
| * D1GP138241 | 16 | .1770 | 2-3/16 | 3-3/8 |
| * D1GP138240 | 17 | .1730 | 2-3/16 | 3-3/8 |
| * D1GP138239 | 18 | .1695 | 2-1/8 | 3-1/4 |
| * D1GP138238 | 19 | .1660 | 2-1/8 | 3-1/4 |
| * D1GP138237 | 20 | .1610 | 2-1/8 | 3-1/4 |
| * D1GP138236 | 21 | .1590 | 2-1/8 | 3-1/4 |
| * D1GP138235 | 22 | .1570 | 2 | 3-1/8 |
| * D1GP138234 | 23 | .1540 | 2 | 3-1/8 |
| * D1GP138233 | 24 | .1520 | 2 | 3-1/8 |
| * D1GP138232 | 25 | .1495 | 1-7/8 | 3 |
| * D1GP138231 | 26 | .1470 | 1-7/8 | 3 |
| * D1GP138230 | 27 | .1440 | 1-7/8 | 3 |
| * D1GP138229 | 28 | .1405 | 1-3/4 | 2-7/8 |

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Wire gauge | Decimal | D1 | |
| | | | L1 | L2 |
| * D1GP138228 | 29 | .1360 | 1-3/4 | 2-7/8 |
| * D1GP138227 | 30 | .1285 | 1-5/8 | 2-3/4 |
| * D1GP138226 | 31 | .1200 | 1-5/8 | 2-3/4 |
| * D1GP138225 | 32 | .1160 | 1-5/8 | 2-3/4 |
| * D1GP138224 | 33 | .1130 | 1-1/2 | 2-5/8 |
| * D1GP138223 | 34 | .1110 | 1-1/2 | 2-5/8 |
| * D1GP138222 | 35 | .1100 | 1-1/2 | 2-5/8 |
| * D1GP138221 | 36 | .1065 | 1-7/16 | 2-1/2 |
| * D1GP138220 | 37 | .1040 | 1-7/16 | 2-1/2 |
| * D1GP138219 | 38 | .1015 | 1-7/16 | 2-1/2 |
| * D1GP138218 | 39 | .0995 | 1-3/8 | 2-3/8 |
| * D1GP138217 | 40 | .0980 | 1-3/8 | 2-3/8 |
| * D1GP138216 | 41 | .0960 | 1-3/8 | 2-3/8 |
| * D1GP138215 | 42 | .0935 | 1-1/4 | 2-1/4 |
| * D1GP138214 | 43 | .0890 | 1-1/4 | 2-1/4 |
| * D1GP138213 | 44 | .0860 | 1-1/8 | 2-1/8 |
| * D1GP138212 | 45 | .0820 | 1-1/8 | 2-1/8 |
| * D1GP138211 | 46 | .0810 | 1-1/8 | 2-1/8 |
| * D1GP138210 | 47 | .0785 | 1 | 2 |
| * D1GP138209 | 48 | .0760 | 1 | 2 |
| * D1GP138208 | 49 | .0730 | 1 | 2 |
| * D1GP138207 | 50 | .0700 | 1 | 2 |
| * D1GP138206 | 51 | .0670 | 1 | 2 |
| * D1GP138205 | 52 | .0635 | 7/8 | 1-7/8 |
| * D1GP134204 | 53 | .0595 | 7/8 | 1-7/8 |
| * D1GP134203 | 54 | .0550 | 7/8 | 1-7/8 |
| * D1GP134202 | 55 | .0520 | 7/8 | 1-7/8 |
| * D1GP134201 | 56 | .0465 | 3/4 | 1-3/4 |

▶ **Tolerance** : See page 124

* 10per package

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | | ○ | ○ | ○ | ○ | | |

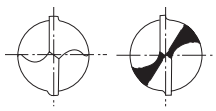
# GOLD-P DRILLS

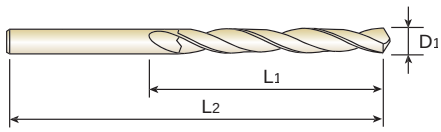
**D2GP185 SERIES**

## HSSCo8, STRAIGHT SHANK, GOLD-P COATED

***JOBBER***

- ▶**Flute Geometry** : Right hand helix, wider flutes
- ▶**Point Angle** : 135°
  under 1/16 : Normal point
  1/16 & over : Split point
- ▶**Surface treatment** : Bright body TiN coating on working part
- ▶**Application** : Drilling in steel, cast steel alloyed and Non-alloyed, grey cast iron, graphite, malleable cast iron




ANSI | HSS Co8 | N ≈ 30° | h8 | 135° P.138

## ▶ Fractional sizes

Unit : Inch

| EDP No. | Diameter Fractional | Diameter Decimal | Flute Length | Overall Length |
|---|---|---|---|---|
| | D1 | | L1 | L2 |
| * D2GP185003 | 3/64 | .0469 | 3/4 | 1-3/4 |
| * D2GP185004 | 1/16 | .0625 | 7/8 | 1-7/8 |
| * D2GP185005 | 5/64 | .0781 | 1 | 2 |
| * D2GP185006 | 3/32 | .0938 | 1-1/4 | 2-1/4 |
| * D2GP185007 | 7/64 | .1094 | 1-1/2 | 2-5/8 |
| * D2GP185008 | 1/8 | .1250 | 1-5/8 | 2-3/4 |
| * D2GP185009 | 9/64 | .1406 | 1-3/4 | 2-7/8 |
| * D2GP185010 | 5/32 | .1563 | 2 | 3-1/8 |
| * D2GP185011 | 11/64 | .1719 | 2-1/8 | 3-1/4 |
| * D2GP185012 | 3/16 | .1875 | 2-5/16 | 3-1/2 |
| * D2GP185013 | 13/64 | .2031 | 2-7/16 | 3-5/8 |
| * D2GP185014 | 7/32 | .2188 | 2-1/2 | 3-3/4 |
| * D2GP185015 | 15/64 | .2344 | 2-5/8 | 3-7/8 |
| * D2GP185016 | 1/4 | .2500 | 2-3/4 | 4 |
| * D2GP185017 | 17/64 | .2656 | 2-7/8 | 4-1/8 |

| EDP No. | Diameter Fractional | Diameter Decimal | Flute Length | Overall Length |
|---|---|---|---|---|
| | D1 | | L1 | L2 |
| * D2GP185018 | 9/32 | .2813 | 2-15/16 | 4-1/4 |
| * D2GP185019 | 19/64 | .2969 | 3-1/16 | 4-3/8 |
| * D2GP185020 | 5/16 | .3125 | 3-3/16 | 4-1/2 |
| ** D2GP185021 | 21/64 | .3281 | 3-5/16 | 4-5/8 |
| ** D2GP185022 | 11/32 | .3438 | 3-7/16 | 4-3/4 |
| ** D2GP185023 | 23/64 | .3594 | 3-1/2 | 4-7/8 |
| ** D2GP185024 | 3/8 | .3750 | 3-5/8 | 5 |
| ** D2GP185025 | 25/64 | .3906 | 3-3/4 | 5-1/8 |
| ** D2GP185026 | 13/32 | .4063 | 3-7/8 | 5-1/4 |
| ** D2GP185027 | 27/64 | .4219 | 3-15/16 | 5-3/8 |
| ** D2GP185028 | 7/16 | .4375 | 4-1/16 | 5-1/2 |
| ** D2GP185029 | 29/64 | .4531 | 4-3/16 | 5-5/8 |
| ** D2GP185030 | 15/32 | .4688 | 4-5/16 | 5-3/4 |
| ** D2GP185031 | 31/64 | .4844 | 4-3/8 | 5-7/8 |
| ** D2GP185032 | 1/2 | .5000 | 4-1/2 | 6 |

* 10per package
** 5per package

| Tolerance Diameter (Inch) | |
|---|---|
| up to 1/8(.1250) | 0 ~ −.0005 |
| over 1/8(.1250) up to 1/4(.2500) | 0 ~ −.0007 |
| over 1/4(.2500) up to 1/2(.5000) | 0 ~ −.0010 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | | ○ | ○ | ○ | ○ | | |

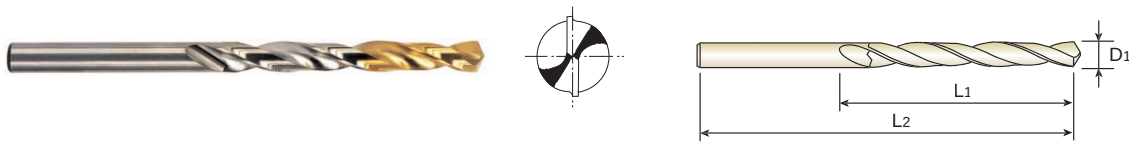
# GOLD-P DRILLS

**D2GP186 SERIES**

## HSSCo8, STRAIGHT SHANK, GOLD-P COATED

***JOBBER***

- **Flute Geometry** : Right hand helix, wider flutes
- **Point Angle** : 135°:Split point
- **Surface treatment** : Bright body TiN coating on working part
- **Application** : Drilling in steel, cast steel alloyed and Non-alloyed, grey cast iron, graphite, malleable cast iron




ANSI | HSS Co8 | N 30° | h8 | 135° | P.138

## ▶ Letter sizes

Unit : Inch

| EDP No. | Diameter Letter | Diameter Decimal | Flute Length L1 | Overall Length L2 |
|---|---|---|---|---|
| * D2GP186101 | A | .2340 | 2-5/8 | 3-7/8 |
| * D2GP186102 | B | .2380 | 2-3/4 | 4 |
| * D2GP186103 | C | .2420 | 2-3/4 | 4 |
| * D2GP186104 | D | .2460 | 2-3/4 | 4 |
| * D2GP185105 | E | .2500 | 2-3/4 | 4 |
| * D2GP186106 | F | .2570 | 2-7/8 | 4-1/8 |
| * D2GP186107 | G | .2610 | 2-7/8 | 4-1/8 |
| * D2GP186108 | H | .2660 | 2-7/8 | 4-1/8 |
| * D2GP186109 | I | .2720 | 2-7/8 | 4-1/8 |
| * D2GP186110 | J | .2770 | 2-7/8 | 4-1/8 |
| * D2GP186111 | K | .2810 | 2-15/16 | 4-1/4 |
| * D2GP186112 | L | .2900 | 2-15/16 | 4-1/4 |
| * D2GP186113 | M | .2950 | 3-1/16 | 4-3/8 |

| EDP No. | Diameter Letter | Diameter Decimal | Flute Length L1 | Overall Length L2 |
|---|---|---|---|---|
| * D2GP186114 | N | .3020 | 3-1/16 | 4-3/8 |
| * D2GP186115 | O | .3160 | 3-3/16 | 4-1/2 |
| * D2GP186116 | P | .3230 | 3-5/16 | 4-5/8 |
| ** D2GP186117 | Q | .3320 | 3-7/16 | 4-3/4 |
| ** D2GP186118 | R | .3390 | 3-7/16 | 4-3/4 |
| ** D2GP186119 | S | .3480 | 3-1/2 | 4-7/8 |
| ** D2GP186120 | T | .3580 | 3-1/2 | 4-7/8 |
| ** D2GP186121 | U | .3680 | 3-5/8 | 5 |
| ** D2GP186122 | V | .3770 | 3-5/8 | 5 |
| ** D2GP186123 | W | .3860 | 3-3/4 | 5-1/8 |
| ** D2GP186124 | X | .3970 | 3-3/4 | 5-1/8 |
| ** D2GP186125 | Y | .4040 | 3-7/8 | 5-1/4 |
| ** D2GP186126 | Z | .4130 | 3-7/8 | 5-1/4 |

* 10per package
** 5per package

| Tolerance Diameter (Inch) | |
|---|---|
| up to 1/8(.1250) | 0 ~ −.0005 |
| over 1/8(.1250) up to 1/4(.2500) | 0 ~ −.0007 |
| over 1/4(.2500) up to 1/2(.5000) | 0 ~ −.0010 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | | ○ | ○ | ○ | ○ | | |

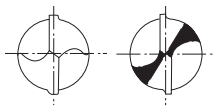
# GOLD-P DRILLS

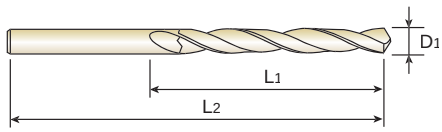
**D2GP187 SERIES**

## HSSCo8, STRAIGHT SHANK, GOLD-P COATED

***JOBBER***

- ▶ **Flute Geometry** : Right hand helix, wider flutes
- ▶ **Point Angle** : 135°:Split point
  Wire gauge size #53~#56:Normal point
  Wire gauge size #1~#52:Split point
- ▶ **Surface treatment** : Bright body TiN coating on working part
- ▶ **Application** : Drilling in steel, cast steel alloyed and Non-alloyed, grey cast iron, graphite, malleable cast iron




ANSI | HSS Co8 | N ≈30° | h8 | 135° P.138

## ▶ Wire gauge sizes

Unit : Inch

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Wire gauge | Decimal | D1 | |
| | | | L1 | L2 |
| * D2GP187256 | 1 | .2280 | 2-5/8 | 3-7/8 |
| * D2GP187255 | 2 | .2210 | 2-5/8 | 3-7/8 |
| * D2GP187254 | 3 | .2130 | 2-1/2 | 3-3/4 |
| * D2GP187253 | 4 | .2090 | 2-1/2 | 3-3/4 |
| * D2GP187252 | 5 | .2055 | 2-1/2 | 3-3/4 |
| * D2GP187251 | 6 | .2040 | 2-1/2 | 3-3/4 |
| * D2GP187250 | 7 | .2010 | 2-7/16 | 3-5/8 |
| * D2GP187249 | 8 | .1990 | 2-7/16 | 3-5/8 |
| * D2GP187248 | 9 | .1960 | 2-7/16 | 3-5/8 |
| * D2GP187247 | 10 | .1935 | 2-7/16 | 3-5/8 |
| * D2GP187246 | 11 | .1910 | 2-5/16 | 3-1/2 |
| * D2GP187245 | 12 | .1890 | 2-5/16 | 3-1/2 |
| * D2GP187244 | 13 | .1850 | 2-5/16 | 3-1/2 |
| * D2GP187243 | 14 | .1820 | 2-3/16 | 3-3/8 |
| * D2GP187242 | 15 | .1800 | 2-3/16 | 3-3/8 |
| * D2GP187241 | 16 | .1770 | 2-3/16 | 3-3/8 |
| * D2GP187240 | 17 | .1730 | 2-3/16 | 3-3/8 |
| * D2GP187239 | 18 | .1695 | 2-1/8 | 3-1/4 |
| * D2GP187238 | 19 | .1660 | 2-1/8 | 3-1/4 |
| * D2GP187237 | 20 | .1610 | 2-1/8 | 3-1/4 |
| * D2GP187236 | 21 | .1590 | 2-1/8 | 3-1/4 |
| * D2GP187235 | 22 | .1570 | 2 | 3-1/8 |
| * D2GP187234 | 23 | .1540 | 2 | 3-1/8 |
| * D2GP187233 | 24 | .1520 | 2 | 3-1/8 |
| * D2GP187232 | 25 | .1495 | 1-7/8 | 3 |
| * D2GP187231 | 26 | .1470 | 1-7/8 | 3 |
| * D2GP187230 | 27 | .1440 | 1-7/8 | 3 |
| * D2GP187229 | 28 | .1405 | 1-3/4 | 2-7/8 |

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Wire gauge | Decimal | D1 | |
| | | | L1 | L2 |
| * D2GP187228 | 29 | .1360 | 1-3/4 | 2-7/8 |
| * D2GP187227 | 30 | .1285 | 1-5/8 | 2-3/4 |
| * D2GP187226 | 31 | .1200 | 1-5/8 | 2-3/4 |
| * D2GP187225 | 32 | .1160 | 1-5/8 | 2-3/4 |
| * D2GP187224 | 33 | .1130 | 1-1/2 | 2-5/8 |
| * D2GP187223 | 34 | .1110 | 1-1/2 | 2-5/8 |
| * D2GP187222 | 35 | .1100 | 1-1/2 | 2-5/8 |
| * D2GP187221 | 36 | .1065 | 1-7/16 | 2-1/2 |
| * D2GP187220 | 37 | .1040 | 1-7/16 | 2-1/2 |
| * D2GP187219 | 38 | .1015 | 1-7/16 | 2-1/2 |
| * D2GP187218 | 39 | .0995 | 1-3/8 | 2-3/8 |
| * D2GP187217 | 40 | .0980 | 1-3/8 | 2-3/8 |
| * D2GP187216 | 41 | .0960 | 1-3/8 | 2-3/8 |
| * D2GP187215 | 42 | .0935 | 1-1/4 | 2-1/4 |
| * D2GP187214 | 43 | .0890 | 1-1/4 | 2-1/4 |
| * D2GP187213 | 44 | .0860 | 1-1/8 | 2-1/8 |
| * D2GP187212 | 45 | .0820 | 1-1/8 | 2-1/8 |
| * D2GP187211 | 46 | .0810 | 1-1/8 | 2-1/8 |
| * D2GP187210 | 47 | .0785 | 1 | 2 |
| * D2GP187209 | 48 | .0760 | 1 | 2 |
| * D2GP187208 | 49 | .0730 | 1 | 2 |
| * D2GP187207 | 50 | .0700 | 1 | 2 |
| * D2GP187206 | 51 | .0670 | 1 | 2 |
| * D2GP187205 | 52 | .0635 | 7/8 | 1-7/8 |
| * D2GP187204 | 53 | .0595 | 7/8 | 1-7/8 |
| * D2GP187203 | 54 | .0550 | 7/8 | 1-7/8 |
| * D2GP187202 | 55 | .0520 | 7/8 | 1-7/8 |
| * D2GP187201 | 56 | .0465 | 3/4 | 1-3/4 |

▶ **Tolerance** : See page 124

* 10per package

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | | ○ | ○ | ○ | ○ | | |

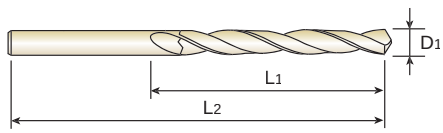
# GOLD-P DRILLS

DLGP511 SERIES

## HSSCo5, STRAIGHT SHANK PARABOLIC FLUTE, GOLD-P COATED

*JOBBER*

- **Flute Geometry** : Right hand spiral, 38° helix, parabolic flute.
- **Point Angle** : 130°:Split point
- **Surface treatment** : Bright body TiN coating on working part
- **Application** : Improved chip removal in most materials, especially in deep drilling applications.




ANSI | HSS Co5 | N 38° | h8 | 130° P.139

## ▶ Fractional sizes

Unit : Inch

| EDP No. | Diameter Fractional D1 | Diameter Decimal D1 | Flute Length L1 | Overall Length L2 |
|---|---|---|---|---|
| * DLGP511005 | 5/64 | .0781 | 1 | 2 |
| * DLGP511006 | 3/32 | .0938 | 1-1/4 | 2-1/4 |
| * DLGP511007 | 7/64 | .1094 | 1-1/2 | 2-5/8 |
| * DLGP511008 | 1/8 | .1250 | 1-5/8 | 2-3/4 |
| * DLGP511009 | 9/64 | .1406 | 1-3/4 | 2-7/8 |
| * DLGP511010 | 5/32 | .1563 | 2 | 3-1/8 |
| * DLGP511011 | 11/64 | .1719 | 2-1/8 | 3-1/4 |
| * DLGP511012 | 3/16 | .1875 | 2-5/16 | 3-1/2 |
| * DLGP511013 | 13/64 | .2031 | 2-7/16 | 3-5/8 |
| * DLGP511014 | 7/32 | .2188 | 2-1/2 | 3-3/4 |
| * DLGP511015 | 15/64 | .2344 | 2-5/8 | 3-7/8 |
| * DLGP511016 | 1/4 | .2500 | 2-3/4 | 4 |
| * DLGP511017 | 17/64 | .2656 | 2-7/8 | 4-1/8 |
| * DLGP511018 | 9/32 | .2813 | 2-15/16 | 4-1/4 |

| EDP No. | Diameter Fractional D1 | Diameter Decimal D1 | Flute Length L1 | Overall Length L2 |
|---|---|---|---|---|
| * DLGP511019 | 19/64 | .2969 | 3-1/16 | 4-3/8 |
| * DLGP511020 | 5/16 | .3125 | 3-3/16 | 4-1/2 |
| ** DLGP511021 | 21/64 | .3281 | 3-5/16 | 4-5/8 |
| ** DLGP511022 | 11/32 | .3438 | 3-7/16 | 4-3/4 |
| ** DLGP511023 | 23/64 | .3594 | 3-1/2 | 4-7/8 |
| ** DLGP511024 | 3/8 | .3750 | 3-5/8 | 5 |
| ** DLGP511025 | 25/64 | .3906 | 3-3/4 | 5-1/8 |
| ** DLGP511026 | 13/32 | .4063 | 3-7/8 | 5-1/4 |
| ** DLGP511027 | 27/64 | .4219 | 3-15/16 | 5-3/8 |
| ** DLGP511028 | 7/16 | .4375 | 4-1/16 | 5-1/2 |
| ** DLGP511029 | 29/64 | .4531 | 4-3/16 | 5-5/8 |
| ** DLGP511030 | 15/32 | .4688 | 4-5/16 | 5-3/4 |
| ** DLGP511031 | 31/64 | .4844 | 4-3/8 | 5-7/8 |
| ** DLGP511032 | 1/2 | .5000 | 4-1/2 | 6 |

* 10per package
** 5per package

| Tolerance Diameter (Inch) | |
|---|---|
| up to 1/8(.1250) | 0 ~ −.0005 |
| over 1/8(.1250) up to 1/4(.2500) | 0 ~ −.0007 |
| over 1/4(.2500) up to 1/2(.5000) | 0 ~ −.0010 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | ○ | ○ | | | ○ | | |

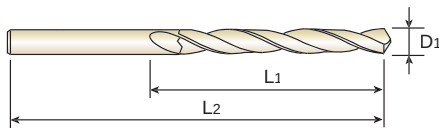
# GOLD-P DRILLS

**DLGP513 SERIES**

## HSSCo5, STRAIGHT SHANK PARABOLIC FLUTE, GOLD-P COATED

***JOBBER***

- ▶**Flute Geometry** : Right hand spiral, 38° helix, parabolic flute.
- ▶**Point Angle** : 130°:Split point
- ▶**Surface treatment** : Bright body TiN coating on working part
- ▶**Application** : Improved chip removal in most materials, especially in deep drilling applications.




ANSI | HSS Co5 | N ≈38° | h8 | 130° P.139

## ▶ Letter sizes

Unit : Inch

| EDP No. | Diameter Letter | Diameter Decimal | Flute Length | Overall Length |
|---|---|---|---|---|
| | D1 | | L1 | L2 |
| * DLGP513101 | A | .2340 | 2-5/8 | 3-7/8 |
| * DLGP513102 | B | .2380 | 2-3/4 | 4 |
| * DLGP513103 | C | .2420 | 2-3/4 | 4 |
| * DLGP513104 | D | .2460 | 2-3/4 | 4 |
| * DLGP511105 | E | .2500 | 2-3/4 | 4 |
| * DLGP513106 | F | .2570 | 2-7/8 | 4-1/8 |
| * DLGP513107 | G | .2610 | 2-7/8 | 4-1/8 |
| * DLGP513108 | H | .2660 | 2-7/8 | 4-1/8 |
| * DLGP513109 | I | .2720 | 2-7/8 | 4-1/8 |
| * DLGP513110 | J | .2770 | 2-7/8 | 4-1/8 |
| * DLGP513111 | K | .2810 | 2-15/16 | 4-1/4 |
| * DLGP513112 | L | .2900 | 2-15/16 | 4-1/4 |
| * DLGP513113 | M | .2950 | 3-1/16 | 4-3/8 |

| EDP No. | Diameter Letter | Diameter Decimal | Flute Length | Overall Length |
|---|---|---|---|---|
| | D1 | | L1 | L2 |
| * DLGP513114 | N | .3020 | 3-1/16 | 4-3/8 |
| * DLGP513115 | O | .3160 | 3-3/16 | 4-1/2 |
| * DLGP513116 | P | .3230 | 3-5/16 | 4-5/8 |
| ** DLGP513117 | Q | .3320 | 3-7/16 | 4-3/4 |
| ** DLGP513118 | R | .3390 | 3-7/16 | 4-3/4 |
| ** DLGP513119 | S | .3480 | 3-1/2 | 4-7/8 |
| ** DLGP513120 | T | .3580 | 3-1/2 | 4-7/8 |
| ** DLGP513121 | U | .3680 | 3-5/8 | 5 |
| ** DLGP513122 | V | .3770 | 3-5/8 | 5 |
| ** DLGP513123 | W | .3860 | 3-3/4 | 5-1/8 |
| ** DLGP513124 | X | .3970 | 3-3/4 | 5-1/8 |
| ** DLGP513125 | Y | .4040 | 3-7/8 | 5-1/4 |
| ** DLGP513126 | Z | .4130 | 3-7/8 | 5-1/4 |

* 10per package
** 5per package

| Tolerance Diameter (Inch) | |
|---|---|
| up to 1/8(.1250) | 0 ~ −.0005 |
| over 1/8(.1250) up to 1/4(.2500) | 0 ~ −.0007 |
| over 1/4(.2500) up to 1/2(.5000) | 0 ~ −.0010 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | ○ | ○ | | | ○ | | |

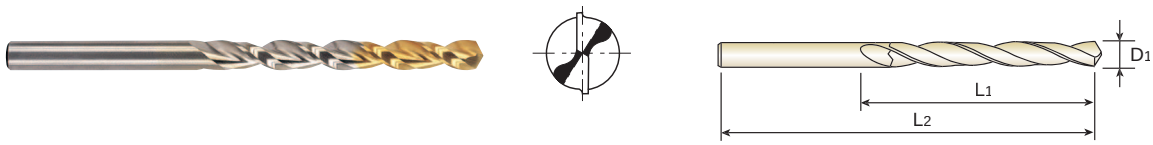
# GOLD-P DRILLS

**DLGP512 SERIES**

## HSSCo5, STRAIGHT SHANK PARABOLIC FLUTE, GOLD-P COATED

***JOBBER***

- **Flute Geometry** : Right hand spiral, 38° helix, parabolic flute.
- **Point Angle** : 130°:Split point
- **Surface treatment** : Bright body TiN coating on working part
- **Application** : Improved chip removal in most materials, especially in deep drilling applications.




ANSI | HSS Co5 | N 38° | h8 | 130° P.139

### ▶ Wire gauge sizes

Unit : Inch

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Wire gauge | Decimal | D1 | L1 | L2 |
| * DLGP512247 | 1 | .2280 | 2-5/8 | 3-7/8 |
| * DLGP512246 | 2 | .2210 | 2-5/8 | 3-7/8 |
| * DLGP512245 | 3 | .2130 | 2-1/2 | 3-3/4 |
| * DLGP512244 | 4 | .2090 | 2-1/2 | 3-3/4 |
| * DLGP512243 | 5 | .2055 | 2-1/2 | 3-3/4 |
| * DLGP512242 | 6 | .2040 | 2-1/2 | 3-3/4 |
| * DLGP512241 | 7 | .2010 | 2-7/16 | 3-5/8 |
| * DLGP512240 | 8 | .1990 | 2-7/16 | 3-5/8 |
| * DLGP512239 | 9 | .1960 | 2-7/16 | 3-5/8 |
| * DLGP512238 | 10 | .1935 | 2-7/16 | 3-5/8 |
| * DLGP512237 | 11 | .1910 | 2-5/16 | 3-1/2 |
| * DLGP512236 | 12 | .1890 | 2-5/16 | 3-1/2 |
| * DLGP512235 | 13 | .1850 | 2-5/16 | 3-1/2 |
| * DLGP512234 | 14 | .1820 | 2-3/16 | 3-3/8 |
| * DLGP512233 | 15 | .1800 | 2-3/16 | 3-3/8 |
| * DLGP512232 | 16 | .1770 | 2-3/16 | 3-3/8 |
| * DLGP512231 | 17 | .1730 | 2-3/16 | 3-3/8 |
| * DLGP512230 | 18 | .1695 | 2-1/8 | 3-1/4 |
| * DLGP512229 | 19 | .1660 | 2-1/8 | 3-1/4 |
| * DLGP512228 | 20 | .1610 | 2-1/8 | 3-1/4 |
| * DLGP512227 | 21 | .1590 | 2-1/8 | 3-1/4 |
| * DLGP512226 | 22 | .1570 | 2 | 3-1/8 |
| * DLGP512225 | 23 | .1540 | 2 | 3-1/8 |
| * DLGP512224 | 24 | .1520 | 2 | 3-1/8 |

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Wire gauge | Decimal | D1 | L1 | L2 |
| * DLGP512223 | 25 | .1495 | 1-7/8 | 3 |
| * DLGP512222 | 26 | .1470 | 1-7/8 | 3 |
| * DLGP512221 | 27 | .1440 | 1-7/8 | 3 |
| * DLGP512220 | 28 | .1405 | 1-3/4 | 2-7/8 |
| * DLGP512219 | 29 | .1360 | 1-3/4 | 2-7/8 |
| * DLGP512218 | 30 | .1285 | 1-5/8 | 2-3/4 |
| * DLGP512217 | 31 | .1200 | 1-5/8 | 2-3/4 |
| * DLGP512216 | 32 | .1160 | 1-5/8 | 2-3/4 |
| * DLGP512215 | 33 | .1130 | 1-1/2 | 2-5/8 |
| * DLGP512214 | 34 | .1110 | 1-1/2 | 2-5/8 |
| * DLGP512213 | 35 | .1100 | 1-1/2 | 2-5/8 |
| * DLGP512212 | 36 | .1065 | 1-7/16 | 2-1/2 |
| * DLGP512211 | 37 | .1040 | 1-7/16 | 2-1/2 |
| * DLGP512210 | 38 | .1015 | 1-7/16 | 2-1/2 |
| * DLGP512209 | 39 | .0995 | 1-3/8 | 2-3/8 |
| * DLGP512208 | 40 | .0980 | 1-3/8 | 2-3/8 |
| * DLGP512207 | 41 | .0960 | 1-3/8 | 2-3/8 |
| * DLGP512206 | 42 | .0935 | 1-1/4 | 2-1/4 |
| * DLGP512205 | 43 | .0890 | 1-1/4 | 2-1/4 |
| * DLGP512204 | 44 | .0860 | 1-1/8 | 2-1/8 |
| * DLGP512203 | 45 | .0820 | 1-1/8 | 2-1/8 |
| * DLGP512202 | 46 | .0810 | 1-1/8 | 2-1/8 |
| * DLGP512201 | 47 | .0785 | 1 | 2 |

▶ **Tolerance** : See page 124

* 10per package

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | ○ | ○ | | | ○ | | |

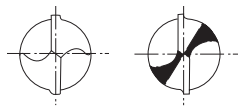
# GOLD-P DRILLS

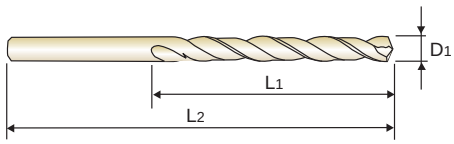
**DLGP195 SERIES**

## HSSCo5, STRAIGHT SHANK DRILLS, GOLD-P COATED

***JOBBER***

- ▶ **Flute Geometry** : Right hand helix
- ▶ **Point Angle** : 135°
  under 1.6mm : Normal point
  1.6mm & over : Split point
- ▶ **Surface treatment** : Bright body, TiN coating on working area
- ▶ **Application** : Drilling to steels, cast steels alloyed and Non-alloyed, grey cast iron, graphite, malleable cast iron




DIN 338 | HSS Co5 | N ≈33° | h8 | 135° P.138

Unit : mm

| EDP No. | Diameter Metric D1 | Diameter Inch D1 | Flute Length L1 | Overall Length L2 |
|---|---|---|---|---|
| * DLGP195010 | 1.0 | .0394 | 12 | 34 |
| * DLGP195011 | 1.1 | .0433 | 14 | 36 |
| * DLGP195012 | 1.2 | .0472 | 16 | 38 |
| * DLGP195013 | 1.3 | .0512 | 16 | 38 |
| * DLGP195014 | 1.4 | .0551 | 18 | 40 |
| * DLGP195015 | 1.5 | .0591 | 18 | 40 |
| * DLGP195016 | 1.6 | .0630 | 20 | 43 |
| * DLGP195017 | 1.7 | .0669 | 20 | 43 |
| * DLGP195018 | 1.8 | .0709 | 22 | 46 |
| * DLGP195019 | 1.9 | .0748 | 22 | 46 |
| * DLGP195020 | 2.0 | .0787 | 24 | 49 |
| * DLGP195021 | 2.1 | .0827 | 24 | 49 |
| * DLGP195022 | 2.2 | .0866 | 27 | 53 |
| * DLGP195023 | 2.3 | .0906 | 27 | 53 |
| * DLGP195024 | 2.4 | .0945 | 30 | 57 |
| * DLGP195025 | 2.5 | .0984 | 30 | 57 |
| * DLGP195026 | 2.6 | .1024 | 30 | 57 |
| * DLGP195027 | 2.7 | .1063 | 33 | 61 |
| * DLGP195028 | 2.8 | .1102 | 33 | 61 |
| * DLGP195029 | 2.9 | .1142 | 33 | 61 |
| * DLGP195030 | 3.0 | .1181 | 33 | 61 |
| * DLGP195031 | 3.1 | .1220 | 36 | 65 |
| * DLGP195032 | 3.2 | .1260 | 36 | 65 |
| * DLGP195033 | 3.3 | .1299 | 36 | 65 |
| * DLGP195034 | 3.4 | .1339 | 39 | 70 |
| * DLGP195035 | 3.5 | .1378 | 39 | 70 |
| * DLGP195036 | 3.6 | .1417 | 39 | 70 |
| * DLGP195037 | 3.7 | .1457 | 39 | 70 |
| * DLGP195038 | 3.8 | .1496 | 43 | 75 |
| * DLGP195039 | 3.9 | .1535 | 43 | 75 |
| * DLGP195040 | 4.0 | .1575 | 43 | 75 |

| EDP No. | Diameter Metric D1 | Diameter Inch D1 | Flute Length L1 | Overall Length L2 |
|---|---|---|---|---|
| * DLGP195041 | 4.1 | .1614 | 43 | 75 |
| * DLGP195042 | 4.2 | .1654 | 43 | 75 |
| * DLGP195043 | 4.3 | .1693 | 47 | 80 |
| * DLGP195044 | 4.4 | .1732 | 47 | 80 |
| * DLGP195045 | 4.5 | .1772 | 47 | 80 |
| * DLGP195046 | 4.6 | .1811 | 47 | 80 |
| * DLGP195047 | 4.7 | .1850 | 47 | 80 |
| * DLGP195048 | 4.8 | .1890 | 52 | 86 |
| * DLGP195049 | 4.9 | .1929 | 52 | 86 |
| * DLGP195050 | 5.0 | .1969 | 52 | 86 |
| * DLGP195051 | 5.1 | .2008 | 52 | 86 |
| * DLGP195052 | 5.2 | .2047 | 52 | 86 |
| * DLGP195053 | 5.3 | .2087 | 52 | 86 |
| * DLGP195054 | 5.4 | .2126 | 57 | 93 |
| * DLGP195055 | 5.5 | .2165 | 57 | 93 |
| * DLGP195056 | 5.6 | .2205 | 57 | 93 |
| * DLGP195057 | 5.7 | .2244 | 57 | 93 |
| * DLGP195058 | 5.8 | .2283 | 57 | 93 |
| * DLGP195059 | 5.9 | .2323 | 57 | 93 |
| * DLGP195060 | 6.0 | .2362 | 57 | 93 |
| * DLGP195061 | 6.1 | .2402 | 63 | 101 |
| * DLGP195062 | 6.2 | .2441 | 63 | 101 |
| * DLGP195063 | 6.3 | .2480 | 63 | 101 |
| * DLGP195064 | 6.4 | .2520 | 63 | 101 |
| * DLGP195065 | 6.5 | .2559 | 63 | 101 |
| * DLGP195066 | 6.6 | .2598 | 63 | 101 |
| * DLGP195067 | 6.7 | .2638 | 63 | 101 |
| * DLGP195068 | 6.8 | .2677 | 69 | 109 |
| * DLGP195069 | 6.9 | .2717 | 69 | 109 |
| * DLGP195070 | 7.0 | .2756 | 69 | 109 |
| * DLGP195071 | 7.1 | .2795 | 69 | 109 |

* 10per package

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | | ○ | ○ | ○ | ○ | | |

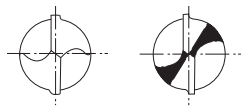
# GOLD-P DRILLS

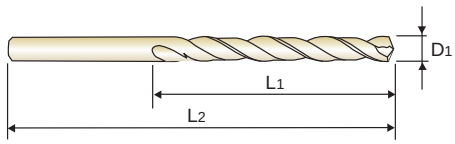
**DLGP195 SERIES**

## HSSCo5, STRAIGHT SHANK DRILLS, GOLD-P COATED

***JOBBER***

- ▶ **Flute Geometry** : Right hand helix
- ▶ **Point Angle** : 135˚
  under 1.6mm : Normal point
  1.6mm & over : Split point
- ▶ **Surface treatment** : Bright body, TiN coating on working area
- ▶ **Application** : Drilling to steels, cast steels alloyed and Non-alloyed, grey cast iron, graphite, malleable cast iron




DIN 338 | HSS Co5 | N ≈ 33° | h8 | 135° P.138

Unit : mm

| EDP No. | Diameter Metric D1 | Diameter Inch D1 | Flute Length L1 | Overall Length L2 |
|---|---|---|---|---|
| * DLGP195072 | 7.2 | .2835 | 69 | 109 |
| * DLGP195073 | 7.3 | .2874 | 69 | 109 |
| * DLGP195074 | 7.4 | .2913 | 69 | 109 |
| * DLGP195075 | 7.5 | .2953 | 69 | 109 |
| * DLGP195076 | 7.6 | .2992 | 75 | 117 |
| * DLGP195077 | 7.7 | .3031 | 75 | 117 |
| * DLGP195078 | 7.8 | .3071 | 75 | 117 |
| * DLGP195079 | 7.9 | .3110 | 75 | 117 |
| * DLGP195080 | 8.0 | .3150 | 75 | 117 |
| * DLGP195081 | 8.1 | .3189 | 75 | 117 |
| * DLGP195082 | 8.2 | .3228 | 75 | 117 |
| * DLGP195083 | 8.3 | .3268 | 75 | 117 |
| ** DLGP195084 | 8.4 | .3307 | 75 | 117 |
| ** DLGP195085 | 8.5 | .3346 | 75 | 117 |
| ** DLGP195086 | 8.6 | .3386 | 81 | 125 |
| ** DLGP195087 | 8.7 | .3425 | 81 | 125 |
| ** DLGP195088 | 8.8 | .3465 | 81 | 125 |
| ** DLGP195089 | 8.9 | .3504 | 81 | 125 |
| ** DLGP195090 | 9.0 | .3543 | 81 | 125 |
| ** DLGP195091 | 9.1 | .3583 | 81 | 125 |
| ** DLGP195092 | 9.2 | .3622 | 81 | 125 |
| ** DLGP195093 | 9.3 | .3661 | 81 | 125 |
| ** DLGP195094 | 9.4 | .3701 | 81 | 125 |
| ** DLGP195095 | 9.5 | .3740 | 81 | 125 |
| ** DLGP195096 | 9.6 | .3780 | 87 | 133 |
| ** DLGP195097 | 9.7 | .3819 | 87 | 133 |
| ** DLGP195098 | 9.8 | .3858 | 87 | 133 |
| ** DLGP195099 | 9.9 | .3898 | 87 | 133 |
| ** DLGP195100 | 10.0 | .3937 | 87 | 133 |
| ** DLGP195101 | 10.1 | .3976 | 87 | 133 |

| EDP No. | Diameter Metric D1 | Diameter Inch D1 | Flute Length L1 | Overall Length L2 |
|---|---|---|---|---|
| ** DLGP195102 | 10.2 | .4016 | 87 | 133 |
| ** DLGP195103 | 10.3 | .4055 | 87 | 133 |
| ** DLGP195104 | 10.4 | .4094 | 87 | 133 |
| ** DLGP195105 | 10.5 | .4134 | 87 | 133 |
| ** DLGP195106 | 10.6 | .4173 | 87 | 133 |
| ** DLGP195107 | 10.7 | .4212 | 94 | 142 |
| ** DLGP195108 | 10.8 | .4252 | 94 | 142 |
| ** DLGP195109 | 10.9 | .4291 | 94 | 142 |
| ** DLGP195110 | 11.0 | .4330 | 94 | 142 |
| ** DLGP195111 | 11.1 | .4370 | 94 | 142 |
| ** DLGP195112 | 11.2 | .4409 | 94 | 142 |
| ** DLGP195113 | 11.3 | .4448 | 94 | 142 |
| ** DLGP195114 | 11.4 | .4488 | 94 | 142 |
| ** DLGP195115 | 11.5 | .4527 | 94 | 142 |
| ** DLGP195116 | 11.6 | .4566 | 94 | 142 |
| ** DLGP195117 | 11.7 | .4606 | 94 | 142 |
| ** DLGP195118 | 11.8 | .4645 | 94 | 142 |
| ** DLGP195119 | 11.9 | .4685 | 101 | 151 |
| ** DLGP195120 | 12.0 | .4724 | 101 | 151 |
| ** DLGP195121 | 12.1 | .4764 | 101 | 151 |
| ** DLGP195122 | 12.2 | .4803 | 101 | 151 |
| ** DLGP195123 | 12.3 | .4843 | 101 | 151 |
| ** DLGP195124 | 12.4 | .4882 | 101 | 151 |
| ** DLGP195125 | 12.5 | .4921 | 101 | 151 |
| ** DLGP195126 | 12.6 | .4921 | 101 | 151 |
| ** DLGP195127 | 12.7 | .5000 | 101 | 151 |
| ** DLGP195128 | 12.8 | .5039 | 101 | 151 |
| ** DLGP195129 | 12.9 | .5079 | 101 | 151 |
| ** DLGP195130 | 13.0 | .5118 | 101 | 151 |

* 10per package
** 5per package

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | | ○ | ○ | ○ | ○ | | |

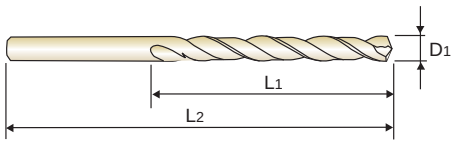
# GOLD-P DRILLS

**DLGP506 SERIES**

## HSSCo5, DH100 STRAIGHT SHANK DRILLS for DEEP HOLES, GOLD-P COATED

***JOBBER***

- ▶ **Flute Geometry** : Right hand, 38° helix, Parabolic flutes
- ▶ **Point Angle** : 130°, Split point giving higher chip removal.
- ▶ **Surface treatment** : Bright body, TiN coating on working area.
- ▶ **Application** : Drilling deep holes in non alloy steels, alloy steels, grey cast iron, malleable cast iron, Special aluminum or magnesium alloys.




DIN 338 | HSS Co5 | N ≈ 38° | h8 | 130° P.139

Unit : mm

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Metric | Inch | | |
| | $D_1$ | | $L_1$ | $L_2$ |
| * DLGP506020 | 2.0 | .0787 | 24 | 49 |
| * DLGP506021 | 2.1 | .0827 | 24 | 49 |
| * DLGP506022 | 2.2 | .0866 | 27 | 53 |
| * DLGP506023 | 2.3 | .0906 | 27 | 53 |
| * DLGP506024 | 2.4 | .0945 | 30 | 57 |
| * DLGP506025 | 2.5 | .0984 | 30 | 57 |
| * DLGP506026 | 2.6 | .1024 | 30 | 57 |
| * DLGP506027 | 2.7 | .1063 | 33 | 61 |
| * DLGP506028 | 2.8 | .1102 | 33 | 61 |
| * DLGP506029 | 2.9 | .1142 | 33 | 61 |
| * DLGP506030 | 3.0 | .1181 | 33 | 61 |
| * DLGP506031 | 3.1 | .1220 | 36 | 65 |
| * DLGP506032 | 3.2 | .1260 | 36 | 65 |
| * DLGP506033 | 3.3 | .1299 | 36 | 65 |
| * DLGP506034 | 3.4 | .1339 | 39 | 70 |
| * DLGP506035 | 3.5 | .1378 | 39 | 70 |
| * DLGP506036 | 3.6 | .1417 | 39 | 70 |
| * DLGP506037 | 3.7 | .1457 | 39 | 70 |
| * DLGP506038 | 3.8 | .1496 | 43 | 75 |
| * DLGP506039 | 3.9 | .1535 | 43 | 75 |
| * DLGP506040 | 4.0 | .1575 | 43 | 75 |
| * DLGP506041 | 4.1 | .1614 | 43 | 75 |
| * DLGP506042 | 4.2 | .1654 | 43 | 75 |
| * DLGP506043 | 4.3 | .1693 | 47 | 80 |
| * DLGP506044 | 4.4 | .1732 | 47 | 80 |
| * DLGP506045 | 4.5 | .1772 | 47 | 80 |
| * DLGP506046 | 4.6 | .1811 | 47 | 80 |
| * DLGP506047 | 4.7 | .1850 | 47 | 80 |

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Metric | Inch | | |
| | $D_1$ | | $L_1$ | $L_2$ |
| * DLGP506048 | 4.8 | .1890 | 52 | 86 |
| * DLGP506049 | 4.9 | .1929 | 52 | 86 |
| * DLGP506050 | 5.0 | .1969 | 52 | 86 |
| * DLGP506051 | 5.1 | .2008 | 52 | 86 |
| * DLGP506052 | 5.2 | .2047 | 52 | 86 |
| * DLGP506053 | 5.3 | .2087 | 52 | 86 |
| * DLGP506054 | 5.4 | .2126 | 57 | 93 |
| * DLGP506055 | 5.5 | .2165 | 57 | 93 |
| * DLGP506056 | 5.6 | .2205 | 57 | 93 |
| * DLGP506057 | 5.7 | .2244 | 57 | 93 |
| * DLGP506058 | 5.8 | .2283 | 57 | 93 |
| * DLGP506059 | 5.9 | .2323 | 57 | 93 |
| * DLGP506060 | 6.0 | .2362 | 57 | 93 |
| * DLGP506061 | 6.1 | .2402 | 63 | 101 |
| * DLGP506062 | 6.2 | .2441 | 63 | 101 |
| * DLGP506063 | 6.3 | .2480 | 63 | 101 |
| * DLGP506064 | 6.4 | .2520 | 63 | 101 |
| * DLGP506065 | 6.5 | .2559 | 63 | 101 |
| * DLGP506066 | 6.6 | .2598 | 63 | 101 |
| * DLGP506067 | 6.7 | .2638 | 63 | 101 |
| * DLGP506068 | 6.8 | .2677 | 69 | 109 |
| * DLGP506069 | 6.9 | .2717 | 69 | 109 |
| * DLGP506070 | 7.0 | .2756 | 69 | 109 |
| * DLGP506071 | 7.1 | .2795 | 69 | 109 |
| * DLGP506072 | 7.2 | .2835 | 69 | 109 |
| * DLGP506073 | 7.3 | .2874 | 69 | 109 |
| * DLGP506074 | 7.4 | .2913 | 69 | 109 |
| * DLGP506075 | 7.5 | .2953 | 69 | 109 |

* 10per package

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | ○ | ○ | | | ○ | | |

# GOLD-P DRILLS

**DLGP506 SERIES**

## HSSCo5, DH100 STRAIGHT SHANK DRILLS for DEEP HOLES, GOLD-P COATED

***JOBBER***

- **Flute Geometry** : Right hand, 38° helix, Parabolic flutes
- **Point Angle** : 130°, Split point giving higher chip removal.
- **Surface treatment** : Bright body, TiN coating on working area.
- **Application** : Drilling deep holes in non alloy steels, alloy steels, grey cast iron, malleable cast iron, Special aluminum or magnesium alloys.

DIN 338 | HSS Co5 | N 38° | h8 | 130° P.139

Unit : mm

| EDP No. | Diameter Metric D1 | Diameter Inch D1 | Flute Length L1 | Overall Length L2 |
|---|---|---|---|---|
| * DLGP506076 | 7.6 | .2992 | 75 | 117 |
| * DLGP506077 | 7.7 | .3031 | 75 | 117 |
| * DLGP506078 | 7.8 | .3071 | 75 | 117 |
| * DLGP506079 | 7.9 | .3110 | 75 | 117 |
| * DLGP506080 | 8.0 | .3150 | 75 | 117 |
| * DLGP506081 | 8.1 | .3189 | 75 | 117 |
| * DLGP506082 | 8.2 | .3228 | 75 | 117 |
| * DLGP506083 | 8.3 | .3268 | 75 | 117 |
| ** DLGP506084 | 8.4 | .3307 | 75 | 117 |
| ** DLGP506085 | 8.5 | .3346 | 75 | 117 |
| ** DLGP506086 | 8.6 | .3386 | 81 | 125 |
| ** DLGP506087 | 8.7 | .3425 | 81 | 125 |
| ** DLGP506088 | 8.8 | .3465 | 81 | 125 |
| ** DLGP506089 | 8.9 | .3504 | 81 | 125 |
| ** DLGP506090 | 9.0 | .3543 | 81 | 125 |
| ** DLGP506091 | 9.1 | .3583 | 81 | 125 |
| ** DLGP506092 | 9.2 | .3622 | 81 | 125 |
| ** DLGP506093 | 9.3 | .3661 | 81 | 125 |
| ** DLGP506094 | 9.4 | .3701 | 81 | 125 |
| ** DLGP506095 | 9.5 | .3740 | 81 | 125 |
| ** DLGP506096 | 9.6 | .3780 | 87 | 133 |
| ** DLGP506097 | 9.7 | .3819 | 87 | 133 |
| ** DLGP506098 | 9.8 | .3858 | 87 | 133 |
| ** DLGP506099 | 9.9 | .3898 | 87 | 133 |
| ** DLGP506100 | 10.0 | .3937 | 87 | 133 |
| ** DLGP506101 | 10.1 | .3976 | 87 | 133 |
| ** DLGP506102 | 10.2 | .4016 | 87 | 133 |
| ** DLGP506103 | 10.3 | .4055 | 87 | 133 |

| EDP No. | Diameter Metric D1 | Diameter Inch D1 | Flute Length L1 | Overall Length L2 |
|---|---|---|---|---|
| ** DLGP506104 | 10.4 | .4094 | 87 | 133 |
| ** DLGP506105 | 10.5 | .4134 | 87 | 133 |
| ** DLGP506106 | 10.6 | .4173 | 87 | 133 |
| ** DLGP506107 | 10.7 | .4212 | 94 | 142 |
| ** DLGP506108 | 10.8 | .4252 | 94 | 142 |
| ** DLGP506109 | 10.9 | .4291 | 94 | 142 |
| ** DLGP506110 | 11.0 | .4330 | 94 | 142 |
| ** DLGP506111 | 11.1 | .4370 | 94 | 142 |
| ** DLGP506112 | 11.2 | .4409 | 94 | 142 |
| ** DLGP506113 | 11.3 | .4448 | 94 | 142 |
| ** DLGP506114 | 11.4 | .4488 | 94 | 142 |
| ** DLGP506115 | 11.5 | .4527 | 94 | 142 |
| ** DLGP506116 | 11.6 | .4566 | 94 | 142 |
| ** DLGP506117 | 11.7 | .4606 | 94 | 142 |
| ** DLGP506118 | 11.8 | .4645 | 94 | 142 |
| ** DLGP506119 | 11.9 | .4685 | 101 | 151 |
| ** DLGP506120 | 12.0 | .4724 | 101 | 151 |
| ** DLGP506121 | 12.1 | .4764 | 101 | 151 |
| ** DLGP506122 | 12.2 | .4803 | 101 | 151 |
| ** DLGP506123 | 12.3 | .4843 | 101 | 151 |
| ** DLGP506124 | 12.4 | .4882 | 101 | 151 |
| ** DLGP506125 | 12.5 | .4921 | 101 | 151 |
| ** DLGP506126 | 12.6 | .4921 | 101 | 151 |
| ** DLGP506127 | 12.7 | .5000 | 101 | 151 |
| ** DLGP506128 | 12.8 | .5039 | 101 | 151 |
| ** DLGP506129 | 12.9 | .5079 | 101 | 151 |
| ** DLGP506130 | 13.0 | .5118 | 101 | 151 |

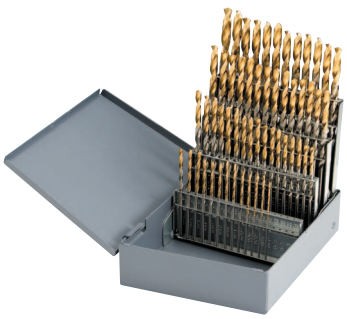
* 10per package
** 5per package

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | ○ | ○ | | | ○ | | |

# GOLD-P DRILLS

## GOLD-P COATED DRILL SETS



| EDP No. | Series No. | Description | SIZE | Q'TY |
|---|---|---|---|---|
| D1GP138 SET | D1GP SET924 | HSS Straight Shank, Split Point ( # 53 ~ # 56 : NORMAL point) | # 1~ # 56(Wire gauge) | 56 pcs |
| D1GP139 SET | D1GP SET925 | HSS Straight Shank, Split Point | A~Z(Letter) | 26 pcs |
| D1GP182 SET | D1GP SET926 | HSS Straight Shank, Split Point | Ø1/16~Ø1/2(Fracitional) | 29 pcs |
| D2GP185 SET | D2GP SET927 | HSSCo8 Straight Shank, Split Point | Ø1/16~Ø1/2(Fracitional) | 29 pcs |
| D2GP186 SET | D2GP SET928 | HSSCo8 Straight Shank, Split Point | A~Z(Letter) | 26 pcs |
| D2GP187 SET | D2GP SET930 | HSSCo8 Straight Shank, Split Point ( # 53 ~ # 56 : NORMAL point) | # 1~ # 56(Wire gauge) | 56 pcs |
| DLGP511 SET | DLGP SET931 | HSSCo5 Straight Shank, Split Point | Ø5/64~Ø1/2(Fracitional) | 28 pcs |
| DLGP512 SET | DLGP SET932 | HSSCo5 Straight Shank, Split Point | # 1~ # 47(Wire gauge) | 47 pcs |
| DLGP513 SET | DLGP SET933 | HSSCo5 Straight Shank, Split Point | A~Z(Letter) | 26 pcs |

# GOLD-P DRILLS

## RECOMMENDED CUTTING CONDITIONS

## HSS & HSSCo5, STRAIGHT SHANK, GOLD-P COATED



### D1GP182, D1GP139, D1GP138, D2GP185, D2GP186, D2GP187, DLGP195, SERIES

| WORK MATERIAL | | | CARBON STEELS | | CARBON STEELS | | ALLOY STEELS | | STAINLESS STEELS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | | | ~ HRc23 | | HRc23 ~ 34 | | ~ HRc23 | |
| STRENGTH | | | ~ 570N/mm² | | ~ 830N/mm² | | 830~1110N/mm² | | ~ 830N/mm² | |
| DIAMETER | | | N | S | N | S | N | S | N | S |
| Fractional | Decimal | Metric | | | | | | | | |
| 3/64 | .0469 | 1.0 | 14000 | 0.0008 | 12500 | 0.0008 | 7700 | 0.0008 | 7000 | 0.0008 |
| #47 | .0785 | 2.0 | 7000 | 0.0023 | 6100 | 0.0024 | 3850 | 0.0024 | 3500 | 0.0024 |
| #32 | .1160 | 3.0 | 4650 | 0.0038 | 4100 | 0.0031 | 2550 | 0.0031 | 2350 | 0.0031 |
| #22 | .1570 | 4.0 | 3500 | 0.0044 | 3050 | 0.0043 | 1950 | 0.0039 | 1750 | 0.0039 |
| #9 | .1960 | 5.0 | 2800 | 0.0049 | 2450 | 0.0043 | 1550 | 0.0039 | 1400 | 0.0039 |
| B | .2380 | 6.0 | 2350 | 0.0056 | 2050 | 0.0051 | 1300 | 0.0047 | 1150 | 0.0047 |
| J | .2770 | 7.0 | 2000 | 0.0064 | 1750 | 0.0059 | 1100 | 0.0055 | 1000 | 0.0055 |
| O | .3160 | 8.0 | 1750 | 0.0072 | 1550 | 0.0071 | 960 | 0.0059 | 875 | 0.0059 |
| T | .3580 | 9.0 | 1550 | 0.0077 | 1350 | 0.0087 | 855 | 0.0071 | 780 | 0.0071 |
| X | .3970 | 10.0 | 1400 | 0.0084 | 1250 | 0.0087 | 770 | 0.0071 | 700 | 0.0071 |
| 7/16 | .4375 | 11.0 | 1250 | 0.0087 | 1100 | 0.0087 | 700 | 0.0071 | 650 | 0.0071 |
| 15/32 | .4688 | 12.0 | 1150 | 0.0090 | 1000 | 0.0087 | 650 | 0.0079 | 585 | 0.0079 |
| 1/2 | .5000 | 13.0 | 1050 | 0.0090 | 950 | 0.0087 | 595 | 0.0079 | 540 | 0.0079 |

| WORK MATERIAL | | | TITANIUM ALLOYS | | ALUMINUM ALLOYS, ZINC ALLOYS | | MAGNESIUM ALLOYS | |
|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | | | | | | |
| STRENGTH | | | ~410N/mm² | | | | | |
| DIAMETER | | | N | S | N | S | N | S |
| Fractional | Decimal | Metric | | | | | | |
| 3/64 | .0469 | 1.0 | 8050 | 0.0008 | 30000 | 0.0008 | 11500 | 0.0012 |
| #47 | .0785 | 2.0 | 4050 | 0.0024 | 15000 | 0.0023 | 5800 | 0.0035 |
| #32 | .1160 | 3.0 | 2700 | 0.0031 | 9900 | 0.0038 | 3850 | 0.0051 |
| #22 | .1570 | 4.0 | 2000 | 0.0035 | 7450 | 0.0044 | 2900 | 0.0059 |
| #9 | .1960 | 5.0 | 1600 | 0.0039 | 5950 | 0.0049 | 2300 | 0.0067 |
| B | .2380 | 6.0 | 1350 | 0.0047 | 4950 | 0.0056 | 1950 | 0.0075 |
| J | .2770 | 7.0 | 1150 | 0.0055 | 4250 | 0.0064 | 1650 | 0.0087 |
| O | .3160 | 8.0 | 1000 | 0.0059 | 3700 | 0.0072 | 1450 | 0.0094 |
| T | .3580 | 9.0 | 895 | 0.0067 | 3300 | 0.0079 | 1280 | 0.0106 |
| X | .3970 | 10.0 | 805 | 0.0071 | 3000 | 0.0090 | 1150 | 0.0114 |
| 7/16 | .4375 | 11.0 | 730 | 0.0071 | 2700 | 0.0090 | 1050 | 0.0118 |
| 15/32 | .4688 | 12.0 | 670 | 0.0079 | 2480 | 0.0090 | 960 | 0.0122 |
| 1/2 | .5000 | 13.0 | 620 | 0.0079 | 2300 | 0.0090 | 890 | 0.0122 |

N = R.P.M
S = Inch per Revolution(inch/rev.)

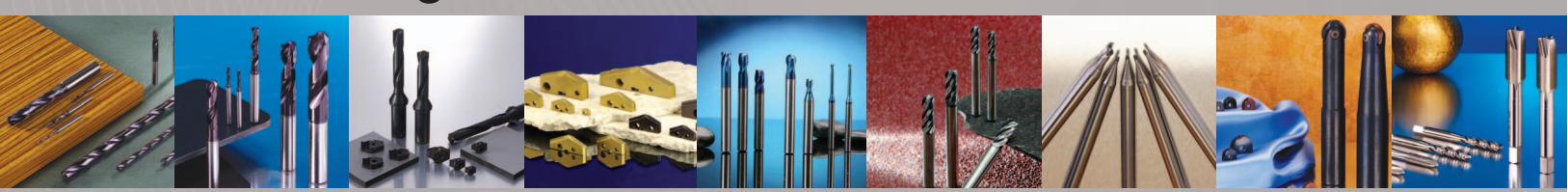
## HSSCo5, STRAIGHT SHANK PARABOLIC FLUTE, GOLD-P COATED

# DLGP511, DLGP513, DLGP512, DLGP506 SERIES

| WORK MATERIAL | | | CARBON STEELS ALLOY STEELS | | TOOL STEELS HARDENED STEELS | | SOFT GREY CAST IRON | | HARD GREY CAST IRON | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | HRc15 ~ 30 | | HRc20 ~ 40 | | | | | |
| STRENGTH | | | 700 ~ 1000N/mm² | | 800~1200N/mm² | | | | | |
| DIAMETER | | | N | S | N | S | N | S | N | S |
| Fractional | Decimal | Metric | | | | | | | | |
| 3/64 | .0469 | 1.0 | 8750 | 0.0008 | 6300 | 0.0008 | 16000 | 0.0008 | 9800 | 0.0008 |
| #47 | .0785 | 2.0 | 4400 | 0.0022 | 3150 | 0.0022 | 7900 | 0.0027 | 4900 | 0.0027 |
| #32 | .1160 | 3.0 | 2900 | 0.0032 | 2100 | 0.0032 | 5250 | 0.0043 | 3250 | 0.0043 |
| #22 | .1570 | 4.0 | 2200 | 0.0036 | 1600 | 0.0036 | 3950 | 0.0054 | 2450 | 0.0054 |
| #9 | .1960 | 5.0 | 1750 | 0.0041 | 1250 | 0.0041 | 3150 | 0.0054 | 1950 | 0.0054 |
| B | .2380 | 6.0 | 1450 | 0.0047 | 1050 | 0.0047 | 2650 | 0.0069 | 1650 | 0.0069 |
| J | .2770 | 7.0 | 1250 | 0.0054 | 900 | 0.0054 | 2250 | 0.0078 | 1400 | 0.0078 |
| O | .3160 | 8.0 | 1100 | 0.0060 | 790 | 0.0060 | 1950 | 0.0087 | 1250 | 0.0087 |
| T | .3580 | 9.0 | 975 | 0.0066 | 700 | 0.0066 | 1750 | 0.0095 | 1100 | 0.0095 |
| X | .3970 | 10.0 | 875 | 0.0071 | 630 | 0.0071 | 1600 | 0.0108 | 980 | 0.0108 |
| 7/16 | .4375 | 11.0 | 800 | 0.0077 | 575 | 0.0077 | 1450 | 0.0108 | 890 | 0.0108 |
| 15/32 | .4688 | 12.0 | 730 | 0.0077 | 525 | 0.0077 | 1300 | 0.0108 | 815 | 0.0108 |
| 1/2 | .5000 | 13.0 | 675 | 0.0077 | 485 | 0.0077 | 1200 | 0.0108 | 755 | 0.0108 |

N = R.P.M
S = Inch per Revolution(inch/rev.)

Global Cutting Tool Leader **YG-1**



# HSS

YG

Being the best through innovation

# STRAIGHT SHANK DRILLS

- General Purpose

## STRAIGHT SHANK TWIST DRILLS

HSS Drills for soft materials & HSS cobalt Drills for tough materials


| ITEM | MODEL | DESCRIPTION | SIZE MIN | SIZE MAX | PAGE |
|---|---|---|---|---|---|
| **INCH** | | | | | |
| D1118 | | HSS, STRAIGHT SHANK SCREW MACHINE / Fractional sizes | D3/64 | D1/2 | 144 |
| D1115 | | HSS, STRAIGHT SHANK SCREW MACHINE / Letter sizes | A | Z | 145 |
| D1119 | | HSS, STRAIGHT SHANK SCREW MACHINE / Wire gauge sizes | #60 | #1 | 146 |
| D2146 D4146 | | HSSCo8, STRAIGHT SHANK SCREW MACHINE / Fractional sizes | D3/64 | D1/2 | 147 |
| D2147 D4147 | | HSSCo8, STRAIGHT SHANK SCREW MACHINE / Letter sizes | A | Z | 148 |
| D2148 D4148 | | HSSCo8, STRAIGHT SHANK SCREW MACHINE / Wire gauge sizes | #60 | #1 | 149 |
| DN514 | | HSSCo5, STRAIGHT SHANK PARABOLIC FLUTE SCREW MACHINE, TiN COATED / Fractional sizes | D3/32 | D1/2 | 151 |
| DN516 | | HSSCo5, STRAIGHT SHANK PARABOLIC FLUTE SCREW MACHINE, TiN COATED / Letter sizes | A | Z | 152 |
| DN515 | | HSSCo5, STRAIGHT SHANK PARABOLIC FLUTE SCREW MACHINE, TiN COATED / Wire gauge sizes | #47 | #1 | 153 |
| DX517 DL517 | | HSSCo5, TAPER LENGTH STRAIGHT SHANK DRILL / Fractional sizes | D5/64 | D1/2 | 154 |
| **METRIC** | | | | | |
| D4107 | | HSSCo5, STRAIGHT SHANK DRILLS, GOLD-P COATED *STUB* | D1.0 | D31.0 | 155 |
| | | RECOMMENDED CUTTING CONDITIONS | | | 158 |

◎ : Excellent
○ : Good

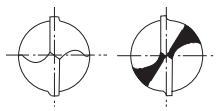
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | ○ | ○ | ○ | ○ | ○ | | |
| ◎ | ◎ | | | | ○ | ○ | ○ | ○ | ○ | | |
| ◎ | ◎ | | | | ○ | ○ | ○ | ○ | ○ | | |
| ◎ | ◎ | | | | | ○ | ○ | ○ | ○ | | |
| ◎ | ◎ | | | | | ○ | ○ | ○ | ○ | | |
| ◎ | ◎ | | | | | ○ | ○ | ○ | ○ | | |
| ◎ | ◎ | | | | ○ | ○ | | | ○ | | |
| ◎ | ◎ | | | | ○ | ○ | | | ○ | | |
| ◎ | ◎ | | | | ○ | ○ | | | ○ | | |
| ◎ | ◎ | | | | ○ | ○ | | | ○ | | |
| ◎ | ◎ | | | | ○ | ○ | ○ | ○ | ○ | | |

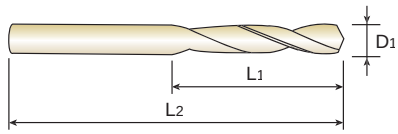
# STRAIGHT SHANK DRILLS

**D1118 SERIES**

## HSS, STRAIGHT SHANK SCREW MACHINE

▶ **Flute Geometry** : Right hand spiral, wider flutes
▶ **Point Angle** : 135°
under 1/16 : Normal point
1/16 & over : Split point
▶ **Application** : Drilling in steel, cast steel alloyed and Non-alloyed, grey cast iron, graphite, malleable cast iron




ANSI HSS N 20~30° ANSI 135° P.158

## ▶ Fractional sizes

Unit : Inch

| EDP No. | Diameter Fractional | Diameter Decimal | Flute Length | Overall Length |
|---|---|---|---|---|
| | D1 | | L1 | L2 |
| * D1118003 | 3/64 | .0469 | 1/2 | 1-3/8 |
| * D1118004 | 1/16 | .0625 | 5/8 | 1-5/8 |
| * D1118005 | 5/64 | .0781 | 11/16 | 1-11/16 |
| * D1118006 | 3/32 | .0938 | 3/4 | 1-3/4 |
| * D1118007 | 7/64 | .1094 | 13/16 | 1-13/16 |
| * D1118008 | 1/8 | .1250 | 7/8 | 1-7/8 |
| * D1118009 | 9/64 | .1406 | 15/16 | 1-15/16 |
| * D1118010 | 5/32 | .1563 | 1 | 2-1/16 |
| * D1118011 | 11/64 | .1719 | 1-1/16 | 2-1/8 |
| * D1118012 | 3/16 | .1875 | 1-1/8 | 2-3/16 |
| * D1118013 | 13/64 | .2031 | 1-3/16 | 2-1/4 |
| * D1118014 | 7/32 | .2188 | 1-1/4 | 2-3/8 |
| * D1118015 | 15/64 | .2344 | 1-5/16 | 2-7/16 |
| * D1118016 | 1/4 | .2500 | 1-3/8 | 2-1/2 |
| * D1118017 | 17/64 | .2656 | 1-7/16 | 2-5/8 |

| EDP No. | Diameter Fractional | Diameter Decimal | Flute Length | Overall Length |
|---|---|---|---|---|
| | D1 | | L1 | L2 |
| * D1118018 | 9/32 | .2813 | 1-1/2 | 2-11/16 |
| * D1118019 | 19/64 | .2969 | 1-9/16 | 2-3/4 |
| * D1118020 | 5/16 | .3125 | 1-5/8 | 2-13/16 |
| * D1118021 | 21/64 | .3281 | 1-11/16 | 2-15/16 |
| ** D1118022 | 11/32 | .3438 | 1-11/16 | 3 |
| ** D1118023 | 23/64 | .3594 | 1-3/4 | 3-1/16 |
| ** D1118024 | 3/8 | .3750 | 1-13/16 | 3-1/8 |
| ** D1118025 | 25/64 | .3906 | 1-7/8 | 3-1/4 |
| ** D1118026 | 13/32 | .4063 | 1-15/16 | 3-5/16 |
| ** D1118027 | 27/64 | .4219 | 2 | 3-3/8 |
| ** D1118028 | 7/16 | .4375 | 2-1/16 | 3-7/16 |
| ** D1118029 | 29/64 | .4531 | 2-1/8 | 3-9/16 |
| ** D1118030 | 15/32 | .4688 | 2-1/8 | 3-5/8 |
| ** D1118031 | 31/64 | .4844 | 2-3/16 | 3-11/16 |
| ** D1118032 | 1/2 | .5000 | 2-1/4 | 3-3/4 |

* 10per package
** 5per package

| Tolerance Diameter (Inch) | |
|---|---|
| up to 1/8(.1250) | 0 ~ −.0005 |
| over 1/8(.1250) up to 1/4(.2500) | 0 ~ −.0007 |
| over 1/4(.2500) up to 1/2(.5000) | 0 ~ −.0010 |

◎ : Excellent ○ : Good

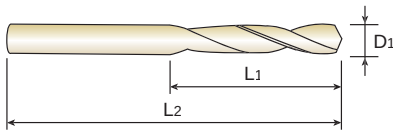
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | ○ | ○ | ○ | ○ | ○ | | |

# STRAIGHT SHANK DRILLS

**D1115 SERIES**

## HSS, STRAIGHT SHANK SCREW MACHINE

▶**Flute Geometry** : Right hand spiral, wider flutes
▶**Point Angle** : 135°:Split point
▶**Application** : Drilling in steel, cast steel alloyed and Non-alloyed, grey cast iron, graphite, malleable cast iron




ANSI HSS N 20~30° ANSI 135° P.158

## ▶ Letter sizes

Unit : Inch

| EDP No. | Diameter Letter | Diameter Decimal | Flute Length | Overall Length |
|---|---|---|---|---|
| | D1 | | L1 | L2 |
| * D1115201 | A | .2340 | 1-5/16 | 2-7/16 |
| * D1115202 | B | .2380 | 1-3/8 | 2-1/2 |
| * D1115203 | C | .2420 | 1-3/8 | 2-1/2 |
| * D1115204 | D | .2460 | 1-3/8 | 2-1/2 |
| * D1115205 | E | .2500 | 1-3/8 | 2-1/2 |
| * D1115206 | F | .2570 | 1-7/16 | 2-5/8 |
| * D1115207 | G | .2610 | 1-7/16 | 2-5/8 |
| * D1115208 | H | .2660 | 1-1/2 | 2-11/16 |
| * D1115209 | I | .2720 | 1-1/2 | 2-11/16 |
| * D1115210 | J | .2770 | 1-1/2 | 2-11/16 |
| * D1115211 | K | .2810 | 1-1/2 | 2-11/16 |
| * D1115212 | L | .2900 | 1-9/16 | 2-3/4 |
| * D1115213 | M | .2950 | 1-9/16 | 2-3/4 |

| EDP No. | Diameter Letter | Diameter Decimal | Flute Length | Overall Length |
|---|---|---|---|---|
| | D1 | | L1 | L2 |
| * D1115214 | N | .3020 | 1-5/8 | 2-13/16 |
| * D1115215 | O | .3160 | 1-11/16 | 2-15/16 |
| * D1115216 | P | .3230 | 1-11/16 | 2-15/16 |
| ** D1115217 | Q | .3320 | 1-11/16 | 3 |
| ** D1115218 | R | .3390 | 1-11/16 | 3 |
| ** D1115219 | S | .3480 | 1-3/4 | 3-1/16 |
| ** D1115220 | T | .3580 | 1-3/4 | 3-1/16 |
| ** D1115221 | U | .3680 | 1-13/16 | 3-1/8 |
| ** D1115222 | V | .3770 | 1-7/8 | 3-1/4 |
| ** D1115223 | W | .3860 | 1-7/8 | 3-1/4 |
| ** D1115224 | X | .3970 | 1-15/16 | 3-5/16 |
| ** D1115225 | Y | .4040 | 1-15/16 | 3-5/16 |
| ** D1115226 | Z | .4130 | 2 | 3-3/8 |

* 10per package
** 5per package

| Tolerance Diameter (Inch) | |
|---|---|
| up to 1/8(.1250) | 0 ~ −.0005 |
| over 1/8(.1250) up to 1/4(.2500) | 0 ~ −.0007 |
| over 1/4(.2500) up to 1/2(.5000) | 0 ~ −.0010 |

◎ : Excellent ○ : Good

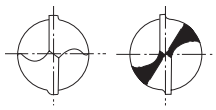
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | ○ | ○ | ○ | ○ | ○ | | |

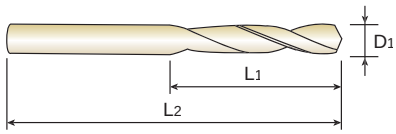
# STRAIGHT SHANK DRILLS

**D1119 SERIES**

## HSS, STRAIGHT SHANK SCREW MACHINE

▶ **Flute Geometry** : Right hand spiral, wider flutes
▶ **Point Angle** : 135°:Split point
Wire gauge size #53~#60:Normal point
Wire gauge size #1~#52:Split point
▶ **Application** : Drilling in steel, cast steel alloyed and Non-alloyed, grey cast iron, graphite, malleable cast iron




ANSI HSS N 20~30° ANSI 135° P.158

## ▶ Wire gauge sizes

Unit : Inch

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Wire gauge | Decimal | D1 | |
| | | | L1 | L2 |
| * D1119201 | 1 | .2280 | 1-5/16 | 2-7/16 |
| * D1119202 | 2 | .2210 | 1-5/16 | 2-7/16 |
| * D1119203 | 3 | .2130 | 1-1/4 | 2-3/8 |
| * D1119204 | 4 | .2090 | 1-1/4 | 2-3/8 |
| * D1119205 | 5 | .2055 | 1-1/4 | 2-3/8 |
| * D1119206 | 6 | .2040 | 1-1/4 | 2-3/8 |
| * D1119207 | 7 | .2010 | 1-3/16 | 2-1/4 |
| * D1119208 | 8 | .1990 | 1-3/16 | 2-1/4 |
| * D1119209 | 9 | .1960 | 1-3/16 | 2-1/4 |
| * D1119210 | 10 | .1935 | 1-3/16 | 2-1/4 |
| * D1119211 | 11 | .1910 | 1-3/16 | 2-1/4 |
| * D1119212 | 12 | .1890 | 1-3/16 | 2-1/4 |
| * D1119213 | 13 | .1850 | 1-1/8 | 2-3/16 |
| * D1119214 | 14 | .1820 | 1-1/8 | 2-3/16 |
| * D1119215 | 15 | .1800 | 1-1/8 | 2-3/16 |
| * D1119216 | 16 | .1770 | 1-1/8 | 2-3/16 |
| * D1119217 | 17 | .1730 | 1-1/8 | 2-3/16 |
| * D1119218 | 18 | .1695 | 1-1/16 | 2-1/8 |
| * D1119219 | 19 | .1660 | 1-1/16 | 2-1/8 |
| * D1119220 | 20 | .1610 | 1-1/16 | 2-1/8 |
| * D1119221 | 21 | .1590 | 1-1/16 | 2-1/8 |
| * D1119222 | 22 | .1570 | 1-1/16 | 2-1/8 |
| * D1119223 | 23 | .1540 | 1 | 2-1/16 |
| * D1119224 | 24 | .1520 | 1 | 2-1/16 |
| * D1119225 | 25 | .1495 | 1 | 2-1/16 |
| * D1119226 | 26 | .1470 | 1 | 2-1/16 |
| * D1119227 | 27 | .1440 | 1 | 2-1/16 |
| * D1119228 | 28 | .1405 | 15/16 | 1-15/16 |
| * D1119229 | 29 | .1360 | 15/16 | 1-15/16 |
| * D1119230 | 30 | .1285 | 15/16 | 1-15/16 |

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Wire gauge | Decimal | D1 | |
| | | | L1 | L2 |
| * D1119231 | 31 | .1200 | 7/8 | 1-7/8 |
| * D1119232 | 32 | .1160 | 7/8 | 1-7/8 |
| * D1119233 | 33 | .1130 | 7/8 | 1-7/8 |
| * D1119234 | 34 | .1110 | 7/8 | 1-7/8 |
| * D1119235 | 35 | .1100 | 7/8 | 1-7/8 |
| * D1119236 | 36 | .1065 | 13/16 | 1-13/16 |
| * D1119237 | 37 | .1040 | 13/16 | 1-13/16 |
| * D1119238 | 38 | .1015 | 13/16 | 1-13/16 |
| * D1119239 | 39 | .0995 | 13/16 | 1-13/16 |
| * D1119240 | 40 | .0980 | 13/16 | 1-13/16 |
| * D1119241 | 41 | .0960 | 13/16 | 1-13/16 |
| * D1119242 | 42 | .0935 | 3/4 | 1-3/4 |
| * D1119243 | 43 | .0890 | 3/4 | 1-3/4 |
| * D1119244 | 44 | .0860 | 3/4 | 1-3/4 |
| * D1119245 | 45 | .0820 | 3/4 | 1-3/4 |
| * D1119246 | 46 | .0810 | 3/4 | 1-3/4 |
| * D1119247 | 47 | .0785 | 11/16 | 1-11/16 |
| * D1119248 | 48 | .0760 | 11/16 | 1-11/16 |
| * D1119249 | 49 | .0730 | 11/16 | 1-11/16 |
| * D1119250 | 50 | .0700 | 11/16 | 1-11/16 |
| * D1119251 | 51 | .0670 | 11/16 | 1-11/16 |
| * D1119252 | 52 | .0635 | 11/16 | 1-11/16 |
| * D1119253 | 53 | .0595 | 5/8 | 1-5/8 |
| * D1119254 | 54 | .0550 | 5/8 | 1-5/8 |
| * D1119255 | 55 | .0520 | 5/8 | 1-5/8 |
| * D1119256 | 56 | .0465 | 1/2 | 1-3/8 |
| * D1119257 | 57 | .0430 | 1/2 | 1-3/8 |
| * D1119258 | 58 | .0420 | 1/2 | 1-3/8 |
| * D1119259 | 59 | .0410 | 1/2 | 1-3/8 |
| * D1119260 | 60 | .0400 | 1/2 | 1-3/8 |

▶ **Tolerance** : See page 144 / * 10per package

◎ : Excellent ○ : Good

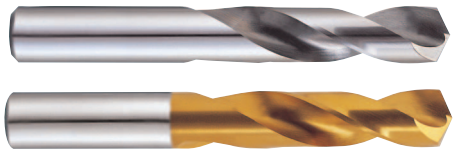
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | ○ | ○ | ○ | ○ | ○ | | |

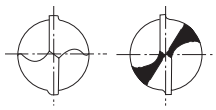
# STRAIGHT SHANK DRILLS

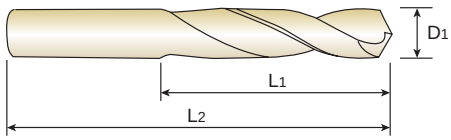
**D2146 SERIES** UN-COATED
**D4146 SERIES** TiN-COATED

## HSSCo8, STRAIGHT SHANK SCREW MACHINE

▶ **Flute Geometry** : Right hand spiral, wider flutes
▶ **Point Angle** : 135°
under 1/16 : Normal point
1/16 & over : Split point
▶ **Application** : Drilling in steel, cast steel alloyed and Non-alloyed, grey cast iron, graphite, malleable cast iron






ANSI | HSS Co8 | N 20~30° | ANSI | 135° | P.158

## ▶ Fractional sizes

Unit : Inch

| EDP No. | | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | | Fractional | Decimal | | |
| UN-COATED | TiN-COATED | $D_1$ | | $L_1$ | $L_2$ |
| * D2146003 | D4146003 | 3/64 | .0469 | 1/2 | 1-3/8 |
| * D2146004 | D4146004 | 1/16 | .0625 | 5/8 | 1-5/8 |
| * D2146005 | D4146005 | 5/64 | .0781 | 11/16 | 1-11/16 |
| * D2146006 | D4146006 | 3/32 | .0938 | 3/4 | 1-3/4 |
| ** D2146007 | D4146007 | 7/64 | .1094 | 13/16 | 1-13/16 |
| ** D2146008 | D4146008 | 1/8 | .1250 | 7/8 | 1-7/8 |
| ** D2146009 | D4146009 | 9/64 | .1406 | 15/16 | 1-15/16 |
| ** D2146010 | D4146010 | 5/32 | .1563 | 1 | 2-1/16 |
| ** D2146011 | D4146011 | 11/64 | .1719 | 1-1/16 | 2-1/8 |
| ** D2146012 | D4146012 | 3/16 | .1875 | 1-1/8 | 2-3/16 |
| ** D2146013 | D4146013 | 13/64 | .2031 | 1-3/16 | 2-1/4 |
| ** D2146014 | D4146014 | 7/32 | .2188 | 1-1/4 | 2-3/8 |
| ** D2146015 | D4146015 | 15/64 | .2344 | 1-5/16 | 2-7/16 |
| ** D2146016 | D4146016 | 1/4 | .2500 | 1-3/8 | 2-1/2 |
| ** D2146017 | D4146017 | 17/64 | .2656 | 1-7/16 | 2-5/8 |
| ** D2146018 | D4146018 | 9/32 | .2813 | 1-1/2 | 2-11/16 |
| ** D2146019 | D4146019 | 19/64 | .2969 | 1-9/16 | 2-3/4 |
| ** D2146020 | D4146020 | 5/16 | .3125 | 1-5/8 | 2-13/16 |
| ** D2146021 | D4146021 | 21/64 | .3281 | 1-11/16 | 2-15/16 |
| ** D2146022 | D4146022 | 11/32 | .3438 | 1-11/16 | 3 |
| ** D2146023 | D4146023 | 23/64 | .3594 | 1-3/4 | 3-1/16 |
| ** D2146024 | D4146024 | 3/8 | .3750 | 1-13/16 | 3-1/8 |
| ** D2146025 | D4146025 | 25/64 | .3906 | 1-7/8 | 3-1/4 |
| ** D2146026 | D4146026 | 13/32 | .4063 | 1-15/16 | 3-5/16 |
| ** D2146027 | D4146027 | 27/64 | .4219 | 2 | 3-3/8 |
| ** D2146028 | D4146028 | 7/16 | .4375 | 2-1/16 | 3-7/16 |
| ** D2146029 | D4146029 | 29/64 | .4531 | 2-1/8 | 3-9/16 |
| ** D2146030 | D4146030 | 15/32 | .4688 | 2-1/8 | 3-5/8 |
| ** D2146031 | D4146031 | 31/64 | .4844 | 2-3/16 | 3-11/16 |
| ** D2146032 | D4146032 | 1/2 | .5000 | 2-1/4 | 3-3/4 |

▶ **Tolerance** : See page 144 / * 10per package, ** 5per package

◎ : Excellent ○ : Good

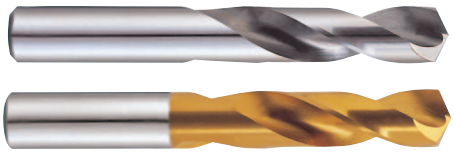
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | | ○ | ○ | ○ | ○ | | |

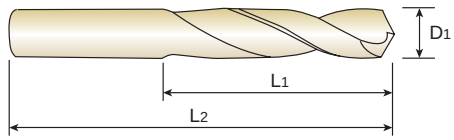
# STRAIGHT SHANK DRILLS

**D2147 SERIES** UN-COATED
**D4147 SERIES** TiN-COATED

## HSSCo8, STRAIGHT SHANK SCREW MACHINE

- **Flute Geometry** : Right hand spiral, wider flutes
- **Point Angle** : 135°:Split point
- **Application** : Drilling in steel, cast steel alloyed and Non-alloyed, grey cast iron, graphite, malleable cast iron






ANSI | HSS Co8 | N 20~30° | ANSI | 135° P.158

## ▶ Letter sizes

Unit : Inch

| EDP No. | | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | | Letter | Decimal | | |
| UN-COATED | TiN-COATED | D1 | | L1 | L2 |
| ** D2147201 | D4147201 | A | .2340 | 1-5/16 | 2-7/16 |
| ** D2147202 | D4147202 | B | .2380 | 1-3/8 | 2-1/2 |
| ** D2147203 | D4147203 | C | .2420 | 1-3/8 | 2-1/2 |
| ** D2147204 | D4147204 | D | .2460 | 1-3/8 | 2-1/2 |
| ** D2147205 | D4147205 | E | .2500 | 1-3/8 | 2-1/2 |
| ** D2147206 | D4147206 | F | .2570 | 1-7/16 | 2-5/8 |
| ** D2147207 | D4147207 | G | .2610 | 1-7/16 | 2-5/8 |
| ** D2147208 | D4147208 | H | .2660 | 1-1/2 | 2-11/16 |
| ** D2147209 | D4147209 | I | .2720 | 1-1/2 | 2-11/16 |
| ** D2147210 | D4147210 | J | .2770 | 1-1/2 | 2-11/16 |
| ** D2147211 | D4147211 | K | .2810 | 1-1/2 | 2-11/16 |
| ** D2147212 | D4147212 | L | .2900 | 1-9/16 | 2-3/4 |
| ** D2147213 | D4147213 | M | .2950 | 1-9/16 | 2-3/4 |
| ** D2147214 | D4147214 | N | .3020 | 1-5/8 | 2-13/16 |
| ** D2147215 | D4147215 | O | .3160 | 1-11/16 | 2-15/16 |
| ** D2147216 | D4147216 | P | .3230 | 1-11/16 | 2-15/16 |
| ** D2147217 | D4147217 | Q | .3320 | 1-11/16 | 3 |
| ** D2147218 | D4147218 | R | .3390 | 1-11/16 | 3 |
| ** D2147219 | D4147219 | S | .3480 | 1-3/4 | 3-1/16 |
| ** D2147220 | D4147220 | T | .3580 | 1-3/4 | 3-1/16 |
| ** D2147221 | D4147221 | U | .3680 | 1-13/16 | 3-1/8 |
| ** D2147222 | D4147222 | V | .3770 | 1-7/8 | 3-1/4 |
| ** D2147223 | D4147223 | W | .3860 | 1-7/8 | 3-1/4 |
| ** D2147224 | D4147224 | X | .3970 | 1-15/16 | 3-5/16 |
| ** D2147225 | D4147225 | Y | .4040 | 1-15/16 | 3-5/16 |
| ** D2147226 | D4147226 | Z | .4130 | 2 | 3-3/8 |

▶ **Tolerance** : See page 144

** 5per package

◎ : Excellent ○ : Good

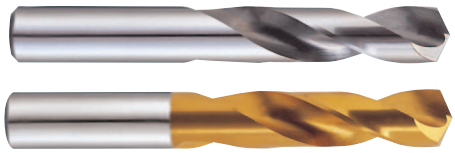
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | | ○ | ○ | ○ | ○ | | |

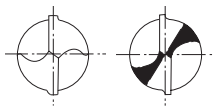
# STRAIGHT SHANK DRILLS

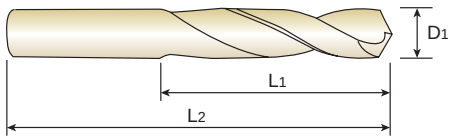
**D2148 SERIES** UN-COATED
**D4148 SERIES** TiN-COATED

## HSSCo8, STRAIGHT SHANK SCREW MACHINE

▶ **Flute Geometry** : Right hand spiral, wider flutes
▶ **Point Angle** : 135°:Split point
Wire gauge size #53~#60:Normal point
Wire gauge size #1~#52:Split point
▶ **Application** : Drilling in steel, cast steel alloyed and Non-alloyed, grey cast iron, graphite, malleable cast iron






ANSI | HSS Co8 | N 20~30° | ANSI | 135° | P.158

## ▶ Wire gauge sizes

Unit : Inch

| EDP No. | | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | | Wire gauge | Decimal | | |
| UN-COATED | TiN-COATED | D1 | | L1 | L2 |
| * D2148101 | D4148101 | 1 | .2280 | 1-5/16 | 2-7/16 |
| * D2148102 | D4148102 | 2 | .2210 | 1-5/16 | 2-7/16 |
| * D2148103 | D4148103 | 3 | .2130 | 1-1/4 | 2-3/8 |
| * D2148104 | D4148104 | 4 | .2090 | 1-1/4 | 2-3/8 |
| * D2148105 | D4148105 | 5 | .2055 | 1-1/4 | 2-3/8 |
| * D2148106 | D4148106 | 6 | .2040 | 1-1/4 | 2-3/8 |
| * D2148107 | D4148107 | 7 | .2010 | 1-3/16 | 2-1/4 |
| * D2148108 | D4148108 | 8 | .1990 | 1-3/16 | 2-1/4 |
| * D2148109 | D4148109 | 9 | .1960 | 1-3/16 | 2-1/4 |
| * D2148110 | D4148110 | 10 | .1935 | 1-3/16 | 2-1/4 |
| * D2148111 | D4148111 | 11 | .1910 | 1-3/16 | 2-1/4 |
| * D2148112 | D4148112 | 12 | .1890 | 1-3/16 | 2-1/4 |
| * D2148113 | D4148113 | 13 | .1850 | 1-1/8 | 2-3/16 |
| * D2148114 | D4148114 | 14 | .1820 | 1-1/8 | 2-3/16 |
| * D2148115 | D4148115 | 15 | .1800 | 1-1/8 | 2-3/16 |
| * D2148116 | D4148116 | 16 | .1770 | 1-1/8 | 2-3/16 |
| * D2148117 | D4148117 | 17 | .1730 | 1-1/8 | 2-3/16 |
| * D2148118 | D4148118 | 18 | .1695 | 1-1/16 | 2-1/8 |
| * D2148119 | D4148119 | 19 | .1660 | 1-1/16 | 2-1/8 |
| * D2148120 | D4148120 | 20 | .1610 | 1-1/16 | 2-1/8 |
| * D2148121 | D4148121 | 21 | .1590 | 1-1/16 | 2-1/8 |
| * D2148122 | D4148122 | 22 | .1570 | 1-1/16 | 2-1/8 |
| * D2148123 | D4148123 | 23 | .1540 | 1 | 2-1/16 |
| * D2148124 | D4148124 | 24 | .1520 | 1 | 2-1/16 |
| * D2148125 | D4148125 | 25 | .1495 | 1 | 2-1/16 |
| * D2148126 | D4148126 | 26 | .1470 | 1 | 2-1/16 |
| * D2148127 | D4148127 | 27 | .1440 | 1 | 2-1/16 |
| * D2148128 | D4148128 | 28 | .1405 | 15/16 | 1-15/16 |
| * D2148129 | D4148129 | 29 | .1360 | 15/16 | 1-15/16 |
| * D2148130 | D4148130 | 30 | .1285 | 15/16 | 1-15/16 |

▶ **Tolerance** : See page 144 / * 10per package

◎ : Excellent ○ : Good

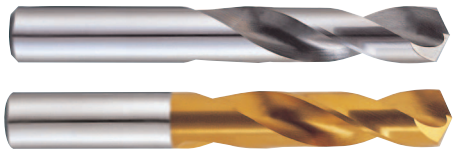
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | | ○ | ○ | ○ | ○ | | |

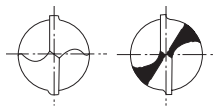
# STRAIGHT SHANK DRILLS

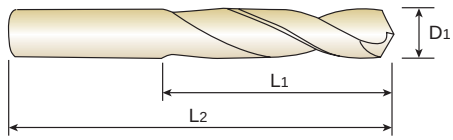
**D2148 SERIES** UN-COATED
**D4148 SERIES** TiN-COATED

## HSSCo8, STRAIGHT SHANK SCREW MACHINE

▶ **Flute Geometry** : Right hand spiral, wider flutes
▶ **Point Angle** : 135°:Split point
Wire gauge size #53~#60:Normal point
Wire gauge size #1~#52:Split point
▶ **Application** : Drilling in steel, cast steel alloyed and Non-alloyed, grey cast iron, graphite, malleable cast iron






ANSI | HSS Co8 | N 20~30° | ANSI | 135° P.158

## ▶ Wire gauge sizes

Unit : Inch

| EDP No. | | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | | Wire gauge | Decimal | | |
| UN-COATED | TiN-COATED | D1 | | L1 | L2 |
| * D2148131 | D4148131 | 31 | .1200 | 7/8 | 1-7/8 |
| * D2148132 | D4148132 | 32 | .1160 | 7/8 | 1-7/8 |
| * D2148133 | D4148133 | 33 | .1130 | 7/8 | 1-7/8 |
| * D2148134 | D4148134 | 34 | .1110 | 7/8 | 1-7/8 |
| * D2148135 | D4148135 | 35 | .1100 | 7/8 | 1-7/8 |
| * D2148136 | D4148136 | 36 | .1065 | 13/16 | 1-13/16 |
| ** D2148137 | D4148137 | 37 | .1040 | 13/16 | 1-13/16 |
| ** D2148138 | D4148138 | 38 | .1015 | 13/16 | 1-13/16 |
| ** D2148139 | D4148139 | 39 | .0995 | 13/16 | 1-13/16 |
| ** D2148140 | D4148140 | 40 | .0980 | 13/16 | 1-13/16 |
| ** D2148141 | D4148141 | 41 | .0960 | 13/16 | 1-13/16 |
| ** D2148142 | D4148142 | 42 | .0935 | 3/4 | 1-3/4 |
| ** D2148143 | D4148143 | 43 | .0890 | 3/4 | 1-3/4 |
| ** D2148144 | D4148144 | 44 | .0860 | 3/4 | 1-3/4 |
| ** D2148145 | D4148145 | 45 | .0820 | 3/4 | 1-3/4 |
| ** D2148146 | D4148146 | 46 | .0810 | 3/4 | 1-3/4 |
| ** D2148147 | D4148147 | 47 | .0785 | 11/16 | 1-11/16 |
| ** D2148148 | D4148148 | 48 | .0760 | 11/16 | 1-11/16 |
| ** D2148149 | D4148149 | 49 | .0730 | 11/16 | 1-11/16 |
| ** D2148150 | D4148150 | 50 | .0700 | 11/16 | 1-11/16 |
| ** D2148151 | D4148151 | 51 | .0670 | 11/16 | 1-11/16 |
| ** D2148152 | D4148152 | 52 | .0635 | 11/16 | 1-11/16 |
| ** D2148153 | D4148153 | 53 | .0595 | 5/8 | 1-5/8 |
| ** D2148154 | D4148154 | 54 | .0550 | 5/8 | 1-5/8 |
| ** D2148155 | D4148155 | 55 | .0520 | 5/8 | 1-5/8 |
| ** D2148156 | D4148156 | 56 | .0465 | 1/2 | 1-3/8 |
| ** D2148157 | D4148157 | 57 | .0430 | 1/2 | 1-3/8 |
| ** D2148158 | D4148158 | 58 | .0420 | 1/2 | 1-3/8 |
| ** D2148159 | D4148159 | 59 | .0410 | 1/2 | 1-3/8 |
| ** D2148160 | D4148160 | 60 | .0400 | 1/2 | 1-3/8 |

▶ **Tolerance** : See page 144 / * 10per package, ** 5per package

◎ : Excellent ○ : Good

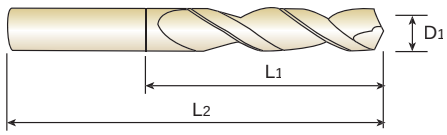
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | | ○ | ○ | ○ | ○ | | |

# STRAIGHT SHANK DRILLS

**DN514 SERIES**

## HSSCo5, STRAIGHT SHANK PARABOLIC FLUTE SCREW MACHINE, TiN COATED

▶**Flute Geometry** : Right hand spiral, Parabolic flute
38° helix
▶**Point Angle** : 130°:Split point
▶**Application** : Improved chip removal in most materials, especially in deep drilling applications.




ANSI HSS-E 38° ANSI 130°

P.159

## ▶ Fractional sizes

Unit : Inch

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Fractional | Decimal | | |
| TiN | D1 | | L1 | L2 |
| * DN514006 | 3/32 | .0938 | 3/4 | 1-3/4 |
| ** DN514007 | 7/64 | .1094 | 13/16 | 1-13/16 |
| ** DN514008 | 1/8 | .1250 | 7/8 | 1-7/8 |
| ** DN514009 | 9/64 | .1406 | 15/16 | 1-15/16 |
| ** DN514010 | 5/32 | .1563 | 1 | 2-1/16 |
| ** DN514011 | 11/64 | .1719 | 1-1/16 | 2-1/8 |
| ** DN514012 | 3/16 | .1875 | 1-1/8 | 2-3/16 |
| ** DN514013 | 13/64 | .2031 | 1-3/16 | 2-1/4 |
| ** DN514014 | 7/32 | .2188 | 1-1/4 | 2-3/8 |
| ** DN514015 | 15/64 | .2344 | 1-5/16 | 2-7/16 |
| ** DN514016 | 1/4 | .2500 | 1-3/8 | 2-1/2 |
| ** DN514017 | 17/64 | .2656 | 1-7/16 | 2-5/8 |
| ** DN514018 | 9/32 | .2813 | 1-1/2 | 2-11/16 |
| ** DN514019 | 19/64 | .2969 | 1-9/16 | 2-3/4 |

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Fractional | Decimal | | |
| TiN | D1 | | L1 | L2 |
| ** DN514020 | 5/16 | .3125 | 1-5/8 | 2-13/16 |
| ** DN514021 | 21/64 | .3281 | 1-11/16 | 2-15/16 |
| ** DN514022 | 11/32 | .3438 | 1-11/16 | 3 |
| ** DN514023 | 23/64 | .3594 | 1-3/4 | 3-1/16 |
| ** DN514024 | 3/8 | .3750 | 1-13/16 | 3-1/8 |
| ** DN514025 | 25/64 | .3906 | 1-7/8 | 3-1/4 |
| ** DN514026 | 13/32 | .4063 | 1-15/16 | 3-5/16 |
| ** DN514027 | 27/64 | .4219 | 2 | 3-3/8 |
| ** DN514028 | 7/16 | .4375 | 2-1/16 | 3-7/16 |
| ** DN514029 | 29/64 | .4531 | 2-1/8 | 3-9/16 |
| ** DN514030 | 15/32 | .4688 | 2-1/8 | 3-5/8 |
| ** DN514031 | 31/64 | .4844 | 2-3/16 | 3-11/16 |
| ** DN514032 | 1/2 | .5000 | 2-1/4 | 3-3/4 |

* 10per package
** 5per package

| Tolerance Diameter (Inch) | |
|---|---|
| up to 1/8(.1250) | 0 ~ −.0005 |
| over 1/8(.1250) up to 1/4(.2500) | 0 ~ −.0007 |
| over 1/4(.2500) up to 1/2(.5000) | 0 ~ −.0010 |

◎ : Excellent ○ : Good

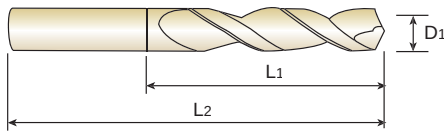
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | ○ | ○ | | | ○ | | |

# STRAIGHT SHANK DRILLS

**DN516 SERIES**

## HSSCo5, STRAIGHT SHANK PARABOLIC FLUTE SCREW MACHINE, TiN COATED

- **Flute Geometry** : Right hand spiral, Parabolic flute 38° helix
- **Point Angle** : 130°:Split point
- **Application** : Improved chip removal in most materials, especially in deep drilling applications.




ANSI HSS-E 38° ANSI 130°

P.159

## Letter sizes

Unit : Inch

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Letter | Decimal | | |
| TiN | D1 | | L1 | L2 |
| ** DN516101 | A | .2340 | 1-5/16 | 2-7/16 |
| ** DN516102 | B | .2380 | 1-3/8 | 2-1/2 |
| ** DN516103 | C | .2420 | 1-3/8 | 2-1/2 |
| ** DN516104 | D | .2460 | 1-3/8 | 2-1/2 |
| ** DN516105 | E | .2500 | 1-3/8 | 2-1/2 |
| ** DN516106 | F | .2570 | 1-7/16 | 2-5/8 |
| ** DN516107 | G | .2610 | 1-7/16 | 2-5/8 |
| ** DN516108 | H | .2660 | 1-1/2 | 2-11/16 |
| ** DN516109 | I | .2720 | 1-1/2 | 2-11/16 |
| ** DN516110 | J | .2770 | 1-1/2 | 2-11/16 |
| ** DN516111 | K | .2810 | 1-1/2 | 2-11/16 |
| ** DN516112 | L | .2900 | 1-9/16 | 2-3/4 |
| ** DN516113 | M | .2950 | 1-9/16 | 2-3/4 |

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Letter | Decimal | | |
| TiN | D1 | | L1 | L2 |
| ** DN516114 | N | .3020 | 1-5/8 | 2-13/16 |
| ** DN516115 | O | .3160 | 1-11/16 | 2-15/16 |
| ** DN516116 | P | .3230 | 1-11/16 | 2-15/16 |
| ** DN516117 | Q | .3320 | 1-11/16 | 3 |
| ** DN516118 | R | .3390 | 1-11/16 | 3 |
| ** DN516119 | S | .3480 | 1-3/4 | 3-1/16 |
| ** DN516120 | T | .3580 | 1-3/4 | 3-1/16 |
| ** DN516121 | U | .3680 | 1-13/16 | 3-1/8 |
| ** DN516122 | V | .3770 | 1-7/8 | 3-1/4 |
| ** DN516123 | W | .3860 | 1-7/8 | 3-1/4 |
| ** DN516124 | X | .3970 | 1-15/16 | 3-5/16 |
| ** DN516125 | Y | .4040 | 1-15/16 | 3-5/16 |
| ** DN516126 | Z | .4130 | 2 | 3-3/8 |

** 5per package

| Tolerance Diameter (Inch) | |
|---|---|
| up to 1/8(.1250) | 0 ~ −.0005 |
| over 1/8(.1250) up to 1/4(.2500) | 0 ~ −.0007 |
| over 1/4(.2500) up to 1/2(.5000) | 0 ~ −.0010 |

◎ : Excellent ○ : Good

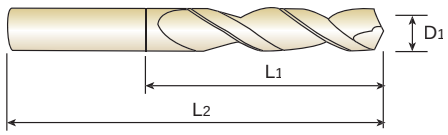
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | ○ | ○ | | | ○ | | |

# STRAIGHT SHANK DRILLS

**DN515 SERIES**

## HSSCo5, STRAIGHT SHANK PARABOLIC FLUTE SCREW MACHINE, TiN COATED

▶ **Flute Geometry** : Right hand spiral, Parabolic flute
38° helix
▶ **Point Angle** : 130°:Split point
▶ **Application** : Improved chip removal in most materials, especially in deep drilling applications.




ANSI HSS-E 38° ANSI 130°

P.159

## ▶ Wire gauge sizes

Unit : Inch

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Wire gauge | Decimal | | |
| TiN | D1 | | L1 | L2 |
| ** DN515201 | 1 | .2280 | 1-5/16 | 2-7/16 |
| ** DN515202 | 2 | .2210 | 1-5/16 | 2-7/16 |
| ** DN515203 | 3 | .2130 | 1-1/4 | 2-3/8 |
| ** DN515204 | 4 | .2090 | 1-1/4 | 2-3/8 |
| ** DN515205 | 5 | .2055 | 1-1/4 | 2-3/8 |
| ** DN515206 | 6 | .2040 | 1-1/4 | 2-3/8 |
| ** DN515207 | 7 | .2010 | 1-3/16 | 2-1/4 |
| ** DN515208 | 8 | .1990 | 1-3/16 | 2-1/4 |
| ** DN515209 | 9 | .1960 | 1-3/16 | 2-1/4 |
| ** DN515210 | 10 | .1935 | 1-3/16 | 2-1/4 |
| ** DN515211 | 11 | .1910 | 1-3/16 | 2-1/4 |
| ** DN515212 | 12 | .1890 | 1-3/16 | 2-1/4 |
| ** DN515213 | 13 | .1850 | 1-1/8 | 2-3/16 |
| ** DN515214 | 14 | .1820 | 1-1/8 | 2-3/16 |
| ** DN515215 | 15 | .1800 | 1-1/8 | 2-3/16 |
| ** DN515216 | 16 | .1770 | 1-1/8 | 2-3/16 |
| ** DN515217 | 17 | .1730 | 1-1/8 | 2-3/16 |
| ** DN515218 | 18 | .1695 | 1-1/16 | 2-1/8 |
| ** DN515219 | 19 | .1660 | 1-1/16 | 2-1/8 |
| ** DN515220 | 20 | .1610 | 1-1/16 | 2-1/8 |
| ** DN515221 | 21 | .1590 | 1-1/16 | 2-1/8 |
| ** DN515222 | 22 | .1570 | 1-1/16 | 2-1/8 |
| ** DN515223 | 23 | .1540 | 1 | 2-1/16 |
| ** DN515224 | 24 | .1520 | 1 | 2-1/16 |

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Wire gauge | Decimal | | |
| TiN | D1 | | L1 | L2 |
| ** DN515225 | 25 | .1495 | 1 | 2-1/16 |
| ** DN515226 | 26 | .1470 | 1 | 2-1/16 |
| ** DN515227 | 27 | .1440 | 1 | 2-1/16 |
| ** DN515228 | 28 | .1405 | 15/16 | 1-15/16 |
| ** DN515229 | 29 | .1360 | 15/16 | 1-15/16 |
| ** DN515230 | 30 | .1285 | 15/16 | 1-15/16 |
| ** DN515231 | 31 | .1200 | 7/8 | 1-7/8 |
| ** DN515232 | 32 | .1160 | 7/8 | 1-7/8 |
| ** DN515233 | 33 | .1130 | 7/8 | 1-7/8 |
| ** DN515234 | 34 | .1110 | 7/8 | 1-7/8 |
| ** DN515235 | 35 | .1100 | 7/8 | 1-7/8 |
| ** DN515236 | 36 | .1065 | 13/16 | 1-13/16 |
| * DN515237 | 37 | .1040 | 13/16 | 1-13/16 |
| * DN515238 | 38 | .1015 | 13/16 | 1-13/16 |
| * DN515239 | 39 | .0995 | 13/16 | 1-13/16 |
| * DN515240 | 40 | .0980 | 13/16 | 1-13/16 |
| * DN515241 | 41 | .0960 | 13/16 | 1-13/16 |
| * DN515242 | 42 | .0935 | 3/4 | 1-3/4 |
| * DN515243 | 43 | .0890 | 3/4 | 1-3/4 |
| * DN515244 | 44 | .0860 | 3/4 | 1-3/4 |
| * DN515245 | 45 | .0820 | 3/4 | 1-3/4 |
| * DN515246 | 46 | .0810 | 3/4 | 1-3/4 |
| * DN515247 | 47 | .0785 | 11/16 | 1-11/16 |

* 10per package
** 5per package

| Tolerance Diameter (Inch) | |
|---|---|
| up to 1/8(.1250) | 0 ~ −.0005 |
| over 1/8(.1250) up to 1/4(.2500) | 0 ~ −.0007 |
| over 1/4(.2500) up to 1/2(.5000) | 0 ~ −.0010 |

◎ : Excellent ○ : Good

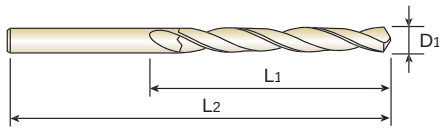
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | ○ | ○ | | | ○ | | |

# STRAIGHT SHANK DRILLS

DL517 SERIES UN-COATED
DX517 SERIES TiCN-COATED

## HSSCo5, TAPER LENGTH STRAIGHT SHANK DRILL

▶ Flute Geometry : Right hand spiral, Parabolic flute
38° helix
▶ Point Angle : 130°:Split point
▶ Application : Improved chip removal in most materials, especially in deep drilling applications.




ANSI HSS-E 38° ANSI 130° P.160

## ▶ Fractional sizes

Unit : Inch

| EDP No. | | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|---|
| | | Fractional | Decimal | | |
| UN-COATED | TiCN-COATED | D1 | | L1 | L2 |
| * DL517005 | DX517005 | 5/64 | .0781 | 2 | 3-3/4 |
| * DL517006 | DX517006 | 3/32 | .0938 | 2-1/4 | 4-1/4 |
| * DL517007 | DX517007 | 7/64 | .1094 | 2-1/2 | 4-5/8 |
| * DL517008 | DX517008 | 1/8 | .1250 | 2-3/4 | 5-1/8 |
| * DL517009 | DX517009 | 9/64 | .1406 | 3 | 5-3/8 |
| * DL517010 | DX517010 | 5/32 | .1563 | 3 | 5-3/8 |
| * DL517011 | DX517011 | 11/64 | .1719 | 3-3/8 | 5-3/4 |
| * DL517012 | DX517012 | 3/16 | .1875 | 3-3/8 | 5-3/4 |
| * DL517013 | DX517013 | 13/64 | .2031 | 3-5/8 | 6 |
| * DL517014 | DX517014 | 7/32 | .2188 | 3-5/8 | 6 |
| * DL517015 | DX517015 | 15/64 | .2344 | 3-3/4 | 6-1/8 |
| ** DL517016 | DX517016 | 1/4 | .2500 | 3-3/4 | 6-1/8 |
| ** DL517017 | DX517017 | 17/64 | .2656 | 3-7/8 | 6-1/4 |
| ** DL517018 | DX517018 | 9/32 | .2813 | 3-7/8 | 6-1/4 |
| ** DL517019 | DX517019 | 19/64 | .2969 | 4 | 6-3/8 |
| ** DL517020 | DX517020 | 5/16 | .3125 | 4 | 6-3/8 |
| ** DL517021 | DX517021 | 21/64 | .3281 | 4-1/8 | 6-1/2 |
| ** DL517022 | DX517022 | 11/32 | .3438 | 4-1/8 | 6-3/4 |
| ** DL517023 | DX517023 | 23/64 | .3594 | 4-1/4 | 6-3/4 |
| ** DL517024 | DX517024 | 3/8 | .3750 | 4-1/4 | 6-3/4 |
| ** DL517025 | DX517025 | 25/64 | .3906 | 4-3/8 | 7 |
| ** DL517026 | DX517026 | 13/32 | .4063 | 4-3/8 | 7 |
| ** DL517027 | DX517027 | 27/64 | .4219 | 4-5/8 | 7-1/4 |
| ** DL517028 | DX517028 | 7/16 | .4375 | 4-5/8 | 7-1/4 |
| ** DL517029 | DX517029 | 29/64 | .4531 | 4-3/4 | 7-1/2 |
| ** DL517030 | DX517030 | 15/32 | .4688 | 4-3/4 | 7-1/2 |
| ** DL517031 | DX517031 | 31/64 | .4844 | 4-3/4 | 7-3/4 |
| ** DL517032 | DX517032 | 1/2 | .5000 | 4-3/4 | 7-3/4 |

▶ **Tolerance** : See page 153

* 10per package
** 5per package

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | ○ | ○ | | | ○ | | |

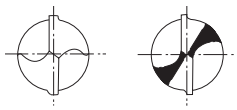
# STRAIGHT SHANK DRILLS

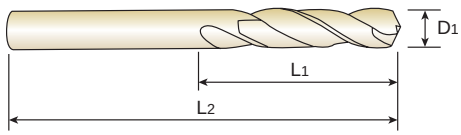
**D4107 SERIES**

## HSSCo8, STRAIGHT SHANK SCREW MACHINE

***STUB***

- ▶ **Flute Geometry** : Right hand spiral helix
- ▶ **Point Angle** : 135°
  under 1.6mm : Normal point
  1.6mm & over : Split point
- ▶ **Surface Treatment** : TiN Coating
- ▶ **Application** : Drills suitable for drilling in thin materials with portable drills. Special twist drills for automatic and turret lathes.




DIN 1897 | HSS Co8 | N 33° | h8 | 135° | P.161

Unit : mm

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Metric | Inch | | |
| TiN | D1 | | L1 | L2 |
| * D4107010 | 1.0 | .0394 | 6 | 26 |
| * D4107011 | 1.1 | .0433 | 7 | 28 |
| * D4107012 | 1.2 | .0472 | 8 | 30 |
| * D4107912 | 1.25 | .0492 | 8 | 30 |
| * D4107013 | 1.3 | .0512 | 8 | 30 |
| * D4107014 | 1.4 | .0551 | 9 | 32 |
| * D4107015 | 1.5 | .0591 | 9 | 32 |
| * D4107016 | 1.6 | .0630 | 10 | 34 |
| * D4107017 | 1.7 | .0669 | 10 | 34 |
| * D4107917 | 1.75 | .0689 | 11 | 36 |
| * D4107018 | 1.8 | .0709 | 11 | 36 |
| * D4107019 | 1.9 | .0748 | 11 | 36 |
| * D4107020 | 2.0 | .0787 | 12 | 38 |
| * D4107021 | 2.1 | .0827 | 12 | 38 |
| * D4107022 | 2.2 | .0866 | 13 | 40 |
| * D4107925 | 2.25 | 0.886 | 13 | 40 |
| * D4107023 | 2.3 | .0906 | 13 | 40 |
| * D4107024 | 2.4 | .0945 | 14 | 43 |
| * D4107025 | 2.5 | .0984 | 14 | 43 |
| * D4107026 | 2.6 | .1024 | 14 | 43 |
| ** D4107027 | 2.7 | .1063 | 16 | 46 |
| ** D4107927 | 2.75 | .1083 | 16 | 46 |
| ** D4107028 | 2.8 | .1102 | 16 | 46 |
| ** D4107029 | 2.9 | .1142 | 16 | 46 |
| ** D4107030 | 3.0 | .1181 | 16 | 46 |
| ** D4107031 | 3.1 | .1220 | 18 | 49 |
| ** D4107032 | 3.2 | .1260 | 18 | 49 |
| ** D4107932 | 3.25 | .1280 | 18 | 49 |
| ** D4107033 | 3.3 | .1299 | 18 | 49 |

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Metric | Inch | | |
| TiN | D1 | | L1 | L2 |
| ** D4107034 | 3.4 | .1339 | 20 | 52 |
| ** D4107035 | 3.5 | .1378 | 20 | 52 |
| ** D4107036 | 3.6 | .1417 | 20 | 52 |
| ** D4107037 | 3.7 | .1457 | 20 | 52 |
| ** D4107937 | 3.75 | .1476 | 20 | 52 |
| ** D4107038 | 3.8 | .1496 | 22 | 55 |
| ** D4107039 | 3.9 | .1535 | 22 | 55 |
| ** D4107040 | 4.0 | .1575 | 22 | 55 |
| ** D4107041 | 4.1 | .1614 | 22 | 55 |
| ** D4107042 | 4.2 | .1654 | 22 | 55 |
| ** D4107942 | 4.25 | .1673 | 22 | 55 |
| ** D4107043 | 4.3 | .1693 | 24 | 58 |
| ** D4107044 | 4.4 | .1732 | 24 | 58 |
| ** D4107045 | 4.5 | .1772 | 24 | 58 |
| ** D4107046 | 4.6 | .1811 | 24 | 58 |
| ** D4107946 | 4.65 | .1831 | 24 | 58 |
| ** D4107047 | 4.7 | .1850 | 24 | 58 |
| ** D4107947 | 4.75 | .1870 | 24 | 58 |
| ** D4107048 | 4.8 | .1890 | 26 | 62 |
| ** D4107049 | 4.9 | .1929 | 26 | 62 |
| ** D4107050 | 5.0 | .1969 | 26 | 62 |
| ** D4107051 | 5.1 | .2008 | 26 | 62 |
| ** D4107052 | 5.2 | .2047 | 26 | 62 |
| ** D4107952 | 5.25 | .2067 | 26 | 62 |
| ** D4107053 | 5.3 | .2087 | 26 | 62 |
| ** D4107054 | 5.4 | .2126 | 28 | 66 |
| ** D4107055 | 5.5 | .2165 | 28 | 66 |
| ** D4107955 | 5.55 | .2185 | 28 | 66 |
| ** D4107056 | 5.6 | .2205 | 28 | 66 |

▶ The HSSCo5(DL107) is available when you need.
The TiN(D4107), TiCN(D7107) and TiAlN(DQ107) are available on your request.

* 10per package, ** 5per package

◎ : Excellent ○ : Good

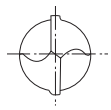
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | ○ | ○ | ○ | ○ | ○ | | |

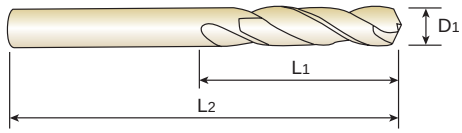
# STRAIGHT SHANK DRILLS

**D4107 SERIES**

## HSSCo8, STRAIGHT SHANK SCREW MACHINE — *STUB*

- ▶ **Flute Geometry** : Right hand spiral helix
- ▶ **Point Angle** : 135°
  under 1.6mm : Normal point
  1.6mm & over : Split point
- ▶ **Surface Treatment** : TiN Coating
- ▶ **Application** : Drills suitable for drilling in thin materials with portable drills. Special twist drills for automatic and turret lathes.




DIN 1897 | HSS Co8 | N 33° | h8 | 135° | P.161

Unit : mm

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Metric | Inch | | |
| TiN | D1 | | L1 | L2 |
| ** D4107057 | 5.7 | .2244 | 28 | 66 |
| ** D4107957 | 5.75 | .2264 | 28 | 66 |
| ** D4107058 | 5.8 | .2283 | 28 | 66 |
| ** D4107059 | 5.9 | .2323 | 28 | 66 |
| ** D4107060 | 6.0 | .2362 | 28 | 66 |
| ** D4107061 | 6.1 | .2402 | 31 | 70 |
| ** D4107062 | 6.2 | .2441 | 31 | 70 |
| ** D4107962 | 6.25 | .2461 | 31 | 70 |
| ** D4107063 | 6.3 | .2480 | 31 | 70 |
| ** D4107064 | 6.4 | .2520 | 31 | 70 |
| ** D4107065 | 6.5 | .2559 | 31 | 70 |
| ** D4107066 | 6.6 | .2598 | 31 | 70 |
| ** D4107067 | 6.7 | .2638 | 31 | 70 |
| ** D4107967 | 6.75 | .2657 | 34 | 74 |
| ** D4107068 | 6.8 | .2677 | 34 | 74 |
| ** D4107069 | 6.9 | .2717 | 34 | 74 |
| ** D4107070 | 7.0 | .2756 | 34 | 74 |
| ** D4107071 | 7.1 | .2795 | 34 | 74 |
| ** D4107072 | 7.2 | .2835 | 34 | 74 |
| ** D4107972 | 7.25 | .2854 | 34 | 74 |
| ** D4107073 | 7.3 | .2874 | 34 | 74 |
| ** D4107074 | 7.4 | .2913 | 34 | 74 |
| ** D4107974 | 7.45 | .2933 | 34 | 74 |
| ** D4107075 | 7.5 | .2953 | 34 | 74 |
| ** D4107076 | 7.6 | .2992 | 37 | 79 |
| ** D4107077 | 7.7 | .3031 | 37 | 79 |
| ** D4107977 | 7.75 | .3051 | 37 | 79 |
| ** D4107078 | 7.8 | .3071 | 37 | 79 |
| ** D4107079 | 7.9 | .3110 | 37 | 79 |

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Metric | Inch | | |
| TiN | D1 | | L1 | L2 |
| ** D4107080 | 8.0 | .3150 | 37 | 79 |
| ** D4107081 | 8.1 | .3189 | 37 | 79 |
| ** D4107082 | 8.2 | .3228 | 37 | 79 |
| ** D4107982 | 8.25 | .3248 | 37 | 79 |
| ** D4107083 | 8.3 | .3268 | 37 | 79 |
| ** D4107084 | 8.4 | .3307 | 37 | 79 |
| ** D4107085 | 8.5 | .3346 | 37 | 79 |
| ** D4107086 | 8.6 | .3386 | 40 | 84 |
| ** D4107087 | 8.7 | .3425 | 40 | 84 |
| ** D4107987 | 8.75 | .3445 | 40 | 84 |
| ** D4107088 | 8.8 | .3465 | 40 | 84 |
| ** D4107089 | 8.9 | .3504 | 40 | 84 |
| ** D4107090 | 9.0 | .3543 | 40 | 84 |
| ** D4107091 | 9.1 | .3583 | 40 | 84 |
| ** D4107092 | 9.2 | .3622 | 40 | 84 |
| ** D4107992 | 9.25 | .3642 | 40 | 84 |
| ** D4107093 | 9.3 | .3661 | 40 | 84 |
| ** D4107993 | 9.35 | .3681 | 40 | 84 |
| ** D4107094 | 9.4 | .3701 | 40 | 84 |
| ** D4107095 | 9.5 | .3740 | 40 | 84 |
| ** D4107096 | 9.6 | .3780 | 43 | 89 |
| ** D4107097 | 9.7 | .3819 | 43 | 89 |
| ** D4107997 | 9.75 | .3839 | 43 | 89 |
| ** D4107098 | 9.8 | .3858 | 43 | 89 |
| ** D4107099 | 9.9 | .3898 | 43 | 89 |
| ** D4107100 | 10.0 | .3937 | 43 | 89 |
| ** D4107102 | 10.2 | .4016 | 43 | 89 |
| ** D4107802 | 10.25 | .4035 | 43 | 89 |
| ** D4107105 | 10.5 | .4134 | 43 | 89 |

▶ The HSSCo5(DL107) is available when you need.
The TiN(D4107), TiCN(D7107) and TiAlN(DQ107) are available on your request.

** 5per package

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | ○ | ○ | ○ | ○ | ○ | | |

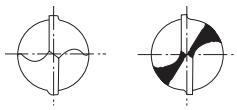
# STRAIGHT SHANK DRILLS

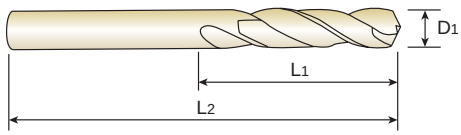
**D4107 SERIES**

## HSSCo8, STRAIGHT SHANK SCREW MACHINE

***STUB***

- ▶ **Flute Geometry** : Right hand spiral helix
- ▶ **Point Angle** : 135°
  under 1.6mm : Normal point
  1.6mm & over : Split point
- ▶ **Surface Treatment** : TiN Coating
- ▶ **Application** : Drills suitable for drilling in thin materials with portable drills. Special twist drills for automatic and turret lathes.




DIN 1897 | HSS Co8 | N 33° | h8 | 135° | P.161

Unit : mm

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Metric | Inch | | |
| TiN | D1 | | L1 | L2 |
| ** D4107807 | 10.75 | .4232 | 47 | 95 |
| ** D4107110 | 11.0 | .4330 | 47 | 95 |
| ** D4107812 | 11.25 | .4429 | 47 | 95 |
| ** D4107115 | 11.5 | .4527 | 47 | 95 |
| ** D4107817 | 11.75 | .4626 | 47 | 95 |
| ** D4107118 | 11.8 | .4645 | 47 | 95 |
| ** D4107120 | 12.0 | .4724 | 51 | 102 |
| ** D4107822 | 12.25 | .4823 | 51 | 102 |
| ** D4107125 | 12.5 | .4921 | 51 | 102 |
| ** D4107827 | 12.75 | .5020 | 51 | 102 |
| ** D4107130 | 13.0 | .5118 | 51 | 102 |
| – D4107832 | 13.25 | .5217 | 54 | 107 |
| – D4107135 | 13.5 | .5314 | 54 | 107 |
| – D4107837 | 13.75 | .5413 | 54 | 107 |
| – D4107138 | 13.8 | .5433 | 54 | 107 |
| – D4107140 | 14.0 | .5512 | 54 | 107 |
| – D4107842 | 14.25 | .5610 | 56 | 111 |
| – D4107145 | 14.5 | .5708 | 56 | 111 |
| – D4107847 | 14.75 | .5807 | 56 | 111 |
| – D4107150 | 15.0 | .5905 | 56 | 111 |
| – D4107852 | 15.25 | .6004 | 58 | 115 |
| – D4107155 | 15.5 | .6102 | 58 | 115 |
| – D4107857 | 15.75 | .6201 | 58 | 115 |
| – D4107160 | 16.0 | .6299 | 58 | 115 |
| – D4107862 | 16.25 | .6398 | 60 | 119 |
| – D4107165 | 16.5 | .6495 | 60 | 119 |
| – D4107867 | 16.75 | .6594 | 60 | 119 |
| – D4107170 | 17.0 | .6692 | 60 | 119 |

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Metric | Inch | | |
| TiN | D1 | | L1 | L2 |
| – D4107872 | 17.25 | .6791 | 62 | 123 |
| – D4107175 | 17.5 | .6889 | 62 | 123 |
| – D4107877 | 17.75 | .6907 | 62 | 123 |
| – D4107180 | 18.0 | .7087 | 62 | 123 |
| – D4107882 | 18.25 | .7185 | 64 | 127 |
| – D4107185 | 18.5 | .7283 | 64 | 127 |
| – D4107887 | 18.75 | .7382 | 64 | 127 |
| – D4107190 | 19.0 | .7480 | 64 | 127 |
| – D4107892 | 19.25 | .7579 | 66 | 131 |
| – D4107195 | 19.5 | .7676 | 66 | 131 |
| – D4107897 | 19.75 | .7776 | 66 | 131 |
| – D4107200 | 20.0 | .7874 | 66 | 131 |
| – D4107205 | 20.5 | .8071 | 68 | 136 |
| – D4107210 | 21.0 | .8268 | 68 | 136 |
| – D4107215 | 21.5 | .8465 | 70 | 141 |
| – D4107220 | 22.0 | .8661 | 70 | 141 |
| – D4107225 | 22.5 | .8858 | 72 | 146 |
| – D4107230 | 23.0 | .9055 | 72 | 146 |
| – D4107235 | 23.5 | .9252 | 72 | 146 |
| – D4107240 | 24.0 | .9449 | 75 | 151 |
| – D4107245 | 24.5 | .9646 | 75 | 151 |
| – D4107250 | 25.0 | .9843 | 75 | 151 |
| – D4107260 | 26.0 | 1.0236 | 78 | 156 |
| – D4107270 | 27.0 | 1.0630 | 81 | 162 |
| – D4107280 | 28.0 | 1.1024 | 81 | 162 |
| – D4107290 | 29.0 | 1.1417 | 84 | 168 |
| – D4107300 | 30.0 | 1.1811 | 84 | 168 |
| – D4107310 | 31.0 | 1.2205 | 87 | 174 |

▶ The HSSCo5(DL107) is available when you need.
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** 5per package
– 1per package

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | ○ | ○ | ○ | ○ | ○ | | |

# STRAIGHT SHANK DRILLS

## RECOMMENDED CUTTING CONDITIONS

## HSS & HSSCo8, STRAIGHT SHANK SCREW MACHINE DRILLS

### D1118, D1115, D1119, D2146, D2147, D2148 SERIES

| WORK MATERIAL | CARBON STEELS | | CARBON STEELS | | CARBON STEELS | | ALLOY STEELS | | ALLOY STEELS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~ HRc23 | | ~ HRc23 ~ 28 | | HRc23 ~ 34 | | HRc34 ~ 38 | |
| STRENGTH | ~ 570 N/mm² | | ~ 830 N/mm² | | 830 ~ 950 N/mm² | | 830 ~ 1110 N/mm² | | 1110 ~ 1260 N/mm² | |
| DIAMETER | N | S | N | S | N | S | N | S | N | S |
| 0 ~ 3/32 | 3380 | .0010 | 2550 | .0010 | 1900 | .0006 | 2380 | .0008 | 1400 | .0006 |
| 3/32 ~ 5/32 | 2700 | .0020 | 2000 | .0020 | 1500 | .0010 | 1880 | .0020 | 1100 | .0008 |
| 11/64 ~ 1/4 | 1700 | .0025 | 1280 | .0025 | 960 | .0015 | 1190 | .0025 | 700 | .0010 |
| 17/64 ~ 23/64 | 1050 | .0051 | 780 | .0051 | 590 | .0030 | 730 | .0051 | 430 | .0015 |
| 3/8 ~ 37/64 | 750 | .0059 | 560 | .0060 | 425 | .0030 | 520 | .0070 | 310 | .0020 |
| 19/32 ~ 1 | 440 | .0090 | 330 | .0090 | 255 | .0051 | 300 | .0090 | 180 | .0020 |
| 1 ~ | 260 | .0110 | 195 | .0110 | 145 | .0070 | 180 | .0070 | 107 | .0030 |

| WORK MATERIAL | STAINLESS STEELS | | TITANIUM ALLOYS | | TOOL STEELS | | CAST IRON | | ALUMINUM ALLOYS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | HRc23 | | | | | | ~ HRc21 | | | |
| STRENGTH | 830 N/mm² | | 410 N/mm² | | ~ 270 N/mm² | | ~ 800 N/mm² | | | |
| DIAMETER | N | S | N | S | N | S | N | S | N | S |
| 0 ~ 3/32 | 2550 | .0010 | 1400 | .0008 | 3180 | .0016 | 2250 | .0010 | 6400 | .0015 |
| 3/32 ~ 5/32 | 2000 | .0020 | 1100 | .0010 | 2500 | .0020 | 2000 | .0020 | 5000 | .0025 |
| 11/64 ~ 1/4 | 1280 | .0025 | 700 | .0015 | 1590 | .0025 | 1280 | .0025 | 3200 | .0030 |
| 17/64 ~ 23/64 | 780 | .0051 | 430 | .0030 | 970 | .0051 | 780 | .0051 | 2000 | .0070 |
| 3/8 ~ 37/64 | 560 | .0060 | 430 | .0030 | 700 | .0070 | 560 | .0060 | 1400 | .0078 |
| 19/32 ~ 1 | 330 | .0090 | 180 | .0051 | 440 | .0090 | 330 | .0090 | 820 | .0118 |
| 1 ~ | 195 | .0110 | 107 | .0070 | 240 | .1180 | 195 | .0110 | 490 | .0150 |

| WORK MATERIAL | MAGNESIUM ALLOYS | | ZINC ALLOYS | | PLASTIC | |
|---|---|---|---|---|---|---|
| HARDNESS | | | | | | |
| STRENGTH | | | | | | |
| DIAMETER | N | S | N | S | N | S |
| 0 ~ 3/32 | 8600 | .0015 | 6400 | .0015 | 3380 | .0010 |
| 3/32 ~ 5/32 | 6800 | .0025 | 5000 | .0025 | 2700 | .0020 |
| 11/64 ~ 1/4 | 4300 | .0030 | 3200 | .0030 | 1700 | .0025 |
| 17/64 ~ 23/64 | 2600 | .0070 | 2000 | .0070 | 1050 | .0051 |
| 3/8 ~ 37/64 | 1900 | .0078 | 1400 | .0078 | 750 | .0060 |
| 19/32 ~ 1 | 1100 | .0118 | 820 | .0118 | 440 | .0090 |
| 1 ~ | 660 | .0150 | 490 | .0150 | 260 | .0110 |

N = R.P.M
S =Inch per Revolution(inch/rev.)

## HSSCo5, STRAIGHT SHANK PARABOLIC FLUTE SCREW MACHINE, TiN COATED

### DN514, DN516, DN515 SERIES

| WORK MATERIAL | CARBON STEELS ALLOY STEELS | | TOOL STEELS HARDENED STEELS | | SOFT GREY CAST IRON | | HARD GREY CAST IRON | |
|---|---|---|---|---|---|---|---|---|
| HARDNESS | HRc15 ~ 30 | | HRc20 ~ 40 | | | | | |
| STRENGTH | 700 ~ 1000 N/mm² | | 800 ~ 1200 N/mm² | | | | | |
| DIAMETER | N | S | N | S | N | S | N | S |
| ~ 5/64 | 2630 | .0012 | 2100 | .0010 | 4200 | .0023 | 1680 | .0500 |
| 3/32 ~ 7/64 | 2100 | .0015 | 1680 | .0012 | 3300 | .0031 | 1310 | .0023 |
| 1/8 ~ 5/32 | 1680 | .0020 | 1310 | .0015 | 2630 | .0039 | 1050 | .0031 |
| 11/64 ~ 3/16 | 1310 | .0023 | 1050 | .0019 | 2100 | .0051 | 840 | .0039 |
| 13/64 ~ 15/64 | 1050 | .0023 | 840 | .0019 | 1680 | .0051 | 660 | .0039 |
| 1/4 ~ 9/32 | 840 | .0031 | 660 | .0023 | 1310 | .0063 | 530 | .0051 |
| 19/64 ~ 11/32 | 660 | .0039 | 530 | .0031 | 1050 | .0078 | 420 | .0067 |
| 23/64 ~ 7/16 | 530 | .0051 | 420 | .0039 | 840 | .0098 | 330 | .0082 |
| 29/64 ~ 9/16 | 420 | .0051 | 330 | .0039 | 660 | .0098 | 260 | .0082 |
| 37/64 ~ 45/64 | 330 | .0059 | 260 | .0051 | 530 | .0118 | 210 | .0098 |
| 23/32 ~ 7/8 | 260 | .0078 | 210 | .0059 | 420 | .0157 | 170 | .0118 |
| 57/64 ~ 1-1/8 | 210 | .0098 | 170 | .0078 | 330 | .0196 | 130 | .0196 |
| 1-9/64 ~ | 170 | .0098 | 130 | .0078 | 260 | .0196 | 110 | .0196 |

N = R.P.M
S =Inch per Revolution(inch/rev.)

# STRAIGHT SHANK DRILLS

## RECOMMENDED CUTTING CONDITIONS



## HSSCo5, TAPER LENGTH STRAIGHT SHANK DRILL, TiCN COATED

### DX517 SERIES

| WORK MATERIAL | CARBON STEELS ALLOY STEELS | | TOOL STEELS HARDENED STEELS | | SOFT GREY CAST IRON | | HARD GREY CAST IRON | |
|---|---|---|---|---|---|---|---|---|
| HARDNESS | HRc15 ~ 30 | | HRc20 ~ 40 | | | | | |
| STRENGTH | 700 ~ 1000 N/mm² | | 800 ~ 1200 N/mm² | | | | | |
| DIAMETER | N | S | N | S | N | S | N | S |
| ~ 5/64 | 4900 | .0023 | 3400 | .0023 | 8500 | .0027 | 5400 | .0027 |
| 3/32 ~ 7/64 | 3000 | .0031 | 2350 | .0031 | 5700 | .0043 | 3500 | .0043 |
| 1/8 ~ 5/32 | 2440 | .0035 | 1800 | .0035 | 4300 | .0055 | 2700 | .0055 |
| 11/64 ~ 15/64 | 1950 | .0039 | 1400 | .0039 | 3450 | .0055 | 2150 | .0055 |
| 1/4 ~ 9/32 | 1400 | .0055 | 1000 | .0055 | 2450 | .0078 | 1550 | .0078 |
| 19/64 ~ 5/16 | 1200 | .0059 | 850 | .0059 | 2100 | .0086 | 1350 | .0086 |
| 21/64 ~ 23/64 | 1100 | .0066 | 800 | .0066 | 1950 | .0094 | 1200 | .0094 |
| 3/8 ~ 25/64 | 950 | .0071 | 660 | .0071 | 1750 | .0110 | 1050 | .0110 |
| 13/32 ~ 7/16 | 900 | .0078 | 630 | .0078 | 1600 | .0110 | 960 | .0110 |
| 29/64 ~ 15/32 | 800 | .0078 | 575 | .0078 | 1450 | .0110 | 900 | .0110 |
| 31/64 ~ 1/2 | 720 | .0078 | 500 | .0078 | 1300 | .0110 | 830 | .0110 |

N = R.P.M
S =Inch per Revolution(inch/rev.)

## HSSCo5, TAPER LENGTH STRAIGHT SHANK DRILL

### DL517 SERIES

| WORK MATERIAL | CARBON STEELS ALLOY STEELS | | TOOL STEELS HARDENED STEELS | | SOFT GREY CAST IRON | | HARD GREY CAST IRON | |
|---|---|---|---|---|---|---|---|---|
| HARDNESS | HRc15 ~ 30 | | HRc20 ~ 40 | | | | | |
| STRENGTH | 700 ~ 1000 N/mm² | | 800 ~ 1200 N/mm² | | | | | |
| DIAMETER | N | S | N | S | N | S | N | S |
| ~ 5/64 | 3990 | .0023 | 2770 | .0023 | 6920 | .0027 | 4400 | .0027 |
| 3/32 ~ 7/64 | 2440 | .0031 | 1910 | .0031 | 4640 | .0043 | 2850 | .0043 |
| 1/8 ~ 5/32 | 1990 | .0035 | 1470 | .0035 | 3500 | .0055 | 2200 | .0055 |
| 11/64 ~ 15/64 | 1590 | .0039 | 1140 | .0039 | 2810 | .0055 | 1750 | .0055 |
| 1/4 ~ 9/32 | 1140 | .0055 | 810 | .0055 | 1990 | .0078 | 1260 | .0078 |
| 19/64 ~ 5/16 | 980 | .0059 | 690 | .0059 | 1710 | .0086 | 1100 | .0086 |
| 21/64 ~ 23/64 | 900 | .0066 | 650 | .0066 | 1590 | .0094 | 980 | .0094 |
| 3/8 ~ 25/64 | 770 | .0071 | 540 | .0071 | 1420 | .0110 | 850 | .0110 |
| 13/32 ~ 7/16 | 730 | .0078 | 510 | .0078 | 1300 | .0110 | 780 | .0110 |
| 29/64 ~ 15/32 | 650 | .0078 | 470 | .0078 | 1180 | .0110 | 730 | .0110 |
| 31/64 ~ 1/2 | 590 | .0078 | 410 | .0078 | 1060 | .0110 | 680 | .0110 |

N = R.P.M
S =Inch per Revolution(inch/rev.)

## HSSCo8, STRAIGHT SHANK SCREW MACHINE

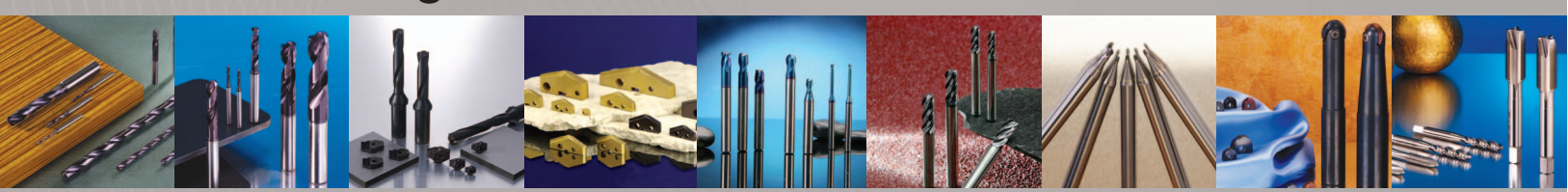
### D4107 SERIES

| WORK MATERIAL | CARBON STEELS | | CARBON STEELS | | CARBON STEELS | | ALLOY STEELS | | ALLOY STEELS | | STAINLESS STEELS | | TITANIUM ALLOYS | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~ HRc23 | | ~ HRc23 ~ 28 | | HRc23 ~ 34 | | HRc34 ~ 38 | | HRc23 | | | |
| STRENGTH | ~ 570 N/mm² | | ~ 830 N/mm² | | 830 ~ 950 N/mm² | | 830 ~ 1110 N/mm² | | 1110 ~ 1260 N/mm² | | 830 N/mm² | | 410 N/mm² | |
| DIAMETER | N | S | N | S | N | S | N | S | N | S | N | S | N | S |
| 2.5 | 4225 | 0.025 | 3200 | 0.025 | 2500 | 0.015 | 2980 | 0.020 | 1750 | 0.015 | 3200 | 0.025 | 1750 | 0.020 |
| 3.0 | 3375 | 0.050 | 2500 | 0.050 | 2000 | 0.025 | 2350 | 0.050 | 1375 | 0.020 | 2500 | 0.050 | 1375 | 0.025 |
| 5.0 | 2125 | 0.063 | 1600 | 0.063 | 1280 | 0.038 | 1500 | 0.063 | 875 | 0.025 | 1600 | 0.063 | 875 | 0.038 |
| 8.0 | 1310 | 0.130 | 975 | 0.130 | 785 | 0.076 | 910 | 0.130 | 535 | 0.038 | 975 | 0.130 | 535 | 0.076 |
| 11.0 | 935 | 0.150 | 700 | 0.150 | 565 | 0.076 | 650 | 0.180 | 385 | 0.050 | 700 | 0.150 | 535 | 0.076 |
| 19.0 | 550 | 0.230 | 410 | 0.230 | 340 | 0.130 | 375 | 0.230 | 225 | 0.050 | 410 | 0.230 | 225 | 0.130 |
| 31.0 | 325 | 0.280 | 244 | 0.280 | 193 | 0.180 | 225 | 0.180 | 134 | 0.076 | 244 | 0.280 | 134 | 0.180 |

| WORK MATERIAL | TOOL STEELS | | CAST IRON | | ALUMINUM ALLOYS | | MAGNESIUM ALLOYS | | ZINC ALLOYS | | PLASTIC | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~ HRc21 | | | | | | | | | |
| STRENGTH | ~ 270 N/mm² | | ~ 800 N/mm² | | | | | | | | | |
| DIAMETER | N | S | N | S | N | S | N | S | N | S | N | S |
| 2.5 | 3975 | 0.042 | 2800 | 0.025 | 7950 | 0.038 | 10700 | 0.038 | 7950 | 0.038 | 4225 | 0.025 |
| 3.0 | 3125 | 0.050 | 2500 | 0.050 | 6200 | 0.063 | 8450 | 0.063 | 6200 | 0.063 | 3350 | 0.050 |
| 5.0 | 2000 | 0.063 | 1600 | 0.063 | 3950 | 0.076 | 5350 | 0.076 | 3950 | 0.076 | 2125 | 0.063 |
| 8.0 | 1210 | 0.130 | 975 | 0.130 | 2490 | 0.180 | 3240 | 0.180 | 2490 | 0.180 | 1310 | 0.130 |
| 11.0 | 875 | 0.180 | 700 | 0.150 | 1740 | 0.200 | 2365 | 0.200 | 1740 | 0.200 | 935 | 0.150 |
| 19.0 | 550 | 0.230 | 410 | 0.230 | 1020 | 0.300 | 1370 | 0.300 | 1020 | 0.300 | 550 | 0.230 |
| 31.0 | 300 | 0.300 | 244 | 0.280 | 610 | 0.380 | 820 | 0.380 | 610 | 0.380 | 325 | 0.280 |

N = R.P.M
S = Feed per Revolution (mm/rev.)

Global Cutting Tool Leader **YG-1**



# HSS

YG

Being the best through innovation

# AIRCRAFT DRILLS

- 6 and 12 inch Length Drills

# AIRCRAFT DRILLS

6 and 12 inch Length Drills

| ITEM | MODEL | DESCRIPTION | SIZE | | PAGE |
|---|---|---|---|---|---|
| | | | MIN | MAX | |
| **INCH** | | | | | |
| DL601 DL604 | | HSSCo5, AIRCRAFT EXTENSION DRILL 135° SPLIT POINT COLORING / Fractional sizes | D5/64 | D1/2 | **166** |
| DL602 DL605 | | HSSCo5, AIRCRAFT EXTENSION DRILL 135° SPLIT POINT COLORING / Letter sizes | A | Z | **167** |
| DL603 DL606 | | HSSCo5, AIRCRAFT EXTENSION DRILL 135° SPLIT POINT COLORING / Wire gauge sizes | #43 | #1 | **168** |
| D1631 D1634 | | HSS, AIRCRAFT EXTENSION DRILL 135° SPLIT POINT STEAM OXIDE / Fractional sizes | D5/64 | D1/2 | **169** |
| D1632 D1635 | | HSS, AIRCRAFT EXTENSION DRILL 135° SPLIT POINT STEAM OXIDE / Letter sizes | A | Z | **170** |
| D1633 D1636 | | HSS, AIRCRAFT EXTENSION DRILL 135° SPLIT POINT STEAM OXIDE / Wire gauge sizes | #43 | #1 | **171** |
| | | RECOMMENDED CUTTING CONDITIONS | | | **172** |

◎ : Excellent
○ : Good

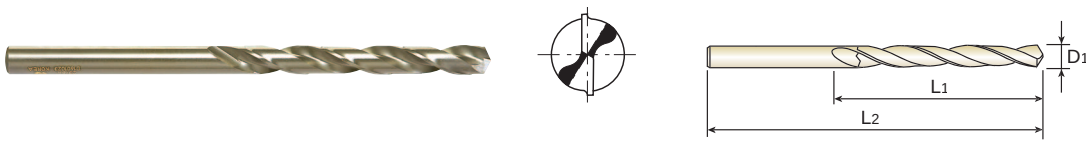
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ○ | | | | ○ | ○ | ○ | | ○ | ○ | ○ |
| ◎ | ○ | | | | ○ | ○ | ○ | | ○ | ○ | ○ |
| ◎ | ○ | | | | ○ | ○ | ○ | | ○ | ○ | ○ |
| ◎ | ◎ | ○ | | | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| ◎ | ◎ | ○ | | | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| ◎ | ◎ | ○ | | | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

# AIRCRAFT DRILLS

**DL601 SERIES**
**DL604 SERIES**

## HSSCo5, AIRCRAFT EXTENSION DRILL 135° SPLIT POINT COLORING

- **Flute Geometry** : Right hand spiral, 30° helix
- **Point Angle** : 135°:Split point
- **Application** : Improved chip removal in most materials, especially in deep drilling applications.




HSS Co5 | NAS 907 | 30° | 135°

P.172

## ▶ Fractional sizes

Unit : Inch

| EDP No. | Diameter Fractional | Diameter Decimal | Flute Length | Overall Length |
|---|---|---|---|---|
| | D1 | | L1 | L2 |
| * DL601005 | 5/64 | .0781 | 1 | 6 |
| * DL601006 | 3/32 | .0938 | 1-1/4 | 6 |
| * DL601007 | 7/64 | .1094 | 1-1/4 | 6 |
| * DL601008 | 1/8 | .1250 | 1-5/8 | 6 |
| * DL601009 | 9/64 | .1406 | 1-3/4 | 6 |
| * DL601010 | 5/32 | .1563 | 2 | 6 |
| * DL601011 | 11/64 | .1719 | 2-1/8 | 6 |
| * DL601012 | 3/16 | .1875 | 2-5/16 | 6 |
| * DL601013 | 13/64 | .2031 | 2-7/16 | 6 |
| * DL601014 | 7/32 | .2188 | 2-1/2 | 6 |
| * DL601015 | 15/64 | .2344 | 2-5/8 | 6 |
| ** DL601016 | 1/4 | .2500 | 2-3/4 | 6 |
| ** DL601017 | 17/64 | .2656 | 2-7/8 | 6 |
| ** DL601018 | 9/32 | .2813 | 2-15/16 | 6 |
| ** DL601019 | 19/64 | .2969 | 3-1/16 | 6 |
| ** DL601020 | 5/16 | .3125 | 3-3/16 | 6 |
| ** DL601021 | 21/64 | .3281 | 3-5/16 | 6 |
| ** DL601022 | 11/32 | .3438 | 3-7/16 | 6 |
| ** DL601023 | 23/64 | .3594 | 3-1/2 | 6 |
| ** DL601024 | 3/8 | .3750 | 3-5/8 | 6 |
| ** DL601025 | 25/64 | .3906 | 3-3/4 | 6 |
| ** DL601026 | 13/32 | .4063 | 3-7/8 | 6 |
| ** DL601027 | 27/64 | .4219 | 3-15/16 | 6 |
| ** DL601028 | 7/16 | .4375 | 4-1/16 | 6 |
| ** DL601029 | 29/64 | .4531 | 4-3/16 | 6 |
| ** DL601030 | 15/32 | .4688 | 4-5/16 | 6 |
| ** DL601031 | 31/64 | .4844 | 4-3/8 | 6 |
| ** DL601032 | 1/2 | .5000 | 4-1/2 | 6 |
| * DL604014 | 7/32 | .2188 | 2-1/2 | 12 |
| * DL604015 | 15/64 | .2344 | 2-5/8 | 12 |
| ** DL604016 | 1/4 | .2500 | 2-3/4 | 12 |
| ** DL604017 | 17/64 | .2656 | 2-7/8 | 12 |
| ** DL604018 | 9/32 | .2813 | 2-15/16 | 12 |
| ** DL604019 | 19/64 | .2969 | 3-1/16 | 12 |
| ** DL604020 | 5/16 | .3125 | 3-3/16 | 12 |
| ** DL604021 | 21/64 | .3281 | 3-5/16 | 12 |
| ** DL604022 | 11/32 | .3438 | 3-7/16 | 12 |
| ** DL604023 | 23/64 | .3594 | 3-1/2 | 12 |
| ** DL604024 | 3/8 | .3750 | 3-5/8 | 12 |
| ** DL604025 | 25/64 | .3906 | 3-3/4 | 12 |
| ** DL604026 | 13/32 | .4063 | 3-7/8 | 12 |
| ** DL604027 | 27/64 | .4219 | 3-15/16 | 12 |
| ** DL604028 | 7/16 | .4375 | 4-1/16 | 12 |
| ** DL604029 | 29/64 | .4531 | 4-3/16 | 12 |
| ** DL604030 | 15/32 | .4688 | 4-5/16 | 12 |
| ** DL604031 | 31/64 | .4844 | 4-3/8 | 12 |
| ** DL604032 | 1/2 | .5000 | 4-1/2 | 12 |

* 10per package
** 5per package

| Tolerance Diameter (Inch) | |
|---|---|
| up to 1/8(.1250) | 0 ~ −.0005 |
| over 1/8(.1250) up to 1/4(.2500) | 0 ~ −.0007 |
| over 1/4(.2500) up to 1/2(.5000) | 0 ~ −.0010 |

◎ : Excellent ○ : Good

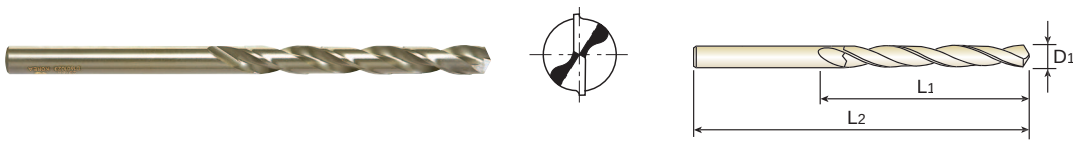
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ○ | | | | ○ | ○ | ○ | | ○ | ○ | ○ |

# AIRCRAFT DRILLS

**DL602 SERIES**
**DL605 SERIES**

## HSSCo5, AIRCRAFT EXTENSION DRILL 135° SPLIT POINT COLORING

▶ **Flute Geometry** : Right hand spiral, 30° helix
▶ **Point Angle** : 135°:Split point
▶ **Application** : Improved chip removal in most materials, especially in deep drilling applications.




HSS Co5 | NAS 907 | 30° | 135° P.172

### ▶ Letter sizes

Unit : Inch

| EDP No. | Diameter Letter | Diameter Decimal | Flute Length | Overall Length |
|---|---|---|---|---|
| | D1 | | L1 | L2 |
| * DL602101 | A | .2340 | 2-5/8 | 6 |
| ** DL602102 | B | ,2380 | 2-3/4 | 6 |
| ** DL602103 | C | .2420 | 2-3/4 | 6 |
| ** DL602104 | D | .2460 | 2-3/4 | 6 |
| ** DL602105 | E | .2500 | 2-3/4 | 6 |
| ** DL602106 | F | .2570 | 2-7/8 | 6 |
| ** DL602107 | G | .2610 | 2-7/8 | 6 |
| ** DL602108 | H | .2660 | 2-7/8 | 6 |
| ** DL602109 | I | .2720 | 2-7/8 | 6 |
| ** DL602110 | J | .2770 | 2-7/8 | 6 |
| ** DL602111 | K | .2810 | 2-15/16 | 6 |
| ** DL602112 | L | .2900 | 2-15/16 | 6 |
| ** DL602113 | M | .2950 | 3-1/16 | 6 |
| ** DL602114 | N | .3020 | 3-1/16 | 6 |
| ** DL602115 | O | .3160 | 3-3/16 | 6 |
| ** DL602116 | P | .3230 | 3-5/16 | 6 |
| ** DL602117 | Q | .3320 | 3-7/16 | 6 |
| ** DL602118 | R | .3390 | 3-7/16 | 6 |
| ** DL602119 | S | .3480 | 3-1/2 | 6 |
| ** DL602120 | T | .3580 | 3-1/2 | 6 |
| ** DL602121 | U | .3680 | 3-5/8 | 6 |
| ** DL602122 | V | .3770 | 3-5/8 | 6 |
| ** DL602123 | W | .3860 | 3-3/4 | 6 |
| ** DL602124 | X | .3970 | 3-3/4 | 6 |
| ** DL602125 | Y | .4040 | 3-7/8 | 6 |
| ** DL602126 | Z | .4130 | 3-7/8 | 6 |

| EDP No. | Diameter Letter | Diameter Decimal | Flute Length | Overall Length |
|---|---|---|---|---|
| | D1 | | L1 | L2 |
| * DL605101 | A | .2340 | 2-5/8 | 12 |
| ** DL605102 | B | ,2380 | 2-3/4 | 12 |
| ** DL605103 | C | .2420 | 2-3/4 | 12 |
| ** DL605104 | D | .2460 | 2-3/4 | 12 |
| ** DL605105 | E | .2500 | 2-3/4 | 12 |
| ** DL605106 | F | .2570 | 2-7/8 | 12 |
| ** DL605107 | G | .2610 | 2-7/8 | 12 |
| ** DL605108 | H | .2660 | 2-7/8 | 12 |
| ** DL605109 | I | .2720 | 2-7/8 | 12 |
| ** DL605110 | J | .2770 | 2-7/8 | 12 |
| ** DL605111 | K | .2810 | 2-15/16 | 12 |
| ** DL605112 | L | .2900 | 2-15/16 | 12 |
| ** DL605113 | M | .2950 | 3-1/16 | 12 |
| ** DL605114 | N | .3020 | 3-1/16 | 12 |
| ** DL605115 | O | .3160 | 3-3/16 | 12 |
| ** DL605116 | P | .3230 | 3-5/16 | 12 |
| ** DL605117 | Q | .3320 | 3-7/16 | 12 |
| ** DL605118 | R | .3390 | 3-7/16 | 12 |
| ** DL605119 | S | .3480 | 3-1/2 | 12 |
| ** DL605120 | T | .3580 | 3-1/2 | 12 |
| ** DL605121 | U | .3680 | 3-5/8 | 12 |
| ** DL605122 | V | .3770 | 3-5/8 | 12 |
| ** DL605123 | W | .3860 | 3-3/4 | 12 |
| ** DL605124 | X | .3970 | 3-3/4 | 12 |
| ** DL605125 | Y | .4040 | 3-7/8 | 12 |
| ** DL605126 | Z | .4130 | 3-7/8 | 12 |

▶ **Tolerance** : See page 166

* 10per package
** 5per package

◎ : Excellent ○ : Good

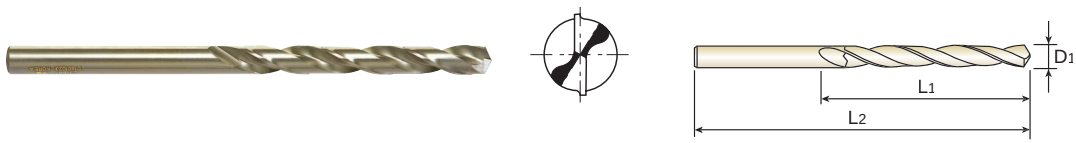
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ○ | | | | ○ | ○ | ○ | | ○ | ○ | ○ |

# AIRCRAFT DRILLS

**DL603 SERIES**
**DL606 SERIES**

## HSSCo5, AIRCRAFT EXTENSION DRILL 135° SPLIT POINT COLORING

▶ **Flute Geometry** : Right hand spiral, PARABOLIC FLUTE
30° helix
▶ **Point Angle** : 135°:Split point
▶ **Application** : Improved chip removal in most materials, especially in deep drilling applications.




HSS Co5 | NAS 907 | 30° | 135°

P.172

## ▶ Wire gauge sizes

Unit : Inch

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Wire gauge | Decimal | D1 | |
| | | | L1 | L2 |
| * DL603256 | 1 | .2280 | 2-5/8 | 6 |
| * DL603255 | 2 | .2210 | 2-5/8 | 6 |
| * DL603254 | 3 | .2130 | 2-1/2 | 6 |
| * DL603253 | 4 | .2090 | 2-1/2 | 6 |
| * DL603252 | 5 | .2055 | 2-1/2 | 6 |
| * DL603251 | 6 | .2040 | 2-1/2 | 6 |
| * DL603250 | 7 | .2010 | 2-7/16 | 6 |
| * DL603249 | 8 | .1990 | 2-7/16 | 6 |
| * DL603248 | 9 | .1960 | 2-7/16 | 6 |
| * DL603247 | 10 | .1935 | 2-7/16 | 6 |
| * DL603246 | 11 | .1910 | 2-5/16 | 6 |
| * DL603245 | 12 | .1890 | 2-5/16 | 6 |
| * DL603244 | 13 | .1850 | 2-5/16 | 6 |
| * DL603243 | 14 | .1820 | 2-3/16 | 6 |
| * DL603242 | 15 | .1800 | 2-3/16 | 6 |
| * DL603241 | 16 | .1770 | 2-3/16 | 6 |
| * DL603240 | 17 | .1730 | 2-3/16 | 6 |
| * DL603239 | 18 | .1695 | 2-1/8 | 6 |
| * DL603238 | 19 | .1660 | 2-1/8 | 6 |
| * DL603237 | 20 | .1610 | 2-1/8 | 6 |
| * DL603236 | 21 | .1590 | 2-1/8 | 6 |
| * DL603235 | 22 | .1570 | 2 | 6 |
| * DL603234 | 23 | .1540 | 2 | 6 |

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Wire gauge | Decimal | D1 | |
| | | | L1 | L2 |
| * DL603233 | 24 | .1520 | 2 | 6 |
| * DL603232 | 25 | .1495 | 1-7/8 | 6 |
| * DL603231 | 26 | .1470 | 1-7/8 | 6 |
| * DL603230 | 27 | .1440 | 1-7/8 | 6 |
| * DL603229 | 28 | .1405 | 1-3/4 | 6 |
| * DL603228 | 29 | .1360 | 1-3/4 | 6 |
| * DL603227 | 30 | .1280 | 1-5/8 | 6 |
| * DL603226 | 31 | .1200 | 1-5/8 | 6 |
| * DL603225 | 32 | .1160 | 1-5/8 | 6 |
| * DL603224 | 33 | .1130 | 1-1/2 | 6 |
| * DL603223 | 34 | .1110 | 1-1/2 | 6 |
| * DL603222 | 35 | .1100 | 1-1/2 | 6 |
| * DL603221 | 36 | .1065 | 1-7/16 | 6 |
| * DL603220 | 37 | .1040 | 1-7/16 | 6 |
| * DL603219 | 38 | .1015 | 1-7/16 | 6 |
| * DL603218 | 39 | .0995 | 1-3/8 | 6 |
| * DL603217 | 40 | .0980 | 1-3/8 | 6 |
| * DL603216 | 41 | .0960 | 1-3/8 | 6 |
| * DL603215 | 42 | .0935 | 1-1/4 | 6 |
| * DL603214 | 43 | .0890 | 1-1/4 | 6 |
| * DL606256 | 1 | .2280 | 2-5/8 | 12 |
| * DL606254 | 3 | .2130 | 2-1/2 | 12 |

* 10per package

| Tolerance Diameter (Inch) | |
|---|---|
| up to 1/8(.1250) | 0 ~ −.0005 |
| over 1/8(.1250) up to 1/4(.2500) | 0 ~ −.0007 |
| over 1/4(.2500) up to 1/2(.5000) | 0 ~ −.0010 |

◎ : Excellent ○ : Good

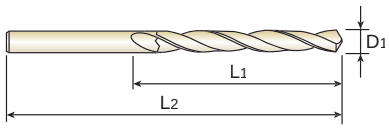
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ○ | | | | ○ | ○ | ○ | | ○ | ○ | ○ |

YG AIRCRAFT DRILLS

D1631 SERIES
D1634 SERIES

# HSS, AIRCRAFT EXTENSION DRILL 135° SPLIT POINT STEAM OXIDE

▶ **Flute Geometry** : Right hand spiral, 30° helix
▶ **Point Angle** : 135°:Split point
▶ **Application** : Improved chip removal in most materials, especially in deep drilling applications.




HSS | NAS 907 | 30° | 135°

P.172

## ▶ Fractional sizes

Unit : Inch

| EDP No. | Diameter Fractional | Diameter Decimal | Flute Length | Overall Length |
|---|---|---|---|---|
| | D1 | | L1 | L2 |
| * D1631005 | 5/64 | .0781 | 1 | 6 |
| * D1631006 | 3/32 | .0938 | 1-1/4 | 6 |
| * D1631007 | 7/64 | .1094 | 1-1/4 | 6 |
| * D1631008 | 1/8 | .1250 | 1-5/8 | 6 |
| * D1631009 | 9/64 | .1406 | 1-3/4 | 6 |
| * D1631010 | 5/32 | .1563 | 2 | 6 |
| * D1631011 | 11/64 | .1719 | 2-1/8 | 6 |
| * D1631012 | 3/16 | .1875 | 2-5/16 | 6 |
| * D1631013 | 13/64 | .2031 | 2-7/16 | 6 |
| * D1631014 | 7/32 | .2188 | 2-1/2 | 6 |
| * D1631015 | 15/64 | .2344 | 2-5/8 | 6 |
| ** D1631016 | 1/4 | .2500 | 2-3/4 | 6 |
| ** D1631017 | 17/64 | .2656 | 2-7/8 | 6 |
| ** D1631018 | 9/32 | .2813 | 2-15/16 | 6 |
| ** D1631019 | 19/64 | .2969 | 3-1/16 | 6 |
| ** D1631020 | 5/16 | .3125 | 3-3/16 | 6 |
| ** D1631021 | 21/64 | .3281 | 3-5/16 | 6 |
| ** D1631022 | 11/32 | .3438 | 3-7/16 | 6 |
| ** D1631023 | 23/64 | .3594 | 3-1/2 | 6 |
| ** D1631024 | 3/8 | .3750 | 3-5/8 | 6 |
| ** D1631025 | 25/64 | .3906 | 3-3/4 | 6 |
| ** D1631026 | 13/32 | .4063 | 3-7/8 | 6 |
| ** D1631027 | 27/64 | .4219 | 3-15/16 | 6 |
| ** D1631028 | 7/16 | .4375 | 4-1/16 | 6 |
| ** D1631029 | 29/64 | .4531 | 4-3/16 | 6 |
| ** D1631030 | 15/32 | .4688 | 4-5/16 | 6 |
| ** D1631031 | 31/64 | .4844 | 4-3/8 | 6 |
| ** D1631032 | 1/2 | .5000 | 4-1/2 | 6 |
| * D1634014 | 7/32 | .2188 | 2-1/2 | 12 |
| * D1634015 | 15/64 | .2344 | 2-5/8 | 12 |
| ** D1634016 | 1/4 | .2500 | 2-3/4 | 12 |
| ** D1634017 | 17/64 | .2656 | 2-7/8 | 12 |
| ** D1634018 | 9/32 | .2813 | 2-15/16 | 12 |
| ** D1634019 | 19/64 | .2969 | 3-1/16 | 12 |
| ** D1634020 | 5/16 | .3125 | 3-3/16 | 12 |
| ** D1634021 | 21/64 | .3281 | 3-5/16 | 12 |
| ** D1634022 | 11/32 | .3438 | 3-7/16 | 12 |
| ** D1634023 | 23/64 | .3594 | 3-1/2 | 12 |
| ** D1634024 | 3/8 | .3750 | 3-5/8 | 12 |
| ** D1634025 | 25/64 | .3906 | 3-3/4 | 12 |
| ** D1634026 | 13/32 | .4063 | 3-7/8 | 12 |
| ** D1634027 | 27/64 | .4219 | 3-15/16 | 12 |
| ** D1634028 | 7/16 | .4375 | 4-1/16 | 12 |
| ** D1634029 | 29/64 | .4531 | 4-3/16 | 12 |
| ** D1634030 | 15/32 | .4688 | 4-5/16 | 12 |
| ** D1634031 | 31/64 | .4844 | 4-3/8 | 12 |
| ** D1634032 | 1/2 | .5000 | 4-1/2 | 12 |

* 10per package
** 5per package

| Tolerance Diameter (Inch) | |
|---|---|
| up to 1/8(.1250) | 0 ~ −.0005 |
| over 1/8(.1250) up to 1/4(.2500) | 0 ~ −.0007 |
| over 1/4(.2500) up to 1/2(.5000) | 0 ~ −.0010 |

◎ : Excellent ○ : Good

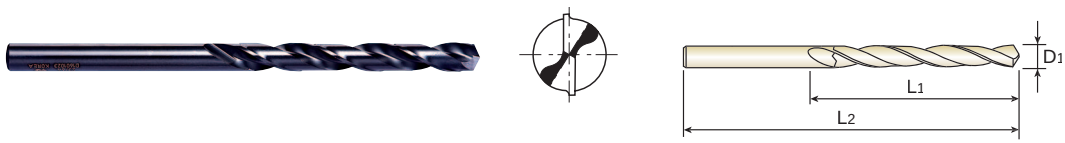
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | ○ | | | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

# AIRCRAFT DRILLS

**D1632 SERIES**
**D1635 SERIES**

## HSS, AIRCRAFT EXTENSION DRILL 135° SPLIT POINT STEAM OXIDE

▶ **Flute Geometry** : Right hand spiral, 30° helix
▶ **Point Angle** : 135°:Split point
▶ **Application** : Improved chip removal in most materials, especially in deep drilling applications.




HSS | NAS 907 | 30° | 135°

P.172

### ▶ Letter sizes

Unit : Inch

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Letter | Decimal | D1 | |
| | | | L1 | L2 |
| * D1632101 | A | .2340 | 2-5/8 | 6 |
| ** D1632102 | B | ,2380 | 2-3/4 | 6 |
| ** D1632103 | C | .2420 | 2-3/4 | 6 |
| ** D1632104 | D | .2460 | 2-3/4 | 6 |
| ** D1632105 | E | .2500 | 2-3/4 | 6 |
| ** D1632106 | F | .2570 | 2-7/8 | 6 |
| ** D1632107 | G | .2610 | 2-7/8 | 6 |
| ** D1632108 | H | .2660 | 2-7/8 | 6 |
| ** D1632109 | I | .2720 | 2-7/8 | 6 |
| ** D1632110 | J | .2770 | 2-7/8 | 6 |
| ** D1632111 | K | .2810 | 2-15/16 | 6 |
| ** D1632112 | L | .2900 | 2-15/16 | 6 |
| ** D1632113 | M | .2950 | 3-1/16 | 6 |
| ** D1632114 | N | .3020 | 3-1/16 | 6 |
| ** D1632115 | O | .3160 | 3-3/16 | 6 |
| ** D1632116 | P | .3230 | 3-5/16 | 6 |
| ** D1632117 | Q | .3320 | 3-7/16 | 6 |
| ** D1632118 | R | .3390 | 3-7/16 | 6 |
| ** D1632119 | S | .3480 | 3-1/2 | 6 |
| ** D1632120 | T | .3580 | 3-1/2 | 6 |
| ** D1632121 | U | .3680 | 3-5/8 | 6 |
| ** D1632122 | V | .3770 | 3-5/8 | 6 |
| ** D1632123 | W | .3860 | 3-3/4 | 6 |
| ** D1632124 | X | .3970 | 3-3/4 | 6 |
| ** D1632125 | Y | .4040 | 3-7/8 | 6 |
| ** D1632126 | Z | .4130 | 3-7/8 | 6 |

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Letter | Decimal | D1 | |
| | | | L1 | L2 |
| * D1635101 | A | .2340 | 2-5/8 | 12 |
| ** D1635102 | B | ,2380 | 2-3/4 | 12 |
| ** D1635103 | C | .2420 | 2-3/4 | 12 |
| ** D1635104 | D | .2460 | 2-3/4 | 12 |
| ** D1635105 | E | .2500 | 2-3/4 | 12 |
| ** D1635106 | F | .2570 | 2-7/8 | 12 |
| ** D1635107 | G | .2610 | 2-7/8 | 12 |
| ** D1635108 | H | .2660 | 2-7/8 | 12 |
| ** D1635109 | I | .2720 | 2-7/8 | 12 |
| ** D1635110 | J | .2770 | 2-7/8 | 12 |
| ** D1635111 | K | .2810 | 2-15/16 | 12 |
| ** D1635112 | L | .2900 | 2-15/16 | 12 |
| ** D1635113 | M | .2950 | 3-1/16 | 12 |
| ** D1635114 | N | .3020 | 3-1/16 | 12 |
| ** D1635115 | O | .3160 | 3-3/16 | 12 |
| ** D1635116 | P | .3230 | 3-5/16 | 12 |
| ** D1635117 | Q | .3320 | 3-7/16 | 12 |
| ** D1635118 | R | .3390 | 3-7/16 | 12 |
| ** D1635119 | S | .3480 | 3-1/2 | 12 |
| ** D1635120 | T | .3580 | 3-1/2 | 12 |
| ** D1635121 | U | .3680 | 3-5/8 | 12 |
| ** D1635122 | V | .3770 | 3-5/8 | 12 |
| ** D1635123 | W | .3860 | 3-3/4 | 12 |
| ** D1635124 | X | .3970 | 3-3/4 | 12 |
| ** D1635125 | Y | .4040 | 3-7/8 | 12 |
| ** D1635126 | Z | .4130 | 3-7/8 | 12 |

▶ **Tolerance** : See page 166

* 10per package
** 5per package

◎ : Excellent ○ : Good

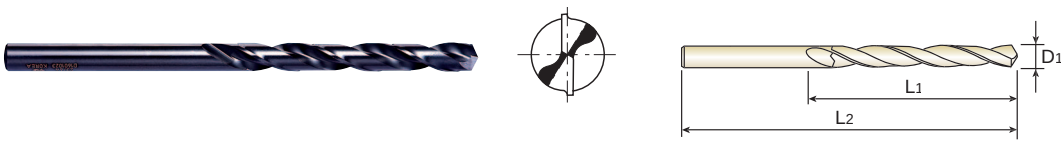
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | ○ | | | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

YG AIRCRAFT DRILLS

D1633 SERIES
D1636 SERIES

# HSS, AIRCRAFT EXTENSION DRILL 135° SPLIT POINT STEAM OXIDE

▶ **Flute Geometry** : Right hand spiral, 30° helix
▶ **Point Angle** : 135°:Split point
▶ **Application** : Improved chip removal in most materials, especially in deep drilling applications.




HSS | NAS 907 | 30° | 135° P.172

## ▶ Wire gauge sizes

Unit : Inch

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Wire gauge | Decimal | D1 | |
| | | | L1 | L2 |
| * D1633256 | 1 | .2280 | 2-5/8 | 6 |
| * D1633255 | 2 | .2210 | 2-5/8 | 6 |
| * D1633254 | 3 | .2130 | 2-1/2 | 6 |
| * D1633253 | 4 | .2090 | 2-1/2 | 6 |
| * D1633252 | 5 | .2055 | 2-1/2 | 6 |
| * D1633251 | 6 | .2040 | 2-1/2 | 6 |
| * D1633250 | 7 | .2010 | 2-7/16 | 6 |
| * D1633249 | 8 | .1990 | 2-7/16 | 6 |
| * D1633248 | 9 | .1960 | 2-7/16 | 6 |
| * D1633247 | 10 | .1935 | 2-7/16 | 6 |
| * D1633246 | 11 | .1910 | 2-5/16 | 6 |
| * D1633245 | 12 | .1890 | 2-5/16 | 6 |
| * D1633244 | 13 | .1850 | 2-5/16 | 6 |
| * D1633243 | 14 | .1820 | 2-3/16 | 6 |
| * D1633242 | 15 | .1800 | 2-3/16 | 6 |
| * D1633241 | 16 | .1770 | 2-3/16 | 6 |
| * D1633240 | 17 | .1730 | 2-3/16 | 6 |
| * D1633239 | 18 | .1695 | 2-1/8 | 6 |
| * D1633238 | 19 | .1660 | 2-1/8 | 6 |
| * D1633237 | 20 | .1610 | 2-1/8 | 6 |
| * D1633236 | 21 | .1590 | 2-1/8 | 6 |
| * D1633235 | 22 | .1570 | 2 | 6 |
| * D1633234 | 23 | .1540 | 2 | 6 |

| EDP No. | Diameter | | Flute Length | Overall Length |
|---|---|---|---|---|
| | Wire gauge | Decimal | D1 | |
| | | | L1 | L2 |
| * D1633233 | 24 | .1520 | 2 | 6 |
| * D1633232 | 25 | .1495 | 1-7/8 | 6 |
| * D1633231 | 26 | .1470 | 1-7/8 | 6 |
| * D1633230 | 27 | .1440 | 1-7/8 | 6 |
| * D1633229 | 28 | .1405 | 1-3/4 | 6 |
| * D1633228 | 29 | .1360 | 1-3/4 | 6 |
| * D1633227 | 30 | .1280 | 1-5/8 | 6 |
| * D1633226 | 31 | .1200 | 1-5/8 | 6 |
| * D1633225 | 32 | .1160 | 1-5/8 | 6 |
| * D1633224 | 33 | .1130 | 1-1/2 | 6 |
| * D1633223 | 34 | .1110 | 1-1/2 | 6 |
| * D1633222 | 35 | .1100 | 1-1/2 | 6 |
| * D1633221 | 36 | .1065 | 1-7/16 | 6 |
| * D1633220 | 37 | .1040 | 1-7/16 | 6 |
| * D1633219 | 38 | .1015 | 1-7/16 | 6 |
| * D1633218 | 39 | .0995 | 1-3/8 | 6 |
| * D1633217 | 40 | .0980 | 1-3/8 | 6 |
| * D1633216 | 41 | .0960 | 1-3/8 | 6 |
| * D1633215 | 42 | .0935 | 1-1/4 | 6 |
| * D1633214 | 43 | .0890 | 1-1/4 | 6 |
| * D1636256 | 1 | .2280 | 2-5/8 | 12 |
| * D1636254 | 3 | .2130 | 2-1/2 | 12 |

* 10per package

| Tolerance Diameter (Inch) | |
|---|---|
| up to 1/8(.1250) | 0 ~ −.0005 |
| over 1/8(.1250) up to 1/4(.2500) | 0 ~ −.0007 |
| over 1/4(.2500) up to 1/2(.5000) | 0 ~ −.0010 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | ○ | | | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

# AIRCRAFT DRILLS

## RECOMMENDED CUTTING CONDITIONS

## HSS & HSSCo5, AIRCRAFT EXTENSION DRILL 135° SPLIT POINT

### DL601, DL602, DL603, D1631, D1632, D1633 SERIES

| WORK MATERIAL | CARBON STEELS | | CARBON STEELS | | CARBON STEELS | | ALLOY STEELS | | ALLOY STEELS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~ HRc23 | | ~ HRc23 ~ 28 | | HRc23 ~ 34 | | HRc34 ~ 38 | |
| STRENGTH | ~ 570 N/mm² | | ~ 830 N/mm² | | 830 ~ 950 N/mm² | | 830 ~ 1110 N/mm² | | 1110 ~ 1260 N/mm² | |
| DIAMETER | N | S | N | S | N | S | N | S | N | S |
| 0 ~ 3/32 | 3380 | .0010 | 2550 | .0010 | 1900 | .0006 | 2380 | .0008 | 1400 | .0006 |
| 3/32 ~ 5/32 | 2700 | .0020 | 2000 | .0020 | 1500 | .0010 | 1880 | .0020 | 1100 | .0008 |
| 11/64 ~ 1/4 | 1700 | .0025 | 1280 | .0025 | 960 | .0015 | 1190 | .0025 | 700 | .0010 |
| 17/64 ~ 23/64 | 1050 | .0051 | 780 | .0051 | 590 | .0030 | 730 | .0051 | 430 | .0015 |
| 3/8 ~ 37/64 | 750 | .0059 | 560 | .0060 | 425 | .0030 | 520 | .0070 | 310 | .0020 |
| 19/32 ~ 1 | 440 | .0090 | 330 | .0090 | 255 | .0051 | 300 | .0090 | 180 | .0020 |
| 1 ~ | 260 | .0110 | 195 | .0110 | 145 | .0070 | 180 | .0070 | 107 | .0030 |

| WORK MATERIAL | STAINLESS STEELS | | TITANIUM ALLOYS | | TOOL STEELS | | CAST IRON | | ALUMINUM ALLOYS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | HRc23 | | | | | | ~ HRc21 | | | |
| STRENGTH | 830 N/mm² | | 410 N/mm² | | ~ 270 N/mm² | | ~ 800 N/mm² | | | |
| DIAMETER | N | S | N | S | N | S | N | S | N | S |
| 0 ~ 3/32 | 2550 | .0010 | 1400 | .0008 | 3180 | .0016 | 2250 | .0010 | 6400 | .0015 |
| 3/32 ~ 5/32 | 2000 | .0020 | 1100 | .0010 | 2500 | .0020 | 2000 | .0020 | 5000 | .0025 |
| 11/64 ~ 1/4 | 1280 | .0025 | 700 | .0015 | 1590 | .0025 | 1280 | .0025 | 3200 | .0030 |
| 17/64 ~ 23/64 | 780 | .0051 | 430 | .0030 | 970 | .0051 | 780 | .0051 | 2000 | .0070 |
| 3/8 ~ 37/64 | 560 | .0060 | 430 | .0030 | 700 | .0070 | 560 | .0060 | 1400 | .0078 |
| 19/32 ~ 1 | 330 | .0090 | 180 | .0051 | 440 | .0090 | 330 | .0090 | 820 | .0118 |
| 1 ~ | 195 | .0110 | 107 | .0070 | 240 | .1180 | 195 | .0110 | 490 | .0150 |

| WORK MATERIAL | MAGNESIUM ALLOYS | | ZINC ALLOYS | | PLASTIC | |
|---|---|---|---|---|---|---|
| HARDNESS | | | | | | |
| STRENGTH | | | | | | |
| DIAMETER | N | S | N | S | N | S |
| 0 ~ 3/32 | 8600 | .0015 | 6400 | .0015 | 3380 | .0010 |
| 3/32 ~ 5/32 | 6800 | .0025 | 5000 | .0025 | 2700 | .0020 |
| 11/64 ~ 1/4 | 4300 | .0030 | 3200 | .0030 | 1700 | .0025 |
| 17/64 ~ 23/64 | 2600 | .0070 | 2000 | .0070 | 1050 | .0051 |
| 3/8 ~ 37/64 | 1900 | .0078 | 1400 | .0078 | 750 | .0060 |
| 19/32 ~ 1 | 1100 | .0118 | 820 | .0118 | 440 | .0090 |
| 1 ~ | 660 | .0150 | 490 | .0150 | 260 | .0110 |

N = R.P.M
S =Inch per Revolution(inch/rev.)

# HSS

Being the best through innovation

# SILVER & DEMING DRILLS

- 118° Split Point
  3 Flats Black and Gold

## HSS SILVER & DEMING DRILLS

118° Split Point
3 Flat Black and Gold

| ITEM | MODEL | DESCRIPTION | SIZE | | PAGE |
|---|---|---|---|---|---|
| | | | MIN | MAX | |
| **INCH** | | | | | |
| | | HSS(M2), 118° SPLIT POINT 3FLAT BLACK&GOLD SILVER & DEMING DRILLS | D1/2 | D1-1/2 | **176** |
| | | RECOMMENDED CUTTING CONDITIONS | | | **177** |

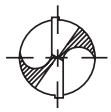
◎ : Excellent
○ : Good

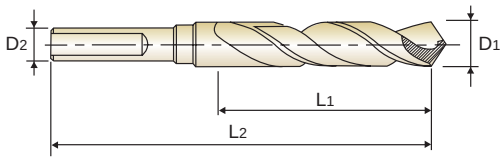
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | ○ | ○ | ○ | | ○ | | |

# SILVER & DEMING DRILLS

**D1191 SERIES**

## HSS(M2), 118° SPLIT POINT 3FLAT BLACK&GOLD SILVER & DEMING DRILLS






ANSI HSS 30~35° h8 118° P.177

Unit : Inch

| EDP No. | Diameter D1 | Shank Diameter D2 | Flute Length L1 | Overall Length L2 |
|---|---|---|---|---|
| D1191032 | 1/2 | 1/2 | 3 | 6 |
| D1191033 | 33/64 | 1/2 | 3 | 6 |
| D1191034 | 17/32 | 1/2 | 3 | 6 |
| D1191035 | 35/64 | 1/2 | 3 | 6 |
| D1191036 | 9/16 | 1/2 | 3 | 6 |
| D1191037 | 37/64 | 1/2 | 3 | 6 |
| D1191038 | 19/32 | 1/2 | 3 | 6 |
| D1191039 | 39/64 | 1/2 | 3 | 6 |
| D1191040 | 5/8 | 1/2 | 3 | 6 |
| D1191041 | 41/64 | 1/2 | 3 | 6 |
| D1191042 | 21/32 | 1/2 | 3 | 6 |
| D1191043 | 43/64 | 1/2 | 3 | 6 |
| D1191044 | 11/16 | 1/2 | 3 | 6 |
| D1191045 | 45/64 | 1/2 | 3 | 6 |
| D1191046 | 23/32 | 1/2 | 3 | 6 |
| D1191047 | 47/64 | 1/2 | 3 | 6 |
| D1191048 | 3/4 | 1/2 | 3 | 6 |
| D1191049 | 49/64 | 1/2 | 3 | 6 |
| D1191050 | 25/32 | 1/2 | 3 | 6 |
| D1191051 | 51/64 | 1/2 | 3 | 6 |
| D1191052 | 13/16 | 1/2 | 3 | 6 |
| D1191053 | 53/64 | 1/2 | 3 | 6 |
| D1191054 | 27/32 | 1/2 | 3 | 6 |
| D1191055 | 55/64 | 1/2 | 3 | 6 |
| D1191056 | 7/8 | 1/2 | 3 | 6 |
| D1191057 | 57/64 | 1/2 | 3 | 6 |
| D1191058 | 29/32 | 1/2 | 3 | 6 |
| D1191059 | 59/64 | 1/2 | 3 | 6 |
| D1191060 | 15/16 | 1/2 | 3 | 6 |

| EDP No. | Diameter D1 | Shank Diameter D2 | Flute Length L1 | Overall Length L2 |
|---|---|---|---|---|
| D1191061 | 61/64 | 1/2 | 3 | 6 |
| D1191062 | 31/32 | 1/2 | 3 | 6 |
| D1191063 | 63/64 | 1/2 | 3 | 6 |
| D1191064 | 1 | 1/2 | 3 | 6 |
| D1191101 | 1-1/64 | 1/2 | 3 | 6 |
| D1191102 | 1-1/32 | 1/2 | 3 | 6 |
| D1191103 | 1-3/64 | 1/2 | 3 | 6 |
| D1191104 | 1-1/16 | 1/2 | 3 | 6 |
| D1191105 | 1-5/64 | 1/2 | 3 | 6 |
| D1191106 | 1-3/32 | 1/2 | 3 | 6 |
| D1191107 | 1-7/64 | 1/2 | 3 | 6 |
| D1191108 | 1-1/8 | 1/2 | 3 | 6 |
| D1191109 | 1-9/64 | 1/2 | 3 | 6 |
| D1191110 | 1-5/32 | 1/2 | 3 | 6 |
| D1191111 | 1-11/64 | 1/2 | 3 | 6 |
| D1191112 | 1-3/16 | 1/2 | 3 | 6 |
| D1191113 | 1-13/64 | 1/2 | 3 | 6 |
| D1191114 | 1-7/32 | 1/2 | 3 | 6 |
| D1191115 | 1-15/64 | 1/2 | 3 | 6 |
| D1191116 | 1-1/4 | 1/2 | 3 | 6 |
| D1191118 | 1-9/32 | 1/2 | 3 | 6 |
| D1191120 | 1-5/16 | 1/2 | 3 | 6 |
| D1191122 | 1-11/32 | 1/2 | 3 | 6 |
| D1191124 | 1-3/8 | 1/2 | 3 | 6 |
| D1191126 | 1-13/32 | 1/2 | 3 | 6 |
| D1191128 | 1-7/16 | 1/2 | 3 | 6 |
| D1191130 | 1-15/32 | 1/2 | 3 | 6 |
| D1191132 | 1-1/2 | 1/2 | 3 | 6 |

* Individually packaged

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | ○ | ○ | ○ | | ○ | | |

# HSS(M2), 118° SPLIT POINT 3FLAT BLACK&GOLD SILVER & DEMING DRILLS

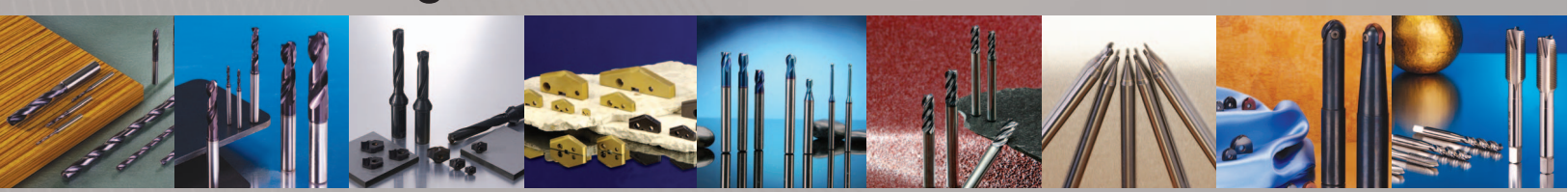
## D1191 SERIES

| WORK MATERIAL | CARBON STEELS | | CARBON STEELS | | CARBON STEELS | | ALLOY STEELS | | ALLOY STEELS | | STAINLESS STEELS | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~ HRc23 | | ~ HRc23 ~ 28 | | HRc23 ~ 34 | | HRc34 ~ 38 | | HRc23 | |
| STRENGTH | ~ 570 N/mm² | | ~ 830 N/mm² | | 830 ~ 950 N/mm² | | 830 ~ 1110 N/mm² | | 1110 ~ 1260 N/mm² | | 830 N/mm² | |
| DIAMETER | N | S | N | S | N | S | N | S | N | S | N | S |
| 3/32 | 3380 | .0010 | 2550 | .0010 | 1900 | .0006 | 2380 | .0008 | 1400 | .0006 | 2550 | .0010 |
| 1/8 | 2700 | .0020 | 2000 | .0020 | 1500 | .0010 | 1880 | .0020 | 1100 | .0008 | 2000 | .0020 |
| 13/64 | 1700 | .0025 | 1280 | .0025 | 960 | .0015 | 1190 | .0025 | 700 | .0010 | 1280 | .0025 |
| 5/16 | 1050 | .0051 | 780 | .0051 | 590 | .0030 | 730 | .0051 | 430 | .0015 | 780 | .0051 |
| 7/16 | 750 | .0059 | 560 | .0059 | 425 | .0030 | 520 | .0071 | 310 | .0020 | 560 | .0059 |
| 3/4 | 440 | .0091 | 330 | .0091 | 255 | .0051 | 300 | .0091 | 180 | .0020 | 330 | .0091 |
| 1-17/64 | 260 | .0110 | 195 | .0110 | 145 | .0071 | 180 | .0071 | 107 | .0030 | 195 | .0110 |
| 1-31/32 | 165 | .0130 | 125 | .0130 | 93 | .0079 | 115 | .0079 | 68 | .0030 | 125 | .0130 |

| WORK MATERIAL | TOOL STEELS | | CAST IRON | | ALUMINUM ALLOYS | | MAGNESIUM ALLOYS | | ZINC ALLOYS | | PLASTIC | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~ HRc21 | | | | | | | | | |
| STRENGTH | ~ 270 N/mm² | | ~ 800 N/mm² | | | | | | | | | |
| DIAMETER | N | S | N | S | N | S | N | S | N | S | N | S |
| 3/32 | 3180 | .0017 | 2250 | .0010 | 6400 | .0015 | 8600 | .0015 | 6400 | .0015 | 3380 | .0010 |
| 1/8 | 2500 | .0020 | 2000 | .0020 | 5000 | .0025 | 6800 | .0025 | 5000 | .0025 | 2700 | .0020 |
| 13/64 | 1590 | .0025 | 1280 | .0025 | 3200 | .0030 | 4300 | .0030 | 3200 | .0030 | 1700 | .0025 |
| 5/16 | 970 | .0051 | 780 | .0051 | 2000 | .0071 | 2600 | .0071 | 2000 | .0071 | 1050 | .0051 |
| 7/16 | 700 | .0071 | 560 | .0059 | 1400 | .0079 | 1900 | .0079 | 1400 | .0079 | 750 | .0059 |
| 3/4 | 440 | .0091 | 330 | .0091 | 820 | .0118 | 1100 | .0118 | 820 | .0118 | 440 | .0091 |
| 1-17/64 | 240 | .0118 | 195 | .0110 | 490 | .0150 | 660 | .0150 | 490 | .0150 | 260 | .0110 |
| 1-31/32 | 150 | .0169 | 125 | .0130 | 310 | .0181 | 415 | .0181 | 310 | .0181 | 165 | .0130 |

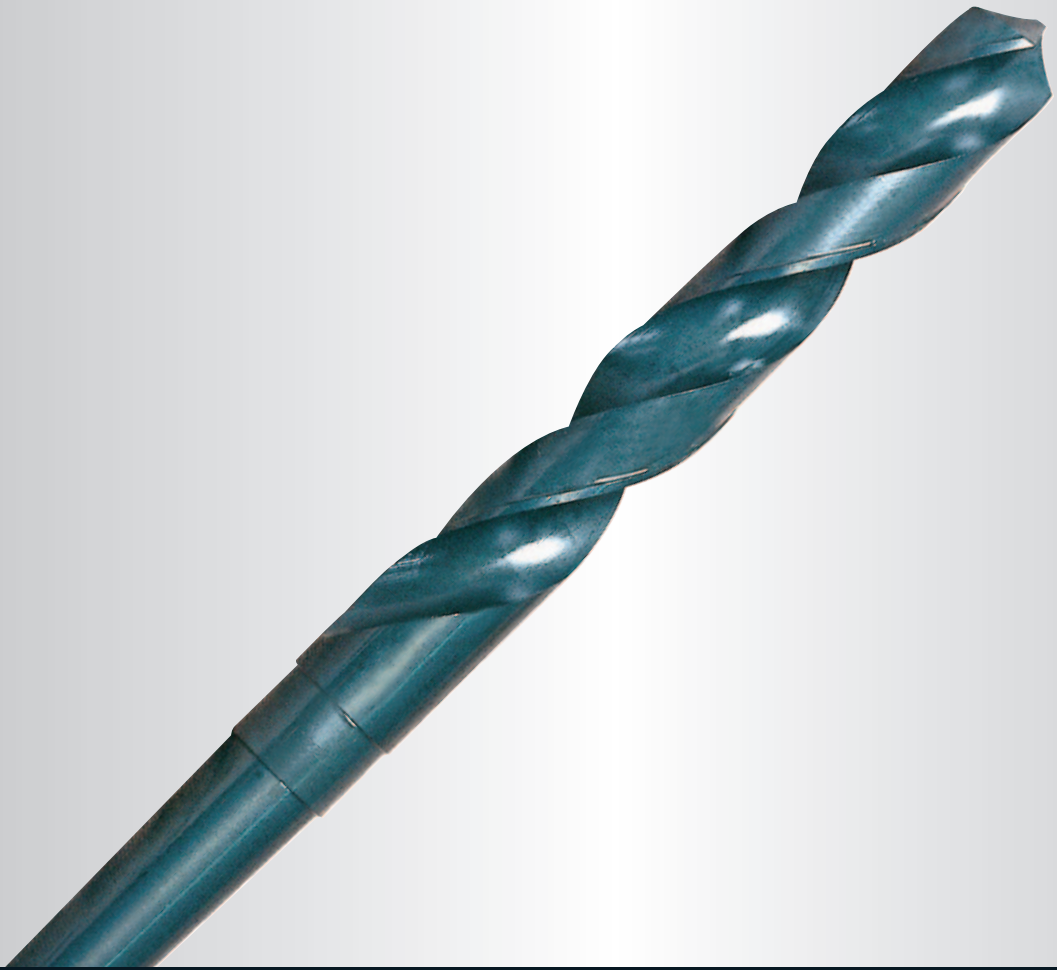
N = R.P.M
S = Inch per Revolution(inch/rev.)

Global Cutting Tool Leader **YG-1**



HSS

Being the best through innovation



# MORSE TAPER SHANK DRILLS

- General Purpose
  Standard Length

# HSS MORSE TAPER SHANK DRILLS

General Purpose
Standard Length

| ITEM | MODEL | DESCRIPTION | SIZE | | PAGE |
|---|---|---|---|---|---|
| | | | MIN | MAX | |
| **INCH** | | | | | |
| | D1211 | | HSS(M2), MORSE TAPER SHANK TWIST DRILL | D1/2 | D2-1/2 | **182** |
| | | | RECOMMENDED CUTTING CONDITIONS | | | **184** |

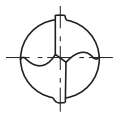
◎ : Excellent
○ : Good

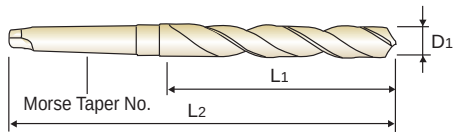
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | ○ | | | ○ | ○ | ○ | | ○ | | |

# MORSE TAPER SHANK DRILLS

D1211 SERIES

## HSS(M2) MORSE TAPER SHANK TWIST DRILL






ANSI HSS 30~35° 2~5 h8 118° P.184

Unit : Inch

| EDP No. | Diameter D1 | Flute Length L1 | Overall Length L2 | Morse Taper No. |
|---|---|---|---|---|
| D1211032 | 1/2 | 4-3/8 | 8-1/4 | 2 |
| D1211033 | 33/64 | 4-5/8 | 8-1/2 | 2 |
| D1211034 | 17/32 | 4-5/8 | 8-1/2 | 2 |
| D1211035 | 35/64 | 4-7/8 | 8-3/4 | 2 |
| D1211036 | 9/16 | 4-7/8 | 8-3/4 | 2 |
| D1211037 | 37/64 | 4-7/8 | 8-3/4 | 2 |
| D1211038 | 19/32 | 4-7/8 | 8-3/4 | 2 |
| D1211039 | 39/64 | 4-7/8 | 8-3/4 | 2 |
| D1211040 | 5/8 | 4-7/8 | 8-3/4 | 2 |
| D1211041 | 41/64 | 5-1/8 | 9 | 2 |
| D1211042 | 21/32 | 5-1/8 | 9 | 2 |
| D1211043 | 43/64 | 5-3/8 | 9-1/4 | 2 |
| D1211044 | 11/16 | 5-3/8 | 9-1/4 | 2 |
| D1211045 | 45/64 | 5-5/8 | 9-1/2 | 2 |
| D1211046 | 23/32 | 5-5/8 | 9-1/2 | 2 |
| D1211047 | 47/64 | 5-7/8 | 9-3/4 | 2 |
| D1211048 | 3/4 | 5-7/8 | 9-3/4 | 2 |
| D1211049 | 49/64 | 6 | 9-7/8 | 2 |
| D1211050 | 25/32 | 6 | 9-7/8 | 2 |
| D1211051 | 51/64 | 6-1/8 | 10-3/4 | 3 |
| D1211052 | 13/16 | 6-1/8 | 10-3/4 | 3 |
| D1211053 | 53/64 | 6-1/8 | 10-3/4 | 3 |
| D1211054 | 27/32 | 6-1/8 | 10-3/4 | 3 |
| D1211055 | 55/64 | 6-1/8 | 10-3/4 | 3 |
| D1211056 | 7/8 | 6-1/8 | 10-3/4 | 3 |
| D1211057 | 57/64 | 6-1/8 | 10-3/4 | 3 |
| D1211058 | 29/32 | 6-1/8 | 10-3/4 | 3 |
| D1211059 | 59/64 | 6-1/8 | 10-3/4 | 3 |
| D1211060 | 15/16 | 6-1/8 | 10-3/4 | 3 |

| EDP No. | Diameter D1 | Flute Length L1 | Overall Length L2 | Morse Taper No. |
|---|---|---|---|---|
| D1211061 | 61/64 | 6-3/8 | 11 | 3 |
| D1211062 | 31/32 | 6-3/8 | 11 | 3 |
| D1211063 | 63/64 | 6-3/8 | 11 | 3 |
| D1211100 | 1 | 6-3/8 | 11 | 3 |
| D1211101 | 1-1/64 | 6-1/2 | 11-1/8 | 3 |
| D1211102 | 1-1/32 | 6-1/2 | 11-1/8 | 3 |
| D1211103 | 1-3/64 | 6-5/8 | 11-1/4 | 3 |
| D1211104 | 1-1/16 | 6-5/8 | 11-1/4 | 3 |
| D1211105 | 1-5/64 | 6-7/8 | 12-1/2 | 4 |
| D1211106 | 1-3/32 | 6-7/8 | 12-1/2 | 4 |
| D1211107 | 1-7/64 | 7-1/8 | 12-3/4 | 4 |
| D1211108 | 1-1/8 | 7-1/8 | 12-3/4 | 4 |
| D1211109 | 1-9/64 | 7-1/4 | 12-7/8 | 4 |
| D1211110 | 1-5/32 | 7-1/4 | 12-7/8 | 4 |
| D1211111 | 1-11/64 | 7-3/8 | 13 | 4 |
| D1211112 | 1-3/16 | 7-3/8 | 13 | 4 |
| D1211113 | 1-13/64 | 7-1/2 | 13-1/8 | 4 |
| D1211114 | 1-7/32 | 7-1/2 | 13-1/8 | 4 |
| D1211115 | 1-15/64 | 7-7/8 | 13-1/2 | 4 |
| D1211116 | 1-1/4 | 7-7/8 | 13-1/2 | 4 |
| D1211117 | 1-17/64 | 8-1/2 | 14-1/8 | 4 |
| D1211118 | 1-9/32 | 8-1/2 | 14-1/8 | 4 |
| D1211119 | 1-19/64 | 8-5/8 | 14-1/4 | 4 |
| D1211120 | 1-5/16 | 8-5/8 | 14-1/4 | 4 |
| D1211121 | 1-21/64 | 8-3/4 | 14-3/8 | 4 |
| D1211122 | 1-11/32 | 8-3/4 | 14-3/8 | 4 |
| D1211123 | 1-23/64 | 8-7/8 | 14-1/2 | 4 |
| D1211124 | 1-3/8 | 8-7/8 | 14-1/2 | 4 |
| D1211126 | 1-13/32 | 9 | 14-5/8 | 4 |

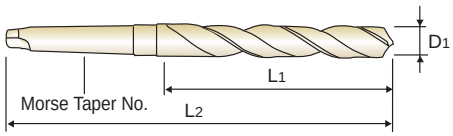
◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | ○ | | | ○ | ○ | ○ | | ○ | | |

# MORSE TAPER SHANK DRILLS

**D1211 SERIES**

## HSS(M2) MORSE TAPER SHANK TWIST DRILL




ANSI | HSS | 30~35° | 2 ~ 5 | h8 | 118° P.184

Unit : Inch

| EDP No. | Diameter D1 | Flute Length L1 | Overall Length L2 | Morse Taper No. |
|---|---|---|---|---|
| D1211128 | 1-7/16 | 9-1/8 | 14-3/4 | 4 |
| D1211130 | 1-15/32 | 9-1/4 | 14-7/8 | 4 |
| D1211132 | 1-1/2 | 9-3/8 | 15 | 4 |
| D1211133 | 1-33/64 | 9-3/8 | 16-3/8 | 4 |
| D1211134 | 1-17/32 | 9-3/8 | 16-3/8 | 5 |
| D1211136 | 1-9/16 | 9-5/8 | 16-5/8 | 5 |
| D1211138 | 1-19/32 | 9-7/8 | 16-7/8 | 5 |
| D1211140 | 1-5/8 | 10 | 17 | 5 |
| D1211142 | 1-21/32 | 10-1/8 | 17-1/8 | 5 |
| D1211144 | 1-11/16 | 10-1/8 | 17-1/8 | 5 |
| D1211146 | 1-23/32 | 10-1/8 | 17-1/8 | 5 |
| D1211148 | 1-3/4 | 10-1/8 | 17-1/8 | 5 |
| D1211152 | 1-13/16 | 10-1/8 | 17-1/8 | 5 |
| D1211154 | 1-27/32 | 10-1/8 | 17-1/8 | 5 |
| D1211156 | 1-7/8 | 10-3/8 | 17-3/8 | 5 |

| EDP No. | Diameter D1 | Flute Length L1 | Overall Length L2 | Morse Taper No. |
|---|---|---|---|---|
| D1211160 | 1-15/16 | 10-3/8 | 17-3/8 | 5 |
| D1211162 | 1-31/32 | 10-3/8 | 17-3/8 | 5 |
| D1211200 | 2 | 10-3/8 | 17-3/8 | 5 |
| D1211202 | 2-1/32 | 10-3/8 | 17-3/8 | 5 |
| D1211204 | 2-1/16 | 10-1/4 | 17-3/8 | 5 |
| D1211206 | 2-3/32 | 10-1/4 | 17-3/8 | 5 |
| D1211208 | 2-1/8 | 10-1/4 | 17-3/8 | 5 |
| D1211210 | 2-5/32 | 10-1/4 | 17-3/8 | 5 |
| D1211212 | 2-3/16 | 10-1/4 | 17-3/8 | 5 |
| D1211214 | 2-7/32 | 10-1/8 | 17-3/8 | 5 |
| D1211216 | 2-1/4 | 10-1/8 | 17-3/8 | 5 |
| D1211220 | 2-5/16 | 10-1/8 | 17-3/8 | 5 |
| D1211224 | 2-3/8 | 10-1/8 | 17-3/8 | 5 |
| D1211228 | 2-7/16 | 11-1/4 | 18-3/4 | 5 |
| D1211232 | 2-1/2 | 11-1/4 | 18-3/4 | 5 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | ○ | | | ○ | ○ | ○ | | ○ | | |

# MORSE TAPER SHANK DRILLS

**RECOMMENDED CUTTING CONDITIONS**

## HSS(M2) MORSE TAPER SHANK TWIST DRILL

### D1211 SERIES

| WORK MATERIAL | CARBON STEELS | | CARBON STEELS | | CARBON STEELS | | ALLOY STEELS | | ALLOY STEELS | | STAINLESS STEELS | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~ HRc23 | | ~ HRc23 ~ 28 | | HRc23 ~ 34 | | HRc34 ~ 38 | | HRc23 | |
| STRENGTH | ~ 570 N/mm² | | ~ 830 N/mm² | | 830 ~ 950 N/mm² | | 830 ~ 1110 N/mm² | | 1110 ~ 1260 N/mm² | | 830 N/mm² | |
| DIAMETER | N | S | N | S | N | S | N | S | N | S | N | S |
| 3/32 | 3380 | .0010 | 2550 | .0010 | 1900 | .0006 | 2380 | .0008 | 1400 | .0006 | 2550 | .0010 |
| 1/8 | 2700 | .0020 | 2000 | .0020 | 1500 | .0010 | 1880 | .0020 | 1100 | .0008 | 2000 | .0020 |
| 13/64 | 1700 | .0025 | 1280 | .0025 | 960 | .0015 | 1190 | .0025 | 700 | .0010 | 1280 | .0025 |
| 5/16 | 1050 | .0051 | 780 | .0051 | 590 | .0030 | 730 | .0051 | 430 | .0015 | 780 | .0051 |
| 7/16 | 750 | .0059 | 560 | .0059 | 425 | .0030 | 520 | .0071 | 310 | .0020 | 560 | .0059 |
| 3/4 | 440 | .0091 | 330 | .0091 | 255 | .0051 | 300 | .0091 | 180 | .0020 | 330 | .0091 |
| 1-17/64 | 260 | .0110 | 195 | .0110 | 145 | .0071 | 180 | .0071 | 107 | .0030 | 195 | .0110 |
| 1-31/32 | 165 | .0130 | 125 | .0130 | 93 | .0079 | 115 | .0079 | 68 | .0030 | 125 | .0130 |

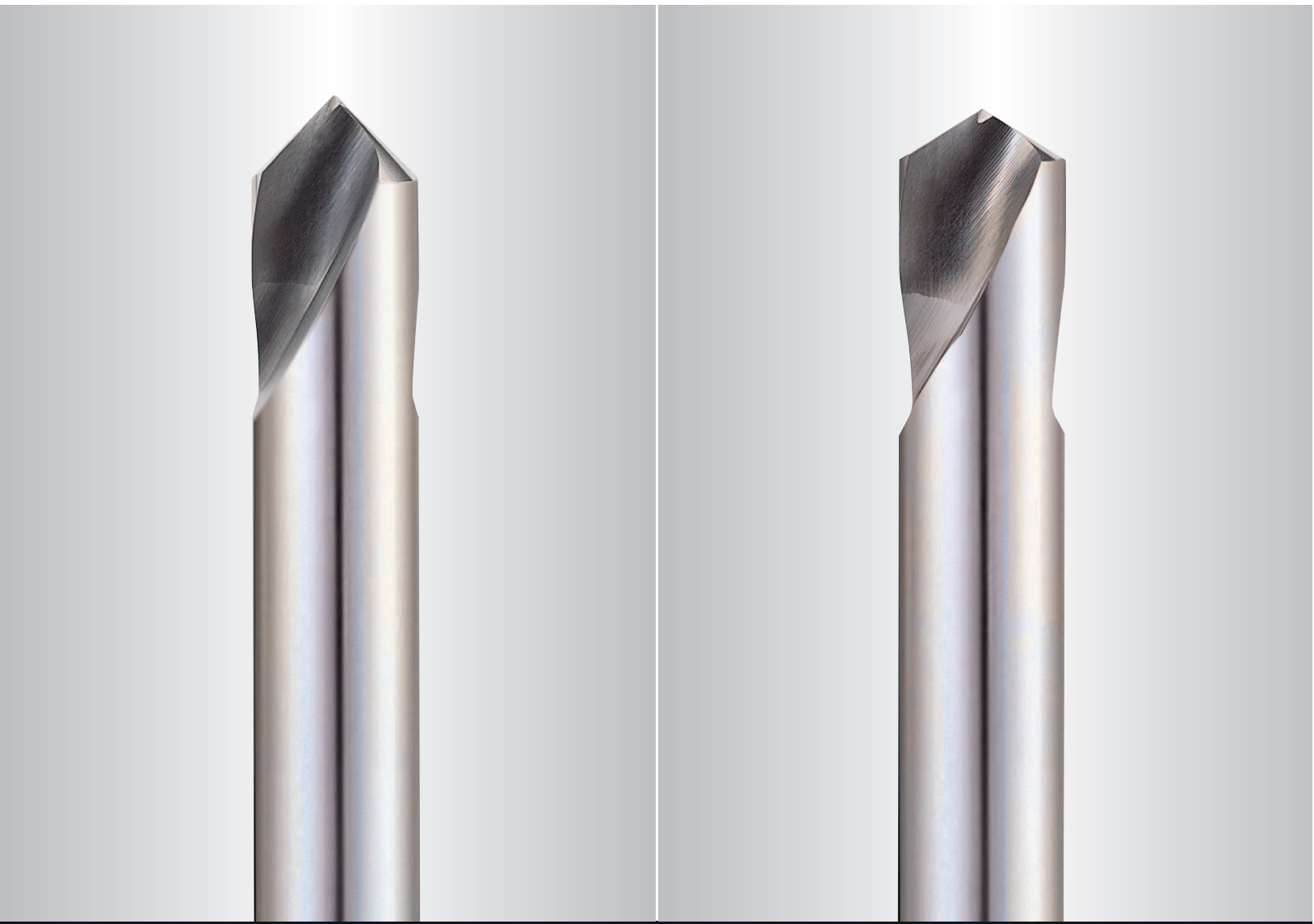
| WORK MATERIAL | TOOL STEELS | | CAST IRON | | ALUMINUM ALLOYS | | MAGNESIUM ALLOYS | | ZINC ALLOYS | | PLASTIC | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~ HRc21 | | | | | | | | | |
| STRENGTH | ~ 270 N/mm² | | ~ 800 N/mm² | | | | | | | | | |
| DIAMETER | N | S | N | S | N | S | N | S | N | S | N | S |
| 3/32 | 3180 | .0017 | 2250 | .0010 | 6400 | .0015 | 8600 | .0015 | 6400 | .0015 | 3380 | .0010 |
| 1/8 | 2500 | .0020 | 2000 | .0020 | 5000 | .0025 | 6800 | .0025 | 5000 | .0025 | 2700 | .0020 |
| 13/64 | 1590 | .0025 | 1280 | .0025 | 3200 | .0030 | 4300 | .0030 | 3200 | .0030 | 1700 | .0025 |
| 5/16 | 970 | .0051 | 780 | .0051 | 2000 | .0071 | 2600 | .0071 | 2000 | .0071 | 1050 | .0051 |
| 7/16 | 700 | .0071 | 560 | .0059 | 1400 | .0079 | 1900 | .0079 | 1400 | .0079 | 750 | .0059 |
| 3/4 | 440 | .0091 | 330 | .0091 | 820 | .0118 | 1100 | .0118 | 820 | .0118 | 440 | .0091 |
| 1-17/64 | 240 | .0118 | 195 | .0110 | 490 | .0150 | 660 | .0150 | 490 | .0150 | 260 | .0110 |
| 1-31/32 | 150 | .0169 | 125 | .0130 | 310 | .0181 | 415 | .0181 | 310 | .0181 | 165 | .0130 |

N = R.P.M
S = Inch per Revolution(inch/rev.)

i-DREAM DRILLS
DREAM DRILLS
DREAM DRILLS -INOX
DREAM DRILLS -ALU
DREAM DRILLS -MQL TYPE
DREAM DRILLS for HARDENED STEELS
STANDARD CARBIDE DRILLS
MULTI-1 DRILLS
HPD DRILLS
GOLD-P DRILLS
STRAIGHT SHANK DRILLS
AIRCRAFT DRILLS
SILVER & DEMING DRILLS
TAPER SHANK DRILLS
NC SPOTTING DRILLS
CENTER DRILLS
SPADE DRILLS
TECHNICAL DATA

HSS

Being the best through innovation



# NC-SPOTTING DRILLS

- HSS(8% COBALT)
  Centering and Chamfering of Holes

## HSS(8% Cobalt) NC-SPOTTING DRILLS

Centering and Chamfering of Holes

| ITEM | MODEL | DESCRIPTION | SIZE MIN | SIZE MAX | PAGE |
|---|---|---|---|---|---|
| **INCH** | | | | | |
| **D2N90** | | HSSCo8, NC-SPOTTING DRILLS 90° | D1/8 | D1 | **188** |
| | | HSSCo8, NC-SPOTTING DRILLS 120° | D1/8 | D1 | **188** |
| | | RECOMMENDED CUTTING CONDITIONS | | | **189** |

◎ : Excellent
○ : Good

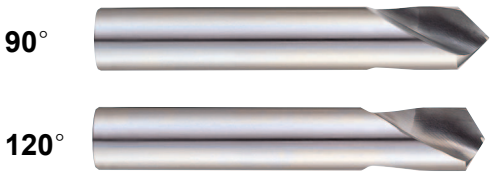
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | | ○ | ○ | | ○ | | ○ |
| ◎ | ◎ | | | | | ○ | ○ | | ○ | | ○ |

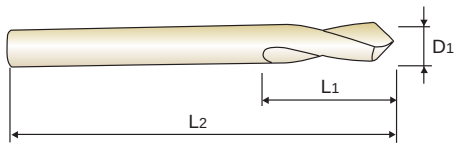
# NC-SPOTTING DRILLS

D2N90 SERIES

## HSSCo8, NC-SPOTTING DRILLS

▶ **Application** : For more precise centering work on NC/CNC machine. A larger diameter in respect to the subsequent drilling tool permit to obtain the centering and chamfering simultaneously.




NC | HSS Co8 | h6 | h6 | 90° | 120° P.

### NC-Spotting drills 90°

Unit : Inch

| EDP No. | Diameter | Flute Length | Overall Length |
|---|---|---|---|
| | D1 | L1 | L2 |
| 0081L | 1/8 | 0.472 | 1.93 |
| 0121L | 3/16 | 0.590 | 2.44 |
| 0161L | 1/4 | 0.669 | 2.76 |
| 0201L | 5/16 | 0.984 | 3.11 |
| 0241L | 3/8 | 0.827 | 3.50 |
| 0321L | 1/2 | 0.984 | 4.02 |
| 0401L | 5/8 | 1.575 | 4.53 |
| 0481L | 3/4 | 1.968 | 5.16 |
| 0641L | 1 | 1.968 | 6.14 |

### NC-Spotting drills 120°

| EDP No. | Diameter | Flute Length | Overall Length |
|---|---|---|---|
| | D1 | L1 | L2 |
| 2081L | 1/8 | 0.472 | 1.93 |
| 2121L | 3/16 | 0.590 | 2.44 |
| 2161L | 1/4 | 0.669 | 2.76 |
| 2201L | 5/16 | 0.984 | 3.11 |
| 2241L | 3/8 | 0.827 | 3.50 |
| 2321L | 1/2 | 0.984 | 4.02 |
| 2401L | 5/8 | 1.575 | 4.53 |
| 2481L | 3/4 | 1.968 | 5.16 |
| 2641L | 1 | 1.968 | 6.14 |

* Individually packaged

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | | ○ | ○ | | ○ | | ○ |

## HSSCo8, NC-SPOTTING DRILLS

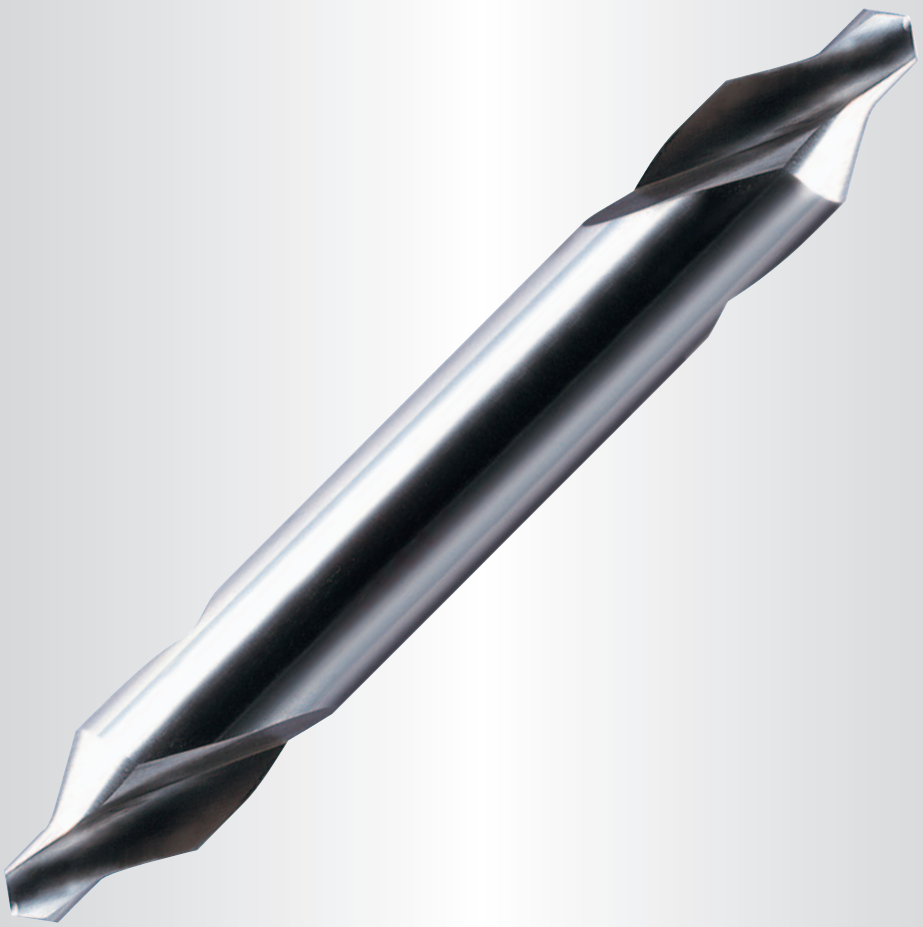
| WORK MATERIAL | CARBON STEELS | | ALLOY STEELS | | ALLOY STEELS, TOOL STEELS, HARDENED STEELS | | STAINLESS STEELS | | ALUMINUM, ALUMINUM ALLOYS | |
|---|---|---|---|---|---|---|---|---|---|---|
| DIAMETER | N | S | N | S | N | S | N | S | N | S |
| 1/8 ~5/32 | 2460 | .002 | 2110 | .002 | 1080 | .002 | 940 | .002 | 7040 | .005 |
| 11/64 ~3/16 | 1850 | .002 | 1580 | .002 | 800 | .002 | 700 | .002 | 5280 | .006 |
| 13/64 ~15/64 | 1510 | .003 | 1300 | .003 | 670 | .003 | 580 | .003 | 4400 | .006 |
| 1/4 ~5/16 | 1170 | .003 | 1030 | .003 | 540 | .003 | 460 | .003 | 3520 | .007 |
| 21/64 ~25/64 | 880 | .004 | 790 | .004 | 400 | .004 | 350 | .004 | 2640 | .008 |
| 13/32 ~15/32 | 700 | .004 | 630 | .004 | 320 | .004 | 290 | .004 | 2110 | .009 |
| 31/64 ~5/8 | 590 | .005 | 530 | .005 | 260 | .005 | 240 | .005 | 1760 | .011 |
| 41/64 ~47/64 | 460 | .007 | 400 | .007 | 200 | .007 | 180 | .007 | 1320 | .012 |
| 3/4 ~1 | 350 | .009 | 320 | .009 | 150 | .009 | 140 | .009 | 1060 | .017 |

N = R.P.M
S = Inch per Revolution(inch/rev.)

