



YU09

# YG-1 Cutting Tools

Catalog 2009/2010



**YG-1 CO., LTD.**

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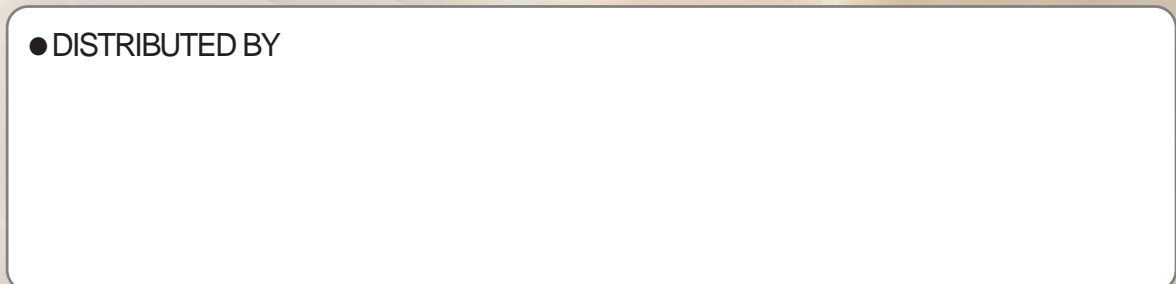
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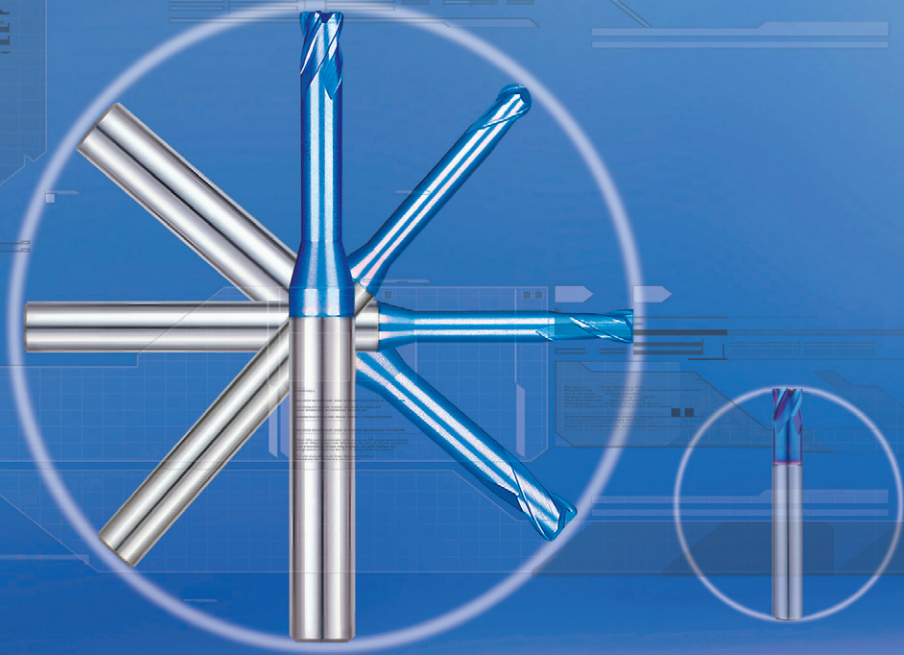
USA OFFICE [Http://www.yg1usa.com](http://www.yg1usa.com)

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PHONE : 800-765-8665, FAX : 866-941-8665  
Technical Assistance : 888-868-5988

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The founding will of YG-1 was challenging spirit; we knew better than anyone that, to become a winner in the age of unlimited competition, challenging spirit and the highest quality were only solutions.

Today, YG-1 is realizing the global management without boundaries. Not only possessing the largest share in domestic market, as one of the top 5 makers of the world, we are exporting to some 70 nations in the name of YG-1, and building an organic global network of manufacture and operation, to provide products of superior quality to customers all over the world.

The spirit of YG-1 toward development of new products is being passed on to developments of high value-added products. Therefore, the international market of YG-1 will further extend, and we are giving relevant efforts as the market leader of cutting tools.

We will, not only manufacture products that lead the era, with our best talents and technology, but become a corporation thinking what is best for the customers.

Thank you for your support to YG-1, and we promise to you that we will keep advancing, with constant efforts.

CEO/ **Ho-keun Song**

## MEMO





There are no limits or boundaries,  
in quality control and technology development



Highest Quality cutting tools and lowest prices are achieved with modern equipment!

From raw materials to finished product, "Leading Edge" cutting tools are being produced 365 days a year on state of the art automated production and inspection equipment.

Our goal is zero defects.





# 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.

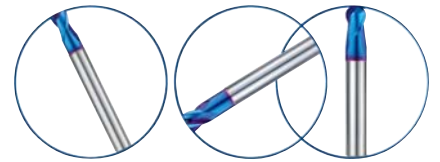


Even today, modern products are flowing out from the production line of YG-1, which runs 365 days a year. Know-how of cutting tools are not established in a day; the history of YG-1 was the history of new technology development. As a result, YG-1 today proceeds all one-stop process, from input of raw materials to manufacture of finished product, with latest high-tech production facility and equipments. Therefore the cutting tools of highest quality are manufactured at lowest prices.

Also, to win the battle of technology competition, YG-1 pursues the rigid quality control; through 20 inquisitive inspections, YG-1 is attempting to the 0% inferiority rate.