HSS

YG

Being the best through innovation



# CENTER DRILLS

- Regular and Long Length

## HSS CENTER DRILLS

Regular and Long Length

| ITEM | MODEL | DESCRIPTION | SIZE | | PAGE |
|---|---|---|---|---|---|
| | | | MIN | MAX | |
| **INCH** | | | | | |
| **D1C90** | | HSS(M2), CENTER DRILL | D3/64 | D7/32 | **194** |
| | | RECOMMENDED CUTTING CONDITIONS | | | |

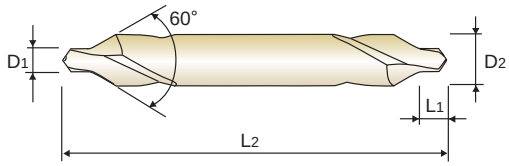
◎ : Excellent
○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

# YG CENTER DRILLS

**D1C90 SERIES**

## HSS(M2), CENTER DRILLS




HSS | h8 | k12 | 120°

### 60°

| EDP No. | Size | Diameter D1 | Shank Diameter D2 | Drill Length L1 | Overall Length L2 |
|---|---|---|---|---|---|
| * D1C90079 | 1 | 3/64 | 1/8 | 1/16 | 1-1/2 |
| * D1C90080 | 2 | 1/16 | 3/16 | 5/64 | 1-3/4 |
| * D1C90081 | 3 | 3/32 | 1/4 | 1/8 | 2 |
| * D1C90082 | 4 | 1/8 | 5/16 | 5/32 | 2-1/4 |
| * D1C90083 | 5 | 3/6 | 7/16 | 1/4 | 2-1/2 |
| ★ D1C90084 | 6 | 7/32 | 1/2 | 7/32 | 3 |

* 10per package
★ Individually package

### 60°

| EDP No. | Size | Diameter D1 | Shank Diameter D2 | Drill Length L1 | Overall Length L2 |
|---|---|---|---|---|---|
| * D1C90141 | 1 | 3/64 | 1/8 | 3/64 | 1-1/4 |
| * D1C90142 | 2 | 5/64 | 3/16 | 5/64 | 1-7/8 |
| * D1C90143 | 3 | 7/64 | 1/4 | 7/64 | 2 |
| * D1C90144 | 4 | 1/8 | 5/16 | 1/8 | 2-1/8 |
| * D1C90145 | 5 | 3/16 | 7/16 | 3/16 | 2-3/4 |

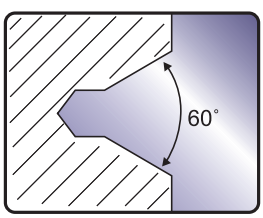
* 10per package

### LONG LENGTH (60°)

Unit : Inch

| EDP No. | Size | Diameter D1 | Shank Diameter D2 | Drill Length L1 | Overall Length L2 |
|---|---|---|---|---|---|
| * D1C90085 | 1 | 3/64 | 1/8 | 3/64 | 3 |
| * D1C90086 | 1 | 3/64 | 1/8 | 3/64 | 4 |
| * D1C90087 | 1 | 3/64 | 1/8 | 3/64 | 5 |
| * D1C90088 | 1 | 3/64 | 1/8 | 3/64 | 6 |
| * D1C90089 | 2 | 5/64 | 3/16 | 5/64 | 3 |
| * D1C90090 | 2 | 5/64 | 3/16 | 5/64 | 4 |
| * D1C90091 | 2 | 5/64 | 3/16 | 5/64 | 5 |
| * D1C90092 | 2 | 5/64 | 3/16 | 5/64 | 6 |
| * D1C90093 | 3 | 7/64 | 1/4 | 7/64 | 4 |
| * D1C90094 | 3 | 7/64 | 1/4 | 7/64 | 5 |
| * D1C90095 | 3 | 7/64 | 1/4 | 7/64 | 6 |
| * D1C90096 | 4 | 1/8 | 5/16 | 1/8 | 4 |
| * D1C90097 | 4 | 1/8 | 5/16 | 1/8 | 5 |
| * D1C90098 | 4 | 1/8 | 5/16 | 1/8 | 6 |
| * D1C90099 | 5 | 3/16 | 7/16 | 3/16 | 4 |
| * D1C90100 | 5 | 3/16 | 7/16 | 3/16 | 5 |
| * D1C90101 | 5 | 3/16 | 7/16 | 3/16 | 6 |
| * D1C90102 | 6 | 7/32 | 1/2 | 7/32 | 4 |
| * D1C90103 | 6 | 7/32 | 1/2 | 7/32 | 5 |
| * D1C90104 | 6 | 7/32 | 1/2 | 7/32 | 6 |

* 10per package

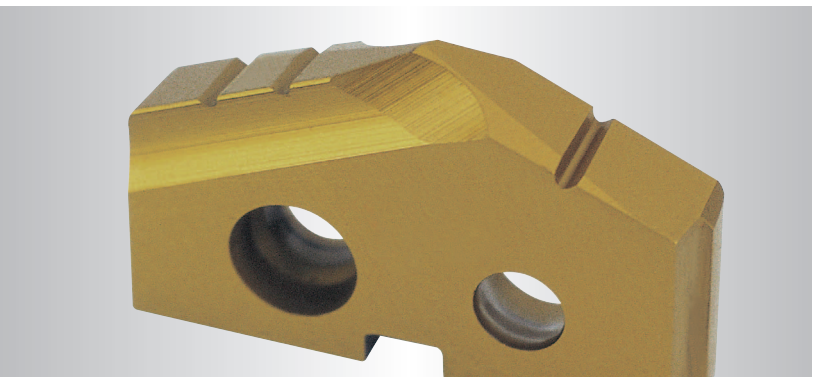



◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | Cast Iron | Aluminum | Stainless Steels | Titanium | Mild Steels | Copper | Bronze |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HB225 | HB225~325 | HRc30~45 | HRc45~55 | HRc55~ | | | | | | | |
| ◎ | ◎ | | | | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

# INSERTS & HOLDERS

Being the best through innovation



# SPADE DRILLS

- **Carbide for Long Tool Life, and HSS-PM for General Machines and Large Diameters Higher Productivity than Other Drilling Tools**

## SPADE DRILL INSERTS

| ITEM | MODEL | DESCRIPTION | SIZE | | PAGE |
|---|---|---|---|---|---|
| | | | MIN | MAX | |
| SERIES 1~8 | | SPADE DRILL INSERTS - HSS M4 | .7031 (#1) | 4.5000 (#8) | 198 |
| SERIES Y,Z,0,1~8 | | SPADE DRILL INSERTS - SUPER HSS T15 | .3740 (#Y) | 4.5000 (#8) | 202 |
| SERIES Y,Z,0,1,2 | | SPADE DRILL INSERTS - PREMIUM HSS M48 | .3740 (#Y) | 1.3780 (#2) | 209 |
| SERIES Y,Z,0,1~3 | | CARBIDE BLADE INSERTS-C2(K20) | .3740 (#Y) | 1.8750 (#3) | 212 |
| SERIES Y,Z,0,1~3 | | CARBIDE BLADE INSERTS-C5(P40) | .3740 (#Y) | 1.8750 (#3) | 212 |
| SERIES Y,Z,0,1~2 | | CARBIDE BLADE INSERTS-C3(K10) | .3740 (#Y) | 1.3780 (#2) | 212 |
| SERIES Y,Z,0,1~8 | | SM-POINT SPADE DRILL INSERTS - SUPER COBALT(T15) | .3740 (#Y) | 4.5000 (#8) | 218 |
| SERIES Y,Z,0,1~3 | | SM-POINT SPADE DRILL INSERTS - CARBIDE(C5) | .3740 (#Y) | 1.8750 (#3) | 222 |
| SERIES Y,Z,0,1,2 | | SPADE DRILL FLAT BOTTOM INSERTS - SUPER COBALT T15 | .3750 (#Y) | 1.3750 (#2) | 224 |

◎ : Excellent
○ : Good

| Non-alloyed Steels, Free Machining Steels | Carbon Steels | | Alloy Steels | | High Alloyed steels | | Structural Steels | | Tool Steels | | Stainless Steels | Cast Iron | | Aluminum | Copper Alloys |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc24 (~HB250) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc37 (~HB350) | HRc37~ (HB350~) | ~HRc24 (~HB250) | HRc24~ (HB250~) | ~HRc13 (~HB200) | HRc13~ (HB200~) | ~HRc28 (~HB275) | ~HRc19 (~HB220) | HRc19~ (HB220~) | ~HRc8 (~HB180) | ~HB110 |
| ○ | ○ | ○ | ○ | | ○ | | ○ | ○ | | | ◎ | ◎ | ○ | ◎ | ◎ |
| ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ◎ | ○ | ○ | ○ | ○ | ◎ | ○ | ○ |
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ |
| ○ | ○ | ○ | ○ | ○ | ◎ | ◎ | ○ | ○ | ○ | ○ | ◎ | ○ | ○ | ◎ | ◎ |
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ○ | ○ |
| | | | | | | | | | | | | ◎ | ◎ | | |
| ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ◎ | ○ | ○ | ○ | ○ | ◎ | ○ | ○ |
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ○ | ○ |
| ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ◎ | ○ | ○ | ○ | ○ | ◎ | ○ | ○ |

# SPADE DRILLS

SERIES 1,2

## SPADE DRILL INSERTS - HSS M4

- General purpose insert for most materials
- Not recommended for tool steels and high temp alloys
- High toughness for loose or manual machines

**POINT ANGLE** **- under 2-1/2 : 132 degree**
**- over 2-1/2 : 144 degree**

cutting conditions : p.231

| Series Min. to Max. (inch/mm) | Diameter | | | Thick | EDP No. | | |
|---|---|---|---|---|---|---|---|
| | Fractional (inch) | Metric (mm) | Decimal (inch) | Metric (inch/mm) | HSS (M4) TiN | HSS (M4) TiAlN | HSS (M4) Hardslick |
| **1** .690 (17.53) to .960 (24.38) | 45/64 | 17.86 | .7031 | 5/32 (4.0) | S01101 | S03101 | S04101 |
| | | 18.00 | .7087 | | S01102 | S03102 | S04102 |
| | 23/32 | 18.26 | .7188 | | S01103 | S03103 | S04103 |
| | | 18.50 | .7283 | | S01104 | S03104 | S04104 |
| | 47/64 | 18.65 | .7344 | | S01105 | S03105 | S04105 |
| | | 19.00 | .7480 | | S01106 | S03106 | S04106 |
| | 3/4 | 19.05 | .7500 | | S01107 | S03107 | S04107 |
| | 49/64 | 19.45 | .7656 | | S01108 | S03108 | S04108 |
| | | 19.50 | .7677 | | S01109 | S03109 | S04109 |
| | 25/32 | 19.84 | .7813 | | S01110 | S03110 | S04110 |
| | | 20.00 | .7874 | | S01111 | S03111 | S04111 |
| | 51/64 | 20.24 | .7969 | | S01160 | S03160 | S04160 |
| | | 20.50 | .8071 | | S01112 | S03112 | S04112 |
| | 13/16 | 20.64 | .8125 | | S01113 | S03113 | S04113 |
| | | 21.00 | .8268 | | S01114 | S03114 | S04114 |
| | 27/32 | 21.43 | .8438 | | S01115 | S03115 | S04115 |
| | 55/64 | 21.83 | .8594 | | S01161 | S03161 | S04161 |
| | | 22.00 | .8661 | | S01116 | S03116 | S04116 |
| | 7/8 | 22.23 | .8750 | | S01117 | S03117 | S04117 |
| | 57/64 | 22.62 | .8906 | | S01162 | S03162 | S04162 |
| | | 23.00 | .9055 | | S01118 | S03118 | S04118 |
| | 29/32 | 23.02 | .9063 | | S01119 | S03119 | S04119 |
| | 59/64 | 23.42 | .9219 | | S01120 | S03120 | S04120 |
| | 15/16 | 23.81 | .9375 | | S01121 | S03121 | S04121 |
| | | 24.00 | .9449 | | S01122 | S03122 | S04122 |
| **2** .961 (24.41) to 1.380 (35.05) | 31/32 | 24.61 | .9688 | 3/16 (4.8) | S01201 | S03201 | S04201 |
| | 63/64 | 25.00 | .9843 | | S01202 | S03202 | S04202 |
| | 1 | 25.40 | 1.0000 | | S01203 | S03203 | S04203 |
| | 1-1/64 | 25.80 | 1.0156 | | S01204 | S03204 | S04204 |
| | | 26.00 | 1.0236 | | S01205 | S03205 | S04205 |
| | 1-1/32 | 26.19 | 1.0313 | | S01206 | S03206 | S04206 |
| | 1-3/64 | 26.59 | 1.0469 | | S01260 | S03260 | S04260 |
| | 1-1/16 | 26.99 | 1.0625 | | S01207 | S03207 | S04207 |
| | | 27.00 | 1.0630 | | S01208 | S03208 | S04208 |

◎ : Excellent ○ : Good

| Non-alloyed Steels, Free Machining Steels | Carbon Steels | | Alloy Steels | | High Alloyed steels | | Structural Steels | | Tool Steels | | Stainless Steels | Cast Iron | | Aluminum | Copper Alloys |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc24 (~HB250) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc37 (~HB350) | HRc37~ (HB350~) | ~HRc24 (~HB250) | HRc24~ (HB250~) | ~HRc13 (~HB200) | HRc13~ (HB200~) | ~HRc28 (~HB275) | ~HRc19 (~HB220) | HRc19~ (HB220~) | ~HRc8 (~HB180) | ~HB110 |
| ○ | ○ | ○ | ○ | | ○ | | ○ | ○ | | | ◎ | ◎ | ○ | ◎ | ◎ |

# SPADE DRILLS

SERIES 2,3

## SPADE DRILL INSERTS - HSS M4

- General purpose insert for most materials
- Not recommended for tool steels and high temp alloys
- High toughness for loose or manual machines

**POINT ANGLE** **- under 2-1/2 : 132 degree**
**- over 2-1/2 : 144 degree**

cutting conditions : p.231

| Series Min. to Max. (inch/mm) | Diameter | | | Thick | EDP No. | | |
|---|---|---|---|---|---|---|---|
| | | | | | HSS (M4) | | |
| | Fractional (inch) | Metric (mm) | Decimal (inch) | Metric (inch/mm) | TiN | TiAlN | Hardslick |
| **2** .961 (24.41) to 1.380 (35.05) | 1-3/32 | 27.78 | 1.0938 | 3/16 (4.8) | SO1209 | SO3209 | SO4209 |
| | | 28.00 | 1.1024 | | SO1210 | SO3210 | SO4210 |
| | 1-7/64 | 28.18 | 1.1094 | | SO1261 | SO3261 | SO4261 |
| | 1-1/8 | 28.58 | 1.1250 | | SO1211 | SO3211 | SO4211 |
| | | 29.00 | 1.1417 | | SO1212 | SO3212 | SO4212 |
| | 1-5/32 | 29.37 | 1.1563 | | SO1213 | SO3213 | SO4213 |
| | | 30.00 | 1.1811 | | SO1214 | SO3214 | SO4214 |
| | 1-3/16 | 30.16 | 1.1875 | | SO1215 | SO3215 | SO4215 |
| | 1-7/32 | 30.96 | 1.2188 | | SO1216 | SO3216 | SO4216 |
| | | 31.00 | 1.2205 | | SO1217 | SO3217 | SO4217 |
| | 1-1/4 | 31.75 | 1.2500 | | SO1218 | SO3218 | SO4218 |
| | | 32.00 | 1.2598 | | SO1219 | SO3219 | SO4219 |
| | 1-9/32 | 32.54 | 1.2813 | | SO1220 | SO3220 | SO4220 |
| | | 33.00 | 1.2992 | | SO1221 | SO3221 | SO4221 |
| | 1-5/16 | 33.34 | 1.3125 | | SO1222 | SO3222 | SO4222 |
| | | 34.00 | 1.3386 | | SO1223 | SO3223 | SO4223 |
| | 1-11/32 | 34.13 | 1.3438 | | SO1224 | SO3224 | SO4224 |
| | 1-3/8 | 34.93 | 1.3750 | | SO1225 | SO3225 | SO4225 |
| | | 35.00 | 1.3780 | | SO1226 | SO3226 | SO4226 |
| **3** 1.353 (34.37) to 1.882 (47.80) | 1-13/32 | 35.72 | 1.4063 | 1/4 (6.4) | SO1301 | SO3301 | SO4301 |
| | | 36.00 | 1.4173 | | SO1302 | SO3302 | SO4302 |
| | 1-7/16 | 36.51 | 1.4375 | | SO1303 | SO3303 | SO4303 |
| | | 37.00 | 1.4567 | | SO1304 | SO3304 | SO4304 |
| | 1-15/32 | 37.31 | 1.4688 | | SO1305 | SO3305 | SO4305 |
| | | 38.00 | 1.4961 | | SO1306 | SO3306 | SO4306 |
| | 1-1/2 | 38.10 | 1.5000 | | SO1307 | SO3307 | SO4307 |
| | 1-17/32 | 38.89 | 1.5313 | | SO1308 | SO3308 | SO4308 |
| | | 39.00 | 1.5354 | | SO1309 | SO3309 | SO4309 |
| | 1-9/16 | 39.69 | 1.5625 | | SO1310 | SO3310 | SO4310 |
| | | 40.00 | 1.5748 | | SO1311 | SO3311 | SO4311 |
| | 1-19/32 | 40.48 | 1.5938 | | SO1312 | SO3312 | SO4312 |
| | | 41.00 | 1.6142 | | SO1313 | SO3313 | SO4313 |
| | 1-5/8 | 41.28 | 1.6250 | | SO1314 | SO3314 | SO4314 |
| | | 42.00 | 1.6535 | | SO1315 | SO3315 | SO4315 |

◎ : Excellent ○ : Good

| Non-alloyed Steels, Free Machining Steels | Carbon Steels | | Alloy Steels | | High Alloyed steels | | Structural Steels | | Tool Steels | | Stainless Steels | Cast Iron | | Aluminum | Copper Alloys |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc24 (~HB250) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc37 (~HB350) | HRc37~ (HB350~) | ~HRc24 (~HB250) | HRc24~ (HB250~) | ~HRc13 (~HB200) | HRc13~ (HB200~) | ~HRc28 (~HB275) | ~HRc19 (~HB220) | HRc19~ (HB220~) | ~HRc8 (~HB180) | ~HB110 |
| ○ | ○ | ○ | ○ | | ○ | | ○ | ○ | | | ◎ | ◎ | ○ | ◎ | ◎ |

# SPADE DRILLS

SERIES 3,4

## SPADE DRILL INSERTS - HSS M4

- General purpose insert for most materials
- Not recommended for tool steels and high temp alloys
- High toughness for loose or manual machines

**POINT ANGLE** **- under 2-1/2 : 132 degree**
**- over 2-1/2 : 144 degree**

cutting conditions : p.231

| Series Min. to Max. (inch/mm) | Diameter | | | Thick | EDP No. | | |
|---|---|---|---|---|---|---|---|
| | Fractional (inch) | Metric (mm) | Decimal (inch) | Metric (inch/mm) | HSS (M4) TiN | HSS (M4) TiAlN | HSS (M4) Hardslick |
| **3** **1.353 (34.37) to 1.882 (47.80)** | 1-21/32 | 42.07 | 1.6563 | 1/4 (6.4) | S01316 | S03316 | S04316 |
| | 1-11/16 | 42.86 | 1.6875 | | S01317 | S03317 | S04317 |
| | | 43.00 | 1.6929 | | S01318 | S03318 | S04318 |
| | 1-23/32 | 43.66 | 1.7188 | | S01319 | S03319 | S04319 |
| | | 44.00 | 1.7323 | | S01320 | S03320 | S04320 |
| | 1-3/4 | 44.45 | 1.7500 | | S01321 | S03321 | S04321 |
| | | 45.00 | 1.7717 | | S01322 | S03322 | S04322 |
| | 1-25/32 | 45.24 | 1.7813 | | S01323 | S03323 | S04323 |
| | | 46.00 | 1.8110 | | S01324 | S03324 | S04324 |
| | 1-13/16 | 46.04 | 1.8125 | | S01325 | S03325 | S04325 |
| | 1-27/32 | 46.83 | 1.8438 | | S01326 | S03326 | S04326 |
| | | 47.00 | 1.8504 | | S01327 | S03327 | S04327 |
| | 1-7/8 | 47.63 | 1.8750 | | S01328 | S03328 | S04328 |
| **4** **1.850 (46.99) to 2.570 (65.28)** | 1-29/32 | 48.42 | 1.9063 | 5/16 (7.9) | S01402 | S03402 | S04402 |
| | 1-15/16 | 49.21 | 1.9375 | | S01404 | S03404 | S04404 |
| | 1-31/32 | 50.01 | 1.9688 | | S01406 | S03406 | S04406 |
| | 2 | 50.80 | 2.0000 | | S01407 | S03407 | S04407 |
| | 2-1/32 | 51.59 | 2.0313 | | S01409 | S03409 | S04409 |
| | 2-3/64 | 52.00 | 2.0472 | | S01410 | S03410 | S04410 |
| | 2-1/16 | 52.39 | 2.0625 | | S01411 | S03411 | S04411 |
| | 2-3/32 | 53.18 | 2.0938 | | S01413 | S03413 | S04413 |
| | 2-1/8 | 53.98 | 2.1250 | | S01414 | S03414 | S04414 |
| | 2-5/32 | 54.77 | 2.1563 | | S01416 | S03416 | S04416 |
| | 2-3/16 | 55.56 | 2.1875 | | S01418 | S03418 | S04418 |
| | 2-7/32 | 56.36 | 2.2188 | | S01420 | S03420 | S04420 |
| | 2-1/4 | 57.15 | 2.2500 | | S01422 | S03422 | S04422 |
| | 2-9/32 | 57.94 | 2.2813 | | S01423 | S03423 | S04423 |
| | 2-5/16 | 58.74 | 2.3125 | | S01425 | S03425 | S04425 |
| | 2-11/32 | 59.53 | 2.3438 | | S01427 | S03427 | S04427 |
| | 2-3/8 | 60.33 | 2.3750 | | S01429 | S03429 | S04429 |
| | 2-13/32 | 61.12 | 2.4063 | | S01431 | S03431 | S04431 |
| | 2-7/16 | 61.91 | 2.4375 | | S01432 | S03432 | S04432 |
| | 2-15/32 | 62.71 | 2.4688 | | S01434 | S03434 | S04434 |
| | 2-1/2 | 63.50 | 2.5000 | | S01436 | S03436 | S04436 |

◎ : Excellent ○ : Good

| Non-alloyed Steels, Free Machining Steels | Carbon Steels | | Alloy Steels | | High Alloyed steels | | Structural Steels | | Tool Steels | | Stainless Steels | Cast Iron | | Aluminum | Copper Alloys |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc24 (~HB250) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc37 (~HB350) | HRc37~ (HB350~) | ~HRc24 (~HB250) | HRc24~ (HB250~) | ~HRc13 (~HB200) | HRc13~ (HB200~) | ~HRc28 (~HB275) | ~HRc19 (~HB220) | HRc19~ (HB220~) | ~HRc8 (~HB180) | ~HB110 |
| ○ | ○ | ○ | ○ | | ○ | | ○ | ○ | | | ◎ | ◎ | ○ | ◎ | ◎ |

# SPADE DRILLS

SERIES 4,5,6,7,8

## SPADE DRILL INSERTS - HSS M4

- General purpose insert for most materials
- Not recommended for tool steels and high temp alloys
- High toughness for loose or manual machines

**POINT ANGLE** **- under 2-1/2 : 132 degree**
**- over 2-1/2 : 144 degree**

cutting conditions : p.231

| Series Min. to Max. (inch/mm) | Diameter | | | Thick | EDP No. | | |
|---|---|---|---|---|---|---|---|
| | Fractional (inch) | Metric (mm) | Decimal (inch) | Metric (inch/mm) | HSS (M4) TiN | HSS (M4) TiAlN | HSS (M4) Hardslick |
| 4 | 2-17/32 | 64.29 | 2.5313 | 5/16 (7.9) | SO1438 | SO3438 | SO4438 |
| | 2-9/16 | 65.09 | 2.5625 | | SO1440 | SO3440 | SO4440 |
| 5 2.456 (62.38) to 3.000 (76.20) | 2-1/2 | 63.50 | 2.5000 | 7/16 (11.1) | SO1501 | SO3501 | SO4501 |
| | 2-5/8 | 66.68 | 2.6250 | | SO1507 | SO3507 | SO4507 |
| | 2-3/4 | 69.85 | 2.7500 | | SO1512 | SO3512 | SO4512 |
| | 2-25/32 | 70.64 | 2.7813 | | SO1514 | SO3514 | SO4514 |
| | 2-13/16 | 71.44 | 2.8125 | | SO1515 | SO3515 | SO4515 |
| | 2-27/32 | 72.23 | 2.8438 | | SO1517 | SO3517 | SO4517 |
| | 2-7/8 | 73.03 | 2.8750 | | SO1518 | SO3518 | SO4518 |
| | 2-29/32 | 73.82 | 2.9063 | | SO1519 | SO3519 | SO4519 |
| | 2-15/16 | 74.61 | 2.9375 | | SO1521 | SO3521 | SO4521 |
| | 2-31/32 | 75.41 | 2.9688 | | SO1522 | SO3522 | SO4522 |
| | 3 | 76.20 | 3.0000 | | SO1524 | SO3524 | SO4524 |
| 6 3.001(76.23) to 3.507(89.08) | 3-1/16 | 77.79 | 3.0625 | 7/16 (11.1) | SO1602 | SO3602 | SO4602 |
| | 3-1/8 | 79.38 | 3.1250 | | SO1605 | SO3605 | SO4605 |
| | 3-1/4 | 82.55 | 3.2500 | | SO1611 | SO3611 | SO4611 |
| | 3-3/8 | 85.73 | 3.3750 | | SO1616 | SO3616 | SO4616 |
| | 3-7/16 | 87.31 | 3.4375 | | SO1619 | SO3619 | SO4619 |
| | 3-1/2 | 88.90 | 3.5000 | | SO1622 | SO3622 | SO4622 |
| 7 3.455 (87.76) to 4.000 (101.60) | 3-9/16 | 90.49 | 3.5625 | 7/16 (11.1) | SO1703 | SO3703 | SO4703 |
| | 3-5/8 | 92.08 | 3.6250 | | SO1706 | SO3706 | SO4706 |
| | 3-3/4 | 95.25 | 3.7500 | | SO1711 | SO3711 | SO4711 |
| | 3-7/8 | 98.43 | 3.8750 | | SO1717 | SO3717 | SO4717 |
| | 4 | 101.60 | 4.0000 | | SO1722 | SO3722 | SO4722 |
| 8 4.001 (101.63) to 4.507 (114.48) | 4-1/8 | 104.78 | 4.1250 | 7/16 (11.1) | SO1804 | SO3804 | SO4804 |
| | 4-1/4 | 107.95 | 4.2500 | | SO1807 | SO3807 | SO4807 |
| | 4-3/8 | 111.13 | 4.3750 | | SO1811 | SO3811 | SO4811 |
| | 4-1/2 | 114.30 | 4.5000 | | SO1815 | SO3815 | SO4815 |

◎ : Excellent ○ : Good

| Non-alloyed Steels, Free Machining Steels | Carbon Steels | | Alloy Steels | | High Alloyed steels | | Structural Steels | | Tool Steels | | Stainless Steels | Cast Iron | | Aluminum | Copper Alloys |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc24 (~HB250) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc37 (~HB350) | HRc37~ (HB350~) | ~HRc24 (~HB250) | HRc24~ (HB250~) | ~HRc13 (~HB200) | HRc13~ (HB200~) | ~HRc28 (~HB275) | ~HRc19 (~HB220) | HRc19~ (HB220~) | ~HRc8 (~HB180) | ~HB110 |
| ○ | ○ | ○ | ○ | | ○ | | ○ | ○ | | | ◎ | ◎ | ○ | ◎ | ◎ |

# SPADE DRILLS

SERIES Y,Z,0

## SPADE DRILL INSERTS - SUPER COBALT(T15)

- Increase wear resistance over M4
- For use in medium carbon steel to high temperature alloys over 280 Brinell
- Performs best in rigid setups

**POINT ANGLE** **- under 2-1/2 : 132 degree**
**- over 2-1/2 : 144 degree**

cutting conditions : p.231

| Series Min. to Max. (inch/mm) | Diameter | | | Thick | EDP No. | | |
|---|---|---|---|---|---|---|---|
| | Fractional (inch) | Metric (mm) | Decimal (inch) | Metric (inch/mm) | SUPER COBALT(T15) TiN | SUPER COBALT(T15) TiAlN | SUPER COBALT(T15) Hardslick |
| **Y** .374 (9.50) to .436 (11.07) | | 9.50 | .3740 | 3/32 (2.4) | * SO6YO1 | * SO8YO1 | * SO9YO1 |
| | 3/8 | 9.53 | .3750 | | * SO6YO2 | * SO8YO2 | * SO9YO2 |
| | | 9.80 | .3860 | | * SO6YO3 | * SO8YO3 | * SO9YO3 |
| | 25/64 | 9.92 | .3906 | | * SO6YO4 | * SO8YO4 | * SO9YO4 |
| | | 10.00 | .3937 | | * SO6YO5 | * SO8YO5 | * SO9YO5 |
| | | 10.20 | .4016 | | * SO6YO6 | * SO8YO6 | * SO9YO6 |
| | 13/32 | 10.32 | .4063 | | * SO6YO7 | * SO8YO7 | * SO9YO7 |
| | | 10.50 | .4134 | | * SO6YO8 | * SO8YO8 | * SO9YO8 |
| | 27/64 | 10.72 | .4219 | | * SO6YO9 | * SO8YO9 | * SO9YO9 |
| | | 10.80 | .4252 | | * SO6Y10 | * SO8Y10 | * SO9Y10 |
| | | 11.00 | .4331 | | * SO6Y11 | * SO8Y11 | * SO9Y11 |
| **Z** .437 (11.11) to .510 (12.95) | 7/16 | 11.11 | .4375 | 3/32 (2.4) | * SO6ZO1 | * SO8ZO1 | * SO9ZO1 |
| | | 11.50 | .4528 | | * SO6ZO2 | * SO8ZO2 | * SO9ZO2 |
| | 29/64 | 11.51 | .4531 | | * SO6ZO3 | * SO8ZO3 | * SO9ZO3 |
| | 15/32 | 11.91 | .4688 | | * SO6ZO4 | * SO8ZO4 | * SO9ZO4 |
| | | 12.00 | .4724 | | * SO6ZO5 | * SO8ZO5 | * SO9ZO5 |
| | 31/64 | 12.30 | .4844 | | * SO6ZO6 | * SO8ZO6 | * SO9ZO6 |
| | | 12.50 | .4921 | | * SO6ZO7 | * SO8ZO7 | * SO9ZO7 |
| | 1/2 | 12.70 | .5000 | | * SO6ZO8 | * SO8ZO8 | * SO9ZO8 |
| **0** .511 (12.98) to .695 (17.65) | | 13.00 | .5118 | 1/8 (3.2) | * SO6001 | * SO8001 | * SO9001 |
| | 33/64 | 13.10 | .5156 | | * SO6002 | * SO8002 | * SO9002 |
| | 17/32 | 13.49 | .5313 | | * SO6003 | * SO8003 | * SO9003 |
| | | 13.50 | .5315 | | * SO6004 | * SO8004 | * SO9004 |
| | 35/64 | 13.89 | .5469 | | * SO6060 | * SO8060 | * SO9060 |
| | | 14.00 | .5512 | | * SO6005 | * SO8005 | * SO9005 |
| | 9/16 | 14.29 | .5625 | | * SO6006 | * SO8006 | * SO9006 |
| | | 14.50 | .5709 | | * SO6007 | * SO8007 | * SO9007 |
| | 37/64 | 14.68 | .5781 | | * SO6008 | * SO8008 | * SO9008 |
| | | 15.00 | .5906 | | * SO6009 | * SO8009 | * SO9009 |
| | 19/32 | 15.08 | .5938 | | * SO6010 | * SO8010 | * SO9010 |
| | 39/64 | 15.48 | .6094 | | * SO6061 | * SO8061 | * SO9061 |
| | | 15.50 | .6102 | | * SO6011 | * SO8011 | * SO9011 |
| | 5/8 | 15.88 | .6250 | | * SO6012 | * SO8012 | * SO9012 |

* 2pcs per package

◎ : Excellent ○ : Good

| Non-alloyed Steels, Free Machining Steels | Carbon Steels | | Alloy Steels | | High Alloyed steels | | Structural Steels | | Tool Steels | | Stainless Steels | Cast Iron | | Aluminum | Copper Alloys |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc24 (~HB250) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc37 (~HB350) | HRc37~ (HB350~) | ~HRc24 (~HB250) | HRc24~ (HB250~) | ~HRc13 (~HB200) | HRc13~ (HB200~) | ~HRc28 (~HB275) | ~HRc19 (~HB220) | HRc19~ (HB220~) | ~HRc8 (~HB180) | ~HB110 |
| ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ◎ | ○ | ○ | ○ | ○ | ◎ | ○ | ○ |

# SPADE DRILLS

SERIES 0,1

## SPADE DRILL INSERTS - SUPER COBALT(T15)

- Increase wear resistance over M4
- For use in medium carbon steel to high temperature alloys over 280 Brinell
- Performs best in rigid setups

**POINT ANGLE** **- under 2-1/2 : 132 degree**
**- over 2-1/2 : 144 degree**

cutting conditions : p.231

| Series Min. to Max. (inch/mm) | Diameter | | | Thick | EDP No. | | |
|---|---|---|---|---|---|---|---|
| | Fractional (inch) | Metric (mm) | Decimal (inch) | Metric (inch/mm) | SUPER COBALT(T15) TiN | TiAlN | Hardslick |
| **0** .511 (12.98) to .695 (17.65) | | 16.00 | .6299 | 1/8 (3.2) | * SO6013 | * SO8013 | * SO9013 |
| | 41/64 | 16.27 | .6406 | | * SO6062 | * SO8062 | * SO9062 |
| | | 16.50 | .6496 | | * SO6014 | * SO8014 | * SO9014 |
| | 21/32 | 16.67 | .6563 | | * SO6015 | * SO8015 | * SO9015 |
| | | 17.00 | .6693 | | * SO6016 | * SO8016 | * SO9016 |
| | 43/64 | 17.07 | .6719 | | * SO6063 | * SO8063 | * SO9063 |
| | 11/16 | 17.46 | .6875 | | * SO6017 | * SO8017 | * SO9017 |
| | | 17.50 | .6890 | | * SO6018 | * SO8018 | * SO9018 |
| **1** .690 (17.53) to .960 (24.38) | 45/64 | 17.86 | .7031 | 5/32 (4.0) | SO6101 | SO8101 | SO9101 |
| | | 18.00 | .7087 | | SO6102 | SO8102 | SO9102 |
| | 23/32 | 18.26 | .7188 | | SO6103 | SO8103 | SO9103 |
| | | 18.50 | .7283 | | SO6104 | SO8104 | SO9104 |
| | 47/64 | 18.65 | .7344 | | SO6105 | SO8105 | SO9105 |
| | | 19.00 | .7480 | | SO6106 | SO8106 | SO9106 |
| | 3/4 | 19.05 | .7500 | | SO6107 | SO8107 | SO9107 |
| | 49/64 | 19.45 | .7656 | | SO6108 | SO8108 | SO9108 |
| | | 19.50 | .7677 | | SO6109 | SO8109 | SO9109 |
| | 25/32 | 19.84 | .7813 | | SO6110 | SO8110 | SO9110 |
| | | 20.00 | .7874 | | SO6111 | SO8111 | SO9111 |
| | 51/64 | 20.24 | .7969 | | SO6160 | SO8160 | SO9160 |
| | | 20.50 | .8071 | | SO6112 | SO8112 | SO9112 |
| | 13/16 | 20.64 | .8125 | | SO6113 | SO8113 | SO9113 |
| | | 21.00 | .8268 | | SO6114 | SO8114 | SO9114 |
| | 27/32 | 21.43 | .8438 | | SO6115 | SO8115 | SO9115 |
| | 55/64 | 21.83 | .8594 | | SO6161 | SO8161 | SO9161 |
| | | 22.00 | .8661 | | SO6116 | SO8116 | SO9116 |
| | 7/8 | 22.23 | .8750 | | SO6117 | SO8117 | SO9117 |
| | 57/64 | 22.62 | .8906 | | SO6162 | SO8162 | SO9162 |
| | | 23.00 | .9055 | | SO6118 | SO8118 | SO9118 |
| | 29/32 | 23.02 | .9063 | | SO6119 | SO8119 | SO9119 |
| | 59/64 | 23.42 | .9219 | | SO6120 | SO8120 | SO9120 |
| | 15/16 | 23.81 | .9375 | | SO6121 | SO8121 | SO9121 |
| | | 24.00 | .9449 | | SO6122 | SO8122 | SO9122 |

* 2pcs per package

◎ : Excellent ○ : Good

| Non-alloyed Steels, Free Machining Steels | Carbon Steels | | Alloy Steels | | High Alloyed steels | | Structural Steels | | Tool Steels | | Stainless Steels | Cast Iron | | Aluminum | Copper Alloys |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc24 (~HB250) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc37 (~HB350) | HRc37~ (HB350~) | ~HRc24 (~HB250) | HRc24~ (HB250~) | ~HRc13 (~HB200) | HRc13~ (HB200~) | ~HRc28 (~HB275) | ~HRc19 (~HB220) | HRc19~ (HB220~) | ~HRc8 (~HB180) | ~HB110 |
| ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ◎ | ○ | ○ | ○ | ○ | ◎ | ○ | ○ |

# SPADE DRILLS

SERIES 2,3

## SPADE DRILL INSERTS - SUPER COBALT(T15)

- Increase wear resistance over M4
- For use in medium carbon steel to high temperature alloys over 280 Brinell
- Performs best in rigid setups

**POINT ANGLE** **- under 2-1/2 : 132 degree**
**- over 2-1/2 : 144 degree**

cutting conditions : p.231

| Series Min. to Max. (inch/mm) | Diameter | | | Thick | EDP No. | | |
|---|---|---|---|---|---|---|---|
| | Fractional (inch) | Metric (mm) | Decimal (inch) | Metric (inch/mm) | SUPER COBALT(T15) TiN | SUPER COBALT(T15) TiAlN | SUPER COBALT(T15) Hardslick |
| **2** .961 (24.41) to 1.380 (35.05) | 31/32 | 24.61 | .9688 | 3/16 (4.8) | S06201 | S08201 | S09201 |
| | 63/64 | 25.00 | .9843 | | S06202 | S08202 | S09202 |
| | 1 | 25.40 | 1.0000 | | S06203 | S08203 | S09203 |
| | 1-1/64 | 25.80 | 1.0156 | | S06204 | S08204 | S09204 |
| | | 26.00 | 1.0236 | | S06205 | S08205 | S09205 |
| | 1-1/32 | 26.19 | 1.0313 | | S06206 | S08206 | S09206 |
| | 1-3/64 | 26.59 | 1.0469 | | S06260 | S08260 | S09260 |
| | 1-1/16 | 26.99 | 1.0625 | | S06207 | S08207 | S09207 |
| | | 27.00 | 1.0630 | | S06208 | S08208 | S09208 |
| | 1-3/32 | 27.78 | 1.0938 | | S06209 | S08209 | S09209 |
| | | 28.00 | 1.1024 | | S06210 | S08210 | S09210 |
| | 1-7/64 | 28.18 | 1.1094 | | S06261 | S08261 | S09261 |
| | 1-1/8 | 28.58 | 1.1250 | | S06211 | S08211 | S09211 |
| | | 29.00 | 1.1417 | | S06212 | S08212 | S09212 |
| | 1-5/32 | 29.37 | 1.1563 | | S06213 | S08213 | S09213 |
| | | 30.00 | 1.1811 | | S06214 | S08214 | S09214 |
| | 1-3/16 | 30.16 | 1.1875 | | S06215 | S08215 | S09215 |
| | 1-7/32 | 30.96 | 1.2188 | | S06216 | S08216 | S09216 |
| | | 31.00 | 1.2205 | | S06217 | S08217 | S09217 |
| | 1-1/4 | 31.75 | 1.2500 | | S06218 | S08218 | S09218 |
| | | 32.00 | 1.2598 | | S06219 | S08219 | S09219 |
| | 1-9/32 | 32.54 | 1.2813 | | S06220 | S08220 | S09220 |
| | | 33.00 | 1.2992 | | S06221 | S08221 | S09221 |
| | 1-5/16 | 33.34 | 1.3125 | | S06222 | S08222 | S09222 |
| | | 34.00 | 1.3386 | | S06223 | S08223 | S09223 |
| | 1-11/32 | 34.13 | 1.3438 | | S06224 | S08224 | S09224 |
| | 1-3/8 | 34.93 | 1.3750 | | S06225 | S08225 | S09225 |
| | | 35.00 | 1.3780 | | S06226 | S08226 | S09226 |
| **3** | 1-13/32 | 35.72 | 1.4063 | 1/4 (6.4) | S06301 | S08301 | S09301 |
| | | 36.00 | 1.4173 | | S06302 | S08302 | S09302 |
| | 1-7/16 | 36.51 | 1.4375 | | S06303 | S08303 | S09303 |
| | | 37.00 | 1.4567 | | S06304 | S08304 | S09304 |
| | 1-15/32 | 37.31 | 1.4688 | | S06305 | S08305 | S09305 |

◎ : Excellent ○ : Good

| Non-alloyed Steels, Free Machining Steels | Carbon Steels | | Alloy Steels | | High Alloyed steels | | Structural Steels | | Tool Steels | | Stainless Steels | Cast Iron | | Aluminum | Copper Alloys |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc24 (~HB250) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc37 (~HB350) | HRc37~ (HB350~) | ~HRc24 (~HB250) | HRc24~ (HB250~) | ~HRc13 (~HB200) | HRc13~ (HB200~) | ~HRc28 (~HB275) | ~HRc19 (~HB220) | HRc19~ (HB220~) | ~HRc8 (~HB180) | ~HB110 |
| ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ◎ | ○ | ○ | ○ | ○ | ◎ | ○ | ○ |

# SPADE DRILLS

SERIES 3,4

## SPADE DRILL INSERTS - SUPER COBALT(T15)

- Increase wear resistance over M4
- For use in medium carbon steel to high temperature alloys over 280 Brinell
- Performs best in rigid setups

**POINT ANGLE** **- under 2-1/2 : 132 degree**
**- over 2-1/2 : 144 degree**

cutting conditions : p.231

| Series Min. to Max. (inch/mm) | Diameter | | | Thick | EDP No. | | |
|---|---|---|---|---|---|---|---|
| | Fractional (inch) | Metric (mm) | Decimal (inch) | Metric (inch/mm) | SUPER COBALT(T15) TiN | TiAlN | Hardslick |
| **3** **1.353 (34.37) to 1.882 (47.80)** | | 38.00 | 1.4961 | 1/4 (6.4) | SO6306 | SO8306 | SO9306 |
| | 1-1/2 | 38.10 | 1.5000 | | SO6307 | SO8307 | SO9307 |
| | 1-17/32 | 38.89 | 1.5313 | | SO6308 | SO8308 | SO9308 |
| | | 39.00 | 1.5354 | | SO6309 | SO8309 | SO9309 |
| | 1-9/16 | 39.69 | 1.5625 | | SO6310 | SO8310 | SO9310 |
| | | 40.00 | 1.5748 | | SO6311 | SO8311 | SO9311 |
| | 1-19/32 | 40.48 | 1.5938 | | SO6312 | SO8312 | SO9312 |
| | | 41.00 | 1.6142 | | SO6313 | SO8313 | SO9313 |
| | 1-5/8 | 41.28 | 1.6250 | | SO6314 | SO8314 | SO9314 |
| | | 42.00 | 1.6535 | | SO6315 | SO8315 | SO9315 |
| | 1-21/32 | 42.07 | 1.6563 | | SO6316 | SO8316 | SO9316 |
| | 1-11/16 | 42.86 | 1.6875 | | SO6317 | SO8317 | SO9317 |
| | | 43.00 | 1.6929 | | SO6318 | SO8318 | SO9318 |
| | 1-23/32 | 43.66 | 1.7188 | | SO6319 | SO8319 | SO9319 |
| | | 44.00 | 1.7323 | | SO6320 | SO8320 | SO9320 |
| | 1-3/4 | 44.45 | 1.7500 | | SO6321 | SO8321 | SO9321 |
| | | 45.00 | 1.7717 | | SO6322 | SO8322 | SO9322 |
| | 1-25/32 | 45.24 | 1.7813 | | SO6323 | SO8323 | SO9323 |
| | | 46.00 | 1.8110 | | SO6324 | SO8324 | SO9324 |
| | 1-13/16 | 46.04 | 1.8125 | | SO6325 | SO8325 | SO9325 |
| | 1-27/32 | 46.83 | 1.8438 | | SO6326 | SO8326 | SO9326 |
| | | 47.00 | 1.8504 | | SO6327 | SO8327 | SO9327 |
| | 1-7/8 | 47.63 | 1.8750 | | SO6328 | SO8328 | SO9328 |
| **4** **1.850 (46.99) to 2.570 (65.28)** | 1-29/32 | 48.42 | 1.9062 | 5/16 (7.9) | SO6402 | SO8402 | SO9402 |
| | 1-15/16 | 49.21 | 1.9375 | | SO6404 | SO8404 | SO9404 |
| | 1-31/32 | 50.01 | 1.9688 | | SO6406 | SO8406 | SO9406 |
| | 2 | 50.80 | 2.0000 | | SO6407 | SO8407 | SO9407 |
| | 2-1/32 | 51.59 | 2.0312 | | SO6409 | SO8409 | SO9409 |
| | 2-3/64 | 52.00 | 2.0472 | | SO6410 | SO8410 | SO9410 |
| | 2-1/16 | 52.39 | 2.0625 | | SO6411 | SO8411 | SO9411 |
| | 2-3/32 | 53.18 | 2.0938 | | SO6413 | SO8413 | SO9413 |
| | 2-1/8 | 53.98 | 2.1250 | | SO6414 | SO8414 | SO9414 |
| | 2-5/32 | 54.77 | 2.1562 | | SO6416 | SO8416 | SO9416 |

◎ : Excellent ○ : Good

| Non-alloyed Steels, Free Machining Steels | Carbon Steels | | Alloy Steels | | High Alloyed steels | | Structural Steels | | Tool Steels | | Stainless Steels | Cast Iron | | Aluminum | Copper Alloys |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc24 (~HB250) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc37 (~HB350) | HRc37~ (HB350~) | ~HRc24 (~HB250) | HRc24~ (HB250~) | ~HRc13 (~HB200) | HRc13~ (HB200~) | ~HRc28 (~HB275) | ~HRc19 (~HB220) | HRc19~ (HB220~) | ~HRc8 (~HB180) | ~HB110 |
| ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ◎ | ○ | ○ | ○ | ○ | ◎ | ○ | ○ |

# SPADE DRILLS

SERIES 4,5

## SPADE DRILL INSERTS - SUPER COBALT(T15)

- Increase wear resistance over M4
- For use in medium carbon steel to high temperature alloys over 280 Brinell
- Performs best in rigid setups

**POINT ANGLE** **- under 2-1/2 : 132 degree**
**- over 2-1/2 : 144 degree**

cutting conditions : p.231

| Series Min. to Max. (inch/mm) | Diameter | | | Thick | EDP No. | | |
|---|---|---|---|---|---|---|---|
| | Fractional (inch) | Metric (mm) | Decimal (inch) | Metric (inch/mm) | SUPER COBALT(T15) TiN | SUPER COBALT(T15) TiAlN | SUPER COBALT(T15) Hardslick |
| **4** **1.850 (46.99) to 2.570 (65.28)** | 2-3/16 | 55.56 | 2.1875 | 5/16 (7.9) | S06418 | S08418 | S09418 |
| | 2-7/32 | 56.36 | 2.2188 | | S06420 | S08420 | S09420 |
| | 2-1/4 | 57.15 | 2.2500 | | S06422 | S08422 | S09422 |
| | 2-9/32 | 57.94 | 2.2812 | | S06423 | S08423 | S09423 |
| | 2-5/16 | 58.74 | 2.3125 | | S06425 | S08425 | S09425 |
| | 2-11/32 | 59.53 | 2.3438 | | S06427 | S08427 | S09427 |
| | 2-3/8 | 60.33 | 2.3750 | | S06429 | S08429 | S09429 |
| | 2-13/32 | 61.12 | 2.4062 | | S06431 | S08431 | S09431 |
| | 2-7/16 | 61.91 | 2.4375 | | S06432 | S08432 | S09432 |
| | 2-15/32 | 62.71 | 2.4688 | | S06434 | S08434 | S09434 |
| | 2-1/2 | 63.50 | 2.5000 | | S06436 | S08436 | S09436 |
| | 2-17/32 | 64.29 | 2.5312 | | S06438 | S08438 | S09438 |
| | 2-9/16 | 65.09 | 2.5625 | | S06440 | S08440 | S09440 |
| **5** **2.456 (62.38) to 3.000 (76.20)** | 2-1/2 | 63.50 | 2.5000 | 7/16 (11.1) | — | — | S09501 |
| | | 64.00 | 2.5197 | | — | — | S09502 |
| | 2-17/32 | 64.29 | 2.5312 | | — | — | S09503 |
| | 2-9/16 | 65.09 | 2.5625 | | — | — | S09504 |
| | 2-19/32 | 65.88 | 2.5938 | | — | — | S09505 |
| | | 66.00 | 2.5984 | | — | — | S09506 |
| | 2-5/8 | 66.68 | 2.6250 | | — | — | S09507 |
| | 2-21/32 | 67.47 | 2.6562 | | — | — | S09508 |
| | | 68.00 | 2.6772 | | — | — | S09509 |
| | 2-11/16 | 68.26 | 2.6875 | | — | — | S09510 |
| | 2-23/32 | 69.09 | 2.7188 | | — | — | S09511 |
| | 2-3/4 | 69.85 | 2.7500 | | — | — | S09512 |
| | | 70.00 | 2.7559 | | — | — | S09513 |
| | 2-25/32 | 70.64 | 2.7812 | | — | — | S09514 |
| | 2-13/16 | 71.44 | 2.8125 | | — | — | S09515 |
| | | 72.00 | 2.8346 | | — | — | S09516 |
| | 2-27/32 | 72.23 | 2.8438 | | — | — | S09517 |
| | 2-7/8 | 73.03 | 2.8750 | | — | — | S09518 |
| | 2-29/32 | 73.82 | 2.9062 | | — | — | S09519 |
| | | 74.00 | 2.9134 | | — | — | S09520 |

◎ : Excellent ○ : Good

| Non-alloyed Steels, Free Machining Steels | Carbon Steels | | Alloy Steels | | High Alloyed steels | | Structural Steels | | Tool Steels | | Stainless Steels | Cast Iron | | Aluminum | Copper Alloys |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc24 (~HB250) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc37 (~HB350) | HRc37~ (HB350~) | ~HRc24 (~HB250) | HRc24~ (HB250~) | ~HRc13 (~HB200) | HRc13~ (HB200~) | ~HRc28 (~HB275) | ~HRc19 (~HB220) | HRc19~ (HB220~) | ~HRc8 (~HB180) | ~HB110 |
| ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ◎ | ○ | ○ | ○ | ○ | ◎ | ○ | ○ |

# SPADE DRILLS

SERIES 5,6,7

## SPADE DRILL INSERTS - SUPER COBALT(T15)

- Increase wear resistance over M4
- For use in medium carbon steel to high temperature alloys over 280 Brinell
- Performs best in rigid setups

**POINT ANGLE** **- under 2-1/2 : 132 degree**
**- over 2-1/2 : 144 degree**

cutting conditions : p.231

| Series Min. to Max. (inch/mm) | Diameter | | | Thick | EDP No. | | |
|---|---|---|---|---|---|---|---|
| | Fractional (inch) | Metric (mm) | Decimal (inch) | Metric (inch/mm) | SUPER COBALT(T15) TiN | TiAlN | Hardslick |
| 5 | 2-15/16 | 74.61 | 2.9375 | 7/16 (11.1) | — | — | S09521 |
| | 2-31/32 | 75.41 | 2.8688 | | — | — | S09522 |
| | | 76.00 | 2.9921 | | — | — | S09523 |
| | 3 | 76.20 | 3.0000 | | — | — | S09524 |
| 6 3.001 (76.23) to 3.507 (89.08) | 3-1/32 | 76.99 | 3.0312 | 7/16 (11.1) | — | — | S09601 |
| | 3-1/16 | 77.79 | 3.0625 | | — | — | S09602 |
| | | 78.00 | 3.0709 | | — | — | S09603 |
| | 3-3/32 | 78.58 | 3.0938 | | — | — | S09604 |
| | 3-1/8 | 79.38 | 3.1250 | | — | — | S09605 |
| | | 80.00 | 3.1496 | | — | — | S09606 |
| | 3-5/32 | 80.17 | 3.1562 | | — | — | S09607 |
| | 3-3/16 | 80.96 | 3.1875 | | — | — | S09608 |
| | 3-7/32 | 81.76 | 3.2188 | | — | — | S09609 |
| | | 82.00 | 3.2283 | | — | — | S09610 |
| | 3-1/4 | 82.55 | 3.2500 | | — | — | S09611 |
| | 3-9/32 | 83.34 | 3.2812 | | — | — | S09612 |
| | | 84.00 | 3.3071 | | — | — | S09613 |
| | 3-5/16 | 84.14 | 3.3125 | | — | — | S09614 |
| | 3-11/32 | 84.93 | 3.3438 | | — | — | S09615 |
| | 3-3/8 | 85.73 | 3.3750 | | — | — | S09616 |
| | | 86.00 | 3.3858 | | — | — | S09617 |
| | 3-13/32 | 86.52 | 3.3062 | | — | — | S09618 |
| | 3-7/16 | 87.31 | 3.4375 | | — | — | S09619 |
| | | 88.00 | 3.4646 | | — | — | S09620 |
| | 3-15/32 | 88.11 | 3.4688 | | — | — | S09621 |
| | 3-1/2 | 88.90 | 3.5000 | | — | — | S09622 |
| 7 3.455(87.76) to 4.000(101.60) | 3-17/32 | 89.69 | 3.5312 | 7/16 (11.1) | — | — | S09701 |
| | | 90.00 | 3.5433 | | — | — | S09702 |
| | 3-9/16 | 90.49 | 3.5625 | | — | — | S09703 |
| | 3-19/32 | 91.28 | 3.5938 | | — | — | S09704 |
| | | 92.00 | 3.6221 | | — | — | S09705 |
| | 3-5/8 | 92.08 | 3.6250 | | — | — | S09706 |
| | 3-21/32 | 92.87 | 3.6563 | | — | — | S09707 |

◎ : Excellent ○ : Good

| Non-alloyed Steels, Free Machining Steels | Carbon Steels | | Alloy Steels | | High Alloyed steels | | Structural Steels | | Tool Steels | | Stainless Steels | Cast Iron | | Aluminum | Copper Alloys |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc24 (~HB250) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc37 (~HB350) | HRc37~ (HB350~) | ~HRc24 (~HB250) | HRc24~ (HB250~) | ~HRc13 (~HB200) | HRc13~ (HB200~) | ~HRc28 (~HB275) | ~HRc19 (~HB220) | HRc19~ (HB220~) | ~HRc8 (~HB180) | ~HB110 |
| ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ◎ | ○ | ○ | ○ | ○ | ◎ | ○ | ○ |

# SPADE DRILLS

SERIES 7,8

## SPADE DRILL INSERTS - SUPER COBALT(T15)

- Increase wear resistance over M4
- For use in medium carbon steel to high temperature alloys over 280 Brinell
- Performs best in rigid setups

**POINT ANGLE** **- under 2-1/2 : 132 degree**
**- over 2-1/2 : 144 degree**

cutting conditions : p.231

| Series Min. to Max. (inch/mm) | Diameter | | | Thick | EDP No. | | |
|---|---|---|---|---|---|---|---|
| | Fractional (inch) | Metric (mm) | Decimal (inch) | Metric (inch/mm) | SUPER COBALT(T15) TiN | SUPER COBALT(T15) TiAlN | SUPER COBALT(T15) Hardslick |
| **7** 3.455 (87.76) to 4.000 (101.60) | 3-11/16 | 93.66 | 3.6875 | 7/16 (11.1) | — | — | S09708 |
| | | 94.00 | 3.7008 | | — | — | S09709 |
| | 3-23/32 | 94.46 | 3.7188 | | — | — | S09710 |
| | 3-3/4 | 95.25 | 3.7500 | | — | — | S09711 |
| | | 96.00 | 3.7795 | | — | — | S09712 |
| | 3-25/32 | 96.04 | 3.7812 | | — | — | S09713 |
| | 3-13/16 | 96.84 | 3.8125 | | — | — | S09714 |
| | 3-27/32 | 97.63 | 3.8438 | | — | — | S09715 |
| | | 98.00 | 3.8583 | | — | — | S09716 |
| | 3-7/8 | 98.43 | 3.8750 | | — | — | S09717 |
| | 3-29/32 | 99.22 | 3.9062 | | — | — | S09718 |
| | | 100.00 | 3.9370 | | — | — | S09719 |
| | 3-15/16 | 100.01 | 3.9375 | | — | — | S09720 |
| | 3-31/32 | 100.81 | 3.9688 | | — | — | S09721 |
| | 4 | 101.60 | 4.0000 | | — | — | S09722 |
| **8** 4.001 (101.63) to 4.507 (114.48) | 4-1/64 | 102.00 | 4.0156 | 7/16 (11.1) | — | — | S09801 |
| | 4-1/16 | 103.19 | 4.0625 | | — | — | S09802 |
| | 4-3/32 | 104.00 | 4.0945 | | — | — | S09803 |
| | 4-1/8 | 104.78 | 4.1250 | | — | — | S09804 |
| | | 106.00 | 4.1732 | | — | — | S09805 |
| | 4-3/16 | 106.36 | 4.1875 | | — | — | S09806 |
| | 4-1/4 | 107.95 | 4.2500 | | — | — | S09807 |
| | | 108.00 | 4.2520 | | — | — | S09808 |
| | 4-5/16 | 109.54 | 4.3125 | | — | — | S09809 |
| | | 110.00 | 4.3307 | | — | — | S09810 |
| | 4-3/8 | 111.13 | 4.3750 | | — | — | S09811 |
| | | 112.00 | 4.4094 | | — | — | S09812 |
| | 4-7/16 | 112.71 | 4.4375 | | — | — | S09813 |
| | | 114.00 | 4.4882 | | — | — | S09814 |
| | 4-1/2 | 114.30 | 4.5000 | | — | — | S09815 |

◎ : Excellent ○ : Good

| Non-alloyed Steels, Free Machining Steels | Carbon Steels | | Alloy Steels | | High Alloyed steels | | Structural Steels | | Tool Steels | | Stainless Steels | Cast Iron | | Aluminum | Copper Alloys |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc24 (~HB250) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc37 (~HB350) | HRc37~ (HB350~) | ~HRc24 (~HB250) | HRc24~ (HB250~) | ~HRc13 (~HB200) | HRc13~ (HB200~) | ~HRc28 (~HB275) | ~HRc19 (~HB220) | HRc19~ (HB220~) | ~HRc8 (~HB180) | ~HB110 |
| ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ◎ | ○ | ○ | ○ | ○ | ◎ | ○ | ○ |

# SPADE DRILLS

SERIES Y,Z,0

## SPADE DRILL INSERTS - PREMIUM COBALT(M48)

- Increased tool life over T15
- For use in high temperature alloys and materials including medium carbon, Alloy and tool steels with 350~500 Brinell
- Rigid set up needed

**POINT ANGLE : 132 degree**

cutting conditions : p.231

| Series Min. to Max. (inch/mm) | Diameter | | | Thick | EDP No. | | |
|---|---|---|---|---|---|---|---|
| | Fractional (inch) | Metric (mm) | Decimal (inch) | Metric (inch/mm) | PREMIUM COBALT(M48) TiN | TiAlN | Hardslick |
| **Y** .374 (9.50) to .436 (11.07) | | 9.50 | .3740 | 3/32 (2.4) | * S11Y01 | * S13Y01 | * S14Y01 |
| | 3/8 | 9.53 | .3750 | | * S11Y02 | * S13Y02 | * S14Y02 |
| | | 9.80 | .3860 | | * S11Y03 | * S13Y03 | * S14Y03 |
| | 25/64 | 9.92 | .3906 | | * S11Y04 | * S13Y04 | * S14Y04 |
| | | 10.00 | .3937 | | * S11Y05 | * S13Y05 | * S14Y05 |
| | | 10.20 | .4016 | | * S11Y06 | * S13Y06 | * S14Y06 |
| | 13/32 | 10.32 | .4063 | | * S11Y07 | * S13Y07 | * S14Y07 |
| | | 10.50 | .4134 | | * S11Y08 | * S13Y08 | * S14Y08 |
| | 27/64 | 10.72 | .4219 | | * S11Y09 | * S13Y09 | * S14Y09 |
| | | 10.80 | .4252 | | * S11Y10 | * S13Y10 | * S14Y10 |
| | | 11.00 | .4331 | | * S11Y11 | * S13Y11 | * S14Y11 |
| **Z** .437 (11.11) to .510 (12.95) | 7/16 | 11.11 | .4375 | 3/32 (2.4) | * S11Z01 | * S13Z01 | * S14Z01 |
| | | 11.50 | .4528 | | * S11Z02 | * S13Z02 | * S14Z02 |
| | 29/64 | 11.51 | .4531 | | * S11Z03 | * S13Z03 | * S14Z03 |
| | 15/32 | 11.91 | .4688 | | * S11Z04 | * S13Z04 | * S14Z04 |
| | | 12.00 | .4724 | | * S11Z05 | * S13Z05 | * S14Z05 |
| | 31/64 | 12.30 | .4844 | | * S11Z06 | * S13Z06 | * S14Z06 |
| | | 12.50 | .4921 | | * S11Z07 | * S13Z07 | * S14Z07 |
| | 1/2 | 12.70 | .5000 | | * S11Z08 | * S13Z08 | * S14Z08 |
| **0** .511 (12.98) to .695 (17.65) | | 13.00 | .5118 | 1/8 (3.2) | * S11001 | * S13001 | * S14001 |
| | 33/64 | | .5156 | | * S11002 | * S13002 | * S14002 |
| | 17/32 | | .5313 | | * S11003 | * S13003 | * S14003 |
| | | 13.50 | .5315 | | * S11004 | * S13004 | * S14004 |
| | 35/64 | | .5469 | | * S11060 | * S13060 | * S14060 |
| | | 14.00 | .5512 | | * S11005 | * S13005 | * S14005 |
| | 9/16 | | .5625 | | * S11006 | * S13006 | * S14006 |
| | | 14.50 | .5709 | | * S11007 | * S13007 | * S14007 |
| | 37/64 | | .5781 | | * S11008 | * S13008 | * S14008 |
| | | 15.00 | .5906 | | * S11009 | * S13009 | * S14009 |
| | 19/32 | | .5938 | | * S11010 | * S13010 | * S14010 |
| | 39/64 | | .6094 | | * S11061 | * S13061 | * S14061 |
| | | 15.50 | .6102 | | * S11011 | * S13011 | * S14011 |
| | 5/8 | | .6250 | | * S11012 | * S13012 | * S14012 |

* 2pcs per package

◎ : Excellent ○ : Good

| Non-alloyed Steels, Free Machining Steels | Carbon Steels | | Alloy Steels | | High Alloyed steels | | Structural Steels | | Tool Steels | | Stainless Steels | Cast Iron | | Aluminum | Copper Alloys |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc24 (~HB250) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc37 (~HB350) | HRc37~ (HB350~) | ~HRc24 (~HB250) | HRc24~ (HB250~) | ~HRc13 (~HB200) | HRc13~ (HB200~) | ~HRc28 (~HB275) | ~HRc19 (~HB220) | HRc19~ (HB220~) | ~HRc8 (~HB180) | ~HB110 |
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ |

# SPADE DRILLS

SERIES 0,1

## SPADE DRILL INSERTS - PREMIUM COBALT(M48)

- Increased tool life over T15
- For use in high temperature alloys and materials including medium carbon, Alloy and tool steels with 350~500 Brinell
- Rigid set up needed

**POINT ANGLE : 132 degree**

cutting conditions : p.231

| Series Min. to Max. (inch/mm) | Diameter | | | Thick | EDP No. | | |
|---|---|---|---|---|---|---|---|
| | Fractional (inch) | Metric (mm) | Decimal (inch) | Metric (inch/mm) | PREMIUM COBALT(M48) TiN | TiAlN | Hardslick |
| **0** .511 (12.98) to .695 (17.65) | | 16.00 | .6299 | 1/8 (3.2) | * S11013 | * S13013 | * S14013 |
| | 41/64 | | .6406 | | * S11062 | * S13062 | * S14062 |
| | | 16.50 | .6496 | | * S11014 | * S13014 | * S14014 |
| | 21/32 | | .6563 | | * S11015 | * S13015 | * S14015 |
| | | 17.00 | .6693 | | * S11016 | * S13016 | * S14016 |
| | 43/64 | | .6719 | | * S11063 | * S13063 | * S14063 |
| | 11/16 | | .6875 | | * S11017 | * S13017 | * S14017 |
| | | 17.50 | .6890 | | * S11018 | * S13018 | * S14018 |
| **1** .690 (17.53) to .960 (24.38) | 45/64 | 17.86 | .7031 | 5/32 (4.0) | S11101 | S13101 | S14101 |
| | | 18.00 | .7087 | | S11102 | S13102 | S14102 |
| | 23/32 | 18.26 | .7188 | | S11103 | S13103 | S14103 |
| | | 18.50 | .7283 | | S11104 | S13104 | S14104 |
| | 47/64 | 18.65 | .7344 | | S11105 | S13105 | S14105 |
| | | 19.00 | .7480 | | S11106 | S13106 | S14106 |
| | 3/4 | 19.05 | .7500 | | S11107 | S13107 | S14107 |
| | 49/64 | 19.45 | .7656 | | S11108 | S13108 | S14108 |
| | | 19.50 | .7677 | | S11109 | S13109 | S14109 |
| | 25/32 | 19.84 | .7812 | | S11110 | S13110 | S14110 |
| | | 20.00 | .7874 | | S11111 | S13111 | S14111 |
| | 51/64 | 20.24 | .7969 | | S11160 | S13160 | S14160 |
| | | 20.50 | .8071 | | S11112 | S13112 | S14112 |
| | 13/16 | 20.64 | .8125 | | S11113 | S13113 | S14113 |
| | | 21.00 | .8268 | | S11114 | S13114 | S14114 |
| | 27/32 | 21.43 | .8438 | | S11115 | S13115 | S14115 |
| | 55/64 | 21.83 | .8594 | | S11161 | S13161 | S14161 |
| | | 22.00 | .8661 | | S11116 | S13116 | S14116 |
| | 7/8 | 22.23 | .8750 | | S11117 | S13117 | S14117 |
| | 57/64 | 22.62 | .8906 | | S11162 | S13162 | S14162 |
| | | 23.00 | .9055 | | S11118 | S13118 | S14118 |
| | 29/32 | 23.02 | .9062 | | S11119 | S13119 | S14119 |
| | 59/64 | 23.42 | .9219 | | S11120 | S13120 | S14120 |
| | 15/16 | 23.81 | .9375 | | S11121 | S13121 | S14121 |
| | | 24.00 | .9449 | | S11122 | S13122 | S14122 |

* 2pcs per package

◎ : Excellent ○ : Good

| Non-alloyed Steels, Free Machining Steels | Carbon Steels | | Alloy Steels | | High Alloyed steels | | Structural Steels | | Tool Steels | | Stainless Steels | Cast Iron | | Aluminum | Copper Alloys |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc24 (~HB250) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc37 (~HB350) | HRc37~ (HB350~) | ~HRc24 (~HB250) | HRc24~ (HB250~) | ~HRc13 (~HB200) | HRc13~ (HB200~) | ~HRc28 (~HB275) | ~HRc19 (~HB220) | HRc19~ (HB220~) | ~HRc8 (~HB180) | ~HB110 |
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ |

# SPADE DRILLS

SERIES 2

## SPADE DRILL INSERTS - PREMIUM COBALT(M48)

- Increased tool life over T15
- For use in high temperature alloys and materials including medium carbon, Alloy and tool steels with 350~500 Brinell
- Rigid set up needed

**POINT ANGLE : 132 degree**

cutting conditions : p.231

| Series Min. to Max. (inch/mm) | Diameter | | | Thick | EDP No. | | |
|---|---|---|---|---|---|---|---|
| | Fractional (inch) | Metric (mm) | Decimal (inch) | Metric (inch/mm) | PREMIUM COBALT(M48) TiN | PREMIUM COBALT(M48) TiAlN | PREMIUM COBALT(M48) Hardslick |
| 2<br>.961 (24.41) to 1.380 (35.05) | 31/32 | 24.61 | .9688 | 3/16 (4.8) | S11201 | S13201 | S14201 |
| | 63/64 | 25.00 | .9843 | | S11202 | S13202 | S14202 |
| | 1 | 25.40 | 1.0000 | | S11203 | S13203 | S14203 |
| | 1-1/64 | 25.80 | 1.0156 | | S11204 | S13204 | S14204 |
| | | 26.00 | 1.0236 | | S11205 | S13205 | S14205 |
| | 1-1/32 | 26.19 | 1.0312 | | S11206 | S13206 | S14206 |
| | 1-3/64 | 26.59 | 1.0469 | | S11260 | S13260 | S14260 |
| | 1-1/16 | 26.99 | 1.0625 | | S11207 | S13207 | S14207 |
| | | 27.00 | 1.0630 | | S11208 | S13208 | S14208 |
| | 1-3/32 | 27.78 | 1.0938 | | S11209 | S13209 | S14209 |
| | | 28.00 | 1.1024 | | S11210 | S13210 | S14210 |
| | 1-7/64 | 28.18 | 1.1094 | | S11261 | S13261 | S14261 |
| | 1-1/8 | 28.58 | 1.1250 | | S11211 | S13211 | S14211 |
| | | 29.00 | 1.1417 | | S11212 | S13212 | S14212 |
| | 1-5/32 | 29.37 | 1.1562 | | S11213 | S13213 | S14213 |
| | | 30.00 | 1.1811 | | S11214 | S13214 | S14214 |
| | 1-3/16 | 30.16 | 1.1875 | | S11215 | S13215 | S14215 |
| | 1-7/32 | 30.96 | 1.2188 | | S11216 | S13216 | S14216 |
| | | 31.00 | 1.2205 | | S11217 | S13217 | S14217 |
| | 1-1/4 | 31.75 | 1.2500 | | S11218 | S13218 | S14218 |
| | | 32.00 | 1.2598 | | S11219 | S13219 | S14219 |
| | 1-9/32 | 32.54 | 1.2812 | | S11220 | S13220 | S14220 |
| | | 33.00 | 1.2992 | | S11221 | S13221 | S14221 |
| | 1-5/16 | 33.34 | 1.3125 | | S11222 | S13222 | S14222 |
| | | 34.00 | 1.3386 | | S11223 | S13223 | S14223 |
| | 1-11/32 | 34.13 | 1.3438 | | S11224 | S13224 | S14224 |
| | 1-3/8 | 34.93 | 1.3750 | | S11225 | S13225 | S14225 |
| | | 35.00 | 1.3780 | | S11226 | S13226 | S14226 |

◎ : Excellent ○ : Good

| Non-alloyed Steels, Free Machining Steels | Carbon Steels | | Alloy Steels | | High Alloyed steels | | Structural Steels | | Tool Steels | | Stainless Steels | Cast Iron | | Aluminum | Copper Alloys |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc24 (~HB250) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc37 (~HB350) | HRc37~ (HB350~) | ~HRc24 (~HB250) | HRc24~ (HB250~) | ~HRc13 (~HB200) | HRc13~ (HB200~) | ~HRc28 (~HB275) | ~HRc19 (~HB220) | HRc19~ (HB220~) | ~HRc8 (~HB180) | ~HB110 |
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ |

# SPADE DRILLS

SERIES Y,Z

## CARBIDE BLADE INSERTS(C2,C5,C3)

- High performance on Gray cast iron over 220 Brinell, malleable cast iron with short chips, silicon aluminum and copper alloys. (C3)
- For general use in carbon steels and alloys steels. (C5)
- For use in Gray cast iron up to 220 Brinell, nonferrous metals,copper, brass and aluminum. (C2)

**POINT ANGLE : 132 degree**

cutting conditions : p.232

| Series Min. to Max. (inch/mm) | Diameter | | | Thick | EDP No. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Multi purpose Geometry | | | | Cast Iron Geometry | |
| | | | | | C2(K20) | | C5(P40) | | C3(K10) | |
| | Fractional (inch) | Metric (mm) | Decimal (inch) | Metric (inch/mm) | TiN | TiAlN | TiN | TiAlN | TiN | TiAlN |
| **Y** .374 (9.50) to .436 (11.07) | | 9.50 | .3740 | 3/32 (2.4) | * S21Y01 | * S23Y01 | * S26Y01 | * S28Y01 | * S16Y01 | * S18Y01 |
| | 3/8 | 9.53 | .3750 | | * S21Y02 | * S23Y02 | * S26Y02 | * S28Y02 | * S16Y02 | * S18Y02 |
| | | 9.80 | .3860 | | * S21Y03 | * S23Y03 | * S26Y03 | * S28Y03 | * S16Y03 | * S18Y03 |
| | 25/64 | 9.92 | .3906 | | * S21Y04 | * S23Y04 | * S26Y04 | * S28Y04 | * S16Y04 | * S18Y04 |
| | | 10.00 | .3937 | | * S21Y05 | * S23Y05 | * S26Y05 | * S28Y05 | * S16Y05 | * S18Y05 |
| | | 10.20 | .4016 | | * S21Y06 | * S23Y06 | * S26Y06 | * S28Y06 | * S16Y06 | * S18Y06 |
| | 13/32 | 10.32 | .4063 | | * S21Y07 | * S23Y07 | * S26Y07 | * S28Y07 | * S16Y07 | * S18Y07 |
| | | 10.50 | .4134 | | * S21Y08 | * S23Y08 | * S26Y08 | * S28Y08 | * S16Y08 | * S18Y08 |
| | 27/64 | 10.72 | .4219 | | * S21Y09 | * S23Y09 | * S26Y09 | * S28Y09 | * S16Y09 | * S18Y09 |
| | | 10.80 | .4252 | | * S21Y10 | * S23Y10 | * S26Y10 | * S28Y10 | * S16Y10 | * S18Y10 |
| | | 11.00 | .4331 | | * S21Y11 | * S23Y11 | * S26Y11 | * S28Y11 | * S16Y11 | * S18Y11 |
| **Z** .437 (11.11) to .510 (12.95) | 7/16 | 11.11 | .4375 | 3/32 (2.4) | * S21Z01 | * S23Z01 | * S26Z01 | * S28Z01 | * S16Z01 | * S18Z01 |
| | | 11.50 | .4528 | | * S21Z02 | * S23Z02 | * S26Z02 | * S28Z02 | * S16Z02 | * S18Z02 |
| | 29/64 | 11.51 | .4531 | | * S21Z03 | * S23Z03 | * S26Z03 | * S28Z03 | * S16Z03 | * S18Z03 |
| | 15/32 | 11.91 | .4688 | | * S21Z04 | * S23Z04 | * S26Z04 | * S28Z04 | * S16Z04 | * S18Z04 |
| | | 12.00 | .4724 | | * S21Z05 | * S23Z05 | * S26Z05 | * S28Z05 | * S16Z05 | * S18Z05 |
| | 31/64 | 12.30 | .4844 | | * S21Z06 | * S23Z06 | * S26Z06 | * S28Z06 | * S16Z06 | * S18Z06 |
| | | 12.50 | .4921 | | * S21Z07 | * S23Z07 | * S26Z07 | * S28Z07 | * S16Z07 | * S18Z07 |
| | 1/2 | 12.70 | .5000 | | * S21Z08 | * S23Z08 | * S26Z08 | * S28Z08 | * S16Z08 | * S18Z08 |

* 2pcs per package

◎ : Excellent ○ : Good

| | Non-alloyed Steels, Free Machining Steels | Carbon Steels | | Alloy Steels | | High Alloyed steels | | Structural Steels | | Tool Steels | | Stainless Steels | Cast Iron | | Aluminum | Copper Alloys |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ~HRc24 (~HB250) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc37 (~HB350) | HRc37~ (HB350~) | ~HRc24 (~HB250) | HRc24~ (HB250~) | ~HRc13 (~HB200) | HRc13~ (HB200~) | ~HRc28 (~HB275) | ~HRc19 (~HB220) | HRc19~ (HB220~) | ~HRc8 (~HB180) | ~HB110 |
| C2 | ○ | ○ | ○ | ○ | ○ | ◎ | ◎ | ○ | ○ | ○ | ○ | ◎ | ○ | ○ | ◎ | ◎ |
| C5 | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ○ | ○ |
| C3 | | | | | | | | | | | | | ◎ | ◎ | | |

# SPADE DRILLS

SERIES 0

## CARBIDE BLADE INSERTS(C2,C5,C3)

- High performance on Gray cast iron over 220 Brinell, malleable cast iron with short chips, silicon aluminum and copper alloys. (C3)
- For general use in carbon steels and alloys steels. (C5)
- For use in Gray cast iron up to 220 Brinell, nonferrous metals,copper, brass and aluminum. (C2)

**POINT ANGLE : 132 degree**

cutting conditions : p.232

| Series Min. to Max. (inch/mm) | Diameter | | | Thick | EDP No. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Multi purpose Geometry | | | | Cast Iron Geometry | |
| | | | | | C2(K20) | | C5(P40) | | C3(K10) | |
| | Fractional (inch) | Metric (mm) | Decimal (inch) | Metric (inch/mm) | TiN | TiAlN | TiN | TiAlN | TiN | TiAlN |
| 0 .511 (12.98) to .695 (17.65) | | 13.00 | .5118 | 1/8 (3.2) | * S21001 | * S23001 | * S26001 | * S28001 | * S16001 | * S18001 |
| | 33/64 | 13.10 | .5156 | | * S21002 | * S23002 | * S26002 | * S28002 | * S16002 | * S18002 |
| | 17/32 | 13.49 | .5313 | | * S21003 | * S23003 | * S26003 | * S28003 | * S16003 | * S18003 |
| | | 13.50 | .5315 | | * S21004 | * S23004 | * S26004 | * S28004 | * S16004 | * S18004 |
| | 35/64 | 13.89 | .5469 | | * S21060 | * S23060 | * S26060 | * S28060 | * S16060 | * S18060 |
| | | 14.00 | .5512 | | * S21005 | * S23005 | * S26005 | * S28005 | * S16005 | * S18005 |
| | 9/16 | 14.29 | .5625 | | * S21006 | * S23006 | * S26006 | * S28006 | * S16006 | * S18006 |
| | | 14.50 | .5709 | | * S21007 | * S23007 | * S26007 | * S28007 | * S16007 | * S18007 |
| | 37/64 | 14.68 | .5781 | | * S21008 | * S23008 | * S26008 | * S28008 | * S16008 | * S18008 |
| | | 15.00 | .5906 | | * S21009 | * S23009 | * S26009 | * S28009 | * S16009 | * S18009 |
| | 19/32 | 15.08 | .5938 | | * S21010 | * S23010 | * S26010 | * S28010 | * S16010 | * S18010 |
| | 39/64 | 15.48 | .6094 | | * S21061 | * S23061 | * S26061 | * S28061 | * S16061 | * S18061 |
| | | 15.50 | .6102 | | * S21011 | * S23011 | * S26011 | * S28011 | * S16011 | * S18011 |
| | | 15.70 | .6181 | | * S21064 | * S23064 | * S26064 | * S28064 | * S16064 | * S18064 |
| | 5/8 | 15.88 | .6250 | | * S21012 | * S23012 | * S26012 | * S28012 | * S16012 | * S18012 |
| | | 16.00 | .6299 | | * S21013 | * S23013 | * S26013 | * S28013 | * S16013 | * S18013 |
| | 41/64 | 16.27 | .6406 | | * S21062 | * S23062 | * S26062 | * S28062 | * S16062 | * S18062 |
| | | 16.50 | .6496 | | * S21014 | * S23014 | * S26014 | * S28014 | * S16014 | * S18014 |
| | 21/32 | 16.67 | .6563 | | * S21015 | * S23015 | * S26015 | * S28015 | * S16015 | * S18015 |
| | | 17.00 | .6693 | | * S21016 | * S23016 | * S26016 | * S28016 | * S16016 | * S18016 |
| | 43/64 | 17.07 | .6719 | | * S21063 | * S23063 | * S26063 | * S28063 | * S16063 | * S18063 |
| | 11/16 | 17.46 | .6875 | | * S21017 | * S23017 | * S26017 | * S28017 | * S16017 | * S18017 |
| | | 17.50 | .6890 | | * S21018 | * S23018 | * S26018 | * S28018 | * S16018 | * S18018 |

* 2pcs per package

◎ : Excellent ○ : Good

| | Non-alloyed Steels, Free Machining Steels | Carbon Steels | | Alloy Steels | | High Alloyed steels | | Structural Steels | | Tool Steels | | Stainless Steels | Cast Iron | | Aluminum | Copper Alloys |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ~HRc24 (~HB250) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc37 (~HB350) | HRc37~ (HB350~) | ~HRc24 (~HB250) | HRc24~ (HB250~) | ~HRc13 (~HB200) | HRc13~ (HB200~) | ~HRc28 (~HB275) | ~HRc19 (~HB220) | HRc19~ (HB220~) | ~HRc8 (~HB180) | ~HB110 |
| C2 | ○ | ○ | ○ | ○ | ○ | ◎ | ◎ | ○ | ○ | ○ | ○ | ◎ | ○ | ○ | ◎ | ◎ |
| C5 | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ○ | ○ |
| C3 | | | | | | | | | | | | | ◎ | ◎ | | |

# SPADE DRILLS

SERIES 1

## CARBIDE BLADE INSERTS(C2,C5,C3)

- High performance on Gray cast iron over 220 Brinell, malleable cast iron with short chips, silicon aluminum and copper alloys. (C3)
- For general use in carbon steels and alloys steels. (C5)
- For use in Gray cast iron up to 220 Brinell, nonferrous metals,copper, brass and aluminum. (C2)

**POINT ANGLE : 132 degree**

cutting conditions : p.232

| Series Min. to Max. (inch/mm) | Diameter | | | Thick | EDP No. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Multi purpose Geometry | | | | Cast Iron Geometry | |
| | | | | | C2(K20) | | C5(P40) | | C3(K10) | |
| | Fractional (inch) | Metric (mm) | Decimal (inch) | Metric (inch/mm) | TiN | TiAlN | TiN | TiAlN | TiN | TiAlN |
| 1<br>.690 (17.53) to .960 (24.38) | 45/64 | 17.86 | .7031 | 5/32 (4.0) | S21101 | S23101 | S26101 | S28101 | S16101 | S18101 |
| | | 18.00 | .7087 | | S21102 | S23102 | S26102 | S28102 | S16102 | S18102 |
| | 23/32 | 18.26 | .7188 | | S21103 | S23103 | S26103 | S28103 | S16103 | S18103 |
| | | 18.50 | .7283 | | S21104 | S23104 | S26104 | S28104 | S16104 | S18104 |
| | 47/64 | 18.65 | .7344 | | S21105 | S23105 | S26105 | S28105 | S16105 | S18105 |
| | | 19.00 | .7480 | | S21106 | S23106 | S26106 | S28106 | S16106 | S18106 |
| | 3/4 | 19.05 | .7500 | | S21107 | S23107 | S26107 | S28107 | S16107 | S18107 |
| | 49/64 | 19.45 | .7656 | | S21108 | S23108 | S26108 | S28108 | S16108 | S18108 |
| | | 19.50 | .7677 | | S21109 | S23109 | S26109 | S28109 | S16109 | S18109 |
| | 25/32 | 19.84 | .7813 | | S21110 | S23110 | S26110 | S28110 | S16110 | S18110 |
| | | 20.00 | .7874 | | S21111 | S23111 | S26111 | S28111 | S16111 | S18111 |
| | 51/64 | 20.24 | .7969 | | S21160 | S23160 | S26160 | S28160 | S16160 | S18160 |
| | | 20.50 | .8071 | | S21112 | S23112 | S26112 | S28112 | S16112 | S18112 |
| | 13/16 | 20.64 | .8125 | | S21113 | S23113 | S26113 | S28113 | S16113 | S18113 |
| | | 21.00 | .8268 | | S21114 | S23114 | S26114 | S28114 | S16114 | S18114 |
| | 27/32 | 21.43 | .8438 | | S21115 | S23115 | S26115 | S28115 | S16115 | S18115 |
| | 55/64 | 21.83 | .8594 | | S21161 | S23161 | S26161 | S28161 | S16161 | S18161 |
| | | 22.00 | .8661 | | S21116 | S23116 | S26116 | S28116 | S16116 | S18116 |
| | 7/8 | 22.23 | .8750 | | S21117 | S23117 | S26117 | S28117 | S16117 | S18117 |
| | 57/64 | 22.62 | .8906 | | S21162 | S23162 | S26162 | S28162 | S16162 | S18162 |
| | | 23.00 | .9055 | | S21118 | S23118 | S26118 | S28118 | S16118 | S18118 |
| | 29/32 | 23.02 | .9063 | | S21119 | S23119 | S26119 | S28119 | S16119 | S18119 |
| | 59/64 | 23.42 | .9219 | | S21120 | S23120 | S26120 | S28120 | S16120 | S18120 |
| | 15/16 | 23.81 | .9375 | | S21121 | S23121 | S26121 | S28121 | S16121 | S18121 |
| | | 24.00 | .9449 | | S21122 | S23122 | S26122 | S28122 | S16122 | S18122 |

◎ : Excellent ○ : Good

| | Non-alloyed Steels, Free Machining Steels | Carbon Steels | | Alloy Steels | | High Alloyed steels | | Structural Steels | | Tool Steels | | Stainless Steels | Cast Iron | | Aluminum | Copper Alloys |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ~HRc24 (~HB250) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc37 (~HB350) | HRc37~ (HB350~) | ~HRc24 (~HB250) | HRc24~ (HB250~) | ~HRc13 (~HB200) | HRc13~ (HB200~) | ~HRc28 (~HB275) | ~HRc19 (~HB220) | HRc19~ (HB220~) | ~HRc8 (~HB180) | ~HB110 |
| C2 | ○ | ○ | ○ | ○ | ○ | ◎ | ◎ | ○ | ○ | ○ | ○ | ◎ | ○ | ○ | ◎ | ◎ |
| C5 | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ○ | ○ |
| C3 | | | | | | | | | | | | | ◎ | ◎ | | |

# SPADE DRILLS

SERIES 2

## CARBIDE BLADE INSERTS(C2,C5,C3)

- High performance on Gray cast iron over 220 Brinell, malleable cast iron with short chips, silicon aluminum and copper alloys. (C3)
- For general use in carbon steels and alloys steels. (C5)
- For use in Gray cast iron up to 220 Brinell, nonferrous metals,copper, brass and aluminum. (C2)

**POINT ANGLE : 132 degree**

cutting conditions : p.232

| Series Min. to Max. (inch/mm) | Diameter | | | Thick | EDP No. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Multi purpose Geometry | | | | Cast Iron Geometry | |
| | | | | | C2(K20) | | C5(P40) | | C3(K10) | |
| | Fractional (inch) | Metric (mm) | Decimal (inch) | Metric (inch/mm) | TiN | TiAlN | TiN | TiAlN | TiN | TiAlN |
| 2<br>.961 (24.41) to 1.380 (35.05) | 31/32 | 24.61 | .9688 | 3/16 (4.8) | S21201 | S23201 | S26201 | S28201 | S16201 | S18201 |
| | 63/64 | 25.00 | .9843 | | S21202 | S23202 | S26202 | S28202 | S16202 | S18202 |
| | 1 | 25.40 | 1.0000 | | S21203 | S23203 | S26203 | S28203 | S16203 | S18203 |
| | 1-1/64 | 25.80 | 1.0156 | | S21204 | S23204 | S26204 | S28204 | S16204 | S18204 |
| | | 26.00 | 1.0236 | | S21205 | S23205 | S26205 | S28205 | S16205 | S18205 |
| | 1-1/32 | 26.19 | 1.0313 | | S21206 | S23206 | S26206 | S28206 | S16206 | S18206 |
| | 1-3/64 | 26.59 | 1.0469 | | S21260 | S23260 | S26260 | S28260 | S16260 | S18260 |
| | 1-1/16 | 26.99 | 1.0625 | | S21207 | S23207 | S26207 | S28207 | S16207 | S18207 |
| | | 27.00 | 1.0630 | | S21208 | S23208 | S26208 | S28208 | S16208 | S18208 |
| | 1-3/32 | 27.78 | 1.0938 | | S21209 | S23209 | S26209 | S28209 | S16209 | S18209 |
| | | 28.00 | 1.1024 | | S21210 | S23210 | S26210 | S28210 | S16210 | S18210 |
| | 1-7/64 | 28.18 | 1.1094 | | S21261 | S23261 | S26261 | S28261 | S16261 | S18261 |
| | 1-1/8 | 28.58 | 1.1250 | | S21211 | S23211 | S26211 | S28211 | S16211 | S18211 |
| | | 29.00 | 1.1417 | | S21212 | S23212 | S26212 | S28212 | S16212 | S18212 |
| | 1-5/32 | 29.37 | 1.1563 | | S21213 | S23213 | S26213 | S28213 | S16213 | S18213 |
| | | 30.00 | 1.1811 | | S21214 | S23214 | S26214 | S28214 | S16214 | S18214 |
| | 1-3/16 | 30.16 | 1.1875 | | S21215 | S23215 | S26215 | S28215 | S16215 | S18215 |
| | 1-7/32 | 30.96 | 1.2188 | | S21216 | S23216 | S26216 | S28216 | S16216 | S18216 |
| | | 31.00 | 1.2205 | | S21217 | S23217 | S26217 | S28217 | S16217 | S18217 |
| | 1-1/4 | 31.75 | 1.2500 | | S21218 | S23218 | S26218 | S28218 | S16218 | S18218 |
| | | 32.00 | 1.2598 | | S21219 | S23219 | S26219 | S28219 | S16219 | S18219 |
| | 1-9/32 | 32.54 | 1.2813 | | S21220 | S23220 | S26220 | S28220 | S16220 | S18220 |
| | | 33.00 | 1.2992 | | S21221 | S23221 | S26221 | S28221 | S16221 | S18221 |
| | 1-5/16 | 33.34 | 1.3125 | | S21222 | S23222 | S26222 | S28222 | S16222 | S18222 |
| | | 34.00 | 1.3386 | | S21223 | S23223 | S26223 | S28223 | S16223 | S18223 |
| | 1-11/32 | 34.13 | 1.3438 | | S21224 | S23224 | S26224 | S28224 | S16224 | S18224 |
| | 1-3/8 | 34.93 | 1.3750 | | S21225 | S23225 | S26225 | S28225 | S16225 | S18225 |
| | | 35.00 | 1.3780 | | S21226 | S23226 | S26226 | S28226 | S16226 | S18226 |

◎ : Excellent ○ : Good

| | Non-alloyed Steels, Free Machining Steels | Carbon Steels | | Alloy Steels | | High Alloyed steels | | Structural Steels | | Tool Steels | | Stainless Steels | Cast Iron | | Aluminum | Copper Alloys |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ~HRc24 (~HB250) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc37 (~HB350) | HRc37~ (HB350~) | ~HRc24 (~HB250) | HRc24~ (HB250~) | ~HRc13 (~HB200) | HRc13~ (HB200~) | ~HRc28 (~HB275) | ~HRc19 (~HB220) | HRc19~ (HB220~) | ~HRc8 (~HB180) | ~HB110 |
| C2 | ○ | ○ | ○ | ○ | ○ | ◎ | ◎ | ○ | ○ | ○ | ○ | ◎ | ○ | ○ | ◎ | ◎ |
| C5 | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ○ | ○ |
| C3 | | | | | | | | | | | | | ◎ | ◎ | | |

# SPADE DRILLS

SERIES 3

## CARBIDE BLADE INSERTS(C2,C5,C3)

- High performance on Gray cast iron over 220 Brinell, malleable cast iron with short chips, silicon aluminum and copper alloys. (C3)
- For general use in carbon steels and alloys steels. (C5)
- For use in Gray cast iron up to 220 Brinell, nonferrous metals,copper, brass and aluminum. (C2)

**POINT ANGLE : 132 degree**

cutting conditions : p.232

| Series Min. to Max. (inch/mm) | Diameter | | | Thick | EDP No. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Multi purpose Geometry | | | | Cast Iron Geometry | |
| | | | | | C2(K20) | | C5(P40) | | C3(K10) | |
| | Fractional (inch) | Metric (mm) | Decimal (inch) | Metric (inch/mm) | TiN | TiAlN | TiN | TiAlN | TiN | TiAlN |
| 3<br>1.353 (34.37) to 1.882 (47.80) | 1-13/32 | 35.72 | 1.4063 | 1/4 (6.4) | S21301 | S23301 | S26301 | S28301 | Special or non-standard inserts available on request | |
| | | 36.00 | 1.4173 | | S21302 | S23302 | S26302 | S28302 | | |
| | 1-7/16 | 36.51 | 1.4375 | | S21303 | S23303 | S26303 | S28303 | | |
| | | 37.00 | 1.4567 | | S21304 | S23304 | S26304 | S28304 | | |
| | 1-15/32 | 37.31 | 1.4688 | | S21305 | S23305 | S26305 | S28305 | | |
| | | 38.00 | 1.4961 | | S21306 | S23306 | S26306 | S28306 | | |
| | 1-1/2 | 38.10 | 1.5000 | | S21307 | S23307 | S26307 | S28307 | | |
| | 1-17/32 | 38.89 | 1.5313 | | S21308 | S23308 | S26308 | S28308 | | |
| | | 39.00 | 1.5354 | | S21309 | S23309 | S26309 | S28309 | | |
| | 1-9/16 | 39.69 | 1.5625 | | S21310 | S23310 | S26310 | S28310 | | |
| | | 40.00 | 1.5748 | | S21311 | S23311 | S26311 | S28311 | | |
| | 1-19/32 | 40.48 | 1.5938 | | S21312 | S23312 | S26312 | S28312 | | |
| | | 41.00 | 1.6142 | | S21313 | S23313 | S26313 | S28313 | | |
| | 1-5/8 | 41.28 | 1.6250 | | S21314 | S23314 | S26314 | S28314 | | |
| | | 42.00 | 1.6535 | | S21315 | S23315 | S26315 | S28315 | | |
| | 1-21/32 | 42.07 | 1.6563 | | S21316 | S23316 | S26316 | S28316 | | |
| | 1-11/16 | 42.86 | 1.6875 | | S21317 | S23317 | S26317 | S28317 | | |
| | | 43.00 | 1.6929 | | S21318 | S23318 | S26318 | S28318 | | |
| | 1-23/32 | 43.66 | 1.7188 | | S21319 | S23319 | S26319 | S28319 | | |
| | | 44.00 | 1.7323 | | S21320 | S23320 | S26320 | S28320 | | |
| | 1-3/4 | 44.45 | 1.7500 | | S21321 | S23321 | S26321 | S28321 | | |
| | | 45.00 | 1.7717 | | S21322 | S23322 | S26322 | S28322 | | |
| | 1-25/32 | 45.24 | 1.7813 | | S21323 | S23323 | S26323 | S28323 | | |
| | | 46.00 | 1.8110 | | S21324 | S23324 | S26324 | S28324 | | |
| | 1-13/16 | 46.04 | 1.8125 | | S21325 | S23325 | S26325 | S28325 | | |
| | 1-27/32 | 46.83 | 1.8438 | | S21326 | S23326 | S26326 | S28326 | | |
| | | 47.00 | 1.8504 | | S21327 | S23327 | S26327 | S28327 | | |
| | 1-7/8 | 47.63 | 1.8750 | | S21328 | S23328 | S26328 | S28328 | | |

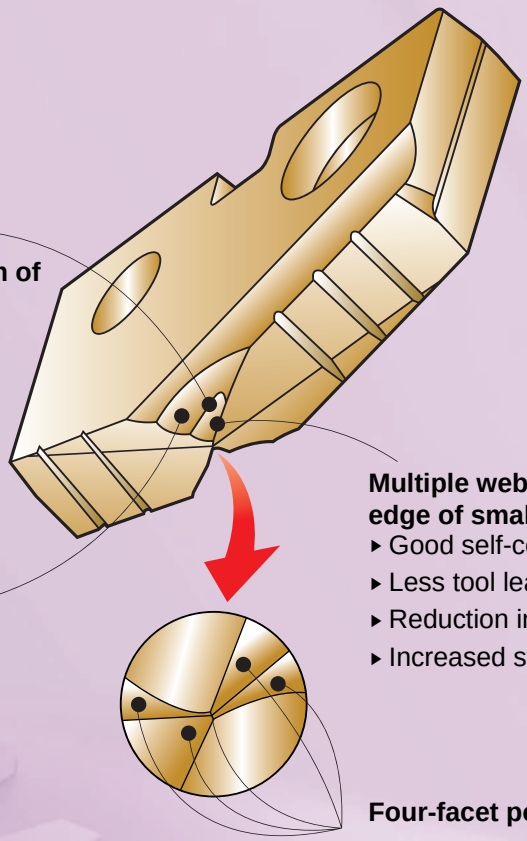
◎ : Excellent ○ : Good

| | Non-alloyed Steels, Free Machining Steels | Carbon Steels | | Alloy Steels | | High Alloyed steels | | Structural Steels | | Tool Steels | | Stainless Steels | Cast Iron | | Aluminum | Copper Alloys |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ~HRc24 (~HB250) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc37 (~HB350) | HRc37~ (HB350~) | ~HRc24 (~HB250) | HRc24~ (HB250~) | ~HRc13 (~HB200) | HRc13~ (HB200~) | ~HRc28 (~HB275) | ~HRc19 (~HB220) | HRc19~ (HB220~) | ~HRc8 (~HB180) | ~HB110 |
| C2 | ○ | ○ | ○ | ○ | ○ | ◎ | ◎ | ○ | ○ | ○ | ○ | ◎ | ○ | ○ | ◎ | ◎ |
| C5 | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ○ | ○ |
| C3 | | | | | | | | | | | | | ◎ | ◎ | | |

# Special features of SM-Point Spade Drill

**This new “Hybrid Point” combines the strength of the standard point with additional “Web Thinning”.**

**This new point increases stability, reduces thrust, improves centering and allows increased speeds and feeds.**



**Multiple thinning form at the bottom of the large thinning.**

- The optimum thinning for the difference from the cutting speed, the cutting quantity and the cutting load according to the distance from the drill point to the cutting edge.

**Multiple web thinning with the cutting edge of small web thinning.**

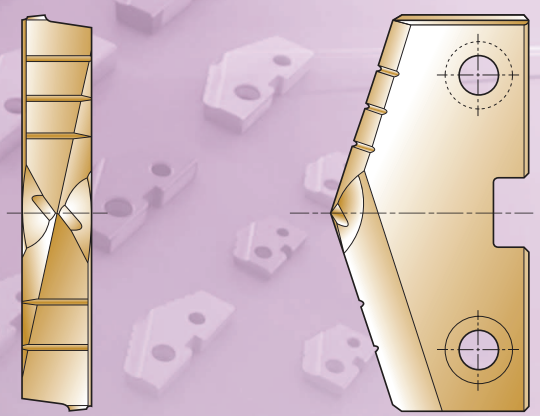
- Good self-centering
- Less tool lead off
- Reduction in bell mouthing, thrust
- Increased stability

**Radius back face**

- Wide chip space

**Four-facet point**

- Self-centering
- Less thrust force



# SPADE DRILLS

SERIES Y,Z,0,1

## SM-POINT SPADE DRILL INSERTS - SUPER COBALT(T15)

- Improved stability and hole straightness by newly developed thinning design.
- Less thrust force and excellent self-centering.
- Any non-standard size available.

**POINT ANGLE : 132 degree**

cutting conditions : p.231

| Series Min. to Max. (inch/mm) | Diameter Fractional (inch) | Diameter Metric (mm) | Diameter Decimal (inch) | EDP No. TiAIN |
|---|---|---|---|---|
| **Y** .374 (9.50) to .436 (11.07) Thick 3/32 (2.4) | | 9.50 | .3740 | * SM08Y01 |
| | 3/8 | 9.53 | .3750 | * SM08Y02 |
| | | 9.80 | .3858 | * SM08Y03 |
| | 25/64 | 9.92 | .3906 | * SM08Y04 |
| | | 10.00 | .3937 | * SM08Y05 |
| | | 10.20 | .4016 | * SM08Y06 |
| | 13/32 | 10.32 | .4062 | * SM08Y07 |
| | | 10.50 | .4134 | * SM08Y08 |
| | 27/64 | 10.72 | .4219 | * SM08Y09 |
| | | 10.80 | .4252 | * SM08Y10 |
| | | 11.00 | .4331 | * SM08Y11 |
| **Z** .437 (11.11) to .510 (12.95) 3/32(2.4) | 7/16 | 11.11 | .4375 | * SM08Z01 |
| | | 11.50 | .4528 | * SM08Z02 |
| | 29/64 | 11.51 | .4531 | * SM08Z03 |
| | 15/32 | 11.91 | .4688 | * SM08Z04 |
| | | 12.00 | .4724 | * SM08Z05 |
| | 31/64 | 12.30 | .4844 | * SM08Z06 |
| | | 12.50 | .4921 | * SM08Z07 |
| | 1/2 | 12.70 | .5000 | * SM08Z08 |
| **0** .511 (12.98) to .695 (17.65) Thick 1/8 (3.2) | | 13.00 | .5118 | * SM08001 |
| | 33/64 | 13.10 | .5156 | * SM08002 |
| | 17/32 | 13.49 | .5312 | * SM08003 |
| | | 13.50 | .5315 | * SM08004 |
| | 35/64 | 13.89 | .5469 | * SM08060 |
| | | 14.00 | .5512 | * SM08005 |
| | 9/16 | 14.29 | .5625 | * SM08006 |
| | | 14.50 | .5709 | * SM08007 |
| | 37/64 | 14.68 | .5781 | * SM08008 |
| | | 15.00 | .5906 | * SM08009 |
| | 19/32 | 15.08 | .5938 | * SM08010 |
| | 39/64 | 15.48 | .6094 | * SM08061 |
| | | 15.50 | .6102 | * SM08011 |
| | 5/8 | 15.88 | .6250 | * SM08012 |

| Series Min. to Max. (inch/mm) | Diameter Fractional (inch) | Diameter Metric (mm) | Diameter Decimal (inch) | EDP No. TiAIN |
|---|---|---|---|---|
| **0** .511 (12.98) to .695 (17.65) | | 16.00 | .6299 | * SM08013 |
| | 41/64 | 16.27 | .6406 | * SM08062 |
| | | 16.50 | .6496 | * SM08014 |
| | 21/32 | 16.67 | .6562 | * SM08015 |
| | | 17.00 | .6693 | * SM08016 |
| | 43/64 | 17.07 | .6719 | * SM08063 |
| | 11/16 | 17.46 | .6875 | * SM08017 |
| | | 17.50 | .6890 | * SM08018 |
| **1** .690 (17.53) to .960 (24.38) Thick 5/32 (4.0) | 45/64 | 17.86 | .7031 | SM08101 |
| | | 18.00 | .7087 | SM08102 |
| | 23/32 | 18.26 | .7188 | SM08103 |
| | | 18.50 | .7283 | SM08104 |
| | 47/64 | 18.65 | .7344 | SM08105 |
| | | 19.00 | .7480 | SM08106 |
| | 3/4 | 19.05 | .7500 | SM08107 |
| | 49/64 | 19.45 | .7656 | SM08108 |
| | | 19.50 | .7677 | SM08109 |
| | 25/32 | 19.84 | .7812 | SM08110 |
| | | 20.00 | .7874 | SM08111 |
| | 51/64 | 20.24 | .7969 | SM08160 |
| | | 20.50 | .8071 | SM08112 |
| | 13/16 | 20.64 | .8125 | SM08113 |
| | | 21.00 | .8268 | SM08114 |
| | 27/32 | 21.43 | .8438 | SM08115 |
| | 55/64 | 21.83 | .8594 | SM08161 |
| | | 22.00 | .8661 | SM08116 |
| | 7/8 | 22.23 | .8750 | SM08117 |
| | 57/64 | 22.62 | .8906 | SM08162 |
| | | 23.00 | .9055 | SM08118 |
| | 29/32 | 23.02 | .9062 | SM08119 |
| | 59/64 | 23.42 | .9219 | SM08120 |
| | 15/16 | 23.81 | .9375 | SM08121 |
| | | 24.00 | .9449 | SM08122 |

* 2pcs per package

◎ : Excellent ○ : Good

| Non-alloyed Steels, Free Machining Steels | Carbon Steels | | Alloy Steels | | High Alloyed steels | | Structural Steels | | Tool Steels | | Stainless Steels | Cast Iron | | Aluminum | Copper Alloys |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc24 (~HB250) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc37 (~HB350) | HRc37~ (HB350~) | ~HRc24 (~HB250) | HRc24~ (HB250~) | ~HRc13 (~HB200) | HRc13~ (HB200~) | ~HRc28 (~HB275) | ~HRc19 (~HB220) | HRc19~ (HB220~) | ~HRc8 (~HB180) | ~HB110 |
| ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ◎ | ○ | ○ | ○ | ○ | ◎ | ○ | ○ |

# SPADE DRILLS

SERIES 2,3

## SM-POINT SPADE DRILL INSERTS - SUPER COBALT(T15)

- Improved stability and hole straightness by newly developed thinning design.
- Less thrust force and excellent self-centering.
- Any non-standard size available.

**POINT ANGLE : 132 degree**

cutting conditions : p.231

| Series Min. to Max. (inch/mm) | Diameter | | | EDP No. |
|---|---|---|---|---|
| | Fractional (inch) | Metric (mm) | Decimal (inch) | TiAIN |
| **2** .961 (24.41) to 1.380 (35.05) Thick 3/16 (4.8) | 31/32 | 24.61 | .9688 | SM08201 |
| | 63/64 | 25.00 | .9843 | SM08202 |
| | 1 | 25.40 | 1.0000 | SM08203 |
| | 1-1/64 | 25.80 | 1.0156 | SM08204 |
| | | 26.00 | 1.0236 | SM08205 |
| | 1-1/32 | 26.19 | 1.0312 | SM08206 |
| | 1-3/64 | 26.59 | 1.0469 | SM08260 |
| | 1-1/16 | 26.99 | 1.0625 | SM08207 |
| | | 27.00 | 1.0630 | SM08208 |
| | 1-3/32 | 27.78 | 1.0938 | SM08209 |
| | | 28.00 | 1.1024 | SM08210 |
| | 1-7/64 | 28.18 | 1.1094 | SM08261 |
| | 1-1/8 | 28.58 | 1.1250 | SM08211 |
| | | 29.00 | 1.1417 | SM08212 |
| | 1-5/32 | 29.37 | 1.1562 | SM08213 |
| | | 30.00 | 1.1811 | SM08214 |
| | 1-3/16 | 30.16 | 1.1875 | SM08215 |
| | 1-7/32 | 30.96 | 1.2188 | SM08216 |
| | | 31.00 | 1.2205 | SM08217 |
| | 1-1/4 | 31.75 | 1.2500 | SM08218 |
| | | 32.00 | 1.2598 | SM08219 |
| | 1-9/32 | 32.54 | 1.2812 | SM08220 |
| | | 33.00 | 1.2992 | SM08221 |
| | 1-5/16 | 33.34 | 1.3125 | SM08222 |
| | | 34.00 | 1.3386 | SM08223 |
| | 1-11/32 | 34.13 | 1.3438 | SM08224 |
| | 1-3/8 | 34.93 | 1.3750 | SM08225 |
| | | 35.00 | 1.3780 | SM08226 |

| Series Min. to Max. (inch/mm) | Diameter | | | EDP No. |
|---|---|---|---|---|
| | Fractional (inch) | Metric (mm) | Decimal (inch) | TiAIN |
| **3** 1.353 (34.37) to 1.882 (47.80) Thick 1/4 (6.4) | 1-13/32 | 35.72 | 1.4062 | SM08301 |
| | | 36.00 | 1.4173 | SM08302 |
| | 1-7/16 | 36.51 | 1.4375 | SM08303 |
| | | 37.00 | 1.4567 | SM08304 |
| | 1-15/32 | 37.31 | 1.4688 | SM08305 |
| | | 38.00 | 1.4961 | SM08306 |
| | 1-1/2 | 38.10 | 1.5000 | SM08307 |
| | 1-17/32 | 38.89 | 1.5312 | SM08308 |
| | | 39.00 | 1.5354 | SM08309 |
| | 1-9/16 | 39.69 | 1.5625 | SM08310 |
| | | 40.00 | 1.5748 | SM08311 |
| | 1-19/32 | 40.48 | 1.5938 | SM08312 |
| | | 41.00 | 1.6142 | SM08313 |
| | 1-5/8 | 41.28 | 1.6250 | SM08314 |
| | | 42.00 | 1.6535 | SM08315 |
| | 1-21/32 | 42.07 | 1.6562 | SM08316 |
| | 1-11/16 | 42.86 | 1.6875 | SM08317 |
| | | 43.00 | 1.6929 | SM08318 |
| | 1-23/32 | 43.66 | 1.7188 | SM08319 |
| | | 44.00 | 1.7323 | SM08320 |
| | 1-3/4 | 44.45 | 1.7500 | SM08321 |
| | | 45.00 | 1.7717 | SM08322 |
| | 1-25/32 | 45.24 | 1.7812 | SM08323 |
| | | 46.00 | 1.8110 | SM08324 |
| | 1-13/16 | 46.04 | 1.8125 | SM08325 |
| | 1-27/32 | 46.83 | 1.8438 | SM08326 |
| | | 47.00 | 1.8504 | SM08327 |
| | 1-7/8 | 47.63 | 1.8750 | SM08328 |

◎ : Excellent ○ : Good

| Non-alloyed Steels, Free Machining Steels | Carbon Steels | | Alloy Steels | | High Alloyed steels | | Structural Steels | | Tool Steels | | Stainless Steels | Cast Iron | | Aluminum | Copper Alloys |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc24 (~HB250) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc37 (~HB350) | HRc37~ (HB350~) | ~HRc24 (~HB250) | HRc24~ (HB250~) | ~HRc13 (~HB200) | HRc13~ (HB200~) | ~HRc28 (~HB275) | ~HRc19 (~HB220) | HRc19~ (HB220~) | ~HRc8 (~HB180) | ~HB110 |
| ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ◎ | ○ | ○ | ○ | ○ | ◎ | ○ | ○ |

# SPADE DRILLS

SERIES 4,5

## SM-POINT SPADE DRILL INSERTS - SUPER COBALT(T15)

- Improved stability and hole straightness by newly developed thinning design.
- Less thrust force and excellent self-centering.
- Any non-standard size available.

**POINT ANGLE** **- under 2-1/2 : 132 degree**
**- over 2-1/2 : 144 degree**

cutting conditions : p.231

| Series Min. to Max. (inch/mm) | Diameter Fractional (inch) | Diameter Metric (mm) | Diameter Decimal (inch) | EDP No. TiAlN |
|---|---|---|---|---|
| 4<br>1.850 (46.99) to 2.570 (65.28)<br>Thick 5/16 (7.9) | | 48.00 | 1.8898 | SM08401 |
| | 1-29/32 | 48.42 | 1.9062 | SM08402 |
| | | 49.00 | 1.9291 | SM08403 |
| | 1-15/16 | 49.21 | 1.9375 | SM08404 |
| | | 50.00 | 1.9685 | SM08405 |
| | 1-31/32 | 50.01 | 1.9688 | SM08406 |
| | 2 | 50.80 | 2.0000 | SM08407 |
| | | 51.00 | 2.0079 | SM08408 |
| | 2-1/32 | 51.59 | 2.0312 | SM08409 |
| | 2-3/64 | 52.00 | 2.0472 | SM08410 |
| | 2-1/16 | 52.39 | 2.0625 | SM08411 |
| | | 53.00 | 2.0866 | SM08412 |
| | 2-3/32 | 53.18 | 2.0938 | SM08413 |
| | 2-1/8 | 53.98 | 2.1250 | SM08414 |
| | | 54.00 | 2.1260 | SM08415 |
| | 2-5/32 | 54.77 | 2.1562 | SM08416 |
| | | 55.00 | 2.1654 | SM08417 |
| | 2-3/16 | 55.56 | 2.1875 | SM08418 |
| | | 56.00 | 2.2047 | SM08419 |
| | 2-7/32 | 56.36 | 2.2188 | SM08420 |
| | | 57.00 | 2.2441 | SM08421 |
| | 2-1/4 | 57.15 | 2.2500 | SM08422 |
| | 2-9/32 | 57.94 | 2.2812 | SM08423 |
| | | 58.00 | 2.2835 | SM08424 |
| | 2-5/16 | 58.74 | 2.3125 | SM08425 |
| | | 59.00 | 2.3228 | SM08426 |
| | 2-11/32 | 59.53 | 2.3438 | SM08427 |
| | | 60.00 | 2.3622 | SM08428 |
| | 2-3/8 | 60.33 | 2.3750 | SM08429 |
| | | 61.00 | 2.4016 | SM08430 |
| | 2-13/32 | 61.12 | 2.4062 | SM08431 |
| | 2-7/16 | 61.91 | 2.4375 | SM08432 |

| Series Min. to Max. (inch/mm) | Diameter Fractional (inch) | Diameter Metric (mm) | Diameter Decimal (inch) | EDP No. TiAlN |
|---|---|---|---|---|
| 4<br>1.850 (46.99) to 2.570 (65.28) | | 62.00 | 2.4409 | SM08433 |
| | 2-15/32 | 62.71 | 2.4688 | SM08434 |
| | | 63.00 | 2.4803 | SM08435 |
| | 2-1/2 | 63.50 | 2.5000 | SM08436 |
| | | 64.00 | 2.5197 | SM08437 |
| | 2-17/32 | 64.29 | 2.5312 | SM08438 |
| | | 65.00 | 2.5591 | SM08439 |
| | 2-9/16 | 65.09 | 2.5625 | SM08440 |
| 5<br>2.456 (62.38) to 3.000 (76.20)<br>Thick 7/16 (11.1) | 2-1/2 | 63.50 | 2.5000 | SM08501 |
| | | 64.00 | 2.5197 | SM08502 |
| | 2-17/32 | 64.29 | 2.5312 | SM08503 |
| | 2-9/16 | 65.09 | 2.5625 | SM08504 |
| | 2-19/32 | 65.88 | 2.5938 | SM08505 |
| | | 66.00 | 2.5984 | SM08506 |
| | 2-5/8 | 66.68 | 2.6250 | SM08507 |
| | 2-21/32 | 67.47 | 2.6562 | SM08508 |
| | | 68.00 | 2.6772 | SM08509 |
| | 2-11/16 | 68.26 | 2.6875 | SM08510 |
| | 2-23/32 | 69.05 | 2.7188 | SM08511 |
| | 2-3/4 | 69.85 | 2.7500 | SM08512 |
| | | 70.00 | 2.7559 | SM08513 |
| | 2-25/32 | 70.64 | 2.7812 | SM08514 |
| | 2-13/16 | 71.44 | 2.8125 | SM08515 |
| | | 72.00 | 2.8346 | SM08516 |
| | 2-27/32 | 72.23 | 2.8438 | SM08517 |
| | 2-7/8 | 73.03 | 2.8750 | SM08518 |
| | 2-29/32 | 73.82 | 2.9062 | SM08519 |
| | | 74.00 | 2.9134 | SM08520 |
| | 2-15/16 | 74.61 | 2.9375 | SM08521 |
| | 2-31/32 | 75.41 | 2.9688 | SM08522 |
| | | 76.00 | 2.9921 | SM08523 |
| | 3 | 76.20 | 3.0000 | SM08524 |

◎ : Excellent ○ : Good

| Non-alloyed Steels, Free Machining Steels | Carbon Steels | | Alloy Steels | | High Alloyed steels | | Structural Steels | | Tool Steels | | Stainless Steels | Cast Iron | | Aluminum | Copper Alloys |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc24 (~HB250) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc37 (~HB350) | HRc37~ (HB350~) | ~HRc24 (~HB250) | HRc24~ (HB250~) | ~HRc13 (~HB200) | HRc13~ (HB200~) | ~HRc28 (~HB275) | ~HRc19 (~HB220) | HRc19~ (HB220~) | ~HRc8 (~HB180) | ~HB110 |
| ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ◎ | ○ | ○ | ○ | ○ | ◎ | ○ | ○ |

# SPADE DRILLS

SERIES 6,7,8

## SM-POINT SPADE DRILL INSERTS - SUPER COBALT(T15)

- Improved stability and hole straightness by newly developed thinning design.
- Less thrust force and excellent self-centering.
- Any non-standard size available.

**POINT ANGLE : 144 degree**

cutting conditions : p.231

| Series Min. to Max. (inch/mm) | Diameter | | | EDP No. |
|---|---|---|---|---|
| | Fractional (inch) | Metric (mm) | Decimal (inch) | TiAlN |
| **6** 3.001 (76.23) to 3.507 (89.08) Thick 7/16 (11.1) | 3-1/32 | 76.99 | 3.0312 | SM08601 |
| | 3-1/16 | 77.79 | 3.0625 | SM08602 |
| | | 78.00 | 3.0709 | SM08603 |
| | 3-3/32 | 78.58 | 3.0938 | SM08604 |
| | 3-1/8 | 79.38 | 3.1250 | SM08605 |
| | | 80.00 | 3.1496 | SM08606 |
| | 3-5/32 | 80.17 | 3.1562 | SM08607 |
| | 3-3/16 | 80.96 | 3.1875 | SM08608 |
| | 3-7/32 | 81.76 | 3.2188 | SM08609 |
| | | 82.00 | 3.2283 | SM08610 |
| | 3-1/4 | 82.55 | 3.2500 | SM08611 |
| | 3-9/32 | 83.34 | 3.2812 | SM08612 |
| | | 84.00 | 3.3071 | SM08613 |
| | 3-5/16 | 84.14 | 3.3125 | SM08614 |
| | 3-11/32 | 84.93 | 3.3438 | SM08615 |
| | 3-3/8 | 85.73 | 3.3750 | SM08616 |
| | | 86.00 | 3.3858 | SM08617 |
| | 3-13/32 | 86.52 | 3.4063 | SM08618 |
| | 3-7/16 | 87.31 | 3.4375 | SM08619 |
| | | 88.00 | 3.4646 | SM08620 |
| | 3-15/32 | 88.11 | 3.4688 | SM08621 |
| | 3-1/2 | 88.90 | 3.5000 | SM08622 |
| **7** 3.455 (87.76) to 4.000 (101.60) | 3-17/32 | 89.69 | 3.5312 | SM08701 |
| | | 90.00 | 3.5433 | SM08702 |
| | 3-9/16 | 90.49 | 3.5625 | SM08703 |
| | 3-19/32 | 91.28 | 3.5938 | SM08704 |
| | | 92.00 | 3.6221 | SM08705 |
| | 3-5/8 | 92.08 | 3.6250 | SM08706 |
| | 3-21/32 | 92.87 | 3.6562 | SM08707 |
| | 3-11/16 | 93.66 | 3.6875 | SM08708 |

| Series Min. to Max. (inch/mm) | Diameter | | | EDP No. |
|---|---|---|---|---|
| | Fractional (inch) | Metric (mm) | Decimal (inch) | TiAlN |
| **7** 3.455 (87.76) to 4.000 (101.60) Thick 7/16 (11.1) | | 94.00 | 3.7008 | SM08709 |
| | 3-23/32 | 94.46 | 3.7188 | SM08710 |
| | 3-3/4 | 95.25 | 3.7500 | SM08711 |
| | | 96.00 | 3.7795 | SM08712 |
| | 3-25/32 | 96.04 | 3.7812 | SM08713 |
| | 3-13/16 | 96.84 | 3.8125 | SM08714 |
| | 3-27/32 | 97.63 | 3.8438 | SM08715 |
| | | 98.00 | 3.8583 | SM08716 |
| | 3-7/8 | 98.43 | 3.8750 | SM08717 |
| | 3-29/32 | 99.22 | 3.9062 | SM08718 |
| | | 100.00 | 3.9370 | SM08719 |
| | 3-15/16 | 100.01 | 3.9375 | SM08720 |
| | 3-31/32 | 100.81 | 3.9688 | SM08721 |
| | 4 | 101.60 | 4.0000 | SM08722 |
| **8** 4.001 (101.63) to 4.507 (114.48) Thick 7/16 (11.1) | 4-1/64 | 102.00 | 4.0156 | SM08801 |
| | 4-1/16 | 103.19 | 4.0625 | SM08802 |
| | 4-3/32 | 104.00 | 4.0945 | SM08803 |
| | 4-1/8 | 104.78 | 4.1250 | SM08804 |
| | | 106.00 | 4.1732 | SM08805 |
| | 4-3/16 | 106.36 | 4.1875 | SM08806 |
| | 4-1/4 | 107.95 | 4.2500 | SM08807 |
| | | 108.00 | 4.2520 | SM08808 |
| | 4-5/16 | 109.54 | 4.3125 | SM08809 |
| | | 110.00 | 4.3307 | SM08810 |
| | 4-3/8 | 111.13 | 4.3750 | SM08811 |
| | | 112.00 | 4.4094 | SM08812 |
| | 4-7/16 | 112.71 | 4.4375 | SM08813 |
| | | 114.00 | 4.4882 | SM08814 |
| | 4-1/2 | 114.30 | 4.5000 | SM08815 |
| | | | | |

◎ : Excellent ○ : Good

| Non-alloyed Steels, Free Machining Steels | Carbon Steels | | Alloy Steels | | High Alloyed steels | | Structural Steels | | Tool Steels | | Stainless Steels | Cast Iron | | Aluminum | Copper Alloys |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc24 (~HB250) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc37 (~HB350) | HRc37~ (HB350~) | ~HRc24 (~HB250) | HRc24~ (HB250~) | ~HRc13 (~HB200) | HRc13~ (HB200~) | ~HRc28 (~HB275) | ~HRc19 (~HB220) | HRc19~ (HB220~) | ~HRc8 (~HB180) | ~HB110 |
| ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ◎ | ○ | ○ | ○ | ○ | ◎ | ○ | ○ |

# SPADE DRILLS

SERIES Y,Z,0,1

## SM-POINT SPADE DRILL INSERTS - CARBIDE(C5)

- Improved stability and hole straightness by newly developed chip thinning design.
- Less thrust force and excellent self-centering.
- Any non-standard size available.
- Increased speeds & feeds

**POINT ANGLE : 132 degree**

cutting conditions : p.232

| Series Min. to Max. (inch/mm) | Diameter Fractional (inch) | Diameter Metric (mm) | Diameter Decimal (inch) | EDP No. TiAIN |
|---|---|---|---|---|
| **Y** .374 (9.50) to .436 (11.07) Thick 3/32 (2.4) | | 9.50 | .3740 | * SM28Y01 |
| | 3/8 | 9.53 | .3750 | * SM28Y02 |
| | | 9.80 | .3858 | * SM28Y03 |
| | 25/64 | 9.92 | .3906 | * SM28Y04 |
| | | 10.00 | .3937 | * SM28Y05 |
| | | 10.20 | .4016 | * SM28Y06 |
| | 13/32 | 10.32 | .4062 | * SM28Y07 |
| | | 10.50 | .4134 | * SM28Y08 |
| | 27/64 | 10.72 | .4219 | * SM28Y09 |
| | | 10.80 | .4252 | * SM28Y10 |
| | | 11.00 | .4331 | * SM28Y11 |
| **Z** .437 (11.11) to .510 (12.95) 3/32(2.4) | 7/16 | 11.11 | .4375 | * SM28Z01 |
| | | 11.50 | .4528 | * SM28Z02 |
| | 29/64 | 11.51 | .4531 | * SM28Z03 |
| | 15/32 | 11.91 | .4688 | * SM28Z04 |
| | | 12.00 | .4724 | * SM28Z05 |
| | 31/64 | 12.30 | .4844 | * SM28Z06 |
| | | 12.50 | .4921 | * SM28Z07 |
| | 1/2 | 12.70 | .5000 | * SM28Z08 |
| **0** .511 (12.98) to .695 (17.65) Thick 1/8 (3.2) | | 13.00 | .5118 | * SM28001 |
| | 33/64 | 13.10 | .5156 | * SM28002 |
| | 17/32 | 13.49 | .5312 | * SM28003 |
| | | 13.50 | .5315 | * SM28004 |
| | 35/64 | 13.89 | .5469 | * SM28060 |
| | | 14.00 | .5512 | * SM28005 |
| | 9/16 | 14.29 | .5625 | * SM28006 |
| | | 14.50 | .5709 | * SM28007 |
| | 37/64 | 14.68 | .5781 | * SM28008 |
| | | 15.00 | .5906 | * SM28009 |
| | 19/32 | 15.08 | .5938 | * SM28010 |
| | 39/64 | 15.48 | .6094 | * SM28061 |
| | | 15.50 | .6102 | * SM28011 |
| | 5/8 | 15.88 | .6250 | * SM28012 |

| Series Min. to Max. (inch/mm) | Diameter Fractional (inch) | Diameter Metric (mm) | Diameter Decimal (inch) | EDP No. TiAIN |
|---|---|---|---|---|
| **0** .511 (12.98) to .695 (17.65) | | 16.00 | .6299 | * SM28013 |
| | 41/64 | 16.27 | .6406 | * SM28062 |
| | | 16.50 | .6496 | * SM28014 |
| | 21/32 | 16.67 | .6562 | * SM28015 |
| | | 17.00 | .6693 | * SM28016 |
| | 43/64 | 17.07 | .6719 | * SM28063 |
| | 11/16 | 17.46 | .6875 | * SM28017 |
| | | 17.50 | .6890 | * SM28018 |
| **1** .690 (17.53) to .960 (24.38) Thick 5/32 (4.0) | 45/64 | 17.86 | .7031 | SM28101 |
| | | 18.00 | .7087 | SM28102 |
| | 23/32 | 18.26 | .7188 | SM28103 |
| | | 18.50 | .7283 | SM28104 |
| | 47/64 | 18.65 | .7344 | SM28105 |
| | | 19.00 | .7480 | SM28106 |
| | 3/4 | 19.05 | .7500 | SM28107 |
| | 49/64 | 19.45 | .7656 | SM28108 |
| | | 19.50 | .7677 | SM28109 |
| | 25/32 | 19.84 | .7812 | SM28110 |
| | | 20.00 | .7874 | SM28111 |
| | 51/64 | 20.24 | .7969 | SM28160 |
| | | 20.50 | .8071 | SM28112 |
| | 13/16 | 20.64 | .8125 | SM28113 |
| | | 21.00 | .8268 | SM28114 |
| | 27/32 | 21.43 | .8438 | SM28115 |
| | 55/64 | 21.83 | .8594 | SM28161 |
| | | 22.00 | .8661 | SM28116 |
| | 7/8 | 22.23 | .8750 | SM28117 |
| | 57/64 | 22.62 | .8906 | SM28162 |
| | | 23.00 | .9055 | SM28118 |
| | 29/32 | 23.02 | .9062 | SM28119 |
| | 59/64 | 23.42 | .9219 | SM28120 |
| | 15/16 | 23.81 | .9375 | SM28121 |
| | | 24.00 | .9449 | SM28122 |

* 2pcs per package

◎ : Excellent ○ : Good

| Non-alloyed Steels, Free Machining Steels | Carbon Steels | | Alloy Steels | | High Alloyed steels | | Structural Steels | | Tool Steels | | Stainless Steels | Cast Iron | | Aluminum | Copper Alloys |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc24 (~HB250) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc37 (~HB350) | HRc37~ (HB350~) | ~HRc24 (~HB250) | HRc24~ (HB250~) | ~HRc13 (~HB200) | HRc13~ (HB200~) | ~HRc28 (~HB275) | ~HRc19 (~HB220) | HRc19~ (HB220~) | ~HRc8 (~HB180) | ~HB110 |
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ○ | ○ |

# SPADE DRILLS

SERIES 2,3

## SM-POINT SPADE DRILL INSERTS - CARBIDE(C5)

- Improved stability and hole straightness by newly developed chip thinning design.
- Less thrust force and excellent self-centering.
- Any non-standard size available.
- Increased speeds & feeds

**POINT ANGLE : 132 degree**

cutting conditions : p.232

| Series Min. to Max. (inch/mm) | Diameter | | | EDP No. |
|---|---|---|---|---|
| | Fractional (inch) | Metric (mm) | Decimal (inch) | TiAIN |
| **2** **.961 (24.41) to 1.380 (35.05)** **Thick** 3/16 (4.8) | 31/32 | 24.61 | .9688 | SM28201 |
| | 63/64 | 25.00 | .9843 | SM28202 |
| | 1 | 25.40 | 1.0000 | SM28203 |
| | 1-1/64 | 25.80 | 1.0156 | SM28204 |
| | | 26.00 | 1.0236 | SM28205 |
| | 1-1/32 | 26.19 | 1.0312 | SM28206 |
| | 1-3/64 | 26.59 | 1.0469 | SM28260 |
| | 1-1/16 | 26.99 | 1.0625 | SM28207 |
| | | 27.00 | 1.0630 | SM28208 |
| | 1-3/32 | 27.78 | 1.0938 | SM28209 |
| | | 28.00 | 1.1024 | SM28210 |
| | 1-7/64 | 28.18 | 1.1094 | SM28261 |
| | 1-1/8 | 28.58 | 1.1250 | SM28211 |
| | | 29.00 | 1.1417 | SM28212 |
| | 1-5/32 | 29.37 | 1.1562 | SM28213 |
| | | 30.00 | 1.1811 | SM28214 |
| | 1-3/16 | 30.16 | 1.1875 | SM28215 |
| | 1-7/32 | 30.96 | 1.2188 | SM28216 |
| | | 31.00 | 1.2205 | SM28217 |
| | 1-1/4 | 31.75 | 1.2500 | SM28218 |
| | | 32.00 | 1.2598 | SM28219 |
| | 1-9/32 | 32.54 | 1.2812 | SM28220 |
| | | 33.00 | 1.2992 | SM28221 |
| | 1-5/16 | 33.34 | 1.3125 | SM28222 |
| | | 34.00 | 1.3386 | SM28223 |
| | 1-11/32 | 34.13 | 1.3438 | SM28224 |
| | 1-3/8 | 34.93 | 1.3750 | SM28225 |
| | | 35.00 | 1.3780 | SM28226 |

| Series Min. to Max. (inch/mm) | Diameter | | | EDP No. |
|---|---|---|---|---|
| | Fractional (inch) | Metric (mm) | Decimal (inch) | TiAIN |
| **3** **1.353 (34.37) to 1.882 (47.80)** **Thick** 1/4 (6.4) | 1-13/32 | 35.72 | 1.4062 | SM28301 |
| | | 36.00 | 1.4173 | SM28302 |
| | 1-7/16 | 36.51 | 1.4375 | SM28303 |
| | | 37.00 | 1.4567 | SM28304 |
| | 1-15/32 | 37.31 | 1.4688 | SM28305 |
| | | 38.00 | 1.4961 | SM28306 |
| | 1-1/2 | 38.10 | 1.5000 | SM28307 |
| | 1-17/32 | 38.89 | 1.5312 | SM28308 |
| | | 39.00 | 1.5354 | SM28309 |
| | 1-9/16 | 39.69 | 1.5625 | SM28310 |
| | | 40.00 | 1.5748 | SM28311 |
| | 1-19/32 | 40.48 | 1.5938 | SM28312 |
| | | 41.00 | 1.6142 | SM28313 |
| | 1-5/8 | 41.28 | 1.6250 | SM28314 |
| | | 42.00 | 1.6535 | SM28315 |
| | 1-21/32 | 42.07 | 1.6562 | SM28316 |
| | 1-11/16 | 42.86 | 1.6875 | SM28317 |
| | | 43.00 | 1.6929 | SM28318 |
| | 1-23/32 | 43.66 | 1.7188 | SM28319 |
| | | 44.00 | 1.7323 | SM28320 |
| | 1-3/4 | 44.45 | 1.7500 | SM28321 |
| | | 45.00 | 1.7717 | SM28322 |
| | 1-25/32 | 45.24 | 1.7812 | SM28323 |
| | | 46.00 | 1.8110 | SM28324 |
| | 1-13/16 | 46.04 | 1.8125 | SM28325 |
| | 1-27/32 | 46.83 | 1.8438 | SM28326 |
| | | 47.00 | 1.8504 | SM28327 |
| | 1-7/8 | 47.63 | 1.8750 | SM28328 |

◎ : Excellent ○ : Good

| Non-alloyed Steels, Free Machining Steels | Carbon Steels | | Alloy Steels | | High Alloyed steels | | Structural Steels | | Tool Steels | | Stainless Steels | Cast Iron | | Aluminum | Copper Alloys |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc24 (~HB250) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc37 (~HB350) | HRc37~ (HB350~) | ~HRc24 (~HB250) | HRc24~ (HB250~) | ~HRc13 (~HB200) | HRc13~ (HB200~) | ~HRc28 (~HB275) | ~HRc19 (~HB220) | HRc19~ (HB220~) | ~HRc8 (~HB180) | ~HB110 |
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ○ | ○ |

# SPADE DRILLS

SERIES Y,Z,0,1,2

## SPADE DRILL FLAT BOTTOM INSERTS - SUPER COBALT T15

**POINT ANGLE : 180 degree**

cutting conditions : p.233

| Series | Diameter | | EDP No. | |
|---|---|---|---|---|
| | Fractional (inch) | Decimal (inch) | TiN | TiAlN |
| Y | 3/8 | .3750 | * SF05024 | * SF15024 |
| | 13/32 | .4063 | * SF05026 | * SF15026 |
| Z | 7/16 | .4375 | * SF05028 | * SF15028 |
| | 15/32 | .4688 | * SF05030 | * SF15030 |
| | 1/2 | .5000 | * SF05032 | * SF15032 |
| 0 | 17/32 | .5313 | * SF05034 | * SF15034 |
| | 9/16 | .5625 | * SF05036 | * SF15036 |
| | 19/32 | .5938 | * SF05038 | * SF15038 |
| | 5/8 | .6250 | * SF05040 | * SF15040 |
| | 21/32 | .6563 | * SF05042 | * SF15042 |
| | 11/16 | .6875 | * SF05044 | * SF15044 |
| 1 | 23/32 | .7188 | SF05046 | SF15046 |
| | 3/4 | .7500 | SF05048 | SF15048 |
| | 25/32 | .7813 | SF05050 | SF15050 |
| | 13/16 | .8125 | SF05052 | SF15052 |
| | 27/32 | .8438 | SF05054 | SF15054 |
| | 7/8 | .8750 | SF05056 | SF15056 |
| | 29/32 | .9063 | SF05058 | SF15058 |
| | 15/16 | .9375 | SF05060 | SF15060 |

| Series | Diameter | | EDP No. | |
|---|---|---|---|---|
| | Fractional (inch) | Decimal (inch) | TiN | TiAlN |
| 2 | 31/32 | .9688 | SF05062 | SF15062 |
| | 1 | 1.0000 | SF05100 | SF15100 |
| | 1-1/32 | 1.0313 | SF05102 | SF15102 |
| | 1-1/16 | 1.0625 | SF05104 | SF15104 |
| | 1-3/32 | 1.0938 | SF05106 | SF15106 |
| | 1-1/8 | 1.1250 | SF05108 | SF15108 |
| | 1-5/32 | 1.1563 | SF05110 | SF15110 |
| | 1-3/16 | 1.1875 | SF05112 | SF15112 |
| | 1-7/32 | 1.2188 | SF05114 | SF15114 |
| | 1-1/4 | 1.2500 | SF05116 | SF15116 |
| | 1-9/32 | 1.2813 | SF05118 | SF15118 |
| | 1-5/16 | 1.3125 | SF05120 | SF15120 |
| | 1-11/32 | 1.3438 | SF05122 | SF15122 |
| | 1-3/8 | 1.3750 | SF05124 | SF15124 |

* 2pcs per package

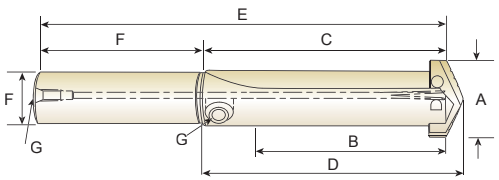
◎ : Excellent ○ : Good

| Non-alloyed Steels, Free Machining Steels | Carbon Steels | | Alloy Steels | | High Alloyed steels | | Structural Steels | | Tool Steels | | Stainless Steels | Cast Iron | | Aluminum | Copper Alloys |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc24 (~HB250) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc28 (~HB275) | HRc28~ (HB275~) | ~HRc37 (~HB350) | HRc37~ (HB350~) | ~HRc24 (~HB250) | HRc24~ (HB250~) | ~HRc13 (~HB200) | HRc13~ (HB200~) | ~HRc28 (~HB275) | ~HRc19 (~HB220) | HRc19~ (HB220~) | ~HRc8 (~HB180) | ~HB110 |
| ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ◎ | ○ | ○ | ○ | ○ | ◎ | ○ | ○ |

# SPADE DRILLS

P13 SERIES
P14 SERIES

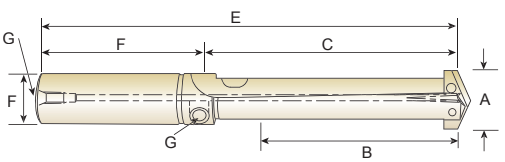
## STRAIGHT SHANK HOLDER, STRAIGHT FLUTE




### SHORT LENGTH

Unit : Inch

| Series | EDP No. | Drill Insert Range | Max. Drill Depth | Flute Length | Ref. Length | Overall Length | Shank | | Pipe Tap |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Dia. | Length | |
| | | A | B | C | D | E | F | | G |
| Y | P13Y01 | 3/8 – 27/64 | 1-1/4 | 2-1/32 | 2-1/8 | 4-13/32 | 3/4 | 2-3/8 | 1/8 |
| Z | P13Z01 | 7/16 – 1/2 | 1-1/4 | 2-1/32 | 2-1/8 | 4-13/32 | 3/4 | 2-3/8 | 1/8 |
| 0 | P13001 | 33/64 – 11/16 | 1-3/8 | 2-3/16 | 2-19/64 | 4-9/16 | 3/4 | 2-3/8 | 1/8 |
| 0.5 | P13051 | 39/64 – 11/16 | 1-3/8 | 2-3/16 | 2-19/64 | 4-9/16 | 3/4 | 2-3/8 | 1/8 |
| 1 | P13101 | 45/64 – 15/16 | 2-5/8 | 3-7/8 | 4-1/64 | 6-7/8 | 3/4 | 3 | 1/8 |
| | P13102 | 45/64 – 15/16 | 2-5/8 | 3-7/8 | 4-1/64 | 6-7/8 | 1 | 3 | 1/8 |
| 1.5 | P13151 | 55/64 – 15/16 | 2-5/8 | 3-7/8 | 4-1/64 | 6-7/8 | 3/4 | 3 | 1/8 |
| | P13152 | 55/64 – 15/16 | 2-5/8 | 3-7/8 | 4-1/64 | 6-7/8 | 1 | 3 | 1/8 |
| 2 | P13202 | 31/32 – 1-3/8 | 3-3/8 | 4-1/2 | 4-41/64 | 8 | 1 | 3-1/2 | 1/8 |
| | P13203 | 31/32 – 1-3/8 | 3-3/8 | 4-1/2 | 4-41/64 | 8 | 1-1/4 | 3-1/2 | 1/8 |
| 2.5 | P13252 | 1-3/16 – 1-3/8 | 3-3/8 | 4-1/2 | 4-41/64 | 8 | 1 | 3-1/2 | 1/8 |
| | P13253 | 1-3/16 – 1-3/8 | 3-3/8 | 4-1/2 | 4-41/64 | 8 | 1-1/4 | 3-1/2 | 1/8 |
| 3 | P13303 | 1-13/32 – 1-7/8 | 4-3/4 | 6 | 6-3/16 | 10 | 1-1/4 | 4 | 1/4 |
| | P13304 | 1-13/32 – 1-7/8 | 4-3/4 | 6 | 6-3/16 | 10 | 1-1/2 | 4 | 1/4 |
| 4 | P13404 | 1-29/32 – 2-9/16 | 5-1/8 | 6-1/2 | 6-11/16 | 10-1/2 | 1-1/2 | 4 | 1/4 |
| | P13405 | 1-29/32 – 2-9/16 | 5-1/8 | 6-1/2 | 6-11/16 | 10-1/2 | 1-3/4 | 4 | 1/4 |
| 5-6 | P13506 | 2-1/2 – 3-1/2 | 6-3/4 | 8-1/2 | 8-3/4 | 12-1/2 | 2 | 4 | 1/2 |
| 7-8 | P13708 | 3-17/32 – 4-1/2 | 6-3/4 | 8-7/8 | 9-1/8 | 13-7/8 | 3 | 5 | 1/2 |




### INTERMEDIATE LENGTH

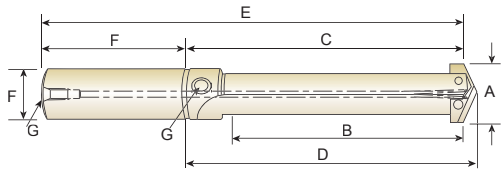
Unit : Inch

| Series | EDP No. | Drill Insert Range | Max. Drill Depth | Flute Length | Overall Length | Shank | | Pipe Tap |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Dia. | Length | |
| | | A | B | C | E | F | | G |
| 1 | P14102 | 45/64 – 15/16 | 4-5/8 | 5-7/8 | 8-7/8 | 1 | 3 | 1/8 |
| 1.5 | P14152 | 55/64 – 15/16 | 4-5/8 | 5-7/8 | 8-7/8 | 1 | 3 | 1/8 |
| 2 | P14203 | 31/32 – 1-3/8 | 5-3/8 | 6-1/2 | 10 | 1-1/4 | 3-1/2 | 1/8 |
| 2.5 | P14253 | 1-3/16 – 1-3/8 | 5-3/8 | 6-1/2 | 10 | 1-1/4 | 3-1/2 | 1/8 |
| 3 | P14304 | 1-13/32 – 1-7/8 | 6-1/2 | 7-3/4 | 11-3/4 | 1-1/2 | 4 | 1/4 |

# SPADE DRILLS

P15 SERIES
P16 SERIES

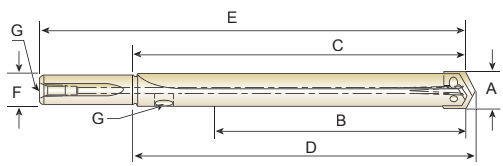
## STRAIGHT SHANK HOLDER, STRAIGHT FLUTE




## STANDARD LENGTH

Unit : Inch

| Series | EDP No. | Drill Insert Range | Max. Drill Depth | Flute Length | Ref. Length | Overall Length | Shank | | Pipe Tap |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Dia. | Length | |
| | | A | B | C | D | E | F | | G |
| Y | P15Y01 | 3/8 – 27/64 | 2-3/8 | 3-5/32 | 3-1/4 | 5-17/32 | 3/4 | 2-3/8 | 1/8 |
| Z | P15Z01 | 7/16 – 1/2 | 2-3/8 | 3-5/32 | 3-1/4 | 5-17/32 | 3/4 | 2-3/8 | 1/8 |
| 0 | P15001 | 33/64 – 11/16 | 2-1/2 | 3-5/16 | 3-27/64 | 5-11/16 | 3/4 | 2-3/8 | 1/8 |
| 0.5 | P15051 | 39/64 – 11/16 | 2-1/2 | 3-5/16 | 3-27/64 | 5-11/16 | 3/4 | 2-3/8 | 1/8 |
| 1 | P15101 | 45/64 – 15/16 | 6-5/8 | 7-7/8 | 8-1/64 | 10-7/8 | 3/4 | 3 | 1/8 |
| | P15102 | 45/64 – 15/16 | 6-5/8 | 7-7/8 | 8-1/64 | 10-7/8 | 1 | 3 | 1/8 |
| 1.5 | P15151 | 55/64 – 15/16 | 6-5/8 | 7-7/8 | 8-1/64 | 10-7/8 | 3/4 | 3 | 1/8 |
| | P15152 | 55/64 – 15/16 | 6-5/8 | 7-7/8 | 8-1/64 | 10-7/8 | 1 | 3 | 1/8 |
| 2 | P15202 | 31/32 – 1-3/8 | 7-3/8 | 8-1/2 | 8-41/64 | 12 | 1 | 3-1/2 | 1/8 |
| | P15203 | 31/32 – 1-3/8 | 7-3/8 | 8-1/2 | 8-41/64 | 12 | 1-1/4 | 3-1/2 | 1/8 |
| 2.5 | P15252 | 1-3/16 – 1-3/8 | 7-3/8 | 8-1/2 | 8-41/64 | 12 | 1 | 3-1/2 | 1/8 |
| | P15253 | 1-3/16 – 1-3/8 | 7-3/8 | 8-1/2 | 8-41/64 | 12 | 1-1/4 | 3-1/2 | 1/8 |
| 3 | P15303 | 1-13/32 – 1-7/8 | 8-1/4 | 9-1/2 | 9-11/16 | 13-1/2 | 1-1/4 | 4 | 1/4 |
| | P15304 | 1-13/32 – 1-7/8 | 8-1/4 | 9-1/2 | 9-11/16 | 13-1/2 | 1-1/2 | 4 | 1/4 |
| 4 | P15404 | 1-29/32 – 2-9/16 | 9-1/8 | 10-1/2 | 10-11/16 | 14-1/2 | 1-1/2 | 4 | 1/4 |
| | P15405 | 1-29/32 – 2-9/16 | 9-1/8 | 10-1/2 | 10-11/16 | 14-1/2 | 1-3/4 | 4 | 1/4 |
| 5-6 | P15506 | 2-1/2 – 3-1/2 | 10-3/4 | 12-1/2 | 12-3/4 | 16-1/2 | 2 | 4 | 1/2 |
| 7-8 | P15708 | 3-17/32 – 4-1/2 | 10-3/4 | 12-7/8 | 13-1/8 | 17-7/8 | 3 | 5 | 1/2 |

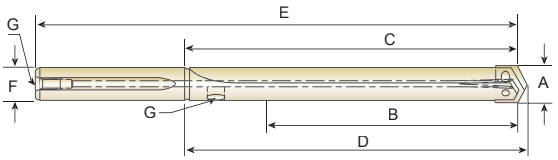



## EXTENDED LENGTH

Unit : Inch

| Series | EDP No. | Drill Insert Range | Max. Drill Depth | Flute Length | Ref. Length | Overall Length | Shank | | Pipe Tap |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Dia. | Length | |
| | | A | B | C | D | E | F | | G |
| Y | P16Y01 | 3/8 – 27/64 | 4-3/8 | 5-5/32 | 5-1/4 | 7-17/32 | 3/4 | 2-3/8 | 1/8 |
| Z | P16Z01 | 7/16 – 1/2 | 4-3/8 | 5-5/32 | 5-1/4 | 7-17/32 | 3/4 | 2-3/8 | 1/8 |
| 0 | P16001 | 33/64 – 11/16 | 4-1/2 | 5-5/16 | 5-27/64 | 7-11/16 | 3/4 | 2-3/8 | 1/8 |
| 0.5 | P16051 | 39/64 – 11/16 | 4-1/2 | 5-5/16 | 5-27/64 | 7-11/16 | 3/4 | 2-3/8 | 1/8 |
| 1 | P16102 | 45/64 – 15/16 | 10-5/8 | 11-7/8 | 12-1/64 | 14-7/8 | 1 | 3 | 1/8 |
| 1.5 | P16152 | 55/64 – 15/16 | 10-5/8 | 11-7/8 | 12-1/64 | 14-7/8 | 1 | 3 | 1/8 |
| 2 | P16203 | 31/32 – 1-3/8 | 11-3/8 | 12-1/2 | 12-41/64 | 16 | 1-1/4 | 3-1/2 | 1/8 |
| 2.5 | P16253 | 1-3/16 – 1-3/8 | 11-3/8 | 12-1/2 | 12-41/64 | 16 | 1-1/4 | 3-1/2 | 1/8 |
| 3 | P16303 | 1-13/32 – 1-7/8 | 13-3/4 | 15 | 15-3/16 | 19 | 1-1/4 | 4 | 1/4 |
| 4 | P16404 | 1-29/32 – 2-9/16 | 16-5/8 | 18 | 18-3/16 | 22 | 1-1/2 | 4 | 1/4 |
| 5 | P16506 | 2-1/2 – 3-1/2 | 18-1/4 | 20 | 20-1/4 | 24 | 2 | 4 | 1/2 |
| 7 | P16708 | 3-17/32 – 4-1/2 | 21-7/8 | 24 | 24-1/4 | 29 | 3 | 5 | 1/2 |

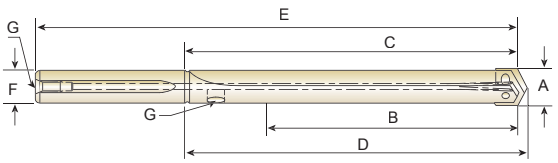
# STRAIGHT SHANK HOLDER, STRAIGHT FLUTE




## LONG LENGTH

Unit : Inch

| Series | EDP No. | Drill Insert Range | Max. Drill Depth | Flute Length | Ref. Length | Overall Length | Shank | | Pipe Tap |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Dia. | Length | |
| | | A | B | C | D | E | F | | G |
| 0 | P17001 | 33/64 – 11/16 | 7 | 7-13/16 | 7-59/64 | 10-3/16 | 3/4 | 2-3/8 | 1/8 |
| 0.5 | P17051 | 39/64 – 11/16 | 7 | 7-13/16 | 7-59/64 | 10-3/16 | 3/4 | 2-3/8 | 1/8 |




## EXTRA LONG LENGTH

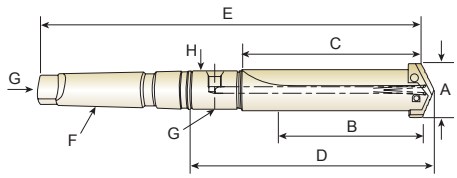
Unit : Inch

| Series | EDP No. | Drill Insert Range | Max. Drill Depth | Flute Length | Ref. Length | Overall Length | Shank | | Pipe Tap |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Dia. | Length | |
| | | A | B | C | D | E | F | | G |
| 1 | P17101 | 45/64 – 15/16 | 18 | 19-1/4 | 19-25/64 | 22-1/4 | 1 | 3 | 1/8 |
| 2 | P17202 | 31/32 – 1-3/8 | 20-1/8 | 21-1/4 | 21-25/64 | 24-3/4 | 1-1/4 | 3-1/2 | 1/8 |
| 3 | P17303 | 1-13/32 – 1-7/8 | 22 | 23-1/4 | 23-7/16 | 27-1/4 | 1-1/2 | 4 | 1/4 |
| 4 | P17404 | 1-29/32 – 2-9/16 | 24-5/8 | 26 | 26-3/16 | 30 | 1-1/2 | 4 | 1/4 |
| 5 | P17506 | 2-1/2 – 3-1/2 | 26 | 27-3/4 | 28 | 31-3/4 | 2 | 4 | 1/2 |
| 7 | P17708 | 3-17/32 – 4-1/2 | 27 | 29-1/8 | 29-3/8 | 34-1/8 | 3 | 5 | 1/2 |

# SPADE DRILLS

P01 SERIES
P08 SERIES

## TAPER SHANK HOLDER, STRAIGHT FLUTE / HELICAL FLUTE

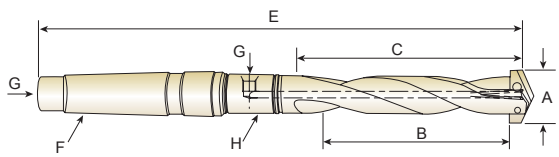



### SHORT LENGTH

Unit : Inch

| Series | EDP No. | Drill Insert Range | Max. Drill Depth | Flute Length | Ref. Length | Overall Length | MT | Pipe Tap | RCI |
|---|---|---|---|---|---|---|---|---|---|
| | | A | B | C | D | E | F | G | H |
| Y | P01Y02 | 3/8 – 27/64 | 1-1/4 | 2-1/32 | 3-15/32 | 6-5/16 | #2 | 1/16 | PR1030 |
| Z | P01Z02 | 7/16 – 1/2 | 1-1/4 | 2-1/32 | 3-15/32 | 6-5/16 | #2 | 1/16 | PR1030 |
| 0 | P01002 | 33/64 – 11/16 | 1-3/8 | 2-3/16 | 3-41/64 | 6-15/32 | #2 | 1/16 | PR1030 |
| 0.5 | P01052 | 39/64 – 11/16 | 1-3/8 | 2-3/16 | 3-41/64 | 6-15/32 | #2 | 1/16 | PR1030 |
| 1 | P01103 | 45/64 – 15/16 | 2-3/4 | 3-7/8 | 5-39/64 | 9-5/32 | #3 | 1/8 | PR1031 |
| | P01104 | 45/64 – 15/16 | 2-3/4 | 3-7/8 | 5-43/64 | 10-5/32 | #4 | 1/8 | PR1031 |
| 1.5 | P01153 | 55/64 – 15/16 | 2-3/4 | 3-7/8 | 5-39/64 | 9-5/32 | #3 | 1/8 | PR1031 |
| | P01154 | 55/64 – 15/16 | 2-3/4 | 3-7/8 | 5-43/64 | 10-5/32 | #4 | 1/8 | PR1031 |
| 2 | P01203 | 31/32 – 1-3/8 | 3-3/8 | 4-1/2 | 6-15/64 | 9-25/32 | #3 | 1/8 | PR1031 |
| | P01204 | 31/32 – 1-3/8 | 3-3/8 | 4-1/2 | 6-19/64 | 10-25/32 | #4 | 1/8 | PR1031 |
| 2.5 | P01253 | 1-3/16 – 1-3/8 | 3-3/8 | 4-1/2 | 6-15/64 | 9-25/32 | #3 | 1/8 | PR1031 |
| | P01254 | 1-3/16 – 1-3/8 | 3-3/8 | 4-1/2 | 6-37/64 | 11-1/16 | #4 | 1/4 | PR1042 |
| 3 | P01304 | 1-13/32 – 1-7/8 | 4-3/4 | 6 | 8-1/8 | 12-9/16 | #4 | 1/4 | PR1042 |
| | P01305 | 1-13/32 – 1-7/8 | 4-3/4 | 6 | 8-1/8 | 13-13/16 | #5 | 1/4 | PR1043 |
| 4 | P01404 | 1-29/32 – 2-9/16 | 5-1/8 | 6-1/2 | 8-5/8 | 13-1/16 | #4 | 1/4 | PR1042 |
| | P01405 | 1-29/32 – 2-9/16 | 5-1/8 | 6-1/2 | 8-5/8 | 14-5/16 | #5 | 1/4 | PR1043 |
| 5-6 | P01505 | 2-1/2 – 3-1/2 | 6-3/4 | 8-1/2 | 11-5/16 | 16-15/16 | #5 | 1/2 | PR1054 |
| 7-8 | P01705 | 3-17/32 – 4-1/2 | 6-3/4 | 8-7/8 | 11-11/16 | 17-5/16 | #5 | 1/2 | PR1054 |

▶ You can also apply **RCI**(**R**otary **C**oolant **I**nducer) for internal cooling. (See page 230)




### INTERMEDIATE LENGTH

Unit : Inch

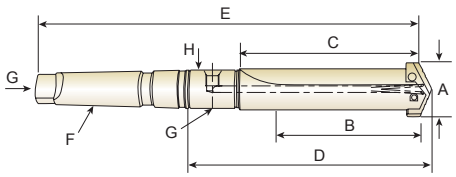
| Series | EDP No. | Drill Insert Range | Max. Drill Depth | Flute Length | Overall Length | MT | Pipe Tap | RCI |
|---|---|---|---|---|---|---|---|---|
| | | A | B | C | E | F | G | H |
| 1 | P08103 | 45/64 – 15/16 | 4-3/4 | 5-7/8 | 11-5/32 | #3 | 1/8 | PR1031 |
| 1.5 | P08153 | 55/64 – 15/16 | 4-3/4 | 5-7/8 | 11-5/32 | #3 | 1/8 | PR1031 |
| 2 | P08204 | 31/32 – 1-3/8 | 5-3/8 | 6-1/2 | 12-25/32 | #4 | 1/8 | PR1031 |
| 2.5 | P08254 | 1-3/16 – 1-3/8 | 5-3/8 | 6-1/2 | 13-1/16 | #4 | 1/4 | PR1042 |

▶ You can also apply **RCI**(**R**otary **C**oolant **I**nducer) for internal cooling. (See page 230)

# SPADE DRILLS

P03 SERIES

## TAPER SHANK HOLDER, STRAIGHT FLUTE




## STANDARD LENGTH

Unit : Inch

| Series | EDP No. | Drill Insert Range | Max. Drill Depth | Flute Length | Ref. Length | Overall Length | MT | Pipe Tap | RCI |
|---|---|---|---|---|---|---|---|---|---|
| | | A | B | C | D | E | F | G | H |
| Y | P03Y02 | 3/8 – 27/64 | 2-3/8 | 3-5/32 | 4-19/32 | 7-7/16 | #2 | 1/16 | PR1030 |
| Z | P03Z02 | 7/16 – 1/2 | 2-3/8 | 3-5/32 | 4-19/32 | 7-7/16 | #2 | 1/16 | PR1030 |
| 0 | P03002 | 33/64 – 11/16 | 2-1/2 | 3-5/16 | 4-49/64 | 7-19/32 | #2 | 1/16 | PR1030 |
| 0.5 | P03052 | 39/64 – 11/16 | 2-1/2 | 3-5/16 | 4-49/64 | 7-19/32 | #2 | 1/16 | PR1030 |
| 1 | P03103 | 45/64 – 15/16 | 6-3/4 | 7-7/8 | 9-39/64 | 13-5/32 | #3 | 1/8 | PR1031 |
| | P03104 | 45/64 – 15/16 | 6-3/4 | 7-7/8 | 9-43/64 | 14-5/32 | #4 | 1/8 | PR1031 |
| 1.5 | P03153 | 55/64 – 15/16 | 6-3/4 | 7-7/8 | 9-39/64 | 13-5/32 | #3 | 1/8 | PR1031 |
| | P03154 | 55/64 – 15/16 | 6-3/4 | 7-7/8 | 9-43/64 | 14-5/32 | #4 | 1/8 | PR1031 |
| 2 | P03203 | 31/32 – 1-3/8 | 7-3/8 | 8-1/2 | 10-15/64 | 13-25/32 | #3 | 1/8 | PR1031 |
| | P03204 | 31/32 – 1-3/8 | 7-3/8 | 8-1/2 | 10-19/64 | 14-25/32 | #4 | 1/8 | PR1031 |
| 2.5 | P03253 | 1-3/16 – 1-3/8 | 7-3/8 | 8-1/2 | 10-15/64 | 13-25/32 | #3 | 1/8 | PR1031 |
| | P03254 | 1-3/16 – 1-3/8 | 7-3/8 | 8-1/2 | 10-37/64 | 15-1/16 | #4 | 1/4 | PR1042 |
| 3 | P03304 | 1-13/32 – 1-7/8 | 8-1/4 | 9-1/2 | 11-5/8 | 16-1/16 | #4 | 1/4 | PR1042 |
| | P03305 | 1-13/32 – 1-7/8 | 8-1/4 | 9-1/2 | 11-5/8 | 17-5/16 | #5 | 1/4 | PR1043 |
| 4 | P03404 | 1-29/32 – 2-9/16 | 9-1/8 | 10-1/2 | 12-5/8 | 17-1/16 | #4 | 1/4 | PR1042 |
| | P03405 | 1-29/32 – 2-9/16 | 9-1/8 | 10-1/2 | 12-5/8 | 18-5/16 | #5 | 1/4 | PR1043 |
| 5-6 | P03505 | 2-1/2 – 3-1/2 | 10-3/4 | 12-1/2 | 15-5/16 | 20-15/16 | #5 | 1/2 | PR1054 |
| 7-8 | P03705 | 3-17/32 – 4-1/2 | 10-3/4 | 12-7/8 | 15-11/16 | 21-5/16 | #5 | 1/2 | PR1054 |

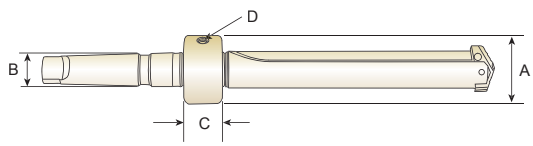
▶ You can also apply **RCI**(**R**otary **C**oolant **I**nducer) for internal cooling. (See page 230)

# HOLDER ACCESSORIES

## TORX SCREWS AND PREMIUM TORX HAND DRIVERS

| Series | Torx Screws | | Torx Screws (Nylon Locking) | | Premium Torx Drivers | Drill Range | | Torque in Lbs. 5.5 |
|---|---|---|---|---|---|---|---|---|
| | Item | PKG EDP No. (10 Screws) | Item | PKG EDP No. (10 Screws) | EDP No. | Fractional inch | Metric mm | |
| Y | 2XT7 | J7Y001 | 2XT7N | J7Y006 | J5Y007 | 3/8 – 27/64 | 9.5 – 11.0 | 5.5 |
| Z | 2LXT7 | J7Z011 | 2LXT7N | J7Z016 | J5Y007 | 7/16 – 1/2 | 11.5 – 12.5 | 5.5 |
| 0 | 2.5XT8 | J80021 | 2.5XT8N | J80026 | J50008 | 33/64 –11/16 | 13.0 – 17.5 | 11.0 |
| 0.5 | 2.5LXT8 | J80531 | 2.5LXT8N | J80536 | J50008 | 39/64 – 11/16 | 15.5 – 17.5 | 11.0 |
| 1 | 3XT9 | J91041 | 3XT9N | J91046 | J51009 | 45/64 – 15/16 | 18.0 – 24.0 | 20.0 |
| 1.5 | 3LXT9 | J91551 | 3LXT9N | J91556 | J51009 | 55/64 – 15/16 | 22.0 – 24.0 | 20.0 |
| 2 | 4XT15 | JB2061 | 4XT15N | JB2066 | J52015 | 31/32 – 1-3/8 | 25.0 – 35.0 | 45.0 |
| 2.5 | 4XT15 | JB2061 | 4XT15N | JB2066 | J52015 | 31/32 – 1-3/8 | 30.0 – 35.0 | 45.0 |
| 3-4 | 5XT20 | JC3081 | 5XT20N | JC3086 | J53020 | 1-13/32 – 2-9/16 | 36.0 – 65.0 | 90.0 |
| 5-8 | 6XT25 | JD5091 | 6XT25N | JD5096 | J55025 | 2-1/2 – 4-1/2 | 64.0 – 114.0 | 155.0 |

**NOTE**: Replacement screws sold in packages (10 screws per package)



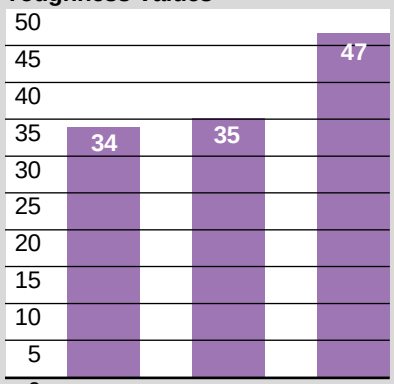

## ROTARY COOLANT INDUCER (RCI) AND ACCESSORIES

Complete with O'Rings, Flat Washers and Locking Clips.

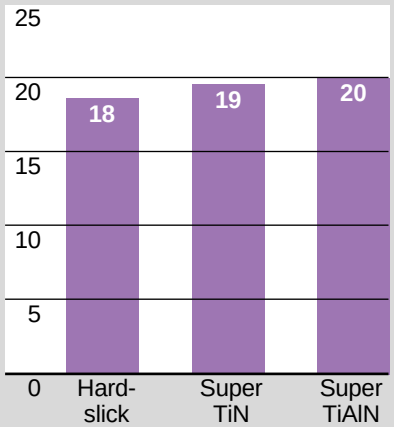
| EDP No. | I.D. A | Pipe O.D. B | Length C | Tap D | Thread for Driving Rod |
|---|---|---|---|---|---|
| PR1030 | 3/4 | 1-3/4 | 7/8 | 1/8 | 5/16 – NC |
| PR1031 | 1 | 2-1/8 | 1-1/8 | 1/8 | 5/16 – NC |
| PR1042 | 1-1/4 | 2-1/2 | 1-3/8 | 1/4 | 3/8 – NC |
| PR1043 | 1-3/4 | 3 | 1-3/8 | 1/4 | 3/8 – NC |
| PR1054 | 2-1/4 | 3-3/4 | 1-3/4 | 1/2 | 1/2 – NC |

## SPADE BLADE INSERTS SELECTION & APPLICATIONS HSS

**Toughness Values**




**Wear Values**




- **WHEN TO USE M4**
  - Loose or Manual Machines
  - If T15 Breaks
- **WHEN TO USE T15**
  - When M4 Life needs to be Extended
  - If M48 Breaks
- **WHEN TO USE M48**
  - Extend Life T15
- **WHEN TO USE SM POINT**
  - Reduce Thrust
  - Smoother Entry
  - Improve Hole Quality
  - Higher Speeds and Feeds

## SPEEDS – FEED RECOMMENDATIONS (STD POINT-SM POINT)

STANDARD GEOMETRY
SM POINT

| Material | Material Hardness (BHN) | SFM Surface Footage | | Feed (IPR) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 3/8 ~ 1/2 | | 33/64 ~ 11/16 | | 45/64 ~ 15/16 | | 31/32~ 1-3/8 | | 1-13/32 ~ 1-7/8 | | 1-29/32 ~ 2-9/16 | | 2-19/32 ~ 4-1/2 | |
| Free Machining Steel 1118, 1215, 12L14 | 100 - 150 | 280 | 330 | .007 | .008 | .010 | .012 | .013 | .016 | .016 | .019 | .020 | .020 | .023 | .023 | .028 | .028 |
| | 150 - 200 | 260 | 305 | .007 | .007 | .010 | .011 | .013 | .015 | .016 | .017 | .020 | .020 | .023 | .023 | .028 | .028 |
| | 200 - 250 | 240 | 285 | .007 | .006 | .010 | .010 | .013 | .014 | .016 | .016 | .020 | .020 | .023 | .023 | .028 | .028 |
| Low & Medium Carbon Steel 1018, 1040, 1140 | | 240 | 280 | .006 | .007 | .009 | .010 | .012 | .014 | .015 | .017 | .019 | .019 | .023 | .023 | .027 | .027 |
| | | 225 | 265 | .005 | .006 | .008 | .009 | .010 | .013 | .014 | .016 | .018 | .018 | .021 | .021 | .024 | .024 |
| | | 210 | 245 | .005 | .006 | .008 | .009 | .010 | .013 | .014 | .016 | .018 | .018 | .021 | .021 | .024 | .024 |
| | | 195 | 230 | .004 | .005 | .007 | .008 | .009 | .012 | .012 | .015 | .016 | .016 | .019 | .019 | .022 | .022 |
| Alloy Steel 4140, 5140, 8640 | 125 - 175 | 210 | 245 | .006 | .007 | .008 | .010 | .010 | .014 | .014 | .017 | .017 | .017 | .019 | .019 | .022 | .022 |
| | 175 - 225 | 195 | 230 | .005 | .006 | .008 | .009 | .010 | .013 | .014 | .016 | .017 | .017 | .019 | .019 | .022 | .022 |
| | 225 - 275 | 180 | 215 | .005 | .006 | .007 | .009 | .010 | .013 | .014 | .016 | .017 | .017 | .019 | .019 | .022 | .022 |
| | 275 - 325 | 170 | 200 | .004 | .005 | .006 | .008 | .009 | .012 | .012 | .015 | .015 | .015 | .017 | .017 | .020 | .020 |
| | 325 - 375 | 155 | 185 | .003 | .004 | .006 | .007 | .009 | .011 | .012 | .014 | .015 | .015 | .017 | .017 | .020 | .020 |
| High Strength Alloy Stee 4340, 4330V, 300M | | 110 | 130 | .005 | .006 | .007 | .009 | .009 | .011 | .010 | .013 | .014 | .014 | .017 | .017 | .020 | .020 |
| | | 85 | 105 | .004 | .005 | .007 | .008 | .009 | .010 | .010 | .012 | .014 | .014 | .017 | .017 | .020 | .020 |
| | | 70 | 85 | .003 | .004 | .006 | .007 | .008 | .009 | .009 | .011 | .012 | .012 | .015 | .015 | .018 | .018 |
| Structural Steel A36, A285, A516 | 100 - 150 | 200 | 240 | .006 | .008 | .010 | .011 | .012 | .015 | .014 | .017 | .018 | .018 | .021 | .021 | .026 | .026 |
| | 150 - 250 | 170 | 195 | .005 | .006 | .009 | .010 | .010 | .013 | .012 | .015 | .016 | .016 | .019 | .019 | .024 | .024 |
| | 250 - 350 | 140 | 165 | .004 | .005 | .008 | .009 | .009 | .012 | .010 | .013 | .014 | .014 | .017 | .017 | .020 | .020 |
| High Temp, Alloy Hastelloy B, Inconel 600 | | 40 | 50 | .003 | .004 | .006 | .007 | .007 | .009 | .008 | .011 | .010 | .012 | .012 | .015 | .015 | .017 |
| | | 35 | 45 | .003 | .004 | .006 | .006 | .007 | .008 | .008 | .010 | .010 | .010 | .012 | .012 | .015 | .014 |
| Stainless Steel 303, 416, 420, 17-4 PH | 135 - 185 | 105 | 125 | .006 | .007 | .008 | .009 | .009 | .012 | .011 | .014 | .014 | .014 | .016 | .016 | .020 | .020 |
| | 185 - 275 | 90 | 110 | .005 | .006 | .007 | .008 | .008 | .011 | .010 | .012 | .012 | .012 | .014 | .014 | .018 | .018 |
| Tool Steel H-13, H021, A04, 0-2, S-3 | | 110 | 130 | .004 | .004 | .006 | .007 | .008 | .010 | .010 | .012 | .012 | .012 | .015 | .015 | .017 | .017 |
| | | 90 | 110 | .004 | .004 | .006 | .007 | .008 | .010 | .010 | .012 | .012 | .012 | .015 | .015 | .017 | .017 |
| Aluminum | 30 | 850 | - | .008 | - | .013 | - | .016 | - | .020 | - | .022 | .022 | .025 | .025 | .025 | .025 |
| | 180 | 450 | - | .008 | - | .013 | - | .016 | - | .018 | - | .022 | .022 | .025 | .025 | .025 | .025 |
| Cast Iron Gray, Ductile, Nodular | | 250 | 295 | .007 | .008 | .012 | .012 | .016 | .016 | .020 | .020 | .024 | .024 | .027 | .027 | .030 | .030 |
| | | 225 | 265 | .006 | .007 | .011 | .011 | .014 | .015 | .018 | .019 | .022 | .022 | .025 | .025 | .028 | .028 |
| | | 195 | 230 | .006 | .006 | .009 | .009 | .012 | .013 | .016 | .017 | .018 | .018 | .021 | .021 | .024 | .024 |
| | | 165 | 195 | .005 | .005 | .007 | .008 | .009 | .011 | .012 | .014 | .014 | .014 | .017 | .017 | .020 | .020 |
| | | 135 | 160 | .004 | .005 | .006 | .007 | .007 | .010 | .009 | .011 | .012 | .012 | .014 | .014 | .016 | .016 |

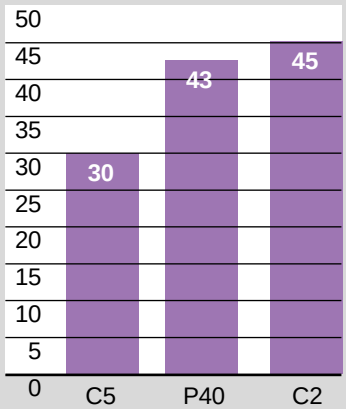
The recommendations for speed, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points. Speed and feed reduction (20% reduction in speed and 10% reduction in feed) are recommended.

# SPADE DRILLS

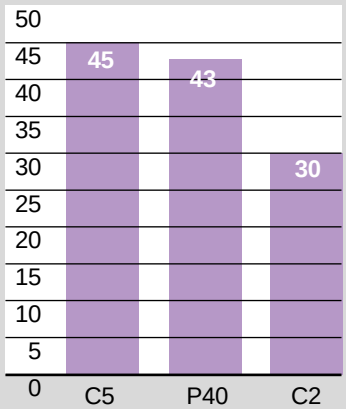
## RECOMMENDED CUTTING CONDITIONS

## SPADE BLADE INSERTS SELECTION & APPLICATIONS CARBIDE

**Toughness Values**




**Wear Values**




**If C5 chips try C2 at 10% – 20% lower S.F.M. than C5 rating**

| Grade | Geometry and Application | Stocked Coatings |
|---|---|---|
| P40 & C5 | Steel Cutting | Super TiN TiAlN |
| C3 | Cast Iron | Super TiN TiAlN |
| P40 & C2 | Ductile Iron Stainless Steel Aluminum Exotic Alloys | Super TiN TiAlNE |

**Note:** Carbide has a lower transverse rupture strength than HSS and is prone to chipping and breakage.

Recutting of chips or lack of rigidity can cause breakage.

Check Coolant Recommendations Chart on Page 461 for flow rates.

## SPEEDS – FEED RECOMMENDATIONS (STD POINT-SM POINT)

**STANDARD GEOMETRY**

**SM POINT**

| Material | Material Hardness (BHN) | SFM Surface Footage | | Feed (IPR) 3/8 ~ 1/2 | | 33/64 ~ 11/16 | | 45/64 ~ 15/16 | | 31/32 ~ 1-3/8 | | 1-13/32 ~ 1-7/8 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Free Machining Steel 1118, 1215, 12L14 | 100 - 150 | 420 | 485 | .006 | .008 | .009 | .012 | .012 | .016 | .015 | .019 | .019 | - |
| | 150 - 200 | 360 | 420 | .006 | .007 | .008 | .011 | .011 | .015 | .013 | .017 | .017 | - |
| | 200 - 250 | 340 | 395 | .005 | .006 | .008 | .010 | .010 | .014 | .012 | .016 | .015 | - |
| Low & Medium Carbon Steel 1018, 1040, 1140 | 125 - 175 | 340 | 395 | .005 | .007 | .008 | .010 | .010 | .014 | .014 | .017 | .017 | - |
| | 175 - 225 | 310 | 360 | .005 | .006 | .007 | .009 | .008 | .013 | .012 | .016 | .016 | - |
| | 225 - 275 | 270 | 315 | .004 | .006 | .007 | .009 | .008 | .013 | .012 | .016 | .015 | - |
| | 275 - 325 | 230 | 270 | .004 | .005 | .006 | .008 | .006 | .012 | .010 | .015 | .014 | - |
| Alloy Steel 4140, 5140, 8640 | 125 - 175 | 325 | 380 | .005 | .007 | .008 | .010 | .010 | .014 | .013 | .017 | .016 | - |
| | 175 - 225 | 300 | 350 | .005 | .006 | .007 | .009 | .009 | .013 | .012 | .016 | .015 | - |
| | 225 - 275 | 270 | 315 | .004 | .006 | .007 | .009 | .009 | .013 | .012 | .016 | .015 | - |
| | 275 - 325 | 250 | 290 | .004 | .005 | .006 | .008 | .008 | .012 | .011 | .015 | .014 | - |
| | 325 - 375 | 220 | 260 | .003 | .004 | .005 | .007 | .008 | .011 | .010 | .014 | .013 | - |
| High Strength Alloy Stee 4340, 4330V, 300M | 225 - 300 | 200 | 235 | .005 | .006 | .007 | .009 | .008 | .011 | .010 | .013 | .014 | - |
| | 300 - 350 | 180 | 210 | .004 | .005 | .006 | .008 | .007 | .010 | .009 | .012 | .012 | - |
| | 350 - 400 | 160 | 190 | .003 | .004 | .005 | .007 | .006 | .009 | .008 | .011 | .010 | - |
| Structural Steel A36, A285, A516 | 100 - 150 | 310 | 360 | .006 | .008 | .010 | .011 | .011 | .015 | .012 | .017 | .016 | - |
| | 150 - 250 | 250 | 290 | .005 | .006 | .008 | .010 | .009 | .013 | .011 | .015 | .015 | - |
| | 250 - 350 | 230 | 270 | .004 | .005 | .007 | .009 | .008 | .012 | .009 | .013 | .013 | - |
| High Temp, Alloy Hastelloy B, Inconel 600 | 140 - 220 | 80 | 125 | .003 | .004 | .006 | .007 | .007 | .009 | .009 | .011 | .011 | - |
| | 220 - 310 | 60 | 100 | .003 | .004 | .005 | .006 | .006 | .008 | .008 | .010 | .010 | - |
| Stainless Steel 303, 416, 420, 17-4 PH | 135 - 185 | 210 | 245 | .006 | .007 | .008 | .009 | .009 | .012 | .011 | .014 | .013 | - |
| | 185 - 275 | 160 | 190 | .005 | .006 | .007 | .008 | .008 | .011 | .010 | .012 | .011 | - |
| Tool Steel H-13, H021, A04, 0-2, S-3 | 150 - 200 | 220 | 260 | .003 | .004 | .005 | .007 | .007 | .010 | .009 | .012 | .011 | - |
| | 200 - 250 | 170 | 200 | .003 | .004 | .005 | .007 | .007 | .010 | .009 | .012 | .011 | - |
| Aluminum | 30 | 1500 | - | .008 | - | .013 | - | .016 | - | .020 | - | .022 | - |
| | 180 | 1000 | - | .007 | - | .011 | - | .014 | - | .018 | - | .020 | - |
| Cast Iron Gray, Ductile, Nodular | 120 - 150 | 460 | 505 | .006 | .008 | .009 | .012 | .011 | .015 | .015 | .019 | .020 | - |
| | 150 - 200 | 400 | 485 | .005 | .007 | .008 | .011 | .010 | .013 | .014 | .017 | .018 | - |
| | 200 - 220 | 360 | 435 | .005 | .006 | .007 | .009 | .008 | .012 | .012 | .015 | .015 | - |
| | 220 - 260 | 310 | 375 | .004 | .005 | .006 | .008 | .007 | .011 | .010 | .013 | .013 | - |
| | 260 - 320 | 270 | 340 | .004 | .005 | .005 | .007 | .006 | .010 | .008 | .011 | .011 | - |

The recommendations for speed, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points. Speed and feed reduction (20% reduction in speed and 10% reduction in feed) are recommended.

## SUPER COBALT T15 FLAT BOTTOM

| Material | Material Hardness (BHN) | Speed (SFM) | | Feed | | | |
|---|---|---|---|---|---|---|---|
| | | TiN | TiAlN | 3/8 ~ 1/2 | 33/64 ~ 11/16 | 45/64 ~ 15/16 | 31/32 ~ 1-3/8 |
| **Free machining Steel**<br>**1213, 12L13, 1215**<br>**12L14, 1118** | 100 - 150<br>150 - 200<br>200 - 250 | 165<br>150<br>135 | 220<br>215<br>190 | 0.005<br>0.005<br>0.004 | 0.007<br>0.007<br>0.007 | 0.010<br>0.010<br>0.010 | 0.013<br>0.013<br>0.012 |
| **Low Carbon Steel**<br>**1015, 1020, 1140,**<br>**1025** | 85 - 125<br>125 - 175<br>175 - 225<br>225 - 275 | 140<br>135<br>125<br>115 | 195<br>190<br>180<br>175 | 0.005<br>0.005<br>0.004<br>0.004 | 0.007<br>0.007<br>0.006<br>0.006 | 0.009<br>0.009<br>0.008<br>0.008 | 0.012<br>0.012<br>0.011<br>0.011 |
| **Medium Carbon Steel**<br>**1035, 1050, 1045**<br>**1055, 1140** | 125 - 175<br>175 - 225<br>225 - 275<br>275 - 325 | 135<br>125<br>115<br>105 | 195<br>180<br>165<br>150 | 0.004<br>0.004<br>0.004<br>0.003 | 0.007<br>0.006<br>0.006<br>0.005 | 0.009<br>0.007<br>0.007<br>0.007 | 0.011<br>0.011<br>0.011<br>0.009 |
| **Structural Steel**<br>**A36, A516, A182** | 100 - 150<br>150 - 250<br>250 - 350 | 115<br>100<br>80 | 165<br>140<br>115 | 0.004<br>0.004<br>0.003 | 0.007<br>0.007<br>0.006 | 0.009<br>0.008<br>0.007 | 0.011<br>0.009<br>0.008 |
| **Cast Iron / S,G Iron**<br>**A48-76 GR30/GR45**<br>**A536-72 60-40-18**<br>**A220-76 GR40010** | 120 - 150<br>150 - 200<br>200 - 220<br>220 - 260<br>260 - 320 | 145<br>130<br>110<br>95<br>80 | 215<br>190<br>165<br>150<br>120 | 0.005<br>0.005<br>0.005<br>0.004<br>0.004 | 0.010<br>0.008<br>0.008<br>0.006<br>0.005 | 0.014<br>0.011<br>0.010<br>0.008<br>0.006 | 0.016<br>0.016<br>0.014<br>0.010<br>0.008 |
| **Alloy Steel**<br>**8620, 4130, 4137**<br>**4140, 6150** | 125 - 175<br>175 - 225<br>225 - 275<br>275 - 325<br>325 - 375 | 125<br>115<br>105<br>100<br>90 | 165<br>150<br>145<br>140<br>120 | 0.005<br>0.004<br>0.004<br>0.003<br>0.003 | 0.006<br>0.006<br>0.005<br>0.005<br>0.005 | 0.008<br>0.008<br>0.007<br>0.007<br>0.007 | 0.011<br>0.011<br>0.011<br>0.009<br>0.009 |
| **Tool Steel**<br>**H13, H21, A2, S1** | 150 - 200<br>200 - 250 | 65<br>45 | 90<br>75 | 0.003<br>0.003 | 0.005<br>0.005 | 0.006<br>0.006 | 0.008<br>0.008 |
| **High Temp. Alloy**<br>**Hastelloy B,Inconel** | 140 - 220<br>220 - 310<br>225 - 300 | 20<br>15<br>65 | 30<br>25<br>90 | 0.003<br>0.003<br>0.004 | 0.005<br>0.004<br>0.006 | 0.006<br>0.006<br>0.007 | 0.008<br>0.006<br>0.008 |
| **High Strength Alloy**<br>**9840, 4340, 4330V** | 300 - 350<br>350 - 400 | 45<br>40 | 70<br>60 | 0.003<br>0.003 | 0.006<br>0.005 | 0.007<br>0.006 | 0.008<br>0.007 |
| **Aluminium**<br>**2014, 6061, 7075** | 30<br>180 | 520<br>255 | 700<br>390 | 0.007<br>0.007 | 0.011<br>0.011 | 0.014<br>0.014 | 0.017<br>0.016 |
| **Stainless Steel**<br>**310, 316, 410, 330** | 135 - 185<br>185 - 275 | 60<br>50 | 90<br>80 | 0.005<br>0.004 | 0.007<br>0.006 | 0.008<br>0.007 | 0.009<br>0.009 |

**RPM** = revolution per minute (rev/min)
**SFM** = surface feet per minute (ft/min)
**DIA** = diameter of drill (inch)
**IPR** = feed rate (in/rev)
**IPM** = inch per minute penetration rate

*** Formulas :**

$SFM = (RPM) \cdot (.262) \cdot (DIA.)$

$IPM = (RPM) \cdot (IPR)$

$$RPM = \frac{(SFM) \cdot (3.82)}{(DIA.)}$$

The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points. Speed and feed reductions (20% reduction in speed and 10% reduction in feed) are recommended.

# SPADE BLADE INSERTS HORSEPOWER CONSUMPTION RATE

**Metal Removal Rates (MRR)**
Example: 1.50 Dia. Drill @ 6.412 I.P.M.

**Volume of Cylinder Method: $D^2$x.785xL**
D = Hole Diameter
L = Length in I.P.M.
.785 is Constant

Material Drilled 4140 250 BHN:
Cutting Data: 180 S.F.M. (458 R.P.M.) x .014 Feed per Rev.

458 R.P.M. x .014 = 6.412 I.P.M. (L)

$D^2$ $(1.5)^2$ x .785 x L (6.412) = 11.3 C.U.In./ Min (MRR)

**MRR of 11.3 x 1.4 Energy Value = 15.8HP.**

## metal removal rates (mrR)

- Cubic inches of metal removal per unit of horsepower.
- Unit horsepower ($HP_u$) is the amount of power to remove a volume of metal in a period of time.
  - $HP_u$ = power to cut 1 cubic inch per minute – found in tables

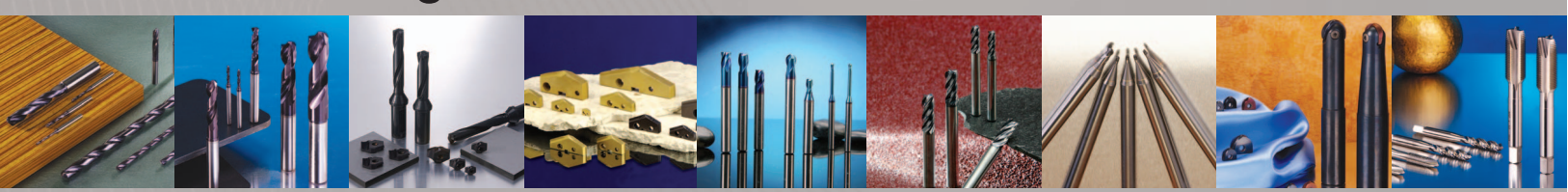
**Average Unit Horsepower Values of Energy Per Unit Volume**

| Material | BHN | $HP_u$ (HP/($in^3$/min.)) |
|---|---|---|
| **Carbon Steels** | 150-200<br>200-250<br>250-350 | 1.0<br>1.4<br>1.6 |
| **Leaded Steels** | 150-175 | 0.7 |
| **Cast Irons** | 125-190<br>190-250 | 0.5<br>1.6 |
| **Stainless Steels** | 135-275 | 1.5 |
| **Aluminum Alloys** | 50-100 | 0.3 |
| **Magnesium Alloys** | 40-90 | 0.2 |
| **Copper** | 125-140 | 0.7 |
| **Copper Alloys** | 100-150 | 0.7 |

## COOLANT RECOMMENDATIONS (SPADE BLADE)

| Material | Material Hardness (BHN) | Coolant Pressure (PSI) / Coolant Volumetric Flowrate (GPM) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 3/8 ~ 1/2 | 33/64 ~ 11/16 | 23/32 ~ 1 | 1 ~ 1-1/4 | 1-1/4 ~ 2 | 2 ~ 3 | 3 ~ 4 |
| Free Machining Steel<br>1118, 1215, 12L14, etc. | 100 – 250 | 175-185<br>2.5-2.6 | 100-120<br>2.8-3.0 | 105-140<br>4.4-5.2 | 80-115<br>7-8 | 75-100<br>12-14 | 40-50<br>30-33 | 65-90<br>38-44 |
| Low Carbon Steel<br>1010, 1020, 1025, 1522, etc. | 85 – 275 | 165-170<br>2.4-2.5 | 75-90<br>2.4-2.6 | 75-95<br>3.7-4.2 | 60-80<br>6-7 | 55-75<br>11-12 | 30-40<br>26-30 | 50-65<br>33-38 |
| Medium Carbon Steel<br>1030,1040,1050,1527,1140,1151,etc. | 125 – 325 | 160-165<br>2.3-2.4 | 70-85<br>2.3-2.6 | 70-90<br>3.6-4.1 | 55-75<br>5-6 | 50-70<br>10-12 | 30-40<br>26-30 | 50-65<br>33-38 |
| Alloy Steel<br>4140, 5140, 8640, etc. | 125 – 375 | 160-165<br>2.3-2.4 | 66-75<br>2.2-2.4 | 65-80<br>3.5-3.9 | 50-70<br>5-6 | 45-60<br>10-11 | 30-35<br>26-28 | 40-50<br>30-33 |
| High Strength Alloy<br>4340, 4330V, 300M, etc. | 225 – 400 | 150-155<br>2.3-2.4 | 55-60<br>2.1-2.2 | 45-50<br>2.9-3.1 | 25-30<br>4-5 | 25-30<br>7-8 | 20-25<br>21-23 | 25-30<br>23-26 |
| Structural Steel<br>A36, A285, A516, etc. | 100 – 350 | 160-165<br>2.3-2.4 | 75-85<br>2.4-2.6 | 65-80<br>3.5-3.9 | 40-55<br>5-6 | 40-50<br>9-10 | 25-30<br>23-26 | 40-50<br>30-33 |
| High Temp. Alloy<br>Hastelloy B, Inconel 600, etc. | 140 – 310 | 150-155<br>2.3-2.4 | 60-65<br>2.2-2.3 | 50-55<br>3.1-3.2 | 30-35<br>4-5 | 25-30<br>7-8 | 25-30<br>23-26 | -<br>- |
| Stainless Steel<br>301, 316, 330, 17-4PH, etc. | 135 – 275 | 165-170<br>2.4-2.5 | 70-85<br>2.3-2.6 | 65-75<br>3.5-3.7 | 40-55<br>5-6 | 40-50<br>9-10 | 25-30<br>23-26 | 35-45<br>28-31 |
| Tool Steel<br>H-13, H-21, A-4, O-2, S-3, etc. | 150 – 250 | 150-155<br>2.3-2.4 | 55-60<br>2.1-2.2 | 45-50<br>2.9-3.1 | 25-30<br>4-5 | 25-30<br>7-8 | 20-25<br>21-23 | 25-30<br>23-26 |
| Aluminum | 30 – 180 | 190-210<br>2.6-2.7 | 140-180<br>3.3-3.7 | 150-200<br>5.3-6.1 | 115-160<br>8-9 | 90-125<br>14-16 | 40-50<br>30-33 | 60-80<br>36-42 |
| Cast Iron | 120 – 320 | 155-160<br>2.3-2.4 | 60-65<br>2.2-2.3 | 50-60<br>3.1-3.3 | 30-40<br>4-5 | 30-35<br>8-9 | 25-30<br>23-26 | 30-35<br>26-28 |

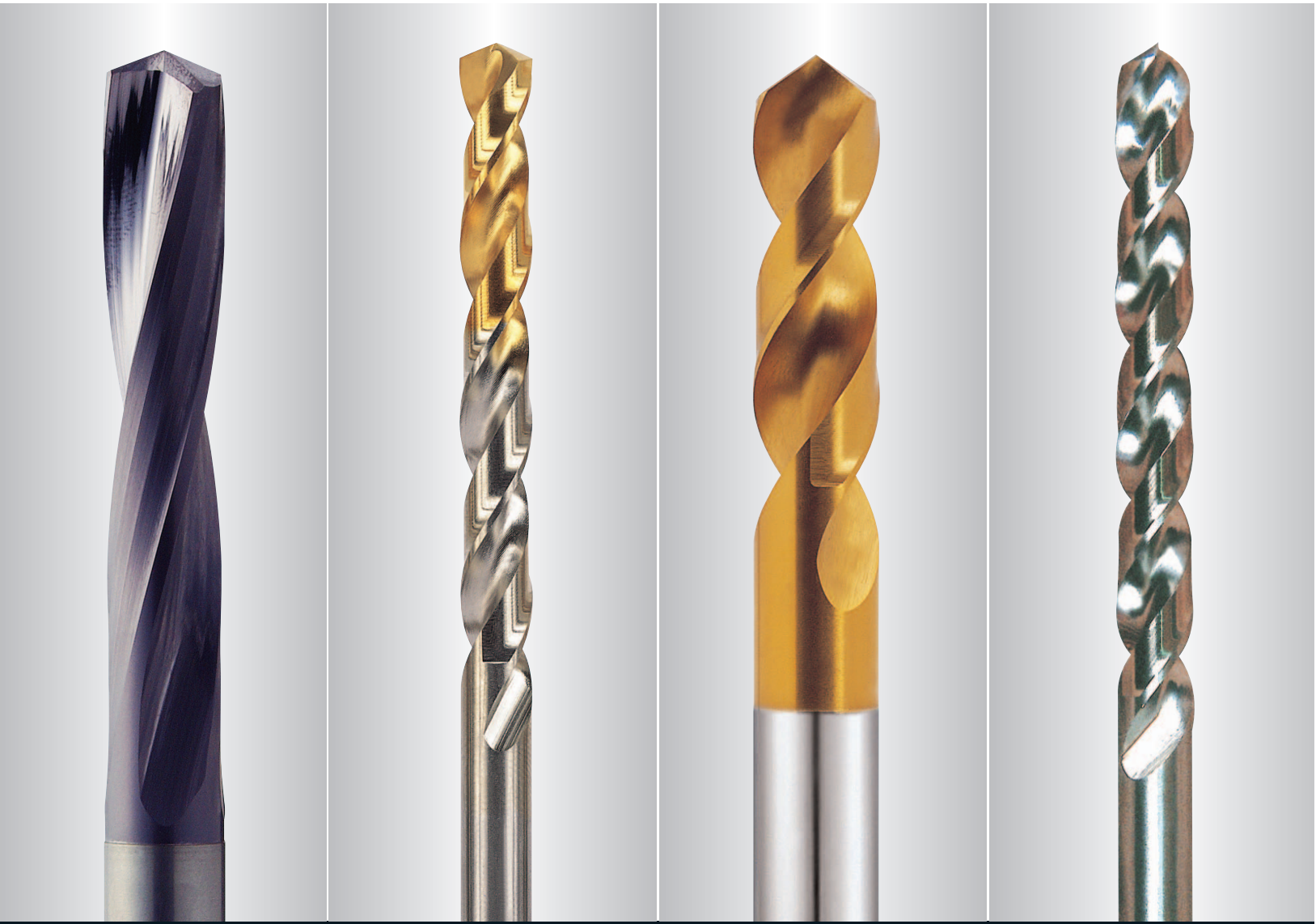
Global Cutting Tool Leader **YG-1**



# DRILLS

YG

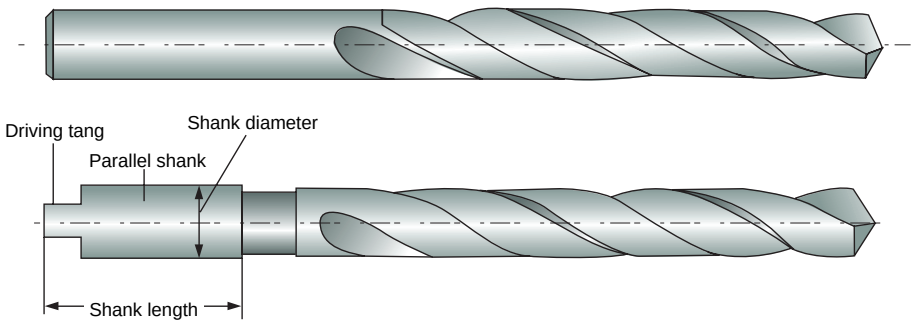
Being the best through innovation



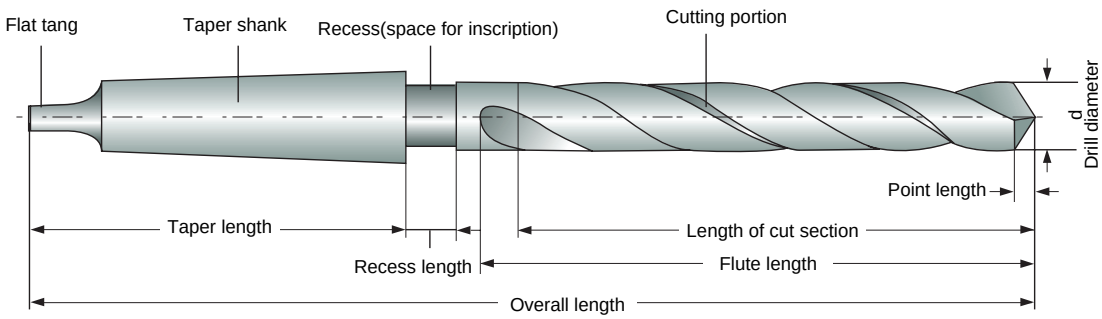
# TECHNICAL DATA

# TECHNICAL DATA

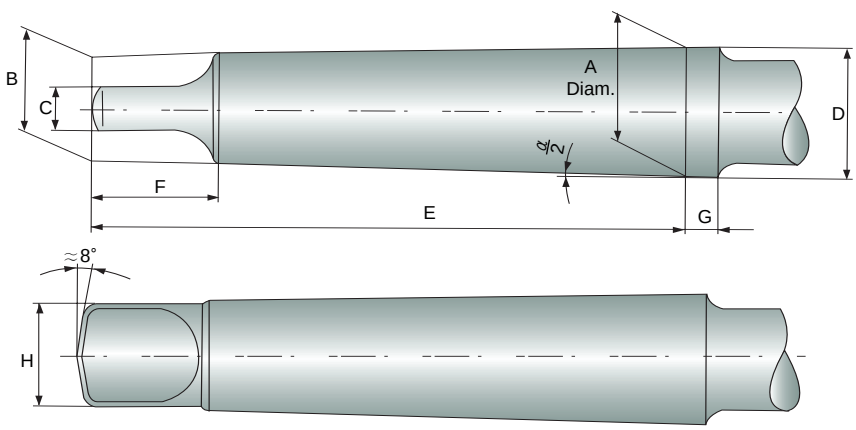
## 1 Twist Drill with parallel shank




## 2 Twist Drill with taper shank

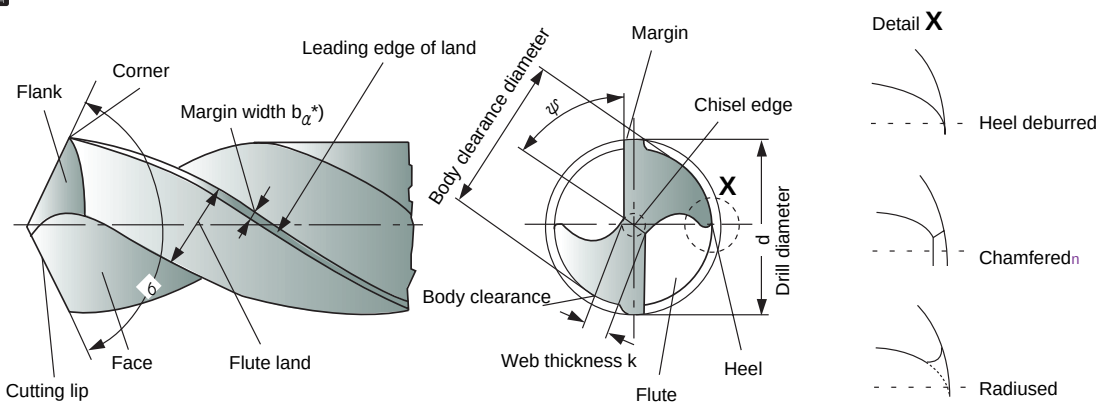



## 3 General dimensions of morse taper shanks




| Morse Taper Shank | A mm | B mm | C(h13) mm | D mm | E mm | F(max.) mm | G mm | H(max.) mm | α/2 |
|---|---|---|---|---|---|---|---|---|---|
| **No.1** | 12.065 | 9 | 5.2 | 12.2 | 62 | 13.5 | 3.5 | 8.7 | 1°25′43″ |
| **No.2** | 17.780 | 14 | 6.3 | 18.0 | 75 | 16 | 5 | 13.5 | 1°25′50″ |
| **No.3** | 23.825 | 19.1 | 7.9 | 24.1 | 94 | 20 | 5 | 18.5 | 1°26′16″ |
| **No.4** | 31.267 | 25.2 | 11.9 | 31.6 | 117.5 | 24 | 6.5 | 24.5 | 1°29′15″ |
| **No.5** | 44.399 | 36.5 | 15.9 | 44.7 | 149.5 | 29 | 6.5 | 35.7 | 1°30′26″ |
| **No.6** | 63.348 | 52.4 | 19 | 63.8 | 210 | 40 | 8 | 51 | 1°29′36″ |

## 4 Cutting portion



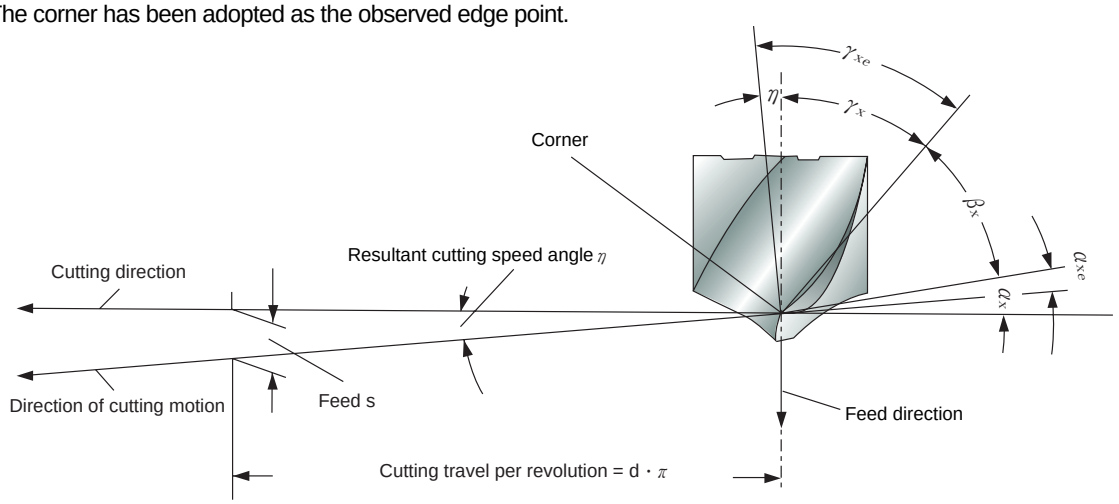

$\sigma$ = Point angle (sigma)

$\psi$ = Chisel edge angle (psi)

* In the context of cutting technology, land width $b_\alpha$ is the body clearance land width which is to be by $b_{f\alpha}$n, see DIN 6581.

## 5 Angle at the cutting edges

The corner has been adopted as the observed edge point.




$\alpha_x$ = Side clearance angle (alpha)

$\alpha_{xe}$ = Effective side clearance angle

$\beta_x$ = Side wedge angle (beta)

$\gamma_x$ = Front rake angle (gamma)

$\gamma_{xe}$ = Working front rake angle

$\eta$ = Resultant cutting speed angle (eta)

Clearance angle $\alpha$, wedge angle $\beta$ and rake angle $\gamma$ are measured in the tool orthogonal plane. For details, see DIN 6581, definitions of metal-cutting technology; geometry at the tool edge.

## 6 Web thickness k

**Test values :** The web thickness according to Fig. 1 shall not be less than the minimum value $k_{min}$ indicated in Fig. 2.
**Test point :** At the point of the drill.
**Testing equipment :** Slide gauge with measuring points.

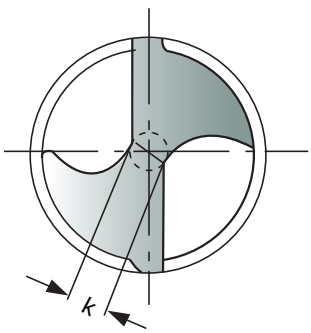



**Figure 1. Web thickness k**

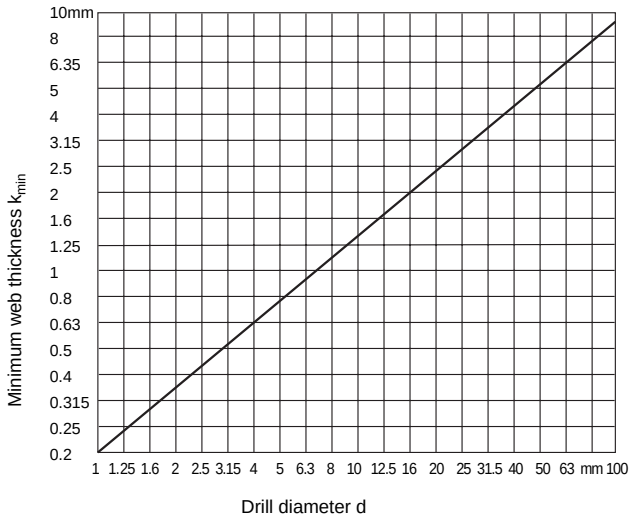



**Figure 2. Web thickness $k_{min}$**

## 7 Margin width b$\alpha$

**Test values :** The land width as in Fig. 3 shall lie within the limited values indicated in Fig. 4.
**Test point :** 5mm behind the corner
**Testing equipment :** Slide gauge

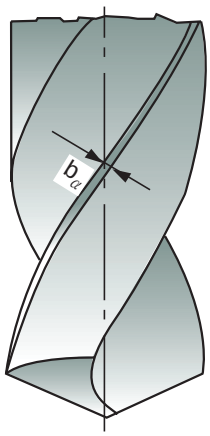



**Figure 3. Margin width $b_\alpha$**

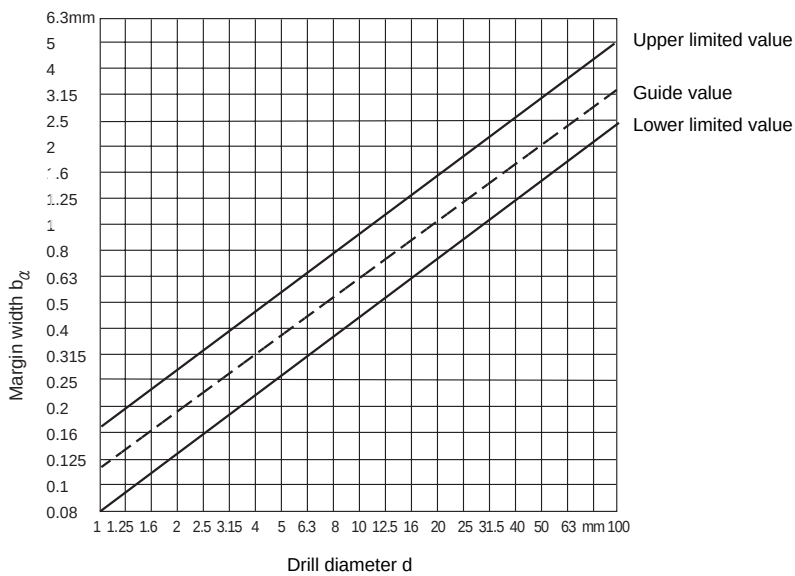



**Figure 4. Margin width $b_\alpha$**

## Angle on Twist Drills

### (1) Side rake angle $\gamma_f$ (Helix angle)

**Recommended test value :** Recommended ranges depending on the tool types N,H and W according to DIN 1836 and the diameter of the drill included in Fig. 5.

**Test point :** At the corner, see Fig. 6.

**Testing equipment :** According to VDI Guideline 3331 Part 1, Section Margin width $b_\alpha$

**Note :** The side rake angle $\gamma_f$ is measured in place of the orthogonal rake angle $\gamma_O$ found in the wedge measuring plane (see DIN 6581), as this changes along the cutting edge (becoming smaller towards the point of the drill).

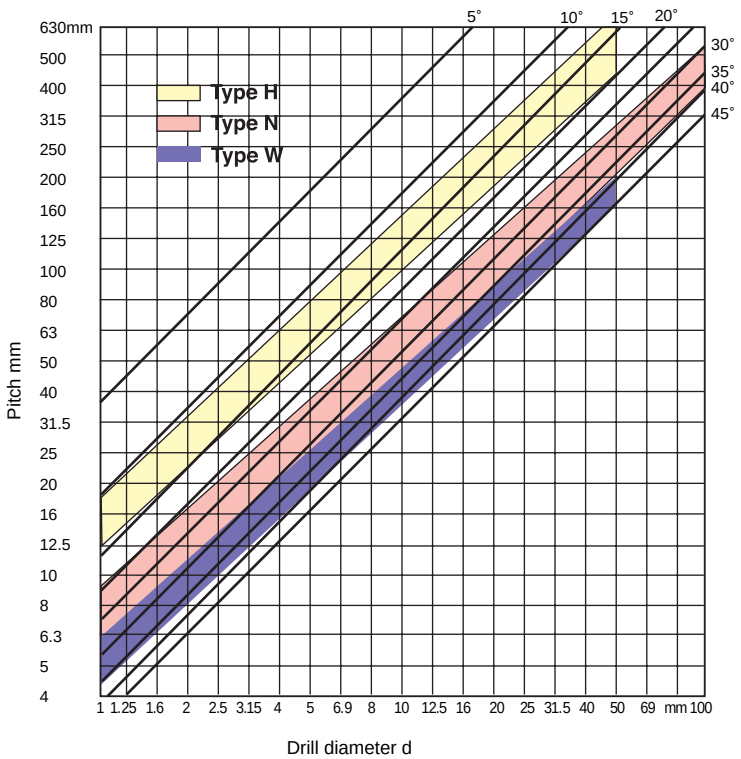



Figure 6. Side rake angle $\gamma_f$

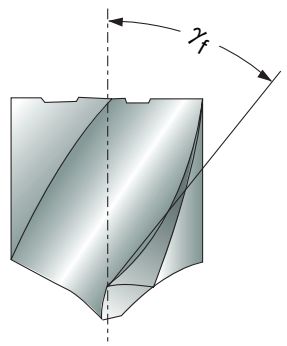



Figure 5. Side rake angle $\gamma_f$

### (2) Point angle $\sigma$

**Test value :** Usual executin for tool types N and H : $\sigma$=118 ˚ , for tool type W : $\sigma$=130 ˚

**Test point :** At the cutting , see Fig. 7.

**Testing equipment :** According to VDI Guideline 3331 Part 1, Section Margin width $b_\alpha$.

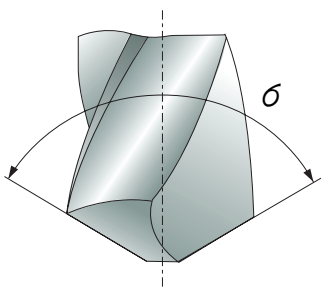



Figure 7. Point angle $\sigma$

## 9 Resharpening Twist Drills

**(1) Drills are worn off irregularly. It should be sharpened prior to developing into excessive wear.**

**(2) Resharpening**

① Grind the correct point angle to suit your application.(figure 8)
② Check that both cutting lips have the same angle. On a 130° point, each lip should be 65° toward the axis. The point must be on center, i.e., the chisel edge must produce cutting lips of equal length.(figure 8)
③ Grind Primary relief and Secondary clearance.(figure 9)
④ Grind web thinning. (figure 10)

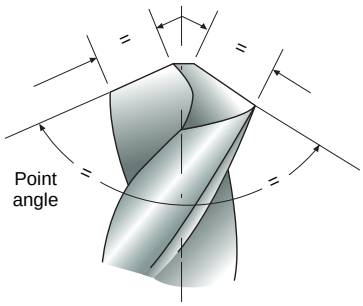


Figure 8

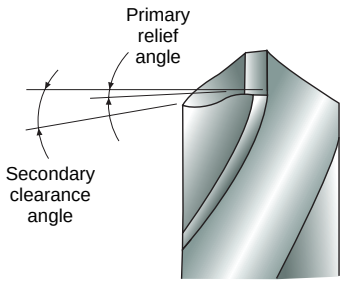


Figure 9

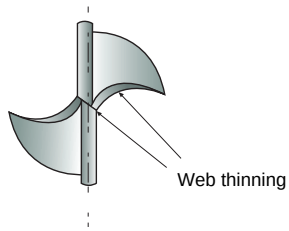
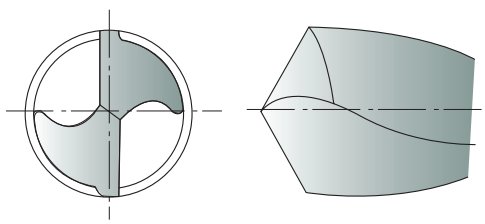


Figure 10

## 10 Web thinning

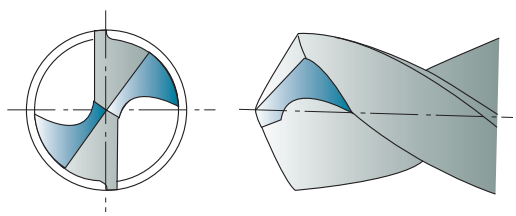
**(1) Without thinning**

Suitable for drill of general purpose.
Thanks to thin web thickness, web thinning is not needed.
This without web thinning type is applied to design of drills for mild steels, alloy steels, cast iron, stainless steels, titanium, inconel, etc. and conventional cutting conditons.



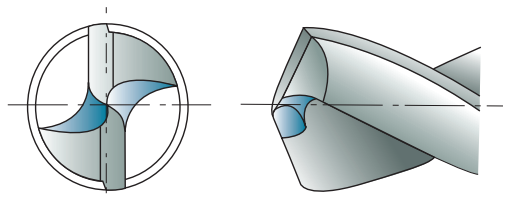
**(2) Type C thinning (DIN1412 FORM C, SPLIT POINT)**

Because Split point enables good centering when drilling and breaks the chips, chip removals are easy.
Suitable for drill design in high hardened tough materials, i.e, heat treated steels, titanium alloys, stainless steels, incoroy inconel, nimonic, etc.



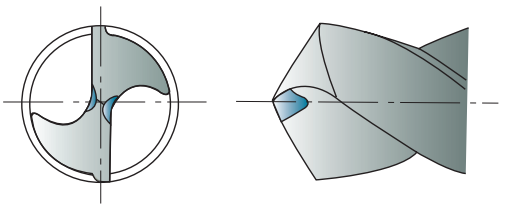
**(3) Type R thinning (HELICAL THINNING)**

Helical thinning ensures to frequent chip breaking and removal. The different direction force of cutting edges and helical thinning parts enable that chips curl, break and remove through the flutes. In addition, helical thinning makes the chip room up to center, remove the chisel and enables good centering



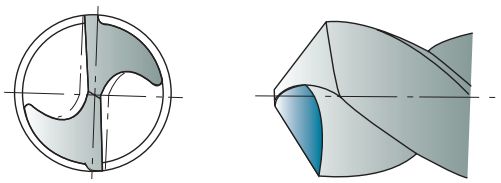
**(4) Type A thinning (DIN1412 FORM A)**

A type thinnings makes thin chisel, good chip removal and favorable centering.
This type is the easiest type to grind the thinning. In narrow web and wide fluted drills, keeping of the rigidity and smooth chip removal are possible.



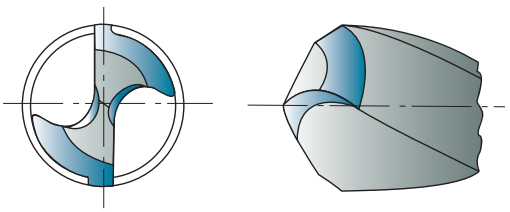
**(5) Type B thinning (DIN1412 FORM B)**

In case of work materials with low cutting resistance and good chip removal, i.e., cast iron, aluminum, plastic etc., B type thinning is suitable.
Especially when drills for high hardened steels are designed, this type is applied to decrease rake angle and avoid chipping of cutting lips.



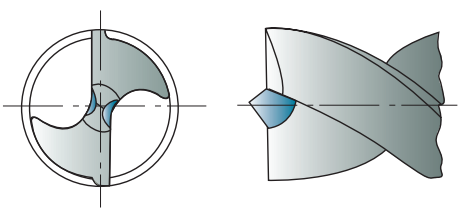
**(6) Type D thinning (DIN1412 FORM D)**

Grey cast iron thinning; bevelling of external edges strengthens the cutting edge.
Used for medium to high grey cast iron hardness and for abrasives.



**(7) Type E thinning (DIN1412 FORM E)**

Center drill bit thinning; ensures optimal center drilling and does not leave burs in through holes.
As the bit and cutting edges are delicate, this bit should be used for drilling thin sheet metal.



## Surface Finishes for high speed steels Twist Drills

**(1) Bright Finish**

Drills with a bright finish are without surface treatment and ground condition.
Especially bright finished drills are used in machining of non ferrous materials.

**(2) Coloring (Gold color)**

The coloring is a thin oxide layer formed on the tool surfaces.
This is often applied to cobalt high speed steels twist drills.

**(3) Steam Tempered (black oxide finish)**

This is a black oxide layer 1-2㎛ formed on the tool surfaces.
Steam Tempered treated drill is the result of a steam tempering operation. Because the oxide layer retains some coolant on the tool surface, and aids chip flow, helps to dissipate heat, steam homo treated drills are recommended for ferrous applications.

# 12 Coating

The use of coated cutting tools reduce production costs.
For example

- Avoidance of machine downtime due to premature tool wear.
- Higher cutting capabilities to reduce actual machining times.
- Reproducible tool life.
- Improvement of component surface quality.

### (1) TiN (Titanium Nitride) coating

Titanium Nitride gives the tool a higher performance in comparison to traditional non-coated drills.
TiN coating, with good all-around properties, is recommended for the general application, i.e., attack by abrasive, adhesive and chemical wear in equal proportions.

### (2) TiCN (Titanium Carbon Nitride) coating

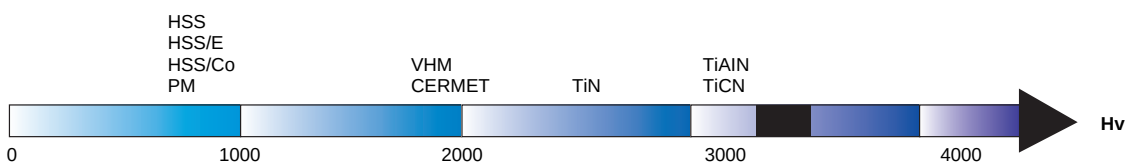
TiCN coating should be employed when severe thermodynamic stress is expected, for example when drilling in high hardened steels or in mild steels with high speed and feed.

### (3) TiAlN (Titanium Alumium Nitride) coating

The addition of Aluminum to the Titanium Nitride produces an increase in hardness and an exceptional increase in resistance to oxidation at high temperature.
TiAlN coating is applied to drilling with severe thermal stress on cutting edges when continuous non-step feed, dry cutting or high speed cutting.

### (4) Properties of coating

| Properties | TiN | TiCN | TiAlN |
|---|---|---|---|
| Coating color | gold - yellow | blue - grey | violet - grey |
| Hardness (Hv 0.05) | 2300 | 3000 | 3000 |
| Coating thickness(㎛) | 1~4 | 1~4 | 1~5 |
| Max. working temperature (˚C) | 600 | 400 | 800 |
| Coefficient of friction against steels(dry) | 0.4 | 0.4 | 0.4 |




### (5) Selection of coating

| Work-material | HSS TWIST DRILLS | CARBIDE DRILLS |
|---|---|---|
| Unalloyed steels | TiCN, TiAlN | TiCN, TiAlN |
| Steels < 1000 N/mm² | TiCN, TiAlN | TiCN, TiAlN |
| Steels > 1000 N/mm² | TiCN, TiAlN | TiCN, TiAlN |
| Stainless steels | TiCN, TiAlN | TiCN, TiAlN |
| Cast iron | TiCN, TiAlN | TiAlN |
| Al-wrought alloys | TiN | TiN |
| Al-cast alloys | TiCN | TiCN |
| Copper (pure) | CrN | CrN |
| Brass | TiCN | TiCN |
| Bronze | TiCN | TiCN |

## Drill sizes before Tapping

### (1) Metric - ISO threads coarse pitch

| Nominal diameter | Drill diameter | Nominal diameter | Drill diameter | Nominal diameter | Drill diameter | Nominal diameter | Drill diameter |
|---|---|---|---|---|---|---|---|
| | | M3 | 2.5 | M11 | 9.5 | M30 | 26.5 |
| M1 | 0.75 | M3.5 | 2.9 | M12 | 10.2 | M33 | 29.5 |
| M1.2 | 0.95 | M4 | 3.3 | M14 | 12.0 | M36 | 32.0 |
| M1.4 | 1.1 | M5 | 4.2 | M16 | 14.0 | M39 | 35.0 |
| M1.6 | 1.25 | M6 | 5.0 | M18 | 15.5 | M42 | 37.5 |
| M1.8 | 1.45 | M7 | 6.0 | M20 | 17.5 | M45 | 40.5 |
| M2 | 1.6 | M8 | 6.8 | M22 | 19.5 | M48 | 43.0 |
| M2.2 | 1.75 | M9 | 7.8 | M24 | 21.0 | M52 | 47.0 |
| M2.5 | 2.05 | M10 | 8.5 | M27 | 24.0 | M56 | 50.5 |

### (2) Metric ISO threads fine pitch

| Nominal diameter | Tap Pitch | Drill diameter | Nominal diameter | Tap Pitch | Drill diameter | Nominal diameter | Tap Pitch | Drill diameter |
|---|---|---|---|---|---|---|---|---|
| 2.5 | 0.35 | 2.15 | 17 | 1.5 | 15.5 | 33 | 1.5 | 31.5 |
| 3 | 0.35 | 2.65 | 18 | 1 | 17 | 33 | 2 | 31 |
| 3.5 | 0.35 | 3.15 | 18 | 1.5 | 16.5 | 33 | 3 | 30 |
| 4 | 0.5 | 3.5 | 18 | 2 | 16 | 35 | 1.5 | 33.5 |
| 4.5 | 0.5 | 4 | 20 | 1 | 19 | 36 | 1.5 | 34.5 |
| 5 | 0.5 | 4.5 | 20 | 1.5 | 18.5 | 36 | 2 | 34 |
| 5.5 | 0.5 | 5 | 20 | 2 | 18 | 36 | 3 | 33 |
| 6 | 0.75 | 5.2 | 22 | 1 | 21 | 38 | 1.5 | 36.5 |
| 7 | 0.75 | 6.2 | 22 | 1.5 | 20.5 | 39 | 1.5 | 37.5 |
| 8 | 0.75 | 7.2 | 22 | 2 | 20 | 39 | 2 | 37 |
| 8 | 1 | 7 | 24 | 1 | 23 | 39 | 3 | 36 |
| 9 | 0.75 | 8.2 | 24 | 1.5 | 22.5 | 40 | 1.5 | 38.5 |
| 9 | 1 | 8 | 24 | 2 | 22 | 40 | 2 | 38 |
| 10 | 0.75 | 9.2 | 25 | 1 | 24 | 40 | 3 | 37 |
| 10 | 1 | 9 | 25 | 1.5 | 23.5 | 42 | 1.5 | 40.5 |
| 10 | 1.25 | 8.8 | 25 | 2 | 23 | 42 | 2 | 40 |
| 11 | 0.75 | 10.2 | 26 | 1.5 | 24.5 | 42 | 3 | 39 |
| 11 | 1 | 10 | 27 | 1 | 26 | 45 | 1.5 | 43.5 |
| 12 | 1 | 11 | 27 | 1.5 | 25.5 | 45 | 2 | 43 |
| 12 | 1.25 | 10.8 | 27 | 2 | 25 | 45 | 3 | 42 |
| 12 | 1.5 | 10.5 | 28 | 1 | 27 | 48 | 1.5 | 46.5 |
| 14 | 1 | 13 | 28 | 1.5 | 26.5 | 48 | 2 | 46 |
| 14 | 1.25 | 12.8 | 28 | 2 | 26 | 48 | 3 | 45 |
| 14 | 1.5 | 12.5 | 30 | 1 | 29 | 50 | 1.5 | 48.5 |
| 15 | 1 | 14 | 30 | 1.5 | 28.5 | 50 | 2 | 48 |
| 15 | 1.5 | 13.5 | 30 | 2 | 28 | 50 | 3 | 47 |
| 16 | 1 | 15 | 30 | 3 | 27 | 52 | 1.5 | 50.5 |
| 16 | 1.5 | 14.5 | 32 | 1.5 | 30.5 | 52 | 2 | 50 |
| 17 | 1 | 16 | 32 | 2 | 30 | 52 | 3 | 49 |

### (3) WITHWORTH pipe threads (BSP)

| Nominal size | Drill diameter | Nominal size | Drill diameter |
|---|---|---|---|
| inches | mm | inches | mm |
| G1/8 | 8.8 | G1 * 1/4 | 39.5 |
| G1/4 | 11.8 | G1 * 3/8 | 42.0 |
| G3/8 | 15.25 | G1 * 1/2 | 45.0 |
| G1/2 | 19.0 | G1 * 3/4 | 51.0 |
| G5/8 | 21.0 | G2 | 57.0 |
| G3/4 | 24.5 | G2 * 1/4 | 63.0 |
| G7/8 | 28.25 | G2 * 1/2 | 73.0 |
| G1 | 30.75 | G2 * 3/4 | 79.0 |
| G11/8 | 35.5 | G3 | 85.0 |

### (4) American unified coarse threads

| UNC | Drill diameter | | UNC | Drill diameter | |
|---|---|---|---|---|---|
| | inches | mm | | inches | mm |
| **No. 1** | 53 | 1.51 | **7/16** | U | 9.35 |
| **No. 2** | 50 | 1.78 | **1/2** | 27/64 | 10.71 |
| **No. 3** | 47 | 1.99 | **9/16** | 31/64 | 12.30 |
| **No. 4** | 43 | 2.26 | **5/8** | 17/32 | 13.49 |
| **No. 5** | 38 | 2.58 | **3/4** | 21/32 | 16.67 |
| **No. 6** | 36 | 2.71 | **7/8** | 49/64 | 19.44 |
| **No. 8** | 29 | 3.45 | **1** | 7/8 | 22.22 |
| **No. 10** | 25 | 3.8 | **1 * 1/8** | 63/64 | 25.00 |
| **No. 12** | 16 | 4.5 | **1 * 1/4** | 1 * 7/64 | 28.18 |
| **1/4** | 7 | 5.11 | **1 * 3/8** | 1 * 7/32 | 30.95 |
| **5/16** | F | 6.53 | **1 * 1/2** | 1 * 11/32 | 34.13 |
| **3/8** | 5/16 | 7.94 | | | |

### (5) American unified fine threads

| NF | Drill diameter | | NF | Drill diameter | |
|---|---|---|---|---|---|
| | inches | mm | | inches | mm |
| **No. 0** | 3/64 | 1.19 | **3/8** | Q | 8.43 |
| **No. 1** | 53 | 1.51 | **7/16** | 25/64 | 9.92 |
| **No. 2** | 50 | 1.78 | **1/2** | 29/64 | 11.51 |
| **No. 3** | 45 | 2.08 | **9/16** | 33/64 | 13.10 |
| **No. 4** | 42 | 2.37 | **5/8** | 37/64 | 14.86 |
| **No. 5** | 37 | 2.64 | **3/4** | 11/16 | 17.46 |
| **No. 6** | 33 | 2.87 | **7/8** | 13/16 | 20.64 |
| **No. 8** | 29 | 3.45 | **1** | 59/64 | 23.42 |
| **No. 10** | 21 | 4.04 | **1 * 1/8** | 1 * 3/64 | 26.59 |
| **No. 12** | 14 | 4.62 | **1 * 1/4** | 1 * 11/32 | 29.76 |
| **1/4** | 3 | 5.41 | **1 * 3/8** | 1 * 19/32 | 32.94 |
| **5/16** | 1 | 6.91 | **1 * 1/2** | 1 * 27/64 | 36.11 |

## 14 ISO Tolerance

### Drill Diameter Tolerance Inch

| up to .118 | over .118 up to .236 | over .236 up to .394 | over .394 up to .709 |
|---|---|---|---|
| +0<br>-.00055 | +0<br>-.00071 | +0<br>-.00087 | +0<br>-.00106 |

### Drill Diameter Tolerance Metric

| Diameter (mm) | 1 - 3 from to | 3 - 6 over to | 6 - 10 over to | 10 - 18 over to | 18 - 30 over to |
|---|---|---|---|---|---|
| h6 | 0<br>–.00024 | 0<br>–.00032 | 0<br>–.00036 | 0<br>–.00044 | 0<br>–.00052 |
| h7 | 0<br>–.0004 | 0<br>–.00048 | 0<br>–.00059 | 0<br>–.00071 | 0<br>–.00083 |
| h8 | 0<br>–.00056 | 0<br>–.00071 | 0<br>–.00087 | 0<br>–.00107 | 0<br>–.00130 |
| m7 | +.00048<br>+.00007 | +.00063<br>+.00015 | +.00083<br>+.00023 | +.00099<br>+.00027 | +.00114<br>+.00031 |

## 15 Trouble Shooting in Drilling

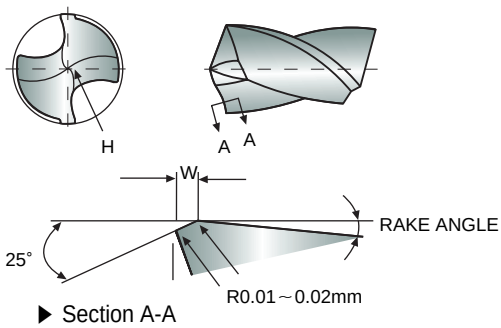
| Occurrence of trouble | Cause of trouble | Countermeasures |
|---|---|---|
| **Drill will not enter work** | 1. Drill is dull.<br>2. Lip relief too small.<br>3. Too thick a web. | 1. Grind lip relief sufficiently.<br>2. Grind web thinning.<br>3. Choose a drill with narrow web. |
| **Margin chipping** | 1.Oversized jig bushing. | 1. Choose the suitable jig bushing for drill diameter |
| **Cutting lip breaks** | 1. Lip relief too much.<br>2. Feed too heavy. | 1. Grind lip relief sufficiently.<br>2. Decrease feed rate. |
| **Tang breaks Bruch der** | 1. Imperfect fit between taper shank and socket.<br>2. Burred or Badly worn sockets. | 1. Clean the dirt or chips in sockets.<br>2. Change the worn sockets to new ones. |
| **Drill breaks in brass** | 1. Unsuitable drill<br>2. Flutes clogged with chips | 1. Choose the suitable drill for work material. |
| **Chipping of drill center** | 1. Lip relief too much.<br>2. Feed too heavy. | 1. Grind lip relief sufficiently.<br>2. Decrease feed rate. |
| **Hole oversize** | 1. Unequal angle or length of cutting edges.<br>2. Loosen spindle. | 1. Resharpening point, choose correct drills.<br>2. Tighten spindle sufficiently. |
| **Outer corners broken down** | 1. Cutting speed too high.<br>2. Hard spots in work material.<br>3. Flutes clogged with chips.<br>4. Too wear of drills. | 1. Grind point to suit work material.<br>2. Decrease the feed rates.<br>3. Resharpening early beforce too wear. |
| **Large chip of one flute and small chip of other flute** | 1. Improperly ground point.<br>2. Only one lip doing all the cutting | 1. Properly grind point.<br>2. Grind point with same point angle and length of lip<br>3. Grind with small lip height. |
| **Hole rough** | 1. Improperly ground point.<br>2. Unenough coolant supply<br>3. Too much feed.<br>4. Fixture not rigid. | 1. Properly grind point.<br>2. Supply coolant enough.<br>3. Decrease the feed rate.<br>4. Tighten the fixture or replace. |

## 16 Characteristic of DREAM DRILLS

- YG-1's Dream Drill Series are suitable for high speed and accurate drilling operations by special design and high quality.
- Good performance for Steels, Cast Irons, Tool steels, Alloy steels and Stainless steels.
- Rapid chip evacuation and excellent chip breaking can be achieved by special designed cutting edges on point and chip breakers on leading edges.
- High accuracy and stability.
- Longer tool life with TiAlN coating.
- Self-centering

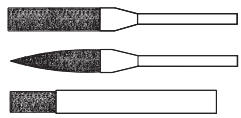
## 17 Honing Guide of DREAM DRILLS

■ **Dimension of Honing**




▶ Section A-A

■ **Scraper**



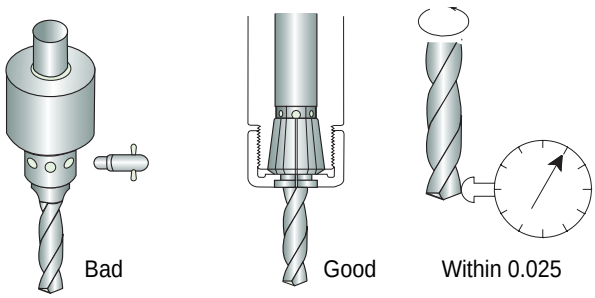
for Roughing (#140)

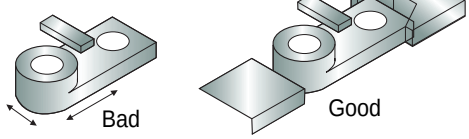
for Finishing (#230～#400)

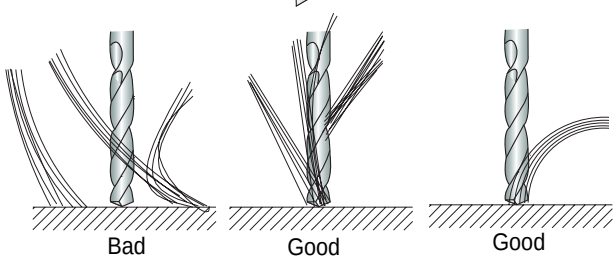
| Work Material | Alloy Steels | Mild Steels | Cast Iron |
|---|---|---|---|
| W(mm) | 0.15～0.2 | 0.1～0.15 | 0.03 |

▶ The dimension W of stocked products is 0.1～0.15.

## 18 Use of DREAM DRILLS




▶ Chucking with spring collet correctly.

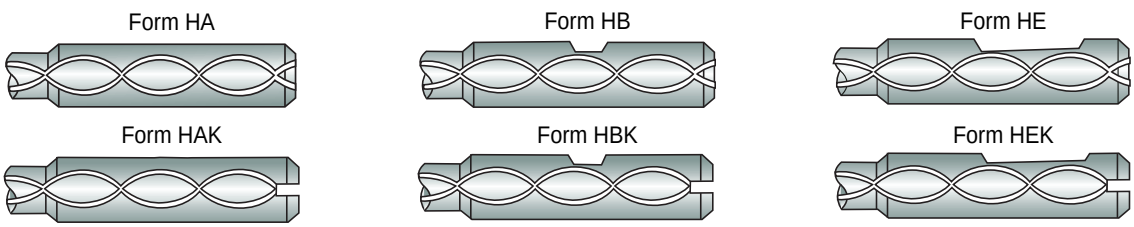
▶ Radial run out at cutting lip must not exceed 0.025 mm.

▶ Tighten clamp of work piece.

▶ Supply coolant enough to the entrance of hole.

▶ When using Dream Drills with Coolant holes, Supply high pressure coolant.

## 19 Shank Type DREAM DRILLS with Coolant Holes




▶ Shank Type of stocked products is Form HA.

▶ If you need other Shank Type, we can supply them.

# THREADING TOOLS

HSS COMBO TAPS (Spiral Point & Spiral Flute)

HSS SPIRAL FLUTE TAPS

HSS SPIRAL POINT TAPS

HSS TAPER PIPE TAPS

HSS FORMING TAPS

HSS STANDARD TAPS

HSS HAND TAPS

TECHNICAL DATA

YG-1 CO., LTD.

# Contents

## THREADING TOOLS

HSS TAPS

TECHNICAL DATA

YG-1 CO., LTD.

# Contents / THREADING TOOLS


HSS COMBO TAPS (Spiral Point & Spiral Flute) — COMBO TAPS
Multi Purpose tapping, YG-1's Patent, HSS-EX. for Prevention of Oversize Threads

HSS SPIRAL FLUTE TAPS — SPIRAL FLUTE TAPS
Tapping Blind Holes, HSS-E & HSS-PM

HSS SPIRAL POINT TAPS — SPIRAL POINT TAPS
Tapping Through Holes, HSS-E & HSS-PM

HSS TAPER PIPE TAPS — TAPER PIPE TAPS
Tapping NPT and NPTF Pipe threads

HSS FORMING TAPS — FORMING TAPS
Tapping by Forming Soft Materials, HSS-E & HSS-PM

HSS STANDARD TAPS — STANDARD TAPS
Spiral Point and Spiral Flute Taps

HSS HAND TAPS — HAND TAPS

TECHNICAL DATA — TECHNICAL DATA

# COMBO TAPS

**INCH**

● SPIRAL POINT TAP ● SPIRAL FLUTE TAP

| EDP No. | MODEL | Tool Material | Standard | Dimensions | Tolerance | Chamfer | Surface Treatment | Page |
|---|---|---|---|---|---|---|---|---|
| ● **T2 / T2-C** | | HSS-EX | UNC/UNF | ANSI | H2 ~ H6 | 2P ~ 3P | Bright TiCN | **263** |
| ● **T5 / T5-C** | | HSS-EX | M | ANSI | D3 ~ D8 | 2P ~ 3P | Bright TiCN | **265** |
| ● **T4 / T4-C** | | HSS-EX | UNC/UNF | ANSI | H2 ~ H6 | 4P ~ 5P | Bright TiCN | **266** |
| ● **T3 / T3-C** | | HSS-EX | M | ANSI | D3 ~ D8 | 4P ~ 5P | Bright TiCN | **268** |

# SPIRAL FLUTE TAPS

**INCH**

| EDP No. | MODEL | Tool Material | Standard | Dimensions | Tolerance | Chamfer | Surface Treatment | Page |
|---|---|---|---|---|---|---|---|---|
| **BB/BI/BF/BK** | | Super HSS | UNC/UNF | ANSI<br>DIN Length ANSI Shank | H2~H6 | 2P ~ 3P | Steam Oxide Hardslick | **271** |
| **H6/H7/H8** | | P-HSS | UNC/UNF | ANSI | H2~H5 | 2P ~ 3P | Bright / TiCN Hardslick | **272** |
| **B3/H9/B5/D6** | | P-HSS | UNC/UNF | ANSI | H2~H5 | 2P ~ 3P | Steam Oxide TiCN / TiN Hardslick | **273** |
| **B1/B0/B2/D2** | | HSSE-V3 | UNC/UNF | ANSI | H2~H6 | 2P ~ 3P | Bright Steam Oxide TiN / Hardslick | **275** |
| **G7/G8/G9/H0** | | P-HSS | UNC/UNF | ANSI Shank | H2~H3 | 4P ~ 5P | TiN Hardslick | **277** |
| **H1/H2/H3/H4** | | P-HSS | UNC/UNF | ANSI Shank | H3 | 4P ~ 5P | TiN Hardslick | **278** |
| **D4/D3/E0** | | HSSE-V3 | UNC/UNF | ANSI | H2~H5 | 2P ~ 3P | Bright Steam Oxide Hardslick | **279** |
| **C0/D8** | | HSSE-V3 | UNC/UNF | ANSI | H2~H5 | 2P ~ 3P | Bright Hardslick | **281** |
| **F4/F8/F6** | | HSS-V | UNC/UNF | ANSI | H2~H6 | 1.5P ~ 2P | Steam Oxide TiN / Hardslick | **282** |
| **G0/G1/G2** | | HSS-V | UNC/UNF | DIN Length ANSI Shank | H2~H6 | 2P ~ 3P | Bright TiN / Hardslick | **284** |
| **ST/SI** | | HSSE-V3 | UNC/UNF | ANSI | 2B | 1.5P ~ 2P | Hardslick | **286** |

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys | Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hasteloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Steel | | | | Stainless steel | | | Aluminium | | Cast iron | | Nickel Alloy | | Titanium | Copper | Brass | Bronze | Zine | Magnesium | |
| <15 | <23 | >24 ≤38 | <38 ≤44 | <23 | >24 ≤38 | >38 ≤44 | | | | | ≤38 | <38 ≤44 | ≤38 | | | <44 | | | Hardness (HRc) |
| <180 | <240 | >250 ≤350 | >350 ≤420 | <240 | >250 ≤350 | >350 ≤420 | | | ≤220 | ≥250 | ≤350 | >350 ≤420 | ≤350 | | | <420 | | | Hardness (BHN) |
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ◎ | ◎ | ◎ | ◎ | |
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ◎ | ◎ | ◎ | ◎ | |
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ◎ | ◎ | ◎ | ◎ | |
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ◎ | ◎ | ◎ | ◎ | |
| ○ | ◎ | | | ◎ | | | ○ | | | | | | | ○ | ○ | | ○ | ○ | |
| | | ○ | ◎ | | ○ | ◎ | | | | | ○ | ○ | ○ | | | ◎ | | | |
| | | | | | | | | | | | ◎ | ◎ | ◎ | | | | | | |
| ○ | ◎ | | | ◎ | | | ○ | | | | | | | ○ | ○ | | ○ | ○ | |
| ○ | ◎ | | | ◎ | | | ○ | | | | | | | ○ | ○ | | ○ | ○ | |
| ○ | ◎ | | | ◎ | | | ○ | | | | | | | ○ | ○ | | ○ | ○ | |
| | ◎ | ◎ | | ○ | ○ | | | | | | ○ | | | | | | | | |
| | | | | | | | ◎ | ◎ | | | | | | | | | | | |
| ◎ | ◎ | ○ | | ○ | ○ | | | ○ | | | | | | | | | | | |
| ◎ | ◎ | ○ | | ○ | ○ | | | ○ | | ○ | | | | | | | | | |
| ◎ | ◎ | ○ | | ○ | ○ | | | ○ | | ○ | | | | | | | | | |

# SPIRAL FLUTE TAPS

## METRIC

| EDP No. | MODEL | Tool Material | Standard | Dimensions | Tolerance | Chamfer | Surface Treatment | Page |
|---|---|---|---|---|---|---|---|---|
| **BH/BM BD/BO** | | Super HSS | M/MF | ANSI DIN Length ANSI Shank | D3~D7 | 2P~3P | Steam Oxide Hardslick | **287** |
| **BS/BT E6/E8/E9** | | HSSE-V3 | M/MF | ANSI DIN Length ANSI Shank | D3~D7 | 2P~3P | Steam Oxide TiCN / Hardslick | **288** |
| **BU/BV E2/E4/E5** | | HSSE-V3 | M/MF | ANSI DIN Length ANSI Shank | D3~D7 | 2P~3P | Steam Oxide TiCN / Hardslick | **289** |
| **BW/BX F1/F3** | | HSSE-V3 | M/MF | ANSI DIN Length ANSI Shank | D3~D6 | 2P~3P | Bright Hardslick | **290** |
| **G4/G5/G6** | | HSS-V | M/MF | ANSI | D3~D6 | 1.5P~2P | Bright TiCN / Hardslick | **291** |

# SPIRAL POINT TAPS

## INCH

| EDP No. | MODEL | Tool Material | Standard | Dimensions | Tolerance | Chamfer | Surface Treatment | Page |
|---|---|---|---|---|---|---|---|---|
| **M9/O1 N4/O5** | | Super HSS | UNC/UNF | ANSI DIN Length ANSI Shank | H2~H6 | 4P~5P | Steam Oxide Hardslick | **295** |
| **M5/M6/M7** | | P-HSS | UNC/UNF | ANSI | H2~H5 | 4P~5P | Bright / TiCN Hardslick | **296** |
| **I3/M8/I5/J6** | | P-HSS | UNC/UNF | ANSI | H2~H5 | 4P~5P | Steam Oxide TiCN / TiN Hardslick | **297** |
| **I0/I2/J2** | | HSSE-V3 | UNC/UNF | ANSI | H2~H6 | 4P~5P | Steam Oxide TiN / Hardslick | **299** |
| **M0/M1/M2/M3** | | P-HSS | UNC/UNF | ANSI Long Shank | H2~H3 | 4P~5P | TiN Hardslick | **301** |
| **J4/J8/J3** | | HSSE-V3 | UNC/UNF | ANSI | H2~H5 | 4P~5P | Bright Steam Oxide Hardslick | **302** |
| **K9/L0/L1** | | HSS-V | UNC/UNF | ANSI | H2~H6 | 4P~5P | Bright TiN / Hardslick | **304** |
| **L3/L4/L5** | | HSS-V | UNC/UNF | DIN Length ANSI Shank | H2~H6 | 4P~5P | Bright TiN / Hardslick | **306** |
| **ST/SI** | | HSSE-V3 | UNC/UNF | ANSI | 2B | 4.5P~5P | Hardslick | **307** |

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys | Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hasteiloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Steel | | | | Stainless steel | | | Aluminium | | Cast iron | | Nickel Alloy | | Titanium | Copper | Brass | Bronze | Zine | Magnesium | |
| <15 | <23 | >24 ≤38 | <38 ≤44 | <23 | >24 ≤38 | >38 ≤44 | | | | | ≤38 | <38 ≤44 | ≤38 | | | <44 | | | Hardness (HRc) |
| <180 | <240 | >250 ≤350 | >350 ≤420 | <240 | >250 ≤350 | >350 ≤420 | | | ≤220 | ≥250 | ≤350 | >350 ≤420 | ≤350 | | | <420 | | | Hardness (BHN) |
| ○ | ◎ | | | ◎ | | | ○ | | | | | | | ○ | ○ | | ○ | ○ | |
| ○ | ◎ | | | ◎ | | | ○ | | | | | | | ○ | ○ | | ○ | ○ | |
| | ◎ | ◎ | | ○ | ○ | | | | | | ○ | | | | | | | | |
| | | | | | | | ◎ | ◎ | | | | | | | | | | | |
| ◎ | ◎ | ○ | | ○ | ○ | | | ○ | | ○ | | | | | | | | | |
| ○ | ◎ | | | ◎ | | | ○ | | | | | | | ○ | ○ | | ○ | ○ | |
| | | ○ | ◎ | | ○ | ◎ | | | | | ○ | ○ | ○ | | | ◎ | | | |
| | | | | | | | | | | | ◎ | ◎ | ◎ | | | | | | |
| ○ | ◎ | | | ◎ | | | ○ | | | | | | | ○ | ○ | | ○ | ○ | |
| ○ | ◎ | | | ◎ | | | ○ | | | | | | | ○ | ○ | | ○ | ○ | |
| | ◎ | ◎ | | ○ | ○ | | | | | | ○ | | | | | | | | |
| ◎ | ◎ | ○ | | ○ | ○ | | | ○ | | ○ | ○ | | | | | | | | |
| ◎ | ◎ | ○ | | ○ | ○ | | | ○ | | ○ | | | | | | | | | |
| ◎ | ◎ | ○ | | ○ | ○ | | | ○ | | ○ | | | | | | | | | |

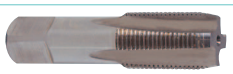
# SPIRAL POINT TAPS

### METRIC

| EDP No. | MODEL | Tool Material | Standard | Dimensions | Tolerance | Chamfer | Surface Treatment | Page |
|---|---|---|---|---|---|---|---|---|
| **N7/N8 N3/O3** | | Super HSS | M/MF | ANSI DIN Length ANSI Shank | D3~D7 | 4P~5P | Steam Oxide Hardslick | **308** |
| **O9/IA K3/K5/K6** | | HSSE-V3 | M/MF | ANSI DIN Length ANSI Shank | D3~D7 | 4P~5P | Steam Oxide TiCN / Hardslick | **309** |
| **IB/IC J9/K7/K2** | | HSSE-V3 | M/MF | ANSI DIN Length ANSI Shank | D3~D7 | 4P~5P | Steam Oxide TiCN / Hardslick | **310** |
| **L7/L8/L9** | | HSS-V | M/MF | ANSI | D3~D6 | 4P~5P | Bright TiCN / Hardslick | **311** |

# TAPER PIPE TAPS

### INCH

| EDP No. | MODEL | Tool Material | Standard | Dimensions | Tolerance | Chamfer | Surface Treatment | Page |
|---|---|---|---|---|---|---|---|---|
| **Q0/Q1/Q6** | | HSSE-V3 | NPT/F | ANSI | | 2P~3P | Bright Steam Oxide Hardslick | **315** |
| **Q9/R0/R1** | | HSSE-V3 | NPT/F | ANSI | | 2P~3P | Bright / TiN Hardslick | **316** |
| **R7/R8/R9/S0** |  | HSSE-V3 | NPT/F | ANSI | | 2P~3P | Bright / TiN Hardslick Nitrided-Steam Oxide | **317** |
| **S1/S2** | | HSSE-V3 | NPTF | ANSI | | 2P~3P | Bright / TiCN | **318** |

# FORMING TAPS

### INCH

| EDP No. | MODEL | Tool Material | Standard | Dimensions | Tolerance | Chamfer | Surface Treatment | Page |
|---|---|---|---|---|---|---|---|---|
| **Z0/Z1/Z2/Z3** | | HSSE-V3 | UNC/UNF | ANSI | H3~H8 | 4P~5P 1.5P~2P | Bright / TiN | **321** |
| **Z4/Z5/Z6/Z7** | | HSSE-V3 | UNC/UNF | ANSI | H3~H8 | 4P~5P 1.5P~2P | Bright / TiN | **322** |

### METRIC

| EDP No. | MODEL | Tool Material | Standard | Dimensions | Tolerance | Chamfer | Surface Treatment | Page |
|---|---|---|---|---|---|---|---|---|
| **Z8/ZA/ZC** | | HSSE-V3 | M/MF | ANSI | D5~D11 | 4P~5P 1.5P~2P | Bright TiN / TiCN | **323** |

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys | Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hasteloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Steel | | | | Stainless steel | | | Aluminium | | Cast iron | | Nickel Alloy | | Titanium | Copper | Brass | Bronze | Zine | Magnesium | |
| <15 | <23 | >24 ≤38 | <38 ≤44 | <23 | >24 ≤38 | >38 ≤44 | | | | | ≤38 | <38 ≤44 | ≤38 | | | <44 | | | Hardness (HRc) |
| <180 | <240 | >250 ≤350 | >350 ≤420 | <240 | >250 ≤350 | >350 ≤420 | | | ≤220 | ≥250 | ≤350 | >350 ≤420 | ≤350 | | | <420 | | | Hardness (BHN) |
| ○ | ◎ | | | ◎ | | | ○ | | | | | | | ○ | ○ | | ○ | ○ | |
| | ◎ | ○ | | ◎ | ○ | | | ○ | | | | | | | | | | | |
| | ◎ | ◎ | | ○ | ○ | | | | | | ○ | | | | | | | | |
| ◎ | ◎ | ○ | | ○ | ○ | | | ○ | | ○ | | | | | | | | | |
| ○ | ◎ | ○ | | ◎ | ○ | | | ○ | | ○ | | | | | | | | | |
| ◎ | ◎ | ○ | | | | | | | ◎ | ◎ | | | | | | | | | |
| ◎ | ◎ | ○ | | | | | | | ◎ | ◎ | | | | | | | | | |
| ◎ | ◎ | ○ | | | | | | | ◎ | ◎ | | | | | | | | | |
| ◎ | ◎ | | | ◎ | | | ◎ | ◎ | | | | | | ◎ | ◎ | | ◎ | ◎ | |
| ◎ | ◎ | | | ◎ | | | ◎ | ◎ | | | | | | ◎ | ◎ | | ◎ | ◎ | |
| ◎ | ◎ | | | ◎ | | | ◎ | ◎ | | | | | | ◎ | ◎ | | ◎ | ◎ | |

# STANDARD TAPS

## INCH

| EDP No. | MODEL | Tool Material | Standard | Dimensions | Tolerance | Chamfer | Surface Treatment | Page |
|---|---|---|---|---|---|---|---|---|
| **C2/C3/C4/D9** | | HSSE-V3 | UNC/UNF | ANSI | H2~H6 | 1.5P~2P | Steam Oxide Bright / TiN Hardslick | **327** |
| **I9/J0/J1/J7** | | HSSE-V3 | UNC/UNF | ANSI | H2~H6 | 4P~5P | Steam Oxide Bright / TiN Hardslick | **328** |

# HAND TAPS

## INCH

| EDP No. | MODEL | Tool Material | Standard | Dimensions | Tolerance | Chamfer | Surface Treatment | Page |
|---|---|---|---|---|---|---|---|---|
| **A3/A5/A7** | | HSS-V | UNC/UNF | ANSI | H2~H4 | 9/4/1.5P | Bright | **331** |

## METRIC

| EDP No. | MODEL | Tool Material | Standard | Dimensions | Tolerance | Chamfer | Surface Treatment | Page |
|---|---|---|---|---|---|---|---|---|
| **A6/A9** | | HSS-V | M | ANSI | D3~D9 | 4/1.5P | Bright | **332** |

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys | Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hasteiloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Steel | | | | Stainless steel | | | Aluminium | | Cast iron | | Nickel Alloy | | Titanium | Copper | Brass | Bronze | Zine | Magnesium | |
| <15 | <23 | >24 ≤38 | <38 ≤44 | <23 | >24 ≤38 | >38 ≤44 | | | | | ≤38 | <38 ≤44 | ≤38 | | | <44 | | | Hardness (HRc) |
| <180 | <240 | >250 ≤350 | >350 ≤420 | <240 | >250 ≤350 | >350 ≤420 | | | ≤220 | ≥250 | ≤350 | >350 ≤420 | ≤350 | | | <420 | | | Hardness (BHN) |
| ◎ | ◎ | ○ | | ○ | ○ | | | ○ | | ○ | | | | | | | | | |
| ◎ | ◎ | ○ | | ○ | ○ | | | ○ | | ○ | | | | | | | | | |
| ◎ | ◎ | | | ◎ | | | ◎ | ◎ | | | | | | ◎ | ◎ | | ◎ | ◎ | |
| ◎ | ◎ | ○ | | ○ | ○ | | | ○ | | ○ | | | | | | | | | |

# HARDslick

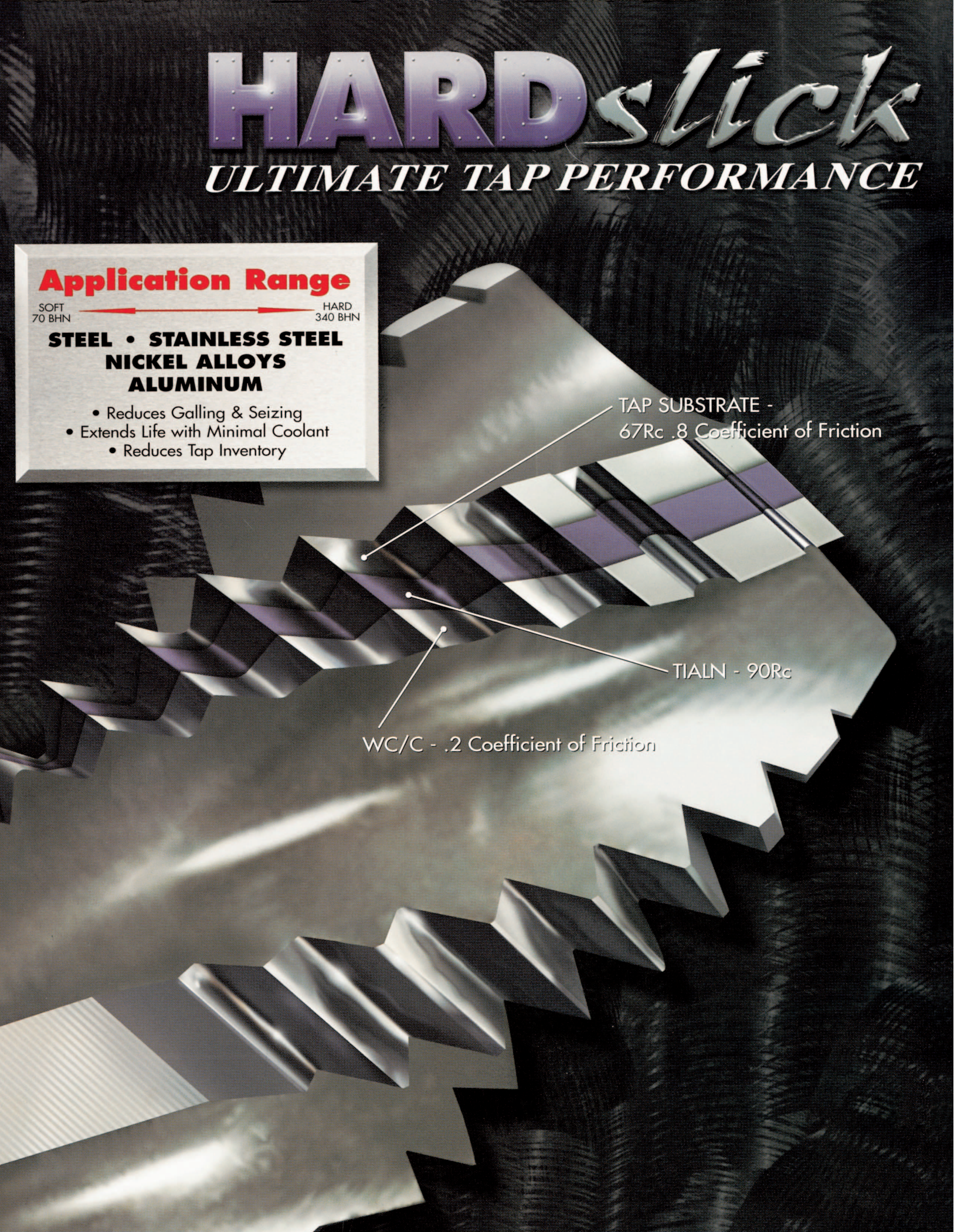
## ULTIMATE TAP PERFORMANCE

### Application Range

SOFT 70 BHN — HARD 340 BHN

**STEEL • STAINLESS STEEL**
**NICKEL ALLOYS**
**ALUMINUM**

- Reduces Galling & Seizing
- Extends Life with Minimal Coolant
- Reduces Tap Inventory



# HSS

Being the best through innovation

# COMBO TAPS

**Spiral Point and Spiral Flute Taps**
**Multi Purpose tapping, YG-1's Patent, HSS-EX**
**for Prevention of Oversize Threads**

## Spiral Point and Spiral Flute Taps

Multi Purpose tapping, YG-1's Patent, HSS-EX
for Prevention of Oversize Threads

### INCH

● SPIRAL POINT TAP ● SPIRAL FLUTE TAP

| EDP No. | MODEL | Tool Material | Standard | Dimensions | Tolerance | Chamfer | Surface Treatment | Page |
|---|---|---|---|---|---|---|---|---|
| ● **T2 / T2-C** | | HSS-EX | UNC/UNF | ANSI | H2 ~ H6 | 2P ~ 3P | Bright TiCN | **263** |
| ● **T5 / T5-C** | | HSS-EX | M | ANSI | D3 ~ D8 | 2P ~ 3P | Bright TiCN | **265** |
| ● **T4 / T4-C** | | HSS-EX | UNC/UNF | ANSI | H2 ~ H6 | 4P ~ 5P | Bright TiCN | **266** |
| ● **T3 / T3-C** | | HSS-EX | M | ANSI | D3 ~ D8 | 4P ~ 5P | Bright TiCN | **268** |

# YG COMBO TAPS

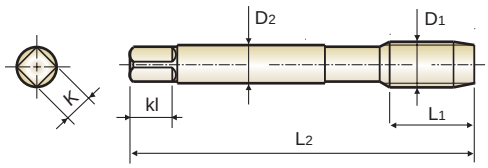
Combo TAP

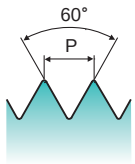
T2 / T2-C SERIES

## SPIRAL FLUTE TAPS for Multi-Purpose

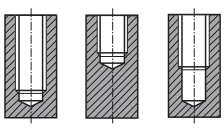
- Reduces Tap breakage, ensures accurate thread depth
- Eliminates loose threads due to Tap Overfeeding
- Improves Thread quality & chip evacuation
- Allows Tapping of many metals including Stainless Steel & Steels
- Eliminates "Bird Nests" around tap shank

ANSI




Hole type



HSS-EX | UNC UNF | H2~H6 | 60° | 2P~3P | Bright | TiCN | R40

Unit : Inch

| EDP No. Bright Finish | EDP No. TiCN Coated | SIZE TPI D1 | Limit | Thread Length L1 | Overall Length L2 | Shank Diameter D2 | Square Size K | Square Length kl | No. of Flute |
|---|---|---|---|---|---|---|---|---|---|
| **T2162** | **T2162C** | #4 - 40 UNC | **H2** | .236 | 1.88 | .141 | .110 | .188 | 2 |
| **T2182** | **T2182C** | #4 - 48 UNF | **H2** | .236 | 1.88 | .141 | .110 | .188 | 2 |
| **T2202** | **T2202C** | #5 - 40 UNC | **H2** | .236 | 1.94 | .141 | .110 | .188 | 3 |
| **T2222** | **T2222C** | #5 - 44 UNF | **H2** | .236 | 1.94 | .141 | .110 | .188 | 3 |
| **T2243** | **T2243C** | #6 - 32 UNC | **H3** | .276 | 2.00 | .141 | .110 | .188 | 3 |
| **T2262** | **T2262C** | #6 - 40 UNF | **H2** | .276 | 2.00 | .141 | .110 | .188 | 3 |
| **T2283** | **T2283C** | #8 - 32 UNC | **H3** | .276 | 2.13 | .168 | .131 | .250 | 3 |
| **T2302** | **T2302C** | #8 - 36 UNF | **H2** | .276 | 2.13 | .168 | .131 | .250 | 3 |
| **T2323** | **T2323C** | #10 - 24 UNC | **H3** | .354 | 2.38 | .194 | .152 | .250 | 3 |
| **T2343** | **T2343C** | #10 - 32 UNF | **H3** | .276 | 2.38 | .194 | .152 | .250 | 3 |
| **T2363** | **T2363C** | #12 - 24 UNC | **H3** | .354 | 2.38 | .220 | .165 | .281 | 3 |
| **T2383** | **T2383C** | #12 - 28 UNF | **H3** | .276 | 2.38 | .220 | .165 | .281 | 3 |
| **T2403** | **T2403C** | 1/4 - 20 UNC | **H3** | .433 | 2.50 | .255 | .191 | .312 | 3 |
| **T2405** | **T2405C** | 1/4 - 20 UNC | H5 | .433 | 2.50 | .255 | .191 | .312 | 3 |
| **T2423** | **T2423C** | 1/4 - 28 UNF | **H3** | .354 | 2.50 | .255 | .191 | .312 | 3 |
| **T2424** | **T2424C** | 1/4 - 28 UNF | H4 | .354 | 2.50 | .255 | .191 | .312 | 3 |
| **T2443** | **T2443C** | 5/16 - 18 UNC | **H3** | .472 | 2.72 | .318 | .238 | .375 | 3 |
| **T2445** | **T2445C** | 5/16 - 18 UNC | H5 | .472 | 2.72 | .318 | .238 | .375 | 3 |
| **T2463** | **T2463C** | 5/16 - 24 UNF | **H3** | .394 | 2.72 | .318 | .238 | .375 | 3 |
| **T2465** | **T2465C** | 5/16 - 24 UNF | H5 | .394 | 2.72 | .318 | .238 | .375 | 3 |

- Bold H Limits denote most popular limits.
- Coating(TiN, TiAlN or Hardslick) or Surface Treatment(Steam Oxide) is available on your request.
- Coating Codes for Combo Tap
  Bright Finish No. + N(Tin), F(TiAlN), H(Hardslick), S(Steam Oxide)

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ |

| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ◎ | ◎ | ◎ | ◎ |

# COMBO TAPS

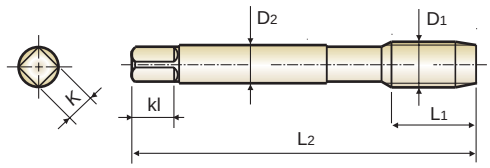
Combo TAP

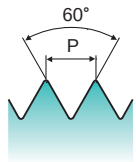
T2 / T2-C SERIES

## SPIRAL FLUTE TAPS for Multi-Purpose

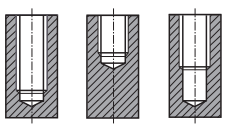
- Reduces Tap breakage, ensures accurate thread depth
- Eliminates loose threads due to Tap Overfeeding
- Improves Thread quality & chip evacuation
- Allows Tapping of many metals including Stainless Steel & Steels
- Eliminates "Bird Nests" around tap shank

ANSI




Hole type



HSS-EX | UNC UNF | H2~H6 | 60° | 2P~3P | Bright | TiCN | R40

Unit : Inch

| EDP No. | | SIZE TPI | Limit | Thread Length | Overall Length | Shank Diameter | Square Size | Square Length | No. of Flute |
|---|---|---|---|---|---|---|---|---|---|
| Bright Finish | TiCN Coated | D1 | | L1 | L2 | D2 | K | kl | |
| **T2483** | **T2483C** | 3/8 - 16 UNC | **H3** | .551 | 2.94 | .381 | .286 | .438 | 3 |
| **T2485** | **T2485C** | 3/8 - 16 UNC | H5 | .551 | 2.94 | .381 | .286 | .438 | 3 |
| **T2503** | **T2503C** | 3/8 - 24 UNF | **H3** | .394 | 2.94 | .381 | .286 | .438 | 3 |
| **T2504** | **T2504C** | 3/8 - 24 UNF | H4 | .394 | 2.94 | .381 | .286 | .438 | 3 |
| **T2523** | **T2523C** | 7/16 - 14 UNC | **H3** | .591 | 3.16 | .323 | .242 | .406 | 3 |
| **T2525** | **T2525C** | 7/16 - 14 UNC | H5 | .591 | 3.16 | .323 | .242 | .406 | 3 |
| **T2543** | **T2543C** | 7/16 - 20 UNF | **H3** | .472 | 3.16 | .323 | .242 | .406 | 3 |
| **T2545** | **T2545C** | 7/16 - 20 UNF | H5 | .472 | 3.16 | .323 | .242 | .406 | 3 |
| **T2565** | **T2565C** | 1/2 - 13 UNC | H5 | .630 | 3.38 | .367 | .275 | .438 | 3 |
| **T2585** | **T2585C** | 1/2 - 20 UNF | H5 | .472 | 3.38 | .367 | .275 | .438 | 3 |
| **T2605** | **T2605C** | 9/16 - 12 UNC | **H5** | .709 | 3.59 | .429 | .322 | .500 | 3 |
| **T2625** | **T2625C** | 9/16 - 18 UNF | **H5** | .512 | 3.59 | .429 | .322 | .500 | 3 |
| **T2645** | **T2645C** | 5/8 - 11 UNC | H5 | .748 | 3.81 | .480 | .360 | .562 | 4 |
| **T2665** | **T2665C** | 5/8 - 18 UNF | H5 | .512 | 3.81 | .480 | .360 | .562 | 4 |
| **T2705** | **T2705C** | 3/4 - 10 UNC | H5 | .827 | 4.25 | .590 | .442 | .688 | 4 |
| **T2725** | **T2725C** | 3/4 - 16 UNF | H5 | .591 | 4.25 | .590 | .442 | .688 | 4 |
| **T2746** | **T2746C** | 7/8 - 9 UNC | H6 | .827 | 4.69 | .697 | .523 | .750 | 4 |
| **T2766** | **T2766C** | 7/8 - 14 UNF | H6 | .709 | 4.69 | .697 | .523 | .750 | 4 |
| **T2786** | **T2786C** | 1" - 8 UNC | H6 | .984 | 5.13 | .800 | .600 | .812 | 4 |
| **T2806** | **T2806C** | 1" - 12 UNF | H6 | .709 | 5.13 | .800 | .600 | .812 | 4 |

- Bold H Limits denote most popular limits.
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- Coating Codes for Combo Tap
  Bright Finish No. + N(Tin), F(TiAlN), H(Hardslick), S(Steam Oxide)

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ |

| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ◎ | ◎ | ◎ | ◎ |

# YG COMBO TAPS

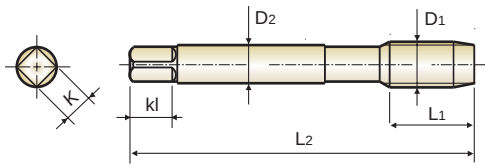
Combo TAP

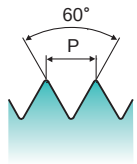
T5 / T5-C SERIES

## SPIRAL FLUTE TAPS for Multi-Purpose

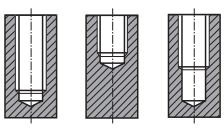
- Reduces Tap breakage, ensures accurate thread depth
- Eliminates loose threads due to Tap Overfeeding
- Improves Thread quality & chip evacuation
- Allows Tapping of many metals including Stainless Steel & Steels
- Eliminates "Bird Nests" around tap shank

ANSI




Hole type



HSS-EX | M | D3~D8 | 60° | 2P~3P | Bright | TiCN | R40

Unit : Inch

| EDP No. Bright Finish | EDP No. TiCN Coated | SIZE D1 | TPI | Limit | Thread Length L1 | Overall Length L2 | Shank Diameter D2 | Square Size K | Square Length kl | No. of Flute |
|---|---|---|---|---|---|---|---|---|---|---|
| T5203 | T5203C | M3 x | 0.5 | D3 | .197 | 1.94 | .141 | .110 | .188 | 3 |
| T5224 | T5224C | M3.5 x | 0.6 | D4 | .276 | 2.00 | .141 | .110 | .188 | 3 |
| T5244 | T5244C | M4 x | 0.7 | D4 | .276 | 2.13 | .168 | .131 | .250 | 3 |
| T5284 | T5284C | M5 x | 0.8 | D4 | .354 | 2.38 | .194 | .152 | .250 | 3 |
| T5315 | T5315C | M6 x | 1.0 | D5 | .433 | 2.50 | .255 | .191 | .312 | 3 |
| T5345 | T5345C | M7 x | 1.0 | D5 | .433 | 2.72 | .318 | .238 | .375 | 3 |
| T5365 | T5365C | M8 x | 1.25 | D5 | .472 | 2.72 | .318 | .238 | .375 | 3 |
| T5375 | T5375C | M8 x | 1.0 | D5 | .433 | 2.72 | .318 | .238 | .375 | 3 |
| T5426 | T5426C | M10 x | 1.5 | D6 | .512 | 2.94 | .381 | .286 | .438 | 3 |
| T5435 | T5435C | M10 x | 1.25 | D5 | .472 | 2.94 | .381 | .286 | .438 | 3 |
| T5506 | T5506C | M12 x | 1.75 | D6 | .591 | 3.38 | .367 | .275 | .438 | 3 |
| T5525 | T5525C | M12 x | 1.25 | D5 | .551 | 3.38 | .367 | .275 | .438 | 3 |
| T5547 | T5547C | M14 x | 2.0 | D7 | .709 | 3.59 | .429 | .322 | .500 | 3 |
| T5556 | T5556C | M14 x | 1.5 | D6 | .551 | 3.59 | .429 | .322 | .500 | 3 |
| T5607 | T5607C | M16 x | 2.0 | D7 | .709 | 3.81 | .480 | .360 | .562 | 3 |
| T5616 | T5616C | M16 x | 1.5 | D6 | .551 | 3.81 | .480 | .360 | .562 | 3 |
| T5657 | T5657C | M18 x | 2.5 | D7 | .787 | 4.03 | .542 | .406 | .625 | 4 |
| T5676 | T5676C | M18 x | 1.5 | D6 | .551 | 4.03 | .542 | .406 | .625 | 4 |
| T5707 | T5707C | M20 x | 2.5 | D7 | .787 | 4.47 | .652 | .489 | .688 | 4 |
| T5726 | T5726C | M20 x | 1.5 | D6 | .551 | 4.47 | .652 | .489 | .688 | 4 |
| T5747 | T5747C | M22 x | 2.5 | D7 | .787 | 4.69 | .697 | .523 | .750 | 4 |
| T5766 | T5766C | M22 x | 1.5 | D6 | .551 | 4.69 | .697 | .523 | .750 | 4 |
| T5788 | T5788C | M24 x | 3.0 | D8 | .945 | 4.91 | .760 | .570 | .750 | 4 |

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- Coating Codes for Combo Tap
  Bright Finish No. + N(Tin), F(TiAlN), H(Hardslick), S(Steam Oxide)

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ |

| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ◎ | ◎ | ◎ | ◎ |

# COMBO TAPS

Combo TAP

T4 / T4-C SERIES

## SPIRAL POINT TAPS for Multi-Purpose

- Reduces Tap breakage, ensures accurate thread depth
- Eliminates loose threads due to Tap Overfeeding
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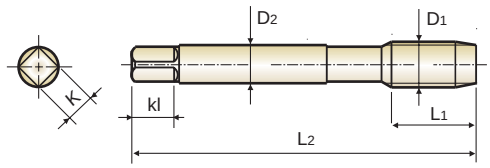
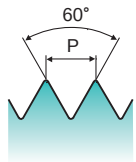
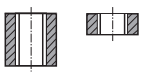
ANSI




Hole type



HSS-EX | UNC UNF | H2~H6 | 60° | 4P~5P | Bright | TiCN

Unit : Inch

| EDP No. | | SIZE TPI | Limit | Thread Length | Overall Length | Shank Diameter | Square Size | Square Length | No. of Flute |
|---|---|---|---|---|---|---|---|---|---|
| Bright Finish | TiCN Coated | D1 | | L1 | L2 | D2 | K | kl | |
| T4162 | T4162C | #4 - 40 UNC | H2 | .335 | 1.88 | .141 | .110 | .188 | 2 |
| T4182 | T4182C | #4 - 48 UNF | H2 | .335 | 1.88 | .141 | .110 | .188 | 2 |
| T4202 | T4202C | #5 - 40 UNC | H2 | .374 | 1.94 | .141 | .110 | .188 | 3 |
| T4222 | T4222C | #5 - 44 UNF | H2 | .374 | 1.94 | .141 | .110 | .188 | 3 |
| T4243 | T4243C | #6 - 32 UNC | H3 | .413 | 2.00 | .141 | .110 | .188 | 3 |
| T4262 | T4262C | #6 - 40 UNF | H2 | .413 | 2.00 | .141 | .110 | .188 | 3 |
| T4283 | T4283C | #8 - 32 UNC | H3 | .453 | 2.13 | .168 | .131 | .250 | 3 |
| T4302 | T4302C | #8 - 36 UNF | H2 | .453 | 2.13 | .168 | .131 | .250 | 3 |
| T4323 | T4323C | #10 - 24 UNC | H3 | .531 | 2.38 | .194 | .152 | .250 | 3 |
| T4343 | T4343C | #10 - 32 UNF | H3 | .531 | 2.38 | .194 | .152 | .250 | 3 |
| T4363 | T4363C | #12 - 24 UNC | H3 | .571 | 2.38 | .220 | .165 | .281 | 3 |
| T4383 | T4383C | #12 - 28 UNF | H3 | .571 | 2.38 | .220 | .165 | .281 | 3 |
| T4403 | T4403C | 1/4 - 20 UNC | H3 | .591 | 2.50 | .255 | .191 | .312 | 3 |
| T4405 | T4405C | 1/4 - 20 UNC | H5 | .591 | 2.50 | .255 | .191 | .312 | 3 |
| T4423 | T4423C | 1/4 - 28 UNF | H3 | .591 | 2.50 | .255 | .191 | .312 | 3 |
| T4424 | T4424C | 1/4 - 28 UNF | H4 | .591 | 2.50 | .255 | .191 | .312 | 3 |
| T4443 | T4443C | 5/16 - 18 UNC | H3 | .669 | 2.72 | .318 | .238 | .375 | 3 |
| T4445 | T4445C | 5/16 - 18 UNC | H5 | .669 | 2.72 | .318 | .238 | .375 | 3 |
| T4463 | T4463C | 5/16 - 24 UNF | H3 | .669 | 2.72 | .318 | .238 | .375 | 3 |
| T4465 | T4465C | 5/16 - 24 UNF | H5 | .669 | 2.72 | .318 | .238 | .375 | 3 |

- Bold H Limits denote most popular limits.
- Coating(TiN, TiAlN or Hardslick) or Surface Treatment(Steam Oxide) is available on your request.
- Coating Codes for Combo Tap
  Bright Finish No. + N(Tin), F(TiAlN), H(Hardslick), S(Steam Oxide)

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ |

| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ◎ | ◎ | ◎ | ◎ |

# YG COMBO TAPS

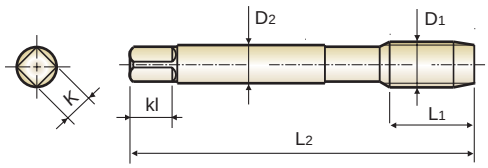
Combo TAP

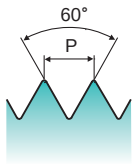
T4 / T4-C SERIES

## SPIRAL POINT TAPS for Multi-Purpose

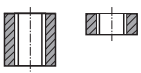
- Reduces Tap breakage, ensures accurate thread depth
- Eliminates loose threads due to Tap Overfeeding
- Improves Thread quality & chip evacuation
- Allows Tapping of many metals including Stainless Steel & Steels
- Eliminates "Bird Nests" around tap shank

ANSI




Hole type



HSS-EX | UNC UNF | H2~H6 | 60° | 4P~5P | Bright | TiCN

Unit : Inch

| EDP No. Bright Finish | EDP No. TiCN Coated | SIZE TPI D1 | Limit | Thread Length L1 | Overall Length L2 | Shank Diameter D2 | Square Size K | Square Length kl | No. of Flute |
|---|---|---|---|---|---|---|---|---|---|
| **T4483** | **T4483C** | 3/8 - 16 UNC | **H3** | .748 | 2.94 | .381 | .286 | .438 | 3 |
| **T4485** | **T4485C** | 3/8 - 16 UNC | H5 | .748 | 2.94 | .381 | .286 | .438 | 3 |
| **T4503** | **T4503C** | 3/8 - 24 UNF | **H3** | .748 | 2.94 | .381 | .286 | .438 | 3 |
| **T4504** | **T4504C** | 3/8 - 24 UNF | H4 | .748 | 2.94 | .381 | .286 | .438 | 3 |
| **T4523** | **T4523C** | 7/16 - 14 UNC | **H3** | .866 | 3.16 | .323 | .242 | .406 | 3 |
| **T4525** | **T4525C** | 7/16 - 14 UNC | H5 | .866 | 3.16 | .323 | .242 | .406 | 3 |
| **T4543** | **T4543C** | 7/16 - 20 UNF | **H3** | .866 | 3.16 | .323 | .242 | .406 | 3 |
| **T4545** | **T4545C** | 7/16 - 20 UNF | H5 | .866 | 3.16 | .323 | .242 | .406 | 3 |
| **T4565** | **T4565C** | 1/2 - 13 UNC | H5 | .984 | 3.38 | .367 | .275 | .438 | 3 |
| **T4585** | **T4585C** | 1/2 - 20 UNF | H5 | .984 | 3.38 | .367 | .275 | .438 | 3 |
| **T4605** | **T4605C** | 9/16 - 12 UNC | **H5** | .984 | 3.59 | .429 | .322 | .500 | 3 |
| **T4625** | **T4625C** | 9/16 - 18 UNF | **H5** | .984 | 3.59 | .429 | .322 | .500 | 3 |
| **T4645** | **T4645C** | 5/8 - 11 UNC | H5 | 1.083 | 3.81 | .480 | .360 | .562 | 3 |
| **T4665** | **T4665C** | 5/8 - 18 UNF | H5 | 1.083 | 3.81 | .480 | .360 | .562 | 3 |
| **T4705** | **T4705C** | 3/4 - 10 UNC | H5 | 1.201 | 4.25 | .590 | .442 | .688 | 3 |
| **T4725** | **T4725C** | 3/4 - 16 UNF | H5 | 1.201 | 4.25 | .590 | .442 | .688 | 3 |
| **T4746** | **T4746C** | 7/8 - 9 UNC | H6 | 1.339 | 4.69 | .697 | .523 | .750 | 3 |
| **T4766** | **T4766C** | 7/8 - 14 UNF | H6 | 1.339 | 4.69 | .697 | .523 | .750 | 3 |
| **T4786** | **T4786C** | 1" - 8 UNC | H6 | 1.496 | 5.13 | .800 | .600 | .812 | 3 |
| **T4806** | **T4806C** | 1" - 12 UNF | H6 | 1.496 | 5.13 | .800 | .600 | .812 | 3 |

- Bold H Limits denote most popular limits.
- Coating(TiN, TiAlN or Hardslick) or Surface Treatment(Steam Oxide) is available on your request.
- Coating Codes for Combo Tap
  Bright Finish No. + N(Tin), F(TiAlN), H(Hardslick), S(Steam Oxide)

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ |

| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ◎ | ◎ | ◎ | ◎ |

# YG COMBO TAPS

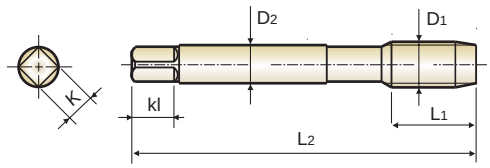
Combo TAP

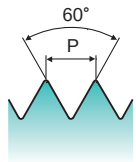
T3 / T3-C SERIES

## SPIRAL POINT TAPS for Multi-Purpose

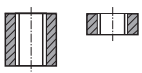
- Reduces Tap breakage, ensures accurate thread depth
- Eliminates loose threads due to Tap Overfeeding
- Improves Thread quality & chip evacuation
- Allows Tapping of many metals including Stainless Steel & Steels
- Eliminates "Bird Nests" around tap shank

ANSI




Hole type



HSS-EX | M | D3~D8 | 60° | 4P~5P | Bright | TiCN

Unit : Inch

| EDP No. | | SIZE | TPI | Limit | Thread Length | Overall Length | Shank Diameter | Square Size | Square Length | No. of Flute |
|---|---|---|---|---|---|---|---|---|---|---|
| Bright Finish | TiCN Coated | $D_1$ | | | $L_1$ | $L_2$ | $D_2$ | K | kl | |
| T3203 | T3203C | M3 | x 0.5 | D3 | .374 | 1.94 | .141 | .110 | .188 | 3 |
| T3224 | T3224C | M3.5 | x 0.6 | D4 | .413 | 2.00 | .141 | .110 | .188 | 3 |
| T3244 | T3244C | M4 | x 0.7 | D4 | .453 | 2.13 | .168 | .131 | .250 | 3 |
| T3284 | T3284C | M5 | x 0.8 | D4 | .531 | 2.38 | .194 | .152 | .250 | 3 |
| T3315 | T3315C | M6 | x 1.0 | D5 | .591 | 2.50 | .255 | .191 | .312 | 3 |
| T3345 | T3345C | M7 | x 1.0 | D5 | .669 | 2.72 | .318 | .238 | .375 | 3 |
| T3365 | T3365C | M8 | x 1.25 | D5 | .669 | 2.72 | .318 | .238 | .375 | 3 |
| T3375 | T3375C | M8 | x 1.0 | D5 | .669 | 2.72 | .318 | .238 | .375 | 3 |
| T3426 | T3426C | M10 | x 1.5 | D6 | .748 | 2.94 | .381 | .286 | .438 | 3 |
| T3435 | T3435C | M10 | x 1.25 | D5 | .748 | 2.94 | .381 | .286 | .438 | 3 |
| T3506 | T3506C | M12 | x 1.75 | D6 | .984 | 3.38 | .367 | .275 | .438 | 3 |
| T3525 | T3525C | M12 | x 1.25 | D5 | .984 | 3.38 | .367 | .275 | .438 | 3 |
| T3547 | T3547C | M14 | x 2.0 | D7 | .984 | 3.59 | .429 | .322 | .500 | 3 |
| T3556 | T3556C | M14 | x 1.5 | D6 | .984 | 3.59 | .429 | .322 | .500 | 3 |
| T3607 | T3607C | M16 | x 2.0 | D7 | 1.083 | 3.81 | .480 | .360 | .562 | 3 |
| T3616 | T3616C | M16 | x 1.5 | D6 | 1.083 | 3.81 | .480 | .360 | .562 | 3 |
| T3657 | T3657C | M18 | x 2.5 | D7 | 1.083 | 4.03 | .542 | .406 | .625 | 3 |
| T3676 | T3676C | M18 | x 1.5 | D6 | 1.083 | 4.03 | .542 | .406 | .625 | 3 |
| T3707 | T3707C | M20 | x 2.5 | D7 | 1.201 | 4.47 | .652 | .489 | .688 | 3 |
| T3726 | T3726C | M20 | x 1.5 | D6 | 1.201 | 4.47 | .652 | .489 | .688 | 3 |
| T3747 | T3747C | M22 | x 2.5 | D7 | 1.339 | 4.69 | .697 | .523 | .750 | 3 |
| T3766 | T3766C | M22 | x 1.5 | D6 | 1.339 | 4.69 | .697 | .523 | .750 | 3 |
| T3788 | T3788C | M24 | x 3.0 | D8 | 1.339 | 4.91 | .760 | .570 | .750 | 3 |

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- Coating Codes for Combo Tap
  Bright Finish No. + N(Tin), F(TiAlN), H(Hardslick), S(Steam Oxide)

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ |

| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ◎ | ◎ | ◎ | ◎ |

HSS

Being the best through innovation

# SPIRAL FLUTE TAPS

**Tapping Blind Holes, HSS-E & HSS-PM**

## SPIRAL FLUTE TAPS

### INCH

| EDP No. | MODEL | Tool Material | Standard | Dimensions | Tolerance | Chamfer | Surface Treatment | Page |
|---|---|---|---|---|---|---|---|---|
| **BB/BI/BF/BK** | | Super HSS | UNC/UNF | ANSI<br>DIN Length ANSI Shank | H2~H6 | 2P ~ 3P | Steam Oxide<br>Hardslick | **271** |
| **H6/H7/H8** | | P-HSS | UNC/UNF | ANSI | H2~H5 | 2P ~ 3P | Bright / TiCN<br>Hardslick | **272** |
| **B3/H9/B5/D6** | | P-HSS | UNC/UNF | ANSI | H2~H5 | 2P ~ 3P | Steam Oxide<br>TiCN / TiN<br>Hardslick | **273** |
| **B1/B0/B2/D2** | | HSSE-V3 | UNC/UNF | ANSI | H2~H6 | 2P ~ 3P | Bright<br>Steam Oxide<br>TiN / Hardslick | **275** |
| **G7/G8/G9/H0** | | P-HSS | UNC/UNF | ANSI Shank | H2~H3 | 4P ~ 5P | TiN<br>Hardslick | **277** |
| **H1/H2/H3/H4** | | P-HSS | UNC/UNF | ANSI Shank | H3 | 4P ~ 5P | TiN<br>Hardslick | **278** |
| **D4/D3/E0** | | HSSE-V3 | UNC/UNF | ANSI | H2~H5 | 2P ~ 3P | Bright<br>Steam Oxide<br>Hardslick | **279** |
| **C0/D8** | | HSSE-V3 | UNC/UNF | ANSI | H2~H5 | 2P ~ 3P | Bright<br>Hardslick | **281** |
| **F4/F8/F6** | | HSS-V | UNC/UNF | ANSI | H2~H6 | 1.5P ~ 2P | Steam Oxide<br>TiN / Hardslick | **282** |
| **G0/G1/G2** | | HSS-V | UNC/UNF | DIN Length ANSI Shank | H2~H6 | 2P ~ 3P | Bright<br>TiN / Hardslick | **284** |
| **ST/SI** | | HSSE-V3 | UNC/UNF | ANSI | 2B | 1.5P ~ 2P | Hardslick | **286** |

### METRIC

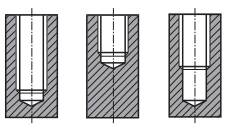
| EDP No. | MODEL | Tool Material | Standard | Dimensions | Tolerance | Chamfer | Surface Treatment | Page |
|---|---|---|---|---|---|---|---|---|
| **BH/BM<br>BD/BO** | | Super HSS | M/MF | ANSI<br>DIN Length ANSI Shank | D3~D7 | 2P~3P | Steam Oxide<br>Hardslick | **287** |
| **BS/BT<br>E6/E8/E9** | | HSSE-V3 | M/MF | ANSI<br>DIN Length ANSI Shank | D3~D7 | 2P~3P | Steam Oxide<br>TiCN / Hardslick | **288** |
| **BU/BV<br>E2/E4/E5** | | HSSE-V3 | M/MF | ANSI<br>DIN Length ANSI Shank | D3~D7 | 2P~3P | Steam Oxide<br>TiCN / Hardslick | **289** |
| **BW/BX<br>F1/F3** | | HSSE-V3 | M/MF | ANSI<br>DIN Length ANSI Shank | D3~D6 | 2P~3P | Bright<br>Hardslick | **290** |
| **G4/G5/G6** | | HSS-V | M/MF | ANSI | D3~D6 | 1.5P~2P | Bright<br>TiCN / Hardslick | **291** |

# SPIRAL FLUTE TAPS

BB/BI SERIES
BF/BK SERIES

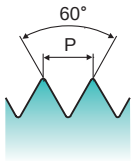
## SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE for Steels & Stainless Steels up to 35HRc

Hole type



BB/BI : ANSI

BF/BK : DIN Length ANSI Shank




Super HSS | UNC UNF | H2~H6 | 60° | 2P~3P | Steam Oxide | Hardslick | R40

Unit : Inch

| EDP No. | | | | SIZE | Thread Per Inch | | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|---|
| Steam Oxide | Hardslick Coated | Steam Oxide | Hardslick Coated | | UNC | UNF | | |
| BB082 | BI082 | BF082 | BK082 | 2 | 56 | | H2 | 2 |
| BB162 | BI162 | BF162 | BK162 | 4 | 40 | | H2 | 2 |
| BB202 | BI202 | BF202 | BK202 | 5 | 40 | | H2 | 3 |
| BB243 | BI243 | BF243 | BK243 | 6 | 32 | | H3 | 3 |
| BB283 | BI283 | BF283 | BK283 | 8 | 32 | | H3 | 3 |
| BB323 | BI323 | BF323 | BK323 | 10 | 24 | | H3 | 3 |
| BB343 | BI343 | BF343 | BK343 | | | 32 | H3 | 3 |
| BB403 | BI403 | BF403 | BK403 | 1/4 | 20 | | H3 | 3 |
| BB405 | BI405 | BF405 | BK405 | | | | H5 | 3 |
| BB423 | BI423 | BF423 | BK423 | | | 28 | H3 | 3 |
| BB424 | BI424 | BF424 | BK424 | | | | H4 | 3 |
| BB445 | BI445 | BF445 | BK445 | 5/16 | 18 | | H5 | 3 |
| BB464 | BI464 | BF464 | BK464 | | | 24 | H4 | 3 |
| BB485 | BI485 | BF485 | BK485 | 3/8 | 16 | | H5 | 3 |
| BB504 | BI504 | BF504 | BK504 | | | 24 | H4 | 3 |
| BB525 | BI525 | BF525 | BK525 | 7/16 | 14 | | H5 | 3 |
| BB545 | BI545 | BF545 | BK545 | | | 20 | H5 | 3 |
| BB565 | BI565 | BF565 | BK565 | 1/2 | 13 | | H5 | 3 |
| BB585 | BI585 | BF585 | BK585 | | | 20 | H5 | 3 |
| BB605 | BI605 | BF605 | BK605 | 9/16 | 12 | | H5 | 3 |
| BB625 | BI625 | BF625 | BK625 | | | 18 | H5 | 3 |
| BB645 | BI645 | BF645 | BK645 | 5/8 | 11 | | H5 | 4 |
| BB665 | BI665 | BF665 | BK665 | | | 18 | H5 | 4 |
| BB705 | BI705 | BF705 | BK705 | 3/4 | 10 | | H5 | 4 |
| BB725 | BI725 | BF725 | BK725 | | | 16 | H5 | 4 |
| BB746 | BI746 | BF746 | BK746 | 7/8 | 9 | | H6 | 4 |
| BB766 | BI766 | BF766 | BK766 | | | 14 | H6 | 4 |
| BB786 | BI786 | BF786 | BK786 | 1 | 8 | | H6 | 4 |
| BB806 | BI806 | BF806 | BK806 | | | 12 | H6 | 4 |
| BB836 | BI836 | BF836 | BK836 | 1-1/8 | 8 | | H6 | 4 |
| BB876 | BI876 | BF876 | BK876 | 1-1/4 | 8 | | H6 | 4 |
| BB916 | BI916 | BF916 | BK916 | 1-3/8 | 8 | | H6 | 4 |
| BB956 | BI956 | BF956 | BK956 | 1-1/2 | 8 | | H6 | 4 |

▶ For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.
▶ For tapping depth on DIN / ANSI Shank Taps, refer to DIN Table on page 336 & 337.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ○ | ◎ | | | ◎ | | | ○ |

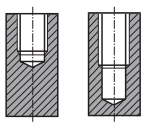
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | ○ | ○ | | ○ | ○ |

# SPIRAL FLUTE TAPS

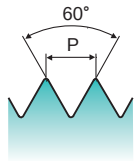
**H6/H7/H8 SERIES**

## SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE
## Steels up to 45HRc

Hole type



ANSI




P-HSS | UNC UNF | H2~H5 | 60° | 2P~3P | Bright | TiCN | Hardslick | R15

Unit : Inch

| EDP No. | | | SIZE | Thread Per Inch | | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|
| Bright Finish | TiCN Coated | Hardslick Coated | | UNC | UNF | | |
| H6082 | H7082 | H8082 | 2 | 56 | | H2 | 3 |
| H6162 | H7162 | H8162 | 4 | 40 | | H2 | 3 |
| H6202 | H7202 | H8202 | 5 | 40 | | H2 | 3 |
| H6243 | H7243 | H8243 | 6 | 32 | | H3 | 3 |
| H6283 | H7283 | H8283 | 8 | 32 | | H3 | 3 |
| H6323 | H7323 | H8323 | 10 | 24 | | H3 | 3 |
| H6343 | H7343 | H8343 | | | 32 | H3 | 3 |
| H6405 | H7405 | H8405 | 1/4 | 20 | | H5 | 3 |
| H6424 | H7424 | H8424 | | | 28 | H4 | 3 |
| H6445 | H7445 | H8445 | 5/16 | 18 | | H5 | 3 |
| H6464 | H7464 | H8464 | | | 24 | H4 | 3 |
| H6485 | H7485 | H8485 | 3/8 | 16 | | H5 | 3 |
| H6504 | H7504 | H8504 | | | 24 | H4 | 3 |
| H6525 | H7525 | H8525 | 7/16 | 14 | | H5 | 3 |
| H6545 | H7545 | H8545 | | | 20 | H5 | 3 |
| H6565 | H7565 | H8565 | 1/2 | 13 | | H5 | 3 |
| H6585 | H7585 | H8585 | | | 20 | H5 | 3 |
| H6645 | H7645 | H8645 | 5/8 | 11 | | H5 | 4 |
| H6665 | H7665 | H8665 | | | 18 | H5 | 4 |
| H6705 | H7705 | H8705 | 3/4 | 10 | | H5 | 4 |
| H6725 | H7725 | H8725 | | | 16 | H5 | 4 |

▶ For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| | | ○ | ◎ | | ○ | ◎ | |

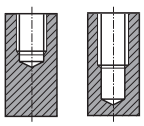
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ○ | ○ | ○ | | | ◎ | | |

# SPIRAL FLUTE TAPS

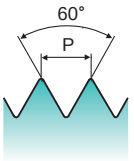
**B3/H9/B5/D6 SERIES**

## SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE for Titanium Alloys & Nickel Base Alloys up to 44HRc

Hole type



ANSI




P-HSS | UNC UNF | H2~H5 | 60° | 2P~3P | Steam Oxide | TiN | TiCN | Hardslick

Unit : Inch

| EDP No. | | | | SIZE | Thread Per Inch | | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|---|
| Steam Oxide | TiN Coated | TiCN Coated | Hardslick Coated | | UNC | UNF | | |
| B3082 | H9082 | B5082 | D6082 | 2 | 56 | | H2 | 3 |
| B3162 | H9162 | B5162 | D6162 | 4 | 40 | | H2 | 3 |
| B3202 | H9202 | B5202 | D6202 | 5 | 40 | | H2 | 3 |
| B3243 | H9243 | B5243 | D6243 | 6 | 32 | | H3 | 3 |
| B3283 | H9283 | B5283 | D6283 | 8 | 32 | | H3 | 3 |
| B3323 | H9323 | B5323 | D6323 | 10 | 24 | | H3 | 3 |
| B3343 | H9343 | B5343 | D6343 | | | 32 | H3 | 3 |
| B3403 | H9403 | B5403 | D6403 | 1/4 | 20 | | H3 | 3 |
| B3405 | H9405 | B5405 | D6405 | | | | H5 | 3 |
| B3423 | H9423 | B5423 | D6423 | | | 28 | H3 | 3 |
| B3424 | H9424 | B5424 | D6424 | | | | H4 | 3 |
| B3443 | H9443 | B5443 | D6443 | 5/16 | 18 | | H3 | 3 |
| B3445 | H9445 | B5445 | D6445 | | | | H5 | 3 |
| B3463 | H9463 | B5463 | D6463 | | | 24 | H3 | 3 |
| B3483 | H9483 | B5483 | D6483 | 3/8 | 16 | | H3 | 3 |
| B3485 | H9485 | B5485 | D6485 | | | | H5 | 3 |
| B3503 | H9503 | B5503 | D6503 | | | 24 | H3 | 3 |
| B3504 | H9504 | B5504 | D6504 | | | | H4 | 3 |
| B3523 | H9523 | B5523 | D6523 | 7/16 | 14 | | H3 | 3 |
| B3525 | H9525 | B5525 | D6525 | | | | H5 | 3 |
| B3543 | H9543 | B5543 | D6543 | | | 20 | H3 | 3 |
| B3545 | H9545 | B5545 | D6545 | | | | H5 | 3 |
| B3563 | H9563 | B5563 | D6563 | 1/2 | 13 | | H3 | 3 |
| B3565 | H9565 | B5565 | D6565 | | | | H5 | 3 |
| B3583 | H9583 | B5583 | D6583 | | | 20 | H3 | 3 |
| B3585 | H9585 | B5585 | D6585 | | | | H5 | 3 |

▶For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

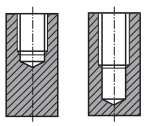
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ◎ | ◎ | ◎ | | | | | |

# SPIRAL FLUTE TAPS

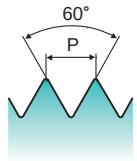
**B3/H9/B5/D6 SERIES**

## SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE for Titanium Alloys & Nickel Base Alloys up to 44HRc

Hole type



ANSI




P-HSS | UNC UNF | H2~H5 | 60° | 2P~3P | Steam Oxide | TiN | TiCN | Hardslick | R15

Unit : Inch

| EDP No. | | | | SIZE | Thread Per Inch | | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|---|
| Steam Oxide | TiN Coated | TiCN Coated | Hardslick Coated | | UNC | UNF | | |
| B3603 | H9603 | B5603 | D6603 | 9/16 | 12 | | H3 | 3 |
| B3605 | H9605 | B5605 | D6605 | | | | H5 | 3 |
| B3623 | H9623 | B5623 | D6623 | | | 18 | H3 | 3 |
| B3625 | H9625 | B5625 | D6625 | | | | H5 | 3 |
| B3643 | H9643 | B5643 | D6643 | 5/8 | 11 | | H3 | 4 |
| B3645 | H9645 | B5645 | D6645 | | | | H5 | 4 |
| B3663 | H9663 | B5663 | D6663 | | | 18 | H3 | 4 |
| B3665 | H9665 | B5665 | D6665 | | | | H5 | 4 |
| B3703 | H9703 | B5703 | D6703 | 3/4 | 10 | | H3 | 4 |
| B3705 | H9705 | B5705 | D6705 | | | | H5 | 4 |
| B3723 | H9723 | B5723 | D6723 | | | 16 | H3 | 4 |
| B3725 | H9725 | B5725 | D6725 | | | | H5 | 4 |

▶For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

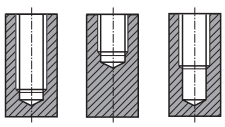
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ◎ | ◎ | ◎ | | | | | |

# SPIRAL FLUTE TAPS

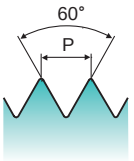
**B1/B0/B2/D2 SERIES**

## SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE for Stainless Steels up to 28HRc

**Hole type**



**ANSI**




HSSE-V3 | UNC UNF | H2~H6 | 60° | 2P~3P | Bright | Steam Oxide | TiN | Hardslick | R45

Unit : Inch

| EDP No. | | | | SIZE | Thread Per Inch | | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|---|
| Bright Finish | Steam Oxide | TiN Coated | Hardslick Coated | | UNC | UNF | | |
| B1082 | B0082 | B2082 | D2082 | 2 | 56 | | H2 | 2 |
| B1162 | B0162 | B2162 | D2162 | 4 | 40 | | H2 | 2 |
| B1202 | B0202 | B2202 | D2202 | 5 | 40 | | H2 | 3 |
| B1203 | B0203 | B2203 | D2203 | | | | H3 | 3 |
| B1243 | B0243 | B2243 | D2243 | 6 | 32 | | H3 | 3 |
| B1283 | B0283 | B2283 | D2283 | 8 | 32 | | H3 | 3 |
| B1323 | B0323 | B2323 | D2323 | 10 | 24 | | H3 | 3 |
| B1343 | B0343 | B2343 | D2343 | | | 32 | H3 | 3 |
| B1403 | B0403 | B2403 | D2403 | 1/4 | 20 | | H3 | 3 |
| B1405 | B0405 | B2405 | D2405 | | | | H5 | 3 |
| B1423 | B0423 | B2423 | D2423 | | | 28 | H3 | 3 |
| B1443 | B0443 | B2443 | D2443 | 5/16 | 18 | | H3 | 3 |
| B1445 | B0445 | B2445 | D2445 | | | | H5 | 3 |
| B1463 | B0463 | B2463 | D2463 | | | 24 | H3 | 3 |
| B1483 | B0483 | B2483 | D2483 | 3/8 | 16 | | H3 | 3 |
| B1485 | B0485 | B2485 | D2485 | | | | H5 | 3 |
| B1503 | B0503 | B2503 | D2503 | | | 24 | H3 | 3 |
| B1523 | B0523 | B2523 | D2523 | 7/16 | 14 | | H3 | 3 |
| B1525 | B0525 | B2525 | D2525 | | | | H5 | 3 |
| B1543 | B0543 | B2543 | D2543 | | | 20 | H3 | 3 |
| B1545 | B0545 | B2545 | D2545 | | | | H5 | 3 |
| B1563 | B0563 | B2563 | D2563 | 1/2 | 13 | | H3 | 3 |
| B1565 | B0565 | B2565 | D2565 | | | | H5 | 3 |
| B1583 | B0583 | B2583 | D2583 | | | 20 | H3 | 3 |
| B1603 | B0603 | B2603 | D2603 | 9/16 | 12 | | H3 | 3 |
| B1623 | B0623 | B2623 | D2623 | | | 18 | H3 | 3 |

▶ For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ○ | ◎ | | | ◎ | | | ○ |

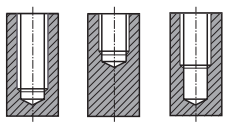
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | ○ | ○ | | ○ | ○ |

# SPIRAL FLUTE TAPS

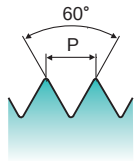
**B1/B0/B2/D2 SERIES**

## SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE for Stainless Steels up to 28HRc

Hole type



ANSI




HSSE-V3 | UNC UNF | H2~H6 | 60° | 2P~3P | Bright | Steam Oxide | TiN | Hardslick | R45

Unit : Inch

| EDP No. | | | | SIZE | Thread Per Inch | | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|---|
| Bright Finish | Steam Oxide | TiN Coated | Hardslick Coated | | UNC | UNF | | |
| B1625 | B0625 | B2625 | D2625 | | | | H5 | 3 |
| B1643 | B0643 | B2643 | D2643 | 5/8 | 11 | | H3 | 4 |
| B1645 | B0645 | B2645 | D2645 | | | | H5 | 4 |
| B1663 | B0663 | B2663 | D2663 | | | 18 | H3 | 4 |
| B1665 | B0665 | B2665 | D2665 | | | | H5 | 4 |
| B1703 | B0703 | B2703 | D2703 | 3/4 | 10 | | H3 | 4 |
| B1705 | B0705 | B2705 | D2705 | | | | H5 | 4 |
| B1723 | B0723 | B2723 | D2723 | | | 16 | H3 | 4 |
| B1725 | B0725 | B2725 | D2725 | | | | H5 | 4 |
| B1744 | B0744 | B2744 | D2744 | 7/8 | 9 | | H4 | 4 |
| B1746 | B0746 | B2746 | D2746 | | | | H6 | 4 |
| B1764 | B0764 | B2764 | D2764 | | | 14 | H4 | 4 |
| B1766 | B0766 | B2766 | D2766 | | | | H6 | 4 |
| B1784 | B0784 | B2784 | D2784 | 1 | 8 | | H4 | 4 |
| B1786 | B0786 | B2786 | D2786 | | | | H6 | 4 |
| B1804 | B0804 | B2804 | D2804 | | | 12 | H4 | 4 |
| B1806 | B0806 | B2806 | D2806 | | | | H6 | 4 |
| B1824 | B0824 | B2824 | D2824 | 1-1/8 | 7 | | H4 | 4 |
| B1864 | B0864 | B2864 | D2864 | 1-1/4 | 7 | | H4 | 4 |
| B1904 | B0904 | B2904 | D2904 | 1-3/8 | 6 | | H4 | 4 |
| B1944 | B0944 | B2944 | D2944 | 1-1/2 | 6 | | H4 | 4 |

▶ For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ○ | ◎ | | | ◎ | | | ○ |

| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | ○ | ○ | | ○ | ○ |

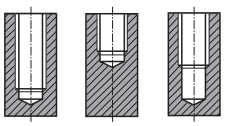
# SPIRAL FLUTE TAPS

**G7/G8/G9/H0 SERIES**

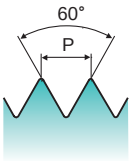
## SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE for Stainless Steels up to 28HRc

Maximum Tapping Depth is 50% Deeper than Standard ANSI Taps.

**Hole type**



**ANSI Long Shank**




P-HSS | UNC UNF | H2~H3 | 60° | 4P~5P | TiN | Hardslick | R45

Unit : Inch

| EDP No. | | | | SIZE | Thread Per Inch | | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|---|
| TiN Coated 4″ OAL | TiN Coated 6″ OAL | Hardslick Coated 4″ OAL | Hardslick Coated 6″ OAL | | UNC | UNF | | |
| G7162 | — | G9162 | — | 4 | 40 | | H2 | 3 |
| G7243 | G8243 | G9243 | H0243 | 6 | 32 | | H3 | 3 |
| G7283 | G8283 | G9283 | H0283 | 8 | 32 | | H3 | 3 |
| G7323 | G8323 | G9323 | H0323 | 10 | 24 | | H3 | 3 |
| G7343 | G8343 | G9343 | H0343 | | | 32 | H3 | 3 |
| G7403 | G8403 | G9403 | H0403 | 1/4 | 20 | | H3 | 3 |
| — | G8423 | — | H0423 | | | 28 | H3 | 3 |
| — | G8443 | — | H0443 | 5/16 | 18 | | H3 | 3 |
| — | G8463 | — | H0463 | | | 24 | H3 | 3 |
| — | G8483 | — | H0483 | 3/8 | 16 | | H3 | 3 |
| — | G8503 | — | H0503 | | | 24 | H3 | 3 |
| — | G8523 | — | H0523 | 7/16 | 14 | | H3 | 3 |
| — | G8543 | — | H0543 | | | 20 | H3 | 3 |
| — | G8563 | — | H0563 | 1/2 | 13 | | H3 | 3 |
| — | G8583 | — | H0583 | | | 20 | H3 | 3 |
| — | G8643 | — | H0643 | 5/8 | 11 | | H3 | 4 |

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ○ | ◎ | | | ◎ | | | ○ |

| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | ○ | ○ | | ○ | ○ |

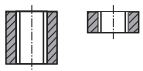
# SPIRAL FLUTE TAPS

H1/H2/H3/H4 SERIES

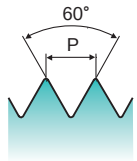
## SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE
## Machining Center Tap

Left hand spiral, right hand cut Reduces chip packing in deep holes Maximum Tapping Depth is 50% Deeper than Standard ANSI Taps.

**Hole type**



**ANSI Long Shank**




P-HSS | UNC UNF | H3 | 60° | 4P~5P | TiN | Hardslick | L15

Unit : Inch

| EDP No. | | | | SIZE | Thread Per Inch | | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|---|
| TiN Coated 4″ OAL | TiN Coated 6″ OAL | Hardslick Coated 4″ OAL | Hardslick Coated 6″ OAL | | UNC | UNF | | |
| **H1403** | **H2403** | **H3403** | **H4403** | 1/4 | 20 | | H3 | 2 |
| — | **H2423** | — | **H4423** | | | 28 | H3 | 3 |
| — | **H2443** | — | **H4443** | 5/16 | 18 | | H3 | 3 |
| — | **H2483** | — | **H4483** | 3/8 | 16 | | H3 | 3 |
| — | **H2523** | — | **H4523** | 7/16 | 14 | | H3 | 3 |
| — | **H2563** | — | **H4563** | 1/2 | 13 | | H3 | 3 |
| — | **H2643** | — | **H4643** | 5/8 | 11 | | H3 | 3 |

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ○ | ◎ | | | ◎ | | | ○ |

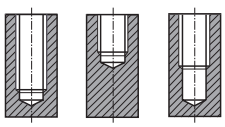
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | ○ | ○ | | ○ | ○ |

# SPIRAL FLUTE TAPS

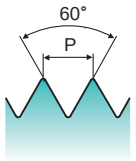
**D4/D3/E0 SERIES**

## SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE
## Steels up to 38HRc

**Hole type**



**ANSI**




HSSE-V3 | UNC UNF | H2~H5 | 60° | 2P~3P | Bright | Steam Oxide | Hardslick | R45

Unit : Inch

| EDP No. | | | SIZE | Thread Per Inch | | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|
| Bright Finish | Steam Oxide | Hardslick Coated | | UNC | UNF | | |
| D4082 | D3082 | E0082 | 2 | 56 | | H2 | 2 |
| D4162 | D3162 | E0162 | 4 | 40 | | H2 | 2 |
| D4202 | D3202 | E0202 | 5 | 40 | | H2 | 3 |
| D4243 | D3243 | E0243 | 6 | 32 | | H3 | 3 |
| D4283 | D3283 | E0283 | 8 | 32 | | H3 | 3 |
| D4323 | D3323 | E0323 | 10 | 24 | | H3 | 3 |
| D4343 | D3343 | E0343 | 10 | | 32 | H3 | 3 |
| D4403 | D3403 | E0403 | 1/4 | 20 | | H3 | 3 |
| D4405 | D3405 | E0405 | 1/4 | 20 | | H5 | 3 |
| D4423 | D3423 | E0423 | 1/4 | | 28 | H3 | 3 |
| D4425 | D3425 | E0425 | 1/4 | | 28 | H5 | 3 |
| D4443 | D3443 | E0443 | 5/16 | 18 | | H3 | 3 |
| D4445 | D3445 | E0445 | 5/16 | 18 | | H5 | 3 |
| D4463 | D3463 | E0463 | 5/16 | | 24 | H3 | 3 |
| D4465 | D3465 | E0465 | 5/16 | | 24 | H5 | 3 |
| D4483 | D3483 | E0483 | 3/8 | 16 | | H3 | 3 |
| D4485 | D3485 | E0485 | 3/8 | 16 | | H5 | 3 |
| D4503 | D3503 | E0503 | 3/8 | | 24 | H3 | 3 |
| D4505 | D3505 | E0505 | 3/8 | | 24 | H5 | 3 |
| D4523 | D3523 | E0523 | 7/16 | 14 | | H3 | 3 |
| D4525 | D3525 | E0525 | 7/16 | 14 | | H5 | 3 |
| D4543 | D3543 | E0543 | 7/16 | | 20 | H3 | 3 |
| D4545 | D3545 | E0545 | 7/16 | | 20 | H5 | 3 |
| D4563 | D3563 | E0563 | 1/2 | 13 | | H3 | 3 |
| D4565 | D3565 | E0565 | 1/2 | 13 | | H5 | 3 |
| D4583 | D3583 | E0583 | 1/2 | | 20 | H3 | 3 |
| D4585 | D3585 | E0585 | 1/2 | | 20 | H5 | 3 |

▶ For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| | ◎ | ◎ | | ○ | ○ | | |

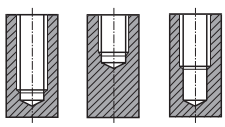
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ○ | | | | | | | |

# SPIRAL FLUTE TAPS

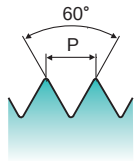
**D4/D3/E0 SERIES**

## SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE
## Steels up to 38HRc

**Hole type**



**ANSI**




HSSE-V3 | UNC UNF | H2~H5 | 60° | 2P~3P | Bright | Steam Oxide | Hardslick | R45

Unit : Inch

| EDP No. | | | SIZE | Thread Per Inch | | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|
| Bright Finish | Steam Oxide | Hardslick Coated | | UNC | UNF | | |
| **D4605** | **D3605** | **E0605** | 9/16 | 12 | | H5 | 3 |
| **D4625** | **D3625** | **E0625** | 9/16 | | 18 | H5 | 3 |
| **D4643** | **D3643** | **E0643** | 5/8 | 11 | | H3 | 4 |
| **D4645** | **D3645** | **E0645** | 5/8 | 11 | | H5 | 4 |
| **D4663** | **D3663** | **E0663** | 5/8 | | 18 | H3 | 4 |
| **D4665** | **D3665** | **E0665** | 5/8 | | 18 | H5 | 4 |
| **D4703** | **D3703** | **E0703** | 3/4 | 10 | | H3 | 4 |
| **D4705** | **D3705** | **E0705** | 3/4 | 10 | | H5 | 4 |
| **D4723** | **D3723** | **E0723** | 3/4 | | 16 | H3 | 4 |
| **D4725** | **D3725** | **E0725** | 3/4 | | 16 | H5 | 4 |
| **D4784** | **D3784** | **E0784** | 1 | 8 | | H4 | 4 |
| **D4786** | **D3786** | **E0786** | 1 | 8 | | H6 | 4 |
| **D4804** | **D3804** | **E0804** | 1 | | 12 | H4 | 4 |
| **D4806** | **D3806** | **E0806** | 1 | | 12 | H6 | 4 |
| **D4824** | **D3824** | **E0824** | 1-1/8 | 7 | | H4 | 4 |
| **D4864** | **D3864** | **E0864** | 1-1/4 | 7 | | H4 | 4 |
| **D4904** | **D3904** | **E0904** | 1-3/8 | 6 | | H4 | 4 |
| **D4944** | **D3944** | **E0944** | 1-1/2 | 6 | | H4 | 4 |

▶ For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| | ◎ | ◎ | | ○ | ○ | | |

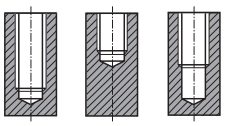
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ○ | | | | | | | |

# SPIRAL FLUTE TAPS

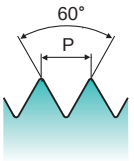
**C0/D8 SERIES**

## SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE for Aluminum Alloys or Die Cast Aluminium

**Hole type**



**ANSI**




HSSE-V3 | UNC UNF | H2~H5 | 60° | 2P~3P | Bright | Hardslick | R50

Unit : Inch

| EDP No. | | SIZE | Thread Per Inch | | Limit | No. of Flute |
|---|---|---|---|---|---|---|
| Bright Finish | Hardslick Coated | | UNC | UNF | | |
| **C0162** | **D8162** | 4 | 40 | | H2 | 2 |
| **C0242** | **D8242** | 6 | 32 | | H2 | 2 |
| **C0243** | **D8243** | | | | H3 | 2 |
| **C0283** | **D8283** | 8 | 32 | | H3 | 2 |
| **C0323** | **D8323** | 10 | 24 | | H3 | 2 |
| **C0343** | **D8343** | | | 32 | H3 | 2 |
| **C0403** | **D8403** | 1/4 | 20 | | H3 | 2 |
| **C0405** | **D8405** | | | | H5 | 2 |
| **C0423** | **D8423** | | | 28 | H3 | 2 |
| **C0443** | **D8443** | 5/16 | 18 | | H3 | 2 |
| **C0445** | **D8445** | | | | H5 | 2 |
| **C0463** | **D8463** | | | 24 | H3 | 2 |
| **C0465** | **D8465** | | | | H5 | 2 |
| **C0483** | **D8483** | 3/8 | 16 | | H3 | 2 |
| **C0485** | **D8485** | | | | H5 | 2 |
| **C0503** | **D8503** | | | 24 | H3 | 2 |
| **C0505** | **D8505** | | | | H5 | 2 |

▶ For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| | | | | | | | ◎ |

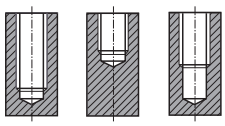
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| ◎ | | | | | | | | | | |

# SPIRAL FLUTE TAPS

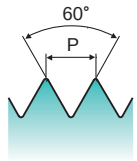
**F4/F8/F6 SERIES**

## SPIRAL FLUTED TAPS BOTTOMING STYLE for Multi Purpose

Hole type



ANSI




HSS-V | UNC UNF | H2~H6 | 60° | 1.5P~2P | Steam Oxide | TiN | Hardslick | R45

Unit : Inch

| EDP No. | | | SIZE | Thread Per Inch | | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|
| Steam Oxide | TiN Coated | Hardslick Coated | | UNC | UNF | | |
| **F4082** | **F8082** | **F6082** | 2 | 56 | | H2 | 2 |
| **F4162** | **F8162** | **F6162** | 4 | 40 | | H2 | 2 |
| **F4202** | **F8202** | **F6202** | 5 | 40 | | H2 | 2 |
| **F4243** | **F8243** | **F6243** | 6 | 32 | | H3 | 2 |
| **F4283** | **F8283** | **F6283** | 8 | 32 | | H3 | 3 |
| **F4323** | **F8323** | **F6323** | 10 | 24 | | H3 | 3 |
| **F4343** | **F8343** | **F6343** | | | 32 | H3 | 3 |
| **F4403** | **F8403** | **F6403** | 1/4 | 20 | | H3 | 3 |
| **F4405** | **F8405** | **F6405** | | | | H5 | 3 |
| **F4423** | **F8423** | **F6423** | | | 28 | H3 | 3 |
| **F4443** | **F8443** | **F6443** | 5/16 | 18 | | H3 | 3 |
| **F4445** | **F8445** | **F6445** | | | | H5 | 3 |
| **F4463** | **F8463** | **F6463** | | | 24 | H3 | 3 |
| **F4483** | **F8483** | **F6483** | 3/8 | 16 | | H3 | 3 |
| **F4485** | **F8485** | **F6485** | | | | H5 | 3 |
| **F4503** | **F8503** | **F6503** | | | 24 | H3 | 3 |
| **F4523** | **F8523** | **F6523** | 7/16 | 14 | | H3 | 3 |
| **F4525** | **F8525** | **F6525** | | | | H5 | 3 |
| **F4543** | **F8543** | **F6543** | | | 20 | H3 | 3 |
| **F4545** | **F8545** | **F6545** | | | | H5 | 3 |
| **F4563** | **F8563** | **F6563** | 1/2 | 13 | | H3 | 3 |
| **F4565** | **F8565** | **F6565** | | | | H5 | 3 |
| **F4583** | **F8583** | **F6583** | | | 20 | H3 | 3 |
| **F4585** | **F8585** | **F6585** | | | | H5 | 3 |
| **F4603** | **F8603** | **F6603** | 9/16 | 12 | | H3 | 3 |
| **F4605** | **F8605** | **F6605** | | | | H5 | 3 |
| **F4623** | **F8623** | **F6623** | | | 18 | H3 | 3 |

▶For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | | ○ | ○ | | |

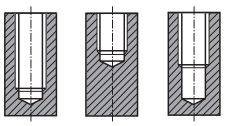
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| ○ | | ○ | | | | | | | | |

# SPIRAL FLUTE TAPS

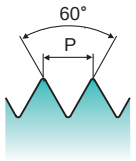
**F4/F8/F6 SERIES**

## SPIRAL FLUTED TAPS BOTTOMING STYLE for Multi Purpose

**Hole type**



**ANSI**




HSS-V | UNC UNF | H2~H6 | 60° | 1.5P~2P | Steam Oxide | TiN | Hardslick

Unit : Inch

| EDP No. | | | SIZE | Thread Per Inch | | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|
| Steam Oxide | TiN Coated | Hardslick Coated | | UNC | UNF | | |
| **F4625** | **F8625** | **F6625** | | | | H5 | 3 |
| **F4643** | **F8643** | **F6643** | 5/8 | 11 | | H3 | 4 |
| **F4645** | **F8645** | **F6645** | | | | H5 | 4 |
| **F4663** | **F8663** | **F6663** | | | 18 | H3 | 4 |
| **F4665** | **F8665** | **F6665** | | | | H5 | 4 |
| **F4703** | **F8703** | **F6703** | 3/4 | 10 | | H3 | 4 |
| **F4705** | **F8705** | **F6705** | | | | H5 | 4 |
| **F4723** | **F8723** | **F6723** | | | 16 | H3 | 4 |
| **F4725** | **F8725** | **F6725** | | | | H5 | 4 |
| **F4744** | **F8744** | **F6744** | 7/8 | 9 | | H4 | 4 |
| **F4746** | **F8746** | **F6746** | | | | H6 | 4 |
| **F4764** | **F8764** | **F6764** | | | 14 | H4 | 4 |
| **F4766** | **F8766** | **F6766** | | | | H6 | 4 |
| **F4784** | **F8784** | **F6784** | 1 | 8 | | H4 | 4 |
| **F4786** | **F8786** | **F6786** | | | | H6 | 4 |
| **F4806** | **F8806** | **F6806** | | | 12 | H6 | 4 |

▶For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | | ○ | ○ | | |

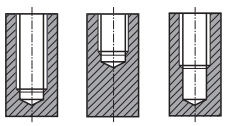
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| ○ | | | | | | | | | | |

# SPIRAL FLUTE TAPS

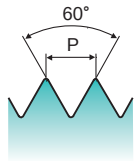
**G0/G1/G2 SERIES**

## SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE for Multi Purpose

**Hole type**



**DIN Length ANSI Shank**




HSS-V | UNC UNF | H2~H6 | 60° | 2P~3P | Bright | TiN | Hardslick

Unit : Inch

| EDP No. | | | SIZE | Thread Per Inch | | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|
| Bright Finish | TiN Coated | Hardslick Coated | | UNC | UNF | | |
| G0082 | G1082 | G2082 | 2 | 56 | | H2 | 2 |
| G0162 | G1162 | G2162 | 4 | 40 | | H2 | 2 |
| G0202 | G1202 | G2202 | 5 | 40 | | H2 | 3 |
| G0243 | G1243 | G2243 | 6 | 32 | | H3 | 3 |
| G0283 | G1283 | G2283 | 8 | 32 | | H3 | 3 |
| G0323 | G1323 | G2323 | 10 | 24 | | H3 | 3 |
| G0343 | G1343 | G2343 | | | 32 | H3 | 3 |
| G0403 | G1403 | G2403 | 1/4 | 20 | | H3 | 3 |
| G0405 | G1405 | G2405 | | | | H5 | 3 |
| G0423 | G1423 | G2423 | | | 28 | H3 | 3 |
| G0443 | G1443 | G2443 | 5/16 | 18 | | H3 | 3 |
| G0445 | G1445 | G2445 | | | | H5 | 3 |
| G0463 | G1463 | G2463 | | | 24 | H3 | 3 |
| G0483 | G1483 | G2483 | 3/8 | 16 | | H3 | 3 |
| G0485 | G1485 | G2485 | | | | H5 | 3 |
| G0503 | G1503 | G2503 | | | 24 | H3 | 3 |
| G0523 | G1523 | G2523 | 7/16 | 14 | | H3 | 3 |
| G0525 | G1525 | G2525 | | | | H5 | 3 |
| G0543 | G1543 | G2543 | | | 20 | H3 | 3 |
| G0545 | G1545 | G2545 | | | | H5 | 3 |
| G0563 | G1563 | G2563 | 1/2 | 13 | | H3 | 3 |
| G0565 | G1565 | G2565 | | | | H5 | 3 |
| G0583 | G1583 | G2583 | | | 20 | H3 | 3 |
| G0585 | G1585 | G2585 | | | | H5 | 3 |
| G0603 | G1603 | G2603 | 9/16 | 12 | | H3 | 3 |
| G0605 | G1605 | G2605 | | | | H5 | 3 |
| G0623 | G1623 | G2623 | | | 18 | H3 | 3 |

▶ For tapping depth on DIN Length ANSI Length Taps, refer to DIN table on page 338.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | | ○ | ○ | | |

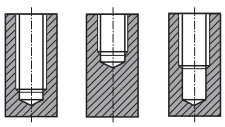
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| ○ | | ○ | | | | | | | | |

# SPIRAL FLUTE TAPS

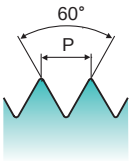
**G0/G1/G2 SERIES**

## SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE for Multi Purpose

**Hole type**



**DIN Length ANSI Shank**




HSS-V | UNC UNF | H2~H6 | 60° | 2P~3P | Bright | TiN | Hardslick

Unit : Inch

| EDP No. | | | SIZE | Thread Per Inch | | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|
| Bright Finish | TiN Coated | Hardslick Coated | | UNC | UNF | | |
| G0625 | G1625 | G2625 | | | | H5 | 3 |
| G0643 | G1643 | G2643 | 5/8 | 11 | | H3 | 4 |
| G0645 | G1645 | G2645 | | | | H5 | 4 |
| G0663 | G1663 | G2663 | | | 18 | H3 | 4 |
| G0665 | G1665 | G2665 | | | | H5 | 4 |
| G0703 | G1703 | G2703 | 3/4 | 10 | | H3 | 4 |
| G0705 | G1705 | G2705 | | | | H5 | 4 |
| G0723 | G1723 | G2723 | | | 16 | H3 | 4 |
| G0725 | G1725 | G2725 | | | | H5 | 4 |
| G0746 | G1746 | G2746 | 7/8 | 9 | | H6 | 4 |
| G0764 | G1764 | G2764 | | | 14 | H4 | 4 |
| G0766 | G1766 | G2766 | | | | H6 | 4 |
| G0786 | G1786 | G2786 | 1 | 8 | | H6 | 4 |
| G0804 | G1804 | G2804 | | | 12 | H4 | 4 |
| G0806 | G1806 | G2806 | | | | H6 | 4 |

▶ For tapping depth on DIN Length ANSI Length Taps, refer to DIN table on page 338.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | | ○ | ○ | | |

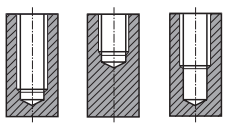
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| ○ | | ○ | | | | | | | | |

# SPIRAL FLUTE TAPS

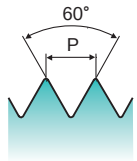
ST/SI SERIES

## SCREW THREAD INSERT TAP

Hole type



ANSI




HSSE-V3 | UNC UNF | 2B | 60° | 1.5P~2P | Hardslick

Unit : Inch

| SIZE | EDP No. Hardslick Coated | Thread Per Inch UNC | EDP No. Hardslick Coated | Thread Per Inch UNF | Limit | No. of Flute |
|---|---|---|---|---|---|---|
| #4 | ST162 | 40 | SI182 | 48 | 2B | 3 |
| #5 | ST202 | 40 | SI222 | 48 | 2B | 3 |
| #6 | ST242 | 32 | SI262 | 40 | 2B | 3 |
| #8 | ST282 | 32 | SI302 | 36 | 2B | 3 |
| #10 | ST322 | 24 | SI342 | 32 | 2B | 3 |
| #12 | ST362 | 24 | SI382 | 32 | 2B | 3 |
| 1/4 | ST402 | 20 | SI422 | 28 | 2B | 3 |
| 5/16 | ST442 | 18 | SI462 | 24 | 2B | 3 |
| 3/8 | ST482 | 16 | SI502 | 24 | 2B | 3 |
| 7/16 | ST522 | 14 | SI542 | 20 | 2B | 3 |
| 1/2 | ST562 | 13 | SI582 | 20 | 2B | 3 |
| 9/16 | ST602 | 12 | SI622 | 18 | 2B | 4 |
| 5/8 | ST642 | 11 | SI662 | 18 | 2B | 4 |
| 3/4 | ST702 | 10 | SI722 | 16 | 2B | 4 |

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | | ○ | ○ | | |

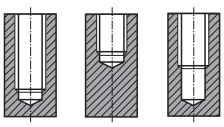
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| ○ | | ○ | | | | | | | | |

# SPIRAL FLUTE TAPS

**BH/BM SERIES**
**BD/BO SERIES**

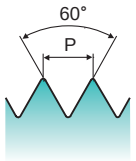
## METRIC SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE for Steels & Stainless Steels up to 35HRc

Hole type



BH/BM : ANSI

BD/BO : DIN Length ANSI Shank




Super HSS | M MF | D3~D7 | 60° | 2P~3P | Steam Oxide | Hardslick | R40

Unit : mm

| EDP No. | | | | SIZE | Pitch | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|
| Steam Oxide | Hardslick Coated | Steam Oxide | Hardslick Coated | | | | |
| BH203 | BM203 | BD203 | BO203 | M3 | 0.5 | D3 | 3 |
| BH224 | BM224 | BD224 | BO224 | M3.5 | 0.6 | D4 | 3 |
| BH244 | BM244 | BD244 | BO244 | M4 | 0.7 | D4 | 3 |
| BH284 | BM284 | BD284 | BO284 | M5 | 0.8 | D4 | 3 |
| BH315 | BM315 | BD315 | BO315 | M6 | 1.0 | D5 | 3 |
| BH345 | BM345 | BD345 | BO345 | M7 | 1.0 | D5 | 3 |
| BH365 | BM365 | BD365 | BO365 | M8 | 1.25 | D5 | 3 |
| BH375 | BM375 | BD375 | BO375 | M8 | 1.0 | D5 | 3 |
| BH426 | BM426 | BD426 | BO426 | M10 | 1.5 | D6 | 3 |
| BH435 | BM435 | BD435 | BO435 | M10 | 1.25 | D5 | 3 |
| BH506 | BM506 | BD506 | BO506 | M12 | 1.75 | D6 | 3 |
| BH525 | BM525 | BD525 | BO525 | M12 | 1.25 | D5 | 3 |
| BH547 | BM547 | BD547 | BO547 | M14 | 2.0 | D7 | 3 |
| BH556 | BM556 | BD556 | BO556 | M14 | 1.5 | D6 | 3 |
| BH607 | BM607 | BD607 | BO607 | M16 | 2.0 | D7 | 3 |
| BH616 | BM616 | BD616 | BO616 | M16 | 1.5 | D6 | 3 |
| BH657 | BM657 | BD657 | BO657 | M18 | 2.5 | D7 | 4 |
| BH676 | BM676 | BD676 | BO676 | M18 | 1.5 | D6 | 4 |

▶ For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.
▶ For tapping depth on DIN / ANSI Shank Taps, refer to DIN Table on page 336 & 337.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ○ | ◎ | | | ◎ | | | ○ |

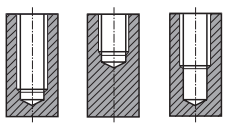
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | ○ | ○ | | ○ | ○ |

# SPIRAL FLUTE TAPS

BS/BT SERIES
E6/E8/E9 SERIES

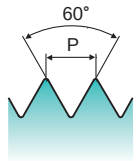
## METRIC SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE for Stainless Steels up to 28HRc

Hole type



BS/BT : ANSI

E6/E8/E9 : DIN Length ANSI Shank




HSSE-V3 | M MF | D3~D7 | 60° | 2P~3P | Steam Oxide | TiCN | Hardslick | R45

Unit : mm

| EDP No. | | | | | SIZE | Pitch | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|---|
| Steam Oxide | Hardslick Coated | Steam Oxide | TiCN Coated | Hardslick Coated | | | | |
| BS203 | BT203 | E6203 | E8203 | E9203 | M3 | 0.5 | D3 | 3 |
| BS224 | BT224 | E6224 | E8224 | E9224 | M3.5 | 0.6 | D4 | 3 |
| BS244 | BT244 | E6244 | E8244 | E9244 | M4 | 0.7 | D4 | 3 |
| BS284 | BT284 | E6284 | E8284 | E9284 | M5 | 0.8 | D4 | 3 |
| BS315 | BT315 | E6315 | E8315 | E9315 | M6 | 1.0 | D5 | 3 |
| BS345 | BT345 | E6345 | E8345 | E9345 | M7 | 1.0 | D5 | 3 |
| BS365 | BT365 | E6365 | E8365 | E9365 | M8 | 1.25 | D5 | 3 |
| BS375 | BT375 | E6375 | E8375 | E9375 | M8 | 1.0 | D5 | 3 |
| BS426 | BT426 | E6426 | E8426 | E9426 | M10 | 1.5 | D6 | 3 |
| BS435 | BT435 | E6435 | E8435 | E9435 | M10 | 1.25 | D5 | 3 |
| BS506 | BT506 | E6506 | E8506 | E9506 | M12 | 1.75 | D6 | 3 |
| BS525 | BT525 | E6525 | E8525 | E9525 | M12 | 1.25 | D5 | 3 |
| BS547 | BT547 | E6547 | E8547 | E9547 | M14 | 2.0 | D7 | 3 |
| BS556 | BT556 | E6556 | E8556 | E9556 | M14 | 1.5 | D6 | 3 |
| BS607 | BT607 | E6607 | E8607 | E9607 | M16 | 2.0 | D7 | 3 |
| BS616 | BT616 | E6616 | E8616 | E9616 | M16 | 1.5 | D6 | 3 |
| BS657 | BT657 | E6657 | E8657 | E9657 | M18 | 2.5 | D7 | 4 |
| BS676 | BT676 | E6676 | E8676 | E9676 | M18 | 1.5 | D6 | 4 |

▶ For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.
▶ For tapping depth on DIN / ANSI Shank Taps, refer to DIN Table on page 336 & 337.

▶ Tapping depth for DIN and ANSI style are the same, refer to MCTI table 302

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ○ | ◎ | | | ◎ | | | ○ |

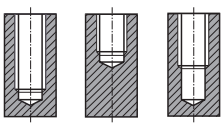
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | ○ | ○ | | ○ | ○ |

# SPIRAL FLUTE TAPS

**BU/BV SERIES**
**E2/E4/E5 SERIES**

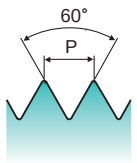
## METRIC SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE
## Steels up to 38HRc

Hole type



BU/BV : ANSI

E2/E4/E5 : DIN Length ANSI Shank




HSSE-V3 | M MF | D3~D7 | 60° | 2P~3P | Steam Oxide | TiCN | Hardslick | R45

Unit : mm

| EDP No. | | | | | SIZE | Pitch | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|---|
| Steam Oxide | Hardslick Coated | Steam Oxide | TiCN Coated | Hardslick Coated | | | | |
| **BU203** | **BV203** | **E2203** | **E4203** | **E5203** | M3 | 0.5 | D3 | 3 |
| **BU224** | **BV224** | **E2224** | **E4224** | **E5224** | M3.5 | 0.6 | D4 | 3 |
| **BU244** | **BV244** | **E2244** | **E4244** | **E5244** | M4 | 0.7 | D4 | 3 |
| **BU284** | **BV284** | **E2284** | **E4284** | **E5284** | M5 | 0.8 | D4 | 3 |
| **BU315** | **BV315** | **E2315** | **E4315** | **E5315** | M6 | 1.0 | D5 | 3 |
| **BU345** | **BV345** | **E2345** | **E4345** | **E5345** | M7 | 1.0 | D5 | 3 |
| **BU365** | **BV365** | **E2365** | **E4365** | **E5365** | M8 | 1.25 | D5 | 3 |
| **BU375** | **BV375** | **E2375** | **E4375** | **E5375** | M8 | 1.0 | D5 | 3 |
| **BU426** | **BV426** | **E2426** | **E4426** | **E5426** | M10 | 1.5 | D6 | 3 |
| **BU435** | **BV435** | **E2435** | **E4435** | **E5435** | M10 | 1.25 | D5 | 3 |
| **BU506** | **BV506** | **E2506** | **E4506** | **E5506** | M12 | 1.75 | D6 | 3 |
| **BU525** | **BV525** | **E2525** | **E4525** | **E5525** | M12 | 1.25 | D5 | 3 |
| **BU547** | **BV547** | **E2547** | **E4547** | **E5547** | M14 | 2.0 | D7 | 3 |
| **BU556** | **BV556** | **E2556** | **E4556** | **E5556** | M14 | 1.5 | D6 | 3 |
| **BU607** | **BV607** | **E2607** | **E4607** | **E5607** | M16 | 2.0 | D7 | 3 |
| **BU616** | **BV616** | **E2616** | **E4616** | **E5616** | M16 | 1.5 | D6 | 3 |
| **BU657** | **BV657** | **E2657** | **E4657** | **E5657** | M18 | 2.5 | D7 | 4 |
| **BU676** | **BV676** | **E2676** | **E4676** | **E5676** | M18 | 1.5 | D6 | 4 |

▶ For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.
▶ For tapping depth on DIN / ANSI Shank Taps, refer to DIN Table on page 336 & 337.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| | ◎ | ◎ | | ○ | ○ | | |

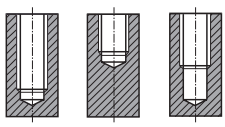
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ○ | | | | | | | |

# SPIRAL FLUTE TAPS

BW/BX SERIES
F1/F3 SERIES

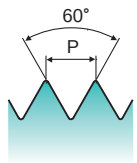
## METRIC SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE for Aluminum Alloys or Die Cast Aluminum

Hole type



BW/BX : ANSI

F1/F3 : DIN Length ANSI Shank




HSSE-V3 | M MF | D3~D6 | 60° | 2P~3P | Bright | Hardslick | R50

Unit : mm

| EDP No. | | | | SIZE | Pitch | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|
| Bright Finish | Hardslick Coated | Bright Finish | Hardslick Coated | | | | |
| **BW203** | **BX203** | **F1203** | **F3203** | M3 | 0.5 | D3 | 2 |
| **BW244** | **BX244** | **F1244** | **F3244** | M4 | 0.7 | D4 | 2 |
| **BW285** | **BX285** | **F1285** | **F3285** | M5 | 0.8 | D5 | 2 |
| **BW315** | **BX315** | **F1315** | **F3315** | M6 | 1.0 | D5 | 2 |
| **BW365** | **BX365** | **F1365** | **F3365** | M8 | 1.25 | D5 | 2 |
| **BW426** | **BX426** | **F1426** | **F3426** | M10 | 1.5 | D6 | 2 |
| **BW435** | **BX435** | **F1435** | **F3435** | M10 | 1.25 | D5 | 2 |

▶ For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.
▶ For tapping depth on DIN / ANSI Shank Taps, refer to DIN Table on page 336 & 337.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| | | | | | | | ◎ |

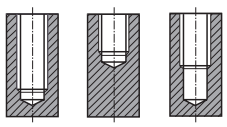
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| ◎ | | | | | | | | | | |

# SPIRAL FLUTE TAPS

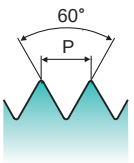
**G4/G5/G6 SERIES**

## METRIC SPIRAL FLUTED TAPS BOTTOMING STYLE for Multi Purpose

**Hole type**



**ANSI**




HSS-V | M MF | D3~D6 | 60° | 1.5P~2P | Bright | TiCN | Hardslick | R50

Unit : mm

| EDP No. | | | SIZE | Pitch | Limit | No. of Flute |
|---|---|---|---|---|---|---|
| Bright Finish | TiCN Coated | Hardslick Coated | | | | |
| G4203 | G5203 | G6203 | M3 | 0.5 | D3 | 2 |
| G4224 | G5224 | G6224 | M3.5 | 0.6 | D4 | 2 |
| G4244 | G5244 | G6244 | M4 | 0.7 | D4 | 3 |
| G4284 | G5284 | G6284 | M5 | 0.8 | D4 | 3 |
| G4315 | G5315 | G6315 | M6 | 1.0 | D5 | 3 |
| G4345 | G5345 | G6345 | M7 | 1.0 | D5 | 3 |
| G4365 | G5365 | G6365 | M8 | 1.25 | D5 | 3 |
| G4375 | G5375 | G6375 | M8 | 1.0 | D5 | 3 |
| G4426 | G5426 | G6426 | M10 | 1.5 | D6 | 3 |
| G4435 | G5435 | G6435 | M10 | 1.25 | D5 | 3 |
| G4506 | G5506 | G6506 | M12 | 1.75 | D6 | 3 |
| G4525 | G5525 | G6525 | M12 | 1.25 | D5 | 3 |

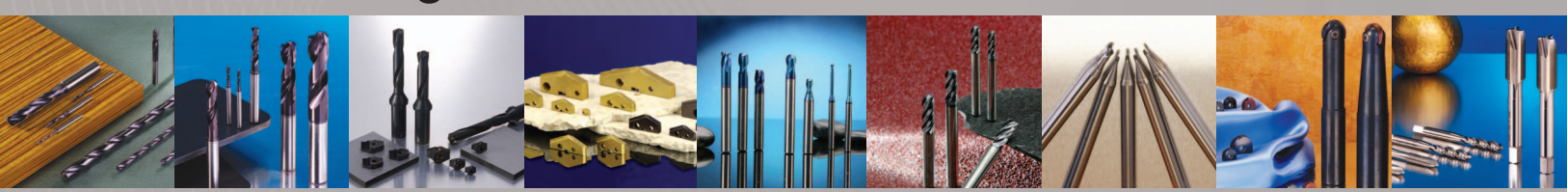
▶ For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | | ○ | ○ | | |

| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| ○ | | ○ | | | | | | | | |

Global Cutting Tool Leader **YG-1**



# HSS

Being the best through innovation

# SPIRAL POINT TAPS

- **Tapping NPT and NPTF Pipe threads**

# SPIRAL POINT TAPS

Tapping NPT and NPTF Pipe threads

## INCH

| EDP No. | MODEL | Tool Material | Standard | Dimensions | Tolerance | Chamfer | Surface Treatment | Page |
|---|---|---|---|---|---|---|---|---|
| **M9/O1 N4/O5** | | Super HSS | UNC/UNF | ANSI DIN Length ANSI Shank | H2~H6 | 4P~5P | Steam Oxide Hardslick | **295** |
| **M5/M6/M7** | | P-HSS | UNC/UNF | ANSI | H2~H5 | 4P~5P | Bright / TiCN Hardslick | **296** |
| **I3/M8/I5/J6** | | P-HSS | UNC/UNF | ANSI | H2~H5 | 4P~5P | Steam Oxide TiCN / TiN Hardslick | **297** |
| **I0/I2/J2** | | HSSE-V3 | UNC/UNF | ANSI | H2~H6 | 4P~5P | Steam Oxide TiN / Hardslick | **299** |
| **M0/M1/M2/M3** | | P-HSS | UNC/UNF | ANSI Long Shank | H2~H3 | 4P~5P | TiN Hardslick | **301** |
| **J4/J8/J3** | | HSSE-V3 | UNC/UNF | ANSI | H2~H5 | 4P~5P | Bright Steam Oxide Hardslick | **302** |
| **K9/L0/L1** | | HSS-V | UNC/UNF | ANSI | H2~H6 | 4P~5P | Bright TiN / Hardslick | **304** |
| **L3/L4/L5** | | HSS-V | UNC/UNF | DIN Length ANSI Shank | H2~H6 | 4P~5P | Bright TiN / Hardslick | **306** |
| **ST/SI** | | HSSE-V3 | UNC/UNF | ANSI | 2B | 4.5P~5P | Hardslick | **307** |

## METRIC

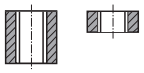
| EDP No. | MODEL | Tool Material | Standard | Dimensions | Tolerance | Chamfer | Surface Treatment | Page |
|---|---|---|---|---|---|---|---|---|
| **N7/N8 N3/O3** | | Super HSS | M/MF | ANSI DIN Length ANSI Shank | D3~D7 | 4P~5P | Steam Oxide Hardslick | **308** |
| **O9/IA K3/K5/K6** | | HSSE-V3 | M/MF | ANSI DIN Length ANSI Shank | D3~D7 | 4P~5P | Steam Oxide TiCN / Hardslick | **309** |
| **IB/IC J9/K7/K2** | | HSSE-V3 | M/MF | ANSI DIN Length ANSI Shank | D3~D7 | 4P~5P | Steam Oxide TiCN / Hardslick | **310** |
| **L7/L8/L9** | | HSS-V | M/MF | ANSI | D3~D6 | 4P~5P | Bright TiCN / Hardslick | **311** |

# SPIRAL POINT TAPS

**M9/O1 SERIES**
**N4/O5 SERIES**

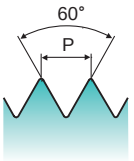
## SPIRAL POINTED TAPS PLUG STYLE
## for Steels & Stainless Steels up to 35HRc

Hole type



M9/O1 : ANSI

N4/O5 : DIN Length ANSI Shank




Super HSS | UNC UNF | H2~H6 | 60° | 4P~5P | Steam Oxide | Hardslick

Unit : Inch

| EDP No. | | | | SIZE | Thread Per Inch | | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|---|
| Steam Oxide | Hardslick Coated | Steam Oxide | Hardslick Coated | | UNC | UNF | | |
| M9082 | 01082 | N4082 | 05082 | 2 | 56 | | H2 | 2 |
| M9162 | 01162 | N4162 | 05162 | 4 | 40 | | H2 | 2 |
| M9202 | 01202 | N4202 | 05202 | 5 | 40 | | H2 | 3 |
| M9243 | 01243 | N4243 | 05243 | 6 | 32 | | H3 | 3 |
| M9283 | 01283 | N4283 | 05283 | 8 | 32 | | H3 | 3 |
| M9323 | 01323 | N4323 | 05323 | 10 | 24 | | H3 | 3 |
| M9343 | 01343 | N4343 | 05343 | | | 32 | H3 | 3 |
| M9403 | 01403 | N4403 | 05403 | 1/4 | 20 | | H3 | 3 |
| M9405 | 01405 | N4405 | 05405 | | | | H5 | 3 |
| M9423 | 01423 | N4423 | 05423 | | | 28 | H3 | 3 |
| M9445 | 01445 | N4445 | 05445 | 5/16 | 18 | | H5 | 3 |
| M9464 | 01464 | N4464 | 05464 | | | 24 | H4 | 3 |
| M9485 | 01485 | N4485 | 05485 | 3/8 | 16 | | H5 | 3 |
| M9504 | 01504 | N4504 | 05504 | | | 24 | H4 | 3 |
| M9525 | 01525 | N4525 | 05525 | 7/16 | 14 | | H5 | 3 |
| M9545 | 01545 | N4545 | 05545 | | | 20 | H5 | 3 |
| M9565 | 01565 | N4565 | 05565 | 1/2 | 13 | | H5 | 3 |
| M9585 | 01585 | N4585 | 05585 | | | 20 | H5 | 3 |
| M9605 | 01605 | N4605 | 05605 | 9/16 | 12 | | H5 | 3 |
| M9625 | 01625 | N4625 | 05625 | | | 18 | H5 | 3 |
| M9645 | 01645 | N4645 | 05645 | 5/8 | 11 | | H5 | 3 |
| M9665 | 01665 | N4665 | 05665 | | | 18 | H5 | 3 |
| M9705 | 01705 | N4705 | 05705 | 3/4 | 10 | | H5 | 3 |
| M9725 | 01725 | N4725 | 05725 | | | 16 | H5 | 3 |
| M9746 | 01746 | N4746 | 05746 | 7/8 | 9 | | H6 | 3 |
| M9766 | 01766 | N4766 | 05766 | | | 14 | H6 | 3 |
| M9786 | 01786 | N4786 | 05786 | 1 | 8 | | H6 | 3 |
| M9806 | 01806 | N4806 | 05806 | | | 12 | H6 | 3 |
| M9836 | 01836 | N4836 | 05836 | 1-1/8 | 8 | | H6 | 4 |
| M9876 | 01876 | N4876 | 05876 | 1-1/4 | 8 | | H6 | 4 |
| M9916 | 01916 | N4916 | 05916 | 1-3/8 | 8 | | H6 | 4 |
| M9956 | 01956 | N4956 | 05956 | 1-1/2 | 8 | | H6 | 4 |

▶ For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.
▶ For tapping depth on DIN / ANSI Shank Taps, refer to DIN Table on page 336 & 337.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ○ | ◎ | | | ◎ | | | ○ |

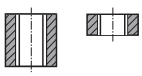
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | ○ | ○ | | ○ | ○ |

# SPIRAL POINT TAPS

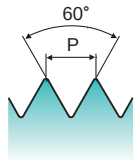
**M5/M6/M7 SERIES**

## SPIRAL POINTED TAPS PLUG STYLE
## Steels up to 45HRc

Hole type



ANSI




P-HSS | UNC UNF | H2~H5 | 60° | 4P~5P | Bright | TiCN | Hardslick

Unit : Inch

| EDP No. | | | SIZE | Thread Per Inch | | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|
| Bright Finish | TiCN Coated | Hardslick Coated | | UNC | UNF | | |
| M5082 | M6082 | M7082 | 2 | 56 | | H2 | 2 |
| M5162 | M6162 | M7162 | 4 | 40 | | H2 | 2 |
| M5202 | M6202 | M7202 | 5 | 40 | | H2 | 3 |
| M5243 | M6243 | M7243 | 6 | 32 | | H3 | 3 |
| M5283 | M6283 | M7283 | 8 | 32 | | H3 | 3 |
| M5323 | M6323 | M7323 | 10 | 24 | | H3 | 3 |
| M5343 | M6343 | M7343 | | | 32 | H3 | 3 |
| M5405 | M6405 | M7405 | 1/4 | 20 | | H5 | 3 |
| M5424 | M6424 | M7424 | | | 28 | H4 | 3 |
| M5445 | M6445 | M7445 | 5/16 | 18 | | H5 | 3 |
| M5464 | M6464 | M7464 | | | 24 | H4 | 3 |
| M5485 | M6485 | M7485 | 3/8 | 16 | | H5 | 3 |
| M5504 | M6504 | M7504 | | | 24 | H4 | 3 |
| M5525 | M6525 | M7525 | 7/16 | 14 | | H5 | 3 |
| M5545 | M6545 | M7545 | | | 20 | H5 | 3 |
| M5565 | M6565 | M7565 | 1/2 | 13 | | H5 | 3 |
| M5585 | M6585 | M7585 | | | 20 | H5 | 3 |
| M5605 | M6605 | M7605 | 9/16 | 12 | | H5 | 3 |
| M5625 | M6625 | M7625 | | | 18 | H5 | 3 |
| M5645 | M6645 | M7645 | 5/8 | 11 | | H5 | 3 |
| M5665 | M6665 | M7665 | | | | H5 | 3 |
| M5705 | M6705 | M7705 | 3/4 | 10 | | H5 | 3 |
| M5725 | M6725 | M7725 | | | 16 | H5 | 3 |

▶ For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| | | ○ | ◎ | | ○ | ◎ | |

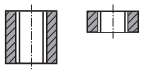
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ○ | ○ | ○ | | | ◎ | | |

# SPIRAL POINT TAPS

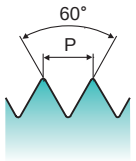
**I3/M8/I5/J6 SERIES**

## SPIRAL POINTED TAPS PLUG STYLE
## for Titanium Alloys & Nickel Base Alloys up to 44HRc

Hole type



ANSI




P-HSS | UNC UNF | H2~H5 | 60° | 4P~5P | Steam Oxide | TiN | TiCN | Hardslick

Unit : Inch

| EDP No. | | | | SIZE | Thread Per Inch | | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|---|
| Steam Oxide | TiN Coated | TiCN Coated | Hardslick Coated | | UNC | UNF | | |
| I3082 | M8082 | I5082 | J6082 | 2 | 56 | | H2 | 2 |
| I3162 | M8162 | I5162 | J6162 | 4 | 40 | | H2 | 2 |
| I3202 | M8202 | I5202 | J6202 | 5 | 40 | | H2 | 3 |
| I3243 | M8243 | I5243 | J6243 | 6 | 32 | | H3 | 3 |
| I3283 | M8283 | I5283 | J6283 | 8 | 32 | | H3 | 3 |
| I3323 | M8323 | I5323 | J6323 | 10 | 24 | | H3 | 3 |
| I3343 | M8343 | I5343 | J6343 | | | 32 | H3 | 3 |
| I3403 | M8403 | I5403 | J6403 | 1/4 | 20 | | H3 | 3 |
| I3405 | M8405 | I5405 | J6405 | | | | H5 | 3 |
| I3423 | M8423 | I5423 | J6423 | | | 28 | H3 | 3 |
| I3424 | M8424 | I5424 | J6424 | | | | H4 | 3 |
| I3443 | M8443 | I5443 | J6443 | 5/16 | 18 | | H3 | 3 |
| I3445 | M8445 | I5445 | J6445 | | | | H5 | 3 |
| I3463 | M8463 | I5463 | J6463 | | | 24 | H3 | 3 |
| I3483 | M8483 | I5483 | J6483 | 3/8 | 16 | | H3 | 3 |
| I3485 | M8485 | I5485 | J6485 | | | | H5 | 3 |
| I3503 | M8503 | I5503 | J6503 | | | 24 | H3 | 3 |
| I3504 | M8504 | I5504 | J6504 | | | | H4 | 3 |
| I3523 | M8523 | I5523 | J6523 | 7/16 | 14 | | H3 | 3 |
| I3525 | M8525 | I5525 | J6525 | | | | H5 | 3 |
| I3543 | M8543 | I5543 | J6543 | | | 20 | H3 | 3 |
| I3545 | M8545 | I5545 | J6545 | | | | H5 | 3 |
| I3563 | M8563 | I5563 | J6563 | 1/2 | 13 | | H3 | 3 |
| I3565 | M8565 | I5565 | J6565 | | | | H5 | 3 |
| I3583 | M8583 | I5583 | J6583 | | | 20 | H3 | 3 |
| I3585 | M8585 | I5585 | J6585 | | | | H5 | 3 |

▶For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

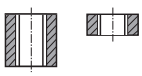
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ◎ | ◎ | ◎ | | | | | |

# SPIRAL POINT TAPS

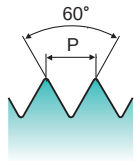
**I3/M8/I5/J6 SERIES**

## SPIRAL POINTED TAPS PLUG STYLE
## for Titanium Alloys & Nickel Base Alloys up to 44HRc

Hole type



ANSI




P-HSS | UNC UNF | H2~H5 | 60° | 4P~5P | Steam Oxide | TiN | TiCN | Hardslick

Unit : Inch

| EDP No. | | | | SIZE | Thread Per Inch | | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|---|
| Steam Oxide | TiN Coated | TiCN Coated | Hardslick Coated | | UNC | UNF | | |
| I3603 | M8603 | I5603 | J6603 | 9/16 | 12 | | H3 | 3 |
| I3605 | M8605 | I5605 | J6605 | | | | H5 | 3 |
| I3623 | M8623 | I5623 | J6623 | | | 18 | H3 | 3 |
| I3625 | M8625 | I5625 | J6625 | | | | H5 | 3 |
| I3643 | M8643 | I5643 | J6643 | 5/8 | 11 | | H3 | 3 |
| I3645 | M8645 | I5645 | J6645 | | | | H5 | 3 |
| I3663 | M8663 | I5663 | J6663 | | | 18 | H3 | 3 |
| I3665 | M8665 | I5665 | J6665 | | | | H5 | 3 |
| I3703 | M8703 | I5703 | J6703 | 3/4 | 10 | | H3 | 3 |
| I3705 | M8705 | I5705 | J6705 | | | | H5 | 3 |
| I3723 | M8723 | I5723 | J6723 | | | 16 | H3 | 3 |
| I3725 | M8725 | I5725 | J6725 | | | | H5 | 3 |

▶For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

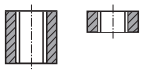
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ◎ | ◎ | ◎ | | | | | |

# SPIRAL POINT TAPS

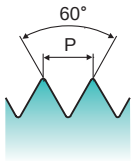
**I0/I2/J2 SERIES**

## SPIRAL POINTED TAPS PLUG STYLE for Stainless Steels up to 28HRc

Hole type



ANSI




HSSE-V3 | UNC UNF | H2~H6 | 60° | 4P~5P | Steam Oxide | TiN | Hardslick

Unit : Inch

| EDP No. | | | SIZE | Thread Per Inch | | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|
| Steam Oxide | TiN Coated | Hardslick Coated | | UNC | UNF | | |
| I0082 | I2082 | J2082 | 2 | 56 | | H2 | 2 |
| I0162 | I2162 | J2162 | 4 | 40 | | H2 | 2 |
| I0202 | I2202 | J2202 | 5 | 40 | | H2 | 3 |
| I0203 | I2203 | J2203 | | | | H3 | 3 |
| I0243 | I2243 | J2243 | 6 | 32 | | H3 | 3 |
| I0283 | I2283 | J2283 | 8 | 32 | | H3 | 3 |
| I0323 | I2323 | J2323 | 10 | 24 | | H3 | 3 |
| I0343 | I2343 | J2343 | | | 32 | H3 | 3 |
| I0403 | I2403 | J2403 | 1/4 | 20 | | H3 | 3 |
| I0405 | I2405 | J2405 | | | | H5 | 3 |
| I0423 | I2423 | J2423 | | | 28 | H3 | 3 |
| I0443 | I2443 | J2443 | 5/16 | 18 | | H3 | 3 |
| I0445 | I2445 | J2445 | | | | H5 | 3 |
| I0463 | I2463 | J2463 | | | 24 | H3 | 3 |
| I0483 | I2483 | J2483 | 3/8 | 16 | | H3 | 3 |
| I0485 | I2485 | J2485 | | | | H5 | 3 |
| I0503 | I2503 | J2503 | | | 24 | H3 | 3 |
| I0523 | I2523 | J2523 | 7/16 | 14 | | H3 | 3 |
| I0525 | I2525 | J2525 | | | | H5 | 3 |
| I0543 | I2543 | J2543 | | | 20 | H3 | 3 |
| I0545 | I2545 | J2545 | | | | H5 | 3 |
| I0563 | I2563 | J2563 | 1/2 | 13 | | H3 | 3 |
| I0565 | I2565 | J2565 | | | | H5 | 3 |
| I0583 | I2583 | J2583 | | | 20 | H3 | 3 |
| I0603 | I2603 | J2603 | 9/16 | 12 | | H3 | 3 |
| I0623 | I2623 | J2623 | | | 18 | H3 | 3 |

▶ For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ○ | ◎ | | | ◎ | | | ○ |

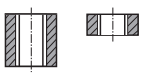
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | ○ | ○ | | ○ | ○ |

# SPIRAL POINT TAPS

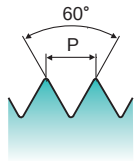
**I0/I2/J2 SERIES**

## SPIRAL POINTED TAPS PLUG STYLE for Stainless Steels up to 28HRc

Hole type



ANSI




HSSE-V3 | UNC UNF | H2~H6 | 60° | 4P~5P | Steam Oxide | TiN | Hardslick

Unit : Inch

| EDP No. | | | SIZE | Thread Per Inch | | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|
| Steam Oxide | TiN Coated | Hardslick Coated | | UNC | UNF | | |
| I0643 | I2643 | J2643 | 5/8 | 11 | | H3 | 3 |
| I0645 | I2645 | J2645 | | | | H5 | 3 |
| I0665 | I2665 | J2665 | | | 18 | H5 | 3 |
| I0703 | I2703 | J2703 | 3/4 | 10 | | H3 | 3 |
| I0705 | I2705 | J2705 | | | | H5 | 3 |
| I0723 | I2723 | J2723 | 3/4 | | 16 | H3 | 3 |
| I0725 | I2725 | J2725 | 3/4 | | 16 | H5 | 3 |
| I0744 | I2744 | J2744 | 7/8 | 9 | | H4 | 3 |
| I0746 | I2746 | J2746 | | | | H6 | 3 |
| I0766 | I2766 | J2766 | | | 14 | H6 | 3 |
| I0784 | I2784 | J2784 | 1 | 8 | | H4 | 3 |
| I0786 | I2786 | J2786 | | | | H6 | 3 |
| I0806 | I2806 | J2806 | | | 12 | H6 | 3 |

▶ For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ○ | ◎ | | | ◎ | | | ○ |

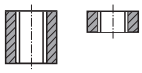
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | ○ | ○ | | ○ | ○ |

# SPIRAL POINT TAPS

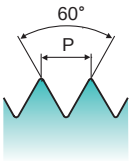
**M0/M1/M2/M3 SERIES**

## SPIRAL POINTED TAPS PLUG STYLE for Stainless Steels up to 28HRc

**Hole type**



**ANSI Long Shank**




P-HSS | UNC UNF | H2~H3 | 60° | 4P~5P | TiN | Hardslick

Unit : Inch

| EDP No. | | | | SIZE | Thread Per Inch | | Limit | No. of Flute | Maximum Tapping Depth |
|---|---|---|---|---|---|---|---|---|---|
| TiN Coated 4″ OAL | TiN Coated 6″ OAL | Hardslick Coated 4″ OAL | Hardslick Coated 6″ OAL | | UNC | UNF | | | |
| M0162 | — | M2162 | — | 4 | 40 | | H2 | 2 | 0.844 |
| M0243 | M1243 | M2243 | M3243 | 6 | 32 | | H3 | 2 | 1.031 |
| M0283 | M1283 | M2283 | M3283 | 8 | 32 | | H3 | 3 | 1.125 |
| M0323 | M1323 | M2323 | M3323 | 10 | 24 | | H3 | 3 | 1.312 |
| M0343 | M1343 | M2343 | M3343 | | | 32 | H3 | 3 | 1.312 |
| M0403 | M1403 | M2403 | M3403 | 1/4 | 20 | | H3 | 3 | 1.500 |
| — | M1423 | — | M3423 | | | 28 | H3 | 3 | 1.500 |
| — | M1443 | — | M3443 | 5/16 | 18 | | H3 | 3 | 1.688 |
| — | M1463 | — | M3463 | | | 24 | H3 | 3 | 1.688 |
| — | M1483 | — | M3483 | 3/8 | 16 | | H3 | 3 | 1.875 |
| — | M1503 | — | M3503 | | | 24 | H3 | 3 | |
| — | M1523 | — | M3523 | 7/16 | 14 | | H3 | 3 | |
| — | M1543 | — | M3543 | | | 20 | H3 | 3 | |
| — | M1563 | — | M3563 | 1/2 | 13 | | H3 | 3 | |
| — | M1583 | — | M3583 | | | 20 | H3 | 3 | |
| — | M1603 | — | M3603 | 9/16 | 12 | | H3 | 3 | |
| — | M1623 | — | M3623 | | | 18 | H3 | 3 | |
| — | M1643 | — | M3643 | 5/8 | 11 | | H3 | 3 | |

▶ For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ○ | ◎ | | | ◎ | | | ○ |

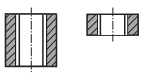
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | ○ | ○ | | ○ | ○ |

# SPIRAL POINT TAPS

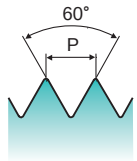
J4/J3/J8 SERIES

## SPIRAL POINTED TAPS PLUG STYLE
## Steels up to 38HRc

Hole type



ANSI




HSSE-V3 | UNC UNF | H2~H5 | 60° | 4P~5P | Bright | Steam Oxide | Hardslick

Unit : Inch

| EDP No. | | | SIZE | Thread Per Inch | | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|
| Bright Finish | Steam Oxide | Hardslick Coated | | UNC | UNF | | |
| J4082 | J3082 | J8082 | 2 | 56 | | H2 | 2 |
| J4162 | J3162 | J8162 | 4 | 40 | | H2 | 2 |
| J4202 | J3202 | J8202 | 5 | 40 | | H2 | 3 |
| J4243 | J3243 | J8243 | 6 | 32 | | H3 | 3 |
| J4283 | J3283 | J8283 | 8 | 32 | | H3 | 3 |
| J4323 | J3323 | J8323 | 10 | 24 | | H3 | 3 |
| J4343 | J3343 | J8343 | 10 | | 32 | H3 | 3 |
| J4403 | J3403 | J8403 | 1/4 | 20 | | H3 | 3 |
| J4405 | J3405 | J8405 | 1/4 | 20 | | H5 | 3 |
| J4423 | J3423 | J8423 | 1/4 | | 28 | H3 | 3 |
| J4425 | J3425 | J8425 | 1/4 | | 28 | H5 | 3 |
| J4443 | J3443 | J8443 | 5/16 | 18 | | H3 | 3 |
| J4445 | J3445 | J8445 | 5/16 | 18 | | H5 | 3 |
| J4463 | J3463 | J8463 | 5/16 | | 24 | H3 | 3 |
| J4465 | J3465 | J8465 | 5/16 | | 24 | H5 | 3 |
| J4483 | J3483 | J8483 | 3/8 | 16 | | H3 | 3 |
| J4485 | J3485 | J8485 | 3/8 | 16 | | H5 | 3 |
| J4503 | J3503 | J8503 | 3/8 | | 24 | H3 | 3 |
| J4505 | J3505 | J8505 | 3/8 | | 24 | H5 | 3 |
| J4523 | J3523 | J8523 | 7/16 | 14 | | H3 | 3 |
| J4525 | J3525 | J8525 | 7/16 | 14 | | H5 | 3 |
| J4543 | J3543 | J8543 | 7/16 | | 20 | H3 | 3 |
| J4545 | J3545 | J8545 | 7/16 | | 20 | H5 | 3 |
| J4563 | J3563 | J8563 | 1/2 | 13 | | H3 | 3 |
| J4565 | J3565 | J8565 | 1/2 | 13 | | H5 | 3 |
| J4583 | J3583 | J8583 | 1/2 | | 20 | H3 | 3 |
| J4585 | J3585 | J8585 | 1/2 | | 20 | H5 | 3 |

▶ For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| | ◎ | ◎ | | ○ | ○ | | |

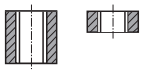
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ○ | | | | | | | |

# SPIRAL POINT TAPS

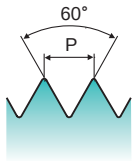
**J4/J3/J8 SERIES**

## SPIRAL POINTED TAPS PLUG STYLE
## Steels up to 38HRc

**Hole type**



**ANSI**




HSSE-V3 | UNC UNF | H2~H5 | 60° | 4P~5P | Bright | Steam Oxide | Hardslick

Unit : Inch

| EDP No. | | | SIZE | Thread Per Inch | | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|
| Bright Finish | Steam Oxide | Hardslick Coated | | UNC | UNF | | |
| J4605 | J3605 | J8605 | 9/16 | 12 | | H5 | 3 |
| J4625 | J3625 | J8625 | 9/16 | | 18 | H5 | 3 |
| J4643 | J3643 | J8643 | 5/8 | 11 | | H3 | 3 |
| J4645 | J3645 | J8645 | 5/8 | 11 | | H5 | 3 |
| J4663 | J3663 | J8663 | 5/8 | | 18 | H3 | 3 |
| J4665 | J3665 | J8665 | 5/8 | | 18 | H5 | 3 |
| J4703 | J3703 | J8703 | 3/4 | 10 | | H3 | 3 |
| J4705 | J3705 | J8705 | 3/4 | 10 | | H5 | 3 |
| J4723 | J3723 | J8723 | 3/4 | | 16 | H3 | 3 |
| J4725 | J3725 | J8725 | 3/4 | | 16 | H5 | 3 |
| J4784 | J3784 | J8784 | 1 | 8 | | H4 | 3 |
| J4786 | J3786 | J8786 | 1 | 8 | | H6 | 3 |
| J4804 | J3804 | J8804 | 1 | | 12 | H4 | 3 |
| J4806 | J3806 | J8806 | 1 | | 12 | H6 | 3 |
| J4824 | J3824 | J8824 | 1-1/8 | 7 | | H4 | 4 |
| J4864 | J3864 | J8864 | 1-1/4 | 7 | | H4 | 4 |
| J4904 | J3904 | J8904 | 1-3/8 | 6 | | H4 | 4 |
| J4944 | J3944 | J8944 | 1-1/2 | 6 | | H4 | 4 |

▶ For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| | ◎ | ◎ | | ○ | ○ | | |

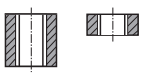
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ○ | | | | | | | |

# SPIRAL POINT TAPS

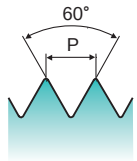
**K9/L0/L1 SERIES**

## SPIRAL POINTED TAPS PLUG STYLE for Multi Purpose

Hole type



ANSI




HSS-V | UNC UNF | H2~H6 | 60° | 4P~5P | Bright | TiN | Hardslick

Unit : Inch

| EDP No. | | | SIZE | Thread Per Inch | | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|
| Bright Finish | TiN Coated | Hardslick Coated | | UNC | UNF | | |
| K9082 | L0082 | L1082 | 2 | 56 | | H2 | 2 |
| K9162 | L0162 | L1162 | 4 | 40 | | H2 | 2 |
| K9202 | L0202 | L1202 | 5 | 40 | | H2 | 2 |
| K9243 | L0243 | L1243 | 6 | 32 | | H3 | 2 |
| K9283 | L0283 | L1283 | 8 | 32 | | H3 | 2 |
| K9323 | L0323 | L1323 | 10 | 24 | | H3 | 2 |
| K9343 | L0343 | L1343 | | | 32 | H3 | 2 |
| K9403 | L0403 | L1403 | 1/4 | 20 | | H3 | 2 |
| K9405 | L0405 | L1405 | | | | H5 | 2 |
| K9423 | L0423 | L1423 | | | 28 | H3 | 3 |
| K9443 | L0443 | L1443 | 5/16 | 18 | | H3 | 2 |
| K9445 | L0445 | L1445 | | | | H5 | 3 |
| K9463 | L0463 | L1463 | | | 24 | H3 | 3 |
| K9483 | L0483 | L1483 | 3/8 | 16 | | H3 | 3 |
| K9485 | L0485 | L1485 | | | | H5 | 3 |
| K9503 | L0503 | L1503 | | | 24 | H3 | 3 |
| K9523 | L0523 | L1523 | 7/16 | 14 | | H3 | 3 |
| K9525 | L0525 | L1525 | | | | H5 | 3 |
| K9543 | L0543 | L1543 | | | 20 | H3 | 3 |
| K9545 | L0545 | L1545 | | | | H5 | 3 |
| K9563 | L0563 | L1563 | 1/2 | 13 | | H3 | 3 |
| K9565 | L0565 | L1565 | | | | H5 | 3 |
| K9583 | L0583 | L1583 | | | 20 | H3 | 3 |
| K9585 | L0585 | L1585 | | | | H5 | 3 |
| K9603 | L0603 | L1603 | 9/16 | 12 | | H3 | 3 |
| K9623 | L0623 | L1623 | | | 18 | H3 | 3 |
| K9625 | L0625 | L1625 | | | | H5 | 3 |

▶For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | | ○ | ○ | | |

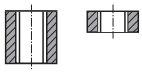
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| ○ | | ○ | ○ | | | | | | | |

# SPIRAL POINT TAPS

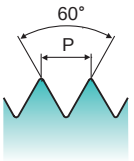
**K9/L0/L1 SERIES**

## SPIRAL POINTED TAPS PLUG STYLE for Multi Purpose

**Hole type**



**ANSI**




HSS-V | UNC UNF | H2~H6 | 60° | 4P~5P | Bright | TiN | Hardslick

Unit : Inch

| EDP No. | | | SIZE | Thread Per Inch | | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|
| Bright Finish | TiN Coated | Hardslick Coated | | UNC | UNF | | |
| K9643 | L0643 | L1643 | 5/8 | 11 | | H3 | 3 |
| K9645 | L0645 | L1645 | | | | H5 | 3 |
| K9663 | L0663 | L1663 | | | 18 | H3 | 3 |
| K9665 | L0665 | L1665 | | | | H5 | 3 |
| K9703 | L0703 | L1703 | 3/4 | 10 | | H3 | 3 |
| K9705 | L0705 | L1705 | | | | H5 | 3 |
| K9723 | L0723 | L1723 | | | 16 | H3 | 3 |
| K9725 | L0725 | L1725 | | | | H5 | 3 |
| K9746 | L0746 | L1746 | 7/8 | 9 | | H6 | 3 |
| K9764 | L0764 | L1764 | | | 14 | H4 | 3 |
| K9766 | L0766 | L1766 | | | | H6 | 3 |
| K9786 | L0786 | L1786 | 1 | 8 | | H6 | 3 |
| K9806 | L0806 | L1806 | | | 12 | H6 | 3 |

▶For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | | ○ | ○ | | |

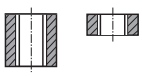
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| ○ | | ○ | ○ | | | | | | | |

# SPIRAL POINT TAPS

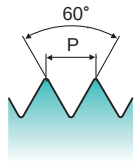
L3/L4/L5 SERIES

## SPIRAL POINTED TAPS PLUG STYLE for Multi Purpose

Hole type



DIN Length ANSI Shank




HSS-V | UNC UNF | H2~H6 | 60° | 4P~5P | Bright | TiN | Hardslick

Unit : Inch

| EDP No. | | | SIZE | Thread Per Inch | | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|
| Bright Finish | TiN Coated | Hardslick Coated | | UNC | UNF | | |
| L3082 | L4082 | L5082 | 2 | 56 | | H2 | 2 |
| L3162 | L4162 | L5162 | 4 | 40 | | H2 | 2 |
| L3202 | L4202 | L5202 | 5 | 40 | | H2 | 3 |
| L3243 | L4243 | L5243 | 6 | 32 | | H3 | 3 |
| L3283 | L4283 | L5283 | 8 | 32 | | H3 | 3 |
| L3323 | L4323 | L5323 | 10 | 24 | | H3 | 3 |
| L3343 | L4343 | L5343 | | | 32 | H3 | 3 |
| L3403 | L4403 | L5403 | 1/4 | 20 | | H3 | 3 |
| L3405 | L4405 | L5405 | | | | H5 | 3 |
| L3423 | L4423 | L5423 | | | 28 | H3 | 3 |
| L3443 | L4443 | L5443 | 5/16 | 18 | | H3 | 3 |
| L3445 | L4445 | L5445 | | | | H5 | 3 |
| L3463 | L4463 | L5463 | | | 24 | H3 | 3 |
| L3483 | L4483 | L5483 | 3/8 | 16 | | H3 | 3 |
| L3485 | L4485 | L5485 | | | | H5 | 3 |
| L3503 | L4503 | L5503 | | | 24 | H3 | 3 |
| L3523 | L4523 | L5523 | 7/16 | 14 | | H3 | 3 |
| L3525 | L4525 | L5525 | | | | H5 | 3 |
| L3543 | L4543 | L5543 | | | 20 | H3 | 3 |
| L3545 | L4545 | L5545 | | | | H5 | 3 |
| L3563 | L4563 | L5563 | 1/2 | 13 | | H3 | 3 |
| L3565 | L4565 | L5565 | | | | H5 | 3 |
| L3583 | L4583 | L5583 | | | 20 | H3 | 3 |
| L3585 | L4585 | L5585 | | | | H5 | 3 |
| L3605 | L4605 | L5605 | 9/16 | 12 | | H5 | 3 |
| L3625 | L4625 | L5625 | | | 18 | H5 | 3 |
| L3643 | L4643 | L5643 | 5/8 | 11 | | H3 | 3 |
| L3645 | L4645 | L5645 | | | | H5 | 3 |
| L3703 | L4703 | L5703 | 3/4 | 10 | | H3 | 3 |
| L3705 | L4705 | L5705 | | | | H5 | 3 |
| L3725 | L4725 | L5725 | 3/4 | | 16 | H5 | 3 |
| L3746 | L4746 | L5746 | 7/8 | 9 | | H6 | 3 |
| L3766 | L4766 | L5766 | | | 14 | H6 | 3 |
| L3786 | L4786 | L5786 | 1 | 8 | | H6 | 3 |
| L3806 | L4806 | L5806 | | | 12 | H6 | 3 |

▶ For tapping depth on DIN / ANSI shank Taps, refer to DIN Table on page 336 & 337.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | | ○ | ○ | | |

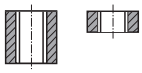
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| ○ | | ○ | | | | | | | | |

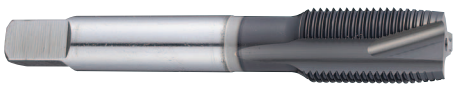
# SPIRAL POINT TAPS

**ST/SI SERIES**

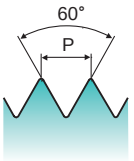
## SCREW THREAD INSERT TAP

**Hole type**





**ANSI**




HSSE-V3 | UNC UNF | 2B | 60° | 4.5P ~ 5P | Hardslick

Unit : Inch

| SIZE | EDP No. Hardslick Coated | Thread Per Inch UNC | EDP No. Hardslick Coated | Thread Per Inch UNF | Limit | No. of Flute |
|---|---|---|---|---|---|---|
| #4 | SI162 | 40 | ST182 | 48 | 2B | 3 |
| #6 | SI242 | 32 | ST262 | 40 | 2B | 3 |
| #8 | SI282 | 32 | ST302 | 36 | 2B | 3 |
| #10 | SI322 | 24 | ST342 | 32 | 2B | 3 |
| 1/4 | SI402 | 20 | ST422 | 28 | 2B | 3 |
| 5/16 | SI442 | 18 | ST462 | 24 | 2B | 3 |
| 3/8 | SI482 | 16 | ST502 | 24 | 2B | 3 |
| 7/16 | SI522 | 14 | ST542 | 20 | 2B | 3 |
| 1/2 | SI562 | 13 | ST582 | 20 | 2B | 3 |
| 9/16 | SI602 | 12 | ST622 | 18 | 2B | 3 |
| 5/8 | SI642 | 11 | ST662 | 18 | 2B | 3 |
| 3/4 | SI702 | 10 | ST722 | 16 | 2B | 3 |

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | | ○ | ○ | | |

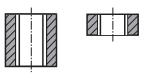
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| ○ | | ○ | | | | | | | | |

# SPIRAL POINT TAPS

N7/N8 SERIES
N3/O3 SERIES

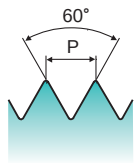
## METRIC SPIRAL POINTED TAPS PLUG STYLE for Steels & Stainless Steels up to 35HRc

Hole type



N7/N8 : ANSI

N3/O3 : DIN Length ANSI Shank




Super HSS | M MF | D3~D7 | 60° | 4P~5P | Steam Oxide | Hardslick

Unit : mm

| EDP No. | | | | SIZE | Pitch | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|
| Steam Oxide | Hardslick Coated | Steam Oxide | Hardslick Coated | | | | |
| N7203 | N8203 | N3203 | O3203 | M3 | 0.5 | D3 | 3 |
| N7224 | N8224 | N3224 | O3224 | M3.5 | 0.6 | D4 | 3 |
| N7244 | N8244 | N3244 | O3244 | M4 | 0.7 | D4 | 3 |
| N7284 | N8284 | N3284 | O3284 | M5 | 0.8 | D4 | 3 |
| N7315 | N8315 | N3315 | O3315 | M6 | 1.0 | D5 | 3 |
| N7345 | N8345 | N3345 | O3345 | M7 | 1.0 | D5 | 3 |
| N7365 | N8365 | N3365 | O3365 | M8 | 1.25 | D5 | 3 |
| N7375 | N8375 | N3375 | O3375 | M8 | 1.0 | D5 | 3 |
| N7426 | N8426 | N3426 | O3426 | M10 | 1.5 | D6 | 3 |
| N7435 | N8435 | N3435 | O3435 | M10 | 1.25 | D5 | 3 |
| N7506 | N8506 | N3506 | O3506 | M12 | 1.75 | D6 | 3 |
| N7525 | N8525 | N3525 | O3525 | M12 | 1.25 | D5 | 3 |
| N7547 | N8547 | N3547 | O3547 | M14 | 2.0 | D7 | 3 |
| N7556 | N8556 | N3556 | O3556 | M14 | 1.5 | D6 | 3 |
| N7607 | N8607 | N3607 | O3607 | M16 | 2.0 | D7 | 3 |
| N7616 | N8616 | N3616 | O3616 | M16 | 1.5 | D6 | 3 |
| N7657 | N8657 | N3657 | O3657 | M18 | 2.5 | D7 | 3 |
| N7676 | N8676 | N3676 | O3676 | M18 | 1.5 | D6 | 3 |

▶ For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.
▶ For tapping depth on DIN / ANSI Shank Taps, refer to DIN Table on page 336 & 337.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ○ | ◎ | | | ◎ | | | ○ |

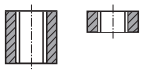
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | ○ | ○ | | ○ | ○ |

# SPIRAL POINT TAPS

**O9/IA SERIES**
**K3/K5/K6 SERIES**

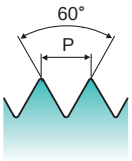
## METRIC SPIRAL FLUTED TAPS PLUG STYLE
## Steels up to 35HRc

**Hole type**



**O9/IA : ANSI**

**K3/K5/K6 : DIN Length ANSI Shank**




HSSE-V3 | M MF | D3~D7 | 60° | 4P~5P | Steam Oxide | TiCN | Hardslick

Unit : mm

| EDP No. | | | | | SIZE | Pitch | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|---|
| Steam Oxide | Hardslick Coated | Steam Oxide | TiCN Coated | Hardslick Coated | | | | |
| 09203 | IA203 | K3203 | K5203 | K6203 | M3 | 0.5 | D3 | 3 |
| 09224 | IA224 | K3224 | K5224 | K6224 | M3.5 | 0.6 | D4 | 3 |
| 09244 | IA244 | K3244 | K5244 | K6244 | M4 | 0.7 | D4 | 3 |
| 09284 | IA284 | K3284 | K5284 | K6284 | M5 | 0.8 | D4 | 3 |
| 09315 | IA315 | K3315 | K5315 | K6315 | M6 | 1.0 | D5 | 3 |
| 09345 | IA345 | K3345 | K5345 | K6345 | M7 | 1.0 | D5 | 3 |
| 09365 | IA365 | K3365 | K5365 | K6365 | M8 | 1.25 | D5 | 3 |
| 09375 | IA375 | K3375 | K5375 | K6375 | M8 | 1.0 | D5 | 3 |
| 09426 | IA426 | K3426 | K5426 | K6426 | M10 | 1.5 | D6 | 3 |
| 09435 | IA435 | K3435 | K5435 | K6435 | M10 | 1.25 | D5 | 3 |
| 09506 | IA506 | K3506 | K5506 | K6506 | M12 | 1.75 | D6 | 3 |
| 09525 | IA525 | K3525 | K5525 | K6525 | M12 | 1.25 | D5 | 3 |
| 09547 | IA547 | K3547 | K5547 | K6547 | M14 | 2.0 | D7 | 3 |
| 09556 | IA556 | K3556 | K5556 | K6556 | M14 | 1.5 | D6 | 3 |
| 09607 | IA607 | K3607 | K5607 | K6607 | M16 | 2.0 | D7 | 3 |
| 09616 | IA616 | K3616 | K5616 | K6616 | M16 | 1.5 | D6 | 3 |
| 09657 | IA657 | K3657 | K5657 | K6657 | M18 | 2.5 | D7 | 3 |
| 09676 | IA676 | K3676 | K5676 | K6676 | M18 | 1.5 | D6 | 3 |

▶For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.
▶For tapping depth on DIN / ANSI Shank Taps, refer to DIN Table on page 336 & 337.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| | ◎ | ○ | | ◎ | ○ | | |

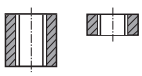
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| ○ | | | | | | | | | | |

# SPIRAL POINT TAPS

IB/IC SERIES
J9/K7/K2 SERIES

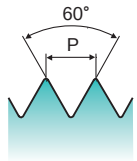
## METRIC SPIRAL POINTED TAPS PLUG STYLE
## Steels up to 35HRc

Hole type



IB/IC : ANSI

J9/K7/K2 : DIN Length ANSI Shank




HSSE-V3 | M MF | D3~D7 | 60° | 4P~5P | Steam Oxide | TiCN | Hardslick

Unit : mm

| EDP No. | | | | | SIZE | Pitch | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|---|
| Steam Oxide | Hardslick Coated | Steam Oxide | TiCN Coated | Hardslick Coated | | | | |
| IB203 | IC203 | J9203 | K7203 | K2203 | M3 | 0.5 | D3 | 3 |
| IB224 | IC224 | J9224 | K7224 | K2224 | M3.5 | 0.6 | D4 | 3 |
| IB244 | IC244 | J9244 | K7244 | K2244 | M4 | 0.7 | D4 | 3 |
| IB284 | IC284 | J9284 | K7284 | K2284 | M5 | 0.8 | D4 | 3 |
| IB315 | IC315 | J9315 | K7315 | K2315 | M6 | 1.0 | D5 | 3 |
| IB345 | IC345 | J9345 | K7345 | K2345 | M7 | 1.0 | D5 | 3 |
| IB365 | IC365 | J9365 | K7365 | K2365 | M8 | 1.25 | D5 | 3 |
| IB375 | IC375 | J9375 | K7375 | K2375 | M8 | 1.0 | D5 | 3 |
| IB426 | IC426 | J9426 | K7426 | K2426 | M10 | 1.5 | D6 | 3 |
| IB435 | IC435 | J9435 | K7435 | K2435 | M10 | 1.25 | D5 | 3 |
| IB506 | IC506 | J9506 | K7506 | K2506 | M12 | 1.75 | D6 | 3 |
| IB525 | IC525 | J9525 | K7525 | K2525 | M12 | 1.25 | D5 | 3 |
| IB547 | IC547 | J9547 | K7547 | K2547 | M14 | 2.0 | D7 | 3 |
| IB556 | IC556 | J9556 | K7556 | K2556 | M14 | 1.5 | D6 | 3 |
| IB607 | IC607 | J9607 | K7607 | K2607 | M16 | 2.0 | D7 | 3 |
| IB616 | IC616 | J9616 | K7616 | K2616 | M16 | 1.5 | D6 | 3 |
| IB657 | IC657 | J9657 | K7657 | K2657 | M18 | 2.5 | D7 | 4 |
| IB676 | IC676 | J9676 | K7676 | K2676 | M18 | 1.5 | D6 | 4 |

▶ For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.
▶ For tapping depth on DIN / ANSI Shank Taps, refer to DIN Table on page 336 & 337.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| | ◎ | ◎ | | ○ | ○ | | |

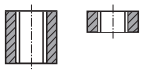
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ○ | | | | | | | |

# SPIRAL POINT TAPS

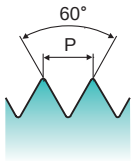
**L7/L8/L9 SERIES**

## METRIC SPIRAL POINTED TAPS PLUG STYLE for Multi Purpose

Hole type



ANSI




HSS-V | M MF | D3~D6 | 60° | 4P~5P | Bright | TiCN | Hardslick

Unit : mm

| EDP No. | | | SIZE | Pitch | Limit | No. of Flute |
|---|---|---|---|---|---|---|
| Bright Finish | TiCN Coated | Hardslick Coated | | | | |
| L7203 | L8203 | L9203 | M3 | 0.5 | D3 | 2 |
| L7224 | L8224 | L9224 | M3.5 | 0.6 | D4 | 2 |
| L7244 | L8244 | L9244 | M4 | 0.7 | D4 | 2 |
| L7284 | L8284 | L9284 | M5 | 0.8 | D4 | 2 |
| L7315 | L8315 | L9315 | M6 | 1.0 | D5 | 3 |
| L7345 | L8345 | L9345 | M7 | 1.0 | D5 | 3 |
| L7365 | L8365 | L9365 | M8 | 1.25 | D5 | 3 |
| L7375 | L8375 | L9375 | M8 | 1.0 | D5 | 3 |
| L7426 | L8426 | L9426 | M10 | 1.5 | D6 | 3 |
| L7435 | L8435 | L9435 | M10 | 1.25 | D5 | 3 |
| L7506 | L8506 | L9506 | M12 | 1.75 | D6 | 3 |
| L7525 | L8525 | L9525 | M12 | 1.25 | D5 | 3 |

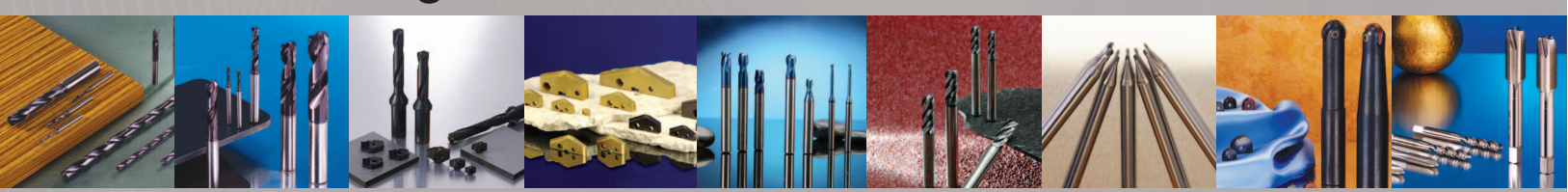
▶ For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | | ○ | ○ | | |

| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| ○ | | ○ | | | | | | | | |

Global Cutting Tool Leader **YG-1**



HSS

Being the best through innovation

# TAPER PIPE TAPS

- Tapping NPT & NPTF threads

# TAPER PIPE TAPS

Tapping NPT & NPTF threads

## INCH

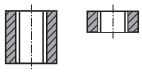
| EDP No. | MODEL | Tool Material | Standard | Dimensions | Tolerance | Chamfer | Surface Treatment | Page |
|---|---|---|---|---|---|---|---|---|
| **Q1/Q0/Q6** | | HSSE-V3 | NPT/F | ANSI | | 2P~3P | Bright<br>Steam Oxide<br>Hardslick | **315** |
| **Q9/R0/R1** | | HSSE-V3 | NPT/F | ANSI | | 2P~3P | Bright / TiN<br>Hardslick | **316** |
| **R7/R8/R9/S0** | | HSSE-V3 | NPT/F | ANSI | | 2P~3P | Bright / TiN<br>Hardslick<br>Nitrided-Steam Oxide | **317** |
| **S1/S2** | | HSSE-V3 | NPTF | ANSI | | 2P~3P | Bright / TiCN | **318** |

# TAPER PIPE TAPS

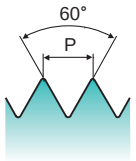
**Q1/Q0/Q6 SERIES**

## TAPER PIPE TAPS : SPIRAL FLUTED for Steels & Stainless Steels

Hole type



ANSI




HSSE-V3 | NPT/F | 60° | 2P~3P | Bright | Steam Oxide | Hardslick | R15

Unit : Inch

| EDP No. | | | SIZE | Thread Per Inch | No. of Flute |
|---|---|---|---|---|---|
| Bright Finish | Steam Oxide | Hardslick Coated | | | |
| Q1020 | Q0020 | Q6020 | 1/16 | 27 | 4 |
| Q1200 | Q0200 | Q6200 | 1/8(Lg) | 27 | 4 |
| Q1210 | Q0210 | Q6210 | 1/8(Sm) | 27 | 4 |
| Q1400 | Q0400 | Q6400 | 1/4 | 18 | 4 |
| Q1480 | Q0480 | Q6480 | 3/8 | 18 | 4 |
| Q1560 | Q0560 | Q6560 | 1/2 | 14 | 4 |
| Q1700 | Q0700 | Q6700 | 3/4 | 14 | 4 |
| Q1780 | Q0780 | Q6780 | 1 | 11-1/2 | 4 |
| Q1860 | Q0860 | Q6860 | 1-1/4 | 11-1/2 | 5 |
| Q1960 | Q0960 | Q6960 | 1-1/2 | 11-1/2 | 7 |
| Q1D20 | Q0D20 | Q6D20 | 2 | 11-1/2 | 7 |

▶ These Taps meet both NPT and NPTF Standards.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ○ | ◎ | ○ | | ◎ | ○ | | |

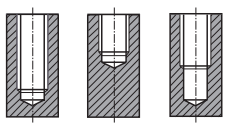
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| ○ | | ○ | | | | | | | | |

# TAPER PIPE TAPS

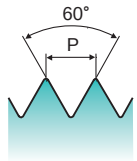
**Q9/R0/R1 SERIES**

## TAPER PIPE TAPS : SPIRAL FLUTED for Cast Irons & Steels

**Hole type**



**ANSI**




HSSE-V3 | NPT/F | 60° | 2P~3P | Bright | TiN | Hardslick | R15

Unit : Inch

| EDP No. | | | SIZE | Thread Per Inch | No. of Flute |
|---|---|---|---|---|---|
| Bright Finish | TiN Coated | Hardslick Coated | | | |
| **Q9020** | **R0020** | **R1020** | 1/16 | 27 | 4 |
| **Q9200** | **R0200** | **R1200** | 1/8(Lg) | 27 | 4 |
| **Q9210** | **R0210** | **R1210** | 1/8(Sm) | 27 | 4 |
| **Q9400** | **R0400** | **R1400** | 1/4 | 18 | 4 |
| **Q9480** | **R0480** | **R1480** | 3/8 | 18 | 4 |
| **Q9560** | **R0560** | **R1560** | 1/2 | 14 | 4 |
| **Q9700** | **R0700** | **R1700** | 3/4 | 14 | 4 |
| **Q9780** | **R0780** | **R1780** | 1 | 11-1/2 | 4 |
| **Q9860** | **R0860** | **R1860** | 1-1/4 | 11-1/2 | 5 |
| **Q9960** | **R0960** | **R1960** | 1-1/2 | 11-1/2 | 7 |
| **Q9D20** | **R0D20** | **R1D20** | 2 | 11-1/2 | 7 |

▶ These Taps meet both NPT and NPTF Standards.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | | | | | |

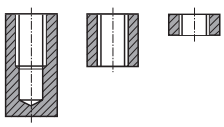
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| | ◎ | ◎ | | | | | | | | |

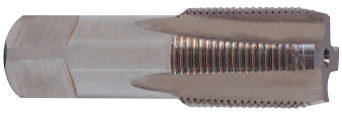
# TAPER PIPE TAPS

R7/R8/R9/S0 SERIES

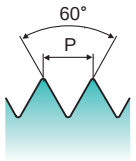
## TAPER PIPE TAPS : STRAIGHT FLUTED for Cast Irons & Steels

Hole type





ANSI




HSSE-V3 | NPT/F | 60° | 2P~3P | Bright | TiN | Hardslick | NiNitrided Steam Oxide

Unit : Inch

| EDP No. | | | | SIZE | Thread Per Inch | No. of Flute |
|---|---|---|---|---|---|---|
| Bright Finish | TiN Coated | Hardslick Coated | Nitrided Steam Oxide | | | |
| R7020 | R8020 | R9020 | S0020 | 1/16 | 27 | 4 |
| R7200 | R8200 | R9200 | S0200 | 1/8(Lg) | 27 | 4 |
| R7210 | R8210 | R9210 | S0210 | 1/8(Sm) | 27 | 4 |
| R7400 | R8400 | R9400 | S0400 | 1/4 | 18 | 4 |
| R7480 | R8480 | R9480 | S0480 | 3/8 | 18 | 4 |
| R7560 | R8560 | R9560 | S0560 | 1/2 | 14 | 4 |
| R7700 | R8700 | R9700 | S0700 | 3/4 | 14 | 5 |
| R7780 | R8780 | R9780 | S0780 | 1 | 11-1/2 | 5 |
| R7860 | R8860 | R9860 | S0860 | 1-1/4 | 11-1/2 | 5 |
| R7960 | R8960 | R9960 | S0960 | 1-1/2 | 11-1/2 | 7 |
| R7D20 | R8D20 | R9D20 | S0D20 | 2 | 11-1/2 | 7 |

▶ These Taps meet both NPT and NPTF Standards.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | | | | | |

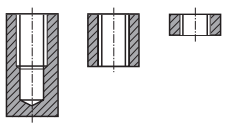
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| | ◎ | ◎ | | | | | | | | |

# TAPER PIPE TAPS

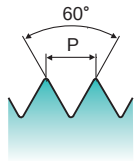
S1/S2 SERIES

## TAPER PIPE TAPS : INTTERUPTED THREAD for Cast Irons & Steels

Hole type



ANSI




HSSE-V3 | NPTF | 60° | 2P~3P | Bright | TiCN

Unit : Inch

| EDP No. | | SIZE | Thread Per Inch | No. of Flute |
|---|---|---|---|---|
| Bright Finish | TiCN Coated | | | |
| S1020 | S2020 | 1/16 | 27 | 5 |
| S1200 | S2200 | 1/8(Lg) | 27 | 5 |
| S1210 | S2210 | 1/8(Sm) | 27 | 5 |
| S1400 | S2400 | 1/4 | 18 | 5 |
| S1480 | S2480 | 3/8 | 18 | 5 |
| S1560 | S2560 | 1/2 | 14 | 5 |
| S1700 | S2700 | 3/4 | 14 | 5 |
| S1780 | S2780 | 1 | 11-1/2 | 5 |

▶ These Taps meet and NPTF Standards.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | | | | | |

| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| | ◎ | ◎ | | | | | | | | |

HSS

YG

Being the best through innovation

# FORMING TAPS

- Tapping by Forming Soft Materials

## FORMING TAPS

Tapping by Forming Soft Materials

### INCH

| EDP No. | MODEL | Tool Material | Standard | Dimensions | Tolerance | Chamfer | Surface Treatment | Page |
|---|---|---|---|---|---|---|---|---|
| **Z0/Z1/Z2/Z3** | | HSSE-V3 | UNC/UNF | ANSI | H3~H8 | 4P~5P<br>1.5P~2P | Bright / TiN | **321** |
| **Z4/Z5/Z6/Z7** | | HSSE-V3 | UNC/UNF | ANSI | H3~H8 | 4P~5P<br>1.5P~2P | Bright / TiN | **322** |

### METRIC

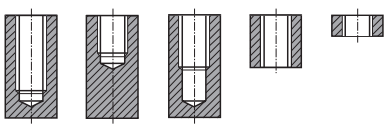
| EDP No. | MODEL | Tool Material | Standard | Dimensions | Tolerance | Chamfer | Surface Treatment | Page |
|---|---|---|---|---|---|---|---|---|
| **Z8/ZA/ZC** | | HSSE-V3 | M/MF | ANSI | D5~D11 | 4P~5P<br>1.5P~2P | Bright<br>TiN / TiCN | **323** |

# FORMING TAPS

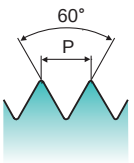
**Z0/Z1/Z2/Z3 SERIES**

## FORMING TAPS PLUG & BOTTOMING STYLE for Multi Purpose

Hole type



ANSI




HSSE-V3 | UNC UNF | H3~H8 | 60° | 4P~5P Plug | 1.5P~2P Bottoming | Bright | TiN

Unit : Inch

| EDP No. | | | | SIZE | Thread Per Inch | | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|---|
| Bright Finish Plug | TiN Coated Plug | Bright Finish Bottoming | TiN Coated Bottoming | | UNC | UNF | | |
| Z0163 | Z1163 | Z2163 | Z3163 | 4 | 40 | | H3 | 4 |
| Z0165 | Z1165 | Z2165 | Z3165 | | | | H5 | 4 |
| Z0185 | Z1185 | Z2185 | Z3185 | | | 48 | H5 | 4 |
| Z0203 | Z1203 | Z2203 | Z3203 | 5 | 40 | | H3 | 4 |
| Z0205 | Z1205 | Z2205 | Z3205 | | | | H5 | 4 |
| Z0225 | Z1225 | Z2225 | Z3225 | | | 44 | H5 | 4 |
| Z0243 | Z1243 | Z2243 | Z3243 | 6 | 32 | | H3 | 4 |
| Z0245 | Z1245 | Z2245 | Z3245 | | | | H5 | 4 |
| Z0265 | Z1265 | Z2265 | Z3265 | | | 40 | H5 | 4 |
| Z0283 | Z1283 | Z2283 | Z3283 | 8 | 32 | | H3 | 4 |
| Z0285 | Z1285 | Z2285 | Z3285 | | | | H5 | 4 |
| Z0305 | Z1305 | Z2305 | Z3305 | | | 36 | H5 | 4 |
| Z0324 | Z1324 | Z2324 | Z3324 | 10 | 24 | | H4 | 4 |
| Z0326 | Z1326 | Z2326 | Z3326 | | | | H6 | 4 |
| Z0344 | Z1344 | Z2344 | Z3344 | | | 32 | H4 | 4 |
| Z0346 | Z1346 | Z2346 | Z3346 | | | | H6 | 4 |
| Z0404 | Z1404 | Z2404 | Z3404 | 1/4 | 20 | | H4 | 4 |
| Z0406 | Z1406 | Z2406 | Z3406 | | | | H6 | 4 |
| Z0424 | Z1424 | Z2424 | Z3424 | | | 28 | H4 | 4 |
| Z0426 | Z1426 | Z2426 | Z3426 | | | | H6 | 4 |
| Z0445 | Z1445 | Z2445 | Z3445 | 5/16 | 18 | | H5 | 4 |
| Z0447 | Z1447 | Z2447 | Z3447 | | | | H7 | 4 |
| Z0465 | Z1465 | Z2465 | Z3465 | | | 24 | H5 | 4 |
| Z0467 | Z1467 | Z2467 | Z3467 | | | | H7 | 4 |
| Z0485 | Z1485 | Z2485 | Z3485 | 3/8 | 16 | | H5 | 4 |
| Z0487 | Z1487 | Z2487 | Z3487 | | | | H7 | 4 |
| Z0505 | Z1505 | Z2505 | Z3505 | | | 24 | H5 | 4 |
| Z0507 | Z1507 | Z2507 | Z3507 | | | | H7 | 4 |
| Z0528 | Z1528 | Z2528 | Z3528 | 7/16 | 14 | | H8 | 4 |
| Z0548 | Z1548 | Z2548 | Z3548 | | | 20 | H8 | 4 |
| Z0568 | Z1568 | Z2568 | Z3568 | 1/2 | 13 | | H8 | 4 |
| Z0588 | Z1588 | Z2588 | Z3588 | | | 20 | H8 | 4 |

▶ For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.
▶ Hardslck coating is available on your request (Bright Finish EDP No + H)

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ◎ | ◎ | | | ◎ | | | ◎ |

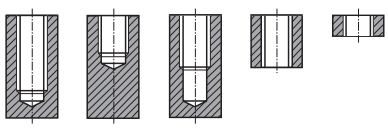
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| ◎ | | | | | | ◎ | ◎ | | ◎ | ◎ |

# YG FORMING TAPS

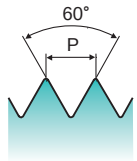
**Z4/Z5/Z6/Z7 SERIES**

## FORMING TAPS WITH OIL GROOVE PLUG & BOTTOMING STYLE for Multi Purpose

**Hole type**



**ANSI**




HSSE-V3 | UNC UNF | H3~H8 | 60° | 4P~5P Plug | 1.5P~2P Bottoming | Bright | TiN

Unit : Inch

| EDP No. | | | | SIZE | Thread Per Inch | | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|---|
| Bright Finish Plug | TiN Coated Plug | Bright Finish Bottoming | TiN Coated Bottoming | | UNC | UNF | | |
| Z4163 | Z5163 | Z6163 | Z7163 | 4 | 40 | | H3 | 4 |
| Z4165 | Z5165 | Z6165 | Z7165 | | | | H5 | 4 |
| Z4185 | Z5185 | Z6185 | Z7185 | | | 48 | H5 | 4 |
| Z4203 | Z5203 | Z6203 | Z7203 | 5 | 40 | | H3 | 4 |
| Z4205 | Z5205 | Z6205 | Z7205 | | | | H5 | 4 |
| Z4225 | Z5225 | Z6225 | Z7225 | | | 44 | H5 | 4 |
| Z4243 | Z5243 | Z6243 | Z7243 | 6 | 32 | | H3 | 4 |
| Z4245 | Z5245 | Z6245 | Z7245 | | | | H5 | 4 |
| Z4265 | Z5265 | Z6265 | Z7265 | | | 40 | H5 | 4 |
| Z4283 | Z5283 | Z6283 | Z7283 | 8 | 32 | | H3 | 4 |
| Z4285 | Z5285 | Z6285 | Z7285 | | | | H5 | 4 |
| Z4305 | Z5305 | Z6305 | Z7305 | | | 36 | H5 | 4 |
| Z4324 | Z5324 | Z6324 | Z7324 | 10 | 24 | | H4 | 4 |
| Z4326 | Z5326 | Z6326 | Z7326 | | | | H6 | 4 |
| Z4344 | Z5344 | Z6344 | Z7344 | | | 32 | H4 | 4 |
| Z4346 | Z5346 | Z6346 | Z7346 | | | | H6 | 4 |
| Z4404 | Z5404 | Z6404 | Z7404 | 1/4 | 20 | | H4 | 4 |
| Z4406 | Z5406 | Z6406 | Z7406 | | | | H6 | 4 |
| Z4424 | Z5424 | Z6424 | Z7424 | | | 28 | H4 | 4 |
| Z4426 | Z5426 | Z6426 | Z7426 | | | | H6 | 4 |
| Z4445 | Z5445 | Z6445 | Z7445 | 5/16 | 18 | | H5 | 4 |
| Z4447 | Z5447 | Z6447 | Z7447 | | | | H7 | 4 |
| Z4465 | Z5465 | Z6465 | Z7465 | | | 24 | H5 | 4 |
| Z4467 | Z5467 | Z6467 | Z7467 | | | | H7 | 4 |
| Z4485 | Z5485 | Z6485 | Z7485 | 3/8 | 16 | | H5 | 4 |
| Z4487 | Z5487 | Z6487 | Z7487 | | | | H7 | 4 |
| Z4505 | Z5505 | Z6505 | Z7505 | | | 24 | H5 | 4 |
| Z4507 | Z5507 | Z6507 | Z7507 | | | | H7 | 4 |
| Z4528 | Z5528 | Z6528 | Z7528 | 7/16 | 14 | | H8 | 4 |
| Z4548 | Z5548 | Z6548 | Z7548 | | | 20 | H8 | 4 |
| Z4568 | Z5568 | Z6568 | Z7568 | 1/2 | 13 | | H8 | 4 |
| Z4588 | Z5588 | Z6588 | Z7588 | | | 20 | H8 | 4 |

▶ For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.
▶ Hardslck coating is available on your request (Bright Finish EDP No + H)

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ◎ | ◎ | | | ◎ | | | ◎ |

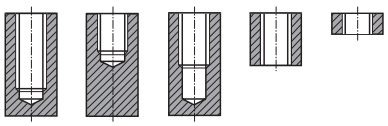
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| ◎ | | | | | | ◎ | ◎ | | ◎ | ◎ |

# FORMING TAPS

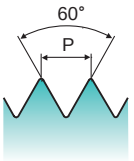
## Z8/Z9/ZA/ZB/ZC/ZD SERIES

## FORMING TAPS WITH OIL GROOVE PLUG & BOTTOMING STYLE for Multi Purpose

Hole type



ANSI




HSSE-V3 | M MF | D5~D11 | 60° | 4P~5P Plug | 1.5P~2P Bottoming | Bright | TiN | TiCN

Unit : mm

| EDP No. | | | | | | SIZE | Pitch | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|---|---|
| Bright Finish Plug | Bright Finish Bottoming | TiN Coated Plug | TiN Coated Bottoming | TiCN Coated Plug | TiCN Coated Bottoming | | | | |
| Z8205 | Z9205 | ZA205 | ZB205 | ZC205 | ZD205 | M3 | 0.5 | D5 | 4 |
| Z8246 | Z9246 | ZA246 | ZB246 | ZC246 | ZD246 | M4 | 0.7 | D6 | 4 |
| Z8287 | Z9287 | ZA287 | ZB287 | ZC287 | ZD287 | M5 | 0.8 | D7 | 4 |
| Z8318 | Z9318 | ZA318 | ZB318 | ZC318 | ZD318 | M6 | 1.0 | D8 | 4 |
| Z8369 | Z9369 | ZA369 | ZB369 | ZC369 | ZD369 | M8 | 1.25 | D9 | 4 |
| Z8420 | Z9420 | ZA420 | ZB420 | ZC420 | ZD420 | M10 | 1.5 | D10 | 4 |
| Z850A | Z950A | ZA50A | ZB50A | ZC50A | ZD50A | M12 | 1.75 | D11 | 4 |

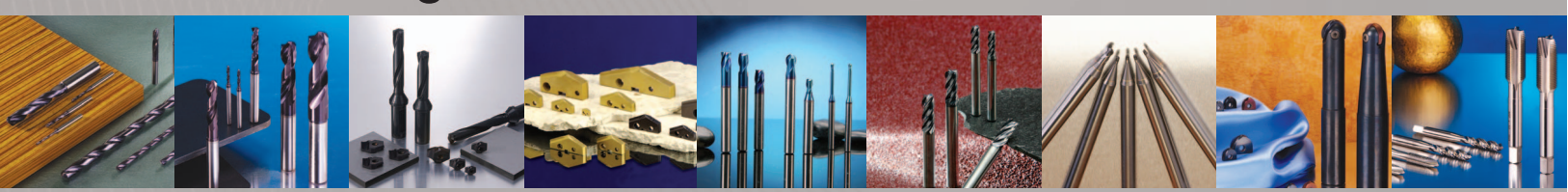
▶ For tapping depth on ANSI length taps, refer to MCTI 302 on page338
▶ Hardslck coating is available on your request (Bright Finish EDP No + H)

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ◎ | ◎ | | | ◎ | | | ◎ |

| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| ◎ | | | | | | ◎ | ◎ | | ◎ | ◎ |

Global Cutting Tool Leader **YG-1**



HSS

YG

Being the best through innovation

# STANDARD TAPS

- Spiral Point and Spiral Flute Taps

## STANDARD TAPS

Spiral Point and Spiral Flute Taps

### INCH

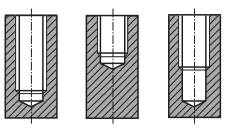
| EDP No. | MODEL | Tool Material | Standard | Dimensions | Tolerance | Chamfer | Surface Treatment | Page |
|---|---|---|---|---|---|---|---|---|
| **C2/C3/C4/D9** | | HSSE-V3 | UNC/UNF | ANSI | H2~H6 | 1.5P~2P | Steam Oxide Bright / TiN Hardslick | **327** |
| **I9/J0/J1/J7** | | HSSE-V3 | UNC/UNF | ANSI | H2~H6 | 4P~5P | Steam Oxide Bright / TiN Hardslick | **328** |

# STANDARD TAPS

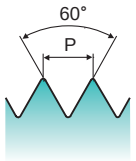
C2/C3/C4/D9 SERIES

## STANDARD TAPS : SPIRAL FLUTED BOTTOMING STYLE for Multi Purpose

Hole type



ANSI




HSSE-V3 | UNC UNF | H2~H6 | 60° | 1.5P~2P | Steam Oxide | Bright | TiN | Hardslick | R45

Unit : Inch

| EDP No. | | | | SIZE | Thread Per Inch | | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|---|
| Steam Oxide | Bright Finish | TiN Coated | Hardslick Coated | | UNC | UNF | | |
| C2162 | C3162 | C4162 | D9162 | 4 | 40 | | H2 | 3 |
| C2202 | C3202 | C4202 | D9202 | 5 | 40 | | H2 | 3 |
| C2243 | C3243 | C4243 | D9243 | 6 | 32 | | H3 | 3 |
| C2283 | C3283 | C4283 | D9283 | 8 | 32 | | H3 | 3 |
| C2323 | C3323 | C4323 | D9323 | 10 | 24 | | H3 | 3 |
| C2343 | C3343 | C4343 | D9343 | | | 32 | H3 | 3 |
| C2403 | C3403 | C4403 | D9403 | 1/4 | 20 | | H3 | 3 |
| C2405 | C3405 | C4405 | D9405 | | | | H5 | 3 |
| C2423 | C3423 | C4423 | D9423 | | | 28 | H3 | 3 |
| C2443 | C3443 | C4443 | D9443 | 5/16 | 18 | | H3 | 3 |
| C2445 | C3445 | C4445 | D9445 | | | | H5 | 3 |
| C2463 | C3463 | C4463 | D9463 | | | 24 | H3 | 3 |
| C2483 | C3483 | C4483 | D9483 | 3/8 | 16 | | H3 | 3 |
| C2485 | C3485 | C4485 | D9485 | | | | H5 | 3 |
| C2503 | C3503 | C4503 | D9503 | | | 24 | H3 | 3 |
| C2523 | C3523 | C4523 | D9523 | 7/16 | 14 | | H3 | 3 |
| C2525 | C3525 | C4525 | D9525 | | | | H5 | 3 |
| C2543 | C3543 | C4543 | D9543 | | | 20 | H3 | 3 |
| C2545 | C3545 | C4545 | D9545 | | | | H5 | 3 |
| C2563 | C3563 | C4563 | D9563 | 1/2 | 13 | | H3 | 3 |
| C2565 | C3565 | C4565 | D9565 | | | | H5 | 3 |
| C2583 | C3583 | C4583 | D9583 | | | 20 | H3 | 3 |
| C2585 | C3585 | C4585 | D9585 | | | | H5 | 3 |
| C2605 | C3605 | C4605 | D9605 | 9/16 | 12 | | H5 | 3 |
| C2625 | C3625 | C4625 | D9625 | | | 18 | H5 | 3 |
| C2643 | C3643 | C4643 | D9643 | 5/8 | 11 | | H3 | 4 |
| C2645 | C3645 | C4645 | D9645 | | | | H5 | 4 |
| C2663 | C3663 | C4663 | D9663 | | | 18 | H3 | 4 |
| C2703 | C3703 | C4703 | D9703 | 3/4 | 10 | | H3 | 4 |
| C2705 | C3705 | C4705 | D9705 | | | | H5 | 4 |
| C2723 | C3723 | C4723 | D9723 | | | 16 | H3 | 4 |
| C2744 | C3744 | C4744 | D9744 | 7/8 | 9 | | H4 | 4 |
| C2766 | C3766 | C4766 | D9766 | | | 14 | H6 | 4 |
| C2784 | C3784 | C4784 | D9784 | 1 | 8 | | H4 | 4 |

▶ For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | | ○ | ○ | | |

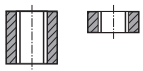
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| ○ | | ○ | | | | | | | | |

# STANDARD TAPS

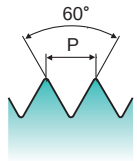
I9/J0/J1/J7 SERIES

## STANDARD TAPS : SPIRAL POINTED PLUG STYLE for Multi Purpose

Hole type



ANSI




HSSE-V3 | UNC UNF | H2~H6 | 60° | 4P~5P | Steam Oxide | Bright | TiN | Hardslick

Unit : Inch

| EDP No. | | | | SIZE | Thread Per Inch | | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|---|
| Steam Oxide | Bright Finish | TiN Coated | Hardslick Coated | | UNC | UNF | | |
| I9082 | J0082 | J1082 | J7082 | 2 | 56 | | H2 | 2 |
| I9162 | J0162 | J1162 | J7162 | 4 | 40 | | H2 | 2 |
| I9202 | J0202 | J1202 | J7202 | 5 | 40 | | H2 | 2 |
| I9243 | J0243 | J1243 | J7243 | 6 | 32 | | H3 | 2 |
| I9283 | J0283 | J1283 | J7283 | 8 | 32 | | H3 | 2 |
| I9323 | J0323 | J1323 | J7323 | 10 | 24 | | H3 | 2 |
| I9343 | J0343 | J1343 | J7343 | | | 32 | H3 | 2 |
| I9403 | J0403 | J1403 | J7403 | 1/4 | 20 | | H3 | 2 |
| I9405 | J0405 | J1405 | J7405 | | | | H5 | 2 |
| I9423 | J0423 | J1423 | J7423 | | | 28 | H3 | 2 |
| I9443 | J0443 | J1443 | J7443 | 5/16 | 18 | | H3 | 2 |
| I9445 | J0445 | J1445 | J7445 | | | | H5 | 2 |
| I9463 | J0463 | J1463 | J7463 | | | 24 | H3 | 2 |
| I9483 | J0483 | J1483 | J7483 | 3/8 | 16 | | H3 | 3 |
| I9485 | J0485 | J1485 | J7485 | | | | H5 | 3 |
| I9503 | J0503 | J1503 | J7503 | | | 24 | H3 | 3 |
| I9523 | J0523 | J1523 | J7523 | 7/16 | 14 | | H3 | 3 |
| I9525 | J0525 | J1525 | J7525 | | | | H5 | 3 |
| I9543 | J0543 | J1543 | J7543 | | | 20 | H3 | 3 |
| I9545 | J0545 | J1545 | J7545 | | | | H5 | 3 |
| I9563 | J0563 | J1563 | J7563 | 1/2 | 13 | | H3 | 3 |
| I9565 | J0565 | J1565 | J7565 | | | | H5 | 3 |
| I9583 | J0583 | J1583 | J7583 | | | 20 | H3 | 3 |
| I9585 | J0585 | J1585 | J7585 | | | | H5 | 3 |
| I9603 | J0603 | J1603 | J7603 | 9/16 | 12 | | H3 | 3 |
| I9625 | J0625 | J1625 | J7625 | | | 18 | H5 | 3 |
| I9643 | J0643 | J1643 | J7643 | 5/8 | 11 | | H3 | 3 |
| I9645 | J0645 | J1645 | J7645 | | | | H5 | 3 |
| I9665 | J0665 | J1665 | J7665 | | | 18 | H5 | 3 |
| I9703 | J0703 | J1703 | J7703 | 3/4 | 10 | | H3 | 3 |
| I9705 | J0705 | J1705 | J7705 | | | | H5 | 3 |
| I9725 | J0725 | J1725 | J7725 | | | 16 | H5 | 3 |
| I9744 | J0744 | J1744 | J7744 | 7/8 | 9 | | H4 | 3 |
| I9766 | J0766 | J1766 | J7766 | | | 14 | H6 | 3 |
| I9784 | J0784 | J1784 | J7784 | 1 | 8 | | H4 | 3 |

▶For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | | ○ | ○ | | |

| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| ○ | | ○ | | | | | | | | |

# HSS

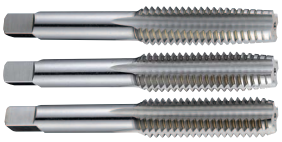
YG

Being the best through innovation

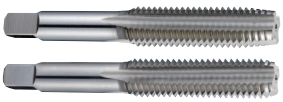
# HAND TAPS

# HAND TAPS

## INCH

| EDP No. | MODEL | Tool Material | Standard | Dimensions | Tolerance | Chamfer | Surface Treatment | Page |
|---|---|---|---|---|---|---|---|---|
| **A3/A5/A7** |  | HSS-V | UNC/UNF | ANSI | H2~H4 | 9/4/1.5P | Bright | **331** |

## METRIC

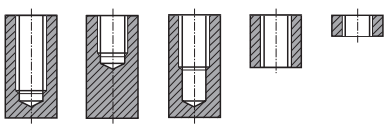
| EDP No. | MODEL | Tool Material | Standard | Dimensions | Tolerance | Chamfer | Surface Treatment | Page |
|---|---|---|---|---|---|---|---|---|
| **A6/A9** |  | HSS-V | M | ANSI | D3~D9 | 4/1.5P | Bright | **332** |

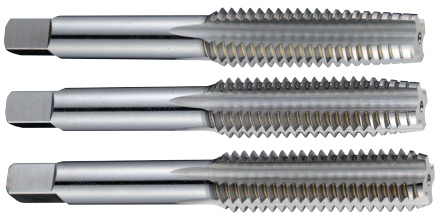
# HAND TAPS

**A3/A5/A7 SERIES**

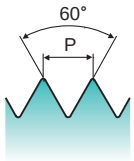
## HAND TAPS TAPER, PLUG & BOTTOMING STYLE for Multi Purpose

Hole type





ANSI




HSS-V | UNC UNF | H2~H4 | 60° | 9.0P/4.0P/1.5P | Bright

Unit : Inch

| EDP No. | | | SIZE | Thread Per Inch | | Limit | No. of Flute |
|---|---|---|---|---|---|---|---|
| Bright Finish Taper | Bright Finish Plug | Bright Finish Bottoming | | UNC | UNF | | |
| A3082 | A5082 | A7082 | 2 | 56 | | H2 | 3 |
| A3162 | A5162 | A7162 | 4 | 40 | | H2 | 3 |
| A3202 | A5202 | A7202 | 5 | 40 | | H2 | 3 |
| A3243 | A5243 | A7243 | 6 | 32 | | H3 | 3 |
| A3262 | A5262 | A7262 | | | 40 | H2 | 3 |
| A3283 | A5283 | A7283 | 8 | 32 | | H3 | 4 |
| A3323 | A5323 | A7323 | 10 | 24 | | H3 | 4 |
| A3343 | A5343 | A7343 | | | 32 | H3 | 4 |
| A3403 | A5403 | A7403 | 1/4 | 20 | | H3 | 4 |
| A3423 | A5423 | A7423 | | | 28 | H3 | 4 |
| A3443 | A5443 | A7443 | 5/16 | 18 | | H3 | 4 |
| A3463 | A5463 | A7463 | | | 24 | H3 | 4 |
| A3483 | A5483 | A7483 | 3/8 | 16 | | H3 | 4 |
| A3503 | A5503 | A7503 | | | 24 | H3 | 4 |
| A3523 | A5523 | A7523 | 7/16 | 14 | | H3 | 4 |
| A3543 | A5543 | A7543 | | | 20 | H3 | 4 |
| A3563 | A5563 | A7563 | 1/2 | 13 | | H3 | 4 |
| A3583 | A5583 | A7583 | | | 20 | H3 | 4 |
| A3603 | A5603 | A7603 | 9/16 | 12 | | H3 | 4 |
| A3623 | A5623 | A7623 | | | 18 | H3 | 4 |
| A3643 | A5643 | A7643 | 5/8 | 11 | | H3 | 4 |
| A3663 | A5663 | A7663 | | | 18 | H3 | 4 |
| A3703 | A5703 | A7703 | 3/4 | 10 | | H3 | 4 |
| A3723 | A5723 | A7723 | | | 16 | H3 | 4 |
| A3744 | A5744 | A7744 | 7/8 | 9 | | H4 | 4 |
| A3764 | A5764 | A7764 | | | 14 | H4 | 4 |
| A3784 | A5784 | A7784 | 1 | 8 | | H4 | 4 |
| A3804 | A5804 | A7804 | | | 12 | H4 | 4 |

▶For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ◎ | ◎ | | | ◎ | | | ◎ |

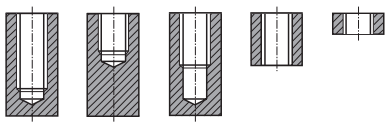
| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| ◎ | | | | | | ◎ | ◎ | | ◎ | ◎ |

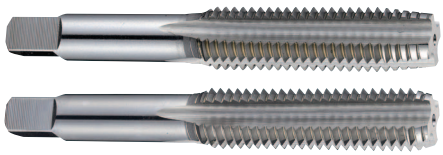
# HAND TAPS

A6/A9 SERIES

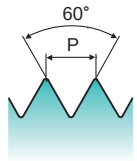
## HAND TAPS PLUG & BOTTOMING STYLE for Multi Purpose

Hole type





ANSI




HSS-V | M | D3~D9 | 60° | 4.0P / 1.5P | Bright

Unit : mm

| EDP No. | | SIZE | Pitch | Limit | No. of Flute |
|---|---|---|---|---|---|
| Bright Finish Plug | Bright Finish Bottoming | | | | |
| **A6097** | **A9098** | M1.6 | 0.35 | D3 | 3 |
| **A6137** | **A9138** | M2 | 0.4 | D3 | 3 |
| **A6177** | **A9178** | M2.5 | 0.45 | D3 | 3 |
| **A6207** | **A9208** | M3 | 0.5 | D3 | 3 |
| **A6227** | **A9228** | M3.5 | 0.6 | D4 | 3 |
| **A6247** | **A9248** | M4 | 0.7 | D4 | 3 |
| **A6267** | **A9268** | M4.5 | 0.75 | D4 | 4 |
| **A6287** | **A9288** | M5 | 0.8 | D4 | 4 |
| **A6317** | **A9318** | M6 | 1 | D5 | 4 |
| **A6347** | **A9348** | M7 | 1 | D5 | 4 |
| **A6367** | **A9368** | M8 | 1.25 | D5 | 4 |
| **A6427** | **A9428** | M10 | 1.5 | D6 | 4 |
| **A6507** | **A9508** | M12 | 1.75 | D6 | 4 |
| **A6547** | **A9548** | M14 | 2 | D7 | 4 |
| **A6607** | **A9608** | M16 | 2 | D7 | 4 |
| **A6657** | **A9658** | M18 | 2.5 | D7 | 4 |
| **A6707** | **A9708** | M20 | 2.5 | D7 | 4 |
| **A6787** | **A9788** | M24 | 3 | D8 | 4 |
| **A6947** | **A9948** | M30 | 3.5 | D9 | 4 |
| **A6B37** | **A9B38** | M36 | 4 | D9 | 4 |

▶For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 338.

◎ : Excellent ○ : Good

| Low carbon / Free machining carbon steel | Medium to high carbon steel | Steel castings & forgings / Heat-treatable alloy steels | Alloyed tool steels / Mold steels | Free machining stainless steel | Heat and corrosion-resistant stainless steel / Valve stainless steel | Stainless steel castings / Precipitation hardening stainless steel | Pure alluminium / Aluminium alloys |
|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | | ○ | ○ | | |

| Alluminium alloy castings | Grey cast iron | Nodular cast Iron / Chilled cast Iron / Meehanite Iron / Ductile Iron | 71 / &625 INCO / Waspaloy / Hastelloy / Invar / Monel / Incoloy | 718 Inconel / A286 | Titanium | Pure and alloyed copper | Free machining brass / Alloyed brass | Bronze | Zine | Magnesium |
|---|---|---|---|---|---|---|---|---|---|---|
| ○ | | ○ | | | | | | | | |

# TAPS

YG

Being the best through innovation

# TECHNICAL DATA

# TECHNICAL DATA

## HIGH PERFORMANCE TAPS (HSSE-V3) GENERAL DIMENSIONS

| Size | Metric Size | Overall Length | Thread Length | | | | Square Length | Shank Diameter | Size of Square |
|---|---|---|---|---|---|---|---|---|---|
| | | | SP | SF | M-SP | M-SF | | | |
| 4 | — | 1-7/8 | .335 | .236 | — | — | 3/16 | .141 | .110 |
| 5 | M3 | 1-15/16 | .374 | .236 | .374 | .197 | 3/16 | .141 | .110 |
| 6 | M3.5 | 2 | .413 | .276 | .413 | .276 | 3/16 | .141 | .110 |
| 8 | M4 | 2-1/8 | .453 | .276 | .453 | .276 | 1/4 | .168 | .131 |
| 10-24 | M5 | 2-3/8 | .531 | .354 | .531 | .354 | 1/4 | .194 | .152 |
| 10-32 | — | 2-3/8 | .531 | .276 | — | — | 1/4 | .194 | .152 |
| 12-24 | — | 2-3/8 | .571 | .354 | — | — | 9/32 | .220 | .165 |
| 12-28 | — | 2-3/8 | .571 | .276 | — | — | 9/32 | .220 | .165 |
| 1/4-20 | M6 | 2-1/2 | .591 | .433 | .591 | .433 | 5/16 | .255 | .191 |
| 1/4-28 | — | 2-1/2 | .591 | .354 | — | — | 5/16 | .255 | .191 |
| 5/16-18 | M7 | 2-23/32 | .669 | .472 | .669 | .433 | 3/8 | .318 | .238 |
| 5/16-24 | M8 | 2-23/32 | .669 | .394 | .669 | .472 | 3/8 | .318 | .238 |
| 3/8-16 | M10×1.5 | 2-15/16 | .748 | .551 | .748 | .512 | 7/16 | .381 | .286 |
| 3/8-24 | M10×1.25 | 2-15/16 | .748 | .394 | .748 | .472 | 7/16 | .381 | .286 |
| 7/16-14 | — | 3-5/32 | .866 | .591 | — | — | 13/32 | .323 | .242 |
| 7/16-20 | — | 3-5/32 | .866 | .472 | — | — | 13/32 | .323 | .242 |
| 1/2-13 | M12×1.75 | 3-3/8 | .984 | .630 | .984 | .591 | 7/16 | .367 | .275 |
| 1/2-20 | M12×1.25 | 3-3/8 | .984 | .472 | .984 | .551 | 7/16 | .367 | .275 |
| 9/16-12 | M14×2.0 | 3-19/32 | .984 | .709 | .984 | .709 | 1/2 | .429 | .322 |
| 9/16-18 | M14×1.5 | 3-19/32 | .984 | .512 | .984 | .551 | 1/2 | .429 | .322 |
| 5/8-11 | M16×2.0 | 3-13/16 | 1.083 | .748 | 1.083 | .709 | 9/16 | .480 | .360 |
| 5/8-18 | M16×1.5 | 3-13/16 | 1.083 | .512 | 1.083 | .551 | 9/16 | .480 | .360 |
| — | M18×2.5 | 4-1/32 | — | — | 1.083 | .787 | 5/8 | .542 | .406 |
| — | M18×1.5 | 4-1/32 | — | — | 1.083 | .551 | 5/8 | .542 | .406 |
| 3/4-10 | — | 4-1/4 | 1.201 | .827 | — | — | 11/16 | .590 | .442 |
| 3/4-16 | — | 4-1/4 | 1.201 | .591 | — | — | 11/16 | .590 | .442 |
| 7/8-9 | — | 4-11/16 | 1.339 | .827 | — | — | 3/4 | .697 | .523 |
| 7/8-14 | — | 4-11/16 | 1.339 | .709 | — | — | 3/4 | .697 | .523 |
| 1-8 | — | 5-1/8 | 1.496 | .984 | — | — | 13/16 | .800 | .600 |
| 1-12 | — | 5-1/8 | 1.496 | .709 | — | — | 13/16 | .800 | .600 |

* **SP** : Spiral Pointed Taps
* **SF** : Spiral Fluted Taps
* **M-SP** : Metric Spiral Pointed Taps
* **M-SF** : Metric Spiral Fluted Taps

## HIGH PERFORMANCE TAPS (HSS-V) GENERAL DIMENSIONS

| Size | Metric Size | Overall Length | Thread Length | | | | Square Length | Shank Diameter | Size of Square |
|---|---|---|---|---|---|---|---|---|---|
| | | | SP | SF | M-SP | M-SF | | | |
| 4 | — | 1-7/8 | 5/16 | 5/16 | — | — | 3/16 | .141 | .110 |
| 5 | M3 | 1-15/16 | 5/16 | 5/16 | 5/16 | 5/16 | 3/16 | .141 | .110 |
| 6 | M3.5 | 2 | 3/8 | 3/8 | 3/8 | 3/8 | 3/16 | .141 | .110 |
| 8 | M4 | 2-1/8 | 3/8 | 3/8 | 3/8 | 3/8 | 1/4 | .168 | .131 |
| 10-24 | M5 | 2-3/8 | 1/2 | 1/2 | 1/2 | 1/2 | 1/4 | .194 | .152 |
| 10-32 | — | 2-3/8 | 1/2 | 1/2 | — | — | 1/4 | .194 | .152 |
| 12-24 | — | 2-3/8 | 1/2 | 1/2 | — | — | 9/32 | .220 | .165 |
| 12-28 | — | 2-3/8 | 1/2 | 1/2 | — | — | 9/32 | .220 | .165 |
| 1/4-20 | M6 | 2-1/2 | 5/8 | 5/8 | 5/8 | 5/8 | 5/16 | .255 | .191 |
| 1/4-28 | — | 2-1/2 | 5/8 | 5/8 | — | — | 5/16 | .255 | .191 |
| 5/16-18 | M7 | 2-23/32 | 11/16 | 11/16 | 11/16 | 11/16 | 3/8 | .318 | .238 |
| 5/16-24 | M8 | 2-23/32 | 11/16 | 11/16 | 11/16 | 11/16 | 3/8 | .318 | .238 |
| 3/8-16 | M10×1.5 | 2-15/16 | 3/4 | 3/4 | 3/4 | 3/4 | 7/16 | .381 | .286 |
| 3/8-24 | M10×1.25 | 2-15/16 | 3/4 | 3/4 | 3/4 | 3/4 | 7/16 | .381 | .286 |
| 7/16-14 | — | 3-5/32 | 7/8 | 7/8 | — | — | 13/32 | .323 | .242 |
| 7/16-20 | — | 3-5/32 | 7/8 | 7/8 | — | — | 13/32 | .323 | .242 |
| 1/2-13 | M12×1.75 | 3-3/8 | 15/16 | 15/16 | 15/16 | 15/16 | 7/16 | .367 | .275 |
| 1/2-20 | M12×1.25 | 3-3/8 | 15/16 | 15/16 | 15/16 | 15/16 | 7/16 | .367 | .275 |
| 9/16-12 | M14×2.0 | 3-19/32 | 1 | 1 | 1 | 1 | 1/2 | .429 | .322 |
| 9/16-18 | M14×1.5 | 3-19/32 | 1 | 1 | 1 | 1 | 1/2 | .429 | .322 |
| 5/8-11 | M16×2.0 | 3-13/16 | 1-3/32 | 1-3/32 | 1-3/32 | 1-3/32 | 9/16 | .480 | .360 |
| 5/8-18 | M16×1.5 | 3-13/16 | 1-3/32 | 1-3/32 | 1-3/32 | 1-3/32 | 9/16 | .480 | .360 |
| — | M18×2.5 | 4-1/32 | — | — | 1-3/32 | 1-3/32 | 5/8 | .542 | .406 |
| — | M18×1.5 | 4-1/32 | — | — | 1-3/32 | 1-3/32 | 5/8 | .542 | .406 |
| 3/4-10 | — | 4-1/4 | 1-7/32 | 1-7/32 | — | — | 11/16 | .590 | .442 |
| 3/4-16 | — | 4-1/4 | 1-7/32 | 1-7/32 | — | — | 11/16 | .590 | .442 |
| 7/8-9 | — | 4-11/16 | 1-11/32 | 1-11/32 | — | — | 3/4 | .697 | .523 |
| 7/8-14 | — | 4-11/16 | 1-11/32 | 1-11/32 | — | — | 3/4 | .697 | .523 |
| 1-8 | — | 5-1/8 | 1-1/2 | 1-1/2 | — | — | 13/16 | .800 | .600 |
| 1-12 | — | 5-1/8 | 1-1/2 | 1-1/2 | — | — | 13/16 | .800 | .600 |

* **SP** : Spiral Pointed Taps
* **SF** : Spiral Fluted Taps
* **M-SP** : Metric Spiral Pointed Taps
* **M-SF** : Metric Spiral Fluted Taps

# TECHNICAL DATA

## HIGH PERFORMANCE DIN LENGTH ANSI SHANK TAPS (HSSE-V3) DIMENSIONS

| Size | Metric Size | Overall Length | Thread Length | | | | Square Length | Shank Diameter | Size of Square |
|---|---|---|---|---|---|---|---|---|---|
| | | | SP | SF | M-SP | M-SF | | | |
| 4 | — | 2.205 | .335 | .236 | — | — | 3/16 | .141 | .110 |
| 5 | M3 | 2.205 | .374 | .236 | .374 | .197 | 3/16 | .141 | .110 |
| 6 | M3.5 | 2.205 | .413 | .276 | .413 | .276 | 3/16 | .141 | .110 |
| 8 | M4 | 2.480 | .453 | .276 | .453 | .276 | 1/4 | .168 | .131 |
| 10-24 | M5 | 2.756 | .531 | .354 | .531 | .354 | 1/4 | .194 | .152 |
| 10-32 | — | 2.756 | .531 | .276 | — | — | 1/4 | .194 | .152 |
| 12-24 | — | 3.150 | .571 | .354 | — | — | 9/32 | .220 | .165 |
| 12-28 | — | 3.150 | .571 | .276 | — | — | 9/32 | .220 | .165 |
| 1/4-20 | M6 | 3.150 | .591 | .433 | .591 | .433 | 5/16 | .255 | .191 |
| 1/4-28 | — | 3.150 | .591 | .354 | — | — | 5/16 | .255 | .191 |
| 5/16-18 | — | 3.543 | .669 | .472 | — | — | 3/8 | .318 | .238 |
| 5/16-24 | M8 | 3.543 | .669 | .394 | .669 | .472 | 3/8 | .318 | .238 |
| 3/8-16 | M10×1.5 | 3.937 | .748 | .551 | .748 | .512 | 7/16 | .381 | .286 |
| 3/8-24 | M10×1.25 | 3.937 | .748 | .394 | .748 | .472 | 7/16 | .381 | .286 |
| 7/16-14 | — | 3.937 | .866 | .591 | — | — | 13/32 | .323 | .242 |
| 7/16-20 | — | 3.937 | .866 | .472 | — | — | 13/32 | .323 | .242 |
| 1/2-13 | M12×1.75 | 4.331 | .984 | .630 | .984 | .591 | 7/16 | .367 | .275 |
| 1/2-20 | M12×1.25 | 3.937 | .984 | .472 | .984 | .551 | 7/16 | .367 | .275 |
| 9/16-12 | M14×2.0 | 4.331 | .984 | .709 | .984 | .709 | 1/2 | .429 | .322 |
| 9/16-18 | M14×1.5 | 3.937 | .984 | .512 | .984 | .551 | 1/2 | .429 | .322 |
| 5/8-11 | M16×2.0 | 4.331 | 1.083 | .748 | 1.083 | .709 | 9/16 | .480 | .360 |
| 5/8-18 | M16×1.5 | 3.937 | 1.083 | .512 | 1.083 | .551 | 9/16 | .480 | .360 |
| — | M18×2.5 | 4.921 | — | — | 1.083 | .787 | 5/8 | .542 | .406 |
| — | M18×1.5 | 4.331 | — | — | 1.083 | .551 | 5/8 | .542 | .406 |
| 3/4-10 | — | 4.921 | 1.201 | .827 | — | — | 11/16 | .590 | .442 |
| 3/4-16 | — | 4.331 | 1.201 | .591 | — | — | 11/16 | .590 | .442 |
| 7/8-9 | — | 5.512 | 1.339 | .827 | — | — | 3/4 | .697 | .523 |
| 7/8-14 | — | 4.921 | 1.339 | .709 | — | — | 3/4 | .697 | .523 |
| 1-8 | — | 6.299 | 1.496 | .984 | — | — | 13/16 | .800 | .600 |
| 1-12 | — | 5.512 | 1.496 | .709 | — | — | 13/16 | .800 | .600 |

* **SP** : Spiral Pointed Taps
* **SF** : Spiral Fluted Taps
* **M-SP** : Metric Spiral Pointed Taps
* **M-SF** : Metric Spiral Fluted Taps

## HIGH PERFORMANCE DIN LENGTH ANSI SHANK TAPS (HSS-V) DIMENSIONS

| Size | Metric Size | Overall Length | Thread Length | | | | Square Length | Shank Diameter | Size of Square |
|---|---|---|---|---|---|---|---|---|---|
| | | | SP | SF | M-SP | M-SF | | | |
| 4 | — | 2.205 | 5/16 | 5/16 | — | — | 3/16 | .141 | .110 |
| 5 | M3 | 2.205 | 5/16 | 5/16 | 5/16 | 5/16 | 3/16 | .141 | .110 |
| 6 | M3.5 | 2.205 | 3/8 | 3/8 | 3/8 | 3/8 | 3/16 | .141 | .110 |
| 8 | M4 | 2.480 | 3/8 | 3/8 | 3/8 | 3/8 | 1/4 | .168 | .131 |
| 10-24 | M5 | 2.756 | 1/2 | 1/2 | 1/2 | 1/2 | 1/4 | .194 | .152 |
| 10-32 | — | 2.756 | 1/2 | 1/2 | — | — | 1/4 | .194 | .152 |
| 12-24 | — | 3.150 | 1/2 | 1/2 | — | — | 9/32 | .220 | .165 |
| 12-28 | — | 3.150 | 1/2 | 1/2 | — | — | 9/32 | .220 | .165 |
| 1/4-20 | M6 | 3.150 | 5/8 | 5/8 | 5/8 | 5/8 | 5/16 | .255 | .191 |
| 1/4-28 | — | 3.150 | 5/8 | 5/8 | — | — | 5/16 | .255 | .191 |
| 5/16-18 | — | 3.543 | 11/16 | 11/16 | — | — | 3/8 | .318 | .238 |
| 5/16-24 | M8 | 3.543 | 11/16 | 11/16 | 11/16 | 11/16 | 3/8 | .318 | .238 |
| 3/8-16 | M10×1.5 | 3.937 | 3/4 | 3/4 | 3/4 | 3/4 | 7/16 | .381 | .286 |
| 3/8-24 | M10×1.25 | 3.937 | 3/4 | 3/4 | 3/4 | 3/4 | 7/16 | .381 | .286 |
| 7/16-14 | — | 3.937 | 7/8 | 7/8 | — | — | 13/32 | .323 | .242 |
| 7/16-20 | — | 3.937 | 7/8 | 7/8 | — | — | 13/32 | .323 | .242 |
| 1/2-13 | M12×1.75 | 4.331 | 15/16 | 15/16 | 15/16 | 15/16 | 7/16 | .367 | .275 |
| 1/2-20 | M12×1.25 | 3.937 | 15/16 | 15/16 | 15/16 | 15/16 | 7/16 | .367 | .275 |
| 9/16-12 | M14×2.0 | 4.331 | 1 | 1 | 1 | 1 | 1/2 | .429 | .322 |
| 9/16-18 | M14×1.5 | 3.937 | 1 | 1 | 1 | 1 | 1/2 | .429 | .322 |
| 5/8-11 | M16×2.0 | 4.331 | 1-3/32 | 1-3/32 | 1-3/32 | 1-3/32 | 9/16 | .480 | .360 |
| 5/8-18 | M16×1.5 | 3.937 | 1-3/32 | 1-3/32 | 1-3/32 | 1-3/32 | 9/16 | .480 | .360 |
| — | M18×2.5 | 4.921 | — | — | 1-3/32 | 1-3/32 | 5/8 | .542 | .406 |
| — | M18×1.5 | 4.331 | — | — | 1-3/32 | 1-3/32 | 5/8 | .542 | .406 |
| 3/4-10 | — | 4.921 | 1-7/32 | 1-7/32 | — | — | 11/16 | .590 | .442 |
| 3/4-16 | — | 4.331 | 1-7/32 | 1-7/32 | — | — | 11/16 | .590 | .442 |
| 7/8-9 | — | 5.512 | 1-11/32 | 1-11/32 | — | — | 3/4 | .697 | .523 |
| 7/8-14 | — | 4.921 | 1-11/32 | 1-11/32 | — | — | 3/4 | .697 | .523 |
| 1-8 | — | 6.299 | 1-1/2 | 1-1/2 | — | — | 13/16 | .800 | .600 |
| 1-12 | — | 5.512 | 1-1/2 | 1-1/2 | — | — | 13/16 | .800 | .600 |

* Maximum tapping depth = Thread length unless shank diameter is smaller than minor diameter

* **SP** : Spiral Pointed Taps
* **SF** : Spiral Fluted Taps
* **M-SP** : Metric Spiral Pointed Taps
* **M-SF** : Metric Spiral Fluted Taps

# TECHNICAL DATA

## 5 MCTI TABLE 302 GENERAL DIMENSIONS

| Size | Metric Size | Overall Length | Thread Length | Square Length | Shank Diameter | Size of Square |
|---|---|---|---|---|---|---|
| 4 | — | 1-7/8 | 9/16 | 3/16 | .141 | .110 |
| 5 | M3 | 1-15/16 | 5/8 | 3/16 | .141 | .110 |
| 6 | M3.5 | 2 | 11/16 | 3/16 | .141 | .110 |
| 8 | M4 | 2-1/8 | 3/4 | 1/4 | .168 | .131 |
| 10 | M5 | 2-3/8 | 7/8 | 1/4 | .194 | .152 |
| 12 | — | 2-3/8 | 15/16 | 9/32 | .220 | .165 |
| 1/4 | M6 | 2-1/2 | 1 | 5/16 | .255 | .191 |
| 5/16 | M7 | 2-23/32 | 1-1/8 | 3/8 | .318 | .238 |
| 3/8 | M10 | 2-15/16 | 1-1/4 | 7/16 | .381 | .286 |
| 7/16 | — | 3-5/32 | 1-7/16 | 13/32 | .323 | .242 |
| 1/2 | M12 | 3-3/8 | 1-21/32 | 7/16 | .367 | .275 |
| 9/16 | M14 | 3-19/32 | 1-21/32 | 1/2 | .429 | .322 |
| 5/8 | M16 | 3-13/16 | 1-13/16 | 9/16 | .480 | .360 |
| 11/16 | M18 | 4-1/32 | 1-13/16 | 5/8 | .542 | .406 |
| 3/4 | — | 4-1/4 | 2 | 11/16 | .590 | .442 |
| 13/16 | M20 | 4-15/32 | 2 | 11/16 | .652 | .489 |
| 7/8 | M22 | 4-11/16 | 2-7/32 | 3/4 | .697 | .523 |
| 15/16 | M24 | 4-29/32 | 2-7/32 | 3/4 | .760 | .570 |
| 1 | M25 | 5-1/8 | 2-1/2 | 13/16 | .800 | .600 |
| 1-1/16 | M27 | 5-1/8 | 2-1/2 | 7/8 | .896 | .672 |
| 1-1/8 | — | 5-7/16 | 2-9/16 | 7/8 | .896 | .672 |
| 1-3/16 | M30 | 5-7/16 | 2-9/16 | 1 | 1.021 | .766 |
| 1-1/4 | — | 5-3/4 | 2-9/16 | 1 | 1.021 | .766 |
| 1-5/16 | M33 | 5-3/4 | 2-9/16 | 1-1/16 | 1.108 | .831 |
| 1-3/8 | — | 6-1/16 | 3 | 1-1/16 | 1.108 | .831 |
| 1-7/16 | M36 | 6-1/16 | 3 | 1-1/8 | 1.233 | .925 |
| 1-1/2 | — | 6-3/8 | 3 | 1-1/8 | 1.233 | .925 |

## 6 TAPER PIPE TAPS GENERAL DIMENSIONS

| Size | Overall Length | Thread Length | Square Length | Shank Diameter | Size of Square |
|---|---|---|---|---|---|
| 1/16 | 2-1/8 | 11/16 | 3/8 | .3125 | .234 |
| 1/8(sm) | 2-1/8 | 3/4 | 3/8 | .3125 | .234 |
| 1/8(Lg) | 2-1/8 | 3/4 | 3/8 | .4375 | .328 |
| 1/4 | 2-7/16 | 1-1/16 | 7/16 | .5625 | .421 |
| 3/8 | 2-9/16 | 1-1/16 | 1/2 | .7000 | .531 |
| 1/2 | 3-1/8 | 1-3/8 | 5/8 | .6875 | .515 |
| 3/4 | 3-1/4 | 1-3/8 | 11/16 | .9063 | .679 |
| 1 | 3-3/4 | 1-3/4 | 13/16 | 1.1250 | .843 |
| 1-1/4 | 4 | 1-3/4 | 15/16 | 1.3125 | .984 |
| 1-1/2 | 4-1/4 | 1-3/4 | 1 | 1.5000 | 1.125 |
| 2 | 4-1/2 | 1-3/4 | 1-1/8 | 1.8750 | 1.406 |

## TAP RECOMMENDATIONS

### Unified Thread, Machine Screw Size

| Size | Threads per Inch | | Recommended Tap for Class of Thread | | | | Pitch Diameter Limits for Class of Thread | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | UNC | UNF | Class 2 | Class 3 | Class 2B | Class 3B | Min. All Class(Basic) | Max Class 2 | Max Class 3 | Max Class 2B | Max Class 3B |
| 0 | | 80 | GH1 | GH1 | GH2 | GH1 | .0519 | .0536 | .0532 | .0542 | .0536 |
| 1 | 64 | | GH1 | GH1 | GH2 | GH1 | .0629 | .0648 | .0643 | .0655 | .0648 |
| | | 72 | GH1 | GH1 | GH2 | GH1 | .0640 | .0658 | .0653 | .0665 | .0659 |
| 2 | 56 | | GH1 | GH1 | GH2 | GH1 | .0744 | .0764 | .0759 | .0772 | .0765 |
| | | 64 | GH1 | GH1 | GH2 | GH1 | .0759 | .0778 | .0773 | .0786 | .0779 |
| 3 | 48 | | GH1 | GH1 | GH2 | GH1 | .0855 | .0877 | .0871 | .0885 | .0877 |
| | | 56 | GH1 | GH1 | GH2 | GH1 | .0874 | .0894 | .8890 | .0902 | .0895 |
| 4 | 40 | | GH2 | GH1 | GH2 | GH2 | .0958 | .0982 | .0975 | .0991 | .0982 |
| | | 48 | GH1 | GH1 | GH2 | GH1 | .0985 | .1007 | .1001 | .1016 | .1008 |
| 5 | 40 | | GH2 | GH1 | GH2 | GH2 | .1088 | .1112 | .1105 | .1121 | .1113 |
| | | 44 | GH1 | GH1 | GH2 | GH1 | .1102 | .1125 | .1118 | .1134 | .1126 |
| 6 | 32 | | GH2 | GH1 | GH3 | GH2 | .1177 | .1204 | .1196 | .1214 | .1204 |
| | | 40 | GH2 | GH1 | GH2 | GH2 | .1218 | .1242 | .1235 | .1252 | .1243 |
| 8 | 32 | | GH2 | GH1 | GH3 | GH2 | .1437 | .1464 | .1456 | .1475 | .1465 |
| | | 36 | GH2 | GH1 | GH2 | GH2 | .1460 | .1485 | .1478 | .1496 | .1487 |
| 10 | 24 | | GH3 | GH1 | GH3 | GH3 | .1629 | .1662 | .1653 | .1672 | .1661 |
| | | 32 | GH2 | GH1 | GH3 | GH2 | .1697 | .1724 | .1716 | .1736 | .1726 |
| 12 | 24 | | GH3 | GH1 | GH3 | GH3 | .1889 | .1922 | .1913 | .1933 | .1922 |
| | | 28 | GH3 | GH1 | GH3 | GH3 | .1928 | .1959 | .1950 | .1970 | .1959 |

### Unified Thread, Fractional Size

| Size | Threads per Inch | | Recommended Tap for Class of Thread | | | | Pitch Diameter Limits for Class of Thread | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | UNC | UNF | Class 2 | Class 3 | Class 2B | Class 3B | Min. All Class(Basic) | Max Class 2 | Max Class 3 | Max Class 2B | Max Class 3B |
| 1/4 | 20 | | GH3 | GH2 | GH5 | GH3 | .2175 | .2211 | .2201 | .2223 | .2211 |
| | | 28 | GH3 | GH1 | GH4 | GH3 | .2268 | .2299 | .2290 | .2311 | .2300 |
| 5/16 | 18 | | GH3 | GH2 | GH5 | GH3 | .2764 | .2805 | .2794 | .2817 | .2803 |
| | | 24 | GH3 | GH1 | GH4 | GH3 | .2854 | .2887 | .2878 | .2902 | .2890 |
| 3/8 | 16 | | GH3 | GH2 | GH5 | GH3 | .3344 | .3389 | .3376 | .3401 | .3387 |
| | | 24 | GH3 | GH1 | GH4 | GH3 | .3479 | .3512 | .3503 | .3528 | .3516 |
| 7/16 | 14 | | GH5 | GH3 | GH5 | GH3 | .3911 | .3960 | .3947 | .3972 | .3957 |
| | | 20 | GH3 | GH1 | GH5 | GH3 | .4050 | .4086 | .4076 | .4104 | .4091 |
| 1/2 | 13 | | GH5 | GH3 | GH5 | GH3 | .4500 | .4552 | .4537 | .4565 | .4548 |
| | | 20 | GH3 | GH1 | GH5 | GH3 | .4675 | .4711 | .4701 | .4731 | .4717 |
| 9/16 | 12 | | GH5 | GH3 | GH5 | GH3 | .5084 | .5140 | .5124 | .5152 | .5135 |
| | | 18 | GH3 | GH2 | GH5 | GH3 | .5264 | .5305 | .5294 | .5323 | .5308 |
| 5/8 | 11 | | GH5 | GH3 | GH5 | GH3 | .5660 | .5719 | .5702 | .5732 | .5714 |
| | | 18 | GH3 | GH2 | GH5 | GH3 | .5889 | .5930 | .5919 | .5949 | .5934 |
| 3/4 | 10 | | GH5 | GH3 | GH5 | GH3 | .6850 | .6914 | .6895 | .6927 | .6907 |
| | | 16 | GH3 | GH2 | GH5 | GH3 | .7094 | .7139 | .7126 | .7159 | .7143 |
| 7/8 | 9 | | GH6 | GH4 | GH6 | GH4 | .8028 | .8098 | .8077 | .8110 | .8089 |
| | | 14 | GH4 | GH2 | GH6 | GH4 | .8286 | .8335 | .8322 | .8356 | .8339 |
| 1 | 8 | | GH6 | GH4 | GH6 | GH4 | .9188 | .9264 | .9242 | .9276 | .9254 |
| | | 12 | GH4 | GH2 | GH6 | GH4 | .9459 | .9515 | .9499 | .9535 | .9516 |

The above recommended taps normally produce the Class of Thread indicated in average materials when used with reasonable care.
However, if the tap specified does not give a satisfactory gage fit in the work, a choice of some other limit tap will be necessary.

## THREAD LIMITS

### Unified Thread, Machine Screw Size - Ground Thread

| Size | Thread per Inch | | | Major Diameter(Inches) | | | Pitch Diameter Limits(Inches) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UNC | UNF | UNS | Basic | Min. | Max. | Basic Pitch Dia. | H1 Limit | | H2 Limit | | H3 Limit | | H7 Limit | |
| | | | | | | | | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. |
| 0 | — | 80 | — | .0600 | .0605 | .0615 | .0519 | .0519 | .0524 | .0524 | .0529 | — | — | — | — |
| 1 | 64 | — | — | .0730 | .0735 | .0745 | .0629 | .0629 | .0634 | .0634 | .0639 | — | — | — | — |
| | — | 72 | — | .0730 | .0735 | .0745 | .0640 | .0640 | .0645 | .0645 | .0650 | — | — | — | — |
| 2 | 56 | — | — | .0860 | .0865 | .0875 | .0744 | .0744 | .0749 | .0749 | .0754 | — | — | — | — |
| | — | 64 | — | .0860 | .0865 | .0875 | .0759 | — | — | .0764 | .0769 | — | — | — | — |
| 3 | 48 | — | — | .0990 | .0100 | .1010 | .0855 | .0855 | .0860 | .0860 | .0865 | — | — | — | — |
| | — | 56 | — | .0990 | .0995 | .1005 | .0874 | .0874 | .0879 | .0879 | .0884 | — | — | — | — |
| 4 | — | — | 36 | .1120 | .1135 | .1145 | .0940 | — | — | .0945 | .0950 | — | — | — | — |
| | 40 | — | — | .1120 | .1135 | .1145 | .0958 | .0958 | .0963 | .0963 | .0968 | — | — | — | — |
| | — | 48 | — | .1120 | .1130 | .1140 | .0985 | .0985 | .0990 | .0990 | .0995 | — | — | — | — |
| 5 | 40 | — | — | .1250 | .1265 | .1275 | .1088 | .1088 | .1093 | .1093 | .1098 | — | — | — | — |
| | — | 44 | — | .1250 | .1260 | .1270 | .1102 | — | — | .1107 | .1112 | — | — | — | — |
| 6 | 32 | — | — | .1380 | .1400 | .1410 | .1177 | .1177 | .1182 | .1182 | .1187 | .1187 | .1192 | .1207 | .1212 |
| | — | 40 | — | .1380 | .1395 | .1405 | .1218 | .1218 | .1223 | .1223 | .1228 | — | — | — | — |
| 8 | 32 | — | — | .1640 | .1660 | .1670 | .1437 | .1437 | .1442 | .1442 | .1447 | .1447 | .1452 | .1467 | .1472 |
| | — | 36 | — | .1640 | .1655 | .1665 | .1460 | — | — | .1465 | .1470 | — | — | — | — |
| 10 | 24 | — | — | .1900 | .1930 | .1940 | .1629 | .1629 | .1634 | .1634 | .1639 | .1639 | .1644 | .1659 | .1664 |
| | — | 32 | — | .1900 | .1920 | .1930 | .1697 | .1697 | .1702 | .1702 | .1707 | .1707 | .1712 | .1727 | .1732 |
| 12 | 24 | — | — | .2160 | .2190 | .2200 | .1889 | — | — | — | — | .1899 | .1904 | — | — |
| | — | 28 | — | .2160 | .2185 | .2195 | .1928 | — | — | — | — | .1938 | .1943 | — | — |

### Lead Tolerance

A maximum lead deviation of plus or minus .0005" within any two threads not farther apart than 1" is permitted

### Pitch Diameter Limits

H1 = Basic to basic plus .0005"
H2 = Basic plus .0005" to basic plus .001"
H3 = Basic plus .001" to basic plus .0015"
H7 = Basic plus .003" to basic plus .0035"

### Angle Tolerance

24 to 80 threads per inch incl. = 30′ plus or minus in 1/2 angle.

## Unified Thread, Fractional Size - Ground Thread

| Size | Thread per Inch | | | Major Diameter (Inches) | | | Pitch Diameter Limits(Inches) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Basic Pitch Dia. | H1 Limit | | H2 Limit | | H3 Limit | | H4 Limit | | H5 Limit | | H6 Limit | |
| | UNC | UNF | UNS | Basic | Min. | Max. | | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. |
| 1/4 | 20 | — | — | .2500 | .2540 | .2550 | .2175 | .2175 | .2180 | .2180 | .2185 | .2185 | .2190 | — | — | .2195 | .2200 | — | — |
| | — | 28 | — | .2500 | .2525 | .2535 | .2268 | .2268 | .2273 | .2273 | .2278 | .2278 | .2283 | .2283 | .2288 | — | — | — | — |
| 5/16 | 18 | — | — | .3125 | .3170 | .3180 | .2764 | .2764 | .2769 | .2769 | .2774 | .2774 | .2779 | — | — | .2784 | .2789 | — | — |
| | — | 24 | — | .3125 | .3155 | .3165 | .2854 | .2854 | .2859 | .2859 | .2864 | .2864 | .2869 | .2869 | .2874 | — | — | — | — |
| 3/8 | 16 | — | — | .3750 | .3800 | .3810 | .3344 | .3344 | .3349 | .3349 | .3354 | .3354 | .3359 | — | — | .3364 | .3369 | — | — |
| | — | 24 | — | .3750 | .3780 | .3790 | .3479 | .3479 | .3484 | .3484 | .3489 | .3489 | .3494 | .3494 | .3499 | — | — | — | — |
| 7/16 | 14 | — | — | .4375 | .4435 | .4445 | .3911 | — | — | .3916 | .3921 | .3921 | .3926 | — | — | .3931 | .3936 | — | — |
| | — | 20 | — | .4375 | .4415 | .4425 | .4050 | — | — | — | — | .4060 | .4065 | — | — | .4070 | .4075 | — | — |
| 1/2 | 13 | — | — | .5000 | .5065 | .5075 | .4500 | .4500 | .4505 | .4505 | .4510 | .4510 | .4515 | — | — | .4520 | .4525 | — | — |
| | — | 20 | — | .5000 | .5040 | .5050 | .4675 | .4675 | .4680 | .4680 | .4685 | .4685 | .4690 | — | — | .4695 | .4700 | — | — |
| 9/16 | 12 | — | — | .5625 | .5690 | .5700 | .5084 | — | — | .5089 | .5094 | .5094 | .5099 | — | — | .5104 | .5109 | — | — |
| | — | 18 | — | .5625 | .5670 | .5680 | .5264 | — | — | .5269 | .5274 | .5274 | .5279 | — | — | .5284 | .5289 | — | — |
| 5/8 | 11 | — | — | .6250 | .6320 | .6330 | .5660 | — | — | .5665 | .5670 | .5670 | .5675 | — | — | .5680 | .5685 | — | — |
| | — | 18 | — | .6250 | .6295 | .6305 | .5889 | — | — | .5894 | .5899 | .5899 | .5904 | — | — | .5909 | .5914 | — | — |
| 11/16 | — | — | 11 | .6875 | .6945 | .6955 | .6285 | — | — | — | — | .6295 | .6300 | — | — | — | — | — | — |
| | — | — | 16 | .6875 | .6925 | .6935 | .6469 | — | — | | | .6479 | .6484 | — | — | — | — | — | — |
| 3/4 | 10 | — | — | .7500 | .7525 | .7590 | .6850 | .6850 | .6855 | .6855 | .6860 | .6860 | .6865 | — | — | .6870 | .6875 | — | — |
| | — | 16 | — | .7500 | .7550 | .7560 | .7094 | .7094 | .7099 | .7099 | .7104 | .7104 | .7109 | — | — | .7114 | .7119 | — | — |
| 7/8 | 9 | — | — | .8750 | .8835 | .8850 | .8028 | — | — | — | — | — | — | .8043 | .8048 | — | — | .8053 | .8058 |
| | — | 14 | — | .8750 | .8810 | .8820 | .8286 | — | — | .8291 | .8296 | — | — | .8301 | .8306 | — | — | .8311 | .8318 |
| 1" | 8 | — | — | 1.0000 | 1.0095 | 1.0110 | .9188 | — | — | .9193 | .9198 | — | — | .9203 | .9208 | — | — | .9213 | .9218 |
| | — | 12 | — | 1.0000 | 1.0065 | 1.0075 | .9459 | — | — | — | — | — | — | .9474 | .9479 | — | — | — | — |
| | — | — | 14 | 1.0000 | 1.0060 | 1.0070 | .9536 | — | — | — | — | — | — | .9551 | .9556 | — | — | — | — |

### Lead Tolerance

A maximum lead deviation of plus or minus .0005" within any two threads not farther apart than 1" is permitted

### Pitch Diameter Limits

H1 = Basic to basic plus .0005"
H2 = Basic plus .0005" to basic plus .001"
H3 = Basic plus .001" to basic plus .0015"
H4 = Basic plus .0015" to basic plus .0020"
H5 = Basic plus .0020" to basic plus .0025"
H6 = Basic plus .0025" to basic plus .0030"

### Angle Tolerance

| Threads per Inch | Deviation in Half Angle |
|---|---|
| 6 to 9 Incl. | 25' Plus or Minus |
| 10 to 28 Incl. | 30' Plus or Minus |

# TECHNICAL DATA

## Metric Thread - Ground Thread

| Size | Pitch | | Major Diameter(Inches) | | | Pitch Diameter Limits(Inches) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Basic Pitch Dia. | D2 Limit | | D3 Limit | | D4 Limit | | D5 Limit | | D6 Limit | |
| | Coarse | Fine | Basic | Min. | Max. | | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. |
| M2 | 0.4 | — | .0787 | .0801 | .0811 | .0685 | .0690 | .0696 | .0695 | .0701 | .0700 | .0706 | — | — | — | — |
| M2.2 | 0.45 | — | .0866 | .0881 | .0891 | .0751 | .0756 | .0762 | .0761 | .0767 | .0766 | .0772 | — | — | — | — |
| M2.3 | 0.4 | — | .0906 | .0919 | .0929 | .0803 | .0808 | .0814 | .0813 | .0819 | .0818 | .0824 | — | — | — | — |
| M2.6 | 0.45 | — | .1024 | .1038 | .1048 | .0909 | .0913 | .0919 | .0918 | .0924 | .0923 | .0929 | — | — | — | — |
| M3 | 0.5 | — | .1181 | .1198 | .1208 | .1053 | .1058 | .1064 | .1063 | .1069 | .1068 | .1074 | .1073 | .1079 | — | — |
| | — | 0.35 | .1181 | .1193 | .1203 | .1092 | .1096 | .1102 | .1101 | .1107 | .1106 | .1112 | .1111 | .1117 | — | — |
| M3.5 | 0.6 | — | .1378 | .1397 | .1407 | .1225 | .1227 | .1235 | .1232 | .1240 | .1237 | .1245 | .1242 | .1250 | — | — |
| | — | 0.35 | .1378 | .1389 | .1399 | .1289 | .1293 | .1299 | .1298 | .1304 | .1303 | .1309 | .1308 | .1314 | — | — |
| M4 | 0.7 | — | .1575 | .1597 | .1613 | .1396 | .1398 | .1406 | .1403 | .1411 | .1408 | .1416 | .1413 | .1421 | — | — |
| | — | 0.5 | .1575 | .1591 | .1601 | .1447 | .1451 | .1457 | .1456 | .1462 | .1461 | .1467 | .1466 | .1472 | — | — |
| M5 | 0.8 | — | .1969 | .1994 | .2010 | .1764 | .1766 | .1774 | .1771 | .1779 | .1776 | .1784 | .1781 | .1789 | — | — |
| | — | 0.5 | .1969 | .1985 | .1995 | .1841 | .1845 | .1851 | .1850 | .1856 | .1855 | .1861 | .1861 | .1866 | — | — |
| M6 | 1 | — | .2362 | .2395 | .2411 | .2106 | .2107 | .2117 | .2112 | .2122 | .2117 | .2127 | .2122 | .2132 | .2127 | .2137 |
| | — | 0.75 | .2362 | .2387 | .2403 | .2170 | .2173 | .2181 | .2178 | .2186 | .2183 | .2191 | .2188 | .2196 | .2193 | .2201 |
| M7 | 1 | — | .2756 | .2788 | .2804 | .2500 | .2501 | .2511 | .2506 | .2516 | .2511 | .2521 | .2516 | .2526 | .2521 | .2531 |
| | — | 0.75 | .2756 | .2780 | .2796 | .2564 | .2565 | .2575 | .2570 | .2580 | .2575 | .2585 | .2580 | .2590 | .2585 | .2595 |
| M8 | 1.25 | — | .3150 | .3189 | .3214 | .2830 | .2828 | .2840 | .2833 | .2845 | .2838 | .2850 | .2843 | .2855 | .2848 | .2860 |
| | — | 1 | .3150 | .3182 | .3198 | .2894 | .2894 | .2904 | .2899 | .2909 | .2904 | .2914 | .2909 | .2919 | .2914 | .2924 |
| M10 | 1.5 | — | .3937 | .3984 | .4009 | .3553 | .3552 | .3564 | .3557 | .3569 | .3562 | .3574 | .3567 | .3579 | .3572 | .3584 |
| | — | 1.25 | .3937 | .3976 | .4001 | .3617 | .3616 | .3628 | .3621 | .3633 | .3626 | .3638 | .3631 | .3643 | .3636 | .3648 |
| | | 1 | .3937 | .3969 | .3985 | .3681 | .3682 | .3692 | .3687 | .3697 | .3692 | .3702 | .3697 | .3707 | .3702 | .3712 |
| M12 | 1.75 | — | .4724 | .4780 | .4805 | .4277 | .4275 | .4287 | .4280 | .4292 | .4285 | .4297 | .4290 | .4302 | .4295 | .4307 |
| | — | 1.5 | .4724 | .4772 | .4797 | .4341 | .4339 | .4351 | .4344 | .4356 | .4349 | .4361 | .4354 | .4366 | .4359 | .4371 |
| | — | 1.25 | .4724 | .4764 | .4789 | .4405 | .4403 | .4415 | .4408 | .4420 | .4413 | .4425 | .4418 | .4430 | .4423 | .4435 |

### Lead Tolerance

The tap major and pitch diameter conversions have been rounded upward.
A maximum lead deviation of +/- .0005″ within any two threads not further apart than 1″ is permitted.

### Angle Tolerance

| Pitch(mm) | Deviation in Half Angle |
|---|---|
| Over 0.25 to 2.5 Incl. | 30' Plus or Minus |
| Over 2.5 to 4.0 Incl. | 25' Plus or Minus |

## Metric Thread - Ground Thread

| Size | Pitch | | Major Diameter(Inches) | | | Pitch Diameter Limits(Inches) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coarse | Fine | Basic | Min. | Max. | Basic Pitch Dia. | D6 Limit | | D7 Limit | | D8 Limit | | D9 Limit | |
| | | | | | | | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. |
| M14 | 2 | — | .5512 | .5575 | .5600 | .5000 | .5015 | .5031 | .5020 | .5036 | .5025 | .5041 | — | — |
| | — | 1.5 | .5512 | .5559 | .5584 | .5128 | .5147 | .5159 | .5152 | .5164 | .5157 | .5169 | — | — |
| | — | 1.25 | .5512 | .5551 | .5576 | .5192 | .5211 | .5223 | .5216 | .5228 | .5221 | .5233 | — | — |
| M16 | 2 | — | .6299 | .6363 | .6388 | .5788 | .5802 | .5818 | .5807 | .5823 | .5812 | .5828 | — | — |
| | — | 1.5 | .6299 | .6347 | .6372 | .5916 | .5934 | .5946 | .5939 | .5951 | .5944 | .5956 | — | — |
| M18 | 2.5 | — | .7087 | .7166 | .7191 | .6448 | .6462 | .6478 | .6467 | .6483 | .6472 | .6488 | — | — |
| | — | 2 | .7087 | .7150 | .7175 | .6576 | .6590 | .6606 | .6595 | .6611 | .6600 | .6616 | — | — |
| | — | 1.5 | .7087 | .7134 | .7159 | .6703 | .6722 | .6734 | .6727 | .6739 | .6732 | .6744 | — | — |
| M20 | 2.5 | — | .7874 | .7953 | .7976 | .7235 | .7249 | .7265 | .7254 | .7270 | .7259 | .7275 | — | — |
| | — | 2 | .7874 | .7937 | .7962 | .7363 | .7377 | .7393 | .7382 | .7398 | .7387 | .7403 | — | — |
| | — | 1.5 | .7874 | .7921 | .7946 | .7490 | .7509 | .7521 | .7514 | .7526 | .7519 | .7531 | — | — |
| | — | 1 | .7874 | .7906 | .7922 | .7618 | .7639 | .7649 | .7644 | .7654 | .7649 | .7659 | — | — |
| M22 | 2.5 | — | .8661 | .8741 | .8766 | .8022 | .8037 | .8053 | .8042 | .8058 | .8047 | .8063 | — | — |
| | — | 2 | .8661 | .8725 | .8750 | .8150 | .8164 | .8180 | .8169 | .8185 | .8174 | .8190 | — | — |
| | — | 1.5 | .8661 | .8709 | .8734 | .8278 | .8296 | .8308 | .8301 | .8313 | .8306 | .8318 | — | — |
| | — | 1 | .8661 | .8694 | .8710 | .8406 | .8426 | .8436 | .8431 | .8441 | .8436 | .8446 | — | — |
| M24 | 3 | — | .9449 | .9544 | .9583 | .8682 | .8696 | .8712 | .8701 | .8717 | .8706 | .8722 | .8711 | .8727 |
| | — | 2 | .9449 | .9512 | .9537 | .8938 | .8952 | .8968 | .8957 | .8973 | .8962 | .8978 | — | — |
| | — | 1.5 | .9449 | .9496 | .9521 | .9065 | .9084 | .9096 | .9089 | .9101 | .9094 | .9106 | — | — |
| | — | 1 | .9449 | .9481 | .9497 | .9193 | .9214 | .9224 | .9219 | .9229 | .9224 | .9234 | — | — |
| M27 | 3 | — | 1.0630 | 1.0725 | 1.0764 | .9863 | .9873 | .9893 | .9878 | .9898 | .9883 | .9903 | .9888 | .9908 |
| | — | 2 | 1.0630 | 1.0693 | 1.0718 | 1.0118 | 1.0133 | 1.0149 | 1.0138 | 1.0154 | 1.0143 | 1.0159 | — | — |
| | — | 1.5 | 1.0630 | 1.0677 | 1.0702 | 1.0246 | 1.0265 | 1.0277 | 1.0270 | 1.0282 | 1.0275 | 1.0287 | — | — |
| | — | 1 | 1.0630 | 1.0662 | 1.0678 | 1.0374 | 1.0393 | 1.0405 | 1.0398 | 1.0410 | 1.0403 | 1.0415 | — | — |
| M28 | — | 2 | 1.1024 | 1.1087 | 1.1112 | 1.0512 | 1.0527 | 1.0543 | 1.0532 | 1.0548 | 1.0537 | 1.0553 | — | — |
| | — | 1.5 | 1.1024 | 1.1071 | 1.1096 | 1.0640 | 1.0659 | 1.0671 | 1.0664 | 1.0676 | 1.0669 | 1.0681 | — | — |
| | — | 1 | 1.1024 | 1.1056 | 1.1072 | 1.0768 | 1.0786 | 1.0798 | 1.0791 | 1.0803 | 1.0796 | 1.0808 | — | — |
| M30 | 3.5 | — | 1.1811 | 1.1921 | 1.1961 | 1.0916 | 1.0926 | 1.0946 | 1.0931 | 1.0951 | 1.0936 | 1.0956 | 1.0941 | 1.0961 |
| | — | 3 | 1.1811 | 1.1906 | 1.1945 | 1.1044 | 1.1054 | 1.1074 | 1.1059 | 1.1079 | 1.1064 | 1.1084 | 1.1069 | 1.1089 |
| | — | 2 | 1.1811 | 1.1874 | 1.1899 | 1.1300 | 1.1314 | 1.1330 | 1.1319 | 1.1335 | 1.1324 | 1.1340 | — | — |
| | — | 1.5 | 1.1811 | 1.1858 | 1.1883 | 1.1427 | 1.1446 | 1.1458 | 1.1451 | 1.1463 | 1.1456 | 1.1468 | — | — |
| M33 | 3.5 | — | 1.2992 | 1.3103 | 1.3142 | 1.2097 | 1.2108 | 1.2128 | 1.2113 | 1.2133 | 1.2118 | 1.2138 | 1.2123 | 1.2143 |
| | — | 3 | 1.2992 | 1.3088 | 1.3127 | 1.2225 | 1.2235 | 1.2255 | 1.2240 | 1.2260 | 1.2245 | 1.2265 | 1.2250 | 1.2270 |
| | — | 2 | 1.2992 | 1.3056 | 1.3081 | 1.2481 | 1.2495 | 1.2511 | 1.2500 | 1.2516 | 1.2505 | 1.2521 | — | — |
| | — | 1.5 | 1.2992 | 1.3040 | 1.3065 | 1.2609 | 1.2627 | 1.2639 | 1.2632 | 1.2644 | 1.2637 | 1.2649 | — | — |

# TECHNICAL DATA

## TAP DRILL SIZES - UNIFIED THREAD

| Size | Threads Per Inch | | Drills for Cutting Taps | | | | Drill for Forming Taps |
|---|---|---|---|---|---|---|---|
| | UNC | UNF | Tap Drill | Inch Equiv. | Probable Hole Size (Inch) | Probable Percent of Thread | Drill for 65% |
| 0 | | 80 | 3/64 | .0469 | .0484 | 71 | 54 or 1.4mm |
| 1 | 64 | | 53 | .0595 | .0610 | 59 | 51 or 1.7mm |
| | | 72 | 53 | .0595 | .0610 | 67 | 51 or 1.75mm |
| 2 | 56 | | 50 | .0700 | .0717 | 62 | 47 or 2.0mm |
| | | 64 | 50 | .0700 | .0717 | 70 | 2.0mm |
| 3 | 48 | | 47 | .0785 | .0804 | 69 | 2.3mm |
| | | 56 | 45 | .0820 | .0839 | 65 | 2.3mm |
| 4 | 40 | | 43 | .0890 | .0910 | 65 | 39 |
| | | 48 | 42 | .0935 | .0955 | 61 | 37 |
| 5 | 40 | | 38 | .1015 | .1038 | 65 | 33 or 2.9mm |
| | | 44 | 37 | .1040 | .1063 | 63 | 33 or 2.9mm |
| 6 | 32 | | 36 | .1065 | .1088 | 72 | 3.1mm |
| | | 40 | 33 | .1130 | .1156 | 69 | 1/8 or 3.2mm |
| 8 | 32 | | 29 | .1360 | .1389 | 62 | 25 or 3.8mm |
| | | 36 | 29 | .1360 | .1389 | 70 | 24 |
| 10 | 24 | | 25 | .1495 | .1527 | 69 | 11/64 |
| | | 32 | 21 | .1590 | .1622 | 68 | 16 or .176 |
| 12 | 24 | | 16 | .1770 | .1805 | 66 | 9 or 5.0mm |
| | | 28 | 14 | .1820 | .1855 | 66 | 7 or 5.1mm |
| 1/4 | 20 | | 7 | .2010 | .2048 | 70 | 5.75mm |
| | | 28 | 3 | .2130 | .2168 | 72 | A |
| 5/16 | 18 | | F | .2570 | .2608 | 72 | 7.25mm |
| | | 24 | 1 | .2720 | .2761 | 67 | .293 |
| 3/8 | 16 | | 5/16 | .3125 | .3169 | 72 | S or 11/32mm |
| | | 24 | Q | .3320 | .3364 | 71 | 9.0mm |
| 7/16 | 14 | | U | .3680 | .3726 | 70 | Y |
| | | 20 | 25/64 | .3906 | .3952 | 65 | Z or 10.5mm |
| 1/2 | 13 | | 27/64 | .4219 | .4266 | 73 | .463 |
| | | 20 | 29/64 | .4531 | .4578 | 65 | .476 |
| 9/16 | 12 | | 31/64 | .4844 | .4892 | 68 | .521 |
| | | 18 | 33/64 | .5156 | .5204 | 58 | .536 |
| 5/8 | 11 | | 17/32 | .5312 | .5362 | 75 | 37/64 |
| | | 18 | 37/64 | .5781 | .5831 | 58 | .598 |
| 3/4 | 10 | | 21/32 | .6562 | .6613 | 68 | 45/64 |
| | | 16 | 11/16 | .6875 | .6925 | 71 | 23/32 |
| 7/8 | 9 | | 49/64 | .7656 | .7708 | 72 | .823 |
| | | 14 | 13/16 | .8125 | .8177 | 62 | 27/32 |
| 1 | 8 | | 7/8 | .8750 | .8809 | 73 | 15/16 |
| | | 12 | 59/64 | .9219 | .9279 | 67 | .963 |
| 1-1/8 | 7 | | 63/64 | .9844 | .9911 | 72 | |
| | | 12 | 1-3/64 | 1.0469 | 1.0541 | 65 | |
| 1-1/4 | 7 | | 1-7/64 | 1.1094 | — | — | |
| | | 12 | 1-11/64 | 1.1719 | — | — | |
| 1-3/8 | 6 | | 1-7/32 | 1.2187 | — | — | |
| | | 16 | 1-19/64 | 1.2969 | — | — | |
| 1-1/2 | 6 | | 1-11/32 | 1.3437 | — | — | |
| | | 12 | 1-27/64 | 1.4219 | — | — | |

## TAP DRILL SIZES - METRIC THREAD

| Size | Pitch | Recommended Metric Drill | | | | Closest Recommended Inch Drill | | | | Drill for Forming Taps |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Tap Drill (mm) | Inch Equiv. | Probable Hole Size (Inch) | Probable Percent of Thread | Tap Drill | Inch Equiv. | Probable Hole Size (Inch) | Probable Percent of Thread | 6H Recommended |
| M1.6 | 0.35 | 1.25 | .0492 | .0507 | 69 | — | — | — | — | 1.45 |
| M1.8 | 0.35 | 1.45 | .0571 | .0586 | 69 | — | — | — | — | 1.65 |
| M2 | 0.40 | 1.6 | .0630 | .0647 | 69 | 52 | .0635 | .0652 | 66 | 1.85 |
| M2.2 | 0.45 | 1.75 | .0689 | .0706 | 70 | — | — | — | — | 2.0 |
| M2.5 | 0.45 | 2.05 | .0807 | .0826 | 69 | 46 | .0810 | .0829 | 67 | 2.3 |
| M3 | 0.50 | 2.5 | .0984 | .1007 | 68 | 40 | .0980 | .1003 | 70 | #35 |
| M3.5 | 0.60 | 2.9 | .1142 | .1168 | 68 | 33 | .1130 | .1156 | 72 | #30 |
| M4 | 0.70 | 3.3 | .1299 | .1328 | 69 | 30 | .1285 | .1314 | 73 | 3.7 |
| M4.5 | 0.75 | 3.7 | .1457 | .1486 | 74 | 26 | .1470 | .1502 | 70 | 4.16 |
| M5 | 0.80 | 4.2 | .1654 | .1686 | 69 | 19 | .1660 | .1692 | 68 | #14 |
| M6 | 1.00 | 5.0 | .1968 | .2006 | 70 | 9 | .1960 | .1998 | 71 | 5.5 |
| M7 | 1.00 | 6.0 | .2362 | .2400 | 70 | 15/64 | .2344 | .2382 | 73 | 6.5 |
| M8 | 1.25 | 6.7 | .2638 | .2679 | 74 | 17/64 | .2656 | .2697 | 71 | 7.4 |
| | 1.00 | 7.0 | .2756 | .2797 | 69 | J | .2770 | .2811 | 66 | 7.55 |
| M10 | 1.50 | 8.5 | .3346 | .3390 | 71 | Q | .3320 | .3364 | 75 | 9.3 |
| | 1.25 | 8.7 | .3425 | .3471 | 73 | 11/32 | .3438 | .3483 | 71 | 9.4 |
| M12 | 1.75 | 10.2 | .4016 | .4063 | 74 | Y | .4040 | .4087 | 71 | 7/16 |
| | 1.25 | 10.8 | .4252 | .4299 | 67 | 27/64 | .4219 | .4266 | 72 | 11.3 |
| M14 | 2.00 | 12.0 | .4724 | .4772 | 72 | 15/32 | .4688 | .4736 | 76 | — |
| | 1.50 | 12.5 | .4921 | .4969 | 71 | — | — | — | — | |
| M16 | 2.00 | 14.0 | .5512 | .5561 | 72 | 35/64 | .5469 | .5518 | 76 | — |
| | 1.50 | 14.5 | .5709 | .5758 | 71 | — | — | — | — | |
| M18 | 2.50 | 15.5 | .6102 | .6152 | 73 | 39/64 | .6094 | .6144 | 74 | — |
| | 1.50 | 16.5 | .6496 | .6546 | 70 | — | — | — | — | |
| M20 | 2.50 | 17.5 | .6890 | .6942 | 73 | 11/16 | .6875 | .6925 | 74 | — |
| | 1.50 | 18.5 | .7283 | .7335 | 70 | — | — | — | — | |
| M22 | 2.50 | 19.5 | .7677 | .7729 | 73 | 49/64 | .7656 | .7708 | 75 | — |
| | 1.50 | 20.5 | .8071 | .8123 | 70 | — | — | — | — | |
| M24 | 3.00 | 21.0 | .8268 | .8327 | 73 | 53/64 | .8281 | .8340 | 72 | — |
| | 2.00 | 22.0 | .8661 | .8720 | 71 | — | — | — | — | |
| M27 | 3.00 | 24.0 | .9449 | .9511 | 73 | 15/16 | .9375 | .9435 | 78 | — |
| | 2.00 | 25.0 | .9843 | .9913 | 70 | 63/64 | .9844 | .9914 | 70 | |
| M30 | 3.00 | 26.5 | 1.0433 | | | | | | | |
| | 2.00 | 28.0 | 1.1024 | | | | | | | |
| M33 | 3.50 | 29.5 | 1.1614 | | | | | | | |
| | 2.00 | 31.0 | 1.2205 | | | | | | | |
| M36 | 4.00 | 32.0 | 1.2598 | | | | | | | |
| | 3.00 | 33.0 | 1.2992 | | | | | | | |
| M39 | 4.00 | 35.0 | 1.3780 | | | | | | | |
| | 3.00 | 36.0 | 1.4173 | | | | | | | |

**Reaming Recommended to the Drill Size Shown**

# TECHNICAL DATA

## CONVERSION TABLE

### SURFACE FEET PER MINUTE TO REVOLUTIONS PER MINUTE

| Surface Feet Per Minute | 20 | 25 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tap Size | Revolutions Per Minute | | | | | | | | | | | | | | |
| 0 | 1273 | 1592 | 1910 | 2546 | 3183 | 3820 | 4456 | 5093 | 5730 | 6366 | 7003 | 7639 | 8276 | 8913 | 9549 |
| 1 | 1047 | 1308 | 1570 | 2093 | 2617 | 3140 | 3663 | 4186 | 4710 | 5233 | 5756 | 6279 | 6808 | 7326 | 7849 |
| 2 | 888 | 1110 | 1333 | 1777 | 2221 | 2665 | 3109 | 3554 | 3999 | 4222 | 4886 | 5330 | 5774 | 6218 | 6662 |
| 3 | 772 | 964 | 1157 | 1543 | 1929 | 2315 | 2701 | 3086 | 3472 | 3858 | 4244 | 4629 | 5015 | 5401 | 5787 |
| 4 | 682 | 853 | 1023 | 1364 | 1705 | 2046 | 2387 | 2728 | 3069 | 3411 | 3751 | 4092 | 4434 | 4775 | 5116 |
| 5 | 611 | 764 | 917 | 1222 | 1528 | 1833 | 2139 | 2445 | 2750 | 3056 | 3361 | 3367 | 3973 | 4278 | 4584 |
| 6 | 553 | 691 | 829 | 1106 | 1382 | 1658 | 1934 | 2211 | 2487 | 2764 | 3040 | 3316 | 3592 | 3869 | 4145 |
| 8 | 466 | 583 | 699 | 932 | 1165 | 1398 | 1631 | 1864 | 2097 | 2330 | 2563 | 2796 | 3029 | 3262 | 3495 |
| 10 | 402 | 502 | 603 | 804 | 1005 | 1205 | 1406 | 1607 | 1808 | 2009 | 2210 | 2411 | 2612 | 2813 | 3014 |
| 12 | 354 | 442 | 531 | 707 | 884 | 1061 | 1238 | 1415 | 1592 | 1769 | 1945 | 2122 | 2300 | 2476 | 2653 |
| 1/4 | 306 | 382 | 458 | 611 | 764 | 917 | 1070 | 1222 | 1375 | 1528 | 1681 | 1833 | 1986 | 2139 | 2292 |
| 5/16 | 245 | 306 | 367 | 486 | 611 | 733 | 856 | 978 | 1100 | 1222 | 1345 | 1467 | 1589 | 1711 | 1833 |
| 3/8 | 204 | 255 | 306 | 407 | 509 | 611 | 713 | 815 | 917 | 1019 | 1120 | 1222 | 1324 | 1426 | 1528 |
| 7/16 | 175 | 219 | 262 | 349 | 437 | 524 | 611 | 698 | 786 | 873 | 960 | 1048 | 1135 | 1222 | 1310 |
| 1/2 | 153 | 191 | 229 | 306 | 382 | 458 | 535 | 611 | 688 | 764 | 840 | 917 | 993 | 1070 | 1146 |
| 9/16 | 137 | 172 | 206 | 275 | 344 | 412 | 481 | 550 | 619 | 687 | 756 | 825 | 893 | 963 | 1031 |
| 5/8 | 122 | 153 | 183 | 244 | 306 | 367 | 428 | 489 | 550 | 611 | 672 | 733 | 794 | 856 | 917 |
| 3/4 | 102 | 128 | 153 | 203 | 255 | 306 | 357 | 407 | 458 | 509 | 560 | 611 | 662 | 713 | 764 |
| 7/8 | 87 | 109 | 131 | 175 | 218 | 252 | 306 | 350 | 392 | 437 | 480 | 524 | 568 | 611 | 655 |
| 1 | 76 | 96 | 115 | 153 | 191 | 230 | 268 | 306 | 344 | 382 | 420 | 458 | 497 | 535 | 573 |

## TROUBLE SHOOTING GUIDE

| Specific Problem | Cause | Solution |
|---|---|---|
| | **Dimensional Accuracy** | |
| **Oversize Pitch Diameter** | Incorrect Tap | 1. Use proper limits of taps<br>2. Use longer chamfered taps |
| | Chip Packing | 1. Use spiral point or spiral fluted taps<br>2. Reduce number of flutes to provied extra chip room<br>3. Use larger hole size<br>4. If tapping a hole, allow deeper hole where applicable or shorten the thread length of the parts<br>5. Use proper lubricant |
| | Galling | 1. Apply proper surface treatment such as Hardslick or chrome<br>2. Use proper cutting lubricant<br>3. Reduce tapping speed<br>4. Use proper cutting angle in accordance with material being tapped<br>5. Use large hole size |
| | Operating Conditions | 1. Apply proper tapping speed<br>2. Correct alignment of tap and drill hole<br>3. Free cutting either tap or workpiece<br>4. Use proper tapping speed to avoid torn or rough threads<br>5. Use lead screw tapper<br>6. Use proper tapping machine with suitable power<br>7. Avoid misalignment of the tap and drill hole from loose spindle or worn holder |
| | Tool Condition | 1. Obtain proper indexing angle for the flutes at the cutting edge<br>2. Grind proper cutting angle and chamfer angle<br>3. Avoid too narrow a land width<br>4. Remove burrs from regrinding |
| **Oversize Internal Diameter** | Hole Size | 1. Use minimum hole size<br>2. Avoid tapered hole<br>3. Use proper chamfered taps |
| | Galling | 1. Galling solutions 1 through 4 above can be applied to this specific problem |
| **Undersize Pitch Diameter** | Incorrect Tap | 1. Use oversize taps<br>2. Apply proper chamfer angle<br>3. Increase cutting angle |
| | Damaged Thread | 1. Use proper reversing speed to avoid damaging tapped thread on the way out of the hole |
| | Left-over Chips | 1. Increase cutting performance to avoid any left over chips in the hole<br>2. Remove left over chips from the hole for gage checking |
| **Undersize Internal Diameter** | Hole Size | 1. Use maximum drill size |

| Specific Problem | Cause | Solution |
|---|---|---|
| | **Tool Life** | |
| **Breakage** | Incorrect Tap Selection | 1. Avoid chip packing in the flutes or the bottom of the hole. Use spiral pointed or spiral fluted taps or fluteless taps.<br>2. Apply correct surface treatment such as Hardslick or bright |
| | Excessive Tapping Torque | 1. Use larger drill size<br>2. Try to shorten thread length<br>3. Increase cutting angle<br>4. Apply a tap with more thread relief and reduced land width<br>5. Apply correct surface treatment such as Hardslick |
| | Operating Conditions | 1. Reduce tapping speed<br>2. Avoid misalignment between tap and the hole and tapered hole<br>3. Use floating type of tapping holder<br>4. Use tapping holder with torque adjustment<br>5. Avoid hitting bottom of the hole with tap |
| | Tool Condition | 1. Do not grind the bottom of the flute<br>2. Avoid too narrow a land width<br>3. Remove all worn sections when regrindig the flutes<br>4. Regrind tool more frequently |
| **Chipping** | Incorrect Tap Selection | 1. Reduce cutting angle<br>2. Use a different kind of high-speed steel tap<br>3. Reduce hardness of the tap<br>4. Increase chamfer length<br>5. Avoid chip packing in the flutes or in the bottom of the hole by using spiral fluted or spiral pointed taps |
| | Operating Conditions | 1. Reduce tapping speed<br>2. Avoid misalignment between tap and hole<br>3. Avoid sudden return of reverse in blind hole tapping<br>4. Avoid galling<br>5. Use larger hole size |
| **Wear** | Incorrect Tap Selection | 1. Apply specially designed tap for tapping heat treated materal<br>2. Change to a type of high-speed steel tap that contains vanadium<br>3. Apply special surface treatment such as TiCN or Hardslick<br>4. Increase chamfer length |
| | Operating Conditions | 1. Reduce tapping speed<br>2. Apply proper cutting lubricants<br>3. Avoid work hardened hole<br>4. Use larger hole size |
| | Tool Condition | 1. Grind proper cutting angle<br>2. Avoid hardness reduction from grinding process |

| Specific Problem | Cause | Solution |
|---|---|---|
| | **Surface Finish** | |
| **Torn or Rough Thread** | Chamfer Too Short | 1. Increase chamfer length |
| | Wrong Cutting Angle | 1. Apply proper cutting angle |
| | Galling | 1. Use thread relieved taps<br>2. Reduce land width<br>3. Apply surface treatment such as Hardslick or chrome<br>4. Use proper cutting lubricant<br>5. Reduce tapping speed<br>6. Use larger hole size<br>7. Obtain proper alignment between tap and work |
| | Chip Packing | 1. Use spiral pointed or spiral fluted taps<br>2. Use larger drill size |
| **Chattering on Tapped Thread** | Tool Free Cutting | 1. Reduce cutting angle<br>2. Reduce amount of thread relief |
| | Tool Condition | 1. Do not grind the bottom of the flute<br>2. Avoid too narrow a land width |

# TECHNICAL DATA

## 13 TOLERANCE CHART - METRIC COARSE / FINE

| Metric Coarse Thread | Pitch | Tap Tolerance | | Metric Fine Thread | Tap Tolerance | |
|---|---|---|---|---|---|---|
| | | 4H Tap | 6H Tap | | 4H Tap | 6H Tap |
| M1.6 | 0.35 | D2 | D2/D3 | M3x0.35 | D2 | D3 |
| M1.8 | 0.35 | D2 | D2/D3 | M4x0.50 | D2 | D3 |
| M2.0 | 0.40 | D2 | D3 | M6x0.50 | D2/D3 | D3/D4 |
| M2.2 | 0.45 | D2 | D3 | M6x0.75 | D2/D3 | D4 |
| M2.5 | 0.45 | D2 | D3 | M8x0.75 | D2/D3 | D4 |
| M3.0 | 0.50 | D2 | D3 | M8x1.00 | D3 | D4/D5 |
| M3.5 | 0.60 | D2 | D3/D4 | M12x1.00 | D3 | D4/D5 |
| M4.0 | 0.70 | D2/D3 | D3/D4 | M10x1.25 | D3 | D4/D5 |
| M4.5 | 0.75 | D2/D3 | D3/D4 | M14x1.25 | D3 | D4/D5 |
| M5.0 | 0.80 | D2/D3 | D3/D4 | M12x1.50 | D3/D4 | D5/D6 |
| M6.0 | 1.00 | D2/D3 | D4/D5 | M20x1.50 | D3/D4 | D5/D6 |
| M7.0 | 1.00 | D2/D3 | D4/D5 | M24x1.50 | D3/D4 | D5/D6 |
| M8.0 | 1.25 | D3 | D4/D5 | M42x1.50 | D3/D4 | D5/D6 |
| M10.0 | 1.50 | D3 | D4/D5 | M18x2.00 | D3/D4 | D6/D7 |
| M12.0 | 1.75 | D3/D4 | D5/D6 | M24x2.00 | D4 | D6/D7 |
| M14.0 | 2.00 | D3/D4 | D5/D6 | M42x2.00 | D4 | D6/D7 |
| M16.0 | 2.00 | D3/D4 | D5/D6 | M36x3.00 | D4/D5 | D7/D8 |
| M18.0 | 2.50 | D4 | D6/D7 | M42x3.00 | D4/D5 | D7/D8 |
| M20.0 | 2.50 | D4 | D6/D7 | M52x3.00 | D4/D5 | D7/D8 |
| M22.0 | 2.50 | D4 | D6/D7 | | | |
| M24.0 | 3.00 | D4/D5 | D7/D8 | | | |
| M27.0 | 3.00 | D4/D5 | D7/D8 | | | |
| M30.0 | 3.50 | D4/D5 | D7/D8 | | | |
| M33.0 | 3.50 | D4/D5 | D8/D9 | | | |
| M36.0 | 4.00 | D5 | D8/D9 | | | |
| M39.0 | 4.00 | D5 | D8/D9 | | | |
| M42.0 | 4.50 | D5 | D8/D9 | | | |
| M45.0 | 4.50 | D5 | D8/D9 | | | |
| M48.0 | 5.00 | D5/D6 | D9/D10 | | | |
| M52.0 | 5.00 | D5/D6 | D9/D10 | | | |

# MILLING TOOLS


CBN END MILLS

i-Xmills, CARBIDE INSERT END MILLS

X5070 NANO SOLID CARBIDE END MILLS

X-SPEED ROUGHER SOLID CARBIDE END MILLS

X-POWER SOLID CARBIDE END MILLS

JET-POWER SOLID CARBIDE & HSS-PM END MILLS

V7 Mill STEEL SOLID CARBIDE END MILLS

V7 Mill INOX SOLID CARBIDE END MILLS

ALU-POWER SOLID CARBIDE & HSS-PM END MILLS

D-POWER  DIAMOND COATED SOLID CARBIDE END MILLS

STANDARD SOLID CARBIDE END MILLS

TANK-POWER HSS-PM END MILLS

COBALT & HSS END MILLS

TECHNICAL DATA



YG-1 CO., LTD.

# Contents

## MILLING TOOLS


CBN END MILLS

CARBIDE INSERT END MILLS

SOLID CARBIDE END MILLS

HSS END MILLS

TECHNICAL DATA


YG-1 CO., LTD.

# Contents / MILLING TOOLS


CBN END MILLS
Machining High Hardened Steels up to HRc70, Mirror Finish — CBN END MILL

i-Xmills, CARBIDE INSERT END MILLS
Available for General Steels and for Hardened Steels up to HRc65 — i-Xmill END MILL

X5070 NANO SOLID CARBIDE END MILLS
High Hardened Steels HRc45 to HRc70, High Speed Machining, Dry Cutting — X5070 END MILLS

X-SPEED ROUGHER SOLID CARBIDE END MILLS
Carbide Roughing End Mills for High-Feed Machining with reduced vibrations — X-SPEED ROUGHER END MILLS

X-POWER SOLID CARBIDE END MILLS
Medium Steels to High Hardened Steels up to HRc70 — X-POWER END MILLS

JET-POWER SOLID CARBIDE & HSS-PM END MILLS
Exotic materials like Stainless Steels, Nickel alloys and Titanium — JET-POWER END MILLS

V7 Mill STEEL SOLID CARBIDE END MILLS
Steels in Heavy and Silent Cutting Materials up to HRc40. Designed as Unequal Leads. — V7 Mill STEEL END MILLS

V7 Mill INOX SOLID CARBIDE END MILLS
Stainless Steels in Heavy and Silent Cutting Materials up to HRc40.
Designed as Variable Leads, YG-1's Patent. — V7 Mill INOX END MILLS

ALU-POWER SOLID CARBIDE & HSS-PM END MILLS
Aluminium Alloys and Silent Cutting, Mirror Surface — ALU-POWER END MILLS

D-POWER DIAMOND COATED SOLID CARBIDE END MILLS
Diamond Coated Carbide End Mills for Graphite — D-POWER END MILLS

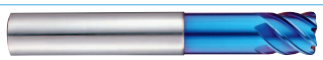
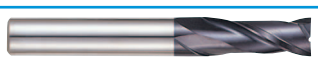
STANDARD SOLID CARBIDE END MILLS
General Purpose, Non-coated, Any Coating Available — STANDARD CARBIDE END MILLS

TANK-POWER HSS-PM END MILLS
Next Generation of Powered Metal End Mills. Higher Edge Strength & Feed Rates — TANK-POWER END MILLS

COBALT & HSS END MILLS
General Purpose, Non-coated, Any Coating Available — STANDARD COBALT & HSS END MILLS

TECHNICAL DATA — TECHNICAL DATA

# MILLING TOOLS **APPLICATION TABLE**

| | ITEM | MODEL | FLUTES | HELIX | INCH / METRIC | TYPE | SIZE RANGE MIN | SIZE RANGE MAX | PAGE |
|---|---|---|---|---|---|---|---|---|---|
| CBN | ESB94 | | 2Flute | 30° | Metric | Ball | R0.2 | R1.5 | **378** |
| | ESD02 | | 2Flute | 0° | Metric | Radius | D0.5 | D2.0 | **379** |
| X5070 | G826 | | 4Flute | 0° | Inch | Radius | D1/8 | D1/2 | **400** |
| | G8A43 | | 2Flute | 30° | Inch | Ball | R1/64 | R1/4 | **401** |
| | G850 | | 4Flute | 30° | Inch | Radius | D1/16 | D3/4 | **402** |
| | G851 | | 6&8Flute | 45° | Inch | Radius | D1/4 | D1 | **403** |
| | G859 | | 4Flute | 0° | Metric | Radius | D2.0 | D16.0 | **404** |
| | G854 | | 4Flute | 0° | Metric | Radius | D2.0 | D16.0 | **405** |
| | G8A46 | | 2Flute | 30° | Metric | Ball for Rib | R0.05 | R2.0 | **406** |
| | G8A54 | | 2Flute | 30° | Metric | Ball for Rib | R0.25 | R1.0 | **410** |
| | G8A28 | | 2Flute | 30° | Metric | Ball | R0.05 | R6.0 | **411** |
| | G8A38 | | 2Flute | 30° | Metric | Stub Ball with Extended Neck | R0.5 | R12.5 | **412** |
| | G8A53 | | 2Flute | 30° | Metric | Miniature Ball | R0.2 | R1.0 | **413** |
| | G8A59 | | 3Flute | 30° | Metric | Ball | R1.5 | R10.0 | **414** |
| | G8A36 | | 2Flute | 30° | Metric | Stub Radius with Extended Neck | D0.3 | D20.0 | **415** |
| | G8A50 | | 2Flute | 30° | Metric | Miniature Radius | D0.3 | D2.0 | **417** |
| | G8A47 | | 4Flute | 30° | Metric | Radius | D3.0 | D12.0 | **418** |
| | G8A37 | | 4Flute | 30° | Metric | Stub Radius with Extended Neck | D1.0 | D20.0 | **419** |
| | G8A39 |  | 6Flute | 45° | Metric | Radius | D6.0 | D20.0 | **420** |
| X-SPEED ROUGHER | G907 G928 | | 4&5Flute | Multiple | Inch | Stub Roughing Radius | D1/4 | D1 | **434** |
| | G908 G929 | | 4&5Flute | Multiple | Inch | Regular Roughing Radius | D1/4 | D1 | **435** |
| | G909 G930 | | 4&5Flute | Multiple | Inch | Extended Reach Roughing Radius | D1/4 | D3/4 | **436** |
| | G9D75 | | 4&5Flute | Multiple | Metric | Short Radius | D6.0 | D20.0 | **437** |
| | G9D76 | | 4&5Flute | Multiple | Metric | Long Radius | D6.0 | D20.0 | **438** |
| | G9D77 | | 4&5Flute | Multiple | Metric | Long Reach Radius | D6.0 | D20.0 | **439** |
| X-POWER | EM154 |  | 2Flute | 30° | Inch | Regular | D1/16 | D1 | **450** |
| | EM206 | | 2Flute | 30° | Inch | Long | D1/8 | D1 | **450** |
| | EM959 | | 2Flute | 30° | Inch | Miniature | D.016 | D.062 | **451** |
| | EM153 | | 4Flute | 30° | Inch | Regular | D1/16 | D1 | **452** |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | ◎ | ◎ | | | | | | | |
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# MILLING TOOLS **APPLICATION TABLE**

| | ITEM | MODEL | FLUTES | HELIX | INCH / METRIC | TYPE | SIZE RANGE MIN | SIZE RANGE MAX | PAGE |
|---|---|---|---|---|---|---|---|---|---|
| X-POWER | EM207 | | 4Flute | 30° | Inch | Long | D1/8 | D1 | **452** |
| | EM636 | | 2Flute | 30° | Inch | Short Radius | D1/16 | D1/2 | **453** |
| | EM639 | | 4Flute | 30° | Inch | Short Radius | D1/16 | D1/2 | **453** |
| | EM637 | | 2Flute | 30° | Inch | Regular Radius | D1/16 | D1/2 | **454** |
| | EM649 | | 4Flute | 30° | Inch | Regular Radius | D1/16 | D1/2 | **454** |
| | EM211 | | 2Flute | 30° | Inch | Long Radius | D1/4 | D1/2 | **455** |
| | EM212 | | 4Flute | 30° | Inch | Long Radius | D1/4 | D1/2 | **455** |
| | EM102 | | 4Flute | 45° | Inch | Long | D3/8 | D7/8 | **456** |
| | EM103 | | 4Flute | 45° | Inch | Long Reach Radius | D3/8 | D7/8 | **457** |
| | EM965 | | 4Flute | 55° | Inch | Stub Radius | D1/4 | D1/2 | **458** |
| | EM208 | | 6&8Flute | 45° | Inch | Long | D1/4 | D1 | **459** |
| | EM218 | | 6&8Flute | 45° | Inch | Extra Long | D1/4 | D1 | **459** |
| | EM668 | | 6&8Flute | 45° | Inch | Long Radius | D1/4 | D3/4 | **460** |
| | EM209 | | 2Flute | 30° | Inch | Long Ball | R1/64 | R1/2 | **461** |
| | EM210 | | 4Flute | 30° | Inch | Long Ball | R1/16 | R1/2 | **461** |
| | EM961 | | 2Flute | 30° | Inch | Medium Ball | R1/16 | R1/2 | **462** |
| | EM962 | | 2Flute | 30° | Inch | Long Reach Ball | R3/64 | R3/8 | **463** |
| | EM960 | | 2Flute | 30° | Inch | Miniature Ball | R.012 | R.031 | **464** |
| | EM109 | | 2Flute | 15° | Inch | Stub Ball | R1/64 | R1/4 | **465** |
| | EM963 | | 2Flute | 30° | Inch | Ball with Taper Neck | R1/32 | R1/4 | **466** |
| | EM979 | | 2Flute | 30° | Inch | Ball with Pencil Neck | R3/32 | R1/4 | **467** |
| | EM084 | | 2Flute | 30° | Inch | Long Ball | R1/16 | R5/16 | **469** |
| | EM093 | | 4Flute | 30° | Inch | Long Ball | R1/16 | R5/16 | **470** |
| | EM096 | | 2Flute | 30° | Inch | Long Ball | R1/16 | R5/16 | **471** |
| | EM097 | | 4Flute | 30° | Inch | Long Ball | R1/16 | R5/16 | **472** |
| | EM666 | | 3~5Flute | 20° | Inch | Stub Roughing | D1/4 | D1 | **473** |
| | EM156 | | 3~5Flute | 20° | Inch | Long Roughing | D1/4 | D1 | **473** |
| | EM662 | | 3~5Flute | 20° | Inch | Long Roughing Ball | R1/8 | R1/2 | **474** |
| | EM966 | | 2Flute | 30° | Inch | Rib | D1/32 | D1/8 | **475** |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | | | |
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| ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | ○ | | |
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# MILLING TOOLS **APPLICATION TABLE**

| | ITEM | MODEL | FLUTES | HELIX | INCH / METRIC | TYPE | SIZE RANGE MIN | SIZE RANGE MAX | PAGE |
|---|---|---|---|---|---|---|---|---|---|
| X-POWER | EM967 | | 2Flute | 30° | Inch | Ball for Rib | R1/64 | R1/16 | **476** |
| | EM810 | | 2Flute | 30° | Metric | Short | D1.0 | D25.0 | **477** |
| | EM816 | | 2Flute | 30° | Metric | Long | D2.0 | D25.0 | **478** |
| | EM811 | | 4Flute | 30° | Metric | Short | D2.0 | D25.0 | **479** |
| | EM817 | | 4Flute | 30° | Metric | Long | D2.0 | D25.0 | **480** |
| | EM895 | | 3Flute | 38° | Metric | Short | D1.0 | D20.0 | **481** |
| | EM810 | | 2Flute | 30° | Metric | Miniature | D0.4 | D1.5 | **482** |
| | EM818 | | 2Flute | 30° | Metric | Long Radius | D3.0 | D20.0 | **483** |
| | EM819 | | 4Flute | 30° | Metric | Long Radius | D3.0 | D20.0 | **483** |
| | EM905 | | 4Flute | 45° | Metric | Short Radius | D10.0 | D22.0 | **484** |
| | EM839 | | 4Flute | 30° | Metric | Stub Radius | D2.0 | D16.0 | **485** |
| | EM812 | | 6&8Flute | 45° | Metric | Long | D6.0 | D25.0 | **486** |
| | EM834 | | 6&8Flute | 45° | Metric | Extra Long | D6.0 | D25.0 | **486** |
| | EM835 | | 6Flute | 45° | Metric | Long Radius | D6.0 | D20.0 | **487** |
| | EM897 | | 6Flute | 45° | Metric | Stub Radius | D6.0 | D12.0 | **488** |
| | EM876 | | 2Flute | 30° | Metric | Long Ball | R0.5 | R12.5 | **489** |
| | EM813<br>EM823 | | 2Flute | 30° | Metric | Long Ball | R0.5 | R12.5 | **490** |
| | EM815<br>EM825 | | 4Flute | 30° | Metric | Long Ball | R0.5 | R12.5 | **490** |
| | EM899 | | 2Flute | 30° | Metric | Medium Ball | R1.5 | R12.5 | **491** |
| | EM838 | | 2Flute | 30° | Metric | Long Reach Ball | R1.0 | R10.0 | **492** |
| | EM865 | | 2Flute | 30° | Metric | Miniature Ball | R0.3 | R0.75 | **493** |
| | EM868 | | 2Flute | 15° | Metric | Stub Ball | R0.5 | R12.5 | **494** |
| | EM902 | | 2Flute | 30° | Metric | Ball with Taper Neck | R0.5 | R6.0 | **495** |
| | EM669 | | 2Flute | 30° | Metric | Long Ball | R1.5 | R8.0 | **496** |
| | EM673 | | 4Flute | 30° | Metric | Long Ball | R2.5 | R8.0 | **497** |
| | EM863 | | 2Flute | 30° | Metric | Long Ball | R1.5 | R8.0 | **498** |
| | EM864 | | 4Flute | 30° | Metric | Long Ball | R2.5 | R8.0 | **499** |
| | EM832 | | 3~5Flute | 20° | Metric | Short Roughing | D6.0 | D25.0 | **500** |
| | EM814 | | 3~5Flute | 20° | Metric | Long Roughing | D6.0 | D25.0 | **501** |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | | | |
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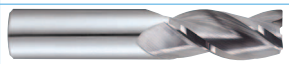
# MILLING TOOLS **APPLICATION TABLE**

| | ITEM | MODEL | FLUTES | HELIX | INCH / METRIC | TYPE | SIZE RANGE MIN | SIZE RANGE MAX | PAGE |
|---|---|---|---|---|---|---|---|---|---|
| X-POWER | EM833 | | 3&4Flute | 20° | Metric | Long Roughing Ball | R3.0 | R10.0 | **502** |
| | EM837 | | 2Flute | 30° | Metric | Taper | D2.0 | D8.0 | **503** |
| | EM883 | | 2Flute | 30° | Metric | Rib | D0.8 | D3.0 | **504** |
| | EM886 | | 2Flute | 30° | Metric | Ball for Rib | R0.3 | R2.0 | **505** |
| JET-POWER | EH108 | | 3&4Flute | 50° | Inch | Regular | D1/8 | D1 | **532** |
| | EE882 | | 6Flute | 35° | Inch | Regular | D3/4 | D1-1/2 | **533** |
| | E5075<br>E5105 | | 3Flute | 35° | Inch | Stub Radius | D1/8 | D1 | **534** |
| | E5074<br>E5104 |  | 3Flute | 35° | Inch | Regular Radius | D1/8 | D1 | **535** |
| | EH094 | | 3~5Flute | 30° | Inch | Stub Roughing | D1/4 | D1 | **536** |
| | EH095 | | 3~5Flute | 30° | Inch | Long Roughing | D1/4 | D1 | **537** |
| | EH969 | | 3~6Flute | 45° | Inch | Long Roughing | D3/16 | D1 | **538** |
| | EH970 | | 4~6Flute | 45° | Inch | Long Reach Roughing | D1/4 | D3/4 | **539** |
| | EH830 | | 3&4Flute | 50° | Metric | Long Square | D6.0 | D25.0 | **540** |
| | EE515 | | 4&6Flute | 30° | Metric | Short Square | D3.0 | D25.0 | **541** |
| | EH852 | | 3&5Flute | 30° | Metric | Short Roughing | D6.0 | D25.0 | **542** |
| | EH831 | | 3&5Flute | 30° | Metric | Long Roughing | D6.0 | D25.0 | **543** |
| | EH917 | | 4&6Flute | 45° | Metric | Short Roughing | D6.0 | D20.0 | **544** |
| | EH919 | | 3&6Flute | 45° | Metric | Long Roughing | D4.0 | D25.0 | **545** |
| | EH921 | | 4&6Flute | 45° | Metric | Long Reach Roughing | D6.0 | D20.0 | **546** |
| V7 Mill STEEL | EMD56<br>EMD57 | | 4Flute | Multiple | Inch | Stub Square | D1/8 | D1 | **554** |
| | EMD58<br>EMD59 | | 4Flute | Multiple | Inch | Stub Radius | D1/8 | D1 | **555** |
| | EMD46<br>EMD47 | | 4Flute | Multiple | Inch | Regular Square | D1/8 | D1 | **556** |
| | EMD48<br>EMD49 | | 4Flute | Multiple | Inch | Regular Radius | D1/8 | D1 | **557** |
| | EMD42<br>EMD43 | | 4Flute | Multiple | Metric | Short Square | D3.0 | D20.0 | **558** |
| | EMD44<br>EMD45 | | 4Flute | Multiple | Metric | Short Radius | D3.0 | D20.0 | **559** |
| | EMD38<br>EMD39 | | 4Flute | Multiple | Metric | Regular Square | D3.0 | D25.0 | **560** |
| | EMD40<br>EMD41 | | 4Flute | Multiple | Metric | Regular Radius | D3.0 | D25.0 | **561** |
| V7 Mill INOX | EMC75<br>EMD60 | | 4Flute | Sinusoidal | Inch | Stub Square | D1/8 | D1 | **566** |
| | EMC76<br>EMD61 | | 4Flute | Sinusoidal | Inch | Stub Radius | D1/8 | D1 | **567** |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | ○ | | |
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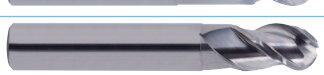
# MILLING TOOLS **APPLICATION TABLE**

| | ITEM | MODEL | FLUTES | HELIX | INCH / METRIC | TYPE | SIZE RANGE MIN | SIZE RANGE MAX | PAGE |
|---|---|---|---|---|---|---|---|---|---|
| V7 Mill INOX | EMB12 EMB37 | | 4Flute | Sinusoidal | Inch | Regular Square | D1/8 | D1 | **568** |
| | EMB13 EMB38 | | 4Flute | Sinusoidal | Inch | Regular Radius | D1/8 | D1 | **569** |
| | EMB20 | | 4Flute | Sinusoidal | Inch | Extended Long Reach | D1/4 | D1 | **570** |
| | EMB78 EMB79 | | 4Flute | Sinusoidal | Inch | Regular Ball | D1/8 | D1 | **571** |
| | EMB76 EMB77 | | 5Flute | Sinusoidal | Inch | Regular Square | D1/4 | D1 | **572** |
| | EMB41 EMB42 | | 4Flute | Sinusoidal | Metric | Short Square | D3.0 | D20.0 | **573** |
| | EMB43 EMB44 | | 4Flute | Sinusoidal | Metric | Short Radius | D3.0 | D20.0 | **574** |
| | EMB14 EMB39 | | 4Flute | Sinusoidal | Metric | Regular Square | D3.0 | D25.0 | **575** |
| | EMB15 EMB40 | | 4Flute | Sinusoidal | Metric | Regular Radius | D3.0 | D25.0 | **576** |
| | EMB74 EMB75 | | 4Flute | Sinusoidal | Metric | Regular Ball | D3.0 | D25.0 | **577** |
| | EMB72 EMB73 | | 5Flute | Sinusoidal | Metric | Regular Square | D6.0 | D25.0 | **578** |
| ALU-POWER | E5253 | | 2Flute | 42° | Inch | Regular | D1/4 | D1 | **586** |
| | E5254 | | 2Flute | 42° | Inch | Regular | D1/16 | D1 | **587** |
| | E5976 | | 2Flute | 37° | Inch | with Extended Neck | D1/4 | D1 | **588** |
| | E5980 | | 3Flute | 45° | Inch | Stub Square | D1/8 | D1 | **589** |
| | E5981 | | 3Flute | 45° | Inch | Regular Square | D1/8 | D1 | **590** |
| | E5983 | | 3Flute | 45° | Inch | Regular Radius | D1/2 | D1 | **591** |
| | E5982 | | 3Flute | 45° | Inch | Long Square | D1/4 | D1 | **592** |
| | E5984 | | 3Flute | 45° | Inch | Long Radius | D1/2 | D1 | **593** |
| | E5977 | | 3Flute | 37° | Inch | with Extended Neck | D1/4 | D1 | **594** |
| | E5985 | | 3Flute | 37° | Inch | Radius with Extended Neck | D1/2 | D1 | **595** |
| | E5973 | | 2Flute | 30° | Inch | Radius with Neck | D5/32 | D3/4 | **596** |
| | E5974 | | 2Flute | 50° | Inch | Stub Ball with Neck | D1/4 | D3/4 | **597** |
| | E5978 | | 2Flute | 37° | Inch | Long Reach Ball | D1/4 | D1 | **598** |
| | E5975 |  | 3Flute | 40° | Inch | Long Ball with Neck | D3/32 | D5/8 | **599** |
| | E5522 EG522 | | 2Flute | 45° | Metric | Long Square | D3.0 | D20.0 | **600** |
| | EG930 | | 2Flute | 25° | Metric | Stub Radius | D2.0 | D20.0 | **601** |
| | EG909 | | 2Flute | 30° | Metric | Stub Radius with Extended Neck | D4.0 | D20.0 | **602** |
| | EG910 | | 2Flute | 50° | Metric | Stub Ball with Extended Neck | D6.0 | D20.0 | **603** |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
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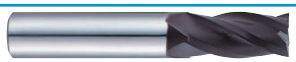
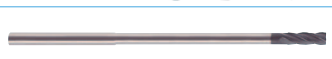
# MILLING TOOLS **APPLICATION TABLE**

| | ITEM | MODEL | FLUTES | HELIX | INCH / METRIC | TYPE | SIZE RANGE MIN | SIZE RANGE MAX | PAGE |
|---|---|---|---|---|---|---|---|---|---|
| ALU-POWER | EG908 | | 3Flute | 40° | Metric | Stub Ball with Extended Neck | D6.0 | D16.0 | **604** |
| | EK191 | | 3Flute | 42° | Inch | Regular Roughing | D1/2 | D2 | **605** |
| | EK191 | | 3Flute | 42° | Inch | Regular Radius Roughing | D3/4 | D1-1/4 | **605** |
| | EK226 | | 3Flute | 42° | Inch | Medium Roughing | D3/4 | D2 | **606** |
| | EK226 | | 3Flute | 42° | Inch | Medium Radius Roughing | D3/4 | D1-1/4 | **606** |
| | EK192 | | 3Flute | 42° | Inch | Long Roughing | D1/2 | D2 | **607** |
| | EK192 | | 3Flute | 42° | Inch | Long Radius Roughing | D3/4 | D1-1/4 | **608** |
| | EK196 | | 3Flute | 42° | Inch | Regular Ball Roughing | R1/4 | R5/8 | **609** |
| | EK193 | | 3Flute | 42° | Inch | Regular, Medium & Long Radius | D1/2 | D1-1/2 | **610** |
| | EP922 | | 3Flute | 42° | Metric | Short Roughing | D12.0 | D32.0 | **612** |
| | EP924 | | 3Flute | 42° | Metric | Long Roughing | D12.0 | D32.0 | **613** |
| D-POWER | EI107 |  | 4Flute | 30° | Inch | Regular Square | D1/64 | D1/2 | **628** |
| | EI099 | | 2Flute | 30° | Inch | Regular Ball | R.0391 | R1/4 | **629** |
| | EI106 | | 4Flute | 30° | Inch | Regular Ball | R.0391 | R1/4 | **629** |
| | EI971 | | 2Flute | 30° | Inch | Long Ball | R.0391 | R1/4 | **630** |
| | EI972 | | 2Flute | 30° | Inch | Long Reach Ball | R.0391 | R5/32 | **631** |
| | EIB07 | | 4Flute | 30° | Inch | Regular Ball with Extended Neck | R.0156 | R.0625 | **632** |
| | EIB05 | | 4Flute | 30° | Inch | Regular Radius | D1/16 | D1/2 | **633** |
| | EIB06 |  | 4Flute | 30° | Inch | Regular Radius with Extended Neck | D1/32 | D1/8 | **634** |
| | EI880 | | 2Flute | 30° | Metric | Short Ball | R1.0 | R6.0 | **635** |
| | EI881 | | 3Flute | 30° | Metric | Short Ball | R1.0 | R6.0 | **635** |
| | EI451 | | 2Flute | 30° | Metric | Long Ball | R1.0 | R6.0 | **636** |
| | EI450 | | 2Flute | 30° | Metric | Long Reach Ball | R1.0 | R4.0 | **637** |
| CARBIDE | E5020 | | 2Flute | 30° | Inch | Regular Square | D1/32 | D1 | **646** |
| | E5021 | | 4Flute | 30° | Inch | Regular Square | D1/16 | D1 | **647** |
| | E5244 | | 2Flute | 30° | Inch | Stub Square | D1/16 | D3/4 | **648** |
| | E5245 | | 4Flute | 30° | Inch | Stub Square | D1/16 | D3/4 | **649** |
| | E5011 | | 2Flute | 30° | Inch | Long Square | D1/8 | D1 | **650** |
| | E5012 | | 4Flute | 30° | Inch | Long Square | D1/8 | D1 | **650** |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
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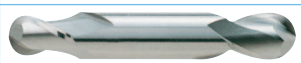
# MILLING TOOLS **APPLICATION TABLE**

| | ITEM | MODEL | FLUTES | HELIX | INCH / METRIC | TYPE | SIZE RANGE MIN | SIZE RANGE MAX | PAGE |
|---|---|---|---|---|---|---|---|---|---|
| CARBIDE | E5026 | | 2Flute | 30° | Inch | Extra Long Square | D1/8 | D1 | **651** |
| | E5065 | | 4Flute | 30° | Inch | Extra Long Square | D1/8 | D1 | **652** |
| | E5022 | | 2Flute | 30° | Inch | Stub Double | D1/32 | D1/2 | **653** |
| | E5023 | | 4Flute | 30° | Inch | Stub Double | D1/16 | D1/2 | **654** |
| | E5025 | | 2Flute | 30° | Inch | Regular Double | D1/8 | D1/2 | **655** |
| | E5024 | | 4Flute | 30° | Inch | Regular Double | D1/8 | D1/2 | **655** |
| | E5249 | | 2Flute | 30° | Inch | Regular Ball | R1/16 | R1/2 | **656** |
| | E5250 | | 4Flute | 30° | Inch | Regular Ball | R1/16 | R1/2 | **656** |
| | E5014 | | 2Flute | 30° | Inch | Long Ball | R1/16 | R1/2 | **657** |
| | E5060 | | 4Flute | 30° | Inch | Long Ball | R1/16 | R1/2 | **657** |
| | E5018 | | 2Flute | 30° | Inch | Extra Long Ball | R1/16 | R1/2 | **658** |
| | E5062 | | 4Flute | 30° | Inch | Extra Long Ball | R1/16 | R1/2 | **659** |
| | E5251<br>E5252 |  | 2&4Flute | 30° | Inch | Stub Ball Double | R7/64 | R1/4 | **660** |
| | E5216 | | 4Flute | 30° | Inch | Regular Radius | D1/8 | D1 | **661** |
| | E5069 | | 5Flute | 45° | Inch | Regular Radius | D1/4 | D1 | **663** |
| | E5243 | | 3Flute | 45° | Inch | Regular | D1/8 | D1 | **664** |
| | E5059 | | 3Flute | 50° | Inch | Stub | D1/4 | D3/4 | **665** |
| | E5246 | | 3Flute | 60° | Inch | Regular | D1/8 | D1 | **666** |
| | E5066 | | 5Flute | 45° | Inch | Stub | D1/8 | D1 | **667** |
| | E5067 | | 5Flute | 45° | Inch | Regular | D1/8 | D1 | **668** |
| | E5068 | | 5Flute | 45° | Inch | Long Square | D1/4 | D1 | **669** |
| | E5073 | | 5Flute | 45° | Inch | Extra Long Square | D5/16 | D1 | **670** |
| | E5058 | | 6Flute | 40° | Inch | Regular Square | D3/16 | D3/4 | **671** |
| | E5056<br>E5057 | | 5Flute | 45° | Inch | Stub & Regular Roughing | D3/8 | D1 | **672** |
| | E5077 | | 3Flute | 30° | Inch | Taper | D3/32 | D1/4 | **673** |
| | E5078 | | 3Flute | 30° | Inch | Taper Ball | R.047 | R.125 | **674** |
| | EH527 | | 2Flute | 30° | Metric | Long | D3.5 | D20.0 | **675** |
| | EH540 | | 4Flute | 30° | Metric | Long | D3.5 | D20.0 | **676** |
| | EH882 | | 3Flute | 35° | Metric | Radius | D3.0 | D20.0 | **677** |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | | | | ○ | | ○ | ○ | ○ | | |
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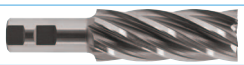
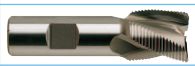
# MILLING TOOLS **APPLICATION TABLE**

| | ITEM | MODEL | FLUTES | HELIX | INCH / METRIC | TYPE | SIZE RANGE MIN | SIZE RANGE MAX | PAGE |
|---|---|---|---|---|---|---|---|---|---|
| TANK-POWER | E9983 | | 2Flute | 30° | Inch | Regular Square | D1/8 | D1 | **688** |
| | E9984 | | 2Flute | 30° | Inch | Regular Double Square | D1/8 | D1 | **689** |
| | E9985 | | 4Flute | 30° | Inch | Regular Square | D1/8 | D1 | **690** |
| | E9986 | | 4Flute | 30° | Inch | Regular Double Square | D1/8 | D1 | **691** |
| | E9988 | | 3&4Flute | 60° | Inch | Regular Square | D1/4 | D1 | **692** |
| | E9992 | | 2Flute | 30° | Inch | Regular Ball | D1/8 | D1 | **693** |
| | E9990 | | 3~6Flute | 30° | Inch | Regular Roughing | D1/4 | D1-1/4 | **694** |
| | E9991 | | 3~6Flute | 30° | Inch | Regular Roughing | D1/4 | D1-1/4 | **695** |
| | E9A86 | | 3~6Flute | 30° | Inch | Long Roughing | D5/16 | D1-1/4 | **696** |
| | E9A87 | | 3~6Flute | 30° | Inch | Long Roughing | D5/16 | D1-1/4 | **697** |
| | E9921 | | 5~6Flute | 35° | Inch | Long Roughing with Neck | D1/2 | D1-1/4 | **698** |
| COBALT & HSS | E2030<br>E1030 | | 2Flute | 30° | Inch | Regular Square | D1/8 | D2 | **711** |
| | E2080<br>E1080 | | 2Flute | 30° | Inch | Long Square | D1/4 | D2 | **713** |
| | E2033<br>E1033 | | 2Flute | 30° | Inch | Extended Square | D1/8 | D1-1/4 | **714** |
| | E2050<br>E1050 | | 2Flute | 30° | Inch | Regular Double Square | D1/8 | D1 | **715** |
| | E2110<br>E1110 | | 2Flute | 30° | Inch | Regular Ball | R1/16 | R1 | **717** |
| | E2111<br>E1111 | | 2Flute | 30° | Inch | Extended Ball | R1/16 | R1/2 | **718** |
| | E2112<br>E1112 | | 2Flute | 30° | Inch | Regular Ball Double | R1/16 | R1/2 | **719** |
| | E2031<br>E1031 | | 4Flute | 30° | Inch | Regular Square | D1/8 | D1 | **720** |
| | E2032<br>E1032 | | 6Flute | 30° | Inch | Regular Square | D5/8 | D2 | **722** |
| | E2034<br>E1034 | | 4Flute | 30° | Inch | Long Square | D1/4 | D1 | **723** |
| | E2035<br>E1035 |  | 6Flute | 30° | Inch | Long Square | D1-1/8 | D2 | **723** |
| | E2036<br>E1036 | | 4Flute | 30° | Inch | Extra Long Square | D1/4 | D1 | **724** |
| | E2037<br>E1037 | | 6Flute | 30° | Inch | Extra Long Square | D1-1/4 | D2 | **724** |
| | E2051<br>E1051 | | 4Flute | 30° | Inch | Regular Double Square | D1/8 | D1 | **725** |
| | E2031<br>E1031 | | 4Flute | 30° | Inch | Regular Square | D3/4 | D1 | **727** |
| | E2032<br>E1032 | | 6&8Flute | 30° | Inch | Regular Square | D1-1/8 | D2 | **727** |
| | E2020 | | 4Flute | 30° | Inch | Regular Ball | R1/16 | R1 | **728** |
| | E2021 | | 4Flute | 30° | Inch | Long Ball | R1/8 | R1/2 | **729** |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | | | | ○ | | ◎ | | ◎ | | |
| ◎ | ◎ | ◎ | | | | ○ | | ◎ | | ◎ | | |
| ◎ | ◎ | ◎ | | | | ○ | | ◎ | | ◎ | | |
| ◎ | ◎ | ◎ | | | | ○ | | ◎ | | ◎ | | |
| ◎ | ◎ | ◎ | | | | ○ | | ◎ | | ◎ | | |
| ◎ | ◎ | ◎ | | | | ○ | | ◎ | | ◎ | | |
| ◎ | ◎ | ◎ | | | | ○ | | ◎ | | ◎ | | |
| ◎ | ◎ | ◎ | | | | ○ | | ◎ | | ◎ | | |
| ◎ | ◎ | ◎ | | | | ○ | | ◎ | | ◎ | | |
| ◎ | ◎ | ◎ | | | | ○ | | ◎ | | ◎ | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

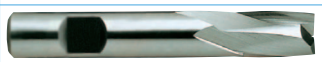
# MILLING TOOLS **APPLICATION TABLE**

| | ITEM | MODEL | FLUTES | HELIX | INCH / METRIC | TYPE | SIZE RANGE MIN | SIZE RANGE MAX | PAGE |
|---|---|---|---|---|---|---|---|---|---|
| COBALT & HSS | E2069 | | 4Flute | 30° | Inch | Regular Ball Double | R1/16 | R1/2 | **730** |
| | E2039<br>E1039 | | 4Flute | 30° | Inch | Regular Square | D1/8 | D1-1/2 | **731** |
| | E2042<br>E1042 | | 6Flute | 30° | Inch | Regular Square | D1/2 | D2 | **733** |
| | E2039<br>E2042 | | 4~8Flute | 30° | Inch | Medium Square | D1 | D2 | **734** |
| | E2040<br>E1040 | | 4Flute | 30° | Inch | Long Square | D1/4 | D1-1/2 | **735** |
| | E2162<br>E1162 | | 6Flute | 30° | Inch | Long Square | D1/2 | D2 | **735** |
| | E2041<br>E1041 | | 4Flute | 30° | Inch | Extra Long Square | D1/4 | D1-1/4 | **736** |
| | E2175<br>E1175 | | 6Flute | 30° | Inch | Extra Long Square | D1/2 | D2 | **736** |
| | E2053<br>E1053 | | 4Flute | 30° | Inch | Regular Double Square | D1/8 | D1 | **737** |
| | E2100<br>E1100 | | 6Flute | 30° | Inch | Regular with Combination | D2 | D2 | **739** |
| | E2001<br>E1001 | | 2Flute | 30° & 39° | Inch | Miniature Stub Double | D1/32 | D3/16 | **740** |
| | E2003<br>E1003 | | 2Flute | 30° & 39° | Inch | Miniature Regular Double | D1/32 | D3/16 | **741** |
| | E2005<br>E1005 | | 2Flute | 30° & 39° | Inch | Miniature Long Double | D1/16 | D3/16 | **742** |
| | E2002<br>E1002 | | 4Flute | 30° & 39° | Inch | Miniature Stub Double | D1/16 | D3/16 | **743** |
| | E2004<br>E1004 | | 4Flute | 30° & 39° | Inch | Miniature Regular Double | D1/16 | D3/16 | **744** |
| | E2006<br>E1006 | | 4Flute | 30° & 39° | Inch | Miniature Long Double | D1/16 | D3/16 | **745** |
| | E2008<br>E1008 | | 2Flute | 30° & 39° | Inch | Miniature Stub Ball Double | R1/32 | R3/32 | **746** |
| | E2013<br>E1013 | | 2Flute | 30° & 39° | Inch | Miniature Regular Ball Double | R1/64 | R3/32 | **747** |
| | E2015<br>E1015 | | 2Flute | 30° & 39° | Inch | Miniature Long Ball Double | R1/32 | R3/32 | **748** |
| | E1070 | | 2Flute | 42° | Inch | Regular & Medium Square | D1/4 | D2 | **749** |
| | E1071 | | 2Flute | 42° | Inch | Long Square | D1/4 | D2 | **750** |
| | E1072 | | 2Flute | 42° | Inch | Extra Long Square | D1/4 | D1-1/2 | **750** |
| | E2086 |  | 4~5Flute | 30° | Inch | Stub Roughing | D1/4 | D1 | **751** |
| | E2085 | | 3~5Flute | 30° | Inch | Regular Roughing | D1/4 | D1 | **752** |
| | E2079 | | 3~6Flute | 30° | Inch | Regular Roughing | D1/4 | D2 | **753** |
| | E2077 | | 4~6Flute | 30° | Inch | Long Roughing | D1/2 | D2 | **754** |
| | E2086 | | 3Flute | 30° | Inch | Stub Roughing | D1/4 | D1 | **755** |
| | E2170 | | 3~8Flute | 30° | Inch | Regular Roughing | D1/4 | D2 | **756** |
| | E2171 | | 5~8Flute | 30° | Inch | Medium Roughing | D1 | D2 | **757** |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○

# MILLING TOOLS **APPLICATION TABLE**

| | ITEM | MODEL | FLUTES | HELIX | INCH / METRIC | TYPE | SIZE RANGE MIN | SIZE RANGE MAX | PAGE |
|---|---|---|---|---|---|---|---|---|---|
| COBALT & HSS | E2172 | | 4~8Flute | 30° | Inch | Long Roughing | D1/2 | D2 | **758** |
| | E2241 | | 3Flute | 30° | Inch | Stub Roughing | D1/4 | D1 | **759** |
| | E2195 | | 4~6Flute | 30° | Inch | Regular Roughing | D1/2 | D1-1/2 | **760** |
| | E2197 | | 4~6Flute | 30° | Inch | Long Roughing | D1/2 | D1-1/2 | **760** |
| | E2193<br>E2125 | | 3~6Flute | 30° | Inch | Regular & Long Roughing | R1/8 | R3/4 | **761** |
| | E2248 | | 4~8Flute | 30° | Inch | Regular Roughing&Finishing | D1/4 | D2 | **762** |
| | E2191 | | 3Flute | 37° | Inch | Regular Roughing | D1/4 | D1-1/2 | **763** |
| | E2226<br>E2192 | | 3Flute | 37° | Inch | Medium & Long Roughing | D1/2 | D1-1/2 | **764** |
| | E2163<br>E1163 |  | 2Flute | 15° | Inch | Keyway | D1/8 | D1 | **765** |
| | E2120<br>E2121 | | 3&4Flute | 60° | Inch | Regular Square | D1/4<br>D7/8 | D3/4<br>D2 | **766** |
| | E2160 | | 3Flute | 30° | Inch | Short Square | D1/16 | D1/4 | **767** |
| | E2161 | | 3Flute | 30° | Inch | Long Square | D1/16 | D1/4 | **767** |
| | E2237<br>E1237 | | 4Flute | 0° | Inch | Corner Rounding | D1/4 | D5/8 | **768** |
| | E2482<br>E1482 | | 2Flute | 30° | Metric | Regular Square | D2.0<br>(.0787) | D45.0<br>(1.772) | **769** |
| | E2483<br>E1483 | | 4Flute | 30° | Metric | Regular Square | D2.0<br>(.0787) | D45.0<br>(1.772) | **770** |

| SERIES | MODEL | DESCRIPTION | INCH / METRIC | PAGE |
|---|---|---|---|---|
| **XB1A<br>XB1N** | | i-Xmill BALL INSERT FOR GENERAL PURPOSE | Inch<br>Metric | **384<br>389** |
| **XB2C<br>XB2N** | | i-Xmill BALL INSERT FOR HARDENED STEEL | Inch<br>Metric | **384<br>389** |
| **XR1A<br>XRAA** | | i-Xmill CORNER RADIUS INSERTS FOR GENERAL PURPOSE | Inch<br>Metric | **387<br>392** |
| **XR2A<br>XRBA** | | i-Xmill CORNER RADIUS INSERTS FOR HARDENED STEEL | Inch<br>Metric | **387<br>392** |

# SOLID

◎ : Excellent ○ : Good

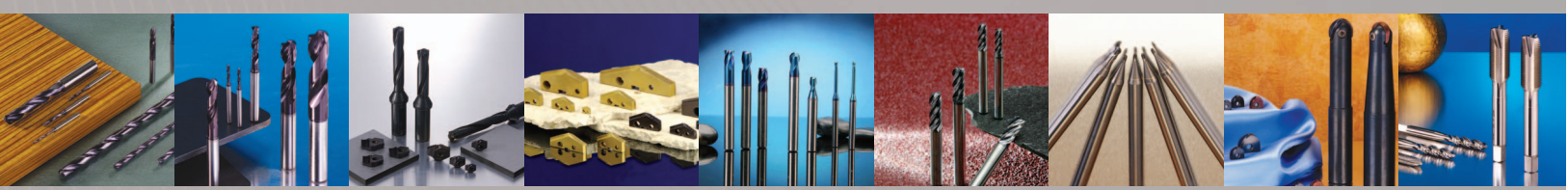
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ◎ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ◎ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# INSERT

◎ : Excellent ○ : Good

| Carbon Steels | | Alloy Steels | | Tool Steels | | Cast Iron | Hardened Steels | Stainless Steels | Aluminum |
|---|---|---|---|---|---|---|---|---|---|
| ~HRc35 | HRc35~ | ~HRc35 | HRc35~ | ~HRc35 | HRc35~ | ~HRc35 | HRc50~ | ~HRc28 | ~HRc8 |
| ◎ | ○ | ◎ | ○ | ◎ | ○ | ○ | | ○ | ○ |
| ○ | ◎ | ○ | ◎ | ○ | ◎ | ◎ | ◎ | | |
| ◎ | ○ | ◎ | ○ | ◎ | ○ | ○ | | ○ | ○ |
| ○ | ◎ | ○ | ◎ | ○ | ◎ | ◎ | ◎ | | |

# CUTTING TOOLS



YG

Being the best through innovation

# CBN (Cubic Boron Nitride)

- Cubic Boron Nitride, Machining High Hardened Steels up to HRc70, Mirror Finish

| ITEM | MODEL | DESCRIPTION | SIZE | | PAGE |
|---|---|---|---|---|---|
| | | | MIN | MAX | |
| **ESB94** | | CBN, 2 FLUTE BALL NOSE | R0.2 | R1.5 | **378** |
| **ESD02** | | CBN, 2 FLUTE CORNER RADIUS | D0.5 | D2.0 | **379** |
| | | RECOMMENDED CUTTING CONDITIONS | | | **380** |

◎ : Excellent
○ : Good

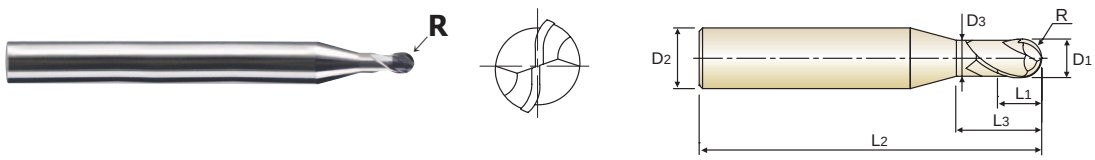
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | StainlessSteels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | ◎ | ◎ | | | | | | | |
| | | | | ◎ | ◎ | | | | | | | |

# YG CBN END MILLS

**ESB94 SERIES** PLAIN SHANK

## CBN, 2 FLUTE BALL NOSE

- Higher accuracy, better finishes, longer tool life.
- Special geometry improves tool rigidity at high Speed.
- Tighter radius tolerance (±.005mm) assures higher accuracy.




CBN | 2 | 30° | R ±0.005 | PLAIN

P.380

Unit : mm

| EDP No. | Radius of Ball Nose | Mill Diameter | | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|
| | | Metric | Inch | | | | | |
| | R (±0.005) | D1 | | D2 | L1 | L3 | L2 | D3 |
| ESB94004012 | R0.2 | 0.4 | .0157 | 4 | 0.3 | 1.2 | 50 | 0.37 |
| ESB94005015 | R0.25 | 0.5 | .0197 | 4 | 0.4 | 1.5 | 50 | 0.46 |
| ESB94006015 | R0.3 | 0.6 | .0236 | 4 | 0.5 | 1.5 | 50 | 0.56 |
| ESB94008020 | R0.4 | 0.8 | .0315 | 4 | 0.6 | 2 | 50 | 0.76 |
| ESB94010025 | R0.5 | 1.0 | .0394 | 4 | 0.6 | 2.5 | 50 | 0.95 |
| ESB94010040 | R0.5 | 1.0 | .0394 | 4 | 0.6 | 4 | 50 | 0.95 |
| ESB94010060 | R0.5 | 1.0 | .0394 | 4 | 0.6 | 6 | 50 | 0.95 |
| ESB94012030 | R0.6 | 1.2 | .0472 | 4 | 0.8 | 3 | 50 | 1.15 |
| ESB94015030 | R0.75 | 1.5 | .0591 | 4 | 0.95 | 3 | 50 | 1.45 |
| ESB94015040 | R0.75 | 1.5 | .0591 | 4 | 0.95 | 4 | 50 | 1.45 |
| ESB94015060 | R0.75 | 1.5 | .0591 | 4 | 0.95 | 6 | 50 | 1.45 |
| ESB94020050 | R1.0 | 2.0 | .0787 | 4 | 1.2 | 5 | 50 | 1.95 |
| ESB94020060 | R1.0 | 2.0 | .0787 | 4 | 1.2 | 6 | 50 | 1.95 |
| ESB94030060 | R1.5 | 3.0 | .1181 | 4 | 1.8 | 6 | 50 | 2.85 |

| Radius Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| ±0.005 | h5 |

◎ : Excellent ○ : Good

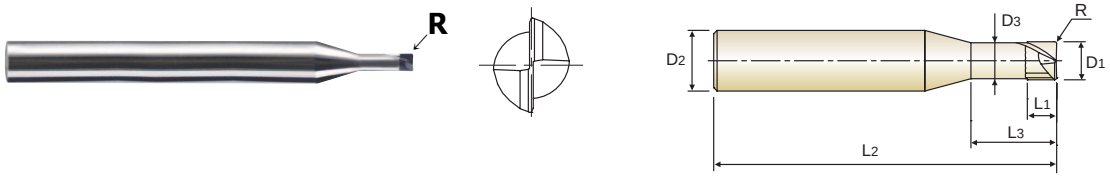
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | ◎ | ◎ | | | | | | | |

# CBN END MILLS

**ESD02 SERIES** PLAIN SHANK

## CBN, 2 FLUTE CORNER RADIUS

- Higher accuracy, better finishes, longer tool life.
- Special geometry improves tool rigidity at high Speed.
- Tighter radius tolerance (±.005mm) assures higher accuracy.




CBN | 2 | 0° | R ±0.005 | PLAIN

P.380

Unit : mm

| EDP No. | Corner Radius | Mill Diameter | | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|
| | | Metric | Inch | | | | | |
| | R (±0.005) | D1 | | D2 | L1 | L3 | L2 | D3 |
| ESD02005052 | R0.05 | 0.5 | .0197 | 4 | 0.3 | 2 | 50 | 0.46 |
| ESD02005053 | R0.05 | 0.5 | .0197 | 4 | 0.3 | 3 | 50 | 0.46 |
| ESD02010053 | R0.05 | 1.0 | .0394 | 4 | 0.7 | 3 | 50 | 0.95 |
| ESD02010055 | R0.05 | 1.0 | .0394 | 4 | 0.7 | 5 | 50 | 0.95 |
| ESD02010103 | R0.1 | 1.0 | .0394 | 4 | 0.7 | 3 | 50 | 0.95 |
| ESD02010105 | R0.1 | 1.0 | .0394 | 4 | 0.7 | 5 | 50 | 0.95 |
| ESD02015105 | R0.1 | 1.5 | .0591 | 4 | 1.0 | 5 | 50 | 1.45 |
| ESD02015108 | R0.1 | 1.5 | .0591 | 4 | 1.0 | 8 | 50 | 1.45 |
| ESD02015205 | R0.2 | 1.5 | .0591 | 4 | 1.0 | 5 | 50 | 1.45 |
| ESD02015208 | R0.2 | 1.5 | .0591 | 4 | 1.0 | 8 | 50 | 1.45 |
| ESD02020106 | R0.1 | 2.0 | .0787 | 4 | 1.2 | 6 | 50 | 1.95 |
| ESD02020100 | R0.1 | 2.0 | .0787 | 4 | 1.2 | 10 | 50 | 1.95 |
| ESD02020206 | R0.2 | 2.0 | .0787 | 4 | 1.2 | 6 | 50 | 1.95 |
| ESD02020200 | R0.2 | 2.0 | .0787 | 4 | 1.2 | 10 | 50 | 1.95 |

| Corner Radius Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| ±0.005 | h5 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | ◎ | ◎ | | | | | | | |

# CBN END MILLS

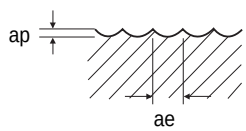
## RECOMMENDED CUTTING CONDITIONS

## CBN, 2 FLUTE BALL NOSE

### ESB94 SERIES

| MATERIAL | HARDENED STEELS | | HIGH HARDENED STEELS | |
|---|---|---|---|---|
| HARDNESS | HRc50 ~ HRc60 | | HRc60 ~ HRc70 | |
| DIAMETER | RPM | FEED | RPM | FEED |
| R0.2 × 0.4 | 50,000 | 47.24 | 50,000 | 47.24 |
| R0.25 × 0.5 | 50,000 | 59.06 | 50,000 | 59.06 |
| R0.3 × 0.6 | 50,000 | 78.74 | 50,000 | 78.74 |
| R0.4 × 0.8 | 50,000 | 78.74 | 50,000 | 78.74 |
| R0.5 × 1.0 | 50,000 | 118.11 | 50,000 | 118.11 |
| R0.6 × 1.2 | 50,000 | 118.11 | 50,000 | 118.11 |
| R0.75 × 1.5 | 50,000 | 118.11 | 50,000 | 118.11 |
| R1.0 × 2.0 | 40,000 | 125.98 | 32,000 | 98.43 |
| R1.5 × 3.0 | 26,500 | 82.68 | 21,500 | 66.93 |

ap : R0.2 ~ R0.4 =0.005mm
R0.5 ~ R1.5 =0.01mm
ae : R0.2 ~ R0.4 =0.005mm
R0.5 ~ R1.5 =0.01 mm

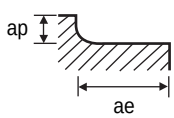



RPM = rev./min.
FEED = inch/min.

## CBN, 2 FLUTE CORNER RADIUS

### ESD02 SERIES

| MATERIAL | HARDENED STEELS | | | | HIGH HARDENED STEELS | | | |
|---|---|---|---|---|---|---|---|---|
| HARDNESS | HRc50 ~ HRc60 | | | | HRc60 ~ HRc70 | | | |
| DIAMETER | RPM | FEED | DEPTH OF CUT ae[mm] | DEPTH OF CUT ap[mm] | RPM | FEED | DEPTH OF CUT ae[mm] | DEPTH OF CUT ap[mm] |
| 0.5 | 50,000 | 27.56 | 0.10 | 0.01 | 50,000 | 21.65 | 0.06 | 0.005 |
| 1.0 | 43,000 | 39.37 | 0.20 | 0.01 | 30,000 | 27.56 | 0.10 | 0.10 |
| 1.5 | 30,000 | 39.37 | 0.40 | 0.02 | 19,000 | 27.56 | 0.20 | 0.20 |
| 2.0 | 22,000 | 35.43 | 0.60 | 0.03 | 14,000 | 31.50 | 0.30 | 0.30 |




RPM = rev./min.
FEED = inch/min.

# CARBIDE INSERT & HOLDER

Being the best through innovation

# i-Xmill

- Available for General Steels and for Hardened Steels up to HRc65

# SELECTION GUIDE


| ITEM | MODEL | DESCRIPTION | PAGE |
|---|---|---|---|
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◎ : Excellent, ○ : Good

| Carbon Steels | | Alloy Steels | | Tool Steels | | Cast Iron | Hardened Steels | Stainless Steels | Aluminum |
|---|---|---|---|---|---|---|---|---|---|
| ~HRc35 | HRc35~ | ~HRc35 | HRc35~ | ~HRc35 | HRc35~ | ~HRc35 | HRc50~ | ~HRc28 | ~HRc8 |
| ◎ | ○ | ◎ | ○ | ◎ | ○ | ○ | | ○ | ○ |
| ○ | ◎ | ○ | ◎ | ○ | ◎ | ◎ | ◎ | | |
| | | | | | | | | | |
| | | | | | | | | | |
| ◎ | ○ | ◎ | ○ | ◎ | ○ | ○ | | ○ | ○ |
| ○ | ◎ | ○ | ◎ | ○ | ◎ | ◎ | ◎ | | |
| | | | | | | | | | |

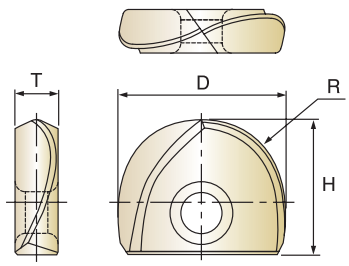
| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ◎ | ○ | ◎ | ○ | ◎ | ○ | ○ | | ○ | ○ |
| ○ | ◎ | ○ | ◎ | ○ | ◎ | ◎ | ◎ | | |
| | | | | | | | | | |
| | | | | | | | | | |
| ◎ | ○ | ◎ | ○ | ◎ | ○ | ○ | | ○ | ○ |
| ○ | ◎ | ○ | ◎ | ○ | ◎ | ◎ | ◎ | | |
| | | | | | | | | | |

# i-Xmill END MILLS

XB1A
XB2C

## i-Xmill BALL INSERTS

- Indexable Ball End Mill for economic use
- Two Types of Inserts are available - For General Purpose (~HRc50) & For Hardened Material (HRc40~HRc65)
- Special Geometry and Coating for Excellent Performance




cutting conditions : p.396

Unit : Inch

| EDP No. For General Material | EDP No. For Hardened Material | Radius of Ball Nose R | Mill Diameter D | Height H | Thickness T |
|---|---|---|---|---|---|
| **XB1A020** | **XB2C020** | R5/32 | **5/16** | 5/16 | .094 |
| **XB1A024** | **XB2C024** | R3/16 | **3/8** | 3/8 | .106 |
| **XB1A032** | **XB2C032** | R1/4 | **1/2** | 7/16 | .126 |
| **XB1A040** | **XB2C040** | R5/16 | **5/8** | 1/2 | .165 |
| **XB1A048** | **XB2C048** | R3/8 | **3/4** | 5/8 | .205 |
| **XB1A100** | **XB2C100** | R1/2 | **1** | 3/4 | .244 |
| **XB1A116** | **XB2C116** | R5/8 | **1-1/4** | 31/32 | .283 |

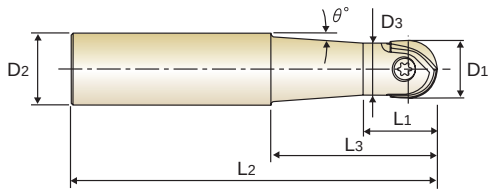
- The ball radius tolerance is ±.0004″ and the set-up accuracy is ±.0008″

◎ : Excellent ○ : Good

| | Carbon Steels | | Alloy Steels | | Tool Steels | | Cast Iron | Hardened Steels | Stainless Steels | Aluminum |
|---|---|---|---|---|---|---|---|---|---|---|
| | ~HRc35 | HRc35~ | ~HRc35 | HRc35~ | ~HRc35 | HRc35~ | ~HRc35 | HRc50~ | ~HRc28 | ~HRc8 |
| XB1A | ◎ | ○ | ◎ | ○ | ◎ | ○ | ○ | | ○ | ○ |
| XB2C | ○ | ◎ | ○ | ◎ | ○ | ◎ | ◎ | ◎ | | |

# i-Xmill BALL HOLDERS - STEEL

- Premium alloy steel with excellent strength.
- Precise shank, Tolerance (h6).
- Nickel plated, to prevent corrosion and improve lubricity.

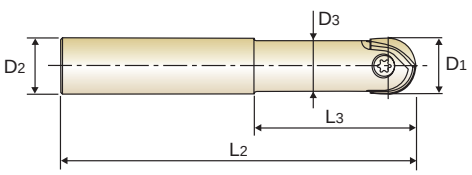



## Taper neck Type

Unit : Inch

| EDP No. | Mill Diameter D1 | Shank Diameter D2 | Length of Cut L1 | Length Below Shank L3 | Overall Length L2 | Neck Diameter D3 | Interference Angle θ° | Length Type | Wrench No. | Screw No. |
|---|---|---|---|---|---|---|---|---|---|---|
| ZBT1020 | 5/16 | 1/2 | 1/2 | 1-5/8 | 3-5/8 | 9/32 | 4°33′ | Short | TWF07 | TX0807 |
| ZBT2020 | | | 1 | 2-1/2 | 4-3/8 | | 3°25′ | Regular | | |
| ZBT1024 | 3/8 | 1/2 | 5/8 | 1-1/2 | 3-9/16 | 11/32 | 3°49′ | Short | TWF08 | TX1008 |
| ZBT2024 | | | 1-1/4 | 2-5/16 | 4-3/8 | | 3°08′ | Regular | | |
| ZBT1032 | 1/2 | 5/8 | 11/16 | 2-3/16 | 4-3/8 | 7/16 | 2°49′ | Short | TWF10 | TX1210 |
| ZBT1040 | 5/8 | 3/4 | 13/16 | 2-9/16 | 5 | 9/16 | 2°25′ | Short | TWF15 | TX1615 |
| ZBT1048 | 3/4 | 1 | 1 | 3-1/8 | 6 | 43/64 | 3°53′ | Short | ● TWB20 | TX2020 |
| ZBT1100 | 1 | 1-1/4 | 1-1/4 | 3-9/16 | 7 | 29/32 | 3°45′ | Short | ● TWB25 | TX2525 |
| ZBT1116 | 1-1/4 | 1-1/4 | 1-9/16 | 4-3/8 | 8 | 1-1/16 | 1°30′ | Short | ● TWB30 | TX3030 |

● Need to use T Handle : TWH600 (See page 40)




## Straight neck Type

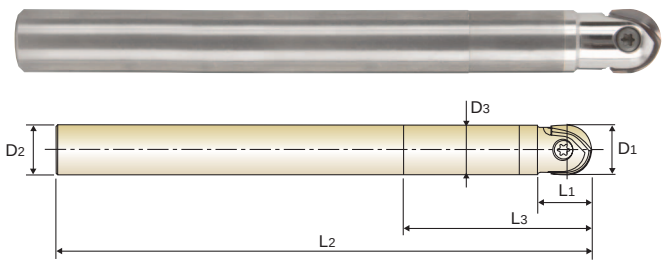
Unit :Inch

| EDP No. | Mill Diameter D1 | Shank Diameter D2 | Length Below Shank L3 | Overall Length L2 | Neck Diameter D3 | Length Type | Wrench No. | Screw No. |
|---|---|---|---|---|---|---|---|---|
| ZBS1032 | 1/2 | 1/2 | 1-3/8 | 3-1/2 | 7/16 | Short | TWF10 | TX1210 |
| ZBS2032 | | | 2-3/16 | 4-3/8 | | Regular | | |
| ZBS1040 | 5/8 | 5/8 | 1-3/8 | 3-3/4 | 9/16 | Short | TWF15 | TX1615 |
| ZBS2040 | | | 2-9/16 | 5 | | Regular | | |
| ZBS1048 | 3/4 | 3/4 | 1-9/16 | 4-3/8 | 43/64 | Short | ● TWB20 | TX2020 |
| ZBS2048 | | | 3 | 6 | | Regular | | |
| ZBS1100 | 1 | 1 | 1-3/4 | 5 | 29/32 | Short | ● TWB25 | TX2525 |
| ZBS2100 | | | 3-9/16 | 6-3/4 | | Regular | | |
| ZBS1116 | 1-1/4 | 1-1/4 | 2-1/4 | 5-1/2 | 1-1/16 | Short | ● TWB30 | TX3030 |
| ZBS2116 | | | 4-3/8 | 7-3/4 | | Regular | | |

● Need to use T Handle : TWH600 (See page 40)

# i-Xmill BALL HOLDERS - CARBIDE

- Equal tool rigidity like solid carbide end mill that makes the stable and high finishing machining with less vibration.
- The high finishing machining for the deeper part of mold.
- The tool's life of carbide ball holders is longer than steel holder.
- Shrink Fit Holding system can be applied.
- Upon request, the worn holder is able to be regenerated.




Unit : Inch

| EDP No. | Mill Diameter D1 | Shank Diameter D2 | Length of Cut L1 | Length Below Shank L3 | Overall Length L2 | Neck Diameter D3 | Length Type | Wrench No. | Screw No. |
|---|---|---|---|---|---|---|---|---|---|
| ZBCB020 | 5/16 | 5/16 | 1/2 | 1-9/16 | 5-1/8 | 19/64 | Long | TWF07 | TX0807 |
| ZBCB024 | 3/8 | 3/8 | 5/8 | 2 | 5-1/2 | 23/64 | Long | TWF08 | TX1008 |
| ZBCB032 | 1/2 | 1/2 | 11/16 | 2-3/8 | 5-15/16 | 31/64 | Long | TWF10 | TX1210 |
| ZBCB040 | 5/8 | 5/8 | 13/16 | 3-3/16 | 7-15/16 | 39/64 | Long | TWF15 | TX1615 |
| ZBCD040 | | | | | 9-7/8 | | | | |
| ZBCB048 | 3/4 | 3/4 | 1 | 3-3/16 | 7-15/16 | 47/64 | Long | ● TWB20 | TX2020 |
| ZBCC048 | | | | 4 | 9-7/8 | | | | |
| ZBCB100 | 1 | 1 | 1-3/16 | 4-3/4 | 9-7/8 | 63/64 | Long | ● TWB25 | TX2525 |
| ZBCB116 | 1-1/4 | 1-1/4 | 1-9/16 | 5-15/16 | 11-7/8 | 1-15/64 | Long | ● TWB30 | TX3030 |

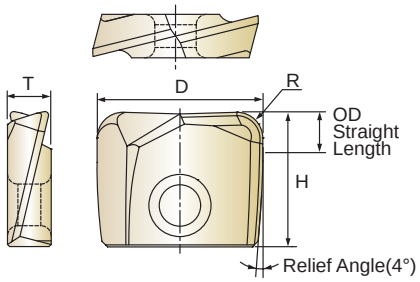
● Need to use T Handle : TWH600 (See page 40)

# i-Xmill END MILLS

XR1A
XR2A

## i-Xmill CORNER RADIUS INSERTS

- The optimum geometry of the tool to achieve the better reliability and less vibration and cutting load.
- Interchangeability with i-Xmill ball holder, but the precise cutting is possible with i-Xmill corner radius holder due to higher stability and strength of tool.
- The various and wide cutting range makes it possible to machine over the roughing and finishing.
- Special coating makes high hardness with high thermal stability against oxidation.
- Two Types of Inserts are available - For General Purpose (~HRc50) & For Hardened Material (HRc40~HRc65)




cutting conditions : p.396

Unit : Inch

| EDP No. | | Corner Radius | Mill Diameter | Height | Thickness | OD Straight Length |
|---|---|---|---|---|---|---|
| For General Material | For Hardened Material | R | D | H | T | |
| XR1A020 01 | XR2A020 01 | R1/64 | 5/16 | 5/16 | .094 | 2 |
| XR1A020 02 | XR2A020 02 | R1/32 | | | | |
| XR1A024 01 | XR2A024 01 | R1/64 | 3/8 | 3/8 | .106 | 3 |
| XR1A024 02 | XR2A024 02 | R1/32 | | | | |
| XR1A024 04 | XR2A024 04 | R1/16 | | | | |
| XR1A032 01 | XR2A032 01 | R1/64 | 1/2 | 7/16 | .126 | 3 |
| XR1A032 02 | XR2A032 02 | R1/32 | | | | |
| XR1A032 04 | XR2A032 04 | R1/16 | | | | |
| XR1A040 01 | XR2A040 01 | R1/64 | 5/8 | 1/2 | .165 | 4 |
| XR1A040 02 | XR2A040 02 | R1/32 | | | | |
| XR1A040 04 | XR2A040 04 | R1/16 | | | | |
| XR1A040 08 | XR2A040 08 | R1/8 | | | | |
| XR1A048 01 | XR2A048 01 | R1/64 | 3/4 | 5/8 | .205 | 4 |
| XR1A048 02 | XR2A048 02 | R1/32 | | | | |
| XR1A048 04 | XR2A048 04 | R1/16 | | | | |
| XR1A048 08 | XR2A048 08 | R1/8 | | | | |
| XR1A100 01 | XR2A100 01 | R1/64 | 1 | 3/4 | .244 | 4 |
| XR1A100 02 | XR2A100 02 | R1/32 | | | | |
| XR1A100 04 | XR2A100 04 | R1/16 | | | | |
| XR1A100 08 | XR2A100 08 | R1/8 | | | | |
| XR1A116 01 | XR2A116 01 | R1/64 | 1-1/4 | 29/32 | .283 | 4 |
| XR1A116 02 | XR2A116 02 | R1/32 | | | | |
| XR1A116 04 | XR2A116 04 | R1/16 | | | | |
| XR1A116 08 | XR2A116 08 | R1/8 | | | | |

- The other corner radius values are available on request.
- The corner radius tolerance is ±.0006˝ and the set-up accuracy is ±.0008˝

◎ : Excellent ○ : Good

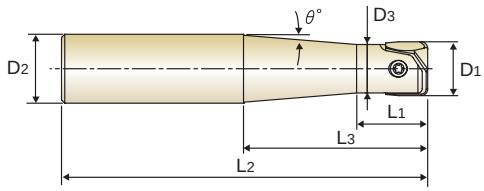
| | Carbon Steels | | Alloy Steels | | Tool Steels | | Cast Iron | Hardened Steels | Stainless Steels | Aluminum |
|---|---|---|---|---|---|---|---|---|---|---|
| | ~HRc35 | HRc35~ | ~HRc35 | HRc35~ | ~HRc35 | HRc35~ | ~HRc35 | HRc50~ | ~HRc28 | ~HRc8 |
| XR1A | ◎ | ○ | ◎ | ○ | ◎ | ○ | ○ | | ○ | ○ |
| XR2A | ○ | ◎ | ○ | ◎ | ○ | ◎ | ◎ | ◎ | | |

YG i-Xmill END MILLS

ZRT
ZRS

# i-Xmill CORNER RADIUS HOLDERS - STEEL

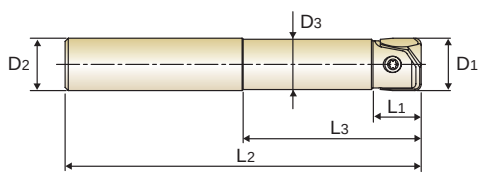
- Premium alloy steel with excellent strength.
- Precise shank, Tolerance (h6).
- Nickel plated, to prevent corrosion and improve lubricity.




## Taper neck Type

Unit : Inch

| EDP No. | Mill Diameter D1 | Shank Diameter D2 | Length of Cut L1 | Length Below Shank L3 | Overall Length L2 | Neck Diameter D3 | Interference Angle θ° | Length Type | Wrench No. | Screw No. |
|---|---|---|---|---|---|---|---|---|---|---|
| ZRT1032 | 5/16 | 1/2 | 13/32 | 7/8 | 4 | 17/64 | 13° 58' | Regular | TWF07 | TX0807 |
| ZRT2032 | | | | 2 | 5-1/8 | | 4° 12' | Long | | |
| ZRT2410 | 3/8 | 1/2 | 17/32 | 1 | 4 | 5/16 | 9° 27' | Regular | TWF08 | TX1008 |
| ZRT2420 | | | | 2 | 5-15/16 | | 3° 6' | Long | | |
| ZRT3220 | 1/2 | 5/8 | 5/8 | 2-3/8 | 6-5/16 | 27/64 | 3° 19' | Long | TWF10 | TX1210 |




## Straight neck Type

Unit :Inch

| EDP No. | Mill Diameter D1 | Shank Diameter D2 | Length of Cut L1 | Length Below Shank L3 | Overall Length L2 | Neck Diameter D3 | Length Type | Wrench No. | Screw No. |
|---|---|---|---|---|---|---|---|---|---|
| ZRS1032 | 1/2 | 1/2 | 17/32 | 1-3/16 | 4-3/8 | 7/16 | Regular | TWF10 | TX1210 |
| ZRS1040 | 5/8 | 5/8 | 5/8 | 2 | 5-1/8 | 19/32 | Regular | TWF15 | TX1615 |
| ZRS2040 | | | | 2-9/16 | 6-1/2 | | Intermediate | | |
| ZRS1048 | 3/4 | 3/4 | 23/32 | 2-3/8 | 5-1/2 | 23/32 | Regular | ● TWB20 | TX2020 |
| ZRS2048 | | | | 3-1/8 | 7-1/8 | | Intermediate | | |
| ZRS1100 | 1 | 1 | 29/32 | 2-3/4 | 5-15/16 | 31/32 | Regular | ● TWB25 | TX2525 |
| ZRS2100 | | | | 3-9/16 | 8 | | Intermediate | | |
| ZRS1116 | 1-1/4 | 1-1/4 | 1-1/8 | 3-1/8 | 6-5/16 | 1-7/32 | Regular | ● TWB30 | TX3030 |
| ZRS2116 | | | | 4 | 8-11/16 | | Intermediate | | |

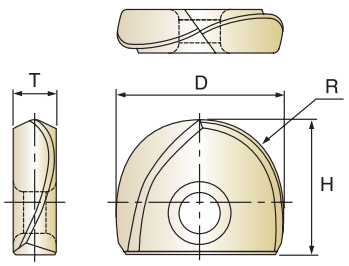
● Need to use T Handle : TWH600 (See page 40)

# i-Xmill END MILLS

**XB1N**
**XB2N**

## i-Xmill BALL INSERTS

- Indexable Ball End Mill for economic use
- Two Types of Inserts are available - For General Purpose (~HRc50) & For Hardened Material (HRc40~HRc65)
- Special Geometry and Coating for Excellent Performance




cutting conditions : p.396

Unit : mm

| EDP No. | | Radius of Ball Nose | Mill Diameter | Height | Thickness |
|---|---|---|---|---|---|
| For General Material | For Hardened Material | R | D | H | T |
| **XB1N080** | **XB2N080** | R4.0 | **8.0** | 8 | 2.4 |
| **XB1N100** | **XB2N100** | R5.0 | **10.0** | 9.5 | 2.7 |
| **XB1N120** | **XB2N120** | R6.0 | **12.0** | 11 | 3.2 |
| **XB1N160** | **XB2N160** | R8.0 | **16.0** | 13 | 4.2 |
| **XB1N200** | **XB2N200** | R10.0 | **20.0** | 16 | 5.2 |
| **XB1N250** | **XB2N250** | R12.5 | **25.0** | 19.5 | 6.2 |
| **XB1N300** | **XB2N300** | R15.0 | **30.0** | 23.5 | 7.2 |
| **XB1N320** | **XB2N320** | R16.0 | **32.0** | 24.5 | 7.2 |

• The ball radius tolerance is ±0.01mm and the set-up accuracy is ±0.02mm

◎ : Excellent ○ : Good

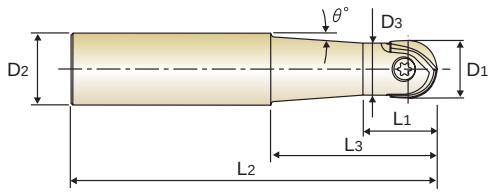
| | Carbon Steels | | Alloy Steels | | Tool Steels | | Cast Iron | Hardened Steels | Stainless Steels | Aluminum |
|---|---|---|---|---|---|---|---|---|---|---|
| | ~HRc35 | HRc35~ | ~HRc35 | HRc35~ | ~HRc35 | HRc35~ | ~HRc35 | HRc50~ | ~HRc28 | ~HRc8 |
| XB1A | ◎ | ○ | ◎ | ○ | ◎ | ○ | ○ | | ○ | ○ |
| XB2N | ○ | ◎ | ○ | ◎ | ○ | ◎ | ◎ | ◎ | | |

# i-Xmill END MILLS

ZBT
ZBS

## i-Xmill BALL HOLDERS - STEEL

- Premium alloy steel with excellent strength.
- Precise shank, Tolerance (h6).
- Nickel plated, to prevent corrosion and improve lubricity.

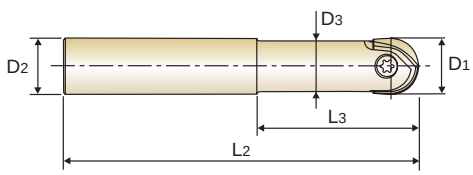



### Taper neck Type

Unit : mm

| EDP No. | Mill Diameter D1 | Shank Diameter D2 | Length of Cut L1 | Length Below Shank L3 | Overall Length L2 | Neck Diameter D3 | Interference Angle θ° | Length Type | Wrench No. | Screw No. |
|---|---|---|---|---|---|---|---|---|---|---|
| ZBT0801 | 8.0 | 12 | 12 | 35 | 90 | 7.2 | 4°43′ | Short | TWF07 | TX0807 |
| ZBT0802 | | | 25 | 55 | 110 | | 3°37′ | Regular | | |
| ZBT1001 | 10.0 | 12 | 15 | 35 | 90 | 9 | 2°51′ | Short | TWF08 | TX1008 |
| ZBT1002 | | | 30 | 55 | 110 | | 2°17′ | Regular | | |
| ZBT1201 | 12.0 | 16 | 17 | 55 | 110 | 10.5 | 3°23′ | Short | TWF10 | TX1210 |
| ZBT1601 | 16.0 | 20 | 20 | 65 | 125 | 14.5 | 2°51′ | Short | TWF15 | TX1615 |
| ZBT2001 | 20.0 | 25 | 25 | 75 | 145 | 18 | 3°26′ | Short | ● TWB20 | TX2020 |
| ZBT2501 | 25.0 | 32 | 30 | 90 | 170 | 22.5 | 4°03′ | Short | ● TWB25 | TX2525 |
| ZBT3001 | 30.0<br>32.0 | 32 | 40 | 110 | 195 | 27 | 1°38′ | Short | ● TWB30 | TX3030 |

● Need to use T Handle : TWH600 (See page 40)




### Straight neck Type

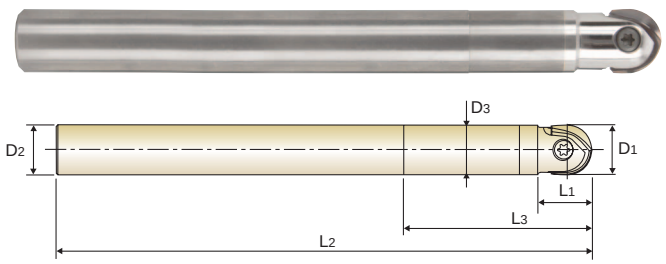
Unit : mm

| EDP No. | Mill Diameter D1 | Shank Diameter D2 | Length Below Shank L3 | Overall Length L2 | Neck Diameter D3 | Length Type | Wrench No. | Screw No. |
|---|---|---|---|---|---|---|---|---|
| ZBS1201 | 12.0 | 12 | 35 | 90 | 10.5 | Short | TWF10 | TX1210 |
| ZBS1202 | | | 55 | 110 | | Regular | | |
| ZBS1601 | 16.0 | 16 | 35 | 95 | 14.5 | Short | TWF15 | TX1615 |
| ZBS1602 | | | 65 | 125 | | Regular | | |
| ZBS2001 | 20.0 | 20 | 40 | 110 | 18 | Short | ● TWB20 | TX2020 |
| ZBS2002 | | | 75 | 145 | | Regular | | |
| ZBS2501 | 25.0 | 25 | 45 | 125 | 22.5 | Short | ● TWB25 | TX2525 |
| ZBS2502 | | | 90 | 170 | | Regular | | |
| ZBS3001 | 30.0 | 32 | 55 | 140 | 27 | Short | ● TWB30 | TX3030 |
| ZBS3002 | 32.0 | | 110 | 195 | | Regular | | |

● Need to use T Handle : TWH600 (See page 40)

# i-Xmill BALL HOLDERS - CARBIDE

- Equal tool rigidity like solid carbide end mill that makes the stable and high finishing machining with less vibration.
- The high finishing machining for the deeper part of mold.
- The tool's life of carbide ball holders is longer than steel holder.
- Shrink Fit Holding system can be applied.
- Upon request, the worn holder is able to be regenerated.




Unit : mm

| EDP No. | Mill Diameter | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter | Length Type | Wrench No. | Screw No. |
|---|---|---|---|---|---|---|---|---|---|
| | D1 | D2 | L1 | L3 | L2 | D3 | | | |
| ZBC1080 | 8.0 | 8 | 12 | 25 | 130 | 7.7 | Long | TWF07 | TX0807 |
| ZBC1100 | 10.0 | 10 | 15 | 30 | 140 | 9.7 | Long | TWF08 | TX1008 |
| ZBC1120 | 12.0 | 12 | 17 | 35 | 150 | 11.7 | Long | TWF10 | TX1210 |
| ZBC1160 | 16.0 | 16 | 20 | 50 | 200 | 15.7 | Long | TWF15 | TX1615 |
| ZBC1200 | 20.0 | 20 | 25 | 60 | 200 | 19.7 | Long | ● TWB20 | TX2020 |
| ZBC1250 | 25.0 | 25 | 30 | 75 | 200 | 24.7 | Long | ● TWB25 | TX2525 |
| ZBC1320 | 30.0<br>32.0 | 32 | 40 | 90 | 250 | 29.7 | Long | ● TWB30 | TX3030 |

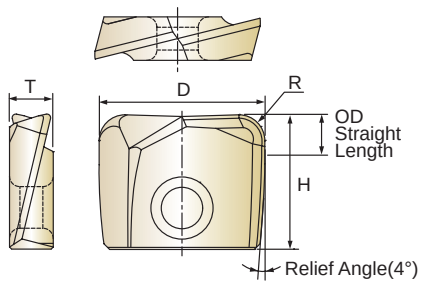
● Need to use T Handle : TWH600 (See page 40)

# i-Xmill END MILLS

XRAA
XRBA

## i-Xmill CORNER RADIUS INSERTS

- The optimum geometry of the tool to achieve the better reliability and less vibration and cutting load.
- Interchangeability with i-Xmill ball holder, but the precise cutting is possible with i-Xmill corner radius holder due to higher stability and strength of tool.
- The various and wide cutting range makes it possible to machine over the roughing and finishing.
- Special coating makes high hardness with high thermal stability against oxidation.
- Two Types of Inserts are available - For General Purpose (~HRc50) & For Hardened Material (HRc40~HRc65)




cutting conditions : p.396

Unit : mm

| EDP No. For General Material | EDP No. For Hardened Material | Corner Radius R | Mill Diameter D | Height H | Thickness T | OD Straight Length |
|---|---|---|---|---|---|---|
| XRAA080 03 | XRBA080 03 | R0.3 | 8.0 | 8 | 2.4 | 2 |
| XRAA080 05 | XRBA080 05 | R0.5 | | | | |
| XRAA080 10 | XRBA080 10 | R1.0 | | | | |
| XRAA100 05 | XRBA100 05 | R0.5 | 10.0 | 9.5 | 2.7 | 3 |
| XRAA100 10 | XRBA100 10 | R1.0 | | | | |
| XRAA100 20 | XRBA100 20 | R2.0 | | | | |
| XRAA120 05 | XRBA120 05 | R0.5 | 12.0 | 11 | 3.2 | 3 |
| XRAA120 10 | XRBA120 10 | R1.0 | | | | |
| XRAA120 20 | XRBA120 20 | R2.0 | | | | |
| XRAA130 05 | XRBA130 05 | R0.5 | 13.0 | 11.2 | 3.2 | 3 |
| XRAA130 10 | XRBA130 10 | R1.0 | | | | |
| XRAA130 20 | XRBA130 20 | R2.0 | | | | |
| XRAA160 05 | XRBA160 05 | R0.5 | 16.0 | 13 | 4.2 | 4 |
| XRAA160 10 | XRBA160 10 | R1.0 | | | | |
| XRAA160 20 | XRBA160 20 | R2.0 | | | | |
| XRAA170 05 | XRBA170 05 | R0.5 | 17.0 | 13 | 4.2 | 4 |
| XRAA170 10 | XRBA170 10 | R1.0 | | | | |
| XRAA170 20 | XRBA170 20 | R2.0 | | | | |

- The other corner radius values are available on request.
- The corner radius tolerance is ±0.015mm and the set-up accuracy is ±0.02mm

◎ : Excellent ○ : Good

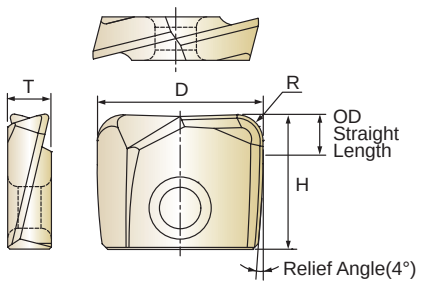
| | Carbon Steels | | Alloy Steels | | Tool Steels | | Cast Iron | Hardened Steels | Stainless Steels | Aluminum |
|---|---|---|---|---|---|---|---|---|---|---|
| | ~HRc35 | HRc35~ | ~HRc35 | HRc35~ | ~HRc35 | HRc35~ | ~HRc35 | HRc50~ | ~HRc28 | ~HRc8 |
| XRAA | ◎ | ○ | ◎ | ○ | ◎ | ○ | ○ | | ○ | ○ |
| XRBA | ○ | ◎ | ○ | ◎ | ○ | ◎ | ◎ | ◎ | | |

# i-Xmill END MILLS

**XRAA**
**XRBA**

## i-Xmill CORNER RADIUS INSERTS

- The optimum geometry of the tool to achieve the better reliability and less vibration and cutting load.
- Interchangeability with i-Xmill ball holder, but the precise cutting is possible with i-Xmill corner radius holder due to higher stability and strength of tool.
- The various and wide cutting range makes it possible to machine over the roughing and finishing.
- Special coating makes high hardness with high thermal stability against oxidation.
- Two Types of Inserts are available - For General Purpose (~HRc50) & For Hardened Material (HRc40~HRc65)




cutting conditions : p.396

Unit : mm

| EDP No. | | Corner Radius | Mill Diameter | Height | Thickness | OD Straight Length |
|---|---|---|---|---|---|---|
| For General Material | For Hardened Material | R | D | H | T | |
| XRAA200 05 | XRBA200 05 | R0.5 | 20.0 | 16 | 5.2 | 4 |
| XRAA200 10 | XRBA200 10 | R1.0 | | | | |
| XRAA200 20 | XRBA200 20 | R2.0 | | | | |
| XRAA210 05 | XRBA210 05 | R0.5 | 21.0 | 16 | 5.2 | 4 |
| XRAA210 10 | XRBA210 10 | R1.0 | | | | |
| XRAA210 20 | XRBA210 20 | R2.0 | | | | |
| XRAA250 05 | XRBA250 05 | R0.5 | 25.0 | 19.5 | 6.2 | 4 |
| XRAA250 10 | XRBA250 10 | R1.0 | | | | |
| XRAA250 20 | XRBA250 20 | R2.0 | | | | |
| XRAA260 05 | XRBA260 05 | R0.5 | 26.0 | 19.5 | 6.2 | 4 |
| XRAA260 10 | XRBA260 10 | R1.0 | | | | |
| XRAA260 20 | XRBA260 20 | R2.0 | | | | |
| XRAA300 05 | XRBA300 05 | R0.5 | 30.0 | 23.5 | 7.2 | 4 |
| XRAA300 10 | XRBA300 10 | R1.0 | | | | |
| XRAA300 20 | XRBA300 20 | R2.0 | | | | |
| XRAA320 05 | XRBA320 05 | R0.5 | 32.0 | 23.5 | 7.2 | 4 |
| XRAA320 10 | XRBA320 10 | R1.0 | | | | |
| XRAA320 20 | XRBA320 20 | R2.0 | | | | |

- The other corner radius values are available on request.
- The corner radius tolerance is ±0.015mm and the set-up accuracy is ±0.02mm

◎ : Excellent ○ : Good

| | Carbon Steels | | Alloy Steels | | Tool Steels | | Cast Iron | Hardened Steels | Stainless Steels | Aluminum |
|---|---|---|---|---|---|---|---|---|---|---|
| | ~HRc35 | HRc35~ | ~HRc35 | HRc35~ | ~HRc35 | HRc35~ | ~HRc35 | HRc50~ | ~HRc28 | ~HRc8 |
| XRAA | ◎ | ○ | ◎ | ○ | ◎ | ○ | ○ | | ○ | ○ |
| XRBA | ○ | ◎ | ○ | ◎ | ○ | ◎ | ◎ | ◎ | | |

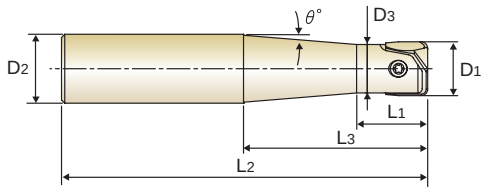
CBN END MILL
i-Xmill END MILL
X5070 END MILLS
X-SPEED ROUGHER END MILLS
X-POWER END MILLS
JET-POWER END MILLS
V7 Mill STEEL END MILLS
V7 Mill INOX END MILLS
ALU-POWER END MILLS
D-POWER END MILLS
STANDARD CARBIDE END MILLS
TANK-POWER END MILLS
STANDARD COBALT & HSS END MILLS
TECHNICAL DATA

# i-Xmill END MILLS

ZRT
ZRS

## i-Xmill CORNER RADIUS HOLDERS - STEEL

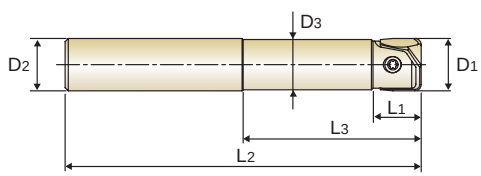
- Premium alloy steel with excellent strength.
- Precise shank, Tolerance (h6).
- Nickel plated, to prevent corrosion and improve lubricity.




### Taper neck Type

Unit : mm

| EDP No. | Mill Diameter D1 | Shank Diameter D2 | Length of Cut L1 | Length Below Shank L3 | Overall Length L2 | Neck Diameter D3 | Interference Angle θ° | Length Type | Wrench No. | Screw No. |
|---|---|---|---|---|---|---|---|---|---|---|
| ZRT8011 | 8.0 | 12 | 10 | 22 | 100 | 6.7 | 9° | Regular | TWF07 | TX0807 |
| ZRT8021 | | | | 50 | 130 | | 2° 43' | Long | | |
| ZRT1001 | 10.0 | 12 | 13 | 25 | 100 | 8.6 | 4° 45' | Regular | TWF08 | TX1008 |
| ZRT1002 | | | | 50 | 150 | | 1° 32' | Long | | |
| ZRT1202 | 12.0<br>13.0 | 16 | 15 | 60 | 160 | 10.2 | 2° 32' | Long | TWF10 | TX1210 |



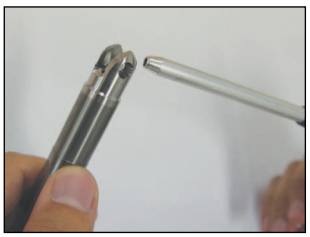
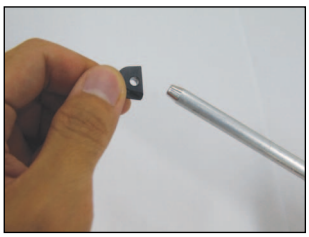

### Straight neck Type

Unit : mm

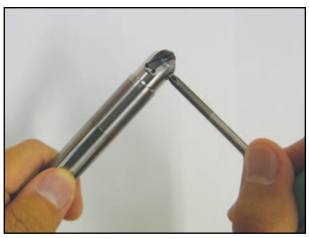
| EDP No. | Mill Diameter D1 | Shank Diameter D2 | Length of Cut L1 | Length Below Shank L3 | Overall Length L2 | Neck Diameter D3 | Length Type | Wrench No. | Screw No. |
|---|---|---|---|---|---|---|---|---|---|
| ZRS1120 | 12.0<br>13.0 | 12 | 13 | 30 | 110 | 11 | Regular | TWF10 | TX1210 |
| ZRS1160 | 16.0 | 16 | 15 | 50 | 130 | 15 | Regular | TWF15 | TX1615 |
| ZRS2160 | 17.0 | | | 65 | 165 | | Intermediate | | |
| ZRS1200 | 20.0 | 20 | 18 | 60 | 140 | 19 | Regular | ● TWB20 | TX2020 |
| ZRS2200 | 21.0 | | | 80 | 180 | | Intermediate | | |
| ZRS1250 | 25.0 | 25 | 23 | 70 | 150 | 24 | Regular | ● TWB25 | TX2525 |
| ZRS2250 | 26.0 | | | 90 | 200 | | Intermediate | | |
| ZRS1300 | 30.0 | 32 | 27 | 80 | 160 | 29 | Regular | ● TWB30 | TX3030 |
| ZRS2300 | | | | 100 | 220 | | Intermediate | | |
| ZRS1320 | 32.0 | 32 | 28 | 80 | 160 | 31 | Regular | ● TWB30 | TX3030 |
| ZRS2320 | | | | 100 | 220 | | Intermediate | | |

● Need to use T Handle : TWH600 (See page 40)

## ASSEMBLY OF *i*-Xmill

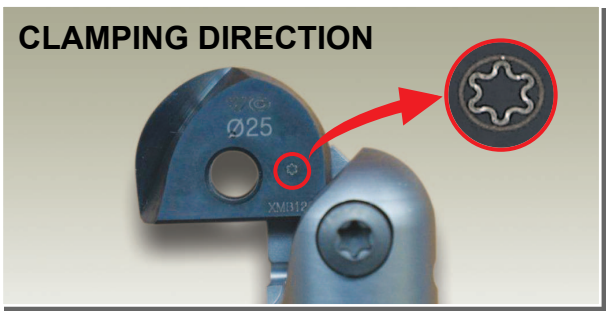
◀ Make sure to clean the insert and insert seat.



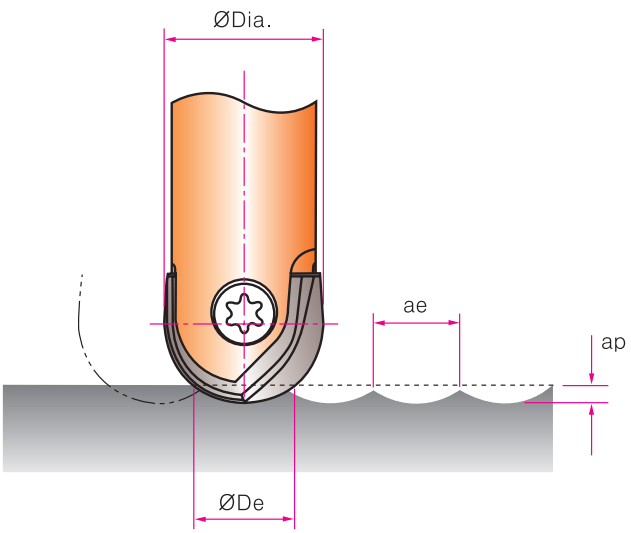
◀ Slide the insert into the slot of the holder.
Tighten the screw using anti-seize compound.

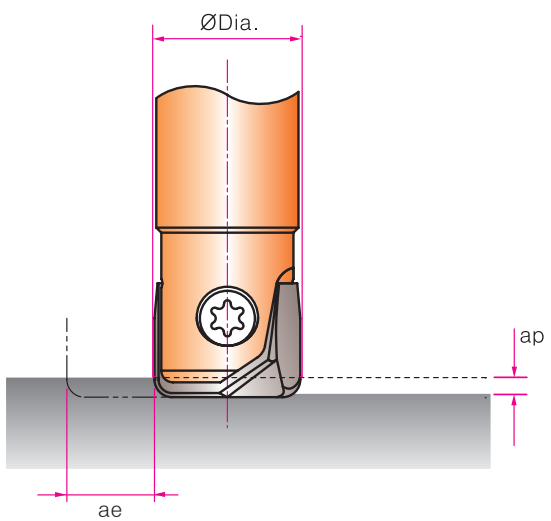
| SIZE ØD | CLAMPING TORQUE [ in · lbs ] |
|---|---|
| Ø5/16 (Ø8) | 9.0 |
| Ø3/8 (Ø10) | 13.5 |
| Ø1/2 (Ø12~Ø13) | 22.5 |
| Ø5/8 (Ø16~Ø17) | 31.5 |
| Ø3/4 (Ø20~Ø21) | 44.5 |
| Ø1 (Ø25~Ø26) | 53.0 |
| Ø1-1/4 (Ø30~Ø32) | 58.0 |

* When the screw is worn out, please change the new screw.
* Please tighten up the screw with recommended torque. (Please refer to the table)
* Don't press down the insert, when the screw is tightened.




## CUTTING CONDITION




**RPM** = revolution per minute (rev/min)
**SFM** = surface feet per minute (ft/min)
**Dia.** = diameter of insert (inch)
**IPR** = feed rate (inch/rev)
**IPM** = inch per minute penetration rate
**De** = effective tool diameter (inch)
**ap** = axial depth of cut (inch)
**ae** = radial depth of cut (inch)

$$\text{SFM [ft/min]} = \frac{(\text{RPM}) \cdot (\pi) \cdot (\text{Dia.})}{12}$$

$$\text{IPM [inch/min]} = (\text{RPM}) \cdot (\text{IPR})$$

$$\text{RPM [rev/min]} = \frac{(\text{SFM}) \cdot (12)}{(\pi) \cdot (\text{Dia.})}$$

$$\text{De [inch]} = 2\sqrt{(\text{ap}) \cdot (\text{Dia.-ap})}$$

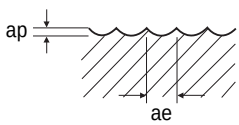
# i-Xmill END MILLS

## RECOMMENDED CUTTING CONDITIONS

## i-Xmill BALL INSERTS

### XB1A, XB2C, XB1N, XB2N SERIES

| WORK MATERIAL | | NON-ALLOYED STEELS ALLOY STEELS CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | DIE TOOL STEELS PRE-HARDENED | | HARDENED STEELS | |
|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | HB | ~280 | | 280~380 | | 380~480 | | 480~740 | |
| | HRc | ~30 | | 30~40 | | 40~50 | | 50~65 | |
| STRENGTH | N/mm² | ~1000 | | 1000~1250 | | 1250~1500 | | 1500~ | |
| *i*-Xmill TYPE | | XB1A, XB1N | | XB1A, XB1N | | XB1A, XB1N XB2C, XB2N | | XB2C, XB2N | |
| CUTTING CONDITION Roughing~Finishing | | RPM [rev/min] | Feed (IPM) [inch/min] | RPM [rev/min] | Feed (IPM) [inch/min] | RPM [rev/min] | Feed (IPM) [inch/min] | RPM [rev/min] | Feed (IPM) [inch/min] |
| Ø5/16(Ø8) | | 6370~12730 | 100~200 | 4770~11140 | 80~180 | 3980~8750 | 50~140 | 3180~7160 | 30~110 |
| Ø3/8(Ø10 ) | | 5090~11460 | 80~180 | 3820~9550 | 60~150 | 3180~8280 | 40~130 | 2550~6370 | 20~100 |
| Ø1/2(Ø12, Ø13) | | 4240~10080 | 70~160 | 3180~9280 | 50~150 | 2650~7430 | 30~120 | 2120~5840 | 20~90 |
| Ø5/8(Ø16, Ø17) | | 3180~9550 | 60~230 | 2390~7560 | 50~180 | 1990~6960 | 30~160 | 1590~5170 | 20~120 |
| Ø3/4(Ø20, Ø21) | | 2550~9230 | 50~290 | 1910~6680 | 40~210 | 1590~6370 | 30~200 | 1270~5090 | 20~160 |
| Ø1(Ø25, Ø26) | | 2040~7640 | 40~300 | 1530~6110 | 30~240 | 1270~5730 | 20~230 | 1020~4580 | 10~180 |
| Ø1-1/4(Ø30, Ø32) | | 1700~7430 | 30~350 | 1270~5840 | 30~280 | 1060~5310 | 20~250 | 850~4240 | 10~200 |




ae : Roughing - 0.1 x D
Finishing - Under Ø1/2 : 0.01
Under Ø3/4 : 0.012
From Ø3/4 : 0.016

ap : Roughing - Under Ø5/8 : 0.025 x D
From Ø5/8 : 0.05 x D
Finishing - 0.004

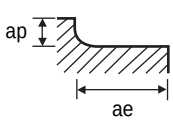
▶ Recommend to reduce the feed rate to 70 ~ 85% when you use long (long & intermediate Type Holder)

RPM = rev./min.
FEED = inch/min.

## i-Xmill CORNER RADIUS INSERTS

### XR1A, XR2A, XRAA, XRBA SERIES

| WORK MATERIAL | | NON-ALLOYED STEELS ALLOY STEELS CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | DIE TOOL STEELS PRE-HARDENED | | HARDENED STEELS | |
|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | HB | ~280 | | 280~380 | | 380~480 | | 480~740 | |
| | HRc | ~30 | | 30~40 | | 40~50 | | 50~65 | |
| STRENGTH | N/mm² | ~1000 | | 1000~1250 | | 1250~1500 | | 1500~ | |
| *i*-Xmill TYPE | | XR1A, XRAA | | XR1A, XRAA | | XR1A, XRAA XR2A, XRBA | | XR2A, XRBA | |
| CUTTING CONDITION Roughing~Finishing | | RPM [rev/min] | Feed (IPM) [inch/min] | RPM [rev/min] | Feed (IPM) [inch/min] | RPM [rev/min] | Feed (IPM) [inch/min] | RPM [rev/min] | Feed (IPM) [inch/min] |
| Ø5/16(Ø8) | | 6370~11940 | 100~140 | 4770~11140 | 80~130 | 3980~11140 | 40~52 | 3180~7160 | 25~34 |
| Ø3/8(Ø10 ) | | 5090~9550 | 80~110 | 3820~8910 | 60~110 | 3180~8910 | 30~42 | 2550~6370 | 20~28 |
| Ø1/2(Ø12, Ø13) | | 4240~7960 | 70~90 | 3180~7430 | 50~90 | 2650~7430 | 25~35 | 2120~5840 | 18~24 |
| Ø5/8(Ø16, Ø17) | | 3180~5970 | 60~90 | 2390~5570 | 50~90 | 1990~5570 | 24~34 | 1590~5170 | 18~22 |
| Ø3/4(Ø20, Ø21) | | 2550~4770 | 50~80 | 1910~4460 | 40~70 | 1590~4460 | 20~26 | 1270~5090 | 15~18 |
| Ø1(Ø25, Ø26) | | 2040~3820 | 40~60 | 1530~3570 | 30~60 | 1270~3570 | 15~20 | 1020~4580 | 12~14 |
| Ø1-1/4(Ø30, Ø32) | | 1700~3180 | 30~50 | 1270~2970 | 30~50 | 1060~2970 | 14~18 | 850~4240 | 10~12 |




ae : Roughing - 0.1 x D
Finishing - 0.008

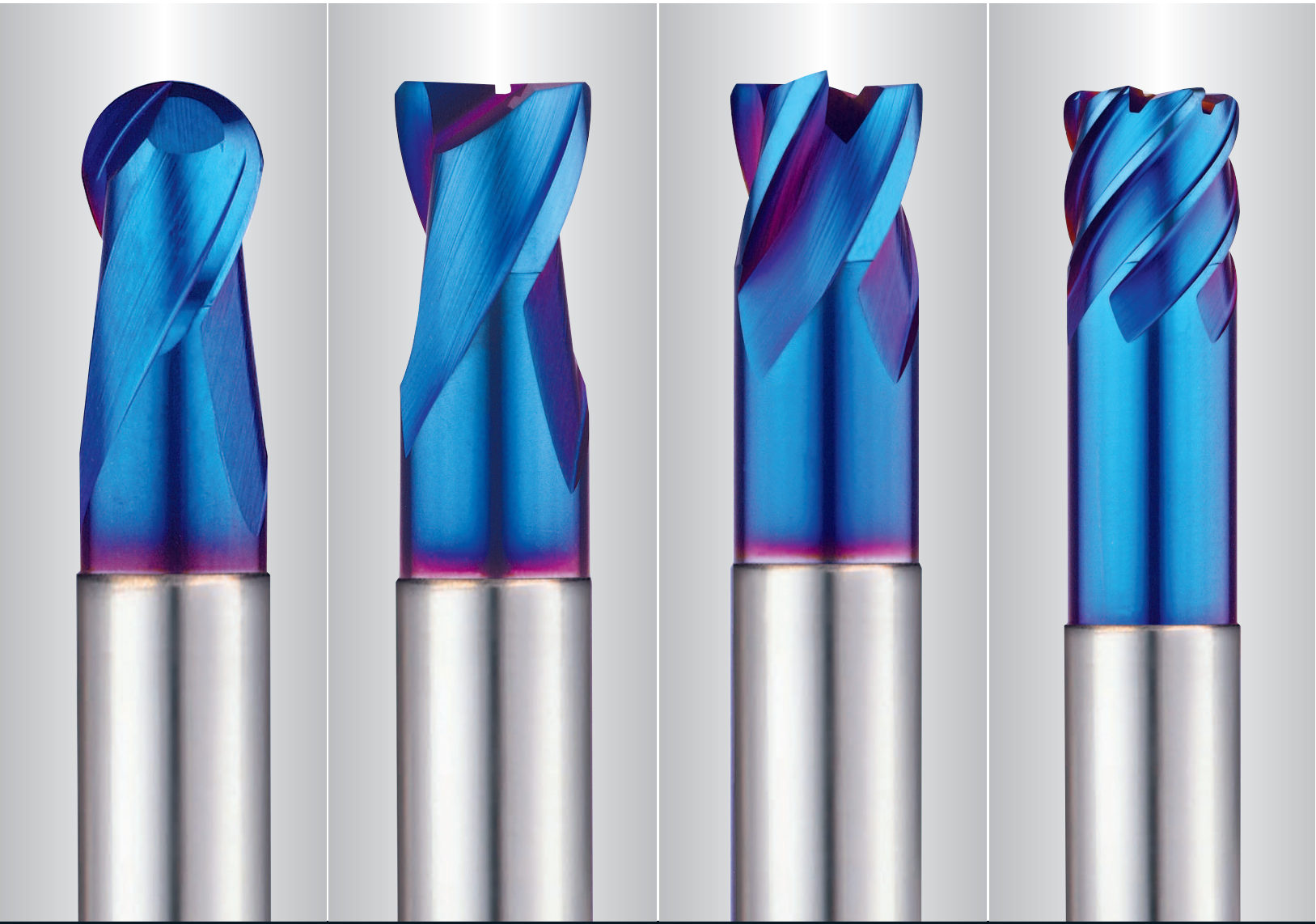
ap : Roughing - Under Ø5/8 : 0.025 x D
From Ø5/8 : 0.05 x D
Finishing - Under Ø5/8 : 0.004
From Ø5/8 : 0.008

▶ Recommend to reduce the feed rate to 70 ~ 85% when you use long (long & intermediate Type Holder)

RPM = rev./min.
FEED = inch/min.

# CARBIDE

Being the best through innovation



# X5070

- High Hardened Steels HRc45 to HRc70, High Speed Machining, Dry Cutting

# SELECTION GUIDE

| ITEM | MODEL | DESCRIPTION | SIZE | | PAGE |
|---|---|---|---|---|---|
| | | | MIN | MAX | |
| **INCH** | | | | | |
| G826 | | CARBIDE, 4FLUTE STUB LENGTH CORNER RADIUS HIGH FEED | D1/8 | D1/2 | 400 |
| G8A43 | | CARBIDE, 2 FLUTE STUB LENGTH BALL NOSE with EXTENDED NECK | R1/64 | R1/4 | 401 |
| G850 | | CARBIDE, 4 FLUTE STUB LENGTH CORNER RADIUS with EXTENDED NECK | D1/16 | D3/4 | 402 |
| G851 | | CARBIDE, 6&8 FLUTE 45° HELIX CORNER RADIUS | D1/4 | D1 | 403 |
| **METRIC** | | | | | |
| G859 | | CARBIDE, 4FLUTE STUB LENGTH CORNER RADIUS HIGH FEED | D2.0 | D12.0 | 404 |
| G854 | | CARBIDE, 4FLUTE STUB LENGTH CORNER RADIUS HIGH FEED | D2.0 | D16.0 | 405 |
| G8A46 | | CARBIDE, 2 FLUTE BALL NOSE for RIB PROCESSING | R0.05 | R2.0 | 406 |
| G8A54 | | CARBIDE, 2 FLUTE BALL NOSE for RIB PROCESSING | R0.25 | R1.0 | 410 |
| G8A28 | | CARBIDE, 2 FLUTE BALL NOSE | R0.05 | R6.0 | 411 |
| G8A38 | | CARBIDE, 2 FLUTE STUB LENGTH BALL NOSE with EXTENDED NECK | R0.5 | R12.5 | 412 |
| G8A53 | | CARBIDE, 2 FLUTE MINIATURE BALL NOSE | R0.2 | R1.0 | 413 |
| G8A59 | | CARBIDE, 3 FLUTE BALL NOSE | R1.5 | R10.0 | 414 |
| G8A36 | | CARBIDE, 2 FLUTE STUB LENGTH CORNER RADIUS with EXTENDED NECK | D0.3 | D20.0 | 415 |
| G8A50 | | CARBIDE, 2 FLUTE MINIATURE CORNER RADIUS | D0.3 | D2.0 | 417 |
| G8A47 | | CARBIDE, 4 FLUTE CORNER RADIUS with EXTENDED NECK | D3.0 | D12.0 | 418 |
| G8A37 | | CARBIDE, 4 FLUTE STUB LENGTH CORNER RADIUS with EXTENDED NECK | D1.0 | D20.0 | 419 |
| G8A39 | | CARBIDE, 6 FLUTE 45° HELIX CORNER RADIUS with EXTENDED NECK | D6.0 | D20.0 | 420 |
| | | RECOMMENDED CUTTING CONDITIONS | | | 421 |

◎ : Excellent
○ : Good

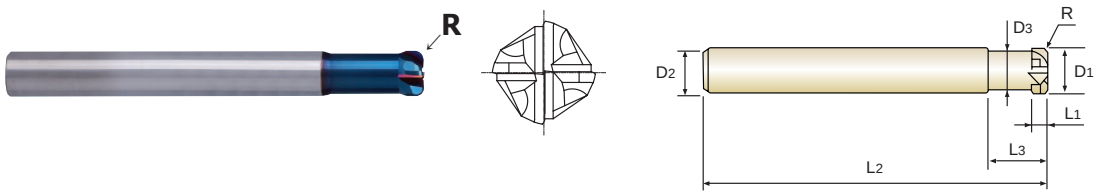
| Carbon Steels | Alloy Steels | Prehardened | Hardened Steels | | High Hardened | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~3 | HRc30~4 | HRc40~4 | HRc45~5 | HRc55~70 | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |

# X5070 END MILLS

G826 SERIES PLAIN SHANK

## CARBIDE, 4 FLUTE STUB LENGTH CORNER RADIUS HIGH FEED

- Excellent wear resistance at heavy feed rates on high hardened material.
- Designed with reduced clearance angles and short flutes for strength.
- High hardness & heat resistance coating for long life in dry applications.




NG | 4 | BLUE | PLAIN | R ±.0002 | P.421

Unit : Inch

| EDP No. | Corner Radius | Mill Diameter | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|
| | R | $D_1$ | $D_2$ | $L_1$ | $L_3$ | $L_2$ | $D_3$ |
| **G826082** | R1/32 | **1/8** | 1/4 | .050 | 3/8 | 2-1/4 | .110 |
| **G826124** | R1/16 | **3/16** | 1/4 | .075 | 3/8 | 2-1/4 | .180 |
| **G826164** | R1/16 | **1/4** | 1/4 | .100 | 1/2 | 2-1/2 | .220 |
| **G826206** | R3/32 | **5/16** | 5/16 | .130 | 5/8 | 2-1/2 | .280 |
| **G826246** | R3/32 | **3/8** | 3/8 | .150 | 3/4 | 2-3/4 | .330 |
| **G826328** | R1/8 | **1/2** | 1/2 | .200 | 1 | 3-1/4 | .460 |

The original bright blue color may discolor during use, however, the performance will not be negatively affected

| Mill Dia. Tolerance (inch) | Corner Radius Tolerance (inch) | Shank Dia. Tolerance |
|---|---|---|
| 0~−.0008 | ±.0002 | h6 |

◎ : Excellent ○ : Good

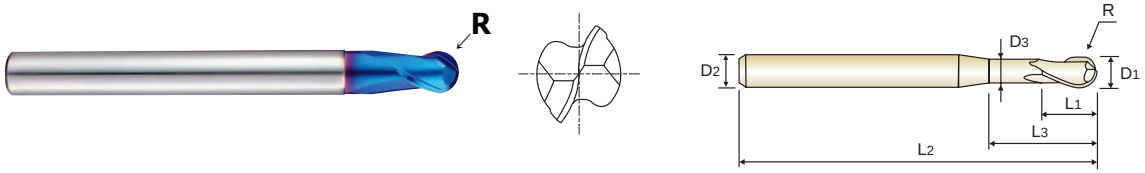
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |

# X5070 END MILLS

**G8A43 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE STUB CUT LENGTH BALL NOSE with EXTENDED NECK

- Designed to machine high hardened materials.
- Suitable for dry cutting, high speed cutting due to newly developed raw-material and new coating.
- Excellent workpiece finish.
- Designed for high precision milling operation.
- Higher wear-resistance.




NG | 2 | BLUE | 30° | R ±.0002 | R ±.0004 | PLAIN

P.422

R1/64~R1/8 R5/32~R1/4

Unit : Inch

| EDP No. | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|
| | R | D1 | D2 | L1 | L3 | L2 | D3 |
| G8A43002 | R1/64 | 1/32 | 1/4 | 1/32 | 1/16 | 2 | .029 |
| G8A43004 | R1/32 | 1/16 | 1/4 | 1/16 | 1/8 | 2 | .059 |
| G8A43006 | R3/64 | 3/32 | 1/4 | 3/32 | 3/16 | 2 | .090 |
| G8A43008 | R1/16 | 1/8 | 1/4 | 1/8 | 1/4 | 2-1/2 | .121 |
| G8A43012 | R3/32 | 3/16 | 1/4 | 3/16 | 3/8 | 3 | .184 |
| G8A43016 | R1/8 | 1/4 | 1/4 | 1/4 | 1/2 | 3-1/2 | .246 |
| G8A43020 | R5/32 | 5/16 | 5/16 | 5/16 | 5/8 | 4 | .309 |
| G8A43024 | R3/16 | 3/8 | 3/8 | 3/8 | 3/4 | 4 | .371 |
| G8A43032 | R1/4 | 1/2 | 1/2 | 1/2 | 1 | 4-1/2 | .496 |

The original bright blue color may discolor during use, however, the permance will not be negatively affected

| Size | Radius Tolerance (Inch) | Mill Dia. Tolerance (Inch) | Shank Dia. Tolerance |
|---|---|---|---|
| up to Ø1/4 | ±.0002 | 0~−.0005 | h6 |
| over Ø1/4 | ±.0004 | 0~−.0006 | |

◎ : Excellent ○ : Good

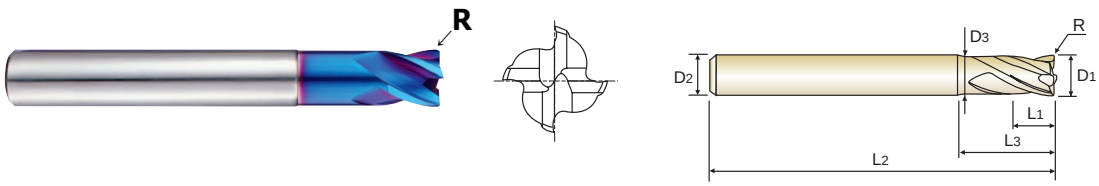
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |

# X5070 END MILLS

G850 SERIES PLAIN SHANK

## CARBIDE, 4 FLUTE STUB LENGTH CORNER RADIUS with EXTENDED NECK

- Designed to machine high hardened materials.
- Suitable for dry cutting, high speed cutting due to newly developed raw-material and new coating.
- Excellent workpiece finish.
- Deep slotting is possible by reduced neck.
- Corner radius for preventing the chipping in high speed machining.
- Higher wear-resistance.




NG | 4 | BLUE | 30° | R ±.0002 | PLAIN

P.423

Unit : Inch

| EDP No. | Corner Radius | Mill Diameter | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|
| | R | D1 | D2 | L1 | L3 | L2 | D3 |
| G85004 | R.004 | 1/16 | 1/8 | 3/32 | - | 1-1/2 | - |
| G85008 | R.004 | 1/8 | 1/4 | 5/32 | 1/4 | 2 | .119 |
| G85012 | R.004 | 3/16 | 1/4 | 1/4 | 3/8 | 2 | .181 |
| G85016 | R.008 | 1/4 | 1/4 | 5/16 | 9/16 | 2 | .238 |
| G85020 | R.008 | 5/16 | 5/16 | 3/8 | 3/4 | 2-1 | .301 |
| G85024 | R.008 | 3/8 | 3/8 | 1/2 | 1 | 3 | .363 |
| G85032 | R.012 | 1/2 | 1/2 | 5/16 | 1-3/16 | 3 | .488 |
| G85040 | R.012 | 5/8 | 5/8 | 3/4 | 1-1/2 | 3-1 | .613 |
| G85048 | R.012 | 3/4 | 3/4 | 1 | 1-3/4 | 4 | .738 |

The original bright blue color may discolor during use, however, the permance will not be negatively affected

| Size | Corner Radius Tolerance (Inch) | Mill Dia. Tolerance (Inch) | Shank Dia. Tolerance |
|---|---|---|---|
| up to Ø1/4 | ±.0002 | 0~−.0005 | h6 |
| over Ø1/4 | ±.0004 | 0~−.0006 | |

◎ : Excellent ○ : Good

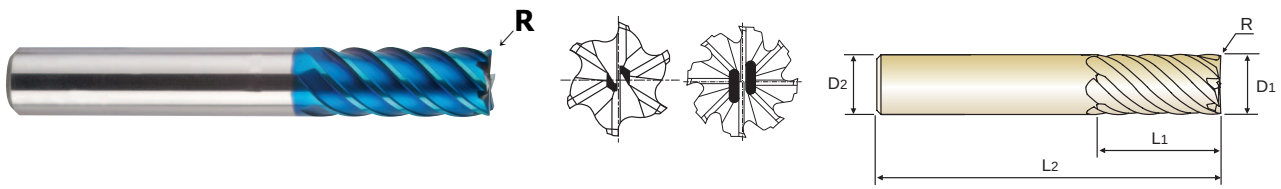
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |

# X5070 END MILLS

**G851 SERIES** PLAIN SHANK

## CARBIDE, 6&8 FLUTE 45° HELIX CORNER RADIUS

- Designed to machine high hardened materials.
- Suitable for dry cutting, high speed cutting due to newly developed raw-material and new coating.
- Excellent workpiece finish.
- Deep slotting is possible by reduced neck.
- Corner radius for preventing the chipping in high speed machining.
- Higher wear-resistance.




NG | 6&8 | BLUE | 45° | R ±.0002 | PLAIN

P.423

Unit : Inch

| EDP No. | Corner Radius R | Mill Diameter D1 | Shank Diameter D2 | Length of Cut L1 | Overall Length L2 | No. of Flute |
|---|---|---|---|---|---|---|
| G85116 | R.02 | 1/4 | 1/4 | 1/2 | 2-1/4 | 6 |
| G85120 | R.02 | 5/16 | 5/16 | 3/4 | 2-1/2 | 6 |
| G85125 | R.03 | 3/8 | 3/8 | 7/8 | 2-7/8 | 6 |
| G85133 | R.03 | 1/2 | 1/2 | 1 | 3-1/4 | 6 |
| G85140 | R.03 | 5/8 | 5/8 | 1-1/4 | 3-5/8 | 6 |
| G85141 | R.06 | 5/8 | 5/8 | 1-1/4 | 3-5/8 | 6 |
| G85148 | R.03 | 3/4 | 3/4 | 1-1/2 | 4-1/8 | 8 |
| G85149 | R.06 | 3/4 | 3/4 | 1-1/2 | 4-1/8 | 8 |
| G85164 | R.03 | 1 | 1 | 1-3/4 | 4-1/4 | 8 |
| G85165 | R.06 | 1 | 1 | 1-3/4 | 4-1/4 | 8 |
| G85167 | R.03 | 1 | 1 | 4-1/8 | 7 | 8 |
| G85168 | R.06 | 1 | 1 | 4-1/8 | 7 | 8 |

The original bright blue color may discolor during use, however, the permance will not be negatively affected

| Size | Corner Radius Tolerance (Inch) | Mill Dia. Tolerance (Inch) | Shank Dia. Tolerance |
|---|---|---|---|
| up to Ø1/4 | ±.0002 | 0~−.0005 | h6 |
| over Ø1/4 | ±.0004 | 0~−.0006 | |

◎ : Excellent ○ : Good

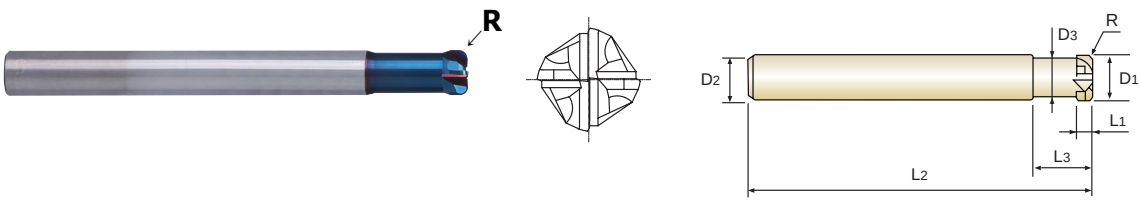
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |

# YG X5070 END MILLS

G859 SERIES PLAIN SHANK

## CARBIDE, 4 FLUTE STUB LENGTH CORNER RADIUS HIGH FEED

- Excellent wear resistance at heavy feed rates on high hardened material.
- Designed with reduced clearance angles and short flutes for strength.
- High hardness & heat resistance coating for long life in dry applications.




NG | 4 | BLUE | PLAIN | R ±0.005 | P.424

Unit : mm

| EDP No. | Corner Radius | Mill Diameter | | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|
| | | Metric | Inch | | | | | |
| | R | D1 | | D2 | L1 | L3 | L2 | D3 |
| G859020 | R0.5 | 2.0 | .0787 | 6 | 1 | 6 | 50 | 1.8 |
| G859030 | R0.5 | 3.0 | .1181 | 6 | 1.2 | 8 | 50 | 2.8 |
| G859040 | R0.5 | 4.0 | .1575 | 6 | 1.5 | 10 | 50 | 3.8 |
| G859060 | R0.5 | 6.0 | .2362 | 6 | 2.5 | 12 | 60 | 5.4 |
| G859061 | R1.0 | 6.0 | .2362 | 6 | 2.5 | 12 | 60 | 5.4 |
| G859081 | R1.0 | 8.0 | .3150 | 8 | 3.5 | 16 | 60 | 7.2 |
| G859082 | R2.0 | 8.0 | .3150 | 8 | 3.5 | 16 | 60 | 7.2 |
| G859101 | R1.0 | 10.0 | .3937 | 10 | 4 | 20 | 70 | 9 |
| G859102 | R2.0 | 10.0 | .3937 | 10 | 4 | 20 | 70 | 9 |
| G859122 | R2.0 | 12.0 | .4724 | 12 | 5 | 25 | 80 | 11 |
| G859123 | R3.0 | 12.0 | .4724 | 12 | 5 | 25 | 80 | 11 |
| G859163 | R3.0 | 16.0 | .6299 | 16 | 6.5 | 30 | 90 | 15 |

The original bright blue color may discolor during use, however, the permance will not be negatively affected

| Mill Dia. Tolerance (inch) | Corner Radius Tolerance (inch) | Shank Dia. Tolerance |
|---|---|---|
| 0 ~ −.0008 | ±.0002 | h6 |

◎ : Excellent ○ : Good

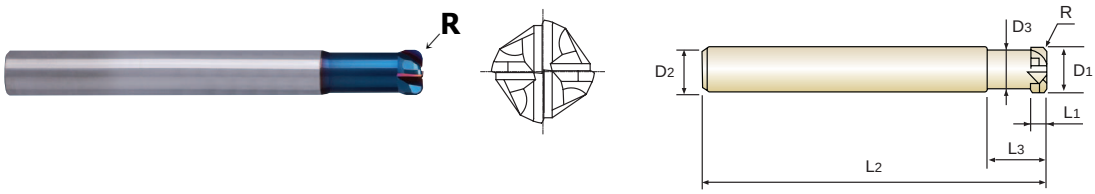
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |

# X5070 END MILLS

**G854 SERIES** PLAIN SHANK

## CARBIDE, 4 FLUTE STUB LENGTH CORNER RADIUS HIGH FEED

- Excellent wear resistance at heavy feed rates on high hardened material.
- Designed with reduced clearance angles and short flutes for strength.
- High hardness & heat resistance coating for long life in dry applications.




NG | 4 | BLUE | PLAIN | R ±0.005 | P.424

Unit : mm

| EDP No. | Corner Radius | Mill Diameter | | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|
| | | Metric | Inch | | | | | |
| | R | $D_1$ | | $D_2$ | $L_1$ | $L_3$ | $L_2$ | $D_3$ |
| G854020 | R0.5 | 2.0 | .0787 | 6 | 1 | 6 | 70 | 1.8 |
| G854030 | R0.5 | 3.0 | .1181 | 6 | 1.2 | 8 | 70 | 2.8 |
| G854040 | R0.5 | 4.0 | .1575 | 6 | 1.5 | 10 | 70 | 3.8 |
| G854050 | R1.0 | 5.0 | .1969 | 6 | 2 | 10 | 70 | 4.6 |
| G854060 | R0.5 | 6.0 | .2362 | 6 | 2.5 | 12 | 90 | 5.4 |
| G854061 | R1.0 | 6.0 | .2362 | 6 | 2.5 | 12 | 90 | 5.4 |
| G854062 | R1.5 | 6.0 | .2362 | 6 | 2.5 | 12 | 90 | 5.4 |
| G854081 | R1.0 | 8.0 | .3150 | 8 | 3.5 | 16 | 100 | 7.2 |
| G854082 | R2.0 | 8.0 | .3150 | 8 | 3.5 | 16 | 100 | 7.2 |
| G854101 | R1.0 | 10.0 | .3937 | 10 | 4 | 20 | 100 | 9 |
| G854102 | R2.0 | 10.0 | .3937 | 10 | 4 | 20 | 100 | 9 |
| G854122 | R2.0 | 12.0 | .4724 | 12 | 5 | 25 | 110 | 11 |
| G854123 | R3.0 | 12.0 | .4724 | 12 | 5 | 25 | 110 | 11 |
| G854163 | R3.0 | 16.0 | .6299 | 16 | 6.5 | 30 | 130 | 15 |

The original bright blue color may discolor during use, however, the permance will not be negatively affected

| Mill Dia. Tolerance (inch) | Corner Radius Tolerance (inch) | Shank Dia. Tolerance |
|---|---|---|
| 0 ~ −.0008 | ±.0002 | h6 |

◎ : Excellent ○ : Good

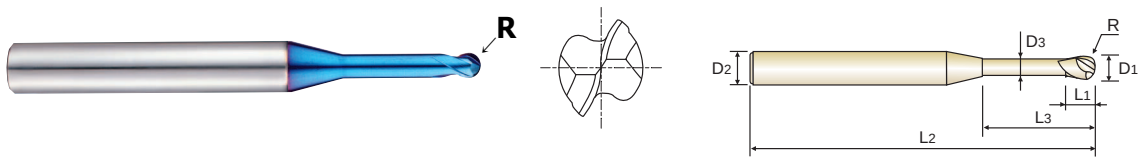
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |

# X5070 END MILLS

G8A46 SERIES PLAIN SHANK

## CARBIDE, 2 FLUTE BALL NOSE for RIB PROCESSING

- Designed to machine high hardened materials.
- Suitable for dry cutting, high speed cutting thanks to newly developed raw-material and new coating.
- Excellent workpiece finish.
- Designed for high precision milling operation.
- Higher wear-resistance.




NG | 2 | BLUE | 30° | R ±0.005 | PLAIN

P.425

Unit : mm

| EDP No. | Radius of Ball Nose | Mill Diameter | | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|
| | | Metric | Inch | | | | | |
| | R (±0.005) | D1 | | D2 | L1 | L3 | L2 | D3 |
| G8A46805 | R0.05 | 0.1 | 0.0039 | 4 | 0.1 | 0.3 | 45 | 0.085 |
| G8A46806 | R0.05 | 0.1 | 0.0039 | 4 | 0.1 | 0.5 | 45 | 0.085 |
| G8A46002 | R0.1 | 0.2 | 0.0079 | 4 | 0.2 | 0.5 | 45 | 0.17 |
| G8A46977 | R0.1 | 0.2 | 0.0079 | 4 | 0.2 | 1 | 45 | 0.17 |
| G8A46958 | R0.1 | 0.2 | 0.0079 | 4 | 0.2 | 1.5 | 45 | 0.17 |
| G8A46003 | R0.15 | 0.3 | 0.0118 | 4 | 0.3 | 1 | 45 | 0.27 |
| G8A46959 | R0.15 | 0.3 | 0.0118 | 4 | 0.3 | 2 | 45 | 0.27 |
| G8A46986 | R0.15 | 0.3 | 0.0118 | 4 | 0.3 | 3 | 45 | 0.27 |
| G8A46004 | R0.2 | 0.4 | 0.0157 | 4 | 0.4 | 1 | 45 | 0.37 |
| G8A46960 | R0.2 | 0.4 | 0.0157 | 4 | 0.4 | 2 | 45 | 0.37 |
| G8A46961 | R0.2 | 0.4 | 0.0157 | 4 | 0.4 | 3 | 45 | 0.37 |
| G8A46981 | R0.2 | 0.4 | 0.0157 | 4 | 0.4 | 4 | 45 | 0.37 |
| G8A46987 | R0.2 | 0.4 | 0.0157 | 4 | 0.4 | 5 | 45 | 0.37 |
| G8A46005 | R0.25 | 0.5 | 0.0197 | 4 | 0.4 | 2 | 45 | 0.45 |
| G8A46804 | R0.25 | 0.5 | 0.0197 | 4 | 0.4 | 2.5 | 45 | 0.45 |
| G8A46962 | R0.25 | 0.5 | 0.0197 | 4 | 0.4 | 4 | 45 | 0.45 |
| G8A46963 | R0.25 | 0.5 | 0.0197 | 4 | 0.4 | 6 | 45 | 0.45 |
| G8A46964 | R0.25 | 0.5 | 0.0197 | 4 | 0.4 | 8 | 45 | 0.45 |
| G8A46957 | R0.3 | 0.6 | 0.0236 | 4 | 0.5 | 2 | 45 | 0.55 |
| G8A46988 | R0.3 | 0.6 | 0.0236 | 4 | 0.5 | 3 | 45 | 0.55 |
| G8A46915 | R0.3 | 0.6 | 0.0236 | 4 | 0.5 | 4 | 45 | 0.55 |
| G8A46989 | R0.3 | 0.6 | 0.0236 | 4 | 0.5 | 5 | 45 | 0.55 |

The original bright blue color may discolor during use, however, the permance will not be negatively affected

◎ : Excellent ○ : Good

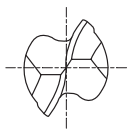
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |

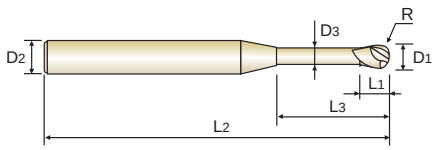
# X5070 END MILLS

**G8A46 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE BALL NOSE for RIB PROCESSING

- Designed to machine high hardened materials.
- Suitable for dry cutting, high speed cutting thanks to newly developed raw-material and new coating.
- Excellent workpiece finish.
- Designed for high precision milling operation.
- Higher wear-resistance.






NG | 2 | BLUE | 30° | R ±0.005 | PLAIN

P.425

Unit : mm

| EDP No. | Radius of Ball Nose | Mill Diameter | | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|
| | | Metric | Inch | | | | | |
| | R (±0.005) | D1 | | D2 | L1 | L3 | L2 | D3 |
| G8A46916 | R0.3 | 0.6 | 0.0236 | 4 | 0.5 | 6 | 45 | 0.55 |
| G8A46917 | R0.3 | 0.6 | 0.0236 | 4 | 0.5 | 8 | 45 | 0.55 |
| G8A46990 | R0.3 | 0.6 | 0.0236 | 4 | 0.5 | 10 | 45 | 0.55 |
| G8A46918 | R0.4 | 0.8 | 0.0315 | 4 | 0.6 | 2 | 45 | 0.75 |
| G8A46919 | R0.4 | 0.8 | 0.0315 | 4 | 0.6 | 4 | 45 | 0.75 |
| G8A46008 | R0.4 | 0.8 | 0.0315 | 4 | 0.6 | 6 | 45 | 0.75 |
| G8A46901 | R0.4 | 0.8 | 0.0315 | 4 | 0.6 | 8 | 45 | 0.75 |
| G8A46965 | R0.4 | 0.8 | 0.0315 | 4 | 0.6 | 10 | 45 | 0.75 |
| G8A46920 | R0.5 | 1.0 | 0.0394 | 4 | 0.8 | 3 | 45 | 0.95 |
| G8A46921 | R0.5 | 1.0 | 0.0394 | 4 | 0.8 | 4 | 45 | 0.95 |
| G8A46923 | R0.5 | 1.0 | 0.0394 | 4 | 0.8 | 5 | 45 | 0.95 |
| G8A46010 | R0.5 | 1.0 | 0.0394 | 4 | 0.8 | 6 | 45 | 0.95 |
| G8A46924 | R0.5 | 1.0 | 0.0394 | 4 | 0.8 | 7 | 45 | 0.95 |
| G8A46902 | R0.5 | 1.0 | 0.0394 | 4 | 0.8 | 8 | 45 | 0.95 |
| G8A46925 | R0.5 | 1.0 | 0.0394 | 4 | 0.8 | 9 | 45 | 0.95 |
| G8A46903 | R0.5 | 1.0 | 0.0394 | 4 | 0.8 | 10 | 45 | 0.95 |
| G8A46904 | R0.5 | 1.0 | 0.0394 | 4 | 0.8 | 12 | 45 | 0.95 |
| G8A46926 | R0.5 | 1.0 | 0.0394 | 4 | 0.8 | 14 | 50 | 0.95 |
| G8A46927 | R0.5 | 1.0 | 0.0394 | 4 | 0.8 | 16 | 50 | 0.95 |
| G8A46966 | R0.5 | 1.0 | 0.0394 | 4 | 0.8 | 20 | 55 | 0.95 |
| G8A46982 | R0.6 | 1.2 | 0.0472 | 4 | 1.0 | 6 | 45 | 1.15 |
| G8A46012 | R0.6 | 1.2 | 0.0472 | 4 | 1.0 | 8 | 45 | 1.15 |

The original bright blue color may discolor during use, however, the permance will not be negatively affected

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |

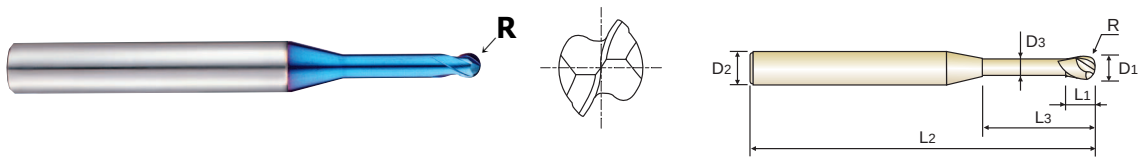
CBN END MILL
i-Xmill END MILL
X5070 END MILLS
X-SPEED ROUGHER END MILLS
X-POWER END MILLS
JET-POWER END MILLS
V7 Mill STEEL END MILLS
V7 Mill INOX END MILLS
ALU-POWER END MILLS
D-POWER END MILLS
STANDARD CARBIDE END MILLS
TANK-POWER END MILLS
STANDARD COBALT & HSS END MILLS
TECHNICAL DATA

# X5070 END MILLS

**G8A46 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE BALL NOSE for RIB PROCESSING

- Designed to machine high hardened materials.
- Suitable for dry cutting, high speed cutting thanks to newly developed raw-material and new coating.
- Excellent workpiece finish.
- Designed for high precision milling operation.
- Higher wear-resistance.




NG | 2 | BLUE | 30° | R ±0.005 | PLAIN

P.425

Unit : mm

| EDP No. | Radius of Ball Nose | Mill Diameter | | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|
| | | Metric | Inch | | | | | |
| | R (±0.005) | D1 | | D2 | L1 | L3 | L2 | D3 |
| G8A46983 | R0.6 | 1.2 | 0.0472 | 4 | 1.0 | 10 | 45 | 1.15 |
| G8A46905 | R0.6 | 1.2 | 0.0472 | 4 | 1.0 | 12 | 45 | 1.15 |
| G8A46930 | R0.75 | 1.5 | 0.0472 | 4 | 1.2 | 6 | 45 | 1.45 |
| G8A46015 | R0.75 | 1.5 | 0.0472 | 4 | 1.2 | 8 | 45 | 1.45 |
| G8A46931 | R0.75 | 1.5 | 0.0472 | 4 | 1.2 | 10 | 45 | 1.45 |
| G8A46906 | R0.75 | 1.5 | 0.0472 | 4 | 1.2 | 12 | 45 | 1.45 |
| G8A46992 | R0.75 | 1.5 | 0.0472 | 4 | 1.2 | 14 | 50 | 1.45 |
| G8A46907 | R0.75 | 1.5 | 0.0472 | 4 | 1.2 | 16 | 50 | 1.45 |
| G8A46932 | R0.75 | 1.5 | 0.0472 | 4 | 1.2 | 20 | 55 | 1.45 |
| G8A46939 | R1.0 | 2.0 | 0.0787 | 4 | 1.6 | 4 | 45 | 1.95 |
| G8A46940 | R1.0 | 2.0 | 0.0787 | 4 | 1.6 | 6 | 45 | 1.95 |
| G8A46020 | R1.0 | 2.0 | 0.0787 | 4 | 1.6 | 8 | 45 | 1.95 |
| G8A46941 | R1.0 | 2.0 | 0.0787 | 4 | 1.6 | 10 | 45 | 1.95 |
| G8A46942 | R1.0 | 2.0 | 0.0787 | 4 | 1.6 | 12 | 50 | 1.95 |
| G8A46943 | R1.0 | 2.0 | 0.0787 | 4 | 1.6 | 14 | 50 | 1.95 |
| G8A46909 | R1.0 | 2.0 | 0.0787 | 4 | 1.6 | 16 | 50 | 1.95 |
| G8A46993 | R1.0 | 2.0 | 0.0787 | 4 | 1.6 | 18 | 55 | 1.95 |
| G8A46910 | R1.0 | 2.0 | 0.0787 | 4 | 1.6 | 20 | 55 | 1.95 |
| G8A46944 | R1.0 | 2.0 | 0.0787 | 4 | 1.6 | 22 | 60 | 1.95 |
| G8A46945 | R1.0 | 2.0 | 0.0787 | 4 | 1.6 | 25 | 60 | 1.95 |
| G8A46967 | R1.0 | 2.0 | 0.0787 | 4 | 1.6 | 30 | 70 | 1.95 |
| G8A46948 | R1.5 | 3.0 | 0.1181 | 6 | 2.4 | 12 | 50 | 2.85 |

The original bright blue color may discolor during use, however, the permance will not be negatively affected

◎ : Excellent ○ : Good

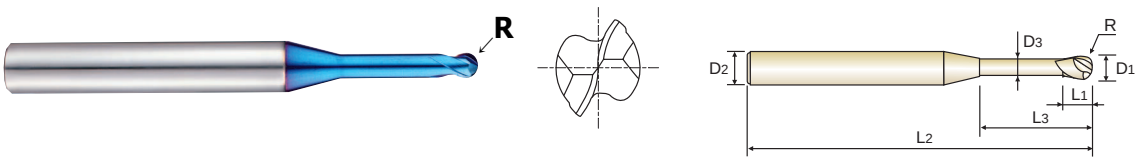
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |

# X5070 END MILLS

**G8A46 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE BALL NOSE for RIB PROCESSING

- Designed to machine high hardened materials.
- Suitable for dry cutting, high speed cutting thanks to newly developed raw-material and new coating.
- Excellent workpiece finish.
- Designed for high precision milling operation.
- Higher wear-resistance.




NG | 2 | BLUE | 30° | R ±0.005 | PLAIN

P.425

Unit : mm

| EDP No. | Radius of Ball Nose | Mill Diameter | | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|
| | | Metric | Inch | | | | | |
| | R (±0.005) | D1 | | D2 | L1 | L3 | L2 | D3 |
| G8A46984 | R1.5 | 3.0 | 0.1181 | 6 | 2.4 | 14 | 55 | 2.85 |
| G8A46030 | R1.5 | 3.0 | 0.1181 | 6 | 2.4 | 16 | 55 | 2.85 |
| G8A46985 | R1.5 | 3.0 | 0.1181 | 6 | 2.4 | 18 | 60 | 2.85 |
| G8A46911 | R1.5 | 3.0 | 0.1181 | 6 | 2.4 | 20 | 60 | 2.85 |
| G8A46968 | R1.5 | 3.0 | 0.1181 | 6 | 2.4 | 25 | 65 | 2.85 |
| G8A46969 | R1.5 | 3.0 | 0.1181 | 6 | 2.4 | 30 | 70 | 2.85 |
| G8A46970 | R1.5 | 3.0 | 0.1181 | 6 | 2.4 | 35 | 80 | 2.85 |
| G8A46950 | R2.0 | 4.0 | 0.1575 | 6 | 3.2 | 12 | 60 | 3.85 |
| G8A46040 | R2.0 | 4.0 | 0.1575 | 6 | 3.2 | 16 | 60 | 3.85 |
| G8A46912 | R2.0 | 4.0 | 0.1575 | 6 | 3.2 | 20 | 65 | 3.85 |
| G8A46913 | R2.0 | 4.0 | 0.1575 | 6 | 3.2 | 25 | 70 | 3.85 |
| G8A46971 | R2.0 | 4.0 | 0.1575 | 6 | 3.2 | 30 | 70 | 3.85 |
| G8A46972 | R2.0 | 4.0 | 0.1575 | 6 | 3.2 | 35 | 80 | 3.85 |
| G8A46973 | R2.0 | 4.0 | 0.1575 | 6 | 3.2 | 40 | 90 | 3.85 |
| G8A46974 | R2.0 | 4.0 | 0.1575 | 6 | 3.2 | 45 | 90 | 3.85 |
| G8A46975 | R2.0 | 4.0 | 0.1575 | 6 | 3.2 | 50 | 100 | 3.85 |

The original bright blue color may discolor during use, however, the permance will not be negatively affected

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.012 | h6 |

◎ : Excellent ○ : Good

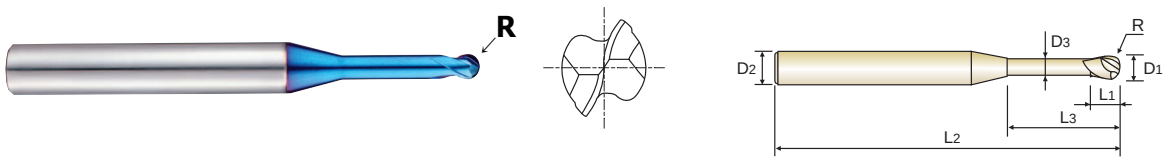
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |

# X5070 END MILLS

G8A54 SERIES PLAIN SHANK

## CARBIDE, 2 FLUTE BALL NOSE for RIB PROCESSING

- Designed to machine high hardened materials.
- Suitable for dry cutting, high speed cutting thanks to newly developed raw-material and new coating.
- Excellent workpiece finish.
- Designed for high precision milling operation.
- Higher wear-resistance.




NG | 2 | BLUE | 30° | R ±0.005 | PLAIN P.425

Unit : mm

| EDP No. | Radius of Ball Nose | Mill Diameter | | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|
| | | Metric | Inch | | | | | |
| | R (±0.005) | D1 | | D2 | L1 | L3 | L2 | D3 |
| G8A54005 | R0.25 | 0.5 | 0.0197 | 6 | 0.5 | 1.5 | 50 | 0.45 |
| G8A54901 | R0.25 | 0.5 | 0.0197 | 6 | 0.5 | 3.3 | 50 | 0.45 |
| G8A54006 | R0.3 | 0.6 | 0.0236 | 6 | 0.6 | 2 | 50 | 0.55 |
| G8A54902 | R0.3 | 0.6 | 0.0236 | 6 | 0.6 | 4 | 50 | 0.55 |
| G8A54008 | R0.4 | 0.8 | 0.0315 | 6 | 0.8 | 2.5 | 50 | 0.75 |
| G8A54903 | R0.4 | 0.8 | 0.0315 | 6 | 0.8 | 5.5 | 50 | 0.75 |
| G8A54010 | R0.5 | 1.0 | 0.0394 | 6 | 1 | 3.3 | 50 | 0.95 |
| G8A54904 | R0.5 | 1.0 | 0.0394 | 6 | 1 | 6.7 | 50 | 0.95 |
| G8A54905 | R0.5 | 1.0 | 0.0394 | 6 | 1 | 12 | 50 | 0.95 |
| G8A54012 | R0.6 | 1.2 | 0.0472 | 6 | 1.2 | 4.4 | 50 | 1.15 |
| G8A54906 | R0.6 | 1.2 | 0.0472 | 6 | 1.2 | 8 | 50 | 1.15 |
| G8A54015 | R0.75 | 1.5 | 0.0591 | 6 | 1.5 | 5 | 50 | 1.45 |
| G8A54907 | R0.75 | 1.5 | 0.0591 | 6 | 1.5 | 9.7 | 50 | 1.45 |
| G8A54908 | R0.75 | 1.5 | 0.0591 | 6 | 1.5 | 15 | 50 | 1.45 |
| G8A54020 | R1.0 | 2.0 | 0.0787 | 6 | 2 | 6 | 50 | 1.95 |
| G8A54909 | R1.0 | 2.0 | 0.0787 | 6 | 2 | 13 | 50 | 1.95 |
| G8A54910 | R1.0 | 2.0 | 0.0787 | 6 | 2 | 20 | 60 | 1.95 |

The original bright blue color may discolor during use, however, the permance will not be negatively affected

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.012 | h6 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |

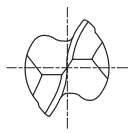
# X5070 END MILLS

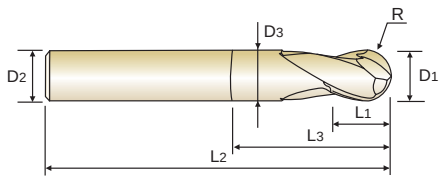
**G8A28 SERIES** PLAIN SHANK



## CARBIDE, 2 FLUTE BALL NOSE

- Designed to machine high hardened materials.
- Suitable for dry cutting, high speed cutting thanks to newly developed raw-material and new coating.
- Excellent workpiece finish.
- Designed for high precision milling operation.
- Higher wear-resistance.






NG | 2 | BLUE | 30° | R ±0.005 (R0.5~R3) | R ±0.010 (R3.5~R6) | PLAIN

P.428

Unit : mm

| EDP No. | Radius of Ball Nose | Mill Diameter | | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|
| | | Metric | Inch | | | | | |
| | R | $D_1$ | | $D_2$ | $L_1$ | $L_3$ | $L_2$ | $D_3$ |
| G8A28001 | R0.05 | 0.1 | 0.0039 | 4 | 0.2 | - | 40 | - |
| G8A28002 | R0.1 | 0.2 | 0.0079 | 4 | 0.3 | - | 40 | - |
| G8A28003 | R0.15 | 0.3 | 0.0118 | 4 | 0.5 | - | 40 | - |
| G8A28004 | R0.2 | 0.4 | 0.0157 | 4 | 0.6 | - | 40 | - |
| G8A28005 | R0.25 | 0.5 | 0.0197 | 4 | 0.7 | - | 40 | - |
| G8A28006 | R0.3 | 0.6 | 0.0236 | 4 | 0.9 | - | 40 | - |
| G8A28007 | R0.35 | 0.7 | 0.0276 | 4 | 1.1 | - | 40 | - |
| G8A28008 | R0.4 | 0.8 | 0.0315 | 4 | 1.2 | - | 40 | - |
| G8A28009 | R0.45 | 0.9 | 0.0354 | 4 | 1.4 | - | 40 | - |
| G8A28010 | R0.5 | 1.0 | 0.0394 | 6 | 1.5 | 3 | 50 | 0.95 |
| G8A28015 | R0.75 | 1.5 | 0.0591 | 6 | 2 | 4 | 50 | 1.45 |
| G8A28020 | R1.0 | 2.0 | 0.0787 | 6 | 2.5 | 5 | 50 | 1.95 |
| G8A28025 | R1.25 | 2.5 | 0.0984 | 6 | 3 | 7 | 50 | 2.4 |
| G8A28030 | R1.5 | 3.0 | 0.1181 | 6 | 4 | 10 | 60 | 2.85 |
| G8A28035 | R1.75 | 3.5 | 0.1378 | 6 | 4.5 | 10 | 60 | 3.35 |
| G8A28040 | R2.0 | 4.0 | 0.1575 | 6 | 5 | 10 | 60 | 3.85 |
| G8A28045 | R2.25 | 4.5 | 0.1772 | 6 | 5.5 | 10 | 60 | 4.35 |
| G8A28050 | R2.5 | 5.0 | 0.1969 | 6 | 6 | 12 | 60 | 4.85 |
| G8A28055 | R2.75 | 5.5 | 0.2165 | 6 | 6.5 | 12 | 60 | 5.35 |
| G8A28060 | R3.0 | 6.0 | 0.2362 | 6 | 7 | 15 | 60 | 5.85 |
| G8A28903 | R3.0 | 6.0 | 0.2362 | 6 | 9 | 30 | 90 | 5.85 |
| G8A28901 | R4.0 | 8.0 | 0.3150 | 8 | 9 | 15 | 60 | 7.7 |
| G8A28080 | R4.0 | 8.0 | 0.3150 | 8 | 9 | 15 | 80 | 7.7 |
| G8A28904 | R4.0 | 8.0 | 0.3150 | 8 | 12 | 30 | 100 | 7.7 |
| G8A28902 | R5.0 | 10.0 | 0.3937 | 10 | 11 | 25 | 60 | 9.7 |
| G8A28100 | R5.0 | 10.0 | 0.3937 | 10 | 11 | 25 | 80 | 9.7 |
| G8A28905 | R5.0 | 10.0 | 0.3937 | 10 | 15 | 30 | 100 | 9.7 |
| G8A28120 | R6.0 | 12.0 | 0.4724 | 12 | 14 | 25 | 80 | 11.7 |

| Size | Radius Tolerance (mm) | Mill Dia. Tolerance (mm) | Shank Dia. Tolerance |
|---|---|---|---|
| up to R3 | ±0.005 | 0~−0.012 | h6 |
| over R3 | ±0.010 | 0~−0.015 | |

The original bright blue color may discolor during use, however, the permance will not be negatively affected

◎ : Excellent ○ : Good

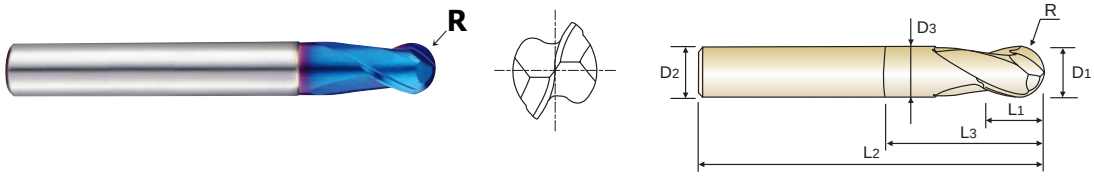
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |

# YG X5070 END MILLS

**G8A38 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE STUB LENGTH BALL NOSE with EXTENDED NECK

- Designed to machine high hardened materials.
- Suitable for dry cutting, high speed cutting due to newly developed raw-material and new coating.
- Excellent workpiece finish.
- Designed for high precision milling operation.
- Higher wear-resistance.




NG | 2 | BLUE | 30° | R ±0.005 (R0.5~R3) | R ±0.010 (R3.5~R12.5) | PLAIN P.428

Unit : mm

| EDP No. | Radius of Ball Nose | Mill Diameter | | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|
| | | Metric | Inch | | | | | |
| | R | D1 | | D2 | L1 | L3 | L2 | D3 |
| G8A38010 | R0.5 | 1.0 | .0394 | 4 | 1 | 2.2 | 50 | 0.95 |
| G8A38012 | R0.6 | 1.2 | .0472 | 4 | 1.2 | 2.6 | 50 | 1.15 |
| G8A38015 | R0.75 | 1.5 | .0591 | 4 | 1.5 | 3 | 50 | 1.45 |
| G8A38020 | R1.0 | 2.0 | .0787 | 6 | 2 | 4 | 50 | 1.95 |
| G8A38030 | R1.5 | 3.0 | .1181 | 6 | 3 | 6 | 60 | 2.85 |
| G8A38040 | R2.0 | 4.0 | .1575 | 6 | 4 | 8 | 70 | 3.85 |
| G8A38050 | R2.5 | 5.0 | .1969 | 6 | 5 | 10 | 80 | 4.85 |
| G8A38060 | R3.0 | 6.0 | .2362 | 6 | 6 | 12 | 90 | 5.85 |
| G8A38070 | R3.5 | 7.0 | .2756 | 8 | 7 | 14 | 90 | 6.7 |
| G8A38080 | R4.0 | 8.0 | .3150 | 8 | 8 | 16 | 100 | 7.7 |
| G8A38090 | R4.5 | 9.0 | .3543 | 10 | 9 | 18 | 100 | 8.7 |
| G8A38100 | R5.0 | 10.0 | .3937 | 10 | 10 | 20 | 100 | 9.7 |
| G8A38120 | R6.0 | 12.0 | .4724 | 12 | 12 | 24 | 110 | 11.7 |
| G8A38140 | R7.0 | 14.0 | .5512 | 14 | 14 | 28 | 110 | 13.7 |
| G8A38160 | R8.0 | 16.0 | .6299 | 16 | 16 | 32 | 140 | 15.7 |
| G8A38180 | R9.0 | 18.0 | .7087 | 18 | 18 | 36 | 140 | 17.7 |
| G8A38200 | R10.0 | 20.0 | .7874 | 20 | 20 | 40 | 160 | 19.7 |
| G8A38250 | R12.5 | 25.0 | .9843 | 25 | 25 | 50 | 180 | 24.7 |

The original bright blue color may discolor during use, however, the permance will not be negatively affected

| Size | Radius Tolerance (mm) | Mill Dia. Tolerance (mm) | Shank Dia. Tolerance |
|---|---|---|---|
| up to R3 | ±0.005 | 0~−0.012 | h6 |
| over R3 | ±0.010 | 0~−0.015 | |

◎ : Excellent ○ : Good

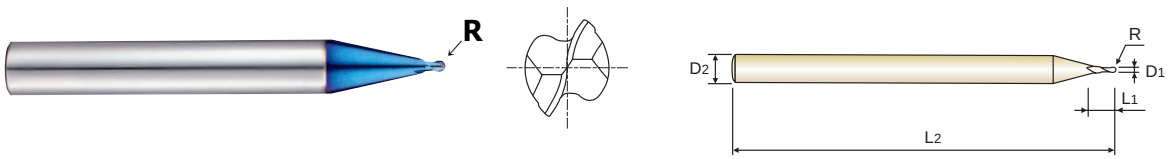
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |

# X5070 END MILLS

**G8A53 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE MINIATURE BALL NOSE

- Designed to machine high hardened materials.
- Suitable for dry cutting, high speed cutting thanks to newly developed raw-material and new coating.
- Excellent workpiece finish.
- Designed for high precision milling operation.
- Higher wear-resistance.




NG | 2 | BLUE | 30° | R ±0.005 | PLAIN

P.428

Unit : mm

| EDP No. | Radius of Ball Nose | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| | | Metric | Inch | | | |
| | R (±0.005) | $D_1$ | | $D_2$ | $L_1$ | $L_2$ |
| G8A53004 | R0.2 | 0.4 | 0.0157 | 6 | 0.4 | 50 |
| G8A53005 | R0.25 | 0.5 | 0.0197 | 6 | 0.5 | 50 |
| G8A53006 | R0.3 | 0.6 | 0.0236 | 6 | 0.6 | 50 |
| G8A53008 | R0.4 | 0.8 | 0.0315 | 6 | 0.8 | 50 |
| G8A53010 | R0.5 | 1.0 | 0.0394 | 6 | 1.0 | 50 |
| G8A53012 | R0.6 | 1.2 | 0.0472 | 6 | 1.2 | 50 |
| G8A53015 | R0.75 | 1.5 | 0.0591 | 6 | 1.5 | 50 |
| G8A53020 | R1.0 | 2.0 | 0.0787 | 6 | 2.0 | 50 |

The original bright blue color may discolor during use, however, the permance will not be negatively affected

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.012 | h6 |

◎ : Excellent ○ : Good

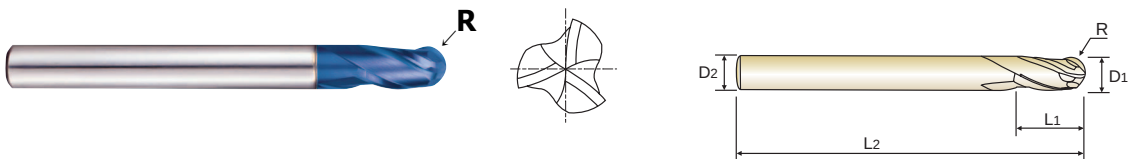
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |

# X5070 END MILLS

G8A59 SERIES PLAIN SHANK

## CARBIDE, 3 FLUTE BALL NOSE

- Designed to machine high hardened materials.
- Suitable for dry cutting, high speed cutting thanks to newly developed raw-material and new coating.
- Excellent workpiece finish.
- Designed for high precision milling operation.
- Higher wear-resistance.




NG | 3 | BLUE | 30° | R ±0.005 (R1.5~R3) | R ±0.010 (R4~R10) | PLAIN P.425

Unit : mm

| EDP No. | Radius of Ball Nose | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| | | Metric | Inch | | | |
| | R | $D_1$ | | $D_2$ | $L_1$ | $L_2$ |
| G8A59030 | R1.5 | 3.0 | 0.1181 | 6 | 8 | 60 |
| G8A59040 | R2.0 | 4.0 | 0.1575 | 6 | 8 | 70 |
| G8A59050 | R2.5 | 5.0 | 0.1969 | 6 | 10 | 80 |
| G8A59060 | R3.0 | 6.0 | 0.2362 | 6 | 12 | 90 |
| G8A59080 | R4.0 | 8.0 | 0.3150 | 8 | 14 | 100 |
| G8A59100 | R5.0 | 10.0 | 0.3937 | 10 | 18 | 100 |
| G8A59120 | R6.0 | 12.0 | 0.4724 | 12 | 22 | 110 |
| G8A59160 | R8.0 | 16.0 | 0.6299 | 16 | 30 | 140 |
| G8A59200 | R10.0 | 20.0 | 0.7874 | 20 | 38 | 160 |

The original bright blue color may discolor during use, however, the permance will not be negatively affected

| Size | Radius Tolerance (mm) | Mill Dia. Tolerance (mm) | Shank Dia. Tolerance |
|---|---|---|---|
| up to R3 | ±0.005 | 0~−0.012 | h6 |
| over R3 | ±0.010 | 0~−0.015 | |

◎ : Excellent ○ : Good

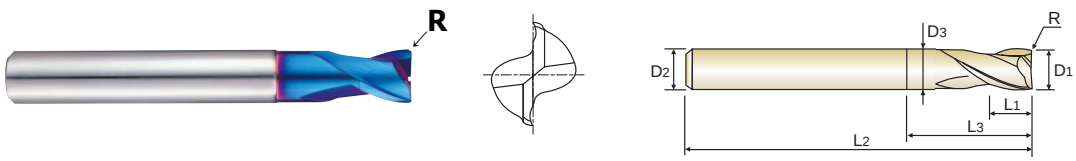
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |

# X5070 END MILLS

**G8A36 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE STUB LENGTH CORNER RADIUS with EXTENDED NECK

- Designed to machine high hardened materials.
- Suitable for dry cutting, high speed cutting due to newly developed raw-material and new coating.
- Excellent workpiece finish.
- Deep slotting is possible by reduced neck.
- Corner radius for preventing the chipping in high speed machining.
- Higher wear-resistance.




NG | 2 | BLUE | 30° | R ±0.010 Ø0.3~Ø6 | R ±0.015 Ø8~Ø20 | PLAIN

P.426, 427

Unit : mm

| EDP No. | Corner Radius | Mill Diameter | | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|
| | | Metric | Inch | | | | | |
| | R | $D_1$ | | $D_2$ | $L_1$ | $L_3$ | $L_2$ | $D_3$ |
| G8A36003 | - | 0.3 | .0118 | 3 | 0.45 | - | 40 | - |
| G8A36004 | - | 0.4 | .0157 | 3 | 0.6 | - | 40 | - |
| G8A36005 | R0.05 | 0.5 | .0197 | 3 | 0.7 | - | 40 | - |
| G8A36907 | R0.05 | 0.5 | .0197 | 4 | 1 | - | 40 | - |
| G8A36006 | R0.05 | 0.6 | .0236 | 3 | 0.9 | - | 40 | - |
| G8A36908 | R0.05 | 0.6 | .0236 | 4 | 1.2 | - | 40 | - |
| G8A36909 | R0.05 | 0.7 | .0276 | 4 | 1.4 | - | 40 | - |
| G8A36008 | R0.05 | 0.8 | .0315 | 3 | 1.2 | - | 40 | - |
| G8A36910 | R0.05 | 0.8 | .0315 | 4 | 1.6 | - | 40 | - |
| G8A36911 | R0.05 | 0.9 | .0354 | 4 | 2 | - | 40 | - |
| G8A36010 | R0.1 | 1.0 | .0394 | 3 | 1.5 | - | 40 | - |
| G8A36901 | R0.1 | 1.0 | .0394 | 4 | 1.5 | - | 40 | - |
| G8A36903 | R0.1 | 1.0 | .0394 | 6 | 1.5 | - | 40 | - |
| G8A36015 | R0.1 | 1.5 | .0591 | 3 | 2.2 | - | 40 | - |
| G8A36904 | R0.1 | 1.5 | .0591 | 6 | 2.2 | - | 40 | - |
| G8A36020 | R0.1 | 2.0 | .0787 | 3 | 3 | 6 | 40 | 1.95 |
| G8A36902 | R0.1 | 2.0 | .0787 | 4 | 3 | 6 | 40 | 1.95 |
| G8A36905 | R0.1 | 2.0 | .0787 | 6 | 3 | 6 | 40 | 1.95 |
| G8A36025 | R0.1 | 2.5 | .0984 | 3 | 4 | 6 | 40 | 2.4 |
| G8A36906 | R0.1 | 2.5 | .0984 | 6 | 4 | 6 | 40 | 2.4 |

The original bright blue color may discolor during use, however, the permance will not be negatively affected

◎ : Excellent ○ : Good

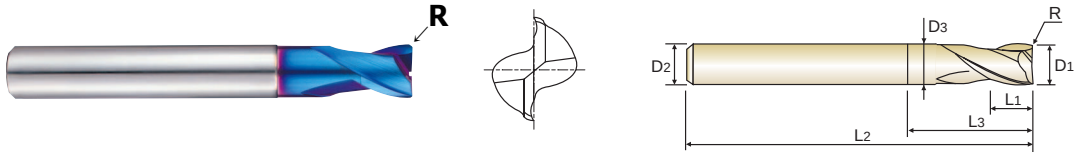
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |

# YG X5070 END MILLS

**G8A36 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE STUB LENGTH CORNER RADIUS with EXTENDED NECK

- Designed to machine high hardened materials.
- Suitable for dry cutting, high speed cutting due to newly developed raw-material and new coating.
- Excellent workpiece finish.
- Deep slotting is possible by reduced neck.
- Corner radius for preventing the chipping in high speed machining.
- Higher wear-resistance.




NG | 2 | BLUE | 30° | R ±0.010 Ø0.3~Ø6 | R ±0.015 Ø8~Ø20 | PLAIN

P.426, 427

Unit : mm

| EDP No. | Corner Radius | Mill Diameter | | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|
| | | Metric | Inch | | | | | |
| | R | $D_1$ | | $D_2$ | $L_1$ | $L_3$ | $L_2$ | $D_3$ |
| G8A36030 | R0.1 | 3.0 | .1181 | 6 | 4 | 7 | 45 | 2.85 |
| G8A36035 | R0.1 | 3.5 | .1378 | 6 | 5 | 9 | 45 | 3.35 |
| G8A36040 | R0.1 | 4.0 | .1575 | 6 | 5 | 9 | 45 | 3.85 |
| G8A36045 | R0.1 | 4.5 | .1772 | 6 | 6 | 10 | 45 | 4.35 |
| G8A36050 | R0.2 | 5.0 | .1969 | 6 | 6 | 11 | 50 | 4.85 |
| G8A36060 | R0.2 | 6.0 | .2362 | 6 | 7 | 14 | 50 | 5.85 |
| G8A36080 | R0.2 | 8.0 | .3150 | 8 | 9 | 18 | 60 | 7.7 |
| G8A36100 | R0.2 | 10.0 | .3937 | 10 | 12 | 25 | 75 | 9.7 |
| G8A36120 | R0.3 | 12.0 | .4724 | 12 | 15 | 30 | 75 | 11.7 |
| G8A36160 | R0.3 | 16.0 | .6299 | 16 | 18 | 38 | 90 | 15.7 |
| G8A36200 | R0.3 | 20.0 | .7874 | 20 | 24 | 45 | 100 | 19.7 |

The original bright blue color may discolor during use, however, the permance will not be negatively affected

| Size | Corner Radius Tolerance (mm) | Mill Dia. Tolerance (mm) | Shank Dia. Tolerance |
|---|---|---|---|
| up to Ø6 | ±0.010 | 0~−0.012 | h6 |
| over Ø6 | ±0.015 | 0~−0.015 | |

◎ : Excellent ○ : Good

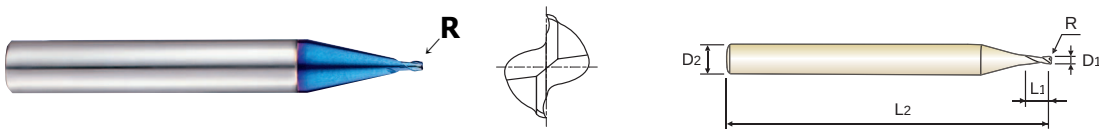
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |

# X5070 END MILLS

**G8A50 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE MINIATURE CORNER RADIUS

- Designed to machine high hardened materials.
- Suitable for dry cutting, high speed cutting thanks to newly developed raw-material and new coating.
- Excellent workpiece finish.
- Deep slotting is possible by reduced neck.
- Corner radius for preventing the chipping in high speed machining.
- Higher wear-resistance.




NG | 2 | BLUE | 30° | R ±0.010 | PLAIN

P.429

Unit : mm

| EDP No. | Corner Radius | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| | | Metric | Inch | | | |
| | R (±0.010) | D1 | | D2 | L1 | L2 |
| G8A50003 | - | 0.3 | 0.0118 | 6 | 0.45 | 50 |
| G8A50004 | - | 0.4 | 0.0157 | 6 | 0.6 | 50 |
| G8A50005 | R0.05 | 0.5 | 0.0197 | 6 | 0.7 | 50 |
| G8A50006 | R0.05 | 0.6 | 0.0236 | 6 | 0.9 | 50 |
| G8A50008 | R0.05 | 0.8 | 0.0315 | 6 | 1.2 | 50 |
| G8A50010 | R0.1 | 1.0 | 0.0394 | 6 | 1.5 | 50 |
| G8A50012 | R0.1 | 1.2 | 0.0472 | 6 | 1.8 | 50 |
| G8A50015 | R0.15 | 1.5 | 0.0591 | 6 | 2.2 | 50 |
| G8A50020 | R0.15 | 2.0 | 0.0787 | 6 | 2.2 | 50 |

The original bright blue color may discolor during use, however, the permance will not be negatively affected

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.012 | h6 |

◎ : Excellent ○ : Good

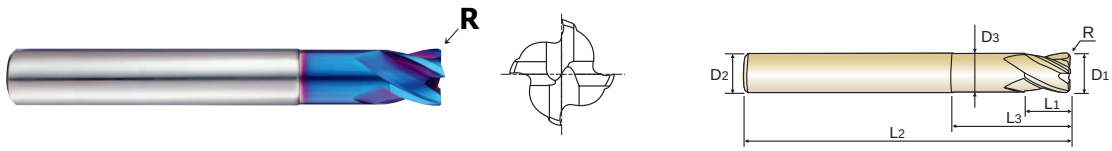
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |

# YG X5070 END MILLS

**G8A47 SERIES** PLAIN SHANK

## CARBIDE, 4 FLUTE CORNER RADIUS with EXTENDED NECK

- Designed to machine high hardened materials.
- Suitable for dry cutting, high speed cutting thanks to newly developed raw-material and new coating.
- Excellent workpiece finish.
- Deep slotting is possible by reduced neck.
- Corner radius for preventing the chipping in high speed machining.
- Higher wear-resistance.




NG | 4 | BLUE | 30° | R ±0.010 Ø1~Ø6 | R ±0.015 Ø8~Ø12 | PLAIN

P.429

Unit : mm

| EDP No. | Corner Radius | Mill Diameter | | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|
| | | Metric | Inch | | | | | |
| | R | D1 | | D2 | L1 | L3 | L2 | D3 |
| G8A47916 | R0.3 | 3.0 | 0.1181 | 6 | 4 | 12 | 55 | 2.85 |
| G8A47917 | R0.3 | 3.0 | 0.1181 | 6 | 4 | 16 | 55 | 2.85 |
| G8A47918 | R0.3 | 3.0 | 0.1181 | 6 | 4 | 20 | 55 | 2.85 |
| G8A47030 | R0.5 | 3.0 | 0.1181 | 6 | 4 | 10 | 55 | 2.85 |
| G8A47901 | R0.5 | 3.0 | 0.1181 | 6 | 4 | 16 | 55 | 2.85 |
| G8A47902 | R0.5 | 3.0 | 0.1181 | 6 | 4 | 20 | 55 | 2.85 |
| G8A47919 | R0.3 | 4.0 | 0.1575 | 6 | 5 | 12 | 55 | 3.85 |
| G8A47920 | R0.3 | 4.0 | 0.1575 | 6 | 5 | 16 | 55 | 3.85 |
| G8A47921 | R0.3 | 4.0 | 0.1575 | 6 | 5 | 20 | 55 | 3.85 |
| G8A47040 | R0.5 | 4.0 | 0.1575 | 6 | 5 | 12 | 55 | 3.85 |
| G8A47903 | R0.5 | 4.0 | 0.1575 | 6 | 5 | 16 | 55 | 3.85 |
| G8A47904 | R0.5 | 4.0 | 0.1575 | 6 | 5 | 20 | 55 | 3.85 |
| G8A47922 | R1.0 | 4.0 | 0.1575 | 6 | 5 | 12 | 55 | 3.85 |
| G8A47060 | R0.5 | 6.0 | 0.2362 | 6 | 7 | 20 | 60 | 5.85 |
| G8A47905 | R1.0 | 6.0 | 0.2362 | 6 | 7 | 20 | 60 | 5.85 |
| G8A47906 | R1.5 | 6.0 | 0.2362 | 6 | 7 | 20 | 60 | 5.85 |
| G8A47910 | R0.5 | 8.0 | 0.3150 | 8 | 9 | 25 | 60 | 7.7 |
| G8A47080 | R1.0 | 8.0 | 0.3150 | 8 | 9 | 25 | 60 | 7.7 |
| G8A47907 | R1.5 | 8.0 | 0.3150 | 8 | 9 | 25 | 60 | 7.7 |
| G8A47913 | R2.0 | 8.0 | 0.3150 | 8 | 9 | 25 | 60 | 7.7 |
| G8A47911 | R0.5 | 10.0 | 0.3937 | 10 | 11 | 32 | 70 | 9.7 |
| G8A47100 | R1.0 | 10.0 | 0.3937 | 10 | 11 | 32 | 70 | 9.7 |
| G8A47908 | R1.5 | 10.0 | 0.3937 | 10 | 11 | 32 | 70 | 9.7 |
| G8A47914 | R2.0 | 10.0 | 0.3937 | 10 | 11 | 32 | 70 | 9.7 |
| G8A47912 | R0.5 | 12.0 | 0.4724 | 12 | 12 | 38 | 80 | 11.7 |
| G8A47120 | R1.0 | 12.0 | 0.4724 | 12 | 12 | 38 | 80 | 11.7 |
| G8A47909 | R1.5 | 12.0 | 0.4724 | 12 | 12 | 38 | 80 | 11.7 |
| G8A47915 | R2.0 | 12.0 | 0.4724 | 12 | 12 | 38 | 80 | 11.7 |

| Size | Corner Radius Tolerance (mm) | Mill Dia. Tolerance (mm) | Shank Dia. Tolerance |
|---|---|---|---|
| up to Ø6 | ±0.010 | 0~−0.012 | h6 |
| over Ø6 | ±0.015 | 0~−0.015 | |

The original bright blue color may discolor during use, however, the permance will not be negatively affected

◎ : Excellent ○ : Good

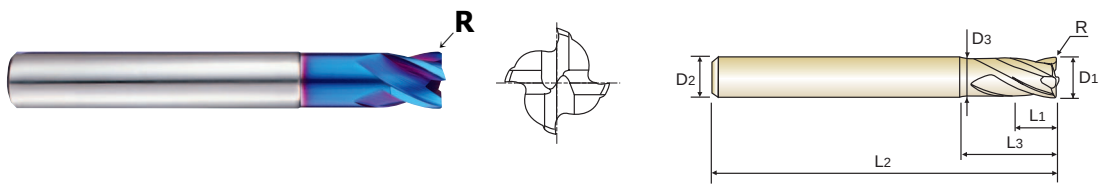
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |

# X5070 END MILLS

**G8A37 SERIES** PLAIN SHANK

## CARBIDE, 4 FLUTE STUB LENGTH CORNER RADIUS with EXTENDED NECK

- Designed to machine high hardened materials.
- Suitable for dry cutting, high speed cutting due to newly developed raw-material and new coating.
- Excellent workpiece finish.
- Deep slotting is possible by reduced neck.
- Corner radius for preventing the chipping in high speed machining.
- Higher wear-resistance.




NG | 4 | BLUE | 30° | R ±0.010 (Ø1~Ø6) | R ±0.015 (Ø8~Ø20) | PLAIN

P.430

Unit : mm

| EDP No. | Corner Radius | Mill Diameter Metric | Mill Diameter Inch | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|
| | R | D1 | | D2 | L1 | L3 | L2 | D3 |
| G8A37010 | RO.1 | 1.0 | .0394 | 3 | 1.5 | - | 40 | - |
| G8A37901 | RO.1 | 1.0 | .0394 | 6 | 1.5 | - | 40 | - |
| G8A37015 | RO.1 | 1.5 | .0591 | 3 | 2.2 | - | 40 | - |
| G8A37902 | RO.1 | 1.5 | .0591 | 6 | 2.2 | - | 40 | - |
| G8A37020 | RO.1 | 2.0 | .0787 | 3 | 3 | 6 | 40 | 1.95 |
| G8A37903 | RO.1 | 2.0 | .0787 | 6 | 3 | 6 | 40 | 1.95 |
| G8A37025 | RO.1 | 2.5 | .0984 | 3 | 4 | 6 | 40 | 2.4 |
| G8A37904 | RO.1 | 2.5 | .0984 | 6 | 4 | 6 | 40 | 2.4 |
| G8A37030 | RO.1 | 3.0 | .1181 | 6 | 4 | 7 | 45 | 2.85 |
| G8A37035 | RO.1 | 3.5 | .1378 | 6 | 5 | 9 | 45 | 3.35 |
| G8A37040 | RO.1 | 4.0 | .1575 | 6 | 5 | 9 | 45 | 3.85 |
| G8A37045 | RO.1 | 4.5 | .1772 | 6 | 6 | 10 | 45 | 4.35 |
| G8A37050 | RO.2 | 5.0 | .1969 | 6 | 6 | 11 | 50 | 4.85 |
| G8A37060 | RO.2 | 6.0 | .2362 | 6 | 7 | 14 | 50 | 5.85 |
| G8A37080 | RO.2 | 8.0 | .3150 | 8 | 9 | 18 | 60 | 7.7 |
| G8A37100 | RO.2 | 10.0 | .3937 | 10 | 12 | 25 | 75 | 9.7 |
| G8A37120 | RO.3 | 12.0 | .4724 | 12 | 15 | 30 | 75 | 11.7 |
| G8A37160 | RO.3 | 16.0 | .6299 | 16 | 18 | 38 | 90 | 15.7 |
| G8A37200 | RO.3 | 20.0 | .7874 | 20 | 24 | 45 | 100 | 19.7 |

The original bright blue color may discolor during use, however, the permance will not be negatively affected

| Size | Corner Radius Tolerance (mm) | Mill Dia. Tolerance (mm) | Shank Dia. Tolerance |
|---|---|---|---|
| up to Ø6 | ±0.010 | 0~−0.012 | h6 |
| over Ø6 | ±0.015 | 0~−0.015 | |

◎ : Excellent ○ : Good

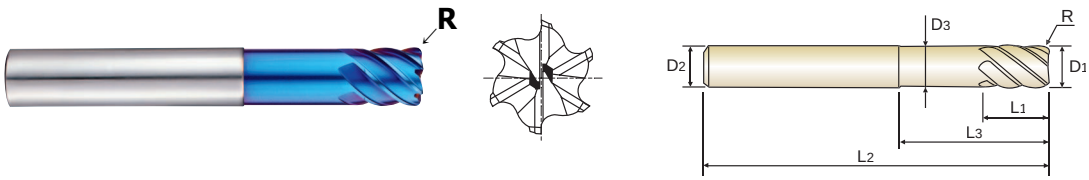
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |

# X5070 END MILLS

**G8A39 SERIES** PLAIN SHANK

## CARBIDE, 6 FLUTE 45° HELIX CORNER RADIUS with EXTENDED NECK

- Designed to machine high hardened materials
- Suitable for dry cutting, high speed cutting due to newly developed raw-material and new coating.
- Excellent workpiece finish.
- Deep slotting is possible by reduced neck.
- Corner radius for preventing the chipping in high speed machining
- Higher wear-resistance.




NG | 6 | BLUE | 45° | R ±0.010 Ø6 | R ±0.015 Ø8~Ø20 | PLAIN | P.430

Unit : mm

| EDP No. | Corner Radius | Mill Diameter Metric | Mill Diameter Inch | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|
| | R | D1 | | D2 | L1 | L3 | L2 | D3 |
| G8A39916 | R0.25 | 6.0 | .2362 | 6 | 6 | 14 | 50 | 5.85 |
| G8A39060 | R0.5 | 6.0 | .2362 | 6 | 6 | 14 | 50 | 5.85 |
| G8A39901 | R0.5 | 6.0 | .2362 | 6 | 13 | - | 70 | - |
| G8A39910 | R0.5 | 6.0 | .2362 | ✻ 6 | 26 | - | 70 | - |
| G8A39080 | R0.5 | 8.0 | .3150 | 8 | 8 | 24 | 60 | 7.7 |
| G8A39902 | R0.5 | 8.0 | .3150 | 8 | 19 | - | 90 | - |
| G8A39911 | R0.5 | 8.0 | .3150 | ✻ 8 | 36 | - | 90 | - |
| G8A39903 | R0.5 | 10.0 | .3937 | 10 | 22 | - | 100 | - |
| G8A39100 | R1.0 | 10.0 | .3937 | 10 | 10 | 30 | 70 | 9.7 |
| G8A39904 | R1.0 | 10.0 | .3937 | 10 | 22 | - | 100 | - |
| G8A39912 | R1.0 | 10.0 | .3937 | ✻ 10 | 46 | - | 100 | - |
| G8A39905 | R0.5 | 12.0 | .4724 | 12 | 26 | - | 110 | - |
| G8A39120 | R1.0 | 12.0 | .4724 | 12 | 12 | 30 | 75 | 11.7 |
| G8A39906 | R1.0 | 12.0 | .4724 | 12 | 26 | - | 110 | - |
| G8A39913 | R1.0 | 12.0 | .4724 | ✻ 12 | 56 | - | 110 | - |
| G8A39160 | R1.0 | 16.0 | .6299 | 16 | 32 | - | 130 | - |
| G8A39907 | R1.5 | 16.0 | .6299 | 16 | 32 | - | 130 | - |
| G8A39914 | R1.5 | 16.0 | .6299 | ✻ 16 | 66 | - | 130 | - |
| G8A39200 | R1.0 | 20.0 | .7874 | 20 | 38 | - | 140 | - |
| G8A39908 | R1.5 | 20.0 | .7874 | 20 | 38 | - | 140 | - |
| G8A39909 | R2.0 | 20.0 | .7874 | 20 | 38 | - | 140 | - |
| G8A39915 | R2.0 | 20.0 | .7874 | ✻ 20 | 76 | - | 140 | - |

The original bright blue color may discolor during use, however, the permance will not be negatively affected

| Size | Corner Radius Tolerance (mm) | Mill Dia. Tolerance (mm) | Shank Dia. Tolerance |
|---|---|---|---|
| up to Ø6 | ±0.010 | 0~−0.02 (✻Extra Long Type : 0~-0.03) | h6 |
| over Ø6 | ±0.015 | | |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | ○ | ○ | ◎ | ◎ | | | | | | | |

# X5070 END MILLS

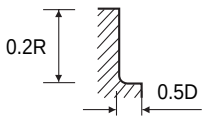
## RECOMMENDED CUTTING CONDITIONS

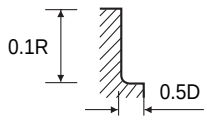
## CARBIDE, 4 FLUTE STUB LENGTH CORNER RADIUS HIGH FEED

**G826 SERIES**

### ■ NORMAL SPEED

| MATERIAL | HARDENED STEELS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc40 | | HRc40 ~ HRc50 | | HRc50 ~ HRc55 | | HRc55 ~ HRc60 | | HRc60 ~ HRc65 | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/8 × R1/32 | 9000 | 245 | 6500 | 155 | 4300 | 100 | 2700 | 43 | 1800 | 23 |
| 3/16 × R1/16 | 7500 | 310 | 5100 | 200 | 3800 | 140 | 2350 | 70 | 1650 | 30 |
| 1/4 × R1/16 | 5500 | 310 | 3900 | 200 | 2800 | 140 | 1750 | 70 | 1250 | 30 |
| 5/16 × R3/32 | 4500 | 310 | 3100 | 200 | 2200 | 140 | 1400 | 70 | 1000 | 30 |
| 3/8 × R3/32 | 3800 | 310 | 2600 | 200 | 1850 | 140 | 1170 | 70 | 840 | 30 |
| 1/2 × R1/8 | 2800 | 310 | 1950 | 200 | 1400 | 140 | 880 | 70 | 630 | 30 |

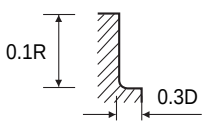


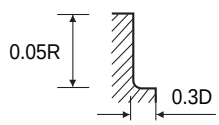




RPM = rev./min.
FEED = inch/min.

### ■ HIGH SPEED

| MATERIAL | HARDENED STEELS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc40 | | HRc40 ~ HRc50 | | HRc50 ~ HRc55 | | HRc55 ~ HRc60 | | HRc60 ~ HRc65 | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/8 × R1/32 | 21000 | 600 | 16000 | 380 | 12000 | 300 | 9000 | 170 | 6500 | 92 |
| 3/16 × R1/16 | 16500 | 720 | 13500 | 550 | 11500 | 420 | 8000 | 250 | 5700 | 150 |
| 1/4 × R1/16 | 12500 | 720 | 10000 | 550 | 8500 | 420 | 6000 | 250 | 4300 | 150 |
| 5/16 × R3/32 | 10000 | 720 | 8000 | 550 | 6800 | 420 | 4800 | 250 | 3400 | 150 |
| 3/8 × R3/32 | 8500 | 720 | 6700 | 550 | 5700 | 420 | 4000 | 250 | 2850 | 150 |
| 1/2 × R1/8 | 6500 | 720 | 5000 | 550 | 4300 | 420 | 3000 | 250 | 2150 | 150 |




RPM = rev./min.
FEED = inch/min.

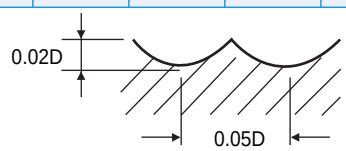
# X5070 END MILLS

## RECOMMENDED CUTTING CONDITIONS

## CARBIDE, 2 FLUTE BALL NOSE with EXTENDED NECK

### G8A43 SERIES

| MATERIAL | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | HRc 30 ~ HRc 40 | | HRc 40 ~ HRc 50 | | HRc 50 ~ HRc 55 | | HRc 55 ~ HRc 60 | | HRc 60 ~ HRc 65 | | HRc 65 ~ HRc 70 | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| R1/64 × 1/32 | 50000 | 188.98 | 50000 | 165.35 | 45000 | 149.61 | 40000 | 118.11 | 35000 | 102.36 | 35000 | 90.55 |
| R1/32 × 1/16 | 49700 | 224.41 | 47800 | 188.98 | 40000 | 157.48 | 35000 | 124.02 | 32000 | 110.24 | 28500 | 90.55 |
| R3/64 × 3/32 | 49700 | 224.41 | 47800 | 188.98 | 40000 | 157.48 | 35000 | 124.02 | 32000 | 110.24 | 28500 | 90.55 |
| R1/16 × 1/8 | 33100 | 236.22 | 31800 | 208.66 | 26500 | 157.48 | 23500 | 124.02 | 21000 | 110.24 | 19000 | 90.55 |
| R3/32 × 3/16 | 18600 | 228.35 | 17800 | 192.91 | 15000 | 147.64 | 13500 | 120.08 | 11500 | 100.39 | 10500 | 82.68 |
| R1/8 × 1/14 | 13900 | 190.94 | 13400 | 161.42 | 11000 | 122.05 | 10000 | 98.43 | 8800 | 84.65 | 8000 | 68.90 |
| R5/32 × 5/16 | 11100 | 165.35 | 10700 | 137.80 | 9000 | 106.30 | 8000 | 84.65 | 7000 | 72.83 | 6500 | 61.02 |
| R3/16 × 3/8 | 9300 | 145.67 | 8900 | 122.05 | 7500 | 94.49 | 6600 | 74.80 | 5800 | 64.96 | 5300 | 54.33 |
| R1/4 × 1/2 | 6950 | 116.14 | 6680 | 98.43 | 5600 | 74.80 | 5000 | 61.02 | 4400 | 49.21 | 4000 | 41.34 |




※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

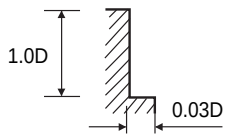
# X5070 END MILLS

## RECOMMENDED CUTTING CONDITIONS

## CARBIDE, 4 FLUTE STUB LENGTH CORNER RADIUS

### G850 SERIES

| MATERIAL | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | HRc 30 ~ HRc 40 | | HRc 40 ~ HRc 50 | | HRc 50 ~ HRc 55 | | HRc 55 ~ HRc 60 | | HRc 60 ~ HRc 65 | | HRc 65 ~ HRc 70 | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/16 | 41950 | 69.44 | 32750 | 49.59 | 22050 | 33.34 | 18250 | 20.61 | 13850 | 12.69 | 11950 | 9.11 |
| 1/8 | 20600 | 52.08 | 16350 | 37.21 | 10850 | 24.96 | 9000 | 15.52 | 7100 | 9.54 | 6050 | 6.85 |
| 3/16 | 16500 | 66.20 | 13100 | 49.51 | 8700 | 33.01 | 6700 | 19.12 | 5350 | 12.22 | 4650 | 8.89 |
| 1/4 | 12400 | 58.14 | 9800 | 41.75 | 6500 | 28.19 | 5000 | 16.64 | 3950 | 10.37 | 3500 | 7.75 |
| 5/16 | 9950 | 59.63 | 7850 | 42.79 | 5250 | 28.62 | 4050 | 16.58 | 3250 | 10.56 | 2800 | 7.56 |
| 3/8 | 8200 | 57.94 | 6450 | 41.62 | 4300 | 27.75 | 3350 | 15.83 | 2700 | 10.34 | 2300 | 7.24 |
| 1/2 | 6300 | 52.22 | 4950 | 37.42 | 3300 | 24.94 | 2500 | 14.26 | 2000 | 9.00 | 1750 | 6.52 |
| 5/8 | 4950 | 47.73 | 3950 | 35.09 | 2600 | 22.99 | 2000 | 13.23 | 1600 | 8.50 | 1400 | 6.30 |
| 3/4 | 4100 | 43.04 | 3250 | 32.03 | 2150 | 21.47 | 1700 | 12.72 | 1350 | 8.18 | 1150 | 5.93 |

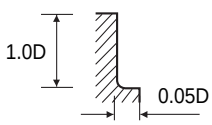


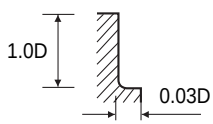

RPM = rev./min.
FEED = inch/min.

## CARBIDE, 6&8 FLUTE 45° HELIX CORNER RADIUS

### G851 SERIES

| MATERIAL | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | HRc 30 ~ HRc 40 | | HRc 40 ~ HRc 50 | | HRc 50 ~ HRc 55 | | HRc 55 ~ HRc 60 | | HRc 60 ~ HRc 65 | | HRc 65 ~ HRc 70 | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/4 | 23450 | 199.16 | 22200 | 182.24 | 15100 | 182.06 | 12750 | 122.70 | 9900 | 77.95 | 7550 | 53.88 |
| 5/16 | 20650 | 191.28 | 19600 | 174.78 | 13200 | 171.84 | 11150 | 115.33 | 8700 | 73.32 | 6600 | 51.16 |
| 3/8 | 17900 | 183.40 | 17000 | 167.31 | 11350 | 161.63 | 9500 | 107.96 | 7450 | 68.69 | 5700 | 48.45 |
| 1/2 | 12300 | 167.63 | 11800 | 152.38 | 7550 | 141.19 | 6250 | 93.21 | 5000 | 59.43 | 3800 | 43.01 |
| 5/8 | 10100 | 159.06 | 9800 | 147.17 | 6050 | 134.97 | 5050 | 91.46 | 4050 | 49.83 | 3000 | 34.25 |
| 3/4 | 8850 | 140.66 | 8600 | 133.29 | 5300 | 123.23 | 4400 | 82.68 | 3550 | 43.68 | 2650 | 30.00 |
| 1 | 6300 | 103.86 | 6150 | 105.54 | 3800 | 99.74 | 3150 | 65.11 | 2500 | 31.37 | 1900 | 21.51 |




※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

# X5070 END MILLS

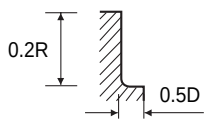
## RECOMMENDED CUTTING CONDITIONS

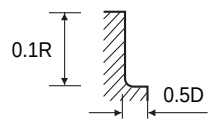
## CARBIDE, 4 FLUTE STUB LENGTH CORNER RADIUS HIGH FEED

### G859, G854 SERIES

### ■ NORMAL SPEED

| MATERIAL | HARDENED STEELS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc40 | | HRc40 ~ HRc50 | | HRc50 ~ HRc55 | | HRc55 ~ HRc60 | | HRc60 ~ HRc65 | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 2.0 × R0.5 | 13500 | 6500 | 9550 | 3800 | 5500 | 2200 | 3200 | 1000 | 2200 | 550 |
| 3.0 × R0.5 | 9550 | 6500 | 6900 | 4150 | 4550 | 2750 | 2850 | 1150 | 1900 | 610 |
| 4.0 × R0.5 | 7950 | 7000 | 5750 | 4600 | 4000 | 3200 | 2550 | 1350 | 1750 | 700 |
| 5.0 × R0.5 | 6500 | 7300 | 4800 | 4800 | 3400 | 3200 | 2200 | 1600 | 1500 | 700 |
| 6.0 × R0.5 | 5800 | 7650 | 4100 | 4900 | 2900 | 3500 | 1850 | 1850 | 1350 | 795 |
| 6.0 × R1.0 | 5800 | 7650 | 4100 | 4900 | 2900 | 3500 | 1850 | 1850 | 1350 | 795 |
| 8.0 × R1.0 | 4350 | 7650 | 3050 | 4900 | 2200 | 3500 | 1400 | 1850 | 995 | 795 |
| 8.0 × R2.0 | 4350 | 7650 | 3050 | 4900 | 2200 | 3500 | 1400 | 1850 | 995 | 795 |
| 10.0 × R1.0 | 3500 | 7650 | 2450 | 4900 | 1750 | 3500 | 1100 | 1850 | 795 | 795 |
| 10.0 × R2.0 | 3500 | 7650 | 2450 | 4900 | 1750 | 3500 | 1100 | 1850 | 795 | 795 |
| 12.0 × R2.0 | 2900 | 7650 | 2050 | 4900 | 1450 | 3500 | 925 | 1850 | 665 | 795 |
| 12.0 × R3.0 | 2900 | 7650 | 2050 | 4900 | 1450 | 3500 | 925 | 1850 | 665 | 795 |
| 16.0 × R3.0 | 2200 | 7650 | 1550 | 4900 | 1100 | 3500 | 700 | 1850 | 500 | 795 |

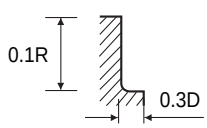


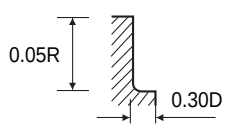




RPM = rev./min.
FEED = inch/min.

### ■ HIGH SPEED

| MATERIAL | HARDENED STEELS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc40 | | HRc40 ~ HRc50 | | HRc50 ~ HRc55 | | HRc55 ~ HRc60 | | HRc60 ~ HRc65 | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 2.0 × R0.5 | 29000 | 15000 | 22000 | 9800 | 15000 | 7850 | 11000 | 4450 | 8700 | 2450 |
| 3.0 × R0.5 | 22000 | 16000 | 17000 | 10000 | 12500 | 8000 | 9500 | 4600 | 6900 | 2500 |
| 4.0 × R0.5 | 17000 | 17500 | 13000 | 12000 | 11000 | 9200 | 8000 | 5500 | 5600 | 2900 |
| 5.0 × R0.5 | 15000 | 18000 | 11000 | 12500 | 10000 | 10000 | 7000 | 6000 | 4900 | 3100 |
| 6.0 × R0.5 | 13500 | 18500 | 10500 | 13800 | 9000 | 11000 | 6400 | 6400 | 4500 | 3600 |
| 6.0 × R1.0 | 13500 | 18500 | 10500 | 13800 | 9000 | 11000 | 6400 | 6400 | 4500 | 3600 |
| 8.0 × R1.0 | 10000 | 18500 | 8000 | 14000 | 6800 | 11000 | 4800 | 6700 | 3400 | 4100 |
| 8.0 × R2.0 | 10000 | 18500 | 8000 | 14000 | 6800 | 11000 | 4800 | 6700 | 3400 | 4100 |
| 10.0 × R1.0 | 8000 | 18500 | 6400 | 14000 | 5400 | 11000 | 3800 | 6800 | 2700 | 3800 |
| 10.0 × R2.0 | 8000 | 18500 | 6400 | 14000 | 5400 | 11000 | 3800 | 6800 | 2700 | 3800 |
| 12.0 × R2.0 | 6600 | 18500 | 5300 | 14000 | 4500 | 11000 | 3200 | 7000 | 2250 | 3600 |
| 12.0 × R3.0 | 6600 | 18500 | 5300 | 14000 | 4500 | 11000 | 3200 | 7000 | 2250 | 3600 |
| 16.0 × R3.0 | 5000 | 18500 | 3900 | 14000 | 3300 | 11000 | 2400 | 7000 | 1650 | 3300 |




RPM = rev./min.
FEED = inch/min.

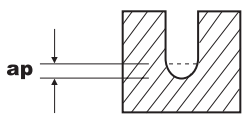
# X5070 END MILLS

## RECOMMENDED CUTTING CONDITIONS

## CARBIDE, 2 FLUTE BALL NOSE for RIB PROCESSING

### G8A46, G8A54 SERIES

| MATERIAL | ALLOY STEELS HEAT RESISTANT STEELS | | | HARDENED STEELS | | | | | | COPPER | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | HRc 30 ~ HRc 45 | | | HRc 45 ~ HRc 55 | | | HRc 55 ~ HRc 65 | | | | | |
| DIAMETER | RPM | FEED | ap (mm) | RPM | FEED | ap (mm) | RPM | FEED | ap (mm) | RPM | FEED | ap (mm) |
| R0.1 × 0.2 | 50000 | 300~350 | 0.006~0.016 | 50000 | 265~310 | 0.005~0.013 | 50000 | 225~265 | 0.005~0.012 | 50000 | 455~530 | 0.010~0.022 |
| R0.15 × 0.3 | 48000~50000 | 480~520 | 0.010~0.017 | 48000~50000 | 440~460 | 0.008~0.014 | 46000~50000 | 390~420 | 0.007~0.013 | 48000~50000 | 690~790 | 0.002~0.023 |
| R0.2 × 0.4 | 48000~50000 | 720~790 | 0.013~0.032 | 48000~50000 | 450~550 | 0.011~0.026 | 46000~50000 | 400~460 | 0.010~0.024 | 48000~50000 | 1000~1150 | 0.019~0.048 |
| R0.25 × 0.5 | 34100~49500 | 600~870 | 0.007~0.028 | 31900~35200 | 490~540 | 0.005~0.023 | 31900~35200 | 440~480 | 0.005~0.021 | 49000~50000 | 1100~1400 | 0.010~0.042 |
| R0.3 × 0.6 | 28600~40700 | 590~850 | 0.007~0.034 | 26400~29700 | 480~540 | 0.006~0.028 | 26400~29700 | 400~480 | 0.006~0.025 | 42000~50000 | 1100~1700 | 0.011~0.050 |
| R0.4 × 0.8 | 22000~30800 | 640~890 | 0.016~0.064 | 19800~22000 | 490~550 | 0.013~0.052 | 19800~22000 | 440~500 | 0.012~0.048 | 31000~50000 | 1100~2250 | 0.024~0.096 |
| R0.5 × 1.0 | 17600~24200 | 600~850 | 0.008~0.080 | 15400~17600 | 470~540 | 0.007~0.065 | 15400~17600 | 440~500 | 0.006~0.060 | 24000~49500 | 1100~2200 | 0.012~0.120 |
| R0.6 × 1.2 | 14300~18700 | 590~780 | 0.024~0.032 | 12000~14000 | 480~540 | 0.020~0.026 | 12000~14000 | 420~480 | 0.018~0.024 | 28500~38500 | 1480~1950 | 0.036~0.048 |
| R0.75 × 1.5 | 11000~14300 | 580~760 | 0.031~0.048 | 10000~11500 | 480~540 | 0.025~0.039 | 10000~11500 | 420~480 | 0.023~0.036 | 17000~28500 | 1100~1950 | 0.046~0.072 |
| R1.0 × 2.0 | 8500~11000 | 590~800 | 0.024~0.160 | 7900~8800 | 470~530 | 0.020~0.130 | 7900~8800 | 440~480 | 0.018~0.120 | 12600~24000 | 1100~2150 | 0.036~0.240 |
| R1.5 × 3.0 | 5700~8200 | 730~1000 | 0.064~0.240 | 5300~5800 | 590~650 | 0.052~0.195 | 5300~5800 | 550~620 | 0.048~0.120 | 11900~17000 | 1850~2700 | 0.096~0.360 |
| R2.0 × 4.0 | 4300~6200 | 680~990 | 0.080~0.320 | 3950~4400 | 550~620 | 0.065~0.026 | 3850~4400 | 530~570 | 0.060~0.240 | 6600~12500 | 1260~2500 | 0.120~0.480 |

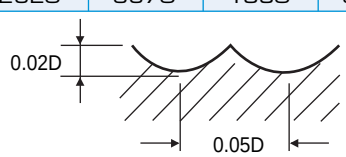



RPM = rev./min.
FEED = inch/min.

## CARBIDE, 3 FLUTE BALL NOSE

### G8A59 SERIES

| MATERIAL | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | HRc 30 ~ HRc 45 | | HRc 45 ~ HRc 55 | | HRc 55 ~ HRc 60 | | HRc 60 ~ HRc 65 | | HRc 65 ~ HRc 70 | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| R1.5 × 3.0 | 32000 | 8600 | 26840 | 5800 | 19840 | 4280 | 18680 | 4040 | 12780 | 2760 |
| R2.0 × 4.0 | 24080 | 7700 | 20130 | 5430 | 14880 | 3880 | 14220 | 3650 | 9580 | 2500 |
| R2.5 × 5.0 | 20000 | 7250 | 16780 | 5430 | 12400 | 3690 | 11670 | 3470 | 8000 | 2370 |
| R3.0 × 6.0 | 18000 | 8570 | 15200 | 6220 | 12200 | 4500 | 11100 | 3830 | 7590 | 2460 |
| R4.0 × 8.0 | 13500 | 7350 | 11300 | 5250 | 9200 | 3980 | 8320 | 3350 | 5690 | 2130 |
| R5.0 × 10.0 | 10800 | 6530 | 9100 | 4590 | 7350 | 3450 | 6660 | 2870 | 4550 | 1960 |
| R6.0 × 12.0 | 9050 | 6100 | 7590 | 4260 | 6130 | 3190 | 5530 | 2400 | 3800 | 1640 |
| R8.0 × 16.0 | 6700 | 4600 | 5690 | 3250 | 4600 | 2480 | 4160 | 1800 | 2850 | 1230 |
| R10.0×20.0 | 5400 | 3600 | 4550 | 2620 | 3670 | 1980 | 3300 | 1440 | 2280 | 980 |




RPM = rev./min.
FEED = inch/min.

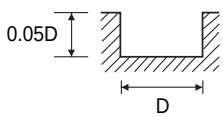
# X5070 END MILLS

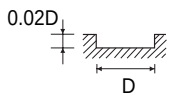
## RECOMMENDED CUTTING CONDITIONS

## CARBIDE, 2 FLUTE - SLOTTING

### G8A36 SERIES

| MATERIAL | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | HRc 30 ~ HRc 40 | | HRc 40 ~ HRc 50 | | HRc 50 ~ HRc 55 | | HRc 55 ~ HRc 60 | | HRc 60 ~ HRc 65 | | HRc 65 ~ HRc 70 | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 0.2 | 50000 | 130 | 45000 | 115 | 40000 | 95 | 33000 | 60 | 33000 | 45 | 26400 | 30 |
| 0.3 | 50000 | 190 | 45000 | 140 | 40000 | 115 | 33000 | 70 | 25000 | 50 | 20000 | 35 |
| 0.4 | 50000 | 235 | 45000 | 180 | 40000 | 140 | 33000 | 90 | 25000 | 55 | 20000 | 40 |
| 0.5 | 50000 | 370 | 45000 | 280 | 40000 | 220 | 33000 | 140 | 25000 | 85 | 20000 | 60 |
| 0.6 | 50000 | 470 | 45000 | 360 | 40000 | 285 | 30000 | 160 | 25000 | 105 | 20000 | 75 |
| 0.8 | 50000 | 600 | 40000 | 440 | 30000 | 295 | 25000 | 185 | 19000 | 110 | 15200 | 80 |
| 0.9 | 49000 | 655 | 39000 | 520 | 27800 | 330 | 22700 | 205 | 17500 | 125 | 14000 | 90 |
| 1.0 | 48000 | 750 | 38000 | 570 | 25500 | 360 | 20500 | 215 | 16000 | 135 | 12500 | 85 |
| 2.0 | 33300 | 850 | 26000 | 680 | 17500 | 420 | 14500 | 260 | 11000 | 160 | 9500 | 115 |
| 3.0 | 21800 | 850 | 17300 | 680 | 11500 | 420 | 9500 | 260 | 7500 | 160 | 6400 | 115 |
| 4.0 | 16700 | 880 | 13200 | 700 | 8800 | 440 | 7200 | 270 | 5600 | 170 | 4750 | 118 |
| 5.0 | 15700 | 1000 | 12500 | 805 | 8300 | 500 | 6400 | 285 | 5100 | 180 | 4450 | 132 |
| 6.0 | 13100 | 950 | 10350 | 770 | 6900 | 480 | 5300 | 280 | 4200 | 180 | 3700 | 130 |
| 8.0 | 9880 | 930 | 7800 | 720 | 5200 | 445 | 4000 | 255 | 3200 | 165 | 2800 | 120 |
| 10.0 | 7800 | 850 | 6150 | 680 | 4100 | 415 | 3200 | 240 | 2550 | 155 | 2200 | 112 |
| 12.0 | 6650 | 850 | 5250 | 680 | 3500 | 415 | 2650 | 240 | 2100 | 155 | 1860 | 112 |
| 16.0 | 4900 | 730 | 3900 | 580 | 2600 | 365 | 2000 | 210 | 1600 | 135 | 1400 | 95 |
| 20.0 | 3900 | 660 | 3100 | 525 | 2050 | 335 | 1600 | 195 | 1300 | 125 | 1100 | 85 |




RPM = rev./min.
FEED = inch/min.

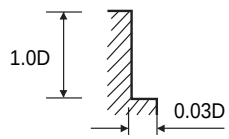
# X5070 END MILLS

## RECOMMENDED CUTTING CONDITIONS

## CARBIDE, 2 FLUTE - SIDE CUTTING

### G8A36 SERIES

| MATERIAL | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | HRc 30 ~ HRc 40 | | HRc 40 ~ HRc 50 | | HRc 50 ~ HRc 55 | | HRc 55 ~ HRc 60 | | HRc 60 ~ HRc 65 | | HRc 65 ~ HRc 70 | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1.0 | 48000 | 1050 | 38000 | 820 | 25500 | 510 | 20500 | 310 | 16000 | 190 | 12500 | 125 |
| 2.0 | 33300 | 1200 | 26000 | 970 | 17500 | 600 | 14500 | 370 | 11000 | 230 | 9500 | 165 |
| 3.0 | 21800 | 1200 | 17300 | 970 | 11500 | 600 | 9500 | 370 | 7500 | 230 | 6400 | 165 |
| 4.0 | 16700 | 1250 | 13200 | 1000 | 8800 | 625 | 7200 | 385 | 5600 | 240 | 4750 | 170 |
| 5.0 | 15700 | 1450 | 12500 | 1150 | 8300 | 710 | 6400 | 410 | 5100 | 260 | 4450 | 190 |
| 6.0 | 13100 | 1350 | 10350 | 1100 | 6900 | 690 | 5300 | 400 | 4200 | 255 | 3700 | 185 |
| 8.0 | 9880 | 1320 | 7800 | 1030 | 5200 | 635 | 4000 | 365 | 3200 | 235 | 2800 | 170 |
| 10.0 | 7800 | 1200 | 6150 | 970 | 4100 | 590 | 3200 | 340 | 2550 | 220 | 2200 | 160 |
| 12.0 | 6650 | 1200 | 5250 | 970 | 3500 | 590 | 2650 | 340 | 2100 | 220 | 1860 | 160 |
| 16.0 | 4900 | 1050 | 3900 | 840 | 2600 | 520 | 2000 | 300 | 1600 | 190 | 1400 | 140 |
| 20.0 | 3900 | 950 | 3100 | 750 | 2050 | 475 | 1600 | 275 | 1300 | 175 | 1100 | 125 |




RPM = rev./min.
FEED = inch/min.

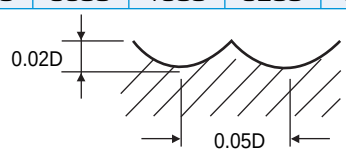
# X5070 END MILLS

## RECOMMENDED CUTTING CONDITIONS

## CARBIDE, 2 FLUTE BALL NOSE

### G8A38, G8A28, G8A53 SERIES

| MATERIAL | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | HRc 30 ~ HRc 40 | | HRc 40 ~ HRc 50 | | HRc 50 ~ HRc 55 | | HRc 55 ~ HRc 60 | | HRc 60 ~ HRc 65 | | HRc 65 ~ HRc 70 | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| R0.1 × 0.2 | 50000 | 1200 | 50000 | 1050 | 45000 | 960 | 40000 | 770 | 35000 | 674 | 31500 | 570 |
| R0.15 × 0.3 | 50000 | 1500 | 50000 | 1350 | 45000 | 1200 | 40000 | 965 | 35000 | 840 | 31500 | 700 |
| R0.2 × 0.4 | 50000 | 1900 | 50000 | 1700 | 45000 | 1500 | 40000 | 1200 | 35000 | 1050 | 31500 | 890 |
| R0.25 × 0.5 | 50000 | 2400 | 50000 | 2100 | 45000 | 1900 | 40000 | 1500 | 35000 | 1300 | 31500 | 1100 |
| R0.3 × 0.6 | 50000 | 2900 | 50000 | 2500 | 45000 | 2200 | 40000 | 1800 | 35000 | 1600 | 31500 | 1400 |
| R0.4 × 0.8 | 50000 | 3900 | 50000 | 3300 | 45000 | 3000 | 40000 | 2400 | 35000 | 2100 | 31500 | 1800 |
| R0.5 × 1.0 | 50000 | 4800 | 50000 | 4200 | 45000 | 3800 | 40000 | 3000 | 35000 | 2600 | 35000 | 2300 |
| R0.6 × 1.2 | 50000 | 5100 | 48000 | 4300 | 43000 | 3850 | 38000 | 3000 | 34000 | 2700 | 30600 | 2300 |
| R0.75 × 1.5 | 50000 | 5400 | 48000 | 4500 | 43000 | 4000 | 37000 | 3100 | 33000 | 2700 | 29700 | 2300 |
| R1.0 × 2.0 | 49700 | 5700 | 47800 | 4800 | 40000 | 4000 | 35000 | 3150 | 32000 | 2800 | 28500 | 2300 |
| R1.5 × 3.0 | 33100 | 6000 | 31800 | 5300 | 26500 | 4000 | 23500 | 3150 | 21000 | 2800 | 19000 | 2300 |
| R2.0 × 4.0 | 24900 | 6000 | 23900 | 5300 | 20000 | 4000 | 17500 | 3150 | 16000 | 2800 | 14500 | 2300 |
| R2.5 × 5.0 | 18600 | 5800 | 17800 | 4900 | 15000 | 3750 | 13500 | 3050 | 11500 | 2550 | 10500 | 2100 |
| R3.0 × 6.0 | 13900 | 4850 | 13400 | 4100 | 11000 | 3100 | 10000 | 2500 | 8800 | 2150 | 8000 | 1750 |
| R4.0 × 8.0 | 11100 | 4200 | 10700 | 3500 | 9000 | 2700 | 8000 | 2150 | 7000 | 1850 | 6500 | 1550 |
| R5.0 × 10.0 | 9300 | 3700 | 8900 | 3100 | 7500 | 2400 | 6600 | 1900 | 5800 | 1650 | 5300 | 1380 |
| R6.0 × 12.0 | 6950 | 2950 | 6680 | 2500 | 5600 | 1900 | 5000 | 1550 | 4400 | 1250 | 4000 | 1050 |
| R8.0 × 16.0 | 5570 | 2650 | 5350 | 2200 | 4500 | 1700 | 4000 | 1350 | 3500 | 1000 | 3200 | 850 |
| R10.0 × 20.0 | 4450 | 2350 | 4300 | 1950 | 3600 | 1500 | 3200 | 1200 | 2800 | 800 | 2550 | 660 |




RPM = rev./min.
FEED = inch/min.

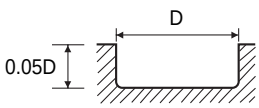
# X5070 END MILLS

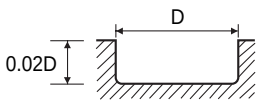
## RECOMMENDED CUTTING CONDITIONS

## CARBIDE, 2 FLUTE MINIATURE CORNER RADIUS - SLOTTING

### G8A50 SERIES

| MATERIAL | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | HRc 30 ~ HRc 40 | | HRc 40 ~ HRc 50 | | HRc 50 ~ HRc 55 | | HRc 55 ~ HRc 60 | | HRc 60 ~ HRc 65 | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 0.3 | 50000 | 190 | 45000 | 140 | 40000 | 115 | 33000 | 70 | 25000 | 40 |
| 0.4 | 50000 | 235 | 45000 | 180 | 40000 | 140 | 33000 | 90 | 25000 | 55 |
| 0.5 | 50000 | 370 | 45000 | 280 | 40000 | 220 | 33000 | 140 | 25000 | 85 |
| 0.6 | 50000 | 470 | 45000 | 360 | 40000 | 285 | 30000 | 160 | 25000 | 105 |
| 0.8 | 50000 | 600 | 40000 | 440 | 30000 | 295 | 25000 | 185 | 19000 | 110 |
| 1.0 | 48000 | 750 | 38000 | 570 | 25500 | 360 | 20500 | 215 | 16000 | 135 |
| 1.2 | 42000 | 790 | 34000 | 640 | 22500 | 380 | 20000 | 250 | 14500 | 145 |
| 1.5 | 37000 | 800 | 30500 | 670 | 21000 | 410 | 17000 | 250 | 13000 | 155 |
| 2.0 | 33300 | 850 | 26000 | 680 | 17500 | 420 | 14500 | 260 | 11000 | 160 |



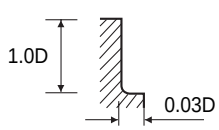




RPM = rev./min.
FEED = inch/min.

## CARBIDE, 4 FLUTE CORNER RADIUS

### G8A47 SERIES

| MATERIAL | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | HRc 30 ~ HRc 40 | | HRc 40 ~ HRc 50 | | HRc 50 ~ HRc 55 | | HRc 55 ~ HRc 60 | | HRc 60 ~ HRc 65 | | HRc 65 ~ HRc 70 | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1.0 | 48000 | 1184 | 38000 | 840 | 25500 | 568 | 20500 | 344 | 16000 | 216 | 12500 | 140 |
| 2.0 | 33300 | 1400 | 26000 | 1000 | 17500 | 672 | 14500 | 416 | 11000 | 256 | 9500 | 184 |
| 3.0 | 21800 | 1400 | 17300 | 1000 | 11500 | 672 | 9500 | 416 | 7500 | 256 | 6400 | 184 |
| 4.0 | 16700 | 1440 | 13200 | 1040 | 8800 | 704 | 7200 | 432 | 5600 | 268 | 4750 | 192 |
| 5.0 | 15700 | 1600 | 12500 | 1200 | 8300 | 800 | 6400 | 464 | 5100 | 296 | 4450 | 216 |
| 6.0 | 13100 | 1560 | 10350 | 1120 | 6900 | 760 | 5300 | 448 | 4200 | 280 | 3700 | 208 |
| 8.0 | 9880 | 1504 | 7800 | 1080 | 5200 | 720 | 4000 | 416 | 3200 | 264 | 2800 | 192 |
| 10.0 | 7800 | 1400 | 6150 | 1008 | 4100 | 672 | 3200 | 384 | 2550 | 248 | 2200 | 176 |
| 12.0 | 6650 | 1400 | 5250 | 1008 | 3500 | 672 | 2650 | 384 | 2100 | 240 | 1860 | 176 |
| 16.0 | 4900 | 1200 | 3900 | 880 | 2600 | 584 | 2000 | 336 | 1600 | 216 | 1400 | 160 |
| 20.0 | 3900 | 1040 | 3100 | 776 | 2050 | 520 | 1600 | 304 | 1300 | 200 | 1100 | 144 |




RPM = rev./min.
FEED = inch/min.

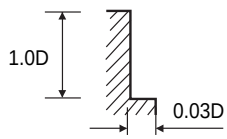
# X5070 END MILLS

## RECOMMENDED CUTTING CONDITIONS

## CARBIDE, 4 FLUTE STUB LENGTH CORNER RADIUS with EXTENDED NECK

### G8A37 SERIES

| MATERIAL | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | HRc 30 ~ HRc 40 | | HRc 40 ~ HRc 50 | | HRc 50 ~ HRc 55 | | HRc 55 ~ HRc 60 | | HRc 60 ~ HRc 65 | | HRc 65 ~ HRc 70 | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1.0 | 48000 | 1480 | 38000 | 1050 | 25500 | 710 | 20500 | 430 | 16000 | 270 | 12500 | 175 |
| 2.0 | 33300 | 1750 | 26000 | 1250 | 17500 | 840 | 14500 | 520 | 11000 | 320 | 9500 | 230 |
| 3.0 | 21800 | 1750 | 17300 | 1250 | 11500 | 840 | 9500 | 520 | 7500 | 320 | 6400 | 230 |
| 4.0 | 16700 | 1800 | 13200 | 1300 | 8800 | 880 | 7200 | 540 | 5600 | 335 | 4750 | 240 |
| 5.0 | 15700 | 2000 | 12500 | 1500 | 8300 | 1000 | 6400 | 580 | 5100 | 370 | 4450 | 270 |
| 6.0 | 13100 | 1950 | 10350 | 1400 | 6900 | 950 | 5300 | 560 | 4200 | 350 | 3700 | 260 |
| 8.0 | 9880 | 1880 | 7800 | 1350 | 5200 | 900 | 4000 | 520 | 3200 | 330 | 2800 | 240 |
| 10.0 | 7800 | 1750 | 6150 | 1260 | 4100 | 840 | 3200 | 480 | 2550 | 310 | 2200 | 220 |
| 12.0 | 6650 | 1750 | 5250 | 1260 | 3500 | 840 | 2650 | 480 | 2100 | 300 | 1860 | 220 |
| 16.0 | 4900 | 1500 | 3900 | 1100 | 2600 | 730 | 2000 | 420 | 1600 | 270 | 1400 | 200 |
| 20.0 | 3900 | 1300 | 3100 | 970 | 2050 | 650 | 1600 | 380 | 1300 | 250 | 1100 | 180 |

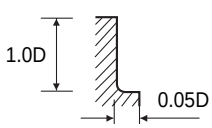


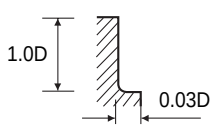

RPM = rev./min.
FEED = inch/min.

## CARBIDE, 6 FLUTE 45° HELIX CORNER RADIUS

### G8A39 SERIES

| MATERIAL | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | HRc 30 ~ HRc 40 | | HRc 40 ~ HRc 50 | | HRc 50 ~ HRc 55 | | HRc 55 ~ HRc 60 | | HRc 60 ~ HRc 65 | | HRc 65 ~ HRc 70 | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 6.0 | 24800 | 5350 | 23500 | 4900 | 16000 | 4900 | 13500 | 3300 | 10500 | 2100 | 8000 | 1450 |
| 8.0 | 20000 | 5500 | 19000 | 5000 | 12000 | 4600 | 10000 | 3100 | 8000 | 2000 | 6000 | 1400 |
| 10.0 | 16000 | 4900 | 15500 | 4500 | 9500 | 4100 | 8000 | 2900 | 6400 | 1800 | 4800 | 1300 |
| 12.0 | 13000 | 4500 | 12500 | 4100 | 8000 | 3800 | 6600 | 2500 | 5300 | 1600 | 4000 | 1150 |
| 16.0 | 10000 | 4000 | 9700 | 3700 | 6000 | 3400 | 5000 | 2300 | 4000 | 1250 | 3000 | 870 |
| 20.0 | 8000 | 3350 | 7800 | 3400 | 4800 | 3200 | 4000 | 2100 | 3200 | 1020 | 2400 | 690 |




※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

# CARBIDE

YG

Being the best through innovation

# X-SPEED ROUGHER

**- Carbide Roughing End Mills for High-Feed Machining with reduced vibrations**

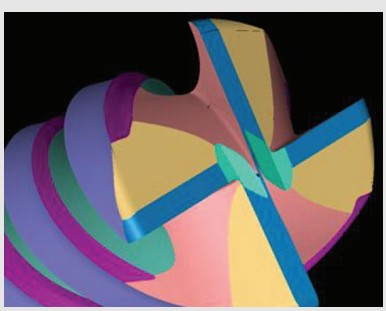
# SELECTION GUIDE

| ITEM | MODEL | DESCRIPTION | SIZE MIN | SIZE MAX | PAGE |
|---|---|---|---|---|---|
| **INCH** | | | | | |
| G907 G928 | | CARBIDE, 4&5 FLUTE STUB LENGTH ROUGHING CORNER RADIUS | D1/4 | D1 | 434 |
| G908 G929 | | CARBIDE, 4&5 FLUTE REGULAR LENGTH ROUGHING CORNER RADIUS | D1/4 | D1 | 435 |
| G909 G930 | | CARBIDE, 4&5 FLUTE EXTENDED REACH ROUGHING CORNER RADIUS | D1/4 | D3/4 | 436 |
| **METRIC** | | | | | |
| G9D75 | | CARBIDE, 4&5 FLUTE MULTIPLE HELIX SHORT LENGTH ROUGHING CORNER RADIUS | D6.0 | D20.0 | 437 |
| G9D76 | | CARBIDE, 4&5 FLUTE MULTIPLE HELIX LONG LENGTH ROUGHING CORNER RADIUS | D6.0 | D20.0 | 438 |
| G9D77 | | CARBIDE, 4&5 FLUTE MULTIPLE HELIX LONG REACH ROUGHING CORNER RADIUS | D6.0 | D20.0 | 439 |
| | | RECOMMENDED CUTTING CONDITIONS | | | 440 |

## CHARACTERISTICS

- Unique flute design for excellent chip evacuation and vibration reduction.
- Optimal roughing tooth profile to reduce cutting forces.
- Special tool geometry for high feed rate and heavy cutting.
- Strong end tooth design for plunge and pocket milling.
- Custom engineered coating to allow long tool life and excellent chip evacuation.

▶ 4 FLUTE



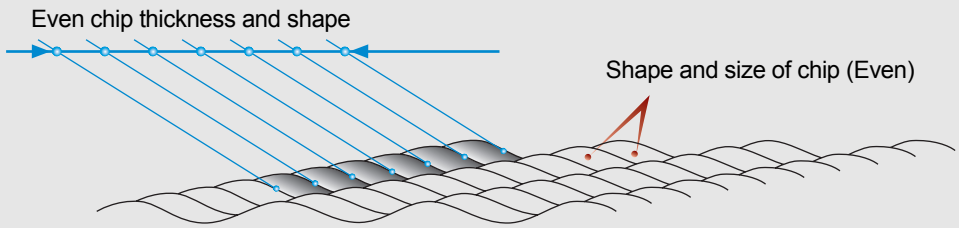
▶ 5 FLUTE

◎ : Excellent
○ : Good

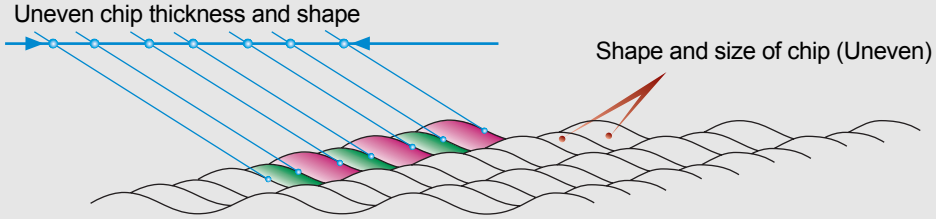
| Carbon Steels | Alloy Steels | Prehardened | Hardened Steels | | High Hardened | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~3 | HRc30~4 | HRc40~4 | HRc45~5 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ◎ | | ○ | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ◎ | | ○ | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ◎ | | ○ | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ◎ | | ○ | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ◎ | | ○ | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ◎ | | ○ | | |

## CHIP THICKNESS AND SHAPE

### ▶ Conventional Roughing End Mills




### ▶ X-SPEED Rougher

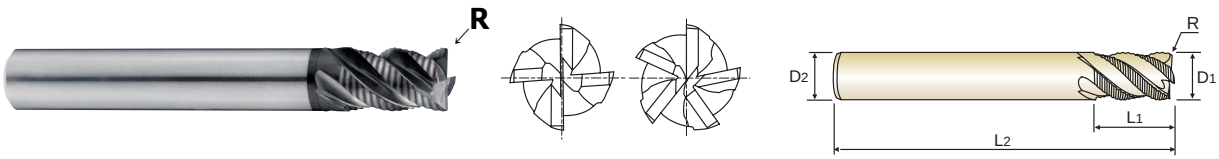


# X-SPEED ROUGHER END MILLS

**G907 SERIES** PLAIN SHANK
**G928 SERIES** FLAT SHANK

## CARBIDE, MULTI FLUTE STUB LENGTH ROUGHING CORNER RADIUS - FINE

- Unique flute design for excellent chip evacuation and vibration reduction.
- Optimal roughing tooth profile to reduce cutting forces.
- Special tool geometry for high feed rate and heavy cutting.
- Strong end tooth design for plunge and pocket milling.
- Strong end tooth design for plunge and pocket milling.
- Custom engineered coating to allow long tool life and excellent chip evacuation.




MG 4&5 M-Helix PLAIN FLAT P.440

Unit : Inch

| EDP No. | | Corner Radius | Mill Diameter | Shank Diameter | Length of Cut | Overall Length | No. of Flute |
|---|---|---|---|---|---|---|---|
| PLAIN | FLAT | R | $D_1$ | $D_2$ | $L_1$ | $L_2$ | |
| **G90716** | - | R.020 | **1/4** | 1/4 | 3/8 | 2 | 4 |
| **G90720** | - | R.020 | **5/16** | 5/16 | 7/16 | 2 | 4 |
| **G90724** | **G92824** | R.020 | **3/8** | 3/8 | 1/2 | 2-1/4 | 4 |
| **G90732** | **G92832** | R.020 | **1/2** | 1/2 | 5/8 | 2-1/2 | 4 |
| **G90740** | **G92840** | R.040 | **5/8** | 5/8 | 3/4 | 3 | 5 |
| **G90748** | **G92848** | R.040 | **3/4** | 3/4 | 1 | 3-1/4 | 5 |
| **G90764** | **G92864** | R.040 | **1** | 1 | 1-1/4 | 4 | 5 |

| Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.002 | h6 |

◎ : Excellent ○ : Good

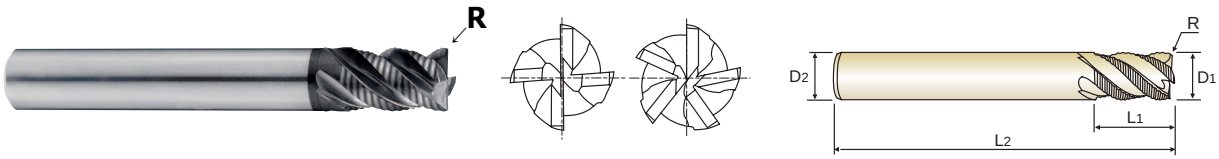
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ◎ | | ○ | | |

# X-SPEED ROUGHER END MILLS

**G908 SERIES** PLAIN SHANK
**G929 SERIES** FLAT SHANK

## CARBIDE, MULTI FLUTE REGULAR LENGTH ROUGHING CORNER RADIUS - FINE

- Unique flute design for excellent chip evacuation and vibration reduction.
- Optimal roughing tooth profile to reduce cutting forces.
- Special tool geometry for high feed rate and heavy cutting.
- Strong end tooth design for plunge and pocket milling.
- Custom engineered coating to allow long tool life and excellent chip evacuation.




MG | 4&5 | M-Helix | PLAIN | FLAT

P.440

Unit : Inch

| EDP No. | | Corner Radius | Mill Diameter | Shank Diameter | Length of Cut | Overall Length | No. of Flute |
|---|---|---|---|---|---|---|---|
| PLAIN | FLAT | R | $D_1$ | $D_2$ | $L_1$ | $L_2$ | |
| **G90816** | - | R.020 | **1/4** | 1/4 | 5/8 | 2-1/2 | 4 |
| **G90820** | - | R.020 | **5/16** | 5/16 | 3/4 | 2-1/2 | 4 |
| **G90824** | **G92924** | R.020 | **3/8** | 3/8 | 7/8 | 2-1/2 | 4 |
| **G90832** | **G92932** | R.020 | **1/2** | 1/2 | 1 | 3 | 4 |
| **G90840** | **G92940** | R.040 | **5/8** | 5/8 | 1-1/4 | 3-1/2 | 5 |
| **G90848** | **G92948** | R.040 | **3/4** | 3/4 | 1-5/8 | 4 | 5 |
| **G90864** | **G92964** | R.040 | **1** | 1 | 1-3/4 | 4-1/4 | 5 |

| Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|
| 0~-.002 | h6 |

◎ : Excellent ○ : Good

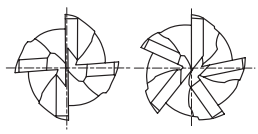
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ◎ | | ○ | | |

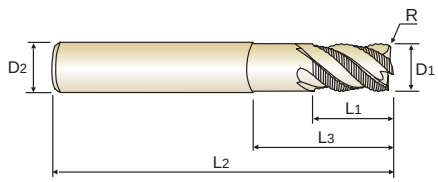
# X-SPEED ROUGHER END MILLS

**G909 SERIES** PLAIN SHANK
**G930 SERIES** FLAT SHANK

## CARBIDE, MULTI FLUTE EXTENDED REACH LENGTH ROUGHING CORNER RADIUS - FINE

- Unique flute design for excellent chip evacuation and vibration reduction.
- Optimal roughing tooth profile to reduce cutting forces.
- Special tool geometry for high feed rate and heavy cutting.
- Strong end tooth design for plunge and pocket milling.
- Custom engineered coating to allow long tool life and excellent chip evacuation.






MG | 4&5 | M-Helix | PLAIN | FLAT

P.440

Unit : Inch

| EDP No. | | Corner Radius | Mill Diameter | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | No. of Flute |
|---|---|---|---|---|---|---|---|---|
| PLAIN | FLAT | R | $D_1$ | $D_2$ | $L_1$ | $L_3$ | $L_2$ | |
| **G90916** | - | R.020 | **1/4** | 1/4 | 3/8 | 7/8 | 2-1/2 | 4 |
| **G90920** | - | R.020 | **5/16** | 5/16 | 7/16 | 1 | 2-1/2 | 4 |
| **G90924** | **G93024** | R.020 | **3/8** | 3/8 | 1/2 | 1 | 2-3/4 | 4 |
| **G90932** | **G93032** | R.020 | **1/2** | 1/2 | 5/8 | 1-1/4 | 3-1/4 | 4 |
| **G90940** | **G93040** | R.040 | **5/8** | 5/8 | 3/4 | 2 | 4 | 5 |
| **G90948** | **G93048** | R.040 | **3/4** | 3/4 | 1 | 2-3/8 | 4-1/2 | 5 |

| Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.002 | h6 |

◎ : Excellent ○ : Good

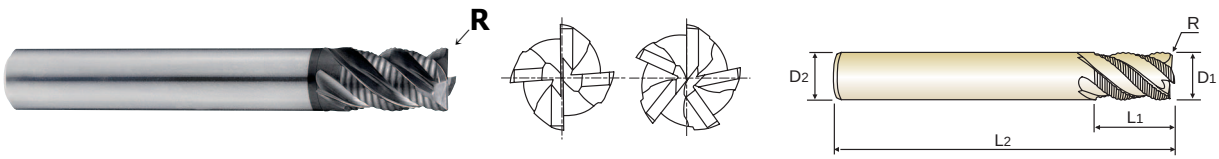
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ◎ | | ○ | | |

# X-SPEED ROUGHER END MILLS

**G9D75 SERIES** PLAIN SHANK

## CARBIDE, MULTI FLUTE SHORT LENGTH ROUGHING CORNER RADIUS - FINE

- Unique flute design for excellent chip evacuation and vibration reduction.
- Optimal roughing tooth profile to reduce cutting forces.
- Special tool geometry for high feed rate and heavy cutting.
- Strong end tooth design for plunge and pocket milling.
- Custom engineered coating to allow long tool life and excellent chip evacuation.




MG 4&5 M-Helix PLAIN P.440

Unit : mm

| EDP No. | Corner Radius | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length | No. of Flute |
|---|---|---|---|---|---|---|---|
| | | Metric | Inch | | | | |
| | R | $D_1$ | | $D_2$ | $L_1$ | $L_2$ | |
| G9D75060 | R0.5 | 6.0 | .2362 | 6 | 9 | 57 | 4 |
| G9D75080 | R0.5 | 8.0 | .3150 | 8 | 12 | 63 | 4 |
| G9D75100 | R0.5 | 10.0 | .3937 | 10 | 15 | 72 | 4 |
| G9D75120 | R0.5 | 12.0 | .4724 | 12 | 18 | 83 | 4 |
| G9D75160 | R1.0 | 16.0 | .6299 | 16 | 24 | 92 | 5 |
| G9D75200 | R1.0 | 20.0 | .7874 | 20 | 30 | 104 | 5 |

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.05 | h6 |

◎ : Excellent ○ : Good

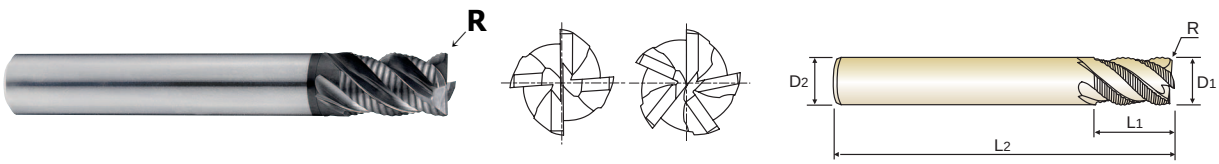
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ◎ | | ○ | | |

# X-SPEED ROUGHER END MILLS

**G9D76 SERIES** PLAIN SHANK

## CARBIDE, MULTI FLUTE LONG LENGTH ROUGHING CORNER RADIUS - FINE

- Unique flute design for excellent chip evacuation and vibration reduction.
- Optimal roughing tooth profile to reduce cutting forces.
- Special tool geometry for high feed rate and heavy cutting.
- Strong end tooth design for plunge and pocket milling.
- Custom engineered coating to allow long tool life and excellent chip evacuation.




MG | 4&5 | M-Helix | PLAIN

P.440

Unit : mm

| EDP No. | Corner Radius | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length | No. of Flute |
|---|---|---|---|---|---|---|---|
| | | Metric | Inch | | | | |
| | R | $D_1$ | | $D_2$ | $L_1$ | $L_2$ | |
| G9D76060 | R0.5 | 6.0 | .2362 | 6 | 12 | 57 | 4 |
| G9D76080 | R0.5 | 8.0 | .3150 | 8 | 16 | 63 | 4 |
| G9D76100 | R0.5 | 10.0 | .3937 | 10 | 20 | 72 | 4 |
| G9D76120 | R0.5 | 12.0 | .4724 | 12 | 24 | 83 | 4 |
| G9D76160 | R1.0 | 16.0 | .6299 | 16 | 32 | 92 | 5 |
| G9D76200 | R1.0 | 20.0 | .7874 | 20 | 40 | 104 | 5 |

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.05 | h6 |

◎ : Excellent ○ : Good

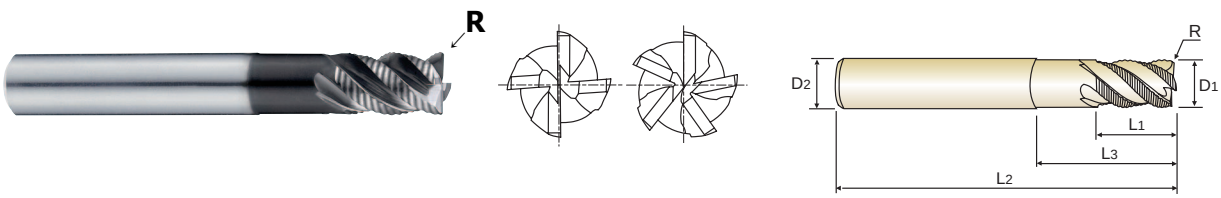
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ◎ | | ○ | | |

# X-SPEED ROUGHER END MILLS

**G9D77 SERIES** PLAIN SHANK

## CARBIDE, MULTI FLUTE LONG REACH ROUGHING CORNER RADIUS - FINE

- Unique flute design for excellent chip evacuation and vibration reduction.
- Optimal roughing tooth profile to reduce cutting forces.
- Special tool geometry for high feed rate and heavy cutting.
- Strong end tooth design for plunge and pocket milling.
- Custom engineered coating to allow long tool life and excellent chip evacuation.




MG 4&5 M-Helix PLAIN P.440

Unit : mm

| EDP No. | Corner Radius | Mill Diameter | | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | No. of Flute |
|---|---|---|---|---|---|---|---|---|
| | | Metric | Inch | | | | | |
| | R | $D_1$ | | $D_2$ | $L_1$ | $L_3$ | $L_2$ | |
| G9D77060 | R0.5 | 6.0 | .2362 | 6 | 9 | 18 | 57 | 4 |
| G9D77080 | R0.5 | 8.0 | .3150 | 8 | 12 | 24 | 63 | 4 |
| G9D77100 | R0.5 | 10.0 | .3937 | 10 | 15 | 30 | 72 | 4 |
| G9D77120 | R0.5 | 12.0 | .4724 | 12 | 18 | 36 | 83 | 4 |
| G9D77160 | R1.0 | 16.0 | .6299 | 16 | 24 | 48 | 100 | 5 |
| G9D77200 | R1.0 | 20.0 | .7874 | 20 | 30 | 60 | 110 | 5 |

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.05 | h6 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ◎ | | ○ | | |

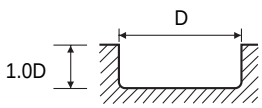
# X-SPEED ROUGHER END MILLS

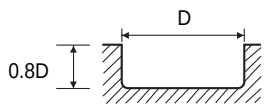
## RECOMMENDED CUTTING CONDITIONS

## CARBIDE, 4&5 FLUTE MULTIPLE HELIX CORNER RADIUS - SLOTTING

### G907, G928, G908, G929, G909, G930, G9D75, G9D76, G9D77 SERIES

| MATERIAL | | ALLOY STEELS, CARBON STEELS TOOL STEELS CAST IRON | | ALLOY STEELS, CARBON STEELS TOOL STEELS, CAST IRON PREHARDENED STEELS | |
|---|---|---|---|---|---|
| HARDNESS | | ~ HRc25 | | HRc25 ~ HRc40 | |
| DIAMETER INCH | DIAMETER METRIC | RPM | FEED | RPM | FEED |
| 1/4 | 6.0 | 12000 | 61.02 | 10600 | 43.31 |
| 5/16 | 8.0 | 9000 | 64.96 | 8100 | 46.46 |
| 3/8 | 10.0 | 7200 | 64.96 | 6400 | 46.46 |
| 1/2 | 12.0 | 6000 | 60.63 | 5400 | 44.88 |
| 5/8 | 16.0 | 4500 | 59.06 | 4100 | 41.34 |
| 3/4 | 20.0 | 3600 | 52.36 | 3200 | 35.43 |
| 1 | - | 2900 | 46.40 | 2600 | 32.50 |



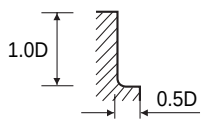



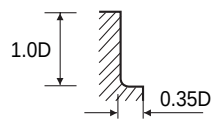

RPM = rev./min.
FEED = inch/min.

## CARBIDE, 4&5 FLUTE MULTIPLE HELIX CORNER RADIUS - SIDE CUTTING

### G907, G928, G908, G929, G909, G930, G9D75, G9D76, G9D77 SERIES

| MATERIAL | | ALLOY STEELS, CARBON STEELS TOOL STEELS CAST IRON | | ALLOY STEELS, CARBON STEELS TOOL STEELS, CAST IRON PREHARDENED STEELS | |
|---|---|---|---|---|---|
| HARDNESS | | ~ HRc25 | | HRc25 ~ HRc40 | |
| DIAMETER INCH | DIAMETER METRIC | RPM | FEED | RPM | FEED |
| 1/4 | 6.0 | 15800 | 101.18 | 14300 | 72.83 |
| 5/16 | 8.0 | 11900 | 106.30 | 10700 | 76.77 |
| 3/8 | 10.0 | 9500 | 106.30 | 8500 | 76.77 |
| 1/2 | 12.0 | 8000 | 101.18 | 7100 | 72.83 |
| 5/8 | 16.0 | 6000 | 96.46 | 5400 | 69.90 |
| 3/4 | 20.0 | 4800 | 84.25 | 4300 | 59.06 |
| 1 | - | 3800 | 75.25 | 3400 | 49.30 |




RPM = rev./min.
FEED = inch/min.

# CARBIDE

YG

Being the best through innovation

# X-POWER

- Medium Steels to High Hardened Steels up to HRc70

# SELECTION GUIDE

| ITEM | MODEL | DESCRIPTION | SIZE | | PAGE |
|---|---|---|---|---|---|
| | | | MIN | MAX | |
| **INCH** | | | | | |
| **EM154** | | CARBIDE, 2 FLUTE REGULAR LENGTH ◆ | D1/16 | D1 | **450** |
| **EM206** | | CARBIDE, 2 FLUTE LONG LENGTH ◆ | D1/8 | D1 | **450** |
| **EM959** | | CARBIDE, 2 FLUTE MINIATURE ◆ | D.016 | D.062 | **451** |
| **EM153** | | CARBIDE, 4 FLUTE REGULAR LENGTH ◆ | D1/16 | D1 | **452** |
| **EM207** | | CARBIDE, 4 FLUTE LONG LENGTH ◆ | D1/8 | D1 | **452** |
| **EM636** | | CARBIDE, 2 FLUTE STUB LENGTH CORNER RADIUS ◆ | D1/16 | D1/2 | **453** |
| **EM639** | | CARBIDE, 4 FLUTE STUB LENGTH CORNER RADIUS ◆ | D1/16 | D1/2 | **453** |
| **EM637** | | CARBIDE, 2 FLUTE REGULAR LENGTH CORNER RADIUS ◆ | D1/16 | D1/2 | **454** |
| **EM649** | | CARBIDE, 4 FLUTE REGULAR LENGTH CORNER RADIUS ◆ | D1/16 | D1/2 | **454** |
| **EM211** | | CARBIDE, 2 FLUTE LONG LENGTH CORNER RADIUS ◆ | D1/4 | D1/2 | **455** |
| **EM212** | | CARBIDE, 4 FLUTE LONG LENGTH CORNER RADIUS ◆ | D1/4 | D1/2 | **455** |
| **EM102** | | CARBIDE, 4 FLUTE 45°HELIX LONG LENGTH ◆ | D3/8 | D7/8 | **456** |
| **EM103** | | CARBIDE, 4 FLUTE 45°HELIX LONG REACH CORNER RADIUS ◆ | D3/8 | D7/8 | **457** |
| **EM965** | | CARBIDE, 4 FLUTE 55° HELIX STUB LENGTH CORNER RADIUS ◆ | D1/4 | D1/2 | **458** |
| **EM208** | | CARBIDE, 6&8 FLUTE 45°HELIX LONG LENGTH ◆ | D1/4 | D1 | **459** |
| **EM218** | | CARBIDE, 6&8 FLUTE 45° HELIX EXTRA LONG LENGTH ◆ | D1/4 | D1 | **459** |
| **EM668** | | CARBIDE, 6&8 FLUTE 45°HELIX LONG LENGTH CORNER RADIUS ◆ | D1/4 | D3/4 | **460** |

◆ U.S.A Stock

◎ : Excellent
○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | ○ | | |
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# SELECTION GUIDE

| ITEM | MODEL | DESCRIPTION | SIZE | | PAGE |
|---|---|---|---|---|---|
| | | | MIN | MAX | |
| **INCH** | | | | | |
| **EM209** | | CARBIDE, 2 FLUTE LONG LENGTH BALL NOSE ◆ | R1/64 | R1/2 | **461** |
| **EM210** | | CARBIDE, 4 FLUTE LONG LENGTH BALL NOSE ◆ | R1/16 | R1/2 | **461** |
| **EM961** | | CARBIDE, 2 FLUTE MEDIUM LENGTH BALL NOSE ◆ | R1/16 | R1/2 | **462** |
| **EM962** | | CARBIDE, 2 FLUTE LONG REACH BALL NOSE ◆ | R3/64 | R3/8 | **463** |
| **EM960** | | CARBIDE, 2 FLUTE MINIATURE BALL NOSE ◆ | R.012 | R.031 | **464** |
| **EM109** | | CARBIDE, 2 FLUTE 15° HELIX STUB CUT LENGTH BALL NOSE for OVER HRc55 ◆ | R1/64 | R1/4 | **465** |
| **EM963** | | CARBIDE, 2 FLUTE BALL NOSE with TAPER NECK ◆ | R1/32 | R1/4 | **466** |
| **EM979** | | CARBIDE, 2 FLUTE BALL NOSE with PENCIL NECK ◆ | R3/32 | R1/4 | **467** |
| **EM084** | | CARBIDE, 2 FLUTE LONG LENGTH BALL NOSE (MMC-ECONOMY TYPE) ◆ | R1/16 | R5/16 | **469** |
| **EM093** | | CARBIDE, 4 FLUTE LONG LENGTH BALL NOSE (MMC-ECONOMY TYPE) ◆ | R1/16 | R5/16 | **470** |
| **EM096** | | CARBIDE, 2 FLUTE LONG LENGTH BALL NOSE (MMC-SPHERE TYPE) ◆ | R1/16 | R5/16 | **471** |
| **EM097** | | CARBIDE, 4 FLUTE LONG LENGTH BALL NOSE (MMC-SPHERE TYPE) ◆ | R1/16 | R5/16 | **472** |
| **EM666** | | CARBIDE, MULTI FLUTE 20° HELIX STUB LENGTH FINE PITCH ROUGHING ◆ | D1/4 | D1 | **473** |
| **EM156** | | CARBIDE, MULTI FLUTE 20° HELIX LONG LENGTH FINE PITCH ROUGHING ◆ | D1/4 | D1 | **473** |
| **EM662** | | CARBIDE, MULTI FLUTE 20° HELIX LONG LENGTH FINE PITCH ROUGHING BALL NOSE ◆ | R1/8 | R1/2 | **474** |
| **EM966** | | CARBIDE, 2 FLUTE for RIB PROCESSING ◆ | D1/32 | D1/8 | **475** |
| **EM967** | | CARBIDE, 2 FLUTE BALL NOSE for RIB PROCESSING ◆ | R1/64 | R1/16 | **476** |

◆ U.S.A Stock

◎ : Excellent
○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
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# SELECTION GUIDE

| ITEM | MODEL | DESCRIPTION | SIZE | | PAGE |
|---|---|---|---|---|---|
| | | | MIN | MAX | |
| **METRIC** | | | | | |
| **EM810** | | CARBIDE, 2 FLUTE SHORT LENGTH ◇ | D1.0 | D25.0 | **477** |
| **EM816** | | CARBIDE, 2 FLUTE LONG LENGTH ◇ | D2.0 | D25.0 | **478** |
| **EM811** | | CARBIDE, 4 FLUTE SHORT LENGTH ◇ | D2.0 | D25.0 | **479** |
| **EM817** | | CARBIDE, 4 FLUTE LONG LENGTH ◇ | D2.0 | D25.0 | **480** |
| **EM895** | | CARBIDE, 3 FLUTE 38° HELIX SHORT LENGTH ◇ | D1.0 | D20.0 | **481** |
| **EM810** | | CARBIDE, 2 FLUTE MINIATURE ◇ | D0.4 | D1.5 | **482** |
| **EM818** | | CARBIDE, 2 FLUTE LONG LENGTH CORNER RADIUS ◇ | D3.0 | D20.0 | **483** |
| **EM819** | | CARBIDE, 4 FLUTE LONG LENGTH CORNER RADIUS ◇ | D3.0 | D20.0 | **483** |
| **EM905** | | CARBIDE, 4 FLUTE 45° HELIX SHORT LENGTH CORNER RADIUS ◇ | D10.0 | D22.0 | **484** |
| **EM839** | | CARBIDE, 4 FLUTE STUB CUT LENGTH CORNER RADIUS ◇ | D2.0 | D16.0 | **485** |
| **EM812** | | CARBIDE, 6&8 FLUTE 45° HELIX LONG LENGTH ◇ | D6.0 | D25.0 | **486** |
| **EM834** | | CARBIDE, 6&8 FLUTE 45° HELIX EXTRA LONG LENGTH ◇ | D6.0 | D25.0 | **486** |
| **EM835** | | CARBIDE, 6 FLUTE 45° HELIX LONG LENGTH CORNER RADIUS ◇ | D6.0 | D20.0 | **487** |
| **EM897** | | CARBIDE, 6 FLUTE 45° HELIX STUB CUT LENGTH CORNER RADIUS ◇ | D6.0 | D12.0 | **488** |
| **EM876** | | CARBIDE, 2 FLUTE SHORT LENGTH BALL NOSE ◇ | R0.5 | R12.5 | **489** |
| **EM813 EM823** | | CARBIDE, 2 FLUTE LONG LENGTH BALL NOSE ◇ | R0.5 | R12.5 | **490** |
| **EM815 EM825** | | CARBIDE, 4 FLUTE LONG LENGTH BALL NOSE ◇ | R0.5 | R12.5 | **490** |

◇ Call for Availability

◎ : Excellent
○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
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# SELECTION GUIDE

| ITEM | MODEL | DESCRIPTION | SIZE | | PAGE |
|---|---|---|---|---|---|
| | | | MIN | MAX | |
| **METRIC** | | | | | |
| **EM899** | | CARBIDE, 2 FLUTE MEDIUM LENGTH BALL NOSE ◇ | R1.5 | R12.5 | **491** |
| **EM838** | | CARBIDE, 2 FLUTE LONG REACH BALL NOSE ◇ | R1.0 | R10.0 | **492** |
| **EM865** | | CARBIDE, 2 FLUTE MINIATURE BALL NOSE ◇ | R0.3 | R0.75 | **493** |
| **EM868** | | CARBIDE, 2 FLUTE 15° HELIX STUB CUT LENGTH BALL NOSE for OVER HRc55 ◇ | R0.5 | R12.5 | **494** |
| **EM902** | | CARBIDE, 2 FLUTE BALL NOSE with TAPER NECK ◇ | R0.5 | R6.0 | **495** |
| **EM669** | | CARBIDE, 2 FLUTE LONG LENGTH BALL NOSE (MMC-ECONOMY TYPE) ◇ | R1.5 | R8.0 | **496** |
| **EM673** | | CARBIDE, 4 FLUTE LONG LENGTH BALL NOSE (MMC-ECONOMY TYPE) ◇ | R2.5 | R8.0 | **497** |
| **EM863** | | CARBIDE, 2 FLUTE LONG LENGTH BALL NOSE (MMC- SPHERE TYPE) ◇ | R1.5 | R8.0 | **498** |
| **EM864** | | CARBIDE, 4 FLUTE LONG LENGTH BALL NOSE (MMC- SPHERE TYPE) ◇ | R2.5 | R8.0 | **499** |
| **EM832** | | CARBIDE, MULTI FLUTE 20° HELIX SHORT LENGTH FINE PITCH ROUGHING ◇ | D6.0 | D25.0 | **500** |
| **EM814** | | CARBIDE, MULTI FLUTE 20° HELIX LONG LENGTH FINE PITCH ROUGHING ◇ | D6.0 | D25.0 | **501** |
| **EM833** | | CARBIDE, 3&4 FLUTE 20° HELIX LONG LENGTH FINE PITCH ROUGHING BALL NOSE ◇ | R3.0 | R10.0 | **502** |
| **EM837** | | CARBIDE, 2 FLUTE TAPER ◇ | D2.0 | D8.0 | **503** |
| **EM883** | | CARBIDE, 2 FLUTE for RIB PROCESSING ◇ | D0.8 | D3.0 | **504** |
| **EM886** | | CARBIDE, 2 FLUTE BALL NOSE for RIB PROCESSING ◇ | R0.3 | R2.0 | **505** |
| | | RECOMMENDED CUTTING CONDITIONS | | | **506** |

◇ Call for Availability

◎ : Excellent
○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
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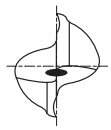
# YG X-POWER END MILLS

**EM154 SERIES** PLAIN SHANK
**EM206 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE REGULAR & LONG LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.
- Increased feed rate.



MG | 2 | 30° | PLAIN

P.506

◆ U.S.A Stock

**EM154 Series** ■ REGULAR LENGTH

Unit : Inch

| EDP No. | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|
| 93074 | 1/16 | 1/8 | 3/16 | 1-1/2 |
| 93075 | 1/8 | 1/8 | 1/2 | 1-1/2 |
| 93076 | 3/16 | 3/16 | 5/8 | 2 |
| 93077 | 1/4 | 1/4 | 3/4 | 2-1/2 |
| 93078 | 5/16 | 5/16 | 13/16 | 2-1/2 |
| 93079 | 3/8 | 3/8 | 1 | 2-1/2 |
| 93080 | 1/2 | 1/2 | 1 | 3 |
| 93081 | 5/8 | 5/8 | 1-1/4 | 3-1/2 |
| 93082 | 3/4 | 3/4 | 1-1/2 | 4 |
| 93083 | 1 | 1 | 1-1/2 | 4 |

**EM206 Series** ■ LONG LENGTH

Unit : Inch

| EDP No. | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|
| 93084 | 1/8 | 1/8 | 3/4 | 2-1/4 |
| 93085 | 3/16 | 3/16 | 3/4 | 2-1/2 |
| 93086 | 1/4 | 1/4 | 1-1/8 | 3 |
| 93087 | 5/16 | 5/16 | 1-1/8 | 3 |
| 93088 | 3/8 | 3/8 | 1-1/8 | 3 |
| 93089 | 1/2 | 1/2 | 2 | 4 |
| 93090 | 5/8 | 5/8 | 2-1/4 | 5 |
| 93091 | 3/4 | 3/4 | 2-1/4 | 5 |
| 93092 | 1 | 1 | 2-1/4 | 5 |

| Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|
| 0~-.0012 | 0~-.0003 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | ○ | | |

# X-POWER END MILLS

**EM959 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE MINIATURE

- ▶ High precision milling in medical, optical, electronics and aero space industries.
- ▶ Excellent performance on high hardened steel(HRc70).

MG | 2 | 30° | PLAIN

P.508

◆ U.S.A Stock

Unit : Inch

| EDP No. | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|
| 93495 | .016 | 1/8 | .031 | 1-1/2 |
| 93496 | .020 | 1/8 | .040 | 1-1/2 |
| 93497 | .024 | 1/8 | .047 | 1-1/2 |
| 93498 | .028 | 1/8 | .055 | 1-1/2 |
| 93499 | .031 | 1/8 | .063 | 1-1/2 |
| 93500 | .035 | 1/8 | .080 | 1-1/2 |
| 93501 | .040 | 1/8 | .100 | 1-1/2 |
| 93502 | .043 | 1/8 | .100 | 1-1/2 |
| 93503 | .047 | 1/8 | .157 | 1-1/2 |
| 93504 | .052 | 1/8 | .157 | 1-1/2 |
| 93505 | .055 | 1/8 | .157 | 1-1/2 |
| 93506 | .062 | 1/8 | .157 | 1-1/2 |

| Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|
| ±.0005 | 0~−.0003 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | | | |

# X-POWER END MILLS

EM153 SERIES PLAIN SHANK
EM207 SERIES PLAIN SHANK

## CARBIDE, 4 FLUTE REGULAR & LONG LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- 4 flute allows for better workpiece finishes.
- Increased production.

MG | 4 | 30° | PLAIN

P.507

◆ U.S.A Stock

### EM153 Series ■ REGULAR LENGTH

Unit : Inch

| EDP No. | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|
| 93093 | 1/16 | 1/8 | 3/16 | 1-1/2 |
| 93094 | 1/8 | 1/8 | 1/2 | 1-1/2 |
| 93095 | 3/16 | 3/16 | 5/8 | 2 |
| 93096 | 1/4 | 1/4 | 3/4 | 2-1/2 |
| 93097 | 5/16 | 5/16 | 13/16 | 2-1/2 |
| 93098 | 3/8 | 3/8 | 1 | 2-1/2 |
| 93594 | 7/16 | 7/16 | 1 | 2-3/4 |
| 93099 | 1/2 | 1/2 | 1 | 3 |
| 93100 | 5/8 | 5/8 | 1-1/4 | 3-1/2 |
| 93101 | 3/4 | 3/4 | 1-1/2 | 4 |
| 93102 | 1 | 1 | 1-1/2 | 4 |

### EM207 Series ■ LONG LENGTH

Unit : Inch

| EDP No. | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|
| 93103 | 1/8 | 1/8 | 3/4 | 2-1/4 |
| 93104 | 3/16 | 3/16 | 3/4 | 2-1/2 |
| 93105 | 1/4 | 1/4 | 1-1/8 | 3 |
| 93106 | 5/16 | 5/16 | 1-1/8 | 3 |
| 93107 | 3/8 | 3/8 | 1-1/8 | 3 |
| 93108 | 1/2 | 1/2 | 2 | 4 |
| 93109 | 5/8 | 5/8 | 2-1/4 | 5 |
| 93110 | 3/4 | 3/4 | 2-1/4 | 5 |
| 93111 | 1 | 1 | 2-1/4 | 5 |

| Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0003 |

◎ : Excellent ○ : Good

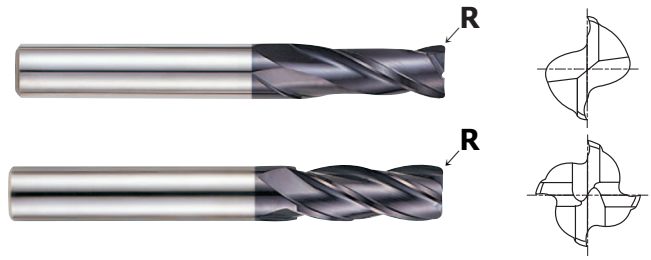
| Series | Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| EM153 | ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | ○ | | |
| EM207 | ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | | | |

# X-POWER END MILLS

**EM636 SERIES** PLAIN SHANK
**EM639 SERIES** PLAIN SHANK

## CARBIDE, 2&4 FLUTE STUB LENGTH CORNER RADIUS

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.
- Increased feed rate.




MG | 2&4 | 30° | R ±.001 | PLAIN

P.508, 509

◆ U.S.A Stock

### EM636(2 FLUTE), EM639(4 FLUTE) Series

Unit : Inch

| EDP No. | | Corner Radius | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| 2 FLUTE | 4 FLUTE | R (±.001) | | | | |
| 93172 | 93216 | R.008 | 1/16 | 1/4 | 1/8 | 2-1/4 |
| 93173 | 93217 | R.010 | 1/8 | 1/4 | 1/4 | 2-1/4 |
| 93174 | 93218 | R.020 | 1/8 | 1/4 | 1/4 | 2-1/4 |
| 93175 | - | R.030 | 1/8 | 1/4 | 1/4 | 2-1/4 |
| 93176 | 93220 | R.010 | 3/16 | 1/4 | 3/8 | 2-1/2 |
| 93177 | 93221 | R.020 | 3/16 | 1/4 | 3/8 | 2-1/2 |
| 93178 | 93222 | R.030 | 3/16 | 1/4 | 3/8 | 2-1/2 |
| 93179 | 93223 | R.010 | 1/4 | 1/4 | 1/2 | 3 |
| 93180 | 93224 | R.020 | 1/4 | 1/4 | 1/2 | 3 |
| 93181 | 93225 | R.030 | 1/4 | 1/4 | 1/2 | 3 |
| 93182 | 93226 | R.020 | 5/16 | 5/16 | 1/2 | 3 |
| 93183 | 93227 | R.030 | 5/16 | 5/16 | 1/2 | 3 |
| 93184 | 93228 | R.060 | 5/16 | 5/16 | 1/2 | 3 |
| 93185 | 93229 | R.090 | 5/16 | 5/16 | 1/2 | 3 |
| 93186 | 93230 | R.020 | 3/8 | 3/8 | 5/8 | 3 |
| 93187 | 93231 | R.030 | 3/8 | 3/8 | 5/8 | 3 |
| 93188 | 93232 | R.060 | 3/8 | 3/8 | 5/8 | 3 |
| 93189 | 93233 | R.090 | 3/8 | 3/8 | 5/8 | 3 |
| 93190 | 93234 | R.020 | 1/2 | 1/2 | 5/8 | 4 |
| 93191 | 93235 | R.030 | 1/2 | 1/2 | 5/8 | 4 |
| 93192 | 93236 | R.060 | 1/2 | 1/2 | 5/8 | 4 |
| 93193 | 93237 | R.090 | 1/2 | 1/2 | 5/8 | 4 |

| Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0003 |

◎ : Excellent ○ : Good

| Series | Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| EM636 | ○ | ◎ | ◎ | ◎ | ○ | | | | | | | | |
| EM639 | ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | ○ | | |

# X-POWER END MILLS

**EM637 SERIES** PLAIN SHANK
**EM649 SERIES** PLAIN SHANK

## CARBIDE, 2&4 FLUTE REGULAR LENGTH CORNER RADIUS

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.
- Increased feed rate.

MG | 2&4 | 30° | R ±.001 | PLAIN

P.508, 509

◆ U.S.A Stock

### EM637(2 FLUTE), EM649(4 FLUTE) Series

Unit : Inch

| EDP No. | | Corner Radius | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| 2 FLUTE | 4 FLUTE | R (±.001) | | | | |
| 93194 | 93238 | R.008 | 1/16 | 1/4 | 3/16 | 2-1/4 |
| 93195 | 93239 | R.010 | 1/8 | 1/4 | 1/2 | 2-1/4 |
| 93196 | 93240 | R.020 | 1/8 | 1/4 | 1/2 | 2-1/4 |
| 93197 | - | R.030 | 1/8 | 1/4 | 1/2 | 2-1/4 |
| 93198 | 93242 | R.010 | 3/16 | 1/4 | 5/8 | 2-1/2 |
| 93199 | 93243 | R.020 | 3/16 | 1/4 | 5/8 | 2-1/2 |
| 93200 | 93244 | R.030 | 3/16 | 1/4 | 5/8 | 2-1/2 |
| 93201 | 93245 | R.010 | 1/4 | 1/4 | 3/4 | 3 |
| 93202 | 93246 | R.020 | 1/4 | 1/4 | 3/4 | 3 |
| 93203 | 93247 | R.030 | 1/4 | 1/4 | 3/4 | 3 |
| 93204 | 93248 | R.020 | 5/16 | 5/16 | 13/16 | 3 |
| 93205 | 93249 | R.030 | 5/16 | 5/16 | 13/16 | 3 |
| 93206 | 93250 | R.060 | 5/16 | 5/16 | 13/16 | 3 |
| 93207 | 93251 | R.090 | 5/16 | 5/16 | 13/16 | 3 |
| 93208 | 93252 | R.020 | 3/8 | 3/8 | 1 | 3 |
| 93209 | 93253 | R.030 | 3/8 | 3/8 | 1 | 3 |
| 93210 | 93254 | R.060 | 3/8 | 3/8 | 1 | 3 |
| 93211 | 93255 | R.090 | 3/8 | 3/8 | 1 | 3 |
| 93600 | 93595 | R.020 | 7/16 | 7/16 | 1 | 4 |
| 93601 | 93597 | R.030 | 7/16 | 7/16 | 1 | 4 |
| 93602 | 93598 | R.060 | 7/16 | 7/16 | 1 | 4 |
| 93603 | 93599 | R.090 | 7/16 | 7/16 | 1 | 4 |
| 93212 | 93256 | R.020 | 1/2 | 1/2 | 1 | 4 |
| 93213 | 93257 | R.030 | 1/2 | 1/2 | 1 | 4 |
| 93214 | 93258 | R.060 | 1/2 | 1/2 | 1 | 4 |
| 93215 | 93259 | R.090 | 1/2 | 1/2 | 1 | 4 |

| Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0003 |

◎ : Excellent ○ : Good

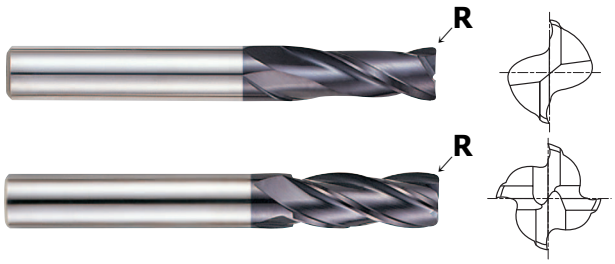
| Series | Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| EM637 | ○ | ◎ | ◎ | ◎ | ○ | | | | | | | | |
| EM649 | ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | ○ | | |

YG X-POWER END MILLS

EM211 SERIES PLAIN SHANK
EM212 SERIES PLAIN SHANK

# CARBIDE, 2&4 FLUTE LONG LENGTH CORNER RADIUS

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.
- Increased feed rate.




MG | 2&4 | 30° | R ±.001 | PLAIN

P.508, 509

◆ U.S.A Stock

## EM211(2 FLUTE), EM212(4 FLUTE) Series

Unit : Inch

| EDP No. | | Corner Radius | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| 2 FLUTE | 4 FLUTE | R (±.001) | | | | |
| **93143** | **93157** | R.020 | **1/4** | 1/4 | 1-1/8 | 3 |
| **93144** | **93158** | R.030 | **1/4** | 1/4 | 1-1/8 | 3 |
| **93145** | **93159** | R.020 | **5/16** | 5/16 | 1-1/8 | 3 |
| **93146** | **93160** | R.030 | **5/16** | 5/16 | 1-1/8 | 3 |
| **93147** | **93161** | R.060 | **5/16** | 5/16 | 1-1/8 | 3 |
| **93148** | **93162** | R.090 | **5/16** | 5/16 | 1-1/8 | 3 |
| **93149** | **93163** | R.020 | **3/8** | 3/8 | 1-1/8 | 3 |
| **93150** | **93164** | R.030 | **3/8** | 3/8 | 1-1/8 | 3 |
| **93151** | **93165** | R.060 | **3/8** | 3/8 | 1-1/8 | 3 |
| **93152** | **93166** | R.090 | **3/8** | 3/8 | 1-1/8 | 3 |
| **93153** | **93167** | R.020 | **1/2** | 1/2 | 2 | 4 |
| **93154** | **93168** | R.030 | **1/2** | 1/2 | 2 | 4 |
| **93155** | **93169** | R.060 | **1/2** | 1/2 | 2 | 4 |
| **93156** | **93170** | R.090 | **1/2** | 1/2 | 2 | 4 |

| Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0003 |

◎ : Excellent ○ : Good

| Series | Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| EM211 | ○ | ◎ | ◎ | ◎ | ○ | | | | | | | | |
| EM212 | ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | ○ | | |

# X-POWER END MILLS

**EM102 SERIES** PLAIN SHANK

## CARBIDE, 4 FLUTE 45° HELIX LONG LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- 4 flute allows for better workpiece finishes.
- Increased production.

MG | 4 | 45° | PLAIN

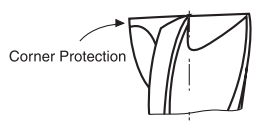
P.509

◆ U.S.A Stock

Unit : Inch

| EDP No. | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|
| 93395 | 3/8 | 5/16 | 5/8 | 5 |
| 93396 | 1/2 | 3/8 | 3/4 | 6 |
| 93397 | 5/8 | 1/2 | 7/8 | 6-1/2 |
| 93398 | 3/4 | 5/8 | 1 | 7 |
| 93399 | 7/8 | 3/4 | 1-1/4 | 8 |

| Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0003 |




◎ : Excellent ○ : Good

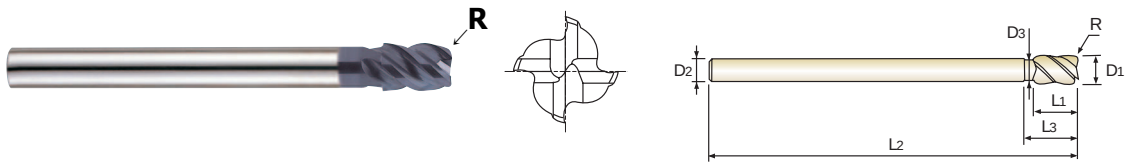
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | ○ | | |

# X-POWER END MILLS

**EM103 SERIES** PLAIN SHANK

## CARBIDE, 4 FLUTE 45° HELIX LONG REACH CORNER RADIUS

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.
- Increased feed rate.




MG | 4 | 45° | R ±.001 | PLAIN

P.510

◆ U.S.A Stock

Unit : Inch

| EDP No. | Corner Radius | Mill Diameter | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|
| | R (±.001) | D1 | D2 | L1 | L3 | L2 | D3 |
| **93400** | R.020 | **3/8** | 5/16 | 5/8 | .750 | 5 | .293 |
| **93405** | R.040 | **3/8** | 5/16 | 5/8 | .750 | 5 | .293 |
| **93401** | R.020 | **1/2** | 3/8 | 3/4 | .875 | 6 | .355 |
| **93406** | R.040 | **1/2** | 3/8 | 3/4 | .875 | 6 | .355 |
| **93402** | R.020 | **5/8** | 1/2 | 7/8 | 1.000 | 6-1/2 | .480 |
| **93407** | R.040 | **5/8** | 1/2 | 7/8 | 1.000 | 6-1/2 | .480 |
| **93403** | R.020 | **3/4** | 5/8 | 1 | 1.125 | 7 | .605 |
| **93408** | R.040 | **3/4** | 5/8 | 1 | 1.125 | 7 | .605 |
| **93404** | R.020 | **7/8** | 3/4 | 1-1/4 | 1.375 | 8 | .730 |
| **93409** | R.040 | **7/8** | 3/4 | 1-1/4 | 1.375 | 8 | .730 |

| Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0003 |

◎ : Excellent ○ : Good

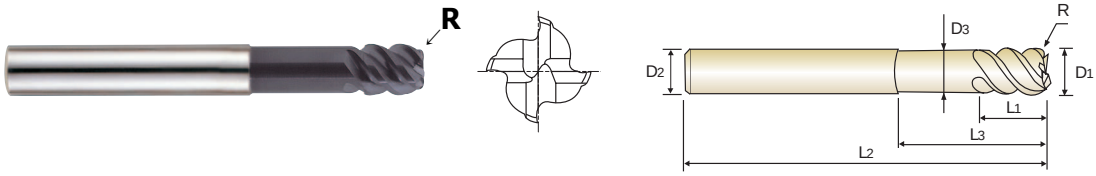
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | ○ | | |

# X-POWER END MILLS

**EM965 SERIES** PLAIN SHANK

## CARBIDE, 4 FLUTE 55° HELIX STUB LENGTH CORNER RADIUS

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Corner radius and corner protection against chipping.




MG | 4 | 55° | R ±.001 | PLAIN

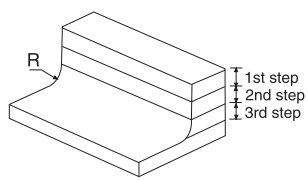
P.511

◆ U.S.A Stock

Unit : Inch

| EDP No. | Corner Radius | Mill Diameter | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|
| | R (±.001) | $D_1$ | $D_2$ | $L_1$ | $L_3$ | $L_2$ | $D_3$ |
| **93544** | R.063 | **1/4** | 1/4 | 5/16 | 7/8 | 2-1/4 | .230 |
| **93545** | R.078 | **5/16** | 5/16 | 3/8 | 1 | 2-1/2 | .289 |
| **93546** | R.094 | **3/8** | 3/8 | 7/16 | 1-1/4 | 3 | .344 |
| **93596** | R.109 | **7/16** | 7/16 | 1/2 | 1-1/2 | 3-1/4 | .395 |
| **93547** | R.125 | **1/2** | 1/2 | 1/2 | 1-1/2 | 3-1/4 | .461 |

| Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0003 |




◎ : Excellent ○ : Good

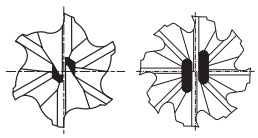
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | ○ | | |

# X-POWER END MILLS

**EM208 SERIES** PLAIN SHANK
**EM218 SERIES** PLAIN SHANK

## CARBIDE, 6&8 FLUTE 45°HELIX LONG & EXTRA LONG LENGTH

- Designed to machine high hardened materials.
- High speed cutting and finish milling with high feed rate.
- Superior workpiece finishes.
- Superior wear resistant.
- Suitable for dry milling.
- Corner Protection against chipping.



MG | 6&8 | 45° | PLAIN

P.512, 513

◆ U.S.A Stock

### EM208 Series ■ LONG LENGTH

Unit : Inch

| EDP No. | Mill Diameter | Shank Diameter | Length of Cut | Overall Length | No. of Flute |
|---|---|---|---|---|---|
| 93119 | 1/4 | 1/4 | 1/2 | 2-1/4 | 6 |
| 93120 | 5/16 | 5/16 | 3/4 | 2-1/2 | 6 |
| 93121 | 3/8 | 3/8 | 7/8 | 2-7/8 | 6 |
| 93122 | 1/2 | 1/2 | 1 | 3-1/4 | 6 |
| 93123 | 5/8 | 5/8 | 1-1/4 | 3-5/8 | 6 |
| 93124 | 3/4 | 3/4 | 1-1/2 | 4-1/8 | 8 |
| 93171 | 1 | 1 | 1-3/4 | 4-1/4 | 8 |

### EM218 Series ■ EXTRA LONG LENGTH

Unit : Inch

| EDP No. | Mill Diameter | Shank Diameter | Length of Cut | Overall Length | No. of Flute |
|---|---|---|---|---|---|
| 99666 | 1/4 | 1/4 | 1 | 2-3/4 | 6 |
| 99667 | 5/16 | 5/16 | 1-1/2 | 3-5/8 | 6 |
| 99668 | 3/8 | 3/8 | 1-3/4 | 4 | 6 |
| 99669 | 1/2 | 1/2 | 2-3/16 | 4-3/8 | 6 |
| 99670 | 5/8 | 5/8 | 2-5/8 | 5-1/8 | 6 |
| 99588 | 3/4 | 3/4 | 2-1/4 | 5 | 8 |
| 99589 | 3/4 | 3/4 | 3-1/4 | 6 | 8 |
| 99590 | 3/4 | 3/4 | 4-1/8 | 7 | 8 |
| 99591 | 1 | 1 | 4-1/8 | 7 | 8 |

| Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0003 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | | | |

CBN END MILL
i-Xmill END MILL
X5070 END MILLS
X-SPEED ROUGHER END MILLS
X-POWER END MILLS
JET-POWER END MILLS
V7 Mill STEEL END MILLS
V7 Mill INOX END MILLS
ALU-POWER END MILLS
D-POWER END MILLS
STANDARD CARBIDE END MILLS
TANK-POWER END MILLS
STANDARD COBALT & HSS END MILLS
TECHNICAL DATA

# X-POWER END MILLS

**EM668 SERIES** PLAIN SHANK

## CARBIDE, 6&8 FLUTE 45°HELIX LONG LENGTH CORNER RADIUS

- Designed to machine high hardened materials.
- High speed cutting and finish milling with high feed rates.
- Superior workpiece finishes.
- Superior wear resistant.
- Suitable for dry milling.

MG | 6&8 | 45° | PLAIN

P.513

◆ U.S.A Stock

Unit : Inch

| EDP No. | Corner Radius R | Mill Diameter | Shank Diameter | Length of Cut | Overall Length | No. of Flute |
|---|---|---|---|---|---|---|
| **93277** | R.020 | **1/4** | 1/4 | 1/2 | 2-1/4 | 6 |
| **93278** | R.020 | **5/16** | 5/16 | 3/4 | 2-1/2 | 6 |
| **93279** | R.020 | **3/8** | 3/8 | 7/8 | 2-7/8 | 6 |
| **93280** | R.030 | **3/8** | 3/8 | 7/8 | 2-7/8 | 6 |
| **93281** | R.020 | **1/2** | 1/2 | 1 | 3-1/4 | 6 |
| **93282** | R.030 | **1/2** | 1/2 | 1 | 3-1/4 | 6 |
| **93283** | R.030 | **5/8** | 5/8 | 1-1/4 | 3-5/8 | 6 |
| **93284** | R.060 | **5/8** | 5/8 | 1-1/4 | 3-5/8 | 6 |
| **93285** | R.030 | **3/4** | 3/4 | 1-1/2 | 4-1/8 | 8 |
| **93286** | R.060 | **3/4** | 3/4 | 1-1/2 | 4-1/8 | 8 |
| **93287** | R.090 | **3/4** | 3/4 | 1-1/2 | 4-1/8 | 8 |

| Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0003 |

◎ : Excellent ○ : Good

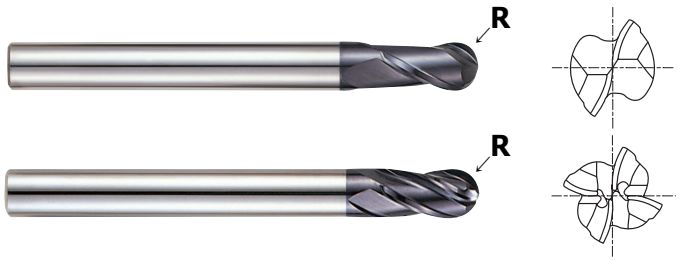
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | | | |

# X-POWER END MILLS

**EM209 SERIES** PLAIN SHANK
**EM210 SERIES** PLAIN SHANK

## CARBIDE, 2&4 FLUTE LONG LENGTH BALL NOSE

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- For copy-milling machines.




MG | 2&4 | 30° | R ±.001 | PLAIN

P.514, 515

◆ U.S.A Stock

**EM209(2 FLUTE), EM210(4 FLUTE) Series**

Unit : Inch

| EDP No. | | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| 2 FLUTE | 4 FLUTE | R (±.001) | | | | |
| **93260** | - | R 1/64 | **1/32** | 1/4 | 1/32 | 2-1/2 |
| **93261** | - | R 1/32 | **1/16** | 1/4 | 1/16 | 2-1/2 |
| **93262** | - | R 3/64 | **3/32** | 1/4 | 3/32 | 2-1/2 |
| **93125** | **93134** | R 1/16 | **1/8** | 1/8 | 5/16 | 2-3/8 |
| **93126** | **93135** | R 3/32 | **3/16** | 3/16 | 3/8 | 3-1/8 |
| **93127** | **93136** | R 1/8 | **1/4** | 1/4 | 1/2 | 3-1/2 |
| **93128** | **93137** | R 5/32 | **5/16** | 5/16 | 9/16 | 4 |
| **93129** | **93138** | R 3/16 | **3/8** | 3/8 | 3/4 | 4 |
| **93130** | **93139** | R 1/4 | **1/2** | 1/2 | 7/8 | 4-1/4 |
| **93131** | **93140** | R 5/16 | **5/8** | 5/8 | 1-1/4 | 5-1/2 |
| **93132** | **93141** | R 3/8 | **3/4** | 3/4 | 1-1/2 | 6-1/4 |
| **93133** | **93142** | R 1/2 | **1** | 1 | 2 | 7-1/8 |

| Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0003 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | ○ | | | ○ | | | | |

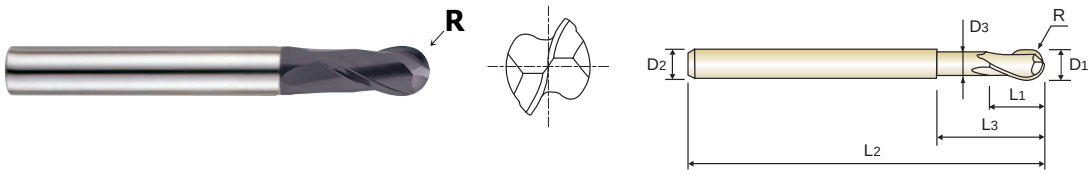
CBN END MILL
i-Xmill END MILL
X5070 END MILLS
X-SPEED ROUGHER END MILLS
X-POWER END MILLS
JET-POWER END MILLS
V7 Mill STEEL END MILLS
V7 Mill INOX END MILLS
ALU-POWER END MILLS
D-POWER END MILLS
STANDARD CARBIDE END MILLS
TANK-POWER END MILLS
STANDARD COBALT & HSS END MILLS
TECHNICAL DATA

YG X-POWER END MILLS

EM961 SERIES PLAIN SHANK

# CARBIDE, 2 FLUTE MEDIUM LENGTH BALL NOSE

- Deep slotting milling is possible by reduced neck.
- High efficiency milling is possible in deep slotting with projection of the end mill being long.




MG | 2 | 30° | R ±.001 | PLAIN

P.516

◆ U.S.A Stock

Unit : Inch

| EDP No. | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|
| | R (±.001) | D1 | D2 | L1 | L3 | L2 | D3 |
| **93517** | R1/16 | **1/8** | 1/4 | 5/16 | - | 2-3/4 | - |
| **93518** | R3/32 | **3/16** | 1/4 | 1/2 | - | 3-1/8 | - |
| **93519** | R1/8 | **1/4** | 1/4 | 1/2 | 7/8 | 3-1/8 | .242 |
| **93520** | R5/32 | **5/16** | 5/16 | 9/16 | 1-1/16 | 3-1/2 | .305 |
| **93521** | R3/16 | **3/8** | 3/8 | 3/4 | 1-1/4 | 4 | .367 |
| **93522** | R1/4 | **1/2** | 1/2 | 7/8 | 1-3/8 | 4-1/4 | .492 |
| **93523** | R5/16 | **5/8** | 5/8 | 1-1/4 | 2 | 5-1/2 | .617 |
| **93524** | R3/8 | **3/4** | 3/4 | 1-1/2 | 2-1/4 | 6-1/4 | .742 |
| **93525** | R1/2 | **1** | 1 | 2-1/8 | 3 | 7 | .992 |

| Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0003 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | ○ | | | ○ | | | | |

# X-POWER END MILLS

**EM962 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE LONG REACH BALL NOSE

▶ Longer overall length than EM209, EM210, type and suitable for machining deeply located area.

MG | 2 | 30° | R ±.001 | PLAIN

P.517

◆ U.S.A Stock

Unit : Inch

| EDP No. | Radius of Ball Nose R (±.001) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| **93578** | R3/64 | **3/32** | 1/8 | 1/4 | 3-1/8 |
| **93579** | R1/16 | **1/8** | 1/8 | 5/16 | 4 |
| **93580** | R3/32 | **3/16** | 3/16 | 3/8 | 4-3/4 |
| **93581** | R1/8 | **1/4** | 1/4 | 3/8 | 4-3/4 |
| **93582** | R5/32 | **5/16** | 5/16 | 9/16 | 5-1/2 |
| **93583** | R3/16 | **3/8** | 3/8 | 3/4 | 7 |
| **93584** | R1/4 | **1/2** | 1/2 | 7/8 | 8 |
| **93585** | R5/16 | **5/8** | 5/8 | 1-1/4 | 10 |
| **93586** | R3/8 | **3/4** | 3/4 | 1-1/2 | 10 |

| Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0003 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | ○ | | | ○ | | | | |

YG X-POWER END MILLS

EM960 SERIES PLAIN SHANK

# CARBIDE, 2 FLUTE MINIATURE BALL NOSE

- High precision milling in medical, optical, electronics and aerospace industrials.
- Excellent performance at dry cutting conditon.
- Excellent performance on high hardened steel up to HRc70.

MG | 2 | 30° | R ±.0005 | PLAIN

P.523

◆ U.S.A Stock

Unit : Inch

| EDP No. | Radius of Ball Nose R (±.0005) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| **93507** | R.012 | **.024** | 1/8 | .043 | 1-1/2 |
| **93508** | R.014 | **.028** | 1/8 | .060 | 1-1/2 |
| **93509** | R.0155 | **.031** | 1/8 | .080 | 1-1/2 |
| **93510** | R.0175 | **.035** | 1/8 | .087 | 1-1/2 |
| **93511** | R.020 | **.040** | 1/8 | .100 | 1-1/2 |
| **93512** | R.0215 | **.043** | 1/8 | .118 | 1-1/2 |
| **93513** | R.0235 | **.047** | 1/8 | .118 | 1-1/2 |
| **93514** | R.026 | **.052** | 1/8 | .138 | 1-1/2 |
| **93515** | R.0275 | **.055** | 1/8 | .138 | 1-1/2 |
| **93516** | R.031 | **.062** | 1/8 | .157 | 1-1/2 |

| Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0010 | 0~−.0003 |

◎ : Excellent ○ : Good

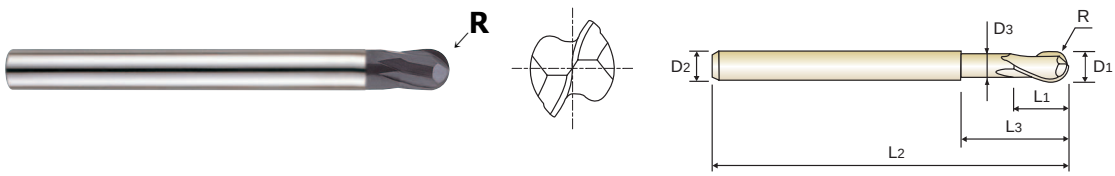
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | | | |

# X-POWER END MILLS

**EM109 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE 15° HELIX STUB CUT LENGTH BALL NOSE for OVER HRc55

- Suitable for HRc55~HRc70 high hardened materials.
- Strong cutting edges and higher tool rigidity.




MG | 2 | 15° | R ±.0005 | PLAIN

P.518

**HRc55 ~ HRc70**

◆ U.S.A Stock

Unit : Inch

| EDP No. | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|
| | R (±.0005) | D1 | D2 | L1 | L3 | L2 | D3 |
| **93485** | R1/64 | **1/32** | 1/4 | 1/32 | 1/16 | 2 | .029 |
| **93486** | R1/32 | **1/16** | 1/4 | 1/16 | 1/8 | 2 | .059 |
| **93487** | R3/64 | **3/32** | 1/4 | 3/32 | 3/16 | 2 | .090 |
| **93488** | R1/16 | **1/8** | 1/4 | 1/8 | 1/4 | 2-1/2 | .121 |
| **93489** | R3/32 | **3/16** | 1/4 | 3/16 | 3/8 | 3 | .184 |
| **93490** | R1/8 | **1/4** | 1/4 | 1/4 | 1/2 | 3-1/2 | .246 |
| **93491** | R5/32 | **5/16** | 5/16 | 5/16 | 5/8 | 4 | .309 |
| **93492** | R3/16 | **3/8** | 3/8 | 3/8 | 3/4 | 4 | .371 |
| **93493** | R1/4 | **1/2** | 1/2 | 1/2 | 1 | 4-1/2 | .496 |

| Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0003 |

◎ : Excellent ○ : Good

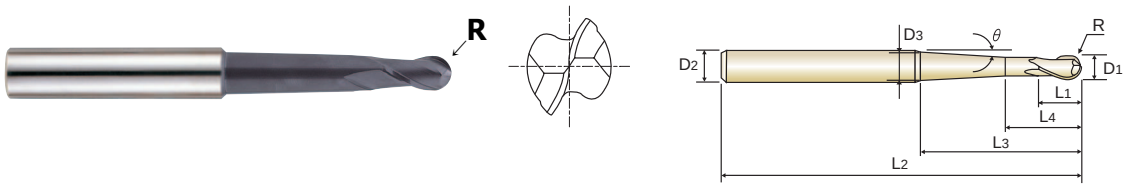
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | ○ | ◎ | ◎ | | | | | | | |

YG X-POWER END MILLS

EM963 SERIES PLAIN SHANK

# CARBIDE, 2 FLUTE BALL NOSE with TAPER NECK

▶ High efficiency milling is possible in deep slotting with projection of the end mill being long.




MG | 2 | 30° | R ±.0005 | PLAIN

P.519

◆ U.S.A Stock

Unit : Inch

| EDP No. | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Under Neck Parallel Length | Length Below Shank | Overall Length | Neck Diameter | Neck Taper Angle |
|---|---|---|---|---|---|---|---|---|---|
| | R (±.0005) | D1 | D2 | L1 | L4 | L3 | L2 | D3 | θ |
| **93526** | R1/32 | **1/16** | 1/4 | 5/32 | 15/64 | 7/8 | 2-3/8 | .096 | 1°30′ |
| **93527** | R1/32 | **1/16** | 1/4 | 5/32 | 15/64 | 1-5/8 | 3-1/8 | .208 | 3° |
| **93528** | R1/16 | **1/8** | 1/4 | 1/4 | 21/64 | 2-1/16 | 3-5/8 | .216 | 1°30′ |
| **93529** | R3/32 | **3/16** | 3/8 | 3/8 | 29/64 | 2-3/8 | 4-3/8 | .288 | 1°30′ |
| **93530** | R1/8 | **1/4** | 3/8 | 1/2 | 5/8 | 2-1/16 | 4-3/8 | .325 | 1°30′ |
| **93531** | R5/32 | **5/16** | 1/2 | 9/16 | 11/16 | 2-1/16 | 4-3/4 | .385 | 1°30′ |
| **93532** | R3/16 | **3/8** | 1/2 | 11/16 | 13/16 | 2-3/8 | 5-1/16 | .458 | 1°30′ |
| **93533** | R1/4 | **1/2** | 3/4 | 7/8 | 1 | 3-1/4 | 6-3/8 | .618 | 1°30′ |

| Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0003 |

◎ : Excellent ○ : Good

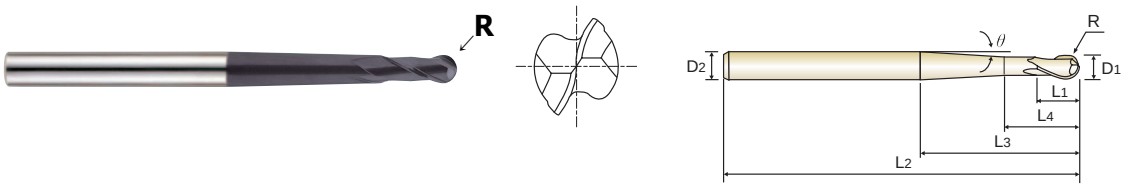
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | ○ | | | ○ | | | | |

# X-POWER END MILLS

**EM979 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE BALL NOSE with PENCIL NECK

▶ High efficiency milling is possible in deep slotting with projection of the end mill being long.




MG | 2 | 30° | R ±.0005 | PLAIN

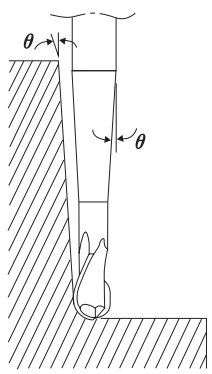
P.520

◆ U.S.A Stock

Unit : Inch

| EDP No. | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Under Neck Parallel Length | Length Below Shank | Overall Length | Neck Taper Angle |
|---|---|---|---|---|---|---|---|---|
| | R (±.0005) | D1 | D2 | L1 | L4 | L3 | L2 | θ |
| **93534** | R3/32 | **3/16** | 3/8 | 9/16 | .659 | 3-11/32 | 7-3/4 | 2° |
| **93535** | R3/32 | **3/16** | 3/8 | 9/16 | .666 | 2-13/16 | 6 | 2°30′ |
| **93536** | R1/8 | **1/4** | 1/2 | 3/4 | .859 | 4-7/16 | 7-3/4 | 2° |
| **93537** | R1/8 | **1/4** | 1/2 | 3/4 | .856 | 3-23/32 | 6 | 2°30′ |
| **93538** | R5/32 | **5/16** | 1/2 | 3/4 | .868 | 4-29/32 | 7-3/4 | 1°20′ |
| **93539** | R5/32 | **5/16** | 1/2 | 3/4 | .870 | 3-15/16 | 6 | 1°45′ |
| **93540** | R3/16 | **3/8** | 5/8 | 1-3/16 | 1.326 | 4-29/32 | 7-3/4 | 2° |
| **93541** | R3/16 | **3/8** | 5/8 | 1-3/16 | 1.325 | 4-3/16 | 6 | 2°30′ |
| **93542** | R1/4 | **1/2** | 5/8 | 1-3/16 | 1.309 | 4 | 7-3/4 | 1°20′ |
| **93543** | R1/4 | **1/2** | 5/8 | 1-3/16 | 1.329 | 3-3/8 | 6 | 1°45′ |

| Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0003 |




MILLING ON TAPERED WALL

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | ○ | | | ○ | | | | |

YG X-POWER END MILLS

# X-POWER BALL NOSE END MILLS - MMC

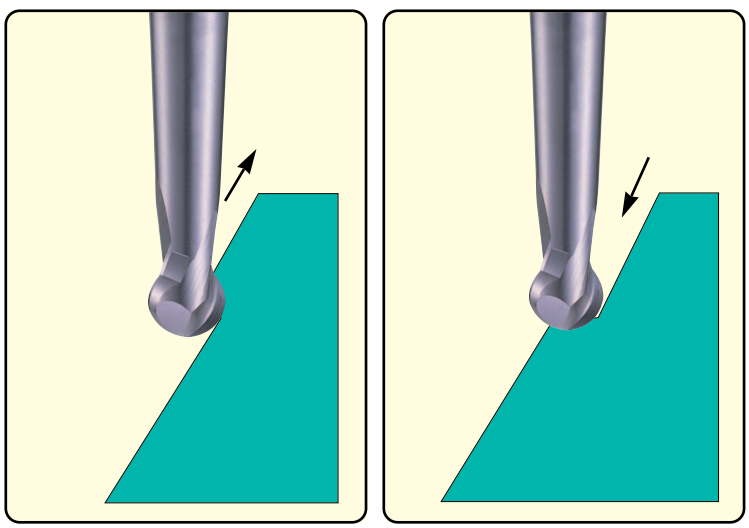
## Useful Field Area

- Die & Mold making, Turbine manufacturing and Aircraft Industry, etc.
- Difficult 3-D Forms.
- Profiling of up to HRc 65 high hardened steels and Alloy steels, Nickelbase alloys, Titanium alloys.

## Characteristics

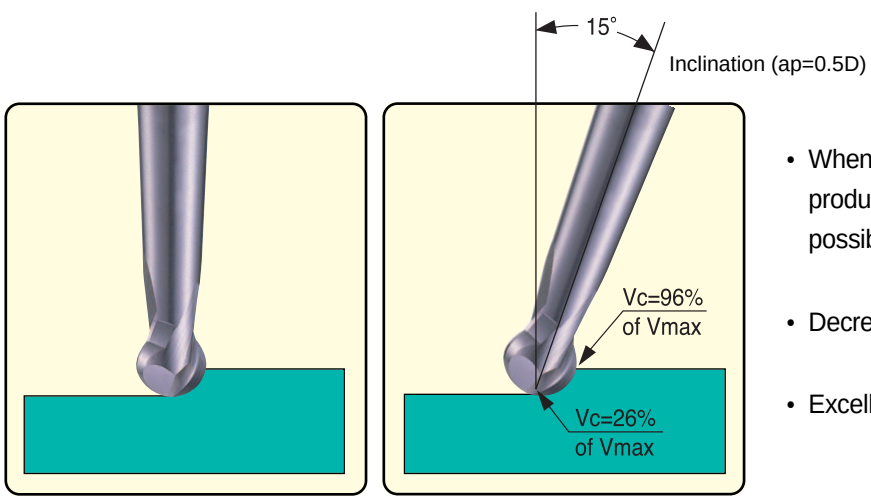
- Ultra micro grain carbide which increase both toughness and hardness.
- YG-1's unique X-POWER coating suitable for dry cutting and high speed cutting.
- Oustanding tool geometry and sphere shape ball enables more increased tool life and higher speed and feed operation.

## Surpassing Milling Operation



Favorable Back Milling | Unfavorable Drilling

- Operating angle 14° ~ 16°, higher speed and feed are possible by decreased cutting resistance at the cutting edges contacting the workpiece.
- Excellent surface finish and faster milling process.
- Enable to milling with higher speed and feed when Back Milling.




Unfavorable Profiling | Favorable Profiling

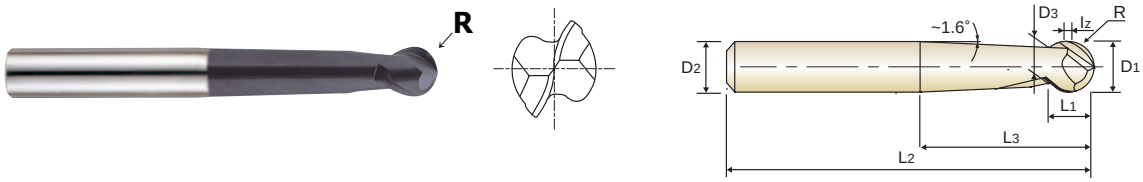
- When 15° inclination milling operation, more productivity and higher speed and feed are possible.
- Decreased cutting force.
- Excellent surface roughness and brightness.

# X-POWER END MILLS

**EM084 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE LONG LENGTH BALL NOSE (MMC-ECONOMY TYPE)

- Designed for copy milling.
- Increased feed rates.
- 15° inclination.
- Easy to regrind.




MG | 2 | 30° | R ±.0005 | PLAIN

P.521

◆ U.S.A Stock

Unit : Inch

| EDP No. | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter | Iz |
|---|---|---|---|---|---|---|---|---|
| | R (±.0005) | D1 | D2 | L1 | L3 | L2 | D3 | |
| **93288** | R1/16 | **1/8** | 1/4 | 5/32 | 1-1/4 | 3-1/4 | .100 | .060 |
| **93289** | R3/32 | **3/16** | 1/4 | 7/32 | 1-1/4 | 3-1/4 | .150 | .080 |
| **93290** | R1/8 | **1/4** | 1/4 | 9/32 | 1-1/4 | 4 | .200 | .080 |
| **93291** | R5/32 | **5/16** | 5/16 | 3/8 | 1-1/2 | 4 | .250 | .120 |
| **93292** | R3/16 | **3/8** | 3/8 | 13/32 | 1-3/4 | 4 | .300 | .120 |
| **93293** | R1/4 | **1/2** | 1/2 | 17/32 | 2-1/4 | 4-1/4 | .400 | .120 |
| **93294** | R5/16 | **5/8** | 5/8 | 5/8 | 2-3/4 | 6-1/4 | .500 | .120 |

| Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0010 | 0~−.0003 |

◎ : Excellent ○ : Good

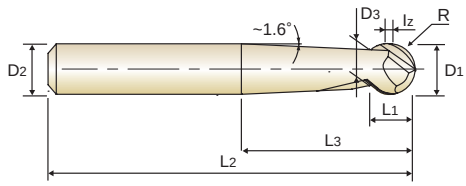
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | ○ | | | ○ | | | | |

# X-POWER END MILLS

**EM093 SERIES** PLAIN SHANK

## CARBIDE, 4 FLUTE LONG LENGTH BALL NOSE (MMC-ECONOMY TYPE)

- Designed for copy milling.
- Increased feed rates.
- 15° inclination.
- Easy to regrind.




MG | 4 | 30° | R ±.0005 | PLAIN

P.522

◆ U.S.A Stock

Unit : Inch

| EDP No. | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter | lz |
|---|---|---|---|---|---|---|---|---|
| | R (±.0005) | D1 | D2 | L1 | L3 | L2 | D3 | |
| **93295** | R1/16 | **1/8** | 1/4 | 5/32 | 1-1/4 | 3-1/4 | .100 | .060 |
| **93296** | R3/32 | **3/16** | 1/4 | 7/32 | 1-1/4 | 3-1/4 | .150 | .080 |
| **93297** | R1/8 | **1/4** | 1/4 | 9/32 | 1-1/4 | 4 | .200 | .080 |
| **93298** | R5/32 | **5/16** | 5/16 | 3/8 | 1-1/2 | 4 | .250 | .120 |
| **93299** | R3/16 | **3/8** | 3/8 | 13/32 | 1-3/4 | 4 | .300 | .120 |
| **93300** | R1/4 | **1/2** | 1/2 | 17/32 | 2-1/4 | 4-1/4 | .400 | .120 |
| **93301** | R5/16 | **5/8** | 5/8 | 5/8 | 2-3/4 | 6-1/4 | .500 | .120 |

| Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0010 | 0~−.0003 |

◎ : Excellent ○ : Good

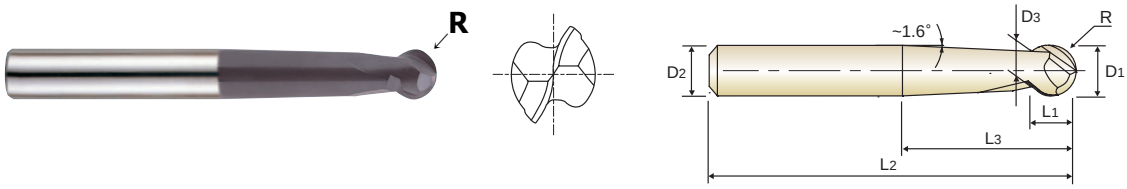
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | ○ | | | ○ | | | | |

# X-POWER END MILLS

**EM096 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE LONG LENGTH BALL NOSE (MMC-SPHERE TYPE)

- Designed for copy milling.
- Increased feed rates.
- 15° inclination.(see page 000)
- Sphere Angle : 250°




MG | 2 | 30° | R ±.0005 | PLAIN

P.521

◆ U.S.A Stock

Unit : Inch

| EDP No. | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|
| | R (±.0005) | D1 | D2 | L1 | L3 | L2 | D3 |
| **93410** | R1/16 | **1/8** | 1/4 | .100 | 1-1/4 | 3-1/4 | .100 |
| **93411** | R3/32 | **3/16** | 1/4 | .150 | 1-1/4 | 3-1/4 | .150 |
| **93412** | R1/8 | **1/4** | 1/4 | .200 | 1-1/8 | 4 | .200 |
| **93413** | R5/32 | **5/16** | 5/16 | .250 | 1-3/8 | 4 | .250 |
| **93414** | R3/16 | **3/8** | 3/8 | .300 | 1-5/8 | 4 | .300 |
| **93415** | R1/4 | **1/2** | 1/2 | .400 | 2-3/16 | 4-1/4 | .400 |
| **93416** | R5/16 | **5/8** | 5/8 | .500 | 2-3/4 | 6-1/4 | .500 |

| Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0010 | 0~−.0003 |

◎ : Excellent ○ : Good

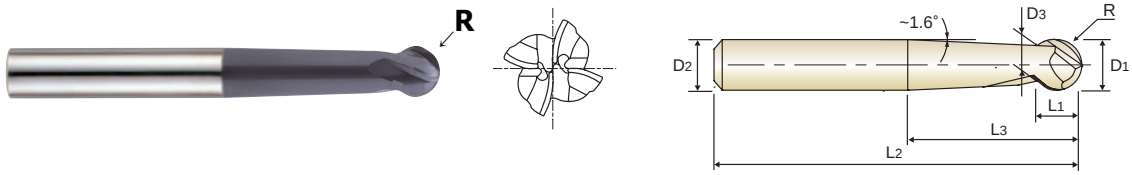
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | ○ | | | ○ | | | | |

# X-POWER END MILLS

**EM097 SERIES** PLAIN SHANK

## CARBIDE, 4 FLUTE LONG LENGTH BALL NOSE (MMC-SPHERE TYPE)

- Designed for copy milling.
- Increased feed rates.
- 15° inclination.(see page 000)
- Sphere Angle : 250°




MG | 4 | 30° | R ±.0005 | PLAIN

P.522

◆ U.S.A Stock

Unit : Inch

| EDP No. | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|
| | R (±.0005) | D1 | D2 | L1 | L3 | L2 | D3 |
| **93417** | R1/16 | **1/8** | 1/4 | .100 | 1-1/4 | 3-1/4 | .100 |
| **93418** | R3/32 | **3/16** | 1/4 | .150 | 1-1/4 | 3-1/4 | .150 |
| **93419** | R1/8 | **1/4** | 1/4 | .200 | 1-1/8 | 4 | .200 |
| **93420** | R5/32 | **5/16** | 5/16 | .250 | 1-3/8 | 4 | .250 |
| **93421** | R3/16 | **3/8** | 3/8 | .300 | 1-5/8 | 4 | .300 |
| **93422** | R1/4 | **1/2** | 1/2 | .400 | 2-3/16 | 4-1/4 | .400 |
| **93423** | R5/16 | **5/8** | 5/8 | .500 | 2-3/4 | 6-1/4 | .500 |

| Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0010 | 0~−.0003 |

◎ : Excellent ○ : Good

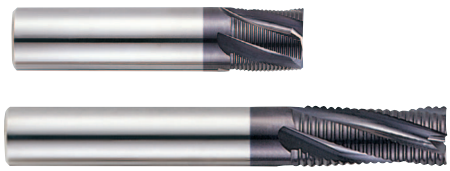
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | ○ | | | ○ | | | | |

# X-POWER END MILLS

**EM666 SERIES** PLAIN SHANK
**EM156 SERIES** PLAIN SHANK

## CARBIDE, MULTI FLUTE 20° HELIX STUB & LONG LENGTH FINE PITCH ROUGHING

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- High velocity milling of hardened steels.
- For dry and wet milling.
- Fast chip ejection.



MG | FINE | 3-5 | 20° | PLAIN

P.523

◆ U.S.A Stock

**EM666 Series** ■ STUB LENGTH

Unit : Inch

| EDP No. | Mill Diameter | Shank Diameter | Length of Cut | Overall Length | No. of Flute |
|---|---|---|---|---|---|
| 93270 | 1/4 | 1/4 | 5/16 | 2-1/8 | 3 |
| 93271 | 5/16 | 5/16 | 3/8 | 2-1/4 | 3 |
| 93272 | 3/8 | 3/8 | 9/16 | 2-1/2 | 3 |
| 93273 | 1/2 | 1/2 | 5/8 | 3 | 4 |
| 93274 | 5/8 | 5/8 | 7/8 | 3-1/4 | 4 |
| 93275 | 3/4 | 3/4 | 1 | 3-3/4 | 4 |
| 93276 | 1 | 1 | 1 | 4 | 5 |

**EM156 Series** ■ LONG LENGTH

Unit : Inch

| EDP No. | Mill Diameter | Shank Diameter | Length of Cut | Overall Length | No. of Flute |
|---|---|---|---|---|---|
| 93112 | 1/4 | 1/4 | 3/4 | 2-1/2 | 3 |
| 93113 | 5/16 | 5/16 | 3/4 | 2-1/2 | 3 |
| 93114 | 3/8 | 3/8 | 7/8 | 2-1/2 | 3 |
| 93115 | 1/2 | 1/2 | 1 | 3 | 4 |
| 93116 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 4 |
| 93117 | 3/4 | 3/4 | 1-5/8 | 4 | 4 |
| 93118 | 1 | 1 | 1-3/4 | 4 | 5 |

| Mill Dia. (inch) | Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|---|
| 1/4~3/8 | 0 ~ −.0022 | 0 ~ −.0003 |
| 1/2~5/8 | 0 ~ −.0027 | |
| 3/4~1 | 0 ~ −.0033 | |

◎ : Excellent ○ : Good

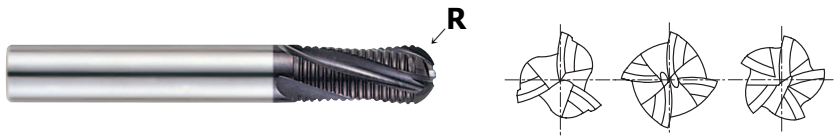
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | ○ | | |

# X-POWER END MILLS

**EM662 SERIES** PLAIN SHANK

## CARBIDE, MULTI FLUTE 20° HELIX LONG LENGTH FINE PITCH ROUGHING BALL NOSE

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- High velocity milling of hardened steels.
- For dry and wet milling.
- Fast chip ejection.




MG | FINE | 3-5 | 20° | R ±.001 | PLAIN

P.524

◆ U.S.A Stock

Unit : Inch

| EDP No. | Radius of Ball Nose R (±.001) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length | No. of Flute |
|---|---|---|---|---|---|---|
| **93263** | R1/8 | **1/4** | 1/4 | 3/4 | 2-1/2 | 3 |
| **93264** | R5/32 | **5/16** | 5/16 | 3/4 | 2-1/2 | 3 |
| **93265** | R3/16 | **3/8** | 3/8 | 7/8 | 2-1/2 | 3 |
| **93266** | R1/4 | **1/2** | 1/2 | 1 | 3 | 4 |
| **93267** | R5/16 | **5/8** | 5/8 | 1-1/4 | 3-1/2 | 4 |
| **93268** | R3/8 | **3/4** | 3/4 | 1-5/8 | 4 | 4 |
| **93269** | R1/2 | **1** | 1 | 1-3/4 | 4 | 5 |

| Mill Dia. (inch) | Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|---|
| 1/4~3/8 | 0 ~ −.0022 | 0 ~ −.0003 |
| 1/2~5/8 | 0 ~ −.0027 | |
| 3/4~1 | 0 ~ −.0033 | |

◎ : Excellent ○ : Good

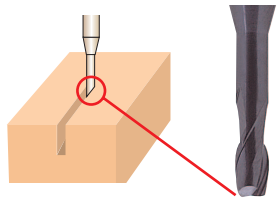
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | | | |

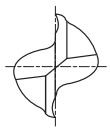
# X-POWER END MILLS

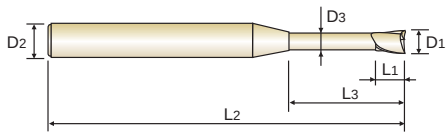
**EM966 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE for RIB PROCESSING

- For deep slotting & pocketing.
- For depths of 6 to 10X cutting diameter.
- Machine carbon steel, alloy steel, tool steel, die and mold steels.
- Suitable for high speed cutting and high precision machining.
- Designed with reinforced shank for higher stability and rigidity.
- Long neck design for deep machining near walls.








MG | 2 | 30° | PLAIN

P.524

◆ U.S.A Stock

Unit : Inch

| EDP No. | Mill Diameter | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|
| | D1 | D2 | L1 | L3 | L2 | D3 |
| **93548** | **1/32** | 1/8 | 3/64 | 7/32 | 2 | .029 |
| **93549** | **1/32** | 1/8 | 3/64 | 5/16 | 2 | .029 |
| **93550** | **3/64** | 1/8 | 1/16 | 7/32 | 2 | .045 |
| **93551** | **3/64** | 1/8 | 1/16 | 9/32 | 2 | .045 |
| **93552** | **3/64** | 1/8 | 1/16 | 1/2 | 2 | .045 |
| **93553** | **1/16** | 1/8 | 3/32 | 5/16 | 2 | .060 |
| **93554** | **1/16** | 1/8 | 3/32 | 3/8 | 2 | .060 |
| **93555** | **1/16** | 1/8 | 3/32 | 1/2 | 2 | .060 |
| **93556** | **1/16** | 1/8 | 3/32 | 5/8 | 2 | .060 |
| **93557** | **5/64** | 1/8 | 1/8 | 1/2 | 2 | .076 |
| **93558** | **5/64** | 1/8 | 1/8 | 5/8 | 2 | .076 |
| **93559** | **3/32** | 1/8 | 9/64 | 1/2 | 2 | .090 |
| **93560** | **3/32** | 1/8 | 9/64 | 5/8 | 2 | .090 |
| **93561** | **1/8** | 1/4 | 3/16 | 9/16 | 2-1/4 | .120 |
| **93562** | **1/8** | 1/4 | 3/16 | 3/4 | 2-1/4 | .120 |

| Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0006 | 0~−.0003 |

◎ : Excellent ○ : Good

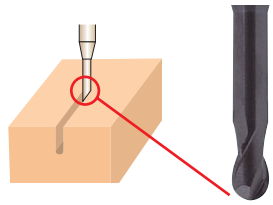
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | | | |

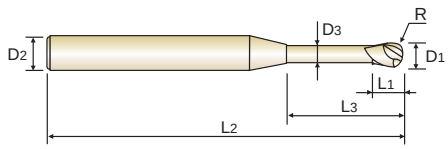
YG X-POWER END MILLS

EM967 SERIES PLAIN SHANK

# CARBIDE, 2 FLUTE BALL NOSE for RIB PROCESSING

- For 3-D milling, deep slotting and pocketing.
- For depths of 6 to 10X cutting diameter.
- Machine carbon steel, alloy steel, tool steel, die and mold steels.
- Suitable for high speed cutting and high precision machining.
- Designed with reinforced shank for higher stability and rigidity.
- Long neck design for deep machining near walls.






MG | 2 | 30° | R ±.0005 | PLAIN

P.525

◆ U.S.A Stock

Unit : Inch

| EDP No. | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|
| | R (±.0005) | D1 | D2 | L1 | L3 | L2 | D3 |
| **93563** | R1/64 | **1/32** | 1/8 | 3/64 | 7/32 | 2 | .029 |
| **93564** | R1/64 | **1/32** | 1/8 | 3/64 | 5/16 | 2 | .029 |
| **93565** | R.0234 | **3/64** | 1/8 | 1/16 | 7/32 | 2 | .045 |
| **93566** | R.0234 | **3/64** | 1/8 | 1/16 | 9/32 | 2 | .045 |
| **93567** | R.0234 | **3/64** | 1/8 | 1/16 | 1/2 | 2 | .045 |
| **93568** | R1/32 | **1/16** | 1/8 | 3/32 | 5/16 | 2 | .060 |
| **93569** | R1/32 | **1/16** | 1/8 | 3/32 | 1/2 | 2 | .060 |
| **93570** | R1/32 | **1/16** | 1/8 | 3/32 | 5/8 | 2 | .060 |
| **93571** | R.0391 | **5/64** | 1/8 | 1/8 | 5/16 | 2 | .076 |
| **93572** | R.0391 | **5/64** | 1/8 | 1/8 | 5/8 | 2 | .076 |
| **93573** | R.0391 | **5/64** | 1/8 | 1/8 | 3/4 | 2 | .076 |
| **93574** | R3/64 | **3/32** | 1/8 | 9/64 | 5/8 | 2 | .090 |
| **93575** | R3/64 | **3/32** | 1/8 | 9/64 | 3/4 | 2 | .090 |
| **93576** | R1/16 | **1/8** | 1/4 | 3/16 | 5/8 | 2-1/4 | .120 |
| **93577** | R1/16 | **1/8** | 1/4 | 3/16 | 3/4 | 2-1/4 | .120 |

| Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0006 | 0~−.0003 |

◎ : Excellent ○ : Good

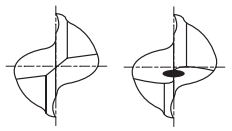
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | | | |

# X-POWER END MILLS

**EM810 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE SHORT LENGTH

- Designed to machine tool steels, alloy steels, mold steels and other hardened materials.
- Superior workpiece finishes.
- Increased feed rates.



up to Ø3mm over Ø3mm

MG | 2 | 30° | PLAIN

P.506

◇ Call for Availability

Unit : mm

| EDP No. | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| EM810901 | 1.0 | .0394 | 6 | 2.5 | 40 |
| EM810902 | 1.5 | .0591 | 6 | 4 | 40 |
| EM810020 | 2.0 | .0787 | 4 | 6 | 40 |
| EM810903 | 2.0 | .0787 | 6 | 6 | 40 |
| EM810025 | 2.5 | .0984 | 4 | 8 | 40 |
| EM810904 | 2.5 | .0984 | 6 | 8 | 40 |
| EM810030 | 3.0 | .1181 | 6 | 8 | 45 |
| EM810035 | 3.5 | .1378 | 6 | 10 | 45 |
| EM810040 | 4.0 | .1575 | 6 | 11 | 45 |
| EM810045 | 4.5 | .1772 | 6 | 11 | 45 |
| EM810050 | 5.0 | .1969 | 6 | 13 | 50 |
| EM810055 | 5.5 | .2165 | 6 | 13 | 50 |
| EM810060 | 6.0 | .2362 | 6 | 13 | 50 |
| EM810065 | 6.5 | .2559 | 8 | 16 | 60 |
| EM810070 | 7.0 | .2756 | 8 | 16 | 60 |
| EM810075 | 7.5 | .2953 | 8 | 16 | 60 |
| EM810080 | 8.0 | .3150 | 8 | 19 | 60 |
| EM810085 | 8.5 | .3346 | 10 | 19 | 70 |
| EM810090 | 9.0 | .3543 | 10 | 19 | 70 |
| EM810095 | 9.5 | .3740 | 10 | 19 | 70 |
| EM810100 | 10.0 | .3937 | 10 | 22 | 70 |
| EM810105 | 10.5 | .4134 | 12 | 22 | 75 |
| EM810110 | 11.0 | .4330 | 12 | 22 | 75 |
| EM810115 | 11.5 | .4527 | 12 | 22 | 75 |
| EM810120 | 12.0 | .4724 | 12 | 26 | 75 |
| EM810906 | 13.0 | .5118 | 12 | 26 | 85 |
| EM810140 | 14.0 | .5512 | 14 | 26 | 85 |
| EM810905 | 14.0 | .5512 | 16 | 26 | 85 |
| EM810908 | 15.0 | .5905 | 16 | 26 | 90 |

◎ : Excellent ○ : Good

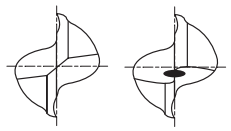
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | ○ | | |

YG X-POWER END MILLS

EM810 SERIES PLAIN SHANK
EM816 SERIES PLAIN SHANK

# CARBIDE, 2 FLUTE SHORT& LONG LENGTH

- Designed to machine tool steels, alloy steels, mold steels and other hardened materials.
- Superior workpiece finishes.
- Increased feed rates.



up to Ø3mm over Ø3mm

MG | 2 | 30° | PLAIN

P.506

◇ Call for Availability

**EM810 Series** ■ SHORT LENGTH

Unit : mm

| EDP No. | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| EM810160 | 16.0 | .6299 | 16 | 32 | 100 |
| EM810909 | 17.0 | .6692 | 16 | 32 | 100 |
| EM810180 | 18.0 | .7087 | 18 | 32 | 100 |
| EM810911 | 19.0 | .7480 | 20 | 32 | 100 |
| EM810200 | 20.0 | .7874 | 20 | 38 | 105 |
| EM810220 | 22.0 | .8661 | 20 | 38 | 105 |
| EM810240 | 24.0 | .9449 | 25 | 45 | 120 |
| EM810250 | 25.0 | .9843 | 25 | 45 | 120 |

**EM816 Series** ■ LONG LENGTH

Unit : mm

| EDP No. | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| EM816020 | 2.0 | .0787 | 4 | 8 | 40 |
| EM816030 | 3.0 | .1181 | 6 | 12 | 50 |
| EM816040 | 4.0 | .1575 | 6 | 15 | 50 |
| EM816050 | 5.0 | .1969 | 6 | 20 | 60 |
| EM816060 | 6.0 | .2362 | 6 | 20 | 60 |
| EM816080 | 8.0 | .3150 | 8 | 25 | 70 |
| EM816100 | 10.0 | .3937 | 10 | 30 | 90 |
| EM816120 | 12.0 | .4724 | 12 | 30 | 90 |
| EM816140 | 14.0 | .5512 | 16 | 40 | 110 |
| EM816160 | 16.0 | .6299 | 16 | 50 | 110 |
| EM816180 | 18.0 | .7087 | 20 | 50 | 110 |
| EM816200 | 20.0 | .7874 | 20 | 55 | 110 |
| EM816250 | 25.0 | .9843 | 25 | 75 | 140 |

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.03 | h6 |

◎ : Excellent ○ : Good

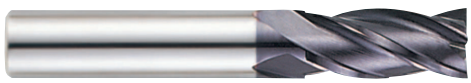
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | ○ | | |

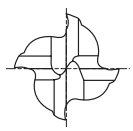
# X-POWER END MILLS

**EM811 SERIES** PLAIN SHANK

## CARBIDE, 4 FLUTE SHORT LENGTH

- Designed to machine tool steels, alloy steels, mold steels and other hardened materials.
- 4 flute allows for better workpiece finishes.
- Increased production.





MG | 4 | 30° | PLAIN

P.507

◇ Call for Availability

Unit : mm

| EDP No. | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| EM811020 | 2.0 | .0787 | 4 | 6 | 40 |
| EM811901 | 2.0 | .0787 | 6 | 6 | 40 |
| EM811025 | 2.5 | .0984 | 4 | 8 | 40 |
| EM811902 | 2.5 | .0984 | 6 | 8 | 40 |
| EM811030 | 3.0 | .1181 | 6 | 8 | 45 |
| EM811035 | 3.5 | .1378 | 6 | 10 | 45 |
| EM811040 | 4.0 | .1575 | 6 | 11 | 45 |
| EM811045 | 4.5 | .1772 | 6 | 11 | 45 |
| EM811050 | 5.0 | .1969 | 6 | 13 | 50 |
| EM811055 | 5.5 | .2165 | 6 | 13 | 50 |
| EM811060 | 6.0 | .2362 | 6 | 13 | 50 |
| EM811065 | 6.5 | .2559 | 8 | 16 | 60 |
| EM811070 | 7.0 | .2756 | 8 | 16 | 60 |
| EM811075 | 7.5 | .2953 | 8 | 16 | 60 |
| EM811080 | 8.0 | .3150 | 8 | 19 | 60 |
| EM811085 | 8.5 | .3346 | 10 | 19 | 70 |
| EM811090 | 9.0 | .3543 | 10 | 19 | 70 |
| EM811095 | 9.5 | .3740 | 10 | 19 | 70 |
| EM811100 | 10.0 | .3937 | 10 | 22 | 70 |
| EM811105 | 10.5 | .4134 | 12 | 22 | 75 |
| EM811110 | 11.0 | .4330 | 12 | 22 | 75 |
| EM811115 | 11.5 | .4527 | 12 | 22 | 75 |
| EM811120 | 12.0 | .4724 | 12 | 26 | 75 |
| EM811904 | 13.0 | .5118 | 12 | 26 | 85 |
| EM811140 | 14.0 | .5512 | 14 | 26 | 85 |
| EM811905 | 14.0 | .5512 | 12 | 26 | 85 |
| EM811903 | 14.0 | .5512 | 16 | 26 | 85 |
| EM811906 | 15.0 | .5905 | 16 | 26 | 90 |
| EM811160 | 16.0 | .6299 | 16 | 32 | 100 |

◎ : Excellent ○ : Good

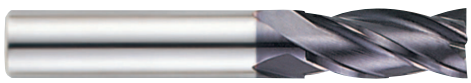
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | ○ | | |

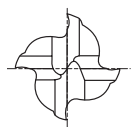
YG X-POWER END MILLS

EM811 SERIES PLAIN SHANK
EM817 SERIES PLAIN SHANK

# CARBIDE, 4 FLUTE SHORT& LONG LENGTH

- Designed to machine tool steels, alloy steels, mold steels and other hardened materials.
- 4 flute allows for better workpiece finishes.
- Increased production.





MG | 4 | 30° | PLAIN

P.507

◇ Call for Availability

**EM811 Series** ■ SHORT LENGTH

Unit : mm

| EDP No. | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| EM811907 | 17.0 | .6692 | 16 | 32 | 100 |
| EM811180 | 18.0 | .7087 | 18 | 32 | 100 |
| EM811908 | 18.0 | .7087 | 16 | 32 | 100 |
| EM811909 | 19.0 | .7480 | 20 | 32 | 100 |
| EM811200 | 20.0 | .7874 | 20 | 38 | 105 |
| EM811220 | 22.0 | .8661 | 20 | 38 | 105 |
| EM811240 | 24.0 | .9449 | 25 | 45 | 120 |
| EM811250 | 25.0 | .9843 | 25 | 45 | 120 |

**EM817 Series** ■ LONG LENGTH

Unit : mm

| EDP No. | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| EM817020 | 2.0 | .0787 | 4 | 8 | 40 |
| EM817030 | 3.0 | .1181 | 6 | 12 | 50 |
| EM817040 | 4.0 | .1575 | 6 | 15 | 50 |
| EM817050 | 5.0 | .1969 | 6 | 20 | 60 |
| EM817060 | 6.0 | .2362 | 6 | 20 | 60 |
| EM817080 | 8.0 | .3150 | 8 | 25 | 70 |
| EM817100 | 10.0 | .3937 | 10 | 30 | 90 |
| EM817120 | 12.0 | .4724 | 12 | 30 | 90 |
| EM817140 | 14.0 | .5512 | 16 | 40 | 110 |
| EM817160 | 16.0 | .6299 | 16 | 50 | 110 |
| EM817180 | 18.0 | .7087 | 20 | 50 | 110 |
| EM817200 | 20.0 | .7874 | 20 | 55 | 110 |
| EM817250 | 25.0 | .9843 | 25 | 75 | 140 |

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.03 | h6 |

◎ : Excellent ○ : Good

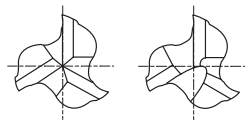
| Series | Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| EM811 | ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | ○ | | |
| EM817 | ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | | | |

# X-POWER END MILLS

**EM895 SERIES** PLAIN SHANK

## CARBIDE, 3 FLUTE 38° HELIX SHORT LENGTH

- Designed to machine tool steels, alloy steels, mold steels and other hardened materials.
- Possesses the advantage of 2 flute and 4 flute end mill.
- Superior workpiece finishes.



under Ø3mm from Ø3mm

MG | 3 | 38° | PLAIN

P.526

◇ Call for Availability

Unit : mm

| EDP No. | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| EM895010 | 1.0 | .0394 | 3 | 2.5 | 38 |
| EM895015 | 1.5 | .0591 | 4 | 5 | 50 |
| EM895025 | 2.5 | .0984 | 3 | 7 | 38 |
| EM895030 | 3.0 | .1181 | 3 | 10 | 38 |
| EM895901 | 3.0 | .1181 | 6 | 10 | 50 |
| EM895035 | 3.5 | .1378 | 4 | 12 | 50 |
| EM895902 | 3.5 | .1378 | 6 | 12 | 50 |
| EM895040 | 4.0 | .1575 | 4 | 12 | 50 |
| EM895903 | 4.0 | .1575 | 6 | 12 | 50 |
| EM895045 | 4.5 | .1772 | 6 | 14 | 57 |
| EM895050 | 5.0 | .1969 | 5 | 14 | 50 |
| EM895904 | 5.0 | .1969 | 6 | 14 | 57 |
| EM895060 | 6.0 | .2362 | 6 | 16 | 57 |
| EM895080 | 8.0 | .3150 | 8 | 20 | 63 |
| EM895100 | 10.0 | .3937 | 10 | 22 | 72 |
| EM895120 | 12.0 | .4724 | 12 | 25 | 73 |
| EM895140 | 14.0 | .5512 | 14 | 25 | 75 |
| EM895160 | 16.0 | .6299 | 16 | 32 | 82 |
| EM895180 | 18.0 | .7087 | 18 | 32 | 92 |
| EM895200 | 20.0 | .7874 | 20 | 38 | 92 |

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.03 | h6 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | ○ | | |

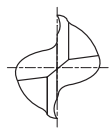
CBN END MILL
i-Xmill END MILL
X5070 END MILLS
X-SPEED ROUGHER END MILLS
X-POWER END MILLS
JET-POWER END MILLS
V7 Mill STEEL END MILLS
V7 Mill INOX END MILLS
ALU-POWER END MILLS
D-POWER END MILLS
STANDARD CARBIDE END MILLS
TANK-POWER END MILLS
STANDARD COBALT & HSS END MILLS
TECHNICAL DATA

# X-POWER END MILLS

EM810 SERIES PLAIN SHANK

## CARBIDE, 2 FLUTE MINIATURE

- High precision milling in medical, optical, electronics and aero space industries.
- Excellent performance on hardened steel



MG | 2 | 30° | PLAIN

P.508

◇ Call for Availability

Unit : mm

| EDP No. | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| EM810004 | 0.4 | .0157 | 3 | 0.8 | 40 |
| EM810005 | 0.5 | .0197 | 3 | 1 | 40 |
| EM810006 | 0.6 | .0236 | 3 | 1.2 | 40 |
| EM810007 | 0.7 | .0276 | 3 | 1.4 | 40 |
| EM810008 | 0.8 | .0315 | 3 | 1.6 | 40 |
| EM810009 | 0.9 | .0354 | 3 | 2 | 40 |
| EM810010 | 1.0 | .0394 | 4 | 2.5 | 40 |
| EM810011 | 1.1 | .0433 | 4 | 2.5 | 40 |
| EM810012 | 1.2 | .0472 | 4 | 4 | 40 |
| EM810013 | 1.3 | .0512 | 4 | 4 | 40 |
| EM810014 | 1.4 | .0551 | 4 | 4 | 40 |
| EM810015 | 1.5 | .0591 | 4 | 4 | 40 |

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.03 | h6 |

◎ : Excellent ○ : Good

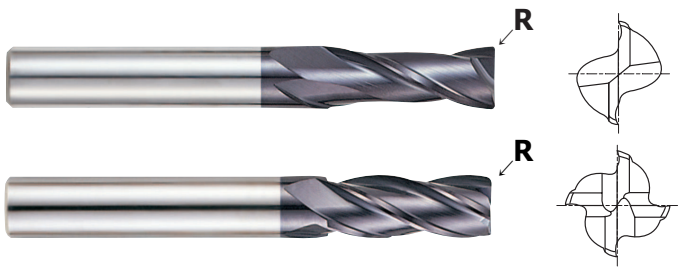
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | | | |

# X-POWER END MILLS

**EM818 SERIES** PLAIN SHANK
**EM819 SERIES** PLAIN SHANK

## CARBIDE, 2&4 FLUTE LONG LENGTH CORNER RADIUS

- Designed to machine tool steels, alloy steels, mold steels and other hardened materials.
- Superior workpiece finishes.
- Increased feed rates.




MG | 2&4 | 30° | PLAIN

P.527

◇ Call for Availability

### EM818(2 FLUTE), EM819(4 FLUTE) Series

Unit : mm

| EDP No. | | Corner Radius | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|
| 2 FLUTE | 4 FLUTE | R | Metric | Inch | | | |
| EM818030 | EM819030 | R0.3 | 3.0 | .1181 | 6 | 12 | 50 |
| EM818040 | EM819040 | R0.3 | 4.0 | .1575 | 6 | 15 | 50 |
| EM818911 | EM819911 | R0.5 | 4.0 | .1575 | 6 | 15 | 50 |
| EM818050 | EM819050 | R0.3 | 5.0 | .1969 | 6 | 20 | 60 |
| EM818912 | EM819912 | R0.5 | 5.0 | .1969 | 6 | 20 | 60 |
| EM818913 | EM819913 | R0.3 | 6.0 | .2362 | 6 | 20 | 60 |
| EM818060 | EM819060 | R0.5 | 6.0 | .2362 | 6 | 20 | 60 |
| EM818901 | EM819901 | R1.0 | 6.0 | .2362 | 6 | 20 | 60 |
| EM818914 | EM819914 | R0.3 | 8.0 | .3150 | 8 | 25 | 70 |
| EM818080 | EM819080 | R0.5 | 8.0 | .3150 | 8 | 25 | 70 |
| EM818902 | EM819902 | R1.0 | 8.0 | .3150 | 8 | 25 | 70 |
| EM818903 | EM819903 | R1.5 | 8.0 | .3150 | 8 | 25 | 70 |
| EM818904 | EM819904 | R2.0 | 8.0 | .3150 | 8 | 25 | 70 |
| EM818915 | EM819915 | R0.3 | 10.0 | .3937 | 10 | 30 | 90 |
| EM818100 | EM819100 | R0.5 | 10.0 | .3937 | 10 | 30 | 90 |
| EM818905 | EM819905 | R1.0 | 10.0 | .3937 | 10 | 30 | 90 |
| EM818906 | EM819906 | R1.5 | 10.0 | .3937 | 10 | 30 | 90 |
| EM818907 | EM819907 | R2.0 | 10.0 | .3937 | 10 | 30 | 90 |
| EM818120 | EM819120 | R0.5 | 12.0 | .4724 | 12 | 30 | 90 |
| EM818908 | EM819908 | R1.0 | 12.0 | .4724 | 12 | 30 | 90 |
| EM818909 | EM819909 | R1.5 | 12.0 | .4724 | 12 | 30 | 90 |
| EM818910 | EM819910 | R2.0 | 12.0 | .4724 | 12 | 30 | 90 |
| EM818160 | EM819160 | R0.5 | 16.0 | .6299 | 16 | 50 | 110 |
| EM818916 | EM819916 | R1.0 | 16.0 | .6299 | 16 | 50 | 110 |
| EM818917 | EM819917 | R1.5 | 16.0 | .6299 | 16 | 50 | 110 |
| EM818918 | EM819918 | R2.0 | 16.0 | .6299 | 16 | 50 | 110 |
| EM818200 | EM819200 | R0.5 | 20.0 | .7874 | 20 | 55 | 110 |
| EM818919 | EM819919 | R1.0 | 20.0 | .7874 | 20 | 55 | 110 |
| EM818920 | EM819920 | R1.5 | 20.0 | .7874 | 20 | 55 | 110 |
| EM818921 | EM819921 | R2.0 | 20.0 | .7874 | 20 | 55 | 110 |

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.03 | h6 |

◎ : Excellent ○ : Good

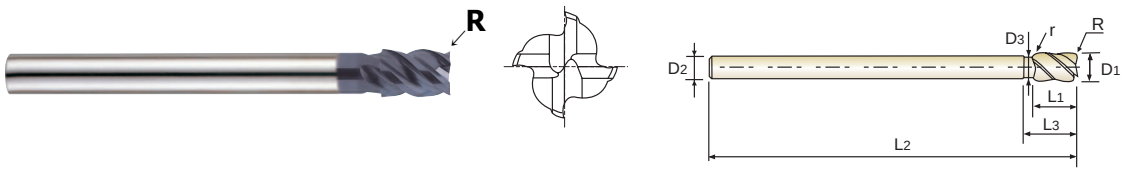
| Series | Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| EM811 | ○ | ◎ | ◎ | ◎ | ○ | | | | | | | | |
| EM817 | ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | ○ | | |

# X-POWER END MILLS

**EM905 SERIES** PLAIN SHANK

## CARBIDE, 4 FLUTE 45° HELIX SHORT LENGTH CORNER RADIUS

- No line is marked on the boundary section during step milling because this tool has radius on the end faces of the shank
- High speed cutting in wide deep wall with step milling
- Suitable for deep side milling, Helical Milling, Contour Milling




MG | 4 | 45° | PLAIN

P.510

◇ Call for Availability

Unit : mm

| EDP No. | Corner Radius | Mill Diameter | | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|
| | | Metric | Inch | | | | | |
| | R | D1 | | D2 | L1 | L3 | L2 | D3 |
| EM905100 | R0.5 | 10.0 | .3937 | 8 | 15 | 19.2 | 130 | 7.5 |
| EM905901 | R1.0 | 10.0 | .3937 | 8 | 15 | 19.2 | 130 | 7.5 |
| EM905120 | R0.5 | 12.0 | .4724 | 10 | 18 | 22.2 | 150 | 9.5 |
| EM905902 | R1.0 | 12.0 | .4724 | 10 | 18 | 22.2 | 150 | 9.5 |
| EM905140 | R0.5 | 14.0 | .5512 | 12 | 21 | 25.2 | 160 | 11.5 |
| EM905903 | R1.0 | 14.0 | .5512 | 12 | 21 | 25.2 | 160 | 11.5 |
| EM905180 | R0.5 | 18.0 | .7087 | 16 | 27 | 31.2 | 180 | 15.5 |
| EM905904 | R1.0 | 18.0 | .7087 | 16 | 27 | 31.2 | 180 | 15.5 |
| EM905220 | R0.5 | 22.0 | .8661 | 20 | 33 | 37.2 | 200 | 19.5 |
| EM905905 | R1.0 | 22.0 | .8661 | 20 | 33 | 37.2 | 200 | 19.5 |

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.03 | h6 |

◎ : Excellent ○ : Good

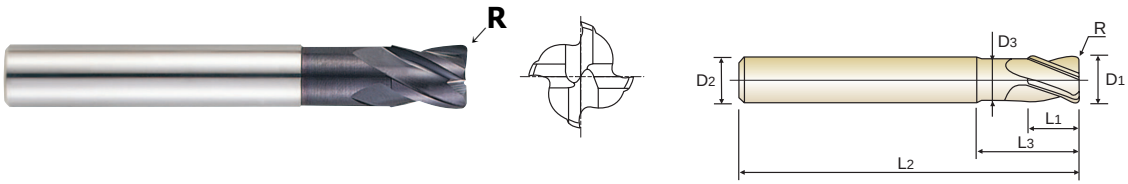
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | ○ | | | ○ | | ○ | | |

# X-POWER END MILLS

**EM839 SERIES** PLAIN SHANK

## CARBIDE, 4 FLUTE STUB LENGTH CORNER RADIUS

- Designed to machine tool steels, alloy steels, mold steels and other hardened materials.
- Superior workpiece finishes.
- Increased feed rates.




MG | 4 | 30° | PLAIN

P.528

◇ Call for Availability

Unit : mm

| EDP No. | Corner Radius | Mill Diameter | | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|
| | | Metric | Inch | | | | | |
| | R | D1 | | D2 | L1 | L3 | L2 | D3 |
| **EM839020** | R0.2 | **2.0** | **.0787** | 6 | 2.5 | 5 | 50 | 1.9 |
| **EM839025** | R0.25 | **2.5** | **.0984** | 6 | 3 | 6 | 50 | 2.4 |
| **EM839030** | R0.3 | **3.0** | **.1181** | 6 | 4 | 7 | 50 | 2.8 |
| **EM839035** | R0.35 | **3.5** | **.1378** | 6 | 4.5 | 8 | 50 | 3.2 |
| **EM839040** | R0.4 | **4.0** | **.1575** | 6 | 5 | 9 | 50 | 3.7 |
| **EM839050** | R0.5 | **5.0** | **.1969** | 6 | 6 | 12 | 50 | 4.6 |
| **EM839060** | R0.6 | **6.0** | **.2362** | 6 | 7 | 14 | 55 | 5.6 |
| **EM839080** | R0.8 | **8.0** | **.3150** | 8 | 10 | 18 | 60 | 7.4 |
| **EM839100** | R1.0 | **10.0** | **.3937** | 10 | 12 | 25 | 70 | 9.4 |
| **EM839120** | R1.2 | **12.0** | **.4724** | 12 | 15 | 30 | 80 | 11.4 |
| **EM839160** | R1.6 | **16.0** | **.6299** | 16 | 18 | 35 | 90 | 15.4 |

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.03 | h6 |

◎ : Excellent ○ : Good

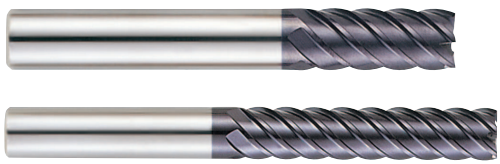
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | ○ | | | ○ | | | | |

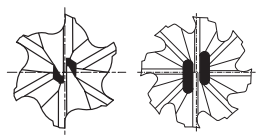
# YG X-POWER END MILLS

**EM812 SERIES** PLAIN SHANK
**EM834 SERIES** PLAIN SHANK

## CARBIDE, 6&8 FLUTE 45° HELIX LONG & EXTRA LONG LENGTH

- Designed to machine hardened materials.
- High speed cutting and finish milling with high feed rates.
- Superior workpiece finishes.
- Superior wear resistant.
- Suitable for dry milling.





MG | 6&8 | 45° | PLAIN

P.512, 513

◇ Call for Availability

### EM812 Series ■ LONG LENGTH

Unit : mm

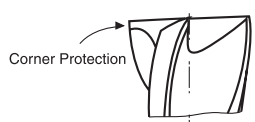
| EDP No. | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length | No. of Flute |
|---|---|---|---|---|---|---|
| | Metric | Inch | | | | |
| EM812060 | 6.0 | .2362 | 6 | 13 | 57 | 6 |
| EM812070 | 7.0 | .2756 | 8 | 16 | 63 | 6 |
| EM812080 | 8.0 | .3150 | 8 | 19 | 63 | 6 |
| EM812090 | 9.0 | .3543 | 10 | 19 | 72 | 6 |
| EM812100 | 10.0 | .3937 | 10 | 22 | 72 | 6 |
| EM812120 | 12.0 | .4724 | 12 | 26 | 83 | 6 |
| EM812140 | 14.0 | .5512 | 14 | 26 | 83 | 6 |
| EM812901 | 14.0 | .5512 | 16 | 26 | 83 | 6 |
| EM812160 | 16.0 | .6299 | 16 | 32 | 92 | 6 |
| EM812180 | 18.0 | .7087 | 18 | 32 | 92 | 8 |
| EM812200 | 20.0 | .7874 | 20 | 38 | 104 | 8 |
| EM812250 | 25.0 | .9843 | 25 | 44 | 104 | 8 |

### EM834 Series ■ EXTRA LONG LENGTH

Unit : mm

| EDP No. | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length | No. of Flute |
|---|---|---|---|---|---|---|
| | Metric | Inch | | | | |
| EM834060 | 6.0 | .2362 | 6 | 26 | 70 | 6 |
| EM834080 | 8.0 | .3150 | 8 | 36 | 90 | 6 |
| EM834100 | 10.0 | .3937 | 10 | 46 | 100 | 6 |
| EM834120 | 12.0 | .4724 | 12 | 56 | 110 | 6 |
| EM834160 | 16.0 | .6299 | 16 | 66 | 130 | 6 |
| EM834200 | 20.0 | .7874 | 20 | 76 | 140 | 6 |
| EM834250 | 25.0 | .9843 | 25 | 92 | 180 | 6 |

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.03 | h6 |




◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | ○ | | | ○ | | | | |

# X-POWER END MILLS

**EM835 SERIES** PLAIN SHANK

## CARBIDE, 6 FLUTE 45° HELIX LONG LENGTH CORNER RADIUS

- Designed to machine hardened materials.
- High speed cutting and finish milling with high feed rates.
- Superior workpiece finishes.
- Superior wear resistant.
- Suitable for dry milling.

MG | 6 | 45° | PLAIN

P.513

◇ Call for Availability

Unit : mm

| EDP No. | Corner Radius R | Mill Diameter Metric | Mill Diameter Inch | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| EM835060 | R0.5 | 6.0 | .2362 | 6 | 13 | 70 |
| EM835080 | R0.5 | 8.0 | .3150 | 8 | 19 | 90 |
| EM835100 | R0.5 | 10.0 | .3937 | 10 | 22 | 100 |
| EM835901 | R1.0 | 10.0 | .3937 | 10 | 22 | 100 |
| EM835120 | R0.5 | 12.0 | .4724 | 12 | 26 | 110 |
| EM835902 | R1.0 | 12.0 | .4724 | 12 | 26 | 110 |
| EM835160 | R1.0 | 16.0 | .6299 | 16 | 32 | 130 |
| EM835903 | R1.5 | 16.0 | .6299 | 16 | 32 | 130 |
| EM835200 | R1.0 | 20.0 | .7874 | 20 | 38 | 140 |
| EM835904 | R1.5 | 20.0 | .7874 | 20 | 38 | 140 |
| EM835905 | R2.0 | 20.0 | .7874 | 20 | 38 | 140 |

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.03 | h6 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | | | |

# YG X-POWER END MILLS

**EM897 SERIES** PLAIN SHANK

## CARBIDE, 6 FLUTE 45° HELIX STUB LENGTH CORNER RADIUS

- High speed cutting
- Excellent performance in dry cutting
- Cutting up to three times length of the cutting diameter due to reduced neck.

MG | 6 | 45° | PLAIN

P.528

◇ Call for Availability

Unit : mm

| EDP No. | Corner Radius | Mill Diameter | | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|
| | | Metric | Inch | | | | | |
| | R | $D_1$ | | $D_2$ | $L_1$ | $L_3$ | $L_2$ | $D_3$ |
| **EM897060** | R0.5 | **6.0** | **.2362** | 6 | 6 | 14 | 50 | 5.7 |
| **EM897080** | R0.5 | **8.0** | **.3150** | 8 | 8 | 24 | 60 | 7.65 |
| **EM897100** | R1.0 | **10.0** | **.3937** | 10 | 10 | 30 | 70 | 9.65 |
| **EM897120** | R1.0 | **12.0** | **.4724** | 12 | 12 | 30 | 75 | 11.6 |

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.03 | h6 |

◎ : Excellent ○ : Good

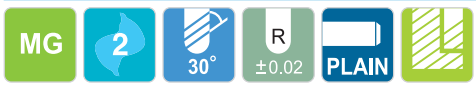
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | | | |

# X-POWER END MILLS

**EM876 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE SHORT LENGTH BALL NOSE

- Economic type with short overall length.
- Radius tolerance ±0.02mm & short length of cut.




P.514

◇ Call for Availability

Unit : mm

| EDP No. | Radius of Ball Nose | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| | R (±0.02) | Metric | Inch | | | |
| EM876010 | R0.5 | 1.0 | .0394 | 3 | 3 | 38 |
| EM876012 | R0.6 | 1.2 | .0472 | 3 | 3 | 38 |
| EM876015 | R0.75 | 1.5 | .0591 | 3 | 3 | 38 |
| EM876020 | R1.0 | 2.0 | .0787 | 6 | 3 | 50 |
| EM876030 | R1.5 | 3.0 | .1181 | 6 | 4 | 50 |
| EM876040 | R2.0 | 4.0 | .1575 | 6 | 5 | 54 |
| EM876050 | R2.5 | 5.0 | .1969 | 6 | 6 | 54 |
| EM876060 | R3.0 | 6.0 | .2362 | 6 | 7 | 54 |
| EM876070 | R3.5 | 7.0 | .2756 | 8 | 8 | 58 |
| EM876080 | R4.0 | 8.0 | .3150 | 8 | 9 | 58 |
| EM876090 | R4.5 | 9.0 | .3543 | 10 | 10 | 66 |
| EM876100 | R5.0 | 10.0 | .3937 | 10 | 11 | 66 |
| EM876120 | R6.0 | 12.0 | .4724 | 12 | 12 | 73 |
| EM876140 | R7.0 | 14.0 | .5512 | 14 | 14 | 75 |
| EM876160 | R8.0 | 16.0 | .6299 | 16 | 16 | 82 |
| EM876180 | R9.0 | 18.0 | .7087 | 18 | 18 | 84 |
| EM876200 | R10.0 | 20.0 | .7874 | 20 | 20 | 92 |
| EM876250 | R12.5 | 25.0 | .9843 | 25 | 25 | 104 |

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.03 | h6 |

◎ : Excellent ○ : Good

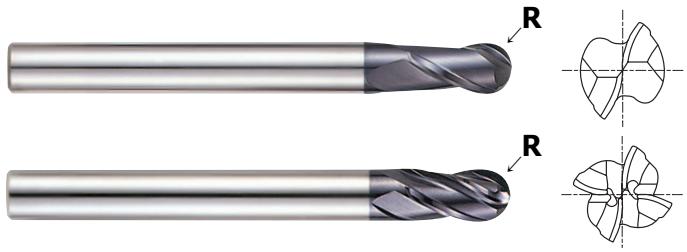
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | ○ | | | ○ | | | | |

YG X-POWER END MILLS

EM813 / EM815 SERIES PLAIN SHANK
EM823 / EM825 SERIES FLAT SHANK

# CARBIDE, 2&4 FLUTE LONG LENGTH BALL NOSE

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- For copy - milling machines.




MG | 2&4 | 30° | R ±0.02 | PLAIN | FLAT

P.514, 515

◇ Call for Availability

## EM813, EM823(2 FLUTE), EM815, EM825(4 FLUTE) Series

Unit : mm

| EDP No. | | | | Radius of Ball Nose | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|---|---|
| 2 FLUTE | | 4 FLUTE | | | Metric | Inch | | | |
| PLAIN | FLAT | PLAIN | FLAT | R (±0.02) | | | | | |
| 93302 | — | 93335 | — | R0.5 | 1.0 | .0394 | 4 | 2.5 | 50 |
| 93303 | — | — | — | R0.6 | 1.2 | .0472 | 4 | 3 | 50 |
| 93304 | — | 93336 | — | R0.75 | 1.5 | .0591 | 4 | 4 | 50 |
| 93305 | 93320 | 93337 | 93352 | R1.0 | 2.0 | .0787 | 6 | 5 | 50 |
| 93306 | 93321 | 93338 | 93353 | R1.5 | 3.0 | .1181 | 6 | 8 | 60 |
| 93307 | 93322 | 93339 | 93354 | R2.0 | 4.0 | .1575 | 6 | 8 | 70 |
| 93308 | 93323 | 93340 | 93355 | R2.5 | 5.0 | .1969 | 6 | 10 | 80 |
| 93309 | 93324 | 93341 | 93356 | R3.0 | 6.0 | .2362 | 6 | 12 | 90 |
| 93310 | 93325 | 93342 | 93357 | R3.5 | 7.0 | .2756 | 8 | 14 | 90 |
| 93311 | 93326 | 93343 | 93358 | R4.0 | 8.0 | .3150 | 8 | 14 | 100 |
| 93312 | 93327 | 93344 | 93359 | R4.5 | 9.0 | .3543 | 10 | 18 | 100 |
| 93313 | 93328 | 93345 | 93360 | R5.0 | 10.0 | .3937 | 10 | 18 | 100 |
| 93314 | 93329 | 93346 | 93361 | R6.0 | 12.0 | .4724 | 12 | 22 | 110 |
| 93315 | 93330 | 93347 | 93362 | R7.0 | 14.0 | .5512 | 14 | 26 | 110 |
| 93316 | 93331 | 93348 | 93363 | R8.0 | 16.0 | .6299 | 16 | 30 | 140 |
| 93317 | 93332 | 93349 | 93364 | R9.0 | 18.0 | .7087 | 18 | 34 | 140 |
| 93318 | 93333 | 93350 | 93365 | R10.0 | 20.0 | .7874 | 20 | 38 | 160 |
| 93319 | 93334 | 93351 | 93366 | R12.5 | 25.0 | .9843 | 25 | 50 | 180 |

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.03 | h6 |

◎ : Excellent ○ : Good

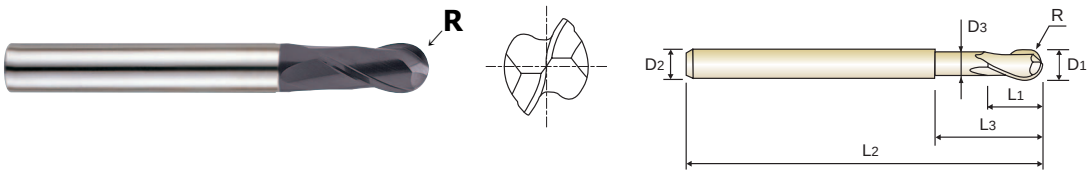
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | ○ | | | ○ | | | | |

# X-POWER END MILLS

**EM899 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE MEDIUM LENGTH BALL NOSE

- Deep slotting milling is possible by reduced neck.
- High efficiency milling is possible in deep slotting with projection of the end mill being long.




MG | 2 | 30° | R ±0.01 | PLAIN

P.516

◇ Call for Availability

Unit : mm

| EDP No. | Radius of Ball Nose | Mill Diameter | | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|
| | | Metric | Inch | | | | | |
| | R (±0.01) | D1 | | D2 | L1 | L3 | L2 | D3 |
| EM899030 | R1.5 | 3.0 | .1181 | 6 | 8 | — | 70 | — |
| EM899040 | R2.0 | 4.0 | .1575 | 6 | 8 | — | 70 | — |
| EM899050 | R2.5 | 5.0 | .1969 | 6 | 12 | — | 80 | — |
| EM899060 | R3.0 | 6.0 | .2362 | 6 | 12 | 22 | 80 | 5.8 |
| EM899070 | R3.5 | 7.0 | .2756 | 8 | 14 | — | 90 | — |
| EM899080 | R4.0 | 8.0 | .3150 | 8 | 14 | 27 | 90 | 7.8 |
| EM899100 | R5.0 | 10.0 | .3937 | 10 | 18 | 31 | 100 | 9.8 |
| EM899120 | R6.0 | 12.0 | .4724 | 12 | 22 | 35 | 110 | 11.8 |
| EM899140 | R7.0 | 14.0 | .5512 | 12 | 26 | — | 120 | — |
| EM899160 | R8.0 | 16.0 | .6299 | 16 | 30 | 50 | 140 | 15.8 |
| EM899180 | R9.0 | 18.0 | .7087 | 16 | 34 | — | 140 | — |
| EM899200 | R10.0 | 20.0 | .7874 | 20 | 38 | 58 | 160 | 19.8 |
| EM899250 | R12.5 | 25.0 | .9843 | 25 | 55 | 75 | 180 | 24.8 |

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.03 | h6 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | ○ | | | ○ | | | | |

CBN END MILL
i-Xmill END MILL
X5070 END MILLS
X-SPEED ROUGHER END MILLS
X-POWER END MILLS
JET-POWER END MILLS
V7 Mill STEEL END MILLS
V7 Mill INOX END MILLS
ALU-POWER END MILLS
D-POWER END MILLS
STANDARD CARBIDE END MILLS
TANK-POWER END MILLS
STANDARD COBALT & HSS END MILLS
TECHNICAL DATA

# YG X-POWER END MILLS

**EM838 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE LONG REACH BALL NOSE

▶ Longer overall length than EM813 types and suitable for machining deeply located area.

MG | 2 | 30° | R ±0.02 | PLAIN

P.517

◇ Call for Availability

Unit : mm

| EDP No. | Radius of Ball Nose | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| | R (±0.02) | Metric | Inch | | | |
| EM838020 | R1.0 | 2.0 | .0787 | 3 | 6 | 80 |
| EM838030 | R1.5 | 3.0 | .1181 | 3 | 8 | 100 |
| EM838040 | R2.0 | 4.0 | .1575 | 4 | 8 | 100 |
| EM838050 | R2.5 | 5.0 | .1969 | 6 | 10 | 120 |
| EM838060 | R3.0 | 6.0 | .2362 | 6 | 10 | 120 |
| EM838080 | R4.0 | 8.0 | .3150 | 8 | 14 | 140 |
| EM838100 | R5.0 | 10.0 | .3937 | 10 | 18 | 180 |
| EM838120 | R6.0 | 12.0 | .4724 | 12 | 22 | 200 |
| EM838160 | R8.0 | 16.0 | .6299 | 16 | 30 | 250 |
| EM838200 | R10.0 | 20.0 | .7874 | 20 | 38 | 250 |

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.03 | h6 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | ○ | | | ○ | | | | |

# X-POWER END MILLS

**EM865 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE MINIATURE BALL NOSE

- High precision milling in medical, optical, electronics and aerospace industrials.
- Excellent performance at dry cutting conditon.
- Excellent performance on hardened steel.

MG | 2 | 30° | R ±0.01 | PLAIN

P.523

◇ Call for Availability

Unit : mm

| EDP No. | Radius of Ball Nose R (±0.01) | Mill Diameter Metric | Mill Diameter Inch | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| 93424 | R0.30 | 0.6 | .0236 | 3 | 1.1 | 40 |
| 93425 | R0.35 | 0.7 | .0276 | 3 | 1.5 | 40 |
| 93426 | R0.40 | 0.8 | .0315 | 3 | 2.0 | 40 |
| 93427 | R0.45 | 0.9 | .0354 | 3 | 2.2 | 40 |
| 93428 | R0.50 | 1.0 | .0394 | 3 | 2.5 | 40 |
| 93429 | R0.55 | 1.1 | .0433 | 3 | 3.0 | 40 |
| 93430 | R0.60 | 1.2 | .0472 | 3 | 3.0 | 40 |
| 93431 | R0.65 | 1.3 | .0512 | 3 | 3.5 | 40 |
| 93432 | R0.70 | 1.4 | .0551 | 3 | 3.5 | 40 |
| 93433 | R0.75 | 1.5 | .0591 | 3 | 4.0 | 40 |

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.03 | h6 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | | | |

CBN END MILL
i-Xmill END MILL
X5070 END MILLS
X-SPEED ROUGHER END MILLS
X-POWER END MILLS
JET-POWER END MILLS
V7 Mill STEEL END MILLS
V7 Mill INOX END MILLS
ALU-POWER END MILLS
D-POWER END MILLS
STANDARD CARBIDE END MILLS
TANK-POWER END MILLS
STANDARD COBALT & HSS END MILLS
TECHNICAL DATA

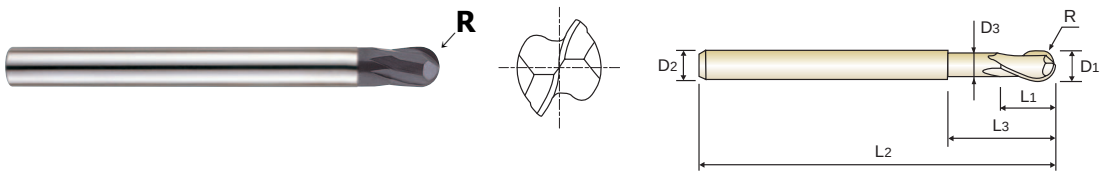
YG X-POWER END MILLS

EM868 SERIES PLAIN SHANK

# CARBIDE, 2 FLUTE 15° HELIX STUB CUT LENGTH BALL NOSE for OVER HRc55

## *HRc55 ~ HRc70*

- Suitable for HRc55~HRc70 high hardened materials.
- Strong cutting edges and higher tool rigidity.




MG | 2 | 15° | R ±0.01 | PLAIN

P.518

◇ Call for Availability

Unit : mm

| EDP No. | Radius of Ball Nose | Mill Diameter | | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|
| | | Metric | Inch | | | | | |
| | R (±0.01) | D1 | | D2 | L1 | L3 | L2 | D3 |
| EM868010 | R0.5 | 1.0 | .0394 | 4 | 1 | 2.2 | 50 | 0.95 |
| EM868901 | R0.5 | 1.0 | .0394 | 6 | 1 | 2.2 | 50 | 0.95 |
| EM868012 | R0.6 | 1.2 | .0472 | 4 | 1.2 | 2.6 | 50 | 1.1 |
| EM868015 | R0.75 | 1.5 | .0591 | 4 | 1.5 | 3 | 50 | 1.4 |
| EM868020 | R1.0 | 2.0 | .0787 | 6 | 2 | 4 | 50 | 1.9 |
| EM868030 | R1.5 | 3.0 | .1181 | 6 | 3 | 6 | 60 | 2.9 |
| EM868040 | R2.0 | 4.0 | .1575 | 6 | 4 | 8 | 70 | 3.9 |
| EM868050 | R2.5 | 5.0 | .1969 | 6 | 5 | 10 | 80 | 4.9 |
| EM868060 | R3.0 | 6.0 | .2362 | 6 | 6 | 12 | 90 | 5.9 |
| EM868070 | R3.5 | 7.0 | .2756 | 8 | 7 | 14 | 90 | 6.9 |
| EM868080 | R4.0 | 8.0 | .3150 | 8 | 8 | 16 | 100 | 7.9 |
| EM868090 | R4.5 | 9.0 | .3543 | 10 | 9 | 18 | 100 | 8.9 |
| EM868100 | R5.0 | 10.0 | .3937 | 10 | 10 | 20 | 100 | 9.9 |
| EM868120 | R6.0 | 12.0 | .4724 | 12 | 12 | 24 | 110 | 11.9 |
| EM868140 | R7.0 | 14.0 | .5512 | 14 | 14 | 28 | 110 | 13.8 |
| EM868160 | R8.0 | 16.0 | .6299 | 16 | 16 | 32 | 140 | 15.8 |
| EM868180 | R9.0 | 18.0 | .7087 | 18 | 18 | 36 | 140 | 17.8 |
| EM868200 | R10.0 | 20.0 | .7874 | 20 | 20 | 40 | 160 | 19.8 |
| EM868250 | R12.5 | 25.0 | .9843 | 25 | 25 | 50 | 180 | 24.8 |

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.03 | h6 |

◎ : Excellent ○ : Good

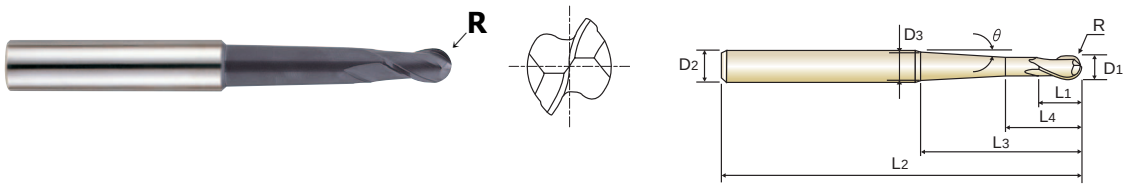
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | ○ | | | ○ | | | | |

# X-POWER END MILLS

**EM902 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE BALL NOSE with TAPER NECK

▶ High efficiency milling is possible in deep slotting with projection of the end mill being long.




MG | 2 | 30° | R ±0.01 | PLAIN

P.519

◇ Call for Availability

Unit : mm

| EDP No. | Radius of Ball Nose | Mill Diameter Metric | Mill Diameter Inch | Shank Diameter | Length of Cut | Under Neck Parallel Length | Length Below Shank | Overall Length | Neck Diameter | Neck Taper Angle |
|---|---|---|---|---|---|---|---|---|---|---|
| | R (±0.01) | D1 | | D2 | L1 | L4 | L3 | L2 | D3 | θ |
| EM902010 | R0.5 | 1.0 | .0394 | 6 | 2 | 4 | 23 | 60 | 2.0 | 1°30′ |
| EM902901 | R0.5 | 1.0 | .0394 | 6 | 2 | 4 | 23 | 60 | 4.3 | 5° |
| EM902902 | R0.5 | 1.0 | .0394 | 6 | 2 | 4 | 42 | 80 | 5.0 | 3° |
| EM902020 | R1.0 | 2.0 | .0787 | 6 | 4 | 6 | 23 | 60 | 2.9 | 1°30′ |
| EM902903 | R1.0 | 2.0 | .0787 | 6 | 4 | 6 | 23 | 60 | 5.0 | 5° |
| EM902904 | R1.0 | 2.0 | .0787 | 6 | 4 | 6 | 41 | 80 | 5.7 | 3° |
| EM902030 | R1.5 | 3.0 | .1181 | 6 | 6 | 8 | 32 | 70 | 5.6 | 3° |
| EM902905 | R1.5 | 3.0 | .1181 | 6 | 6 | 8 | 52 | 90 | 5.3 | 1°30′ |
| EM902040 | R2.0 | 4.0 | .1575 | 6 | 8 | 10 | 28 | 70 | 6.0 | 3° |
| EM902906 | R2.0 | 4.0 | .1575 | 6 | 8 | 10 | 49 | 90 | 6.0 | 1°30′ |
| EM902050 | R2.5 | 5.0 | .1969 | 8 | 10 | 12 | 41 | 90 | 8.0 | 3° |
| EM902907 | R2.5 | 5.0 | .1969 | 8 | 10 | 12 | 61 | 110 | 7.6 | 1°30′ |
| EM902060 | R3.0 | 6.0 | .2362 | 8 | 12 | 15 | 34 | 90 | 8.0 | 3° |
| EM902908 | R3.0 | 6.0 | .2362 | 8 | 12 | 15 | 53 | 110 | 8.0 | 1°30′ |
| EM902080 | R4.0 | 8.0 | .3150 | 10 | 14 | 17 | 36 | 100 | 10.0 | 3° |
| EM902909 | R4.0 | 8.0 | .3150 | 10 | 14 | 17 | 55 | 120 | 10.0 | 1°30′ |
| EM902100 | R5.0 | 10.0 | .3937 | 12 | 18 | 21 | 40 | 110 | 12.0 | 3° |
| EM902910 | R5.0 | 10.0 | .3937 | 12 | 18 | 21 | 59 | 130 | 12.0 | 1°30′ |
| EM902120 | R6.0 | 12.0 | .4724 | 16 | 22 | 25 | 63 | 140 | 16.0 | 3° |
| EM902911 | R6.0 | 12.0 | .4724 | 16 | 22 | 25 | 83 | 160 | 15.0 | 1°30′ |

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.03 | h6 |

◎ : Excellent ○ : Good

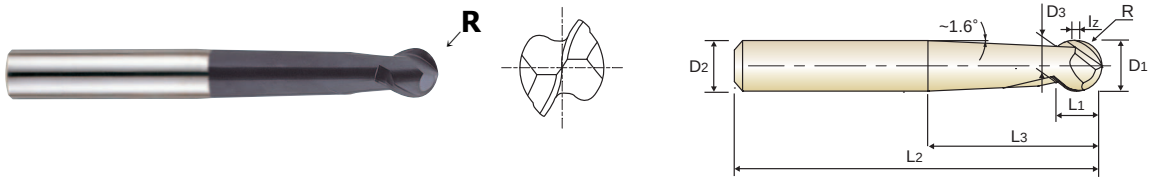
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ○ | ◎ | ◎ | ○ | | | | | | | | |

# X-POWER END MILLS

**EM669 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE LONG LENGTH BALL NOSE (MMC-ECONOMY TYPE)

- Designed for copy milling.
- Increased feed rates.
- 15° inclination.
- Easy to regrind.




MG | 2 | 30° | R ±0.01 | PLAIN

P.521

◇ Call for Availability

Unit : mm

| EDP No. | Radius of Ball Nose | Mill Diameter | | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter | Iz |
|---|---|---|---|---|---|---|---|---|---|
| | | Metric | Inch | | | | | | |
| | R (±0.01) | D1 | | D2 | L1 | L3 | L2 | D3 | |
| EM669030 | R1.5 | 3.0 | .1181 | 6 | 4 | 30 | 80 | 2.5 | 1.5 |
| EM669040 | R2.0 | 4.0 | .1575 | 6 | 5 | 30 | 80 | 3.3 | 1.5 |
| EM669050 | R2.5 | 5.0 | .1969 | 6 | 6 | 43 | 80 | 4.1 | 2.0 |
| EM669060 | R3.0 | 6.0 | .2362 | 6 | 7 | 30 | 100 | 4.7 | 2.0 |
| EM669080 | R4.0 | 8.0 | .3150 | 8 | 9 | 36 | 100 | 6.5 | 3.0 |
| EM669100 | R5.0 | 10.0 | .3937 | 10 | 11 | 43 | 100 | 8.2 | 3.0 |
| EM669120 | R6.0 | 12.0 | .4724 | 12 | 13 | 52 | 100 | 9.8 | 3.0 |
| EM669160 | R8.0 | 16.0 | .6299 | 16 | 15 | 61 | 150 | 13.4 | 3.0 |

※ ECONOMIC TYPE HAS MORE ADVANTAGE IN RESHARPENING THAN SPHERE TYPE.

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.03 | h6 |

◎ : Excellent ○ : Good

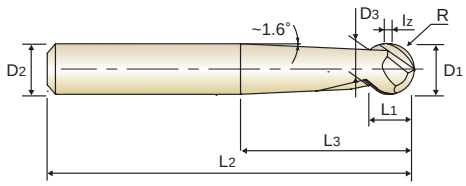
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | ○ | | | ○ | | | | |

# X-POWER END MILLS

**EM673 SERIES** PLAIN SHANK

## CARBIDE, 4 FLUTE LONG LENGTH BALL NOSE (MMC-ECONOMY TYPE)

- Designed for copy milling.
- Increased feed rates.
- 15° inclination.
- Easy to regrind.




MG | 4 | 30° | R ±0.01 | PLAIN

P.522

◇ Call for Availability

Unit : mm

| EDP No. | Radius of Ball Nose | Mill Diameter | | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter | Iz |
|---|---|---|---|---|---|---|---|---|---|
| | | Metric | Inch | | | | | | |
| | R (±0.01) | D1 | | D2 | L1 | L3 | L2 | D3 | |
| EM673050 | R2.5 | 5.0 | .1969 | 6 | 6 | 43 | 80 | 4.1 | 2.0 |
| EM673060 | R3.0 | 6.0 | .2362 | 6 | 7 | 30 | 100 | 4.7 | 2.0 |
| EM673080 | R4.0 | 8.0 | .3150 | 8 | 9 | 36 | 100 | 6.5 | 3.0 |
| EM673100 | R5.0 | 10.0 | .3937 | 10 | 11 | 43 | 100 | 8.2 | 3.0 |
| EM673120 | R6.0 | 12.0 | .4724 | 12 | 13 | 52 | 100 | 9.8 | 3.0 |
| EM673160 | R8.0 | 16.0 | .6299 | 16 | 15 | 61 | 150 | 13.4 | 3.0 |

※ ECONOMIC TYPE HAS MORE ADVANTAGE IN RESHARPENING THAN SPHERE TYPE.

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.03 | h6 |

◎ : Excellent ○ : Good

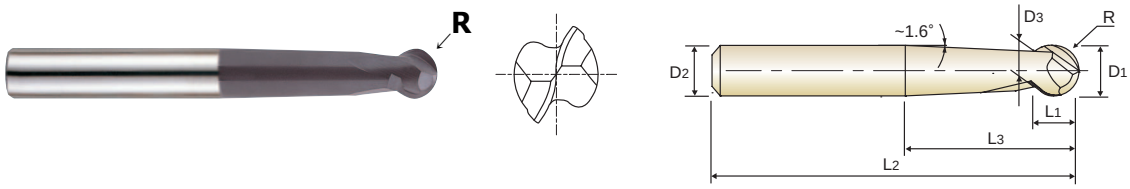
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | ○ | | | ○ | | | | |

YG X-POWER END MILLS

EM863 SERIES PLAIN SHANK

# CARBIDE, 2 FLUTE LONG LENGTH BALL NOSE (MMC-SPHERE TYPE)

- Designed for copy milling.
- Increased feed rates.
- 15° inclination.(see page 000)
- Sphere Angle : 250°




MG | 2 | 30° | R ±0.01 | PLAIN

P.521

◇ Call for Availability

Unit : mm

| EDP No. | Radius of Ball Nose | Mill Diameter | | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|
| | | Metric | Inch | | | | | |
| | R (±0.01) | D1 | | D2 | L1 | L3 | L2 | D3 |
| EM863030 | R1.5 | 3.0 | .1181 | 6 | 2.3 | 30 | 80 | 2.5 |
| EM863040 | R2.0 | 4.0 | .1575 | 6 | 3.1 | 30 | 80 | 3.3 |
| EM863050 | R2.5 | 5.0 | .1969 | 6 | 3.9 | 38 | 80 | 4.1 |
| EM863060 | R3.0 | 6.0 | .2362 | 6 | 4.9 | 28 | 100 | 4.7 |
| EM863080 | R4.0 | 8.0 | .3150 | 8 | 6.3 | 33 | 100 | 6.5 |
| EM863100 | R5.0 | 10.0 | .3937 | 10 | 7.9 | 40 | 100 | 8.2 |
| EM863120 | R6.0 | 12.0 | .4724 | 12 | 9.5 | 49 | 100 | 9.8 |
| EM863160 | R8.0 | 16.0 | .6299 | 16 | 12.4 | 59 | 150 | 13.4 |

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.03 | h6 |

◎ : Excellent ○ : Good

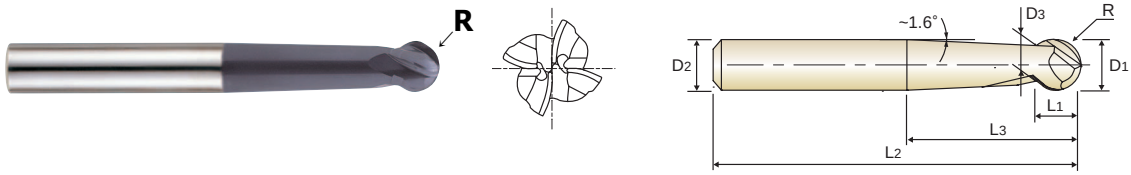
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | ○ | | | ○ | | | | |

# X-POWER END MILLS

**EM864 SERIES** PLAIN SHANK

## CARBIDE, 4 FLUTE LONG LENGTH BALL NOSE (MMC-SPHERE TYPE)

- Designed for copy milling.
- Increased feed rates.
- 15° inclination.(see page 000)
- Sphere Angle : 250°




MG | 4 | 30° | R ±0.01 | PLAIN

P.522

◇ Call for Availability

Unit : mm

| EDP No. | Radius of Ball Nose | Mill Diameter | | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|
| | | Metric | Inch | | | | | |
| | R (±0.01) | D1 | | D2 | L1 | L3 | L2 | D3 |
| **EM864050** | R2.5 | **5.0** | **.1969** | 6 | 3.9 | 38 | 80 | 4.1 |
| **EM864060** | R3.0 | **6.0** | **.2362** | 6 | 4.9 | 28 | 100 | 4.7 |
| **EM864080** | R4.0 | **8.0** | **.3150** | 8 | 6.3 | 33 | 100 | 6.5 |
| **EM864100** | R5.0 | **10.0** | **.3937** | 10 | 7.9 | 40 | 100 | 8.2 |
| **EM864120** | R6.0 | **12.0** | **.4724** | 12 | 9.5 | 49 | 100 | 9.8 |
| **EM864160** | R8.0 | **16.0** | **.6299** | 16 | 12.4 | 59 | 150 | 13.4 |

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.03 | h6 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | ○ | | | ○ | | | | |

# X-POWER END MILLS

**EM832 SERIES** PLAIN SHANK

## CARBIDE, MULTI FLUTE 20° HELIX SHORT LENGTH FINE PITCH ROUGHING

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- High velocity milling of hardened steels.
- For dry and wet milling.
- Fast chip ejection.

MG | FINE | 3-5 | 20° | PLAIN

P.523

◇ Call for Availability

Unit : mm

| EDP No. | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length | No. of Flute |
|---|---|---|---|---|---|---|
| | Metric | Inch | | | | |
| | h10 | | h6 | | | |
| EM832060 | 6.0 | .2362 | 6 | 7 | 54 | 3 |
| EM832070 | 7.0 | .2756 | 8 | 8 | 58 | 3 |
| EM832080 | 8.0 | .3150 | 8 | 9 | 58 | 3 |
| EM832090 | 9.0 | .3543 | 10 | 13 | 66 | 4 |
| EM832100 | 10.0 | .3937 | 10 | 14 | 66 | 4 |
| EM832120 | 12.0 | .4724 | 12 | 16 | 73 | 4 |
| EM832140 | 14.0 | .5512 | 14 | 18 | 75 | 4 |
| EM832160 | 16.0 | .6299 | 16 | 22 | 82 | 4 |
| EM832180 | 18.0 | .7087 | 18 | 24 | 84 | 4 |
| EM832200 | 20.0 | .7874 | 20 | 26 | 92 | 4 |
| EM832250 | 25.0 | .9843 | 25 | 25 | 110 | 5 |

**Tolerances according to DIN 7160 & 7161**

| Tolerance range in µm | | | | | |
|---|---|---|---|---|---|
| Nominal-Diameter in mm | | | | | |
| | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
| h10 | 0 — 40 | 0 — 48 | 0 — 58 | 0 — 70 | 0 — 84 |
| h6 | 0 — 6 | 0 — 8 | 0 — 9 | 0 — 11 | 0 — 13 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | ○ | | |

# X-POWER END MILLS

**EM814 SERIES** PLAIN SHANK

## CARBIDE, MULTI FLUTE 20° HELIX LONG LENGTH FINE PITCH ROUGHING

- ▶Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- ▶High velocity milling of hardened steels.
- ▶For dry and wet milling.
- ▶Fast chip ejection.

MG | FINE | 3-5 | 20° | PLAIN

P.523

◇ Call for Availability

Unit : mm

| EDP No. | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length | No. of Flute |
|---|---|---|---|---|---|---|
| | Metric | Inch | | | | |
| | h10 | | h6 | | | |
| EM814060 | 6.0 | .2362 | 6 | 16 | 57 | 3 |
| EM814070 | 7.0 | .2756 | 8 | 16 | 63 | 3 |
| EM814080 | 8.0 | .3150 | 8 | 16 | 63 | 3 |
| EM814090 | 9.0 | .3543 | 10 | 19 | 72 | 4 |
| EM814100 | 10.0 | .3937 | 10 | 22 | 72 | 4 |
| EM814120 | 12.0 | .4724 | 12 | 26 | 83 | 4 |
| EM814140 | 14.0 | .5512 | 14 | 26 | 83 | 4 |
| EM814901 | 14.0 | .5512 | 16 | 26 | 83 | 4 |
| EM814160 | 16.0 | .6299 | 16 | 32 | 92 | 4 |
| EM814180 | 18.0 | .7087 | 18 | 32 | 92 | 4 |
| EM814200 | 20.0 | .7874 | 20 | 38 | 104 | 4 |
| EM814250 | 25.0 | .9843 | 25 | 45 | 121 | 5 |

**Tolerances according to DIN 7160 & 7161**

| Tolerance range in µm | | | | | |
|---|---|---|---|---|---|
| Nominal-Diameter in mm | | | | | |
| | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
| h10 | 0 — 40 | 0 — 48 | 0 — 58 | 0 — 70 | 0 — 84 |
| h6 | 0 — 6 | 0 — 8 | 0 — 9 | 0 — 11 | 0 — 13 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | ○ | | |

YG X-POWER END MILLS

EM833 SERIES PLAIN SHANK

# CARBIDE, 3&4 FLUTE 20° HELIX LONG LENGTH FINE PITCH ROUGHING BALL NOSE

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- High velocity milling of hardened steels.
- For dry and wet milling.
- Fast chip ejection.

MG | FINE | 3&4 | 20° | R ±0.02 | PLAIN

P.524

◇ Call for Availability

Unit : mm

| EDP No. | Radius of Ball Nose | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length | No. of Flute |
|---|---|---|---|---|---|---|---|
| | | Metric | Inch | | | | |
| | R (±0.02) | h10 | | h6 | | | |
| EM833060 | R3.0 | 6.0 | .2362 | 6 | 16 | 57 | 3 |
| EM833080 | R4.0 | 8.0 | .3150 | 8 | 16 | 63 | 3 |
| EM833100 | R5.0 | 10.0 | .3937 | 10 | 22 | 72 | 4 |
| EM833120 | R6.0 | 12.0 | .4724 | 12 | 26 | 83 | 4 |
| EM833140 | R7.0 | 14.0 | .5512 | 14 | 26 | 83 | 4 |
| EM833160 | R8.0 | 16.0 | .6299 | 16 | 32 | 92 | 4 |
| EM833180 | R9.0 | 18.0 | .7087 | 18 | 32 | 92 | 4 |
| EM833200 | R10.0 | 20.0 | .7874 | 20 | 38 | 104 | 4 |

**Tolerances according to DIN 7160 & 7161**

| Tolerance range in µm | | | | | |
|---|---|---|---|---|---|
| Nominal-Diameter in mm | | | | | |
| | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
| h10 | 0 / — 40 | 0 / — 48 | 0 / — 58 | 0 / — 70 | 0 / — 84 |
| h6 | 0 / — 6 | 0 / — 8 | 0 / — 9 | 0 / — 11 | 0 / — 13 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | ○ | | |

# X-POWER END MILLS

**EM837 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE TAPER

- Designed for milling die cavity.
- Suitable for machining tool steels, alloy steels, mold steels and other hardened materials.

MG | 2 | 30° | PLAIN

P.525

◇ Call for Availability

Unit : mm

| EDP No. | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length | Taper Angle |
|---|---|---|---|---|---|---|
| | Metric | Inch | | | | |
| EM837913 | 2.0 | .0787 | 4 | 6 | 45 | 30′ |
| EM837020 | 2.0 | .0787 | 4 | 6 | 45 | 1° |
| EM837901 | 2.0 | .0787 | 4 | 6 | 45 | 2° |
| EM837902 | 2.0 | .0787 | 4 | 6 | 45 | 3° |
| EM837914 | 3.0 | .1181 | 6 | 10 | 55 | 30′ |
| EM837030 | 3.0 | .1181 | 6 | 10 | 55 | 1° |
| EM837903 | 3.0 | .1181 | 6 | 10 | 55 | 2° |
| EM837904 | 3.0 | .1181 | 6 | 10 | 55 | 3° |
| EM837915 | 4.0 | .1575 | 6 | 15 | 55 | 30′ |
| EM837040 | 4.0 | .1575 | 6 | 15 | 55 | 1° |
| EM837905 | 4.0 | .1575 | 6 | 15 | 55 | 2° |
| EM837906 | 4.0 | .1575 | 6 | 15 | 55 | 3° |
| EM837916 | 5.0 | .1969 | 6 | 15 | 60 | 30′ |
| EM837050 | 5.0 | .1969 | 6 | 15 | 60 | 1° |
| EM837907 | 5.0 | .1969 | 6 | 15 | 60 | 2° |
| EM837908 | 5.0 | .1969 | 6 | 15 | 60 | 3° |
| EM837917 | 6.0 | .2362 | 6 | 20 | 60 | 30′ |
| EM837060 | 6.0 | .2362 | 6 | 20 | 60 | 1° |
| EM837909 | 6.0 | .2362 | 6 | 20 | 60 | 2° |
| EM837910 | 6.0 | .2362 | 8 | 20 | 65 | 3° |
| EM837918 | 8.0 | .3150 | 8 | 25 | 70 | 30′ |
| EM837080 | 8.0 | .3150 | 8 | 25 | 70 | 1° |
| EM837911 | 8.0 | .3150 | 8 | 25 | 70 | 2° |
| EM837912 | 8.0 | .3150 | 10 | 25 | 75 | 3° |

▶ We can supply various sizes and taper angles.

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance | Taper Angle Tolerance |
|---|---|---|
| 0~−0.03 | h6 | ±5′ |

◎ : Excellent ○ : Good

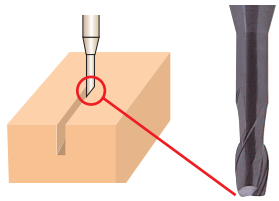
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | | | |

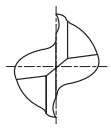
# X-POWER END MILLS

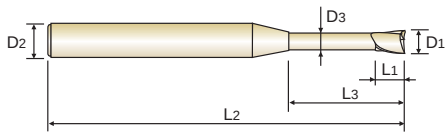
**EM883 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE for RIB PROCESSING

- For deep slotting & pocketing.
- For depths of 6 to 10X cutting diameter.
- Machine carbon steel, alloy steel, tool steel, die and mold steels.
- Suitable for high speed cutting and high precision machining.
- Designed with reinforced shank for higher stability and rigidity.
- Long neck design for deep machining near walls.








MG | 2 | 30° | PLAIN

P.524

◇ Call for Availability

Unit : mm

| EDP No. | Mill Diameter Metric D1 | Mill Diameter Inch D1 | Shank Diameter D2 | Length of Cut L1 | Length Below Shank L3 | Overall Length L2 | Neck Diameter D3 |
|---|---|---|---|---|---|---|---|
| EM883908 | 0.8 | .0315 | 4 | 1.2 | 6 | 45 | 0.75 |
| EM883909 | 0.8 | .0315 | 4 | 1.2 | 8 | 45 | 0.75 |
| EM883010 | 1.0 | .0394 | 4 | 1.5 | 6 | 45 | 0.97 |
| EM883912 | 1.0 | .0394 | 4 | 1.5 | 8 | 45 | 0.95 |
| EM883914 | 1.0 | .0394 | 4 | 1.5 | 12 | 45 | 0.93 |
| EM883915 | 1.2 | .0472 | 4 | 1.8 | 8 | 45 | 1.15 |
| EM883917 | 1.2 | .0472 | 4 | 1.8 | 12 | 45 | 1.13 |
| EM883920 | 1.4 | .0551 | 4 | 2.1 | 12 | 45 | 1.33 |
| EM883923 | 1.5 | .0591 | 4 | 2.3 | 8 | 45 | 1.45 |
| EM883924 | 1.5 | .0591 | 4 | 2.3 | 10 | 45 | 1.45 |
| EM883925 | 1.5 | .0591 | 4 | 2.3 | 12 | 45 | 1.43 |
| EM883927 | 1.5 | .0591 | 4 | 2.3 | 16 | 50 | 1.41 |
| EM883932 | 1.6 | .0630 | 4 | 2.4 | 12 | 45 | 1.53 |
| EM883946 | 1.8 | .0709 | 4 | 2.7 | 12 | 45 | 1.73 |
| EM883960 | 2.0 | .0787 | 4 | 3.0 | 12 | 45 | 1.93 |
| EM883962 | 2.0 | .0787 | 4 | 3.0 | 16 | 50 | 1.91 |
| EM883968 | 2.5 | .0984 | 4 | 3.7 | 12 | 45 | 2.40 |
| EM883970 | 2.5 | .0984 | 4 | 3.7 | 16 | 55 | 2.40 |
| EM883977 | 3.0 | .1181 | 6 | 4.5 | 14 | 50 | 2.85 |
| EM883979 | 3.0 | .1181 | 6 | 4.5 | 18 | 55 | 2.85 |

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.015 | h6 |

◎ : Excellent ○ : Good

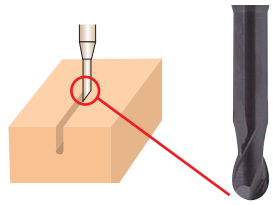
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | | | |

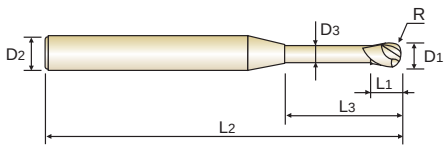
# X-POWER END MILLS

**EM886 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE BALL NOSE for RIB PROCESSING

- For 3-D milling, deep slotting and pocketing.
- For depths of 6 to 10X cutting diameter.
- Machine carbon steel, alloy steel, tool steel, die and mold steels.
- Suitable for high speed cutting and high precision machining.
- Designed with reinforced shank for higher stability and rigidity.
- Long neck design for deep machining near walls.






MG | 2 | 30° | R ±0.01 | PLAIN

P.525

◇ Call for Availability

Unit : mm

| EDP No. | Radius of Ball Nose | Mill Diameter | | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|
| | | Metric | Inch | | | | | |
| | R (±0.01) | D1 | | D2 | L1 | L3 | L2 | D3 |
| EM886006 | R0.3 | 0.6 | .0236 | 3 | 0.9 | 6 | 35 | 0.55 |
| EM886008 | R0.4 | 0.8 | .0315 | 4 | 1.2 | 6 | 45 | 0.75 |
| EM886901 | R0.4 | 0.8 | .0315 | 4 | 1.2 | 8 | 45 | 0.75 |
| EM886010 | R0.5 | 1.0 | .0394 | 4 | 1.5 | 6 | 45 | 0.97 |
| EM886902 | R0.5 | 1.0 | .0394 | 4 | 1.5 | 8 | 45 | 0.95 |
| EM886904 | R0.5 | 1.0 | .0394 | 4 | 1.5 | 12 | 45 | 0.93 |
| EM886012 | R0.6 | 1.2 | .0472 | 4 | 1.8 | 8 | 45 | 1.15 |
| EM886905 | R0.6 | 1.2 | .0472 | 4 | 1.8 | 12 | 45 | 1.13 |
| EM886014 | R0.7 | 1.4 | .0551 | 4 | 2.1 | 12 | 45 | 1.33 |
| EM886015 | R0.75 | 1.5 | .0591 | 4 | 2.3 | 8 | 45 | 1.45 |
| EM886906 | R0.75 | 1.5 | .0591 | 4 | 2.3 | 12 | 45 | 1.43 |
| EM886907 | R0.75 | 1.5 | .0591 | 4 | 2.3 | 16 | 50 | 1.41 |
| EM886016 | R0.8 | 1.6 | .0630 | 4 | 2.4 | 16 | 50 | 1.51 |
| EM886018 | R0.9 | 1.8 | .0709 | 4 | 2.7 | 16 | 50 | 1.71 |
| EM886020 | R1.0 | 2.0 | .0787 | 4 | 3.0 | 8 | 45 | 1.95 |
| EM886909 | R1.0 | 2.0 | .0787 | 4 | 3.0 | 16 | 50 | 1.91 |
| EM886910 | R1.0 | 2.0 | .0787 | 4 | 3.0 | 20 | 55 | 1.89 |
| EM886030 | R1.5 | 3.0 | .1181 | 6 | 4.5 | 16 | 55 | 2.85 |
| EM886911 | R1.5 | 3.0 | .1181 | 6 | 4.5 | 20 | 60 | 2.85 |
| EM886040 | R2.0 | 4.0 | .1575 | 6 | 6.0 | 16 | 60 | 3.85 |
| EM886912 | R2.0 | 4.0 | .1575 | 6 | 6.0 | 20 | 65 | 3.85 |

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.02 | h6 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ◎ | ○ | | | | ○ | | | | |

CBN END MILL
i-Xmill END MILL
X5070 END MILLS
X-SPEED ROUGHER END MILLS
X-POWER END MILLS
JET-POWER END MILLS
V7 Mill STEEL END MILLS
V7 Mill INOX END MILLS
ALU-POWER END MILLS
D-POWER END MILLS
STANDARD CARBIDE END MILLS
TANK-POWER END MILLS
STANDARD COBALT & HSS END MILLS
TECHNICAL DATA

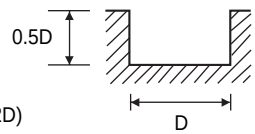
# X-POWER END MILLS

## RECOMMENDED CUTTING CONDITIONS

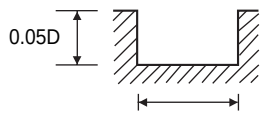
## CARBIDE, 2 FLUTE FINISH - SLOTTING

### EM154, EM810 SERIES

| MATERIAL | CARBON STEELS ALLOY STEELS CAST IRON | | ALLOY STEELS TOOL STEELS | | STAINLESS STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc30 | | HRc30 ~ HRc45 | | | | HRc45 ~ HRc55 | | HRc55 ~ HRc65 | |
| STRENGTH | ~ 1000N/mm² | | 1000 ~ 1500N/mm² | | | | 1500 ~ 2000N/mm² | | 2000N/mm² ~ | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/16 | 11560 | 7.50 | 7560 | 4.70 | 6300 | 3.55 | 5040 | 1.40 | | |
| 1/8 | 8920 | 8.25 | 5560 | 5.50 | 4620 | 4.70 | 3360 | 1.55 | 1900 | 1.55 |
| 3/16 | 6300 | 12.60 | 3780 | 7.50 | 3160 | 6.30 | 2320 | 1.95 | 1260 | 1.55 |
| 1/4 | 5560 | 13.80 | 3360 | 8.65 | 2840 | 7.10 | 2000 | 2.15 | 1100 | 1.55 |
| 5/16 | 4200 | 14.95 | 2520 | 7.85 | 2100 | 7.10 | 1680 | 2.95 | 840 | 1.55 |
| 3/8 | 3260 | 13.00 | 2000 | 6.30 | 1680 | 6.30 | 1360 | 2.35 | 680 | 1.40 |
| 1/2 | 2740 | 11.00 | 1680 | 5.10 | 1360 | 5.10 | 1160 | 2.15 | 560 | 1.40 |
| 5/8 | 2200 | 8.65 | 1360 | 4.30 | 1060 | 4.30 | 900 | 1.55 | 440 | 0.80 |
| 3/4 | 1680 | 6.70 | 1060 | 3.15 | 840 | 3.15 | 680 | 1.20 | 320 | 0.80 |
| 1 | 1360 | 5.10 | 840 | 2.75 | 680 | 2.35 | 540 | 0.80 | 260 | 0.60 |




(up to Ø1/8:0.2D)

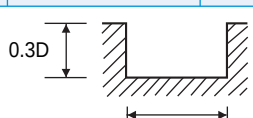



RPM = rev./min.
FEED = inch/min.

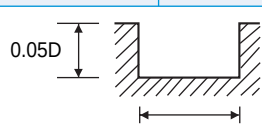
## CARBIDE, 2 FLUTE LONG LENGTH FINISH - SLOTTING

### EM206, EM816 SERIES

| Material | CARBON STEELS ALLOY STEELS CAST IRON | | ALLOY STEELS TOOL STEELS | | STAINLESS STEELS | |
|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc30 | | HRc30 ~ HRc45 | | HRc45 ~ HRc55 | |
| STRENGTH | ~ 1000N/mm² | | 1000 ~ 1500N/mm² | | 1500 ~ 2000N/mm² | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/8 | 4410 | 7.8 | 3570 | 2.4 | 2200 | 1.2 |
| 3/16 | 3050 | 4.1 | 2420 | 3.3 | 1580 | 1.6 |
| 1/4 | 2630 | 4.9 | 2100 | 4.1 | 1370 | 2.0 |
| 5/16 | 2000 | 5.3 | 1580 | 4.1 | 1050 | 2.0 |
| 3/8 | 1680 | 5.3 | 1370 | 4.1 | 840 | 2.0 |
| 1/2 | 1370 | 4.1 | 1160 | 3.7 | 700 | 1.6 |
| 5/8 | 1160 | 3.7 | 890 | 3.0 | 560 | 1.4 |
| 3/4 | 840 | 2.8 | 680 | 2.0 | 420 | 1.0 |
| 1 | 610 | 2.0 | 540 | 1.6 | 330 | 0.7 |




(up to Ø1/8:0.4D)




RPM = rev./min.
FEED = inch/min.

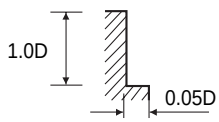
# X-POWER END MILLS

## RECOMMENDED CUTTING CONDITIONS

## CARBIDE, 4 FLUTE FINISH - SIDE CUTTING

### EM153, EM811 SERIES

| MATERIAL | CARBON STEELS ALLOY STEELS CAST IRON | | ALLOY STEELS TOOL STEELS | | STAINLESS STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc30 | | HRc30 ~ HRc45 | | | | HRc45 ~ HRc55 | | HRc55 ~ HRc65 | |
| STRENGTH | ~ 1000N/mm² | | 1000 ~ 1500N/mm² | | | | 1500 ~ 2000N/mm² | | 2000N/mm² ~ | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/16 | 11560 | 11.00 | 7560 | 6.70 | 6300 | 5.50 | 5040 | 1.95 | | |
| 1/8 | 8920 | 12.60 | 5560 | 7.85 | 4620 | 6.70 | 3360 | 2.35 | 1900 | 2.35 |
| 3/16 | 6300 | 23.60 | 3780 | 14.15 | 3160 | 11.80 | 2320 | 2.75 | 1260 | 2.35 |
| 1/4 | 5560 | 26.00 | 3360 | 16.15 | 2840 | 13.00 | 2000 | 3.15 | 1100 | 2.35 |
| 5/16 | 4200 | 27.95 | 2520 | 14.95 | 2100 | 13.80 | 1680 | 4.30 | 840 | 2.35 |
| 3/8 | 3260 | 24.00 | 2000 | 11.80 | 1680 | 11.80 | 1360 | 3.55 | 680 | 1.95 |
| 1/2 | 2740 | 20.50 | 1680 | 9.85 | 1360 | 9.45 | 1160 | 3.15 | 560 | 1.95 |
| 5/8 | 2200 | 16.15 | 1360 | 7.85 | 1060 | 7.85 | 900 | 2.35 | 440 | 1.20 |
| 3/4 | 1680 | 12.60 | 1060 | 6.30 | 840 | 5.90 | 680 | 1.55 | 320 | 1.20 |
| 1 | 1360 | 9.85 | 840 | 5.10 | 680 | 4.70 | 540 | 1.20 | 260 | 0.80 |

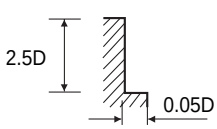


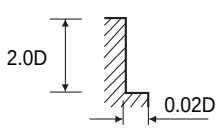

RPM = rev./min.
FEED = inch/min.

## CARBIDE, 4 FLUTE LONG LENGTH FINISH - SIDE CUTTING

### EM207, EM817 SERIES

| MATERIAL | CARBON STEELS ALLOY STEELS CAST IRON | | ALLOY STEELS TOOL STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc30 | | HRc30 ~ HRc45 | | HRc45 ~ HRc55 | | HRc55 ~ HRc65 | |
| STRENGTH | ~ 1000N/mm² | | 1000 ~ 1500N/mm² | | 1500 ~ 2000N/mm² | | 2000N/mm² ~ | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/8 | 4410 | 4.5 | 3570 | 3.9 | 2200 | 2.2 | 1890 | 1.2 |
| 3/16 | 3050 | 7.1 | 2420 | 5.5 | 1580 | 2.8 | 1260 | 1.6 |
| 1/4 | 2630 | 8.5 | 2100 | 7.1 | 1370 | 3.5 | 1160 | 2.0 |
| 5/16 | 2000 | 9.1 | 1580 | 7.1 | 1050 | 3.5 | 840 | 2.0 |
| 3/8 | 1680 | 9.1 | 1370 | 7.1 | 840 | 3.5 | 670 | 2.0 |
| 1/2 | 1370 | 7.1 | 1160 | 6.3 | 700 | 2.8 | 560 | 1.6 |
| 5/8 | 1160 | 6.3 | 890 | 4.9 | 560 | 2.4 | 440 | 1.4 |
| 3/4 | 840 | 4.5 | 680 | 3.5 | 420 | 1.8 | 340 | 1.0 |
| 1 | 670 | 4.5 | 540 | 3.5 | 340 | 1.8 | 270 | 1.0 |




RPM = rev./min.
FEED = inch/min.

# X-POWER END MILLS

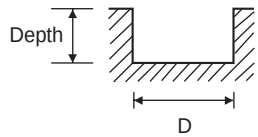
## RECOMMENDED CUTTING CONDITIONS

## CARBIDE, 2 FLUTE MINIATURE - SLOTTING

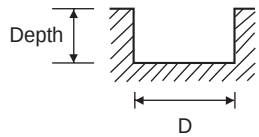
### EM959, EM810 SERIES

| MATERIAL | ALLOY STEELS TOOL STEELS | | HARDENED STEELS | |
|---|---|---|---|---|
| HARDNESS | HRc30 ~ HRc45 | | HRc45 ~ HRc55 | |
| STRENGTH | 1000 ~ 1500N/mm² | | 1500 ~ 2000N/mm² | |
| DIAMETER | RPM | FEED | RPM | FEED |
| .016 | 30000 | 7.10 | 23000 | 3.90 |
| .031 | 24000 | 11.80 | 18000 | 5.10 |
| .040 | 20000 | 12.60 | 15000 | 5.90 |
| .047 | 16000 | 12.60 | 12000 | 5.90 |
| .062 | 12000 | 11.80 | 9000 | 5.50 |

D < .040
Depth=0.15 × D
D ≧ .040
Depth=0.25 × D




D < .040
Depth=0.02 × D
D ≧ .040
Depth=0.05 × D

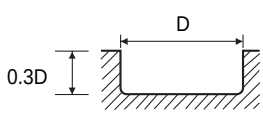


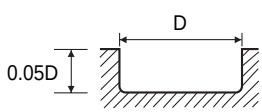

RPM = rev./min.
FEED = inch/min.

## CARBIDE, 2 FLUTE CORNER RADIUS - SLOTTING

### EM636, EM637, EM211 SERIES

| MATERIAL | CARBON STEELS ALLOY STEELS CAST IRON | | ALLOY STEELS TOOL STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc30 | | HRc30 ~ HRc50 | | HRc50 ~ HRc55 | | HRc55 ~ HRc65 | |
| STRENGTH | ~ 1000N/mm² | | 1000 ~ 1750N/mm² | | 1750 ~ 2000N/mm² | | 2000N/mm² ~ | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/4 | 2630 | 4.90 | 2100 | 4.20 | 1370 | 2.00 | 1160 | 1.40 |
| 5/16 | 2000 | 5.30 | 1580 | 4.20 | 1050 | 2.00 | 840 | 1.40 |
| 3/8 | 1680 | 5.30 | 1370 | 4.20 | 840 | 2.00 | 670 | 1.40 |
| 1/2 | 1370 | 4.20 | 1160 | 3.80 | 700 | 1.50 | 550 | 1.00 |



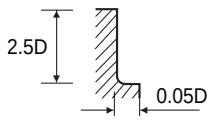



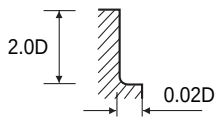

RPM = rev./min.
FEED = inch/min.

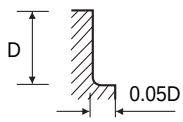
## CARBIDE, 4 FLUTE CORNER RADIUS - SIDE CUTTING

### EM639, EM649, EM212 SERIES

| MATERIAL | CARBON STEELS ALLOY STEELS CAST IRON | | ALLOY STEELS TOOL STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc30 | | HRc30 ~ HRc50 | | HRc50 ~ HRc55 | | HRc55 ~ HRc65 | |
| STRENGTH | ~ 1000N/mm² | | 1000 ~ 1750N/mm² | | 1750 ~ 2000N/mm² | | 2000N/mm² ~ | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/4 | 2630 | 8.50 | 2100 | 7.10 | 1370 | 3.30 | 1160 | 2.00 |
| 5/16 | 2000 | 9.00 | 1580 | 7.10 | 1050 | 3.30 | 840 | 2.00 |
| 3/8 | 1680 | 9.00 | 1370 | 7.10 | 840 | 3.30 | 670 | 2.00 |
| 1/2 | 1370 | 7.10 | 1160 | 6.30 | 700 | 2.80 | 550 | 1.50 |



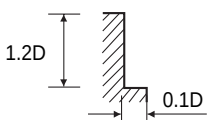



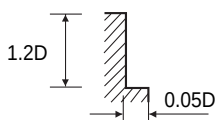

RPM = rev./min.
FEED = inch/min.

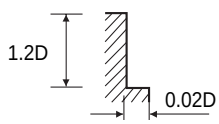
## CARBIDE, 4 FLUTE 45° HELIX - SIDE CUTTING

### EM102 SERIES

| MATERIAL | CARBON STEELS ALLOY STEELS CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | STAINLESS STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc30 | | HRc30 ~ HRc45 | | | | HRc45 ~ HRc55 | | HRc55 ~ HRc60 | |
| STRENGTH | ~ 1000N/mm² | | 1000 ~ 1500N/mm² | | | | 1500 ~ 2000N/mm² | | 2000N/mm² ~ | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 3/8 | 3010 | 31.50 | 2610 | 14.30 | 1600 | 7.70 | 1400 | 5.30 | 1000 | 2.60 |
| 1/2 | 2260 | 27.00 | 1950 | 12.30 | 1200 | 6.30 | 1050 | 4.60 | 750 | 2.00 |
| 5/8 | 1800 | 22.60 | 1560 | 10.10 | 960 | 5.10 | 840 | 4.10 | 600 | 1.70 |
| 3/4 | 1500 | 19.00 | 1300 | 8.50 | 800 | 4.50 | 700 | 3.90 | 500 | 1.60 |
| 7/8 | 1290 | 16.10 | 1120 | 7.60 | 690 | 4.50 | 600 | 3.90 | 430 | 1.60 |




RPM = rev./min.
FEED = inch/min.

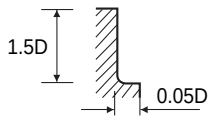
# X-POWER END MILLS

## RECOMMENDED CUTTING CONDITIONS

## CARBIDE, 4 FLUTE 45° HELIX CORNER RADIUS - SIDE CUTTING

### EM103, EM905 SERIES

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | STAINLESS STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc30 | | HRc30 ~ HRc45 | | | | HRc45 ~ HRc55 | | HRc55 ~ HRc65 | |
| STRENGTH | ~ 1000N/mm² | | 1000 ~ 1500N/mm² | | | | 1500 ~ 2000N/mm² | | 2000N/mm² ~ | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 3/8 | 7690 | 79.00 | 7690 | 48.00 | 5680 | 36.00 | 5680 | 29.00 | 3840 | 19.00 |
| 1/2 | 5760 | 79.00 | 5760 | 48.00 | 4260 | 36.00 | 4260 | 29.00 | 2880 | 19.00 |
| 5/8 | 4600 | 71.00 | 4600 | 48.00 | 3410 | 36.00 | 3410 | 29.00 | 2300 | 19.00 |
| 3/4 | 3850 | 60.00 | 3850 | 48.00 | 2840 | 36.00 | 2840 | 29.00 | 1920 | 19.00 |
| 7/8 | 3300 | 51.00 | 3300 | 48.00 | 2430 | 36.00 | 2430 | 29.00 | 1650 | 19.00 |

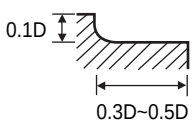


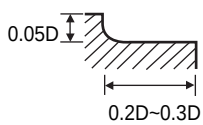

RPM = rev./min.
FEED = inch/min.

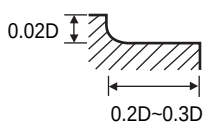
## CARBIDE, 4 FLUTE 45° HELIX CORNER RADIUS - CONTOURING

### EM103, EM905 SERIES

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | STAINLESS STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc30 | | HRc30 ~ HRc45 | | | | HRc45 ~ HRc55 | | HRc55 ~ HRc65 | |
| STRENGTH | ~ 1000N/mm² | | 1000 ~ 1500N/mm² | | | | 1500 ~ 2000N/mm² | | 2000N/mm² ~ | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 3/8 | 7690 | 45.00 | 5680 | 36.00 | 5680 | 31.00 | 5680 | 18.00 | 3840 | 11.00 |
| 1/2 | 5760 | 45.00 | 4260 | 36.00 | 4260 | 31.00 | 4260 | 18.00 | 2880 | 11.00 |
| 5/8 | 4600 | 45.00 | 3410 | 36.00 | 3410 | 31.00 | 3410 | 18.00 | 2300 | 11.00 |
| 3/4 | 4850 | 45.00 | 2840 | 36.00 | 2840 | 31.00 | 2840 | 18.00 | 1920 | 11.00 |
| 7/8 | 3300 | 45.00 | 2430 | 36.00 | 2430 | 31.00 | 2430 | 18.00 | 1650 | 11.00 |



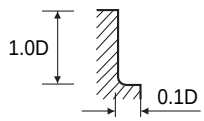




RPM = rev./min.
FEED = inch/min.

## CARBIDE, 4 FLUTE 55° HELIX CORNER RADIUS - SIDE CUTTING

### EM965 SERIES

| MATERIAL | ALLOY STEELS HEAT RESISTANT STEELS | | STAINLESS STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|---|---|
| HARDNESS | HRc30 ~ HRc40 | | | | HRc40 ~ HRc50 | | HRc50 ~ HRc65 | |
| STRENGTH | 1000 ~ 1250N/mm² | | | | 1250 ~ 1700N/mm² | | 1500N/mm² ~ | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/8 | 21000 | 32.00 | 13000 | 21.00 | 13000 | 9.50 | 7300 | 9.50 |
| 3/16 | 18000 | 56.00 | 11000 | 33.00 | 11000 | 9.50 | 4800 | 9.50 |
| 1/4 | 13000 | 66.00 | 7500 | 40.00 | 7500 | 13.00 | 4200 | 9.50 |
| 5/16 | 9500 | 61.00 | 6500 | 39.00 | 6500 | 17.00 | 3200 | 9.50 |
| 3/8 | 7700 | 48.00 | 5700 | 39.00 | 5700 | 22.00 | 3850 | 12.00 |
| 1/2 | 5800 | 48.00 | 4260 | 39.00 | 4260 | 25.00 | 2900 | 15.00 |
| 5/8 | 4200 | 48.00 | 3100 | 39.00 | 3100 | 29.00 | 2100 | 19.00 |

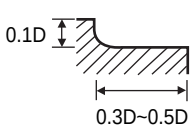


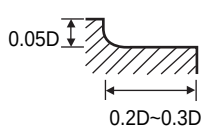

RPM = rev./min.
FEED = inch/min.

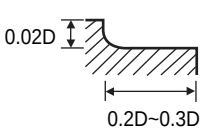
## CARBIDE, 4 FLUTE 55° HELIX CORNER RADIUS - CONTOURING

### EM965 SERIES

| MATERIAL | ALLOY STEELS HEAT RESISTANT STEELS | | STAINLESS STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|---|---|
| HARDNESS | HRc30 ~ HRc40 | | | | HRc40 ~ HRc50 | | HRc50 ~ HRc65 | |
| STRENGTH | 1000 ~ 1250N/mm² | | | | 1250 ~ 1700N/mm² | | 1500N/mm² ~ | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/8 | 21000 | 24 | 13000 | 18 | 13000 | 6 | 7300 | 5.5 |
| 3/16 | 18000 | 42 | 11000 | 29 | 11000 | 6 | 4800 | 5.5 |
| 1/4 | 13000 | 50 | 7500 | 35 | 7500 | 8 | 4200 | 5.5 |
| 5/16 | 9500 | 46 | 6500 | 34 | 6500 | 10 | 3200 | 5.5 |
| 3/8 | 7700 | 36 | 5700 | 34 | 5700 | 12 | 3850 | 7.5 |
| 1/2 | 5800 | 36 | 4260 | 34 | 4260 | 15 | 2900 | 9.5 |
| 5/8 | 4200 | 36 | 3100 | 34 | 3100 | 18 | 2100 | 11.5 |




RPM = rev./min.
FEED = inch/min.

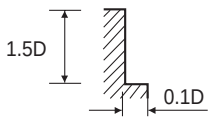
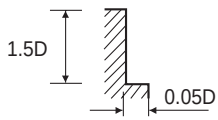
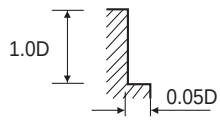
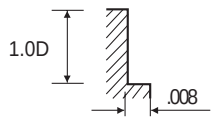
# X-POWER END MILLS

## RECOMMENDED CUTTING CONDITIONS

## CARBIDE, 6&8 FLUTE 45° HELIX LONG LENGTH - SIDE CUTTING

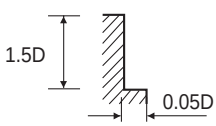
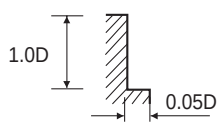
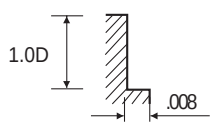
### EM208, EM812 SERIES

### ■ NORMAL SPEED

| MATERIAL | CARBON STEELS ALLOY STEELS CAST IRON | | ALLOY STEELS TOOL STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~HRc30 | | HRc30 ~ HRc50 | | HRc50 ~ HRc55 | | HRc60 ~ HRc65 | |
| STRENGTH | ~1000N/mm² | | 1000 ~ 1750N/mm² | | 1750 ~ 2080N/mm² | | 2080N/mm² ~ | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/4 | 5560 | 79.00 | 3880 | 54.00 | 1580 | 8.25 | 1100 | 5.10 |
| 5/16 | 4200 | 79.00 | 2940 | 54.00 | 1160 | 8.25 | 840 | 5.10 |
| 3/8 | 3360 | 79.00 | 2320 | 54.00 | 1000 | 8.25 | 680 | 5.10 |
| 1/2 | 2840 | 66.00 | 2000 | 46.00 | 840 | 7.10 | 560 | 4.35 |
| 5/8 | 2100 | 50.00 | 1480 | 35.00 | 640 | 5.10 | 420 | 2.75 |
| 3/4 | 1680 | 40.00 | 1160 | 27.00 | 500 | 4.35 | 320 | 2.35 |
| 1 | 1260 | 25.00 | 870 | 17.50 | 375 | 3.00 | 240 | 1.54 |
| |  | |  | |  | |  | |

RPM = rev./min.
FEED = inch/min.

### ■ HIGH SPEED

| MATERIAL | CARBON STEELS TOOL STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|
| HARDNESS | ~HRc50 | | HRc50 ~ HRc60 | | HRc60 ~ | |
| STRENGTH | ~1750N/mm² | | 1750N/mm² | | 1750N/mm² ~ | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/4 | 16800 | 240.00 | 8400 | 120.00 | 4200 | 58.00 |
| 5/16 | 12600 | 240.00 | 6300 | 120.00 | 3160 | 58.00 |
| 3/8 | 9980 | 235.00 | 5040 | 120.00 | 2520 | 58.00 |
| 1/2 | 8400 | 199.00 | 4200 | 100.00 | 2100 | 50.00 |
| 5/8 | 6300 | 149.00 | 3160 | 75.00 | 1580 | 37.00 |
| 3/4 | 5040 | 120.00 | 2520 | 58.00 | 1260 | 30.00 |
| 1 | 3790 | 75.00 | 1890 | 38.00 | 950 | 19.00 |
| |  | |  | |  | |

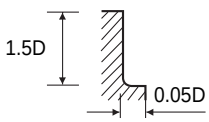
RPM = rev./min.
FEED = inch/min.

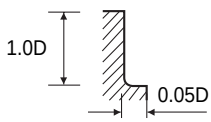
## CARBIDE, 6&8 FLUTE 45° HELIX CORNER RADIUS - SIDE CUTTING

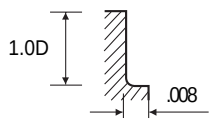
### EM668, EM835 SERIES

■ HIGH SPEED

| MATERIAL | CARBON STEELS ALLOY STEELS CAST IRON | | ALLOY STEELS TOOL STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc50 | | HRc50 ~ HRc60 | | HRc60 ~ HRc65 | |
| STRENGTH | ~ 1750N/mm² | | 1750 ~ 2080N/mm² | | 2080N/mm² ~ | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/4 | 16800 | 240.00 | 8400 | 120.00 | 4200 | 58.00 |
| 5/16 | 12600 | 240.00 | 6300 | 120.00 | 3200 | 58.00 |
| 3/8 | 10000 | 235.00 | 5000 | 120.00 | 2500 | 58.00 |
| 1/2 | 8400 | 200.00 | 4200 | 100.00 | 2100 | 50.00 |
| 5/8 | 6300 | 150.00 | 3150 | 75.00 | 1600 | 37.00 |
| 3/4 | 5000 | 120.00 | 2500 | 58.00 | 1260 | 30.00 |



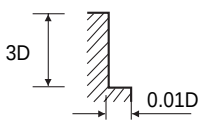



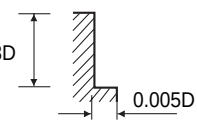

RPM = rev./min.
FEED = inch/min.

## CARBIDE, 6&8 FLUTE 45° HELIX EXTRA LONG LENGTH - SIDE CUTTING

### EM218, EM812, EM834 SERIES

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~HRc40 | | HRc40 ~ HRc50 | | HRc50 ~ HRc60 | | HRc60 ~ HRc65 | |
| STRENGTH | ~1250N/mm² | | 1250 ~ 1750N/mm² | | 1750 ~ 2080N/mm² | | 2080N/mm² ~ | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/4 | 2230 | 19.00 | 1670 | 14.00 | 1390 | 10.00 | 1110 | 8.00 |
| 5/16 | 1670 | 18.00 | 1250 | 13.00 | 1050 | 9.50 | 840 | 7.00 |
| 3/8 | 1330 | 17.00 | 1000 | 12.00 | 840 | 9.00 | 680 | 6.30 |
| 1/2 | 1110 | 16.00 | 840 | 11.00 | 690 | 8.50 | 560 | 6.00 |
| 5/8 | 840 | 13.00 | 630 | 9.00 | 530 | 6.50 | 420 | 5.00 |
| 3/4 | 670 | 11.00 | 500 | 8.00 | 420 | 6.00 | 320 | 4.70 |
| 1 | 540 | 9.50 | 400 | 6.50 | 340 | 5.00 | 270 | 3.70 |




RPM = rev./min.
FEED = inch/min.

# X-POWER END MILLS

## RECOMMENDED CUTTING CONDITIONS

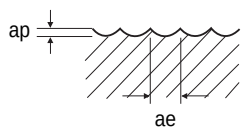
## CARBIDE, 2 FLUTE BALL NOSE

## EM209, EM876, EM813, EM824 SERIES

### ■ NORMAL SPEED

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc30 | | HRc30 ~ HRc40 | | HRc45 ~ HRc65 | |
| STRENGTH | ~ 1000N/mm² | | 1000 ~ 1250N/mm² | | 1500N/mm² ~ | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED |
| R1/64 × 1/32 | 15760 | 9.80 | 12720 | 7.80 | 5800 | 3.50 |
| R1/32 × 1/16 | 15760 | 13.80 | 12140 | 10.60 | 5320 | 4.70 |
| R3/64 × 3/32 | 14400 | 29.50 | 10700 | 19.30 | 4680 | 5.90 |
| R1/16 × 1/8 | 13100 | 26.70 | 10000 | 18.10 | 4520 | 5.90 |
| R3/32 × 3/16 | 9140 | 32.30 | 7300 | 22.80 | 3680 | 7.10 |
| R1/8 × 1/4 | 7780 | 33.00 | 6300 | 24.80 | 3160 | 7.50 |
| R5/32 × 5/16 | 5260 | 37.50 | 4420 | 26.00 | 2100 | 7.50 |
| R3/16 × 3/8 | 4620 | 40.10 | 3780 | 28.00 | 1780 | 7.50 |
| R1/4 × 1/2 | 3780 | 35.40 | 2940 | 26.00 | 1360 | 7.50 |
| R5/16 × 5/8 | 2740 | 36.20 | 2320 | 26.00 | 1160 | 7.50 |
| R3/8 × 3/4 | 2100 | 33.00 | 1900 | 25.00 | 840 | 7.50 |

ap: D1/32~D1/4 =.008″
D5/16~D3/4=.012″
ae: 0.2×D



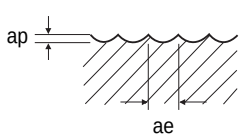

ap: D1/32~D1/4 =.008″
D5/16~D3/4 =.012″
ae: 0.1×D

RPM = rev./min.
FEED = inch/min.

### ■ HIGH SPEED

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS CAST IRON | | HARDENED STEELS | |
|---|---|---|---|---|
| HARDNESS | ~ HRc45 | | HRc45 ~ HRc65 | |
| STRENGTH | ~ 1500N/mm² | | 1500N/mm² ~ | |
| DIAMETER | RPM | FEED | RPM | FEED |
| R1/64 × 1/32 | 25000 | 25.60 | 25000 | 15.70 |
| R1/32 × 1/16 | 23000 | 27.50 | 23000 | 16.90 |
| R3/64 × 3/32 | 21000 | 34.60 | 19000 | 19.30 |
| R1/16 × 1/8 | 21000 | 39.40 | 17000 | 20.50 |
| R3/32 × 3/16 | 21000 | 70.90 | 12000 | 23.60 |
| R1/8 × 1/4 | 21000 | 90.90 | 10500 | 24.80 |
| R5/32 × 5/16 | 15760 | 111.80 | 7880 | 29.10 |
| R3/16 × 3/8 | 13660 | 120.00 | 6300 | 33.00 |
| R1/4 × 1/2 | 10500 | 103.50 | 5260 | 33.00 |
| R5/16 × 5/8 | 8200 | 103.50 | 3780 | 28.00 |
| R3/8 × 3/4 | 6300 | 99.00 | 2940 | 20.80 |

ap: D1/32~D1/4 =.008″
D5/16~D3/4=.012″
ae: 0.05×D




RPM = rev./min.
FEED = inch/min.

# X-POWER END MILLS

## RECOMMENDED CUTTING CONDITIONS

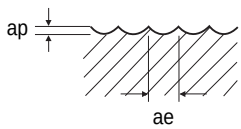
## CARBIDE, 4 FLUTE BALL NOSE

## EM210, EM815, EM825 SERIES

### ■ NORMAL SPEED

| MATERIAL | CARBON STEELS ALLOY STEELS CAST IRON | | ALLOY STEELS TOOL STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc30 | | HRc30 ~ HRc40 | | HRc45 ~ HRc65 | |
| STRENGTH | ~ 1000N/mm² | | 1000 ~ 1250N/mm² | | 1500N/mm² ~ | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED |
| R1/16 × 1/8 | 13100 | 40.10 | 10000 | 27.00 | 4520 | 8.85 |
| R3/32 × 3/16 | 9140 | 48.50 | 7300 | 34.00 | 3680 | 10.50 |
| R1/8 × 1/4 | 7780 | 49.50 | 6300 | 37.00 | 3160 | 11.25 |
| R5/32 × 5/16 | 5260 | 56.00 | 4420 | 39.00 | 2100 | 11.25 |
| R3/16 × 3/8 | 4620 | 60.00 | 3780 | 42.00 | 1780 | 11.25 |
| R1/4 × 1/2 | 3780 | 53.00 | 2940 | 39.00 | 1360 | 11.25 |
| R5/16 × 5/8 | 2740 | 54.50 | 2320 | 38.50 | 1160 | 11.25 |

ap: D1/8~D1/4 =.008″
D5/16~D5/8=.012″
ae: 0.2×D



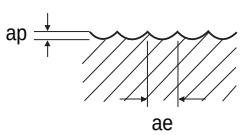

ap: D1/8~D1/4 =.008″
D5/16~D5/8 =.012″
ae: 0.1×D

RPM = rev./min.
FEED = inch/min.

### ■ HIGH SPEED

| MATERIAL | CARBON STEELS ALLOY STEELS CAST IRON | | ALLOY STEELS TOOL STEELS | |
|---|---|---|---|---|
| HARDNESS | ~ HRc45 | | HRc45 ~ HRc65 | |
| STRENGTH | ~ 1500N/mm² | | 1500N/mm² ~ | |
| DIAMETER | RPM | FEED | RPM | FEED |
| R1/16 × 1/8 | 21000 | 59.00 | 17000 | 30.50 |
| R3/32 × 3/16 | 21000 | 106.25 | 12000 | 35.50 |
| R1/8 × 1/4 | 21000 | 136.50 | 10500 | 37.00 |
| R5/32 × 5/16 | 15760 | 167.50 | 7880 | 43.50 |
| R3/16 × 3/8 | 13660 | 180.00 | 6300 | 49.50 |
| R1/4 × 1/2 | 10500 | 155.50 | 5260 | 49.50 |
| R5/16 × 5/8 | 8200 | 155.50 | 3780 | 42.00 |

ap: D1/8~D1/4 =.008″
D5/16~D5/8=.012″
ae: 0.05×D




RPM = rev./min.
FEED = inch/min.

# X-POWER END MILLS

## RECOMMENDED CUTTING CONDITIONS

## CARBIDE, 2 FLUTE MEDIUM LENGTH BALL NOSE

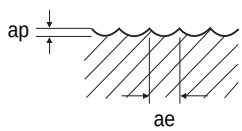
### EM961, EM899 SERIES

### ■ NORMAL SPEED

| MATERIAL | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|
| HARDNESS | HRc30 ~ HRc40 | | HRc45 ~ HRc50 | | HRc50 ~ HRc55 | |
| STRENGTH | 1000 ~ 1250N/mm² | | 1500 ~ 1750N/mm² | | 1750 ~ 2000N/mm² | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED |
| R1/16 × 1/8 | 10000 | 18.10 | 12700 | 43.30 | 12300 | 41.30 |
| R3/32 × 3/16 | 7300 | 22.80 | 9400 | 43.30 | 9050 | 41.30 |
| R1/8 × 1/4 | 6300 | 24.80 | 8600 | 45.30 | 8250 | 43.30 |
| R5/32 × 5/16 | 4420 | 26.00 | 7000 | 41.30 | 6700 | 39.40 |
| R3/16 × 3/8 | 3780 | 28.00 | 6050 | 39.40 | 5800 | 37.80 |
| R1/4 × 1/2 | 2940 | 26.00 | 5450 | 39.40 | 5200 | 37.80 |
| R5/16 × 5/8 | 2320 | 26.00 | 4350 | 34.30 | 4150 | 32.70 |
| R3/8 × 3/4 | 1900 | 25.00 | 3500 | 27.20 | 3300 | 25.60 |
| R1/2 × 1 | 1520 | 25.00 | 2800 | 27.20 | 2650 | 25.60 |

ap: D1/8~D1/4 =.008″
D5/16~D1 =.012″
ae: 0.2×D

ap: D1/8 = .006″
D3/16~D5/16 = .010″
D3/8~D1 = .012″
ae: 0.1×D



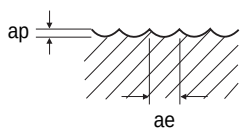

RPM = rev./min.
FEED = inch/min.

### ■ HIGH SPEED

| MATERIAL | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc45 | | HRc45 ~ HRc50 | | HRc50 ~ HRc55 | |
| STRENGTH | 1000 ~ 1250N/mm² | | 1500 ~ 1750N/mm² | | 1750 ~ 2000N/mm² | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED |
| R1/16 × 1/8 | 21000 | 39.40 | 12700 | 68.90 | 12300 | 65.70 |
| R3/32 × 3/16 | 21000 | 70.90 | 9400 | 65.00 | 9050 | 61.80 |
| R1/8 × 1/4 | 21000 | 90.90 | 8600 | 69.00 | 8250 | 65.70 |
| R5/32 × 5/16 | 15760 | 111.80 | 7000 | 61.00 | 6700 | 57.50 |
| R3/16 × 3/8 | 13660 | 120.10 | 6050 | 57.10 | 5800 | 53.50 |
| R1/4 × 1/2 | 10500 | 103.50 | 5450 | 55.90 | 5200 | 52.40 |
| R5/16 × 5/8 | 8200 | 103.50 | 4350 | 48.40 | 4150 | 44.50 |
| R3/8 × 3/4 | 6300 | 99.20 | 3500 | 39.40 | 3300 | 35.40 |
| R1/2 × 1 | 5040 | 99.20 | 2800 | 39.40 | 2650 | 35.40 |

ap: D1/8~D1/4 =.008″
D5/16~D1 =.012″
ae: 0.05×D

ap: D1/8 = .006″
D3/16~D5/16 = .010″
D3/8~D1 = .012″
ae: 0.05×D




RPM = rev./min.
FEED = inch/min.

# X-POWER END MILLS — RECOMMENDED CUTTING CONDITIONS

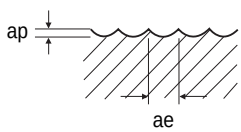
## CARBIDE, 2 FLUTE LONG REACH BALL NOSE

### EM962, EM838 SERIES

### ■ NORMAL SPEED

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc30 | | HRc30 ~ HRc40 | | HRc45 ~ HRc65 | |
| STRENGTH | ~ 1000N/mm² | | 1000 ~ 1250N/mm² | | 1500N/mm² ~ | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED |
| R3/64 × 3/32 | 12600 | 16.50 | 9250 | 10.20 | 3870 | 3.50 |
| R1/16 × 1/8 | 10500 | 21.30 | 8000 | 14.60 | 3620 | 4.70 |
| R3/32 × 3/16 | 7310 | 26.00 | 5840 | 18.10 | 2940 | 5.50 |
| R1/8 × 1/4 | 6220 | 26.40 | 5040 | 19.70 | 2530 | 5.90 |
| R5/32 × 5/16 | 4210 | 29.90 | 3540 | 20.70 | 1680 | 5.90 |
| R3/16 × 3/8 | 3700 | 32.30 | 3020 | 22.40 | 1420 | 5.90 |
| R1/4 × 1/2 | 3020 | 28.30 | 2350 | 20.90 | 1090 | 5.90 |
| R5/16 × 5/8 | 2190 | 29.10 | 1860 | 20.50 | 930 | 5.90 |
| R3/8 × 3/4 | 1680 | 26.40 | 1520 | 19.70 | 670 | 5.90 |

ap: D3/32~D1/4 =.008″
D5/16~D3/4=.012″
ae: 0.2×D



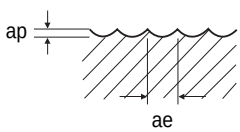

ap: D3/32~D1/4 =.008″
D5/16~D3/4 =.012″
ae: 0.1×D

RPM = rev./min.
FEED = inch/min.

### ■ HIGH SPEED

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS CAST IRON | | HARDENED STEELS | |
|---|---|---|---|---|
| HARDNESS | ~ HRc45 | | HRc45 ~ HRc65 | |
| STRENGTH | ~ 1500N/mm² | | 1500N/mm² ~ | |
| DIAMETER | RPM | FEED | RPM | FEED |
| R3/64 × 3/32 | 16800 | 23.20 | 16800 | 15.00 |
| R1/16 × 1/8 | 16800 | 31.50 | 13600 | 16.50 |
| R3/32 × 3/16 | 16800 | 56.70 | 9600 | 18.90 |
| R1/8 × 1/4 | 16800 | 72.80 | 8400 | 19.70 |
| R5/32 × 5/16 | 12610 | 89.40 | 6300 | 23.20 |
| R3/16 × 3/8 | 10930 | 96.10 | 5040 | 26.40 |
| R1/4 × 1/2 | 8400 | 82.70 | 4210 | 26.40 |
| R5/16 × 5/8 | 6560 | 82.70 | 3020 | 22.40 |
| R3/8 × 3/4 | 5040 | 79.50 | 2350 | 16.50 |

ap: D3/32~D1/4 =.008″
D5/16~D3/4=.012″
ae: 0.05×D




RPM = rev./min.
FEED = inch/min.

# X-POWER END MILLS

## RECOMMENDED CUTTING CONDITIONS

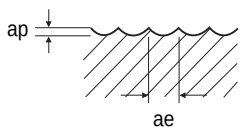
## CARBIDE, 2 FLUTE BALL NOSE for OVER HRc55

### EM109, EM868 SERIES

### ■ NORMAL SPEED

| MATERIAL | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|---|---|
| HARDNESS | HRc45 ~ HRc50 | | HRc50 ~ HRc55 | | HRc55 ~ HRc60 | | HRc60 ~ HRc70 | |
| STRENGTH | 1500 ~ 1750N/mm² | | 1750 ~ 2000N/mm² | | 2000 ~ 2080N/mm² | | 2080N/mm² ~ | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| R1/16 × 1/8 | 12700 | 43.30 | 12300 | 41.30 | 11800 | 39.40 | 8400 | 26.00 |
| R3/32 × 3/16 | 9400 | 43.30 | 9050 | 41.30 | 8600 | 37.40 | 5600 | 26.80 |
| R1/8 × 1/4 | 8600 | 45.30 | 8250 | 43.30 | 7850 | 37.40 | 4850 | 27.60 |
| R5/32 × 5/16 | 7000 | 41.30 | 6700 | 39.40 | 6350 | 37.40 | 3800 | 25.60 |
| R3/16 × 3/8 | 6050 | 39.40 | 5800 | 37.80 | 5450 | 35.40 | 3200 | 24.40 |
| R1/4 × 1/2 | 5450 | 39.40 | 5200 | 37.80 | 4900 | 35.40 | 2750 | 24.00 |
| R5/16 × 5/8 | 4350 | 34.30 | 4150 | 32.70 | 3900 | 32.30 | 2150 | 10.40 |
| R3/8 × 3/4 | 3500 | 27.20 | 3300 | 25.60 | 3150 | 24.80 | 1700 | 8.70 |
| R1/2 × 1 | 2800 | 27.20 | 2650 | 25.60 | 2520 | 24.80 | 1360 | 8.70 |

ap: D1/8 =.006″
D3/16 ~ D5/16=.010″
D3/8 ~ D1=.012″
ae: 0.1 × D

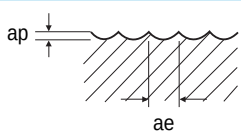



RPM = rev./min.
FEED = inch/min.

### ■ HIGH SPEED

| MATERIAL | HARDENED STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|
| HARDNESS | HRc45 ~ HRc50 | | HRc50 ~ HRc55 | | HRc55 ~ HRc70 | |
| STRENGTH | 1500 ~ 1750N/mm² | | 1750 ~ 2000N/mm² | | 2000 ~ 2080N/mm² | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED |
| R1/16 × 1/8 | 12700 | 68.90 | 12300 | 65.70 | 11800 | 33.90 |
| R3/32 × 3/16 | 9400 | 65.00 | 9050 | 61.80 | 8600 | 29.50 |
| R1/8 × 1/4 | 8600 | 68.90 | 8250 | 65.70 | 7850 | 27.60 |
| R5/32 × 5/16 | 7000 | 61.00 | 6700 | 57.50 | 6350 | 25.60 |
| R3/16 × 3/8 | 6050 | 57.10 | 5800 | 53.50 | 5450 | 24.40 |
| R1/4 × 1/2 | 5450 | 55.90 | 5200 | 52.40 | 4900 | 24.00 |
| R5/16 × 5/8 | 4350 | 48.40 | 4150 | 44.50 | 3900 | 10.40 |
| R3/8 × 3/4 | 3500 | 39.40 | 3300 | 35.40 | 3150 | 8.70 |
| R1/2 × 1 | 2800 | 39.40 | 2640 | 35.40 | 2520 | 8.70 |

ap: D1/8 = .006″
D3/16~D5/16 = .010″
D3/8~D1 = .012″
ae: 0.05 × D




RPM = rev./min.
FEED = inch/min.

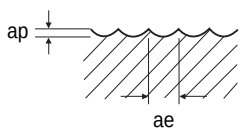
# X-POWER END MILLS

## RECOMMENDED CUTTING CONDITIONS

## CARBIDE, 2 FLUTE BALL NOSE with TAPER NECK

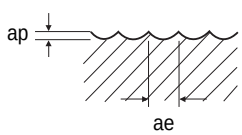
## EM963, EM902 SERIES

### ■ NORMAL SPEED

| MATERIAL | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|
| HARDNESS | HRc30 ~ HRc40 | | HRc45 ~ HRc50 | | HRc50 ~ HRc55 | |
| STRENGTH | 1000 ~ 1250N/mm² | | 1250 ~ 1750N/mm² | | 1750 ~ 2000N/mm² | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED |
| R1/32 × 1/16 | 97000 | 8.30 | 13800 | 19.90 | 13600 | 17.90 |
| R1/16 × 1/8 | 8000 | 14.60 | 10200 | 34.60 | 9800 | 33.50 |
| R3/32 × 3/16 | 5840 | 18.10 | 7500 | 34.60 | 7200 | 33.50 |
| R1/8 × 1/4 | 5040 | 19.70 | 6900 | 36.20 | 6500 | 34.60 |
| R5/32 × 5/16 | 3540 | 20.90 | 5600 | 33.10 | 5300 | 31.50 |
| R3/16 × 3/8 | 3020 | 22.40 | 4850 | 31.50 | 4650 | 30.30 |
| R1/4 × 1/2 | 2350 | 20.90 | 4350 | 31.50 | 4150 | 30.30 |
| | ap: D1/16~D1/4 =.008″<br>D5/16~D1/2 =.012″<br>ae: 0.2×D | | ap: D1/16~D1/8 = 0.05″×D<br>D3/16~D5/16 = .010″<br>D3/8~D1/2 = .012″<br>ae: 0.1×D | |  | |

RPM = rev./min.
FEED = inch/min.

### ■ HIGH SPEED

| MATERIAL | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc45 | | HRc45 ~ HRc50 | | HRc50 ~ HRc55 | |
| STRENGTH | 1500N/mm² | | 1250 ~ 1750N/mm² | | 1750 ~ 2000N/mm² | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED |
| R1/32 × 1/16 | 18400 | 21.90 | 13800 | 28.90 | 13600 | 30.10 |
| R1/16 × 1/8 | 16800 | 31.50 | 10200 | 55.10 | 9800 | 51.20 |
| R3/32 × 3/16 | 16800 | 56.70 | 7500 | 52.00 | 7200 | 49.20 |
| R1/8 × 1/4 | 16800 | 72.80 | 6900 | 55.10 | 6500 | 53.10 |
| R5/32 × 5/16 | 12600 | 89.40 | 5600 | 49.20 | 5300 | 45.30 |
| R3/16 × 3/8 | 10930 | 96.10 | 4850 | 45.30 | 4650 | 43.30 |
| R1/4 × 1/2 | 8400 | 82.70 | 4350 | 44.50 | 4150 | 41.30 |
| | ap: D1/16~D1/4 =.008″<br>D5/16~D1/2 =.012″<br>ae: 0.05×D | | ap: D1/16~D1/8 = 0.05″×D<br>D3/16~D5/16 = .010″<br>D3/8~D1/2 = .012″<br>ae: 0.05×D | |  | |

RPM = rev./min.
FEED = inch/min.

# X-POWER END MILLS — RECOMMENDED CUTTING CONDITIONS

## CARBIDE, 2 FLUTE BALL NOSE with PENCIL NECK

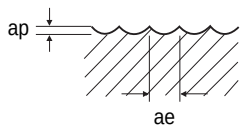
### EM979 SERIES

### ■ NORMAL SPEED

| MATERIAL | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|
| HARDNESS | HRc30 ~ HRc40 | | HRc45 ~ HRc50 | | HRc50 ~ HRc55 | |
| STRENGTH | 1000 ~ 1250N/mm² | | 1250 ~ 1750N/mm² | | 1750 ~ 2000N/mm² | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED |
| R3/32 × 3/16 | 4670 | 14.50 | 6000 | 27.70 | 5760 | 26.80 |
| R1/8 × 1/4 | 4030 | 15.80 | 5520 | 29.00 | 5200 | 27.70 |
| R5/32 × 5/16 | 2830 | 16.70 | 4480 | 26.50 | 4240 | 25.20 |
| R3/16 × 3/8 | 2420 | 17.90 | 3880 | 25.20 | 3720 | 24.20 |
| R1/4 × 1/2 | 1880 | 16.70 | 3480 | 25.20 | 3320 | 24.20 |

ap: D3/16~D1/4 =.008″
D5/16~D1/2 =.012″
ae: 0.2×D

ap: D3/16~D5/16 = .010″
D3/8~D1/2 = .012″
ae: 0.1×D



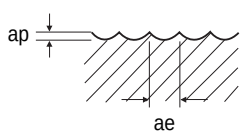

RPM = rev./min.
FEED = inch/min.

### ■ HIGH SPEED

| MATERIAL | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc45 | | HRc45 ~ HRc50 | | HRc50 ~ HRc55 | |
| STRENGTH | 1500N/mm² | | 1250 ~ 1750N/mm² | | 1750 ~ 2000N/mm² | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED |
| R3/32 × 3/16 | 13440 | 45.40 | 6000 | 41.60 | 5760 | 39.40 |
| R1/8 × 1/4 | 13440 | 58.20 | 5520 | 44.10 | 5200 | 42.50 |
| R5/32 × 5/16 | 10080 | 71.50 | 4480 | 39.40 | 4240 | 36.20 |
| R3/16 × 3/8 | 8740 | 76.90 | 3880 | 36.30 | 3720 | 34.60 |
| R1/4 × 1/2 | 6720 | 66.20 | 3480 | 35.60 | 3320 | 33.00 |

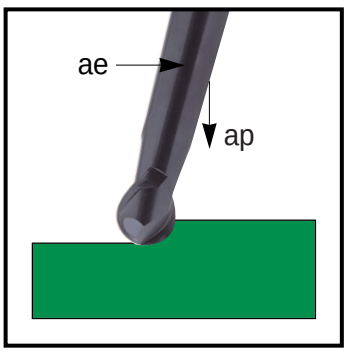
ap: D3/16~D1/4 =.008″
D5/16~D1/2 =.012″
ae: 0.05×D

ap: D3/16~D5/16 = .010″
D3/8~D1/2 = .012″
ae: 0.05×D




RPM = rev./min.
FEED = inch/min.

## CARBIDE, 2 FLUTE BALL NOSE - MMC




# RECOMMENDED CUTTING CONDITIONS

- ap=0.02×D1
- ae=0.05×D1

## EM084, EM096, EM669, EM863 SERIES

### ■ NORMAL SPEED

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS CAST IRON | | ALLOYED STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|
| HARDNESS | ~HRc30 | | HRc30 ~ HRc40 | | HRc45 ~ HRc65 | |
| STRENGTH | ~1000N/mm² | | 1000 ~ 1250N/mm² | | 1500N/mm² | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED |
| R1/16 × 1/8 | 35000 | 110.20 | 33000 | 102.40 | 12000 | 35.43 |
| R5/64 × 5/32 | 26000 | 90.55 | 25000 | 86.61 | 9000 | 31.50 |
| R3/32 × 3/16 | 21000 | 82.68 | 20000 | 78.74 | 7000 | 27.56 |
| R1/8 × 1/4 | 17000 | 74.80 | 16000 | 70.87 | 6000 | 25.60 |
| R5/32 × 5/16 | 13000 | 66.93 | 12000 | 62.99 | 4500 | 21.65 |
| R3/16 × 3/8 | 10500 | 57.09 | 10000 | 55.12 | 3500 | 19.69 |
| R1/4 × 1/2 | 9000 | 55.12 | 8000 | 51.18 | 3000 | 17.72 |
| R5/16 × 5/8 | 6000 | 47.24 | 5500 | 43.31 | 2000 | 15.75 |

RPM = rev./min.
FEED = inch/min.

### ■ NORMAL SPEED

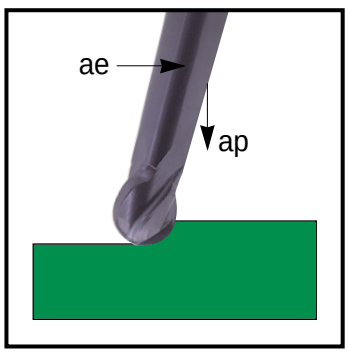
| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS CAST IRON | | ALLOYED STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|
| HARDNESS | ~HRc30 | | HRc30 ~ HRc40 | | HRc45 ~ HRc65 | |
| STRENGTH | ~1000N/mm² | | 1000 ~ 1250N/mm² | | 1500N/mm² | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED |
| R1/16 × 1/8 | 47000 | 145.70 | 44000 | 137.80 | 17000 | 55.12 |
| R5/64 × 5/32 | 35000 | 126.00 | 33000 | 118.10 | 13000 | 47.24 |
| R3/32 × 3/16 | 28000 | 110.20 | 27000 | 102.40 | 10000 | 43.31 |
| R1/8 × 1/4 | 23000 | 102.40 | 22000 | 94.49 | 8000 | 37.40 |
| R5/32 × 5/16 | 18000 | 90.55 | 17000 | 82.68 | 6000 | 33.46 |
| R3/16 × 3/8 | 14000 | 78.74 | 13000 | 74.80 | 5000 | 29.53 |
| R1/4 × 1/2 | 12000 | 70.87 | 11000 | 70.87 | 4000 | 27.56 |
| R5/16 × 5/8 | 9000 | 62.99 | 8000 | 59.06 | 3300 | 23.62 |

RPM = rev./min.
FEED = inch/min.

# X-POWER END MILLS

## RECOMMENDED CUTTING CONDITIONS

## CARBIDE, 4 FLUTE BALL NOSE - MMC




# RECOMMENDED CUTTING CONDITIONS

- ap=0.02×D1
- ae=0.05×D1

## EM093, EM097, EM673, EM864 SERIES

### ■ NORMAL SPEED

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS CAST IRON | | ALLOYED STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|
| HARDNESS | ~HRc30 | | HRc30 ~ HRc40 | | HRc45 ~ HRc65 | |
| STRENGTH | ~1000N/mm² | | 1000 ~ 1250N/mm² | | 1500N/mm² | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED |
| R3/32 × 3/16 | 21000 | 157.50 | 20000 | 157.50 | 7000 | 55.12 |
| R1/8 × 1/4 | 17000 | 157.50 | 16000 | 137.80 | 6000 | 51.18 |
| R5/32 × 5/16 | 13000 | 137.80 | 12000 | 118.10 | 4500 | 43.31 |
| R3/16 × 3/8 | 10500 | 118.10 | 10000 | 98.43 | 3500 | 39.37 |
| R1/4 × 1/2 | 9000 | 110.20 | 8000 | 98.43 | 3000 | 37.40 |
| R5/16 × 5/8 | 6000 | 110.20 | 5500 | 86.61 | 2000 | 31.50 |

RPM = rev./min.
FEED = inch/min.

### ■ NORMAL SPEED

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS CAST IRON | | ALLOYED STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|
| HARDNESS | ~HRc30 | | HRc30 ~ HRc40 | | HRc45 ~ HRc65 | |
| STRENGTH | ~1000N/mm² | | 1000 ~ 1250N/mm² | | 1500N/mm² | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED |
| R3/32 × 3/16 | 28000 | 220.50 | 27000 | 208.70 | 11000 | 82.68 |
| R1/8 × 1/4 | 23000 | 200.10 | 22000 | 192.90 | 9000 | 74.80 |
| R5/32 × 5/16 | 18000 | 181.10 | 17000 | 169.30 | 7000 | 66.93 |
| R3/16 × 3/8 | 14000 | 153.50 | 13000 | 145.70 | 5000 | 55.12 |
| R1/4 × 1/2 | 12000 | 145.70 | 11000 | 137.80 | 4500 | 51.18 |
| R5/16 × 5/8 | 9000 | 122.00 | 8000 | 118.10 | 3300 | 43.31 |

RPM = rev./min.
FEED = inch/min.

# X-POWER END MILLS

## RECOMMENDED CUTTING CONDITIONS

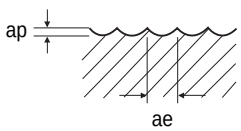
## CARBIDE, 2 FLUTE MINIATURE BALL NOSE

### EM960, EM865 SERIES

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS CAST IRON | | HARDENED STEELS | |
|---|---|---|---|---|
| HARDNESS | HRc30 ~ HRc45 | | HRc45 ~ HRc55 | |
| STRENGTH | 1000 ~ 1500N/mm² | | 1500 ~ 2000N/mm² | |
| DIAMETER | RPM | FEED | RPM | FEED |
| R.012 × .024 | 30000 | 23.60 | 30000 | 11.80 |
| R.0155 × .031 | 27000 | 25.60 | 27000 | 15.00 |
| R.020 × .040 | 25000 | 25.60 | 25000 | 15.70 |
| R.0235 × .047 | 24000 | 26.40 | 24000 | 16.50 |
| R.031 × .062 | 23000 | 27.60 | 23000 | 16.90 |

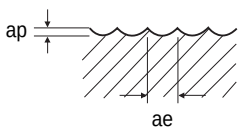
D < .040
ap=0.05 × D
ae=0.15 × D

D ≧ .040
ap=0.075 × D
ae=0.15 × D




D < .040
ap=0.05 × D
ae=0.1 × D

D ≧ .040
ap=0.05 × D
ae=0.15 × D

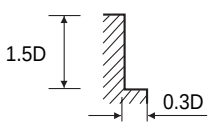


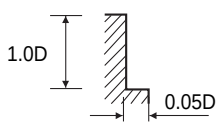

RPM = rev./min.
FEED = inch/min.

## CARBIDE, MULTI FLUTE ROUGHING - SIDE CUTTING

### EM666, EM156, EM832, EM814 SERIES

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~HRc30 | | HRc30 ~ HRc38 | | HRc38 ~ HRc45 | | HRc45 ~ HRc55 | | HRc55 ~ HRc65 | |
| STRENGTH | ~1000N/mm² | | 1000 ~ 1200N/mm² | | 1200` ~ 1400N/mm² | | 1400 ~ 2000N/mm² | | 2000N/mm² ~ | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/4 | 15600 | 91.35 | 12400 | 33.10 | 8400 | 22.45 | 3400 | 10.25 | 2400 | 7.50 |
| 5/16 | 11600 | 91.35 | 9200 | 33.10 | 6300 | 22.45 | 2400 | 9.50 | 1800 | 7.10 |
| 3/8 | 9200 | 91.35 | 7600 | 33.10 | 5100 | 22.45 | 2000 | 11.40 | 1300 | 7.50 |
| 1/2 | 8000 | 94.50 | 6000 | 31.50 | 4200 | 22.45 | 1680 | 10.25 | 1200 | 7.50 |
| 5/8 | 6000 | 94.50 | 4800 | 29.90 | 3300 | 20.05 | 1200 | 6.30 | 800 | 4.35 |
| 3/4 | 5200 | 91.35 | 4400 | 28.35 | 2700 | 16.55 | 1100 | 5.90 | 700 | 3.95 |
| 1 | 4800 | 85.05 | 3600 | 22.05 | 2400 | 14.15 | 1000 | 5.90 | 660 | 3.95 |




RPM = rev./min.
FEED = inch/min.

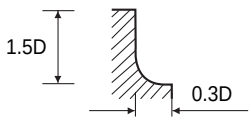
# X-POWER END MILLS

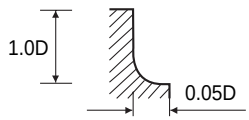
## RECOMMENDED CUTTING CONDITIONS

## CARBIDE, MULTI FLUTE ROUGHING BALL NOSE - SIDE CUTTING

### EM662, EM833 SERIES

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc30 | | HRc30 ~ HRc38 | | HRc38 ~ HRc45 | | HRc45 ~ HRc55 | | HRc55 ~ HRc65 | |
| STRENGTH | ~ 1000N/mm² | | 1000 ~ 1200N/mm² | | 1200 ~ 1400N/mm² | | 1400 ~ 2000N/mm² | | 2000N/mm² ~ | |
| DIAMETER | RPM | RPM | RPM | RPM | RPM | RPM | RPM | RPM | RPM | RPM |
| R1/8 × 1/4 | 15600 | 91.30 | 12400 | 33.00 | 8400 | 22.40 | 3400 | 10.20 | 2400 | 7.50 |
| R5/32 × 5/16 | 11600 | 91.30 | 9200 | 33.00 | 6300 | 22.40 | 2400 | 9.40 | 1800 | 7.10 |
| R3/16 × 3/8 | 9200 | 91.30 | 7600 | 33.00 | 5100 | 22.40 | 2000 | 11.40 | 1300 | 7.50 |
| R1/4 × 1/2 | 8000 | 94.50 | 6000 | 31.50 | 4200 | 22.40 | 1680 | 10.20 | 1200 | 7.50 |
| R5/16 × 5/8 | 6000 | 94.50 | 4800 | 29.90 | 3300 | 20.10 | 1200 | 6.30 | 800 | 4.30 |
| R3/8 × 3/4 | 4800 | 85.00 | 3600 | 22.00 | 2400 | 14.10 | 1000 | 5.90 | 660 | 3.90 |



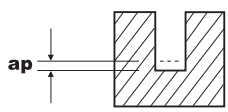

RPM = rev./min.
FEED = inch/min.

## CARBIDE, 2 FLUTE FINISH for RIB PROCESSING

### EM966, EM883 SERIES

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS CAST IRON | | | ALLOY STEELS HEAT RESISTANT STEELS | | | HARDENED STEELS | | |
|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc30 | | | HRc30 ~ HRc45 | | | HRc45 ~ HRc55 | | |
| STRENGTH | ~ 1000N/mm² | | | 1000 ~ 1500N/mm² | | | 1500 ~ 2000N/mm² | | |
| DIAMETER | RPM | FEED | ap (mm) | RPM | FEED | ap (mm) | RPM | FEED | ap (mm) |
| 1/32 | 27000~35000 | 7.5~16.5 | .0006~.0014 | 19500~24500 | 2.4~9.5 | .0006~.0014 | 12500~14800 | 1.4~3.7 | .0003~.0006 |
| 3/64 | 18500~23500 | 7.5~23.6 | .0022~.0039 | 13000~16500 | 3.7~11.8 | .0022~.0039 | 8300~10500 | 2.0~3.9 | .0004~.0009 |
| 1/16 | 14000~18000 | 7.5~23.6 | .0030~.0057 | 10200~12800 | 3.7~11.8 | .0030~.0057 | 6400~8000 | 2.0~3.9 | .0006~.0012 |
| 5/64 | 12000~14500 | 7.5~23.6 | .0035~.0071 | 8300~10500 | 3.7~11.8 | .0035~.0071 | 5300~6600 | 2.0~3.9 | .0007~.0014 |
| 3/32 | 9500~12000 | 7.5~23.6 | .0044~.0093 | 6700~8500 | 3.7~11.8 | .0044~.0093 | 4300~5300 | 2.0~3.9 | .0009~.0018 |
| 1/8 | 8000~10000 | 7.5~23.6 | .0053~.0106 | 5500~7000 | 3.7~11.8 | .0053~.0106 | 3500~4400 | 2.0~3.9 | .0011~.0022 |

(Depth of Cut per one pass)



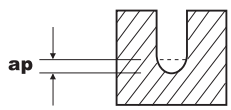

RPM = rev./min.
FEED = inch/min.

## CARBIDE, 2 FLUTE BALL NOSE for RIB PROCESSING

### EM967, EM886 SERIES

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS CAST IRON | | | ALLOY STEELS HEAT RESISTANT STEELS | | | HARDENED STEELS | | |
|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc30 | | | HRc30 ~ HRc45 | | | HRc45 ~ HRc55 | | |
| STRENGTH | ~ 1000N/mm² | | | 1000 ~ 1500N/mm² | | | 1500 ~ 2000N/mm² | | |
| DIAMETER | RPM | FEED | ap (mm) | RPM | FEED | ap (mm) | RPM | FEED | ap (mm) |
| R1/64 × 1/32 | 27000~35000 | 7.5~16.5 | .0006~.0014 | 19500~24500 | 2.4~9.5 | .0006~.0014 | 12500~14800 | 1.4~3.7 | .0003~.0006 |
| R.0234 × 3/64 | 18500~23500 | 7.5~23.6 | .0022~.0039 | 13000~16500 | 3.7~11.8 | .0022~.0039 | 8300~10500 | 2.0~3.9 | .0004~.0009 |
| R1/32 × 1/16 | 14000~18000 | 7.5~23.6 | .0030~.0057 | 10200~12800 | 3.7~11.8 | .0030~.0057 | 6400~8000 | 2.0~3.9 | .0006~.0012 |
| R.0391 × 5/64 | 12000~14500 | 7.5~23.6 | .0035~.0071 | 8300~10500 | 3.7~11.8 | .0035~.0071 | 5300~6600 | 2.0~3.9 | .0007~.0014 |
| R3/64 × 3/32 | 9500~12000 | 7.5~23.6 | .0044~.0093 | 6700~8500 | 3.7~11.8 | .0044~.0093 | 4300~5300 | 2.0~3.9 | .0009~.0018 |
| R1/16 × 1/8 | 8000~10000 | 7.5~23.6 | .0053~.0106 | 5500~7000 | 3.7~11.8 | .0053~.0106 | 3500~4400 | 2.0~3.9 | .0011~.0022 |

(Depth of Cut per one pass)

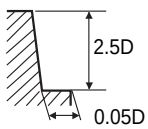



RPM = rev./min.
FEED = inch/min.

## CARBIDE, 2 FLUTE TAPER - SIDE CUTTING

### EM837 SERIES

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS | | ALLOY STEELS HEAT RESISTANT STEELS | |
|---|---|---|---|---|
| HARDNESS | ~ HRc30 | | HRc30 ~ HRc45 | |
| STRENGTH | ~ 1000N/mm² | | 1000 ~ 1500N/mm² | |
| DIAMETER | RPM | FEED | RPM | FEED |
| 2.0 | 8400 | 6.69 | 6300 | 4.92 |
| 3.0 | 4410 | 4.72 | 3570 | 3.94 |
| 4.0 | 3570 | 5.51 | 2840 | 4.53 |
| 5.0 | 3050 | 7.09 | 2410 | 5.71 |
| 6.0 | 2630 | 8.27 | 2100 | 6.69 |
| 8.0 | 2000 | 9.84 | 1580 | 7.09 |




RPM = rev./min.
FEED = inch/min.

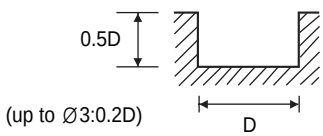
# X-POWER END MILLS

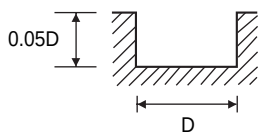
## RECOMMENDED CUTTING CONDITIONS

## CARBIDE, 3 FLUTE - SLOTTING

### EM895 SERIES

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | STAINLESS STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc30 | | HRc30 ~ HRc45 | | | | HRc45 ~ HRc55 | | HRc55 ~ HRc65 | |
| STRENGTH | ~ 1000N/mm² | | 1000 ~ 1500N/mm² | | | | 1500 ~ 2000N/mm² | | 2000N/mm² ~ | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 2.0 | 11560 | 6.69 | 7560 | 4.33 | 6300 | 3.15 | 5040 | 1.18 | | |
| 3.0 | 8920 | 7.48 | 5560 | 5.12 | 4620 | 4.33 | 3360 | 1.38 | 1900 | 1.57 |
| 4.0 | 7560 | 10.63 | 4620 | 6.30 | 3880 | 5.12 | 2940 | 1.38 | 1480 | 1.38 |
| 5.0 | 6300 | 11.02 | 3780 | 6.69 | 3160 | 5.51 | 2320 | 1.77 | 1260 | 1.38 |
| 6.0 | 5560 | 12.20 | 3360 | 7.87 | 2840 | 6.30 | 2000 | 1.97 | 1100 | 1.38 |
| 8.0 | 4200 | 13.39 | 2520 | 7.09 | 2100 | 6.30 | 1680 | 2.56 | 840 | 1.38 |
| 10.0 | 3260 | 11.81 | 2000 | 5.51 | 1680 | 5.71 | 1360 | 2.17 | 680 | 1.18 |
| 12.0 | 2740 | 9.84 | 1680 | 4.72 | 1360 | 4.72 | 1160 | 1.97 | 560 | 1.18 |
| 16.0 | 2200 | 7.87 | 1360 | 3.94 | 1060 | 3.94 | 900 | 1.38 | 440 | 0.79 |
| 18.0 | 1940 | 6.89 | 1210 | 3.35 | 950 | 3.35 | 790 | 1.18 | 380 | 0.79 |
| 20.0 | 1680 | 5.91 | 1060 | 2.76 | 840 | 2.76 | 680 | 0.98 | 320 | 0.79 |



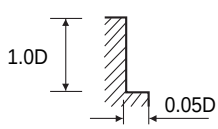




RPM = rev./min. FEED = inch/min.

## CARBIDE, 3 FLUTE - SIDE CUTTING

### EM895 SERIES

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | STAINLESS STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc30 | | HRc30 ~ HRc45 | | | | HRc45 ~ HRc55 | | HRc55 ~ HRc65 | |
| STRENGTH | ~ 1000N/mm² | | 1000 ~ 1500N/mm² | | | | 1500 ~ 2000N/mm² | | 2000N/mm² ~ | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 2.0 | 11560 | 8.27 | 7560 | 5.51 | 6300 | 4.53 | 5040 | 1.18 | | |
| 3.0 | 8920 | 9.45 | 5560 | 5.91 | 4620 | 4.92 | 3360 | 1.57 | 1900 | 1.77 |
| 4.0 | 7560 | 16.93 | 4620 | 10.24 | 3880 | 8.27 | 2940 | 1.77 | 1480 | 1.77 |
| 5.0 | 6300 | 17.72 | 3780 | 10.63 | 3160 | 9.06 | 2320 | 2.17 | 1260 | 1.77 |
| 6.0 | 5560 | 19.69 | 3360 | 12.20 | 2840 | 9.84 | 2000 | 2.36 | 1100 | 1.77 |
| 8.0 | 4200 | 20.87 | 2520 | 11.42 | 2100 | 10.43 | 1680 | 3.15 | 840 | 1.77 |
| 10.0 | 3260 | 18.11 | 2000 | 9.06 | 1680 | 9.06 | 1360 | 2.76 | 680 | 1.38 |
| 12.0 | 2740 | 15.35 | 1680 | 7.48 | 1360 | 7.09 | 1160 | 2.36 | 560 | 1.38 |
| 16.0 | 2200 | 12.20 | 1360 | 5.91 | 1060 | 5.91 | 900 | 1.77 | 440 | 0.79 |
| 18.0 | 1940 | 11.02 | 1210 | 5.31 | 950 | 5.12 | 790 | 1.38 | 380 | 0.79 |
| 20.0 | 1680 | 9.45 | 1060 | 4.72 | 840 | 4.53 | 680 | 1.18 | 320 | 0.79 |

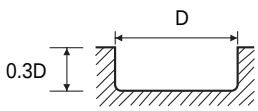


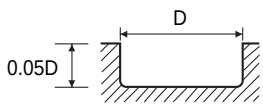

RPM = rev./min. FEED = inch/min.

## CARBIDE, 2 FLUTE LONG CORNER RADIUS - SLOTTING

### EM818 SERIES

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc30 | | HRc30 ~ HRc45 | | HRc45 ~ HRc55 | | HRc55 ~ HRc65 | |
| STRENGTH | ~ 1000N/mm² | | 1000 ~ 1500N/mm² | | 1500 ~ 2000N/mm² | | 2000N/mm² ~ | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 3.0 | 6620 | 5.51 | 4280 | 2.76 | 2640 | 1.38 | 1870 | 0.71 |
| 4.0 | 5360 | 6.69 | 3410 | 3.35 | 2150 | 1.57 | 1470 | 0.79 |
| 5.0 | 4580 | 8.27 | 2900 | 3.94 | 1900 | 1.97 | 1260 | 0.98 |
| 6.0 | 3950 | 9.84 | 2520 | 4.92 | 1640 | 2.36 | 1160 | 1.38 |
| 8.0 | 3000 | 10.63 | 1900 | 4.92 | 1260 | 2.36 | 840 | 1.38 |
| 10.0 | 2520 | 10.63 | 1640 | 4.92 | 1010 | 2.36 | 670 | 1.38 |
| 12.0 | 2060 | 8.27 | 1390 | 4.53 | 840 | 1.97 | 550 | 0.98 |
| 16.0 | 1740 | 7.48 | 1070 | 3.54 | 670 | 1.57 | 440 | 0.79 |
| 20.0 | 1260 | 5.51 | 820 | 2.36 | 500 | 1.18 | 340 | 0.59 |



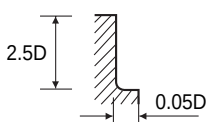



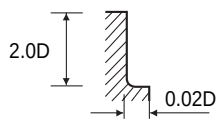

RPM = rev./min.
FEED = inch/min.

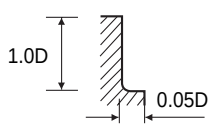
## CARBIDE, 4 FLUTE LONG CORNER RADIUS - SIDE CUTTING

### EM819 SERIES

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc30 | | HRc30 ~ HRc45 | | HRc45 ~ HRc55 | | HRc55 ~ HRc65 | |
| STRENGTH | ~ 1000N/mm² | | 1000 ~ 1500N/mm² | | 1500 ~ 2000N/mm² | | 2000N/mm² ~ | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 3.0 | 6620 | 6.69 | 4280 | 5.12 | 2640 | 2.56 | 1870 | 1.18 |
| 4.0 | 5360 | 8.27 | 3410 | 5.91 | 2150 | 2.76 | 1470 | 1.38 |
| 5.0 | 4580 | 8.46 | 2900 | 7.09 | 1900 | 3.35 | 1260 | 1.57 |
| 6.0 | 3950 | 8.46 | 2520 | 7.09 | 1640 | 3.35 | 1160 | 1.97 |
| 8.0 | 3000 | 9.06 | 1900 | 7.09 | 1260 | 3.35 | 840 | 1.97 |
| 10.0 | 2520 | 9.06 | 1640 | 7.09 | 1010 | 3.35 | 670 | 1.97 |
| 12.0 | 2060 | 7.09 | 1390 | 6.30 | 840 | 2.76 | 550 | 1.57 |
| 16.0 | 1740 | 6.30 | 1070 | 4.92 | 670 | 2.36 | 440 | 1.38 |
| 20.0 | 1260 | 4.53 | 820 | 3.54 | 500 | 1.77 | 340 | 0.98 |




RPM = rev./min.
FEED = inch/min.

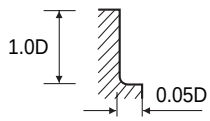
# X-POWER END MILLS

## RECOMMENDED CUTTING CONDITIONS

## CARBIDE, 4 FLUTE STUB CORNER RADIUS - SIDE CUTTING

### EM839 SERIES

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc30 | | HRc30 ~ HRc45 | | HRc45 ~ HRc55 | | HRc55 ~ HRc65 | |
| STRENGTH | ~ 1000N/mm² | | 1000 ~ 1500N/mm² | | 1500 ~ 2000N/mm² | | 2000N/mm² ~ | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 2.0 | 13870 | 13.39 | 9070 | 8.07 | 6050 | 2.36 | | |
| 2.5 | 12290 | 14.17 | 7870 | 8.66 | 5040 | 2.56 | | |
| 3.0 | 10700 | 15.16 | 6670 | 9.45 | 4030 | 2.76 | 2280 | 2.76 |
| 3.5 | 9890 | 21.06 | 6100 | 12.99 | 3780 | 2.76 | 2030 | 2.76 |
| 4.0 | 9070 | 26.97 | 5540 | 16.54 | 3530 | 2.76 | 1780 | 2.76 |
| 5.0 | 7560 | 28.35 | 4540 | 16.93 | 2780 | 3.35 | 1510 | 2.76 |
| 6.0 | 6670 | 31.10 | 4030 | 19.29 | 2400 | 3.74 | 1320 | 2.76 |
| 8.0 | 5040 | 33.46 | 3020 | 17.91 | 2020 | 5.12 | 1010 | 2.76 |
| 10.0 | 3910 | 28.74 | 2400 | 14.17 | 1630 | 4.33 | 820 | 2.36 |
| 12.0 | 3290 | 24.61 | 2020 | 11.81 | 1390 | 3.74 | 670 | 2.36 |
| 16.0 | 2640 | 19.29 | 1630 | 9.45 | 1080 | 2.76 | 530 | 1.38 |

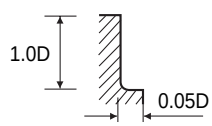



RPM = rev./min.
FEED = inch/min.

## CARBIDE, 6 FLUTE STUB CORNER RADIUS - SIDE CUTTING

### EM897 SERIES

| MATERIAL | NON-ALLOYED STEELS ALLOY STEELS CAST IRON | | ALLOY STEELS HEAT RESISTANT STEELS | | HARDENED STEELS | | HARDENED STEELS | |
|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc30 | | HRc30 ~ HRc45 | | HRc45 ~ HRc55 | | HRc55 ~ HRc65 | |
| STRENGTH | ~ 1000N/mm² | | 1000 ~ 1500N/mm² | | 1500 ~ 2000N/mm² | | 2000N/mm² ~ | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 6.0 | 6670 | 31.10 | 4030 | 19.29 | 2400 | 3.74 | 1320 | 2.76 |
| 8.0 | 5040 | 33.46 | 3020 | 17.91 | 2020 | 5.12 | 1010 | 2.76 |
| 10.0 | 3910 | 28.74 | 2400 | 14.17 | 1630 | 4.33 | 820 | 2.36 |
| 12.0 | 3290 | 24.61 | 2020 | 11.81 | 1390 | 3.74 | 670 | 2.36 |

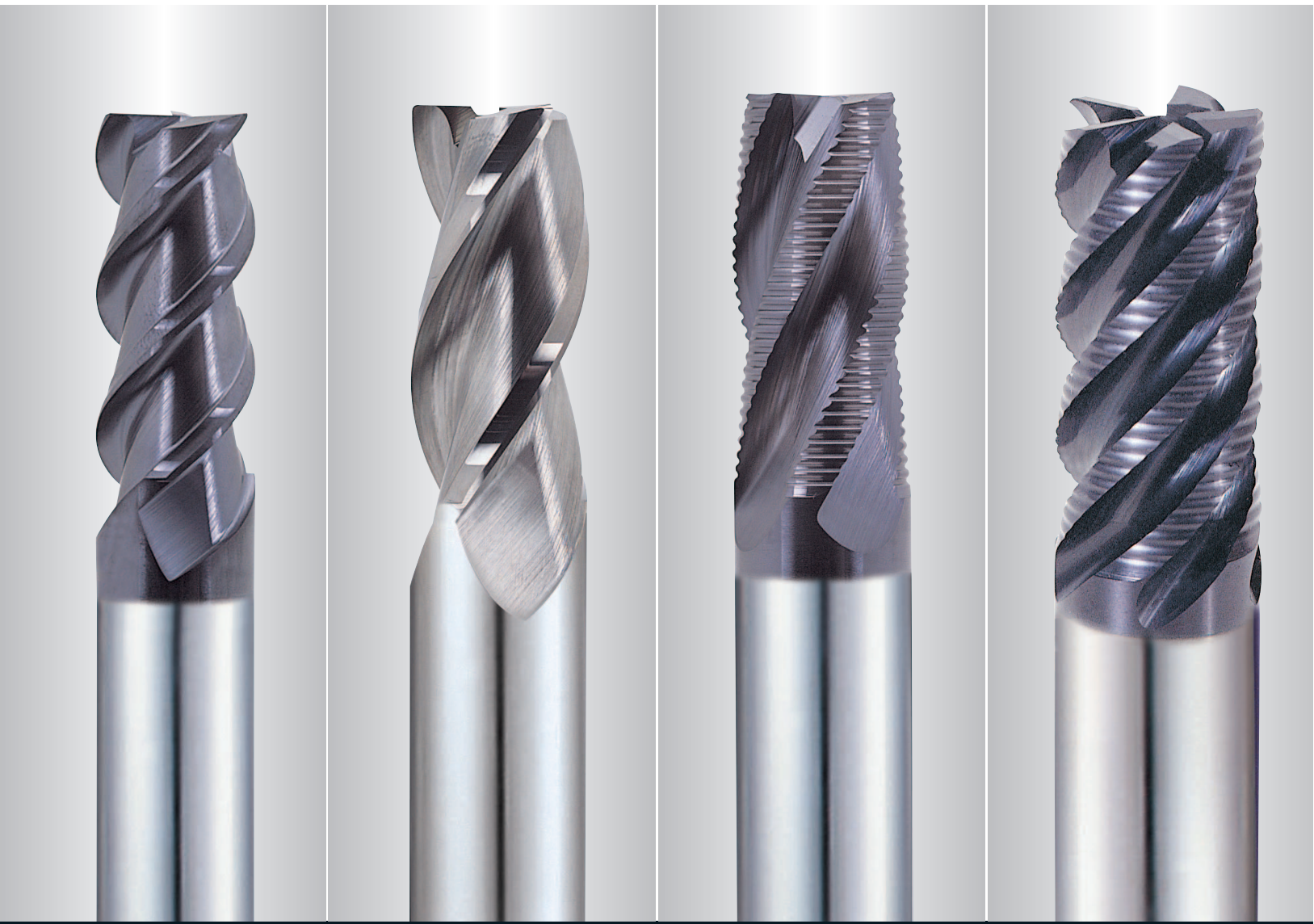



RPM = rev./min.
FEED = inch/min.

# CARBIDE

YG

Being the best through innovation



# JET-POWER

- Exotic materials like Stainless Steels, Nickel alloys and Titanium

# SELECTION GUIDE

| ITEM | MODEL | DESCRIPTION | SIZE MIN | SIZE MAX | PAGE |
|---|---|---|---|---|---|
| **INCH** | | | | | |
| **EH108** | | CARBIDE, 3&4 FLUTE 50° HELIX REGULAR LENGTH ◆ | D1/8 | D1 | **532** |
| **EE882** | | YPM, 6 FLUTE 35° HELIX REGULAR LENGTH ◆ | D3/4 | D1-1/2 | **533** |
| **E5075 E5105** | | CARBIDE, 3 FLUTE 35° HELIX STUB LENGTH CORNER RADIUS - "HOSS" ◆ | D1/8 | D1 | **534** |
| **E5074 E5104** | | CARBIDE, 3 FLUTE 35° HELIX REGULAR LENGTH CORNER RADIUS - "HOSS" ◆ | D1/8 | D1 | **535** |
| **EH094** | | CARBIDE, MULTI FLUTE STUB LENGTH FINE PITCH ROUGHING ◆ | D1/4 | D1 | **536** |
| **EH095** | | CARBIDE, MULTI FLUTE LONG LENGTH FINE PITCH ROUGHING ◆ | D1/4 | D1 | **537** |
| **EH969** | | CARBIDE, MULTI FLUTE 45° HELIX LONG LENGTH FINE PITCH ROUGHING ◆ | D3/16 | D1 | **538** |
| **EH970** | | CARBIDE, MULTI FLUTE 45° HELIX LONG REACH FINE PITCH ROUGHING ◆ | D1/4 | D3/4 | **539** |

◆ U.S.A Stock

| | | | | | |
|---|---|---|---|---|---|
| **METRIC** | | | | | |
| **EH830** | | CARBIDE, 3&4 FLUTE 50° HELIX LONG LENGTH ◇ | D6.0 | D25.0 | **540** |
| **EE515** | | PREMIUM HSS-PM, 4&6 FLUTE SHORT LENGTH ◇ | D3.0 | D25.0 | **541** |
| **EH852** | | CARBIDE, MULTI FLUTE SHORT FINE PITCH ROUGHING ◇ | D6.0 | D25.0 | **542** |
| **EH831** | | CARBIDE, MULTI FLUTE LONG LENGTH FINE PITCH ROUGHING ◇ | D6.0 | D25.0 | **543** |
| **EH917** | | CARBIDE, MULTI FLUTE 45° HELIX SHORT LENGTH FINE PITCH ROUGHING ◇ | D6.0 | D20.0 | **544** |
| **EH919** | | CARBIDE, MULTI FLUTE 45° HELIX LONG LENGTH FINE PITCH ROUGHING ◇ | D4.0 | D25.0 | **545** |
| **EH921** | | CARBIDE, MULTI FLUTE 45° HELIX LONG REACH FINE PITCH ROUGHING ◇ | D6.0 | D20.0 | **546** |
| | | RECOMMENDED CUTTING CONDITIONS | | | **547** |

◇ Call for Availability

◎ : Excellent
○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ○ | | | | | ○ | | ◎ | ○ | ○ |
| ○ | ◎ | ◎ | ○ | | | | | | | ◎ | ◎ | ○ |
| ○ | ◎ | ○ | | | | | | ○ | | ◎ | | |
| ○ | ◎ | ○ | | | | | | ○ | | ◎ | | |
| ○ | ◎ | ◎ | ○ | | | | | | | ◎ | ◎ | ○ |
| ○ | ◎ | ◎ | ○ | | | | | | | ◎ | ◎ | ○ |
| ○ | ◎ | ◎ | ○ | | | | | | | ◎ | ◎ | ○ |
| ○ | ◎ | ◎ | ○ | | | | | | | ◎ | ◎ | ○ |

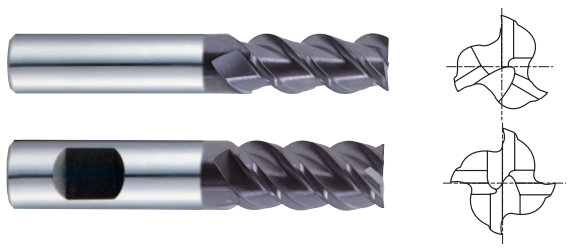
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ○ | ◎ | ◎ | ○ | | | | | | | ◎ | ◎ | ○ |
| ○ | ◎ | ◎ | ○ | | | | | | | ◎ | ◎ | ○ |
| ○ | ◎ | ◎ | ○ | | | | | | | ◎ | ◎ | ○ |
| ○ | ◎ | ◎ | ○ | | | | | | | ◎ | ◎ | ○ |
| ○ | ◎ | ◎ | ○ | | | | | | | ◎ | ◎ | ○ |
| ○ | ◎ | ◎ | ○ | | | | | | | ◎ | ◎ | ○ |
| ○ | ◎ | ◎ | ○ | | | | | | | ◎ | ◎ | ○ |
| ○ | ◎ | ◎ | ○ | | | | | | | ◎ | ◎ | ○ |

# JET-POWER END MILLS

**EH108 SERIES** PLAIN SHANK FLAT SHANK

## CARBIDE, 3&4 FLUTE 50° HELIX REGULAR LENGTH

- Suitable for low hardness materials (under HRc 45), alloy steels, tool steels, carbon steels, prehardened steels, stainless steels, inconel, nimonic, etc.
- Corner Protection against chipping.



MG | 3&4 | 50° | PLAIN | FLAT

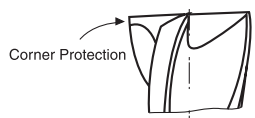
P.547

◆ U.S.A Stock

Unit : Inch

| EDP No. PLAIN | EDP No. FLAT | Mill Diameter | Shank Diameter | Length of Cut | Overall Length | No. of Flute |
|---|---|---|---|---|---|---|
| 95063 | — | 1/8 | 1/8 | 1/2 | 1-1/2 | 3 |
| 95064 | — | 3/16 | 3/16 | 5/8 | 2 | 3 |
| 95065 | — | 1/4 | 1/4 | 3/4 | 2-1/2 | 3 |
| 95066 | — | 5/16 | 5/16 | 13/16 | 2-1/2 | 3 |
| — | 95067 | 3/8 | 3/8 | 1 | 2-1/2 | 3 |
| 95115 | — | 7/16 | 7/16 | 1 | 2-3/4 | 3 |
| — | 95068 | 1/2 | 1/2 | 1 | 3 | 3 |
| — | 95069 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 3 |
| — | 95070 | 3/4 | 3/4 | 1-1/2 | 4 | 4 |
| — | 95071 | 1 | 1 | 1-1/2 | 4 | 4 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0003 |




◎ : Excellent ○ : Good

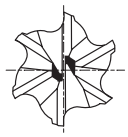
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ○ | | | | | ○ | | ◎ | ○ | ○ |

# JET-POWER END MILLS

**EE882 SERIES** FLAT SHANK

## YPM, 6 FLUTE 35° HELIX REGULAR LENGTH

▶Designed to machine low hardness materials (under HRc45), alloy steels, tool steels, carbon steels, prehardened steels, stainless steel, inconel, nimonic, etc.
▶High velocity milling operation and good surface finishes.



YPM | 6 | 35° | FLAT

P.548

◇ U.S.A Stock

Unit : Inch

| EDP No. | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|
| **95094** | **3/4** | 3/4 | 1-5/8 | 3-7/8 |
| **95095** | **7/8** | 7/8 | 1-7/8 | 4-1/8 |
| **95096** | **1** | 1 | 2 | 4-1/2 |
| **95097** | **1-1/4** | 1-1/4 | 2 | 4-1/2 |
| **95098** | **1-1/2** | 1-1/4 | 2 | 4-1/2 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~+.0010 | 0~−.0003 |

◎ : Excellent ○ : Good

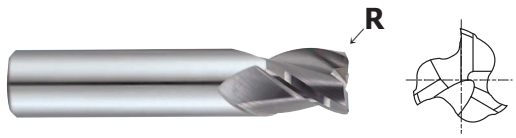
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ○ | | | | | | | ◎ | ◎ | ○ |

# YG JET-POWER END MILLS

**E5075 SERIES** PLAIN SHANK Ø1/8~Ø5/16
**E5105 SERIES** FLAT SHANK Ø11/32~Ø1

## CARBIDE, 3 FLUTE 35° HELIX STUB LENGTH CORNER RADIUS - "HOSS"

- #1 Choice for slotting, ramping & pocket work on stainless, monel & other alloys up to HRc35.
- Dry milling is recommended on steel alloys to reduce thermal shock and increase the life (YG:TYLON F or E COATING).




MG | 3 | 35° | PLAIN | FLAT

Ø1/8~Ø5/16 Ø11/32~Ø1

◆ U.S.A Stock

Unit : Inch

| EDP No. | | | | | Corner Radius | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | R | | | | |
| 57558 | 57558TN | 57558TC | 57558TF | 57558TE | .008~.010 | 1/8 | 1/8 | 1/4 | 1-1/2 |
| 57561 | 57561TN | 57561TC | 57561TF | 57561TE | .008~.010 | 5/32 | 3/16 | 5/16 | 2 |
| 57565 | 57565TN | 57565TC | 57565TF | 57565TE | .008~.010 | 3/16 | 3/16 | 5/16 | 2 |
| 57570 | 57570TN | 57570TC | 57570TF | 57570TE | .015~.020 | 7/32 | 1/4 | 3/8 | 2 |
| 57573 | 57573TN | 57573TC | 57573TF | 57573TE | .015~.020 | 1/4 | 1/4 | 3/8 | 2 |
| 57576 | 57576TN | 57576TC | 57576TF | 57576TE | .015~.020 | 9/32 | 5/16 | 7/16 | 2 |
| 57579 | 57579TN | 57579TC | 57579TF | 57579TE | .015~.020 | 5/16 | 5/16 | 7/16 | 2 |
| 57582 | 57582TN | 57582TC | 57582TF | 57582TE | .015~.020 | 11/32 | 3/8 | 1/2 | 2 |
| 57584 | 57584TN | 57584TC | 57584TF | 57584TE | .015~.020 | 3/8 | 3/8 | 1/2 | 2 |
| 57588 | 57588TN | 57588TC | 57588TF | 57588TE | .015~.020 | 7/16 | 7/16 | 9/16 | 2-1/2 |
| 57593 | 57593TN | 57593TC | 57593TF | 57593TE | .030~.035 | 1/2 | 1/2 | 5/8 | 2-1/2 |
| 57595 | 57595TN | 57595TC | 57595TF | 57595TE | .030~.035 | 5/8 | 5/8 | 3/4 | 3 |
| 57598 | 57598TN | 57598TC | 57598TF | 57598TE | .030~.035 | 3/4 | 3/4 | 1 | 3 |
| 57600 | 57600TN | 57600TC | 57600TF | 57600TE | .030~.035 | 1 | 1 | 1-1/4 | 3 |

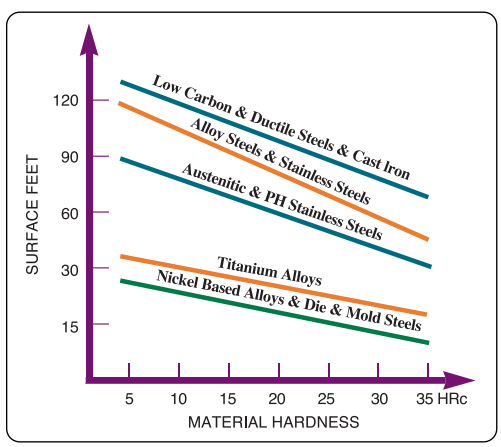
| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~-.0012 | 0~-.0003 |

## RECOMMENDED CUTTING CONDITIONS

- Use stub length whenever possible
- Hardslick coating is recommended on soft gummy material Especially on tools 3/16 and under

### CUTTING TOOL DIAMETER

| | | | | | |
|---|---|---|---|---|---|
| 1/8 | .0003~.0015 | 3/8 | .0015~.0035 | 3/4 | .003~.006 |
| 3/16 | .0004~.002 | 7/16 | .002~.004 | 1 | .003~.007 |
| 1/4 | .001~.0025 | 1/2 | .0025~.0045 | | |
| 5/16 | .0015~.003 | 5/8 | .0025~.005 | | |




◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ○ | | | | | | ○ | | ◎ | | |

# JET-POWER END MILLS

**E5074 SERIES** PLAIN SHANK Ø1/8~Ø5/16
**E5104 SERIES** FLAT SHANK Ø11/32~Ø1

## CARBIDE, 3 FLUTE 35° HELIX REGULAR LENGTH CORNER RADIUS - "HOSS"

- ▶ #1 Choice for slotting, ramping & pocket work on stainless, monel & other alloys up to HRc35.
- ▶ Dry milling is recommended on steel alloys to reduce thermal shock and increase the life (YG:TYLON F or E COATING).

MG | 3 | 35° | PLAIN | FLAT

Ø1/8~Ø5/16 Ø11/32~Ø1

P.534

◆ U.S.A Stock

Unit : Inch

| EDP No. | | | | | Corner Radius | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | R | | | | |
| 56558 | 56558TN | 56558TC | 56558TF | 56558TE | .008~.010 | 1/8 | 1/8 | 1/2 | 1-1/2 |
| 56561 | 56561TN | 56561TC | 56561TF | 56561TE | .008~.010 | 5/32 | 3/16 | 9/16 | 2 |
| 56565 | 56565TN | 56565TC | 56565TF | 56565TE | .008~.010 | 3/16 | 3/16 | 9/16 | 2 |
| 56570 | 56570TN | 56570TC | 56570TF | 56570TE | .015~.020 | 7/32 | 1/4 | 3/4 | 2-1/2 |
| 56573 | 56573TN | 56573TC | 56573TF | 56573TE | .015~.020 | 1/4 | 1/4 | 3/4 | 2-1/2 |
| 56576 | 56576TN | 56576TC | 56576TF | 56576TE | .015~.020 | 9/32 | 5/16 | 13/16 | 2-1/2 |
| 56579 | 56579TN | 56579TC | 56579TF | 56579TE | .015~.020 | 5/16 | 5/16 | 13/16 | 2-1/2 |
| 56582 | 56582TN | 56582TC | 56582TF | 56582TE | .015~.020 | 11/32 | 3/8 | 1 | 2-1/2 |
| 56584 | 56584TN | 56584TC | 56584TF | 56584TE | .015~.020 | 3/8 | 3/8 | 1 | 2-1/2 |
| 56588 | 56588TN | 56588TC | 56588TF | 56588TE | .015~.020 | 7/16 | 7/16 | 1 | 2-3/4 |
| 56593 | 56593TN | 56593TC | 56593TF | 56593TE | .030~.035 | 1/2 | 1/2 | 1-1/4 | 3 |
| 56595 | 56595TN | 56595TC | 56595TF | 56595TE | .030~.035 | 5/8 | 5/8 | 1-5/8 | 3-1/2 |
| 56598 | 56598TN | 56598TC | 56598TF | 56598TE | .030~.035 | 3/4 | 3/4 | 1-5/8 | 4 |
| 56600 | 56600TN | 56600TC | 56600TF | 56600TE | .030~.035 | 1 | 1 | 2 | 4 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~-.0012 | 0~-.0003 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ○ | | | | | | ○ | | ◎ | | |

# JET-POWER END MILLS

**EH094 SERIES** PLAIN SHANK

## CARBIDE, MULTI FLUTE STUB LENGTH FINE PITCH ROUGHING

- Designed to machine low hardness materials (under HRc45), alloy steels, tool steels, carbon steels, prehardened steels, stainless steel, inconel, nimonic.
- High velocity milling operation.
- Fast chip ejection.

MG | FINE | 3-5 | 30° | PLAIN

P.549

◆ U.S.A Stock

Unit : Inch

| EDP No. | Mill Diameter | Shank Diameter | Length of Cut | Overall Length | No. of Flute |
|---|---|---|---|---|---|
| **95072** | **1/4** | 1/4 | 5/16 | 2-1/8 | 3 |
| **95073** | **5/16** | 5/16 | 3/8 | 2-1/4 | 3 |
| **95074** | **3/8** | 3/8 | 9/16 | 2-1/2 | 3 |
| **95075** | **1/2** | 1/2 | 5/8 | 3 | 4 |
| **95076** | **5/8** | 5/8 | 7/8 | 3-1/4 | 4 |
| **95077** | **3/4** | 3/4 | 1 | 3-3/4 | 4 |
| **95078** | **1** | 1 | 1 | 4 | 5 |

| Mill Dia. (inch) | Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|---|
| 1/4~3/8 | 0 ~ −.0022 | 0 ~ −.0003 |
| 1/2~5/8 | 0 ~ −.0027 | |
| 3/4~1 | 0 ~ −.0033 | |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ○ | | | | | | | ◎ | ◎ | ○ |

# JET-POWER END MILLS

**EH095 SERIES** PLAIN SHANK

## CARBIDE, MULTI FLUTE LONG LENGTH FINE PITCH ROUGHING

- ▶Suitable for low hardness materials (under HRc45), alloy steels, tool steels, carbon steels, prehardened steels, stainless steel, inconel, nimonic, etc.
- ▶High velocity milling operation.
- ▶Fast chip ejection.

MG | FINE | 3-5 | 30° | PLAIN

P.549

◆ U.S.A Stock

Unit : Inch

| EDP No. | Mill Diameter | Shank Diameter | Length of Cut | Overall Length | No. of Flute |
|---|---|---|---|---|---|
| **95079** | **1/4** | 1/4 | 3/4 | 2-1/2 | 3 |
| **95080** | **5/16** | 5/16 | 3/4 | 2-1/2 | 3 |
| **95081** | **3/8** | 3/8 | 7/8 | 2-1/2 | 3 |
| **95082** | **1/2** | 1/2 | 1 | 3 | 4 |
| **95083** | **5/8** | 5/8 | 1-1/4 | 3-1/2 | 4 |
| **95084** | **3/4** | 3/4 | 1-5/8 | 4 | 4 |
| **95085** | **1** | 1 | 1-3/4 | 4 | 5 |

| Mill Dia. (inch) | Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|---|
| 1/4~3/8 | 0 ~ −.0022 | 0 ~ −.0003 |
| 1/2~5/8 | 0 ~ −.0027 | |
| 3/4~1 | 0 ~ −.0033 | |

◎ : Excellent ○ : Good

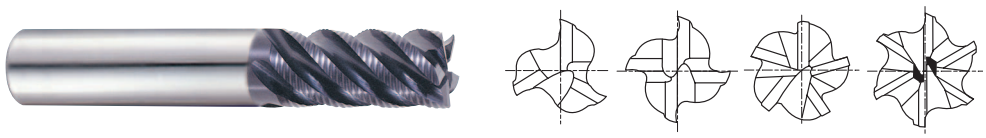
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ○ | | | | | | | ◎ | ◎ | ○ |

# JET-POWER END MILLS

**EH969 SERIES** PLAIN SHANK

## CARBIDE, MULTI FLUTE 45° HELIX LONG LENGTH FINE PITCH ROUGHING

- Suitable for low hardness materials (under HRc45), alloy steels, tool steels, carbon steels, prehardened steels, stainless steel, titanium, inconel, nimonic, etc.
- High chip removed and minimizing breakages of cutting edges.
- Corner Protection against chipping.



MG | FINE | 3-6 | 45° | PLAIN

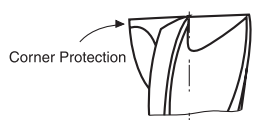
P.549

◆ U.S.A Stock

Unit : Inch

| EDP No. | Mill Diameter | Shank Diameter | Length of Cut | Overall Length | No. of Flute |
|---|---|---|---|---|---|
| 95107 | 3/16 | 1/4 | 1/2 | 2-1/4 | 3 |
| 95108 | 1/4 | 1/4 | 3/4 | 2-1/2 | 4 |
| 95109 | 5/16 | 5/16 | 3/4 | 2-1/2 | 4 |
| 95110 | 3/8 | 3/8 | 7/8 | 2-1/2 | 4 |
| 95111 | 1/2 | 1/2 | 1 | 3 | 4 |
| 95112 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 5 |
| 95113 | 3/4 | 3/4 | 1-5/8 | 4 | 6 |
| 95114 | 1 | 1 | 1-3/4 | 4 | 6 |

| Mill Dia. (inch) | Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|---|
| 3/16 | 0 ~ −.0019 | 0 ~ −.0003 |
| 1/4~3/8 | 0 ~ −.0022 | |
| 1/2~5/8 | 0 ~ −.0027 | |
| 3/4~1 | 0 ~ −.0033 | |




◎ : Excellent ○ : Good

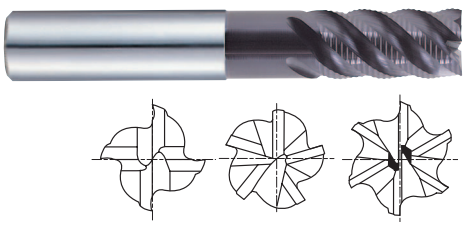
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ○ | | | | | | | ◎ | ◎ | ○ |

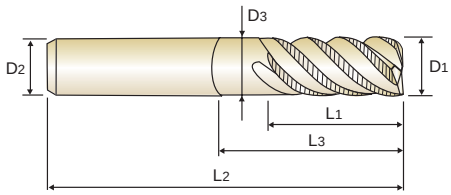
# JET-POWER END MILLS

**EH970 SERIES** PLAIN SHANK

## CARBIDE, MULTI FLUTE 45° HELIX LONG REACH FINE PITCH ROUGHING

- ▶Suitable for low hardness materials (under HRc45), alloy steels, tool steels, carbon steels, prehardened steels, stainless steel, titanium, inconel, nimonic, etc.
- ▶High chip removed and minimizing breakages of cutting edges.
- ▶Corner Protection against chipping.






MG | FINE | 4-6 | 45° | PLAIN

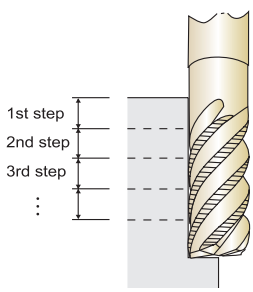
P.549

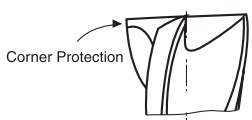
◆ U.S.A Stock

Unit : Inch

| EDP No. | Mill Diameter | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter | No. of Flute |
|---|---|---|---|---|---|---|---|
| | D1 | D2 | L1 | L3 | L2 | D3 | |
| **95101** | **1/4** | 1/4 | 3/4 | 7/8 | 2-1/2 | .230 | 4 |
| **95102** | **5/16** | 5/16 | 3/4 | 1 | 2-1/2 | .292 | 4 |
| **95103** | **3/8** | 3/8 | 7/8 | 1-1/4 | 2-1/2 | .355 | 4 |
| **95104** | **1/2** | 1/2 | 1 | 1-1/2 | 3 | .480 | 4 |
| **95105** | **5/8** | 5/8 | 1-1/4 | 2 | 4 | .605 | 5 |
| **95106** | **3/4** | 3/4 | 1-5/8 | 2-3/8 | 4-3/8 | .719 | 6 |

| Mill Dia. (inch) | Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|---|
| 1/4~3/8 | 0 ~ −.0022 | 0 ~ −.0003 |
| 1/2~5/8 | 0 ~ −.0027 | |
| 3/4~1 | 0 ~ −.0033 | |




◎ : Excellent ○ : Good

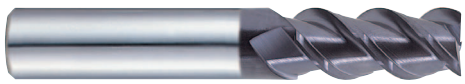
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ○ | | | | | | | ◎ | ◎ | ○ |

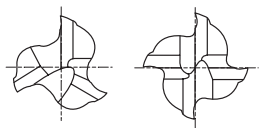
# JET-POWER END MILLS

**EH830 SERIES** PLAIN SHANK

## CARBIDE, 3&4 FLUTE 50° HELIX LONG LENGTH

- Reduces chipping of corner edges
- Suitable for low hardness materials(under HRc45), alloy steels, tool steels, carbon steels, prehardened steels, stainless steels, Inconel, nimonic, etc





MG | 3&4 | 50° | PLAIN

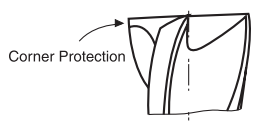
P.547

◇ Call for Availability

Unit : mm

| EDP No. | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length | No. of Flute |
|---|---|---|---|---|---|---|
| | Metric | Inch | | | | |
| EH830060 | 6.0 | .2362 | 6 | 13 | 50 | 3 |
| EH830901 | 6.0 | .2362 | 6 | 13 | 50 | 4 |
| EH830080 | 8.0 | .3150 | 8 | 19 | 60 | 3 |
| EH830100 | 10.0 | .3937 | 10 | 22 | 70 | 3 |
| EH830120 | 12.0 | .4724 | 12 | 25 | 75 | 3 |
| EH830160 | 16.0 | .6299 | 16 | 32 | 90 | 3 |
| EH830180 | 18.0 | .7087 | 18 | 32 | 90 | 3 |
| EH830200 | 20.0 | .7874 | 20 | 38 | 100 | 4 |
| EH830250 | 25.0 | .9843 | 25 | 45 | 120 | 4 |

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.03 | h6 |




◎ : Excellent ○ : Good

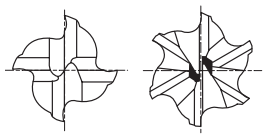
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ○ | | | | | | | ◎ | ◎ | ○ |

# JET-POWER END MILLS

**EE515 SERIES** FLAT SHANK

## PREMIUM HSS-PM, 4&6 FLUTE SHORT LENGTH

- ▶Designed to machine low hardness materials (under HRc45), alloy steels, tool steels, carbon steels, prehardened steels, stainless steel, inconel, nimonic, etc.
- ▶High velocity milling operation and good surface finishes.



YPM | 4&6 | 30° | FLAT

P.548

◇ Call for Availability

Unit : mm

| EDP No. | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length | No. of Flute |
|---|---|---|---|---|---|---|
| | Metric | Inch | | | | |
| EE515030 | 3.0 | .1181 | 6 | 8 | 52 | 4 |
| EE515040 | 4.0 | .1575 | 6 | 11 | 55 | 4 |
| EE515050 | 5.0 | .1969 | 6 | 13 | 57 | 4 |
| EE515060 | 6.0 | .2362 | 6 | 13 | 57 | 4 |
| EE515080 | 8.0 | .3150 | 10 | 19 | 69 | 4 |
| EE515100 | 10.0 | .3937 | 10 | 22 | 72 | 4 |
| EE515120 | 12.0 | .4724 | 12 | 26 | 83 | 4 |
| EE515140 | 14.0 | .5512 | 12 | 26 | 83 | 4 |
| EE515160 | 16.0 | .6299 | 16 | 32 | 92 | 6 |
| EE515180 | 18.0 | .7087 | 16 | 32 | 92 | 6 |
| EE515200 | 20.0 | .7874 | 20 | 38 | 104 | 6 |
| EE515250 | 25.0 | .9843 | 25 | 45 | 121 | 6 |

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~+0.03 | h6 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ○ | | | | | | | ◎ | ◎ | ○ |

# JET-POWER END MILLS

**EH852 SERIES** PLAIN SHANK

## CARBIDE, MULTI FLUTE SHORT LENGTH FINE PITCH ROUGHING

- Designed to machine low hardness materials (under HRc45), alloy steels, tool steels, carbon steels, prehardened steels, stainless steel, inconel, nimonic.
- High velocity milling operation.
- Fast chip ejection.

MG | FINE | 3-5 | 30° | PLAIN

P.549

◇ Call for Availability

Unit : mm

| EDP No. | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length | No. of Flute |
|---|---|---|---|---|---|---|
| | Metric | Inch | | | | |
| | h10 | | h6 | | | |
| EH852060 | 6.0 | .2362 | 6 | 7 | 54 | 3 |
| EH852070 | 7.0 | .2756 | 8 | 8 | 58 | 3 |
| EH852080 | 8.0 | .3150 | 8 | 9 | 58 | 3 |
| EH852090 | 9.0 | .3543 | 10 | 13 | 66 | 4 |
| EH852100 | 10.0 | .3937 | 10 | 14 | 66 | 4 |
| EH852120 | 12.0 | .4724 | 12 | 16 | 73 | 4 |
| EH852140 | 14.0 | .5512 | 14 | 18 | 75 | 4 |
| EH852160 | 16.0 | .6299 | 16 | 22 | 82 | 4 |
| EH852180 | 18.0 | .7087 | 18 | 24 | 84 | 4 |
| EH852200 | 20.0 | .7874 | 20 | 26 | 92 | 4 |
| EH852250 | 25.0 | .9843 | 25 | 25 | 110 | 5 |

**Tolerances according to DIN 7160 & 7161**

| Tolerance range in µm | | | | | |
|---|---|---|---|---|---|
| Nominal-Diameter in mm | | | | | |
| | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
| h10 | 0 / — 40 | 0 / — 48 | 0 / — 58 | 0 / — 70 | 0 / — 84 |
| h6 | 0 / — 6 | 0 / — 8 | 0 / — 9 | 0 / — 11 | 0 / — 13 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ○ | | | | | | | ◎ | ◎ | ○ |

# JET-POWER END MILLS

**EH831 SERIES** PLAIN SHANK

## CARBIDE, MULTI FLUTE LONG LENGTH FINE PITCH ROUGHING

- ▶Designed to machine low hardness materials (under HRc45), alloy steels, tool steels, carbon steels, prehardened steels, stainless steel, inconel, nimonic.
- ▶High velocity milling operation.
- ▶Fast chip ejection.

MG | FINE | 3-5 | 30° | PLAIN

P.549

◇ Call for Availability

Unit : mm

| EDP No. | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length | No. of Flute |
|---|---|---|---|---|---|---|
| | Metric | Inch | | | | |
| | h10 | | h6 | | | |
| EH831060 | 6.0 | .2362 | 6 | 16 | 57 | 3 |
| EH831070 | 7.0 | .2756 | 8 | 16 | 63 | 3 |
| EH831080 | 8.0 | .3150 | 8 | 16 | 63 | 3 |
| EH831090 | 9.0 | .3543 | 10 | 19 | 72 | 4 |
| EH831100 | 10.0 | .3937 | 10 | 22 | 72 | 4 |
| EH831120 | 12.0 | .4724 | 12 | 26 | 83 | 4 |
| EH831140 | 14.0 | .5512 | 14 | 26 | 83 | 4 |
| EH831160 | 16.0 | .6299 | 16 | 32 | 92 | 4 |
| EH831180 | 18.0 | .7087 | 18 | 32 | 92 | 4 |
| EH831200 | 20.0 | .7874 | 20 | 38 | 104 | 4 |
| EH831250 | 25.0 | .9843 | 25 | 45 | 121 | 5 |

**Tolerances according to DIN 7160 & 7161**

| Tolerance range in µm | | | | | |
|---|---|---|---|---|---|
| Nominal-Diameter in mm | | | | | |
| | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
| h10 | 0 — 40 | 0 — 48 | 0 — 58 | 0 — 70 | 0 — 84 |
| h6 | 0 — 6 | 0 — 8 | 0 — 9 | 0 — 11 | 0 — 13 |

◎ : Excellent ○ : Good

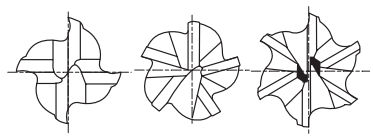
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ○ | | | | | | | ◎ | ◎ | ○ |

# JET-POWER END MILLS

**EH917 SERIES** PLAIN SHANK

## CARBIDE, MULTI FLUTE 45° HELIX SHORT LENGTH FINE PITCH ROUGHING

- High chip removal and minimizing breakages of cutting edges.
- Suitable for low hardness materials(under HRc45), alloy steels, tool steels, carbon steels, prehardened steels, stainless steels, Inconel, nimonic, etc



MG | FINE | 4-6 | 45° | PLAIN

P.549

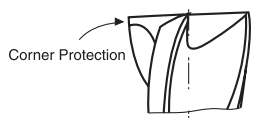
◇ Call for Availability

Unit : mm

| EDP No. | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length | No. of Flute |
|---|---|---|---|---|---|---|
| | Metric | Inch | | | | |
| | h10 | | h6 | | | |
| EH917060 | 6.0 | .2362 | 6 | 7 | 54 | 4 |
| EH917080 | 8.0 | .3150 | 8 | 9 | 58 | 4 |
| EH917100 | 10.0 | .3937 | 10 | 14 | 66 | 4 |
| EH917120 | 12.0 | .4724 | 12 | 16 | 73 | 4 |
| EH917160 | 16.0 | .6299 | 16 | 22 | 82 | 5 |
| EH917200 | 20.0 | .7874 | 20 | 26 | 92 | 6 |

**Tolerances according to DIN 7160 & 7161**

| Tolerance range in µm | | | | | |
|---|---|---|---|---|---|
| Nominal-Diameter in mm | | | | | |
| | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
| h10 | 0 — 40 | 0 — 48 | 0 — 58 | 0 — 70 | 0 — 84 |
| h6 | 0 — 6 | 0 — 8 | 0 — 9 | 0 — 11 | 0 — 13 |




◎ : Excellent ○ : Good

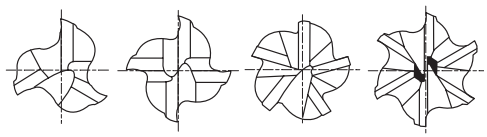
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ○ | | | | | | | ◎ | ◎ | ○ |

# JET-POWER END MILLS

**EH919 SERIES** PLAIN SHANK

## CARBIDE, MULTI FLUTE 45° HELIX LONG LENGTH FINE PITCH ROUGHING

- High chip removal and minimizing breakages of cutting edges.
- Suitable for low hardness materials(under HRc45), alloy steels, tool steels, carbon steels, prehardened steels, stainless steels, Inconel, nimonic, etc



MG | FINE | 3-6 | 45° | PLAIN

P.549

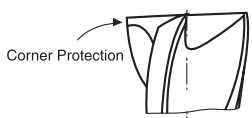
◇ Call for Availability

Unit : mm

| EDP No. | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length | No. of Flute |
|---|---|---|---|---|---|---|
| | Metric | Inch | | | | |
| | h10 | | h6 | | | |
| EH919040 | 4.0 | .1575 | 6 | 11 | 57 | 3 |
| EH919050 | 5.0 | .1969 | 6 | 13 | 57 | 4 |
| EH919060 | 6.0 | .2362 | 6 | 16 | 57 | 4 |
| EH919070 | 7.0 | .2756 | 8 | 16 | 63 | 4 |
| EH919080 | 8.0 | .3150 | 8 | 16 | 63 | 4 |
| EH919090 | 9.0 | .3543 | 10 | 19 | 72 | 4 |
| EH919100 | 10.0 | .3937 | 10 | 22 | 72 | 4 |
| EH919120 | 12.0 | .4724 | 12 | 26 | 83 | 4 |
| EH919140 | 14.0 | .5512 | 14 | 26 | 83 | 5 |
| EH919160 | 16.0 | .6299 | 16 | 32 | 92 | 5 |
| EH919200 | 20.0 | .7874 | 20 | 38 | 104 | 6 |
| EH919250 | 25.0 | .9843 | 25 | 45 | 121 | 6 |

**Tolerances according to DIN 7160 & 7161**

| Tolerance range in µm | | | | | |
|---|---|---|---|---|---|
| Nominal-Diameter in mm | | | | | |
| | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
| h10 | 0 / — 40 | 0 / — 48 | 0 / — 58 | 0 / — 70 | 0 / — 84 |
| h6 | 0 / — 6 | 0 / — 8 | 0 / — 9 | 0 / — 11 | 0 / — 13 |




◎ : Excellent ○ : Good

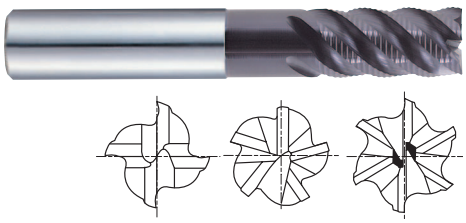
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ○ | | | | | | | ◎ | ◎ | ○ |

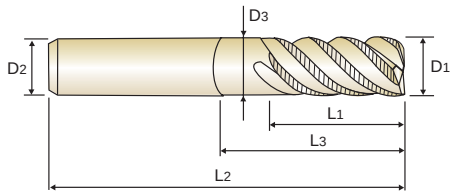
# JET-POWER END MILLS

**EH921 SERIES** PLAIN SHANK

## CARBIDE, MULTI FLUTE 45° HELIX LONG REACH FINE PITCH ROUGHING

- Suitable for low hardness materials (under HRc45), alloy steels, tool steels, carbon steels, prehardened steels, stainless steel, titanium, inconel, nimonic, etc.
- High chip removed and minimizing breakages of cutting edges.
- Corner Protection against chipping.






MG | FINE | 4-6 | 45° | PLAIN

P.549

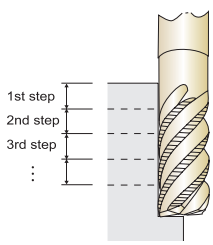
◇ Call for Availability

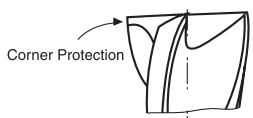
Unit : mm

| EDP No. | Mill Diameter | | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter | No. of Flute |
|---|---|---|---|---|---|---|---|---|
| | Metric | Inch | | | | | | |
| | $D_1$ | | $D_2$ | $L_1$ | $L_3$ | $L_2$ | $D_3$ | |
| EH921060 | 6.0 | .2362 | 6 | 16 | 20 | 57 | 5.5 | 4 |
| EH921080 | 8.0 | .3150 | 8 | 16 | 26 | 63 | 7.5 | 4 |
| EH921100 | 10.0 | .3937 | 10 | 22 | 31 | 72 | 9.5 | 4 |
| EH921120 | 12.0 | .4724 | 12 | 26 | 37 | 83 | 11.5 | 4 |
| EH921160 | 16.0 | .6299 | 16 | 32 | 51 | 100 | 15.5 | 5 |
| EH921200 | 20.0 | .7874 | 20 | 38 | 59 | 110 | 19.2 | 6 |

**Tolerances according to DIN 7160 & 7161**

| Tolerance range in µm | | | | | |
|---|---|---|---|---|---|
| Nominal-Diameter in mm | | | | | |
| | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
| h10 | 0 — 40 | 0 — 48 | 0 — 58 | 0 — 70 | 0 — 84 |
| h6 | 0 — 6 | 0 — 8 | 0 — 9 | 0 — 11 | 0 — 13 |



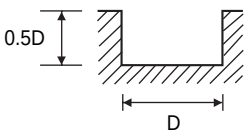

◎ : Excellent ○ : Good

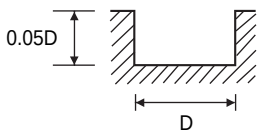
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ○ | | | | | | | ◎ | ◎ | ○ |

## CARBIDE, 3&4 FLUTE FINISH - SLOTTING

### EH108, EH830 SERIES

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | STAINLESS STEELS | | TITANIUM ALLOY | | INCONEL | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~HRc30 | | HRc30 ~ HRc45 | | | | | | | |
| STRENGTH | ~1000N/mm² | | 1000 ~ 1500N/mm² | | | | | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/4 | 5560 | 12.20 | 3360 | 7.85 | 2840 | 6.30 | 1500 | 2.15 | 1160 | 1.60 |
| 5/16 | 4200 | 13.40 | 2520 | 7.10 | 2100 | 6.30 | 1090 | 2.15 | 840 | 1.60 |
| 3/8 | 3260 | 11.80 | 2000 | 5.50 | 1680 | 5.50 | 870 | 2.15 | 670 | 1.60 |
| 1/2 | 2740 | 9.80 | 1680 | 4.70 | 1370 | 4.70 | 730 | 1.75 | 560 | 1.20 |
| 5/8 | 2200 | 7.85 | 1360 | 3.90 | 1050 | 4.00 | 550 | 1.35 | 420 | 1.00 |
| 3/4 | 1750 | 6.90 | 1100 | 3.35 | 880 | 3.35 | 480 | 1.20 | 350 | 1.20 |
| 1 | 1360 | 4.50 | 840 | 2.35 | 670 | 2.35 | 350 | 0.80 | 270 | 0.60 |



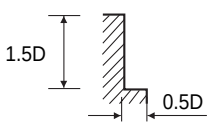

※ The Feed, in long & extra long types, should be reduced by around 50%.

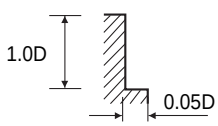
RPM = rev./min.
FEED = inch/min.

## CARBIDE, 3&4 FLUTE FINISH - SIDE CUTTING

### EH108, EH830 SERIES

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | STAINLESS STEELS | | TITANIUM ALLOY | | INCONEL | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~HRc30 | | HRc30 ~ HRc45 | | | | | | | |
| STRENGTH | ~1000N/mm² | | 1000 ~ 1500N/mm² | | | | | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/4 | 5560 | 15.75 | 3360 | 9.85 | 2840 | 8.30 | 1360 | 2.95 | 1050 | 2.20 |
| 5/16 | 4200 | 16.50 | 2520 | 9.05 | 2100 | 8.70 | 1090 | 2.75 | 840 | 2.00 |
| 3/8 | 3260 | 14.55 | 2000 | 7.10 | 1680 | 8.70 | 880 | 2.75 | 680 | 2.00 |
| 1/2 | 2740 | 12.20 | 1680 | 5.90 | 1370 | 7.10 | 730 | 2.55 | 560 | 1.80 |
| 5/8 | 2200 | 9.85 | 1360 | 4.70 | 1050 | 5.30 | 550 | 1.95 | 420 | 1.40 |
| 3/4 | 1750 | 8.65 | 1100 | 4.35 | 880 | 5.40 | 480 | 1.55 | 350 | 1.20 |
| 1 | 1360 | 5.90 | 840 | 2.95 | 670 | 4.50 | 350 | 1.35 | 270 | 1.00 |




※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

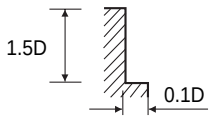
# JET-POWER END MILLS

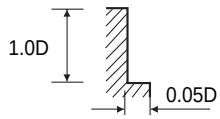
## RECOMMENDED CUTTING CONDITIONS

## YPM, 6 FLUTE - SIDE CUTTING

### EE882 SERIES

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | STAINLESS STEELS | | TITANIUM ALLOY | | INCONEL | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~HRc30 | | HRc30 ~ HRc45 | | | | | | | |
| STRENGTH | ~1000N/mm² | | 1000 ~ 1500N/mm² | | | | | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 3/4 | 960 | 8.00 | 215 | 0.80 | 480 | 4.80 | 220 | 1.35 | 170 | 0.95 |
| 7/8 | 730 | 7.25 | 180 | 0.65 | 365 | 4.35 | 190 | 1.10 | 145 | 0.78 |
| 1 | 640 | 6.60 | 165 | 0.60 | 320 | 3.95 | 170 | 1.00 | 130 | 0.70 |
| 1-1/4 | 520 | 5.25 | 130 | 0.45 | 260 | 3.15 | 140 | 0.77 | 105 | 0.55 |
| 1-1/2 | 430 | 4.35 | 105 | 0.37 | 215 | 2.60 | 110 | 0.63 | 85 | 0.45 |



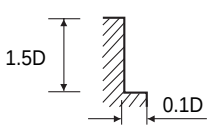

※ The Feed, in long & extra long types, should be reduced by around 50%.

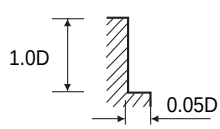
RPM = rev./min.
FEED = inch/min.

## PREMIUM HSS-PM, 4&6 FLUTE SHORT- SIDE CUTTING

### EE515 SERIES

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | STAINLESS STEELS TITANIUM ALLOY | | INCONEL | |
|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc30 | | HRc30 ~ HRc45 | | | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 3.0 | 4400 | 7.28 | 1100 | 0.91 | 2200 | 4.33 | 880 | 1.10 |
| 4.0 | 3600 | 8.27 | 900 | 1.22 | 1800 | 4.92 | 720 | 1.46 |
| 5.0 | 3000 | 8.86 | 750 | 1.18 | 1500 | 5.31 | 600 | 1.42 |
| 6.0 | 2600 | 9.25 | 600 | 1.14 | 1300 | 5.51 | 480 | 1.38 |
| 8.0 | 2000 | 9.84 | 500 | 1.10 | 1000 | 5.91 | 400 | 1.34 |
| 10.0 | 1600 | 11.22 | 410 | 1.18 | 800 | 6.69 | 330 | 1.42 |
| 12.0 | 1320 | 9.84 | 340 | 1.14 | 660 | 5.91 | 270 | 1.38 |
| 14.0 | 1160 | 9.25 | 290 | 1.06 | 580 | 5.51 | 230 | 1.26 |
| 16.0 | 1000 | 8.86 | 250 | 1.02 | 500 | 5.31 | 200 | 1.22 |
| 18.0 | 900 | 8.27 | 225 | 0.91 | 450 | 4.92 | 180 | 1.10 |
| 20.0 | 800 | 7.87 | 200 | 0.67 | 400 | 4.72 | 160 | 0.83 |
| 25.0 | 640 | 6.50 | 165 | 0.59 | 320 | 3.94 | 130 | 0.71 |



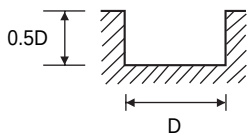




RPM = rev./min.
FEED = inch/min.

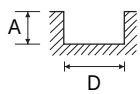
## CARBIDE, MULTI FLUTE ROUGHING - SLOTTING

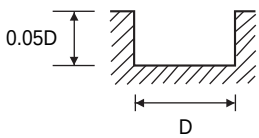
### EH094, EH095, EH969, EH970, EH852, EH831, EH917, EH919, EH921 SERIES

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | STAINLESS STEELS | | TITANIUM ALLOY | | INCONEL | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~HRc30 | | HRc30 ~ HRc45 | | | | | | | |
| STRENGTH | ~1000N/mm² | | 1000 ~ 1500N/mm² | | | | | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/4 | 15600 | 91.35 | 12400 | 33.10 | 8400 | 22.45 | 3150 | 10.60 | 2400 | 7.50 |
| 5/16 | 11600 | 91.35 | 9200 | 33.10 | 6300 | 22.45 | 2350 | 9.80 | 1800 | 7.10 |
| 3/8 | 9200 | 91.35 | 7600 | 33.10 | 5100 | 22.45 | 1700 | 10.20 | 1300 | 7.50 |
| 1/2 | 8000 | 94.50 | 6000 | 31.50 | 4200 | 22.45 | 1560 | 10.20 | 1200 | 7.50 |
| 5/8 | 6000 | 94.50 | 4800 | 29.90 | 3300 | 20.10 | 1040 | 5.80 | 800 | 4.30 |
| 3/4 | 5200 | 91.35 | 4400 | 28.35 | 2500 | 16.55 | 910 | 5.50 | 675 | 4.00 |
| 1 | 4300 | 84.65 | 3200 | 24.40 | 2160 | 16.15 | 780 | 5.10 | 600 | 4.30 |




A: D1/4-D3/8:0.25×D
D1/2-D5/8:0.15×D
D3/4-D1:0.10×D



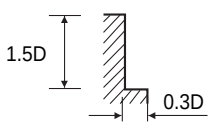

※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

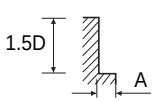
## CARBIDE, MULTI FLUTE ROUGHING - SIDE CUTTING

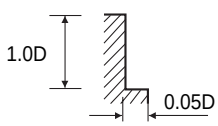
### EH094, EH095, EH969, EH970, EH852, EH831, EH917, EH919, EH921 SERIES

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | STAINLESS STEELS | | TITANIUM ALLOY | | INCONEL | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~HRc30 | | HRc30 ~ HRc45 | | | | | | | |
| STRENGTH | ~1000N/mm² | | 1000 ~ 1500N/mm² | | | | | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/4 | 15600 | 91.35 | 12400 | 33.10 | 8400 | 22.45 | 3150 | 10.60 | 2400 | 7.50 |
| 5/16 | 11600 | 91.35 | 9200 | 33.10 | 6300 | 22.45 | 2350 | 9.80 | 1800 | 7.10 |
| 3/8 | 9200 | 91.35 | 7600 | 33.10 | 5100 | 22.45 | 1700 | 10.20 | 1300 | 7.50 |
| 1/2 | 8000 | 94.50 | 6000 | 31.50 | 4200 | 22.45 | 1560 | 10.20 | 1200 | 7.50 |
| 5/8 | 6000 | 94.50 | 4800 | 29.90 | 3300 | 22.10 | 1040 | 5.90 | 800 | 4.30 |
| 3/4 | 5200 | 91.35 | 4400 | 28.35 | 2700 | 16.55 | 910 | 5.50 | 700 | 4.00 |
| 1 | 4300 | 84.65 | 3200 | 24.40 | 2160 | 16.15 | 780 | 5.10 | 600 | 4.30 |




A: D1/4-D3/8:0.15×D
D1/2-D5/8:0.10×D
D3/4-D1:0.05×D

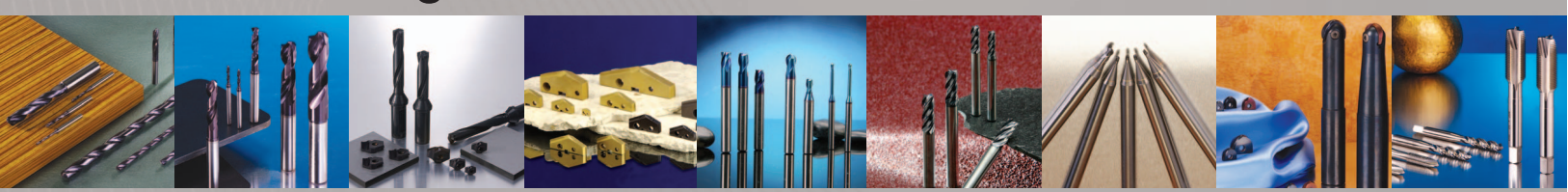



※ The Feed, in long & extra long types, should be reduced by around 50%.

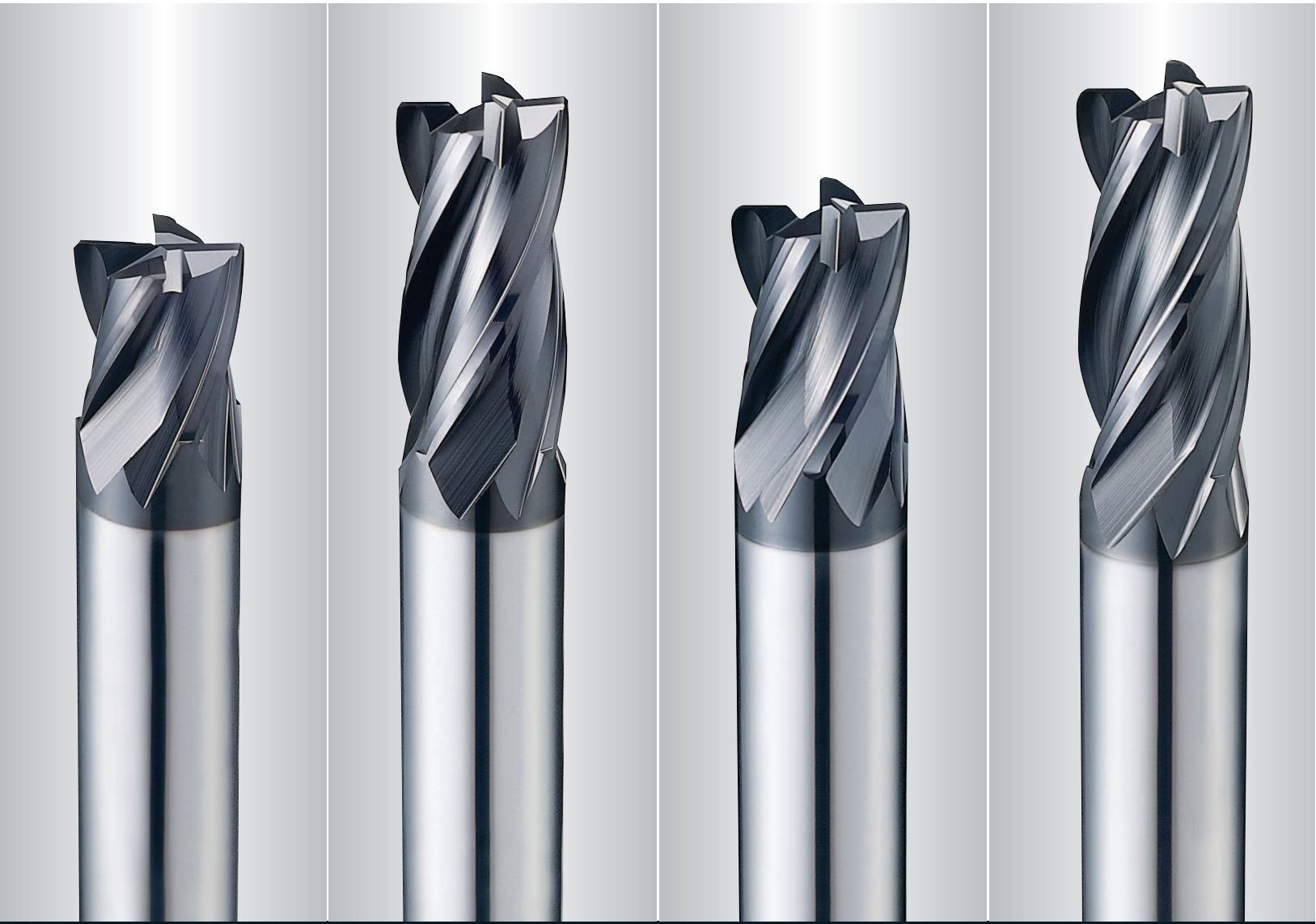
RPM = rev./min.
FEED = inch/min.

Global Cutting Tool Leader **YG-1**



# CARBIDE

Being the best through innovation



# V7 Mill STEEL

- Silent Cutting of Steels up to HRc40.
  Designed as Unequal Leads.

# SELECTION GUIDE

| ITEM | MODEL | DESCRIPTION | | SIZE MIN | SIZE MAX | PAGE |
|---|---|---|---|---|---|---|
| **INCH** | | | | | | |
| **EMD56 EMD57** | | CARBIDE, 4 FLUTE MULTIPLE HELIX STUB LENGTH | ◆ | D1/8 | D1 | **554** |
| **EMD58 EMD59** | | CARBIDE, 4 FLUTE MULTIPLE HELIX STUB LENGTH CORNER RADIUS | ◆ | D1/8 | D1 | **555** |
| **EMD46 EMD47** | | CARBIDE, 4 FLUTE MULTIPLE HELIX REGULAR LENGTH | ◆ | D1/8 | D1 | **556** |
| **EMD48 EMD49** | | CARBIDE, 4 FLUTE MULTIPLE HELIX REGULAR LENGTH CORNER RADIUS | ◆ | D1/8 | D1 | **557** |
| **METRIC** | | | | | | |
| **EMD42 EMD43** | | CARBIDE, 4 FLUTE MULTIPLE HELIX SHORT LENGTH | ◇ | D3.0 | D20.0 | **558** |
| **EMD44 EMD45** | | CARBIDE, 4 FLUTE MULTIPLE HELIX SHORT LENGTH CORNER RADIUS | ◇ | D3.0 | D20.0 | **559** |
| **EMD38 EMD39** | | CARBIDE, 4 FLUTE MULTIPLE HELIX REGULAR LENGTH | ◇ | D3.0 | D25.0 | **560** |
| **EMD40 EMD41** | | CARBIDE, 4 FLUTE MULTIPLE HELIX REGULAR LENGTH CORNER RADIUS | ◇ | D3.0 | D25.0 | **561** |
| | | RECOMMENDED CUTTING CONDITIONS | | | | **562** |

◆ U.S.A Stock

◇ Call for Availability

◎ : Excellent
○ : Good

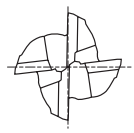
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | | | ○ | | ○ | | |
| ◎ | ◎ | ◎ | ○ | | | | | ○ | | ○ | | |
| ◎ | ◎ | ◎ | ○ | | | | | ○ | | ○ | | |
| ◎ | ◎ | ◎ | ○ | | | | | ○ | | ○ | | |
| ◎ | ◎ | ◎ | ○ | | | | | ○ | | ○ | | |
| ◎ | ◎ | ◎ | ○ | | | | | ○ | | ○ | | |
| ◎ | ◎ | ◎ | ○ | | | | | ○ | | ○ | | |
| ◎ | ◎ | ◎ | ○ | | | | | ○ | | ○ | | |

# V7 Mill STEEL END MILLS

**EMD56 SERIES** PLAIN SHANK
**EMD57 SERIES** FLAT SHANK

## CARBIDE, 4 FLUTE MULTIPLE HELIX STUB LENGTH

- Special flute geometry and multiple helix eliminate vibrations
- Designed for machine mild steels, cast irons, tool steels, and low hardened steels up to HRc 40.
- Excellent work piece finishes.
- Higher speeds, deeper cuts and higher metal removal rates.



MG | 4 | PLAIN | FLAT | P.562

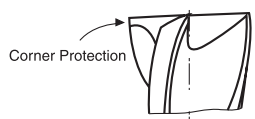
◆ U.S.A Stock

Unit : Inch

| EDP No. PLAIN | EDP No. FLAT | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| EMD56008 | - | 1/8 | 1/8 | 1/8 | 1-1/2 |
| EMD56010 | - | 5/32 | 3/16 | 3/16 | 2 |
| EMD56012 | - | 3/16 | 3/16 | 3/16 | 2 |
| EMD56014 | - | 7/32 | 1/4 | 1/4 | 2 |
| EMD56016 | - | 1/4 | 1/4 | 1/4 | 2 |
| EMD56020 | - | 5/16 | 5/16 | 5/16 | 2 |
| - | EMD57024 | 3/8 | 3/8 | 3/8 | 2 |
| - | EMD57028 | 7/16 | 7/16 | 7/16 | 2-1/2 |
| - | EMD57032 | 1/2 | 1/2 | 1/2 | 2-1/2 |
| - | EMD57040 | 5/8 | 5/8 | 5/8 | 3 |
| - | EMD57048 | 3/4 | 3/4 | 3/4 | 3 |
| - | EMD57064 | 1 | 1 | 1 | 4 |

▶ Shanks 3/8″ and over come standard with Flats.

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | h6 |




◎ : Excellent ○ : Good

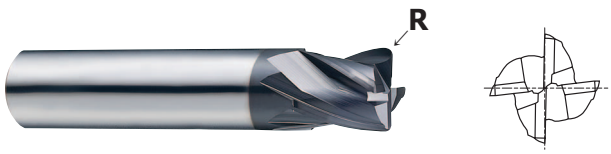
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | | | ○ | | ○ | | |

# V7 Mill STEEL END MILLS

**EMD58 SERIES** PLAIN SHANK
**EMD59 SERIES** FLAT SHANK

## CARBIDE, 4 FLUTE MULTIPLE HELIX STUB LENGTH CORNER RADIUS

- ▶ Special flute geometry and multiple helix eliminate vibrations
- ▶ Designed for machine mild steels, cast irons, tool steels, and low hardened steels up to HRc 40.
- ▶ Excellent work piece finishes.
- ▶ Higher speeds, deeper cuts and higher metal removal rates.






MG | 4 | PLAIN | FLAT

P.562

◆ U.S.A Stock

Unit : Inch

| EDP No. | | Corner Radius | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| PLAIN | FLAT | R | | | | |
| **EMD58008** | - | R.010 | **1/8** | 1/8 | 1/8 | 1-1/2 |
| **EMD58010** | - | R.010 | **5/32** | 3/16 | 3/16 | 2 |
| **EMD58012** | - | R.010 | **3/16** | 3/16 | 3/16 | 2 |
| **EMD58014** | - | R.015 | **7/32** | 1/4 | 1/4 | 2 |
| **EMD58016** | - | R.015 | **1/4** | 1/4 | 1/4 | 2 |
| **EMD58020** | - | R.015 | **5/16** | 5/16 | 5/16 | 2 |
| - | **EMD59024** | R.015 | **3/8** | 3/8 | 3/8 | 2 |
| - | **EMD59028** | R.015 | **7/16** | 7/16 | 7/16 | 2-1/2 |
| - | **EMD59032** | R.025 | **1/2** | 1/2 | 1/2 | 2-1/2 |
| - | **EMD59040** | R.035 | **5/8** | 5/8 | 5/8 | 3 |
| - | **EMD59048** | R.035 | **3/4** | 3/4 | 3/4 | 3 |
| - | **EMD59064** | R.035 | **1** | 1 | 1 | 4 |

▶ Shanks 3/8″ and over come standard with Flats.

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | h6 |

◎ : Excellent ○ : Good

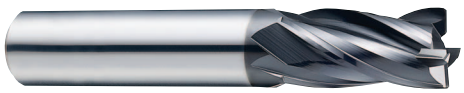
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | | | ○ | | ○ | | |

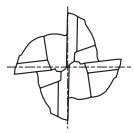
# V7 Mill STEEL END MILLS

**EMD46 SERIES** PLAIN SHANK
**EMD47 SERIES** FLAT SHANK

## CARBIDE, 4 FLUTE MULTIPLE HELIX REGULAR LENGTH

- Special flute geometry and multiple helix eliminate vibrations
- Designed for machine mild steels, cast irons, tool steels, and low hardened steels up to HRc 40.
- Excellent work piece finishes.
- Higher speeds, deeper cuts and higher metal removal rates.





MG | 4 | PLAIN | FLAT | P.562

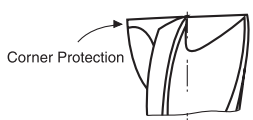
◆ U.S.A Stock

Unit : Inch

| EDP No. PLAIN | EDP No. FLAT | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| EMD46008 | - | 1/8 | 1/8 | 3/8 | 1-1/2 |
| EMD46010 | - | 5/32 | 3/16 | 7/16 | 2 |
| EMD46012 | - | 3/16 | 3/16 | 7/16 | 2 |
| EMD46014 | - | 7/32 | 1/4 | 7/16 | 2-1/2 |
| EMD46016 | - | 1/4 | 1/4 | 1/2 | 2-1/2 |
| EMD46018 | - | 9/32 | 5/16 | 5/8 | 2-1/2 |
| EMD46020 | - | 5/16 | 5/16 | 13/16 | 2-1/2 |
| EMD46022 | EMD47022 | 11/32 | 3/8 | 13/16 | 2-1/2 |
| EMD46024 | EMD47024 | 3/8 | 3/8 | 7/8 | 2-1/2 |
| EMD46026 | EMD47026 | 13/32 | 7/16 | 15/16 | 2-3/4 |
| EMD46028 | EMD47028 | 7/16 | 7/16 | 1 | 2-3/4 |
| EMD46030 | EMD47030 | 15/32 | 1/2 | 1 | 3 |
| EMD46032 | EMD47032 | 1/2 | 1/2 | 1 | 3 |
| EMD46036 | EMD47036 | 9/16 | 9/16 | 1-1/8 | 3-1/2 |
| EMD46040 | EMD47040 | 5/8 | 5/8 | 1-1/4 | 3-1/2 |
| EMD46048 | EMD47048 | 3/4 | 3/4 | 1-1/2 | 4 |
| EMD46064 | EMD47064 | 1 | 1 | 1-1/2 | 4 |

- Shanks 3/8″ and over come standard with Flats.

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | h6 |




◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | | | ○ | | ○ | | |

# V7 Mill STEEL END MILLS

**EMD48 SERIES** PLAIN SHANK
**EMD49 SERIES** FLAT SHANK

## CARBIDE, 4 FLUTE MULTIPLE HELIX REGULAR LENGTH CORNER RADIUS

- ▶ Special flute geometry and multiple helix eliminate vibrations
- ▶ Designed for machine mild steels, cast irons, tool steels, and low hardened steels up to HRc 40.
- ▶ Excellent work piece finishes.
- ▶ Higher speeds, deeper cuts and higher metal removal rates.

MG | 4 | PLAIN | FLAT

P.562

◆ U.S.A Stock

Unit : Inch

| EDP No. | | Corner Radius | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| PLAIN | FLAT | R | | | | |
| **EMD48008** | - | R.010 | **1/8** | 1/8 | 3/8 | 1-1/2 |
| **EMD48012** | - | R.010 | **3/16** | 3/16 | 7/16 | 2 |
| **EMD48016** | - | R.015 | **1/4** | 1/4 | 1/2 | 2-1/2 |
| **EMD48020** | - | R.015 | **5/16** | 5/16 | 13/16 | 2-1/2 |
| **EMD48024** | **EMD49024** | R.015 | **3/8** | 3/8 | 7/8 | 2-1/2 |
| **EMD48028** | **EMD49028** | R.015 | **7/16** | 7/16 | 1 | 2-3/4 |
| **EMD48032** | **EMD49032** | R.025 | **1/2** | 1/2 | 1 | 3 |
| **EMD48036** | **EMD49036** | R.025 | **9/16** | 9/16 | 1-1/8 | 3-1/2 |
| **EMD48040** | **EMD49040** | R.035 | **5/8** | 5/8 | 1-1/4 | 3-1/2 |
| **EMD48048** | **EMD49048** | R.035 | **3/4** | 3/4 | 1-1/2 | 4 |
| **EMD48064** | **EMD49064** | R.035 | **1** | 1 | 1-1/2 | 4 |

▶ Shanks 3/8″ and over come standard with Flats.

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | h6 |

◎ : Excellent ○ : Good

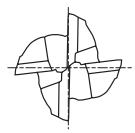
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | | | ○ | | ○ | | |

# V7 Mill STEEL END MILLS

**EMD42 SERIES** PLAIN SHANK
**EMD43 SERIES** FLAT SHANK

## CARBIDE, 4 FLUTE MULTIPLE HELIX SHORT LENGTH

- Special flute geometry and multiple helix eliminate vibrations
- Designed for machine mild steels, cast irons, tool steels, and low hardened steels up to HRc 40.
- Excellent work piece finishes.
- Higher speeds, deeper cuts and higher metal removal rates.



MG | DIN 6527 | 4 | PLAIN | FLAT

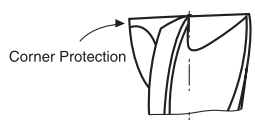
P.562

◇ Call for Availability

Unit : mm

| EDP No. | | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| PLAIN | FLAT | Metric | Inch | | | |
| EMD42030 | EMD43030 | 3.0 | .1181 | 6 | 5 | 50 |
| EMD42040 | EMD43040 | 4.0 | .1575 | 6 | 8 | 54 |
| EMD42050 | EMD43050 | 5.0 | .1969 | 6 | 9 | 54 |
| EMD42060 | EMD43060 | 6.0 | .2362 | 6 | 10 | 54 |
| EMD42080 | EMD43080 | 8.0 | .3150 | 8 | 12 | 58 |
| EMD42100 | EMD43100 | 10.0 | .3937 | 10 | 14 | 66 |
| EMD42120 | EMD43120 | 12.0 | .4724 | 12 | 16 | 73 |
| EMD42140 | EMD43140 | 14.0 | .5512 | 14 | 18 | 75 |
| EMD42160 | EMD43160 | 16.0 | .6299 | 16 | 22 | 82 |
| EMD42180 | EMD43180 | 18.0 | .7087 | 18 | 24 | 84 |
| EMD42200 | EMD43200 | 20.0 | .7874 | 20 | 26 | 92 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | h6 |




◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | | | ○ | | ○ | | |

# V7 Mill STEEL END MILLS

**EMD44 SERIES** PLAIN SHANK
**EMD45 SERIES** FLAT SHANK

## CARBIDE, 4 FLUTE MULTIPLE HELIX SHORT LENGTH CORNER RADIUS

- ▶ Special flute geometry and multiple helix eliminate vibrations
- ▶ Designed for machine mild steels, cast irons, tool steels, and low hardened steels up to HRc 40.
- ▶ Excellent work piece finishes.
- ▶ Higher speeds, deeper cuts and higher metal removal rates.

MG | DIN 6527 | 4 | PLAIN | FLAT

P.562

◇ Call for Availability

Unit : mm

| EDP No. | | Corner Radius | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|
| PLAIN | FLAT | R | Metric | Inch | | | |
| EMD44030 | EMD45030 | R0.3 | 3.0 | .1181 | 6 | 5 | 50 |
| EMD44040 | EMD45040 | R0.3 | 4.0 | .1575 | 6 | 8 | 54 |
| EMD44050 | EMD45050 | R0.3 | 5.0 | .1969 | 6 | 9 | 54 |
| EMD44060 | EMD45060 | R0.4 | 6.0 | .2362 | 6 | 10 | 54 |
| EMD44080 | EMD45080 | R0.4 | 8.0 | .3150 | 8 | 12 | 58 |
| EMD44100 | EMD45100 | R0.4 | 10.0 | .3937 | 10 | 14 | 66 |
| EMD44120 | EMD45120 | R0.6 | 12.0 | .4724 | 12 | 16 | 73 |
| EMD44140 | EMD45140 | R0.6 | 14.0 | .5512 | 14 | 18 | 75 |
| EMD44160 | EMD45160 | R0.8 | 16.0 | .6299 | 16 | 22 | 82 |
| EMD44180 | EMD45180 | R0.8 | 18.0 | .7087 | 18 | 24 | 84 |
| EMD44200 | EMD45200 | R0.8 | 20.0 | .7874 | 20 | 26 | 92 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | h6 |

◎ : Excellent ○ : Good

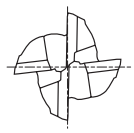
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | | | ○ | | ○ | | |

# V7 Mill STEEL END MILLS

**EMD38 SERIES** PLAIN SHANK
**EMD39 SERIES** FLAT SHANK

## CARBIDE, 4 FLUTE MULTIPLE HELIX REGULAR LENGTH

- Special flute geometry and multiple helix eliminate vibrations
- Designed for machine mild steels, cast irons, tool steels, and low hardened steels up to HRc 40.
- Excellent work piece finishes.
- Higher speeds, deeper cuts and higher metal removal rates.



MG | DIN 6527 | 4 | PLAIN | FLAT

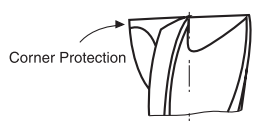
P.562

◇ Call for Availability

Unit : mm

| EDP No. | | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| PLAIN | FLAT | Metric | Inch | | | |
| EMD38030 | EMD39030 | 3.0 | .1181 | 6 | 8 | 57 |
| EMD38040 | EMD39040 | 4.0 | .1575 | 6 | 11 | 57 |
| EMD38050 | EMD39050 | 5.0 | .1969 | 6 | 13 | 57 |
| EMD38060 | EMD39060 | 6.0 | .2362 | 6 | 13 | 57 |
| EMD38080 | EMD39080 | 8.0 | .3150 | 8 | 19 | 63 |
| EMD38100 | EMD39100 | 10.0 | .3937 | 10 | 22 | 72 |
| EMD38120 | EMD39120 | 12.0 | .4724 | 12 | 26 | 83 |
| EMD38140 | EMD39140 | 14.0 | .5512 | 14 | 26 | 83 |
| EMD38160 | EMD39160 | 16.0 | .6299 | 16 | 32 | 92 |
| EMD38180 | EMD39180 | 18.0 | .7087 | 18 | 32 | 92 |
| EMD38200 | EMD39200 | 20.0 | .7874 | 20 | 38 | 104 |
| EMD38250 | EMD39250 | 25.0 | .9800 | 25 | 38 | 104 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | h6 |




◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | | | ○ | | ○ | | |

# V7 Mill STEEL END MILLS

**EMD40 SERIES** PLAIN SHANK
**EMD41 SERIES** FLAT SHANK

## CARBIDE, 4 FLUTE MULTIPLE HELIX REGULAR LENGTH CORNER RADIUS

- ▶ Special flute geometry and multiple helix eliminate vibrations
- ▶ Designed for machine mild steels, cast irons, tool steels, and low hardened steels up to HRc 40.
- ▶ Excellent work piece finishes.
- ▶ Higher speeds, deeper cuts and higher metal removal rates.

MG | DIN 6527 | 4 | PLAIN | FLAT

P.562

◇ Call for Availability

Unit : mm

| EDP No. | | Corner Radius | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|
| PLAIN | FLAT | R | Metric | Inch | | | |
| EMD40030 | EMD41030 | R0.3 | 3.0 | .1181 | 6 | 8 | 57 |
| EMD40040 | EMD41040 | R0.3 | 4.0 | .1575 | 6 | 11 | 57 |
| EMD40050 | EMD41050 | R0.3 | 5.0 | .1969 | 6 | 13 | 57 |
| EMD40060 | EMD41060 | R0.4 | 6.0 | .2362 | 6 | 13 | 57 |
| EMD40080 | EMD41080 | R0.4 | 8.0 | .3150 | 8 | 19 | 63 |
| EMD40100 | EMD41100 | R0.4 | 10.0 | .3937 | 10 | 22 | 72 |
| EMD40120 | EMD41120 | R0.6 | 12.0 | .4724 | 12 | 26 | 83 |
| EMD40140 | EMD41140 | R0.6 | 14.0 | .5512 | 14 | 26 | 83 |
| EMD40160 | EMD41160 | R0.8 | 16.0 | .6299 | 16 | 32 | 92 |
| EMD40180 | EMD41180 | R0.8 | 18.0 | .7087 | 18 | 32 | 92 |
| EMD40200 | EMD41200 | R0.8 | 20.0 | .7874 | 20 | 38 | 104 |
| EMD40250 | EMD41250 | R0.8 | 25.0 | .9800 | 25 | 38 | 104 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | h6 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | | | ○ | | ○ | | |

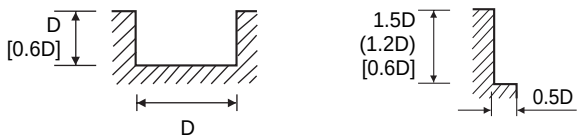
# V7 Mill STEEL END MILLS

## RECOMMENDED CUTTING CONDITIONS

## CARBIDE, 4 FLUTE

### EMD56, EMD57, EMD58, EMD59, EMD46, EMD47, EMD48, EMD49 SERIES

| MATERIAL | ALLOY STEELS CAST IRON | | ALLOY STEELS CAST IRON | |
|---|---|---|---|---|
| HARDNESS | ~ HRc 30 | | HRc 30 ~ HRc 40 | |
| STRENGTH | ~ 1000N/mm² | | 1000 ~ 1300N/mm² | |
| DIAMETER | RPM | FEED | RPM | FEED |
| 1/8 | 12735 | 10.23 | 8910 | 7.07 |
| 3/16 | 8490 | 10.91 | 5940 | 7.61 |
| 1/4 | 6370 | 11.46 | 4460 | 8.06 |
| 5/16 | 5100 | 12.95 | 3560 | 9.08 |
| 3/8 | 4245 | 18.35 | 2970 | 12.73 |
| 7/16 | 4010 | 24.45 | 2800 | 17.01 |
| 1/2 | 3500 | 25.85 | 2460 | 18.04 |
| 9/16 | 3110 | 26.01 | 2180 | 18.08 |
| 5/8 | 2800 | 26.11 | 1960 | 18.30 |
| 3/4 | 2340 | 23.96 | 1640 | 16.74 |
| 1 | 1755 | 17.44 | 1230 | 12.21 |




* 1.2 x D Axial cutting depth should be applied for Short length series DIA over 5/16mm
* 0.6 x D Axial cutting depth should be applied for Stub length series.

* ( ) : Short length Type
* [ ] : Stub length Type

RPM = rev./min.
FEED = inch/min.

# CARBIDE

Being the best through innovation

# V7 Mill INOX

- Silent Cutting of Stainless Steels up to HRc40.
  Designed as Variable Leads, YG-1's Patent.

# SELECTION GUIDE

| ITEM | MODEL | DESCRIPTION | SIZE MIN | SIZE MAX | PAGE |
|---|---|---|---|---|---|
| **INCH** | | | | | |
| EMC75 EMD60 | | CARBIDE, 4 FLUTE STUB LENGTH ◆ | D1/8 | D1 | 566 |
| EMC76 EMD61 | | CARBIDE, 4 FLUTE STUB LENGTH CORNER RADIUS ◆ | D1/8 | D1 | 567 |
| EMB12 EMB37 | | CARBIDE, 4 FLUTE REGULAR LENGTH ◆ | D1/8 | D1 | 568 |
| EMB13 EMB38 | | CARBIDE, 4 FLUTE REGULAR LENGTH CORNER RADIUS ◆ | D1/8 | D1 | 569 |
| EMB20 | | CARBIDE, 4 FLUTE EXTENDED LENGTH LONG REACH ◆ | D1/4 | D1 | 570 |
| EMB78 EMB79 | | CARBIDE, 4 FLUTE REGULAR LENGTH BALL NOSE ◆ | D1/8 | D1 | 571 |
| EMB76 EMB77 | | CARBIDE, 5 FLUTE REGULAR LENGTH ◆ | D1/4 | D1 | 572 |

◆ U.S.A Stock

| | | | | | |
|---|---|---|---|---|---|
| **METRIC** | | | | | |
| EMB41 EMB42 | | CARBIDE, 4 FLUTE SHORT LENGTH ◇ | D3.0 | D20.0 | 573 |
| EMB43 EMB44 | | CARBIDE, 4 FLUTE SHORT LENGTH CORNER RADIUS ◇ | D3.0 | D20.0 | 574 |
| EMB14 EMB39 | | CARBIDE, 4 FLUTE REGULAR LENGTH ◇ | D3.0 | D25.0 | 575 |
| EMB15 EMB40 | | CARBIDE, 4 FLUTE REGULAR LENGTH CORNER RADIUS ◇ | D3.0 | D25.0 | 576 |
| EMB74 EMB75 | | CARBIDE, 4 FLUTE REGULAR LENGTH BALL NOSE ◇ | D3.0 | D25.0 | 577 |
| EMB72 EMB73 | | CARBIDE, 5 FLUTE REGULAR LENGTH ◇ | D6.0 | D25.0 | 578 |
| | | RECOMMENDED CUTTING CONDITIONS | | | 579 |

◇ Call for Availability

◎ : Excellent
○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ○ | ○ | | | | | | | | ◎ | ◎ | ○ |
| ◎ | ○ | ○ | | | | | | | | ◎ | ◎ | ○ |
| ◎ | ○ | ○ | | | | | | | | ◎ | ◎ | ○ |
| ◎ | ○ | ○ | | | | | | | | ◎ | ◎ | ○ |
| ◎ | ○ | ○ | | | | | | | | ◎ | ◎ | ○ |
| ◎ | ○ | ○ | | | | | | | | ◎ | ◎ | ○ |
| ◎ | ○ | ○ | | | | | | | | ◎ | ◎ | ○ |
| ◎ | ○ | ○ | | | | | | | | ◎ | ◎ | ○ |
| ◎ | ○ | ○ | | | | | | | | ◎ | ◎ | ○ |
| ◎ | ○ | ○ | | | | | | | | ◎ | ◎ | ○ |
| ◎ | ○ | ○ | | | | | | | | ◎ | ◎ | ○ |
| ◎ | ○ | ○ | | | | | | | | ◎ | ◎ | ○ |

# V7 Mill INOX END MILLS

EMC75 SERIES PLAIN SHANK
EMD60 SERIES FLAT SHANK

## CARBIDE, 4 FLUTE STUB LENGTH

- Special flute geometry eliminates vibrations
- Designed for mild steels, stainless steel, cast iron, tool steels, titanium alloys, prehardened steels and low hardness material
- Excellent work piece finishes
- Higher speeds, deeper cuts and metal removal rates

MG | 4 | PLAIN | FLAT | P.579

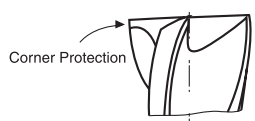
◆ U.S.A Stock

Unit : Inch

| EDP No. PLAIN | EDP No. FLAT | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| EMC75008 | - | 1/8 | 1/8 | 1/8 | 1-1/2 |
| EMC75010 | - | 5/32 | 3/16 | 3/16 | 2 |
| EMC75012 | - | 3/16 | 3/16 | 3/16 | 2 |
| EMC75014 | - | 7/32 | 1/4 | 1/4 | 2 |
| EMC75016 | - | 1/4 | 1/4 | 1/4 | 2 |
| EMC75020 | - | 5/16 | 5/16 | 5/16 | 2 |
| - | EMD60024 | 3/8 | 3/8 | 3/8 | 2 |
| - | EMD60028 | 7/16 | 7/16 | 7/16 | 2-1/2 |
| - | EMD60032 | 1/2 | 1/2 | 1/2 | 2-1/2 |
| - | EMD60040 | 5/8 | 5/8 | 5/8 | 3 |
| - | EMD60048 | 3/4 | 3/4 | 3/4 | 3 |
| - | EMD60064 | 1 | 1 | 1 | 4 |

▶ Shanks 3/8″ and over come standard with Flats.

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | h6 |




◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ○ | ○ | | | | | | | | ◎ | ◎ | ○ |

# V7 Mill INOX END MILLS

**EMC76 SERIES** PLAIN SHANK
**EMD61 SERIES** FLAT SHANK

## CARBIDE, 4 FLUTE STUB LENGTH CORNER RADIUS

- ▶Special flute geometry eliminates vibrations
- ▶Designed for mild steels, stainless steel, cast iron, tool steels, titanium alloys, prehardened steels and low hardness material
- ▶Excellent work piece finishes
- ▶Higher speeds, deeper cuts and metal removal rates

MG | 4 | PLAIN | FLAT

P.579

◆ U.S.A Stock

Unit : Inch

| EDP No. | | Corner Radius | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| PLAIN | FLAT | R | | | | |
| **EMC76008** | - | R.015 | **1/8** | 1/8 | 1/8 | 1-1/2 |
| **EMC76010** | - | R.015 | **5/32** | 3/16 | 3/16 | 2 |
| **EMC76012** | - | R.015 | **3/16** | 3/16 | 3/16 | 2 |
| **EMC76014** | - | R.020 | **7/32** | 1/4 | 1/4 | 2 |
| **EMC76016** | - | R.020 | **1/4** | 1/4 | 1/4 | 2 |
| **EMC76020** | - | R.020 | **5/16** | 5/16 | 5/16 | 2 |
| - | **EMD61024** | R.020 | **3/8** | 3/8 | 3/8 | 2 |
| - | **EMD61028** | R.020 | **7/16** | 7/16 | 7/16 | 2-1/2 |
| - | **EMD61032** | R.030 | **1/2** | 1/2 | 1/2 | 2-1/2 |
| - | **EMD61040** | R.040 | **5/8** | 5/8 | 5/8 | 3 |
| - | **EMD61048** | R.040 | **3/4** | 3/4 | 3/4 | 3 |
| - | **EMD61064** | R.040 | **1** | 1 | 1 | 4 |

▶ Shanks 3/8″ and over come standard with Flats.

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| ±.0012 | h6 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ○ | ○ | | | | | | | | ◎ | ◎ | ○ |

# V7 Mill INOX END MILLS

**EMB12 SERIES** PLAIN SHANK
**EMB37 SERIES** FLAT SHANK

## CARBIDE, 4 FLUTE REGULAR LENGTH

- ▶ Special flute geometry eliminates vibrations
- ▶ Designed for mild steels, stainless steel, cast iron, tool steels, titanium alloys, prehardened steels and low hardness material
- ▶ Excellent work piece finishes
- ▶ Higher speeds, deeper cuts and metal removal rates

MG | 4 | PLAIN | FLAT

P.579

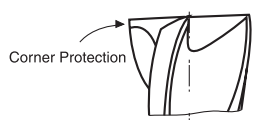
◆ U.S.A Stock

Unit : Inch

| EDP No. PLAIN | EDP No. FLAT | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| EMB12008 | - | 1/8 | 1/8 | 3/8 | 1-1/2 |
| EMB12010 | - | 5/32 | 3/16 | 7/16 | 2 |
| EMB12012 | - | 3/16 | 3/16 | 7/16 | 2 |
| EMB12014 | - | 7/32 | 1/4 | 7/16 | 2-1/2 |
| EMB12016 | - | 1/4 | 1/4 | 1/2 | 2-1/2 |
| EMB12018 | - | 9/32 | 5/16 | 5/8 | 2-1/2 |
| EMB12020 | - | 5/16 | 5/16 | 13/16 | 2-1/2 |
| EMB12022 | - | 11/32 | 3/8 | 13/16 | 2-1/2 |
| - | EMB37024 | 3/8 | 3/8 | 7/8 | 2-1/2 |
| - | EMB37026 | 13/32 | 7/16 | 15/16 | 2-3/4 |
| - | EMB37028 | 7/16 | 7/16 | 1 | 2-3/4 |
| - | EMB37030 | 15/32 | 1/2 | 1 | 3 |
| - | EMB37032 | 1/2 | 1/2 | 1 | 3 |
| - | EMB37036 | 9/16 | 9/16 | 1-1/8 | 3-1/2 |
| - | EMB37040 | 5/8 | 5/8 | 1-1/4 | 3-1/2 |
| - | EMB37048 | 3/4 | 3/4 | 1-1/2 | 4 |
| - | EMB37064 | 1 | 1 | 1-1/2 | 4 |

▶ Shanks 3/8″ and over come standard with Flats.

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | h6 |




◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ○ | ○ | | | | | | | | ◎ | ◎ | ○ |

# V7 Mill INOX END MILLS

**EMB13 SERIES** PLAIN SHANK
**EMB38 SERIES** FLAT SHANK

## CARBIDE, 4 FLUTE REGULAR LENGTH CORNER RADIUS

- ▶Special flute geometry eliminates vibrations
- ▶Designed for mild steels, stainless steel, cast iron, tool steels, titanium alloys, prehardened steels and low hardness material
- ▶Excellent work piece finishes
- ▶Higher speeds, deeper cuts and metal removal rates

MG | 4 | PLAIN | FLAT P.579

◆ U.S.A Stock

Unit : Inch

| EDP No. | | Corner Radius | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| PLAIN | FLAT | R | | | | |
| **EMB13008** | - | R.015 | **1/8** | 1/8 | 3/8 | 1-1/2 |
| **EMB13012** | - | R.015 | **3/16** | 3/16 | 7/16 | 2 |
| **EMB13016** | - | R.020 | **1/4** | 1/4 | 1/2 | 2-1/2 |
| **EMB13020** | - | R.020 | **5/16** | 5/16 | 13/16 | 2-1/2 |
| - | **EMB38024** | R.020 | **3/8** | 3/8 | 7/8 | 2-1/2 |
| - | **EMB38028** | R.020 | **7/16** | 7/16 | 1 | 2-3/4 |
| - | **EMB38032** | R.030 | **1/2** | 1/2 | 1 | 3 |
| - | **EMB38036** | R.030 | **9/16** | 9/16 | 1-1/8 | 3-1/2 |
| - | **EMB38040** | R.040 | **5/8** | 5/8 | 1-1/4 | 3-1/2 |
| - | **EMB38048** | R.040 | **3/4** | 3/4 | 1-1/2 | 4 |
| - | **EMB38064** | R.040 | **1** | 1 | 1-1/2 | 4 |

▶ Shanks 3/8″ and over come standard with Flats.

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| ±.0012 | h6 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ○ | ○ | | | | | | | | ◎ | ◎ | ○ |

# V7 Mill INOX END MILLS

**EMB20 SERIES** PLAIN SHANK FLAT SHANK

## CARBIDE, 4 FLUTE EXTENDED LENGTH, LONG REACH

- ▶ Higher speeds, deeper cuts and metal removal rates.
- ▶ Improved surface finishes
- ▶ New "NANO" AlTiN coating

MG | 4 | PLAIN | FLAT | P.579

◆ U.S.A Stock

Unit : Inch

| EDP No. PLAIN | EDP No. FLAT | Mill Diameter | Shank Diameter | Length of Cut | Reach Length | Overall Length |
|---|---|---|---|---|---|---|
| EMB20160 | - | 1/4 | 1/4 | 3/8 | 1-1/4 | 4 |
| - | EMB20240 | 3/8 | 3/8 | 1/2 | 1-7/8 | 4 |
| - | EMB20320 | 1/2 | 1/2 | 5/8 | 2-1/4 | 4 |
| - | EMB20400 | 5/8 | 5/8 | 3/4 | 2-1/4 | 4-1/8 |
| - | EMB20401 | 5/8 | 5/8 | 3/4 | 3-1/4 | 5 |
| - | EMB20480 | 3/4 | 3/4 | 1 | 2-1/4 | 4-1/4 |
| - | EMB20481 | 3/4 | 3/4 | 1 | 3-1/4 | 5-1/2 |
| - | EMB20640 | 1 | 1 | 1-1/8 | 2-1/4 | 4-1/2 |
| - | EMB20641 | 1 | 1 | 1-1/8 | 3-1/4 | 5-1/2 |
| - | EMB20642 | 1 | 1 | 1-1/8 | 4-1/4 | 6-1/2 |

▶ Shanks 3/8″ and over come standard with Flats.

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | h6 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ○ | ○ | | | | | | | | ◎ | ◎ | ○ |

# V7 Mill INOX END MILLS

**EMB78 SERIES** PLAIN SHANK
**EMB79 SERIES** FLAT SHANK

## CARBIDE, 4 FLUTE REGULAR LENGTH BALL NOSE

- ▶Special flute geometry eliminates vibrations
- ▶Designed for mild steels, stainless steel, cast iron, tool steels, titanium alloys, prehardened steels and low hardness material
- ▶Excellent work piece finishes
- ▶Higher speeds, deeper cuts and metal removal rates

MG | 4 | R ±.0004" | PLAIN | FLAT

P.580

◆ U.S.A Stock

Unit : Inch

| EDP No. | | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| PLAIN | FLAT | R (±.0004) | | | | |
| **EMB78008** | - | R1/16 | **1/8** | 1/8 | 3/8 | 1-1/2 |
| **EMB78010** | - | R5/64 | **5/32** | 3/16 | 7/16 | 2 |
| **EMB78012** | - | R3/32 | **3/16** | 3/16 | 7/16 | 2 |
| **EMB78016** | - | R1/8 | **1/4** | 1/4 | 1/2 | 2-1/2 |
| **EMB78020** | - | R5/32 | **5/16** | 5/16 | 13/16 | 2-1/2 |
| - | **EMB79024** | R3/16 | **3/8** | 3/8 | 7/8 | 2-1/2 |
| - | **EMB79032** | R1/4 | **1/2** | 1/2 | 1 | 3 |
| - | **EMB79040** | R5/16 | **5/8** | 5/8 | 1-1/4 | 3-1/2 |
| - | **EMB79048** | R3/8 | **3/4** | 3/4 | 1-1/2 | 4 |
| - | **EMB79064** | R1/2 | **1** | 1 | 1-1/2 | 4 |

▶ Shanks 3/8″ and over come standard with Flats.

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | h6 |

◎ : Excellent ○ : Good

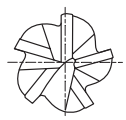
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ○ | ○ | | | | | | | | ◎ | ◎ | ○ |

# V7 Mill INOX END MILLS

**EMB76 SERIES** PLAIN SHANK
**EMB77 SERIES** FLAT SHANK

## CARBIDE, 5 FLUTE REGULAR LENGTH

- Special flute geometry eliminates vibrations
- Designed for mild steels, stainless steel, cast iron, tool steels, titanium alloys, prehardened steels and low hardness material
- Excellent work piece finishes
- Higher speeds, deeper cuts and metal removal rates



MG | 5 | PLAIN | FLAT

P.580

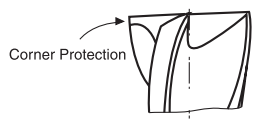
◆ U.S.A Stock

Unit : Inch

| EDP No. PLAIN | EDP No. FLAT | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| EMB76016 | - | 1/4 | 1/4 | 1/2 | 2-1/2 |
| EMB76020 | - | 5/16 | 5/16 | 13/16 | 2-1/2 |
| EMB76024 | EMB77024 | 3/8 | 3/8 | 7/8 | 2-1/2 |
| - | EMB77032 | 1/2 | 1/2 | 1 | 3 |
| - | EMB77036 | 9/16 | 9/16 | 1-1/8 | 3-1/2 |
| - | EMB77040 | 5/8 | 5/8 | 1-1/4 | 3-1/2 |
| - | EMB77048 | 3/4 | 3/4 | 1-1/2 | 4 |
| - | EMB77064 | 1 | 1 | 1-1/2 | 4 |

▶ Shanks 3/8″ and over come standard with Flats.

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | h6 |




◎ : Excellent ○ : Good

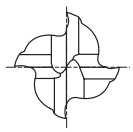
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ○ | ○ | | | | | | | | ◎ | ◎ | ○ |

# V7 Mill INOX END MILLS

**EMB41 SERIES** PLAIN SHANK
**EMB42 SERIES** FLAT SHANK

## CARBIDE, 4 FLUTE SHORT LENGTH

- ▶Special flute geometry eliminates vibrations
- ▶Designed for mild steels, stainless steel, cast iron, tool steels, titanium alloys, prehardened steels and low hardness material
- ▶Excellent work piece finishes
- ▶Higher speeds, deeper cuts and metal removal rates



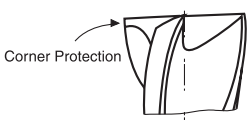
MG | 4 | PLAIN | FLAT | P.579

◇ Call for Availability

Unit : mm

| EDP No. | | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| PLAIN | FLAT | Metric | Inch | | | |
| EMB41030 | EMB42030 | 3.0 | .1181 | 6 | 7 | 54 |
| EMB41040 | EMB42040 | 4.0 | .1575 | 6 | 8 | 54 |
| EMB41050 | EMB42050 | 5.0 | .1969 | 6 | 10 | 54 |
| EMB41060 | EMB42060 | 6.0 | .2362 | 6 | 10 | 54 |
| EMB41080 | EMB42080 | 8.0 | .3150 | 8 | 12 | 58 |
| EMB41100 | EMB42100 | 10.0 | .3937 | 10 | 14 | 66 |
| EMB41120 | EMB42120 | 12.0 | .4724 | 12 | 16 | 73 |
| EMB41140 | EMB42140 | 14.0 | .5512 | 14 | 18 | 75 |
| EMB41160 | EMB42160 | 16.0 | .6299 | 16 | 22 | 82 |
| EMB41180 | EMB42180 | 18.0 | .7087 | 18 | 24 | 84 |
| EMB41200 | EMB42200 | 20.0 | .7874 | 20 | 26 | 92 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | h6 |




◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ○ | ○ | | | | | | | | ◎ | ◎ | ○ |

# V7 Mill INOX END MILLS

**EMB43 SERIES** PLAIN SHANK
**EMB44 SERIES** FLAT SHANK

## CARBIDE, 4 FLUTE SHORT LENGTH CORNER RADIUS

- Special flute geometry eliminates vibrations
- Designed for mild steels, stainless steel, cast iron, tool steels, titanium alloys, prehardened steels and low hardness material
- Excellent work piece finishes
- Higher speeds, deeper cuts and metal removal rates

MG | 4 | PLAIN | FLAT

P.579

◇ Call for Availability

Unit : mm

| EDP No. | | Corner Radius | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|
| PLAIN | FLAT | R | Metric | Inch | | | |
| EMB43030 | EMB44030 | R0.3 | 3.0 | .1181 | 6 | 7 | 54 |
| EMB43040 | EMB44040 | R0.3 | 4.0 | .1575 | 6 | 8 | 54 |
| EMB43050 | EMB44050 | R0.3 | 5.0 | .1969 | 6 | 10 | 54 |
| EMB43060 | EMB44060 | R0.5 | 6.0 | .2362 | 6 | 10 | 54 |
| EMB43080 | EMB44080 | R0.5 | 8.0 | .3150 | 8 | 12 | 58 |
| EMB43100 | EMB44100 | R0.5 | 10.0 | .3937 | 10 | 14 | 66 |
| EMB43120 | EMB44120 | R0.7 | 12.0 | .4724 | 12 | 16 | 73 |
| EMB43140 | EMB44140 | R0.7 | 14.0 | .5512 | 14 | 18 | 75 |
| EMB43160 | EMB44160 | R1.0 | 16.0 | .6299 | 16 | 22 | 82 |
| EMB43180 | EMB44180 | R1.0 | 18.0 | .7087 | 18 | 24 | 84 |
| EMB43200 | EMB44200 | R1.0 | 20.0 | .7874 | 20 | 26 | 92 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| ±0.030 | h6 |

◎ : Excellent ○ : Good

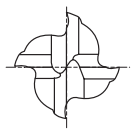
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ○ | ○ | | | | | | | | ◎ | ◎ | ○ |

# V7 Mill INOX END MILLS

**EMB14 SERIES** PLAIN SHANK
**EMB39 SERIES** FLAT SHANK

## CARBIDE, 4 FLUTE REGULAR LENGTH

- ▶Special flute geometry eliminates vibrations
- ▶Designed for mild steels, stainless steel, cast iron, tool steels, titanium alloys, prehardened steels and low hardness material
- ▶Excellent work piece finishes
- ▶Higher speeds, deeper cuts and metal removal rates



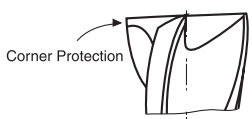
MG | 4 | PLAIN | FLAT | P.579

◇ Call for Availability

Unit : mm

| EDP No. | | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| PLAIN | FLAT | Metric | Inch | | | |
| EMB14030 | - | 3.0 | .1181 | 6 | 8 | 57 |
| EMB14040 | - | 4.0 | .1575 | 6 | 11 | 57 |
| EMB14050 | - | 5.0 | .1969 | 6 | 13 | 57 |
| EMB14060 | - | 6.0 | .2362 | 6 | 13 | 57 |
| EMB14080 | - | 8.0 | .3150 | 8 | 19 | 63 |
| EMB14100 | - | 10.0 | .3937 | 10 | 22 | 72 |
| - | EMB39120 | 12.0 | .4724 | 12 | 26 | 83 |
| - | EMB39140 | 14.0 | .5512 | 14 | 26 | 83 |
| - | EMB39160 | 16.0 | .6299 | 16 | 32 | 92 |
| - | EMB39180 | 18.0 | .7087 | 18 | 32 | 92 |
| - | EMB39200 | 20.0 | .7874 | 20 | 38 | 104 |
| - | EMB39250 | 25.0 | .9800 | 25 | 38 | 104 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | h6 |




◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ○ | ○ | | | | | | | | ◎ | ◎ | ○ |

# V7 Mill INOX END MILLS

**EMB15 SERIES** PLAIN SHANK
**EMB40 SERIES** FLAT SHANK

## CARBIDE, 4 FLUTE REGULAR LENGTH CORNER RADIUS

- Special flute geometry eliminates vibrations
- Designed for mild steels, stainless steel, cast iron, tool steels, titanium alloys, prehardened steels and low hardness material
- Excellent work piece finishes
- Higher speeds, deeper cuts and metal removal rates

MG | 4 | PLAIN | FLAT

P.579

◇ Call for Availability

Unit : mm

| EDP No. | | Corner Radius | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|
| PLAIN | FLAT | R | Metric | Inch | | | |
| EMB15030 | - | R0.3 | 3.0 | .1181 | 6 | 8 | 57 |
| EMB15040 | - | R0.3 | 4.0 | .1575 | 6 | 11 | 57 |
| EMB15050 | - | R0.3 | 5.0 | .1969 | 6 | 13 | 57 |
| EMB15060 | - | R0.5 | 6.0 | .2362 | 6 | 13 | 57 |
| EMB15080 | - | R0.5 | 8.0 | .3150 | 8 | 19 | 63 |
| EMB15100 | - | R0.5 | 10.0 | .3937 | 10 | 22 | 72 |
| - | EMB40120 | R0.7 | 12.0 | .4724 | 12 | 26 | 83 |
| - | EMB40140 | R0.7 | 14.0 | .5512 | 14 | 26 | 83 |
| - | EMB40160 | R1.0 | 16.0 | .6299 | 16 | 32 | 92 |
| - | EMB40180 | R1.0 | 18.0 | .7087 | 18 | 32 | 92 |
| - | EMB40200 | R1.0 | 20.0 | .7874 | 20 | 38 | 104 |
| - | EMB40250 | R1.0 | 25.0 | .9800 | 25 | 38 | 104 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| ±0.030 | h6 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ○ | ○ | | | | | | | | ◎ | ◎ | ○ |

# V7 Mill INOX END MILLS

**EMB74 SERIES** PLAIN SHANK
**EMB75 SERIES** FLAT SHANK

## CARBIDE, 4 FLUTE REGULAR LENGTH BALL NOSE

- ▶Special flute geometry eliminates vibrations
- ▶Designed for mild steels, stainless steel, cast iron, tool steels, titanium alloys, prehardened steels and low hardness material
- ▶Excellent work piece finishes
- ▶Higher speeds, deeper cuts and metal removal rates

MG | 4 | R ±0.01 | PLAIN | FLAT

P.580

◇ Call for Availability

Unit : mm

| EDP No. | | Radius of Ball Nose | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|
| PLAIN | FLAT | R (±0.01) | Metric | Inch | | | |
| EMB74030 | EMB75030 | R1.5 | 3.0 | .1181 | 6 | 8 | 57 |
| EMB74040 | EMB75040 | R2.0 | 4.0 | .1575 | 6 | 11 | 57 |
| EMB74050 | EMB75050 | R2.5 | 5.0 | .1969 | 6 | 13 | 57 |
| EMB74060 | EMB75060 | R3.0 | 6.0 | .2362 | 6 | 13 | 57 |
| EMB74080 | EMB75080 | R4.0 | 8.0 | .3150 | 8 | 19 | 63 |
| EMB74100 | EMB75100 | R5.0 | 10.0 | .3937 | 10 | 22 | 72 |
| EMB74120 | EMB75120 | R6.0 | 12.0 | .4724 | 12 | 26 | 83 |
| EMB74160 | EMB75160 | R8.0 | 16.0 | .6299 | 16 | 32 | 92 |
| EMB74200 | EMB75200 | R10.0 | 20.0 | .7874 | 20 | 38 | 104 |
| EMB74250 | EMB75250 | R12.5 | 25.0 | .9800 | 25 | 38 | 104 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | h6 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ○ | ○ | | | | | | | | ◎ | ◎ | ○ |

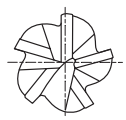
CBN END MILL
i-Xmill END MILL
X5070 END MILLS
X-SPEED ROUGHER END MILLS
X-POWER END MILLS
JET-POWER END MILLS
V7 Mill STEEL END MILLS
V7 Mill INOX END MILLS
ALU-POWER END MILLS
D-POWER END MILLS
STANDARD CARBIDE END MILLS
TANK-POWER END MILLS
STANDARD COBALT & HSS END MILLS
TECHNICAL DATA

# V7 Mill INOX END MILLS

**EMB72 SERIES** PLAIN SHANK
**EMB73 SERIES** FLAT SHANK

## CARBIDE, 5 FLUTE REGULAR LENGTH

- Special flute geometry eliminates vibrations
- Designed for mild steels, stainless steel, cast iron, tool steels, titanium alloys, prehardened steels and low hardness material
- Excellent work piece finishes
- Higher speeds, deeper cuts and metal removal rates



MG | 5 | PLAIN | FLAT

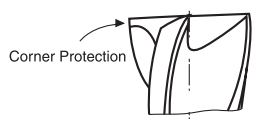
P.580

◇ Call for Availability

Unit : mm

| EDP No. | | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| PLAIN | FLAT | Metric | Inch | | | |
| EMB72060 | EMB73060 | 6.0 | .2362 | 6 | 13 | 57 |
| EMB72080 | EMB73080 | 8.0 | .3150 | 8 | 19 | 63 |
| EMB72100 | EMB73100 | 10.0 | .3937 | 10 | 22 | 72 |
| EMB72120 | EMB73120 | 12.0 | .4724 | 12 | 26 | 83 |
| EMB72140 | EMB73140 | 14.0 | .5512 | 14 | 26 | 83 |
| EMB72160 | EMB73160 | 16.0 | .6299 | 16 | 32 | 92 |
| EMB72180 | EMB73180 | 18.0 | .7087 | 18 | 32 | 92 |
| EMB72200 | EMB73200 | 20.0 | .7874 | 20 | 38 | 104 |
| EMB72250 | EMB73250 | 25.0 | .9800 | 25 | 38 | 104 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | h6 |




◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ○ | ○ | | | | | | | | ◎ | ◎ | ○ |

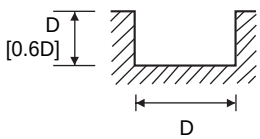
# V7 Mill INOX END MILLS

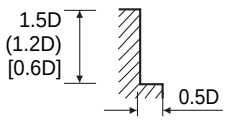
## RECOMMENDED CUTTING CONDITIONS

## CARBIDE, 4 FLUTE

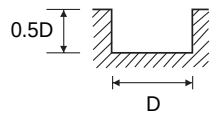
### EMC75, EMD60, EMC76, EMD61, EMB12, EMB37, EMB13, EMB38, EMB20 SERIES

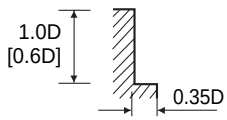
| MATERIAL | ALLOY STEELS CAST IRON | | STAINLESS STEELS 300SERIES | | STAINLESS STEELS 400SERIES | | TITANIUM | | INCONEL | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~HRc 20 | | | | | | | | | |
| STRENGTH | ~1000N/mm² | | | | | | | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/8 | 12735 | 10.23 | 9625 | 7.25 | 13475 | 7.63 | 8320 | 7.63 | 2565 | 2.05 |
| 3/16 | 8490 | 10.91 | 6385 | 8.27 | 12000 | 8.43 | 5550 | 8.43 | 1685 | 1.82 |
| 1/4 | 6370 | 11.46 | 4810 | 9.60 | 6815 | 9.60 | 4160 | 9.61 | 1285 | 2.48 |
| 5/16 | 5100 | 12.95 | 3850 | 10.71 | 5390 | 10.71 | 3330 | 10.71 | 1025 | 2.83 |
| 3/8 | 4245 | 18.35 | 3210 | 15.38 | 4490 | 15.38 | 2770 | 15.38 | 855 | 4.13 |
| 7/16 | 4010 | 24.45 | 2750 | 20.90 | 3850 | 20.90 | 2380 | 20.73 | 735 | 5.49 |
| 1/2 | 3500 | 25.85 | 2400 | 21.02 | 3370 | 21.02 | 2080 | 21.02 | 640 | 5.58 |
| 9/16 | 3110 | 26.01 | 2140 | 21.16 | 2990 | 21.16 | 1850 | 21.16 | 570 | 5.73 |
| 5/8 | 2800 | 26.11 | 1925 | 21.20 | 2700 | 21.20 | 1660 | 21.20 | 510 | 5.58 |
| 3/4 | 2340 | 23.96 | 1600 | 19.43 | 2250 | 19.43 | 1390 | 19.43 | 425 | 5.17 |
| 1 | 1755 | 17.44 | 1200 | 14.73 | 1685 | 15.11 | 1040 | 15.11 | 315 | 4.26 |




* ( ) : Short length Type
* [ ] : Stub length Type




* 1.2 x D Axial cutting depth should be applied for Short length series DIA over 5/16mm
* 0.6 x D Axial cutting depth should be applied for Stub length series.

RPM = rev./min.
FEED = inch/min.

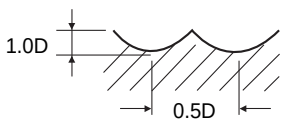
# V7 Mill INOX END MILLS

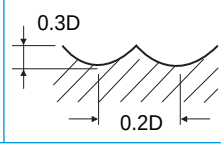
## RECOMMENDED CUTTING CONDITIONS

## CARBIDE, 4 FLUTE BALL NOSE

### EMB78, EMB79 SERIES

| MATERIAL | ALLOY STEELS CAST IRON | | STAINLESS STEELS 300SERIES | | STAINLESS STEELS 400SERIES | | TITANIUM | | INCONEL | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~HRc 20 | | | | | | | | | |
| STRENGTH | ~1000N/mm² | | | | | | | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/8 | 13530 | 53.20 | 7770 | 24.19 | 7020 | 16.38 | 5510 | 10.42 | 3010 | 5.21 |
| 3/16 | 9020 | 42.59 | 5180 | 20.27 | 4680 | 18.21 | 3680 | 8.69 | 2010 | 3.31 |
| 1/4 | 6770 | 40.71 | 3880 | 24.93 | 3510 | 16.38 | 2760 | 8.58 | 1500 | 3.73 |
| 5/16 | 5410 | 50.80 | 3110 | 21.85 | 2810 | 17.49 | 2210 | 10.36 | 1200 | 4.77 |
| 3/8 | 4510 | 42.64 | 2590 | 20.31 | 2340 | 16.60 | 1840 | 8.69 | 1000 | 4.16 |
| 7/16 | 3870 | 39.54 | 2220 | 18.30 | 2010 | 15.01 | 1580 | 8.64 | 860 | 4.35 |
| 1/2 | 3380 | 37.21 | 1940 | 16.79 | 1750 | 13.82 | 1380 | 8.61 | 750 | 4.49 |
| 9/16 | 3010 | 34.21 | 1730 | 15.63 | 1560 | 12.77 | 1230 | 8.03 | 670 | 4.45 |
| 5/8 | 2710 | 31.82 | 1550 | 14.70 | 1400 | 11.93 | 1100 | 7.57 | 600 | 4.41 |
| 3/4 | 2260 | 31.95 | 1290 | 13.27 | 1170 | 10.79 | 920 | 8.74 | 500 | 4.20 |
| 1 | 1690 | 26.49 | 970 | 10.73 | 880 | 8.15 | 690 | 7.37 | 380 | 3.12 |



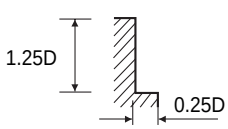



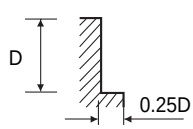

RPM = rev./min.
FEED = inch/min.

## CARBIDE, 5 FLUTE

### EMB76, EMB77 SERIES

| MATERIAL | ALLOY STEELS CAST IRON | | STAINLESS STEELS 300SERIES | | STAINLESS STEELS 400SERIES | | TITANIUM | | INCONEL | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~HRc 20 | | | | | | | | | |
| STRENGTH | ~1000N/mm² | | | | | | | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/4 | 6870 | 46.12 | 5710 | 34.16 | 5310 | 31.79 | 4200 | 24.93 | 1350 | 4.41 |
| 5/16 | 5490 | 41.27 | 4570 | 28.55 | 4250 | 26.45 | 3360 | 20.63 | 1080 | 4.30 |
| 3/8 | 4580 | 45.47 | 3810 | 28.51 | 3540 | 26.33 | 2800 | 20.70 | 900 | 4.49 |
| 7/16 | 3920 | 43.96 | 3270 | 32.59 | 3040 | 23.93 | 2400 | 20.78 | 770 | 4.67 |
| 1/2 | 3430 | 42.83 | 2860 | 35.65 | 2660 | 22.14 | 2100 | 20.84 | 680 | 4.81 |
| 9/16 | 3050 | 41.73 | 2540 | 32.69 | 2360 | 29.58 | 1860 | 20.87 | 600 | 5.35 |
| 5/8 | 2750 | 41.35 | 2290 | 30.92 | 2130 | 28.42 | 1680 | 20.70 | 540 | 5.13 |
| 3/4 | 2290 | 39.63 | 1900 | 28.59 | 1770 | 26.41 | 1400 | 20.70 | 450 | 5.37 |
| 1 | 1720 | 34.19 | 1430 | 24.83 | 1330 | 23.24 | 1050 | 18.31 | 340 | 5.10 |

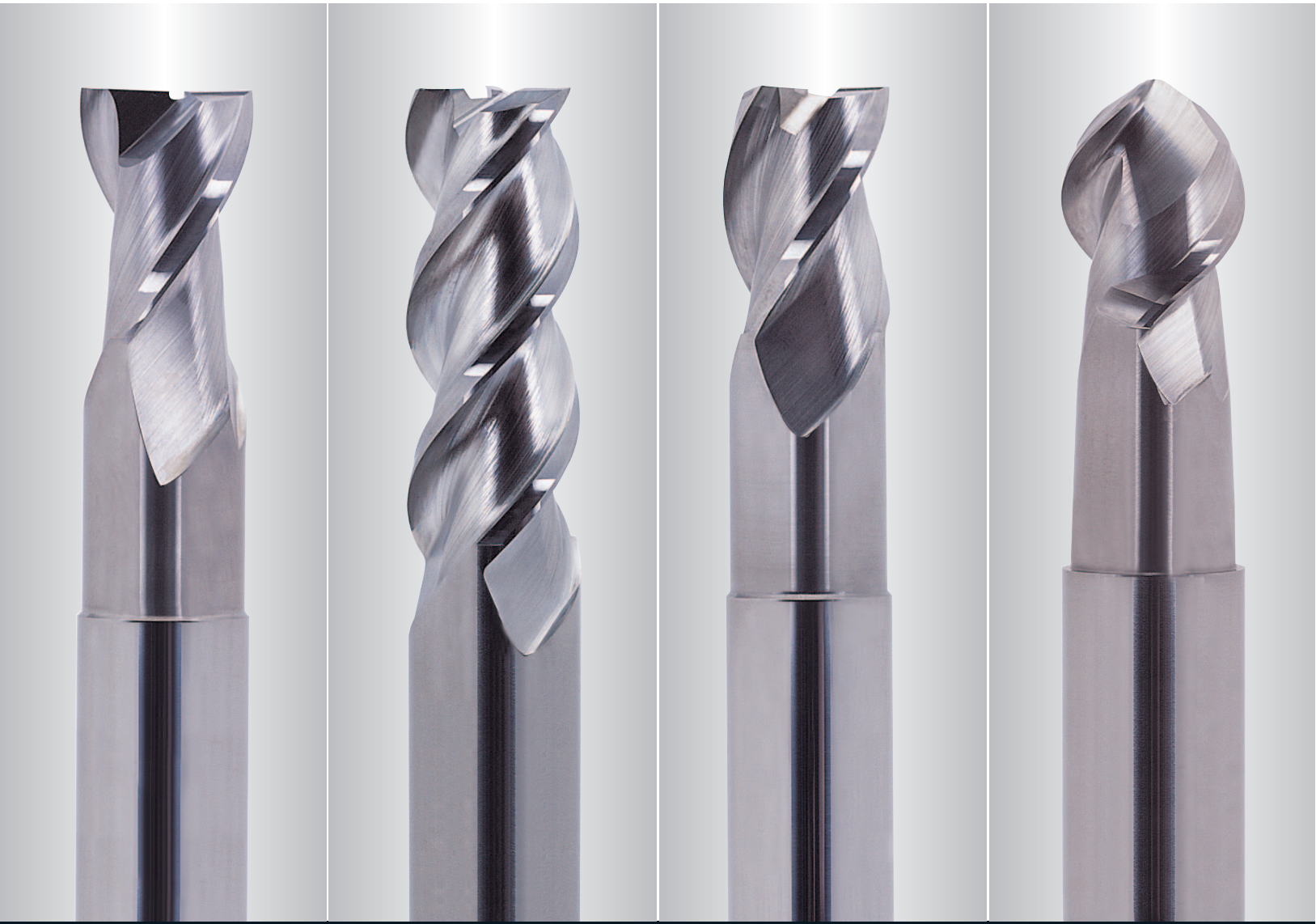



RPM = rev./min.
FEED = inch/min.

# CARBIDE

Being the best through innovation



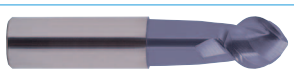
# ALU-POWER

- Silent Cutting of Aluminium Alloys, Mirror Surface

# SELECTION GUIDE

| ITEM | MODEL | DESCRIPTION | SIZE MIN | SIZE MAX | PAGE |
|---|---|---|---|---|---|
| **INCH** | | | | | |
| **E5253** | | CARBIDE, 2 FLUTE 42° HELIX REGULAR & LONG LENGTH - "BANSHEE" (FLAT SHANK) ◆ | D1/4 | D1 | **586** |
| **E5254** | | CARBIDE, 2 FLUTE 42° HELIX REGULAR & LONG LENGTH - "BANSHEE" (PLAIN SHANK) ◆ | D1/16 | D1 | **587** |
| **E5976** | | CARBIDE, 2 FLUTE 37° HELIX with EXTENDED NECK ◆ | D1/4 | D1 | **588** |
| **E5980** | | CARBIDE, 3 FLUTE 45° HELIX STUB LENGTH ◆ | D1/8 | D1 | **589** |
| **E5981** | | CARBIDE, 3 FLUTE 45° HELIX REGULAR LENGTH ◆ | D1/8 | D1 | **590** |
| **E5983** | | CARBIDE, 3 FLUTE, 45° HELIX REGULAR LENGTH CORNER RADIUS ◆ | D1/2 | D1 | **591** |
| **E5982** | | CARBIDE, 3 FLUTE 45° HELIX LONG LENGTH ◆ | D1/4 | D1 | **592** |
| **E5984** | | CARBIDE, 3 FLUTE 45° HELIX LONG LENGTH CORNER RADIUS ◆ | D1/2 | D1 | **593** |
| **E5977** | | CARBIDE, 3 FLUTE 37° HELIX with EXTENDED NECK ◆ | D1/4 | D1 | **594** |
| **E5985** | | CARBIDE, 3 FLUTE 37° HELIX with EXTENDED NECK CORNER RADIUS ◆ | D1/2 | D1 | **595** |
| **E5973** | | CARBIDE, 2 FLUTE CORNER RADIUS with NECK ◆ | D5/32 | D3/4 | **596** |
| **E5974** | | CARBIDE, 2 FLUTE 50° HELIX STUB CUT LENGTH BALL NOSE with NECK ◆ | D1/4 | D3/4 | **597** |
| **E5978** | | CARBIDE, 2 FLUTE 37° HELIX LONG REACH BALL NOSE ◆ | D1/4 | D1 | **598** |
| **E5975** | | CARBIDE, 3 FLUTE 40° HELIX LONG LENGTH BALL NOSE with NECK ◆ | D3/32 | D5/8 | **599** |

◆ U.S.A Stock

| | | | | | |
|---|---|---|---|---|---|
| **METRIC** | | | | | |
| **E5522 EG522** | | CARBIDE, 2 FLUTE 45° HELIX LONG LENGTH TiCN COATED ◇ | D3.0 | D20.0 | **600** |
| **EG930** | | CARBIDE, 2 FLUTE 25° HELIX STUB CUT LENGTH CORNER RADIUS TiCN COATED | D2.0 | D20.0 | **601** |
| **EG909** | | CARBIDE, 2 FLUTE STUB CUT LENGTH CORNER RADIUS with NECK TiCN COATED ◇ | D4.0 | D20.0 | **602** |
| **EG910** |  | CARBIDE 2 FLUTE 50° HELIX STUB CUT LENGTH BALL NOSE with NECK TiCN COATED ◇ | D6.0 | D20.0 | **603** |
| **EG908** | | CARBIDE, 3 FLUTE 40° HELIX LONG LENGTH BALL NOSE with NECK TiCN COATED | D6.0 | D16.0 | **604** |

◇ Call for Availability

◎ : Excellent
○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | | | ◎ | | | |
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| | | | | | | | | | ◎ | | | |

# SELECTION GUIDE

| ITEM | MODEL | DESCRIPTION | SIZE MIN | SIZE MAX | PAGE |
|---|---|---|---|---|---|
| **INCH / SPEED FREEK** | | | | | |
| **EK191** | | T15, 3 FLUTE 42° HELIX REGULAR LENGTH ROUGHING for ALUMINUM ◆ | D1/2 | D2 | **605** |
| **EK191** | | T15, 3 FLUTE 42° HELIX REGULAR LENGTH ROUGHING with CORNER RADIUS for ALUMINUM ◆ | D3/4 | D1-1/4 | **605** |
| **EK226** | | T15, 3 FLUTE 42° HELIX MEDIUM LENGTH ROUGHING for ALUMINUM ◆ | D3/4 | D2 | **606** |
| **EK226** | | T15, 3 FLUTE 42° HELIX MEDIUM LENGTH ROUGHING with CORNER RADIUS for ALUMINUM ◆ | D3/4 | D1-1/4 | **606** |
| **EK192** | | T15, 3 FLUTE 42° HELIX LONG LENGTH ROUGHING for ALUMINUM ◆ | D1/2 | D2 | **607** |
| **EK192** | | T15, 3 FLUTE 42° HELIX LONG LENGTH ROUGHING with CORNER RADIUS for ALUMINUM ◆ | D3/4 | D1-1/4 | **608** |
| **EK196** | | 3 FLUTE BALL NOSE 42° HELIX ROUGHING BALL NOSE REGULAR LENGTH for ALUMINUM ◆ | R1/4 | R5/8 | **609** |
| **EK193** | | 3 FLUTE FINISHING with & without CORNER RADIUS REGULAR & MEDIUM & LONG LENGTH ◆ | D1/2 | D1-1/4 | **610** |

◆ U.S.A Stock

| | | | | | |
|---|---|---|---|---|---|
| **METRIC / SPEED FREEK** | | | | | |
| **EP922** | | PREMIUM HSS-PM, 3 FLUTE, 42° HELIX SHORT LENGTH ROUGHING for ALUMINUM ◇ | D12.0 | D32.0 | **612** |
| **EP924** | | PREMIUM HSS-PM, 3 FLUTE 42° HELIX LONG LENGTH ROUGHING for ALUMINUM ◇ | D12.0 | D32.0 | **613** |
| | | RECOMMENDED CUTTING CONDITIONS | | | **614** |

◇ Call for Availability

◎ : Excellent
○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | | | ◎ | | | |
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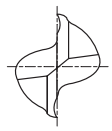
# YG ALU-POWER END MILLS

**E5253 SERIES** FLAT SHANK

## CARBIDE, 2 FLUTE 42° HELIX REGULAR LENGTH - "BANSHEE"

- ▶ High velocity milling of aluminum & other non ferrous materials.
- ▶ Excellent plunging capabilities.
- ▶ Improved surface roughness-cylindrical margin which is controlled tightly.
- ▶ Maximum-metal removal rate.
- ▶ Superior chip evacuation.
- ▶ Mirror face-excellent surface finish.



MG | 2 | 42° | FLAT

P.614

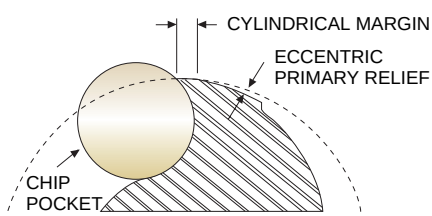
◆ U.S.A Stock

Unit : Inch

| EDP No. | | | | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | | | | |
| 17574 | 17574TN | 17574TC | 17574TF | 17574TE | 1/4 | 3/8 | 3/4 | 2-1/2 |
| 17580 | 17580TN | 17580TC | 17580TF | 17580TE | 5/16 | 3/8 | 13/16 | 2-1/2 |
| 17584 | 17584TN | 17584TC | 17584TF | 17584TE | 3/8 | 3/8 | 1 | 2-1/2 |
| 17593 | 17593TN | 17593TC | 17593TF | 17593TE | 1/2 | 1/2 | 1 | 3 |
| 18593 | 18593TN | 18593TC | 18593TF | 18593TE | 1/2 | 1/2 | 2 | 4 |
| 17595 | 17595TN | 17595TC | 17595TF | 17595TE | 5/8 | 5/8 | 1-1/4 | 3-1/2 |
| 17598 | 17598TN | 17598TC | 17598TF | 17598TE | 3/4 | 3/4 | 1-1/2 | 4 |
| 18598 | 18598TN | 18598TC | 18598TF | 18598TE | 3/4 | 3/4 | 3 | 5-1/2 |
| 17600 | 17600TN | 17600TC | 17600TF | 17600TE | 1 | 1 | 1-1/2 | 4 |
| 18600 | 18600TN | 18600TC | 18600TF | 18600TE | 1 | 1 | 3 | 5-1/2 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0003 |

- High performance in machining aluminum and non-ferrous materials
- Special designed geometry with high rigidity cutting edge
- Improved surface roughness - cylindrical margin which is controlled tightly.
- Excellent chip removal - higher rake angle, higher helix angle(42°), bigger chip pocket.




◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | | | ◎ | | | |

# ALU-POWER END MILLS

**E5254 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE 42° HELIX REGULAR LENGTH - "BANSHEE"

- ▶High velocity milling of aluminum & other non ferrous materials.
- ▶Excellent plunging capabilities.
- ▶Improved surface roughness-cylindrical margin which is controlled tightly.
- ▶Maximum-metal removal rate.
- ▶Superior chip evacuation.
- ▶Mirror face-excellent surface finish.

MG | 2 | 42° | PLAIN

P.614

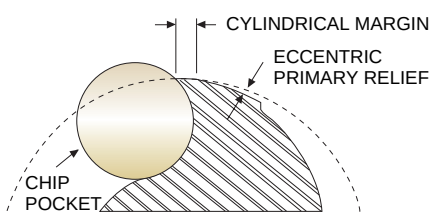
◆ U.S.A Stock

Unit : Inch

| EDP No. | | | | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | | | | |
| 21554 | 21554TN | 21554TC | 21554TF | 21554TE | 1/16 | 1/8 | 1/8 | 1-1/2 |
| 21556 | 21556TN | 21556TC | 21556TF | 21556TE | 3/32 | 1/8 | 1/4 | 1-1/2 |
| 21601 | 21601TN | 21601TC | 21601TF | 21601TE | 1/8 | 1/4 | 5/16 | 1-3/4 |
| 21566 | 21566TN | 21566TC | 21566TF | 21566TE | 3/16 | 1/4 | 7/16 | 2 |
| 21574 | 21574TN | 21574TC | 21574TF | 21574TE | 1/4 | 3/8 | 3/4 | 2-1/2 |
| 21580 | 21580TN | 21580TC | 21580TF | 21580TE | 5/16 | 3/8 | 13/16 | 2-1/2 |
| 21584 | 21584TN | 21584TC | 21584TF | 21584TE | 3/8 | 3/8 | 1 | 2-1/2 |
| 21588 | 21588TN | 21588TC | 21588TF | 21588TE | 7/16 | 7/16 | 1 | 2-3/4 |
| 21593 | 21593TN | 21593TC | 21593TF | 21593TE | 1/2 | 1/2 | 1 | 3 |
| 21901 | 21901TN | 21901TC | 21901TF | 21901TE | 1/2 | 1/2 | 2 | 4 |
| 21595 | 21595TN | 21595TC | 21595TF | 21595TE | 5/8 | 5/8 | 1-1/4 | 3-1/2 |
| 21598 | 21598TN | 21598TC | 21598TF | 21598TE | 3/4 | 3/4 | 1-1/2 | 4 |
| 21902 | 21902TN | 21902TC | 21902TF | 21902TE | 3/4 | 3/4 | 3 | 5-1/2 |
| 21600 | 21600TN | 21600TC | 21600TF | 21600TE | 1 | 1 | 1-1/2 | 4 |
| 21903 | 21903TN | 21903TC | 21903TF | 21903TE | 1 | 1 | 3 | 5-1/2 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0003 |

- High performance in machining aluminum and non-ferrous materials
- Special designed geometry with high rigidity cutting edge
- Improved surface roughness - cylindrical margin which is controlled tightly.
- Excellent chip removal - higher rake angle, higher helix angle(42°), bigger chip pocket.




◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | | | ◎ | | | |

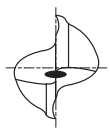
CBN END MILL
i-Xmill END MILL
X5070 END MILLS
X-SPEED ROUGHER END MILLS
X-POWER END MILLS
JET-POWER END MILLS
V7 Mill STEEL END MILLS
V7 Mill INOX END MILLS
ALU-POWER END MILLS
D-POWER END MILLS
STANDARD CARBIDE END MILLS
TANK-POWER END MILLS
STANDARD COBALT & HSS END MILLS
TECHNICAL DATA

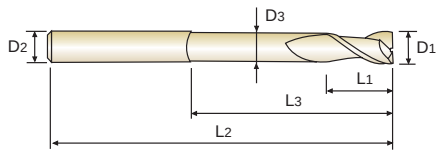
# ALU-POWER END MILLS

**E5976 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE 37° HELIX with EXTENDED NECK

- ▶ High velocity milling of aluminum & other non-ferrous materials.
- ▶ Excellent plunging capabilities.
- ▶ Improved surface roughness-cylindrical margin which is controlled tightly.
- ▶ Maximum-metal removal rate.
- ▶ Superior chip evacuation.
- ▶ Mirror face-excellent surface finish.






MG | 2 | 37° | PLAIN

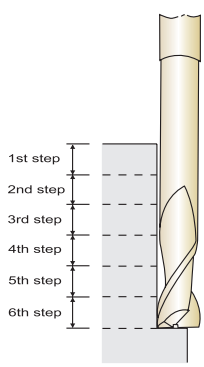
P.617

◆ U.S.A Stock

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|
| UNCOATED | TiCN COATED | $D_1$ | $D_2$ | $L_1$ | $L_3$ | $L_2$ | $D_3$ |
| **39573** | **39573TC** | **1/4** | 1/4 | 3/8 | 2-1/4 | 4 | .220 |
| **39584** | **39584TC** | **3/8** | 3/8 | 1/2 | 2-1/4 | 4 | .345 |
| **39593** | **39593TC** | **1/2** | 1/2 | 5/8 | 2-1/4 | 5 | .470 |
| **39908** | **39908TC** | **1/2** | 1/2 | 5/8 | 3-1/4 | 6 | .470 |
| **39901** | **39901TC** | **1/2** | 1/2 | 5/8 | 4 | 6 | .470 |
| **39595** | **39595TC** | **5/8** | 5/8 | 3/4 | 2-1/4 | 5 | .585 |
| **39902** | **39902TC** | **5/8** | 5/8 | 3/4 | 3-1/4 | 6 | .585 |
| **39903** | **39903TC** | **5/8** | 5/8 | 3/4 | 4-1/4 | 7 | .585 |
| **39598** | **39598TC** | **3/4** | 3/4 | 1 | 2-1/4 | 5 | .710 |
| **39904** | **39904TC** | **3/4** | 3/4 | 1 | 3-1/4 | 6 | .710 |
| **39905** | **39905TC** | **3/4** | 3/4 | 1 | 4-1/4 | 7 | .710 |
| **39600** | **39600TC** | **1** | 1 | 1-1/8 | 2-1/4 | 5 | .960 |
| **39906** | **39906TC** | **1** | 1 | 1-1/8 | 3-1/4 | 6 | .960 |
| **39907** | **39907TC** | **1** | 1 | 1-1/8 | 4-1/4 | 7 | .960 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0005 | 0~−.0003 |




**STEP MILLING**

◎ : Excellent ○ : Good

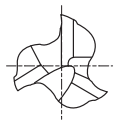
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | | | ◎ | | | |

# ALU-POWER END MILLS

**E5980 SERIES** PLAIN SHANK

## CARBIDE, 3 FLUTE 45° HELIX STUB LENGTH

- ▶Designed to machine aluminium at high speed condition.
- ▶Improved surface roughness-cylindrical margin which is controlled tightly.
- ▶Mirror face-excellent surface finish.



MG | 3 | 45° | PLAIN

P.615

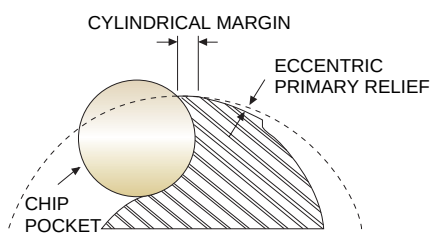
◆ U.S.A Stock

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| UNCOATED | TiCN COATED | | | | |
| 25558 | 25558TC | 1/8 | 1/8 | 1/4 | 1-1/2 |
| 25565 | 25565TC | 3/16 | 3/16 | 5/16 | 2 |
| 25573 | 25573TC | 1/4 | 1/4 | 3/8 | 2 |
| 25579 | 25579TC | 5/16 | 5/16 | 7/16 | 2 |
| 25584 | 25584TC | 3/8 | 3/8 | 1/2 | 2 |
| 25588 | 25588TC | 7/16 | 7/16 | 9/16 | 2-1/2 |
| 25593 | 25593TC | 1/2 | 1/2 | 5/8 | 2-1/2 |
| 25595 | 25595TC | 5/8 | 5/8 | 3/4 | 3 |
| 25598 | 25598TC | 3/4 | 3/4 | 1 | 3 |
| 25600 | 25600TC | 1 | 1 | 1-1/4 | 3 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0005 | 0~−.0003 |

- High performance in machining aluminum and non-ferrous materials
- Special designed geometry with high rigidity cutting edge
- Improved surface roughness - cylindrical margin which is controlled tightly.
- Excellent chip removal - higher rake angle, higher helix angle(45°), bigger chip pocket.




◎ : Excellent ○ : Good

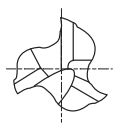
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | | | ◎ | | | |

# YG ALU-POWER END MILLS

**E5981 SERIES** PLAIN SHANK

## CARBIDE, 3 FLUTE 45° HELIX REGULAR LENGTH

- ▶High velocity milling of aluminum & other non-ferrous materials.
- ▶3flute and 45° helix allow harmonic balance at high speed condition and smooth cutting.
- ▶Improved surface roughness-cylindrical margin which is controlled tightly
- ▶Maximum-metal removal rate.
- ▶Superior chip evacuation.
- ▶Mirror face-excellent surface finish.



MG | 3 | 45° | PLAIN

P.615

◆ U.S.A Stock

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| UNCOATED | TiCN COATED | | | | |
| **28558** | **28558TC** | **1/8** | 1/8 | 3/8 | 1-1/2 |
| **28565** | **28565TC** | **3/16** | 3/16 | 9/16 | 2 |
| **28573** | **28573TC** | **1/4** | 1/4 | 5/8 | 2-1/2 |
| **28579** | **28579TC** | **5/16** | 5/16 | 5/8 | 2-1/2 |
| **28584** | **28584TC** | **3/8** | 3/8 | 1 | 2-1/2 |
| **28588** | **28588TC** | **7/16** | 7/16 | 1-1/4 | 2-3/4 |
| **28593** | **28593TC** | **1/2** | 1/2 | 1-1/4 | 3 |
| **28595** | **28595TC** | **5/8** | 5/8 | 1-5/8 | 3-1/2 |
| **28598** | **28598TC** | **3/4** | 3/4 | 1-5/8 | 4 |
| **28600** | **28600TC** | **1** | 1 | 2 | 5 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0005 | 0~−.0003 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | | | ◎ | | | |

# ALU-POWER END MILLS

**E5983 SERIES** PLAIN SHANK

## CARBIDE, 3 FLUTE 45° HELIX REGULAR LENGTH CORNER RADIUS

- ▶High velocity milling of aluminum & other non-ferrous materials.
- ▶3flute and 45° helix allow harmonic balance at high speed condition and smooth cutting.
- ▶Improved surface roughness-cylindrical margin which is controlled tightly
- ▶Maximum-metal removal rate.
- ▶Superior chip evacuation.
- ▶Mirror face-excellent surface finish.

MG | 3 | 45° | PLAIN

P.615

◆ U.S.A Stock

Unit : Inch

| EDP No. | | Corner Radius | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| UNCOATED | TiCN COATED | R | | | | |
| **EA50321** | **EA50321C** | R.060 | **1/2** | 1/2 | 1-1/4 | 3 |
| **EA50401** | **EA50401C** | R.060 | **5/8** | 5/8 | 1-5/8 | 3-1/2 |
| **EA50481** | **EA50481C** | R.060 | **3/4** | 3/4 | 1-5/8 | 4 |
| **EA50641** | **EA50641C** | R.065 | **1** | 1 | 2 | 5 |
| **EA20321** | **EA20321C** | R.120 | **1/2** | 1/2 | 1-1/4 | 3 |
| **EA20401** | **EA20401C** | R.120 | **5/8** | 5/8 | 1-5/8 | 3-1/2 |
| **EA20481** | **EA20481C** | R.120 | **3/4** | 3/4 | 1-5/8 | 4 |
| **EA20641** | **EA20641C** | R.120 | **1** | 1 | 2 | 5 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0005 | 0~−.0003 |

◎ : Excellent ○ : Good

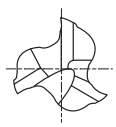
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | | | ◎ | | | |

# YG ALU-POWER END MILLS

**E5982 SERIES** PLAIN SHANK

## CARBIDE, 3 FLUTE 45° HELIX LONG LENGTH

- ▶High velocity milling of aluminum & other non-ferrous materials.
- ▶3flute and 45° helix allow harmonic balance at high speed condition and smooth cutting.
- ▶Improved surface roughness-cylindrical margin which is controlled tightly
- ▶Maximum-metal removal rate.
- ▶Superior chip evacuation.
- ▶Mirror face-excellent surface finish.



MG | 3 | 45° | PLAIN

P.615

◆ U.S.A Stock

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| UNCOATED | TiCN COATED | | | | |
| **36573** | **36573TC** | **1/4** | 1/4 | 1-1/4 | 3-1/4 |
| **36579** | **36579TC** | **5/16** | 5/16 | 1-1/4 | 3-1/2 |
| **36584** | **36584TC** | **3/8** | 3/8 | 1-1/2 | 3-1/2 |
| **36588** | **36588TC** | **7/16** | 7/16 | 2 | 4 |
| **36593** | **36593TC** | **1/2** | 1/2 | 2 | 4 |
| **36595** | **36595TC** | **5/8** | 5/8 | 2-1/2 | 5 |
| **36598** | **36598TC** | **3/4** | 3/4 | 3-1/4 | 6 |
| **36600** | **36600TC** | **1** | 1 | 3-1/4 | 6 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0005 | 0~−.0003 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | | | ◎ | | | |

# ALU-POWER END MILLS

**E5984 SERIES** PLAIN SHANK

## CARBIDE, 3 FLUTE 45° HELIX LONG LENGTH CORNER RADIUS

- ▶High velocity milling of aluminum & other non-ferrous materials.
- ▶3flute and 45° helix allow harmonic balance at high speed condition and smooth cutting.
- ▶Improved surface roughness-cylindrical margin which is controlled tightly
- ▶Maximum-metal removal rate.
- ▶Superior chip evacuation.
- ▶Mirror face-excellent surface finish.

MG | 3 | 45° | PLAIN

P.615

◆ U.S.A Stock

Unit : Inch

| EDP No. | | Corner Radius | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| UNCOATED | TiCN COATED | R | | | | |
| **EA60321** | **EA60321C** | R.060 | **1/2** | 1/2 | 2 | 4 |
| **EA60401** | **EA60401C** | R.060 | **5/8** | 5/8 | 2-1/2 | 5 |
| **EA60481** | **EA60481C** | R.060 | **3/4** | 3/4 | 3-1/4 | 6 |
| **EA60641** | **EA60641C** | R.060 | **1** | 1 | 3-1/4 | 6 |
| **EA30321** | **EA30321C** | R.120 | **1/2** | 1/2 | 2 | 4 |
| **EA30401** | **EA30401C** | R.120 | **5/8** | 5/8 | 2-1/2 | 5 |
| **EA30481** | **EA30481C** | R.120 | **3/4** | 3/4 | 3-1/4 | 6 |
| **EA30641** | **EA30641C** | R.120 | **1** | 1 | 3-1/4 | 6 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0005 | 0~−.0003 |

◎ : Excellent ○ : Good

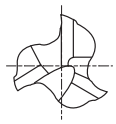
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | | | ◎ | | | |

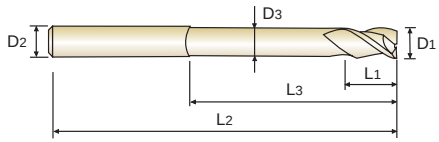
# ALU-POWER END MILLS

**E5977 SERIES** PLAIN SHANK

## CARBIDE, 3 FLUTE 37° HELIX with EXTENDED NECK

- High velocity milling of aluminum & other non-ferrous materials.
- 3flute and 37° helix allow harmonic balance at high speed condition and smooth cutting.
- Improved surface roughness-cylindrical margin which is controlled tightly.
- Maximum-metal removal rate.
- Superior chip evacuation.
- Mirror face-excellent surface finish.






MG | 3 | 37° | PLAIN

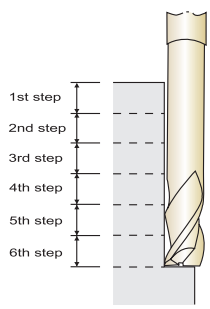
P.616

◆ U.S.A Stock

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|
| UNCOATED | TiCN COATED | $D_1$ | $D_2$ | $L_1$ | $L_3$ | $L_2$ | $D_3$ |
| 40573 | 40573TC | 1/4 | 1/4 | 3/8 | 2-1/4 | 4 | .220 |
| 40584 | 40584TC | 3/8 | 3/8 | 1/2 | 2-1/4 | 4 | .345 |
| 40593 | 40593TC | 1/2 | 1/2 | 5/8 | 2-1/4 | 5 | .470 |
| 40901 | 40901TC | 1/2 | 1/2 | 5/8 | 3-1/4 | 6 | .470 |
| 40902 | 40902TC | 1/2 | 1/2 | 5/8 | 4 | 6 | .470 |
| 40595 | 40595TC | 5/8 | 5/8 | 3/4 | 2-1/4 | 5 | .585 |
| 40903 | 40903TC | 5/8 | 5/8 | 3/4 | 3-1/4 | 6 | .585 |
| 40904 | 40904TC | 5/8 | 5/8 | 3/4 | 4-1/4 | 7 | .585 |
| 40598 | 40598TC | 3/4 | 3/4 | 1 | 2-1/4 | 5 | .710 |
| 40905 | 40905TC | 3/4 | 3/4 | 1 | 3-1/4 | 6 | .710 |
| 40906 | 40906TC | 3/4 | 3/4 | 1 | 4-1/4 | 7 | .710 |
| 40600 | 40600TC | 1 | 1 | 1-1/8 | 2-1/4 | 5 | .960 |
| 40907 | 40907TC | 1 | 1 | 1-1/8 | 3-1/4 | 6 | .960 |
| 40908 | 40908TC | 1 | 1 | 1-1/8 | 4-1/4 | 7 | .960 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0005 | 0~−.0003 |




**STEP MILLING**

◎ : Excellent ○ : Good

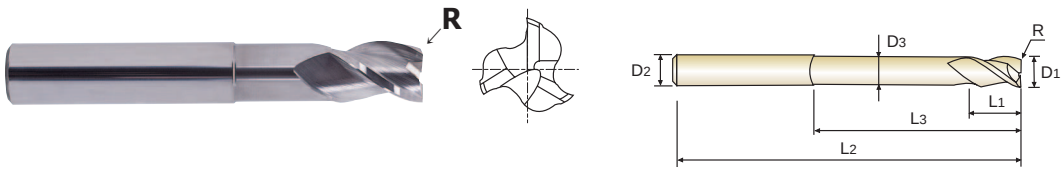
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | | | ◎ | | | |

# ALU-POWER END MILLS

**E5985 SERIES** PLAIN SHANK

## CARBIDE, 3 FLUTE 37° HELIX with EXTENDED NECK CORNER RADIUS

- ▶High velocity milling of aluminum & other non-ferrous materials.
- ▶3flute and 37° helix allow harmonic balance at high speed condition and smooth cutting.
- ▶Improved surface roughness-cylindrical margin which is controlled tightly.
- ▶Maximum-metal removal rate.
- ▶Superior chip evacuation.
- ▶Mirror face-excellent surface finish.




MG | 3 | 37° | PLAIN

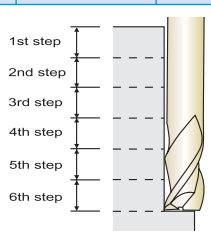
P.616

◆ U.S.A Stock

Unit : Inch

| EDP No. | | Corner Radius | Mill Diameter | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiCN COATED | R | D1 | D2 | L1 | L3 | L2 | D3 |
| EA40321 | EA40321C | R.060 | 1/2 | 1/2 | 5/8 | 3-1/4 | 6 | .470 |
| EA40322 | EA40322C | R.060 | 1/2 | 1/2 | 5/8 | 4 | 6 | .470 |
| EA40401 | EA40401C | R.060 | 5/8 | 5/8 | 3/4 | 2-1/4 | 5 | .585 |
| EA40402 | EA40402C | R.060 | 5/8 | 5/8 | 3/4 | 3-1/4 | 6 | .585 |
| EA40403 | EA40403C | R.060 | 5/8 | 5/8 | 3/4 | 4-1/4 | 7 | .585 |
| EA40481 | EA40481C | R.060 | 3/4 | 3/4 | 1 | 2-1/4 | 5 | .710 |
| EA40482 | EA40482C | R.060 | 3/4 | 3/4 | 1 | 3-1/4 | 6 | .710 |
| EA40483 | EA40483C | R.060 | 3/4 | 3/4 | 1 | 4-1/4 | 7 | .710 |
| EA40641 | EA40641C | R.060 | 1 | 1 | 1-1/8 | 2-1/4 | 5 | .960 |
| EA40642 | EA40642C | R.060 | 1 | 1 | 1-1/8 | 3-1/4 | 6 | .960 |
| EA40643 | EA40643C | R.060 | 1 | 1 | 1-1/8 | 4-1/4 | 7 | .960 |
| EA10321 | EA10321C | R.120 | 1/2 | 1/2 | 5/8 | 3-1/4 | 6 | .470 |
| EA10322 | EA10322C | R.120 | 1/2 | 1/2 | 5/8 | 4 | 6 | .470 |
| EA10401 | EA10401C | R.120 | 5/8 | 5/8 | 3/4 | 2-1/4 | 5 | .585 |
| EA10402 | EA10402C | R.120 | 5/8 | 5/8 | 3/4 | 3-1/4 | 6 | .585 |
| EA10403 | EA10403C | R.120 | 5/8 | 5/8 | 3/4 | 4-1/4 | 7 | .585 |
| EA10481 | EA10481C | R.120 | 3/4 | 3/4 | 1 | 2-1/4 | 5 | .710 |
| EA10482 | EA10482C | R.120 | 3/4 | 3/4 | 1 | 3-1/4 | 6 | .710 |
| EA10483 | EA10483C | R.120 | 3/4 | 3/4 | 1 | 4-1/4 | 7 | .710 |
| EA10641 | EA10641C | R.120 | 1 | 1 | 1-1/8 | 2-1/4 | 5 | .960 |
| EA10642 | EA10642C | R.120 | 1 | 1 | 1-1/8 | 3-1/4 | 6 | .960 |
| EA10643 | EA10643C | R.120 | 1 | 1 | 1-1/8 | 4-1/4 | 7 | .960 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0005 | 0~−.0003 |




STEP MILLING

◎ : Excellent ○ : Good

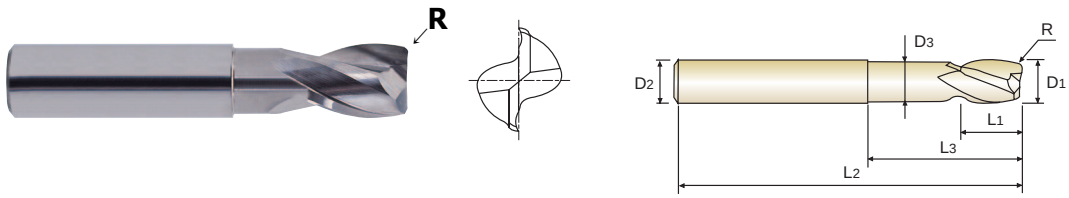
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | | | ◎ | | | |

# ALU-POWER END MILLS

**E5973 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE CORNER RADIUS with NECK

- Excellent cutting qualities on stainless steel, aluminum, copper.
- Increased tool life and higher cutting accuracy.
- Mirror face-excellent surface finish.




MG | 2 | 30° | R ±.001 | PLAIN

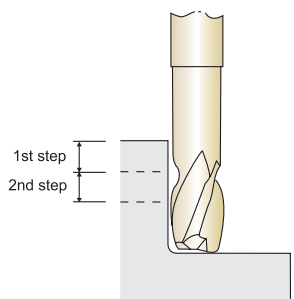
P.617

◆ U.S.A Stock

Unit : Inch

| EDP No. | | Corner Radius | Mill Diameter | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiCN COATED | R | D1 | D2 | L1 | L3 | L2 | D3 |
| **24562** | **24562TC** | R.012 | **5/32** | 1/4 | 3/16 | 3/8 | 2 | .140 |
| **24573** | **24573TC** | R.020 | **1/4** | 1/4 | 5/16 | 3/4 | 2-3/8 | .226 |
| **24579** | **24579TC** | R.024 | **5/16** | 5/16 | 3/8 | 1-1/8 | 2-3/4 | .282 |
| **24584** | **24584TC** | R.031 | **3/8** | 3/8 | 1/2 | 1-1/2 | 3-1/8 | .336 |
| **24593** | **24593TC** | R.040 | **1/2** | 1/2 | 9/16 | 1-1/2 | 3-1/2 | .460 |
| **24595** | **24595TC** | R.051 | **5/8** | 5/8 | 3/4 | 1-3/4 | 4 | .566 |
| **24598** | **24598TC** | R.063 | **3/4** | 3/4 | 1 | 1-3/4 | 4 | .670 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0003 |




**STEP MILLING**

◎ : Excellent ○ : Good

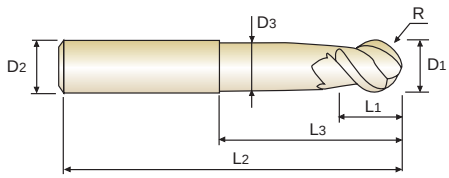
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | | | ◎ | | | |

# ALU-POWER END MILLS

**E5974 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE 50° HELIX STUB CUT LENGTH BALL NOSE with NECK

- ▶Excellent cutting qualities on stainless steel, aluminum, copper.
- ▶Increased tool life and higher cutting accuracy.
- ▶Mirror face-excellent surface finish.




MG | 2 | 50° | R ±.0005 | PLAIN

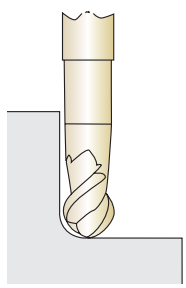
P.619

◆ U.S.A Stock

Unit : Inch

| EDP No. | | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiCN COATED | R (±.0005) | D1 | D2 | L1 | L3 | L2 | D3 |
| **37573** | **37573TC** | R 1/8 | **1/4** | 1/4 | 7/32 | 1 | 2-1/4 | .226 |
| **37579** | **37579TC** | R 5/32 | **5/16** | 5/16 | 9/32 | 1-1/8 | 2-1/2 | .280 |
| **37584** | **37584TC** | R 3/16 | **3/8** | 3/8 | 11/32 | 1-3/8 | 3 | .335 |
| **37593** | **37593TC** | R 1/4 | **1/2** | 1/2 | 13/32 | 1-1/2 | 3 | .460 |
| **37595** | **37595TC** | R 5/16 | **5/8** | 5/8 | 9/16 | 2 | 3-1/2 | .566 |
| **37598** | **37598TC** | R 3/8 | **3/4** | 3/4 | 11/16 | 2 | 4 | .671 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0010 | 0~−.0003 |



◎ : Excellent ○ : Good

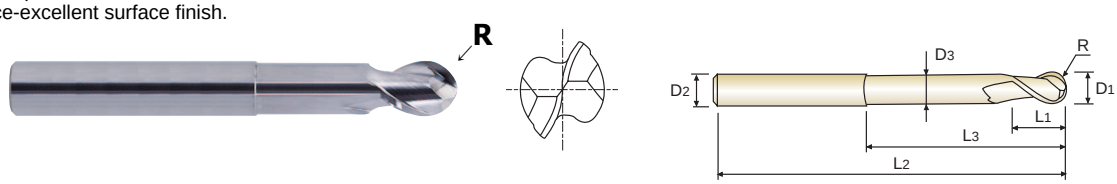
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | | | ◎ | | | |

# ALU-POWER END MILLS

**E5978 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE 37° HELIX LONG REACH BALL NOSE

- ▶ High velocity milling of aluminum & other non-ferrous materials.
- ▶ Extended neck design which is suitable for step milling.
- ▶ Improved surface roughness-cylinderical margin which is controlled tightly
- ▶ Maximum-metal removal rate.
- ▶ Superior chip evacuation.
- ▶ Mirror face-excellent surface finish.




MG | 2 | 37° | R ±.001 | PLAIN

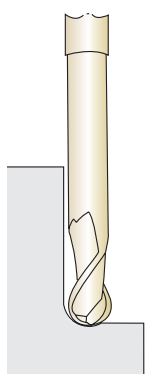
P.618

◆ U.S.A Stock

Unit : Inch

| EDP No. | | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiCN COATED | R (±.001) | D1 | D2 | L1 | L3 | L2 | D3 |
| **89573** | **89573TC** | R 1/8 | **1/4** | 1/4 | 3/8 | 2-1/4 | 4 | .220 |
| **89584** | **89584TC** | R 3/16 | **3/8** | 3/8 | 1/2 | 2-1/4 | 4 | .345 |
| **89593** | **89593TC** | R 1/4 | **1/2** | 1/2 | 5/8 | 2-1/4 | 5 | .470 |
| **89901** | **89901TC** | R 1/4 | **1/2** | 1/2 | 5/8 | 3-1/4 | 6 | .470 |
| **89902** | **89902TC** | R 1/4 | **1/2** | 1/2 | 5/8 | 4 | 6 | .470 |
| **89595** | **89595TC** | R 5/16 | **5/8** | 5/8 | 3/4 | 2-1/4 | 5 | .585 |
| **89903** | **89903TC** | R 5/16 | **5/8** | 5/8 | 3/4 | 3-1/4 | 6 | .585 |
| **89904** | **89904TC** | R 5/16 | **5/8** | 5/8 | 3/4 | 4-1/4 | 7 | .585 |
| **89598** | **89598TC** | R 3/8 | **3/4** | 3/4 | 1 | 2-1/4 | 5 | .710 |
| **89905** | **89905TC** | R 3/8 | **3/4** | 3/4 | 1 | 3-1/4 | 6 | .710 |
| **89906** | **89906TC** | R 3/8 | **3/4** | 3/4 | 1 | 4-1/4 | 7 | .710 |
| **89600** | **89600TC** | R1/2 | **1** | 1 | 1-1/8 | 2-1/4 | 5 | .960 |
| **89907** | **89907TC** | R1/2 | **1** | 1 | 1-1/8 | 3-1/4 | 6 | .960 |
| **89908** | **89908TC** | R1/2 | **1** | 1 | 1-1/8 | 4-1/4 | 7 | .960 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0003 |



◎ : Excellent ○ : Good

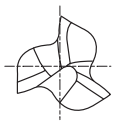
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | | | ◎ | | | |

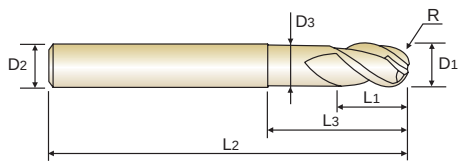
# ALU-POWER END MILLS

**E5975 SERIES** PLAIN SHANK

## CARBIDE, 3 FLUTE 40° HELIX LONG LENGTH BALL NOSE with NECK

- ▶Excellent cutting qualities on stainless steel, aluminum, copper.
- ▶Increased tool life and higher cutting accuracy.
- ▶Mirror face-excellent surface finish.






MG | 3 | 40° | R ±.0005 | PLAIN

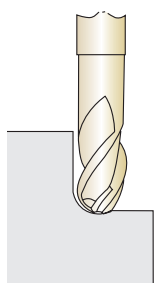
P.619

◆ U.S.A Stock

Unit : Inch

| EDP No. | | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiCN COATED | R (±.0005) | D1 | D2 | L1 | L3 | L2 | D3 |
| **38602** | **38602TC** | R 3/64 | **3/32** | 1/4 | 1/8 | 3/16 | 2-3/8 | .090 |
| **38601** | **38601TC** | R 1/16 | **1/8** | 1/4 | 3/16 | 1/4 | 2-3/8 | .117 |
| **38566** | **38566TC** | R 3/32 | **3/16** | 1/4 | 1/4 | 3/8 | 2-1/2 | .172 |
| **38573** | **38573TC** | R 1/8 | **1/4** | 1/4 | 3/8 | 1/2 | 3 | .235 |
| **38579** | **38579TC** | R 5/32 | **5/16** | 5/16 | 1/2 | 1 | 3 | .289 |
| **38584** | **38584TC** | R 3/16 | **3/8** | 3/8 | 5/8 | 1-1/4 | 3-1/8 | .351 |
| **38593** | **38593TC** | R 1/4 | **1/2** | 1/2 | 3/4 | 1-3/8 | 3-1/2 | .476 |
| **38595** | **38595TC** | R 5/16 | **5/8** | 5/8 | 1 | 1-1/2 | 4 | .601 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0003 |



◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | | | ◎ | | | |

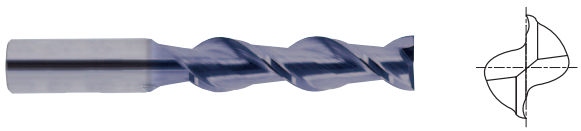
CBN END MILL
i-Xmill END MILL
X5070 END MILLS
X-SPEED ROUGHER END MILLS
X-POWER END MILLS
JET-POWER END MILLS
V7 Mill STEEL END MILLS
V7 Mill INOX END MILLS
ALU-POWER END MILLS
D-POWER END MILLS
STANDARD CARBIDE END MILLS
TANK-POWER END MILLS
STANDARD COBALT & HSS END MILLS
TECHNICAL DATA

# YG ALU-POWER END MILLS

**E5522 SERIES** PLAIN SHANK
**EG522 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE 45° HELIX LONG LENGTH - TiCN COATED

▶ Suitable for high speed machining in aluminum and other non-ferrous materials, excellent surface finishes, superior chip removal.
▶ Mirror face-excellent surface finish.



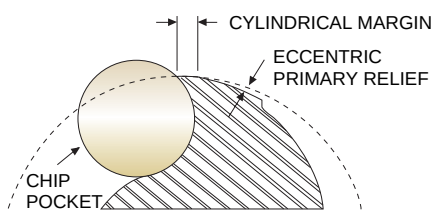
MG | 2 | 45° | PLAIN P.620

Unit : mm

| EDP No. | | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| UNCOATED | TiCN COATED | Metric | Inch | | | |
| E5522030 | EG522030 | 3.0 | .1181 | 6 | 8 | 57 |
| E5522040 | EG522040 | 4.0 | .1575 | 6 | 11 | 57 |
| E5522050 | EG522050 | 5.0 | .1969 | 6 | 13 | 57 |
| E5522060 | EG522060 | 6.0 | .2362 | 6 | 13 | 57 |
| E5522080 | EG522080 | 8.0 | .3150 | 8 | 19 | 63 |
| E5522100 | EG522100 | 10.0 | .3937 | 10 | 22 | 72 |
| E5522120 | EG522120 | 12.0 | .4724 | 12 | 26 | 83 |
| E5522140 | EG522140 | 14.0 | .5512 | 14 | 26 | 83 |
| E5522160 | EG522160 | 16.0 | .6299 | 16 | 32 | 92 |
| E5522180 | EG522180 | 18.0 | .7087 | 18 | 32 | 92 |
| E5522200 | EG522200 | 20.0 | .7874 | 20 | 38 | 104 |

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.03 | h6 |

- High performance in machining aluminum and non-ferrous materials
- Special designed geometry with high rigidity cutting edge
- Improved surface roughness - cylindrical margin which is controlled tightly.
- Excellent chip removal - higher rake angle, higher helix angle(45°), bigger chip pocket.




◎ : Excellent ○ : Good

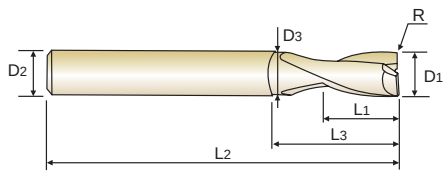
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | | | ◎ | | | |

# ALU-POWER END MILLS

**EG930 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE 25° HELIX STUB CUT LENGTH CORNER RADIUS TiCN COATED

- ▶Designed for the machining aluminum and its alloys, non-ferrous materials.
- ▶Increased tool life and higher cutting accuracy.
- ▶Maximum-stock removal, chip ejection, stability.
- ▶Corner Radius for avoiding the chipping.
- ▶Mirror face-excellent surface finish.




MG | 2 | 25° | R ±0.025 | PLAIN

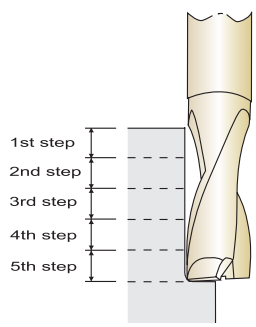
P.620

◇ Call for Availability

Unit : mm

| EDP No. | Corner Radius | Mill Diameter | | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|
| | | Metric | Inch | | | | | |
| | R (±0.025) | D1 | | D2 | L1 | L3 | L2 | D3 |
| EG930020 | R0.2 | 2.0 | .0787 | 3 | 3 | 6 | 40 | 1.9 |
| EG930030 | R0.2 | 3.0 | .1181 | 3 | 4 | 8 | 40 | 2.9 |
| EG930040 | R0.2 | 4.0 | .1575 | 4 | 5 | 12 | 50 | 3.8 |
| EG930050 | R0.2 | 5.0 | .1969 | 5 | 8 | 14 | 50 | 4.8 |
| EG930060 | R0.2 | 6.0 | .2362 | 6 | 8 | 18 | 65 | 5.7 |
| EG930080 | R0.2 | 8.0 | .3150 | 8 | 10 | 22 | 70 | 7.7 |
| EG930100 | R0.2 | 10.0 | .3937 | 10 | 14 | 28 | 80 | 9.7 |
| EG930120 | R0.2 | 12.0 | .4724 | 12 | 16 | 35 | 90 | 11.5 |
| EG930160 | R0.2 | 16.0 | .6299 | 16 | 20 | 40 | 90 | 15.5 |
| EG930200 | R0.2 | 20.0 | .7874 | 20 | 25 | 50 | 100 | 19.5 |

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.03 | h6 |




**STEP MILLING**

◎ : Excellent ○ : Good

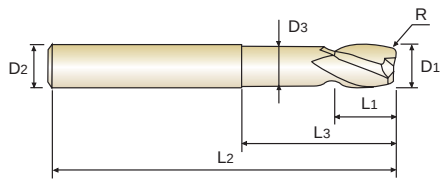
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | | | ◎ | | | |

# YG ALU-POWER END MILLS

**EG909 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE STUB CUT LENGTH CORNER RADIUS with NECK TiCN COATED

- ▶ Excellent cutting qualities on stainless steel, Aluminum, copper.
- ▶ Increased tool life and higher cutting accuracy.
- ▶ Mirror face-excellent surface finish.




MG | 2 | 30° | R ±0.025 | PLAIN

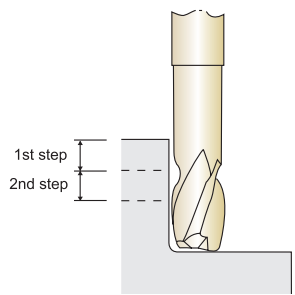
P.621

◇ Call for Availability

Unit : mm

| EDP No. | Corner Radius | Mill Diameter | | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|
| | | Metric | Inch | | | | | |
| | R (±0.025) | D1 | | D2 | L1 | L3 | L2 | D3 |
| EG909040 | R0.3 | 4.0 | .1575 | 6 | 5 | 10 | 50 | 3.6 |
| EG909060 | R0.5 | 6.0 | .2362 | 6 | 8 | 20 | 60 | 5.4 |
| EG909080 | R0.6 | 8.0 | .3150 | 8 | 10 | 30 | 70 | 7.2 |
| EG909100 | R0.8 | 10.0 | .3937 | 10 | 12 | 36 | 80 | 9.0 |
| EG909120 | R1.0 | 12.0 | .4724 | 12 | 14 | 40 | 90 | 11.0 |
| EG909160 | R1.3 | 16.0 | .6299 | 16 | 18 | 45 | 100 | 14.5 |
| EG909200 | R1.6 | 20.0 | .7874 | 20 | 24 | 45 | 100 | 18.0 |

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.03 | h6 |




STEP MILLING

◎ : Excellent ○ : Good

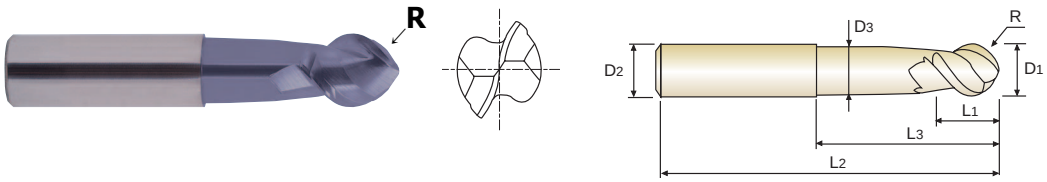
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | | | ◎ | | | |

# ALU-POWER END MILLS

**EG910 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE 50° HELIX STUB CUT LENGTH BALL NOSE with NECK TiCN COATED

- ▶Excellent cutting qualities on stainless steel, Aluminum, copper.
- ▶Increased tool life and higher cutting accuracy.
- ▶Mirror face-excellent surface finish.




MG | 2 | 50° | R ±0.01 | PLAIN

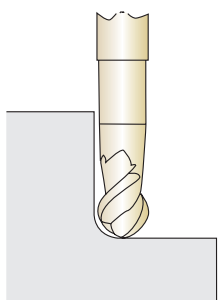
P.621

◇ Call for Availability

Unit : mm

| EDP No. | Radius of Ball Nose | Mill Diameter | | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|
| | | Metric | Inch | | | | | |
| | R (±0.01) | D1 | | D2 | L1 | L3 | L2 | D3 |
| **EG910060** | R 3.0 | **6.0** | **.2362** | 6 | 5.5 | 25 | 55 | 5.4 |
| **EG910080** | R 4.0 | **8.0** | **.3150** | 8 | 7 | 30 | 65 | 7.2 |
| **EG910100** | R 5.0 | **10.0** | **.3937** | 10 | 8.5 | 35 | 75 | 9.0 |
| **EG910120** | R 6.0 | **12.0** | **.4724** | 12 | 10.5 | 40 | 75 | 11.0 |
| **EG910160** | R 8.0 | **16.0** | **.6299** | 16 | 14 | 50 | 90 | 14.5 |
| **EG910200** | R 10.0 | **20.0** | **.7874** | 20 | 17 | 50 | 100 | 18.0 |

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| ± 0.02 | h6 |



◎ : Excellent ○ : Good

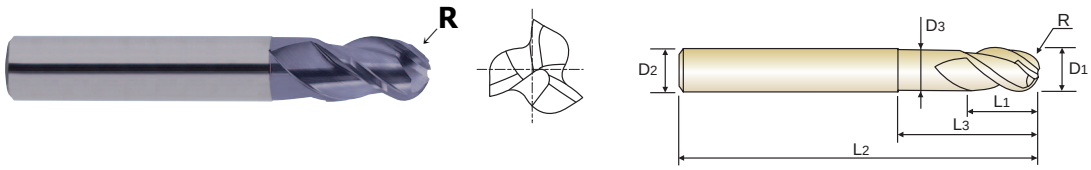
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | | | ◎ | | | |

# ALU-POWER END MILLS

**EG908 SERIES** PLAIN SHANK

## CARBIDE, 3 FLUTE 40° HELIX LONG LENGTH BALL NOSE with NECK TiCN COATED

- Excellent cutting performance on stainless steels, Aluminum & copper.
- Increased tool life and higher cutting accuracy.
- Mirror face-excellent surface finish.

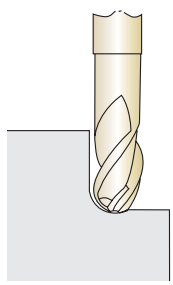



MG | 3 | 40° | R ±0.01 | PLAIN P.622

Unit : mm

| EDP No. | Radius of Ball Nose | Mill Diameter | | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|
| | | Metric | Inch | | | | | |
| | R (±0.01) | D1 | | D2 | L1 | L3 | L2 | D3 |
| EG908020 | R1.0 | 2.0 | .0787 | 6 | 3 | 2.5 | 60 | 1.9 |
| EG908025 | R1.25 | 2.5 | .0984 | 6 | 4 | 6 | 60 | 2.4 |
| EG908030 | R1.5 | 3.0 | .1181 | 6 | 4.5 | 6.5 | 60 | 2.8 |
| EG908035 | R1.75 | 3.5 | .1378 | 6 | 5 | 7 | 65 | 3.2 |
| EG908040 | R2.0 | 4.0 | .1575 | 6 | 6 | 8 | 65 | 3.7 |
| EG908050 | R2.5 | 5.0 | .1969 | 6 | 7.5 | 10 | 65 | 4.6 |
| EG908060 | R3.0 | 6.0 | .2362 | 6 | 9 | 12 | 75 | 5.6 |
| EG908080 | R4.0 | 8.0 | .3150 | 8 | 12 | 25 | 75 | 7.4 |
| EG908100 | R5.0 | 10.0 | .3937 | 10 | 15 | 30 | 80 | 9.4 |
| EG908120 | R6.0 | 12.0 | .4724 | 12 | 18 | 36 | 90 | 11.4 |
| EG908160 | R8.0 | 16.0 | .6299 | 16 | 24 | 40 | 100 | 15.4 |

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.03 | h6 |



◎ : Excellent ○ : Good

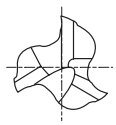
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | | | ◎ | | | |

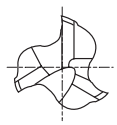
# SPEED FREEK END MILLS

**EK191 SERIES** FLAT SHANK

## T15, 3 FLUTE 42° HELIX REGULAR LENGTH ROUGHING for ALUMINUM

▶High performance metal removal in aluminum alloys.
▶Corner radius against chipping





T15 | ALU | 3 | 42° | FLAT

P.624

◆ U.S.A Stock

### ■ SQUARE

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| UNCOATED | TiCN COATED | | | | |
| 66515 | 66515 PC | 1/2 | 1/2 | 1-1/4 | 3-1/4 |
| 66519 | 66519 PC | 5/8 | 5/8 | 1-5/8 | 3-3/4 |
| 66524 | 66524 PC | 3/4 | 3/4 | 1-5/8 | 3-7/8 |
| 66540 | 66540 PC | 1 | 1 | 2 | 4-1/2 |
| 66541 | 66541 PC | 1-1/4 | 1-1/4 | 2 | 4-1/2 |
| 66542 | 66542 PC | 1-1/2 | 1-1/4 | 2 | 4-1/2 |
| 66543 | 66543 PC | 2 | 2 | 2 | 5-3/4 |

T15 | ALU | 3 | 42° | R ±.001 | FLAT

P.

◆ U.S.A Stock

### ■ with CORNER RADIUS

Unit : Inch

| EDP No. | | Corner Radius | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| UNCOATED | TiCN COATED | R | | | | |
| 66903 | 66903 PC | R .060 | 3/4 | 3/4 | 1-5/8 | 3-7/8 |
| 66904 | 66904 PC | R .090 | 3/4 | 3/4 | 1-5/8 | 3-7/8 |
| 66905 | 66905 PC | R .120 | 3/4 | 3/4 | 1-5/8 | 3-7/8 |
| 66906 | 66906 PC | R .060 | 1 | 1 | 2 | 4-1/2 |
| 66907 | 66907 PC | R .090 | 1 | 1 | 2 | 4-1/2 |
| 66908 | 66908 PC | R .120 | 1 | 1 | 2 | 4-1/2 |
| 66909 | 66909 PC | R .060 | 1-1/4 | 1-1/4 | 2 | 4-1/2 |
| 66910 | 66910 PC | R .090 | 1-1/4 | 1-1/4 | 2 | 4-1/2 |
| 66911 | 66911 PC | R .120 | 1-1/4 | 1-1/4 | 2 | 4-1/2 |

■ The TiN coated, or TiAlN coated is available on your request.

| Mill Dia. Tolerance (inch) | |
|---|---|
| up to 1 | 0~+.0030 |
| over 1 | 0~+.0060 |

◎ : Excellent ○ : Good

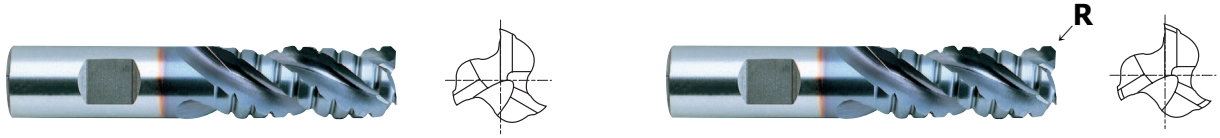
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | | | ◎ | | | |

# SPEED FREEK END MILLS

**EK226 SERIES** FLAT SHANK

## T15, 3 FLUTE 42° HELIX & MEDIUM LENGTH ROUGHING for ALUMINUM

▶ High performance metal removal in aluminum alloys.
▶ Corner radius against chipping




T15 | ALU | 3 | 42° | FLAT P.624

◆ U.S.A Stock

■ SQUARE

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| UNCOATED | TiCN COATED | | | | |
| 80524 | 80524 PC | 3/4 | 3/4 | 2-1/4 | 4-5/8 |
| 80540 | 80540 PC | 1 | 1 | 3 | 5-1/2 |
| 80541 | 80541 PC | 1-1/4 | 1-1/4 | 3 | 5-1/2 |
| 80542 | 80542 PC | 1-1/2 | 1-1/4 | 3 | 5-1/2 |
| 80543 | 80543 PC | 2 | 2 | 3 | 6-3/4 |

T15 | ALU | 3 | 42° | R ±.001 | FLAT P.

◆ U.S.A Stock

■ with CORNER RADIUS

Unit : Inch

| EDP No. | | Corner Radius | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| UNCOATED | TiCN COATED | R | | | | |
| 80901 | 80901 PC | R .060 | 3/4 | 3/4 | 2-1/4 | 4-5/8 |
| 80902 | 80902 PC | R .090 | 3/4 | 3/4 | 2-1/4 | 4-5/8 |
| 80903 | 80903 PC | R .120 | 3/4 | 3/4 | 2-1/4 | 4-5/8 |
| 80904 | 80904 PC | R .060 | 1 | 1 | 3 | 5-1/2 |
| 80905 | 80905 PC | R .090 | 1 | 1 | 3 | 5-1/2 |
| 80906 | 80906 PC | R .120 | 1 | 1 | 3 | 5-1/2 |
| 80907 | 80907 PC | R .060 | 1-1/4 | 1-1/4 | 3 | 5-1/2 |
| 80908 | 80908 PC | R .090 | 1-1/4 | 1-1/4 | 3 | 5-1/2 |
| 80909 | 80909 PC | R .120 | 1-1/4 | 1-1/4 | 3 | 5-1/2 |

■ The TiN coated, or TiAlN coated is available on your request.

| Mill Dia. Tolerance (inch) | |
|---|---|
| up to 1 | 0~+.0030 |
| over 1 | 0~+.0060 |

◎ : Excellent ○ : Good

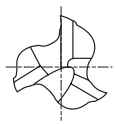
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | | | ◎ | | | |

# SPEED FREEK END MILLS

**EK192 SERIES** FLAT SHANK

## T15, 3 FLUTE 42° HELIX LONG LENGTH ROUGHING for ALUMINUM

▶ High performance metal removal in aluminum alloys.



T15 | ALU | 3 | 42° | FLAT

P.624

◆ U.S.A Stock

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| UNCOATED | TiCN COATED | | | | |
| 67515 | 67515 PC | 1/2 | 1/2 | 2 | 4 |
| 67519 | 67519 PC | 5/8 | 5/8 | 2-1/2 | 4-5/8 |
| 67524 | 67524 PC | 3/4 | 3/4 | 3 | 5-1/4 |
| 67540 | 67540 PC | 1 | 1 | 4 | 6-1/2 |
| 67541 | 67541 PC | 1-1/4 | 1-1/4 | 4 | 6-1/2 |
| 67542 | 67542 PC | 1-1/2 | 1-1/4 | 4 | 6-1/2 |
| 67543 | 67543 PC | 2 | 2 | 4 | 7-3/4 |
| 67544 | 67544 PC | 1-1/4 | 1-1/4 | 6 | 8-1/2 |
| 67545 | 67545 PC | 1-1/2 | 1-1/4 | 6 | 8-1/2 |
| 67546 | 67546 PC | 2 | 2 | 6 | 9-3/4 |

| EDP No. | Mill Diameter | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|
| EK10482 | 3/4 | 3/4 | 1-1/2 | 3 | 5-1/4 | .705 |
| EK10483 | 3/4 | 3/4 | 1-1/2 | 4 | 6-1/4 | .705 |
| EK10642 | 1 | 1 | 1-1/2 | 3 | 5-1/2 | .950 |
| EK10643 | 1 | 1 | 2 | 4 | 6-1/2 | .950 |
| EK10644 | 1 | 1 | 2 | 6 | 8-1/2 | .950 |
| EK11601 | 1-1/4 | 1-1/4 | 2 | 4 | 6-1/2 | 1.200 |
| EK11602 | 1-1/4 | 1-1/4 | 2 | 6 | 8-1/2 | 1.200 |

■ The TiN coated, or TiAlN coated is available on your request.

| Mill Dia. Tolerance (inch) | |
|---|---|
| up to 1 | 0~+.0030 |
| over 1 | 0~+.0060 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | | | ◎ | | | |

CBN END MILL
i-Xmill END MILL
X5070 END MILLS
X-SPEED ROUGHER END MILLS
X-POWER END MILLS
JET-POWER END MILLS
V7 Mill STEEL END MILLS
V7 Mill INOX END MILLS
ALU-POWER END MILLS
D-POWER END MILLS
STANDARD CARBIDE END MILLS
TANK-POWER END MILLS
STANDARD COBALT & HSS END MILLS
TECHNICAL DATA

# SPEED FREEK END MILLS

**EK192 SERIES** FLAT SHANK

## T15, 3 FLUTE 42° HELIX LONG LENGTH ROUGHING with CORNER RADIUS for ALUMINUM

▶ High performance metal in aluminum alloys.
▶ Corner radius against chipping

T15 | ALU | 3 | 42° | R ±.001 | FLAT

P.624

◆ U.S.A Stock

Unit : Inch

| EDP No. | | Corner Radius | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| UNCOATED | TiCN COATED | R | | | | |
| 67904 | 67904 PC | R .060 | 3/4 | 3/4 | 3 | 5-1/4 |
| 67905 | 67905 PC | R .090 | 3/4 | 3/4 | 3 | 5-1/4 |
| 67906 | 67906 PC | R .120 | 3/4 | 3/4 | 3 | 5-1/4 |
| 67907 | 67907 PC | R .060 | 1 | 1 | 4 | 6-1/2 |
| 67908 | 67908 PC | R .090 | 1 | 1 | 4 | 6-1/2 |
| 67909 | 67909 PC | R .120 | 1 | 1 | 4 | 6-1/2 |
| 67910 | 67910 PC | R .060 | 1-1/4 | 1-1/4 | 4 | 6-1/2 |
| 67911 | 67911 PC | R .090 | 1-1/4 | 1-1/4 | 4 | 6-1/2 |
| 67912 | 67912 PC | R .120 | 1-1/4 | 1-1/4 | 4 | 6-1/2 |
| 67913 | 67913 PC | R .060 | 1-1/4 | 1-1/4 | 6 | 8-1/2 |
| 67914 | 67914 PC | R .090 | 1-1/4 | 1-1/4 | 6 | 8-1/2 |
| 67915 | 67915 PC | R .120 | 1-1/4 | 1-1/4 | 6 | 8-1/2 |

■ The TiN coated, or TiAlN coated is available on your request.

| Mill Dia. Tolerance (inch) | |
|---|---|
| up to 1 | 0~+.0030 |
| over 1 | 0~+.0060 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | | | ◎ | | | |

# SPEED FREEK END MILLS

**EK196 SERIES** FLAT SHANK

## T15, 3 FLUTE 42° HELIX ROUGHING BALL NOSE REGULAR LENGTH for ALUMINUM

▶High performance metal removal in aluminum alloys.

T15 | ALU | 3 | 42° | R ±.001 | FLAT

P.623

◆ U.S.A Stock

Unit : Inch

| EDP No. | | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| UNCOATED | TiCN COATED | R (±.001) | | | | |
| **EP12032** | **EP12032C** | R1/4 | **1/2** | 1/2 | 1-1/4 | 3-1/4 |
| **EP12040** | **EP12040C** | R5/16 | **5/8** | 5/8 | 1-5/8 | 3-3/4 |
| **EP12048** | **EP12048C** | R3/8 | **3/4** | 3/4 | 1-5/8 | 3-7/8 |
| **EP12064** | **EP12064C** | R1/2 | **1** | 1 | 2 | 4-1/2 |
| **EP12110** | **EP12110C** | R5/8 | **1-1/4** | 1-1/4 | 2 | 4-1/2 |

■ The TiN coated, or TiAlN coated is available on your request.

| Mill Dia. Tolerance (inch) | |
|---|---|
| up to 1 | 0~+.0030 |
| over 1 | 0~+.0060 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | | | ◎ | | | |

# SPEED FREEK END MILLS

**EK193 SERIES** FLAT SHANK

## T15, 3 FLUTE FINISHING
## REGULAR LENGTH & MEDIUM LENGTH & LONG LENGTH

▶High performance metal removal in aluminum alloys.

T15 | 3 | 42° | FLAT

P.623

◆ U.S.A Stock

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| UNCOATED | TiCN COATED | | | | |
| EP10323 | EP10323C | 1/2 | 1/2 | 1-1/4 | 3-1/4 |
| EP10324 | EP10324C | 1/2 | 1/2 | 2 | 4 |
| EP10403 | EP10403C | 5/8 | 5/8 | 1-5/8 | 3-3/4 |
| EP10404 | EP10404C | 5/8 | 5/8 | 2-1/2 | 4-5/8 |
| EP10484 | EP10484C | 3/4 | 3/4 | 1-5/8 | 3-7/8 |
| EP10485 | EP10485C | 3/4 | 3/4 | 2-1/4 | 4-5/8 |
| EP10486 | EP10486C | 3/4 | 3/4 | 3 | 5-1/4 |
| EP10644 | EP10644C | 1 | 1 | 2 | 4-1/2 |
| EP10645 | EP10645C | 1 | 1 | 3 | 5-1/2 |
| EP10646 | EP10646C | 1 | 1 | 4 | 6-1/2 |
| EP11165 | EP11165C | 1-1/4 | 1-1/4 | 2 | 4-1/2 |
| EP11166 | EP11166C | 1-1/4 | 1-1/4 | 3 | 5-1/2 |
| EP11167 | EP11167C | 1-1/4 | 1-1/4 | 4 | 6-1/2 |
| EP11324 | EP11324C | 1-1/2 | 1-1/4 | 2 | 4-1/2 |
| EP11325 | EP11325C | 1-1/2 | 1-1/4 | 3 | 5-1/2 |
| EP11326 | EP11326C | 1-1/2 | 1-1/4 | 4 | 6-1/2 |

■ The TiN coated, or TiAlN coated is available on your request.

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~+.0010 | ＊＊0~+.0015 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | | | ◎ | | | |

# SPEED FREEK END MILLS

**EK193 SERIES** FLAT SHANK

## T15, 3 FLUTE FINISHING CORNER RADIUS REGULAR LENGTH & MEDIUM LENGTH & LONG LENGTH

▶High performance metal removal in aluminum alloys.
▶Corner radius against chipping

T15 | 3 | 42° | FLAT

P.623

◆ U.S.A Stock

Unit : Inch

| EDP No. | | Corner Radius | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| UNCOATED | TiCN COATED | R | | | | |
| **EP10321** | **EP10321C** | R.120 | **1/2** | 1/2 | 1-1/4 | 3-1/4 |
| **EP10322** | **EP10322C** | R.120 | **1/2** | 1/2 | 2 | 4 |
| **EP10401** | **EP10401C** | R.120 | **5/8** | 5/8 | 1-5/8 | 3-3/4 |
| **EP10402** | **EP10402C** | R.120 | **5/8** | 5/8 | 2-1/2 | 4-5/8 |
| **EP10481** | **EP10481C** | R.120 | **3/4** | 3/4 | 1-5/8 | 3-7/8 |
| **EP10482** | **EP10482C** | R.120 | **3/4** | 3/4 | 2-1/4 | 4-5/8 |
| **EP10483** | **EP10483C** | R.120 | **3/4** | 3/4 | 3 | 5-1/4 |
| **EP10641** | **EP10641C** | R.120 | **1** | 1 | 2 | 4-1/2 |
| **EP10642** | **EP10642C** | R.120 | **1** | 1 | 3 | 5-1/2 |
| **EP10643** | **EP10643C** | R.120 | **1** | 1 | 4 | 6-1/2 |
| **EP11162** | **EP11162C** | R.120 | **1-1/4** | 1-1/4 | 2 | 4-1/2 |
| **EP11163** | **EP11163C** | R.120 | **1-1/4** | 1-1/4 | 3 | 5-1/2 |
| **EP11164** | **EP11164C** | R.120 | **1-1/4** | 1-1/4 | 4 | 6-1/2 |
| **EP11321** | **EP11321C** | R.120 | **1-1/2** | 1-1/4 | 2 | 4-1/2 |
| **EP11322** | **EP11322C** | R.120 | **1-1/2** | 1-1/4 | 3 | 5-1/2 |
| **EP11323** | **EP11323C** | R.120 | **1-1/2** | 1-1/4 | 4 | 6-1/2 |

■ The TiN coated, or TiAlN coated is available on your request.

| Mill Dia. Tolerance (inch) | |
|---|---|
| up to 1 | 0~+.0030 |
| over 1 | 0~+.0060 |

◎ : Excellent ○ : Good

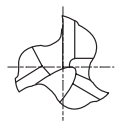
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | | | ◎ | | | |

# SPEED FREEK END MILLS

**EP922 SERIES** PLAIN SHANK

## PREMIUM HSS-PM, 3 FLUTE 42° HELIX SHORT LENGTH ROUGHING for ALUMINUM

- Maximum stock removal rates at High Speed Condition.
- Reduces vibrations and improves surface roughness.



YPM | ALU | 3 | 42° | PLAIN

P.624

◇ Call for Availability

Unit : mm

| EDP No. | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| | js12 | | h6 | | |
| EP922120 | 12.0 | .4724 | 12 | 26 | 83 |
| EP922140 | 14.0 | .5512 | 12 | 26 | 83 |
| EP922160 | 16.0 | .6299 | 16 | 32 | 92 |
| EP922180 | 18.0 | .7087 | 16 | 32 | 92 |
| EP922200 | 20.0 | .7874 | 20 | 38 | 104 |
| EP922220 | 22.0 | .8661 | 20 | 38 | 104 |
| EP922250 | 25.0 | .9843 | 25 | 45 | 121 |
| EP922280 | 28.0 | 1.1024 | 25 | 45 | 121 |
| EP922320 | 32.0 | 1.2598 | 32 | 53 | 133 |

**Tolerances according to DIN 7160 & 7161**

| Tolerance range in µm | | | | | | |
|---|---|---|---|---|---|---|
| Nominal-Diameter in mm | | | | | | |
| | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 | over 30 to 50 |
| **js12** | ± 50 | ± 60 | ± 75 | ± 90 | ± 105 | ± 125 |
| **h6** | 0 — 6 | 0 — 8 | 0 — 9 | 0 — 11 | 0 — 13 | 0 — 16 |

◎ : Excellent ○ : Good

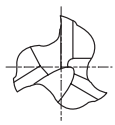
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | | | ◎ | | | |

# SPEED FREEK END MILLS

**EP924 SERIES** PLAIN SHANK

## PREMIUM HSS-PM, 3 FLUTE 42° HELIX LONG LENGTH ROUGHING for ALUMINUM

▶ Maximum stock removal rates at High Speed Condition.
▶ Reduces vibrations and improves surface roughness.



YPM | ALU | 3 | 42° | PLAIN

P.624

◇ Call for Availability

Unit : mm

| EDP No. | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| | js12 | | h6 | | |
| EP924120 | 12.0 | .4724 | 12 | 53 | 110 |
| EP924140 | 14.0 | .5512 | 12 | 53 | 110 |
| EP924160 | 16.0 | .6299 | 16 | 63 | 123 |
| EP924180 | 18.0 | .7087 | 16 | 63 | 123 |
| EP924200 | 20.0 | .7874 | 20 | 75 | 141 |
| EP924220 | 22.0 | .8661 | 20 | 75 | 141 |
| EP924250 | 25.0 | .9843 | 25 | 90 | 166 |
| EP924280 | 28.0 | 1.1024 | 25 | 90 | 166 |
| EP924320 | 32.0 | 1.2598 | 32 | 106 | 186 |

**Tolerances according to DIN 7160 & 7161**

| Tolerance range in µm | | | | | | |
|---|---|---|---|---|---|---|
| Nominal-Diameter in mm | | | | | | |
| | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 | over 30 to 50 |
| js12 | ± 50 | ± 60 | ± 75 | ± 90 | ± 105 | ± 125 |
| h6 | 0 / — 6 | 0 / — 8 | 0 / — 9 | 0 / — 11 | 0 / — 13 | 0 / — 16 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | | | ◎ | | | |

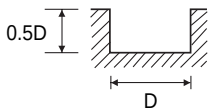
# ALU-POWER END MILLS

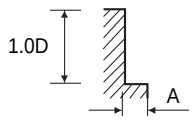
## RECOMMENDED CUTTING CONDITIONS

## CARBIDE, 2 FLUTE 42° HELIX - "BANSHEE"

### E5253, E5254 SERIES

| MATERIAL | ALUMINUM NONFERROUS METALS | | ALUMINUM NONFERROUS METALS | |
|---|---|---|---|---|
| DIAMETER | RPM | FEED | RPM | FEED |
| 1/8 | 10000 | 27.56 | 10000 | 35.43 |
| 5/32 | 10000 | 35.43 | 10000 | 43.31 |
| 3/16 | 10000 | 39.37 | 10000 | 51.18 |
| 1/4 | 10000 | 47.24 | 10000 | 59.06 |
| 5/16 | 8000 | 55.12 | 8000 | 70.87 |
| 3/8 | 8000 | 66.93 | 8000 | 82.68 |
| 1/2 | 8000 | 82.68 | 8000 | 102.40 |
| 9/16 | 6000 | 70.87 | 6000 | 86.61 |
| 5/8 | 6000 | 74.80 | 6000 | 94.49 |
| 11/16 | 4000 | 55.12 | 4000 | 70.87 |
| 13/16 | 4000 | 62.99 | 4000 | 74.80 |




A : Ø1/8 ~ Ø3/8 = 0.25 × D
Ø1/2 ~ Ø13/16 = 0.5 × D

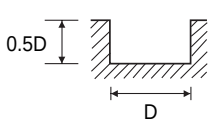
※ The Feed, in long & extra long types, should be reduced by around 50%.

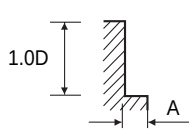
RPM = rev./min.
FEED = inch/min.

## CARBIDE, 2 FLUTE 42° HELIX TiCN COATED - "BANSHEE"

### EG253, EG254 SERIES

| MATERIAL | ALUMINUM NONFERROUS METALS | | ALUMINUM NONFERROUS METALS | |
|---|---|---|---|---|
| DIAMETER | RPM | FEED | RPM | FEED |
| 1/8 | 15600 | 42.52 | 12000 | 56.69 |
| 5/32 | 15600 | 56.69 | 12000 | 66.14 |
| 3/16 | 15600 | 61.42 | 12000 | 80.32 |
| 1/4 | 15600 | 70.87 | 12000 | 94.49 |
| 5/16 | 12000 | 85.05 | 9600 | 108.66 |
| 3/8 | 12000 | 103.93 | 9600 | 127.56 |
| 1/2 | 12000 | 127.56 | 9600 | 160.56 |
| 9/16 | 9600 | 108.66 | 7200 | 132.24 |
| 5/8 | 9600 | 118.12 | 7200 | 146.52 |
| 11/16 | 6000 | 85.04 | 4800 | 108.66 |
| 13/16 | 6000 | 94.49 | 4800 | 118.12 |




A : Ø1/8 ~ Ø3/8 = 0.25 × D
Ø1/2 ~ Ø13/16 = 0.5 × D

※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

# ALU-POWER END MILLS

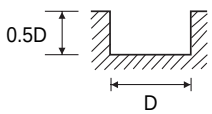
## RECOMMENDED CUTTING CONDITIONS

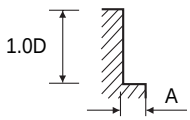


## CARBIDE, 3 FLUTE 45° HELIX FINISH

### E5980, E5981, E5982, E5983, E5984 SERIES

| MATERIAL | ALUMINUM NONFERROUS METALS | | ALUMINUM NONFERROUS METALS | |
|---|---|---|---|---|
| DIAMETER | RPM | FEED | RPM | FEED |
| 1/8 | 10000 | 33.05 | 10000 | 42.50 |
| 5/32 | 10000 | 42.50 | 10000 | 52.00 |
| 3/16 | 10000 | 47.25 | 10000 | 61.40 |
| 1/4 | 10000 | 56.70 | 10000 | 70.90 |
| 5/16 | 8000 | 66.15 | 8000 | 85.05 |
| 3/8 | 8000 | 80.30 | 8000 | 99.20 |
| 1/2 | 8000 | 99.15 | 8000 | 122.90 |
| 9/16 | 6000 | 85.05 | 6000 | 103.95 |
| 5/8 | 6000 | 89.75 | 6000 | 113.40 |
| 11/16 | 4000 | 66.15 | 4000 | 85.05 |
| 13/16 | 4000 | 75.60 | 4000 | 89.75 |




A : Ø1/8 ~ Ø3/8 = 0.25 × D
Ø1/2 ~ Ø13/16 = 0.5 × D

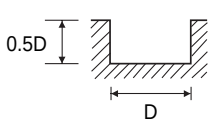
※ The Feed, in long & extra long types, should be reduced by around 50%.

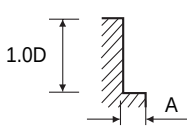
RPM = rev./min.
FEED = inch/min.

## CARBIDE, 3 FLUTE 45° HELIX FINISH TiCN COATED

### EG980, EG981, EG982, EG983, EG984 SERIES

| MATERIAL | ALUMINUM NONFERROUS METALS | | ALUMINUM NONFERROUS METALS | |
|---|---|---|---|---|
| DIAMETER | RPM | FEED | RPM | FEED |
| 1/8 | 15600 | 43.00 | 12000 | 55.25 |
| 5/32 | 15600 | 55.25 | 12000 | 67.60 |
| 3/16 | 15600 | 61.40 | 12000 | 79.80 |
| 1/4 | 15600 | 73.70 | 12000 | 92.20 |
| 5/16 | 12000 | 86.00 | 9600 | 110.55 |
| 3/8 | 12000 | 104.40 | 9600 | 129.00 |
| 1/2 | 12000 | 128.90 | 9600 | 159.80 |
| 9/16 | 9600 | 110.55 | 7200 | 135.15 |
| 5/8 | 9600 | 116.65 | 7200 | 147.40 |
| 11/16 | 6000 | 86.00 | 4800 | 110.55 |
| 13/16 | 6000 | 98.30 | 4800 | 116.65 |




A : Ø1/8 ~ Ø3/8 = 0.25 × D
Ø1/2 ~ Ø13/16 = 0.5 × D

※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

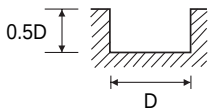
# ALU-POWER END MILLS

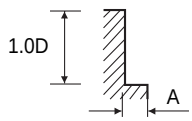
## RECOMMENDED CUTTING CONDITIONS

## CARBIDE, 3 FLUTE 37° HELIX with EXTENDED NECK

### E5977, E5985 SERIES

| MATERIAL | ALUMINUM NONFERROUS METALS | | ALUMINUM NONFERROUS METALS | |
|---|---|---|---|---|
| DIAMETER | RPM | FEED | RPM | FEED |
| 1/4 | 8000 | 45.35 | 8000 | 56.70 |
| 3/8 | 6400 | 64.25 | 6400 | 79.40 |
| 1/2 | 6400 | 79.40 | 6400 | 98.25 |
| 5/8 | 4800 | 71.80 | 4800 | 90.70 |
| 3/4 | 3200 | 70.85 | 3200 | 87.40 |
| 1 | 2600 | 63.80 | 2600 | 78.65 |




A : Ø1/4 ~Ø3/8 = 0.25×D
Ø1/2 ~ Ø1 = 0.5×D

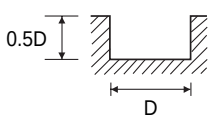
※ The Feed, in long & extra long types, should be reduced by around 50%.

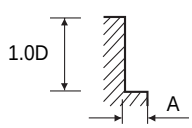
RPM = rev./min.
FEED = inch/min.

## CARBIDE, 3 FLUTE 37° HELIX with EXTENDED NECK TiCN COATED

### EG977, EG985 SERIES

| MATERIAL | ALUMINUM NONFERROUS METALS | | ALUMINUM NONFERROUS METALS | |
|---|---|---|---|---|
| DIAMETER | RPM | FEED | RPM | FEED |
| 1/4 | 10500 | 58.95 | 10500 | 73.70 |
| 3/8 | 8300 | 83.50 | 8300 | 103.20 |
| 1/2 | 8300 | 103.20 | 8300 | 127.70 |
| 5/8 | 6200 | 93.35 | 6200 | 117.90 |
| 3/4 | 4200 | 92.10 | 4200 | 113.60 |
| 1 | 3400 | 82.95 | 3400 | 102.00 |




A : Ø1/4 ~Ø3/8 = 0.25×D
Ø1/2 ~ Ø1 = 0.5×D

※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

# ALU-POWER END MILLS

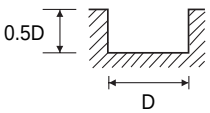
## RECOMMENDED CUTTING CONDITIONS

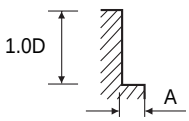


## CARBIDE, 2 FLUTE CORNER RADIUS with NECK

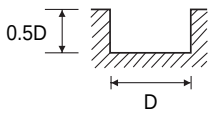
### E5973 SERIES

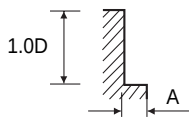
| MATERIAL | ALUMINUM NONFERROUS METALS | | | | COPPER ALLOY | | | |
|---|---|---|---|---|---|---|---|---|
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| R.012 × 5/32 | 10000 | 36.35 | 10000 | 42.40 | 3000 | 9.10 | 3000 | 10.60 |
| R.020 × 1/4 | 10000 | 45.40 | 10000 | 60.60 | 3000 | 11.50 | 3000 | 15.15 |
| R.024 × 5/16 | 8000 | 54.50 | 8000 | 69.60 | 2300 | 13.60 | 2300 | 17.55 |
| R.031 × 3/8 | 8000 | 66.60 | 8000 | 81.75 | 2300 | 16.65 | 2300 | 20.60 |
| R.040 × 1/2 | 8000 | 81.75 | 8000 | 103.00 | 2300 | 20.55 | 2300 | 25.75 |
| R.051 × 5/8 | 6000 | 75.70 | 6000 | 93.90 | 1800 | 19.05 | 1800 | 23.60 |
| R.063 × 3/4 | 4000 | 60.60 | 4000 | 75.70 | 1150 | 15.15 | 1150 | 19.10 |




A : Ø5/32 ~ Ø3/8 = 0.25 × D
Ø1/2 ~ Ø3/4 = 0.5 × D




A : Ø5/32 ~ Ø3/8 = 0.25 × D
Ø1/2 ~ Ø3/4 = 0.5 × D

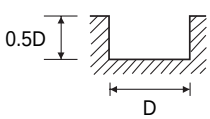
※ The Feed, in long & extra long types, should be reduced by around 50%.

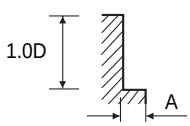
RPM = rev./min.
FEED = inch/min.

## CARBIDE, 2 FLUTE 37° HELIX with EXTENDED NECK

### E5976 SERIES

| MATERIAL | ALUMINUM NONFERROUS METALS | | ALUMINUM NONFERROUS METALS | |
|---|---|---|---|---|
| DIAMETER | RPM | FEED | RPM | FEED |
| 1/4 | 8000 | 37.80 | 8000 | 47.25 |
| 3/8 | 6400 | 53.55 | 6400 | 66.15 |
| 1/2 | 6400 | 66.15 | 6400 | 81.90 |
| 5/8 | 4800 | 59.85 | 4800 | 75.60 |
| 3/4 | 3200 | 59.05 | 3200 | 72.85 |
| 1 | 2600 | 53.15 | 2600 | 65.55 |




A : Ø1/4 ~ Ø3/8 = 0.25 × D
Ø1/2 ~ Ø1 = 0.5 × D

※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

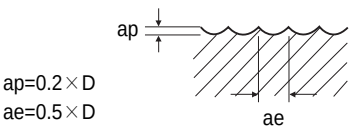
# ALU-POWER END MILLS

## RECOMMENDED CUTTING CONDITIONS

## CARBIDE, 2 FLUTE 37° HELIX LONG REACH BALL NOSE

### E5978 SERIES

| MATERIAL | ALUMINUM NONFERROUS METALS | |
|---|---|---|
| DIAMETER | RPM | FEED |
| R1/8 × 1/4 | 11200 | 55.10 |
| R5/32 × 5/16 | 8600 | 63.00 |
| R3/16 × 3/8 | 8600 | 74.00 |
| R1/4 × 1/2 | 8600 | 94.50 |
| R5/16 × 5/8 | 6800 | 85.00 |
| R3/8 × 3/4 | 4300 | 69.30 |



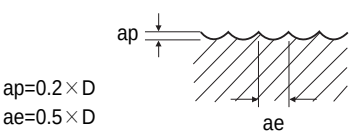

※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

## CARBIDE, 2 FLUTE 37° HELIX LONG REACH BALL NOSE TiCN COATED

### EG978 SERIES

| MATERIAL | ALUMINUM NONFERROUS METALS | |
|---|---|---|
| DIAMETER | RPM | FEED |
| R1/8 × 1/4 | 14500 | 71.65 |
| R5/32 × 5/16 | 11200 | 81.90 |
| R3/16 × 3/8 | 11200 | 96.20 |
| R1/4 × 1/2 | 11200 | 122.85 |
| R5/16 × 5/8 | 8800 | 110.50 |
| R3/8 × 3/4 | 5600 | 104.00 |



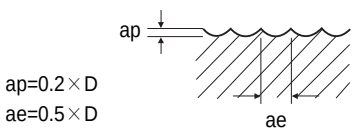

※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

## CARBIDE, 2 FLUTE 50° HELIX BALL NOSE with NECK

### E5974 SERIES

| MATERIAL | ALUMINUM ALUMINUM ALLOY | | COPPER ALLOY | |
|---|---|---|---|---|
| DIAMETER | RPM | FEED | RPM | FEED |
| R1/8 × 1/4 | 14000 | 53.00 | 4200 | 13.30 |
| R5/32 × 5/16 | 10800 | 60.50 | 3200 | 15.10 |
| R3/16 × 3/8 | 10800 | 71.20 | 3200 | 17.50 |
| R1/4 × 1/2 | 10800 | 90.80 | 3200 | 22.70 |
| R5/16 × 5/8 | 8500 | 81.80 | 2500 | 20.30 |
| R3/8 × 3/4 | 5400 | 66.60 | 1600 | 16.70 |




ap=0.2×D
ae=0.5×D

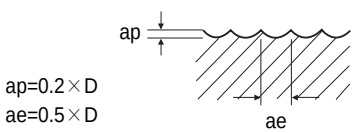
※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

## CARBIDE, 3 FLUTE 40° HELIX BALL NOSE with NECK

### E5975 SERIES

| MATERIAL | ALUMINUM ALUMINUM ALLOY | | COPPER ALLOY | |
|---|---|---|---|---|
| DIAMETER | RPM | FEED | RPM | FEED |
| R3/64 × 3/32 | 20700 | 28.80 | 6200 | 7.25 |
| R1/16 × 1/8 | 13800 | 28.80 | 4200 | 7.25 |
| R3/32 × 3/16 | 13800 | 40.90 | 4200 | 10.30 |
| R1/8 × 1/4 | 13800 | 53.00 | 4200 | 13.30 |
| R5/32 × 5/16 | 10800 | 60.55 | 3200 | 15.15 |
| R3/16 × 3/8 | 10800 | 71.15 | 3200 | 17.55 |
| R1/4 × 1/2 | 10800 | 90.85 | 3200 | 22.70 |
| R5/16 × 5/8 | 8500 | 81.75 | 2500 | 20.30 |




ap=0.2×D
ae=0.5×D

※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

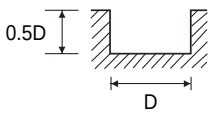
# ALU-POWER END MILLS

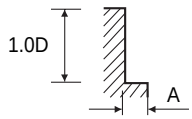
## RECOMMENDED CUTTING CONDITIONS

## CARBIDE, 2 FLUTE

### E5522 SERIES

| MATERIAL | ALUMINUM LOW SILICON ALUMINUM | | | |
|---|---|---|---|---|
| DIAMETER | RPM | FEED | RPM | FEED |
| 3.0 | 10000 | 27.56 | 10000 | 35.43 |
| 4.0 | 10000 | 35.43 | 10000 | 43.31 |
| 5.0 | 10000 | 39.37 | 10000 | 51.18 |
| 6.0 | 10000 | 47.24 | 10000 | 59.06 |
| 8.0 | 8000 | 55.12 | 8000 | 70.87 |
| 10.0 | 8000 | 66.93 | 8000 | 82.68 |
| 12.0 | 8000 | 82.68 | 8000 | 102.36 |
| 14.0 | 6000 | 70.87 | 6000 | 86.61 |
| 16.0 | 6000 | 74.80 | 6000 | 94.49 |
| 18.0 | 4000 | 55.12 | 4000 | 70.87 |
| 20.0 | 4000 | 62.99 | 4000 | 74.80 |



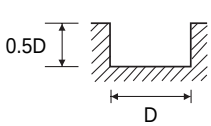

A : Ø3 ~ Ø10 = 0.25 × D
Ø12 ~ Ø20 = 0.5 × D

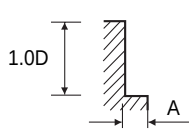
RPM = rev./min.
FEED = inch/min.

## CARBIDE, 2 FLUTE TiCN COATED

### EG522, EG930 SERIES

| MATERIAL | ALUMINUM LOW SILICON ALUMINUM | | | |
|---|---|---|---|---|
| DIAMETER | RPM | FEED | RPM | FEED |
| 3.0 | 13000 | 35.43 | 13000 | 47.24 |
| 4.0 | 13000 | 47.24 | 13000 | 55.12 |
| 5.0 | 13000 | 51.18 | 13000 | 66.93 |
| 6.0 | 13000 | 59.06 | 13000 | 78.74 |
| 8.0 | 10000 | 70.87 | 10000 | 90.55 |
| 10.0 | 10000 | 86.61 | 10000 | 106.30 |
| 12.0 | 10000 | 106.30 | 10000 | 133.86 |
| 14.0 | 8000 | 90.55 | 8000 | 110.24 |
| 16.0 | 8000 | 98.43 | 8000 | 122.05 |
| 18.0 | 5000 | 70.87 | 5000 | 90.55 |
| 20.0 | 5000 | 78.74 | 5000 | 98.43 |



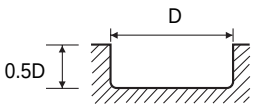

A : Ø3 ~ Ø10 = 0.25 × D
Ø12 ~ Ø20 = 0.5 × D

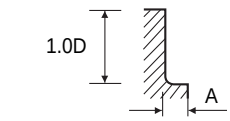
RPM = rev./min.
FEED = inch/min.

## CARBIDE, 2 FLUTE CORNER RADIUS TiCN COATED

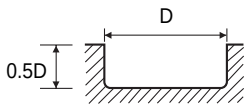
### EG909 SERIES

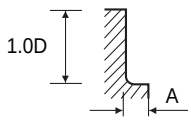
| MATERIAL | ALUMINUM ALUMINUM ALLOY | | | | COPPER ALLOY | | | |
|---|---|---|---|---|---|---|---|---|
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 4.0 | 13000 | 47.24 | 13000 | 55.12 | 3900 | 11.81 | 3900 | 13.78 |
| 6.0 | 13000 | 59.06 | 13000 | 78.74 | 3900 | 14.96 | 3900 | 19.69 |
| 8.0 | 10000 | 70.87 | 10000 | 90.55 | 3000 | 17.72 | 3000 | 22.83 |
| 10.0 | 10000 | 86.61 | 10000 | 106.30 | 3000 | 21.65 | 3000 | 26.77 |
| 12.0 | 10000 | 106.30 | 10000 | 133.86 | 3000 | 26.77 | 3000 | 33.46 |
| 16.0 | 8000 | 98.43 | 8000 | 122.05 | 2400 | 24.80 | 2400 | 30.71 |
| 20.0 | 5000 | 78.74 | 5000 | 98.43 | 1500 | 19.69 | 1500 | 24.80 |




A : ~Ø10=0.25D
Ø12~Ø20=0.5D




A : ~Ø10=0.25D
Ø12~Ø20=0.5D

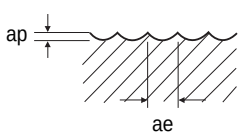
RPM = rev./min.
FEED = inch/min.

## CARBIDE, 2 FLUTE 50° HELIX BALL NOSE TiCN COATED

### EG910 SERIES

| MATERIAL | ALUMINUM ALUMINUM ALLOY | | COPPER ALLOY | |
|---|---|---|---|---|
| DIAMETER | RPM | FEED | RPM | FEED |
| R3.0 × 6.0 | 18000 | 68.90 | 5500 | 17.32 |
| R4.0 × 8.0 | 14000 | 78.74 | 4200 | 19.69 |
| R5.0 × 10.0 | 14000 | 92.52 | 4200 | 22.83 |
| R6.0 × 12.0 | 14000 | 118.11 | 4200 | 29.53 |
| R8.0 × 16.0 | 11000 | 106.30 | 3300 | 26.38 |
| R10.0 × 20.0 | 7000 | 86.61 | 2100 | 21.65 |

ap=0.2×D
ae=0.5×D




RPM = rev./min.
FEED = inch/min.

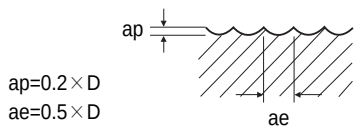
# ALU-POWER END MILLS

## RECOMMENDED CUTTING CONDITIONS

## CARBIDE, 3 FLUTE 40° HELIX BALL NOSE TiCN COATED

### EG908 SERIES

| MATERIAL | ALUMINUM LOW SILICON ALUMINUM | | COPPER ALLOY | |
|---|---|---|---|---|
| DIAMETER | RPM | FEED | RPM | FEED |
| R1.0 × 2.0 | 27000 | 37.40 | 8000 | 9.45 |
| R1.25 × 2.5 | 22000 | 37.40 | 6500 | 9.45 |
| R1.5 × 3.0 | 18000 | 37.40 | 5500 | 9.45 |
| R2.0 × 4.0 | 18000 | 49.21 | 5500 | 12.20 |
| R2.5 × 5.0 | 18000 | 53.15 | 5500 | 13.39 |
| R3.0 × 6.0 | 18000 | 68.90 | 5500 | 17.32 |
| R4.0 × 8.0 | 14000 | 78.74 | 4200 | 19.69 |
| R5.0 × 10.0 | 14000 | 92.52 | 4200 | 22.83 |
| R6.0 × 12.0 | 14000 | 118.11 | 4200 | 29.53 |
| R8.0 × 16.0 | 11000 | 106.30 | 3300 | 26.38 |



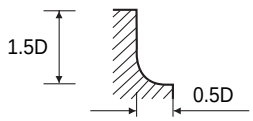

ap=0.2×D
ae=0.5×D

RPM = rev./min.
FEED = inch/min.

## T15, 3 FLUTE 42° HELIX SPEED-FREAK BALL NOSE

### EK196 SERIES

| MATERIAL | ALUMINUM ALUMINUM ALLOYS | |
|---|---|---|
| DIAMETER | RPM | FEED |
| 1/4 | 4500 | 7.90 |
| 5/16 | 3100 | 9.10 |
| 3/8 | 2500 | 13.80 |
| 1/2 | 2000 | 15.80 |
| 5/8 | 1600 | 17.70 |



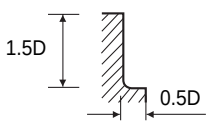

※ The FEED, in long & long reach types, should be reduced by around 50%

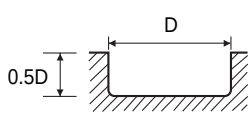
RPM = rev./min.
FEED = inch/min.

## T15, 3 FLUTE, 42° HELIX FINISHING with CORNER RADIUS

### EK193 SERIES

| MATERIAL | ALUMINUM ALUMINUM ALLOY | | | |
|---|---|---|---|---|
| DIAMETER | RPM | FEED | RPM | FEED |
| 1/2 | 4500 | 38 | 4095 | 38 |
| 5/8 | 3500 | 26 | 3185 | 39 |
| 3/4 | 2300 | 27 | 2093 | 41 |
| 1 | 2000 | 27 | 1820 | 40 |
| 1-1/4 | 1600 | 26 | 1456 | 38 |
| 1-1/2 | 1350 | 25 | 1229 | 38 |




※ The FEED, in long & long reach types, should be reduced by around 50%

RPM = rev./min.
FEED = inch/min.

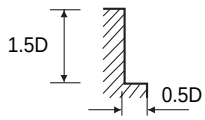
# SPEED FREEK END MILLS

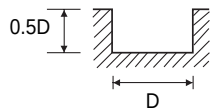
## RECOMMENDED CUTTING CONDITIONS

## PREMIUM HSS-PM, 3 FLUTE 42° HELIX ROUGHING TiAlN COATED

### EP922, EP924 SERIES

| MATERIAL | ALUMINUM ALUMINUM ALLOY | | | |
|---|---|---|---|---|
| DIAMETER | RPM | FEED | RPM | FEED |
| 12.0 | 2800 | 16.14 | 2800 | 21.65 |
| 16.0 | 2200 | 18.31 | 2200 | 24.61 |
| 20.0 | 1700 | 20.67 | 1700 | 27.56 |
| 25.0 | 1400 | 18.31 | 1400 | 24.61 |
| 32.0 | 1100 | 20.67 | 1100 | 27.56 |




※ The FEED, in long & long reach types, should be reduced by around 50%

RPM = rev./min.
FEED = inch/min.

## SPEED FREEK

### YG T-15 3 FLUTE ALUMINUM ROUGHER

**SPEEDS & FEEDS**

| MATERIAL | UNCOATED | TiCN | CHIP LOAD PER TOOTH & CUTTING DIAMETER | | | | |
|---|---|---|---|---|---|---|---|
| | SFM | SFM | 1/2 | 3/4 | 1.00 | 1.25 | 2.00 |
| ALUMINUM [SOFT] | 250-500 | 400-2,500 | .005 | .007 | .010 | .012 | .015 |
| AIRCRAFT ALUMINUM [UNDER 10% SILICON] | 250-750 | 500-3,250 | .005 | .007 | .010 | .012 | .015 |

### 3/4 DIA. / TiCN COATED / 10,186 RPM [2,000 SFM] @ 213 IPM

| | |
|---|---|
| SFM | 0.262 × CUTTER DIA × RPM |
| RPM | $3.82 \times \frac{SFM}{CUTTER\ DIA}$ |
| IPM | FPT × N × RPM |

| | |
|---|---|
| FPT | $\frac{IPM}{N \times RPM}$ |
| IPR | $\frac{IPM}{RPM}$ |
| CUTTING TIME | $\frac{LENGTH\ OF\ CUT}{IPM}$ |

SFM = SURFACE FEET PER MINUTE
RPM = REVOLUTIONS PER MINUTE
N = NUMBER OF TEETH
IPR = INCHES PER REVOLUTION
IPM = INCHES PER MINUTE
FPT = FEED PER TOOTH

# CARBIDE

YG

Being the best through innovation

# D-POWER

**- Diamond Coated Carbide End Mills for Graphite**

# SELECTION GUIDE

| ITEM | MODEL | DESCRIPTION | SIZE MIN | SIZE MAX | PAGE |
|---|---|---|---|---|---|
| **INCH** | | | | | |
| **EI107** | | CARBIDE, 4 FLUTE REGULAR LENGTH ◆ | D1/8 | D1/2 | **628** |
| **EI099** | | CARBIDE, 2 FLUTE REGULAR LENGTH BALL NOSE ◆ | R.0391 | R1/4 | **629** |
| **EI106** | | CARBIDE, 4 FLUTE REGULAR LENGTH BALL NOSE ◆ | R.0391 | R1/4 | **629** |
| **EI971** | | CARBIDE, 2 FLUTE LONG LENGTH BALL NOSE ◆ | R.0391 | R1/4 | **630** |
| **EI972** | | CARBIDE, 2 FLUTE LONG REACH BALL NOSE ◆ | R.0391 | R5/32 | **631** |
| **EIB07** |  | CARBIDE, 4 FLUTE REGULAR LENGTH BALL NOSE with NECK ◆ | R.0156 | R.0625 | **632** |
| **EIB05** | | CARBIDE, 4 FLUTE REGULAR LENGTH CORNER RADIUS ◆ | D1/16 | D1/2 | **633** |
| **EIB06** |  | CARBIDE, 4 FLUTE REGULAR LENGTH CORNER RADIUS with NECK ◆ | D1/32 | D1/8 | **634** |

◆ U.S.A Stock

| | | | | | |
|---|---|---|---|---|---|
| **METRIC** | | | | | |
| **EI880** | | CARBIDE, 2 FLUTE SHORT LENGTH BALL NOSE ◇ | R1.0 | R6.0 | **635** |
| **EI881** | | CARBIDE, 3 FLUTE SHORT LENGTH BALL NOSE ◇ | R1.0 | R6.0 | **635** |
| **EI451** | | CARBIDE, 2 FLUTE LONG LENGTH BALL NOSE ◇ | R1.0 | R6.0 | **636** |
| **EI450** | | CARBIDE, 2 FLUTE LONG REACH BALL NOSE ◇ | R1.0 | R4.0 | **637** |
| | | RECOMMENDED CUTTING CONDITIONS | | | **638** |

◇ Call for Availability

◎ : Excellent
○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | ◎ | | ○ | | | |
| | | | | | | | ◎ | | ○ | | | |
| | | | | | | | ◎ | | ○ | | | |
| | | | | | | | ◎ | | ○ | | | |
| | | | | | | | ◎ | | ○ | | | |
| | | | | | | | ◎ | | ○ | | | |
| | | | | | | | ◎ | | ○ | | | |
| | | | | | | | ◎ | | ○ | | | |
| | | | | | | | ◎ | | ○ | | | |
| | | | | | | | ◎ | | ○ | | | |
| | | | | | | | ◎ | | ○ | | | |
| | | | | | | | ◎ | | ○ | | | |

# D-POWER END MILLS

**EI107 SERIES** PLAIN SHANK

## CARBIDE, 4 FLUTE REGULAR LENGTH

- ▶ Higher hardness of film and excellent wear-resistance increase the tool life surprisingly.
- ▶ Ultra fine film of YG-1's diamond coated carbide end mills ensure the smooth and excellent surface on work materials.
- ▶ High performance on graphite, wrought aluminum, bakelite, plastics, wood, brass, etc.
- ▶ YG-1's diamond coated carbide end mills may have good result for the machining of non-ferrous metals and non-metallic materials.

MG | 4 | 30° | PLAIN | P.639

**for GRAPHITE**
◆ U.S.A Stock

Unit : Inch

| EDP No. | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|
| ★ 99686 | 1/64 | 1/8 | 3/65 | 1-1/2 |
| 99629 | 1/8 | 1/8 | 1/2 | 1-1/2 |
| 99630 | 3/16 | 3/16 | 5/8 | 2 |
| 99631 | 1/4 | 1/4 | 3/4 | 2-1/2 |
| 99632 | 5/16 | 5/16 | 13/16 | 2-1/2 |
| 99633 | 3/8 | 3/8 | 7/8 | 2-1/2 |
| 99635 | 1/2 | 1/2 | 1 | 3 |

★ 2Flute

| Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0003 |

▶Recommended Cutting Condition
▶Cutting speed : 500~1200 SFPM
▶ Feed : .002~.006 inch/teeth

◎ : Excellent ○ : Good

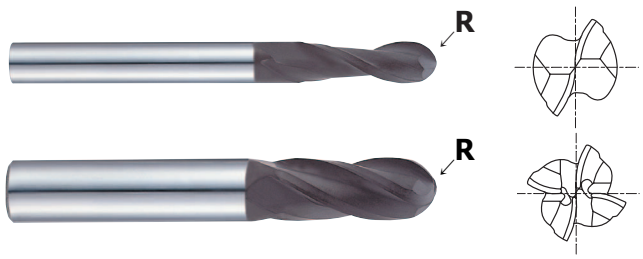
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | ◎ | | ○ | | | |

# D-POWER END MILLS

**EI099 SERIES** PLAIN SHANK
**EI106 SERIES** PLAIN SHANK

## CARBIDE, 2&4 FLUTE REGULAR LENGTH BALL NOSE

- ▶ Higher hardness of film and excellent wear-resistance increase the tool life surprisingly.
- ▶ Ultra fine film of YG-1's diamond coated carbide ball end mills ensure the smooth and excellent surface on work materials.
- ▶ High performance on graphite, wrought aluminum, bakelite, plastics, wood, brass, etc.
- ▶ YG-1's diamond coated carbide ball end mills may have good result for the machining of non-ferrous metals and non-metallic materials.




MG | 2 | 30° | R ±.0008 | PLAIN

P.638

**for GRAPHITE**
◆ U.S.A Stock

### EI099(2 FLUTE), EI106(4 FLUTE) Series

Unit : Inch

| EDP No. | | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| 2 FLUTE | 4 FLUTE | R (±.0008) | | | | |
| **99572** | **99621** | R .0391 | **5/64** | 1/8 | 1/4 | 1-1/2 |
| **99573** | **99622** | R 3/64 | **3/32** | 1/8 | 3/8 | 1-1/2 |
| **99574** | **99623** | R 1/16 | **1/8** | 1/8 | 1/2 | 1-1/2 |
| **99575** | **99624** | R 3/32 | **3/16** | 3/16 | 5/8 | 2 |
| **99576** | **99625** | R 1/8 | **1/4** | 1/4 | 3/4 | 2-1/2 |
| **99577** | **99626** | R 5/32 | **5/16** | 5/16 | 13/16 | 2-1/2 |
| **99578** | **99627** | R 3/16 | **3/8** | 3/8 | 7/8 | 2-1/2 |
| **99583** | **99628** | R 1/4 | **1/2** | 1/2 | 1 | 3 |

| Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0003 |

◎ : Excellent ○ : Good

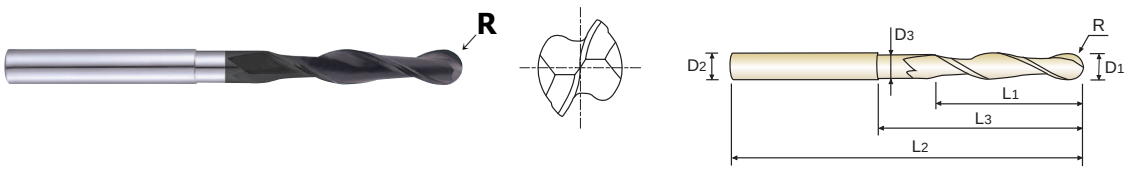
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | ◎ | | ○ | | | |

# D-POWER END MILLS

**EI971 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE LONG LENGTH BALL NOSE

- Higher hardness of film and excellent wear-resistance increase the tool life surprisingly.
- Ultra fine film of YG-1's diamond coated carbide ball end mills ensure the smooth and excellent surface on work materials.
- High performance on graphite, wrought aluminum, bakelite, plastics, wood, brass, etc.
- YG-1's diamond coated carbide ball end mills may have good result for the machining of non-ferrous metals and non-metallic materials.metallic materials.



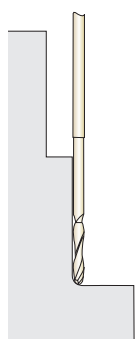

MG | 2 | 30° | R ±.0008 | PLAIN | P.638

**for GRAPHITE**
◆ U.S.A Stock

Unit : Inch

| EDP No. | Radius of Ball Nose R (±.0008) | Mill Diameter D1 | Shank Diameter D2 | Length of Cut L1 | Length Below Shank L3 | Overall Length L2 | Neck Diameter D3 |
|---|---|---|---|---|---|---|---|
| **99671** | R.0391 | **5/64** | 1/8 | 3/8 | 3/4 | 3-1/4 | .076 |
| **99672** | R 1/16 | **1/8** | 1/8 | 5/8 | 1 | 3-1/4 | .120 |
| **99973** | R 3/32 | **3/16** | 3/16 | 1-1/8 | 2 | 4 | .182 |
| **99673** | R 3/32 | **3/16** | 1/4 | 1-1/8 | 2 | 4 | .185 |
| **99674** | R 1/8 | **1/4** | 1/4 | 1-1/8 | 2 | 4 | .230 |
| **99675** | R 5/32 | **5/16** | 5/16 | 1-1/2 | 2-3/8 | 4-1/2 | .293 |
| **99676** | R 3/16 | **3/8** | 3/8 | 2 | 2-3/4 | 4-3/4 | .355 |
| **99677** | R1/4 | **1/2** | 1/2 | 2-1/8 | 3 | 5-1/8 | .480 |

| Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0003 |



◎ : Excellent ○ : Good

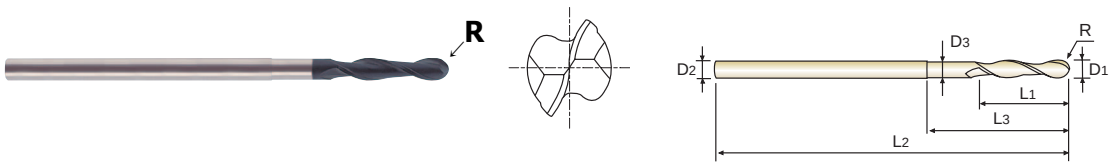
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | ◎ | | ○ | | | |

# D-POWER END MILLS

**EI972 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE LONG REACH BALL NOSE

- ▶ Higher hardness of film and excellent wear-resistance increase the tool life surprisingly.
- ▶ Ultra fine film of YG-1's diamond coated carbide ball end mills ensure the smooth and excellent surface on work materials.
- ▶ High performance on graphite, wrought aluminum, bakelite, plastics, wood, brass, etc.
- ▶ YG-1's diamond coated carbide ball end mills may have good result for the machining of non-ferrous metals and non-metallic materials.metallic materials.



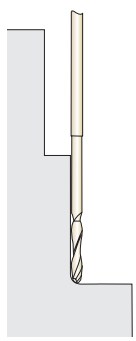

MG | 2 | 30° | R ±.0008 | PLAIN | P.638

**for GRAPHITE**
◆ U.S.A Stock

Unit : Inch

| EDP No. | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|
| | R (±.0008) | D1 | D2 | L1 | L3 | L2 | D3 |
| **99678** | R.0391 | **5/64** | 1/8 | 3/8 | 3/4 | 4 | .076 |
| **99679** | R1/16 | **1/8** | 1/8 | 5/8 | 1 | 4 | .120 |
| **99980** | R3/32 | **3/16** | 3/16 | 1-1/8 | 2 | 4-3/4 | .182 |
| **99680** | R3/32 | **3/16** | 1/4 | 1-1/8 | 2 | 4-3/4 | .186 |
| **99681** | R1/8 | **1/4** | 1/4 | 1-1/8 | 2 | 6 | .230 |
| **99682** | R5/32 | **5/16** | 5/16 | 1-1/2 | 2-3/8 | 6 | .293 |

| Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0003 |



◎ : Excellent ○ : Good

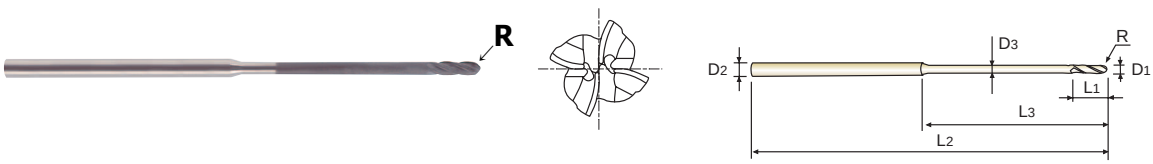
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | ◎ | | ○ | | | |

# D-POWER END MILLS

**EIB07 SERIES** PLAIN SHANK

## CARBIDE, 4 FLUTE REGULAR LENGTH BALL NOSE with NECK

- Higher hardness of film and excellent wear-resistance increase the tool life surprisingly.
- Ultra fine film of YG-1's diamond coated carbide ball end mills ensure the smooth and excellent surface on work materials.
- High performance on graphite, wrought aluminum, bakelite, plastics, wood, brass, etc.
- YG-1's diamond coated carbide ball end mills may have good result for the machining of non-ferrous metals and non-metallic materials.metallic materials.




MG | 4 | 30° | R ±.0008 | PLAIN | P.638

**for GRAPHITE**
◆ U.S.A Stock

Unit : Inch

| EDP No. | Radius of Ball Nose R (±.0008) | Mill Diameter D1 | Shank Diameter D2 | Length of Cut L1 | Length Below Shank L3 | Overall Length L2 | Neck Diameter D3 |
|---|---|---|---|---|---|---|---|
| **EIB07002** | R.0156 | **1/32** | 1/8 | 3/32 | 3/8 | 3 | .028 |
| **EIB07901** | R.0156 | **1/32** | 1/8 | 3/32 | 1/2 | 3 | .028 |
| **EIB07003** | R.0234 | **3/64** | 1/8 | 9/64 | 9/16 | 3 | .043 |
| **EIB07902** | R.0234 | **3/64** | 1/8 | 9/64 | 3/4 | 3 | .043 |
| **EIB07004** | R.0312 | **1/16** | 1/8 | 3/16 | 3/4 | 3 | .057 |
| **EIB07903** | R.0312 | **1/16** | 1/8 | 3/16 | 1 | 3 | .057 |
| **EIB07006** | R.0469 | **3/32** | 1/8 | 9/32 | 1 | 3 | .086 |
| **EIB07904** | R.0469 | **3/32** | 1/8 | 9/32 | 1-1/2 | 3 | .086 |
| **EIB07008** | R.0625 | **1/8** | 1/8 | 3/8 | 1-1/2 | 3 | .115 |
| **EIB07905** | R.0625 | **1/8** | 1/8 | 3/8 | 2 | 3 | .115 |

| Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0003 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | ◎ | | ○ | | | |

# D-POWER END MILLS

**EIB05 SERIES** PLAIN SHANK

## CARBIDE, 4 FLUTE REGULAR LENGTH CORNER RADIUS

- ▶ Higher hardness of film and excellent wear-resistance increase the tool life surprisingly.
- ▶ Ultra fine film of YG-1's diamond coated carbide ball end mills ensure the smooth and excellent surface on work materials.
- ▶ High performance on graphite, wrought aluminum, bakelite, plastics, wood, brass, etc.
- ▶ YG-1's diamond coated carbide ball end mills may have good result for the machining of non-ferrous metals and non-metallic materials.metallic materials.

MG | 4 | 30° | R ±.001 | PLAIN

P.638

**for GRAPHITE**
◆ U.S.A Stock

Unit : Inch

| EDP No. | Corner Radius | Mill Diameter | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|
| | R (±.001) | $D_1$ | $D_2$ | $L_1$ | $L_3$ | $L_2$ | $D_3$ |
| **EIB05004** | R.010 | **1/16** | 1/8 | 3/16 | - | 1-1/2 | - |
| **EIB05901** | R.015 | **1/16** | 1/8 | 3/16 | - | 1-1/2 | - |
| **EIB05006** | R.010 | **3/32** | 1/8 | 3/8 | - | 1-1/2 | - |
| **EIB05008** | R.015 | **1/8** | 1/8 | 1/2 | - | 1-1/2 | - |
| **EIB05902** | R.020 | **1/8** | 1/8 | 1/2 | - | 1-1/2 | - |
| **EIB05012** | R.020 | **3/16** | 3/16 | 5/8 | - | 2 | - |
| **EIB05911** | R.020 | **3/16** | 3/16 | 3/16 | 1-1/2 | 4 | .169 |
| **EIB05903** | R.030 | **3/16** | 3/16 | 5/8 | - | 2 | - |
| **EIB05016** | R.020 | **1/4** | 1/4 | 3/4 | - | 2-1/2 | - |
| **EIB05913** | R.020 | **1/4** | 1/4 | 1/4 | 2 | 4 | .230 |
| **EIB05912** | R.020 | **1/4** | 1/4 | 1/4 | 2 | 6 | .230 |
| **EIB05904** | R.030 | **1/4** | 1/4 | 3/4 | - | 2-1/2 | - |
| **EIB05024** | R.020 | **3/8** | 3/8 | 7/8 | - | 2-1/2 | - |
| **EIB05908** | R.020 | **3/8** | 3/8 | 3/8 | 2 | 4 | .355 |
| **EIB05907** | R.020 | **3/8** | 3/8 | 3/8 | - | 4 | - |
| **EIB05905** | R.030 | **3/8** | 3/8 | 7/8 | - | 2-1/2 | - |
| **EIB05032** | R.030 | **1/2** | 1/2 | 1 | - | 3 | - |
| **EIB05906** | R.060 | **1/2** | 1/2 | 1 | - | 3 | - |
| **EIB05909** | R.030 | **1/2** | 1/2 | 1-1/2 | - | 4 | - |
| **EIB05910** | R.030 | **1/2** | 1/2 | 3 | - | 6 | - |

| Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|
| 0~-.0012 | 0~-.0003 |

◎ : Excellent ○ : Good

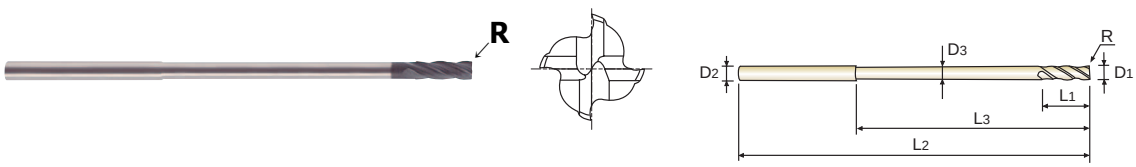
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | ◎ | | ○ | | | |

# D-POWER END MILLS

**EIB06 SERIES** PLAIN SHANK

## CARBIDE, 4 FLUTE REGULAR LENGTH CORNER RADIUS with NECK

- Higher hardness of film and excellent wear-resistance increase the tool life surprisingly.
- Ultra fine film of YG-1's diamond coated carbide ball end mills ensure the smooth and excellent surface on work materials.
- High performance on graphite, wrought aluminum, bakelite, plastics, wood, brass, etc.
- YG-1's diamond coated carbide ball end mills may have good result for the machining of non-ferrous metals and non-metallic materials.metallic materials.




MG | 4 | 30° | R ±.001 | PLAIN | P.639

**for GRAPHITE**
◆ U.S.A Stock

Unit : Inch

| EDP No. | Corner Radius R (±.001) | Mill Diameter D1 | Shank Diameter D2 | Length of Cut L1 | Length Below Shank L3 | Overall Length L2 | Neck Diameter D3 |
|---|---|---|---|---|---|---|---|
| **EIB06002** | R.005 | **1/32** | 1/8 | 3/32 | 3/8 | 3 | .028 |
| **EIB06901** | R.005 | **1/32** | 1/8 | 3/32 | 1/2 | 3 | .028 |
| **EIB06003** | R.010 | **3/64** | 1/8 | 9/64 | 9/16 | 3 | .043 |
| **EIB06902** | R.010 | **3/64** | 1/8 | 9/64 | 3/4 | 3 | .043 |
| **EIB06004** | R.010 | **1/16** | 1/8 | 3/16 | 3/4 | 3 | .057 |
| **EIB06903** | R.010 | **1/16** | 1/8 | 3/16 | 1 | 3 | .057 |
| **EIB06006** | R.010 | **3/32** | 1/8 | 9/32 | 1 | 3 | .086 |
| **EIB06904** | R.010 | **3/32** | 1/8 | 9/32 | 1-1/2 | 3 | .086 |
| **EIB06008** | R.010 | **1/8** | 1/8 | 3/8 | 1-1/2 | 3 | .115 |
| **EIB06905** | R.010 | **1/8** | 1/8 | 3/8 | 2 | 3 | .115 |
| **EIB06906** | R.015 | **1/8** | 1/8 | 3/16 | .800 | 2-1/2 | .115 |
| **EIB06907** | R.020 | **3/8** | 3/8 | 3/8 | 3 | 6 | .355 |

| Mill Dia. Tolerance(inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0003 |

◎ : Excellent ○ : Good

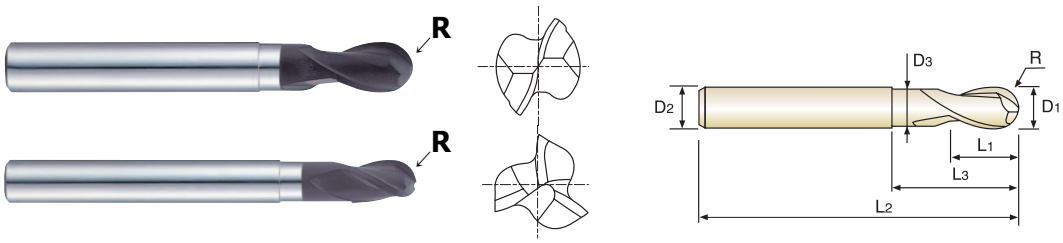
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | ◎ | | ○ | | | |

# D-POWER END MILLS

**EI880 SERIES** PLAIN SHANK
**EI881 SERIES** PLAIN SHANK

## CARBIDE, 2&3 FLUTE SHORT LENGTH BALL NOSE

- ▶ Higher hardness of film and excellent wear-resistance increase the tool life surprisingly.
- ▶ Ultra fine film of YG-1's diamond coated carbide ball end mills ensure the smooth and excellent surface on work materials.
- ▶ High performance on graphite, wrought aluminum, bakelite, plastics, wood, brass, etc.
- ▶ YG-1's diamond coated carbide ball end mills may have good result for the machining of non-ferrous metals and non-metallic materials.




MG | 2&3 | 30° | R ±0.01 | PLAIN

P.639

**for GRAPHITE**
◇ Call for Availability

### EI880(2 FLUTE), EI881(3 FLUTE) Series

Unit : mm

| EDP No. | | Radius of Ball Nose | Mill Diameter | | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|---|
| | | | Metric | Inch | | | | | |
| 2 FLUTE | 3 FLUTE | R (±0.01) | D1 | | D2 | L1 | L3 | L2 | D3 |
| EI880020 | EI881020 | R1.0 | 2.0 | .0787 | 6 | 3 | 5 | 60 | 1.9 |
| EI880025 | EI881025 | R1.25 | 2.5 | .0984 | 6 | 4 | 6 | 60 | 2.4 |
| EI880030 | EI881030 | R1.5 | 3.0 | .1181 | 6 | 4.5 | 6.5 | 60 | 2.8 |
| EI880035 | EI881035 | R1.75 | 3.5 | .1378 | 6 | 5 | 7 | 65 | 3.2 |
| EI880040 | EI881040 | R2.0 | 4.0 | .1575 | 6 | 6 | 8 | 65 | 3.7 |
| EI880050 | EI881050 | R2.5 | 5.0 | .1969 | 6 | 7.5 | 10 | 65 | 4.6 |
| EI880060 | EI881060 | R3.0 | 6.0 | .2362 | 6 | 9 | 12 | 75 | 5.6 |
| EI880080 | EI881080 | R4.0 | 8.0 | .3150 | 8 | 12 | 25 | 75 | 7.4 |
| EI880100 | EI881100 | R5.0 | 10.0 | .3937 | 10 | 15 | 30 | 80 | 9.4 |
| EI880120 | EI881120 | R6.0 | 12.0 | .4724 | 12 | 18 | 36 | 90 | 11.4 |

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.03 | h6 |

◎ : Excellent ○ : Good

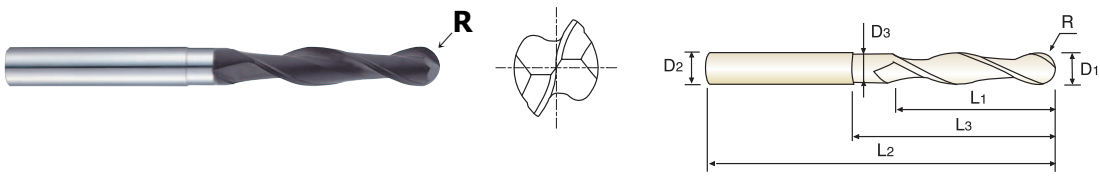
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | ◎ | | ○ | | | |

# D-POWER END MILLS

**EI451 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE LONG LENGTH BALL NOSE

- Higher hardness of film and excellent wear-resistance increase the tool life surprisingly.
- Ultra fine film of YG-1's diamond coated carbide ball end mills ensure the smooth and excellent surface on work materials.
- High performance on graphite, wrought aluminum, bakelite, plastics, wood, brass, etc.
- YG-1's diamond coated carbide ball end mills may have good result for the machining of non-ferrous metals and non-metallic materials.




MG | 2 | 30° | R ±0.01 | PLAIN

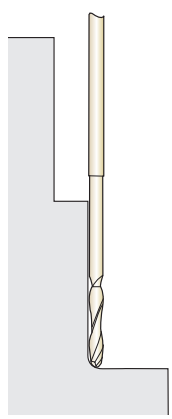
P.639

**for GRAPHITE**
◇ Call for Availability

Unit : mm

| EDP No. | Radius of Ball Nose | Mill Diameter | | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|
| | | Metric | Inch | | | | | |
| | R (±0.01) | $D_1$ | | $D_2$ | $L_1$ | $L_3$ | $L_2$ | $D_3$ |
| **99558** | R1.0 | **2.0** | **.0787** | 4 | 10 | 20 | 80 | 1.95 |
| **99559** | R1.5 | **3.0** | **.1181** | 4 | 15 | 25 | 80 | 2.9 |
| **99560** | R2.0 | **4.0** | **.1575** | 4 | 20 | 30 | 80 | 3.9 |
| **99561** | R2.5 | **5.0** | **.1969** | 6 | 30 | 50 | 100 | 4.9 |
| **99562** | R3.0 | **6.0** | **.2362** | 6 | 30 | 50 | 100 | 5.5 |
| **99563** | R4.0 | **8.0** | **.3150** | 8 | 40 | 60 | 110 | 7.5 |
| **99564** | R5.0 | **10.0** | **.3937** | 10 | 50 | 70 | 120 | 9.5 |
| **99565** | R6.0 | **12.0** | **.4724** | 12 | 55 | 75 | 130 | 11.5 |

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.03 | h6 |



◎ : Excellent ○ : Good

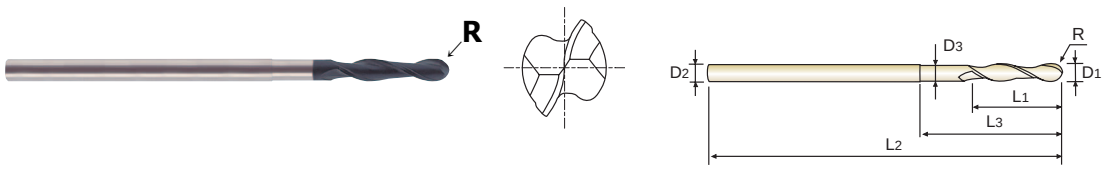
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | ◎ | | ○ | | | |

# D-POWER END MILLS

**EI450 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE LONG REACH BALL NOSE

- ▶ Higher hardness of film and excellent wear-resistance increase the tool life surprisingly.
- ▶ Ultra fine film of YG-1's diamond coated carbide ball end mills ensure the smooth and excellent surface on work materials.
- ▶ High performance on graphite, wrought aluminum, bakelite, plastics, wood, brass, etc.
- ▶ YG-1's diamond coated carbide ball end mills may have good result for the machining of non-ferrous metals and non-metallic materials.




MG | 2 | 30° | R ±0.01 | PLAIN

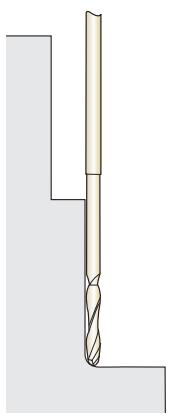
P.639

**for GRAPHITE**
◇ Call for Availability

Unit : mm

| EDP No. | Radius of Ball Nose | Mill Diameter | | Shank Diameter | Length of Cut | Length Below Shank | Overall Length | Neck Diameter |
|---|---|---|---|---|---|---|---|---|
| | | Metric | Inch | | | | | |
| | R (±0.01) | D1 | | D2 | L1 | L3 | L2 | D3 |
| **99566** | R1.0 | **2.0** | **.0787** | 4 | 10 | 20 | 100 | 1.95 |
| **99567** | R1.5 | **3.0** | **.1181** | 4 | 15 | 25 | 100 | 2.9 |
| **99568** | R2.0 | **4.0** | **.1575** | 4 | 20 | 30 | 100 | 3.9 |
| **99569** | R2.5 | **5.0** | **.1969** | 6 | 30 | 50 | 120 | 4.9 |
| **99570** | R3.0 | **6.0** | **.2362** | 6 | 30 | 50 | 150 | 5.5 |
| **99571** | R4.0 | **8.0** | **.3150** | 8 | 40 | 60 | 150 | 7.5 |

| Mill Dia. Tolerance(mm) | Shank Dia. Tolerance |
|---|---|
| 0~−0.03 | h6 |



◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| | | | | | | | ◎ | | ○ | | | |

# D-POWER END MILLS

## RECOMMENDED CUTTING CONDITIONS

## CARBIDE, 4 FLUTE BALL NOSE

### EI106 SERIES

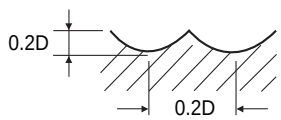
| MATERIAL | GRAPHITE | |
|---|---|---|
| DIAMETER | RPM | FEED |
| 5/64 | 16000 | 62.99 |
| 3/32 | 16000 | 88.19 |
| 1/8 | 16000 | 114.17 |
| 9/64 | 16000 | 137.80 |
| 5/32 | 16000 | 165.35 |
| 3/16 | 15500 | 200.79 |
| 1/4 | 15000 | 232.28 |
| 6/16 | 13000 | 236.22 |
| 3/8 | 11500 | 324.16 |
| 1/2 | 10500 | 248.03 |

RPM = rev./min.
FEED = inch/min.

## CARBIDE, 2 FLUTE BALL NOSE

### EI099, EI971, EI972 SERIES

| MATERIAL | GRAPHITE | |
|---|---|---|
| DIAMETER | RPM | FEED |
| 5/64 | 16000 | 31.50 |
| 3/32 | 16000 | 44.09 |
| 1/8 | 16000 | 57.09 |
| 9/64 | 16000 | 58.90 |
| 5/32 | 16000 | 82.68 |
| 3/16 | 15500 | 100.39 |
| 1/4 | 15000 | 116.14 |
| 6/16 | 13000 | 118.11 |
| 3/8 | 11500 | 120.08 |
| 1/2 | 10500 | 124.02 |

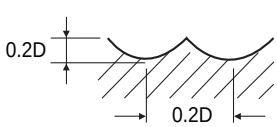



RPM = rev./min.
FEED = inch/min.

## CARBIDE, 4 FLUTE BALL NOSE with NECK

### EIB07 SERIES

| MATERIAL | GRAPHITE | |
|---|---|---|
| DIAMETER | RPM | FEED |
| 1/32 | 20000 | 30.36 |
| 3/64 | 20000 | 33.73 |
| 1/16 | 20000 | 37.48 |
| 5/64 | 16000 | 44.09 |
| 3/32 | 16000 | 61.73 |
| 1/8 | 16000 | 79.92 |
| 9/64 | 16000 | 96.46 |
| 5/32 | 16000 | 115.75 |
| 3/16 | 15500 | 140.55 |
| 1/4 | 15000 | 162.60 |
| 5/16 | 13000 | 165.35 |
| 3/8 | 11500 | 168.11 |
| 1/2 | 10500 | |

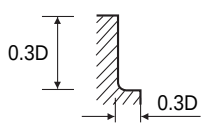



RPM = rev./min.
FEED = inch/min.

## CARBIDE, 4 FLUTE CORNER RADIUS

### EIB05 SERIES

| MATERIAL | GRAPHITE | |
|---|---|---|
| DIAMETER | RPM | FEED |
| 1/16 | 40000 | 125.98 |
| 5/64 | 40000 | 157.48 |
| 1/8 | 40000 | 220.47 |
| 5/32 | 40000 | 314.96 |
| 3/16 | 40000 | 377.95 |
| 1/4 | 40000 | 440.94 |
| 5/16 | 32000 | 440.94 |
| 3/8 | 26000 | 451.44 |
| 1/2 | 21000 | 430.45 |




RPM = rev./min.
FEED = inch/min.

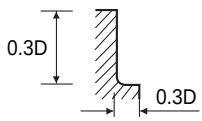
# D-POWER END MILLS

## RECOMMENDED CUTTING CONDITIONS

## CARBIDE, 4 FLUTE CORNER RADIUS with NECK

### EIB06 SERIES

| MATERIAL | GRAPHITE | |
|---|---|---|
| DIAMETER | RPM | FEED |
| 1/32 | 40000 | 44.09 |
| 3/64 | 40000 | 66.14 |
| 1/16 | 40000 | 88.19 |
| 5/64 | 40000 | 110.24 |
| 1/8 | 40000 | 154.33 |
| 5/32 | 40000 | 220.47 |
| 3/16 | 40000 | 264.57 |
| 1/4 | 40000 | 308.66 |
| 5/16 | 32000 | 308.66 |
| 3/89 | 26000 | 316.14 |
| 1/2 | 21000 | 301.41 |

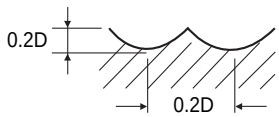



RPM = rev./min.
FEED = inch/min.

## CARBIDE, 2 FLUTE BALL NOSE

### EI880, EI451, EI450 SERIES

| MATERIAL | GRAPHITE | |
|---|---|---|
| DIAMETER | RPM | FEED |
| 2.0 | 16000 | 31.50 |
| 2.5 | 16000 | 44.09 |
| 3.0 | 16000 | 57.09 |
| 3.5 | 16000 | 68.90 |
| 4.0 | 16000 | 82.68 |
| 5.0 | 15500 | 100.39 |
| 6.0 | 15000 | 116.14 |
| 8.0 | 13000 | 118.11 |
| 10.0 | 11500 | 120.08 |
| 12.0 | 10500 | 124.02 |

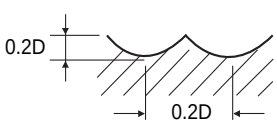



RPM = rev./min.
FEED = inch/min.

## CARBIDE, 3 FLUTE BALL NOSE

### EI881 SERIES

| MATERIAL | GRAPHITE | |
|---|---|---|
| DIAMETER | RPM | FEED |
| 2.0 | 16000 | 47.24 |
| 2.5 | 16000 | 66.93 |
| 3.0 | 16000 | 84.65 |
| 3.5 | 16000 | 104.33 |
| 4.0 | 16000 | 122.05 |
| 5.0 | 15500 | 149.61 |
| 6.0 | 15000 | 175.20 |
| 8.0 | 13000 | 177.17 |
| 10.0 | 11500 | 181.10 |
| 12.0 | 10500 | 187.01 |

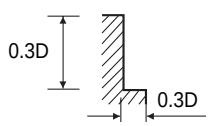



RPM = rev./min.
FEED = inch/min.

## CARBIDE, 4 FLUTE

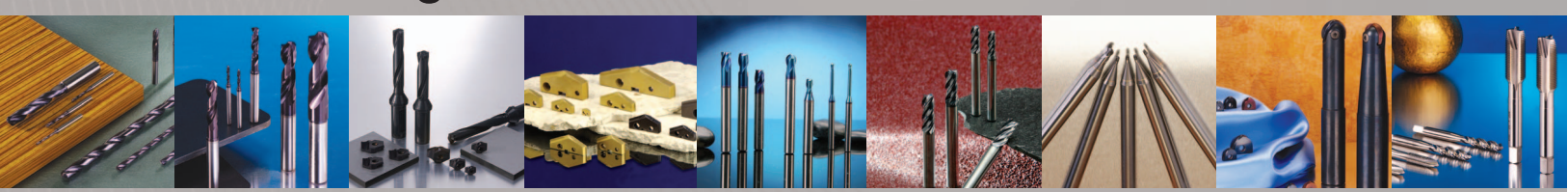
### EI107 SERIES

| MATERIAL | GRAPHITE | |
|---|---|---|
| DIAMETER | RPM | FEED |
| 1/64 | 40000 | 31.50 |
| 1/8 | 40000 | 62.99 |
| 3/16 | 40000 | 125.98 |
| 1/4 | 40000 | 188.98 |
| 5/16 | 32000 | 196.85 |
| 3/8 | 26000 | 204.72 |
| 1/2 | 20000 | 188.98 |




RPM = rev./min.
FEED = inch/min.

Global Cutting Tool Leader **YG-1**



# CARBIDE

Being the best through innovation

# STANDARD CARBIDE

- General Purpose, Non-coated, Many Coatings Available

# SELECTION GUIDE

| ITEM | MODEL | DESCRIPTION | SIZE | | PAGE |
|---|---|---|---|---|---|
| | | | MIN | MAX | |
| **INCH** | | | | | |
| **E5020** | | CARBIDE, 2 FLUTE REGULAR LENGTH | D1/32 | D1 | **646** |
| **E5021** | | CARBIDE, 4 FLUTE REGULAR LENGTH | D1/16 | D1 | **647** |
| **E5244** | | CARBIDE, 2 FLUTE STUB LENGTH | D1/16 | D3/4 | **648** |
| **E5245** | | CARBIDE, 4 FLUTE STUB LENGTH | D1/16 | D3/4 | **649** |
| **E5011** | | CARBIDE, 2 FLUTE LONG LENGTH | D1/8 | D1 | **650** |
| **E5012** | | CARBIDE, 4 FLUTE LONG LENGTH | D1/8 | D1 | **650** |
| **E5026** | | CARBIDE, 2 FLUTE EXTRA LONG LENGTH | D1/8 | D1 | **651** |
| **E5065** | | CARBIDE, 4 FLUTE EXTRA LONG LENGTH | D1/8 | D1 | **652** |
| **E5022** | | CARBIDE, 2 FLUTE STUB LENGTH DOUBLE | D1/32 | D1/2 | **653** |
| **E5023** | | CARBIDE, 4 FLUTE STUB LENGTH DOUBLE | D1/16 | D1/2 | **654** |
| **E5025** | | CARBIDE, 2 FLUTE REGULAR LENGTH DOUBLE | D1/8 | D1/2 | **655** |
| **E5024** | | CARBIDE, 4 FLUTE REGULAR LENGTH DOUBLE | D1/8 | D1/2 | **655** |
| **E5249** | | CARBIDE, 2 FLUTE REGULAR LENGTH BALL NOSE | R1/16 | R1/2 | **656** |
| **E5250** | | CARBIDE, 4 FLUTE REGULAR LENGTH BALL NOSE | R1/16 | R1/2 | **656** |
| **E5014** | | CARBIDE, 2 FLUTE LONG LENGTH BALL NOSE | R1/16 | R1/2 | **657** |
| **E5060** | | CARBIDE, 4 FLUTE LONG LENGTH BALL NOSE | R1/16 | R1/2 | **657** |
| **E5018** | | CARBIDE, 2 FLUTE EXTRA LONG LENGTH BALL NOSE | R1/16 | R1/2 | **658** |
| **E5062** | | CARBIDE, 4 FLUTE EXTRA LONG LENGTH BALL NOSE | R1/16 | R1/2 | **659** |
| **E5251 E5252** | | CARBIDE, 2&4 FLUTE STUB LENGTH DOUBLE BALL NOSE | R7/64 | R1/4 | **660** |

◎ : Excellent
○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | | | | ○ | | ○ | ○ | ○ | | |
| ◎ | ◎ | ◎ | | | | ○ | | ○ | ○ | ○ | | |
| ◎ | ◎ | ◎ | | | | ○ | | ○ | ○ | ○ | | |
| ◎ | ◎ | ◎ | | | | ○ | | ○ | ○ | ○ | | |
| ◎ | ◎ | ◎ | | | | ○ | | ○ | ○ | ○ | | |
| ◎ | ◎ | ◎ | | | | ○ | | ○ | ○ | ○ | | |
| ◎ | ◎ | ◎ | | | | ○ | | ○ | ○ | ○ | | |
| ◎ | ◎ | ◎ | | | | ○ | | ○ | ○ | ○ | | |
| ◎ | ◎ | ◎ | | | | ○ | | ○ | ○ | ○ | | |
| ◎ | ◎ | ◎ | | | | ○ | | ○ | ○ | ○ | | |
| ◎ | ◎ | ◎ | | | | ○ | | ○ | ○ | ○ | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | ○ | | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | ○ | | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | ○ | | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | ○ | | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | ○ | | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | ○ | | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | ○ | | | |

# SELECTION GUIDE

| ITEM | MODEL | DESCRIPTION | SIZE | | PAGE |
|---|---|---|---|---|---|
| | | | MIN | MAX | |
| **INCH** | | | | | |
| **E5216** | | CARBIDE, 4 FLUTE REGULAR LENGTH CORNER RADIUS | D1/8 | D1 | **661** |
| **E5069** | | CARBIDE, 5 FLUTE 45° HELIX REGULAR LENGTH CORNER RADIUS | D1/4 | D1 | **663** |
| **E5243** | | CARBIDE, 3 FLUTE 45° HELIX REGULAR LENGTH | D1/8 | D1 | **664** |
| **E5059** | | CARBIDE, 3 FLUTE 50° HELIX STUB & REGULAR & LONG LENGTH | D1/4 | D3/4 | **665** |
| **E5246** | | CARBIDE, 3 FLUTE 60° HELIX REGULAR LENGTH | D1/8 | D1 | **666** |
| **E5066** | | CARBIDE, 5 FLUTE 45° HELIX STUB LENGTH | D1/8 | D1 | **667** |
| **E5067** | | CARBIDE, 5 FLUTE 45° HELIX REGULAR LENGTH | D1/8 | D1 | **668** |
| **E5068** | | CARBIDE, 5 FLUTE 45° HELIX MEDIUM & LONG LENGTH | D1/4 | D1 | **669** |
| **E5073** | | CARBIDE, 5 FLUTE 45° HELIX EXTRA LONG LENGTH | D5/16 | D1 | **670** |
| **E5058** | | CARBIDE, 6 FLUTE 40° HELIX REGULAR LENGTH | D3/16 | D3/4 | **671** |
| **E5056**<br>**E5057** | | CARBIDE, 5 FLUTE 45° HELIX STUB & REGULAR LENGTH<br>FINE PITCH ROUGHING | D3/8 | D1 | **672** |
| **E5077** | | CARBIDE, 3 FLUTE TAPER | D3/32 | D1/4 | **673** |
| **E5078** | | CARBIDE, 3 FLUTE TAPER BALL NOSE | R.047 | R.125 | **674** |
| **METRIC** | | | | | |
| **EH527** | | CARBIDE, 2 FLUTE LONG LENGTH TiAlN 'F' COATED | D3.5 | D20.0 | **675** |
| **EH540** | | CARBIDE, 4 FLUTE LONG LENGTH TiAlN 'F' COATED | D3.5 | D20.0 | **676** |
| **EH882** | | CARBIDE, 3 FLUTE 35° HELIX CORNER RADIUS TiAlN 'F' COATED | D3.0 | D20.0 | **677** |
| | | RECOMMENDED CUTTING CONDITIONS | | | **678** |

◎ : Excellent
○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | ○ | ○ | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | | ◎ | ○ | ○ |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | | ◎ | ○ | ○ |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | | ◎ | ○ | ○ |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | | ◎ | ○ | ○ |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | | ◎ | ○ | ○ |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | | ◎ | ○ | ○ |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | | ◎ | ○ | ○ |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | | ◎ | ○ | ○ |
| ○ | ◎ | ◎ | ○ | | | | | | | ◎ | ○ | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | ○ | ○ | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | ○ | ○ | | |

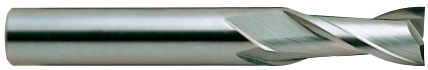
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | ○ | ○ | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | ○ | ○ | | |
| ◎ | ◎ | ◎ | ○ | | | ◎ | | ○ | ◎ | | | |

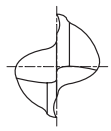
# CARBIDE END MILLS

**E5020 SERIES** FLAT SHANK

## CARBIDE, 2 FLUTE REGULAR LENGTH

- These are designed for slotting, drilling, pocketing and general operation.
- Suitable for cutting hardened & high alloy steels, steel casting, chill casting, malleable cast iron, CrNi-steels, brass, copper, aluminum with a high percentage of silicon and abrasive plastics.





MG | 2 | 30° | PLAIN | P.679

Unit : Inch

| EDP No. | | | | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | | | | |
| 01552 | 01552TN | 01552TC | 01552TF | 01552TE | 1/32 | 1/8 | 5/64 | 1-1/2 |
| 01553 | 01553TN | 01553TC | 01553TF | 01553TE | 3/64 | 1/8 | 7/64 | 1-1/2 |
| 01554 | 01554TN | 01554TC | 01554TF | 01554TE | 1/16 | 1/8 | 3/16 | 1-1/2 |
| 01555 | 01555TN | 01555TC | 01555TF | 01555TE | 5/64 | 1/8 | 3/16 | 1-1/2 |
| 01556 | 01556TN | 01556TC | 01556TF | 01556TE | 3/32 | 1/8 | 3/8 | 1-1/2 |
| 01557 | 01557TN | 01557TC | 01557TF | 01557TE | 7/64 | 1/8 | 3/8 | 1-1/2 |
| 01558 | 01558TN | 01558TC | 01558TF | 01558TE | 1/8 | 1/8 | 1/2 | 1-1/2 |
| 01560 | 01560TN | 01560TC | 01560TF | 01560TE | 9/64 | 3/16 | 1/2 | 2 |
| 01562 | 01562TN | 01562TC | 01562TF | 01562TE | 5/32 | 3/16 | 9/16 | 2 |
| 01564 | 01564TN | 01564TC | 01564TF | 01564TE | 11/64 | 3/16 | 5/8 | 2 |
| 01565 | 01565TN | 01565TC | 01565TF | 01565TE | 3/16 | 3/16 | 5/8 | 2 |
| 01569 | 01569TN | 01569TC | 01569TF | 01569TE | 13/64 | 1/4 | 5/8 | 2-1/2 |
| 01570 | 01570TN | 01570TC | 01570TF | 01570TE | 7/32 | 1/4 | 5/8 | 2-1/2 |
| 01572 | 01572TN | 01572TC | 01572TF | 01572TE | 15/64 | 1/4 | 3/4 | 2-1/2 |
| 01573 | 01573TN | 01573TC | 01573TF | 01573TE | 1/4 | 1/4 | 3/4 | 2-1/2 |
| 01579 | 01579TN | 01579TC | 01579TF | 01579TE | 5/16 | 5/16 | 13/16 | 2-1/2 |
| 01584 | 01584TN | 01584TC | 01584TF | 01584TE | 3/8 | 3/8 | 1 | 2-1/2 |
| 01588 | 01588TN | 01588TC | 01588TF | 01588TE | 7/16 | 7/16 | 1 | 2-3/4 |
| 01593 | 01593TN | 01593TC | 01593TF | 01593TE | 1/2 | 1/2 | 1 | 3 |
| 01595 | 01595TN | 01595TC | 01595TF | 01595TE | 5/8 | 5/8 | 1-1/4 | 3-1/2 |
| 01598 | 01598TN | 01598TC | 01598TF | 01598TE | 3/4 | 3/4 | 1-1/2 | 4 |
| 01600 | 01600TN | 01600TC | 01600TF | 01600TE | 1 | 1 | 1-1/2 | 4 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0005 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | | | | ○ | | ○ | ○ | ○ | | |

# CARBIDE END MILLS

**E5021 SERIES** PLAIN SHANK

## CARBIDE, 4 FLUTE REGULAR LENGTH

▶ Possible for high-speed cutting, suitable for high efficiency maching for hardened & high alloy steels, steel casting, chill casting, malleable cast iron, CrNi-steels, brass, copper, aluminum with a high percentage of silicon and abrasive plastics.

MG | 4 | 30° | PLAIN | P.680

Unit : Inch

| EDP No. | | | | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | | | | |
| 07554 | 07554TN | 07554TC | 07554TF | 07554TE | 1/16 | 1/8 | 3/16 | 1-1/2 |
| 07555 | 07555TN | 07555TC | 07555TF | 07555TE | 5/64 | 1/8 | 3/16 | 1-1/2 |
| 07556 | 07556TN | 07556TC | 07556TF | 07556TE | 3/32 | 1/8 | 3/8 | 1-1/2 |
| 07557 | 07557TN | 07557TC | 07557TF | 07557TE | 7/64 | 1/8 | 3/8 | 1-1/2 |
| 07558 | 07558TN | 07558TC | 07558TF | 07558TE | 1/8 | 1/8 | 1/2 | 1-1/2 |
| 07560 | 07560TN | 07560TC | 07560TF | 07560TE | 9/64 | 3/16 | 1/2 | 2 |
| 07561 | 07561TN | 07561TC | 07561TF | 07561TE | 5/32 | 3/16 | 9/16 | 2 |
| 07564 | 07564TN | 07564TC | 07564TF | 07564TE | 11/64 | 3/16 | 5/8 | 2 |
| 07565 | 07565TN | 07565TC | 07565TF | 07565TE | 3/16 | 3/16 | 5/8 | 2 |
| 07569 | 07569TN | 07569TC | 07569TF | 07569TE | 13/64 | 1/4 | 5/8 | 2-1/2 |
| 07570 | 07570TN | 07570TC | 07570TF | 07570TE | 7/32 | 1/4 | 5/8 | 2-1/2 |
| 07572 | 07572TN | 07572TC | 07572TF | 07572TE | 15/64 | 1/4 | 3/4 | 2-1/2 |
| 07573 | 07573TN | 07573TC | 07573TF | 07573TE | 1/4 | 1/4 | 3/4 | 2-1/2 |
| 07576 | 07576TN | 07576TC | 07576TF | 07576TE | 9/32 | 5/16 | 3/4 | 2-1/2 |
| 07579 | 07579TN | 07579TC | 07579TF | 07579TE | 5/16 | 5/16 | 13/16 | 2-1/2 |
| 07584 | 07584TN | 07584TC | 07584TF | 07584TE | 3/8 | 3/8 | 1 | 2-1/2 |
| 07588 | 07588TN | 07588TC | 07588TF | 07588TE | 7/16 | 7/16 | 1 | 2-3/4 |
| 07593 | 07593TN | 07593TC | 07593TF | 07593TE | 1/2 | 1/2 | 1 | 3 |
| 07595 | 07595TN | 07595TC | 07595TF | 07595TE | 5/8 | 5/8 | 1-1/4 | 3-1/2 |
| 07598 | 07598TN | 07598TC | 07598TF | 07598TE | 3/4 | 3/4 | 1-1/2 | 4 |
| 07600 | 07600TN | 07600TC | 07600TF | 07600TE | 1 | 1 | 1-1/2 | 4 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0005 |

◎ : Excellent ○ : Good

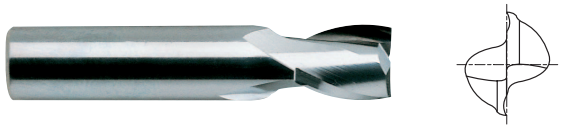
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | | | | ○ | | ○ | ○ | ○ | | |

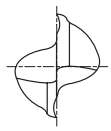
# YG CARBIDE END MILLS

E5244 SERIES PLAIN SHANK

## CARBIDE, 2 FLUTE STUB LENGTH

▶ Suitable for cutting hardened & high alloy steels, steel casting, chill casting, malleable cast iron, CrNi-steels, brass, copper, aluminum with a high percentage of silicon and abrasive plastics.





MG | 2 | 30° | PLAIN | P.679

Unit : Inch

| EDP No. | | | | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | | | | |
| 30554 | 30554TN | 30554TC | 30554TF | 30554TE | 1/16 | 1/8 | 1/8 | 1-1/2 |
| 30556 | 30556TN | 30556TC | 30556TF | 30556TE | 3/32 | 1/8 | 3/16 | 1-1/2 |
| 30558 | 30558TN | 30558TC | 30558TF | 30558TE | 1/8 | 1/8 | 1/4 | 1-1/2 |
| 30561 | 30561TN | 30561TC | 30561TF | 30561TE | 5/32 | 3/16 | 5/16 | 2 |
| 30565 | 30565TN | 30565TC | 30565TF | 30565TE | 3/16 | 3/16 | 3/8 | 2 |
| 30570 | 30570TN | 30570TC | 30570TF | 30570TE | 7/32 | 1/4 | 7/16 | 2 |
| 30573 | 30573TN | 30573TC | 30573TF | 30573TE | 1/4 | 1/4 | 1/2 | 2 |
| 30579 | 30579TN | 30579TC | 30579TF | 30579TE | 5/16 | 5/16 | 1/2 | 2 |
| 30584 | 30584TN | 30584TC | 30584TF | 30584TE | 3/8 | 3/8 | 5/8 | 2 |
| 30588 | 30588TN | 30588TC | 30588TF | 30588TE | 7/16 | 7/16 | 5/8 | 2-1/2 |
| 30593 | 30593TN | 30593TC | 30593TF | 30593TE | 1/2 | 1/2 | 5/8 | 2-1/2 |
| 30595 | 30595TN | 30595TC | 30595TF | 30595TE | 5/8 | 5/8 | 3/4 | 3 |
| 30598 | 30598TN | 30598TC | 30598TF | 30598TE | 3/4 | 3/4 | 1 | 3 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0005 |

◎ : Excellent ○ : Good

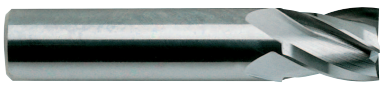
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | | | | ○ | | ○ | ○ | ○ | | |

# CARBIDE END MILLS

**E5245 SERIES** PLAIN SHANK

## CARBIDE, 4 FLUTE STUB LENGTH

▶ Suitable for cutting hardened & high alloy steels, steel casting, chill casting, malleable cast iron, CrNi-steels, brass, copper, aluminum with a high percentage of silicon and abrasive plastics.



MG | 4 | 30° | PLAIN

P.680

Unit : Inch

| EDP No. | | | | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | | | | |
| 31554 | 31554TN | 31554TC | 31554TF | 31554TE | 1/16 | 1/8 | 1/8 | 1-1/2 |
| 31556 | 31556TN | 31556TC | 31556TF | 31556TE | 3/32 | 1/8 | 3/16 | 1-1/2 |
| 31558 | 31558TN | 31558TC | 31558TF | 31558TE | 1/8 | 1/8 | 1/4 | 1-1/2 |
| 31561 | 31561TN | 31561TC | 31561TF | 31561TE | 5/32 | 3/16 | 5/16 | 2 |
| 31565 | 31565TN | 31565TC | 31565TF | 31565TE | 3/16 | 3/16 | 3/8 | 2 |
| 31570 | 31570TN | 31570TC | 31570TF | 31570TE | 7/32 | 1/4 | 7/16 | 2 |
| 31573 | 31573TN | 31573TC | 31573TF | 31573TE | 1/4 | 1/4 | 1/2 | 2 |
| 31579 | 31579TN | 31579TC | 31579TF | 31579TE | 5/16 | 5/16 | 1/2 | 2 |
| 31584 | 31584TN | 31584TC | 31584TF | 31584TE | 3/8 | 3/8 | 5/8 | 2 |
| 31588 | 31588TN | 31588TC | 31588TF | 31588TE | 7/16 | 7/16 | 5/8 | 2-1/2 |
| 31593 | 31593TN | 31593TC | 31593TF | 31593TE | 1/2 | 1/2 | 5/8 | 2-1/2 |
| 31595 | 31595TN | 31595TC | 31595TF | 31595TE | 5/8 | 5/8 | 3/4 | 3 |
| 31598 | 31598TN | 31598TC | 31598TF | 31598TE | 3/4 | 3/4 | 1 | 3 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0005 |

◎ : Excellent ○ : Good

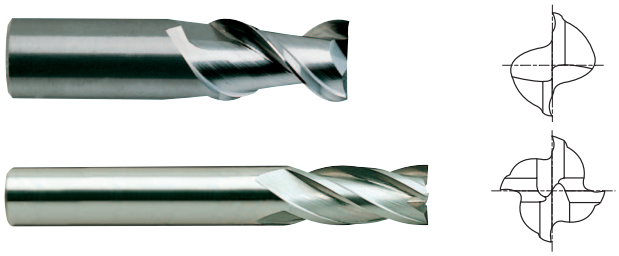
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | | | | ○ | | ○ | ○ | ○ | | |

# YG CARBIDE END MILLS

**E5011 SERIES** PLAIN SHANK
**E5012 SERIES** PLAIN SHANK

## CARBIDE, 2&4 FLUTE LONG LENGTH

▶ Suitable for cutting hardened & high alloy steels, steel casting, chill casting, malleable cast iron, CrNi-steels, brass, copper, aluminum with a high percentage of silicon and abrasive plastics.



MG | 2&4 | 30° | PLAIN

P.679, 680

### E5011(2 FLUTE) Series

Unit : Inch

| EDP No. | | | | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | | | | |
| 02558 | 02558TN | 02558TC | 02558TF | 02558TE | 1/8 | 1/8 | 3/4 | 2-1/4 |
| 02565 | 02565TN | 02565TC | 02565TF | 02565TE | 3/16 | 3/16 | 3/4 | 2-1/2 |
| 02573 | 02573TN | 02573TC | 02573TF | 02573TE | 1/4 | 1/4 | 1-1/8 | 3 |
| 02579 | 02579TN | 02579TC | 02579TF | 02579TE | 5/16 | 5/16 | 1-1/8 | 3 |
| 02584 | 02584TN | 02584TC | 02584TF | 02584TE | 3/8 | 3/8 | 1-1/8 | 3 |
| 02588 | 02588TN | 02588TC | 02588TF | 02588TE | 7/16 | 7/16 | 2 | 4 |
| 02593 | 02593TN | 02593TC | 02593TF | 02593TE | 1/2 | 1/2 | 2 | 4 |
| 02595 | 02595TN | 02595TC | 02595TF | 02595TE | 5/8 | 5/8 | 2-1/4 | 5 |
| 02598 | 02598TN | 02598TC | 02598TF | 02598TE | 3/4 | 3/4 | 2-1/4 | 5 |
| 02600 | 02600TN | 02600TC | 02600TF | 02600TE | 1 | 1 | 2-1/4 | 5 |

### E5012(4 FLUTE) Series

Unit : Inch

| EDP No. | | | | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | | | | |
| 08558 | 08558TN | 08558TC | 08558TF | 08558TE | 1/8 | 1/8 | 3/4 | 2-1/4 |
| 08565 | 08565TN | 08565TC | 08565TF | 08565TE | 3/16 | 3/16 | 3/4 | 2-1/2 |
| 08573 | 08573TN | 08573TC | 08573TF | 08573TE | 1/4 | 1/4 | 1-1/8 | 3 |
| 08579 | 08579TN | 08579TC | 08579TF | 08579TE | 5/16 | 5/16 | 1-1/8 | 3 |
| 08584 | 08584TN | 08584TC | 08584TF | 08584TE | 3/8 | 3/8 | 1-1/8 | 3 |
| 08588 | 08588TN | 08588TC | 08588TF | 08588TE | 7/16 | 7/16 | 2 | 4 |
| 08593 | 08593TN | 08593TC | 08593TF | 08593TE | 1/2 | 1/2 | 2 | 4 |
| 08595 | 08595TN | 08595TC | 08595TF | 08595TE | 5/8 | 5/8 | 2-1/4 | 5 |
| 08598 | 08598TN | 08598TC | 08598TF | 08598TE | 3/4 | 3/4 | 2-1/4 | 5 |
| 08600 | 08600TN | 08600TC | 08600TF | 08600TE | 1 | 1 | 2-1/4 | 5 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0005 |

◎ : Excellent ○ : Good

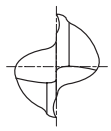
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | | | | ○ | | ○ | ○ | ○ | | |

# CARBIDE END MILLS

**E5026 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE EXTRA LONG LENGTH

▶ Suitable for cutting hardened & high alloy steels, steel casting, chill casting, malleable cast iron, CrNi-steels, brass, copper, aluminum with a high percentage of silicon and abrasive plastics.



MG | 2 | 30° | PLAIN

P.679

Unit : Inch

| EDP No. | | | | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | | | | |
| 54558 | 54558TN | 54558TC | 54558TF | 54558TE | 1/8 | 1/8 | 1 | 3 |
| 54565 | 54565TN | 54565TC | 54565TF | 54565TE | 3/16 | 3/16 | 1-1/8 | 3 |
| 54904 | 54904TN | 54904TC | 54904TF | 54904TE | 3/16 | 3/16 | 1 | 4 |
| 54573 | 54573TN | 54573TC | 54573TF | 54573TE | 1/4 | 1/4 | 1-1/2 | 4 |
| 54901 | 54901TN | 54901TC | 54901TF | 54901TE | 1/4 | 1/4 | 1-1/2 | 6 |
| 54579 | 54579TN | 54579TC | 54579TF | 54579TE | 5/16 | 5/16 | 1-5/8 | 4 |
| 54584 | 54584TN | 54584TC | 54584TF | 54584TE | 3/8 | 3/8 | 1-3/4 | 4 |
| 54902 | 54902TN | 54902TC | 54902TF | 54902TE | 3/8 | 3/8 | 1-1/2 | 6 |
| 54588 | 54588TN | 54588TC | 54588TF | 54588TE | 7/16 | 7/16 | 3 | 6 |
| 54903 | 54903TN | 54903TC | 54903TF | 54903TE | 1/2 | 1/2 | 1-1/2 | 6 |
| 54593 | 54593TN | 54593TC | 54593TF | 54593TE | 1/2 | 1/2 | 3 | 6 |
| 54595 | 54595TN | 54595TC | 54595TF | 54595TE | 5/8 | 5/8 | 3 | 6 |
| 54598 | 54598TN | 54598TC | 54598TF | 54598TE | 3/4 | 3/4 | 3 | 6 |
| 54600 | 54600TN | 54600TC | 54600TF | 54600TE | 1 | 1 | 3 | 6 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0005 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | | | | ○ | | ○ | ○ | ○ | | |

# CARBIDE END MILLS

**E5065 SERIES** PLAIN SHANK

## CARBIDE, 4 FLUTE EXTRA LONG LENGTH

▶ Suitable for cutting hardened & high alloy steels, steel casting, chill casting, malleable cast iron, CrNi-steels, brass, copper, aluminum with a high percentage of silicon and abrasive plastics.

MG | 4 | 30° | PLAIN P.680

Unit : Inch

| EDP No. | | | | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | | | | |
| 55558 | 55558TN | 55558TC | 55558TF | 55558TE | 1/8 | 1/8 | 1 | 3 |
| 55565 | 55565TN | 55565TC | 55565TF | 55565TE | 3/16 | 3/16 | 1-1/8 | 3 |
| 55904 | 55904TN | 55904TC | 55904TF | 55904TE | 3/16 | 3/16 | 1 | 4 |
| 55573 | 55573TN | 55573TC | 55573TF | 55573TE | 1/4 | 1/4 | 1-1/2 | 4 |
| 55901 | 55901TN | 55901TC | 55901TF | 55901TE | 1/4 | 1/4 | 1-1/2 | 6 |
| 55579 | 55579TN | 55579TC | 55579TF | 55579TE | 5/16 | 5/16 | 1-5/8 | 4 |
| 55584 | 55584TN | 55584TC | 55584TF | 55584TE | 3/8 | 3/8 | 1-3/4 | 4 |
| 55902 | 55902TN | 55902TC | 55902TF | 55902TE | 3/8 | 3/8 | 1-1/2 | 6 |
| 55588 | 55588TN | 55588TC | 55588TF | 55588TE | 7/16 | 7/16 | 3 | 6 |
| 55903 | 55903TN | 55903TC | 55903TF | 55903TE | 1/2 | 1/2 | 1-1/2 | 6 |
| 55593 | 55593TN | 55593TC | 55593TF | 55593TE | 1/2 | 1/2 | 3 | 6 |
| 55595 | 55595TN | 55595TC | 55595TF | 55595TE | 5/8 | 5/8 | 3 | 6 |
| 55598 | 55598TN | 55598TC | 55598TF | 55598TE | 3/4 | 3/4 | 3 | 6 |
| 55600 | 55600TN | 55600TC | 55600TF | 55600TE | 1 | 1 | 3 | 6 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0005 |

◎ : Excellent ○ : Good

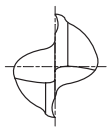
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | | | | ○ | | ○ | ○ | ○ | | |

# CARBIDE END MILLS

**E5022 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE STUB LENGTH DOUBLE

- Same construction features as 2&4 flute single end mill in a more economical version.
- Suitable for cutting hardened & high alloy steels, steel casting, chill casting, malleable cast iron, CrNi-steels, brass, copper, aluminum with a high percentage of silicon and abrasive plastics.



MG | 2 | 30° | PLAIN

P.679

Unit : Inch

| EDP No. | | | | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | | | | |
| 32552 | 32552TN | 32552TC | 32552TF | 32552TE | 1/32 | 1/8 | 1/16 | 1-1/2 |
| 32553 | 32553TN | 32553TC | 32553TF | 32553TE | 3/64 | 1/8 | 3/32 | 1-1/2 |
| 32554 | 32554TN | 32554TC | 32554TF | 32554TE | 1/16 | 1/8 | 1/8 | 1-1/2 |
| 32555 | 32555TN | 32555TC | 32555TF | 32555TE | 5/64 | 1/8 | 1/8 | 1-1/2 |
| 32556 | 32556TN | 32556TC | 32556TF | 32556TE | 3/32 | 1/8 | 3/16 | 1-1/2 |
| 32557 | 32557TN | 32557TC | 32557TF | 32557TE | 7/64 | 1/8 | 3/16 | 1-1/2 |
| 32558 | 32558TN | 32558TC | 32558TF | 32558TE | 1/8 | 1/8 | 1/4 | 1-1/2 |
| 32560 | 32560TN | 32560TC | 32560TF | 32560TE | 9/64 | 3/16 | 5/16 | 2 |
| 32562 | 32562TN | 32562TC | 32562TF | 32562TE | 5/32 | 3/16 | 5/16 | 2 |
| 32564 | 32564TN | 32564TC | 32564TF | 32564TE | 11/64 | 3/16 | 5/16 | 2 |
| 32565 | 32565TN | 32565TC | 32565TF | 32565TE | 3/16 | 3/16 | 3/8 | 2 |
| 32569 | 32569TN | 32569TC | 32569TF | 32569TE | 13/64 | 1/4 | 1/2 | 2-1/2 |
| 32570 | 32570TN | 32570TC | 32570TF | 32570TE | 7/32 | 1/4 | 1/2 | 2-1/2 |
| 32572 | 32572TN | 32572TC | 32572TF | 32572TE | 15/64 | 1/4 | 1/2 | 2-1/2 |
| 32573 | 32573TN | 32573TC | 32573TF | 32573TE | 1/4 | 1/4 | 1/2 | 2-1/2 |
| 32579 | 32579TN | 32579TC | 32579TF | 32579TE | 5/16 | 5/16 | 1/2 | 2-1/2 |
| 32584 | 32584TN | 32584TC | 32584TF | 32584TE | 3/8 | 3/8 | 9/16 | 2-1/2 |
| 32588 | 32588TN | 32588TC | 32588TF | 32588TE | 7/16 | 7/16 | 9/16 | 2-3/4 |
| 32593 | 32593TN | 32593TC | 32593TF | 32593TE | 1/2 | 1/2 | 5/8 | 3 |

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~−.0012 | ＊＊0~−.0020 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

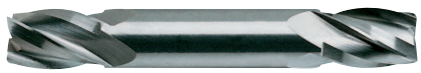
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | | | | ○ | | ○ | ○ | ○ | | |

# YG CARBIDE END MILLS

E5023 SERIES PLAIN SHANK

## CARBIDE, 4 FLUTE STUB LENGTH DOUBLE

- Same construction features as 2&4 flute single end mill in a more economical version.
- Suitable for cutting hardened & high alloy steels, steel casting, chill casting, malleable cast iron, CrNi-steels, brass, copper, aluminum with a high percentage of silicon and abrasive plastics.



MG | 4 | 30° | PLAIN

P.680

Unit : Inch

| EDP No. | | | | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | | | | |
| 33554 | 33554TN | 33554TC | 33554TF | 33554TE | 1/16 | 1/8 | 1/8 | 1-1/2 |
| 33555 | 33555TN | 33555TC | 33555TF | 33555TE | 5/64 | 1/8 | 1/8 | 1-1/2 |
| 33556 | 33556TN | 33556TC | 33556TF | 33556TE | 3/32 | 1/8 | 3/16 | 1-1/2 |
| 33557 | 33557TN | 33557TC | 33557TF | 33557TE | 7/64 | 1/8 | 3/16 | 1-1/2 |
| 33558 | 33558TN | 33558TC | 33558TF | 33558TE | 1/8 | 1/8 | 1/4 | 1-1/2 |
| 33560 | 33560TN | 33560TC | 33560TF | 33560TE | 9/64 | 3/16 | 5/16 | 2 |
| 33561 | 33561TN | 33561TC | 33561TF | 33561TE | 5/32 | 3/16 | 5/16 | 2 |
| 33564 | 33564TN | 33564TC | 33564TF | 33564TE | 11/64 | 3/16 | 5/16 | 2 |
| 33565 | 33565TN | 33565TC | 33565TF | 33565TE | 3/16 | 3/16 | 3/8 | 2 |
| 33569 | 33569TN | 33569TC | 33569TF | 33569TE | 13/64 | 1/4 | 1/2 | 2-1/2 |
| 33570 | 33570TN | 33570TC | 33570TF | 33570TE | 7/32 | 1/4 | 1/2 | 2-1/2 |
| 33572 | 33572TN | 33572TC | 33572TF | 33572TE | 15/64 | 1/4 | 1/2 | 2-1/2 |
| 33573 | 33573TN | 33573TC | 33573TF | 33573TE | 1/4 | 1/4 | 1/2 | 2-1/2 |
| 33579 | 33579TN | 33579TC | 33579TF | 33579TE | 5/16 | 5/16 | 1/2 | 2-1/2 |
| 33584 | 33584TN | 33584TC | 33584TF | 33584TE | 3/8 | 3/8 | 9/16 | 2-1/2 |
| 33588 | 33588TN | 33588TC | 33588TF | 33588TE | 7/16 | 7/16 | 9/16 | 2-3/4 |
| 33593 | 33593TN | 33593TC | 33593TF | 33593TE | 1/2 | 1/2 | 5/8 | 3 |

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~−.0012 | ＊＊0~−.0020 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

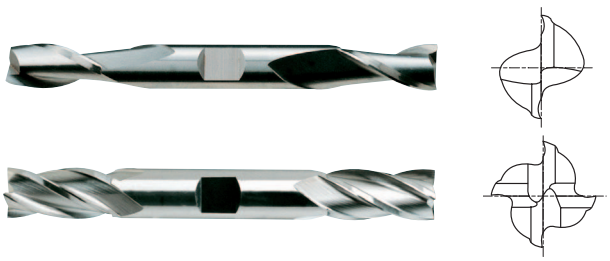
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | | | | ○ | | ○ | ○ | ○ | | |

# CARBIDE END MILLS

**E5025 SERIES** FLAT SHANK
**E5024 SERIES** FLAT SHANK

## CARBIDE, 2&4 FLUTE REGULAR LENGTH DOUBLE

- Same construction features as single end mill in a more economical version.
- Suitable for cutting hardened & high alloy steels, steel casting, chill casting, malleable cast iron, CrNi-steels, brass, copper, aluminum with a high percentage of silicon and abrasive plastics.



MG | 2&4 | 30° | FLAT

P.679, 680

### E5025(2 FLUTE) Series

Unit : Inch

| EDP No. | | | | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | | | | |
| 11559 | 11559TN | 11559TC | 11559TF | 11559TE | 1/8 | 3/8 | 3/8 | 3-1/16 |
| 11563 | 11563TN | 11563TC | 11563TF | 11563TE | 5/32 | 3/8 | 7/16 | 3-1/8 |
| 11567 | 11567TN | 11567TC | 11567TF | 11567TE | 3/16 | 3/8 | 1/2 | 3-1/4 |
| 11571 | 11571TN | 11571TC | 11571TF | 11571TE | 7/32 | 3/8 | 9/16 | 3-3/8 |
| 11574 | 11574TN | 11574TC | 11574TF | 11574TE | 1/4 | 3/8 | 5/8 | 3-3/8 |
| 11577 | 11577TN | 11577TC | 11577TF | 11577TE | 9/32 | 3/8 | 11/16 | 3-3/8 |
| 11580 | 11580TN | 11580TC | 11580TF | 11580TE | 5/16 | 3/8 | 3/4 | 3-1/2 |
| 11582 | 11582TN | 11582TC | 11582TF | 11582TE | 11/32 | 3/8 | 3/4 | 3-1/2 |
| 11584 | 11584TN | 11584TC | 11584TF | 11584TE | 3/8 | 3/8 | 3/4 | 3-1/2 |
| 11589 | 11589TN | 11589TC | 11589TF | 11589TE | 7/16 | 1/2 | 7/8 | 4 |
| 11593 | 11593TN | 11593TC | 11593TF | 11593TE | 1/2 | 1/2 | 1 | 4 |

### E5024(4 FLUTE) Series

Unit : Inch

| EDP No. | | | | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | | | | |
| 13559 | 13559TN | 13559TC | 13559TF | 13559TE | 1/8 | 3/8 | 3/8 | 3-1/16 |
| 13563 | 13563TN | 13563TC | 13563TF | 13563TE | 5/32 | 3/8 | 7/16 | 3-1/8 |
| 13567 | 13567TN | 13567TC | 13567TF | 13567TE | 3/16 | 3/8 | 1/2 | 3-1/4 |
| 13571 | 13571TN | 13571TC | 13571TF | 13571TE | 7/32 | 3/8 | 9/16 | 3-3/8 |
| 13574 | 13574TN | 13574TC | 13574TF | 13574TE | 1/4 | 3/8 | 5/8 | 3-3/8 |
| 13577 | 13577TN | 13577TC | 13577TF | 13577TE | 9/32 | 3/8 | 11/16 | 3-3/8 |
| 13580 | 13580TN | 13580TC | 13580TF | 13580TE | 5/16 | 3/8 | 3/4 | 3-1/2 |
| 13582 | 13582TN | 13582TC | 13582TF | 13582TE | 11/32 | 3/8 | 3/4 | 3-1/2 |
| 13584 | 13584TN | 13584TC | 13584TF | 13584TE | 3/8 | 3/8 | 3/4 | 3-1/2 |
| 13589 | 13589TN | 13589TC | 13589TF | 13589TE | 7/16 | 1/2 | 7/8 | 4 |
| 13593 | 13593TN | 13593TC | 13593TF | 13593TE | 1/2 | 1/2 | 1 | 4 |

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~−.0012 | ＊＊0~−.0020 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

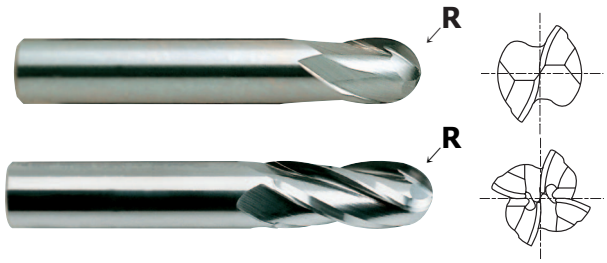
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | | | | ○ | | ○ | ○ | ○ | | |

# YG CARBIDE END MILLS

**E5249 SERIES** PLAIN SHANK
**E5250 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE REGULAR LENGTH BALL NOSE

▶ Suitable for cutting hardened & high alloy steels, steel casting, chill casting, malleable cast iron, CrNi-steels, brass, copper, aluminum with a high percentage of silicon and abrasive plastics.




MG | 2&4 | 30° | R ±.0008 | PLAIN

P.681, 682

### E5049(2 FLUTE) Series

Unit : Inch

| EDP No. | | | | | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | R (±.0008) | | | | |
| 41558 | 41558TN | 41558TC | 41558TF | 41558TE | R1/16 | 1/8 | 1/8 | 1/2 | 1-1/2 |
| 41561 | 41561TN | 41561TC | 41561TF | 41561TE | R5/64 | 5/32 | 3/16 | 9/16 | 2 |
| 41565 | 41565TN | 41565TC | 41565TF | 41565TE | R3/32 | 3/16 | 3/16 | 5/8 | 2 |
| 41570 | 41570TN | 41570TC | 41570TF | 41570TE | R7/64 | 7/32 | 1/4 | 5/8 | 2-1/2 |
| 41573 | 41573TN | 41573TC | 41573TF | 41573TE | R1/8 | 1/4 | 1/4 | 3/4 | 2-1/2 |
| 41579 | 41579TN | 41579TC | 41579TF | 41579TE | R5/32 | 5/16 | 5/16 | 13/16 | 2-1/2 |
| 41584 | 41584TN | 41584TC | 41584TF | 41584TE | R3/16 | 3/8 | 3/8 | 1 | 2-1/2 |
| 41588 | 41588TN | 41588TC | 41588TF | 41588TE | R7/32 | 7/16 | 7/16 | 1 | 2-3/4 |
| 41593 | 41593TN | 41593TC | 41593TF | 41593TE | R1/4 | 1/2 | 1/2 | 1 | 3 |
| 41595 | 41595TN | 41595TC | 41595TF | 41595TE | R5/16 | 5/8 | 5/8 | 1-1/4 | 3-1/2 |
| 41598 | 41598TN | 41598TC | 41598TF | 41598TE | R3/8 | 3/4 | 3/4 | 1-1/2 | 4 |
| 41600 | 41600TN | 41600TC | 41600TF | 41600TE | R1/2 | 1 | 1 | 1-1/2 | 4 |

### E5050(4 FLUTE) Series

Unit : Inch

| EDP No. | | | | | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | R (±.0008) | | | | |
| 43558 | 43558TN | 43558TC | 43558TF | 43558TE | R1/16 | 1/8 | 1/8 | 1/2 | 1-1/2 |
| 43561 | 43561TN | 43561TC | 43561TF | 43561TE | R5/64 | 5/32 | 3/16 | 9/16 | 2 |
| 43565 | 43565TN | 43565TC | 43565TF | 43565TE | R3/32 | 3/16 | 3/16 | 5/8 | 2 |
| 43570 | 43570TN | 43570TC | 43570TF | 43570TE | R7/64 | 7/32 | 1/4 | 5/8 | 2-1/2 |
| 43573 | 43573TN | 43573TC | 43573TF | 43573TE | R1/8 | 1/4 | 1/4 | 3/4 | 2-1/2 |
| 43579 | 43579TN | 43579TC | 43579TF | 43579TE | R5/32 | 5/16 | 5/16 | 13/16 | 2-1/2 |
| 43584 | 43584TN | 43584TC | 43584TF | 43584TE | R3/16 | 3/8 | 3/8 | 1 | 2-1/2 |
| 43588 | 43588TN | 43588TC | 43588TF | 43588TE | R7/32 | 7/16 | 7/16 | 1 | 2-3/4 |
| 43593 | 43593TN | 43593TC | 43593TF | 43593TE | R1/4 | 1/2 | 1/2 | 1 | 3 |
| 43595 | 43595TN | 43595TC | 43595TF | 43595TE | R5/16 | 5/8 | 5/8 | 1-1/4 | 3-1/2 |
| 43598 | 43598TN | 43598TC | 43598TF | 43598TE | R3/8 | 3/4 | 3/4 | 1-1/2 | 4 |
| 43600 | 43600TN | 43600TC | 43600TF | 43600TE | R1/2 | 1 | 1 | 1-1/2 | 4 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0005 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | ○ | | | |

# CARBIDE END MILLS

**E5014 SERIES** PLAIN SHANK
**E5060 SERIES** PLAIN SHANK

## CARBIDE, 2&4 FLUTE LONG LENGTH BALL NOSE

▶ Suitable for cutting hardened & high alloy steels, steel casting, chill casting, malleable cast iron, CrNi-steels, brass, copper, aluminum with a high percentage of silicon and abrasive plastics.

MG | 2&4 | 30° | R ±.0008 | PLAIN

P.681, 682

### E5014(2 FLUTE) Series

Unit : Inch

| EDP No. | | | | | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | R (±.0008) | | | | |
| 50558 | 50558TN | 50558TC | 50558TF | 50558TE | R1/16 | 1/8 | 1/8 | 3/4 | 2-1/4 |
| 50565 | 50565TN | 50565TC | 50565TF | 50565TE | R3/32 | 3/16 | 3/16 | 3/4 | 2-1/2 |
| 50573 | 50573TN | 50573TC | 50573TF | 50573TE | R1/8 | 1/4 | 1/4 | 1-1/8 | 3 |
| 50579 | 50579TN | 50579TC | 50579TF | 50579TE | R5/32 | 5/16 | 5/16 | 1-1/8 | 3 |
| 50584 | 50584TN | 50584TC | 50584TF | 50584TE | R3/16 | 3/8 | 3/8 | 1-1/8 | 3 |
| 50588 | 50588TN | 50588TC | 50588TF | 50588TE | R7/32 | 7/16 | 7/16 | 2 | 4 |
| 50593 | 50593TN | 50593TC | 50593TF | 50593TE | R1/4 | 1/2 | 1/2 | 2 | 4 |
| 50595 | 50595TN | 50595TC | 50595TF | 50595TE | R5/16 | 5/8 | 5/8 | 2-1/4 | 5 |
| 50598 | 50598TN | 50598TC | 50598TF | 50598TE | R3/8 | 3/4 | 3/4 | 2-1/4 | 5 |
| 50600 | 50600TN | 50600TC | 50600TF | 50600TE | R1/2 | 1 | 1 | 2-1/4 | 5 |

### E5060(4 FLUTE) Series

Unit : Inch

| EDP No. | | | | | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | R (±.0008) | | | | |
| 51558 | 51558TN | 51558TC | 51558TF | 51558TE | R1/16 | 1/8 | 1/8 | 3/4 | 2-1/4 |
| 51565 | 51565TN | 51565TC | 51565TF | 51565TE | R3/32 | 3/16 | 3/16 | 3/4 | 2-1/2 |
| 51573 | 51573TN | 51573TC | 51573TF | 51573TE | R1/8 | 1/4 | 1/4 | 1-1/8 | 3 |
| 51579 | 51579TN | 51579TC | 51579TF | 51579TE | R5/32 | 5/16 | 5/16 | 1-1/8 | 3 |
| 51584 | 51584TN | 51584TC | 51584TF | 51584TE | R3/16 | 3/8 | 3/8 | 1-1/8 | 3 |
| 51588 | 51588TN | 51588TC | 51588TF | 51588TE | R7/32 | 7/16 | 7/16 | 2 | 4 |
| 51593 | 51593TN | 51593TC | 51593TF | 51593TE | R1/4 | 1/2 | 1/2 | 2 | 4 |
| 51595 | 51595TN | 51595TC | 51595TF | 51595TE | R5/16 | 5/8 | 5/8 | 2-1/4 | 5 |
| 51598 | 51598TN | 51598TC | 51598TF | 51598TE | R3/8 | 3/4 | 3/4 | 2-1/4 | 5 |
| 51600 | 51600TN | 51600TC | 51600TF | 51600TE | R1/2 | 1 | 1 | 2-1/4 | 5 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0005 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | ○ | | | |

# CARBIDE END MILLS

**E5018 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE EXTRA LONG LENGTH BALL NOSE

▶ Suitable for cutting hardened & high alloy steels, steel casting, chill casting, malleable cast iron, CrNi-steels, brass, copper, aluminum with a high percentage of silicon and abrasive plastics.

MG | 2 | 30° | R ±.0008 | PLAIN P.681

Unit : Inch

| EDP No. | | | | | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | R (±.0008) | | | | |
| 52558 | 52558TN | 52558TC | 52558TF | 52558TE | R1/16 | 1/8 | 1/8 | 1 | 3 |
| 52565 | 52565TN | 52565TC | 52565TF | 52565TE | R3/32 | 3/16 | 3/16 | 1-1/8 | 3 |
| 52904 | 52904TN | 52904TC | 52904TF | 52904TE | R3/32 | 3/16 | 3/16 | 1 | 4 |
| 52573 | 52573TN | 52573TC | 52573TF | 52573TE | R1/8 | 1/4 | 1/4 | 1-1/2 | 4 |
| 52901 | 52901TN | 52901TC | 52901TF | 52901TE | R1/8 | 1/4 | 1/4 | 1-1/2 | 6 |
| 52579 | 52579TN | 52579TC | 52579TF | 52579TE | R5/32 | 5/16 | 5/16 | 1-5/8 | 4 |
| 52584 | 52584TN | 52584TC | 52584TF | 52584TE | R3/16 | 3/8 | 3/8 | 1-3/4 | 4 |
| 52902 | 52902TN | 52902TC | 52902TF | 52902TE | R3/16 | 3/8 | 3/8 | 1-1/2 | 6 |
| 52588 | 52588TN | 52588TC | 52588TF | 52588TE | R7/32 | 7/16 | 7/16 | 3 | 6 |
| 52903 | 52903TN | 52903TC | 52903TF | 52903TE | R1/4 | 1/2 | 1/2 | 1-1/2 | 6 |
| 52593 | 52593TN | 52593TC | 52593TF | 52593TE | R1/4 | 1/2 | 1/2 | 3 | 6 |
| 52595 | 52595TN | 52595TC | 52595TF | 52595TE | R5/16 | 5/8 | 5/8 | 3 | 6 |
| 52598 | 52598TN | 52598TC | 52598TF | 52598TE | R3/8 | 3/4 | 3/4 | 3 | 6 |
| 52600 | 52600TN | 52600TC | 52600TF | 52600TE | R1/2 | 1 | 1 | 3 | 6 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0005 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | ○ | | | |

# CARBIDE END MILLS

**E5062 SERIES** PLAIN SHANK

## CARBIDE, 4 FLUTE EXTRA LONG LENGTH BALL NOSE

▶ Suitable for cutting hardened & high alloy steels, steel casting, chill casting, malleable cast iron, CrNi-steels, brass, copper, aluminum with a high percentage of silicon and abrasive plastics.

MG | 4 | 30° | R ±.0008 | PLAIN

P.682

Unit : Inch

| EDP No. | | | | | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | R (±.0008) | | | | |
| 53558 | 53558TN | 53558TC | 53558TF | 53558TE | R1/16 | 1/8 | 1/8 | 1 | 3 |
| 53565 | 53565TN | 53565TC | 53565TF | 53565TE | R3/32 | 3/16 | 3/16 | 1-1/8 | 3 |
| 53573 | 53573TN | 53573TC | 53573TF | 53573TE | R1/8 | 1/4 | 1/4 | 1-1/2 | 4 |
| 53901 | 53901TN | 53901TC | 53901TF | 53901TE | R1/8 | 1/4 | 1/4 | 1-1/2 | 6 |
| 53579 | 53579TN | 53579TC | 53579TF | 53579TE | R5/32 | 5/16 | 5/16 | 1-5/8 | 4 |
| 53584 | 53584TN | 53584TC | 53584TF | 53584TE | R3/16 | 3/8 | 3/8 | 1-3/4 | 4 |
| 53902 | 53902TN | 53902TC | 53902TF | 53902TE | R3/16 | 3/8 | 3/8 | 1-1/2 | 6 |
| 53588 | 53588TN | 53588TC | 53588TF | 53588TE | R7/32 | 7/16 | 7/16 | 3 | 6 |
| 53903 | 53903TN | 53903TC | 53903TF | 53903TE | R1/4 | 1/2 | 1/2 | 1-1/2 | 6 |
| 53593 | 53593TN | 53593TC | 53593TF | 53593TE | R1/4 | 1/2 | 1/2 | 3 | 6 |
| 53595 | 53595TN | 53595TC | 53595TF | 53595TE | R5/16 | 5/8 | 5/8 | 3 | 6 |
| 53904 | 53904TN | 53904TC | 53904TF | 53904TE | R5/16 | 5/8 | 5/8 | 1-1/2 | 6 |
| 53598 | 53598TN | 53598TC | 53598TF | 53598TE | R3/8 | 3/4 | 3/4 | 3 | 6 |
| 53905 | 53905TN | 53905TC | 53905TF | 53905TE | R3/8 | 3/4 | 3/4 | 1-1/2 | 6 |
| 53600 | 53600TN | 53600TC | 53600TF | 53600TE | R1/2 | 1 | 1 | 3 | 6 |
| 53906 | 53906TN | 53906TC | 53906TF | 53906TE | R1/2 | 1 | 1 | 1-1/2 | 6 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0005 |

◎ : Excellent ○ : Good

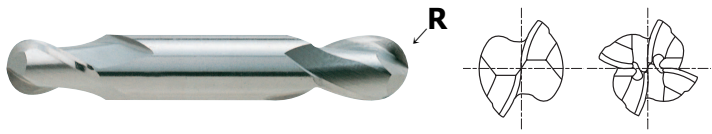
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | ○ | | | |

# YG CARBIDE END MILLS

**E5251 SERIES** PLAIN SHANK
**E5252 SERIES** PLAIN SHANK

## CARBIDE, 2&4 FLUTE STUB LENGTH DOUBLE BALL NOSE

- Same construction features as single end mill in a more economical version.
- Suitable for cutting hardened & high alloy steels, steel casting, chill casting, malleable cast iron, CrNi-steels, brass, copper, aluminum with a high percentage of silicon and abrasive plastics.




MG | 2&4 | 30° | R ±.0008 | PLAIN

P.681, 682

### E5251 Series ■ 2 FLUTE

Unit : Inch

| EDP No. | | | | | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | R (±.0008) | | | | |
| 47570 | 47570TN | 47570TC | 47570TF | 47570TE | R7/64 | 7/32 | 1/4 | 1/2 | 2-1/2 |
| 47573 | 47573TN | 47573TC | 47573TF | 47573TE | R1/8 | 1/4 | 1/4 | 1/2 | 2-1/2 |
| 47579 | 47579TN | 47579TC | 47579TF | 47579TE | R5/32 | 5/16 | 5/16 | 1/2 | 2-1/2 |
| 47584 | 47584TN | 47584TC | 47584TF | 47584TE | R3/16 | 3/8 | 3/8 | 9/16 | 2-1/2 |
| 47588 | 47588TN | 47588TC | 47588TF | 47588TE | R7/32 | 7/16 | 7/16 | 9/16 | 2-3/4 |
| 47593 | 47593TN | 47593TC | 47593TF | 47593TE | R1/4 | 1/2 | 1/2 | 5/8 | 3 |

### E5252 Series ■ 4 FLUTE

Unit : Inch

| EDP No. | | | | | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | R (±.0008) | | | | |
| 48570 | 48570TN | 48570TC | 48570TF | 48570TE | R7/64 | 7/32 | 1/4 | 1/2 | 2-1/2 |
| 48573 | 48573TN | 48573TC | 48573TF | 48573TE | R1/8 | 1/4 | 1/4 | 1/2 | 2-1/2 |
| 48579 | 48579TN | 48579TC | 48579TF | 48579TE | R5/32 | 5/16 | 5/16 | 1/2 | 2-1/2 |
| 48584 | 48584TN | 48584TC | 48584TF | 48584TE | R3/16 | 3/8 | 3/8 | 9/16 | 2-1/2 |
| 48588 | 48588TN | 48588TC | 48588TF | 48588TE | R7/32 | 7/16 | 7/16 | 9/16 | 2-3/4 |
| 48593 | 48593TN | 48593TC | 48593TF | 48593TE | R1/4 | 1/2 | 1/2 | 5/8 | 3 |

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~−.0012 | ＊＊0~−.0020 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | ○ | | | |

# CARBIDE END MILLS

**E5216 SERIES** PLAIN SHANK

## CARBIDE, 4 FLUTE REGULAR LENGTH CORNER RADIUS

▶ Suitable for cutting hardened & high alloy steels, steel casting, chill casting, malleable cast iron, CrNi-steels, brass, copper, aluminum with a high percentage of silicon and abrasive plastics.

MG | 4 | 30° | R ±.001 | PLAIN

P.680

Unit : Inch

| EDP No. | | Corner Radius | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| UNCOATED | YG:TYLON F | R | | | | |
| 07558-015R | 07558TF-015R | R.015 | 1/8 | 1/8 | 1/2 | 1-1/2 |
| 07558-030R | 07558TF-030R | R.030 | 1/8 | 1/8 | 1/2 | 1-1/2 |
| 07565-015R | 07565TF-015R | R.015 | 3/16 | 3/16 | 5/8 | 2 |
| 07565-030R | 07565TF-030R | R.030 | 3/16 | 3/16 | 5/8 | 2 |
| 07573-015R | 07573TF-015R | R.015 | 1/4 | 1/4 | 3/4 | 2-1/2 |
| 07573-030R | 07573TF-030R | R.030 | 1/4 | 1/4 | 3/4 | 2-1/2 |
| 07573-045R | 07573TF-045R | R.045 | 1/4 | 1/4 | 3/4 | 2-1/2 |
| 07579-015R | 07579TF-015R | R.015 | 5/16 | 5/16 | 13/16 | 2-1/2 |
| 07579-030R | 07579TF-030R | R.030 | 5/16 | 5/16 | 13/16 | 2-1/2 |
| 07579-045R | 07579TF-045R | R.045 | 5/16 | 5/16 | 13/16 | 2-1/2 |
| 07584-015R | 07584TF-015R | R.015 | 3/8 | 3/8 | 1 | 2-1/2 |
| 07584-030R | 07584TF-030R | R.030 | 3/8 | 3/8 | 1 | 2-1/2 |
| 07584-045R | 07584TF-045R | R.045 | 3/8 | 3/8 | 1 | 2-1/2 |
| 07584-060R | 07584TF-060R | R.060 | 3/8 | 3/8 | 1 | 2-1/2 |
| 07588-015R | 07588TF-015R | R.015 | 7/16 | 7/16 | 1 | 2-3/4 |
| 07588-030R | 07588TF-030R | R.030 | 7/16 | 7/16 | 1 | 2-3/4 |
| 07588-045R | 07588TF-045R | R.045 | 7/16 | 7/16 | 1 | 2-3/4 |
| 07588-060R | 07588TF-060R | R.060 | 7/16 | 7/16 | 1 | 2-3/4 |
| 07588-090R | 07588TF-090R | R.090 | 7/16 | 7/16 | 1 | 2-3/4 |
| 07593-015R | 07593TF-015R | R.015 | 1/2 | 1/2 | 1 | 3 |
| 07593-030R | 07593TF-030R | R.030 | 1/2 | 1/2 | 1 | 3 |
| 07593-045R | 07593TF-045R | R.045 | 1/2 | 1/2 | 1 | 3 |
| 07593-060R | 07593TF-060R | R.060 | 1/2 | 1/2 | 1 | 3 |
| 07593-090R | 07593TF-090R | R.090 | 1/2 | 1/2 | 1 | 3 |
| 07593-125R | 07593TF-125R | R.125 | 1/2 | 1/2 | 1 | 3 |
| 07595-015R | 07595TF-015R | R.015 | 5/8 | 5/8 | 1-1/4 | 3-1/2 |
| 07595-030R | 07595TF-030R | R.030 | 5/8 | 5/8 | 1-1/4 | 3-1/2 |
| 07595-045R | 07595TF-045R | R.045 | 5/8 | 5/8 | 1-1/4 | 3-1/2 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | ○ | ○ | | |

CBN END MILL
i-Xmill END MILL
X5070 END MILLS
X-SPEED ROUGHER END MILLS
X-POWER END MILLS
JET-POWER END MILLS
V7 Mill STEEL END MILLS
V7 Mill INOX END MILLS
ALU-POWER END MILLS
D-POWER END MILLS
STANDARD CARBIDE END MILLS
TANK-POWER END MILLS
STANDARD COBALT & HSS END MILLS
TECHNICAL DATA

# CARBIDE END MILLS

**E5216 SERIES** PLAIN SHANK

## CARBIDE, 4 FLUTE REGULAR LENGTH CORNER RADIUS

▶ Suitable for cutting hardened & high alloy steels, steel casting, chill casting, malleable cast iron, CrNi-steels, brass, copper, aluminum with a high percentage of silicon and abrasive plastics.

MG | 4 | 30° | R ±.001 | PLAIN P.680

Unit : Inch

| EDP No. UNCOATED | EDP No. YG:TYLON F | Corner Radius R | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| 07595-060R | 07595TF-060R | R.060 | 5/8 | 5/8 | 1-1/4 | 3-1/2 |
| 07595-090R | 07595TF-090R | R.090 | 5/8 | 5/8 | 1-1/4 | 3-1/2 |
| 07595-125R | 07595TF-125R | R.125 | 5/8 | 5/8 | 1-1/4 | 3-1/2 |
| 07598-015R | 07598TF-015R | R.015 | 3/4 | 3/4 | 1-1/2 | 4 |
| 07598-030R | 07598TF-030R | R.030 | 3/4 | 3/4 | 1-1/2 | 4 |
| 07598-045R | 07598TF-045R | R.045 | 3/4 | 3/4 | 1-1/2 | 4 |
| 07598-060R | 07598TF-060R | R.060 | 3/4 | 3/4 | 1-1/2 | 4 |
| 07598-090R | 07598TF-090R | R.090 | 3/4 | 3/4 | 1-1/2 | 4 |
| 07598-125R | 07598TF-125R | R.125 | 3/4 | 3/4 | 1-1/2 | 4 |
| 07600-015R | 07600TF-015R | R.015 | 1 | 1 | 1-1/2 | 4 |
| 07600-030R | 07600TF-030R | R.030 | 1 | 1 | 1-1/2 | 4 |
| 07600-045R | 07600TF-045R | R.045 | 1 | 1 | 1-1/2 | 4 |
| 07600-060R | 07600TF-060R | R.060 | 1 | 1 | 1-1/2 | 4 |
| 07600-090R | 07600TF-090R | R.090 | 1 | 1 | 1-1/2 | 4 |
| 07600-125R | 07600TF-125R | R.125 | 1 | 1 | 1-1/2 | 4 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0005 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | ○ | ○ | | |

# CARBIDE END MILLS

**E5069 SERIES** PLAIN SHANK

## CARBIDE, 5 FLUTE 45° HELIX REGULAR LENGTH CORNER RADIUS

▶Designed to machine stainless steels, Inconols and other alloys.
▶5 Flute and 45° medium helix allow harmonic balance and smooth cutting.

MG | 5 | 45° | R ±.001 | PLAIN

P.678

Unit : Inch

| EDP No. | Corner Radius R | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 86573TF-030R | R.030 | 1/4 | 1/4 | 3/4 | 2-1/2 |
| 86584TF-030R | R.030 | 3/8 | 3/8 | 1 | 2-1/2 |
| 86584TF-060R | R.060 | 3/8 | 3/8 | 1 | 2-1/2 |
| 86593TF-030R | R.030 | 1/2 | 1/2 | 1-1/4 | 3 |
| 86593TF-060R | R.060 | 1/2 | 1/2 | 1-1/4 | 3 |
| 86593TF-090R | R.090 | 1/2 | 1/2 | 1-1/4 | 3 |
| 86595TF-030R | R.030 | 5/8 | 5/8 | 1-5/8 | 3-1/2 |
| 86595TF-060R | R.060 | 5/8 | 5/8 | 1-5/8 | 3-1/2 |
| 86595TF-090R | R.090 | 5/8 | 5/8 | 1-5/8 | 3-1/2 |
| 86595TF-125R | R.125 | 5/8 | 5/8 | 1-5/8 | 3-1/2 |
| 86598TF-030R | R.030 | 3/4 | 3/4 | 1-5/8 | 4 |
| 86598TF-060R | R.060 | 3/4 | 3/4 | 1-5/8 | 4 |
| 86598TF-090R | R.090 | 3/4 | 3/4 | 1-5/8 | 4 |
| 86598TF-125R | R.125 | 3/4 | 3/4 | 1-5/8 | 4 |
| 86598TF-156R | R.156 | 3/4 | 3/4 | 1-5/8 | 4 |
| 86598TF-187R | R.187 | 3/4 | 3/4 | 1-5/8 | 4 |
| 86600TF-030R | R.030 | 1 | 1 | 2 | 4 |
| 86600TF-060R | R.060 | 1 | 1 | 2 | 4 |
| 86600TF-090R | R.090 | 1 | 1 | 2 | 4 |
| 86600TF-125R | R.125 | 1 | 1 | 2 | 4 |
| 86600TF-156R | R.156 | 1 | 1 | 2 | 4 |
| 86600TF-187R | R.187 | 1 | 1 | 2 | 4 |

Any non stocked radius available in 1 week for uncoated tools

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0005 |

◎ : Excellent ○ : Good

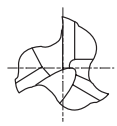
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | | ◎ | ○ | ○ |

# CARBIDE END MILLS

**E5243 SERIES** PLAIN SHANK FLAT SHANK

## CARBIDE, 3 FLUTE 45° HELIX REGULAR LENGTH

- Designed to machine stainless steel, inconel, titanium and other hard to machine materials.
- It's 3 flute design gives high stability and allows good chip removal in plunging & slotting operations.
- The normal rake angle and 45° medium helix allows an extremely wide range of application.
- YG:TYLON super TiAlN coating are recommended for maximum performance.



MG | 3 | 45° | PLAIN | FLAT

Ø1/8~Ø5/16 Ø3/8~Ø1

P.678

Unit : Inch

| EDP No. | | | | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | | | | |
| 34558 | 34558TN | 34558TC | 34558TF | 34558TE | 1/8 | 1/8 | 3/8 | 1-1/2 |
| 34565 | 34565TN | 34565TC | 34565TF | 34565TE | 3/16 | 3/16 | 9/16 | 2 |
| 34573 | 34573TN | 34573TC | 34573TF | 34573TE | 1/4 | 1/4 | 3/4 | 2-1/2 |
| 34579 | 34579TN | 34579TC | 34579TF | 34579TE | 5/16 | 5/16 | 13/16 | 2-1/2 |
| 34584 | 34584TN | 34584TC | 34584TF | 34584TE | 3/8 | 3/8 | 7/8 | 2-1/2 |
| 34593 | 34593TN | 34593TC | 34593TF | 34593TE | 1/2 | 1/2 | 1 | 3 |
| 34594 | 34594TN | 34594TC | 34594TF | 34594TE | 9/16 | 9/16 | 1-1/4 | 3-1/2 |
| 34595 | 34595TN | 34595TC | 34595TF | 34595TE | 5/8 | 5/8 | 1-1/4 | 3-1/2 |
| 34598 | 34598TN | 34598TC | 34598TF | 34598TE | 3/4 | 3/4 | 1-1/2 | 4 |
| 34600 | 34600TN | 34600TC | 34600TF | 34600TE | 1 | 1 | 1-1/2 | 4 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0005 |

◎ : Excellent ○ : Good

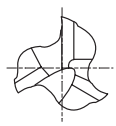
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | | ◎ | ○ | ○ |

# CARBIDE END MILLS

**E5059 SERIES** PLAIN SHANK

## CARBIDE, 3 FLUTE 50° HELIX STUB & REGULAR & LONG LENGTH

- ▶Designed to machine stainless steel, inconel, titanium and other hard to machine materials.
- ▶It's 3 flute design gives high stability and allows good chip removal in plunging & slotting operations.
- ▶The high rake angle and 50° helix allows an extremely wide range of application.
- ▶YG:TYLON super TiAlN coating are recommended for maximum performance.



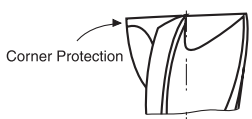
MG | 3 | 50° | PLAIN

P.678

Unit : Inch

| EDP No. | | | | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | | | | |
| 83573 | 83573TN | 83573TC | 83573TF | 83573TE | 1/4 | 1/4 | 1/2 | 2 |
| 83901 | 83901TN | 83901TC | 83901TF | 83901TE | 1/4 | 1/4 | 3/4 | 2-1/2 |
| 83902 | 83902TN | 83902TC | 83902TF | 83902TE | 1/4 | 1/4 | 1-1/4 | 3 |
| 83584 | 83584TN | 83584TC | 83584TF | 83584TE | 3/8 | 3/8 | 1/2 | 2 |
| 83903 | 83903TN | 83903TC | 83903TF | 83903TE | 3/8 | 3/8 | 1 | 2-1/2 |
| 83904 | 83904TN | 83904TC | 83904TF | 83904TE | 3/8 | 3/8 | 1-1/2 | 3-1/2 |
| 83593 | 83593TN | 83593TC | 83593TF | 83593TE | 1/2 | 1/2 | 5/8 | 2-1/2 |
| 83905 | 83905TN | 83905TC | 83905TF | 83905TE | 1/2 | 1/2 | 1 | 3 |
| 83906 | 83906TN | 83906TC | 83906TF | 83906TE | 1/2 | 1/2 | 2 | 4 |
| 83595 | 83595TN | 83595TC | 83595TF | 83595TE | 5/8 | 5/8 | 7/8 | 3 |
| 83907 | 83907TN | 83907TC | 83907TF | 83907TE | 5/8 | 5/8 | 2-1/2 | 6 |
| 83598 | 83598TN | 83598TC | 83598TF | 83598TE | 3/4 | 3/4 | 1 | 3-1/2 |
| 83908 | 83908TN | 83908TC | 83908TF | 83908TE | 3/4 | 3/4 | 3 | 6 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0005 |




◎ : Excellent ○ : Good

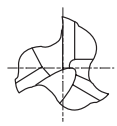
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | | ◎ | ○ | ○ |

# CARBIDE END MILLS

**E5246 SERIES** PLAIN SHANK FLAT SHANK

## CARBIDE, 3 FLUTE 60° HELIX REGULAR LENGTH

▶ Excellent shearing and chip ejection due to 60° Helix.
▶ 20%～ 30% increase in chip load recommended over 30° helix tools.



MG | 3 | 60° | PLAIN | FLAT

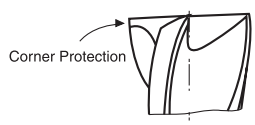
P.678

Ø1/8~Ø5/16 Ø3/8~Ø1

Unit : Inch

| EDP No. | | | | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | | | | |
| 20558 | 20558TN | 20558TC | 20558TF | 20558TE | 1/8 | 1/8 | 3/8 | 1-1/2 |
| 20565 | 20565TN | 20565TC | 20565TF | 20565TE | 3/16 | 3/16 | 9/16 | 2 |
| 20573 | 20573TN | 20573TC | 20573TF | 20573TE | 1/4 | 1/4 | 3/4 | 2-1/2 |
| 20579 | 20579TN | 20579TC | 20579TF | 20579TE | 5/16 | 5/16 | 13/16 | 2-1/2 |
| 20584 | 20584TN | 20584TC | 20584TF | 20584TE | 3/8 | 3/8 | 7/8 | 2-1/2 |
| 20593 | 20593TN | 20593TC | 20593TF | 20593TE | 1/2 | 1/2 | 1 | 3 |
| 20594 | 20594TN | 20594TC | 20594TF | 20594TE | 9/16 | 9/16 | 1-1/4 | 3-1/2 |
| 20595 | 20595TN | 20595TC | 20595TF | 20595TE | 5/8 | 5/8 | 1-1/4 | 3-1/2 |
| 20598 | 20598TN | 20598TC | 20598TF | 20598TE | 3/4 | 3/4 | 1-1/2 | 4 |
| 20600 | 20600TN | 20600TC | 20600TF | 20600TE | 1 | 1 | 1-1/2 | 4 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0005 |




◎ : Excellent ○ : Good

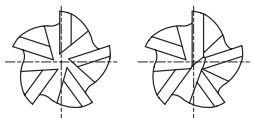
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | | ◎ | ○ | ○ |

# CARBIDE END MILLS

**E5066 SERIES** PLAIN SHANK

## CARBIDE, 5 FLUTE 45° HELIX STUB LENGTH

- Designed to machine stainless steels, inconels and other alloys.
- The new design of stub length allows cutting at maximum speeds and feeds with minimum deflection
- 5 Flute and 45° medium helix allow harmonic balance and smooth cutting.



up to Ø3/16 over Ø3/16

MG 5 45° PLAIN P.678

Unit : Inch

| EDP No. | | | | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | | | | |
| 85558 | 85558TN | 85558TC | 85558TF | 85558TE | 1/8 | 1/8 | 1/4 | 1-1/2 |
| 85561 | 85561TN | 85561TC | 85561TF | 85561TE | 5/32 | 3/16 | 5/16 | 2 |
| 85565 | 85565TN | 85565TC | 85565TF | 85565TE | 3/16 | 3/16 | 5/16 | 2 |
| 85570 | 85570TN | 85570TC | 85570TF | 85570TE | 7/32 | 1/4 | 3/8 | 2 |
| 85573 | 85573TN | 85573TC | 85573TF | 85573TE | 1/4 | 1/4 | 3/8 | 2 |
| 85579 | 85579TN | 85579TC | 85579TF | 85579TE | 5/16 | 5/16 | 7/16 | 2 |
| 85584 | 85584TN | 85584TC | 85584TF | 85584TE | 3/8 | 3/8 | 1/2 | 2 |
| 85588 | 85588TN | 85588TC | 85588TF | 85588TE | 7/16 | 7/16 | 9/16 | 2-1/2 |
| 85593 | 85593TN | 85593TC | 85593TF | 85593TE | 1/2 | 1/2 | 5/8 | 2-1/2 |
| 85595 | 85595TN | 85595TC | 85595TF | 85595TE | 5/8 | 5/8 | 3/4 | 3 |
| 85598 | 85598TN | 85598TC | 85598TF | 85598TE | 3/4 | 3/4 | 1 | 3 |
| 85600 | 85600TN | 85600TC | 85600TF | 85600TE | 1 | 1 | 1-1/4 | 3 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0003 |

◎ : Excellent ○ : Good

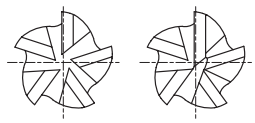
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | | ◎ | ○ | ○ |

# CARBIDE END MILLS

**E5067 SERIES** PLAIN SHANK

## CARBIDE, 5 FLUTE 45° HELIX REGULAR LENGTH

- Designed to machine stainless steels, inconels and other alloys.
- The new design of stub length allows cutting at maximum speeds and feeds with minimum deflection
- 5 Flute and 45° medium helix allow harmonic balance and smooth cutting.



up to Ø3/16 over Ø3/16

MG | 5 | 45° | PLAIN

P.678

Unit : Inch

| EDP No. | | | | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | | | | |
| 86558 | 86558TN | 86558TC | 86558TF | 86558TE | 1/8 | 1/8 | 1/2 | 1-1/2 |
| 86561 | 86561TN | 86561TC | 86561TF | 86561TE | 5/32 | 3/16 | 9/16 | 2 |
| 86565 | 86565TN | 86565TC | 86565TF | 86565TE | 3/16 | 3/16 | 9/16 | 2 |
| 86570 | 86570TN | 86570TC | 86570TF | 86570TE | 7/32 | 1/4 | 3/4 | 2-1/2 |
| 86573 | 86573TN | 86573TC | 86573TF | 86573TE | 1/4 | 1/4 | 3/4 | 2-1/2 |
| 86579 | 86579TN | 86579TC | 86579TF | 86579TE | 5/16 | 5/16 | 13/16 | 2-1/2 |
| 86584 | 86584TN | 86584TC | 86584TF | 86584TE | 3/8 | 3/8 | 1 | 2-1/2 |
| 86588 | 86588TN | 86588TC | 86588TF | 86588TE | 7/16 | 7/16 | 1 | 2-3/4 |
| 86593 | 86593TN | 86593TC | 86593TF | 86593TE | 1/2 | 1/2 | 1-1/4 | 3 |
| 86595 | 86595TN | 86595TC | 86595TF | 86595TE | 5/8 | 5/8 | 1-5/8 | 3-1/2 |
| 86598 | 86598TN | 86598TC | 86598TF | 86598TE | 3/4 | 3/4 | 1-5/8 | 4 |
| 86599 | 86599TN | 86599TC | 86599TF | 86599TE | 7/8 | 7/8 | 2 | 4 |
| 86600 | 86600TN | 86600TC | 86600TF | 86600TE | 1 | 1 | 2 | 4 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0003 |

◎ : Excellent ○ : Good

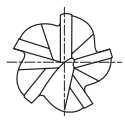
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | | ◎ | ○ | ○ |

# CARBIDE END MILLS

**E5068 SERIES** PLAIN SHANK

## CARBIDE, 5 FLUTE 45° HELIX MEDIUM & LONG LENGTH

- ▶ Designed to machine stainless steel, inconels and other alloys.
- ▶ The new design of stub length allows cutting at maximum speeds and feeds with minimum deflection
- ▶ 5 Flute and 45° medium helix allow harmonic balance and smooth cutting.



MG | 5 | 45° | PLAIN | P.678

Unit : Inch

| EDP No. | | | | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | | | | |
| 58573 | 58573TN | 58573TC | 58573TF | 58573TE | 1/4 | 1/4 | 1-1/4 | 4 |
| 58579 | 58579TN | 58579TC | 58579TF | 58579TE | 5/16 | 5/16 | 1-1/4 | 4 |
| 58584 | 58584TN | 58584TC | 58584TF | 58584TE | 3/8 | 3/8 | 1-1/2 | 4 |
| 58588 | 58588TN | 58588TC | 58588TF | 58588TE | 7/16 | 7/16 | 2 | 4 |
| 58593 | 58593TN | 58593TC | 58593TF | 58593TE | 1/2 | 1/2 | 2 | 4 |
| 58595 | 58595TN | 58595TC | 58595TF | 58595TE | 5/8 | 5/8 | 2-1/2 | 5 |
| 58598 | 58598TN | 58598TC | 58598TF | 58598TE | 3/4 | 3/4 | 3-1/4 | 6 |
| 58901 | 58901TN | 58901TC | 58901TF | 58901TE | 3/4 | 3/4 | 2-1/4 | 5 |
| 58600 | 58600TN | 58600TC | 58600TF | 58600TE | 1 | 1 | 3-1/4 | 6 |
| 58902 | 58902TN | 58902TC | 58902TF | 58902TE | 1 | 1 | 2-5/8 | 6 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0003 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | | ◎ | ○ | ○ |

# CARBIDE END MILLS

**E5073 SERIES** PLAIN SHANK

## CARBIDE, 5 FLUTE 45° HELIX EXTRA LONG LENGTH

- Designed to machine stainless steel, inconels and other alloys.
- The new design of stub length allows cutting at maximum speeds and feeds with minimum deflection
- 5 Flute and 45° medium helix allow harmonic balance and smooth cutting.

MG | 5 | 45° | PLAIN

P.678

Unit : Inch

| EDP No. | | | | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | | | | |
| 59579 | 59579TN | 59579TC | 59579TF | 59579TE | 5/16 | 5/16 | 2-1/8 | 4 |
| 59584 | 59584TN | 59584TC | 59584TF | 59584TE | 3/8 | 3/8 | 2-1/2 | 6 |
| 59593 | 59593TN | 59593TC | 59593TF | 59593TE | 1/2 | 1/2 | 3-1/8 | 6 |
| 59595 | 59595TN | 59595TC | 59595TF | 59595TE | 5/8 | 5/8 | 4 | 6 |
| 59598 | 59598TN | 59598TC | 59598TF | 59598TE | 3/4 | 3/4 | 4 | 6 |
| 59600 | 59600TN | 59600TC | 59600TF | 59600TE | 1 | 1 | 4-1/8 | 7 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0003 |

◎ : Excellent ○ : Good

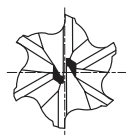
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | | ◎ | ○ | ○ |

# CARBIDE END MILLS

**E5058 SERIES** PLAIN SHANK

## CARBIDE, 6 FLUTE 40° HELIX REGULAR LENGTH

- For finishing in most materials.
- 20～40% increase in inches per minute over 4 flute tools.
- YG:TYLON SUPER TiAlN coating recommended for maximum performance.



MG | 6 | 40° | PLAIN P.678

Unit : Inch

| EDP No. | | | | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | | | | |
| 84565 | 84565TN | 84565TC | 84565TF | 84565TE | 3/16 | 3/16 | 5/8 | 2 |
| 84573 | 84573TN | 84573TC | 84573TF | 84573TE | 1/4 | 1/4 | 3/4 | 2-1/2 |
| 84579 | 84579TN | 84579TC | 84579TF | 84579TE | 5/16 | 5/16 | 7/8 | 2-1/2 |
| 84584 | 84584TN | 84584TC | 84584TF | 84584TE | 3/8 | 3/8 | 7/8 | 2-1/2 |
| 84588 | 84588TN | 84588TC | 84588TF | 84588TE | 7/16 | 7/16 | 1 | 2-1/2 |
| 84593 | 84593TN | 84593TC | 84593TF | 84593TE | 1/2 | 1/2 | 1 | 3 |
| 84595 | 84595TN | 84595TC | 84595TF | 84595TE | 5/8 | 5/8 | 1-1/4 | 3-1/2 |
| 84598 | 84598TN | 84598TC | 84598TF | 84598TE | 3/4 | 3/4 | 1-1/2 | 4 |

| MATERIAL HARDNESS | | |
|---|---|---|
| Recommended Coating | Under 45 Rc F | Over 45 Rc E |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.0012 | 0~−.0005 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | | ◎ | ○ | ○ |

# CARBIDE END MILLS

**E5056 SERIES** FLAT SHANK
**E5057 SERIES** FLAT SHANK

## CARBIDE, 5 FLUTE 45° HELIX STUB & REGULAR LENGTH FINE PITCH ROUGHING CORNER RADIUS

- 5 flute design gives minimum harmonic vibration.
- Stub tools for minimum deflection and maximum rigidity.
- Ideal for profile milling.
- Not recommended for slotting.

MG FINE 5 45° FLAT P.678

**E5056 Series** ■ STUB LENGTH

Unit : Inch

| EDP No. | | | | | Corner Radius | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | R | | | | |
| 81584 | 81584TN | 81584TC | 81584TF | 81584TE | .040 | 3/8 | 3/8 | 1/2 | 2 |
| 81593 | 81593TN | 81593TC | 81593TF | 81593TE | .040 | 1/2 | 1/2 | 5/8 | 2-1/2 |
| 81595 | 81595TN | 81595TC | 81595TF | 81595TE | .060 | 5/8 | 5/8 | 3/4 | 3 |
| 81598 | 81598TN | 81598TC | 81598TF | 81598TE | .060 | 3/4 | 3/4 | 1 | 3 |
| 81600 | 81600TN | 81600TC | 81600TF | 81600TE | .060 | 1 | 1 | 1-1/4 | 3 |

**E5057 Series** ■ REGULAR LENGTH

Unit : Inch

| EDP No. | | | | | Corner Radius | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | R | | | | |
| 82584 | 82584TN | 82584TC | 82584TF | 82584TE | .040 | 3/8 | 3/8 | 1 | 2-1/2 |
| 82593 | 82593TN | 82593TC | 82593TF | 82593TE | .040 | 1/2 | 1/2 | 1-1/4 | 3 |
| 82595 | 82595TN | 82595TC | 82595TF | 82595TE | .060 | 5/8 | 5/8 | 1-5/8 | 3-1/2 |
| 82598 | 82598TN | 82598TC | 82598TF | 82598TE | .060 | 3/4 | 3/4 | 1-5/8 | 4 |
| 82600 | 82600TN | 82600TC | 82600TF | 82600TE | .060 | 1 | 1 | 2 | 4 |

| Mill Dia. Tolerance (inch) | Shank Dia. Tolerance |
|---|---|
| 0~−.003 | 0~−.0005 |

◎ : Excellent ○ : Good

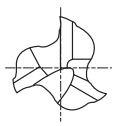
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | ◎ | ◎ | ○ | | | | | | | ◎ | ○ | |

# CARBIDE END MILLS

**E5077 SERIES** PLAIN SHANK

## CARBIDE, 3 FLUTE TAPER

▶Designed for milling die cavity.
▶Many different center line angles are available on your job requirement.



MG | 3 | 30° | PLAIN | P.678

Unit : Inch

| EDP No. | | | | | Cutting Small Diameter | Shank Diameter | Length of Cut | Overall Length | Center Ling Angle |
|---|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | | | | | |
| 87552 | 87552TN | 87552TC | 87552TF | 87552TE | 1/8 | 1/4 | 1-1/2 | 3 | 1° |
| 87553 | 87553TN | 87553TC | 87553TF | 87553TE | 1/8 | 1/4 | 1-1/2 | 3 | 1.5° |
| 87554 | 87554TN | 87554TC | 87554TF | 87554TE | 1/8 | 1/4 | 1-1/4 | 3 | 2° |
| 87556 | 87556TN | 87556TC | 87556TF | 87556TE | 1/8 | 1/4 | 1 | 3 | 3° |
| 87560 | 87560TN | 87560TC | 87560TF | 87560TE | 1/8 | 1/4 | 3/4 | 3 | 5° |
| 87564 | 87564TN | 87564TC | 87564TF | 87564TE | 1/8 | 1/4 | 1/2 | 3 | 7° |
| 87570 | 87570TN | 87570TC | 87570TF | 87570TE | 3/32 | 1/4 | 1/2 | 3 | 10° |
| 87572 | 87572TN | 87572TC | 87572TF | 87572TE | 3/16 | 3/8 | 1-3/4 | 3-1/2 | 1° |
| 87573 | 87573TN | 87573TC | 87573TF | 87573TE | 3/16 | 3/8 | 1-3/4 | 3-1/2 | 1.5° |
| 87574 | 87574TN | 87574TC | 87574TF | 87574TE | 3/16 | 3/8 | 1-3/4 | 3-1/2 | 2° |
| 87576 | 87576TN | 87576TC | 87576TF | 87576TE | 5/32 | 3/8 | 1-3/4 | 3-1/2 | 3° |
| 87580 | 87580TN | 87580TC | 87580TF | 87580TE | 1/8 | 3/8 | 1-1/2 | 3-1/2 | 5° |
| 87584 | 87584TN | 87584TC | 87584TF | 87584TE | 1/8 | 3/8 | 1 | 3-1/2 | 7° |
| 87590 | 87590TN | 87590TC | 87590TF | 87590TE | 1/8 | 3/8 | 3/4 | 3-1/2 | 10° |
| 87592 | 87592TN | 87592TC | 87592TF | 87592TE | 1/4 | 1/2 | 2 | 4 | 1° |
| 87594 | 87594TN | 87594TC | 87594TF | 87594TE | 1/4 | 1/2 | 2 | 4 | 2° |
| 87596 | 87596TN | 87596TC | 87596TF | 87596TE | 1/4 | 1/2 | 2 | 4 | 3° |
| 87600 | 87600TN | 87600TC | 87600TF | 87600TE | 1/4 | 1/2 | 1-1/4 | 4 | 5° |
| 87902 | 87902TN | 87902TC | 87902TF | 87902TE | 3/16 | 1/2 | 1-1/4 | 4 | 7° |
| 87903 | 87903TN | 87903TC | 87903TF | 87903TE | 1/8 | 1/2 | 1 | 4 | 10° |

| Cutting Small Dia. Tolerance(mm) | | Shank Dia. Tolerance | Center Line Angle Tolerance |
|---|---|---|---|
| Ø1/16 ~ Ø1/4 | 0~−.0020 | 0~−.0005 | ±5′ |
| Ø17/64 ~ Ø1 | 0~−.0030 | | |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | ○ | ○ | | |

# YG CARBIDE END MILLS

**E5078 SERIES** PLAIN SHANK

## CARBIDE, 3 FLUTE TAPER BALL NOSE

▶Designed for milling die cavity.
▶Many different center line angles are available on your job requirement.

MG | 3 | 30° | R ±.0008 | PLAIN P.678

Unit : Inch

| EDP No. | | | | | TIP Radius | Cutting Small Diameter | Shank Diameter | Length of Cut | Overall Length | Center Ling Angle |
|---|---|---|---|---|---|---|---|---|---|---|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E | R (±.0008) | | | | | |
| 88552 | 88552TN | 88552TC | 88552TF | 88552TE | .062 | 1/8 | 1/4 | 1-1/2 | 3 | 1° |
| 88553 | 88553TN | 88553TC | 88553TF | 88553TE | .062 | 1/8 | 1/4 | 1-1/2 | 3 | 1.5° |
| 88554 | 88554TN | 88554TC | 88554TF | 88554TE | .062 | 1/8 | 1/4 | 1-1/4 | 3 | 2° |
| 88556 | 88556TN | 88556TC | 88556TF | 88556TE | .062 | 1/8 | 1/4 | 1 | 3 | 3° |
| 88560 | 88560TN | 88560TC | 88560TF | 88560TE | .062 | 1/8 | 1/4 | 3/4 | 3 | 5° |
| 88564 | 88564TN | 88564TC | 88564TF | 88564TE | .062 | 1/8 | 1/4 | 1/2 | 3 | 7° |
| 88570 | 88570TN | 88570TC | 88570TF | 88570TE | .047 | 3/32 | 1/4 | 1/2 | 3 | 10° |
| 88572 | 88572TN | 88572TC | 88572TF | 88572TE | .093 | 3/16 | 3/8 | 1-3/4 | 3-1/2 | 1° |
| 88573 | 88573TN | 88573TC | 88573TF | 88573TE | .093 | 3/16 | 3/8 | 1-3/4 | 3-1/2 | 1.5° |
| 88574 | 88574TN | 88574TC | 88574TF | 88574TE | .093 | 3/16 | 3/8 | 1-3/4 | 3-1/2 | 2° |
| 88576 | 88576TN | 88576TC | 88576TF | 88576TE | .078 | 5/32 | 3/8 | 1-3/4 | 3-1/2 | 3° |
| 88580 | 88580TN | 88580TC | 88580TF | 88580TE | .062 | 1/8 | 3/8 | 1-1/2 | 3-1/2 | 5° |
| 88584 | 88584TN | 88584TC | 88584TF | 88584TE | .062 | 1/8 | 3/8 | 1 | 3-1/2 | 7° |
| 88590 | 88590TN | 88590TC | 88590TF | 88590TE | .062 | 1/8 | 3/8 | 3/4 | 3-1/2 | 10° |
| 88592 | 88592TN | 88592TC | 88592TF | 88592TE | .125 | 1/4 | 1/2 | 2 | 4 | 1° |
| 88594 | 88594TN | 88594TC | 88594TF | 88594TE | .125 | 1/4 | 1/2 | 2 | 4 | 2° |
| 88596 | 88596TN | 88596TC | 88596TF | 88596TE | .125 | 1/4 | 1/2 | 2 | 4 | 3° |
| 88600 | 88600TN | 88600TC | 88600TF | 88600TE | .125 | 1/4 | 1/2 | 1-1/4 | 4 | 5° |
| 88902 | 88902TN | 88902TC | 88902TF | 88902TE | .093 | 3/16 | 1/2 | 1-1/4 | 4 | 7° |
| 88903 | 88903TN | 88903TC | 88903TF | 88903TE | .062 | 1/8 | 1/2 | 1 | 4 | 10° |

| Cutting Small Dia. Tolerance(mm) | | Shank Dia. Tolerance | Center Line Angle Tolerance |
|---|---|---|---|
| Ø1/16 ~ Ø1/4 | 0~−.0020 | 0~−.0005 | ±5′ |
| Ø17/64 ~ Ø1 | 0~−.0030 | | |

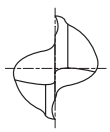
◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | ○ | ○ | | |

# CARBIDE END MILLS

**EH527 SERIES** PLAIN SHANK

## CARBIDE, 2 FLUTE LONG LENGTH - TiAlN 'F' Coated



MG | DIN 6528 | N | 2 | 30° | DIN 6535HA

P.683

Unit : mm

| EDP No. | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| | h10 | | h6 | | |
| EH527035 | 3.5 | .1378 | 3.5 | 7 | 50 |
| EH527040 | 4.0 | .1575 | 4 | 8 | 50 |
| EH527045 | 4.5 | .1772 | 4.5 | 8 | 50 |
| EH527050 | 5.0 | .1969 | 5 | 10 | 50 |
| EH527055 | 5.5 | .2165 | 5.5 | 10 | 57 |
| EH527060 | 6.0 | .2362 | 6 | 10 | 57 |
| EH527065 | 6.5 | .2559 | 6.5 | 13 | 60 |
| EH527070 | 7.0 | .2756 | 7 | 13 | 60 |
| EH527075 | 7.5 | .2953 | 7.5 | 16 | 63 |
| EH527080 | 8.0 | .3150 | 8 | 16 | 63 |
| EH527085 | 8.5 | .3346 | 8.5 | 16 | 67 |
| EH527090 | 9.0 | .3543 | 9 | 16 | 67 |
| EH527095 | 9.5 | .3740 | 9.5 | 19 | 72 |
| EH527100 | 10.0 | .3937 | 10 | 19 | 72 |
| EH527110 | 11.0 | .4330 | 11 | 22 | 83 |
| EH527120 | 12.0 | .4724 | 12 | 22 | 83 |
| EH527130 | 13.0 | .5118 | 13 | 22 | 83 |
| EH527140 | 14.0 | .5512 | 14 | 22 | 83 |
| EH527150 | 15.0 | .5905 | 15 | 26 | 92 |
| EH527160 | 16.0 | .6299 | 16 | 26 | 92 |
| EH527180 | 18.0 | .7087 | 18 | 26 | 92 |
| EH527200 | 20.0 | .7874 | 20 | 32 | 104 |

▶TiN & TiCN-COATING are available on your request.

**Tolerances according to DIN 7160 & 7161**

| Tolerance range in µm | | | | | |
|---|---|---|---|---|---|
| Nominal-Diameter in mm | | | | | |
| | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
| h10 | 0 / — 40 | 0 / — 48 | 0 / — 58 | 0 / — 70 | 0 / — 84 |
| h6 | 0 / — 6 | 0 / — 8 | 0 / — 9 | 0 / — 11 | 0 / — 13 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | ○ | ○ | | |

# YG CARBIDE END MILLS

**EH540 SERIES** PLAIN SHANK

## CARBIDE, 4 FLUTE LONG LENGTH - TiAlN 'F' Coated

MG | DIN 6528 | N | 4 | ≈30° | DIN 6535HA

P.683

Unit : mm

| EDP No. | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| | Metric | Inch | | | |
| | h10 | | h6 | | |
| EH540035 | 3.5 | .1378 | 3.5 | 10 | 50 |
| EH540040 | 4.0 | .1575 | 4 | 11 | 50 |
| EH540045 | 4.5 | .1772 | 4.5 | 11 | 50 |
| EH540050 | 5.0 | .1969 | 5 | 13 | 50 |
| EH540055 | 5.5 | .2165 | 5.5 | 13 | 57 |
| EH540060 | 6.0 | .2362 | 6 | 13 | 57 |
| EH540065 | 6.5 | .2559 | 6.5 | 16 | 60 |
| EH540070 | 7.0 | .2756 | 7 | 16 | 60 |
| EH540075 | 7.5 | .2953 | 7.5 | 19 | 63 |
| EH540080 | 8.0 | .3150 | 8 | 19 | 63 |
| EH540085 | 8.5 | .3346 | 8.5 | 19 | 67 |
| EH540090 | 9.0 | .3543 | 9 | 19 | 67 |
| EH540095 | 9.5 | .3740 | 9.5 | 22 | 72 |
| EH540100 | 10.0 | .3937 | 10 | 22 | 72 |
| EH540110 | 11.0 | .4330 | 11 | 26 | 83 |
| EH540120 | 12.0 | .4724 | 12 | 26 | 83 |
| EH540130 | 13.0 | .5118 | 13 | 26 | 83 |
| EH540140 | 14.0 | .5512 | 14 | 26 | 83 |
| EH540150 | 15.0 | .5905 | 15 | 32 | 92 |
| EH540160 | 16.0 | .6299 | 16 | 32 | 92 |
| EH540180 | 18.0 | .7087 | 18 | 32 | 92 |
| EH540200 | 20.0 | .7874 | 20 | 38 | 104 |

▶TiN & TiCN-COATING are available on your request.

**Tolerances according to DIN 7160 & 7161**

| Tolerance range in µm | | | | | |
|---|---|---|---|---|---|
| Nominal-Diameter in mm | | | | | |
| | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
| h10 | 0 — 40 | 0 — 48 | 0 — 58 | 0 — 70 | 0 — 84 |
| h6 | 0 — 6 | 0 — 8 | 0 — 9 | 0 — 11 | 0 — 13 |

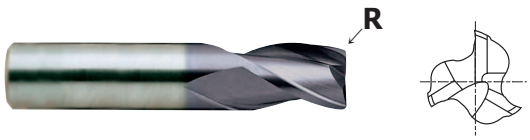
◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | ○ | | ○ | ○ | ○ | | |

# CARBIDE END MILLS

**EH882 SERIES** PLAIN SHANK

## CARBIDE, 3 FLUTE 35° HELIX CORNER RADIUS - TiAlN 'F' Coated




MG | DIN 6527 | N | 3 | 35° | DIN 6535HA

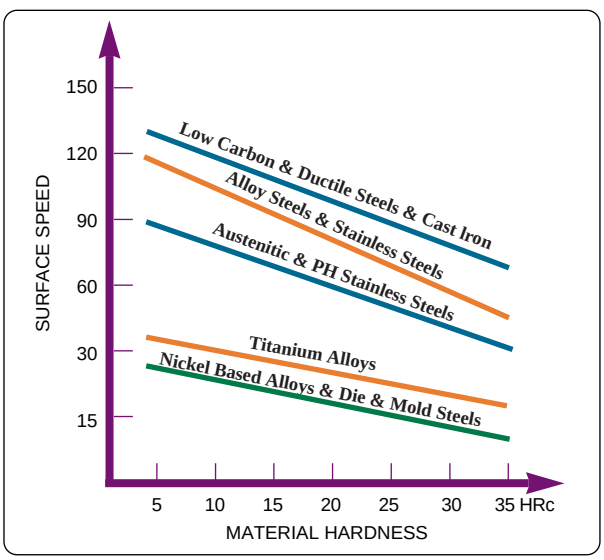
Unit : mm

| EDP No. | Corner Radius | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| | | Metric | Inch | | | |
| | R | h10 | | h6 | | |
| EH882030 | 0.20~0.25 | 3.0 | .1181 | 3 | 4 | 38 |
| EH882040 | 0.20~0.25 | 4.0 | .1575 | 6 | 5 | 54 |
| EH882050 | 0.20~0.25 | 5.0 | .1969 | 6 | 6 | 54 |
| EH882060 | 0.40~0.50 | 6.0 | .2362 | 6 | 7 | 54 |
| EH882080 | 0.40~0.50 | 8.0 | .3150 | 8 | 9 | 58 |
| EH882100 | 0.40~0.50 | 10.0 | .3937 | 10 | 11 | 66 |
| EH882120 | 0.75~0.85 | 12.0 | .4724 | 12 | 12 | 73 |
| EH882160 | 0.75~0.85 | 16.0 | .6299 | 16 | 16 | 82 |
| EH882200 | 0.75~0.85 | 20.0 | .7874 | 20 | 20 | 92 |

▶TiN & TiCN-COATING are available on your request.

**Tolerances according to DIN 7160 & 7161**

| Tolerance range in µm<br>Nominal-Diameter in mm | | | | | |
|---|---|---|---|---|---|
| | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
| h10 | 0<br>— 40 | 0<br>— 48 | 0<br>— 58 | 0<br>— 70 | 0<br>— 84 |
| h6 | 0<br>— 6 | 0<br>— 8 | 0<br>— 9 | 0<br>— 11 | 0<br>— 13 |




### TiAlN FEED CHART

Unit : inch

| Mill Diameter | Feed / Tooth | Mill Diameter | Feed / Tooth |
|---|---|---|---|
| 3 | .0035 ~ .0070 | 10 | .0018 ~ .0040 |
| 5 | .0050 ~ .0025 | 12 | .0025 ~ .0050 |
| 6 | .0012 ~ .0030 | 16 | .0030 ~ .0060 |
| 8 | .0018 ~ .0035 | 20 | .0035 ~ .0070 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | ○ | | | ◎ | | ○ | ◎ | | | |

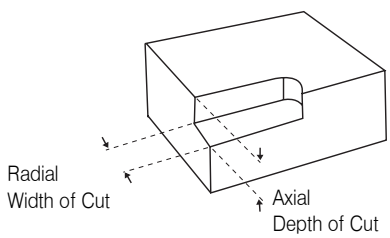
# CARBIDE END MILLS

## RECOMMENDED CUTTING CONDITIONS

## SPEED & FEED RECOMMENDATIONS

| Material | Speed | Chip Load per Tooth by End Mill Diameter | | | Recommended Coating |
|---|---|---|---|---|---|
| | | Up to 1/4″ | Up to 1/2″ | Up to 1″ | |
| **Carbon + Alloy Steel <45Rc** | 100-700 | .0002-.002 | .001-.003 | .003-.007 | TF |
| **Carbon + Alloy Steel >45Rc** | 50-400 | .0002-.001 | .0005-.0015 | .001-.003 | TE |
| **Stainless Steels Non-Hardenable 200-300 Series** | 150-500 | .0002-.001 | .001-.002 | .002-.006 | TF |
| **Stainless Steels Hardenable 400 Series Martensitic and PH Series** | 100-450 | .0002-.0005 | .0005-.001 | .001-.005 | TF |
| **Cast+Ductile Iron** | 100-800 | .0002-.0015 | .002-.003 | .003-.008 | TF or TE |
| **Nickel+Cobalt Based Alloys** | 20-200 | .0003-.0008 | .0008-.001 | .001-.002 | TE |
| **Titanium** | 30-200 | .0002-.0008 | .0008-.002 | .002-.004 | TE |
| **Aluminum** | 600-2000 | .0002-.002 | .002-.004 | .004-.008 | TiCN |
| **Copper** | 300-1000 | .0005-.002 | .002-.003 | .003-.006 | CrN |
| **Brass+ Bronze Alloys**<br>**Graphite** | 600-1000<br>600-1000 | .0005-.002<br>.0005-.005 | .002-.003<br>.001-.008 | .003-.006<br>.002-.010 | TiCN<br>D |
| **Plastic** | 600-1200 | .0006-.003 | .003-.006 | .006-.012 | TF |

**TF** = YG:TYLON F
**TE** = YG:TYLON E
**D** = DIAMOND
**CrN** = CROME NITRIDE




### SPEED & FEED DETERMINANTS

1. MATERIAL HARDNESS
2. MACHINE RIGIDITY
3. TYPE OF COATING
4. TOOL GEOMETRY
5. FINISH REQUIREMENTS
6. DEPTH & WIDTH OF CUT

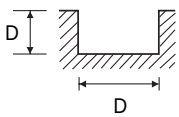
# CARBIDE END MILLS

## RECOMMENDED CUTTING CONDITIONS

## CARBIDE, 2 FLUTE - SLOTTING

### E5020, E5244, E5011, E5026, E5022, E5025 SERIES

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | STAINLESS STEELS TITANIUM ALLOYS | | CAST IRON | | ALUMINUM ALLOYS | | COPPER. BRASS NON-FERROUS METALS | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc 20 | | HRc 20 ~ HRc 30 | | HRc 30 ~ HRc 40 | | | | | | | | | |
| STRENGTH | 500 ~ 800N/mm² | | 800 ~ 1000N/mm² | | 1000 ~ 1300N/mm² | | | | | | | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 3/32 | 5500 | 3.15 | 4800 | 2.76 | 4000 | 2.17 | 8000 | 2.56 | 6500 | 5.91 | 16000 | 12.60 | 12000 | 9.45 |
| 1/8 | 3700 | 3.54 | 3200 | 3.15 | 2600 | 2.36 | 5300 | 2.56 | 4200 | 5.91 | 11000 | 12.60 | 8000 | 9.45 |
| 5/32 | 2800 | 3.54 | 2400 | 3.15 | 2000 | 2.36 | 4000 | 2.56 | 3200 | 5.91 | 8000 | 12.60 | 6000 | 9.45 |
| 3/16 | 2200 | 3.54 | 1900 | 3.15 | 1600 | 2.36 | 3200 | 2.56 | 2500 | 5.91 | 6400 | 12.60 | 4800 | 9.45 |
| 1/4 | 1800 | 3.54 | 1600 | 3.15 | 1300 | 2.36 | 2600 | 2.56 | 2100 | 7.09 | 5300 | 13.39 | 4000 | 10.24 |
| 5/16 | 1400 | 3.54 | 1200 | 3.15 | 1000 | 2.36 | 2000 | 2.56 | 1600 | 7.48 | 4000 | 13.39 | 3000 | 10.24 |
| 3/8 | 1100 | 3.54 | 950 | 3.15 | 800 | 2.36 | 1600 | 2.56 | 1300 | 7.87 | 3200 | 13.39 | 2400 | 10.24 |
| 1/2 | 900 | 3.54 | 800 | 3.15 | 660 | 2.36 | 1300 | 2.56 | 1000 | 8.27 | 2600 | 13.39 | 2000 | 10.24 |
| 9/16 | 800 | 3.54 | 700 | 3.15 | 570 | 2.36 | 1100 | 2.56 | 900 | 8.66 | 2300 | 13.39 | 1700 | 10.24 |
| 5/8 | 700 | 3.94 | 600 | 3.35 | 500 | 2.95 | 1000 | 2.95 | 800 | 8.86 | 2000 | 13.39 | 1500 | 10.24 |
| 13/16 | 550 | 3.94 | 480 | 3.35 | 400 | 2.95 | 800 | 3.15 | 640 | 9.45 | 1600 | 13.39 | 1200 | 10.24 |



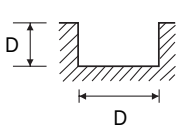

※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min. FEED = inch/min.

## CARBIDE, 2 FLUTE TiAlN "F" COATED - SLOTTING

### EH020, EH244, EH011, EH026, EH022, EH025 SERIES

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | STAINLESS STEELS TITANIUM ALLOYS | | CAST IRON | | ALUMINUM ALLOYS | | COPPER. BRASS NON-FERROUS METALS | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc 20 | | HRc 20 ~ HRc 30 | | HRc 30 ~ HRc 40 | | | | | | | | | |
| STRENGTH | 500 ~ 800N/mm² | | 800 ~ 1000N/mm² | | 1000 ~ 1300N/mm² | | | | | | | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 3/32 | 8640 | 4.73 | 7440 | 4.25 | 6240 | 3.31 | 12000 | 4.02 | 10200 | 9.44 | 24000 | 19.85 | 18000 | 14.64 |
| 1/8 | 5760 | 5.66 | 5040 | 4.96 | 4080 | 3.78 | 8280 | 4.02 | 6600 | 9.44 | 16800 | 19.85 | 12000 | 14.64 |
| 5/32 | 4370 | 5.66 | 3720 | 4.96 | 3120 | 3.78 | 6240 | 4.02 | 5040 | 9.44 | 12000 | 19.85 | 9600 | 14.64 |
| 3/16 | 3430 | 5.66 | 3000 | 4.96 | 2400 | 3.78 | 5040 | 4.02 | 3960 | 9.44 | 9960 | 19.85 | 7440 | 14.64 |
| 1/4 | 2880 | 5.66 | 2400 | 4.96 | 2040 | 3.78 | 4080 | 4.02 | 3240 | 10.87 | 8280 | 20.78 | 6240 | 16.07 |
| 5/16 | 2160 | 5.66 | 1800 | 4.96 | 1560 | 3.78 | 3120 | 4.02 | 2400 | 11.81 | 6240 | 20.78 | 4800 | 16.07 |
| 3/8 | 1680 | 5.66 | 1440 | 4.96 | 1200 | 3.78 | 2400 | 4.02 | 2040 | 12.29 | 5040 | 20.78 | 3720 | 16.07 |
| 1/2 | 1440 | 5.66 | 1200 | 4.96 | 1030 | 3.78 | 2040 | 4.02 | 1560 | 12.76 | 4080 | 20.78 | 3120 | 16.07 |
| 9/16 | 1200 | 5.66 | 1080 | 4.96 | 890 | 3.78 | 1680 | 4.02 | 1440 | 13.22 | 3600 | 20.78 | 2640 | 16.07 |
| 5/8 | 1080 | 6.14 | 960 | 5.20 | 780 | 4.73 | 1560 | 4.73 | 1200 | 13.70 | 3120 | 20.78 | 2400 | 16.07 |
| 13/16 | 880 | 6.14 | 740 | 5.20 | 620 | 4.73 | 1200 | 4.73 | 1000 | 14.64 | 2400 | 20.78 | 1870 | 16.07 |




※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min. FEED = inch/min.

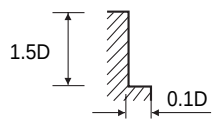
# CARBIDE END MILLS

## RECOMMENDED CUTTING CONDITIONS

## CARBIDE, 4 FLUTE - SIDE CUTTING

### E5021, E5245, E5012, E5065, E5023, E5024, E5216 SERIES

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | STAINLESS STEELS TITANIUM ALLOYS | | CAST IRON | | ALUMINUM ALLOYS | | COPPER. BRASS NON-FERROUS METALS | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc 20 | | HRc 20 ~ HRc 30 | | HRc 30 ~ HRc 40 | | | | | | | | | |
| STRENGTH | 500 ~ 800N/mm² | | 800 ~ 1000N/mm² | | 1000 ~ 1300N/mm² | | | | | | | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 3/32 | 5500 | 9.45 | 4800 | 8.27 | 4000 | 6.30 | 8000 | 7.87 | 6500 | 17.72 | 16000 | 37.80 | 12000 | 25.35 |
| 1/8 | 3700 | 10.63 | 3200 | 9.45 | 2600 | 7.09 | 5300 | 7.87 | 4200 | 17.72 | 11000 | 37.80 | 8000 | 25.35 |
| 5/32 | 2800 | 10.63 | 2400 | 9.45 | 2000 | 7.09 | 4000 | 7.87 | 3200 | 17.72 | 8000 | 37.80 | 6000 | 25.35 |
| 3/16 | 2200 | 10.63 | 1900 | 9.45 | 1600 | 7.09 | 3200 | 7.87 | 2500 | 17.72 | 6400 | 37.80 | 4800 | 25.35 |
| 1/4 | 1800 | 10.63 | 1600 | 9.45 | 1300 | 7.09 | 2600 | 7.87 | 2100 | 21.26 | 5300 | 40.16 | 4000 | 30.71 |
| 5/16 | 1400 | 10.63 | 1200 | 9.45 | 1000 | 7.09 | 2000 | 7.87 | 1600 | 22.44 | 4000 | 40.16 | 3000 | 30.71 |
| 3/8 | 1100 | 10.63 | 950 | 9.45 | 800 | 7.09 | 1600 | 7.87 | 1300 | 23.62 | 3200 | 40.16 | 2400 | 30.71 |
| 1/2 | 900 | 10.63 | 800 | 9.45 | 660 | 7.09 | 1300 | 7.87 | 1000 | 24.80 | 2600 | 40.16 | 2000 | 30.71 |
| 9/16 | 800 | 10.63 | 700 | 9.45 | 570 | 7.09 | 1100 | 7.87 | 900 | 25.98 | 2300 | 40.16 | 1700 | 30.71 |
| 5/8 | 700 | 11.81 | 600 | 10.24 | 500 | 8.66 | 1000 | 8.86 | 800 | 26.77 | 2000 | 40.16 | 1500 | 30.71 |
| 13/16 | 550 | 11.81 | 480 | 10.24 | 400 | 8.66 | 800 | 9.45 | 640 | 28.35 | 1600 | 40.16 | 1200 | 30.71 |



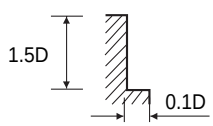

※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min. FEED = inch/min.

## CARBIDE, 4 FLUTE TiAlN "F" COATED - SIDE CUTTING

### EH021, EH245, EH012, EH065, EH023, EH024, EH216 SERIES

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | STAINLESS STEELS TITANIUM ALLOYS | | CAST IRON | | ALUMINUM ALLOYS | | COPPER. BRASS NON-FERROUS METALS | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc 20 | | HRc 20 ~ HRc 30 | | HRc 30 ~ HRc 40 | | | | | | | | | |
| STRENGTH | 500 ~ 800N/mm² | | 800 ~ 1000N/mm² | | 1000 ~ 1300N/mm² | | | | | | | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 3/32 | 8640 | 14.65 | 7440 | 12.76 | 6240 | 9.92 | 12000 | 12.29 | 10200 | 27.40 | 24000 | 56.69 | 18000 | 44.41 |
| 1/8 | 5760 | 16.54 | 5040 | 14.64 | 4080 | 10.87 | 8280 | 12.29 | 6600 | 27.40 | 16800 | 56.69 | 12000 | 44.41 |
| 5/32 | 4370 | 16.54 | 3720 | 14.64 | 3120 | 10.87 | 6240 | 12.29 | 5040 | 27.40 | 12000 | 56.69 | 9600 | 44.41 |
| 3/16 | 3430 | 16.54 | 3000 | 14.64 | 2400 | 10.87 | 5040 | 12.29 | 3960 | 27.40 | 9960 | 56.69 | 7440 | 44.41 |
| 1/4 | 2880 | 16.54 | 2400 | 14.64 | 2040 | 10.87 | 4080 | 12.29 | 3240 | 33.07 | 8280 | 61.42 | 6240 | 47.24 |
| 5/16 | 2160 | 16.54 | 1800 | 14.64 | 1560 | 10.87 | 3120 | 12.29 | 2400 | 34.96 | 6240 | 61.42 | 4800 | 47.24 |
| 3/8 | 1680 | 16.54 | 1440 | 14.64 | 1200 | 10.87 | 2400 | 12.29 | 2040 | 36.85 | 5040 | 61.42 | 3720 | 47.24 |
| 1/2 | 1440 | 16.54 | 1200 | 14.64 | 1030 | 10.87 | 2040 | 12.29 | 1560 | 38.74 | 4080 | 61.42 | 3120 | 47.24 |
| 9/16 | 1200 | 16.54 | 1080 | 14.64 | 890 | 10.87 | 1680 | 12.29 | 1440 | 40.63 | 3600 | 61.42 | 2640 | 47.24 |
| 5/8 | 1080 | 18.42 | 960 | 16.07 | 780 | 13.70 | 1560 | 13.70 | 1200 | 41.58 | 3120 | 61.42 | 2400 | 47.24 |
| 13/16 | 880 | 18.42 | 740 | 16.07 | 620 | 13.70 | 1200 | 14.64 | 1000 | 36.85 | 2400 | 61.42 | 1870 | 47.24 |



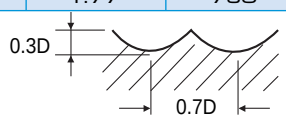

※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min. FEED = inch/min.

## CARBIDE, 2 FLUTE BALL NOSE

### E5249, E5014, E5018, E5251 SERIES

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CAST IRON | | ALUMINUM ALLOYS | |
|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc30 | | HRc30 ~ HRc40 | | | | | |
| STRENGTH | ~ 1000N/mm² | | 1000 ~ 1300N/mm² | | | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 3/32 | 5200 | 3.54 | 4400 | 1.77 | 7300 | 5.91 | 21500 | 11.02 |
| 1/8 | 3500 | 3.94 | 2900 | 1.77 | 4900 | 6.30 | 14300 | 11.02 |
| 5/32 | 2600 | 3.94 | 2100 | 1.77 | 3600 | 7.87 | 10900 | 11.02 |
| 3/16 | 2100 | 4.13 | 1700 | 1.77 | 2900 | 9.06 | 8800 | 12.99 |
| 1/4 | 1700 | 3.94 | 1430 | 1.77 | 2400 | 9.84 | 7260 | 12.99 |
| 5/16 | 1270 | 3.74 | 1100 | 1.77 | 1800 | 12.60 | 5500 | 14.96 |
| 3/8 | 1000 | 3.74 | 870 | 1.77 | 1430 | 12.60 | 4300 | 14.96 |
| 1/2 | 870 | 3.35 | 730 | 1.77 | 1200 | 12.60 | 3600 | 17.32 |
| 9/16 | 750 | 3.35 | 620 | 1.77 | 1000 | 12.80 | 3000 | 17.32 |
| 5/8 | 650 | 3.35 | 540 | 1.77 | 920 | 12.80 | 2700 | 14.96 |
| 11/16 | 580 | 3.35 | 480 | 1.77 | 810 | 12.80 | 2400 | 14.96 |
| 13/16 | 500 | 3.35 | 430 | 1.77 | 730 | 11.42 | 2100 | 14.96 |



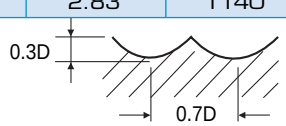

※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min. FEED = inch/min.

## CARBIDE, 2 FLUTE BALL NOSE TiAlN "F" COATED

### EH249, EH014, EF018, EF251 SERIES

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CAST IRON | | ALUMINUM ALLOYS | |
|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc30 | | HRc30 ~ HRc40 | | | | | |
| STRENGTH | ~ 1000N/mm² | | 1000 ~ 1300N/mm² | | | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 3/32 | 8110 | 5.66 | 6840 | 2.83 | 11400 | 9.44 | 33600 | 17.00 |
| 1/8 | 5400 | 6.14 | 4560 | 2.83 | 7680 | 9.92 | 22320 | 17.00 |
| 5/32 | 4080 | 6.14 | 3240 | 2.83 | 5640 | 12.29 | 16800 | 17.00 |
| 3/16 | 3240 | 6.37 | 2640 | 2.83 | 4560 | 14.17 | 13200 | 20.32 |
| 1/4 | 2640 | 6.14 | 2270 | 2.83 | 3720 | 15.59 | 11280 | 20.32 |
| 5/16 | 1920 | 5.66 | 1680 | 2.83 | 2760 | 19.85 | 8640 | 23.15 |
| 3/8 | 1560 | 5.66 | 1320 | 2.83 | 1680 | 19.85 | 6720 | 23.15 |
| 1/2 | 1320 | 5.20 | 1140 | 2.83 | 1920 | 19.85 | 5640 | 26.93 |
| 9/16 | 1180 | 5.20 | 960 | 2.83 | 1560 | 19.85 | 4680 | 26.93 |
| 5/8 | 1020 | 5.20 | 840 | 2.83 | 1440 | 19.85 | 4200 | 23.15 |
| 11/16 | 900 | 5.20 | 740 | 2.83 | 1200 | 19.85 | 3720 | 23.15 |
| 13/16 | 780 | 5.20 | 670 | 2.83 | 1140 | 17.96 | 3240 | 23.15 |




※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min. FEED = inch/min.

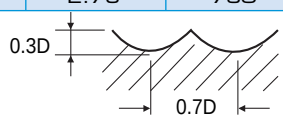
# CARBIDE END MILLS

## RECOMMENDED CUTTING CONDITIONS

## CARBIDE, 4 FLUTE BALL NOSE

### E5250, E5060, E5062, E5252 SERIES

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CAST IRON | | ALUMINUM ALLOYS | |
|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc30 | | HRc30 ~ HRc40 | | | | | |
| STRENGTH | ~ 1000N/mm² | | 1000 ~ 1300N/mm² | | | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 3/32 | 5200 | 5.51 | 4400 | 2.76 | 7300 | 9.06 | 21500 | 16.54 |
| 1/8 | 3500 | 5.91 | 2900 | 2.76 | 4900 | 9.45 | 14300 | 16.54 |
| 5/32 | 2600 | 5.91 | 2100 | 2.76 | 3600 | 11.81 | 10900 | 16.54 |
| 3/16 | 2100 | 6.30 | 1700 | 2.76 | 2900 | 13.78 | 8800 | 19.69 |
| 1/4 | 1700 | 5.91 | 1430 | 2.76 | 2400 | 14.96 | 7260 | 19.69 |
| 5/16 | 1270 | 5.52 | 1100 | 2.76 | 1800 | 18.90 | 5500 | 22.44 |
| 3/8 | 1000 | 5.52 | 870 | 2.76 | 1430 | 18.90 | 4300 | 22.44 |
| 1/2 | 870 | 5.12 | 730 | 2.76 | 1200 | 18.90 | 3600 | 25.98 |
| 9/16 | 750 | 5.12 | 620 | 2.76 | 1000 | 19.29 | 3000 | 25.98 |
| 5/8 | 650 | 5.12 | 540 | 2.76 | 920 | 19.29 | 2700 | 22.44 |
| 11/16 | 580 | 5.12 | 480 | 2.76 | 810 | 19.29 | 2400 | 22.44 |
| 13/16 | 500 | 5.12 | 430 | 2.76 | 730 | 17.29 | 2100 | 22.44 |



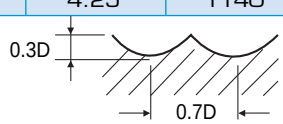

※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min. FEED = inch/min.

## CARBIDE, 4 FLUTE BALL NOSE TiAlN "F" COATED

### EH250, EH060, EH062, EH252 SERIES

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CAST IRON | | ALUMINUM ALLOYS | |
|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc30 | | HRc30 ~ HRc40 | | | | | |
| STRENGTH | ~ 1000N/mm² | | 1000 ~ 1300N/mm² | | | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 3/32 | 8110 | 8.51 | 6840 | 4.25 | 11400 | 14.17 | 33600 | 25.98 |
| 1/8 | 5400 | 9.44 | 4560 | 4.25 | 7680 | 14.64 | 22320 | 25.98 |
| 5/32 | 4080 | 9.44 | 3240 | 4.25 | 5640 | 18.42 | 16800 | 25.98 |
| 3/16 | 3240 | 9.92 | 2640 | 4.25 | 4560 | 21.26 | 13200 | 30.71 |
| 1/4 | 2640 | 9.44 | 2270 | 4.25 | 3720 | 23.15 | 11280 | 30.71 |
| 5/16 | 1920 | 8.51 | 1680 | 4.25 | 2760 | 29.30 | 8640 | 34.96 |
| 3/8 | 1560 | 8.51 | 1320 | 4.25 | 2270 | 29.30 | 6720 | 34.96 |
| 1/2 | 1320 | 8.03 | 1140 | 4.25 | 1920 | 29.30 | 5640 | 40.62 |
| 9/16 | 1180 | 8.03 | 960 | 4.25 | 1560 | 30.23 | 4680 | 40.62 |
| 5/8 | 1020 | 8.03 | 840 | 4.25 | 1440 | 30.23 | 4200 | 34.96 |
| 11/16 | 900 | 8.03 | 740 | 4.25 | 1200 | 30.23 | 3720 | 34.96 |
| 13/16 | 780 | 8.03 | 670 | 4.25 | 1140 | 26.93 | 3240 | 34.96 |




※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min. FEED = inch/min.

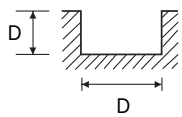
# CARBIDE END MILLS

## RECOMMENDED CUTTING CONDITIONS

## CARBIDE, 2 FLUTE TiAlN-COATED - SLOTTING

### EH527 SERIES

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | STAINLESS STEELS TITANIUM ALLOYS | | CAST IRON | | ALUMINUM ALLOYS | | COPPER. BRASS NON-FERROUS METALS | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc 20 | | HRc 20 ~ HRc 30 | | HRc 30 ~ HRc 40 | | | | | | | | | |
| STRENGTH | 500 ~ 800N/mm² | | 800 ~ 1000N/mm² | | 1000 ~ 1300N/mm² | | | | | | | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 2.0 | 7700 | 4.33 | 6720 | 3.94 | 5600 | 2.95 | 11200 | 3.54 | 9100 | 8.27 | 22400 | 17.72 | 16800 | 13.19 |
| 3.0 | 5180 | 4.92 | 4480 | 4.33 | 3640 | 3.35 | 7420 | 3.54 | 5880 | 8.27 | 15400 | 17.72 | 11200 | 13.19 |
| 4.0 | 3920 | 4.92 | 3360 | 4.33 | 2800 | 3.35 | 5600 | 3.54 | 4480 | 8.27 | 11200 | 17.72 | 8400 | 13.19 |
| 5.0 | 3080 | 4.92 | 2660 | 4.33 | 2240 | 3.35 | 4480 | 3.54 | 3500 | 8.27 | 8960 | 17.72 | 6720 | 13.19 |
| 6.0 | 2520 | 4.92 | 2240 | 4.33 | 1820 | 3.35 | 3640 | 3.54 | 2940 | 9.84 | 7420 | 18.70 | 5600 | 14.37 |
| 8.0 | 1960 | 4.92 | 1680 | 4.33 | 1400 | 3.35 | 2800 | 3.54 | 2240 | 10.43 | 5600 | 18.70 | 4200 | 14.37 |
| 10.0 | 1540 | 4.92 | 1330 | 4.33 | 1120 | 3.35 | 2240 | 3.54 | 1820 | 11.02 | 4480 | 18.70 | 3360 | 14.37 |
| 12.0 | 1260 | 4.92 | 1120 | 4.33 | 924 | 3.35 | 1820 | 3.54 | 1400 | 11.61 | 3640 | 18.70 | 2800 | 14.37 |
| 14.0 | 1120 | 4.92 | 980 | 4.33 | 798 | 3.35 | 1540 | 3.54 | 1260 | 12.20 | 3220 | 18.70 | 2380 | 14.37 |
| 16.0 | 980 | 5.51 | 840 | 4.72 | 700 | 4.13 | 1400 | 4.13 | 1120 | 12.40 | 2800 | 18.70 | 2100 | 14.37 |
| 20.0 | 770 | 5.51 | 672 | 4.72 | 560 | 4.13 | 1120 | 4.33 | 900 | 13.19 | 2240 | 18.70 | 1680 | 14.37 |



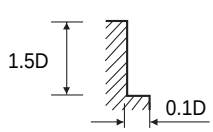

※The FEED, in long & extra long types, should be reduced by around 50%

RPM = rev./min. FEED = inch/min.

## CARBIDE, 4 FLUTE TiAlN-COATED - SIDE CUTTING

### EH540 SERIES

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | STAINLESS STEELS TITANIUM ALLOYS | | CAST IRON | | ALUMINUM ALLOYS | | COPPER. BRASS NON-FERROUS METALS | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~ HRc 20 | | HRc 20 ~ HRc 30 | | HRc 30 ~ HRc 40 | | | | | | | | | |
| STRENGTH | 500 ~ 800N/mm² | | 800 ~ 1000N/mm² | | 1000 ~ 1300N/mm² | | | | | | | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 2.0 | 7700 | 13.19 | 6720 | 11.61 | 5600 | 8.86 | 11200 | 11.02 | 9100 | 24.80 | 22400 | 52.95 | 16800 | 39.76 |
| 3.0 | 5180 | 14.96 | 4480 | 13.19 | 3640 | 9.84 | 7420 | 11.02 | 5880 | 24.80 | 15400 | 52.95 | 11200 | 39.76 |
| 4.0 | 3920 | 14.96 | 3360 | 13.19 | 2800 | 9.84 | 5600 | 11.02 | 4480 | 24.80 | 11200 | 52.95 | 8400 | 39.76 |
| 5.0 | 3080 | 14.96 | 2660 | 13.19 | 2240 | 9.84 | 4480 | 11.02 | 3500 | 24.80 | 8960 | 52.95 | 6720 | 39.76 |
| 6.0 | 2520 | 14.96 | 2240 | 13.19 | 1820 | 9.84 | 3640 | 11.02 | 2940 | 29.72 | 7420 | 56.30 | 5600 | 42.91 |
| 8.0 | 1960 | 14.96 | 1680 | 13.19 | 1400 | 9.84 | 2800 | 11.02 | 2240 | 31.50 | 5600 | 56.30 | 4200 | 42.91 |
| 10.0 | 1540 | 14.96 | 1330 | 13.19 | 1120 | 9.84 | 2240 | 11.02 | 1820 | 33.07 | 4480 | 56.30 | 3360 | 42.91 |
| 12.0 | 1260 | 14.96 | 1120 | 13.19 | 920 | 9.84 | 1820 | 11.02 | 1400 | 34.65 | 3640 | 56.30 | 2800 | 42.91 |
| 14.0 | 1120 | 14.96 | 980 | 13.19 | 800 | 9.84 | 1540 | 11.02 | 1260 | 36.42 | 3220 | 56.30 | 2380 | 42.91 |
| 16.0 | 980 | 16.54 | 840 | 14.37 | 700 | 12.20 | 1400 | 12.40 | 1120 | 37.40 | 2800 | 56.30 | 2100 | 42.91 |
| 20.0 | 770 | 16.54 | 670 | 14.37 | 560 | 12.20 | 1120 | 13.19 | 900 | 39.76 | 2240 | 56.30 | 1680 | 42.91 |




※The FEED, in long & extra long types, should be reduced by around 50%

RPM = rev./min. FEED = inch/min.

# PROPERTIES AND APPLICATIONS OF COATINGS

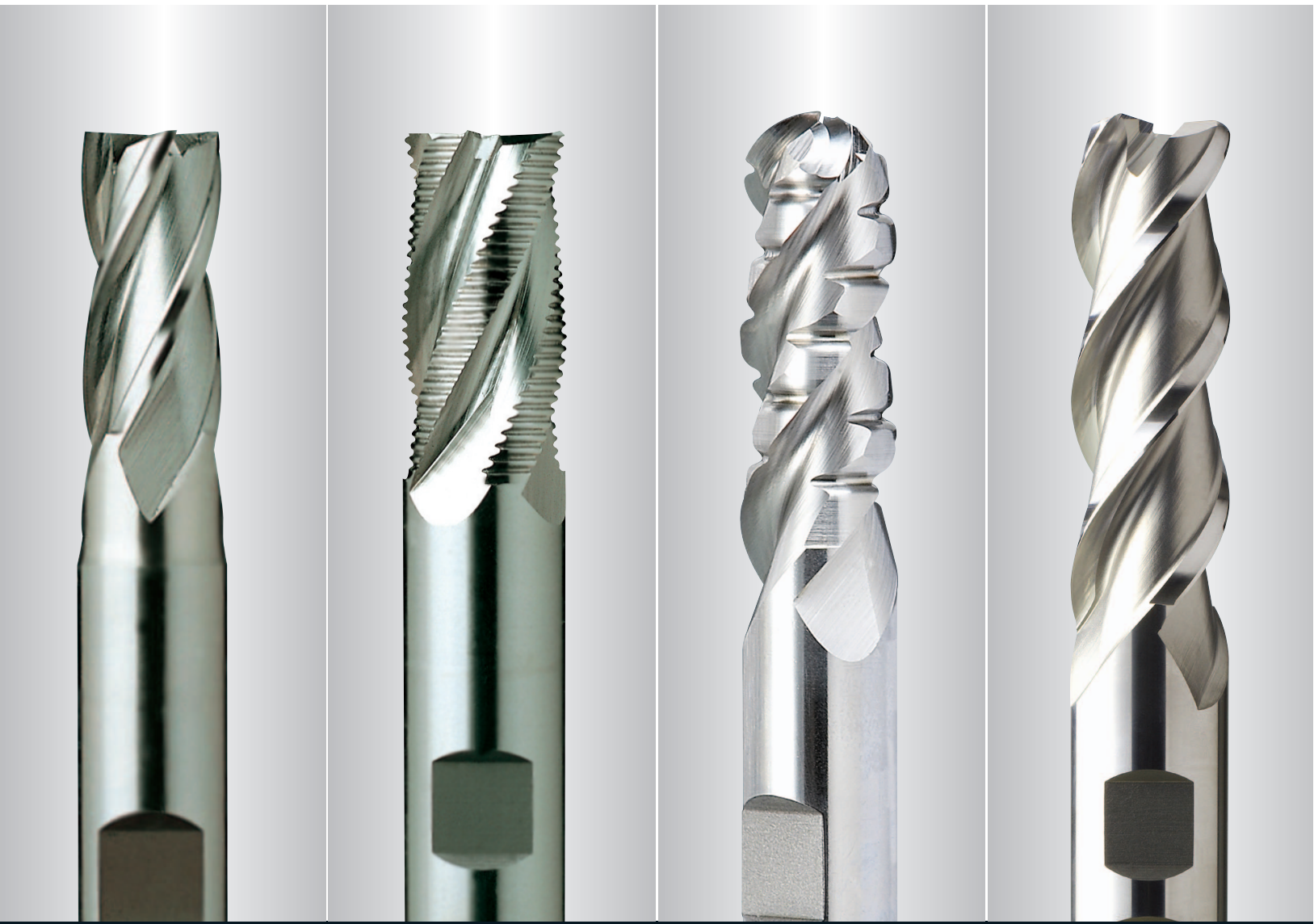
| | Titanium Nitride | Titanium Carbonitride | Super TiAlN "F" Coatings | Super TiAlN "E" Coatings |
|---|---|---|---|---|
| **Hardness** | 82 Rc | 92 Rc | 92 Rc | 95 Rc |
| **Coefficient of Friction Against Dry Steel (.8)** | .4 | .4 | .4 | .4 |
| **Coating Thickness 3 Microns = .0001** | 1- 4 | 1- 4 | 1- 5 | 1- 3 |
| **Maximum Working Temperature** | 1100 F | 750 F | 1470 F | 1470 F |
| **Coating Color** | Gold | Blue - Gray | Violet - Gray | Violet - Gray |
| **Key Characteristics** | Good General Purpose | Good Wear Resistance<br>Good Toughness<br>Moderate Heat Resistance | Enhanced Toughness<br>High Heat Resistance | High Hardness<br>Enhanced Toughness<br>High Heat Resistance |
| **Primary Applications** | Machining of Iron Based Materials | General Machining of Various Materials | Steel, Cast Iron, Stainless, Nickel Based Alloys, High Temp and Titanium Alloys, High Speed Machining Wet, Dry, or Semi Dry Condition | Hardened Workpieces, Steel, Cast Iron, Stainless, Nickel Based Alloys, High Temp and Titanium Alloys, Machining Wet, Dry, or Semi Dry Condition |

**YG:TYLON SUPER TiAlN COATED TOOLS CAN BE RUN 20% - 50% FASTER THAN TiN or TiCN ON MOST MATERIALS**

# HSS

YG

Being the best through innovation



# TANK-POWER

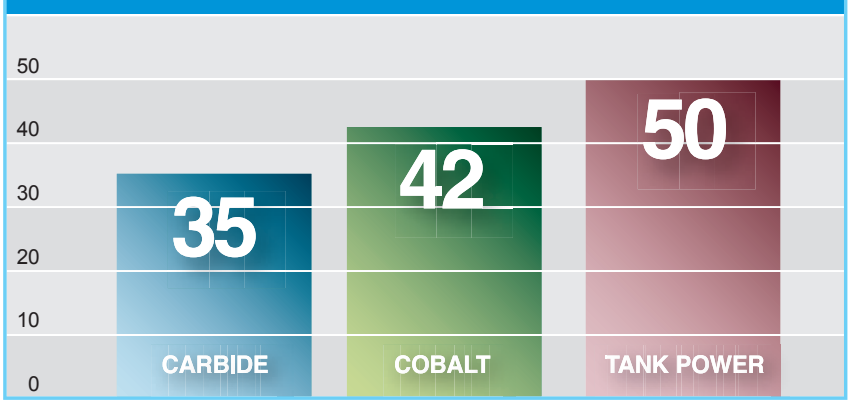
- **Next Generation of Powered Metal End Mills**
  **Higher Edge Strength & Feed Rates**

# SELECTION GUIDE

| ITEM | MODEL | DESCRIPTION | SIZE MIN | SIZE MAX | PAGE |
|---|---|---|---|---|---|
| **INCH** | | | | | |
| **E9983** | | PREMIUM HSS-PM, 2 FLUTE REGULAR LENGTH ◆ | D1/8 | D1 | **688** |
| **E9984** | | PREMIUM HSS-PM, 2 FLUTE REGULAR LENGTH DOUBLE ◆ | D1/8 | D1 | **689** |
| **E9985** | | PREMIUM HSS-PM, 4 FLUTE REGULAR LENGTH ◆ | D1/8 | D1 | **690** |
| **E9986** | | PREMIUM HSS-PM, 4 FLUTE REGULAR LENGTH DOUBLE ◆ | D1/8 | D1 | **691** |
| **E9988** | | PREMIUM HSS-PM, 3&4 FLUTE 60° HELIX REGULAR LENGTH ◆ | D1/4 | D1 | **692** |
| **E9992** | | PREMIUM HSS-PM, 2 FLUTE REGULAR LENGTH BALL NOSE ◆ | D1/8 | D1 | **693** |
| **E9990** | | PREMIUM HSS-PM, MULTI FLUTE REGULAR LENGTH FINE PITCH ROUGHING ◆ | D1/4 | D1-1/4 | **694** |
| **E9991** | | PREMIUM HSS-PM, MULTI FLUTE REGULAR LENGTH COARSE PITCH ROUGHING ◆ | D1/4 | D1-1/4 | **695** |
| **E9A86** | | PREMIUM HSS-PM, MULTI FLUTE LONG LENGTH FINE PITCH ROUGHING ◆ | D5/16 | D1-1/4 | **696** |
| **E9A87** | | PREMIUM HSS-PM, MULTI FLUTE LONG LENGTH COARSE PITCH ROUGHING ◆ | D5/16 | D1-1/4 | **697** |
| **E9921** | | PREMIUM HSS-PM, MULTI FLUTE FINE PITCH ROUGHING EXTENDED NECK CENTER CUTTING ◆ | D1/2 | D1-1/4 | **698** |
| | | RECOMMENDED CUTTING CONDITIONS | | | **699** |

◆ U.S.A Stock

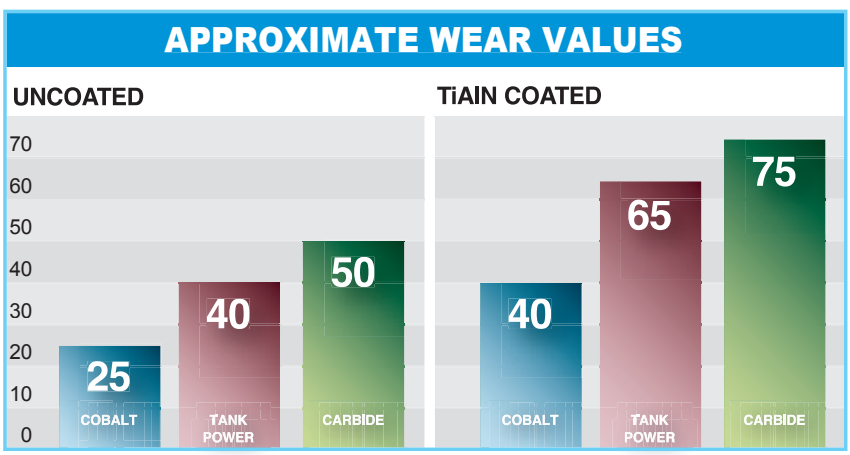
## TOUGHNESS VALUE AND EDGE STRENGTH



◎ : Excellent
○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | | | | ○ | | ◎ | | ◎ | | |
| ◎ | ◎ | ◎ | | | | ○ | | ◎ | | ◎ | | |
| ◎ | ◎ | ◎ | | | | ○ | | ◎ | | ◎ | | |
| ◎ | ◎ | ◎ | | | | ○ | | ◎ | | ◎ | | |
| ◎ | ◎ | ◎ | | | | ○ | | ◎ | | ◎ | | |
| ◎ | ◎ | ◎ | | | | ○ | | ◎ | | ◎ | | |
| ◎ | ◎ | ◎ | | | | ○ | | ◎ | | ◎ | | |
| ◎ | ◎ | ◎ | | | | ○ | | ◎ | | ◎ | | |
| ◎ | ◎ | ◎ | | | | ○ | | ◎ | | ◎ | | |
| ◎ | ◎ | ◎ | | | | ○ | | ◎ | | ◎ | | |

## APPROXIMATE WEAR VALUES



# TANK-POWER END MILLS

**E9983 SERIES** FLAT SHANK

## PREMIUM HSS-PM, 2 FLUTE REGULAR LENGTH

▶ Faster feed & speed than normal HSS can be applied to hardened steels up to Rc 45. Accordingly, YPM made by powder metallurgy makes much higher productivity possible.

YPM | 2 | 30° | FLAT

P.699

◆ U.S.A Stock

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| UNCOATED | TANK-POWER COATED | | | | |
| E9983008 | E9983008TF | 1/8 | 3/8 | 3/8 | 2-5/16 |
| E9983012 | E9983012TF | 3/16 | 3/8 | 7/16 | 2-5/16 |
| E9983016 | E9983016TF | 1/4 | 3/8 | 1/2 | 2-5/16 |
| E9983020 | E9983020TF | 5/16 | 3/8 | 9/16 | 2-5/16 |
| E9983024 | E9983024TF | 3/8 | 3/8 | 9/16 | 2-5/16 |
| E9983032 | E9983032TF | 1/2 | 1/2 | 1 | 3 |
| E9983040 | E9983040TF | 5/8 | 5/8 | 1-5/16 | 3-7/16 |
| E9983048 | E9983048TF | 3/4 | 3/4 | 1-5/16 | 3-7/16 |
| E9983056 | E9983056TF | 7/8 | 7/8 | 1-1/2 | 3-3/4 |
| E9983064 | E9983064TF | 1 | 1 | 1-5/8 | 4-1/8 |

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~+.0010 | ＊＊0~+.0015 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | | | | ○ | | ◎ | | ◎ | | |

# TANK-POWER END MILLS

**E9984 SERIES** FLAT SHANK

## PREMIUM HSS-PM, 2 FLUTE REGULAR LENGTH DOUBLE

▶ Series E9984, E9984 two flute, end mills are the double end version of E9983, E9983 single-end tools.
Faster feed & speed than normal HSS can be applied to hardened steels up to Rc 45. Accordingly, YPM made by powder metallurgy makes much higher productivity possible.

YPM | 2 | 30° | FLAT

P.699

◆ U.S.A Stock

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| UNCOATED | TANK-POWER COATED | | | | |
| E9984008 | E9984008TF | 1/8 | 3/8 | 3/8 | 3-1/16 |
| E9984012 | E9984012TF | 3/16 | 3/8 | 7/16 | 3-1/8 |
| E9984016 | E9984016TF | 1/4 | 3/8 | 1/2 | 3-1/8 |
| E9984020 | E9984020TF | 5/16 | 3/8 | 9/16 | 3-1/8 |
| E9984024 | E9984024TF | 3/8 | 3/8 | 9/16 | 3-1/8 |
| E9984032 | E9984032TF | 1/2 | 1/2 | 13/16 | 3-3/4 |
| E9984040 | E9984040TF | 5/8 | 5/8 | 1-1/8 | 4-1/2 |
| E9984048 | E9984048TF | 3/4 | 3/4 | 1-5/16 | 5 |
| E9984056 | E9984056TF | 7/8 | 7/8 | 1-9/16 | 5-1/2 |
| E9984064 | E9984064TF | 1 | 1 | 1-5/8 | 5-7/8 |

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~−.0010 | ＊＊0~−.0020 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | | | | ○ | | ◎ | | ◎ | | |

# TANK-POWER END MILLS

**E9985 SERIES** FLAT SHANK

## PREMIUM HSS-PM, 4 FLUTE REGULAR LENGTH

▶ Faster feed & speed than normal HSS can be applied to hardened steels up to Rc 45. Accordingly, YPM made by powder metallurgy makes much higher productivity possible.

YPM | 4 | 30° | FLAT

P.699

◆ U.S.A Stock

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| UNCOATED | TANK-POWER COATED | | | | |
| E9985008 | E9985008TF | 1/8 | 3/8 | 3/8 | 2-5/16 |
| E9985012 | E9985012TF | 3/16 | 3/8 | 1/2 | 2-3/8 |
| E9985016 | E9985016TF | 1/4 | 3/8 | 5/8 | 2-7/16 |
| E9985020 | E9985020TF | 5/16 | 3/8 | 3/4 | 2-1/2 |
| E9985024 | E9985024TF | 3/8 | 3/8 | 3/4 | 2-1/2 |
| E9985032 | E9985032TF | 1/2 | 1/2 | 1-1/4 | 3-1/4 |
| E9985040 | E9985040TF | 5/8 | 5/8 | 1-5/8 | 3-3/4 |
| E9985048 | E9985048TF | 3/4 | 3/4 | 1-5/8 | 3-7/8 |
| E9985056 | E9985056TF | 7/8 | 7/8 | 1-7/8 | 4-1/8 |
| E9985064 | E9985064TF | 1 | 1 | 2 | 4-1/2 |

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~+.0010 | ＊＊0~+.0015 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | | | | ○ | | ◎ | | ◎ | | |

# TANK-POWER END MILLS

**E9986 SERIES** FLAT SHANK

## PREMIUM HSS-PM, 4 FLUTE REGULAR LENGTH DOUBLE

▶ Series E9986,EP986 four flute end mills are the double end version of E9985,EP985 single-end tools.
Faster feed & speed than normal HSS can be applied to hardened steels up to Rc 45. Accordingly, YPM made by powder metallurgy makes much higher productivity possible.

YPM | 4 | 30° | FLAT

P.699

◆ U.S.A Stock

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| UNCOATED | TANK-POWER COATED | | | | |
| E9986008 | E9986008TF | 1/8 | 3/8 | 3/8 | 3-1/16 |
| E9986012 | E9986012TF | 3/16 | 3/8 | 1/2 | 3-1/4 |
| E9986016 | E9986016TF | 1/4 | 3/8 | 5/8 | 3-3/8 |
| E9986020 | E9986020TF | 5/16 | 3/8 | 3/4 | 3-1/2 |
| E9986024 | E9986024TF | 3/8 | 3/8 | 3/4 | 3-1/2 |
| E9986032 | E9986032TF | 1/2 | 1/2 | 1 | 4-1/8 |
| E9986040 | E9986040TF | 5/8 | 5/8 | 1-3/8 | 5 |
| E9986048 | E9986048TF | 3/4 | 3/4 | 1-5/8 | 5-5/8 |
| E9986056 | E9986056TF | 7/8 | 7/8 | 1-7/8 | 6-1/8 |
| E9986064 | E9986064TF | 1 | 1 | 1-7/8 | 6-3/8 |

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~−.0010 | ＊＊0~−.0015 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

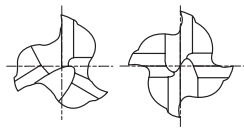
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | | | | ○ | | ◎ | | ◎ | | |

# TANK-POWER END MILLS

**E9988 SERIES** FLAT SHANK

## PREMIUM HSS-PM, 3&4 FLUTE 60° HELIX REGULAR LENGTH

▶ Faster feed & speed than normal HSS can be applied to hardened steels up to Rc 45. Accordingly, YPM made by powder metallurgy makes much higher productivity possible.



YPM | 3&4 | 60° | FLAT

P.700

◆ U.S.A Stock

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length | No. of Flute |
|---|---|---|---|---|---|---|
| UNCOATED | TANK-POWER COATED | | | | | |
| E9988016 | E9988016TF | 1/4 | 3/8 | 5/8 | 2-7/16 | 3 |
| E9988020 | E9988020TF | 5/16 | 3/8 | 3/4 | 2-1/2 | 3 |
| E9988024 | E9988024TF | 3/8 | 3/8 | 3/4 | 2-1/2 | 3 |
| E9988028 | E9988028TF | 7/16 | 3/8 | 1 | 2-11/16 | 3 |
| E9988032 | E9988032TF | 1/2 | 1/2 | 1-1/4 | 3-1/4 | 3 |
| E9988040 | E9988040TF | 5/8 | 5/8 | 1-5/8 | 3-3/4 | 3 |
| E9988048 | E9988048TF | 3/4 | 3/4 | 1-5/8 | 3-7/8 | 3 |
| E9988901 | E9988901TF | 7/8 | 3/4 | 1-7/8 | 4-1/8 | 4 |
| E9988056 | E9988056TF | 7/8 | 7/8 | 1-7/8 | 4-1/8 | 4 |
| E9988064 | E9988064TF | 1 | 1 | 2 | 4-1/2 | 4 |

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~+.0010 | ＊＊0~+.0015 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | | | | ○ | | ◎ | | ◎ | | |

# TANK-POWER END MILLS

**E9992 SERIES** FLAT SHANK

## PREMIUM HSS-PM, 2 FLUTE REGULAR LENGTH BALL NOSE

▶ The two flute ball end mills are designed for milling of radius bottom slots, fillets and special contours. The end teeth are cut to center allowing these end mills to drill into material at the beginning of a slotting cut. The two flute design provides good chip removal ability in slotting.

YPM | 2 | 30° | R ±.001 | FLAT

P.701

◆ U.S.A Stock

Unit : Inch

| EDP No. | | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| UNCOATED | TANK-POWER COATED | R (±.001) | | | | |
| **E9992008** | **E9992008TF** | R1/16 | **1/8** | 3/8 | 3/8 | 2-5/16 |
| **E9992012** | **E9992012TF** | R3/32 | **3/16** | 3/8 | 1/2 | 2-3/8 |
| **E9992016** | **E9992016TF** | R1/8 | **1/4** | 3/8 | 5/8 | 2-7/16 |
| **E9992020** | **E9992020TF** | R5/32 | **5/16** | 3/8 | 3/4 | 2-1/2 |
| **E9992024** | **E9992024TF** | R3/16 | **3/8** | 3/8 | 3/4 | 2-1/2 |
| **E9992032** | **E9992032TF** | R1/4 | **1/2** | 1/2 | 1 | 3 |
| **E9992040** | **E9992040TF** | R5/16 | **5/8** | 5/8 | 1-3/8 | 3-1/2 |
| **E9992048** | **E9992048TF** | R3/8 | **3/4** | 3/4 | 1-5/8 | 3-7/8 |
| **E9992056** | **E9992056TF** | R7/16 | **7/8** | 7/8 | 2 | 4-1/4 |
| **E9992064** | **E9992064TF** | R1/2 | **1** | 1 | 2-1/4 | 4-3/4 |

| Mill Dia. Tolerance (inch) |
|---|
| 0~−.0015 |

◎ : Excellent ○ : Good

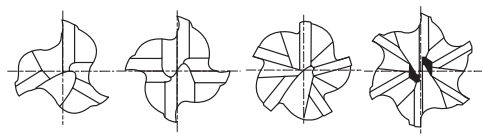
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | | | | ○ | | ◎ | | ◎ | | |

# TANK-POWER END MILLS

**E9990 SERIES** FLAT SHANK

## PREMIUM HSS-PM, MULTI FLUTE REGULAR LENGTH FINE PITCH ROUGHING

▶ This TANK-POWER rougher is designed for high production metal removal in a wide range of work piece material. It is suitable for a very broad spectrum of materials having up to high tensile strengths. In many cases, the milled surfaces are of acceptable quality.



YPM | FINE | 3-6 | 30° | FLAT

P.700

◆ U.S.A Stock

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length | No. of Flute |
|---|---|---|---|---|---|---|
| UNCOATED | TANK-POWER COATED | | | | | |
| E9990016 | E9990016TF | 1/4 | 3/8 | 5/8 | 2-7/16 | 3 |
| E9990907 | E9990907TF | 1/4 | 3/8 | 1-1/8 | 2-15/16 | 3 |
| E9990020 | E9990020TF | 5/16 | 3/8 | 3/4 | 2-1/2 | 3 |
| E9990024 | E9990024TF | 3/8 | 3/8 | 3/4 | 2-1/2 | 4 |
| E9990028 | E9990028TF | 7/16 | 3/8 | 1 | 2-11/16 | 4 |
| E9990032 | E9990032TF | 1/2 | 1/2 | 1-1/4 | 3-1/4 | 4 |
| E9990908 | E9990908TF | 1/2 | 1/2 | 1-5/8 | 3-5/8 | 4 |
| E9990036 | E9990036TF | 9/16 | 1/2 | 1-3/8 | 3-3/8 | 4 |
| E9990040 | E9990040TF | 5/8 | 5/8 | 1-5/8 | 3-3/4 | 4 |
| E9990048 | E9990048TF | 3/4 | 3/4 | 1-5/8 | 3-7/8 | 4 |
| E9990948 | E9990948TF | 3/4 | 5/8 | 1-5/8 | 3-7/8 | 4 |
| E9990909 | E9990909TF | 3/4 | 3/4 | 2-1/2 | 4-3/4 | 4 |
| E9990056 | E9990056TF | 7/8 | 7/8 | 1-7/8 | 4-1/8 | 5 |
| E9990901 | E9990901TF | 7/8 | 3/4 | 1-7/8 | 4-1/8 | 5 |
| E9990064 | E9990064TF | 1 | 1 | 2 | 4-1/2 | 5 |
| E9990905 | E9990905TF | 1 | 1 | 3 | 5-1/2 | 5 |
| E9990108 | E9990108TF | 1-1/8 | 1 | 2 | 4-1/2 | 6 |
| E9990116 | E9990116TF | 1-1/4 | 1-1/4 | 2 | 4-1/2 | 6 |
| E9990906 | E9990906TF | 1-1/4 | 1-1/4 | 3 | 5-1/2 | 6 |

| Mill Dia. Tolerance (inch) | |
|---|---|
| up to 1 | 0~+.0030 |
| over 1 | 0~+.0060 |

◎ : Excellent ○ : Good

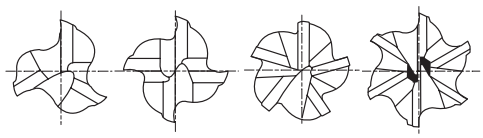
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | | | | ○ | | ◎ | | ◎ | | |

# TANK-POWER END MILLS

**E9991 SERIES** FLAT SHANK

## PREMIUM HSS-PM, MULTI FLUTE REGULAR LENGTH COARSE PITCH ROUGHING

▶ This TANK-POWER rougher is designed for high production metal removal in a wide range of work piece material. It is suitable for a very broad spectrum of materials having up to high tensile strengths.



YPM | COARSE | 3-6 | 30° | FLAT

P.700

◆ U.S.A Stock

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length | No. of Flute |
|---|---|---|---|---|---|---|
| UNCOATED | TANK-POWER COATED | | | | | |
| E9991016 | E9991016TF | 1/4 | 3/8 | 5/8 | 2-7/16 | 3 |
| E9991902 | E9991902TF | 1/4 | 3/8 | 1-1/8 | 2-15/16 | 3 |
| E9991020 | E9991020TF | 5/16 | 3/8 | 3/4 | 2-1/2 | 3 |
| E9991024 | E9991024TF | 3/8 | 3/8 | 3/4 | 2-1/2 | 4 |
| E9991028 | E9991028TF | 7/16 | 3/8 | 1 | 2-11/16 | 4 |
| E9991032 | E9991032TF | 1/2 | 1/2 | 1-1/4 | 3-1/4 | 4 |
| E9991903 | E9991903TF | 1/2 | 1/2 | 1-5/8 | 3-5/8 | 4 |
| E9991036 | E9991036TF | 9/16 | 1/2 | 1-3/8 | 3-3/8 | 4 |
| E9991040 | E9991040TF | 5/8 | 5/8 | 1-5/8 | 3-3/4 | 4 |
| E9991048 | E9991048TF | 3/4 | 3/4 | 1-5/8 | 3-7/8 | 4 |
| E9991948 | E9991948TF | 3/4 | 5/8 | 1-5/8 | 3-7/8 | 4 |
| E9991904 | E9991904TF | 3/4 | 3/4 | 2-1/2 | 4-3/4 | 4 |
| E9991056 | E9991056TF | 7/8 | 7/8 | 1-7/8 | 4-1/8 | 5 |
| E9991901 | E9991901TF | 7/8 | 3/4 | 1-7/8 | 4-1/8 | 5 |
| E9991064 | E9991064TF | 1 | 1 | 2 | 4-1/2 | 5 |
| E9991905 | E9991905TF | 1 | 1 | 3 | 5-1/2 | 5 |
| E9991108 | E9991108TF | 1-1/8 | 1 | 2 | 4-1/2 | 6 |
| E9991116 | E9991116TF | 1-1/4 | 1-1/4 | 2 | 4-1/2 | 6 |
| E9991906 | E9991906TF | 1-1/4 | 1-1/4 | 3 | 5-1/2 | 6 |

| Mill Dia. Tolerance (inch) | |
|---|---|
| up to 1 | 0~+.0030 |
| over 1 | 0~+.0060 |

◎ : Excellent ○ : Good

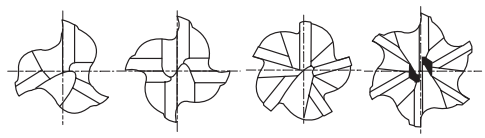
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | | | | ○ | | ◎ | | ◎ | | |

# TANK-POWER END MILLS

**E9A86 SERIES** FLAT SHANK

## PREMIUM HSS-PM, MULTI FLUTE LONG LENGTH FINE PITCH ROUGHING

▶ This TANK-POWER rougher is designed for high production metal removal in a wide range of work piece material. It is suitable for a very broad spectrum of materials having up to high tensile strengths.



YPM | FINE | 3-6 | 30° | FLAT

P.700

◆ U.S.A Stock

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length | No. of Flute |
|---|---|---|---|---|---|---|
| UNCOATED | TANK-POWER COATED | | | | | |
| E9A86020 | E9A86020TF | 5/16 | 3/8 | 1-3/8 | 3-3/16 | 3 |
| E9A86024 | E9A86024TF | 3/8 | 3/8 | 1-1/2 | 3-1/4 | 4 |
| E9A86924 | E9A86924TF | 3/8 | 3/8 | 1-1/2 | 4 | 4 |
| E9A86032 | E9A86032TF | 1/2 | 1/2 | 2 | 4 | 4 |
| E9A86040 | E9A86040TF | 5/8 | 5/8 | 2-1/2 | 4-5/8 | 4 |
| E9A86048 | E9A86048TF | 3/4 | 5/8 | 3 | 5-1/8 | 4 |
| E9990902 | E9990902TF | 3/4 | 3/4 | 3 | 5-1/4 | 4 |
| E9A86056 | E9A86056TF | 7/8 | 3/4 | 3-1/2 | 5-3/4 | 5 |
| E9A86956 | E9A86956TF | 7/8 | 7/8 | 3-1/2 | 5-3/4 | 5 |
| E9990903 | E9990903TF | 1 | 1 | 4 | 6-1/2 | 5 |
| E9A86116 | E9A86116TF | 1-1/4 | 3/4 | 4 | 6-1/4 | 6 |
| E9990904 | E9990904TF | 1-1/4 | 1-1/4 | 4 | 6-1/2 | 6 |

| Mill Dia. Tolerance (inch) | |
|---|---|
| up to 1 | 0~+.0030 |
| over 1 | 0~+.0060 |

◎ : Excellent ○ : Good

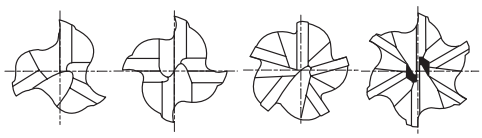
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | | | | ○ | | ◎ | | ◎ | | |

# TANK-POWER END MILLS

**E9A87 SERIES** FLAT SHANK

## PREMIUM HSS-PM, MULTI FLUTE LONG LENGTH COARSE PITCH ROUGHING

▶ This TANK-POWER rougher is designed for high production metal removal in a wide range of work piece material. It is suitable for a very broad spectrum of materials having up to high tensile strengths.



YPM | COARSE | 3-6 | 30° | FLAT

P.700

◆ U.S.A Stock

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length | No. of Flute |
|---|---|---|---|---|---|---|
| UNCOATED | TANK-POWER COATED | | | | | |
| E9A87020 | E9A87020TF | 5/16 | 3/8 | 1-3/8 | 3-3/16 | 3 |
| E9A87024 | E9A87024TF | 3/8 | 3/8 | 1-1/2 | 3-1/4 | 4 |
| E9A87924 | E9A87924TF | 3/8 | 3/8 | 1-1/2 | 4 | 4 |
| E9A87032 | E9A87032TF | 1/2 | 1/2 | 2 | 4 | 4 |
| E9A87040 | E9A87040TF | 5/8 | 5/8 | 2-1/2 | 4-5/8 | 4 |
| E9A87048 | E9A87048TF | 3/4 | 5/8 | 3 | 5-1/8 | 4 |
| E9A87948 | E9A87948TF | 3/4 | 3/4 | 3 | 5-1/4 | 4 |
| E9A87056 | E9A87056TF | 7/8 | 3/4 | 3-1/2 | 5-3/4 | 5 |
| E9A87956 | E9A87956TF | 7/8 | 7/8 | 3-1/2 | 5-3/4 | 5 |
| E9A87064 | E9A87064TF | 1 | 1 | 4 | 6-1/2 | 5 |
| E9A87116 | E9A87116TF | 1-1/4 | 3/4 | 4 | 6-1/4 | 6 |
| E9A87917 | E9A87917TF | 1-1/4 | 1-1/4 | 4 | 6-1/2 | 6 |

| Mill Dia. Tolerance (inch) | |
|---|---|
| up to 1 | 0~+.0030 |
| over 1 | 0~+.0060 |

◎ : Excellent ○ : Good

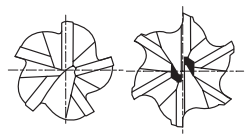
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | | | | ○ | | ◎ | | ◎ | | |

# TANK-POWER END MILLS

**E9921 SERIES** FLAT SHANK

## PREMIUM HSS-PM, MULTI FLUTE FINE PITCH ROUGHING EXTENDED NECK CENTER CUTTING

- ▶ High performance metal removal in Titanium
- ▶ Corner radius against chipping



YPM | FINE | 5&6 | 35° | FLAT

P.624

◆ U.S.A Stock

Unit : Inch

| EDP No. UNCOATED | EDP No. TiAlN COATED | Mill Diameter | Shank Diameter | Length of Cut | Reach Extended Neck | Overall Length | No. of Flute |
|---|---|---|---|---|---|---|---|
| EP20322 | EP20322F | 1/2 | 1/2 | 1-1/4 | 3 | 5 | 5 |
| EP20402 | EP20402F | 5/8 | 5/8 | 1-5/8 | 4 | 6-1/8 | 5 |
| EP20482 | EP20482F | 3/4 | 3/4 | 1-5/8 | 4 | 6-1/4 | 5 |
| EP20484 | EP20484F | 3/4 | 3/4 | 1-5/8 | 6 | 8-1/4 | 5 |
| EP20642 | EP20642F | 1 | 1 | 2 | 4 | 6-1/2 | 6 |
| EP20643 | EP20643F | 1 | 1 | 2 | 6 | 8-1/2 | 6 |
| EP21161 | EP21161F | 1-1/4 | 1 1/4 | 2 | 4 | 6-1/2 | 6 |
| EP21162 | EP21162F | 1-1/4 | 1 1/4 | 2 | 6 | 8-1/2 | 6 |

| Mill Dia. Tolerance (inch) | |
|---|---|
| up to 1 | 0~+.0030 |
| over 1 | 0~+.0060 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ◎ | | | | ○ | | ◎ | | ◎ | | |

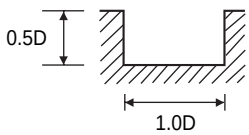
# TANK-POWER END MILLS

## RECOMMENDED CUTTING CONDITIONS

## PREMIUM HSS-PM, 2 FLUTE FINISH - SLOTTING

### E9983, E9984 SERIES

| MATERIAL | STRUCTURAL STEELS, CARBON STEELS | | STRUCTURAL STEELS, CARBON STEELS, CAST IRONS | | CARBON STEELS, ALLOY STEELS, TOOL STEELS | | PREHARDENED STEELS, ALLOY STEELS, TOOL STEELS | | ALLOY STEELS, TOOL STEELS AUSTENITIC STAINLESS STEELS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~HRc20 | | HRc20~HRc30 | | HRc30~HRc35 | | HRc35~HRc40 | |
| STRENGTH | ~ 500N/mm² | | 500~800N/mm² | | 800~1000N/mm² | | 1000~1100N/mm² | | 1100~1300N/mm² | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/8 | 4600 | 5.93 | 3800 | 4.97 | 3150 | 4.21 | 2150 | 2.82 | 1650 | 2.23 |
| 3/16 | 3800 | 8.47 | 3150 | 6.70 | 2600 | 6.11 | 1650 | 3.45 | 1350 | 2.56 |
| 1/4 | 3150 | 9.12 | 2650 | 7.46 | 2100 | 6.56 | 1350 | 3.77 | 1050 | 2.95 |
| 5/16 | 2500 | 9.44 | 2100 | 8.24 | 1700 | 6.88 | 1100 | 3.93 | 855 | 2.95 |
| 3/8 | 2100 | 10.05 | 1800 | 8.87 | 1450 | 7.64 | 910 | 4.24 | 715 | 3.40 |
| 1/2 | 1650 | 9.31 | 1350 | 8.13 | 1050 | 6.95 | 665 | 3.87 | 525 | 2.88 |
| 5/8 | 1300 | 9.06 | 1100 | 7.32 | 855 | 6.14 | 535 | 3.56 | 425 | 2.76 |
| 3/4 | 995 | 7.85 | 820 | 6.18 | 710 | 5.31 | 450 | 3.24 | 360 | 2.46 |
| 7/8 | 795 | 6.23 | 675 | 5.09 | 560 | 4.30 | 375 | 2.74 | 300 | 1.95 |
| 1 | 710 | 5.24 | 590 | 4.65 | 465 | 3.90 | 335 | 2.52 | 235 | 1.73 |



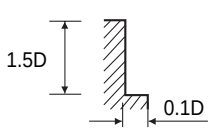

※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min. FEED = inch/min.

## PREMIUM HSS-PM, 4 FLUTE FINISH - SIDE CUTTING

### E9985, E9986 SERIES

| MATERIAL | STRUCTURAL STEELS, CARBON STEELS | | STRUCTURAL STEELS, CARBON STEELS, CAST IRONS | | CARBON STEELS, ALLOY STEELS, TOOL STEELS | | PREHARDENED STEELS, ALLOY STEELS, TOOL STEELS | | ALLOY STEELS, TOOL STEELS AUSTENITIC STAINLESS STEELS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~HRc20 | | HRc20~HRc30 | | HRc30~HRc35 | | HRc35~HRc40 | |
| STRENGTH | ~ 500N/mm² | | 500~800N/mm² | | 800~1000N/mm² | | 1000~1100N/mm² | | 1100~1300N/mm² | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/8 | 6300 | 17.72 | 6000 | 14.37 | 4250 | 10.43 | 2700 | 7.24 | 2320 | 5.12 |
| 3/16 | 4600 | 19.69 | 4100 | 16.14 | 3040 | 12.60 | 2070 | 8.46 | 1780 | 6.20 |
| 1/4 | 3800 | 22.05 | 3300 | 18.11 | 2500 | 12.99 | 1700 | 9.65 | 1400 | 7.13 |
| 5/16 | 3100 | 22.44 | 2600 | 18.90 | 2000 | 14.17 | 1400 | 9.37 | 1150 | 7.24 |
| 3/8 | 2500 | 24.80 | 2200 | 20.47 | 1680 | 14.96 | 1180 | 10.24 | 960 | 7.72 |
| 1/2 | 1900 | 22.05 | 1720 | 18.50 | 1270 | 14.37 | 860 | 9.33 | 690 | 2.72 |
| 5/8 | 1600 | 20.08 | 1410 | 16.93 | 1000 | 13.27 | 690 | 8.86 | 620 | 6.69 |
| 3/4 | 1400 | 17.72 | 1150 | 15.16 | 830 | 11.50 | 580 | 7.28 | 470 | 5.71 |
| 7/8 | 1030 | 15.75 | 930 | 12.40 | 675 | 9.84 | 470 | 6.26 | 390 | 5.12 |
| 1 | 1000 | 14.57 | 830 | 11.81 | 620 | 8.78 | 420 | 5.63 | 360 | 4.92 |




※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min. FEED = inch/min.

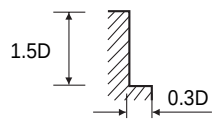
# TANK-POWER END MILLS

## RECOMMENDED CUTTING CONDITIONS

## PREMIUM HSS-PM, 3&4 FLUTE 60° HELIX - SIDE CUTTING

### E9988 SERIES

| MATERIAL | STRUCTURAL STEELS, CARBON STEELS, CAST IRONS | | CARBON STEELS, ALLOY STEELS, TOOL STEELS | | ALLOY STEELS, TOOL STEELS AUSTENITIC STAINLESS STEELS | |
|---|---|---|---|---|---|---|
| HARDNESS | ~HRc20 | | HRc20 ~ HRc30 | | HRc30 ~ HRc40 | |
| STRENGTH | 500 ~ 800N/mm² | | 800 ~ 1000N/mm² | | 1000 ~ 1300N/mm² | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/4 | 3850 | 7.87 | 2500 | 5.32 | 1900 | 3.54 |
| 5/16 | 3050 | 7.87 | 2100 | 6.26 | 1700 | 3.54 |
| 3/8 | 2700 | 8.47 | 1700 | 6.30 | 1450 | 3.84 |
| 1/2 | 1850 | 9.72 | 1200 | 6.30 | 960 | 4.07 |
| 5/8 | 1300 | 10.97 | 845 | 8.51 | 690 | 5.44 |
| 3/4 | 895 | 14.59 | 580 | 11.85 | 475 | 7.87 |
| 7/8 | 720 | 16.63 | 475 | 14.00 | 380 | 8.75 |
| 1 | 630 | 19.00 | 415 | 16.00 | 335 | 10.00 |



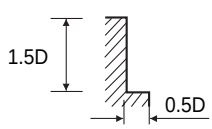

※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

## PREMIUM HSS-PM, MULTI FLUTE ROUGHING - SIDE CUTTING

### E9990, E9991, E9A86, E9A87 SERIES

| MATERIAL | STRUCTURAL STEELS, CARBON STEELS | | STRUCTURAL STEELS, CARBON STEELS, CAST IRONS | | CARBON STEELS, ALLOY STEELS, TOOL STEELS | | PREHARDENED STEELS, ALLOY STEELS, TOOL STEELS | | STAINLESS STEELS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | ~HRc20 | | HRc20 ~ HRc30 | | HRc30 ~ HRc35 | | HRc35 ~ HRc40 | | | |
| STRENGTH | ~800N/mm² | | 800 ~ 1000N/mm² | | 1000 ~ 1100N/mm² | | 1100 ~ 1300N/mm² | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/4 | 2650 | 7.81 | 2050 | 6.25 | 1450 | 4.38 | 1200 | 3.44 | 1900 | 5.60 |
| 3/8 | 1900 | 13.14 | 1500 | 10.13 | 1050 | 6.41 | 885 | 5.23 | 1270 | 8.75 |
| 1/2 | 1450 | 14.17 | 1100 | 11.42 | 805 | 7.87 | 665 | 6.10 | 950 | 9.28 |
| 5/8 | 1150 | 14.17 | 905 | 11.42 | 630 | 7.87 | 525 | 6.10 | 760 | 9.66 |
| 3/4 | 960 | 14.38 | 780 | 11.42 | 540 | 7.87 | 445 | 6.10 | 630 | 9.48 |
| 7/8 | 845 | 14.54 | 615 | 11.37 | 445 | 7.84 | 375 | 6.10 | 540 | 9.34 |
| 1 | 740 | 13.98 | 560 | 10.64 | 395 | 7.39 | 315 | 6.01 | 470 | 8.97 |



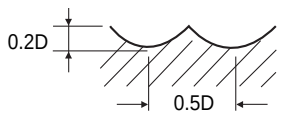

※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

# PREMIUM HSS-PM, 2 FLUTE BALL NOSE PROFILING

## E9992 SERIES

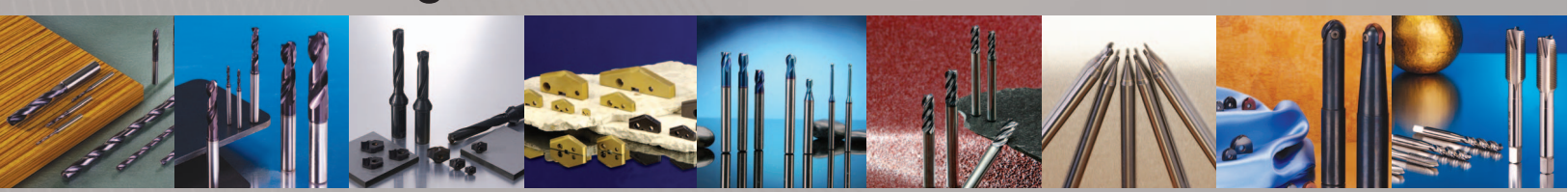
| MATERIAL | STRUCTURAL STEELS, CARBON STEELS | | STRUCTURAL STEELS, CARBON STEELS, CAST IRONS | | CARBON STEELS, ALLOY STEELS, TOOL STEELS | | PREHARDENED STEELS, ALLOY STEELS, TOOL STEELS | |
|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~HRc20 | | HRc20 ~ HRc30 | | HRc30 ~ HRc40 | |
| STRENGTH | ~500N/mm² | | 500 ~ 800N/mm² | | 800 ~ 1000N/mm² | | 1000 ~ 1300N/mm² | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/8 | 6800 | 12.29 | 5300 | 8.22 | 3550 | 4.54 | 1850 | 2.07 |
| 3/16 | 5100 | 15.32 | 4000 | 10.29 | 2650 | 5.74 | 1350 | 2.71 |
| 1/4 | 4050 | 16.81 | 3150 | 11.23 | 2100 | 6.24 | 1100 | 2.95 |
| 5/16 | 3250 | 18.06 | 2550 | 12.17 | 1700 | 6.87 | 860 | 2.95 |
| 3/8 | 2750 | 19.91 | 2100 | 13.41 | 1450 | 7.64 | 700 | 3.40 |
| 1/2 | 2100 | 17.83 | 1600 | 12.00 | 1100 | 6.75 | 530 | 2.92 |
| 5/8 | 1600 | 16.58 | 1250 | 11.06 | 860 | 6.13 | 425 | 2.76 |
| 3/4 | 1350 | 14.73 | 1050 | 9.82 | 700 | 5.35 | 360 | 2.46 |
| 7/8 | 1100 | 12.60 | 865 | 8.40 | 560 | 4.59 | 300 | 2.10 |
| 1 | 890 | 10.51 | 690 | 6.99 | 445 | 3.89 | 235 | 1.73 |




※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

Global Cutting Tool Leader **YG-1**



# HSS

YG

Being the best through innovation

# COBALT & HSS

- General Purpose, Non-coated, Many Coatings Available

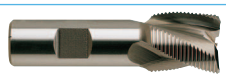
# SELECTION GUIDE

| ITEM | MODEL | DESCRIPTION | SIZE | | PAGE |
|---|---|---|---|---|---|
| | | | MIN | MAX | |
| **INCH** | | | | | |
| **E2030 E1030** | | HSSCo8 & HSS, 2 FLUTE REGULAR LENGTH | D1/8 | D2 | **711** |
| **E2080 E1080** | | HSSCo8 & HSS, 2 FLUTE LONG LENGTH | D1/4 | D2 | **713** |
| **E2033 E1033** | | HSSCo8 & HSS, 2 FLUTE EXTENDED LENGTH | D1/8 | D1-1/4 | **714** |
| **E2050 E1050** | | HSSCo8 & HSS, 2 FLUTE REGULAR LENGTH DOUBLE | D1/8 | D1 | **715** |
| **E2110 E1110** | | HSSCo8 & HSS, 2 FLUTE REGULAR LENGTH BALL NOSE | R1/16 | R1 | **717** |
| **E2111 E1111** | | HSSCo8 & HSS, 2 FLUTE EXTENDED LENGTH BALL NOSE | R1/16 | R1/2 | **718** |
| **E2112 E1112** | | HSSCo8 & HSS, 2 FLUTE REGULAR LENGTH BALL NOSE DOUBLE | R1/16 | R1/2 | **719** |
| **E2031 E1031** | | HSSCo8 & HSS, 4 FLUTE REGULAR LENGTH | D1/8 | D1 | **720** |
| **E2032 E1032** | | HSSCo8 & HSS, 6 FLUTE REGULAR LENGTH | D5/8 | D2 | **722** |
| **E2034 E1034** | | HSSCo8 & HSS, 4 FLUTE LONG LENGTH | D1/4 | D1 | **723** |
| **E2035 E1035** | | HSSCo8 & HSS, 6 FLUTE LONG LENGTH | D1-1/8 | D2 | **723** |
| **E2036 E1036** | | HSSCo8 & HSS, 4 FLUTE EXTRA LONG LENGTH | D1/4 | D1 | **724** |
| **E2037 E1037** | | HSSCo8 & HSS, 6 FLUTE EXTRA LONG LENGTH | D1-1/4 | D2 | **724** |
| **E2051 E1051** | | HSSCo8 & HSS, 4 FLUTE REGULAR LENGTH DOUBLE | D1/8 | D1 | **725** |
| **E2031 E1031** | | HSSCo8 & HSS, 4 FLUTE REGULAR LENGTH 3/4 SHANK | D3/4 | D1 | **727** |
| **E2032 E1032** | | HSSCo8 & HSS, 6&8 FLUTE REGULAR LENGTH 3/4 SHANK | D1-1/8 | D2 | **727** |
| **E2020** | | HSSCo8, 4 FLUTE REGULAR LENGTH BALL NOSE | R1/16 | R1 | **728** |
| **E2021** | | HSSCo8, 4 FLUTE LONG LENGTH BALL NOSE | R1/8 | R1/2 | **729** |
| **E2069** | | HSSCo8, 4 FLUTE REGULAR LENGTH BALL NOSE DOUBLE | R1/16 | R1/2 | **730** |
| **E2039 E1039** | | HSSCo8 & HSS, 4 FLUTE REGULAR LENGTH CENTER CUTTING | D1/8 | D1-1/2 | **731** |
| **E2042 E1042** | | HSSCo8 & HSS, 6 FLUTE REGULAR LENGTH CENTER CUTTING | D1/2 | D2 | **733** |

◎ : Excellent
○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○

# SELECTION GUIDE

| ITEM | MODEL | DESCRIPTION | SIZE | | PAGE |
|---|---|---|---|---|---|
| | | | MIN | MAX | |
| **INCH** | | | | | |
| **E2039 E2042** | | HSSCo8, MULTI FLUTE MEDIUM LENGTH CENTER CUTTING | D1 | D2 | **734** |
| **E2040 E1040** | | HSSCo8 & HSS, 4 FLUTE LONG LENGTH CENTER CUTTING | D1/4 | D1-1/2 | **735** |
| **E2162 E1162** | | HSSCo8 & HSS, 6 FLUTE LONG LENGTH CENTER CUTTING | D1/2 | D2 | **735** |
| **E2041 E1041** | | HSSCo8 & HSS, 4 FLUTE EXTRA LONG LENGTH CENTER CUTTING | D1/4 | D1-1/4 | **736** |
| **E2175 E1175** | | HSSCo8 & HSS, 6 FLUTE EXTRA LONG LENGTH CENTER CUTTING | D1/2 | D2 | **736** |
| **E2053 E1053** | | HSSCo8 & HSS, 4 FLUTE REGULAR LENGTH DOUBLE CENTER CUTTING | D1/8 | D1 | **737** |
| **E2100 E1100** | | HSSCo8 & HSS, 6 FLUTE REGULAR with COMBINATION 2″ SHANK CENTER CUTTING | D2 | D2 | **739** |
| **E2001 E1001** | | HSSCo8 & HSS, 2 FLUTE MINIATURE STUB LENGTH DOUBLE | D1/32 | D3/16 | **740** |
| **E2003 E1003** | | HSSCo8 & HSS, 2 FLUTE MINIATURE REGULAR LENGTH DOUBLE | D1/32 | D3/16 | **741** |
| **E2005 E1005** | | HSSCo8 & HSS, 2 FLUTE MINIATURE LONG LENGTH DOUBLE | D1/16 | D3/16 | **742** |
| **E2002 E1002** | | HSSCo8 & HSS, 4 FLUTE MINIATURE STUB LENGTH DOUBLE | D1/16 | D3/16 | **743** |
| **E2004 E1004** | | HSSCo8 & HSS, 4 FLUTE MINIATURE REGULAR LENGTH DOUBLE | D1/16 | D3/16 | **744** |
| **E2006 E1006** | | HSSCo8 & HSS, 4 FLUTE MINIATURE LONG LENGTH DOUBLE | D1/16 | D3/16 | **745** |
| **E2008 E1008** | | HSSCo8 & HSS, 2 FLUTE MINIATURE STUB LENGTH BALL NOSE DOUBLE | R1/32 | R3/32 | **746** |
| **E2013 E1013** | | HSSCo8 & HSS, 2 FLUTE MINIATURE REGULAR LENGTH BALL NOSE DOUBLE | R1/64 | R3/32 | **747** |
| **E2015 E1015** | | HSSCo8 & HSS, 2 FLUTE MINIATURE LONG LENGTH BALL NOSE DOUBLE | R1/32 | R3/32 | **748** |
| **E1070** | | HSS, 2 FLUTE 42° HELIX REGULAR & MEDIUM LENGTH for ALUMINUM | D1/4 | D2 | **749** |
| **E1071** | | HSS, 2 FLUTE 42° HELIX LONG LENGTH for ALUMINUM | D1/4 | D2 | **750** |
| **E1072** | | HSS, 2 FLUTE 42° HELIX EXTRA LONG LENGTH for ALUMINUM | D1/4 | D1-1/2 | **750** |
| **E2086** |  | HSSCo8, MULTI FLUTE STUB LENGTH FINE PITCH ROUGHING CENTER CUTTING | D1/4 | D1 | **751** |
| **E2085** | | HSSCo8, MULTI FLUTE REGULAR LENGTH FINE PITCH ROUGHING CENTER CUTTING | D1/4 | D1 | **752** |

◎ : Excellent
○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
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| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
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| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# SELECTION GUIDE

| ITEM | MODEL | DESCRIPTION | SIZE MIN | SIZE MAX | PAGE |
|---|---|---|---|---|---|
| **INCH** | | | | | |
| **E2079** | | HSSCo8, MULTI FLUTE REGULAR LENGTH FINE PITCH ROUGHING | D1/4 | D2 | **753** |
| **E2077** | | HSSCo8, MULTI FLUTE LONG LENGTH FINE PITCH ROUGHING | D1/2 | D2 | **754** |
| **E2086** | | HSSCo8, 3 FLUTE STUB LENGTH FINE PITCH ROUGHING CENTER CUTTING | D1/4 | D1 | **755** |
| **E2170** | | HSSCo8, MULTI FLUTE REGULAR LENGTH COARSE PITCH ROUGHING | D1/4 | D2 | **756** |
| **E2171** | | HSSCo8, MULTI FLUTE MEDIUM LENGTH COARSE PITCH ROUGHING | D1 | D2 | **757** |
| **E2172** | | HSSCo8, MULTI FLUTE LONG LENGTH COARSE PITCH ROUGHING | D1/2 | D2 | **758** |
| **E2241** | | HSSCo8,3 FLUTE STUB LENGTH COARSE PITCH ROUGHING CENTER CUTTING | D1/4 | D1 | **759** |
| **E2195** | | HSSCo8, MULTI FLUTE REGULAR LENGTH COARSE PITCH ROUGHING CENTER CUTTING | D1/2 | D1-1/2 | **760** |
| **E2197** | | HSSCo8, MULTI FLUTE LONG LENGTH COARSE PITCH ROUGHING CENTER CUTTING | D1/2 | D1-1/2 | **760** |
| **E2193 E2125** | | HSSCo8, MULTI FLUTE REGULAR & LONG LENGTH COARSE PITCH ROUGHING BALL NOSE | R1/8 | R1-1/4 | **761** |
| **E2248** | | HSSCo8, MULTI FLUTE REGULAR LENGTH ROUGHING & FINISHING | D1/4 | D2 | **762** |
| **E2191** | | HSSCo8, 3 FLUTE 37° HELIX REGULAR LENGTH ROUGHING for ALUMINUM | D1/4 | D1-1/2 | **763** |
| **E2226 E2192** | | HSSCo8, 3 FLUTE 37° HELIX MEDIUM & LONG LENGTH ROUGHING for ALUMINUM | D1/2 | D1-1/2 | **764** |
| **E2163 E1163** | | HSSCo8 & HSS, 2 FLUTE 15° HELIX for KEYWAY CUTTING | D1/8 | D1 | **765** |
| **E2120 E2121** | | HSSCo8, 3&4 FLUTE 60° HELIX REGULAR LENGTH | D1/4 D7/8 | D3/4 D2 | **766** |
| **E2160** | | HSSCo8, 3 FLUTE SHORT LENGTH THROW AWAY | D1/16 | D1/4 | **767** |
| **E2161** | | HSSCo8, 3 FLUTE LONG LENGTH THROW AWAY | D1/16 | D1/4 | **767** |
| **E2237 E1237** | | HSSCo8 & HSS, 4 FLUTE CORNER ROUNDING | D1/4 | D5/8 | **768** |
| **METRIC** | | | | | |
| **E2482 E1482** | | HSSCo8 & HSS, 2 FLUTE REGULAR LENGTH - METRIC | D2.0 (.0787) | D45.0 (1.772) | **769** |
| **E2483 E1483** | | HSSCo8 & HSS, 4 FLUTE REGULAR LENGTH - METRIC | D2.0 (.0787) | D45.0 (1.772) | **770** |
| | | END MILL SET SERIES / RECOMMENDED CUTTING CONDITIONS | | | **773** |

◎ : Excellent
○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
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| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# COBALT & HSS END MILLS



## SUPER CUTTING END MILLS

| DESCRIPTION | | | | YG-1 | **ANSI | REMARK |
|---|---|---|---|---|---|---|
| TYPE | NO. OF FLUTE | LENGTH OF CUT | TYPE OF END | | | |
| **SINGLE END** | 2 | REGULAR LONG EX. LONG | ALL | + .0010 .0000 * ( + .0015 .0000 ) | + .0030 .0000 | |
| | MULTIPLE | ALL | ALL | + .0010 .0000 * ( + .0015 .0000 ) | + .0030 .0000 | |
| **KEY WAY** | 2 | ALL | CENTER CUTTING | + .0000 - .0015 | + .0000 - .0015 | |
| **DOUBLE END** | 2 | REGULAR | ALL | .0000 - .0010 * ( .0000 - .0020 ) | .0000 - .0015 | |
| | 4 | ALL | CENTER CUTTING | .0000 - .0010 * ( .0000 - .0020 ) | .0000 - .0015 | |
| | 4 | ALL | NON CENTER CUTTING | + .0010 .0000 * ( .0000 - .0020 ) | + .0030 .0000 * ( .0000 - .0025 ) | |
| **3/16 SHANK DOUBLE END** | 2 | STUB REGULAR | ALL | .0000 - .0010 * ( .0000 - .0020 ) | .0000 - .0015 | |
| | | LONG | ALL | + .0010 .0000 * ( .0000 - .0020 ) | + .0030 .0000 * ( .0000 - .0025 ) | |
| | 4 | ALL | ALL | + .0010 .0000 * ( .0000 - .0020 ) | + .0030 .0000 * ( .0000 - .0025 ) | |
| **ROUGHING** | MULTIPLE | ALL | ALL | + .0060 .0000 | + .025 - .005 | |
| **ROUGHING & FINISHING** | MULTIPLE | REGULAR | ALL | + .0025 + .0005 | | |
| **HELICAL 60°** | 3.4 | REGULAR | CENTER CUTTING | + .0010 .0000 * ( + .0015 .0000 ) | | |
| **THROW AWAY 1/4 SHANK** | 3 | ALL | CENTER CUTTING | - .0005 - .0013 | | |

* The shank of End Mills is the same diameter as the cutting portion.

** ANSI B94-19-1977 published by the American Society of Mechanical Engineers.

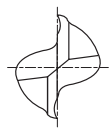
# COBALT & HSS END MILLS

**E2030 SERIES** 8% COBALT (M42) FLAT SHANK

**E1030 SERIES** HSS (M2) FLAT SHANK

## HSSCo8 & HSS, 2 FLUTE REGULAR LENGTH

▶ These end mills are furnished as regular with right-hand cutting and right-hand helical flutes. All shanks are flatted for holder set screw. These are designed for slotting, drilling, pocketing and general-purpose operation.



HSS Co8 | HSS | 2 | 30° | FLAT

P.773, 779, 783

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 8% COBALT (M42) | HSS (M2) | | | | |
| 01289 | 01039 | 1/8 | 3/8 | 3/8 | 2-5/16 |
| 01291 | 01041 | 5/32 | 3/8 | 7/16 | 2-5/16 |
| 01293 | 01043 | 3/16 | 3/8 | 7/16 | 2-5/16 |
| 01295 | 01045 | 7/32 | 3/8 | 1/2 | 2-5/16 |
| 01297 | 01047 | 1/4 | 3/8 | 1/2 | 2-5/16 |
| 01299 | 01049 | 9/32 | 3/8 | 9/16 | 2-5/16 |
| 01301 | 01051 | 5/16 | 3/8 | 9/16 | 2-5/16 |
| 01303 | 01053 | 11/32 | 3/8 | 9/16 | 2-5/16 |
| 01305 | 01055 | 3/8 | 3/8 | 9/16 | 2-5/16 |
| 01308 | 01058 | 13/32 | 3/8 | 13/16 | 2-1/2 |
| 01312 | 01062 | 7/16 | 3/8 | 13/16 | 2-1/2 |
| 01316 | 01066 | 15/32 | 3/8 | 13/16 | 2-1/2 |
| 01320 | 01070 | 1/2 | 3/8 | 13/16 | 2-1/2 |
| 01321 | 01071 | 1/2 | 1/2 | 1 | 3 |
| 01328 | 01078 | 9/16 | 1/2 | 1-1/8 | 3-1/8 |
| 01336 | 01086 | 5/8 | 1/2 | 1-1/8 | 3-1/8 |
| 01337 | 01087 | 5/8 | 5/8 | 1-5/16 | 3-7/16 |
| 01348 | 01098 | 11/16 | 5/8 | 1-5/16 | 3-7/16 |
| 01357 | 01107 | 3/4 | 1/2 | 1-5/16 | 3-5/16 |
| 01358 | 01108 | 3/4 | 5/8 | 1-5/16 | 3-7/16 |
| 01359 | 01109 | 3/4 | 3/4 | 1-5/16 | 3-7/16 |
| 01373 | 01123 | 13/16 | 5/8 | 1-1/2 | 3-5/8 |
| 01391 | 01141 | 7/8 | 3/4 | 1-1/2 | 3-3/4 |
| 01394 | 01144 | 7/8 | 7/8 | 1-1/2 | 3-3/4 |
| 01409 | 01159 | 15/16 | 7/8 | 1-1/2 | 3-3/4 |
| 01420 | 01170 | 1 | 5/8 | 1-1/2 | 3-5/8 |
| 01422 | 01172 | 1 | 3/4 | 1-1/2 | 3-3/4 |
| 01426 | 01176 | 1 | 1 | 1-5/8 | 4-1/8 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

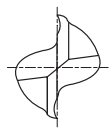
# COBALT & HSS END MILLS

**E2030 SERIES** 8% COBALT (M42) FLAT SHANK
**E1030 SERIES** HSS (M2) FLAT SHANK



## HSSCo8 & HSS, 2 FLUTE REGULAR LENGTH

▶ These end mills are furnished as regular with right-hand cutting and right-hand helical flutes. All shanks are flatted for holder set screw. These are designed for slotting, drilling, pocketing and general-purpose operation.



HSS Co8 | HSS | 2 | 30° | FLAT

P.773, 779, 783

Unit : Inch

| EDP No. 8% COBALT (M42) | EDP No. HSS (M2) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 01435 | 01185 | 1-1/8 | 1 | 1-5/8 | 4-1/8 |
| 01445 | 01195 | 1-1/4 | 1-1/4 | 1-5/8 | 4-1/8 |
| 01451 | 01201 | 1-3/8 | 1 | 1-5/8 | 4-1/8 |
| 01453 | 01203 | 1-3/8 | 1-1/4 | 1-5/8 | 4-1/8 |
| 01459 | 01209 | 1-1/2 | 1 | 1-5/8 | 4-1/8 |
| 01461 | 01211 | 1-1/2 | 1-1/4 | 1-5/8 | 4-1/8 |
| 01469 | 01219 | 1-3/4 | 1-1/4 | 1-5/8 | 4-1/8 |
| 01477 | 01227 | 2 | 1-1/4 | 1-5/8 | 4-1/8 |
| 01480 | 01230 | 2 | 2 | 2 | 5-3/4 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~+.0010 | ＊＊0~+.0015 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

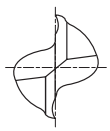
# COBALT & HSS END MILLS

**E2080 SERIES** 8% COBALT (M42) FLAT SHANK

**E1080 SERIES** HSS (M2) FLAT SHANK

## HSSCo8 & HSS, 2 FLUTE LONG LENGTH

▶Longer flute length than E2030 type and allows deeper cutting.



HSS Co8 | HSS | 2 | 30° | FLAT

P.773, 779, 783

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 8% COBALT (M42) | HSS (M2) | | | | |
| 02297 | 02047 | 1/4 | 3/8 | 1-1/4 | 3-1/8 |
| 02301 | 02051 | 5/16 | 3/8 | 1-3/8 | 3-1/8 |
| 02305 | 02055 | 3/8 | 3/8 | 1-1/2 | 3-1/4 |
| 02321 | 02071 | 1/2 | 1/2 | 2 | 4 |
| 02337 | 02087 | 5/8 | 5/8 | 2 | 4-1/8 |
| 02359 | 02109 | 3/4 | 3/4 | 2-1/4 | 4-1/2 |
| 02394 | 02144 | 7/8 | 7/8 | 2-1/2 | 4-3/4 |
| 02426 | 02176 | 1 | 1 | 3 | 5-1/2 |
| 02435 | 02185 | 1-1/8 | 1 | 3 | 5-1/2 |
| 02443 | 02193 | 1-1/4 | 1 | 3 | 5-1/2 |
| 02445 | 02195 | 1-1/4 | 1-1/4 | 3 | 5-1/2 |
| 02461 | 02211 | 1-1/2 | 1-1/4 | 3 | 5-1/2 |
| 02469 | 02219 | 1-3/4 | 1-1/4 | 3 | 5-1/2 |
| 02477 | 02227 | 2 | 1-1/4 | 3 | 5-1/2 |
| 02482 | 02232 | 2 | 2 | 3 | 6-3/4 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~+.0010 | ＊＊0~+.0015 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

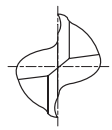
# COBALT & HSS END MILLS

**E2033 SERIES** 8% COBALT (M42) FLAT SHANK
**E1033 SERIES** HSS (M2) FLAT SHANK



## HSSCo8 & HSS, 2 FLUTE EXTENDED LENGTH

▶Provided with the longest flute length and suitable for high accuracy machining of deep step.



HSS Co8 | HSS | 2 | 30° | FLAT

P.773, 779, 783

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Length Below Shank | Overall Length |
|---|---|---|---|---|---|---|
| 8% COBALT (M42) | HSS (M2) | | | | | |
| **03289** | **03039** | **1/8** | 3/8 | 3/8 | - | 2-3/8 |
| **03293** | **03043** | **3/16** | 3/8 | 1/2 | 1-1/8 | 2-11/16 |
| **03297** | **03047** | **1/4** | 3/8 | 5/8 | 1-1/2 | 3-1/16 |
| **03301** | **03051** | **5/16** | 3/8 | 3/4 | 1-3/4 | 3-5/16 |
| **03305** | **03055** | **3/8** | 3/8 | 3/4 | 1-3/4 | 3-5/16 |
| **03321** | **03071** | **1/2** | 1/2 | 1 | 2-7/32 | 4 |
| **03337** | **03087** | **5/8** | 5/8 | 1-3/8 | 2-23/32 | 4-5/8 |
| **03359** | **03109** | **3/4** | 3/4 | 1-5/8 | 3-11/32 | 5-3/8 |
| **03394** | **03144** | **7/8** | 7/8 | 2 | 4 | 6 |
| **03426** | **03176** | **1** | 1 | 2-1/2 | 4-31/32 | 7-1/4 |
| **03445** | **03195** | **1-1/4** | 1-1/4 | 3 | 4-31/32 | 7-1/4 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~+.0010 | ＊＊0~+.0015 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

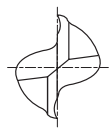
# COBALT & HSS END MILLS

**E2050 SERIES** 8% COBALT (M42) FLAT SHANK

**E1050 SERIES** HSS (M2) FLAT SHANK

## HSSCo8 & HSS, 2 FLUTE REGULAR LENGTH DOUBLE

▶ Series E2050 two flute end mills are the double-end version of E2030 single-end tools. Same excellent tool geometry for slotting, keying and general purpose milling, plus the added economy offered by the double-end design.



HSS Co8 | HSS | 2 | 30° | FLAT

P.773, 779, 783

Unit : Inch

| EDP No. 8% COBALT (M42) | EDP No. HSS (M2) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 11289 | 11039 | 1/8 | 3/8 | 3/8 | 3-1/16 |
| 11290 | 11040 | 9/64 | 3/8 | 7/16 | 3-1/8 |
| 11291 | 11041 | 5/32 | 3/8 | 7/16 | 3-1/8 |
| 11292 | 11042 | 11/64 | 3/8 | 7/16 | 3-1/8 |
| 11293 | 11043 | 3/16 | 3/8 | 7/16 | 3-1/8 |
| 11294 | 11044 | 13/64 | 3/8 | 1/2 | 3-1/8 |
| 11295 | 11045 | 7/32 | 3/8 | 1/2 | 3-1/8 |
| 11296 | 11046 | 15/64 | 3/8 | 1/2 | 3-1/8 |
| 11297 | 11047 | 1/4 | 3/8 | 1/2 | 3-1/8 |
| 11298 | 11048 | 17/64 | 3/8 | 9/16 | 3-1/8 |
| 11299 | 11049 | 9/32 | 3/8 | 9/16 | 3-1/8 |
| 11300 | 11050 | 19/64 | 3/8 | 9/16 | 3-1/8 |
| 11301 | 11051 | 5/16 | 3/8 | 9/16 | 3-1/8 |
| 11302 | 11052 | 21/64 | 3/8 | 9/16 | 3-1/8 |
| 11303 | 11053 | 11/32 | 3/8 | 9/16 | 3-1/8 |
| 11304 | 11054 | 23/64 | 3/8 | 9/16 | 3-1/8 |
| 11305 | 11055 | 3/8 | 3/8 | 9/16 | 3-1/8 |
| 11307 | 11057 | 25/64 | 1/2 | 13/16 | 3-3/4 |
| 11309 | 11059 | 13/32 | 1/2 | 13/16 | 3-3/4 |
| 11311 | 11061 | 27/64 | 1/2 | 13/16 | 3-3/4 |
| 11313 | 11063 | 7/16 | 1/2 | 13/16 | 3-3/4 |
| 11315 | 11065 | 29/64 | 1/2 | 13/16 | 3-3/4 |
| 11317 | 11067 | 15/32 | 1/2 | 13/16 | 3-3/4 |
| 11319 | 11069 | 31/64 | 1/2 | 13/16 | 3-3/4 |
| 11321 | 11071 | 1/2 | 1/2 | 13/16 | 3-3/4 |
| 11326 | 11076 | 17/32 | 5/8 | 1-1/8 | 4-1/2 |
| 11330 | 11080 | 9/16 | 5/8 | 1-1/8 | 4-1/2 |
| 11334 | 11084 | 19/32 | 5/8 | 1-1/8 | 4-1/2 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

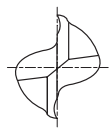
# COBALT & HSS END MILLS

**E2050 SERIES** 8% COBALT (M42) FLAT SHANK
**E1050 SERIES** HSS (M2) FLAT SHANK



## HSSCo8 & HSS, 2 FLUTE REGULAR LENGTH DOUBLE

▶ Series E2050 two flute end mills are the double-end version of E2030 single-end tools. Same excellent tool geometry for slotting, keying and general purpose milling, plus the added economy offered by the double-end design.



HSS Co8 | HSS | 2 | 30° | FLAT

P.773, 779, 783

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 8% COBALT (M42) | HSS (M2) | | | | |
| 11337 | 11087 | 5/8 | 5/8 | 1-1/8 | 4-1/2 |
| 11344 | 11094 | 21/32 | 3/4 | 1-5/16 | 5 |
| 11350 | 11100 | 11/16 | 3/4 | 1-5/16 | 5 |
| 11354 | 11104 | 23/32 | 3/4 | 1-5/16 | 5 |
| 11359 | 11109 | 3/4 | 3/4 | 1-5/16 | 5 |
| 11368 | 11118 | 25/32 | 7/8 | 1-9/16 | 5-1/2 |
| 11377 | 11127 | 13/16 | 7/8 | 1-9/16 | 5-1/2 |
| 11384 | 11134 | 27/32 | 7/8 | 1-9/16 | 5-1/2 |
| 11394 | 11144 | 7/8 | 7/8 | 1-9/16 | 5-1/2 |
| 11402 | 11152 | 29/32 | 1 | 1-5/8 | 5-7/8 |
| 11410 | 11160 | 15/16 | 1 | 1-5/8 | 5-7/8 |
| 11417 | 11167 | 31/32 | 1 | 1-5/8 | 5-7/8 |
| 11426 | 11176 | 1 | 1 | 1-5/8 | 5-7/8 |

■ The TiN coated, TiCN coated or TiAIN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAIN F), CE(TiAIN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAIN F), HE(TiAIN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~—.0010 | ＊＊0~—.0020 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# COBALT & HSS END MILLS

**E2110 SERIES** 8% COBALT (M42) FLAT SHANK
**E1110 SERIES** HSS (M2) FLAT SHANK

## HSSCo8 & HSS, 2 FLUTE REGULAR LENGTH BALL NOSE

▶ The two flute ball end mills are designed for milling of radius bottom slots, fillets and special contours. The end teeth are cut to center allowing these end mills to drill into material at the beginning of a slotting cut. The two flute design provides good chip removal ability in slotting.

HSS Co8 | HSS | 2 | 30° | FLAT

P.776, 781, 785

Unit : Inch

| EDP No. | | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| 8% COBALT (M42) | HSS (M2) | R | | | | |
| **41289** | **41039** | R1/16 | **1/8** | 3/8 | 3/8 | 2-5/16 |
| **41293** | **41043** | R3/32 | **3/16** | 3/8 | 1/2 | 2-3/8 |
| **41297** | **41047** | R1/8 | **1/4** | 3/8 | 5/8 | 2-7/16 |
| **41301** | **41051** | R5/32 | **5/16** | 3/8 | 3/4 | 2-1/2 |
| **41305** | **41055** | R3/16 | **3/8** | 3/8 | 3/4 | 2-1/2 |
| **41313** | **41063** | R7/32 | **7/16** | 1/2 | 1 | 3 |
| **41321** | **41071** | R1/4 | **1/2** | 1/2 | 1 | 3 |
| **41328** | **41078** | R9/32 | **9/16** | 1/2 | 1-1/8 | 3-1/8 |
| **41336** | **41086** | R5/16 | **5/8** | 1/2 | 1-1/8 | 3-1/8 |
| **41337** | **41087** | R5/16 | **5/8** | 5/8 | 1-3/8 | 3-1/2 |
| **41357** | **41107** | R3/8 | **3/4** | 1/2 | 1-5/16 | 3-5/16 |
| **41359** | **41109** | R3/8 | **3/4** | 3/4 | 1-5/8 | 3-7/8 |
| **41391** | **41141** | R7/16 | **7/8** | 3/4 | 2 | 4-1/4 |
| **41394** | **41144** | R7/16 | **7/8** | 7/8 | 2 | 4-1/4 |
| **41422** | **41172** | R1/2 | **1** | 3/4 | 2-1/4 | 4-1/2 |
| **41426** | **41176** | R1/2 | **1** | 1 | 2-1/4 | 4-3/4 |
| **41431** | **41181** | R9/16 | **1-1/8** | 3/4 | 1-5/8 | 3-7/8 |
| **41435** | **41185** | R9/16 | **1-1/8** | 1 | 2-1/4 | 4-3/4 |
| **41439** | **41189** | R5/8 | **1-1/4** | 3/4 | 1-5/8 | 3-7/8 |
| **41445** | **41195** | R5/8 | **1-1/4** | 1-1/4 | 2-1/2 | 5 |
| **41449** | **41199** | R11/16 | **1-3/8** | 3/4 | 1-5/8 | 4-1/8 |
| **41453** | **41203** | R11/16 | **1-3/8** | 1-1/4 | 2-1/2 | 5 |
| **41457** | **41207** | R3/4 | **1-1/2** | 3/4 | 1-5/8 | 4-1/8 |
| **41461** | **41211** | R3/4 | **1-1/2** | 1-1/4 | 2-1/2 | 5 |
| **41478** | **41227** | R1 | **2** | 1-1/4 | 2-1/2 | 5 |

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~+.0010 | ＊＊0~+.0015 |

＊＊ The shank of end mills is the same diameter as the cutting portion.

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# COBALT & HSS END MILLS

**E2111 SERIES** 8% COBALT (M42) FLAT SHANK
**E1111 SERIES** HSS (M2) FLAT SHANK



## HSSCo8 & HSS, 2 FLUTE EXTENDED LENGTH BALL NOSE

▶Longer flute length than E2110 type and suitable for high efficient copying process and deep cutting of die mold corner radius.

HSS Co8 | HSS | 2 | 30° | FLAT

P.776, 781, 785

Unit : Inch

| EDP No. | | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Length Below Shank | Overall Length |
|---|---|---|---|---|---|---|---|
| 8% COBALT (M42) | HSS (M2) | R | | | | | |
| **42289** | **42039** | R1/16 | **1/8** | 3/8 | 3/8 | - | 2-3/8 |
| **42293** | **42043** | R3/32 | **3/16** | 3/8 | 1/2 | 1-1/8 | 2-11/16 |
| **42297** | **42047** | R1/8 | **1/4** | 3/8 | 5/8 | 1-1/2 | 3-1/16 |
| **42301** | **42051** | R5/32 | **5/16** | 3/8 | 3/4 | 1-3/4 | 3-5/16 |
| **42305** | **42055** | R3/16 | **3/8** | 3/8 | 3/4 | 1-3/4 | 3-5/16 |
| **42313** | **42063** | R7/32 | **7/16** | 1/2 | 1 | 1-7/8 | 3-11/16 |
| **42321** | **42071** | R1/4 | **1/2** | 1/2 | 1 | 2-1/4 | 4 |
| **42337** | **42087** | R5/16 | **5/8** | 5/8 | 1-3/8 | 2-3/4 | 4-5/8 |
| **42359** | **42109** | R3/8 | **3/4** | 3/4 | 1-5/8 | 3-3/8 | 5-3/8 |
| **42426** | **42176** | R1/2 | **1** | 1 | 2-1/2 | 5 | 7-1/4 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~+.0010 | * *0~+.0015 |

**The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

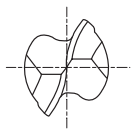
# COBALT & HSS END MILLS

**E2112 SERIES** 8% COBALT (M42) FLAT SHANK

**E1112 SERIES** HSS (M2) FLAT SHANK

## HSSCo8 & HSS, 2 FLUTE REGULAR LENGTH BALL NOSE DOUBLE

▶ Same construction features as E2110 end mill in a more economical version. Removes more material per grind. Machine ground notch assures positive anchorage in tool holder.



HSS Co8 | HSS | 2 | 30° | FLAT

P.776, 781, 785

Unit : Inch

| EDP No. | | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| 8% COBALT (M42) | HSS (M2) | R | | | | |
| **45289** | **45039** | R1/16 | **1/8** | 3/8 | 3/8 | 3-1/16 |
| **45293** | **45043** | R3/32 | **3/16** | 3/8 | 7/16 | 3-1/8 |
| **45297** | **45047** | R1/8 | **1/4** | 3/8 | 1/2 | 3-1/8 |
| **45301** | **45051** | R5/32 | **5/16** | 3/8 | 9/16 | 3-1/8 |
| **45305** | **45055** | R3/16 | **3/8** | 3/8 | 9/16 | 3-1/8 |
| **45313** | **45063** | R7/32 | **7/16** | 1/2 | 13/16 | 3-3/4 |
| **45321** | **45071** | R1/4 | **1/2** | 1/2 | 13/16 | 3-3/4 |
| **45337** | **45087** | R5/16 | **5/8** | 5/8 | 1-1/8 | 4-1/2 |
| **45359** | **45109** | R3/8 | **3/4** | 3/4 | 1-5/16 | 5 |
| **45426** | **45176** | R1/2 | **1** | 1 | 1-5/8 | 5-7/8 |

■ The TiN coated, TiCN coated or TiAIN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAIN F), CE(TiAIN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAIN F), HE(TiAIN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~—.0010 | ＊＊0~—.0020 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# COBALT & HSS END MILLS

**E2031 SERIES** 8% COBALT (M42) FLAT SHANK
**E1031 SERIES** HSS (M2) FLAT SHANK



## HSSCo8 & HSS, 4 FLUTE REGULAR LENGTH

▶ Possible for high-speed cutting, suitable for high efficiency machining. Easy to regrind.

HSS Co8 | HSS | 4 | 30° | FLAT

P.775, 780, 784

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 8% COBALT (M42) | HSS (M2) | | | | |
| 04289 | 04039 | 1/8 | 3/8 | 3/8 | 2-5/16 |
| 04290 | 04040 | 9/64 | 3/8 | 7/16 | 2-3/8 |
| 04291 | 04041 | 5/32 | 3/8 | 7/16 | 2-3/8 |
| 04292 | 04042 | 11/64 | 3/8 | 1/2 | 2-3/8 |
| 04293 | 04043 | 3/16 | 3/8 | 1/2 | 2-3/8 |
| 04294 | 04044 | 13/64 | 3/8 | 9/16 | 2-7/16 |
| 04295 | 04045 | 7/32 | 3/8 | 9/16 | 2-7/16 |
| 04296 | 04046 | 15/64 | 3/8 | 5/8 | 2-7/16 |
| 04297 | 04047 | 1/4 | 3/8 | 5/8 | 2-7/16 |
| 04298 | 04048 | 17/64 | 3/8 | 11/16 | 2-1/2 |
| 04299 | 04049 | 9/32 | 3/8 | 11/16 | 2-1/2 |
| 04300 | 04050 | 19/64 | 3/8 | 3/4 | 2-1/2 |
| 04301 | 04051 | 5/16 | 3/8 | 3/4 | 2-1/2 |
| 04302 | 04052 | 21/64 | 3/8 | 3/4 | 2-1/2 |
| 04303 | 04053 | 11/32 | 3/8 | 3/4 | 2-1/2 |
| 04304 | 04054 | 23/64 | 3/8 | 3/4 | 2-1/2 |
| 04305 | 04055 | 3/8 | 3/8 | 3/4 | 2-1/2 |
| 04306 | 04056 | 25/64 | 3/8 | 1 | 2-11/16 |
| 04308 | 04058 | 13/32 | 3/8 | 1 | 2-11/16 |
| 04310 | 04060 | 27/64 | 3/8 | 1 | 2-11/16 |
| 04312 | 04062 | 7/16 | 3/8 | 1 | 2-11/16 |
| 04315 | 04065 | 29/64 | 1/2 | 1-1/4 | 3-1/4 |
| 04317 | 04067 | 15/32 | 1/2 | 1-1/4 | 3-1/4 |
| 04319 | 04069 | 31/64 | 1/2 | 1-1/4 | 3-1/4 |
| 04320 | 04070 | 1/2 | 3/8 | 1 | 2-11/16 |
| 04321 | 04071 | 1/2 | 1/2 | 1-1/4 | 3-1/4 |
| 04324 | 04074 | 17/32 | 1/2 | 1-3/8 | 3-3/8 |
| 04328 | 04078 | 9/16 | 1/2 | 1-3/8 | 3-3/8 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# COBALT & HSS END MILLS

**E2031 SERIES** 8% COBALT (M42) FLAT SHANK

**E1031 SERIES** HSS (M2) FLAT SHANK

## HSSCo8 & HSS, 4 FLUTE REGULAR LENGTH

▶ Possible for high-speed cutting, suitable for high efficiency machining. Easy to regrind.

HSS Co8 | HSS | 4 | 30° | FLAT

P.775, 780, 784

Unit : Inch

| EDP No. 8% COBALT (M42) | EDP No. HSS (M2) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 04332 | 04082 | 19/32 | 1/2 | 1-3/8 | 3-3/8 |
| 04336 | 04086 | 5/8 | 1/2 | 1-3/8 | 3-3/8 |
| 04337 | 04087 | 5/8 | 5/8 | 1-5/8 | 3-3/4 |
| 04340 | 04090 | 21/32 | 1/2 | 1-5/8 | 3-5/8 |
| 04348 | 04098 | 11/16 | 5/8 | 1-5/8 | 3-3/4 |
| 04352 | 04102 | 23/32 | 1/2 | 1-5/8 | 3-5/8 |
| 04357 | 04107 | 3/4 | 1/2 | 1-5/8 | 3-5/8 |
| 04358 | 04108 | 3/4 | 5/8 | 1-5/8 | 3-3/4 |
| 04359 | 04109 | 3/4 | 3/4 | 1-5/8 | 3-7/8 |
| 04364 | 04114 | 25/32 | 5/8 | 1-7/8 | 4 |
| 04375 | 04125 | 13/16 | 3/4 | 1-7/8 | 4-1/8 |
| 04380 | 04130 | 27/32 | 5/8 | 1-7/8 | 4 |
| 04391 | 04141 | 7/8 | 3/4 | 1-7/8 | 4-1/8 |
| 04394 | 04144 | 7/8 | 7/8 | 1-7/8 | 4-1/8 |
| 04399 | 04149 | 29/32 | 3/4 | 1-7/8 | 4-1/8 |
| 04407 | 04157 | 15/16 | 3/4 | 1-7/8 | 4-1/8 |
| 04414 | 04164 | 31/32 | 3/4 | 1-7/8 | 4-1/8 |
| 04420 | 04170 | 1 | 5/8 | 1-7/8 | 4 |
| 04422 | 04172 | 1 | 3/4 | 1-7/8 | 4-1/8 |
| 04426 | 04176 | 1 | 1 | 2 | 4-1/2 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~+.0010 | ＊＊0~+.0015 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

| Carbon Steels ~HRc20 | Alloy Steels HRc20~30 | Prehardened Steels HRc30~40 | Hardened Steels HRc40~45 | Hardened Steels HRc45~55 | High Hardened Steels HRc55~70 | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

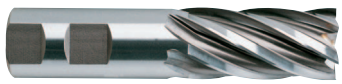
# COBALT & HSS END MILLS

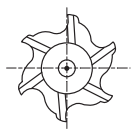
**E2032 SERIES** 8% COBALT (M42) FLAT SHANK
**E1032 SERIES** HSS (M2) FLAT SHANK



## HSSCo8 & HSS, 6 FLUTE REGULAR LENGTH

▶ Possible for high-speed cutting, suitable for high efficiency machining. Easy to regrind.





HSS Co8 | HSS | 6 | 30° | FLAT

P.775, 780, 784

Unit : Inch

| EDP No. 8% COBALT (M42) | EDP No. HSS (M2) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 04338 | 04088 | 5/8 | 5/8 | 1-5/8 | 3-3/4 |
| 04360 | 04110 | 3/4 | 3/4 | 1-5/8 | 3-7/8 |
| 04376 | 04126 | 13/16 | 3/4 | 1-7/8 | 4-1/8 |
| 04390 | 04140 | 7/8 | 5/8 | 1-7/8 | 4 |
| 04395 | 04145 | 7/8 | 7/8 | 1-7/8 | 4-1/8 |
| 04405 | 04155 | 15/16 | 5/8 | 1-7/8 | 4 |
| 04421 | 04171 | 1 | 5/8 | 1-7/8 | 4 |
| 04427 | 04177 | 1 | 1 | 2 | 4-1/2 |
| 04432 | 04182 | 1-1/8 | 3/4 | 2 | 4-1/4 |
| 04436 | 04186 | 1-1/8 | 1 | 2 | 4-1/2 |
| 04440 | 04190 | 1-1/4 | 3/4 | 2 | 4-1/4 |
| 04444 | 04194 | 1-1/4 | 1 | 2 | 4-1/2 |
| 04446 | 04196 | 1-1/4 | 1-1/4 | 2 | 4-1/2 |
| 04452 | 04202 | 1-3/8 | 1 | 2 | 4-1/2 |
| 04460 | 04210 | 1-1/2 | 1 | 2 | 4-1/2 |
| 04462 | 04212 | 1-1/2 | 1-1/4 | 2 | 4-1/2 |
| 04470 | 04220 | 1-3/4 | 1-1/4 | 2 | 4-1/2 |
| 04478 | 04228 | 2 | 1-1/4 | 2 | 4-1/2 |
| 04481 | 04231 | 2 | 2 | 2 | 5-3/4 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~+.0010 | * *0~+.0015 |

**The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | | | | |

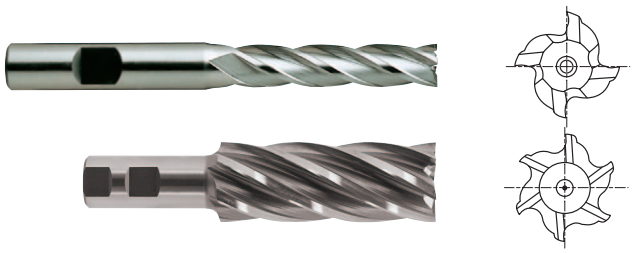
# COBALT & HSS END MILLS

**E2034 / E2035 SERIES** — 8% COBALT (M42) FLAT SHANK

**E1034 / E1035 SERIES** — HSS (M2) FLAT SHANK

## HSSCo8 & HSS, 4&6 FLUTE LONG LENGTH

▶ Longer flute length than E2031 type and allows deeper cutting. Easy to regrind.



HSS Co8 | HSS | 4&6 | 30° | FLAT

P.775, 780, 784

### E2034(8% COBALT) , E1034(HSS) Series ■ 4 FLUTE

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 8% COBALT (M42) | HSS (M2) | | | | |
| 05297 | 05047 | 1/4 | 3/8 | 1-1/4 | 3-1/16 |
| 05301 | 05051 | 5/16 | 3/8 | 1-3/8 | 3-1/8 |
| 05305 | 05055 | 3/8 | 3/8 | 1-1/2 | 3-1/4 |
| 05313 | 05063 | 7/16 | 1/2 | 1-3/4 | 3-3/4 |
| 05321 | 05071 | 1/2 | 1/2 | 2 | 4 |
| 05337 | 05087 | 5/8 | 5/8 | 2-1/2 | 4-5/8 |
| 05359 | 05109 | 3/4 | 3/4 | 3 | 5-1/4 |
| 05394 | 05144 | 7/8 | 7/8 | 3-1/2 | 5-3/4 |
| 05426 | 05176 | 1 | 1 | 4 | 6-1/2 |

### E2035(8% COBALT) , E1035(HSS) Series ■ 6 FLUTE

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 8% COBALT (M42) | HSS (M2) | | | | |
| 05436 | 05186 | 1-1/8 | 1 | 4 | 6-1/2 |
| 05444 | 05194 | 1-1/4 | 1 | 4 | 6-1/2 |
| 05446 | 05196 | 1-1/4 | 1-1/4 | 4 | 6-1/2 |
| 05460 | 05210 | 1-1/2 | 1 | 4 | 6-1/2 |
| 05462 | 05212 | 1-1/2 | 1-1/4 | 4 | 6-1/2 |
| 05470 | 05220 | 1-3/4 | 1-1/4 | 4 | 6-1/2 |
| 05478 | 05228 | 2 | 1-1/4 | 4 | 6-1/2 |
| 05485 | 05235 | 2 | 2 | 4 | 7-3/4 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~+.0010 | ＊＊0~+.0015 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

| Series | Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| E1034 E2034 | ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| E1035 E2035 | ◎ | ◎ | ○ | | | | ○ | | | | | | |

# COBALT & HSS END MILLS

**E2036 / E2037 SERIES** 8% COBALT (M42) FLAT SHANK
**E1036 / E1037 SERIES** HSS (M2) FLAT SHANK



## HSSCo8 & HSS, 4&6 FLUTE EXTRA LONG LENGTH

▶Provided with the longest flute length and suitable for high accuracy machining of deep step. Easy to regrind.

HSS Co8 | HSS | 4&6 | 30° | FLAT

P.775, 780, 784

### E2036(8% COBALT) , E1036(HSS) Series ■ 4 FLUTE

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 8% COBALT (M42) | HSS (M2) | | | | |
| 06297 | 06047 | 1/4 | 3/8 | 1-3/4 | 3-9/16 |
| 06301 | 06051 | 5/16 | 3/8 | 2 | 3-3/4 |
| 06305 | 06055 | 3/8 | 3/8 | 2-1/2 | 4-1/4 |
| 06321 | 06071 | 1/2 | 1/2 | 3 | 5 |
| 06337 | 06087 | 5/8 | 5/8 | 4 | 6-1/8 |
| 06359 | 06109 | 3/4 | 3/4 | 4 | 6-1/4 |
| 06394 | 06144 | 7/8 | 7/8 | 5 | 7-1/4 |
| 06426 | 06176 | 1 | 1 | 6 | 8-1/2 |

### E2037(8% COBALT) , E1037(HSS) Series ■ 6 FLUTE

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 8% COBALT (M42) | HSS (M2) | | | | |
| 06446 | 06196 | 1-1/4 | 1-1/4 | 6 | 8-1/2 |
| 06462 | 06212 | 1-1/2 | 1-1/4 | 8 | 10-1/2 |
| 06491 | 06241 | 2 | 2 | 8 | 11-3/4 |

■ The TiN coated, TiCN coated or TiAIN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAIN F), CE(TiAIN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAIN F), HE(TiAIN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~+.0010 | ＊＊0~+.0015 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

| Series | Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| E1036 E2036 | ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| E1037 E2037 | ◎ | ◎ | ○ | | | | ○ | | | | | | |

# COBALT & HSS END MILLS

**E2051 SERIES** 8% COBALT (M42) FLAT SHANK

**E1051 SERIES** HSS (M2) FLAT SHANK

## HSSCo8 & HSS, 4 FLUTE REGULAR LENGTH DOUBLE

▶ Series E2051 four flute end mills are the double-end version of E2031 four flute tools and are used for the same type of finishing operation. Two tools on one shank saves on sharpening set-up as well as on initial tool costs. Easy to regrind.

HSS Co8 | HSS | 4 | 30° | FLAT

P.775, 780, 784

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 8% COBALT (M42) | HSS (M2) | | | | |
| 12289 | 12039 | 1/8 | 3/8 | 3/8 | 3-1/16 |
| 12290 | 12040 | 9/64 | 3/8 | 7/16 | 3-1/8 |
| 12291 | 12041 | 5/32 | 3/8 | 7/16 | 3-1/8 |
| 12292 | 12042 | 11/64 | 3/8 | 1/2 | 3-1/4 |
| 12293 | 12043 | 3/16 | 3/8 | 1/2 | 3-1/4 |
| 12294 | 12044 | 13/64 | 3/8 | 9/16 | 3-1/4 |
| 12295 | 12045 | 7/32 | 3/8 | 9/16 | 3-1/4 |
| 12296 | 12046 | 15/64 | 3/8 | 5/8 | 3-3/8 |
| 12297 | 12047 | 1/4 | 3/8 | 5/8 | 3-3/8 |
| 12298 | 12048 | 17/64 | 3/8 | 11/16 | 3-3/8 |
| 12299 | 12049 | 9/32 | 3/8 | 11/16 | 3-3/8 |
| 12300 | 12050 | 19/64 | 3/8 | 3/4 | 3-1/2 |
| 12301 | 12051 | 5/16 | 3/8 | 3/4 | 3-1/2 |
| 12302 | 12052 | 21/64 | 3/8 | 3/4 | 3-1/2 |
| 12303 | 12053 | 11/32 | 3/8 | 3/4 | 3-1/2 |
| 12304 | 12054 | 23/64 | 3/8 | 3/4 | 3-1/2 |
| 12305 | 12055 | 3/8 | 3/8 | 3/4 | 3-1/2 |
| 12307 | 12057 | 25/64 | 1/2 | 1 | 4-1/8 |
| 12309 | 12059 | 13/32 | 1/2 | 1 | 4-1/8 |
| 12311 | 12061 | 27/64 | 1/2 | 1 | 4-1/8 |
| 12313 | 12063 | 7/16 | 1/2 | 1 | 4-1/8 |
| 12315 | 12065 | 29/64 | 1/2 | 1 | 4-1/8 |
| 12317 | 12067 | 15/32 | 1/2 | 1 | 4-1/8 |
| 12319 | 12069 | 31/64 | 1/2 | 1 | 4-1/8 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# COBALT & HSS END MILLS

**E2051 SERIES** 8% COBALT (M42) FLAT SHANK
**E1051 SERIES** HSS (M2) FLAT SHANK

## HSSCo8 & HSS, 4 FLUTE REGULAR LENGTH DOUBLE

▶ Series E2051 four flute end mills are the double-end version of E2031 four flute tools and are used for the same type of finishing operation. Two tools on one shank saves on sharpening set-up as well as on initial tool costs. Easy to regrind.

HSS Co8 | HSS | 4 | 30° | FLAT

P.775, 780, 784

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 8% COBALT (M42) | HSS (M2) | | | | |
| 12321 | 12071 | 1/2 | 1/2 | 1 | 4-1/8 |
| 12330 | 12080 | 9/16 | 5/8 | 1-3/8 | 5 |
| 12337 | 12087 | 5/8 | 5/8 | 1-3/8 | 5 |
| 12350 | 12100 | 11/16 | 3/4 | 1-5/8 | 5-5/8 |
| 12359 | 12109 | 3/4 | 3/4 | 1-5/8 | 5-5/8 |
| 12377 | 12127 | 13/16 | 7/8 | 1-7/8 | 6-1/8 |
| 12394 | 12144 | 7/8 | 7/8 | 1-7/8 | 6-1/8 |
| 12410 | 12160 | 15/16 | 1 | 1-7/8 | 6-3/8 |
| 12426 | 12176 | 1 | 1 | 1-7/8 | 6-3/8 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~—.0010 | ＊＊0~—.0020 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# COBALT & HSS END MILLS

**E2031 / E2032 SERIES** 8% COBALT (M42) FLAT SHANK

**E1031 / E1032 SERIES** HSS (M2) FLAT SHANK

## HSSCo8 & HSS, 4, 6&8 FLUTE REGULAR LENGTH 3/4″ SHANK

▶ E2031(3/4″ shank, multi flute, general purpose end mills) are recommended for finishing operations for Bridgeport machines and other similar operations. Easy to regrind.

HSS Co8 | HSS | 4-8 | 30° | FLAT

P.775, 780, 784

### E2031(8% COBALT) , E1031(HSS) Series ■ 4 FLUTE

Unit : Inch

| EDP No. 8% COBALT (M42) | EDP No. HSS (M2) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 04359 | 04109 | 3/4 | 3/4 | 1-5/8 | 3-7/8 |
| 04375 | 04125 | 13/16 | 3/4 | 1-7/8 | 4-1/8 |
| 04391 | 04141 | 7/8 | 3/4 | 1-7/8 | 4-1/8 |
| 04407 | 04157 | 15/16 | 3/4 | 1-7/8 | 4-1/8 |
| 04422 | 04172 | 1 | 3/4 | 1-7/8 | 4-1/8 |

### E2032(8% COBALT) , E1032(HSS) Series ■ 6&8 FLUTE

Unit : Inch

| EDP No. 8% COBALT (M42) | EDP No. HSS (M2) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length | No.of Flute |
|---|---|---|---|---|---|---|
| 04432 | 04182 | 1-1/8 | 3/4 | 2 | 4-1/4 | 6 |
| 04440 | 04190 | 1-1/4 | 3/4 | 2 | 4-1/4 | 6 |
| 04458 | 04208 | 1-1/2 | 3/4 | 2 | 4-1/4 | 6 |
| 04468 | 04218 | 1-3/4 | 3/4 | 2 | 4-1/2 | 6 |
| 04476 | 04226 | 2 | 3/4 | 2 | 4-1/2 | 8 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~+.0010 | ＊＊0~+.0015 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

| Series | Carbon Steels ~HRc20 | Alloy Steels HRc20~30 | Prehardened Steels HRc30~40 | Hardened Steels HRc40~45 | Hardened Steels HRc45~55 | High Hardened Steels HRc55~70 | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E1031 E2031 | ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| E1032 E2032 | ◎ | ◎ | ○ | | | | ○ | | | | | | |

# COBALT & HSS END MILLS

**E2020 SERIES** 8% COBALT (M42) FLAT SHANK



## HSSCo8, 4 FLUTE REGULAR LENGTH BALL NOSE

▶ The four flute ball end mills are designed for milling of radius bottom slots fillets and special contours. The end teeth are cut to center allowing these end mills to drill into material at the beginning of a slotting cut.

HSS Co8 | 4 | 30° | FLAT

P.776, 781, 785

Unit : Inch

| EDP No. | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 8% COBALT (M42) | R | | | | |
| **43289** | R1/16 | **1/8** | 3/8 | 3/8 | 2-5/16 |
| **43293** | R3/32 | **3/16** | 3/8 | 1/2 | 2-3/8 |
| **43297** | R1/8 | **1/4** | 3/8 | 5/8 | 2-7/16 |
| **43301** | R5/32 | **5/16** | 3/8 | 3/4 | 2-1/2 |
| **43305** | R3/16 | **3/8** | 3/8 | 3/4 | 2-1/2 |
| **43312** | R7/32 | **7/16** | 3/8 | 1 | 2-11/16 |
| **43321** | R1/4 | **1/2** | 1/2 | 1-1/4 | 3-1/4 |
| **43337** | R5/16 | **5/8** | 5/8 | 1-5/8 | 3-3/4 |
| **43350** | R11/32 | **11/16** | 5/8 | 1-5/8 | 3-3/4 |
| **43359** | R3/8 | **3/4** | 3/4 | 1-5/8 | 3-7/8 |
| **43394** | R7/16 | **7/8** | 7/8 | 1-7/8 | 4-1/8 |
| **43426** | R1/2 | **1** | 1 | 2 | 4-1/2 |
| **43435** | R9/16 | **1-1/8** | 1 | 2 | 4-1/2 |
| **43445** | R5/8 | **1-1/4** | 1-1/4 | 2 | 4-1/2 |
| **43461** | R3/4 | **1-1/2** | 1-1/4 | 2 | 4-1/2 |
| **43477** | R1 | **2** | 1-1/4 | 2 | 4-1/2 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~+.0010 | ＊＊0~+.0015 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# COBALT & HSS END MILLS

**E2021 SERIES** 8% COBALT (M42) FLAT SHANK

## HSSCo8, 4 FLUTE LONG LENGTH BALL NOSE

▶Longer flute length than E2020 type and suitable for high efficient copying process and deep cutting of die mold corner radius.

HSS Co8 | 4 | 30° | FLAT P.776, 781, 785

Unit : Inch

| EDP No. | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 8% COBALT (M42) | R | | | | |
| **44297** | R1/8 | **1/4** | 3/8 | 1-1/4 | 3-1/16 |
| **44301** | R5/32 | **5/16** | 3/8 | 1-3/8 | 3-1/8 |
| **44305** | R3/16 | **3/8** | 3/8 | 1-1/2 | 3-1/4 |
| **44321** | R1/4 | **1/2** | 1/2 | 2 | 4 |
| **44337** | R5/16 | **5/8** | 5/8 | 2-1/2 | 4-5/8 |
| **44359** | R3/8 | **3/4** | 3/4 | 3 | 5-1/4 |
| **44394** | R7/16 | **7/8** | 7/8 | 3-1/2 | 5-3/4 |
| **44426** | R1/2 | **1** | 1 | 4 | 6-1/2 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~+.0010 | **0~+.0015 |

**The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# COBALT & HSS END MILLS

**E2069 SERIES** 8% COBALT (M42) FLAT SHANK

## HSSCo8, 4 FLUTE REGULAR LENGTH BALL NOSE DOUBLE

▶ Same construction features as E2020 end mill in a more economical version. Removes more material per grind. Machine ground notch assures positive anchorage in tool holder.

HSS Co8 | 4 | 30° | FLAT

P.776, 781, 785

Unit : Inch

| EDP No. | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 8% COBALT (M42) | R | | | | |
| **46289** | R1/16 | **1/8** | 3/8 | 3/8 | 3-1/16 |
| **46293** | R3/32 | **3/16** | 3/8 | 1/2 | 3-1/4 |
| **46297** | R1/8 | **1/4** | 3/8 | 5/8 | 3-3/8 |
| **46301** | R5/32 | **5/16** | 3/8 | 3/4 | 3-1/2 |
| **46305** | R3/16 | **3/8** | 3/8 | 3/4 | 3-1/2 |
| **46313** | R7/32 | **7/16** | 1/2 | 1 | 4-1/8 |
| **46321** | R1/4 | **1/2** | 1/2 | 1 | 4-1/8 |
| **46337** | R5/16 | **5/8** | 5/8 | 1-3/8 | 5 |
| **46359** | R3/8 | **3/4** | 3/4 | 1-5/8 | 5-5/8 |
| **46426** | R1/2 | **1** | 1 | 1-7/8 | 6-3/8 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~—.0010 | ＊＊0~—.0020 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |



CBN END MILL
i-Xmill END MILL
X5070 END MILLS
X-SPEED ROUGHER END MILLS
X-POWER END MILLS
JET-POWER END MILLS
V7 Mill STEEL END MILLS
V7 Mill INOX END MILLS
ALU-POWER END MILLS
D-POWER END MILLS
STANDARD CARBIDE END MILLS
TANK-POWER END MILLS
STANDARD COBALT & HSS END MILLS
TECHNICAL DATA

# COBALT & HSS END MILLS

**E2039 SERIES** 8% COBALT (M42) FLAT SHANK

**E1039 SERIES** HSS (M2) FLAT SHANK

## HSSCo8 & HSS, 4 FLUTE REGULAR LENGTH CENTER CUTTING

▶ Center cutting allows these end mills to drill into the part for the beginning of a slot. These center cutting end mills are recommended for pocketing, tracer milling, cam milling, die sinking and slotting.

HSS Co8 | HSS | 4 | 30° | FLAT

P.775, 780, 784

Unit : Inch

| EDP No. 8% COBALT (M42) | EDP No. HSS (M2) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 07289 | 07039 | 1/8 | 3/8 | 3/8 | 2-5/16 |
| 07291 | 07041 | 5/32 | 3/8 | 7/16 | 2-3/8 |
| 07293 | 07043 | 3/16 | 3/8 | 1/2 | 2-3/8 |
| 07295 | 07045 | 7/32 | 3/8 | 9/16 | 2-7/16 |
| 07297 | 07047 | 1/4 | 3/8 | 5/8 | 2-7/16 |
| 07299 | 07049 | 9/32 | 3/8 | 11/16 | 2-1/2 |
| 07301 | 07051 | 5/16 | 3/8 | 3/4 | 2-1/2 |
| 07303 | 07053 | 11/32 | 3/8 | 3/4 | 2-1/2 |
| 07305 | 07055 | 3/8 | 3/8 | 3/4 | 2-1/2 |
| 07308 | 07058 | 13/32 | 3/8 | 1 | 2-11/16 |
| 07312 | 07062 | 7/16 | 3/8 | 1 | 2-11/16 |
| 07316 | 07066 | 15/32 | 3/8 | 1 | 2-11/16 |
| 07320 | 07070 | 1/2 | 3/8 | 1 | 2-11/16 |
| 07321 | 07071 | 1/2 | 1/2 | 1-1/4 | 3-1/4 |

■ The TiN coated, TiCN coated or TiAIN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAIN F), CE(TiAIN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAIN F), HE(TiAIN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~+.0010 | ＊＊0~+.0015 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# COBALT & HSS END MILLS

**E2039 SERIES** 8% COBALT (M42) FLAT SHANK
**E1039 SERIES** HSS (M2) FLAT SHANK

## HSSCo8 & HSS, 4 FLUTE REGULAR LENGTH CENTER CUTTING

▶ Center cutting allows these end mills to drill into the part for the beginning of a slot. These center cutting end mills are recommended for pocketing, tracer milling, cam milling, die sinking and slotting.

HSS Co8 | HSS | 4 | 30° | FLAT

P.775, 780, 784

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 8% COBALT (M42) | HSS (M2) | | | | |
| 07336 | 07086 | 5/8 | 1/2 | 1-3/8 | 3-3/8 |
| 07337 | 07087 | 5/8 | 5/8 | 1-5/8 | 3-3/4 |
| 07348 | 07098 | 11/16 | 5/8 | 1-5/8 | 3-3/4 |
| 07357 | 07107 | 3/4 | 1/2 | 1-5/8 | 3-5/8 |
| 07358 | 07108 | 3/4 | 5/8 | 1-5/8 | 3-3/4 |
| 07359 | 07109 | 3/4 | 3/4 | 1-5/8 | 3-7/8 |
| 07391 | 07141 | 7/8 | 3/4 | 1-7/8 | 4-1/8 |
| 07394 | 07144 | 7/8 | 7/8 | 1-7/8 | 4-1/8 |
| 07420 | 07170 | 1 | 5/8 | 1-7/8 | 4 |
| 07422 | 07172 | 1 | 3/4 | 1-7/8 | 4-1/8 |
| 07426 | 07176 | 1 | 1 | 2 | 4-1/2 |
| 07435 | 07185 | 1-1/8 | 1 | 2 | 4-1/2 |
| 07445 | 07195 | 1-1/4 | 1-1/4 | 2 | 4-1/2 |
| 07461 | 07211 | 1-1/2 | 1-1/4 | 2 | 4-1/2 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~+.0010 | * *0~+.0015 |

**The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

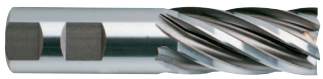
# COBALT & HSS END MILLS

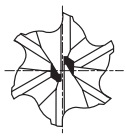
**E2042 SERIES** 8% COBALT (M42) FLAT SHANK

**E1042 SERIES** HSS (M2) FLAT SHANK

## HSSCo8 & HSS, 6 FLUTE REGULAR LENGTH CENTER CUTTING

▶ Center cutting allows these end mills to drill into the part for the beginning of a slot. These center cutting end mills are recommended for pocketing, tracer milling, cam milling, die sinking and slotting.





HSS Co8 | HSS | 6 | 30° | FLAT

P.775, 780, 784

Unit : Inch

| EDP No. 8% COBALT (M42) | EDP No. HSS (M2) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 07322 | 07072 | 1/2 | 1/2 | 1-1/4 | 3-1/4 |
| 07338 | 07088 | 5/8 | 5/8 | 1-5/8 | 3-3/4 |
| 07349 | 07099 | 11/16 | 5/8 | 1-5/8 | 3-3/4 |
| 07360 | 07110 | 3/4 | 3/4 | 1-5/8 | 3-7/8 |
| 07395 | 07145 | 7/8 | 7/8 | 1-7/8 | 4-1/8 |
| 07427 | 07177 | 1 | 1 | 2 | 4-1/2 |
| 07436 | 07186 | 1-1/8 | 1 | 2 | 4-1/2 |
| 07446 | 07196 | 1-1/4 | 1-1/4 | 2 | 4-1/2 |
| 07448 | | 1-5/16 | 3/4 | 2 | 4-1/4 |
| 07462 | 07212 | 1-1/2 | 1-1/4 | 2 | 4-1/2 |
| 07478 | 07228 | 2 | 1-1/4 | 2 | 4-1/2 |
| 07481 | 07231 | 2 | 2 | 2 | 5-3/4 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~+.0010 | ＊＊0~+.0015 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

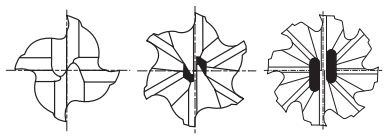
| Carbon Steels ~HRc20 | Alloy Steels HRc20~30 | Prehardened Steels HRc30~40 | Hardened Steels HRc40~45 | Hardened Steels HRc45~55 | High Hardened Steels HRc55~70 | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ◎ | ◎ | ○ | | | | ○ | | | | | | |

# COBALT & HSS END MILLS

**E2039 SERIES** 8% COBALT (M42) FLAT SHANK
**E2042 SERIES** 8% COBALT (M42) FLAT SHANK

## HSSCo8, MULTI FLUTE MEDIUM LENGTH CENTER CUTTING

▶ Center cutting allows these end mills to drill into the part for the beginning of a slot. These center cutting end mills are recommended for pocketing, tracer milling, cam milling, die sinking and slotting.



HSS Co8 | 4-8 | 30° | FLAT

P.775, 780, 784

### E2039(4 FLUTE), E2042(6&8 FLUTE) Series

Unit : Inch

| EDP No. 8% COBALT (M42) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length | No.of Flute |
|---|---|---|---|---|---|
| 07901 | 1 | 1 | 3 | 5-1/2 | 4 |
| 07902 | 1-1/4 | 1-1/4 | 3 | 5-1/2 | 4 |
| 07903 | 1-1/2 | 1-1/4 | 3 | 5-1/2 | 4 |
| 07094 | 1 | 1 | 3 | 5-1/2 | 6 |
| 07095 | 1-1/4 | 1-1/4 | 3 | 5-1/2 | 6 |
| 07096 | 1-1/2 | 1-1/4 | 3 | 5-1/2 | 6 |
| 07097 | 1-3/4 | 1-1/4 | 3 | 5-1/2 | 6 |
| 99098 | 2 | 1-1/4 | 3 | 5-1/2 | 8 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~+.0010 | * *0~+.0015 |

**The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# COBALT & HSS END MILLS

**E2040 / E2162 SERIES** — 8% COBALT (M42) FLAT SHANK

**E1040 / E1162 SERIES** — HSS (M2) FLAT SHANK

## HSSCo8 & HSS, 4&6 FLUTE LONG LENGTH CENTER CUTTING

▶ Longer flute length than E2039 type, E2042 and allows deeper cutting.

HSS Co8 | HSS | 4&6 | 30° | FLAT

P.775, 780, 784

### E2040(8% COBALT) , E1040(HSS) Series ■ 4 FLUTE

Unit : Inch

| EDP No. 8% COBALT (M42) | EDP No. HSS (M2) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 08297 | 08047 | 1/4 | 3/8 | 1-1/4 | 3-1/16 |
| 08301 | 08051 | 5/16 | 3/8 | 1-3/8 | 3-1/8 |
| 08305 | 08055 | 3/8 | 3/8 | 1-1/2 | 3-1/4 |
| 08321 | 08071 | 1/2 | 1/2 | 2 | 4 |
| 08337 | 08087 | 5/8 | 5/8 | 2-1/2 | 4-5/8 |
| 08359 | 08109 | 3/4 | 3/4 | 3 | 5-1/4 |
| 08394 | 08144 | 7/8 | 7/8 | 3-1/2 | 5-3/4 |
| 08426 | 08176 | 1 | 1 | 4 | 6-1/2 |
| 08445 | 08195 | 1-1/4 | 1-1/4 | 4 | 6-1/2 |
| 08461 | 08211 | 1-1/2 | 1-1/4 | 4 | 6-1/2 |

### E2162(8% COBALT) , E1162(HSS) Series ■ 6 FLUTE

Unit : Inch

| EDP No. 8% COBALT (M42) | EDP No. HSS (M2) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 08322 | 08072 | 1/2 | 1/2 | 2 | 4 |
| 08338 | 08088 | 5/8 | 5/8 | 2-1/2 | 4-5/8 |
| 08360 | 08110 | 3/4 | 3/4 | 3 | 5-1/4 |
| 08395 | 08145 | 7/8 | 7/8 | 3-1/2 | 5-3/4 |
| 08427 | 08177 | 1 | 1 | 4 | 6-1/2 |
| 08446 | 08196 | 1-1/4 | 1-1/4 | 4 | 6-1/2 |
| 08462 | 08212 | 1-1/2 | 1-1/4 | 4 | 6-1/2 |
| 08478 | 08228 | 2 | 1-1/4 | 4 | 6-1/2 |
| 08485 | 08235 | 2 | 2 | 4 | 7-3/4 |
| 08489 | 08239 | 2 | 2 | 6 | 9-3/4 |

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~+.0010 | ＊＊0~+.0015 |

＊＊ The shank of end mills is the same diameter as the cutting portion.

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

◎ : Excellent ○ : Good

| Series | Carbon Steels ~HRc20 | Alloy Steels HRc20~30 | Prehardened Steels HRc30~40 | Hardened Steels HRc40~45 | Hardened Steels HRc45~55 | High Hardened Steels HRc55~70 | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E1040 E2040 | ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| E1162 E2162 | ◎ | ◎ | ○ | | | | ○ | | | | | | |

# COBALT & HSS END MILLS

**E2041 / E2175 SERIES** — 8% COBALT (M42) FLAT SHANK
**E1041 / E1175 SERIES** — HSS (M2) FLAT SHANK

## HSSCo8 & HSS, 4&6 FLUTE EXTRA LONG LENGTH CENTER CUTTING

▶ Provided with longest flute length and suitable for high accuracy machining of deep step.

HSS Co8 | HSS | 4&6 | 30° | FLAT

P.775, 780, 784

### E2041(8% COBALT) , E1041(HSS) Series ■ 4 FLUTE

Unit : Inch

| EDP No. 8% COBALT (M42) | EDP No. HSS (M2) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 09297 | 09047 | 1/4 | 3/8 | 1-3/4 | 3-9/16 |
| 09301 | 09051 | 5/16 | 3/8 | 2 | 3-3/4 |
| 09305 | 09055 | 3/8 | 3/8 | 2-1/2 | 4-1/4 |
| 09321 | 09071 | 1/2 | 1/2 | 3 | 5 |
| 09337 | 09087 | 5/8 | 5/8 | 4 | 6-1/8 |
| 09359 | 09109 | 3/4 | 3/4 | 4 | 6-1/4 |
| 09394 | 09144 | 7/8 | 7/8 | 5 | 7-1/4 |
| 09426 | 09176 | 1 | 1 | 6 | 8-1/2 |
| 09445 | 09195 | 1-1/4 | 1-1/4 | 6 | 8-1/2 |

### E2175(8% COBALT) , E1175(HSS) Series ■ 6 FLUTE

Unit : Inch

| EDP No. 8% COBALT (M42) | EDP No. HSS (M2) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 09322 | 09072 | 1/2 | 1/2 | 3 | 5 |
| 09338 | 09088 | 5/8 | 5/8 | 4 | 6-1/8 |
| 09360 | 09110 | 3/4 | 3/4 | 4 | 6-1/4 |
| 09395 | 09145 | 7/8 | 7/8 | 5 | 7-1/4 |
| 09427 | 09177 | 1 | 1 | 6 | 8-1/2 |
| 09446 | 09196 | 1-1/4 | 1-1/4 | 6 | 8-1/2 |
| 09462 | 09212 | 1-1/2 | 1-1/4 | 8 | 10-1/2 |
| 09491 | 09241 | 2 | 2 | 8 | 11-3/4 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~+.0010 | ＊＊0~+.0015 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

| Series | Carbon Steels ~HRc20 | Alloy Steels HRc20~30 | Prehardened Steels HRc30~40 | Hardened Steels HRc40~45 | Hardened Steels HRc45~55 | High Hardened Steels HRc55~70 | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E1041 E2041 | ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |
| E1175 E2175 | ◎ | ◎ | ○ | | | | ○ | | | | | | |

# COBALT & HSS END MILLS

**E2053 SERIES** 8% COBALT (M42) FLAT SHANK

**E1053 SERIES** HSS (M2) FLAT SHANK

## HSSCo8 & HSS, 4 FLUTE REGULAR LENGTH DOUBLE CENTER CUTTING

▶ Series E2053 end mills are the double-end version of E2039 center cutting single-end tools. They are used for slotting, shallow pocketing, tracer milling or die sinking and similar operation.

HSS Co8 | HSS | 4 | 30° | FLAT

P.775, 780, 784

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 8% COBALT (M42) | HSS (M2) | | | | |
| 13289 | 13039 | 1/8 | 3/8 | 3/8 | 3-1/16 |
| 13290 | 13040 | 9/64 | 3/8 | 7/16 | 3-1/8 |
| 13291 | 13041 | 5/32 | 3/8 | 7/16 | 3-1/8 |
| 13292 | 13042 | 11/64 | 3/8 | 1/2 | 3-1/4 |
| 13293 | 13043 | 3/16 | 3/8 | 1/2 | 3-1/4 |
| 13294 | 13044 | 13/64 | 3/8 | 9/16 | 3-1/4 |
| 13295 | 13045 | 7/32 | 3/8 | 9/16 | 3-1/4 |
| 13296 | 13046 | 15/64 | 3/8 | 5/8 | 3-3/8 |
| 13297 | 13047 | 1/4 | 3/8 | 5/8 | 3-3/8 |
| 13298 | 13048 | 17/64 | 3/8 | 11/16 | 3-3/8 |
| 13299 | 13049 | 9/32 | 3/8 | 11/16 | 3-3/8 |
| 13300 | 13050 | 19/64 | 3/8 | 3/4 | 3-1/2 |
| 13301 | 13051 | 5/16 | 3/8 | 3/4 | 3-1/2 |
| 13302 | 13052 | 21/64 | 3/8 | 3/4 | 3-1/2 |
| 13303 | 13053 | 11/32 | 3/8 | 3/4 | 3-1/2 |
| 13304 | 13054 | 23/64 | 3/8 | 3/4 | 3-1/2 |
| 13305 | 13055 | 3/8 | 3/8 | 3/4 | 3-1/2 |
| 13307 | 13057 | 25/64 | 1/2 | 1 | 4-1/8 |
| 13309 | 13059 | 13/32 | 1/2 | 1 | 4-1/8 |
| 13311 | 13061 | 27/64 | 1/2 | 1 | 4-1/8 |
| 13313 | 13063 | 7/16 | 1/2 | 1 | 4-1/8 |
| 13315 | 13065 | 29/64 | 1/2 | 1 | 4-1/8 |
| 13317 | 13067 | 15/32 | 1/2 | 1 | 4-1/8 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# COBALT & HSS END MILLS

**E2053 SERIES** 8% COBALT (M42) FLAT SHANK
**E1053 SERIES** HSS (M2) FLAT SHANK

## HSSCo8 & HSS, 4 FLUTE REGULAR LENGTH DOUBLE CENTER CUTTING

▶ Series E2053 end mills are the double-end version of E2039 center cutting single-end tools. They are used for slotting, shallow pocketing, tracer milling or die sinking and similar operation.

HSS Co8 | HSS | 4 | 30° | FLAT

P.775, 780, 784

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 8% COBALT (M42) | HSS (M2) | | | | |
| 13319 | 13069 | 31/64 | 1/2 | 1 | 4-1/8 |
| 13321 | 13071 | 1/2 | 1/2 | 1 | 4-1/8 |
| 13330 | 13080 | 9/16 | 5/8 | 1-3/8 | 5 |
| 13337 | 13087 | 5/8 | 5/8 | 1-3/8 | 5 |
| 13350 | 13100 | 11/16 | 3/4 | 1-5/8 | 5-5/8 |
| 13359 | 13109 | 3/4 | 3/4 | 1-5/8 | 5-5/8 |
| 13377 | 13127 | 13/16 | 7/8 | 1-7/8 | 6-1/8 |
| 13394 | 13144 | 7/8 | 7/8 | 1-7/8 | 6-1/8 |
| 13426 | 13176 | 1 | 1 | 1-7/8 | 6-3/8 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~—.0010 | ＊＊0~—.0020 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

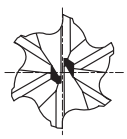
# COBALT & HSS END MILLS

**E2100 SERIES** 8% COBALT (M42) FLAT SHANK

**E1100 SERIES** HSS (M2) FLAT SHANK

## HSSCo8 & HSS, 6 FLUTE REGULAR with COMBINATION 2˝ SHANK CENTER CUTTING

▶ These are to be used for heavy hogging cuts in die-sinking, tape & tracer controlled milling and similar work.
The Heavy-Duty end mills are made with toughened Combination shank, heavy web construction, accurate machine-ground end-teeth notching and a special surface treatment to reduce cutting-edge wear.



HSS Co8 | HSS | 6 | 30° | FLAT

P.775, 780, 784

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 8% COBALT (M42) | HSS (M2) | | | | |
| **10481** | **10231** | **2** | 2 | 2 | 5-3/4 |
| **10485** | **10235** | **2** | 2 | 4 | 7-3/4 |
| **10487** | **10237** | **2** | 2 | 5 | 8-3/4 |
| **10489** | **10239** | **2** | 2 | 6 | 9-3/4 |
| **10491** | **10241** | **2** | 2 | 8 | 11-3/4 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) |
|---|
| 0~+.0030 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | | | | |

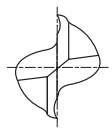
# COBALT & HSS END MILLS

**E2001 SERIES** 8% COBALT (M42) PLAIN SHANK
**E1001 SERIES** HSS (M2) PLAIN SHANK



## HSSCo8 & HSS, 2 FLUTE MINIATURE STUB LENGTH DOUBLE

▶ Tools under Miniature end mills have 3/16″ shank diameter without flats. They are designed with positive rake angle geometry and a high helix angle to insure free cutting action. The flute design provides good strength behind the cutting edge. Suitable for finishing of precision components such as watch, camera, electronic apparatus molds, etc.



HSS Co8 | HSS | 2 | 39° | 30° | PLAIN

~Ø3/32 Ø7/64~

P.778

Unit : Inch

| EDP No. 8% COBALT (M42) | EDP No. HSS (M2) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 49252 | 49002 | 1/32 | 3/16 | 3/64 | 2 |
| 49254 | 49004 | 3/64 | 3/16 | 1/16 | 2 |
| 49256 | 49006 | 1/16 | 3/16 | 3/32 | 2 |
| 49258 | 49008 | 5/64 | 3/16 | 1/8 | 2 |
| 49260 | 49010 | 3/32 | 3/16 | 9/64 | 2 |
| 49262 | 49012 | 7/64 | 3/16 | 5/32 | 2 |
| 49264 | 49014 | 1/8 | 3/16 | 3/16 | 2 |
| 49266 | 49016 | 9/64 | 3/16 | 7/32 | 2 |
| 49268 | 49018 | 5/32 | 3/16 | 15/64 | 2 |
| 49270 | 49020 | 11/64 | 3/16 | 1/4 | 2 |
| 49272 | 49022 | 3/16 | 3/16 | 9/32 | 2 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~—.0010 | ＊＊0~—.0020 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# COBALT & HSS END MILLS

**E2003 SERIES** 8% COBALT (M42) PLAIN SHANK

**E1003 SERIES** HSS (M2) PLAIN SHANK

## HSSCo8 & HSS, 2 FLUTE MINIATURE REGULAR LENGTH DOUBLE

▶ Suitable for finishing of precision components such as watch, camera electronic apparatus molds, etc.

HSS Co8 | HSS | 2 | 39° (~Ø3/32) | 30° (Ø7/64~) | PLAIN | P.778

Unit : Inch

| EDP No. 8% COBALT (M42) | EDP No. HSS (M2) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 50252 | 50002 | 1/32 | 3/16 | 3/32 | 2-1/4 |
| 50254 | 50004 | 3/64 | 3/16 | 9/64 | 2-1/4 |
| 50256 | 50006 | 1/16 | 3/16 | 3/16 | 2-1/4 |
| 50258 | 50008 | 5/64 | 3/16 | 15/64 | 2-1/4 |
| 50260 | 50010 | 3/32 | 3/16 | 9/32 | 2-1/4 |
| 50262 | 50012 | 7/64 | 3/16 | 21/64 | 2-1/4 |
| 50264 | 50014 | 1/8 | 3/16 | 3/8 | 2-1/4 |
| 50266 | 50016 | 9/64 | 3/16 | 13/32 | 2-1/4 |
| 50268 | 50018 | 5/32 | 3/16 | 7/16 | 2-1/4 |
| 50270 | 50020 | 11/64 | 3/16 | 1/2 | 2-1/4 |
| 50272 | 50022 | 3/16 | 3/16 | 1/2 | 2-1/4 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~—.0010 | ＊＊0~—.0020 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

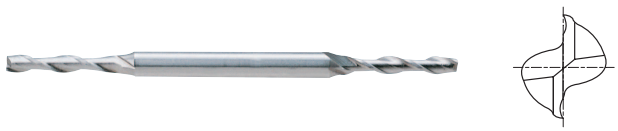
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# COBALT & HSS END MILLS

**E2005 SERIES** 8% COBALT (M42) PLAIN SHANK
**E1005 SERIES** HSS (M2) PLAIN SHANK

## HSSCo8 & HSS, 2 FLUTE MINIATURE LONG LENGTH DOUBLE

▶ Suitable for finishing of precision components such as watch, camera electronic apparatus molds, etc.



HSS Co8 | HSS | 2 | 39° ~Ø3/32 | 30° Ø7/64~ | PLAIN | P.778

Unit : Inch

| EDP No. 8% COBALT (M42) | EDP No. HSS (M2) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 51256 | 51006 | 1/16 | 3/16 | 7/32 | 2-1/2 |
| 51258 | 51008 | 5/64 | 3/16 | 1/4 | 2-1/2 |
| 51260 | 51010 | 3/32 | 3/16 | 9/32 | 2-5/8 |
| 51262 | 51012 | 7/64 | 3/16 | 9/32 | 2-5/8 |
| 51264 | 51014 | 1/8 | 3/16 | 3/4 | 3-1/8 |
| 51266 | 51016 | 9/64 | 3/16 | 3/4 | 3-1/8 |
| 51268 | 51018 | 5/32 | 3/16 | 7/8 | 3-1/4 |
| 51270 | 51020 | 11/64 | 3/16 | 7/8 | 3-1/4 |
| 51272 | 51022 | 3/16 | 3/16 | 1 | 3-3/8 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~—.0010 | ＊＊0~—.0020 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

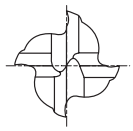
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# COBALT & HSS END MILLS

**E2002 SERIES** 8% COBALT (M42) PLAIN SHANK
**E1002 SERIES** HSS (M2) PLAIN SHANK

## HSSCo8 & HSS, 4FLUTE MINIATURE STUB LENGTH DOUBLE

▶ Suitable for finishing of precision components such as watch, camera electronic apparatus molds, etc.



HSS Co8 | HSS | 4 | 39° ~Ø3/32 | 30° Ø7/64~ | PLAIN

P.778

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 8% COBALT (M42) | HSS (M2) | | | | |
| **52256** | **52006** | **1/16** | 3/16 | 3/32 | 2 |
| **52258** | **52008** | **5/64** | 3/16 | 1/8 | 2 |
| **52260** | **52010** | **3/32** | 3/16 | 9/64 | 2 |
| **52262** | **52012** | **7/64** | 3/16 | 5/32 | 2 |
| **52264** | **52014** | **1/8** | 3/16 | 3/16 | 2 |
| **52266** | **52016** | **9/64** | 3/16 | 7/32 | 2 |
| **52268** | **52018** | **5/32** | 3/16 | 15/64 | 2 |
| **52270** | **52020** | **11/64** | 3/16 | 1/4 | 2 |
| **52272** | **52022** | **3/16** | 3/16 | 9/32 | 2 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~+.0010 | ＊＊0~—.0020 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# COBALT & HSS END MILLS

**E2004 SERIES** 8% COBALT (M42) PLAIN SHANK
**E1004 SERIES** HSS (M2) PLAIN SHANK

## HSSCo8 & HSS, 4FLUTE MINIATURE REGULAR LENGTH DOUBLE

▶ Suitable for finishing of precision components such as watch, camera electronic apparatus molds, etc.

HSS Co8 | HSS | 4 | 39° | 30° | PLAIN

~Ø3/32 Ø7/64~

P.778

Unit : Inch

| EDP No. 8% COBALT (M42) | EDP No. HSS (M2) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 53256 | 53006 | 1/16 | 3/16 | 3/16 | 2-1/4 |
| 53258 | 53008 | 5/64 | 3/16 | 15/64 | 2-1/4 |
| 53260 | 53010 | 3/32 | 3/16 | 9/32 | 2-1/4 |
| 53262 | 53012 | 7/64 | 3/16 | 21/64 | 2-1/4 |
| 53264 | 53014 | 1/8 | 3/16 | 3/8 | 2-1/4 |
| 53266 | 53016 | 9/64 | 3/16 | 13/32 | 2-1/4 |
| 53268 | 53018 | 5/32 | 3/16 | 7/16 | 2-1/4 |
| 53270 | 53020 | 11/64 | 3/16 | 1/2 | 2-1/4 |
| 53272 | 53022 | 3/16 | 3/16 | 1/2 | 2-1/4 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~+.0010 | ＊＊0~—.0020 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

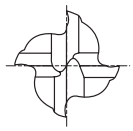
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# COBALT & HSS END MILLS

**E2006 SERIES** 8% COBALT (M42) PLAIN SHANK
**E1006 SERIES** HSS (M2) PLAIN SHANK

## HSSCo8 & HSS, 4FLUTE MINIATURE LONG LENGTH DOUBLE

▶ Suitable for finishing of precision components such as watch, camera electronic apparatus molds, etc.



HSS Co8 | HSS | 4 | 39° ~Ø3/32 | 30° Ø7/64~ | PLAIN

P.778

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 8% COBALT (M42) | HSS (M2) | | | | |
| **54256** | **54006** | **1/16** | 3/16 | 7/32 | 2-1/2 |
| **54258** | **54008** | **5/64** | 3/16 | 1/4 | 2-1/2 |
| **54260** | **54010** | **3/32** | 3/16 | 9/32 | 2-5/8 |
| **54262** | **54012** | **7/64** | 3/16 | 9/32 | 2-5/8 |
| **54264** | **54014** | **1/8** | 3/16 | 3/4 | 3-1/8 |
| **54266** | **54016** | **9/64** | 3/16 | 3/4 | 3-1/8 |
| **54268** | **54018** | **5/32** | 3/16 | 7/8 | 3-1/4 |
| **54270** | **54020** | **11/64** | 3/16 | 7/8 | 3-1/4 |
| **54272** | **54022** | **3/16** | 3/16 | 1 | 3-3/8 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~+.0010 | ＊＊0~—.0020 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# COBALT & HSS END MILLS

**E2008 SERIES** 8% COBALT (M42) PLAIN SHANK
**E1008 SERIES** HSS (M2) PLAIN SHANK

## HSSCo8 & HSS, 2 FLUTE MINIATURE STUB LENGTH BALL NOSE DOUBLE

▶ Helical flute in the nose radius.
Suitable for high efficient copying process and cutting of die mold corner radius.

HSS Co8 | HSS | 2 | 39° | 30° | PLAIN

~Ø3/32 Ø7/64~

P.778

Unit : Inch

| EDP No. | | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| 8% COBALT (M42) | HSS (M2) | R | | | | |
| **55256** | **55006** | R1/32 | **1/16** | 3/16 | 3/32 | 2 |
| **55260** | **55010** | R3/64 | **3/32** | 3/16 | 9/64 | 2 |
| **55264** | **55014** | R1/16 | **1/8** | 3/16 | 3/16 | 2 |
| **55268** | **55018** | R5/64 | **5/32** | 3/16 | 15/64 | 2 |
| **55272** | **55022** | R3/32 | **3/16** | 3/16 | 9/32 | 2 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~—.0010 | ＊＊0~—.0020 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# COBALT & HSS END MILLS

**E2013 SERIES** 8% COBALT (M42) PLAIN SHANK
**E1013 SERIES** HSS (M2) PLAIN SHANK

## HSSCo8 & HSS, 2 FLUTE MINIATURE REGULAR LENGTH BALL NOSE DOUBLE

▶ Helical flute in the nose radius.
Suitable for high efficient copying process and cutting of die mold corner radius.

HSS Co8 | HSS | 2 | 39° ~Ø3/32 | 30° Ø7/64~ | PLAIN

P.778

Unit : Inch

| EDP No. | | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| 8% COBALT (M42) | HSS (M2) | R | | | | |
| **56252** | **56002** | R1/64 | **1/32** | 3/16 | 3/32 | 2-1/4 |
| **56254** | **56004** | R3/128 | **3/64** | 3/16 | 9/64 | 2-1/4 |
| **56256** | **56006** | R1/64 | **1/16** | 3/16 | 3/16 | 2-1/4 |
| **56258** | **56008** | R5/128 | **5/64** | 3/16 | 15/64 | 2-1/4 |
| **56260** | **56010** | R3/64 | **3/32** | 3/16 | 9/32 | 2-1/4 |
| **56262** | **56012** | R7/128 | **7/64** | 3/16 | 21/64 | 2-1/4 |
| **56264** | **56014** | R1/16 | **1/8** | 3/16 | 3/8 | 2-1/4 |
| **56266** | **56016** | R9/128 | **9/64** | 3/16 | 13/32 | 2-1/4 |
| **56268** | **56018** | R5/64 | **5/32** | 3/16 | 7/16 | 2-1/4 |
| **56270** | **56020** | R11/128 | **11/64** | 3/16 | 1/2 | 2-1/4 |
| **56272** | **56022** | R3/32 | **3/16** | 3/16 | 1/2 | 2-1/4 |

■ The TiN coated, TiCN coated or TiAIN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAIN F), CE(TiAIN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAIN F), HE(TiAIN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~—.0010 | ＊＊0~—.0020 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# COBALT & HSS END MILLS

**E2015 SERIES** 8% COBALT (M42) PLAIN SHANK
**E1015 SERIES** HSS (M2) PLAIN SHANK

## HSSCo8 & HSS, 2 FLUTE MINIATURE LONG LENGTH BALL NOSE DOUBLE

▶ Helical flute in the nose radius.
Suitable for high efficient copying process and cutting of die mold corner radius.

HSS Co8 | HSS | 2 | 39° | 30° | PLAIN

~Ø3/32 Ø7/64~

P.778

Unit : Inch

| EDP No. | | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| 8% COBALT (M42) | HSS (M2) | R | | | | |
| **57256** | **57006** | R1/32 | **1/16** | 3/16 | 7/32 | 2-1/2 |
| **57260** | **57010** | R3/64 | **3/32** | 3/16 | 9/32 | 2-5/8 |
| **57264** | **57014** | R1/16 | **1/8** | 3/16 | 3/4 | 3-1/8 |
| **57268** | **57018** | R5/64 | **5/32** | 3/16 | 7/8 | 3-1/4 |
| **57272** | **57022** | R3/32 | **3/16** | 3/16 | 1 | 3-3/8 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~+.0010 | ＊＊0~—.0020 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

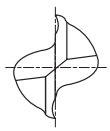
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# COBALT & HSS END MILLS

**E1070 SERIES** HSS (M2) FLAT SHANK

## HSS, 2 FLUTE 42° HELIX REGULAR & MEDIUM LENGTH for ALUMINUM

▶ The two flute end mills for aluminum have High Helix flute design making them well suited for milling aluminum and other non-ferrous materials. Special rake angles and low micro inch finishes on the primary clearance angles and flute faces insure free cutting action, fine finishes and longer tool life for both non-ferrous materials as well as harder alloys. These tools are made from regular HSS(M2), which is good for aluminum cutting.



HSS | 2 | 42° | FLAT

P.773

### ■ REGULAR LENGTH

Unit : Inch

| EDP No. HSS (M2) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|
| 17047 | 1/4 | 3/8 | 5/8 | 2-7/16 |
| 17051 | 5/16 | 3/8 | 3/4 | 2-1/2 |
| 17055 | 3/8 | 3/8 | 3/4 | 2-1/2 |
| 17062 | 7/16 | 3/8 | 1 | 2-11/16 |
| 17071 | 1/2 | 1/2 | 1-1/4 | 3-1/4 |
| 17087 | 5/8 | 5/8 | 1-5/8 | 3-3/4 |
| 17109 | 3/4 | 3/4 | 1-5/8 | 3-7/8 |
| 17141 | 7/8 | 3/4 | 1-7/8 | 4-1/8 |
| 17144 | 7/8 | 7/8 | 1-7/8 | 4-1/8 |
| 17172 | 1 | 3/4 | 1-7/8 | 4-1/8 |
| 17176 | 1 | 1 | 2 | 4-1/2 |
| 17195 | 1-1/4 | 1-1/4 | 2 | 4-1/2 |
| 17211 | 1-1/2 | 1-1/4 | 2 | 4-1/2 |
| 17219 | 1-3/4 | 1-1/4 | 2 | 4-1/2 |
| 17227 | 2 | 1-1/4 | 2 | 4-1/2 |

### ■ MEDIUM LENGTH

Unit : Inch

| EDP No. HSS (M2) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|
| 99089 | 1 | 1 | 3 | 5-1/2 |
| 99090 | 1-1/4 | 1-1/4 | 3 | 5-1/2 |
| 99091 | 1-1/2 | 1-1/4 | 3 | 5-1/2 |
| 99092 | 1-3/4 | 1-1/4 | 3 | 5-1/2 |
| 99093 | 2 | 1-1/4 | 3 | 5-1/2 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~+.0010 | * *0~+.0015 |

**The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

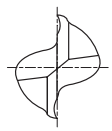
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | | | | | | | | | ◎ | | | |

# COBALT & HSS END MILLS

**E1071 SERIES** HSS (M2) FLAT SHANK
**E1072 SERIES** HSS (M2) FLAT SHANK

## HSS, 2 FLUTE 42° HELIX LONG & EXTRA LONG LENGTH for ALUMINUM

▶ Sharp cutting most suitable flute shape for cutting aluminum alloy, etc.
These tools are made from regular HSS(M2), which is good for aluminum cutting.



HSS | 2 | 42° | FLAT

P.773

### LONG LENGTH

Unit : Inch

| EDP No. HSS (M2) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|
| 18047 | 1/4 | 3/8 | 1-1/4 | 3-1/16 |
| 18051 | 5/16 | 3/8 | 1-3/8 | 3-1/8 |
| 18055 | 3/8 | 3/8 | 1-1/2 | 3-1/4 |
| 18063 | 7/16 | 1/2 | 1-3/4 | 3-3/4 |
| 18071 | 1/2 | 1/2 | 2 | 4 |
| 18087 | 5/8 | 5/8 | 2-1/2 | 4-5/8 |
| 18109 | 3/4 | 3/4 | 3 | 5-1/4 |
| 18176 | 1 | 1 | 4 | 6-1/2 |
| 18195 | 1-1/4 | 1-1/4 | 4 | 6-1/2 |
| 18211 | 1-1/2 | 1-1/4 | 4 | 6-1/2 |
| 18227 | 2 | 1-1/4 | 4 | 6-1/2 |

### EXTRA LONG LENGTH

Unit : Inch

| EDP No. HSS (M2) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|
| 19047 | 1/4 | 3/8 | 1-3/4 | 3-9/16 |
| 19051 | 5/16 | 3/8 | 2 | 3-3/4 |
| 19055 | 3/8 | 3/8 | 2-1/2 | 4-1/4 |
| 19071 | 1/2 | 1/2 | 3 | 5 |
| 19087 | 5/8 | 5/8 | 4 | 6-1/8 |
| 19109 | 3/4 | 3/4 | 4 | 6-1/4 |
| 19176 | 1 | 1 | 6 | 8-1/2 |
| 19195 | 1-1/4 | 1-1/4 | 6 | 8-1/2 |
| 19211 | 1-1/2 | 1-1/4 | 8 | 10-1/2 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~+.0010 | * * 0~+.0015 |

**The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

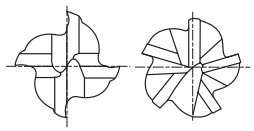
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ○ | | | | | | | | | ◎ | | | |

# COBALT & HSS END MILLS

**E2086 SERIES** 8% COBALT (M42) FLAT SHANK

## HSSCo8, MULTI FLUTE STUB LENGTH FINE PITCH ROUGHING CENTER CUTTING

▶ This general purpose rougher is designed for high production metal removal in a wide range of work piece material. It is suitable for a very broad spectrum of materials having up to high tensile strengths. In many cases, the milled surfaces are of acceptable quality.



HSS Co8 | FINE | 4&5 | 30° | FLAT

P.777, 782, 786

Unit : Inch

| EDP No. 8% COBALT (M42) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length | No.of Flute |
|---|---|---|---|---|---|
| **75297** | **1/4** | 3/8 | 1/4 | 2-1/16 | 4 |
| **75305** | **3/8** | 3/8 | 3/8 | 2-5/32 | 4 |
| **75313** | **7/16** | 1/2 | 1/2 | 2-1/2 | 4 |
| **75321** | **1/2** | 1/2 | 1/2 | 2-1/2 | 4 |
| **75337** | **5/8** | 5/8 | 5/8 | 2-3/4 | 4 |
| **75359** | **3/4** | 3/4 | 3/4 | 2-7/8 | 4 |
| **75391** | **7/8** | 3/4 | 7/8 | 3-1/8 | 5 |
| **75426** | **1** | 1 | 1 | 3-1/2 | 5 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| up to 1 | 0~+.0030 |
| over 1 | 0~+.0060 |

◎ : Excellent ○ : Good

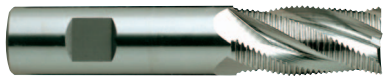
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# COBALT & HSS END MILLS

**E2085 SERIES** 8% COBALT (M42) FLAT SHANK

## HSSCo8, MULTI FLUTE REGULAR LENGTH FINE PITCH ROUGHING CENTER CUTTING

▶ This general purpose rougher is designed for high production metal removal in a wide range of work piece material. It is suitable for a very broad spectrum of materials having up to high tensile strengths. In many cases, the milled surfaces are of acceptable quality.



HSS Co8 | FINE | 3-5 | 30° | FLAT

P.777, 782, 786

Unit : Inch

| EDP No. 8% COBALT (M42) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length | No.of Flute |
|---|---|---|---|---|---|
| **76297** | **1/4** | 3/8 | 5/8 | 2-7/16 | 3 |
| **76301** | **5/16** | 3/8 | 3/4 | 2-1/2 | 3 |
| **76305** | **3/8** | 3/8 | 3/4 | 2-1/2 | 4 |
| **76312** | **7/16** | 3/8 | 1 | 2-11/16 | 4 |
| **76321** | **1/2** | 1/2 | 1-1/4 | 3-1/4 | 4 |
| **76328** | **9/16** | 1/2 | 1-3/8 | 3-3/8 | 4 |
| **76337** | **5/8** | 5/8 | 1-5/8 | 3-3/4 | 4 |
| **76359** | **3/4** | 3/4 | 1-5/8 | 3-7/8 | 4 |
| **76391** | **7/8** | 3/4 | 1-7/8 | 4-1/8 | 5 |
| **76394** | **7/8** | 7/8 | 1-7/8 | 4-1/8 | 5 |
| **76422** | **1** | 3/4 | 2 | 4-1/4 | 5 |
| **76426** | **1** | 1 | 2 | 4-1/2 | 5 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| up to 1 | 0~+.0030 |
| over 1 | 0~+.0060 |

◎ : Excellent ○ : Good

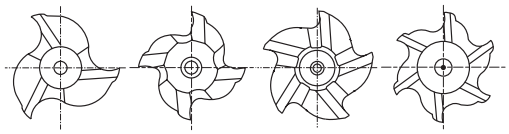
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# COBALT & HSS END MILLS

**E2079 SERIES** 8% COBALT (M42) FLAT SHANK

## HSSCo8, MULTI FLUTE REGULAR LENGTH FINE PITCH ROUGHING

▶ This general purpose rougher is designed for high production metal removal in a wide range of work piece material. It is suitable for a very broad spectrum of materials having up to high tensile strengths. In many cases, the milled surfaces are of acceptable quality.



HSS Co8 | FINE | 3-6 | 30° | FLAT

P.777, 782, 786

Unit : Inch

| EDP No. 8% COBALT (M42) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length | No.of Flute |
|---|---|---|---|---|---|
| 70297 | 1/4 | 3/8 | 5/8 | 2-7/16 | 3 |
| 70301 | 5/16 | 3/8 | 3/4 | 2-1/2 | 3 |
| 70305 | 3/8 | 3/8 | 3/4 | 2-1/2 | 4 |
| 70312 | 7/16 | 3/8 | 1 | 2-11/16 | 4 |
| 70321 | 1/2 | 1/2 | 1-1/4 | 3-1/4 | 4 |
| 70328 | 9/16 | 1/2 | 1-3/8 | 3-3/8 | 4 |
| 70337 | 5/8 | 5/8 | 1-5/8 | 3-3/4 | 4 |
| 70358 | 3/4 | 5/8 | 1-5/8 | 3-3/4 | 4 |
| 70359 | 3/4 | 3/4 | 1-5/8 | 3-7/8 | 4 |
| 70391 | 7/8 | 3/4 | 1-7/8 | 4-1/8 | 5 |
| 70394 | 7/8 | 7/8 | 1-7/8 | 4-1/8 | 5 |
| 70422 | 1 | 3/4 | 2 | 4-1/4 | 5 |
| 70426 | 1 | 1 | 2 | 4-1/2 | 5 |
| 70431 | 1-1/8 | 3/4 | 2 | 4-1/4 | 6 |
| 70435 | 1-1/8 | 1 | 2 | 4-1/2 | 6 |
| 70439 | 1-1/4 | 3/4 | 2 | 4-1/4 | 6 |
| 70445 | 1-1/4 | 1-1/4 | 2 | 4-1/2 | 6 |
| 70449 | 1-3/8 | 3/4 | 2 | 4-1/4 | 6 |
| 70457 | 1-1/2 | 3/4 | 2 | 4-1/4 | 6 |
| 70461 | 1-1/2 | 1-1/4 | 2 | 4-1/2 | 6 |
| 70469 | 1-3/4 | 1-1/4 | 2 | 4-1/2 | 6 |
| 70475 | 2 | 3/4 | 2 | 4-1/4 | 6 |
| 70477 | 2 | 1-1/4 | 2 | 4-1/2 | 6 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| up to 1 | 0~+.0030 |
| over 1 | 0~+.0060 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

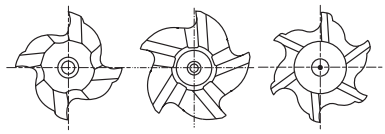
# COBALT & HSS END MILLS

**E2077 SERIES** 8% COBALT (M42) FLAT SHANK



## HSSCo8, MULTI FLUTE LONG LENGTH FINE PITCH ROUGHING

▶ This general purpose rougher is designed for high production metal removal in a wide range of work piece material. It is suitable for a very broad spectrum of materials having up to high tensile strengths. In many cases, the milled surfaces are of acceptable quality.



HSS Co8 | FINE | 4-6 | 30° | FLAT

P.777, 782, 786

Unit : Inch

| EDP No. 8% COBALT (M42) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length | No.of Flute |
|---|---|---|---|---|---|
| 71321 | 1/2 | 1/2 | 2 | 4 | 4 |
| 71337 | 5/8 | 5/8 | 2-1/2 | 4-5/8 | 4 |
| 71358 | 3/4 | 5/8 | 3 | 5-1/8 | 4 |
| 71359 | 3/4 | 3/4 | 3 | 5-1/4 | 4 |
| 71394 | 7/8 | 7/8 | 3-1/2 | 5-3/4 | 5 |
| 71426 | 1 | 1 | 4 | 6-1/2 | 5 |
| 71445 | 1-1/4 | 1-1/4 | 4 | 6-1/2 | 6 |
| 71457 | 1-1/2 | 3/4 | 4 | 6-1/4 | 6 |
| 71461 | 1-1/2 | 1-1/4 | 4 | 6-1/2 | 6 |
| 71469 | 1-3/4 | 1-1/4 | 4 | 6-1/2 | 6 |
| 71477 | 2 | 1-1/4 | 4 | 6-1/2 | 6 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| up to 1 | 0~+.0030 |
| over 1 | 0~+.0060 |

◎ : Excellent ○ : Good

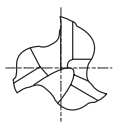
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# COBALT & HSS END MILLS

**E2086 SERIES** 8% COBALT (M42) FLAT SHANK

## HSSCo8, 3 FLUTE STUB LENGTH FINE PITCH ROUGHING CENTER CUTTING

▶ This general purpose rougher is designed for high production metal removal in a wide range of work piece material. It is suitable for a very broad spectrum of materials having up to high tensile strengths. In many cases, the milled surfaces are of acceptable quality.



HSS Co8 | FINE | 3 | 30° | FLAT

P.777, 782, 786

Unit : Inch

| EDP No. 8% COBALT (M42) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|
| **72297** | **1/4** | 3/8 | 1/4 | 2-1/16 |
| **72305** | **3/8** | 3/8 | 3/8 | 2-5/32 |
| **72321** | **1/2** | 1/2 | 1/2 | 2-1/2 |
| **72337** | **5/8** | 5/8 | 5/8 | 2-3/4 |
| **72359** | **3/4** | 3/4 | 3/4 | 2-7/8 |
| **72391** | **7/8** | 3/4 | 7/8 | 3-1/8 |
| **72422** | **1** | 3/4 | 1 | 3-1/4 |
| **72426** | **1** | 1 | 1 | 3-1/2 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| up to 1 | 0~+.0030 |
| over 1 | 0~+.0060 |

◎ : Excellent ○ : Good

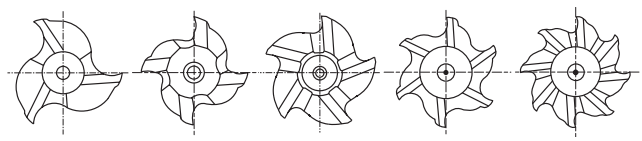
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# COBALT & HSS END MILLS

**E2170 SERIES** 8% COBALT (M42) FLAT SHANK

## HSSCo8, MULTI FLUTE REGULAR LENGTH COARSE PITCH ROUGHING

▶ This general purpose rougher is designed for high production metal removal in a wide range of work piece material. It is recommended for cutting steel grades and many non-ferrous materials.
The end tooth of this tool has a center hole design for many accurate resharpenings between centers.



HSS Co8 | COARSE | 3-8 | 30° | FLAT

P.777, 782, 786

Unit : Inch

| EDP No. 8% COBALT (M42) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length | No.of Flute |
|---|---|---|---|---|---|
| 60297 | 1/4 | 3/8 | 5/8 | 2-7/16 | 3 |
| 60301 | 5/16 | 3/8 | 3/4 | 2-1/2 | 3 |
| 60305 | 3/8 | 3/8 | 3/4 | 2-1/2 | 4 |
| 60312 | 7/16 | 3/8 | 1 | 2-11/16 | 4 |
| 60321 | 1/2 | 1/2 | 1-1/4 | 3-1/4 | 4 |
| 60328 | 9/16 | 1/2 | 1-3/8 | 3-3/8 | 4 |
| 60337 | 5/8 | 5/8 | 1-5/8 | 3-3/4 | 4 |
| 60348 | 11/16 | 5/8 | 1-5/8 | 3-3/4 | 4 |
| 60358 | 3/4 | 5/8 | 1-5/8 | 3-3/4 | 4 |
| 60359 | 3/4 | 3/4 | 1-5/8 | 3-3/4 | 4 |
| 60375 | 13/16 | 3/4 | 1-7/8 | 4-1/8 | 4 |
| 60391 | 7/8 | 3/4 | 1-7/8 | 4-1/8 | 5 |
| 60394 | 7/8 | 7/8 | 1-7/8 | 4-1/8 | 5 |
| 60409 | 15/16 | 7/8 | 1-7/8 | 4-1/8 | 5 |
| 60422 | 1 | 3/4 | 2 | 4-1/4 | 5 |
| 60426 | 1 | 1 | 2 | 4-1/2 | 5 |
| 60431 | 1-1/8 | 3/4 | 2 | 4-1/4 | 6 |
| 60435 | 1-1/8 | 1 | 2 | 4-1/2 | 6 |
| 60439 | 1-1/4 | 3/4 | 2 | 4-1/4 | 6 |
| 60445 | 1-1/4 | 1-1/4 | 2 | 4-1/2 | 6 |
| 60449 | 1-3/8 | 3/4 | 2 | 4-1/4 | 6 |
| 60457 | 1-1/2 | 3/4 | 2 | 4-1/4 | 6 |
| 60461 | 1-1/2 | 1-1/4 | 2 | 4-1/2 | 6 |
| 60467 | 1-3/4 | 3/4 | 2 | 4-1/4 | 6 |
| 60469 | 1-3/4 | 1-1/4 | 2 | 4-1/2 | 6 |
| 60475 | 2 | 3/4 | 2 | 4-1/4 | 6 |
| 60477 | 2 | 1-1/4 | 2 | 4-1/2 | 6 |
| 60480 | 2 | 2 | 2 | 5-3/4 | 8 |
| 60482 | 2 | 2 | 3 | 6-3/4 | 8 |
| 60484 | 2 | 2 | 4 | 7-3/4 | 8 |

| Mill Dia. Tolerance (inch) | |
|---|---|
| up to 1 | 0~+.0030 |
| over 1 | 0~+.0060 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

◎ : Excellent ○ : Good

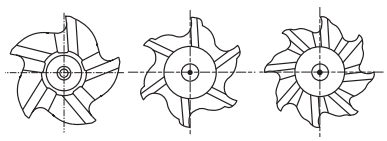
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# COBALT & HSS END MILLS

**E2171 SERIES** 8% COBALT (M42) FLAT SHANK

## HSSCo8, MULTI FLUTE MEDIUM LENGTH COARSE PITCH ROUGHING

▶ This general purpose rougher is designed for high production metal removal in a wide range of work piece material. It is recommended for cutting steel grades and many non-ferrous materials. The end tooth of this tool has a center hole design for many accurate resharpenings between centers.



HSS Co8 | COARSE | 5-8 | 30° | FLAT

P.777, 782, 786

Unit : Inch

| EDP No. 8% COBALT (M42) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length | No.of Flute |
|---|---|---|---|---|---|
| **61426** | **1** | 1 | 3 | 5-1/2 | 5 |
| **61445** | **1-1/4** | 1-1/4 | 3 | 5-1/2 | 6 |
| **61461** | **1-1/2** | 1-1/4 | 3 | 5-1/2 | 6 |
| **61488** | **2** | 2 | 6 | 9-3/4 | 8 |

■ The TiN coated, TiCN coated or TiAIN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAIN F), CE(TiAIN E), CH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| up to 1 | 0~+.0030 |
| over 1 | 0~+.0060 |

◎ : Excellent ○ : Good

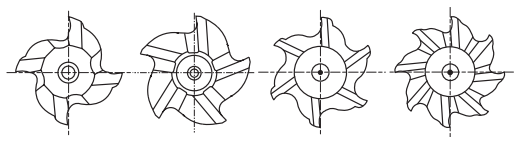
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# COBALT & HSS END MILLS

**E2172 SERIES** 8% COBALT (M42) FLAT SHANK

## HSSCo8, MULTI FLUTE LONG LENGTH COARSE PITCH ROUGHING

▶ This general purpose rougher is designed for high production metal removal in a wide range of work piece material. It is recommended for cutting steel grades and many non-ferrous materials. The end tooth of this tool has a center hole design for many accurate resharpenings between centers.



HSS Co8 | COARSE | 4-8 | 30° | FLAT

P.777, 782, 786

Unit : Inch

| EDP No. 8% COBALT (M42) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length | No.of Flute |
|---|---|---|---|---|---|
| 62321 | 1/2 | 1/2 | 2 | 4 | 4 |
| 62337 | 5/8 | 5/8 | 2-1/2 | 4-5/8 | 4 |
| 62358 | 3/4 | 5/8 | 3 | 5-1/8 | 4 |
| 62359 | 3/4 | 3/4 | 3 | 5-1/4 | 4 |
| 62391 | 7/8 | 3/4 | 3-1/2 | 5-3/4 | 5 |
| 62422 | 1 | 3/4 | 4 | 6-1/4 | 5 |
| 62426 | 1 | 1 | 4 | 6-1/2 | 5 |
| 62439 | 1-1/4 | 3/4 | 4 | 6-1/4 | 6 |
| 62445 | 1-1/4 | 1-1/4 | 4 | 6-1/2 | 6 |
| 62457 | 1-1/2 | 3/4 | 4 | 6-1/4 | 6 |
| 62461 | 1-1/2 | 1-1/4 | 4 | 6-1/2 | 6 |
| 62469 | 1-3/4 | 1-1/4 | 4 | 6-1/2 | 6 |
| 62477 | 2 | 1-1/4 | 4 | 6-1/2 | 6 |
| 62490 | 2 | 2 | 8 | 11-3/4 | 8 |

■ The TiN coated, TiCN coated or TiAIN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAIN F), CE(TiAIN E), CH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| up to 1 | 0~+.0030 |
| over 1 | 0~+.0060 |

◎ : Excellent ○ : Good

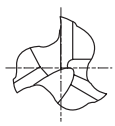
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# COBALT & HSS END MILLS

**E2241 SERIES** 8% COBALT (M42) FLAT SHANK

## HSSCo8, 3FLUTE STUB LENGTH COARSE PITCH ROUGHING CENTER CUTTING

▶ This general purpose rougher is designed for high production metal removal in a wide range of work piece material. It is recommended for cutting steel grades and many non-ferrous materials. The end tooth of this tool has a center hole design for many accurate resharpenings between centers.



HSS Co8 | COARSE | 3 | 30° | FLAT

P.777, 782, 786

Unit : Inch

| EDP No. 8% COBALT (M42) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|
| **63297** | **1/4** | 3/8 | 1/4 | 2-1/16 |
| **63305** | **3/8** | 3/8 | 3/8 | 2-5/32 |
| **63321** | **1/2** | 1/2 | 1/2 | 2-1/2 |
| **63337** | **5/8** | 5/8 | 5/8 | 2-3/4 |
| **63359** | **3/4** | 3/4 | 3/4 | 2-7/8 |
| **63426** | **1** | 1 | 1 | 3-1/2 |

■ The TiN coated, TiCN coated or TiAIN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAIN F), CE(TiAIN E), CH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| up to 1 | 0~+.0030 |
| over 1 | 0~+.0060 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

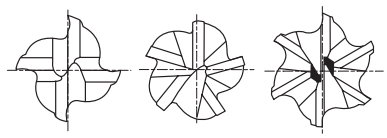
# COBALT & HSS END MILLS

**E2195 SERIES** 8% COBALT (M42) FLAT SHANK

**E2197 SERIES** 8% COBALT (M42) FLAT SHANK

## HSSCo8, MULTI FLUTE REGULAR & LONG LENGTH COARSE PITCH ROUGHING CENTER CUTTING

▶ This general purpose rougher is designed for high production metal removal in a wide range of work piece material. It is recommended for cutting steel grades and many non-ferrous materials.



HSS Co8 | COARSE | 4-6 | 30° | FLAT

P.777, 782, 786

**E2195 Series** ■ REGULAR LENGTH

Unit : Inch

| EDP No. 8% COBALT (M42) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length | No.of Flute |
|---|---|---|---|---|---|
| 64321 | 1/2 | 1/2 | 1-1/4 | 3-1/4 | 4 |
| 64337 | 5/8 | 5/8 | 1-5/8 | 3-3/4 | 4 |
| 64359 | 3/4 | 3/4 | 1-5/8 | 3-7/8 | 4 |
| 64426 | 1 | 1 | 2 | 4-1/2 | 5 |
| 64445 | 1-1/4 | 1-1/4 | 2 | 4-1/2 | 6 |
| 64461 | 1-1/2 | 1-1/4 | 2 | 4-1/2 | 6 |

**E2197 Series** ■ LONG LENGTH

Unit : Inch

| EDP No. 8% COBALT (M42) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length | No.of Flute |
|---|---|---|---|---|---|
| 65321 | 1/2 | 1/2 | 2 | 4 | 4 |
| 65337 | 5/8 | 5/8 | 2-1/2 | 4-5/8 | 4 |
| 65359 | 3/4 | 3/4 | 3 | 5-1/4 | 4 |
| 65426 | 1 | 1 | 4 | 6-1/2 | 5 |
| 65445 | 1-1/4 | 1-1/4 | 4 | 6-1/2 | 6 |
| 65461 | 1-1/2 | 1-1/4 | 4 | 6-1/2 | 6 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| up to 1 | 0~+.0030 |
| over 1 | 0~+.0060 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# COBALT & HSS END MILLS

**E2193 SERIES** 8% COBALT (M42) FLAT SHANK

**E2125 SERIES** 8% COBALT (M42) FLAT SHANK

## HSSCo8, MULTI FLUTE REGULAR & LONG LENGTH COARSE PITCH ROUGHING BALL NOSE

▶ This general purpose rougher is designed for high production metal removal in a wide range of work piece material. It is recommended for cutting steel grades and many non-ferrous materials.

HSS Co8 | COARSE | 3-6 | 30° | FLAT

P.777, 782, 786

### E2193 Series ■ REGULAR LENGTH

Unit : Inch

| EDP No. | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Overall Length | No.of Flute |
|---|---|---|---|---|---|---|
| 8% COBALT (M42) | R | | | | | |
| **68297** | R1/8 | **1/4** | 3/8 | 5/8 | 2-7/16 | 3 |
| **68301** | R5/32 | **5/16** | 3/8 | 3/4 | 2-1/2 | 3 |
| **68305** | R3/16 | **3/8** | 3/8 | 3/4 | 2-1/2 | 4 |
| **68321** | R1/4 | **1/2** | 1/2 | 1-1/4 | 3-1/4 | 4 |
| **68337** | R5/16 | **5/8** | 5/8 | 1-5/8 | 3-3/4 | 4 |
| **68359** | R3/8 | **3/4** | 3/4 | 1-3/4 | 4 | 4 |
| **68422** | R1/2 | **1** | 3/4 | 2 | 4-1/2 | 5 |
| **68426** | R1/2 | **1** | 1 | 2 | 4-1/2 | 5 |
| **68439** | R5/8 | **1-1/4** | 3/4 | 2 | 4-1/2 | 6 |
| **68445** | R5/8 | **1-1/4** | 1-1/4 | 2 | 4-1/2 | 6 |
| **68457** | R3/4 | **1-1/2** | 3/4 | 2 | 4-1/2 | 6 |
| **68461** | R3/4 | **1-1/2** | 1-1/4 | 2 | 4-1/2 | 6 |

### E2125 Series ■ LONG LENGTH

Unit : Inch

| EDP No. | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Overall Length | No.of Flute |
|---|---|---|---|---|---|---|
| 8% COBALT (M42) | R | | | | | |
| **69321** | R1/4 | **1/2** | 1/2 | 2-1/2 | 4-1/2 | 4 |
| **69337** | R5/16 | **5/8** | 5/8 | 2-1/2 | 4-5/8 | 4 |
| **69359** | R3/8 | **3/4** | 3/4 | 3 | 5-1/4 | 4 |
| **69426** | R1/2 | **1** | 1 | 4 | 6-1/2 | 5 |
| **69445** | R5/8 | **1-1/4** | 1-1/4 | 4 | 6-1/2 | 6 |
| **69461** | R3/4 | **1-1/2** | 1-1/4 | 4 | 6-1/2 | 6 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| up to 1 | 0~+.0030 |
| over 1 | 0~+.0060 |

◎ : Excellent ○ : Good

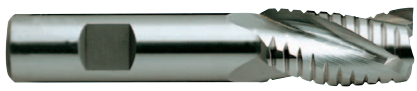
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

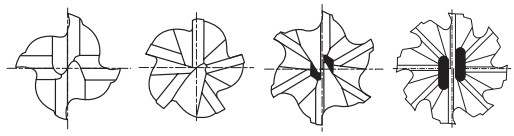
# YG COBALT & HSS END MILLS

**E2248 SERIES** 8% COBALT (M42) FLAT SHANK

## HSSCo8, MULTI FLUTE REGULAR LENGTH ROUGHING & FINISHING

▶ This general purpose rougher is designed for high production metal removal in a wide range of work piece material. It is suitable for a very broad spectrum of materials having up to high tensile strengths. In many cases, the milled surfaces are of acceptable quality.





HSS Co8 | NF | 4-8 | 30° | FLAT

P.777, 782, 786

Unit : Inch

| EDP No. 8% COBALT (M42) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length | No.of Flute |
|---|---|---|---|---|---|
| 73297 | 1/4 | 3/8 | 5/8 | 2-7/16 | 4 |
| 73301 | 5/16 | 3/8 | 3/4 | 2-1/2 | 4 |
| 73305 | 3/8 | 3/8 | 3/4 | 2-1/2 | 4 |
| 73312 | 7/16 | 3/8 | 1 | 2-11/16 | 4 |
| 73321 | 1/2 | 1/2 | 1-1/4 | 3-1/4 | 4 |
| 73328 | 9/16 | 1/2 | 1-3/8 | 3-3/8 | 4 |
| 73337 | 5/8 | 5/8 | 1-5/8 | 3-3/4 | 4 |
| 73348 | 11/16 | 5/8 | 1-5/8 | 3-3/4 | 4 |
| 73358 | 3/4 | 5/8 | 1-5/8 | 3-3/4 | 4 |
| 73359 | 3/4 | 3/4 | 1-5/8 | 3-3/4 | 4 |
| 73391 | 7/8 | 3/4 | 1-7/8 | 4-1/8 | 5 |
| 73394 | 7/8 | 7/8 | 1-7/8 | 4-1/8 | 5 |
| 73422 | 1 | 3/4 | 2 | 4-1/4 | 5 |
| 73426 | 1 | 1 | 2 | 4-1/2 | 5 |
| 73431 | 1-1/8 | 3/4 | 2 | 4-1/4 | 6 |
| 73435 | 1-1/8 | 1 | 2 | 4-1/2 | 6 |
| 73439 | 1-1/4 | 3/4 | 2 | 4-1/4 | 6 |
| 73445 | 1-1/4 | 1-1/4 | 2 | 4-1/2 | 6 |
| 73457 | 1-1/2 | 3/4 | 2 | 4-1/4 | 6 |
| 73461 | 1-1/2 | 1-1/4 | 2 | 4-1/2 | 6 |
| 73467 | 1-3/4 | 3/4 | 2 | 4-1/4 | 6 |
| 73469 | 1-3/4 | 1-1/4 | 2 | 4-1/2 | 6 |
| 73475 | 2 | 3/4 | 2 | 4-1/4 | 6 |
| 73477 | 2 | 1-1/4 | 2 | 4-1/2 | 6 |
| 73480 | 2 | 2 | 2 | 5-3/4 | 8 |
| 73482 | 2 | 2 | 3 | 6-3/4 | 8 |
| 73484 | 2 | 2 | 4 | 7-3/4 | 8 |

| Mill Dia. Tolerance (inch) |
|---|
| + .0025 |
| + .0005 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

◎ : Excellent ○ : Good

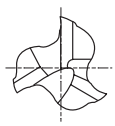
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# COBALT & HSS END MILLS

**E2191 SERIES** 8% COBALT (M42) FLAT SHANK

## HSSCo8, 3 FLUTE 37° HELIX REGULAR LENGTH ROUGHING for ALUMINUM

▶ This general purpose rougher is designed for high production metal removal in a wide range of work piece material. It is suitable for a very broad spectrum of materials having up to high tensile strengths. In many cases, the milled surfaces are of acceptable quality.



HSS Co8 | ALU | 3 | 37° | FLAT

P.777, 782, 786

Unit : Inch

| EDP No. 8% COBALT (M42) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|
| **66297** | **1/4** | 3/8 | 5/8 | 2-7/16 |
| **66301** | **5/16** | 3/8 | 3/4 | 2-1/2 |
| **66305** | **3/8** | 3/8 | 3/4 | 2-1/2 |
| **66321** | **1/2** | 1/2 | 1-1/4 | 3-1/4 |
| **66337** | **5/8** | 5/8 | 1-5/8 | 3-3/4 |
| **66359** | **3/4** | 3/4 | 1-5/8 | 3-7/8 |
| **66391** | **7/8** | 3/4 | 1-7/8 | 4-1/8 |
| **66426** | **1** | 1 | 2 | 4-1/2 |
| **66445** | **1-1/4** | 1-1/4 | 2 | 4-1/2 |
| **66461** | **1-1/2** | 1-1/4 | 2 | 4-1/2 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| up to 1 | 0~+.0030 |
| over 1 | 0~+.0060 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ◎ | | | |

# COBALT & HSS END MILLS

**E2226 SERIES** 8% COBALT (M42) FLAT SHANK
**E2192 SERIES** 8% COBALT (M42) FLAT SHANK

## HSSCo8, 3 FLUTE 37° HELIX MEDIUM & LONG LENGTH ROUGHING for ALUMINUM

▶ This general purpose rougher is designed for high production metal removal in a wide range of work piece material. It is recommended for cutting aluminum, aluminum alloy and many non-ferrous materials.

HSS Co8 | ALU | 3 | 37° | FLAT

P.777, 782, 786

### E2226 Series ■ MEDIUM LENGTH

Unit : Inch

| EDP No. 8% COBALT (M42) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|
| 66901 | 1 | 1 | 3 | 5-1/2 |
| 66902 | 1-1/4 | 1-1/4 | 3 | 5-1/2 |

### E2192 Series ■ LONG LENGTH

Unit : Inch

| EDP No. 8% COBALT (M42) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|
| 67321 | 1/2 | 1/2 | 2 | 4 |
| 67337 | 5/8 | 5/8 | 2-1/2 | 4-5/8 |
| 67359 | 3/4 | 3/4 | 3 | 5-1/4 |
| 67426 | 1 | 1 | 4 | 6-1/2 |
| 67445 | 1-1/4 | 1-1/4 | 4 | 6-1/2 |
| 67461 | 1-1/2 | 1-1/4 | 4 | 6-1/2 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| up to 1 | 0~+.0030 |
| over 1 | 0~+.0060 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ◎ | | | |

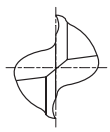
# COBALT & HSS END MILLS

**E2163 SERIES** 8% COBALT (M42) FLAT SHANK

**E1163 SERIES** HSS (M2) FLAT SHANK

## HSSCo8 & HSS, 2 FLUTE 15° HELIX for KEYWAY CUTTING

▶ E2163(E1163) are keyway cutting end mills that have the same design as the general purpose of two flute single end mill, but are held to a mill diameter tolerance of +.0000 -.0015. These close tolerance end mills are recommended for cutting keyway which must be held close to nominal size.



HSS Co8 | HSS | 2 | 15° | FLAT

P.773, 779, 783

Unit : Inch

| EDP No. | | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| 8% COBALT (M42) | HSS (M2) | | | | |
| **14289** | **14039** | **1/8** | 3/8 | 3/8 | 2-5/16 |
| **14293** | **14043** | **3/16** | 3/8 | 7/16 | 2-5/16 |
| **14297** | **14047** | **1/4** | 3/8 | 1/2 | 2-5/16 |
| **14301** | **14051** | **5/16** | 3/8 | 9/16 | 2-5/16 |
| **14305** | **14055** | **3/8** | 3/8 | 9/16 | 2-5/16 |
| **14312** | **14062** | **7/16** | 3/8 | 13/16 | 2-1/2 |
| **14321** | **14071** | **1/2** | 1/2 | 1 | 3 |
| **14337** | **14087** | **5/8** | 5/8 | 1-5/16 | 3-7/16 |
| **14359** | **14109** | **3/4** | 3/4 | 1-5/16 | 3-9/16 |
| **14394** | **14144** | **7/8** | 7/8 | 1-1/2 | 3-3/4 |
| **14426** | **14176** | **1** | 1 | 1-5/8 | 4-1/8 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) |
|---|
| 0~−.0015 |

◎ : Excellent ○ : Good

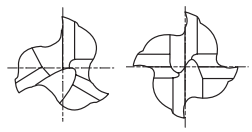
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# COBALT & HSS END MILLS

**E2120 SERIES** 8% COBALT (M42) FLAT SHANK
**E2121 SERIES** 8% COBALT (M42) FLAT SHANK

## HSSCo8, 3&4 FLUTE 60° HELIX REGULAR LENGTH

▶ Provided with high helix angle(60°).
Smooth cutting and small cutting resistance.
Suitable for machining of difficult-to-cut materials.



HSS Co8 | 3&4 | 60° | FLAT P.775

**E2120 Series** ■ 3 FLUTE — Unit : Inch

| EDP No. 8% COBALT (M42) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|
| 20297 | 1/4 | 3/8 | 5/8 | 2-7/16 |
| 20301 | 5/16 | 3/8 | 3/4 | 2-1/2 |
| 20305 | 3/8 | 3/8 | 3/4 | 2-1/2 |
| 20312 | 7/16 | 3/8 | 1 | 2-11/16 |
| 20321 | 1/2 | 1/2 | 1-1/4 | 3-1/4 |
| 20337 | 5/8 | 5/8 | 1-5/8 | 3-3/4 |
| 20359 | 3/4 | 3/4 | 1-5/8 | 3-7/8 |

**E2121 Series** ■ 4 FLUTE — Unit : Inch

| EDP No. 8% COBALT (M42) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|
| 20394 | 7/8 | 7/8 | 1-7/8 | 4-1/8 |
| 20426 | 1 | 1 | 2 | 4-1/2 |
| 20445 | 1-1/4 | 1-1/4 | 2 | 4-1/2 |
| 20461 | 1-1/2 | 1-1/4 | 2 | 4-1/2 |
| 20477 | 2 | 1-1/4 | 2 | 4-1/2 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~+.0010 | ＊＊0~+.0015 |

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | | | | |

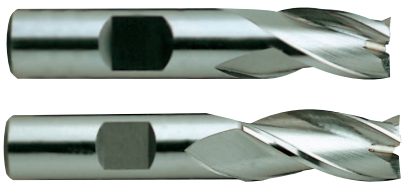
# COBALT & HSS END MILLS

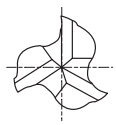
**E2160 SERIES** 8% COBALT (M42) FLAT SHANK

**E2161 SERIES** 8% COBALT (M42) FLAT SHANK

## HSSCo8, 3 FLUTE SHORT & LONG LENGTH THROW AWAY

▶ Well balanced web design to minimize deflection & chattering. High accuracy for O.D. is guaranteed under the strict tolerance control. Much higher(50%) table speed than 2 Flute is allowed.





HSS Co8 | 3 | 30° | FLAT

P.774

**E2160 Series** ■ SHORT LENGTH

Unit : Inch

| EDP No. 8% COBALT (M42) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|
| **22257** | **1/16** | 1/4 | 3/32 | 31/32 |
| **22261** | **3/32** | 1/4 | 5/32 | 1-1/64 |
| **22265** | **1/8** | 1/4 | 3/16 | 1-3/32 |
| **22269** | **5/32** | 1/4 | 1/4 | 1-9/32 |
| **22273** | **3/16** | 1/4 | 9/32 | 1-11/32 |
| **22277** | **7/32** | 1/4 | 5/16 | 1-13/32 |
| **22281** | **1/4** | 1/4 | 3/8 | 1-13/32 |

**E2161 Series** ■ LONG LENGTH

Unit : Inch

| EDP No. 8% COBALT (M42) | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|
| **23257** | **1/16** | 1/4 | 5/32 | 1-3/32 |
| **23261** | **3/32** | 1/4 | 1/4 | 1-1/4 |
| **23265** | **1/8** | 1/4 | 5/16 | 1-11/32 |
| **23269** | **5/32** | 1/4 | 3/8 | 1-17/32 |
| **23273** | **3/16** | 1/4 | 7/16 | 1-21/32 |
| **23277** | **7/32** | 1/4 | 1/2 | 1-3/4 |
| **23281** | **1/4** | 1/4 | 5/8 | 1-3/4 |

■ The TiN coated, TiCN coated or TiAIN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAIN F), CE(TiAIN E), CH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

| Mill Dia. Tolerance (inch) |
|---|
| — .0005 |
| — .0013 |

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# COBALT & HSS END MILLS

**E2237 SERIES** 8% COBALT (M42) FLAT SHANK
**E1237 SERIES** HSS (M2) FLAT SHANK



## HSSCo8 & HSS, 4 FLUTE CORNER ROUNDING

▶ This general corner rounding end mills are designed for machining fillets on work piece.

HSS Co8 | HSS | 4 | FLAT

Unit : Inch

| EDP No. 8% COBALT (M42) | EDP No. HSS (M2) | Radius | Pilot Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| 29251 | 29001 | 1/16 | 1/4 | 3/8 | 7/16 | 2-1/2 |
| 29252 | 29002 | 3/32 | 1/4 | 3/8 | 1/2 | 2-1/2 |
| 29253 | 29003 | 1/8 | 1/4 | 1/2 | 5/8 | 3 |
| 29254 | 29004 | 5/32 | 5/16 | 1/2 | 3/4 | 3 |
| 29255 | 29005 | 3/16 | 3/8 | 1/2 | 7/8 | 3 |
| 29256 | 29006 | 3/16 | 3/8 | 3/4 | 7/8 | 3-1/8 |
| 29257 | 29007 | 7/32 | 5/16 | 1/2 | 7/8 | 3-1/4 |
| 29258 | 29008 | 1/4 | 3/8 | 1/2 | 1 | 3 |
| 29259 | 29009 | 9/32 | 3/8 | 5/8 | 1 | 3 |
| 29260 | 29010 | 1/4 | 3/8 | 3/4 | 1 | 3-1/4 |
| 29261 | 29011 | 5/16 | 3/8 | 1/2 | 1-1/8 | 3-1/4 |
| 29262 | 29012 | 5/16 | 3/8 | 5/8 | 1-1/8 | 3-1/2 |
| 29263 | 29013 | 5/16 | 3/8 | 3/4 | 1-1/8 | 3-1/2 |
| 29264 | 29014 | 5/16 | 3/8 | 7/8 | 1-1/8 | 3-1/2 |
| 29265 | 29015 | 3/8 | 3/8 | 1/2 | 1-1/4 | 3-1/2 |
| 29266 | 29016 | 3/8 | 3/8 | 3/4 | 1-1/4 | 3-3/4 |
| 29267 | 29017 | 3/8 | 3/8 | 7/8 | 1-1/4 | 3-3/4 |
| 29268 | 29018 | 7/16 | 3/8 | 3/4 | 1-3/8 | 3-3/4 |
| 29269 | 29019 | 7/16 | 3/8 | 1 | 1-3/8 | 4 |
| 29270 | 29020 | 1/2 | 3/8 | 3/4 | 1-1/2 | 3-7/8 |
| 29271 | 29021 | 1/2 | 3/8 | 1 | 1-1/2 | 4-1/8 |
| 29272 | 29022 | 5/8 | 5/16 | 3/4 | 1-5/8 | 4 |
| 29273 | 29023 | 5/8 | 5/16 | 1 | 1-5/8 | 4 |
| 29274 | 29024 | 5/8 | 9/16 | 3/4 | 1-15/16 | 4 |
| 29275 | 29025 | 5/8 | 9/16 | 1 | 1-15/16 | 4-1/4 |
| 29276 | 29026 | 3/4 | 5/16 | 3/4 | 1-7/8 | 4 |
| 29277 | 29027 | 3/4 | 5/16 | 1 | 1-7/8 | 4 |
| 29278 | 29028 | 3/4 | 5/8 | 3/4 | 2-1/4 | 4-1/8 |
| 29279 | 29029 | 3/4 | 5/8 | 1 | 2-1/4 | 4-5/16 |
| 29280 | 29030 | 7/8 | 5/8 | 3/4 | 2-1/2 | 4-1/2 |
| 29281 | 29031 | 1 | 5/8 | 3/4 | 2-5/8 | 4-1/2 |
| 29282 | 29032 | 1 | 5/8 | 1 | 2-3/4 | 4-3/4 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

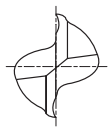
# COBALT & HSS END MILLS

**E2482 SERIES** 8% COBALT (M42) FLAT SHANK

**E1482 SERIES** HSS (M2) FLAT SHANK

## HSSCo8 & HSS, 2 FLUTE REGULAR LENGTH

▶ Two flute end mills with metric cutting diameter are especially recommended for slotting operation, pocketing keyway cutting and other general purpose work including plunge cutting.



HSS Co8 | HSS | 2 | 30° | FLAT

Unit : Inch

| EDP No. | | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| 8% COBALT (M42) | HSS (M2) | Metric | Inch | | | |
| 15252 | 15002 | 2.0 | .0787 | 3/8 | 5/16 | 2-5/16 |
| 15253 | 15003 | 2.5 | .0984 | 3/8 | 5/16 | 2-5/16 |
| 15254 | 15004 | 3.0 | .1181 | 3/8 | 5/16 | 2-5/16 |
| 15255 | 15005 | 3.5 | .1378 | 3/8 | 7/16 | 2-5/16 |
| 15256 | 15006 | 4.0 | .1575 | 3/8 | 7/16 | 2-5/16 |
| 15257 | 15007 | 4.5 | .1772 | 3/8 | 1/2 | 2-5/16 |
| 15258 | 15008 | 5.0 | .1969 | 3/8 | 1/2 | 2-5/16 |
| 15259 | 15009 | 5.5 | .2165 | 3/8 | 1/2 | 2-5/16 |
| 15260 | 15010 | 6.0 | .2362 | 3/8 | 1/2 | 2-5/16 |
| 15261 | 15011 | 7.0 | .2756 | 3/8 | 9/16 | 2-5/16 |
| 15262 | 15012 | 8.0 | .3150 | 3/8 | 9/16 | 2-5/16 |
| 15263 | 15013 | 9.0 | .3543 | 3/8 | 9/16 | 2-5/16 |
| 15264 | 15014 | 10.0 | .3937 | 3/8 | 13/16 | 2-1/2 |
| 15265 | 15015 | 11.0 | .4330 | 3/8 | 13/16 | 2-1/2 |
| 15266 | 15016 | 12.0 | .4724 | 3/8 | 13/16 | 2-1/2 |
| 15267 | 15017 | 12.5 | .4921 | 1/2 | 1-1/8 | 3-1/8 |
| 15268 | 15018 | 13.0 | .5118 | 1/2 | 1-1/8 | 3-1/8 |
| 15270 | 15020 | 14.0 | .5512 | 1/2 | 1-1/8 | 3-1/8 |
| 15276 | 15026 | 16.0 | .6299 | 5/8 | 1-5/16 | 3-7/16 |
| 15280 | 15030 | 18.0 | .7087 | 5/8 | 1-5/16 | 3-7/16 |
| 15282 | 15032 | 20.0 | .7874 | 5/8 | 1-1/2 | 3-3/4 |
| 15284 | 15034 | 22.0 | .8661 | 3/4 | 1-1/2 | 3-3/4 |
| 15288 | 15038 | 24.0 | .9449 | 3/4 | 2 | 4-1/2 |
| 15290 | 15040 | 25.0 | .9843 | 1 | 2 | 4-1/2 |
| 15296 | 15046 | 32.0 | 1.2598 | 1 | 2 | 4-1/2 |
| 15298 | 15048 | 36.0 | 1.4173 | 1 | 2 | 4-1/2 |
| 15300 | 15050 | 40.0 | 1.5748 | 1-1/4 | 2 | 4-1/2 |
| 15302 | 15052 | 45.0 | 1.7717 | 1-1/4 | 2 | 4-1/2 |

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~+.0010 | ＊＊0~+.0015 |

＊＊ The shank of end mills is the same diameter as the cutting portion.

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# COBALT & HSS END MILLS

**E2483 SERIES** 8% COBALT (M42) FLAT SHANK
**E1483 SERIES** HSS (M2) FLAT SHANK

## HSSCo8 & HSS, 4 FLUTE REGULAR LENGTH

▶ E2483 have an extensive range of standard regular length in metric diameter.
End mills with center cutting are recommended for a wide range of cutting jobs, including slotting, shallow pocketing and tracer milling.

HSS Co8 | HSS | 4 | 30° | FLAT

Unit : Inch

| EDP No. | | Mill Diameter | | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|---|
| 8% COBALT (M42) | HSS (M2) | Metric | Inch | | | |
| 16252 | 16002 | 2.0 | .0787 | 3/8 | 3/8 | 2-5/16 |
| 16253 | 16003 | 2.5 | .0984 | 3/8 | 3/8 | 2-5/16 |
| 16254 | 16004 | 3.0 | .1181 | 3/8 | 3/8 | 2-5/16 |
| 16255 | 16005 | 3.5 | .1378 | 3/8 | 1/2 | 2-3/8 |
| 16256 | 16006 | 4.0 | .1575 | 3/8 | 1/2 | 2-3/8 |
| 16257 | 16007 | 4.5 | .1772 | 3/8 | 9/16 | 2-1/2 |
| 16258 | 16008 | 5.0 | .1969 | 3/8 | 9/16 | 2-1/2 |
| 16259 | 16009 | 5.5 | .2165 | 3/8 | 5/8 | 2-1/2 |
| 16260 | 16010 | 6.0 | .2362 | 3/8 | 5/8 | 2-1/2 |
| 16261 | 16011 | 7.0 | .2756 | 3/8 | 11/16 | 2-1/2 |
| 16262 | 16012 | 8.0 | .3150 | 3/8 | 3/4 | 2-1/2 |
| 16263 | 16013 | 9.0 | .3543 | 3/8 | 3/4 | 2-1/2 |
| 16264 | 16014 | 10.0 | .3937 | 3/8 | 1 | 2-11/16 |
| 16265 | 16015 | 11.0 | .4330 | 3/8 | 1 | 2-11/16 |
| 16266 | 16016 | 12.0 | .4724 | 3/8 | 1 | 2-11/16 |
| 16267 | 16017 | 12.5 | .4921 | 1/2 | 1-1/4 | 3-1/4 |
| 16268 | 16018 | 13.0 | .5118 | 1/2 | 1-1/4 | 3-1/4 |
| 16270 | 16020 | 14.0 | .5512 | 1/2 | 1-3/8 | 3-3/8 |
| 16276 | 16026 | 16.0 | .6299 | 5/8 | 1-5/8 | 3-3/4 |
| 16280 | 16030 | 18.0 | .7087 | 5/8 | 1-5/8 | 3-3/4 |
| 16282 | 16032 | 20.0 | .7874 | 5/8 | 1-7/8 | 4-1/8 |
| 16284 | 16034 | 22.0 | .8661 | 3/4 | 1-7/8 | 4-1/8 |
| 16288 | 16038 | 24.0 | .9449 | 3/4 | 2 | 4-1/2 |
| 16290 | 16040 | 25.0 | .9843 | 1 | 2 | 4-1/2 |
| 16296 | 16046 | 32.0 | 1.2598 | 1 | 2 | 4-1/2 |
| 16298 | 16048 | 36.0 | 1.4173 | 1 | 2 | 4-1/2 |
| 16300 | 16050 | 40.0 | 1.5748 | 1-1/4 | 2 | 4-1/2 |
| 16302 | 16052 | 45.0 | 1.7717 | 1-1/4 | 2 | 4-1/2 |

| Mill Dia. Tolerance (inch) | |
|---|---|
| 0~+.0010 | * *0~+.0015 |

** The shank of end mills is the same diameter as the cutting portion.

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

◎ : Excellent ○ : Good

| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | High Hardened Steels | Copper | Graphite | Cast Iron | Aluminum | Stainless Steels | Titanium | Inconel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~HRc20 | HRc20~30 | HRc30~40 | HRc40~45 | HRc45~55 | HRc55~70 | | | | | | | |
| ◎ | ◎ | ○ | | | | ○ | | | ○ | | | |

# COBALT & HSS END MILLS

## END MILL SET SERIES

▶ Various range of sizes in these end mill sets gives you plenty of opportunities to reduce manufacturing costs and improve productivity.

### ■ SET OF MINIATURE, (3/16″ SHANK) DOUBLE

| EDP No. | ITEM No. | EDP No. | ITEM No. | Type | Length | Mill Diameter | No.of Flute |
|---|---|---|---|---|---|---|---|
| 8% COBALT (M42) | | HSS (M2) | | | | | |
| 96002 | CMR211 | 96001 | MR211 | Sq. END (11PCS.) | REGULAR | 1/32, 3/64, 1/16, 5/64, 3/32, 7/64, 1/8, 9/64, 5/32, 11/64, 3/16 | 2 |
| 96004 | CMR409 | 96003 | MR409 | Sq. END (9PCS.) | REGULAR | 1/16, 5/64, 3/32, 7/64, 1/8, 9/64, 5/32, 11/64, 3/16 | 4 |
| 96006 | CMS211 | 96005 | MS211 | Sq. END (11PCS.) | STUB | 1/32, 3/64, 1/16, 5/64, 3/32, 7/64, 1/8, 9/64, 5/32, 11/64, 3/16 | 2 |
| 96008 | CMS409 | 96007 | MS409 | Sq. END (9PCS.) | STUB | 1/16, 5/64, 3/32, 7/64, 1/8, 9/64, 5/32, 11/64, 3/16 | 4 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

＊WITH TRANSPARENT PLASTIC CASE

### ■ SET OF 3/8″ SHANK, (WELDON) SINGLE

| EDP No. | ITEM No. | EDP No. | ITEM No. | Type | Length | Mill Diameter | No.of Flute |
|---|---|---|---|---|---|---|---|
| 8% COBALT (M42) | | HSS (M2) | | | | | |
| 96010 | CWR205 | 96009 | WR205 | Sq. END (5PCS.) | REGULAR | 1/8, 3/16, 1/4, 5/16, 3/8 | 2 |
| 96012 | CWR405 | 96011 | WR405 | Sq. END (5PCS.) | REGULAR | 1/8, 3/16, 1/4, 5/16, 3/8 | 4 |
| 96014 | CWRC05 | 96013 | WRC05 | CENTER CUT (5PCS.) | REGULAR | 1/8, 3/16, 1/4, 5/16, 3/8 | 04 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

＊WITH TRANSPARENT PLASTIC CASE

# COBALT & HSS END MILLS

## END MILL SET SERIES

▶ Various range of sizes in these end mill sets gives you a plenty of opportunities to reduce manufacturing costs and improve productivity.

### ■ SET OF 3/8″ SHANK, (WELDON) DOUBLE

| EDP No. | ITEM No. | EDP No. | ITEM No. | Type | Length | Mill Diameter | No.of Flute |
|---|---|---|---|---|---|---|---|
| 8% COBALT (M42) | | HSS (M2) | | | | | |
| 96016 | CDR209 | 96015 | DR209 | Sq. END (9PCS.) | REGULAR | 1/8, 5/32, 3/16, 7/32, 1/4, 9/32, 5/16, 11/32, 3/8 | 2 |
| 96018 | CDR409 | 96017 | DR409 | Sq. END (9PCS.) | REGULAR | 1/8, 5/32, 3/16, 7/32, 1/4, 9/32, 5/16, 11/32, 3/8 | 4 |
| 96020 | CDRC09 | 96019 | DRC09 | CENTER CUT (9PCS.) | REGULAR | 1/8, 5/32, 3/16, 7/32, 1/4, 9/32, 5/16, 11/32, 3/8 | 4 |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

∗ WITH TRANSPARENT PLASTIC CASE

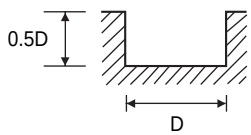
# COBALT & HSS END MILLS

## RECOMMENDED CUTTING CONDITIONS



## HSSCo8 & HSS, 2 FLUTE FINISH - SLOTTING

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | ALUMINUM ALUMINUM ALLOYS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~HRc20 | | HRc20~HRc30 | | HRc30~HRc40 | | | |
| STRENGTH | ~ 500N/mm² | | 500~800N/mm² | | 800~1000N/mm² | | 1000~1300N/mm² | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/8 | 3500 | 2.20 | 3200 | 1.80 | 2500 | 1.60 | 1600 | 0.80 | 11000 | 9.80 |
| 1/4 | 1800 | 3.50 | 1600 | 3.10 | 1200 | 2.40 | 800 | 1.60 | 5600 | 12.20 |
| 3/8 | 1100 | 4.00 | 900 | 3.50 | 800 | 3.10 | 450 | 1.80 | 3100 | 15.80 |
| 1/2 | 900 | 4.30 | 800 | 4.00 | 630 | 3.10 | 400 | 2.00 | 2500 | 15.00 |
| 5/8 | 700 | 4.30 | 560 | 3.50 | 450 | 2.80 | 280 | 1.80 | 2000 | 13.80 |
| 3/4 | 630 | 4.00 | 500 | 3.50 | 400 | 2.80 | 250 | 1.80 | 1800 | 13.80 |
| 7/8 | 500 | 4.00 | 450 | 3.50 | 350 | 2.80 | 220 | 1.80 | 1400 | 11.80 |
| 1 | 450 | 3.50 | 400 | 3.10 | 310 | 2.40 | 180 | 1.40 | 1200 | 11.00 |
| 1-1/8 | 400 | 3.10 | 350 | 2.80 | 280 | 2.20 | 160 | 1.20 | 1100 | 10.50 |
| 1-3/8 | 310 | 2.40 | 250 | 2.00 | 200 | 1.60 | 120 | 1.00 | 900 | 8.70 |
| 1-1/2 | 310 | 2.40 | 250 | 2.00 | 200 | 1.60 | 120 | 1.00 | 900 | 8.70 |
| 1-3/4 | 280 | 2.40 | 220 | 2.00 | 180 | 1.60 | 110 | 1.00 | 800 | 7.80 |
| 2 | 250 | 2.00 | 190 | 1.80 | 110 | 1.00 | 80 | 0.80 | 630 | 6.30 |

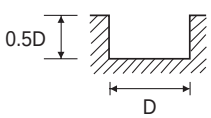


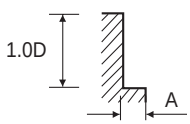

※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

## HSS, 2 FLUTE, 42° HELIX FINISH for ALUMINUM

| MATERIAL | ALUMINUM NONFERROUS METALS | | NON-ALLOYED STEELS ALLOY STEELS CAST IRON | |
|---|---|---|---|---|
| DIAMETER | RPM | FEED | RPM | FEED |
| 1/8 | 8000 | 22.50 | 8000 | 29.00 |
| 3/16 | 7400 | 25.00 | 7400 | 32.50 |
| 1/4 | 6800 | 28.50 | 6800 | 37.00 |
| 5/16 | 5200 | 43.50 | 5200 | 55.00 |
| 7/16 | 5000 | 47.00 | 5000 | 47.00 |
| 1/2 | 4500 | 47.00 | 4500 | 61.00 |
| 9/16 | 3500 | 49.00 | 3500 | 63.00 |
| 5/8 | 3500 | 49.00 | 3500 | 63.00 |
| 3/4 | 2300 | 51.00 | 2300 | 67.00 |
| 13/16 | 2000 | 51.00 | 2000 | 67.00 |




A : Ø1/8 ~ Ø5/16 = 0.25 × D
Ø7/16 ~ Ø13/16 = 0.5 × D

RPM = rev./min.
FEED = inch/min.

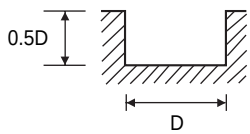
# COBALT & HSS END MILLS

## RECOMMENDED CUTTING CONDITIONS



## HSSCo8, 3 FLUTE FINISH - SLOTTING

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | ALUMINUM ALUMINUM ALLOYS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~HRc20 | | HRc20~HRc30 | | HRc30~HRc40 | | | |
| STRENGTH | ~ 500N/mm² | | 500~800N/mm² | | 800~1000N/mm² | | 1000~1300N/mm² | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 3/32 | 5600 | 2.40 | 4500 | 1.80 | 4000 | 1.80 | 2200 | 0.80 | 12000 | 9.40 |
| 1/8 | 3500 | 3.12 | 3200 | 2.60 | 2500 | 2.40 | 1600 | 1.20 | 11000 | 15.00 |
| 1/4 | 1800 | 5.30 | 1600 | 4.70 | 1200 | 3.50 | 800 | 2.40 | 5600 | 18.50 |
| 3/8 | 1100 | 6.00 | 900 | 5.30 | 800 | 4.70 | 450 | 2.60 | 3100 | 23.60 |
| 1/2 | 900 | 6.50 | 800 | 6.00 | 630 | 4.70 | 400 | 3.00 | 2500 | 22.40 |
| 9/16 | 800 | 6.50 | 700 | 5.30 | 560 | 4.70 | 350 | 3.00 | 2200 | 20.90 |
| 5/8 | 700 | 6.50 | 560 | 5.30 | 450 | 4.10 | 280 | 2.60 | 2000 | 20.90 |
| 7/8 | 500 | 6.00 | 450 | 5.30 | 350 | 4.10 | 220 | 2.60 | 1400 | 17.70 |
| 1 | 450 | 5.3 | 400 | 4.70 | 310 | 3.50 | 180 | 2.00 | 1200 | 16.50 |
| 1-1/8 | 400 | 4.70 | 350 | 4.10 | 280 | 3.10 | 160 | 1.80 | 1100 | 15.80 |

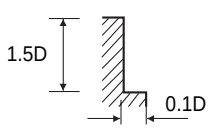



※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

## HSSCo8, 3 FLUTE FINISH - SIDE CUTTING

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | ALUMINUM ALUMINUM ALLOYS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~HRc20 | | HRc20~HRc30 | | HRc30~HRc40 | | | |
| STRENGTH | ~ 500N/mm² | | 500~800N/mm² | | 800~1000N/mm² | | 1000~1300N/mm² | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 3/32 | 5600 | 2.40 | 4500 | 1.60 | 4000 | 1.40 | 2200 | 0.60 | 12000 | 7.10 |
| 1/8 | 3500 | 3.10 | 3200 | 2.40 | 2500 | 1.80 | 1600 | 0.80 | 11000 | 11.00 |
| 5/32 | 2800 | 4.10 | 2200 | 3.00 | 1800 | 2.00 | 1100 | 1.20 | 8000 | 13.00 |
| 3/16 | 2200 | 5.30 | 1800 | 3.70 | 1600 | 2.60 | 900 | 1.40 | 6300 | 13.80 |
| 1/4 | 1800 | 5.30 | 1600 | 4.30 | 1200 | 2.60 | 800 | 1.80 | 5600 | 13.80 |
| 5/16 | 1400 | 6.00 | 1100 | 4.70 | 900 | 3.10 | 560 | 2.00 | 4000 | 17.30 |
| 3/8 | 1100 | 6.00 | 900 | 4.70 | 800 | 3.80 | 450 | 2.00 | 3100 | 17.70 |
| 1/2 | 900 | 6.50 | 800 | 5.30 | 630 | 3.80 | 400 | 2.20 | 2500 | 16.90 |
| 9/16 | 800 | 6.50 | 700 | 4.70 | 560 | 3.80 | 350 | 2.20 | 2200 | 15.80 |
| 5/8 | 700 | 6.50 | 560 | 4.70 | 450 | 3.10 | 280 | 2.00 | 2000 | 15.80 |
| 11/16 | 630 | 6.00 | 500 | 4.70 | 400 | 3.10 | 250 | 2.00 | 1800 | 15.80 |
| 13/16 | 560 | 6.00 | 450 | 4.70 | 400 | 3.10 | 220 | 2.00 | 1600 | 14.20 |
| 7/8 | 500 | 6.00 | 450 | 4.70 | 350 | 3.10 | 220 | 2.00 | 1400 | 13.40 |
| 1 | 450 | 5.30 | 400 | 4.30 | 310 | 2.60 | 180 | 1.40 | 1200 | 12.60 |
| 1-1/8 | 400 | 4.70 | 350 | 3.70 | 280 | 2.40 | 160 | 1.20 | 1100 | 11.80 |
| 1-3/16 | 350 | 4.10 | 310 | 3.10 | 250 | 2.20 | 160 | 1.20 | 1100 | 11.80 |




※ The Feed, in long & extra long types, should be reduced by around 50%.

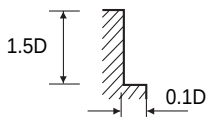
RPM = rev./min.
FEED = inch/min.

# COBALT & HSS END MILLS

## RECOMMENDED CUTTING CONDITIONS

## HSSCo8 & HSS, MULTI FLUTE FINISH - SIDE CUTTING

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | ALUMINUM ALUMINUM ALLOYS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~HRc20 | | HRc20~HRc30 | | HRc30~HRc40 | | | |
| STRENGTH | ~ 500N/mm² | | 500~800N/mm² | | 800~1000N/mm² | | 1000~1300N/mm² | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/8 | 3500 | 4.30 | 3200 | 3.10 | 2500 | 2.40 | 1600 | 1.20 | 11000 | 15.00 |
| 1/4 | 1800 | 7.10 | 1600 | 5.70 | 1200 | 3.50 | 800 | 2.40 | 5600 | 18.50 |
| 3/8 | 1100 | 7.90 | 900 | 6.30 | 800 | 4.70 | 450 | 2.60 | 3100 | 23.60 |
| 1/2 | 900 | 8.70 | 800 | 7.10 | 630 | 4.70 | 400 | 3.00 | 2500 | 22.40 |
| 5/8 | 700 | 8.70 | 560 | 6.30 | 450 | 4.10 | 280 | 2.60 | 2000 | 20.90 |
| 3/4 | 630 | 7.90 | 500 | 6.30 | 400 | 4.10 | 250 | 2.60 | 1800 | 20.90 |
| 13/16 | 500 | 7.90 | 450 | 6.30 | 350 | 4.10 | 220 | 2.60 | 1400 | 17.70 |
| 15/16 | 500 | 7.90 | 450 | 6.30 | 350 | 4.10 | 220 | 2.60 | 1400 | 17.70 |
| 1 | 450 | 7.10 | 400 | 5.70 | 310 | 3.50 | 180 | 2.00 | 1200 | 16.50 |
| 1-1/2 | 310 | 4.70 | 250 | 3.50 | 200 | 2.40 | 120 | 1.40 | 900 | 13.00 |
| 1-3/4 | 280 | 4.70 | 220 | 3.50 | 150 | 2.40 | 110 | 1.40 | 800 | 11.80 |
| 2 | 280 | 4.70 | 190 | 3.50 | 110 | 1.80 | 80 | 1.00 | 630 | 11.80 |

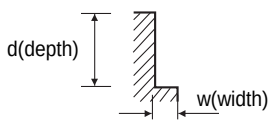



※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

## HSSCo8, MULTI FLUTE 60° HELIX FINISH - SIDE CUTTING

| MATERIAL | | MILD STEELS | | ALLOY STEELS | | TOOL STEELS STAINLESS STEELS | | CAST IRON | |
|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | ~HRc13 | | HRc13~HRc32 | | HRc25~HRc35 | | ~HRc20 | |
| DIAMETER | w×d | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/4 | 0.02 × 0.35 | 1840 | 3.60 | 1250 | 2.20 | 980 | 1.80 | 2050 | 4.80 |
| 1/4 | 0.08 × 0.35 | 1600 | 3.60 | 650 | 2.20 | 510 | 1.60 | 1100 | 4.50 |
| 5/8 | 0.02 × 1 | 750 | 2.90 | 460 | 2.00 | 390 | 1.40 | 840 | 4.10 |
| 5/8 | 0.18 × 1 | 650 | 2.90 | 400 | 2.00 | 340 | 1.40 | 730 | 4.10 |
| 3/4 | 0.02 × 1.2 | 520 | 2.50 | 370 | 1.80 | 300 | 1.40 | 630 | 4.10 |
| 3/4 | 0.26 × 1.2 | 450 | 2.50 | 320 | 1.80 | 260 | 1.40 | 550 | 4.10 |
| 1 | 0.02 × 1.6 | 460 | 2.90 | 290 | 1.80 | 240 | 1.40 | 510 | 4.30 |
| 1 | 0.30 × 1.6 | 400 | 2.90 | 250 | 1.80 | 210 | 1.40 | 440 | 4.30 |
| 1-1/2 | 0.02 × 1.6 | 280 | 2.50 | 170 | 1.40 | 150 | 1.30 | 320 | 3.60 |
| 1-1/2 | 0.80 × 1.6 | 240 | 2.50 | 150 | 1.40 | 130 | 1.30 | 280 | 3.60 |
| 2 | 0.02 × 2 | 220 | 2.20 | 140 | 1.30 | 115 | 1.10 | 260 | 2.90 |
| 2 | 1.60 × 2 | 190 | 2.20 | 120 | 1.30 | 100 | 1.10 | 225 | 2.90 |




※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

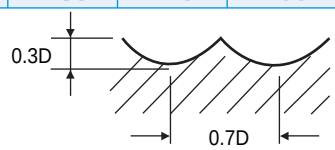
# COBALT & HSS END MILLS

## RECOMMENDED CUTTING CONDITIONS



## HSSCo8 & HSS, 2 FLUTE BALL NOSE

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | ALUMINUM ALUMINUM ALLOYS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~HRc20 | | HRc20~HRc30 | | HRc30~HRc40 | | | |
| STRENGTH | ~ 500N/mm² | | 500~800N/mm² | | 800~1000N/mm² | | 1000~1300N/mm² | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| R1/16 × 1/8 | 4500 | 3.70 | 3400 | 2.80 | 2000 | 1.20 | 1400 | 0.80 | 11000 | 9.10 |
| R5/64 × 5/32 | 3200 | 4.50 | 2400 | 3.10 | 1400 | 1.40 | 1000 | 1.00 | 8000 | 10.20 |
| R1/8 × 1/4 | 2200 | 5.30 | 1700 | 3.50 | 1000 | 1.80 | 700 | 1.00 | 5600 | 11.00 |
| R5/32 × 5/16 | 1600 | 6.30 | 1200 | 4.10 | 700 | 2.00 | 500 | 1.20 | 4000 | 13.80 |
| R3/16 × 3/8 | 1300 | 7.10 | 1000 | 4.70 | 560 | 2.40 | 400 | 1.40 | 3200 | 14.20 |
| R1/4 × 1/2 | 1000 | 6.70 | 800 | 4.10 | 450 | 2.20 | 320 | 1.40 | 2500 | 13.40 |
| R5/16 × 5/8 | 800 | 6.00 | 600 | 4.00 | 350 | 2.20 | 250 | 1.40 | 2000 | 11.80 |
| R3/32 × 3/16 | 600 | 5.50 | 500 | 3.40 | 300 | 2.00 | 200 | 1.40 | 1600 | 11.00 |
| R1/2 × 1 | 500 | 5.10 | 400 | 2.80 | 220 | 1.60 | 160 | 1.20 | 1300 | 9.80 |

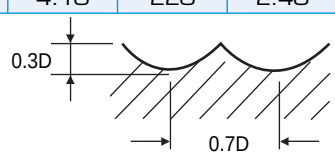



※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

## HSSCo8 & HSS, MULTI FLUTE BALL NOSE

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | ALUMINUM ALUMINUM ALLOYS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~HRc20 | | HRc20~HRc30 | | HRc30~HRc40 | | | |
| STRENGTH | ~ 500N/mm² | | 500~800N/mm² | | 800~1000N/mm² | | 1000~1300N/mm² | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| R1/8 × 1/4 | 2200 | 7.90 | 1700 | 5.30 | 1000 | 2.80 | 700 | 1.60 | 5600 | 16.50 |
| R5/32 × 5/16 | 1600 | 9.40 | 1200 | 6.30 | 700 | 3.00 | 500 | 1.80 | 4000 | 20.90 |
| R3/16 × 3/8 | 1300 | 10.60 | 1000 | 7.10 | 560 | 3.50 | 400 | 2.00 | 3200 | 21.30 |
| R1/4 × 1/2 | 1000 | 10.20 | 800 | 6.30 | 450 | 3.10 | 320 | 2.00 | 2500 | 20.10 |
| R5/16 × 5/8 | 800 | 9.10 | 600 | 6.00 | 350 | 3.10 | 250 | 2.00 | 2000 | 17.70 |
| R3/32 × 3/16 | 600 | 8.30 | 500 | 5.10 | 300 | 3.00 | 200 | 2.00 | 1600 | 16.50 |
| R1/2 × 1 | 500 | 7.90 | 400 | 4.10 | 220 | 2.40 | 160 | 1.80 | 1300 | 15.00 |




※ The Feed, in long & extra long types, should be reduced by around 50%.

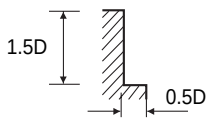
RPM = rev./min.
FEED = inch/min.

# COBALT & HSS END MILLS

## RECOMMENDED CUTTING CONDITIONS

## HSSCo8, MULTI FLUTE ROUGHING - SIDE CUTTING

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | ALUMINUM ALUMINUM ALLOYS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~HRc20 | | HRc20~HRc30 | | HRc30~HRc40 | | | |
| STRENGTH | ~ 500N/mm² | | 500~800N/mm² | | 800~1000N/mm² | | 1000~1300N/mm² | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/4 | 1800 | 3.10 | 1600 | 2.40 | 1200 | 2.20 | 800 | 1.20 | 4500 | 7.90 |
| 5/16 | 1400 | 4.10 | 1100 | 3.00 | 900 | 2.60 | 560 | 1.40 | 3100 | 9.10 |
| 3/8 | 1100 | 6.00 | 900 | 4.70 | 800 | 4.30 | 450 | 2.40 | 2500 | 13.80 |
| 1/2 | 900 | 7.10 | 800 | 5.50 | 630 | 4.30 | 400 | 2.80 | 2000 | 15.80 |
| 5/8 | 700 | 7.10 | 560 | 5.50 | 450 | 4.30 | 280 | 2.80 | 1600 | 17.70 |
| 11/16 | 630 | 7.10 | 500 | 5.50 | 400 | 4.30 | 250 | 2.80 | 1400 | 18.50 |
| 7/8 | 500 | 8.70 | 450 | 6.70 | 350 | 5.50 | 220 | 3.40 | 1100 | 18.50 |
| 1 | 450 | 8.70 | 400 | 6.70 | 310 | 5.50 | 180 | 3.40 | 1000 | 17.70 |
| 1-1/8 | 400 | 8.10 | 350 | 6.30 | 280 | 5.10 | 160 | 3.40 | 900 | 20.10 |
| 1-1/4 | 350 | 8.10 | 280 | 6.30 | 220 | 5.10 | 140 | 3.40 | 800 | 19.70 |
| 1-3/8 | 310 | 8.10 | 250 | 6.30 | 200 | 5.10 | 120 | 3.40 | 700 | 18.50 |
| 1-3/4 | 280 | 7.90 | 220 | 6.00 | 180 | 4.70 | 110 | 3.10 | 630 | 17.70 |
| 2 | 220 | 7.90 | 180 | 6.70 | 160 | 5.50 | 90 | 3.10 | 500 | 14.60 |

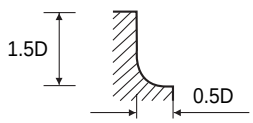



※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

## HSSCo8, MULTI FLUTE BALL NOSE ROUGHING - SIDE CUTTING

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | ALUMINUM ALUMINUM ALLOYS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~HRc20 | | HRc20~HRc30 | | HRc30~HRc40 | | | |
| STRENGTH | ~ 500N/mm² | | 500~800N/mm² | | 800~1000N/mm² | | 1000~1300N/mm² | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| R5/32 × 5/16 | 1400 | 4.10 | 1100 | 3.00 | 900 | 2.60 | 560 | 1.40 | 3100 | 9.10 |
| R3/16 × 3/8 | 1100 | 6.00 | 900 | 4.70 | 800 | 4.30 | 450 | 2.40 | 2500 | 9.80 |
| R1/4 × 1/2 | 900 | 7.10 | 800 | 5.50 | 630 | 4.30 | 400 | 2.80 | 2000 | 15.80 |
| R5/16 × 5/8 | 700 | 7.10 | 560 | 5.50 | 450 | 4.30 | 280 | 2.80 | 1600 | 17.70 |
| R7/16 × 7/8 | 560 | 7.10 | 450 | 5.50 | 400 | 4.30 | 220 | 2.80 | 1200 | 19.70 |
| R1/2 × 1 | 450 | 8.70 | 400 | 6.70 | 310 | 5.50 | 180 | 3.40 | 1000 | 17.70 |
| R5/8 × 1-1/4 | 350 | 8.10 | 280 | 6.30 | 220 | 5.10 | 140 | 3.40 | 800 | 19.70 |
| R7/8 × 1-3/4 | 280 | 7.90 | 220 | 6.00 | 180 | 4.70 | 110 | 3.10 | 630 | 17.70 |




※ The Feed, in long & extra long types, should be reduced by around 50%.

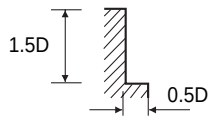
RPM = rev./min.
FEED = inch/min.

# COBALT & HSS END MILLS

## RECOMMENDED CUTTING CONDITIONS

## HSSCo8 & HSS, MULTI FLUTE ROUGHING & FINISHING - SIDE CUTTING

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | ALUMINUM ALUMINUM ALLOYS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~HRc20 | | HRc20~HRc30 | | HRc30~HRc40 | | | |
| STRENGTH | ~ 500N/mm² | | 500~800N/mm² | | 800~1000N/mm² | | 1000~1300N/mm² | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/4 | 1800 | 2.50 | 1300 | 2.00 | 1200 | 1.80 | 800 | 1.00 | 4500 | 6.30 |
| 5/16 | 1400 | 3.35 | 1100 | 2.40 | 900 | 2.20 | 560 | 1.20 | 3100 | 7.30 |
| 3/8 | 1100 | 4.70 | 900 | 3.70 | 800 | 3.50 | 450 | 2.00 | 2500 | 11.00 |
| 1/2 | 900 | 5.70 | 800 | 4.30 | 630 | 3.50 | 400 | 2.20 | 2000 | 12.60 |
| 5/8 | 700 | 5.70 | 560 | 4.30 | 450 | 3.50 | 280 | 2.20 | 1600 | 14.20 |
| 11/16 | 630 | 5.70 | 500 | 4.30 | 400 | 3.50 | 250 | 2.20 | 1400 | 15.00 |
| 7/8 | 500 | 6.90 | 450 | 5.30 | 350 | 4.30 | 220 | 2.80 | 1100 | 15.00 |
| 1 | 450 | 6.90 | 400 | 5.30 | 310 | 4.30 | 180 | 2.80 | 1000 | 14.20 |
| 1-1/4 | 350 | 6.70 | 280 | 5.10 | 220 | 4.10 | 140 | 2.80 | 800 | 15.80 |
| 1-3/8 | 310 | 6.70 | 250 | 5.10 | 200 | 4.10 | 120 | 2.80 | 700 | 15.00 |
| 2 | 240 | 5.35 | 190 | 4.00 | 150 | 3.40 | 110 | 2.60 | 500 | 11.20 |




※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

## HSSCo8 & HSS, MINIATURE

| MATERIAL | HIGH TENSILE STEELS MEDIUM STRENGTH STAINLESS STEELS MEDIUM STRENGTH TITANIUM SLOOYS | | MEDIUM TENSILE STEELS UNALLOYED TITANIUM TOOL STEELS HEAT RESISTANT FERRITIC LOW ALLOYS | | VILD STEEL FORGING HARD BRASS & BRONZE COPPER | | ALUMINUM ALUMINUM ALLOYS PLASTIC WOODS | | ALUMINUM ALUMINUM ALLOYS | |
|---|---|---|---|---|---|---|---|---|---|---|
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/4 | 6600~8800 | 0.34 | 11000 up | 0.45 | 11000 up | 0.79 | 11000 up | 1.24 | 11000 up | 1.46 |
| 1/32 | 3300~4400 | 0.45 | 5500~5600 | 0.56 | 7700~9900 | 1.58 | 11000 up | 1.58 | 11000 up | 2.48 |
| 3/64 | 2200~2935 | 0.56 | 3665~4400 | 0.56 | 5135~6600 | 2.48 | 7335~8800 | 2.03 | 11000 up | 2.59 |
| 1/16 | 1650~2260 | 0.56 | 2750~3300 | 1.01 | 3350~4950 | 3.26 | 5500~6600 | 2.59 | 11000 up | 4.16 |
| 5/64 | 1320~1760 | 0.56 | 2200~2640 | 1.01 | 3850~3960 | 3.26 | 4400~5820 | 2.59 | 8500 up | 4.16 |
| 3/32 | 1100~1285 | 0.56 | 1835~2200 | 1.01 | 2565~3300 | 3.26 | 3665~4400 | 2.59 | 7330up | 4.16 |
| 7/64 | 345~1255 | 0.56 | 1570~1885 | 1.01 | 2200~2830 | 3.26 | 3140~3770 | 2.59 | 5625 up | 4.28 |
| 1/8 | 825~1100 | 0.56 | 1375~1650 | 1.01 | 1925~2475 | 3.26 | 2750~3300 | 2.81 | 5500 up | 4.50 |
| 9/64 | 735~980 | 0.62 | 1220~1465 | 1.01 | 1710~2200 | 3.38 | 2445~3770 | 2.81 | 4890~9780 | 4.50 |
| 5/32 | 560~880 | 0.79 | 1100~1320 | 1.13 | 1540~1980 | 3.60 | 2205~2640 | 2.93 | 4400~8800 | 4.50 |
| 11/64 | 600~800 | 0.90 | 1000~1200 | 1.24 | 1400~1800 | 3.71 | 2000~2400 | 3.04 | 4000~3000 | 4.61 |
| 3/16 | 550~735 | 1.01 | 915~1100 | 1.35 | 1285~1650 | 3.33 | 1535~2200 | 3.26 | 3685~7335 | 4.73 |

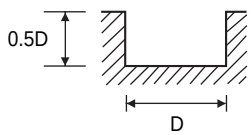
RPM = rev./min.
FEED = inch/min.

**NOTES :**

(1) The cutting conditions in this table are given for reference, which should be varied depending on the machine, tooling, depth of cut. cutting fluid and other conditons.
(2) Use a holder of strong gripping force and machine of high stiffness

## HSSCo8 & HSS, 2 FLUTE FINISH TiN-COATED - SLOTTING

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | ALUMINUM ALUMINUM ALLOYS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~HRc20 | | HRc20~HRc30 | | HRc30~HRc40 | | | |
| STRENGTH | ~ 500N/mm² | | 500~800N/mm² | | 800~1000N/mm² | | 1000~1300N/mm² | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/8 | 4200 | 2.64 | 3840 | 2.16 | 3000 | 1.92 | 1920 | 0.96 | 13200 | 11.76 |
| 1/4 | 2160 | 4.20 | 1920 | 3.72 | 1440 | 2.88 | 960 | 1.92 | 6720 | 14.64 |
| 3/8 | 1320 | 4.80 | 1080 | 4.20 | 960 | 3.72 | 540 | 2.16 | 3720 | 18.96 |
| 1/2 | 1090 | 5.16 | 960 | 4.80 | 756 | 3.72 | 480 | 2.40 | 3000 | 18.00 |
| 5/8 | 840 | 5.16 | 672 | 4.20 | 540 | 3.72 | 336 | 2.16 | 2400 | 16.56 |
| 3/4 | 756 | 4.80 | 600 | 4.20 | 480 | 3.36 | 300 | 2.16 | 2160 | 16.56 |
| 7/8 | 600 | 4.80 | 540 | 4.20 | 420 | 3.36 | 264 | 2.16 | 1680 | 14.16 |
| 1 | 540 | 4.20 | 480 | 3.72 | 372 | 2.88 | 260 | 2.16 | 1440 | 13.20 |
| 1-1/8 | 480 | 3.72 | 420 | 3.36 | 336 | 2.64 | 432 | 1.68 | 1320 | 12.60 |
| 1-3/8 | 372 | 2.88 | 300 | 2.40 | 240 | 1.92 | 144 | 1.20 | 1080 | 10.44 |
| 1-1/2 | 372 | 2.88 | 300 | 2.40 | 240 | 1.92 | 144 | 1.20 | 1080 | 10.44 |
| 1-3/4 | 336 | 2.88 | 264 | 2.40 | 216 | 1.92 | 132 | 1.20 | 960 | 9.48 |
| 2 | 300 | 2.40 | 228 | 2.16 | 132 | 1.20 | 96 | 0.96 | 756 | 7.56 |

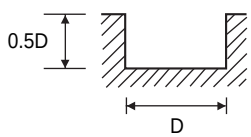



※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

## HSSCo8 & HSS, 3 FLUTE FINISH TiN-COATED - SLOTTING

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | ALUMINUM ALUMINUM ALLOYS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~HRc20 | | HRc20~HRc30 | | HRc30~HRc40 | | | |
| STRENGTH | ~ 500N/mm² | | 500~800N/mm² | | 800~1000N/mm² | | 1000~1300N/mm² | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 3/32 | 6720 | 2.80 | 5400 | 2.16 | 4800 | 2.16 | 2640 | 0.96 | 14400 | 11.28 |
| 1/5 | 4200 | 3.72 | 3840 | 3.12 | 3000 | 2.88 | 1920 | 1.44 | 13200 | 18.00 |
| 1/4 | 2160 | 6.36 | 1920 | 5.64 | 1440 | 4.20 | 960 | 2.88 | 6720 | 21.66 |
| 3/8 | 1320 | 7.20 | 1080 | 6.36 | 960 | 5.64 | 540 | 3.12 | 3720 | 28.32 |
| 1/2 | 1080 | 7.80 | 960 | 7.20 | 756 | 5.64 | 480 | 3.60 | 3000 | 26.88 |
| 5/8 | 840 | 7.80 | 672 | 6.36 | 540 | 4.92 | 336 | 3.12 | 2400 | 25.08 |
| 11/16 | 756 | 7.20 | 600 | 6.36 | 480 | 4.92 | 300 | 3.12 | 2160 | 25.08 |
| 7/8 | 600 | 7.20 | 540 | 6.36 | 420 | 4.92 | 264 | 3.12 | 1680 | 21.24 |
| 1 | 540 | 6.36 | 480 | 5.64 | 372 | 4.20 | 216 | 2.40 | 1440 | 19.80 |
| 1-1/8 | 430 | 5.62 | 420 | 4.92 | 336 | 3.72 | 192 | 2.16 | 1320 | 18.96 |
| 1-3/16 | 420 | 4.92 | 372 | 4.20 | 300 | 3.60 | 192 | 2.16 | 1320 | 18.96 |




※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

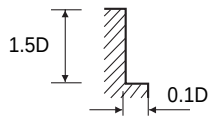
# COBALT & HSS END MILLS

## RECOMMENDED CUTTING CONDITIONS



## HSSCo8 & HSS, 3 FLUTE FINISH TiN-COATED - SIDE CUTTING

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | ALUMINUM ALUMINUM ALLOYS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~HRc20 | | HRc20~HRc30 | | HRc30~HRc40 | | | |
| STRENGTH | ~ 500N/mm² | | 500~800N/mm² | | 800~1000N/mm² | | 1000~1300N/mm² | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 3/32 | 6720 | 2.88 | 5400 | 1.92 | 4800 | 1.68 | 2640 | 0.72 | 14400 | 8.52 |
| 1/8 | 4200 | 3.72 | 3840 | 2.88 | 3000 | 2.16 | 1920 | 0.96 | 13200 | 13.20 |
| 1/4 | 2160 | 6.36 | 1920 | 5.16 | 1440 | 3.12 | 960 | 2.16 | 6720 | 16.56 |
| 3/8 | 1320 | 7.20 | 1080 | 5.64 | 960 | 4.20 | 540 | 2.40 | 3720 | 21.24 |
| 1/2 | 1080 | 7.80 | 960 | 6.36 | 756 | 4.20 | 480 | 2.64 | 3000 | 20.28 |
| 9/16 | 960 | 7.80 | 840 | 5.64 | 672 | 4.20 | 420 | 2.64 | 2640 | 18.96 |
| 5/8 | 840 | 7.80 | 672 | 5.64 | 540 | 3.72 | 336 | 2.40 | 2400 | 18.96 |
| 11/16 | 756 | 7.20 | 600 | 5.64 | 480 | 3.72 | 300 | 2.40 | 2160 | 18.96 |
| 7/8 | 600 | 7.20 | 540 | 5.64 | 420 | 3.72 | 264 | 2.40 | 1680 | 16.08 |
| 1 | 540 | 6.36 | 480 | 5.16 | 372 | 3.12 | 216 | 1.68 | 1440 | 15.12 |
| 1-1/8 | 430 | 5.64 | 420 | 4.44 | 336 | 2.88 | 192 | 1.44 | 1320 | 14.16 |

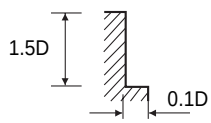



※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

## HSSCo8 & HSS, MULTI FLUTE FINISH TiN-COATED - SIDE CUTTING

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | ALUMINUM ALUMINUM ALLOYS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~HRc20 | | HRc20~HRc30 | | HRc30~HRc40 | | | |
| STRENGTH | ~ 500N/mm² | | 500~800N/mm² | | 800~1000N/mm² | | 1000~1300N/mm² | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/8 | 4200 | 5.16 | 3840 | 3.72 | 3000 | 2.88 | 1920 | 1.44 | 13200 | 18.00 |
| 1/4 | 2640 | 8.52 | 1920 | 6.84 | 1440 | 4.20 | 960 | 2.88 | 6720 | 22.20 |
| 3/8 | 1320 | 9.48 | 1080 | 7.56 | 960 | 5.64 | 540 | 3.12 | 3700 | 28.32 |
| 1/2 | 1080 | 10.44 | 960 | 8.52 | 756 | 5.64 | 480 | 3.60 | 3000 | 26.88 |
| 5/8 | 840 | 10.44 | 672 | 7.56 | 540 | 4.92 | 336 | 3.12 | 2400 | 25.08 |
| 3/4 | 756 | 9.48 | 600 | 7.56 | 480 | 4.92 | 300 | 3.12 | 2160 | 25.08 |
| 7/8 | 600 | 9.48 | 540 | 7.56 | 420 | 4.92 | 264 | 3.12 | 1680 | 21.24 |
| 15/16 | 600 | 9.48 | 540 | 7.56 | 420 | 4.92 | 264 | 3.12 | 1680 | 21.24 |
| 1 | 540 | 8.52 | 480 | 6.84 | 372 | 4.20 | 216 | 2.40 | 1440 | 19.80 |
| 1-1/2 | 372 | 5.64 | 300 | 4.20 | 240 | 2.88 | 144 | 1.68 | 1080 | 15.60 |
| 1-3/4 | 336 | 5.64 | 264 | 4.20 | 216 | 2.88 | 132 | 1.68 | 960 | 14.16 |
| 2 | 336 | 5.64 | 264 | 4.20 | 168 | 2.16 | 96 | 1.20 | 960 | 14.16 |




※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

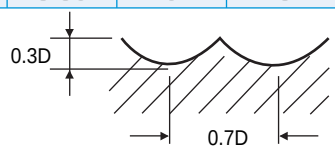
# COBALT & HSS END MILLS

## RECOMMENDED CUTTING CONDITIONS



## HSSCo8 & HSS, 2 FLUTE BALL NOSE TiN-COATED

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | ALUMINUM ALUMINUM ALLOYS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~HRc20 | | HRc20~HRc30 | | HRc30~HRc40 | | | |
| STRENGTH | ~ 500N/mm² | | 500~800N/mm² | | 800~1000N/mm² | | 1000~1300N/mm² | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| R1/16 × 1/8 | 5400 | 4.44 | 4080 | 3.36 | 2400 | 1.44 | 1680 | 0.96 | 13200 | 10.92 |
| R5/64 × 5/32 | 3840 | 5.40 | 2880 | 3.72 | 1680 | 1.68 | 1200 | 1.20 | 9600 | 12.24 |
| R1/8 × 1/4 | 2640 | 6.36 | 2040 | 4.20 | 720 | 2.16 | 840 | 1.20 | 6720 | 13.20 |
| R5/32 × 5/16 | 1920 | 7.56 | 1440 | 4.92 | 840 | 2.40 | 600 | 1.44 | 4800 | 16.56 |
| R3/16 × 3/8 | 1560 | 8.52 | 1200 | 5.64 | 672 | 2.88 | 480 | 1.68 | 3840 | 17.04 |
| R1/4 × 1/2 | 1200 | 8.04 | 960 | 4.92 | 540 | 2.64 | 384 | 1.68 | 3330 | 16.08 |
| R5/16 × 5/8 | 960 | 7.20 | 720 | 4.80 | 420 | 2.64 | 300 | 1.68 | 2400 | 14.16 |
| R3/32 × 3/16 | 720 | 6.60 | 600 | 4.08 | 360 | 2.40 | 240 | 1.68 | 1923 | 13.20 |
| R1/2 × 1 | 600 | 6.12 | 480 | 3.36 | 264 | 1.92 | 192 | 1.44 | 1560 | 11.76 |

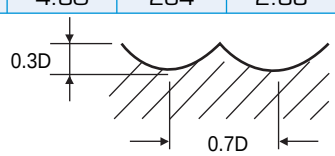



※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

## HSSCo8 & HSS, MULTI FLUTE BALL NOSE TiN-COATED

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | ALUMINUM ALUMINUM ALLOYS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~HRc20 | | HRc20~HRc30 | | HRc30~HRc40 | | | |
| STRENGTH | ~ 500N/mm² | | 500~800N/mm² | | 800~1000N/mm² | | 1000~1300N/mm² | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| R1/8 × 1/4 | 2640 | 9.48 | 2040 | 6.36 | 1200 | 3.36 | 840 | 1.92 | 6720 | 19.80 |
| R5/32 × 5/16 | 1920 | 11.28 | 1440 | 7.56 | 840 | 3.60 | 600 | 2.16 | 4800 | 25.08 |
| R3/16 × 3/8 | 1560 | 12.72 | 1200 | 8.52 | 672 | 4.20 | 480 | 2.40 | 3840 | 25.56 |
| R1/4 × 1/2 | 1200 | 12.24 | 960 | 7.56 | 540 | 3.72 | 384 | 2.40 | 3000 | 24.12 |
| R5/16 × 5/8 | 960 | 10.92 | 720 | 7.20 | 420 | 3.72 | 300 | 2.40 | 2400 | 21.24 |
| R3/32 × 3/16 | 720 | 9.96 | 600 | 6.12 | 380 | 3.60 | 240 | 2.40 | 1920 | 19.80 |
| R1/2 × 1 | 600 | 9.48 | 480 | 4.80 | 264 | 2.88 | 192 | 2.16 | 1560 | 18.00 |




※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

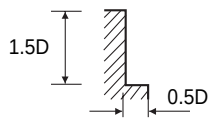
# COBALT & HSS END MILLS

## RECOMMENDED CUTTING CONDITIONS



## HSSCo8, MULTI FLUTE ROUGHING TiN-COATED - SIDE CUTTING

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | ALUMINUM ALUMINUM ALLOYS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~HRc20 | | HRc20~HRc30 | | HRc30~HRc40 | | | |
| STRENGTH | ~ 500N/mm² | | 500~800N/mm² | | 800~1000N/mm² | | 1000~1300N/mm² | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/4 | 2160 | 3.72 | 1920 | 2.88 | 1440 | 2.64 | 960 | 1.44 | 5400 | 9.48 |
| 5/16 | 1680 | 4.92 | 1320 | 3.60 | 1080 | 3.12 | 672 | 1.68 | 3720 | 10.92 |
| 3/8 | 1320 | 7.20 | 1080 | 5.64 | 960 | 5.16 | 540 | 2.88 | 3000 | 16.56 |
| 1/2 | 1080 | 8.52 | 960 | 6.60 | 756 | 5.16 | 480 | 3.36 | 2400 | 18.96 |
| 5/8 | 840 | 8.52 | 672 | 6.60 | 540 | 5.16 | 336 | 3.36 | 1920 | 22.20 |
| 11/16 | 756 | 8.52 | 600 | 6.60 | 480 | 5.16 | 300 | 3.36 | 1680 | 22.20 |
| 7/8 | 600 | 10.44 | 540 | 8.04 | 420 | 6.60 | 264 | 4.08 | 1320 | 21.24 |
| 1 | 540 | 10.44 | 480 | 8.04 | 372 | 6.60 | 216 | 4.08 | 1200 | 21.24 |
| 1-1/8 | 480 | 9.72 | 420 | 7.56 | 336 | 6.12 | 192 | 4.08 | 1680 | 24.12 |
| 1-1/4 | 420 | 9.72 | 336 | 7.56 | 264 | 6.12 | 168 | 4.08 | 960 | 23.64 |
| 1-3/8 | 372 | 9.72 | 300 | 7.56 | 240 | 6.12 | 144 | 4.08 | 840 | 22.20 |
| 1-3/4 | 336 | 9.48 | 264 | 7.20 | 216 | 5.64 | 132 | 3.72 | 756 | 21.24 |
| 2 | 264 | 9.48 | 216 | 8.04 | 192 | 6.60 | 108 | 3.72 | 600 | 7.52 |

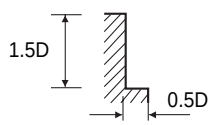



※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

## HSSCo8, MULTI FLUTE ROUGHING & FINISHING TiN-COATED - SIDE CUTTING

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | ALUMINUM ALUMINUM ALLOYS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~HRc20 | | HRc20~HRc30 | | HRc30~HRc40 | | | |
| STRENGTH | ~ 500N/mm² | | 500~800N/mm² | | 800~1000N/mm² | | 1000~1300N/mm² | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/4 | 2160 | 3.00 | 1920 | 2.40 | 1440 | 2.16 | 960 | 1.20 | 5400 | 7.56 |
| 5/16 | 1680 | 4.02 | 1320 | 2.88 | 1080 | 2.40 | 672 | 1.44 | 3720 | 8.76 |
| 3/8 | 1320 | 5.64 | 1080 | 4.44 | 960 | 4.20 | 540 | 2.40 | 3000 | 13.20 |
| 1/2 | 1080 | 6.84 | 960 | 5.16 | 756 | 4.20 | 480 | 2.64 | 2400 | 15.12 |
| 5/8 | 840 | 6.84 | 672 | 5.16 | 540 | 4.20 | 336 | 2.64 | 1920 | 17.64 |
| 11/16 | 756 | 6.84 | 600 | 5.16 | 480 | 4.20 | 300 | 2.64 | 1680 | 18.00 |
| 7/8 | 600 | 8.28 | 540 | 6.36 | 420 | 5.16 | 264 | 3.36 | 1320 | 18.00 |
| 1 | 540 | 8.28 | 480 | 6.36 | 372 | 5.16 | 216 | 3.36 | 1200 | 17.64 |
| 1-1/4 | 420 | 8.04 | 336 | 6.12 | 264 | 4.92 | 168 | 3.36 | 960 | 18.96 |
| 1-3/8 | 372 | 8.04 | 300 | 6.12 | 240 | 4.92 | 144 | 3.36 | 840 | 18.00 |
| 2 | 288 | 6.42 | 228 | 4.80 | 192 | 4.08 | 132 | 3.12 | 600 | 13.44 |

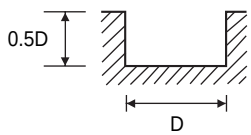



※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

## HSSCo8 & HSS, 2 FLUTE FINISH TiCN-COATED - SLOTTING

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | ALUMINUM ALUMINUM ALLOYS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~HRc20 | | HRc20~HRc30 | | HRc30~HRc40 | | | |
| STRENGTH | ~ 500N/mm² | | 500~800N/mm² | | 800~1000N/mm² | | 1000~1300N/mm² | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/8 | 4550 | 2.86 | 3840 | 2.34 | 3250 | 2.08 | 2048 | 1.04 | 14300 | 12.74 |
| 1/4 | 2340 | 4.55 | 2080 | 4.03 | 1560 | 3.12 | 1040 | 3.24 | 7280 | 15.86 |
| 3/8 | 1430 | 5.20 | 1170 | 4.55 | 1040 | 4.03 | 585 | 3.24 | 4030 | 20.54 |
| 1/2 | 1170 | 5.59 | 1040 | 5.20 | 819 | 4.03 | 520 | 2.80 | 3250 | 19.50 |
| 5/8 | 910 | 5.59 | 728 | 4.55 | 585 | 3.64 | 364 | 2.34 | 2600 | 17.94 |
| 3/4 | 819 | 5.20 | 650 | 4.55 | 520 | 3.64 | 325 | 2.34 | 2340 | 17.94 |
| 7/8 | 650 | 5.20 | 585 | 4.55 | 455 | 3.64 | 286 | 2.34 | 1820 | 15.34 |
| 1 | 585 | 4.55 | 520 | 4.03 | 403 | 3.12 | 234 | 1.82 | 1560 | 14.30 |
| 1-1/8 | 520 | 4.03 | 455 | 3.64 | 364 | 2.86 | 208 | 1.56 | 1430 | 13.65 |
| 1-3/8 | 403 | 3.12 | 325 | 2.60 | 260 | 2.08 | 156 | 1.30 | 1170 | 11.31 |
| 1-1/2 | 403 | 3.12 | 325 | 2.60 | 260 | 2.08 | 156 | 1.30 | 1170 | 11.31 |
| 1-3/4 | 364 | 3.12 | 286 | 2.60 | 234 | 2.08 | 143 | 1.30 | 1040 | 10.27 |
| 2 | 325 | 2.60 | 228 | 2.34 | 143 | 1.30 | 104 | 1.04 | 819 | 8.19 |

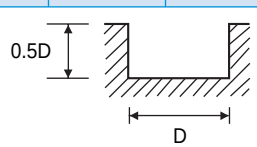



※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

## HSSCo8, 3 FLUTE FINISH TiCN-COATED - SLOTTING

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | ALUMINUM ALUMINUM ALLOYS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~HRc20 | | HRc20~HRc30 | | HRc30~HRc40 | | | |
| STRENGTH | ~ 500N/mm² | | 500~800N/mm² | | 800~1000N/mm² | | 1000~1300N/mm² | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 3/32 | 7280 | 3.12 | 5850 | 2.34 | 5200 | 2.34 | 2860 | 1.04 | 15600 | 12.22 |
| 1/8 | 4550 | 4.03 | 2340 | 3.38 | 3250 | 3.12 | 2080 | 1.56 | 14300 | 19.50 |
| 1/4 | 2340 | 6.89 | 2080 | 6.11 | 1560 | 4.55 | 1040 | 3.12 | 7280 | 23.46 |
| 3/8 | 1430 | 7.80 | 1170 | 6.89 | 1040 | 6.11 | 585 | 3.38 | 4030 | 30.68 |
| 1/2 | 1170 | 8.45 | 1040 | 7.80 | 819 | 6.11 | 520 | 3.80 | 3250 | 29.12 |
| 9/16 | 1040 | 8.45 | 910 | 6.89 | 728 | 6.11 | 455 | 3.80 | 2860 | 27.17 |
| 5/8 | 910 | 8.45 | 728 | 6.89 | 585 | 5.33 | 364 | 3.38 | 2600 | 27.17 |
| 7/8 | 650 | 7.80 | 585 | 6.89 | 455 | 5.33 | 286 | 3.38 | 1820 | 23.01 |
| 1 | 585 | 6.89 | 520 | 6.11 | 403 | 4.55 | 324 | 2.6 | 1560 | 21.45 |
| 1-1/8 | 520 | 6.89 | 455 | 5.33 | 364 | 4.33 | 208 | 2.34 | 1430 | 20.54 |




※ The Feed, in long & extra long types, should be reduced by around 50%.

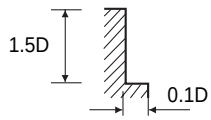
RPM = rev./min.
FEED = inch/min.

# COBALT & HSS END MILLS

## RECOMMENDED CUTTING CONDITIONS

## HSSCo8 & HSS, 3 FLUTE FINISH TiCN-COATED - SIDE CUTTING

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | ALUMINUM ALUMINUM ALLOYS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~HRc20 | | HRc20~HRc30 | | HRc30~HRc40 | | | |
| STRENGTH | ~ 500N/mm² | | 500~800N/mm² | | 800~1000N/mm² | | 1000~1300N/mm² | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 3/32 | 7280 | 3.12 | 5850 | 2.08 | 5200 | 1.82 | 2860 | 0.78 | 15600 | 9.23 |
| 1/8 | 4550 | 4.03 | 4160 | 3.12 | 3250 | 2.34 | 2080 | 1.04 | 14300 | 14.30 |
| 1/4 | 2240 | 6.89 | 2080 | 5.59 | 1560 | 3.38 | 1040 | 2.34 | 7280 | 17.94 |
| 5/16 | 1820 | 7.80 | 1430 | 5.11 | 1170 | 4.03 | 728 | 2.60 | 5200 | 22.49 |
| 1/2 | 1170 | 8.45 | 1040 | 6.89 | 819 | 4.55 | 520 | 2.86 | 3250 | 21.97 |
| 9/16 | 1040 | 8.45 | 910 | 6.11 | 728 | 4.55 | 455 | 2.86 | 2860 | 20.54 |
| 5/8 | 910 | 8.45 | 728 | 6.11 | 585 | 4.55 | 364 | 2.60 | 2600 | 20.54 |
| 11/16 | 819 | 7.80 | 650 | 6.11 | 520 | 4.03 | 325 | 2.60 | 2340 | 20.54 |
| 7/8 | 650 | 7.80 | 585 | 6.11 | 455 | 4.03 | 286 | 2.60 | 1820 | 17.42 |
| 1 | 585 | 6.89 | 520 | 5.59 | 403 | 3.38 | 234 | 1.82 | 1560 | 16.38 |
| 1-1/8 | 520 | 6.11 | 455 | 4.81 | 362 | 3.12 | 208 | 1.56 | 1430 | 15.34 |

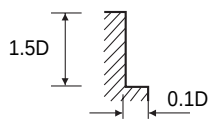



※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

## HSSCo8 & HSS, MULTI FLUTE FINISH TiCN-COATED - SIDE CUTTING

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | ALUMINUM ALUMINUM ALLOYS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~HRc20 | | HRc20~HRc30 | | HRc30~HRc40 | | | |
| STRENGTH | ~ 500N/mm² | | 500~800N/mm² | | 800~1000N/mm² | | 1000~1300N/mm² | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/8 | 4550 | 9.49 | 4160 | 4.03 | 3250 | 3.12 | 22080 | 1.56 | 14300 | 19.50 |
| 1/4 | 2340 | 9.23 | 2090 | 8.41 | 1560 | 4.55 | 1040 | 3.12 | 7280 | 24.05 |
| 3/8 | 1430 | 10.27 | 1170 | 8.19 | 1040 | 6.11 | 585 | 3.38 | 4030 | 30.68 |
| 1/2 | 1170 | 11.31 | 1040 | 9.23 | 818 | 6.11 | 520 | 3.90 | 3250 | 29.12 |
| 5/8 | 910 | 11.31 | 728 | 8.19 | 585 | 5.33 | 364 | 3.38 | 2600 | 27.17 |
| 3/4 | 819 | 10.27 | 819 | 8.19 | 520 | 5.33 | 325 | 3.38 | 2340 | 27.17 |
| 7/8 | 650 | 10.27 | 585 | 8.19 | 455 | 5.33 | 286 | 3.38 | 1820 | 23.01 |
| 15/16 | 650 | 10.27 | 585 | 8.19 | 455 | 5.33 | 234 | 3.38 | 1820 | 23.01 |
| 1 | 585 | 9.23 | 520 | 8.41 | 403 | 4.55 | 208 | 2.60 | 1560 | 21.85 |
| 1-1/2 | 403 | 6.11 | 325 | 4.55 | 260 | 3.12 | 156 | 1.82 | 1170 | 16.90 |
| 1-3/4 | 364 | 6.11 | 286 | 4.55 | 234 | 3.12 | 143 | 1.82 | 1040 | 15.34 |
| 2 | 364 | 6.11 | 286 | 4.55 | 182 | 2.34 | 104 | 1.30 | 1040 | 15.34 |




※ The Feed, in long & extra long types, should be reduced by around 50%.

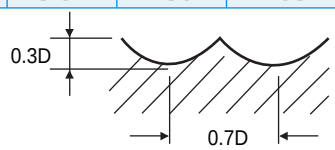
RPM = rev./min.
FEED = inch/min.

# COBALT & HSS END MILLS

## RECOMMENDED CUTTING CONDITIONS

## HSSCo8 & HSS, 2 FLUTE BALL NOSE TiCN-COATED

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | ALUMINUM ALUMINUM ALLOYS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~HRc20 | | HRc20~HRc30 | | HRc30~HRc40 | | | |
| STRENGTH | ~ 500N/mm² | | 500~800N/mm² | | 800~1000N/mm² | | 1000~1300N/mm² | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| R1/16 × 1/8 | 5850 | 4.81 | 4420 | 3.64 | 2600 | 1.56 | 1820 | 1.04 | 14300 | 11.83 |
| R5/64 × 5/32 | 4160 | 5.85 | 3120 | 4.03 | 1820 | 1.82 | 1300 | 1.30 | 10400 | 13.26 |
| R1/8 × 1/4 | 2860 | 6.89 | 2210 | 4.55 | 1300 | 2.34 | 910 | 1.30 | 7280 | 12.30 |
| R5/32 × 5/16 | 2080 | 8.19 | 1560 | 5.33 | 910 | 2.60 | 650 | 1.56 | 5200 | 17.94 |
| R3/16 × 3/8 | 1690 | 9.23 | 1300 | 6.11 | 728 | 3.12 | 520 | 1.82 | 4160 | 18.46 |
| R1/4 × 1/2 | 1300 | 8.71 | 1040 | 5.33 | 585 | 2.86 | 416 | 1.82 | 3250 | 17.42 |
| R5/16 × 5/8 | 1043 | 7.80 | 780 | 5.20 | 455 | 2.86 | 325 | 1.82 | 2600 | 15.34 |
| R3/32 × 3/16 | 780 | 7.15 | 650 | 4.42 | 390 | 2.60 | 263 | 1.82 | 2080 | 14.80 |
| R1/2 × 1 | 650 | 6.63 | 520 | 3.64 | 286 | 2.08 | 208 | 1.56 | 1690 | 12.74 |

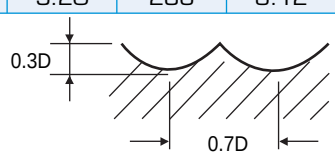



※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

## HSSCo8 & HSS, MULTI FLUTE BALL NOSE TiCN-COATED

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | ALUMINUM ALUMINUM ALLOYS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~HRc20 | | HRc20~HRc30 | | HRc30~HRc40 | | | |
| STRENGTH | ~ 500N/mm² | | 500~800N/mm² | | 800~1000N/mm² | | 1000~1300N/mm² | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| R1/8 × 1/4 | 2860 | 10.27 | 2210 | 6.89 | 1300 | 3.64 | 910 | 2.08 | 7280 | 21.45 |
| R5/32 × 5/16 | 2080 | 12.22 | 1560 | 8.19 | 910 | 3.90 | 650 | 2.34 | 5200 | 27.17 |
| R3/16 × 3/8 | 1690 | 13.78 | 1300 | 9.23 | 728 | 4.55 | 520 | 2.60 | 4160 | 27.69 |
| R1/4 × 1/2 | 1300 | 13.26 | 1040 | 8.19 | 585 | 4.03 | 416 | 2.60 | 3250 | 26.13 |
| R5/16 × 5/8 | 1040 | 11.83 | 780 | 7.80 | 455 | 4.03 | 325 | 2.60 | 2600 | 23.01 |
| R3/32 × 3/16 | 780 | 10.79 | 650 | 6.63 | 390 | 3.90 | 260 | 2.60 | 2080 | 21.45 |
| R1/2 × 1 | 650 | 10.27 | 520 | 5.20 | 286 | 3.12 | 208 | 2.34 | 1690 | 19.50 |




※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

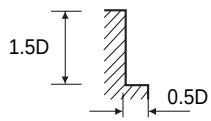
# COBALT & HSS END MILLS

## RECOMMENDED CUTTING CONDITIONS



## HSSCo8, MULTI FLUTE ROUGHING TiCN-COATED - SIDE CUTTING

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | ALUMINUM ALUMINUM ALLOYS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~HRc20 | | HRc20~HRc30 | | HRc30~HRc40 | | | |
| STRENGTH | ~ 500N/mm² | | 500~800N/mm² | | 800~1000N/mm² | | 1000~1300N/mm² | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/4 | 2340 | 4.03 | 2080 | 3.12 | 1560 | 2.86 | 1040 | 1.56 | 5850 | 10.27 |
| 5/16 | 1820 | 5.33 | 1430 | 3.90 | 1170 | 3.38 | 728 | 1.82 | 4030 | 11.53 |
| 3/8 | 1430 | 7.80 | 1170 | 6.11 | 1040 | 5.59 | 585 | 3.12 | 3250 | 17.94 |
| 1/2 | 1170 | 9.23 | 1040 | 7.15 | 819 | 5.59 | 520 | 3.64 | 2600 | 20.54 |
| 5/8 | 910 | 9.23 | 728 | 7.15 | 585 | 5.59 | 364 | 3.64 | 2080 | 24.05 |
| 11/16 | 819 | 9.23 | 650 | 7.15 | 520 | 5.59 | 325 | 3.64 | 1820 | 24.05 |
| 7/8 | 650 | 11.31 | 585 | 8.71 | 455 | 7.15 | 286 | 4.42 | 1430 | 23.01 |
| 1 | 585 | 11.31 | 520 | 8.71 | 403 | 7.15 | 234 | 4.42 | 1300 | 23.01 |
| 1-1/8 | 520 | 10.53 | 455 | 8.19 | 364 | 6.63 | 208 | 4.42 | 1170 | 26.13 |
| 1-1/4 | 455 | 10.53 | 364 | 8.19 | 286 | 6.63 | 182 | 4.42 | 1040 | 25.61 |
| 1-3/8 | 403 | 10.53 | 325 | 8.19 | 260 | 6.63 | 156 | 4.42 | 910 | 24.05 |
| 1-3/4 | 364 | 10.27 | 286 | 7.80 | 234 | 6.11 | 143 | 4.03 | 819 | 23.01 |
| 2 | 286 | 10.27 | 234 | 8.71 | 208 | 7.15 | 117 | 4.03 | 650 | 18.98 |

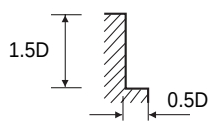



※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

## HSSCo8, MULTI FLUTE ROUGHING & FINISHING TiCN-COATED - SIDE CUTTING

| MATERIAL | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | CARBON STEELS ALLOY STEELS TOOL STEELS | | ALUMINUM ALUMINUM ALLOYS | |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDNESS | | | ~HRc20 | | HRc20~HRc30 | | HRc30~HRc40 | | | |
| STRENGTH | ~ 500N/mm² | | 500~800N/mm² | | 800~1000N/mm² | | 1000~1300N/mm² | | | |
| DIAMETER | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED | RPM | FEED |
| 1/4 | 2340 | 3.25 | 2080 | 2.60 | 1560 | 2.34 | 1040 | 1.30 | 5850 | 8.19 |
| 5/16 | 1820 | 4.35 | 1430 | 3.12 | 1170 | 2.60 | 728 | 1.56 | 4030 | 9.49 |
| 3/8 | 1430 | 6.11 | 1170 | 4.81 | 1040 | 4.55 | 585 | 2.60 | 3250 | 14.30 |
| 1/2 | 1170 | 7.41 | 1040 | 5.59 | 819 | 4.55 | 520 | 2.86 | 2600 | 16.38 |
| 5/8 | 910 | 7.41 | 728 | 5.59 | 585 | 4.55 | 364 | 2.86 | 2080 | 18.46 |
| 11/16 | 819 | 7.41 | 650 | 5.59 | 520 | 4.55 | 325 | 2.86 | 1820 | 19.50 |
| 7/8 | 650 | 8.97 | 585 | 6.89 | 455 | 5.59 | 286 | 3.64 | 1430 | 19.50 |
| 1 | 585 | 8.97 | 520 | 6.89 | 403 | 5.59 | 234 | 3.64 | 1300 | 18.46 |
| 1-1/4 | 455 | 8.71 | 384 | 6.63 | 286 | 5.33 | 182 | 3.64 | 1040 | 20.54 |
| 1-3/4 | 403 | 8.71 | 325 | 6.63 | 260 | 5.33 | 156 | 3.64 | 910 | 19.50 |
| 2 | 312 | 6.95 | 247 | 5.20 | 238 | 4.42 | 143 | 3.38 | 650 | 14.56 |




※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

# END MILLS

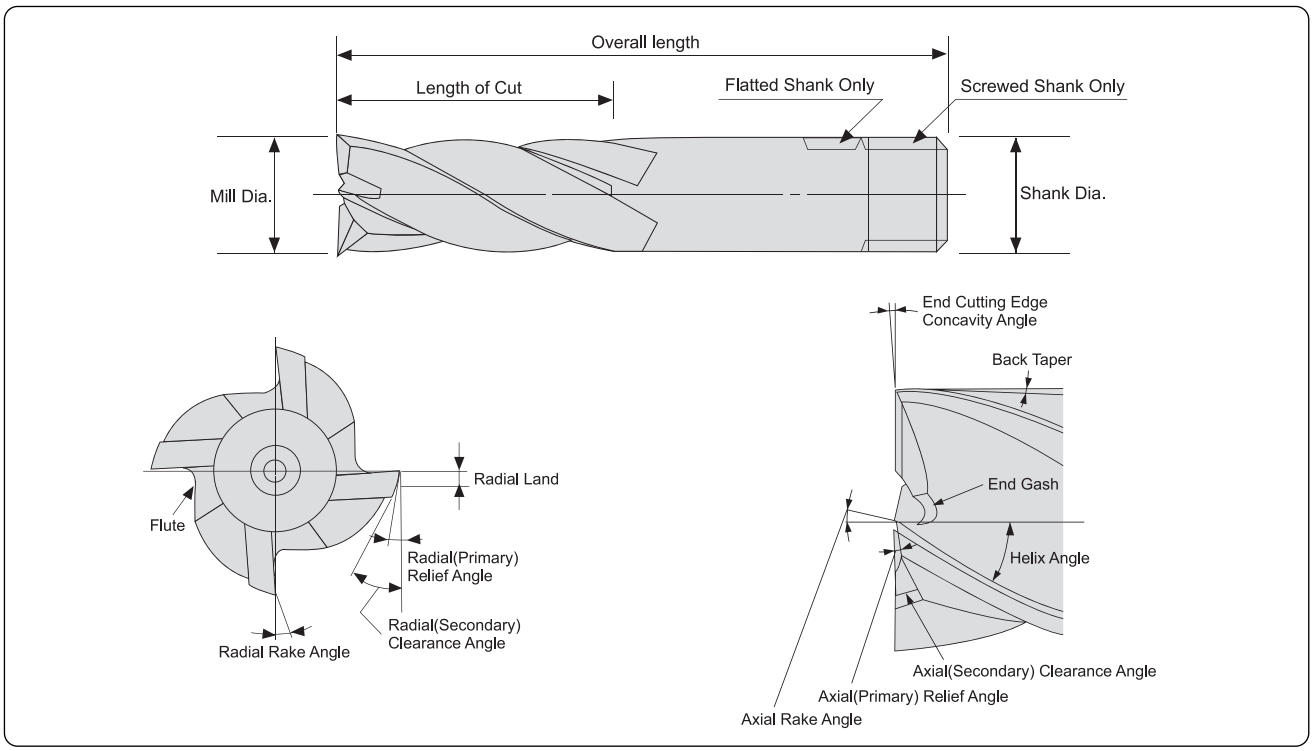
Being the best through innovation

# TECHNICAL DATA

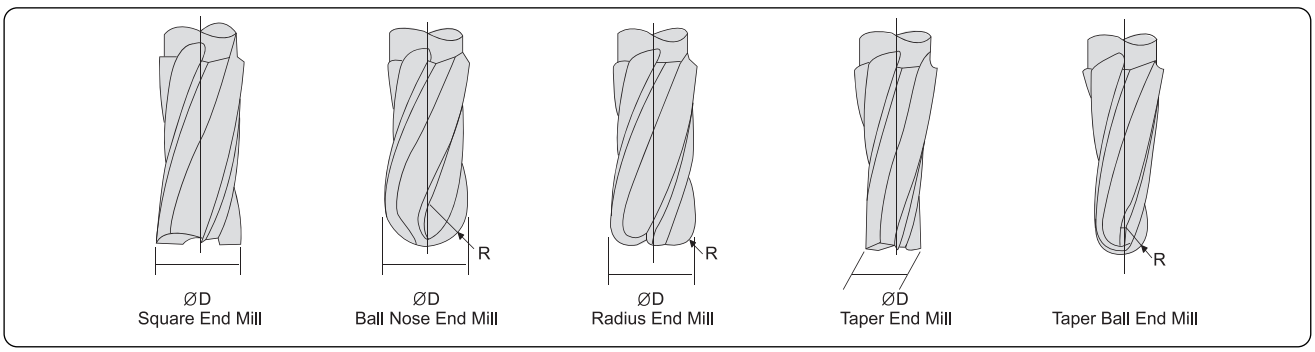
# TECHNICAL DATA

## SUPER CUTTING END MILLS

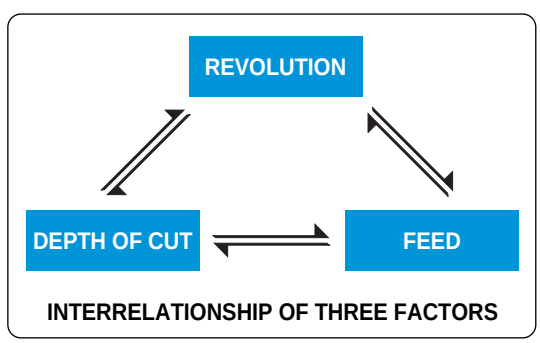
## 1 Names of End Mill Parts




## 2 Type of End Mill




Speed, feed and depth of cut are the most important factors to consider for best results in milling. Improper feeds and speeds often cause low production, poor work quality and unnecessary damage to the cutter.
This section covers the basic principles of speed and feed selection for milling cutters and end mills. It will serve as a guide in setting-up new milling jobs.




INTERRELATIONSHIP OF THREE FACTORS

## 3 Speeds

In milling, Speed is measured in peripheral feet per minute.(revolution per minute × cutter circumference in feet) This is frequently referred to as “peripheral speed” “cutting speed” or “surface speed”.

Revolutions per Minute $N = \frac{1000V}{\pi \times D}$

V : Cutting Speed(m/min)
D : Diameter of Tool(mm)
N : Revolution per minute(rev/min)
$\pi$ : 3.1416

They will have to be tempered to suit the conditons ON THE JOB. For example:

| Use Lower Speed Ranges for | Use Higher Speed Ranges for |
|---|---|
| Hard materials | Softer materials |
| Tough materials | Better finishes |
| Abrasive materials | Smaller diameter cutters |
| Heavy cuts | Light cuts |
| Minimum tool wear | Frail work pieces or set-ups |
| Maximum cutter life | Hand feed operations |
| | Maximum production rates |
| | Non-metallics |

## 4 Feeds

Feed is usually measured in millimeters per minute. It is the product of feed per tooth times revolution per minute times the number of teeth in the cutter. Due to variations in cutter sizes, numbers of teeth and revolutions per minute, all feed rates should be calculated from feed per tooth. Feed per tooth is the basis of all feed rates per minute, whether the cutters are large or small, fine or coarse tooth, and are run at high or low peripheral speed. Because feed per tooth affects chip thickness. It is a very important factor in cutter life.
Highest possible feed per tooth will usually give longer cutter life between grinds and greater production per grind. Excessive feeds may over load the cutter teeth and cause breakage or chipping of the cutting edges. The following factors should be kept in mind when using the recommended starting feed per tooth.

Feed in milimeters per Minute

F.M = F.R. × R.P.M

F.R. : Feed per Revolutions in milimeters
R.P.M .: Revolutions per Minutes

The following factors should be kept in mind when using the recommended stating feed per tooth.

| Use Higher Feeds For | Use Lower Feeds For |
|---|---|
| Heavy, roughing cuts | Light, and finishing cuts |
| Rigid set-ups | Frail set-ups |
| Easy-to-machine work materials | Hard to machine work materials |
| Rugged cutters | Frail and small cutters |
| Slab milling cuts | Deep slots |
| Low tensile strength materials | High tensile strength materials |
| Coarse tooth cutters | Fine tooth cutters |
| Abrasive materials | |

## SPEED AND FEED CALCULATIONS FOR MILLING CUTTERS AND OTHER ROTATING TOOLS

| TO FIND | HAVING | | FORMULA |
|---|---|---|---|
| Surface(or Periphery) Speed in meter Per Minute=S.P.M. | Diameter of Tool in milimeters<br>Revolutions per Minute | =D<br>=R.P.M. | $V=\frac{D\times 3.1416\times R.P.M.}{1000}$ |
| Revolutions Per Minute=R.P.M. | Surface Speed in meter per Minute<br>Diameter of Tool in milimeters | =S.P.M<br>=D | $R.P.M.=\frac{V\times 1000}{D\times 3.1416}$ |
| Feed per Revolution in milimeters-F.R. | Feed in milimeters per Minute<br>Revolution per Minute | =F.M.<br>=R.P.M. | $F.R.=\frac{F.M.}{R.P.M.}$ |
| Feed in milimeters Per Minute-F.M. | Feed per Revolution in milimeters<br>Revolution per Minute | =F.R.<br>=R.P.M. | $F.M.=F.R.\times R.P.M.$ |
| Number of Cutting Teeth per Minute=T.M. | Number of Teeth in Tool<br>Revolution per Minute | =T<br>=R.P.M. | $T.M=T\times R.P.M.$ |
| Feed per tooth=F.T. | Number of Teeth in Tool<br>Feed per Revolution in milimeters | =T<br>=R.P.M. | $F.T.=\frac{F.R.}{T}$ |
| Feed per Tooth=F.T. | Number of Teeth in Tool<br>Feed in milimeters per Minute<br>Speed in Revolution per Minute | =T<br>=F.M.<br>=R.P.M. | $F.T.=\frac{F.M.}{T\times R.P.M.}$ |

## 5 Case of Resharpening

When the product finish become worse, the cutting edge must get dulled, chips become smaller and the cutting sound gets louder. In such cases, an end mill must be resharpened. The following are the damages of end mills when the resharpening is required.

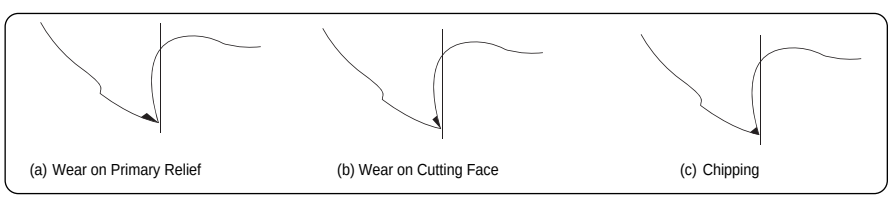



Fig. 1. Damages of Cutting Edge

## 6 Sharpen at Predetermined Wear Land

Cutters should be sharpened as soon as the wear land(Fig. 2.) reaches a predetermined width. This width should permit sharpening without excessive loss of tool life. It may vary from a few hundreths to some tenth of a millimeter, depending on the type of cutter and the finish required on the product. This method is used on production runs where uneven amounts of stock is removed or where the material varies in machinability. It is also used on small quantity product lots.

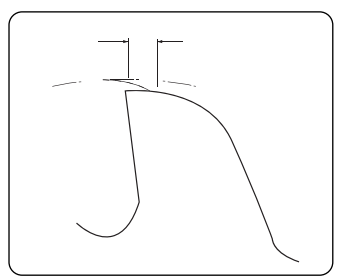


Fig. 2. Wear Land

## Resharpening Peripheral Cutting Edge

# 1 RESHARPENING PERIPHERAL CUTTING EDGE

The geometry of relief angle in an end mill consists of three methods as shown in Fig.3 concave, flat, and eccentric. Recently, most end mills have the eccentric relief(eccentric sharpening). In this method, since the relief is formed an eccentric are surface in cylindrical grinding method, the roughness of the finished surface of the relief improves and the strength of cutting edge increase at the same time.(Fig.4) As a result, the tool life is improved.

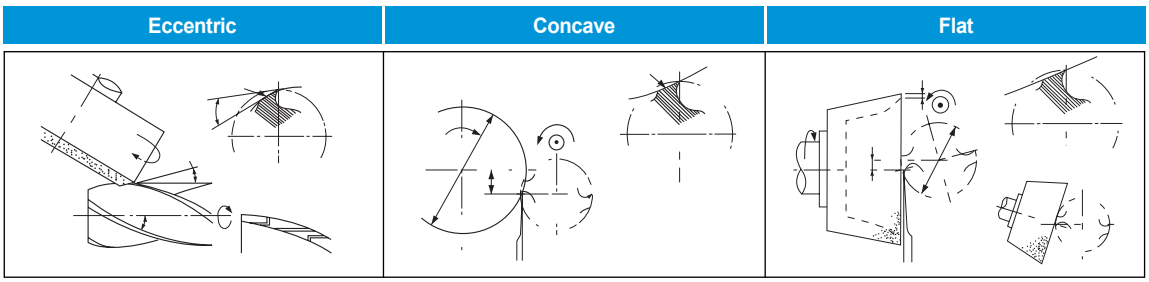



Fig. 3. Three Types of Primary Relief

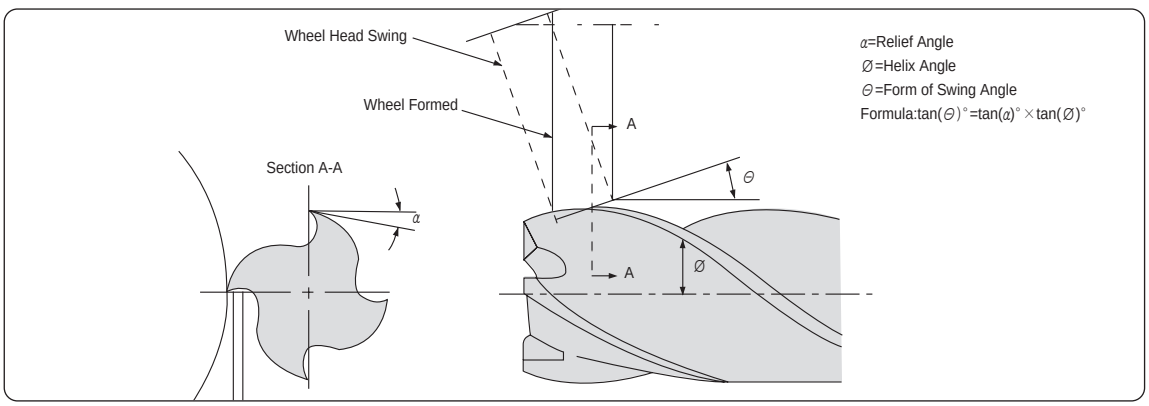



Fig. 4. Toothing of Eccentric Relief Angle

# 2 ANGLE OF WHEEL INCLINATION

Eccentric relief is produced with a plain wheel positioned with its axis parallel or at a slight angle with the cutter axis. The degree of relief is varied by changing the angle of wheel inclination.

## Table 1. RECOMMENDED RELIEF ON END MILLS

| Mill Diameter (inches) | Eccentric relief indicator drop for relief Angles shown | | Checking Distance | Wheel Angles(Deg.)Θ | | | Radial Relief Angles(α1) | Clearance Angles(α2) |
|---|---|---|---|---|---|---|---|---|
| | | | | 15° Helix | 30° Helix | 60° Helix | | |
| - | Min | Max. | - | *Angle | *Angle | *Angle | *Angle | *Angle |
| 1/8 | .0040 | .0052 | 015 | 4°42′ | 10°02′ | 27°58′ | 17°03′ | 25° |
| 1/4 | .0035 | .0050 | .020 | 3°15′ | 6°59′ | 20°12′ | 12°00′ | 25° |
| 1/2 | .0040 | .0053 | .025 | 2°51′ | 6°07′ | 17°51′ | 10°32′ | 25° |
| 1 | .0038 | .0055 | 1/32 | 2°16′ | 4°54′ | 14°27′ | 8°27′ | 25° |
| 1-1/2 | .0033 | .0050 | 1/32 | 2°02′ | 4°22′ | 12°57′ | 7°33′ | 25° |
| 2 | .0033 | .0050 | 1/32 | 2°02′ | 4°22′ | 12°57′ | 7°33′ | 25° |

The actual at the radial relief angle is normally kept within the range shown but may be varied to suit the cutter material, the work material and the operating conditions.
* Angle is calculated from the basic mean at the radical angle.

## 8 Resharpening End Teeth

The three necessary operations and one option feature, along with setup suggestions are shown in Fig.5 A to D in each drawing, the shaded area indicates the surface being ground.

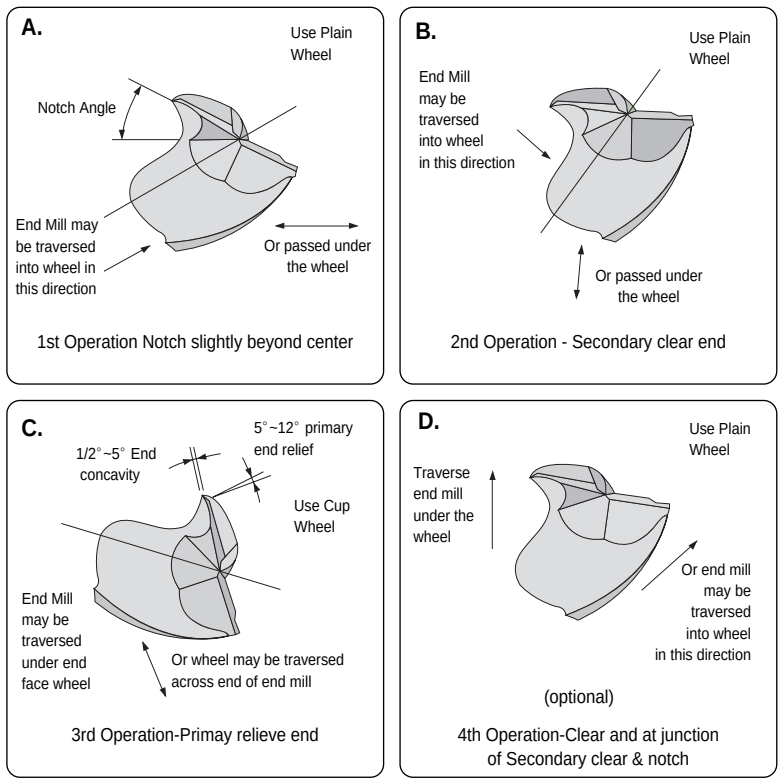



Fig 5. PROCEDURE FOR SHARPENING END OF 2 FLUTE SQUARE END MILLS

## 9 Inspection

The inspection is calculated by using the formula shown in Table1.
Procedure To Check
Radial Relief Angles
With Indicators.

1. Mount the cutter to rotate freely with no end movement.
2. Adjust the sharp pointed indicator to bear at the very tip of the cutting edge, pointing in a radial line, shown in Figure6
3. Roll the cutter the tabuleted amount gives under “checking distance” using the second indicator as control.
4. Consult chart for amount of drop for the particular diameter and relief angle.

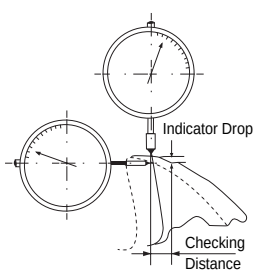
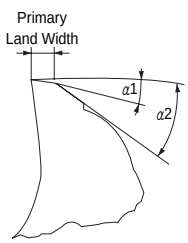
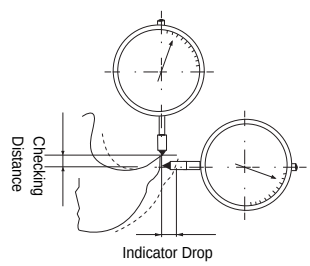
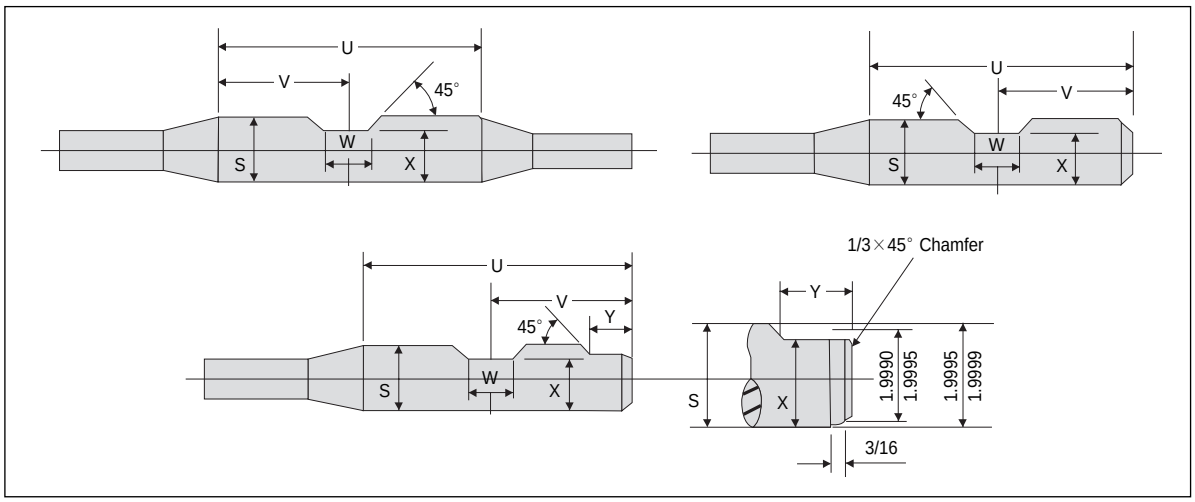
| Radial Relief | Peripheral Cutting Edge | Cutting Angle |
|---|---|---|
|  |  |  |



Fig. 6. Indicator Set-Up for Checking

## 10 Standard Weldon Shanks




## 11 Dimensions

All dimensions are given in inches.

| Diameter of Shank S | Length of Shank U | V | W | | X | Y |
|---|---|---|---|---|---|---|
| | | | Min. | Max. | | |
| 3/8 | 1-9/16 | 25/32 | 0.280 | 0.282 | 0.325 | - |
| 1/2 | 1-25/32 | 57/64 | 0.330 | 0.332 | 0.440 | - |
| 5/8 | 1-29/32 | 61/64 | 0.400 | 0.402 | 0.560 | - |
| 3/4 | 2-1/32 | 1-1/64 | 0.455 | 0.457 | 0.675 | - |
| 7/8 | 2-1/32 | 1-1/64 | 0.455 | 0.457 | 0.810 | 1/2 |
| | | | | | | |
| 1 | 2-9/32 | 1-9/64 | 0.515 | 0.517 | 0.925 | 1/2 |
| 1-1/4 | 2-9/32 | 1-9/64 | 0.515 | 0.517 | 1.156 | 1/2 |
| 1-1/2 | 2-11/16 | 1-3/16 | 0.515 | 0.517 | 1.406 | 9/16 |
| 2 | 3-1/4 | 1-27/32 | 0.700 | 0.702 | 1.900 | 27/32 |
| 2-1/2 | 3-1/2 | 1-15/16 | 0.700 | 0.702 | 2.400 | 27/32 |

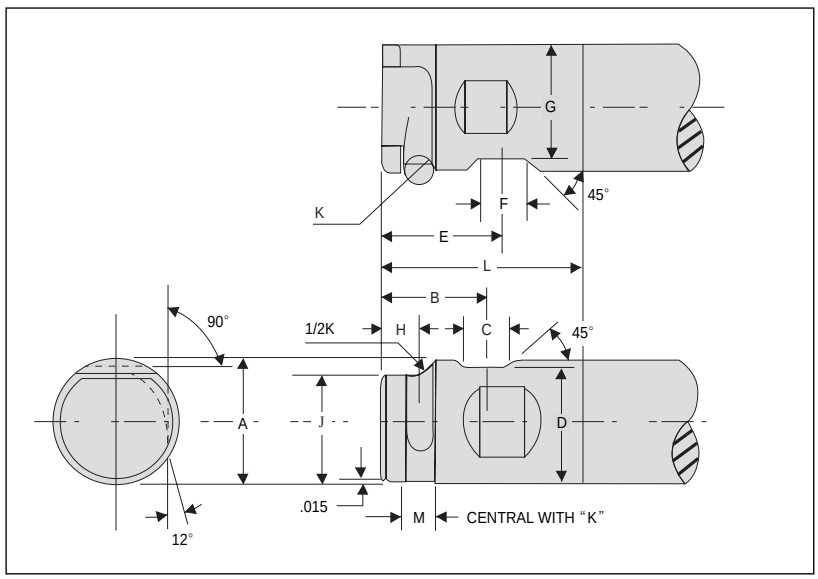
## 12 Tolerances

| Element | Range | Direction | Tolerance |
|---|---|---|---|
| Diameter of Shank, S | All Sizes | minus | .0001 to .0005 |
| Length of Shank, U | All Sizes | plus or minus | 1/32 |
| Dimension, V | All Sizes | plus or minus | 1/64 |
| Dimension, X | All Sizes | minus | 1/64 |
| Dimension, Y | 7/8 to 2-1/2 inc. | plus or minus | 1/32 |

Extracted from Milling Cutters and End Mills. MCTI 1989.

## 13 Combination Shanks for End Mills

Right hand End Mill shank shown. For left hand End Mills flat "F" and pin groove "K" should be located 180° from that shown, maintaining 12° relationship of flat "F"and groove "K"




## 14 Dimensions

All dimensions are given in inches.

| Diameter of Shank A | Length of Shank L | B | C | D | E | F | G | H | J | K | M |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-1/2 | 2-11/16 | 1-3/16 | 0.515 | 1.406 | 1-1/2 | 0.515 | 1.371 | 9/16 | 1.302 | 0.377 | 7/16 |
| 2 | 3-1/4 | 1-23/32 | 0.700 | 1.900 | 1-3/4 | 0.700 | 1.809 | 5/8 | 1.772 | 0.440 | 1/2 |
| 2-1/2 | 3-1/2 | 1-15/16 | 0.700 | 2.400 | 2 | 0.700 | 2.312 | 3/4 | 2.245 | 0.503 | 9/16 |

## 15 Tolerances

| Element | Direction | Tolerance |
|---|---|---|
| Diameter of Shank, A | minus | .0001 to .0005 |
| Length of Shank, L | plus or minus | 1/32 |
| Dimension, B | plus or minus | 1/64 |
| Dimension, C | plus | .002 |
| Dimension, D | minus | 1/64 |
| Dimension, E | plus or minus | 1/64 |
| Dimension, F | plus or minus | .005 |
| Dimension, G | minus | 1/64 |
| Dimension, H | plus | 1/64 |
| Dimension, J | plus or minus | .002 |
| Dimension, K | plus | .003 |

Extracted from Milling Cutters and End Mills. MCTI 1989.

## 16 Troubleshooting in Endmilling

| Trouble | Occurrences of trouble | Countermeasures |
|---|---|---|
| Breaking of tool | · At time of engaging with work material<br>· When ending cut | 1. Decrease feed rate.<br>2. Decrease projection amount<br>3. Shorten cutting edge length to required minimum limit |
| | · During normal cutting | 1. Decrease feed rate<br>2. Control wear → replace tool early<br>3. Replace chuck or collet<br>4. Decrease projection amount<br>5. Carry out honing<br>6. If 4 flute, reduce to 2 flute(clogging of chipping)<br>7. If dry cutting change to wet cutting utilize cutting fluid. In case of wet cutting flow oil supplied from the front, change to from rear angle of side top. Use ample with rate. |
| | · When changing direction of feed | 1. Utilize circular interpolation(in case of NC machine) or temporarily stop feed(Dowelling)<br>2. Reduce feed rate before and after change of directions<br>3. Replace chuck or collect |
| Fracture of cutting edge | · Fracture of corners | 1. Carry out chamfering or nose with hand lapper.<br>2. Down cut → Up cut |
| | · Fracture at boundary of depth of cut | 1. Down cut → Up cut<br>2. Reduce cutting speed |
| | · Chipping at center part or overall | 1. Carry out honing. Or enlarge.<br>2. Change number of rotation(in case machine vibrates)<br>3. Increase cutting speed<br>4. In ease of squeaking noise during cutting, increase feed.<br>5. It dry cutting use cutting fluid or blow air.<br>6. Replace chuck or collet<br>7. Reduce cutting speed |
| | · Large fracturing of cutting edge | 1. Decrease feed rate<br>2. If 4 flute reduce to 2 flute<br>3. Carry out honing. Or enlarge<br>4. Replace chuck or collet<br>5. Reduce cutting speed<br>6. If dry cutting, change to wet cutting. In case oil supply in wet cutting is from the front, change to rear at an angle or from side top. Use ample supply. |
| Rapid tool wear | | 1. Reduce cutting speed<br>2. Up cut → Down cut<br>3. Increase feed<br>4. Utilize wet cutting or air<br>5. If reground tool, improve surface roughness of flank. |

# TECHNICAL DATA

## SUPER CUTTING END MILLS

| Trouble | Occurrences of trouble | Countermeasures |
|---|---|---|
| Inferior finished surface | · Surface is good but rough | 1. Decrease feed<br>2. In case using 2 flute, increase to 4 flute |
| | · Small chip welding | 1. Increase cutting speed<br>2. Utilize wet cutting air blow(ample supply)<br>3. Carry out fine honing<br>4. Up cut → Down cut<br>5. Increase feed or enlarge finish allowance |
| | · With transverse streaks | 1. Carry out fine honing<br>2. Use water insoluble cutting fluid<br>3. Down cut → Up cut |
| | · Signs of excessive cutting | 1. Reduce finishing depth of cut<br>2. Increase cutting speed<br>3. Reduce feed |
| Poor machining accuracy | · Finish dimensions are on minus side | 1. Up cut → Down cut<br>2. Reduce finishing depth of cut<br>3. Replace chuck or collet<br>4. Reduce projection amount<br>5. Increase cutting speed |
| | · Poor perpendicularity | 1. Reduce finishing depth of cut<br>2. Replace chuck or collet<br>3. Reduce projection amount<br>4. Increase cutting speed<br>5. 2Flute → 4 Flute<br>6. Reduce feed<br>7. Check wear rate → Replace tool |
| Chattering | | 1. Increase feed rate(in case over 0.05 mm/Zahn, try reducing)<br>2. Change cutting speed<br>3. Replace chuck or collet<br>4. Reduce projection amount<br>5. Use 2 flute cutter for rough cutting and 4 flute for finishing<br>6. Down cut → Up cut |

# ROTARY TOOL HOLDERS

END MILL HOLDERS - CAT, BT
HIGH BALANCED END MILL HOLDERS - CAT, BT
ER COLLET CHUCKS - CAT, BT
HIGH BALANCED ER COLLET CHUCKS - CAT, BT
ER NUTS, ER WRENCHES, ER STOP SCREWS
ER COLLET-STANDARD
TG COLLET CHUCKS - CAT, BT
TG NUTS, TG WRENCHES, TG STOP SCREWS
MILLING CHUCKS - CAT / BT
MILLING CHUCK COLLETS, MILLING CHUCK WRENCHES
MORSE TAPER ADAPTERS - CAT / BT
TAPPING CHUCKS - CAT, BT
POSITIVE QUICK CHANGE TAP ADAPTERS
SHELL MILL ARBORS - CAT, BT
SHELL MILL DRIVE KEY, SHELL MILL LOCK SCREW - CAT / BT
JACOBS TAPER ARBORS - CAT / BT
STUB ARBORS - CAT / BT
STUB ARBOR NUTS, KEYS, SPACERS - CAT / BT
SLITTING SAW ARBORS, SLITTING SAW ARBOR CAPS - CAT / BT
PULL STUD
TOOL CLAMP, END MILL HOLDER SCREWS

YG-1 CO., LTD.

# SELECTION GUIDE


| | |
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| END MILL HOLDERS - BT | 801-802 |
| HIGH BALANCED END MILL HOLDERS - CAT | 803-804 |
| HIGH BALANCED END MILL HOLDERS - BT | 805-806 |
| ER COLLET CHUCKS - CAT | 807 |
| ER COLLET CHUCKS - BT | 808 |
| HIGH BALANCED ER COLLET CHUCKS - CAT | 809 |
| HIGH BALANCED ER COLLET CHUCKS - BT | 810 |
| ER NUTS, ER WRENCHES, ER STOP SCREWS | 811 |
| ER COLLET-STANDARD | 812 |
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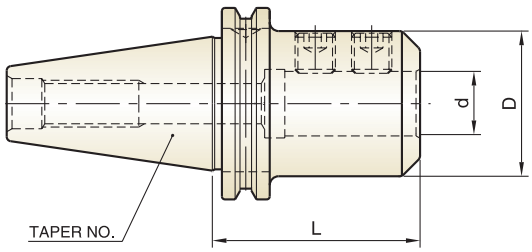
| PULL STUD | 829 |
| TOOL CLAMP, END MILL HOLDER SCREWS | 830 |

# END MILL HOLDER



CAT




## ■ STUB

| EDP NO | TYPE | TAPER No. | d | L | D |
|---|---|---|---|---|---|
| AK206 | CAT40-EMH1/2-1.75 | 40 | 0.500 | 1.75 | 1.25 |
| AK208 | CAT40-EMH5/8-1.75 | 40 | 0.625 | 1.75 | 1.50 |
| AK210 | CAT40-EMH3/4-1.75 | 40 | 0.750 | 1.75 | 1.75 |
| AK214 | CAT40-EMH1 -1.75 | 40 | 1.000 | 1.75 | 1.75 |
| AK217 | CAT40-EMH1 1/4-2.00 | 40 | 1.250 | 2.00 | 2.25 |

## ■ STANDARD

| EDP NO | TYPE | TAPER No. | d | L | D |
|---|---|---|---|---|---|
| AK000 | CAT40-EMH1/8-2.50 | 40 | 0.125 | 2.50 | 0.69 |
| AK001 | CAT40-EMH3/16-2.50 | 40 | 0.187 | 2.50 | 0.69 |
| AK002 | CAT40-EMH1/4-2.50 | 40 | 0.250 | 2.50 | 0.78 |
| AK003 | CAT40-EMH5/16-2.50 | 40 | 0.312 | 2.50 | 0.88 |
| AK004 | CAT40-EMH3/8-2.50 | 40 | 0.375 | 2.50 | 1.00 |
| AK005 | CAT40-EMH7/16-2.50 | 40 | 0.437 | 2.50 | 1.13 |
| AK006 | CAT40-EMH1/2-2.63 | 40 | 0.500 | 2.63 | 1.25 |
| AK008 | CAT40-EMH5/8-3.75 | 40 | 0.625 | 3.75 | 1.50 |
| AK010 | CAT40-EMH3/4-3.75 | 40 | 0.750 | 3.75 | 1.75 |
| AK012 | CAT40-EMH7/8-4.00 | 40 | 0.875 | 4.00 | 1.88 |
| AK014 | CAT40-EMH1 -4.00 | 40 | 1.000 | 4.00 | 2.00 |
| AK017 | CAT40-EMH1 1/4-4.25 | 40 | 1.250 | 4.25 | 2.50 |
| AK021 | CAT40-EMH1 1/2-4.63 | 40 | 1.500 | 4.63 | 2.50 |
| AL002 | CAT50-EMH1/4-2.50 | 50 | 0.250 | 2.50 | 0.78 |
| AL003 | CAT50-EMH5/16-2.50 | 50 | 0.312 | 2.50 | 0.88 |
| AL004 | CAT50-EMH3/8-2.50 | 50 | 0.375 | 2.50 | 1.00 |
| AL005 | CAT50-EMH7/16-2.63 | 50 | 0.437 | 2.63 | 1.13 |
| AL006 | CAT50-EMH1/2-2.63 | 50 | 0.500 | 2.63 | 1.25 |
| AL008 | CAT50-EMH5/8-3.75 | 50 | 0.625 | 3.75 | 1.50 |
| AL010 | CAT50-EMH3/4-3.75 | 50 | 0.750 | 3.75 | 1.75 |
| AL012 | CAT50-EMH7/8-3.75 | 50 | 0.875 | 3.75 | 1.88 |
| AL014 | CAT50-EMH1 -4.00 | 50 | 1.000 | 4.00 | 2.00 |
| AL017 | CAT50-EMH1 1/4-4.00 | 50 | 1.250 | 4.00 | 2.50 |
| AL021 | CAT50-EMH1 1/2-4.00 | 50 | 1.500 | 4.00 | 2.50 |
| AL029 | CAT50-EMH2 -5.63 | 50 | 2.000 | 5.63 | 3.75 |

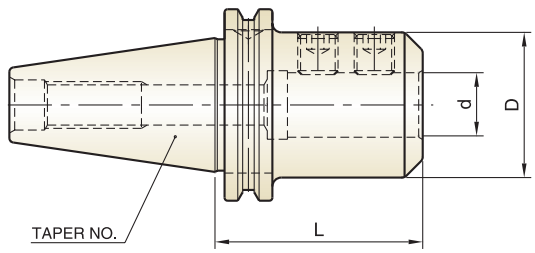
▶ BALANCING GRADE : BASED ON G6.3 / 15,000rpm
▶ HIGH BALANCED END MILL HOLDERS ARE AVAILABLE ON REQUEST
▶ SET SCREWS FOR END MILL HOLDERS ON PAGE 830

# ROTARY TOOL HOLDERS



## END MILL HOLDER

CAT




### ■ EXTENDED

| EDP No. | Type | TAPER No. | d | L | D |
|---|---|---|---|---|---|
| **AK104** | CAT40-EMH3/8-4.50 | 40 | 0.375 | 4.50 | 1.00 |
| **AK106** | CAT40-EMH1/2-4.63 | 40 | 0.500 | 4.63 | 1.25 |
| **AK108** | CAT40-EMH5/8-5.75 | 40 | 0.625 | 5.75 | 1.50 |
| **AK110** | CAT40-EMH3/4-5.75 | 40 | 0.750 | 5.75 | 1.75 |
| **AK112** | CAT40-EMH7/8-6.00 | 40 | 0.875 | 6.00 | 1.88 |
| **AK114** | CAT40-EMH1 -6.00 | 40 | 1.000 | 6.00 | 2.00 |
| **AK117** | CAT40-EMH1 1/4-6.25 | 40 | 1.250 | 6.25 | 2.50 |
| **AK121** | CAT40-EMH1 1/2-6.63 | 40 | 1.500 | 6.63 | 2.50 |
| **AL104** | CAT50-EMH3/8-4.50 | 50 | 0.375 | 4.50 | 1.00 |
| **AL106** | CAT50-EMH1/2-4.63 | 50 | 0.500 | 4.63 | 1.25 |
| **AL108** | CAT50-EMH5/8-5.75 | 50 | 0.625 | 5.75 | 1.50 |
| **AL110** | CAT50-EMH3/4-5.75 | 50 | 0.750 | 5.75 | 1.75 |
| **AL112** | CAT50-EMH7/8-5.75 | 50 | 0.875 | 5.75 | 1.88 |
| **AL114** | CAT50-EMH1 -6.00 | 50 | 1.000 | 6.00 | 2.00 |
| **AL117** | CAT50-EMH1 1/4-6.00 | 50 | 1.250 | 6.00 | 2.50 |
| **AL121** | CAT50-EMH1 1/2-6.00 | 50 | 1.500 | 6.00 | 2.50 |
| **AL129** | CAT50-EMH2 -7.63 | 50 | 2.000 | 7.63 | 3.75 |

▶ BALANCING GRADE : BASED ON G6.3 / 15,000rpm
▶ HIGH BALANCED END MILL HOLDERS ARE AVAILABLE ON REQUEST
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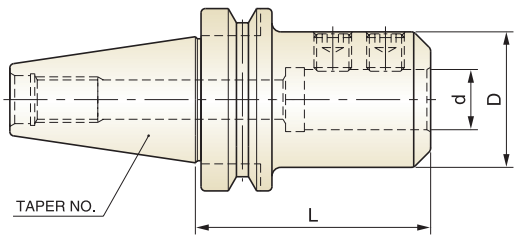
# END MILL HOLDER



BT




## ■ STUB

| EDP No. | Type | TAPER No. | d | L | D |
|---|---|---|---|---|---|
| AH206 | BT40 - EMH 1/2 - 1.25 | 40 | 0.500 | 1.25 | 1.25 |
| AH208 | BT40 - EMH 5/8 - 1.38 | 40 | 0.625 | 1.38 | 1.50 |
| AH210 | BT40 - EMH 3/4 - 1.44 | 40 | 0.750 | 1.44 | 1.75 |
| AH214 | BT40 - EMH 1 - 2.50 | 40 | 1.000 | 2.50 | 2.00 |
| AH217 | BT40 - EMH 1 1/4 - 2.50 | 40 | 1.250 | 2.50 | 2.50 |

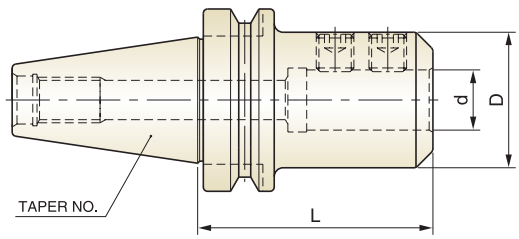
## ■ STANDARD

| EDP No. | Type | TAPER No. | d | L | D |
|---|---|---|---|---|---|
| AH000 | BT40 - EMH 1/8 - 2.50 | 40 | 0.125 | 2.50 | 0.69 |
| AH001 | BT40 - EMH 3/16 - 2.50 | 40 | 0.187 | 2.50 | 0.69 |
| AH002 | BT40 - EMH 1/4 - 2.50 | 40 | 0.250 | 2.50 | 0.78 |
| AH003 | BT40 - EMH 5/16 - 2.50 | 40 | 0.312 | 2.50 | 0.88 |
| AH004 | BT40 - EMH 3/8 - 2.50 | 40 | 0.375 | 2.50 | 1.00 |
| AH005 | BT40 - EMH 7/16 - 2.50 | 40 | 0.437 | 2.50 | 1.13 |
| AH006 | BT40 - EMH 1/2 - 2.50 | 40 | 0.500 | 2.50 | 1.25 |
| AH008 | BT40 - EMH 5/8 - 2.50 | 40 | 0.625 | 2.50 | 1.50 |
| AH010 | BT40 - EMH 3/4 - 2.50 | 40 | 0.750 | 2.50 | 1.75 |
| AH012 | BT40 - EMH 7/8 - 3.50 | 40 | 0.875 | 3.50 | 1.88 |
| AH014 | BT40 - EMH 1 - 3.75 | 40 | 1.000 | 3.75 | 2.00 |
| AH017 | BT40 - EMH 1 1/4 - 3.75 | 40 | 1.250 | 3.75 | 2.50 |
| AH021 | BT40 - EMH 1 1/2 - 4.25 | 40 | 1.500 | 4.25 | 2.50 |
| AI002 | BT50 - EMH 1/4 - 3.00 | 50 | 0.250 | 3.00 | 0.78 |
| AI004 | BT50 - EMH 3/8 - 3.00 | 50 | 0.375 | 3.00 | 1.00 |
| AI006 | BT50 - EMH 1/2 - 3.00 | 50 | 0.500 | 3.00 | 1.25 |
| AI008 | BT50 - EMH 5/8 - 3.00 | 50 | 0.625 | 3.00 | 1.50 |
| AI010 | BT50 - EMH 3/4 - 3.00 | 50 | 0.750 | 3.00 | 1.75 |
| AI012 | BT50 - EMH 7/8 - 4.00 | 50 | 0.875 | 4.00 | 1.88 |
| AI014 | BT50 - EMH 1 - 4.25 | 50 | 1.000 | 4.25 | 2.00 |
| AI017 | BT50 - EMH 1 1/4 - 4.25 | 50 | 1.250 | 4.25 | 2.50 |
| AI021 | BT50 - EMH 1 1/2 - 4.25 | 50 | 1.500 | 4.25 | 2.50 |
| AI029 | BT50 - EMH 2 - 5.00 | 50 | 2.000 | 5.00 | 3.75 |

▶ BALANCING GRADE : BASED ON G6.3 / 15,000rpm
▶ HIGH BALANCED END MILL HOLDERS ARE AVAILABLE ON REQUEST
▶ SET SCREWS FOR END MILL HOLDERS ON PAGE 830

# END MILL HOLDER

BT




## ■ EXTENDED

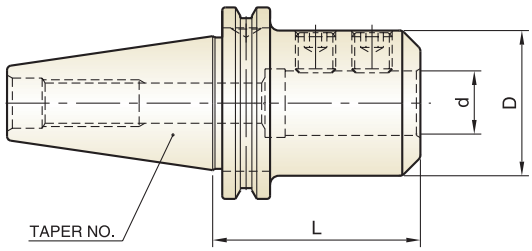
| EDP No. | Type | TAPER No. | d | L | D |
|---|---|---|---|---|---|
| **AH104** | BT40 - EMH 3/8 - 4.00 | 40 | 0.375 | 4.00 | 1.00 |
| **AH106** | BT40 - EMH 1/2 - 4.00 | 40 | 0.500 | 4.00 | 1.25 |
| **AH108** | BT40 - EMH 5/8 - 4.00 | 40 | 0.625 | 4.00 | 1.50 |
| **AH110** | BT40 - EMH 3/4 - 4.00 | 40 | 0.750 | 4.00 | 1.75 |
| **AH114** | BT40 - EMH 1 - 5.00 | 40 | 1.000 | 5.00 | 2.00 |
| **AH117** | BT40 - EMH 1 1/4 - 5.00 | 40 | 1.250 | 5.00 | 2.50 |
| **AH121** | BT40 - EMH 1 1/2 - 6.00 | 40 | 1.500 | 6.00 | 2.50 |
| **AI104** | BT50 - EMH 3/8 - 6.00 | 50 | 0.375 | 6.00 | 1.00 |
| **AI106** | BT50 - EMH 1/2 - 6.00 | 50 | 0.500 | 6.00 | 1.25 |
| **AI108** | BT50 - EMH 5/8 - 6.00 | 50 | 0.625 | 6.00 | 1.50 |
| **AI110** | BT50 - EMH 3/4 - 6.00 | 50 | 0.750 | 6.00 | 1.75 |
| **AI112** | BT50 - EMH 7/8 - 6.00 | 50 | 0.875 | 6.00 | 1.88 |
| **AI114** | BT50 - EMH 1 - 6.00 | 50 | 1.000 | 6.00 | 2.00 |
| **AI117** | BT50 - EMH 1 1/4 - 6.00 | 50 | 1.250 | 6.00 | 2.50 |
| **AI121** | BT50 - EMH 1 1/2 - 6.00 | 50 | 1.500 | 6.00 | 2.50 |
| **AI129** | BT50 - EMH 2 - 6.00 | 50 | 2.000 | 6.00 | 3.75 |

▶ BALANCING GRADE : BASED ON G6.3 / 15,000rpm
▶ HIGH BALANCED END MILL HOLDERS ARE AVAILABLE ON REQUEST
▶ SET SCREWS FOR END MILL HOLDERS ON PAGE 830

# HIGH BALANCED END MILL HOLDER



CAT




## ■ STUB

| EDP No. | Type | TAPER No. | d | L | D |
|---|---|---|---|---|---|
| **AK206B25** | CAT40 - EMH 1/2 - 1.75 | 40 | 0.500 | 1.75 | 1.25 |
| **AK208B25** | CAT40 - EMH 5/8 - 1.75 | 40 | 0.625 | 1.75 | 1.50 |
| **AK210B25** | CAT40 - EMH 3/4 - 1.75 | 40 | 0.750 | 1.75 | 1.75 |
| **AK214B25** | CAT40 - EMH 1 - 1.75 | 40 | 1.000 | 1.75 | 1.75 |
| **AK217B25** | CAT40 - EMH 1 1/4 - 2.00 | 40 | 1.250 | 2.00 | 2.25 |

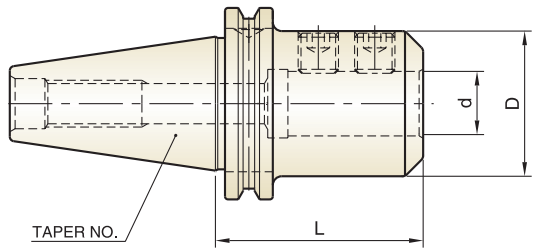
## ■ STANDARD

| EDP No. | Type | TAPER No. | d | L | D |
|---|---|---|---|---|---|
| **AK000B25** | CAT40 - EMH 1/8 - 2.50 | 40 | 0.125 | 2.50 | 0.69 |
| **AK001B25** | CAT40 - EMH 3/16 - 2.50 | 40 | 0.187 | 2.50 | 0.69 |
| **AK002B25** | CAT40 - EMH 1/4 - 2.50 | 40 | 0.250 | 2.50 | 0.78 |
| **AK003B25** | CAT40 - EMH 5/16 - 2.50 | 40 | 0.312 | 2.50 | 0.88 |
| **AK004B25** | CAT40 - EMH 3/8 - 2.50 | 40 | 0.375 | 2.50 | 1.00 |
| **AK005B25** | CAT40 - EMH 7/16 - 2.50 | 40 | 0.437 | 2.50 | 1.13 |
| **AK006B25** | CAT40 - EMH 1/2 - 2.63 | 40 | 0.500 | 2.63 | 1.25 |
| **AK008B25** | CAT40 - EMH 5/8 - 3.75 | 40 | 0.625 | 3.75 | 1.50 |
| **AK010B25** | CAT40 - EMH 3/4 - 3.75 | 40 | 0.750 | 3.75 | 1.75 |
| **AK012B25** | CAT40 - EMH 7/8 - 4.00 | 40 | 0.875 | 4.00 | 1.88 |
| **AK014B25** | CAT40 - EMH 1 - 4.00 | 40 | 1.000 | 4.00 | 2.00 |
| **AK017B25** | CAT40 - EMH 1 1/4 - 4.25 | 40 | 1.250 | 4.25 | 2.50 |
| **AK021B25** | CAT40 - EMH 1 1/2 - 4.63 | 40 | 1.500 | 4.63 | 2.50 |

- BALANCING GRADE : BASED ON G2.5 / 25,000rpm
- HIGH BALANCED END MILL HOLDERS ARE AVAILABLE ON REQUEST
- THESE TOOLS ARE BALANCED WITH NO HARDWARE, NUTS, COLLETS OR CUTTING TOOLS IN THEM
- TO ACHIEVE TRUE G2.5 @ 25,000 RPM THE ENTIRE ROTARY TOOLING ASSEMBLY INCLUDING THE CUTTING TOOL NEEDS TO BE BALANCED
- SET SCREWS FOR END MILL HOLDERS ON PAGE 830

# HIGH BALANCED END MILL HOLDER

CAT




## ■ EXTENDED

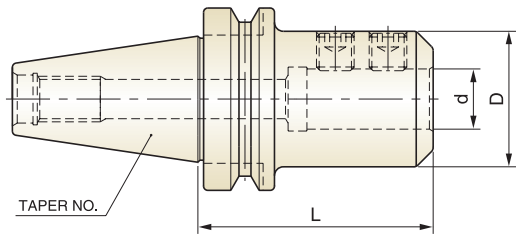
| EDP No. | Type | TAPER No. | d | L | D |
|---|---|---|---|---|---|
| **AK104B25** | CAT40 - EMH 3/8 - 4.50 | 40 | 0.375 | 4.50 | 1.00 |
| **AK106B25** | CAT40 - EMH 1/2 - 4.63 | 40 | 0.500 | 4.63 | 1.25 |
| **AK108B25** | CAT40 - EMH 5/8 - 5.75 | 40 | 0.625 | 5.75 | 1.50 |
| **AK110B25** | CAT40 - EMH 3/4 - 5.75 | 40 | 0.750 | 5.75 | 1.75 |
| **AK112B25** | CAT40 - EMH 7/8 - 6.00 | 40 | 0.875 | 6.00 | 1.88 |
| **AK114B25** | CAT40 - EMH 1 - 6.00 | 40 | 1.000 | 6.00 | 2.00 |
| **AK117B25** | CAT40 - EMH 1 1/4 - 6.25 | 40 | 1.250 | 6.25 | 2.50 |
| **AK121B25** | CAT40 - EMH 1 1/2 - 6.63 | 40 | 1.500 | 6.63 | 2.50 |

- ▶ BALANCING GRADE : BASED ON G2.5 / 25,000rpm
- ▶ HIGH BALANCED END MILL HOLDERS ARE AVAILABLE ON REQUEST
- ▶ THESE TOOLS ARE BALANCED WITH NO HARDWARE, NUTS, COLLETS OR CUTTING TOOLS IN THEM
- ▶ TO ACHIEVE TRUE G2.5 @ 25,000 RPM THE ENTIRE ROTARY TOOLING ASSEMBLY INCLUDING THE CUTTING TOOL NEEDS TO BE BALANCED
- ▶ SET SCREWS FOR END MILL HOLDERS ON PAGE 830

# HIGH BALANCED END MILL HOLDER



BT




## ■ STUB

| EDP No. | Type | TAPER No. | d | L | D |
|---|---|---|---|---|---|
| **AH206B25** | BT40 - EMH 1/2 - 1.25 | 40 | 0.500 | 1.25 | 1.25 |
| **AH208B25** | BT40 - EMH 5/8 - 1.38 | 40 | 0.625 | 1.38 | 1.50 |
| **AH210B25** | BT40 - EMH 3/4 - 1.44 | 40 | 0.750 | 1.44 | 1.75 |
| **AH214B25** | BT40 - EMH 1 - 2.50 | 40 | 1.000 | 2.50 | 2.00 |
| **AH217B25** | BT40 - EMH 1 1/4 - 2.50 | 40 | 1.250 | 2.50 | 2.50 |

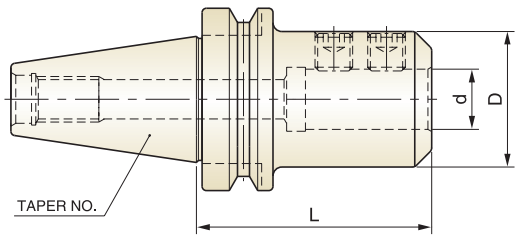
## ■ STANDARD

| EDP No. | Type | TAPER No. | d | L | D |
|---|---|---|---|---|---|
| **AH000B25** | BT40 - EMH 1/8 - 2.50 | 40 | 0.125 | 2.50 | 0.69 |
| **AH001B25** | BT40 - EMH 3/16 - 2.50 | 40 | 0.187 | 2.50 | 0.69 |
| **AH002B25** | BT40 - EMH 1/4 - 2.50 | 40 | 0.250 | 2.50 | 0.78 |
| **AH003B25** | BT40 - EMH 5/16 - 2.50 | 40 | 0.312 | 2.50 | 0.88 |
| **AH004B25** | BT40 - EMH 3/8 - 2.50 | 40 | 0.375 | 2.50 | 1.00 |
| **AH005B25** | BT40 - EMH 7/16 - 2.50 | 40 | 0.437 | 2.50 | 1.13 |
| **AH006B25** | BT40 - EMH 1/2 - 2.50 | 40 | 0.500 | 2.50 | 1.25 |
| **AH008B25** | BT40 - EMH 5/8 - 2.50 | 40 | 0.625 | 2.50 | 1.50 |
| **AH010B25** | BT40 - EMH 3/4 - 2.50 | 40 | 0.750 | 2.50 | 1.75 |
| **AH012B25** | BT40 - EMH 7/8 - 3.50 | 40 | 0.875 | 3.50 | 1.88 |
| **AH014B25** | BT40 - EMH 1 - 3.75 | 40 | 1.000 | 3.75 | 2.00 |
| **AH017B25** | BT40 - EMH 1 1/4 - 3.75 | 40 | 1.250 | 3.75 | 2.50 |
| **AH021B25** | BT40 - EMH 1 1/2 - 4.25 | 40 | 1.500 | 4.25 | 2.50 |

- BALANCING GRADE : BASED ON G2.5 / 25,000rpm
- HIGH BALANCED END MILL HOLDERS ARE AVAILABLE ON REQUEST
- THESE TOOLS ARE BALANCED WITH NO HARDWARE, NUTS, COLLETS OR CUTTING TOOLS IN THEM
- TO ACHIEVE TRUE G2.5 @ 25,000 RPM THE ENTIRE ROTARY TOOLING ASSEMBLY INCLUDING THE CUTTING TOOL NEEDS TO BE BALANCED
- SET SCREWS FOR END MILL HOLDERS ON PAGE 830

# HIGH BALANCED END MILL HOLDER

BT




## ■ EXTENDED

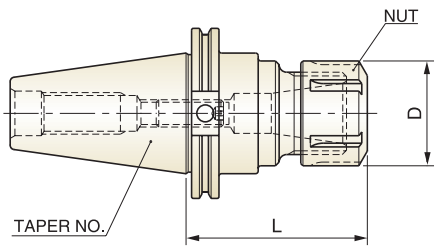
| EDP No. | Type | TAPER No. | d | L | D |
|---|---|---|---|---|---|
| **AH104B25** | BT40 - EMH 3/8 - 4.00 | 40 | 0.375 | 4.00 | 1.00 |
| **AH106B25** | BT40 - EMH 1/2 - 4.00 | 40 | 0.500 | 4.00 | 1.25 |
| **AH108B25** | BT40 - EMH 5/8 - 4.00 | 40 | 0.625 | 4.00 | 1.50 |
| **AH110B25** | BT40 - EMH 3/4 - 4.00 | 40 | 0.750 | 4.00 | 1.75 |
| **AH114B25** | BT40 - EMH 1 - 5.00 | 40 | 1.000 | 5.00 | 2.00 |
| **AH117B25** | BT40 - EMH 1 1/4 - 5.00 | 40 | 1.250 | 5.00 | 2.50 |
| **AH121B25** | BT40 - EMH 1 1/2 - 6.00 | 40 | 1.500 | 6.00 | 2.50 |

- ▶ BALANCING GRADE : BASED ON G2.5 / 25,000rpm
- ▶ HIGH BALANCED END MILL HOLDERS ARE AVAILABLE ON REQUEST
- ▶ THESE TOOLS ARE BALANCED WITH NO HARDWARE, NUTS, COLLETS OR CUTTING TOOLS IN THEM
- ▶ TO ACHIEVE TRUE G2.5 @ 25,000 RPM THE ENTIRE ROTARY TOOLING ASSEMBLY INCLUDING THE CUTTING TOOL NEEDS TO BE BALANCED
- ▶ SET SCREWS FOR END MILL HOLDERS ON PAGE 830

# ER COLLET CHUCK



CAT




## ■ STUB

| EDP No. | Type | TAPER No. | Size Range | L | D | Collet Series |
|---|---|---|---|---|---|---|
| **BK232** | CAT40 - ER20 - 2.55 | 40 | 0.039-0.511 | 2.55 | 1.26 | ER20 |
| **BK233** | CAT40 - ER25 - 2.50 | 40 | 0.039-0.629 | 2.50 | 1.65 | ER25 |
| **BK234** | CAT40 - ER32 - 2.70 | 40 | 0.078-0.787 | 2.70 | 1.88 | ER32 |

## ■ STANDARD

| EDP No. | Type | TAPER No. | Size Range | L | D | Collet Series |
|---|---|---|---|---|---|---|
| **BK030** | CAT40 - ER11 - 3.00 | 40 | 0.019-0.275 | 3.00 | 0.63 | ER11 |
| **BK031** | CAT40 - ER16 - 2.88 | 40 | 1/32-13/32 | 2.88 | 1.08 | ER16 |
| **BK032** | CAT40 - ER20 - 4.00 | 40 | 0.039-0.511 | 4.00 | 1.26 | ER20 |
| **BK133** | CAT40 - ER25 - 4.00 | 40 | 0.039-0.629 | 4.00 | 1.65 | ER25 |
| **BK134** | CAT40 - ER32 - 4.00 | 40 | 0.078-0.787 | 4.00 | 1.88 | ER32 |
| **BL031** | CAT50 - ER16 - 4.88 | 50 | 1/32-13/32 | 4.88 | 1.08 | ER16 |
| **BL032** | CAT50 - ER20 - 4.00 | 50 | 0.039-0.511 | 4.00 | 1.26 | ER20 |
| **BL033** | CAT50 - ER25 - 4.00 | 50 | 0.039-0.629 | 4.00 | 1.65 | ER25 |
| **BL034** | CAT50 - ER32 - 4.00 | 50 | 0.078-0.787 | 4.00 | 1.88 | ER32 |

## ■ EXTENDED

| EDP No. | Type | TAPER No. | Size Range | L | D | Collet Series |
|---|---|---|---|---|---|---|
| **BK331** | CAT40 - ER16 - 4.88 | 40 | 1/32-13/32 | 4.88 | 1.08 | ER16 |
| **BK332** | CAT40 - ER20 - 6.00 | 40 | 0.039-0.511 | 6.00 | 1.26 | ER20 |
| **BK333** | CAT40 - ER25 - 6.00 | 40 | 0.039-0.629 | 6.00 | 1.65 | ER25 |
| **BK334** | CAT40 - ER32 - 6.00 | 40 | 0.078-0.787 | 6.00 | 1.88 | ER32 |
| **BL331** | CAT50 - ER16 - 6.88 | 50 | 1/32-13/32 | 6.88 | 1.08 | ER16 |
| **BL332** | CAT50 - ER20 - 6.00 | 50 | 0.039-0.511 | 6.00 | 1.26 | ER20 |
| **BL333** | CAT50 - ER25 - 6.00 | 50 | 0.039-0.629 | 6.00 | 1.65 | ER25 |
| **BL334** | CAT50 - ER32 - 6.00 | 50 | 0.078-0.787 | 6.00 | 1.88 | ER32 |

## ■ EXTRA EXTENDED

| EDP No. | Type | TAPER No. | Size Range | L | D | Collet Series |
|---|---|---|---|---|---|---|
| **BK432** | CAT40-ER20-8.00 | 40 | 0.039-0.511 | 8.00 | 1.26 | ER20 |

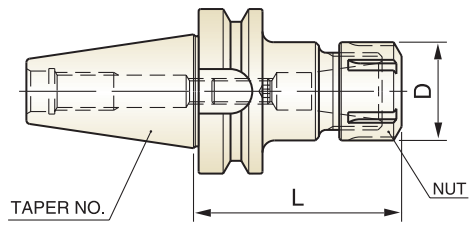
▶ BALANCING GRADE : BASED ON G6.3 / 15,000rpm
▶ HIGH BALANCED END MILL HOLDERS ARE AVAILABLE ON REQUEST
▶ ER NUT : SWISS MADE PRECISION ER NUT
▶ SUPPLIED without WRENCH
▶ WRENCHES ON PAGE 811

# ROTARY TOOL HOLDERS



## ER COLLET CHUCK

BT




### ■ STUB

| EDP No. | Type | TAPER No. | Size Range | L | D | Collet Series |
|---|---|---|---|---|---|---|
| **BH232** | BT40 - ER20 - 2.20 | 40 | 0.039-0.511 | 2.20 | 1.26 | ER20 |
| **BH233** | BT40 - ER25 - 2.50 | 40 | 0.039-0.629 | 2.50 | 1.65 | ER25 |
| **BH234** | BT40 - ER32 - 2.40 | 40 | 0.078-0.787 | 2.40 | 1.88 | ER32 |

### ■ STANDARD

| EDP No. | Type | TAPER No. | Size Range | L | D | Collet Series |
|---|---|---|---|---|---|---|
| **BH030** | BT40 - ER11 - 3.00 | 40 | 0.019-0.250 | 3.00 | 0.63 | ER11 |
| **BH031** | BT40 - ER16 - 2.88 | 40 | 1/32-13/32 | 2.88 | 1.08 | ER16 |
| **BH032** | BT40 - ER20 - 4.00 | 40 | 0.039-0.511 | 4.00 | 1.26 | ER20 |
| **BH133** | BT40 - ER25 - 4.00 | 40 | 0.039-0.629 | 4.00 | 1.65 | ER25 |
| **BH134** | BT40 - ER32 - 4.00 | 40 | 0.078-0.787 | 4.00 | 1.88 | ER32 |
| **BI031** | BT50 - ER16 - 4.88 | 50 | 1/32-13/32 | 4.88 | 1.08 | ER16 |
| **BI032** | BT50 - ER20 - 2.63 | 50 | 0.039-0.511 | 2.63 | 1.26 | ER20 |
| **BI033** | BT50 - ER25 - 2.63 | 50 | 0.039-0.629 | 2.63 | 1.65 | ER25 |
| **BI034** | BT50 - ER32 - 4.00 | 50 | 0.078-0.787 | 4.00 | 1.88 | ER32 |

### ■ EXTENDED

| EDP No. | Type | TAPER No. | Size Range | L | D | Collet Series |
|---|---|---|---|---|---|---|
| **BH331** | BT40 - ER16 - 4.88 | 40 | 1/32-13/32 | 4.88 | 1.08 | ER16 |
| **BH332** | BT40 - ER20 - 6.00 | 40 | 0.039-0.511 | 6.00 | 1.26 | ER20 |
| **BH333** | BT40 - ER25 - 6.00 | 40 | 0.039-0.629 | 6.00 | 1.65 | ER25 |
| **BH334** | BT40 - ER32 - 6.00 | 40 | 0.078-0.787 | 6.00 | 1.88 | ER32 |
| **BI331** | BT50 - ER16 - 6.00 | 50 | 1/32-13/32 | 6.00 | 1.08 | ER16 |
| **BI332** | BT50 - ER20 - 6.00 | 50 | 0.039-0.511 | 6.00 | 1.26 | ER20 |
| **BI333** | BT50 - ER25 - 6.00 | 50 | 0.039-0.629 | 6.00 | 1.65 | ER25 |
| **BI334** | BT50 - ER32 - 6.00 | 50 | 0.078-0.787 | 6.00 | 1.88 | ER32 |

### ■ EXTRA EXTENDED

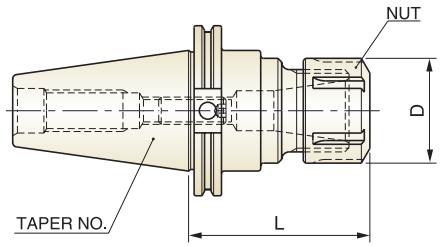
| EDP No. | Type | TAPER No. | Size Range | L | D | Collet Series |
|---|---|---|---|---|---|---|
| **BH432** | BT40 - ER20 - 8.00 | 40 | 0.039-0.511 | 8.00 | 1.26 | ER20 |

▶ BALANCING GRADE : BASED ON G6.3 / 15,000rpm
▶ HIGH BALANCED END MILL HOLDERS ARE AVAILABLE ON REQUEST
▶ ER NUT : SWISS MADE PRECISION ER NUT
▶ SUPPLIED without WRENCH
▶ WRENCHES ON PAGE 811

# HIGH BALANCED ER COLLET CHUCK



CAT




## ■ STUB

| EDP No. | Type | TAPER No. | Size Range | L | D | Collet Series |
|---|---|---|---|---|---|---|
| **BK232B25** | CAT40 - ER20 - 2.55 | 40 | 0.039-0.511 | 2.55 | 1.26 | ER20 |
| **BK233B25** | CAT40 - ER25 - 2.50 | 40 | 0.039-0.629 | 2.50 | 1.65 | ER25 |
| **BK234B25** | CAT40 - ER32 - 2.70 | 40 | 0.078-0.787 | 2.70 | 1.88 | ER32 |

## ■ STANDARD

| EDP No. | Type | TAPER No. | Size Range | L | D | Collet Series |
|---|---|---|---|---|---|---|
| **BK030B25** | CAT40 - ER11 - 3.00 | 40 | 0.019-0.250 | 3.00 | 0.63 | ER11 |
| **BK031B25** | CAT40 - ER16 - 2.88 | 40 | 1/32-13/32 | 2.88 | 1.08 | ER16 |
| **BK032B25** | CAT40 - ER20 - 4.00 | 40 | 0.039-0.511 | 4.00 | 1.26 | ER20 |
| **BK133B25** | CAT40 - ER25 - 4.00 | 40 | 0.039-0.629 | 4.00 | 1.65 | ER25 |
| **BK134B25** | CAT40 - ER32 - 4.00 | 40 | 0.078-0.787 | 4.00 | 1.88 | ER32 |

## ■ EXTENDED

| EDP No. | Type | TAPER No. | Size Range | L | D | Collet Series |
|---|---|---|---|---|---|---|
| **BK331B25** | CAT40 - ER16 - 4.88 | 40 | 1/32-13/32 | 4.88 | 1.08 | ER16 |
| **BK332B25** | CAT40 - ER20 - 6.00 | 40 | 0.039-0.511 | 6.00 | 1.26 | ER20 |
| **BK333B25** | CAT40 - ER25 - 6.00 | 40 | 0.039-0.629 | 6.00 | 1.65 | ER25 |
| **BK334B25** | CAT40 - ER32 - 6.00 | 40 | 0.078-0.787 | 6.00 | 1.88 | ER32 |

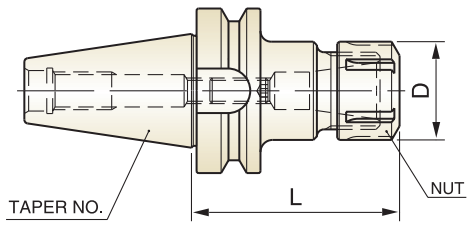
## ■ EXTRA EXTENDED

| EDP No. | Type | TAPER No. | Size Range | L | D | Collet Series |
|---|---|---|---|---|---|---|
| **BK432B25** | CAT40 - ER20 - 8.00 | 40 | 0.039-0.511 | 8.00 | 1.26 | ER20 |

- BALANCING GRADE : BASED ON G2.5 / 25,000rpm
- HIGH BALANCED END MILL HOLDERS ARE AVAILABLE ON REQUEST
- THESE TOOLS ARE BALANCED WITH NO HARDWARE, NUTS, SCREWS, COLLETS OR CUTTING TOOLS IN THEM
- TO ACHIEVE TRUE G2.5 @ 25,000 RPM THE ENTIRE ROTARY TOOLING ASSEMBLY INCLUDING THE CUTTING TOOL NEEDS TO BE BALANCED
- ER NUT : SWISS MADE PRECISION ER NUT
- SUPPLIED without WRENCH
- WRENCHES ON PAGE 811

# HIGH BALANCED ER COLLET CHUCK

BT




## ■ STUB

| EDP No. | Type | TAPER No. | Size Range | L | D | Collet Series |
|---|---|---|---|---|---|---|
| **BH232B25** | BT40-ER20-2.20 | 40 | 0.039 - 0.511 | 2.20 | 1.26 | ER20 |
| **BH233B25** | BT40-ER25-2.50 | 40 | 0.039 - 0.629 | 2.50 | 1.65 | ER25 |
| **BH234B25** | BT40-ER32-2.40 | 40 | 0.078 - 0.787 | 2.40 | 1.88 | ER32 |

## ■ STANDARD

| EDP No. | Type | TAPER No. | Size Range | L | D | Collet Series |
|---|---|---|---|---|---|---|
| **BH030B25** | BT40-ER11-3.00 | 40 | 0.019 - 0.250 | 3.00 | 0.63 | ER11 |
| **BH031B25** | BT40-ER16-2.88 | 40 | 1/32 - 13/32 | 2.88 | 1.08 | ER16 |
| **BH032B25** | BT40-ER20-4.00 | 40 | 0.039 - 0.511 | 4.00 | 1.26 | ER20 |
| **BH133B25** | BT40-ER25-4.00 | 40 | 0.039 - 0.629 | 4.00 | 1.65 | ER25 |
| **BH134B25** | BT40-ER32-4.00 | 40 | 0.078 - 0.787 | 4.00 | 1.88 | ER32 |

## ■ EXTENDED

| EDP No. | Type | TAPER No. | Size Range | L | D | Collet Series |
|---|---|---|---|---|---|---|
| **BH331B25** | BT40-ER16-4.88 | 40 | 1/32 - 13/32 | 4.88 | 1.08 | ER16 |
| **BH332B25** | BT40-ER20-6.00 | 40 | 0.039 - 0.511 | 6.00 | 1.26 | ER20 |
| **BH333B25** | BT40-ER25-6.00 | 40 | 0.039 - 0.629 | 6.00 | 1.65 | ER25 |
| **BH334B25** | BT40-ER32-6.00 | 40 | 0.078 - 0.787 | 6.00 | 1.88 | ER32 |

## ■ EXTRA EXTENDED

| EDP No. | Type | TAPER No. | Size Range | L | D | Collet Series |
|---|---|---|---|---|---|---|
| **BH432B25** | BT40-ER20-8.00 | 40 | 0.039 - 0.511 | 8.00 | 1.26 | ER20 |

- ▶ BALANCING GRADE : BASED ON G2.5 / 25,000rpm
- ▶ HIGH BALANCED END MILL HOLDERS ARE AVAILABLE ON REQUEST
- ▶ THESE TOOLS ARE BALANCED WITH NO HARDWARE, NUTS, SCREWS, COLLETS OR CUTTING TOOLS IN THEM
- ▶ TO ACHIEVE TRUE G2.5 @ 25,000 RPM THE ENTIRE ROTARY TOOLING ASSEMBLY INCLUDING THE CUTTING TOOL NEEDS TO BE BALANCED
- ▶ ER NUT : SWISS MADE PRECISION ER NUT
- ▶ SUPPLIED without WRENCH
- ▶ WRENCHES ON PAGE 811

## ER NUT

CAT / BT

| EDP No. | Series | Type |
|---|---|---|
| ZZ061 | ER11 - NUT | FIG.1 |
| ZZ063 | ER16 - NUT | FIG.1 |
| ZZ066 | ER20 - NUT | FIG.1 |
| ZZ069 | ER25 - NUT | FIG.2 |
| ZZ072 | ER32 - NUT | FIG.2 |

FIG.1

FIG.2

## ER WRENCH

CAT / BT

| EDP No. | For Use With | Type |
|---|---|---|
| ZZ062 | ER11 | FIG.1 |
| ZZ064 | ER16 | FIG.1 |
| ZZ067 | ER20 | FIG.1 |
| ZZ070 | ER25 | FIG.2 |
| ZZ073 | ER32 | FIG.2 |

FIG.1

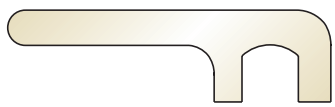
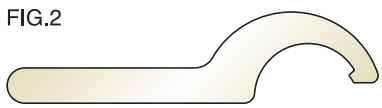


FIG.2



## ER STOP SCREW

CAT / BT

FIG.1

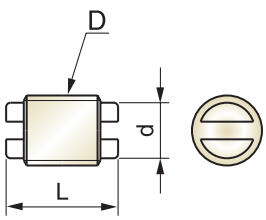
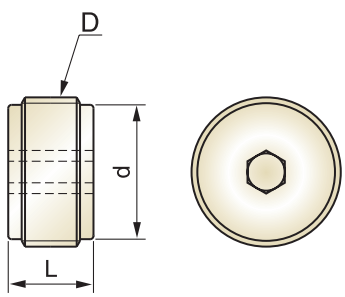



FIG.2

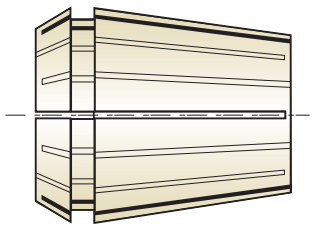



| EDP No. | Series | L | d | D | Type |
|---|---|---|---|---|---|
| ZZ060 | ER11 | 0.50 | 0.25 | UN5/16 - 18 | FIG.1 |
| ZZ065 | ER16 | 0.50 | 0.35 | UN7/16 - 16 | FIG.2 |
| ZZ068 | ER20 | 0.50 | 0.48 | UN9/16 - 16 | FIG.2 |
| ZZ071 | ER25 | 0.50 | 0.60 | UN11/16 - 16 | FIG.2 |
| ZZ074 | ER32 | 0.50 | 0.79 | UN7/8 - 16 | FIG.2 |

# ROTARY TOOL HOLDERS



## ER COLLET - STANDARD



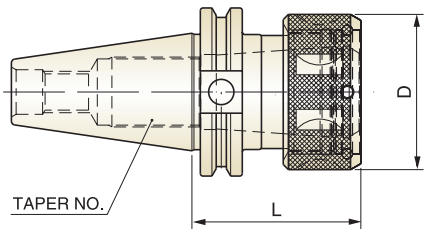
| Type ER 11 | | Type ER 16 | | Type ER 20 | | Type ER 25 | | Type ER 32 | |
|---|---|---|---|---|---|---|---|---|---|
| Clamping Capacity | EDP No. | Clamping Capacity | EDP No. | Clamping Capacity | EDP No. | Clamping Capacity | EDP No. | Clamping Capacity | EDP No. |
| 1/16 | 110116 | 1/16 | 160116 | 1/16 | 200116 | 1/16 | 250116 | 3/32 | 320332 |
| 3/32 | 110332 | 3/32 | 160332 | 3/32 | 200332 | 3/32 | 250332 | 1/8 | 320108 |
| 1/8 | 110108 | 1/8 | 160108 | 1/8 | 200108 | 1/8 | 250108 | 5/32 | 320532 |
| 5/32 | 110532 | 5/32 | 160532 | 5/32 | 200532 | 5/32 | 250532 | 3/16 | 320316 |
| 3/16 | 110316 | 3/16 | 160316 | 3/16 | 200316 | 3/16 | 250316 | 7/32 | 320732 |
| 7/32 | 110732 | 7/32 | 160732 | 7/32 | 200732 | 7/32 | 250732 | 1/4 | 320104 |
| 1/4 | 110104 | 1/4 | 160104 | 1/4 | 200104 | 1/4 | 250104 | 9/32 | 320932 |
| | | 9/32 | 160932 | 9/32 | 200932 | 9/32 | 250932 | 5/16 | 320516 |
| | | 5/16 | 160516 | 5/16 | 200516 | 5/16 | 250516 | 11/32 | 321132 |
| | | 11/32 | 161132 | 11/32 | 201132 | 11/32 | 251132 | 3/8 | 320308 |
| | | 3/8 | 160308 | 3/8 | 200308 | 3/8 | 250308 | 13/32 | 321332 |
| | | 13/32 | 161332 | 13/32 | 201332 | 13/32 | 251332 | 7/16 | 320716 |
| | | | | 7/16 | 200716 | 7/16 | 250716 | 15/32 | 321532 |
| | | | | 15/32 | 201532 | 15/32 | 251532 | 1/2 | 320102 |
| | | | | 1/2 | 200102 | 1/2 | 250102 | 17/32 | 321732 |
| | | | | | | 17/32 | 251732 | 9/16 | 320916 |
| | | | | | | 9/16 | 250916 | 19/32 | 321932 |
| | | | | | | 19/32 | 251932 | 5/8 | 320508 |
| | | | | | | 5/8 | 250508 | 21/32 | 322132 |
| | | | | | | | | 11/16 | 321116 |
| | | | | | | | | 23/32 | 322332 |
| | | | | | | | | 3/4 | 320304 |
| Standard Set | ER11S07 | Standard Set | ER16S12 | Standard Set | ER20S15 | Standard Set | ER25S19 | Standard Set | ER32S22 |
| 1/16 to 1/4 | | 1/16 to 13/32 | | 1/16 to 1/2 | | 1/16 to 5/8 | | 3/32 to 3/4 | |
| 7 Pcs. | | 12 Pcs. | | 15 Pcs. | | 19 Pcs. | | 22 Pcs. | |

▶ Rubber sealed er collets are available on request

# TG COLLET CHUCK



CAT




## TG75

### ■ STANDARD

| EDP No. | Type | TAPER No. | Size Range | L | D | Collet Series |
|---|---|---|---|---|---|---|
| VK012 | CAT40-TG75-2.50 | 40 | 3/64-3/4 | 2.50 | 1.87 | 75TG |

### ■ EXTENDED

| EDP No. | Type | TAPER No. | Size Range | L | D | Collet Series |
|---|---|---|---|---|---|---|
| VK312 | CAT40-TG75-3.00 | 40 | 3/64-3/4 | 3.00 | 1.87 | 75TG |

## TG100

### ■ STANDARD

| EDP No. | Type | TAPER No. | Size Range | L | D | Collet Series |
|---|---|---|---|---|---|---|
| OK014 | CAT40-TG100-3.25 | 40 | 1/16-1 | 3.25 | 2.50 | 100TG |
| OL014 | CAT50-TG100-3.25 | 50 | 1/16-1 | 3.25 | 2.50 | 100TG |

### ■ EXTENDED

| EDP No. | Type | TAPER No. | Size Range | L | D | Collet Series |
|---|---|---|---|---|---|---|
| OK314 | CAT40-TG100-4.50 | 40 | 1/16-1 | 4.50 | 2.50 | 100TG |
| OL314 | CAT50-TG100-5.50 | 50 | 1/16-1 | 5.50 | 2.50 | 100TG |

## TG150

### ■ STANDARD

| EDP No. | Type | TAPER No. | Size Range | L | D | Collet Series |
|---|---|---|---|---|---|---|
| UL052 | CAT50-TG150-3.50 | 50 | 1/2-1 1/2 | 3.50 | 3.50 | 150TG |

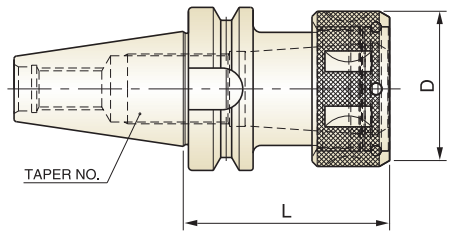
### ■ EXTENDED

| EDP No. | Type | TAPER No. | Size Range | L | D | Collet Series |
|---|---|---|---|---|---|---|
| UL352 | CAT50 - TG150 - 6.00 | 50 | 1/2-1 1/2 | 6.00 | 3.50 | 150TG |

▶ WRENCH / NUTS / STOP SCREW FOR TG COLLET CHUCKS ON PAGE 815

# TG COLLET CHUCK

BT




## TG75

■ **STANDARD**

| EDP No. | Type | TAPER No. | Size Range | L | D | Collet Series |
|---|---|---|---|---|---|---|
| VH012 | BT40 - TG75 - 3.00 | 40 | 3/64-3/4 | 3.00 | 1.87 | 75TG |

## TG100

■ **STANDARD**

| EDP No. | Type | TAPER No. | Size Range | L | D | Collet Series |
|---|---|---|---|---|---|---|
| OH014 | BT40 - TG100 - 3.50 | 40 | 1/16-1 | 3.50 | 2.50 | 100TG |
| OI014 | BT50 - TG100 - 3.50 | 50 | 1/16-1 | 3.50 | 2.50 | 100TG |

■ **EXTENDED**

| EDP No. | Type | TAPER No. | Size Range | L | D | Collet Series |
|---|---|---|---|---|---|---|
| OH314 | BT40 - TG100 - 5.50 | 40 | 1/16-1 | 5.50 | 2.50 | 100TG |
| OI314 | BT50 - TG100 - 6.00 | 50 | 1/16-1 | 6.00 | 2.50 | 100TG |

## TG150

■ **STANDARD**

| EDP No. | Type | TAPER No. | Size Range | L | D | Collet Series |
|---|---|---|---|---|---|---|
| UI052 | BT50 - TG150 - 4.00 | 50 | 1/2-1 1/2 | 4.00 | 3.50 | 150TG |

■ **EXTENDED**

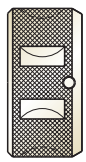
| EDP No. | Type | TAPER No. | Size Range | L | D | Collet Series |
|---|---|---|---|---|---|---|
| UI352 | BT50 - TG150 - 6.00 | 50 | 1/2-1 1/2 | 6.00 | 3.50 | 150TG |

▶ WRENCH / NUTS / STOP SCREW FOR TG COLLET CHUCKS ON PAGE 815

## TG NUT

CAT / BT

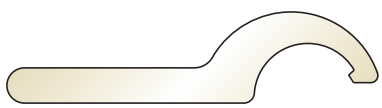
| EDP No. | Series |
|---|---|
| ZZ084 | TG75-NUT |
| ZZ081 | TG100-NUT |
| ZZ087 | TG150-NUT |



## TG WRENCH

CAT / BT

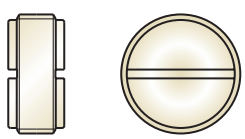
| EDP No. | For Use With |
|---|---|
| ZZ085 | TG75 |
| ZZ082 | TG100 |
| ZZ088 | TG150 |



## TG STOP SCREW

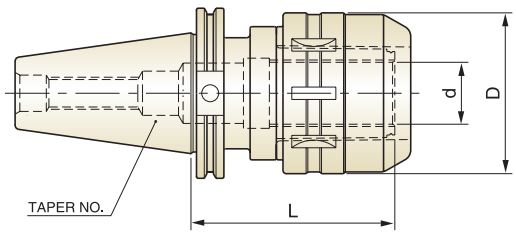
CAT / BT

| EDP No. | Series |
|---|---|
| ZZ086 | TG75 |
| ZZ083 | TG100 |
| ZZ089 | TG150 |



## MILLING CHUCK

CAT



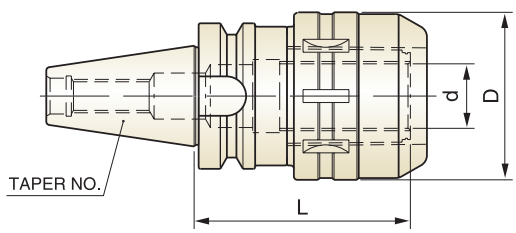

■ **STANDARD**

| EDP No. | Type | TAPER No. | d | L | D |
|---|---|---|---|---|---|
| LK010 | CAT40 - C 3/4 - 4.13 | 40 | 0.750 | 4.13 | 2.13 |
| LK014 | CAT40 - C 1 - 4.13 | 40 | 1.000 | 4.13 | 2.50 |
| LK017 | CAT40 - C 1 1/4 - 4.13 | 40 | 1.250 | 4.13 | 2.81 |
| LL010 | CAT50 - C 3/4 - 4.13 | 50 | 0.750 | 4.13 | 2.13 |
| LL014 | CAT50 - C 1 - 4.13 | 50 | 1.000 | 4.13 | 2.50 |
| LL017 | CAT50 - C 1 1/4 - 4.13 | 50 | 1.250 | 4.13 | 2.81 |

▶ COLLETS / WRENCHS FOR MILLING CHUCKS ON PAGE 817

## MILLING CHUCK

BT



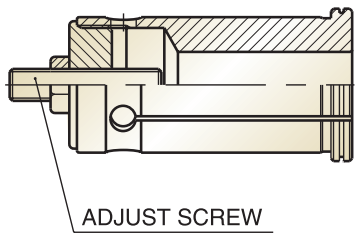

■ **STANDARD**

| EDP No. | Type | TAPER No. | d | L | D |
|---|---|---|---|---|---|
| LH010 | BT40 -C 3/4 - 3.56 | 40 | 0.750 | 3.56 | 2.13 |
| LH014 | BT40 - C 1 - 4.13 | 40 | 1.000 | 4.13 | 2.50 |
| LH017 | BT40 - C 1 1/4 - 4.13 | 40 | 1.250 | 4.13 | 2.81 |
| LI010 | BT50 - C 3/4 - 4.13 | 50 | 0.750 | 4.13 | 2.13 |
| LI014 | BT50 - C 1 - 4.13 | 50 | 1.000 | 4.13 | 2.50 |
| LI017 | BT50 - C 1 1/4 - 4.13 | 50 | 1.250 | 4.13 | 2.81 |

▶ COLLETS / WRENCHS FOR MILLING CHUCKS ON PAGE 817

## MILLING CHUCK COLLET

CAT / BT




| EDP No. | Type | Hole Size (D) |
|---|---|---|
| MZ002 | C3/4 | 1/4 |
| MZ003 | C3/4 | 5/16 |
| MZ004 | C3/4 | 3/8 |
| MZ006 | C3/4 | 1/2 |
| MZ008 | C3/4 | 5/8 |

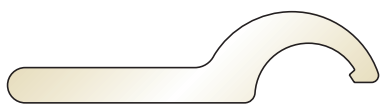
| EDP No. | Type | Hole Size (D) |
|---|---|---|
| MZ102 | C1 | 1/4 |
| MZ103 | C1 | 5/16 |
| MZ104 | C1 | 3/8 |
| MZ106 | C1 | 1/2 |
| MZ108 | C1 | 5/8 |
| MZ110 | C1 | 3/4 |

| EDP No. | Type | Hole Size (D) |
|---|---|---|
| MZ302 | C1 1/4 | 1/4 |
| MZ303 | C1 1/4 | 5/16 |
| MZ304 | C1 1/4 | 3/8 |
| MZ306 | C1 1/4 | 1/2 |
| MZ308 | C1 1/4 | 5/8 |
| MZ310 | C1 1/4 | 3/4 |
| MZ312 | C1 1/4 | 7/8 |
| MZ314 | C1 1/4 | 1" |

## WRENCH

CAT / BT

| EDP No. | For Use With |
|---|---|
| ZZ056 | C3/4 |
| ZZ057 | C1 |
| ZZ058 | C1 1/4 |

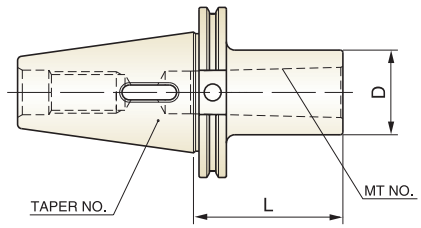


# ROTARY TOOL HOLDERS



## MORSE TAPER ADAPTER

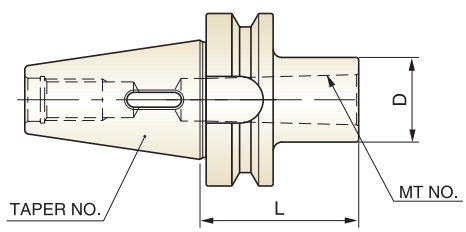
CAT




| EDP No. | Type | TAPER No. | MT No. | L | D |
|---|---|---|---|---|---|
| **CK037** | CAT40-MTA1-1.75 | 40 | #1 | 1.75 | 1.00 |
| **CK038** | CAT40-MTA2-2.00 | 40 | #2 | 2.00 | 1.26 |
| **CK039** | CAT40-MTA3-2.75 | 40 | #3 | 2.75 | 1.58 |
| **CK040** | CAT40-MTA4-3.63 | 40 | #4 | 3.63 | 1.97 |
| **CL038** | CAT50-MTA2-1.38 | 50 | #2 | 1.38 | 1.26 |
| **CL039** | CAT50-MTA3-1.88 | 50 | #3 | 1.88 | 1.58 |
| **CL040** | CAT50-MTA4-2.75 | 50 | #4 | 2.75 | 1.97 |
| **CL041** | CAT50-MTA5-4.06 | 50 | #5 | 4.06 | 2.55 |

## MORSE TAPER ADAPTER

BT

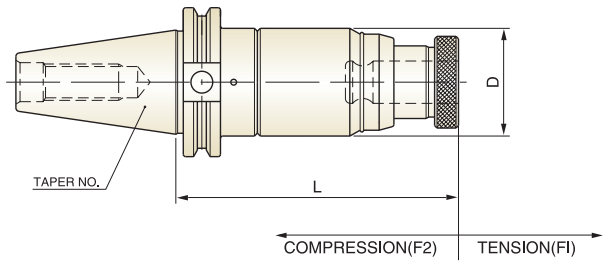



| EDP No. | Type | TAPER No. | MT No. | L | D |
|---|---|---|---|---|---|
| **CH037** | BT40 - MTA 1 - 1.75 | 40 | #1 | 1.75 | 1.00 |
| **CH038** | BT40 - MTA 2 - 2.36 | 40 | #2 | 2.36 | 1.26 |
| **CH039** | BT40 - MTA 3 - 2.95 | 40 | #3 | 2.95 | 1.58 |
| **CH040** | BT40 - MTA 4 - 3.74 | 40 | #4 | 3.74 | 1.97 |
| **CI038** | BT50 - MTA 2 - 2.36 | 50 | #2 | 2.36 | 1.26 |
| **CI039** | BT50 - MTA 3 - 2.95 | 50 | #3 | 2.95 | 1.58 |
| **CI040** | BT50 - MTA 4 - 3.74 | 50 | #4 | 3.74 | 1.97 |
| **CI041** | BT50 - MTA 5 - 4.13 | 50 | #5 | 4.13 | 2.55 |

# TAPPING CHUCK



CAT




■ **These holders use Tap System #1 collets.**

| EDP No. | Type | TAPER No. | D | L | FI | F2 |
|---|---|---|---|---|---|---|
| **JK048** | CAT40-TC#1-4.56 | 40 | 1.77 | 4.56 | 0.197 | 0.591 |
| **JL048** | CAT50-TC#1-4.56 | 50 | 1.77 | 4.56 | 0.197 | 0.591 |

■ **These holders use Tap System #2 collets.**

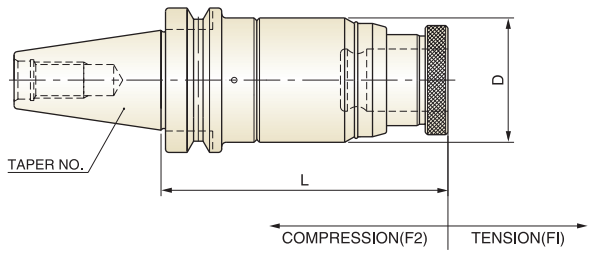
| EDP No. | Type | TAPER No. | D | L | FI | F2 |
|---|---|---|---|---|---|---|
| **JK049** | CAT40-TC#2-6.47 | 40 | 2.48 | 6.47 | 0.197 | 0.787 |
| **JL049** | CAT50-TC#2-5.82 | 50 | 2.48 | 5.82 | 0.197 | 0.787 |

■ **These holders use Tap System #3 collets.**

| EDP No. | Type | TAPER No. | D | L | FI | F2 |
|---|---|---|---|---|---|---|
| **JL050** | CAT50-TC#3-7.75 | 50 | 3.86 | 7.75 | 0.394 | 0.984 |

# TAPPING CHUCK

BT




■ **These holders use Tap System #1 collets.**

| EDP No. | Type | TAPER No. | D | L | FI | F2 |
|---|---|---|---|---|---|---|
| **JH048** | BT40 - TC #1 - 4.53 | 40 | 1.77 | 4.53 | 0.197 | 0.591 |
| **JI048** | BT50 - TC #1 - 4.64 | 50 | 1.77 | 4.64 | 0.197 | 0.591 |

■ **These holders use Tap System #2 collets.**

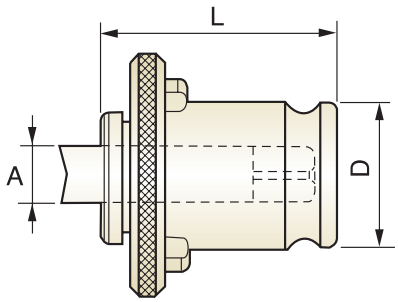
| EDP No. | Type | TAPER No. | D | L | FI | F2 |
|---|---|---|---|---|---|---|
| **JH049** | BT40 - TC #2 - 6.72 | 40 | 2.48 | 6.72 | 0.197 | 0.787 |
| **JI049** | BT50 - TC #2 - 6.72 | 50 | 2.48 | 6.72 | 0.197 | 0.787 |

■ **These holders use Tap System #3 collets.**

| EDP No. | Type | TAPER No. | D | L | FI | F2 |
|---|---|---|---|---|---|---|
| **JI050** | BT50 - TC #3 - 8.33 | 50 | 3.86 | 8.33 | 0.394 | 0.984 |

# POSITIVE QUICK CHANGE TAP ADAPTERS





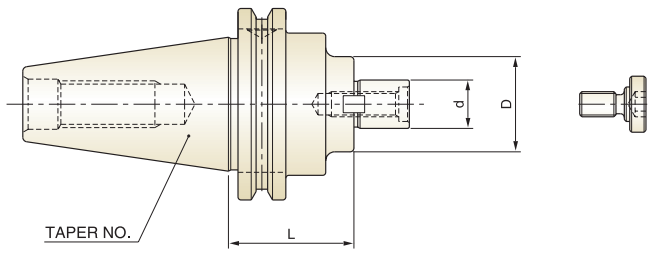

## ■ Bilz Type Tap Chucks

| EDP No. | Adapter size | Tap size range | tap size | A shank dia | square AF |
|---|---|---|---|---|---|
| QCT12001 | QCT 12 | 0-9/16 | # 0-6 | 0.141 | 0.110 |
| QCT12002 | | | # 8 | 0.168 | 0.131 |
| QCT12003 | | | # 10 | 0.194 | 0.152 |
| QCT12004 | | | # 12 | 0.220 | 0.165 |
| QCT12005 | | | 1/4 | 0.255 | 0.191 |
| QCT12006 | D = 19mm/0.748 | | 5/16 | 0.318 | 0.238 |
| QCT12007 | L = 28.5mm/1.122 | | 3/8 | 0.381 | 0.286 |
| QCT12008 | | | 7/16 | 0.323 | 0.242 |
| QCT12009 | | | 1/2 | 0.367 | 0.275 |
| QCT12010 | | 1/8 PIPE | 9/16 | 0.429 | 0.322 |
| QCT12011 | | | 1/8pss | 0.3125 | 0.234 |
| QCT12012 | | | 1/8pls | 0.4370 | 0.328 |
| QCT24001 | QCT 24 | 5/16-7/8 | 5/16 | 0.318 | 0.238 |
| QCT24002 | | | 3/8 | 0.381 | 0.286 |
| QCT24003 | | | 7/16 | 0.323 | 0.242 |
| QCT24004 | | | 1/2 | 0.367 | 0.275 |
| QCT24005 | | | 9/16 | 0.429 | 0.322 |
| QCT24006 | | | 5/8 | 0.480 | 0.360 |
| QCT24007 | D = 31mm/1.220 | | 11/16 | 0.542 | 0.406 |
| QCT24008 | L = 46mm/1.811 | | 3/4 | 0.590 | 0.442 |
| QCT24009 | | | 13/16 | 0.652 | 0.489 |
| QCT24010 | | | 7/8 | 0.697 | 0.523 |
| QCT24011 | | 1/4 - 3/8 1/2 PIPE | 1/4p | 0.5620 | 0.421 |
| QCT24012 | | | 3/8p | 0.7000 | 0.531 |
| QCT24013 | | | 1/2p | 0.6875 | 0.515 |
| QCT32001 | QCT 32 | 13/16-1-3/8 | 13/16 | 0.652 | 0.489 |
| QCT32002 | | | 7/8 | 0.697 | 0.523 |
| QCT32003 | | | 15/16 | 0.760 | 0.570 |
| QCT32004 | | | 1 | 0.800 | 0.600 |
| QCT32005 | D = 48mm/1.890 | | 1-1/8 | 0.896 | 0.672 |
| QCT32006 | L = 69.5mm/2.736 | | 1-1/4 | 1.021 | 0.766 |
| QCT32007 | | | 1-3/8 | 1.108 | 0.831 |
| QCT32008 | | 1/2, 3/4 & 1 PIPE | 1/2p | 0.6875 | 0.515 |
| QCT32009 | | | 3/4p | 0.9060 | 0.679 |
| QCT32010 | | | 1p | 1.1250 | 0.843 |

▶ IMPROPER SELECTION OF PULL STUDS CAN CAUSE SERIOUS DAMAGE AND POSSIBLE INJURY. PLEASE MAKE SURE THE MACHINE ACCEPTS THE PULL STUD YOU SELECT.
▶ ADDITIONAL PULL STUDS AVAILABLE

# SHELL MILL ARBOR

CAT




## ■ STANDARD

| EDP No. | Type | TAPER No. | d | L | D |
|---|---|---|---|---|---|
| EK006 | CAT40-SMA1/2-1.50 | 40 | 0.500 | 1.50 | 1.44 |
| EK010 | CAT40-SMA3/4-1.50 | 40 | 0.750 | 1.50 | 1.69 |
| EK014 | CAT40-SMA1 -2.06 | 40 | 1.000 | 2.06 | 2.19 |
| EK017 | CAT40-SMA1 1/4-2.63 | 40 | 1.250 | 2.63 | 2.75 |
| EK021 | CAT40-SMA1 1/2-3.00 | 40 | 1.500 | 3.00 | 3.81 |
| EL010 | CAT50-SMA3/4-1.50 | 50 | 0.750 | 1.50 | 1.69 |
| EL014 | CAT50-SMA1 -2.00 | 50 | 1.000 | 2.00 | 2.19 |
| EL017 | CAT50-SMA1 1/4-1.50 | 50 | 1.250 | 1.50 | 2.75 |
| EL021 | CAT50-SMA1 1/2-2.50 | 50 | 1.500 | 2.50 | 3.81 |
| EL029 | CAT50-SMA2 -3.00 | 50 | 2.000 | 3.00 | 4.88 |

## ■ EXTENDED

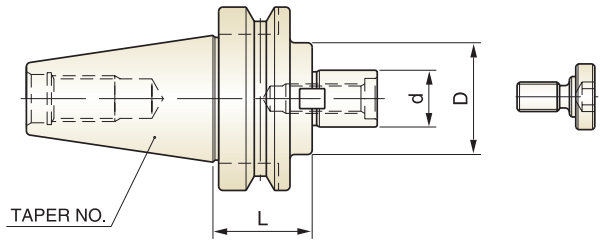
| EDP No. | Type | TAPER No. | d | L | D |
|---|---|---|---|---|---|
| EK306 | CAT40-SMA1/2-3.50 | 40 | 0.500 | 3.50 | 1.44 |
| EK310 | CAT40-SMA3/4-3.50 | 40 | 0.750 | 3.50 | 1.69 |
| EK314 | CAT40-SMA1 -4.00 | 40 | 1.000 | 4.00 | 2.19 |
| EK317 | CAT40-SMA1 1/4-4.00 | 40 | 1.250 | 4.00 | 2.75 |
| EK321 | CAT40-SMA1 1/2-4.00 | 40 | 1.500 | 4.00 | 3.81 |
| EL310 | CAT50-SMA3/4-3.50 | 50 | 0.750 | 3.50 | 1.69 |
| EL314 | CAT50-SMA1 -4.00 | 50 | 1.000 | 4.00 | 2.19 |
| EL317 | CAT50-SMA1 1/4-3.50 | 50 | 1.250 | 3.50 | 2.75 |
| EL321 | CAT50-SMA1 1/2-4.00 | 50 | 1.500 | 4.00 | 3.81 |
| EL329 | CAT50-SMA2 -4.00 | 50 | 2.000 | 4.00 | 4.88 |

▶ BALANCING GRADE : BASED ON G6.3 / 15,000rpm
▶ HIGH BALANCED END MILL HOLDERS ARE AVAILABLE ON REQUEST
▶ DRIVE KEY / LOCK SCREW FOR SHELL MILL ARBORS ON PAGE 824

# SHELL MILL ARBOR



BT




## ■ STANDARD

| EDP No. | Type | TAPER No. | d | L | D |
|---|---|---|---|---|---|
| **EH006** | BT40 - SMA 1/2 - 1.75 | 40 | 0.500 | 1.75 | 1.44 |
| **EH010** | BT40 - SMA 3/4 - 1.77 | 40 | 0.750 | 1.77 | 1.69 |
| **EH014** | BT40 - SMA 1 - 1.77 | 40 | 1.000 | 1.77 | 2.19 |
| **EH017** | BT40 - SMA 1 1/4 - 1.81 | 40 | 1.250 | 1.81 | 2.75 |
| **EH021** | BT40 - SMA 1 1/2 - 2.36 | 40 | 1.500 | 2.36 | 3.81 |
| **EI010** | BT50 - SMA 3/4 - 1.75 | 50 | 0.750 | 1.75 | 1.69 |
| **EI014** | BT50 - SMA 1 - 1.75 | 50 | 1.000 | 1.75 | 2.19 |
| **EI017** | BT50 - SMA 1 1/4 - 1.75 | 50 | 1.250 | 1.75 | 2.75 |
| **EI021** | BT50 - SMA 1 1/2 - 1.75 | 50 | 1.500 | 1.75 | 3.81 |
| **EI029** | BT50 - SMA 2 - 3.00 | 50 | 2.000 | 3.00 | 4.88 |

## ■ EXTENDED

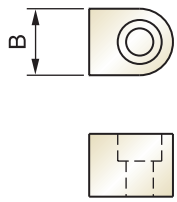
| EDP No. | Type | TAPER No. | d | L | D |
|---|---|---|---|---|---|
| **EH306** | BT40 - SMA 1/2 - 3.50 | 40 | 0.500 | 3.50 | 1.44 |
| **EH310** | BT40 - SMA 3/4 - 4.13 | 40 | 0.750 | 4.13 | 1.69 |
| **EH314** | BT40 - SMA 1 - 4.13 | 40 | 1.000 | 4.13 | 2.19 |
| **EH317** | BT40 - SMA 1 1/4 - 4.13 | 40 | 1.250 | 4.13 | 2.75 |
| **EH321** | BT40 - SMA 1 1/2 - 4.72 | 40 | 1.500 | 4.72 | 3.81 |
| **EI310** | BT50 - SMA 3/4 - 3.50 | 50 | 0.750 | 3.50 | 1.69 |
| **EI314** | BT50 - SMA 1 - 4.00 | 50 | 1.000 | 4.00 | 2.19 |
| **EI317** | BT50 - SMA 1 1/4 - 4.00 | 50 | 1.250 | 4.00 | 2.75 |
| **EI321** | BT50 - SMA 1 1/2 - 4.00 | 50 | 1.500 | 4.00 | 3.81 |
| **EI329** | BT50 - SMA 2 - 4.00 | 50 | 2.000 | 4.00 | 4.88 |

▶ BALANCING GRADE : BASED ON G6.3 / 15,000rpm
▶ HIGH BALANCED END MILL HOLDERS ARE AVAILABLE ON REQUEST
▶ DRIVE KEY / LOCK SCREW FOR SHELL MILL ARBORS ON PAGE 824

## SHELL MILL DRIVE KEY

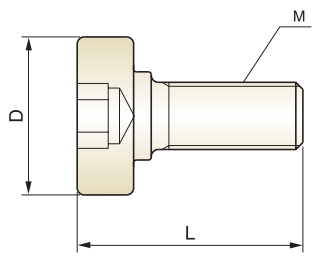
CAT / BT

| EDP No. | Series | B |
|---|---|---|
| ZZ021 | SMA 1/2-KEY | 0.25 |
| ZZ022 | SMA 3/4-KEY | 0.312 |
| ZZ023 | SMA 1 -KEY | 0.375 |
| ZZ024 | SMA 1 1/4-KEY | 0.5 |
| ZZ025 | SMA 1 1/2-KEY | 0.625 |
| ZZ026 | SMA 2 -KEY | 0.75 |




## SHELL MILL LOCK SCREW

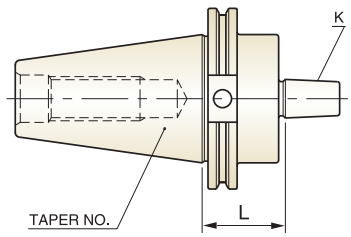
CAT / BT




| EDP No. | Type (M) | L | D | Series |
|---|---|---|---|---|
| ZZ031 | UNF 1/4 - 28 | 0.906 | 0.618 | SMA 1/2 - SCREW |
| ZZ032 | UNF 3/8 - 24 | 1.26 | 0.882 | SMA 3/4 - SCREW |
| ZZ033 | UNF 1/2 - 20 | 1.69 | 1.181 | SMA 1 - SCREW |
| ZZ034 | UNF 5/8 - 18 | 2.05 | 1.5 | SMA 1 1/4 - SCREW |
| ZZ035 | UNF 3/4 - 16 | 2.36 | 1.88 | SMA 1 1/2 - SCREW |
| ZZ036 | UNS 1 - 14 | 2.52 | 2.5 | SMA 2 - SCREW |

## JACOBS TAPER ARBOR

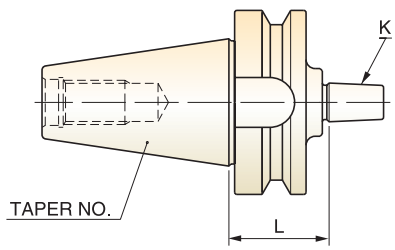
CAT




| EDP No. | Type | TAPER No. | K | L |
|---|---|---|---|---|
| GK042 | CAT40 - JTA 1 - 1.50 | 40 | #1 | 1.50 |
| GK043 | CAT40 - JTA 2 - 1.50 | 40 | #2 | 1.50 |
| GK044 | CAT40 - JTA 3 - 1.50 | 40 | #3 | 1.50 |
| GK045 | CAT40 - JTA 4 - 1.50 | 40 | #4 | 1.50 |
| GK046 | CAT40 - JTA 6 - 1.50 | 40 | #6 | 1.50 |
| GK047 | CAT40 - JTA 33 - 1.50 | 40 | #33 | 1.50 |
| GL042 | CAT50 - JTA 1 - 1.50 | 50 | #1 | 1.50 |
| GL043 | CAT50 - JTA 2 - 1.50 | 50 | #2 | 1.50 |
| GL044 | CAT50 - JTA 3 - 1.50 | 50 | #3 | 1.50 |
| GL045 | CAT50 - JTA 4 - 1.50 | 50 | #4 | 1.50 |
| GL046 | CAT50 - JTA 6 - 1.50 | 50 | #6 | 1.50 |
| GL047 | CAT50 - JTA 33 - 1.50 | 50 | #33 | 1.50 |

## JACOBS TAPER ARBOR

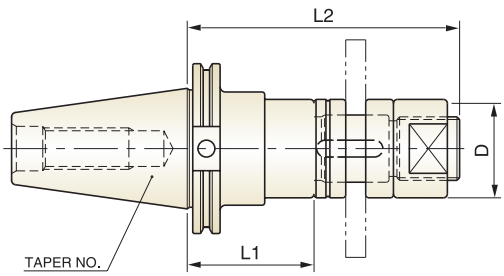
BT




| EDP No. | Type | TAPER No. | K | L |
|---|---|---|---|---|
| GH042 | BT40 - JTA 1 - 1.34 | 40 | #1 | 1.34 |
| GH043 | BT40 - JTA 2 - 1.77 | 40 | #2 | 1.77 |
| GH044 | BT40 - JTA 3 - 1.77 | 40 | #3 | 1.77 |
| GH045 | BT40 - JTA 4 - 1.77 | 40 | #4 | 1.77 |
| GH046 | BT40 - JTA 6 - 1.77 | 40 | #6 | 1.77 |
| GH047 | BT40 - JTA 33 - 1.77 | 40 | #33 | 1.77 |
| GI042 | BT50 - JTA 1 - 1.80 | 50 | #1 | 1.80 |
| GI043 | BT50 - JTA 2 - 1.77 | 50 | #2 | 1.77 |
| GI044 | BT50 - JTA 3 - 1.77 | 50 | #3 | 1.77 |
| GI045 | BT50 - JTA 4 - 1.77 | 50 | #4 | 1.77 |
| GI046 | BT50 - JTA 6 - 1.77 | 50 | #6 | 1.77 |
| GI047 | BT50 - JTA 33 - 1.77 | 50 | #33 | 1.77 |

## STUB ARBOR

CAT

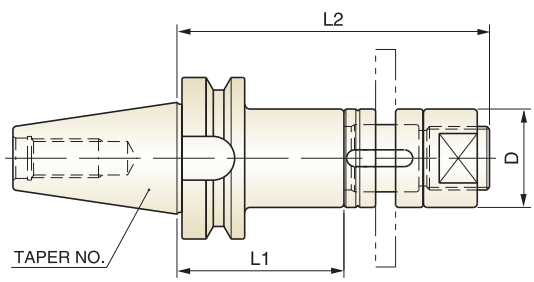



■ **STANDARD**

| EDP No. | Type | TAPER No. | Cutter Size I.D | L1 | D | L2 |
|---|---|---|---|---|---|---|
| **PK014** | CAT40-STUB1 -4.00 | 40 | 1.000 | 4.00 | 1.56 | 6.25 |
| **PK017** | CAT40-STUB1 1/4-4.00 | 40 | 1.250 | 4.00 | 1.88 | 6.50 |
| **PK021** | CAT40-STUB1 1/2-4.00 | 40 | 1.500 | 4.00 | 2.12 | 6.75 |
| **PL014** | CAT50-STUB1 -4.00 | 50 | 1.000 | 4.00 | 1.56 | 6.25 |
| **PL017** | CAT50-STUB1 1/4-4.00 | 50 | 1.250 | 4.00 | 1.88 | 6.50 |
| **PL021** | CAT50-STUB1 1/2-4.00 | 50 | 1.500 | 4.00 | 2.12 | 6.75 |

## STUB ARBOR

BT




■ **STANDARD**

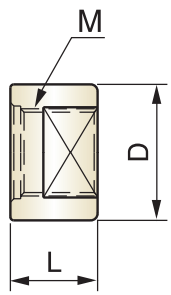
| EDP No. | Type | TAPER No. | Cutter Size I.D | L1 | D | L2 |
|---|---|---|---|---|---|---|
| **PH014** | BT40 - STUB 1 - 3.00 | 40 | 1.000 | 3.00 | 1.56 | 5.25 |
| **PH017** | BT40 - STUB 1 1/4 - 3.00 | 40 | 1.250 | 3.00 | 1.88 | 5.50 |
| **PH021** | BT40 - STUB 1 1/2 - 3.00 | 40 | 1.500 | 3.00 | 2.12 | 5.75 |
| **PI014** | BT50 - STUB 1 - 4.00 | 50 | 1.000 | 4.00 | 1.56 | 6.25 |
| **PI017** | BT50 - STUB 1 1/4 - 4.00 | 50 | 1.250 | 4.00 | 1.88 | 6.50 |
| **PI021** | BT50 - STUB 1 1/2 - 4.00 | 50 | 1.500 | 4.00 | 2.12 | 6.75 |

# ROTARY TOOL HOLDERS

## NUT

CAT / BT

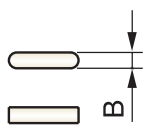
| EDP No. | Type(M) | L | D | Series |
|---|---|---|---|---|
| **ZZ041** | 1.56 | 1.00 | 1.56 | STUB 1 |
| **ZZ046** | 1.87 | 1.25 | 1.87 | STUB 1 1/4 |
| **ZZ052** | 2.12 | 1.50 | 2.12 | STUB 1 1/2 |




## KEY

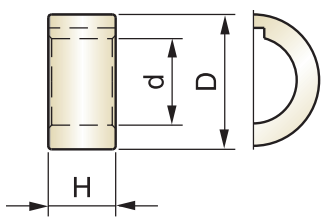
CAT / BT

| EDP No. | Serie | B |
|---|---|---|
| **ZZ042** | STUB 1 | 0.25 |
| **ZZ047** | STUB 1 1/4 | 0.312 |
| **ZZ054** | STUB 1 1/2 | 0.375 |




## SPACER

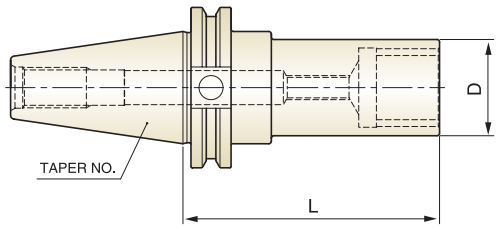
CAT / BT




| EDP No. | Type | H | D | d | Series |
|---|---|---|---|---|---|
| **ZZ048** | 1/4-SPACER | 0.25 | 1.87 | 1.25 | STUB1 1/4 |
| **ZZ049** | 3/8-SPACER | 0.375 | 1.87 | 1.25 | STUB1 1/4 |
| **ZZ050** | 3/4-SPACER | 0.75 | 1.87 | 1.25 | STUB1 1/4 |
| **ZZ043** | 1/4-SPACER | 0.25 | 1.56 | 1.00 | STUB1 |
| **ZZ044** | 3/8-SPACER | 0.375 | 1.56 | 1.00 | STUB1 |
| **ZZ045** | 3/4-SPACER | 0.75 | 1.56 | 1.00 | STUB1 |
| **ZZ037** | 1/4-SPACER | 0.25 | 2.12 | 1.50 | STUB1 1/2 |
| **ZZ038** | 3/8-SPACER | 0.375 | 2.12 | 1.50 | STUB1 1/2 |
| **ZZ039** | 3/4-SPACER | 0.75 | 2.12 | 1.50 | STUB1 1/2 |

## SLITTING SAW ARBOR

CAT

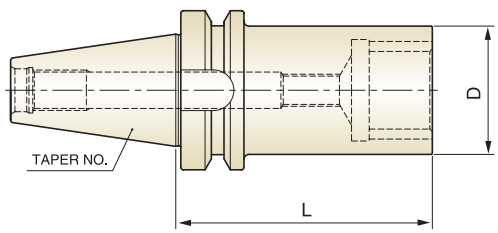



■ **STANDARD**

| EDP No. | Type | TAPER No. | Collet Series | L | D |
|---|---|---|---|---|---|
| **QK014** | CAT40-SSA1 -4.00 | 40 | 1.000 | 4.00 | 1.50 |
| **QK017** | CAT40-SSA1 1/4-4.00 | 40 | 1.250 | 4.00 | 2.00 |
| **QL014** | CAT50-SSA1 -4.00 | 50 | 1.000 | 4.00 | 1.50 |
| **QL017** | CAT50-SSA1 1/4-4.00 | 50 | 1.250 | 4.00 | 2.00 |

## SLITTING SAW ARBOR

BT



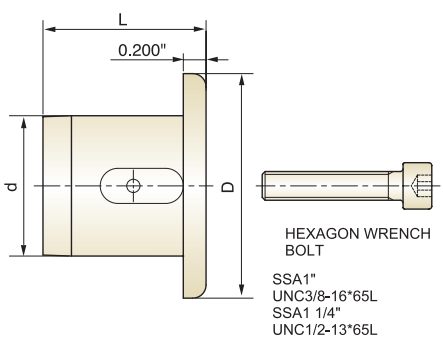

■ **STANDARD**

| EDP No. | Type | TAPER No. | Collet Series | L | D |
|---|---|---|---|---|---|
| **QH014** | BT40 - SSA 1 - 4.00 | 40 | 1.000 | 4.00 | 1.50 |
| **QH017** | BT40 - SSA 1 1/4 - 4.00 | 40 | 1.250 | 4.00 | 2.00 |

## CAP

CAT / BT

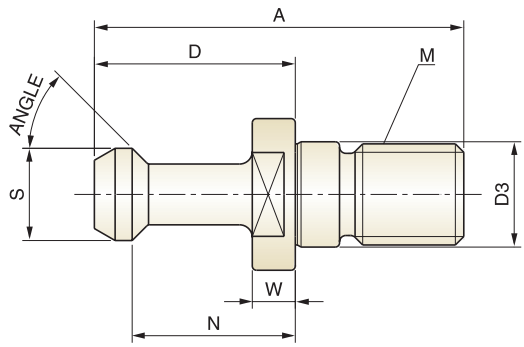
| EDP No. | Type | L | D | d |
|---|---|---|---|---|
| **ZZ051** | SSA 1 | 1.02 | 1.50 | 1.00 |
| **ZZ053** | SSA 1 1/4 | 1.30 | 2.00 | 1.25 |



# PULL STUD



PS




| EDP No. | Type C = Coolant | Angle | S | P | D3 | A | N | D | W | M |
|---|---|---|---|---|---|---|---|---|---|---|
| SK661 | CAT-40 ANSI C | 45° | 0.740 | 0.490 | 0.490 | 1.500 | 0.440 | 0.640 | 0.120 | 5/8-11 |
| SL661 | CAT-50 ANSI C | 45° | 1.140 | 0.820 | 0.820 | 2.300 | 0.700 | 1.000 | 0.200 | 1-8 |
| SK561 | CAT-40 ANSI | 45° | 0.740 | 0.490 | 0.490 | 1.500 | 0.440 | 0.640 | 0.120 | 5/8-11 |
| SL561 | CAT-50 ANSI | 45° | 1.140 | 0.820 | 0.820 | 2.300 | 0.700 | 1.000 | 0.200 | 1-8 |
| SK761 | CAT-40 TYPE I | 45° | 0.590 | 0.394 | 0.512 | 2.250 | 0.990 | 1.266 | 0.120 | 5/8-11 |
| SK762 | CAT-40 TYPE II | 60° | 0.590 | 0.394 | 0.512 | 2.250 | 0.990 | 1.266 | 0.120 | 5/8-11 |
| SK763 | CAT-40 TYPE III | 90° | 0.590 | 0.394 | 0.512 | 2.250 | 0.990 | 1.266 | 0.120 | 5/8-11 |
| SK861 | CAT-40 TYPE I C | 45° | 0.590 | 0.394 | 0.512 | 2.250 | 0.990 | 1.266 | 0.120 | 5/8-11 |
| SK862 | CAT-40 TYPE II C | 60° | 0.590 | 0.394 | 0.512 | 2.250 | 0.990 | 1.266 | 0.120 | 5/8-11 |
| SK863 | CAT-40 TYPE III C | 90° | 0.590 | 0.394 | 0.512 | 2.250 | 0.990 | 1.266 | 0.120 | 5/8-11 |
| SL761 | CAT-50 TYPE I | 45° | 0.906 | 0.669 | 0.827 | 3.346 | 1.377 | 1.772 | 0.390 | 1-8 |
| SL762 | CAT-50 TYPE II | 60° | 0.906 | 0.669 | 0.827 | 3.346 | 1.377 | 1.772 | 0.390 | 1-8 |
| SL763 | CAT-50 TYPE III | 90° | 0.906 | 0.669 | 0.827 | 3.346 | 1.377 | 1.772 | 0.390 | 1-8 |
| SL861 | CAT-50 TYPE I C | 45° | 0.906 | 0.669 | 0.827 | 3.346 | 1.377 | 1.772 | 0.390 | 1-8 |
| SL862 | CAT-50 TYPE II C | 60° | 0.906 | 0.669 | 0.827 | 3.346 | 1.377 | 1.772 | 0.390 | 1-8 |
| SL863 | CAT-50 TYPE III C | 90° | 0.906 | 0.669 | 0.827 | 3.346 | 1.377 | 1.772 | 0.390 | 1-8 |
| SH061 | BT-40 PS 1 | 45° | 0.590 | 0.394 | 0.669 | 2.360 | 1.102 | 1.378 | 0.230 | M16 |
| SI061 | BT-50 PS 5 | 45° | 0.905 | 0.669 | 0.984 | 3.346 | 1.377 | 1.772 | 0.390 | M24 |
| SH062 | BT-40 PS 2 | 60° | 0.590 | 0.394 | 0.669 | 2.360 | 1.102 | 1.378 | 0.230 | M16 |
| SI062 | BT-50 PS 6 | 60° | 0.905 | 0.669 | 0.984 | 3.346 | 1.377 | 1.772 | 0.390 | M24 |
| SH063 | BT-40 PS 8 | 90° | 0.590 | 0.394 | 0.669 | 2.360 | 1.102 | 1.378 | 0.230 | M16 |
| SI063 | BT-50 PS O | 90° | 0.905 | 0.669 | 0.984 | 3.346 | 1.377 | 1.772 | 0.390 | M24 |
| SK161 | CAT-40 TYPE I | 45° | 0.590 | 0.394 | 0.512 | 2.250 | 0.990 | 1.266 | 0.236 | 5/8-11 |
| SK162 | CAT-40 TYPE II | 60° | 0.590 | 0.394 | 0.512 | 2.250 | 0.990 | 1.266 | 0.236 | 5/8-11 |
| SK163 | CAT-40 TYPE III | 90° | 0.590 | 0.394 | 0.512 | 2.250 | 0.990 | 1.266 | 0.236 | 5/8-11 |
| SK261 | CAT-40 TYPE I C | 45° | 0.590 | 0.394 | 0.512 | 2.250 | 0.990 | 1.266 | 0.236 | 5/8-11 |
| SK262 | CAT-40 TYPE II C | 60° | 0.590 | 0.394 | 0.512 | 2.250 | 0.990 | 1.266 | 0.236 | 5/8-11 |
| SK263 | CAT-40 TYPE III C | 90° | 0.590 | 0.394 | 0.512 | 2.250 | 0.990 | 1.266 | 0.236 | 5/8-11 |

▶ IMPROPER SELECTION OF PULL STUDS CAN CAUSE SERIOUS DAMAGE AND POSSIBLE INJURY.
PLEASE MAKE SURE THE MACHINE ACCEPTS THE PULL STUD YOU SELECT.

# ROTARY TOOL HOLDERS



## TOOL CLAMP

TBT, TCT

| EDP No. | Type | Shank Flange Type |
|---|---|---|
| RK099 | TCT-40 | CAT-40 |
| RH099 | TBT-40 | BT-40 |
| RL099 | TCT-50 | CAT-50 |
| RM099 | TBT-50 | BT-50 |

▶ AVAILABLE IN ALL TAPERS.

### FEATURES :

- ▶ ACCESS BOTH ENDS OF YOUR TOOL HOLDERS SIMULTANEOUSLY
- ▶ MINIMIZES TOOL HOLDERS HANDLING
- ▶ SPEEDS UP YOUR OPERATIONS
- ▶ CONVENIENT

## END MILL HOLDER SCREWS

HEXAGON SOCKET SET SCREW (FLAT TYPE)

| EDP No. | Screw | End Mill DIA. |
|---|---|---|
| ZZ003 | UNF5/16-24 | 1/8 |
| ZZ003 | UNF5/16-24 | 3/16 |
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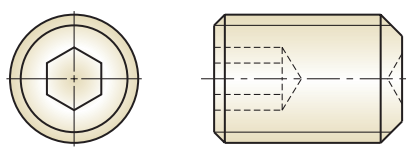
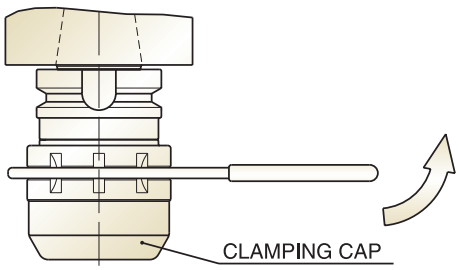


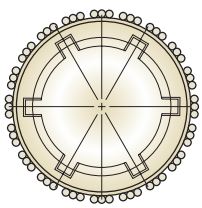
# MILLING CHUCK



## Grasping;




## Structure;



## SPECIAL FEATURES

**EASE OF USE**
BORE DIAMETER IS REDUCED BY .006 WITH ONLY TWO FULL TURNS OF THE CLAMPING CAP.

**HOLDING POWER**
THICKER BODY STRUCTURE OF CLAMPING CAP ASSURES STRONG HOLDING POWER MAXIMUM DURABILITY AND SMOOTH MOVEMENT OF NEEDLE BEARINGS 300 kgm HOLDING FORCE.

**ACCURACY**
SLOTS ON THE INSIDE OF BORE HELP PREVENT EXCESSIVE OIL AND GRIME FROM BUILDING UP BETWEEN SHANK OF END MILL AND INSIDE OF BORE WHICH INCREASES ACCURACY AND HOLDING POWER .0002 TIR AT 3940 FROM NOSE

**DURABILITY**
SPECIAL ENGINEERED STEELS AND ALLOYS ARE USED IN THE BEARING AND STOP SEAL TO INCREASE LIFE AND REDUCE MAINTENANCE.

## T.I.R TOLERANCE

**ER CHUCK**
Concentric to 0.0002″T.I.R
puts tool precisely on spindle centerline

**END MILL HOLDER**
Concentric to 0.0002″ T.I.R
puts tool precisely on spindle centerline

**MILLING CHUCK**
Concentric to 0.0002″T.I.R
puts tool precisely on spindle centerline

**SLITTING SAW ARBOR**
Face perpendicular to taper within 0.0002″T.I.R

**STUB ARBOR**
Face perpendicular to taper within 0.0002″T.I.R

**SHELL MILL ARBOR**
Face perpendicular to taper within 0.0001″T.I.R
Out diameter to taper within 0.0002″T.I.R

**MORSE TAPER ARBOR**
Concentric to 0.0003″T.I.R

**JACOBS TAPER ARBOR**
Concentric to 0.0002″T.I.R

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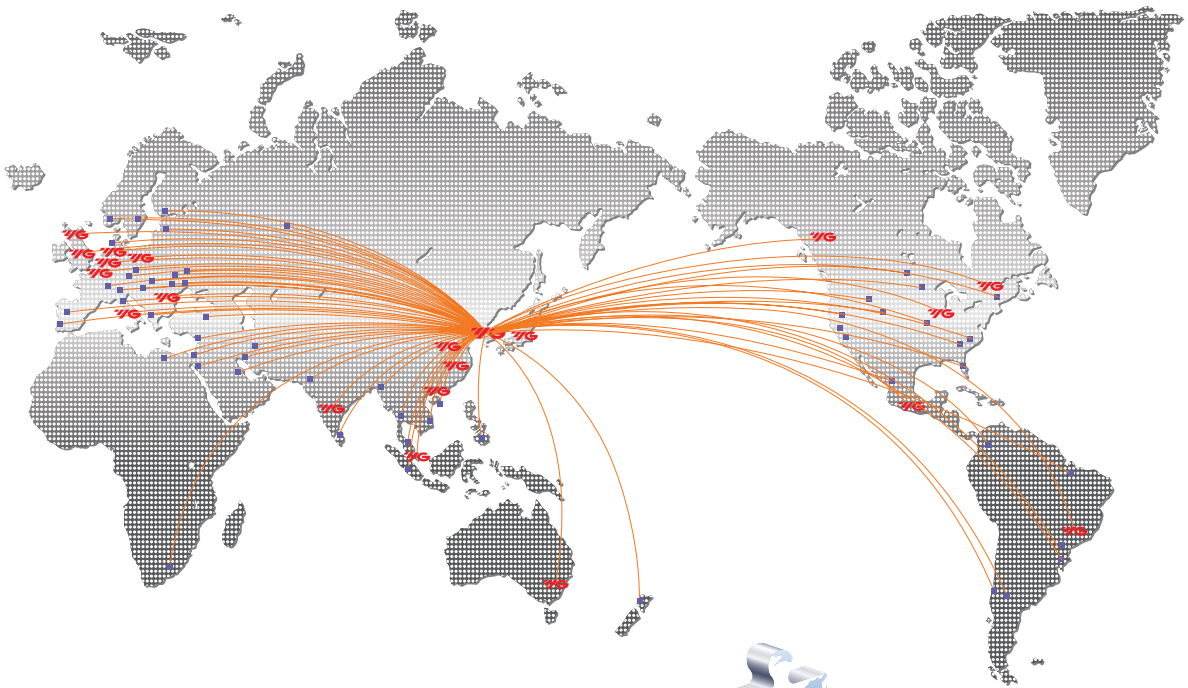
Based on Global Management,

# YG-1 Brand is Exporting to 75 countries.

In front of the technology and goods of YG-1, Borders is collapsed.
We have already established regional manufacturing plants in the US,the UK, France, China and India, and also have been exporting our goods to 75 countries in the name of YG-1 by means of building up local subsidiaries and worldwide sales network.
Automobiles of Germany, Aircrafts of the US and Electronics of Japan need cutting tools of YG-1 to come into existence.
From now on,when you look at a global map, please remember the name, YG-1.



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Tool specifications are subject to change without notice.

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