# GLOBAL NETWORK



WORLDWIDE YG-1  
Being the best through innovation

We are exporting to 75 nations all over the world,  
with the name of **YG-1**



- ALBANIA
- ARGENTINA
- AUSTRALIA
- AUSTRIA
- BANGLADESH
- BELARUS
- BELGIUM
- BOLIVIA
- BRAZIL
- BULGARIA
- CANADA
- CHILE
- COLOMBIA
- CZECH
- DENMARK
- EGYPT
- ESTONIA
- FINLAND
- FRANCE
- GERMANY
- GREECE
- HONG KONG
- HUNGARY
- INDIA
- INDONESIA
- IRAN
- IRAQ
- ISRAEL
- ITALY
- JAMAICA
- JAPAN
- JORDAN
- KAZAKHSTAN
- KUWAIT
- LATVIA
- LEBANON
- LITHUANIA
- LUXEMBURG
- MALAYSIA
- MEXICO
- MYANMAR
- NEPAL
- NETHERLANDS
- NEW ZEALAND
- NORWAY
- PAKISTAN
- PERU
- PHILIPPINES
- POLAND
- PORTUGAL
- RUMANIA
- RUSSIA
- SOUTH AFRICA
- SAUDI ARABIA
- SINGAPORE
- SLOVAKIA
- SLOVENIA
- SPAIN
- SRI LANKA
- SWEDEN
- SWISS
- TAIWAN
- TAJIKISTAN
- THAILAND
- TURKEY
- U.A.E
- U.K
- U.S.A
- UKRAINE
- UZBEKISTAN
- VIETNAM

## Global Company

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FAX : +91 22 2580 3576
- **Regal Cutting Tools Inc.(U.S.A)**  
PHONE : +1 800 435 2948  
FAX : +1 800 992 1674
- **Premier Cutting Tools Inc.(U.S.A)**  
PHONE : +1 847 793 0053  
FAX : +1 847 793 0106
- **YG-1 Europe(France)**  
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FAX : +44 6173 9667 29
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PHONE : +49 711 365 659 37  
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FAX : +81 6 6305 9898
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PHONE : +86 21 6383 1661  
FAX : +86 21 6383 1771



# NEW PRODUCTS

X5070



## Development of New Products always starts from scratch

### X5070

X5070 E/M is made from new top carbide grade that is made of superfine (Nano grain size) tungsten carbide and significantly surpasses our previous grades in hardness without losing in toughness.

Also, newly developed X5070 coating has improved hardness, oxidation resistance and thermal stability. They make the ability of performance stand out, especially high speed cutting and dry cutting.

X5070 E/M is applicable to high hardened materials from 50HRc to 70HRc, such as alloy steels, mold steels and titanium alloys.

TANK-POWER



### TANK-POWER

The TANK POWER series of end mills are made of "next generation" powdered metal which is tougher than carbide and more wear and heat resistant than cobalt. This combination allows higher edge strength and higher feed rates.

Gold-P



### Gold-P

The Gold-P drill has a full thickness tin coating on its tip. This allows higher production rates and lower costs. The newly designed point, helps reduce thrust and is self centering.

SM-Point Throw-Away Spade Drill Inserts



### SM-Point Spade Drill Inserts

This product shows hybrid feature combined an existed notch point of spade drill with standard point. As adding additional thinning shape over existed spade drill (making small thinning for a part of point), it could be able to realize an optimized drilling by ,not only creating a proper speed and a cutting volume according to a distance from drill point to the line drawn by thinning, but also completing a matched thinning shape with a difference which comes from a various cutting object.
































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# GUIDE TO ICONS

<b>TOOL MATERIALS</b>		Micro Grain Carbide is used in the tool material.
		YG-1 Premium Material, Powdered HSS
		Cobalt 8% HSS is used in the tool material.
		Cobalt 5% HSS is used in the tool material.
		HSS is used in the tool material.
<b>HELIX ANGLE</b>		Helix angle for Ball EndMill.
		Helix angle for Square EndMill.
<b>THE TYPES OF SHANK</b>		Plain shank
		Flat shank.
<b>THE TYPES OF PERIPHERY</b>		Coarse pitch type.
		Fine pitch type.
		Roughing & Finishing type
<b>THE TYPES OF END TEETH</b>		Corner Radius
		Ball Nose Radius
<b>CUTTING CONDITIONS</b>		Indicates the pages of cutting conditions
<b>NUMBER OF FLUTES</b>	       	The number of flutes
	     	

**If it's not perfect,  
it's not YG-1**

## END MILLS

Cutting tools for high precision making for mold & dies, mold for automobile, electronic appliances manufacturing aircraft fuselage, medical, optical, and aerospace industries. Our representative production series are X5070 carbide endmills, X-POWER carbide endmills, TANK-POWER powdered metal endmills, V7 Mill, K-2 carbide endmills, and etc...

## DRILLS

Cutting tools for making holes in manufactured articles includes metal molds, components for machine tools, automobiles, and electronic appliances. YG-1 produces Carbide Dream Drills, HPD Drills, Gold-P Drills, and Spade Drills. Especially, spade drills are used to produce holes ranging in size from about 9.5mm to 114.3mm diameter, and very deep holes can also be drilled.

## TAPS

Cutting tools for precision processing of threading mainly for automobile parts. The market is being gradually expanded through continuous development of new products including fluteless taps(Forming tap) and Multi-1 taps.

## Special products

Cutting tools for various metalworking. YG-1 offers special products as like carbide rotary burrs, mill cutters, carbide drill mills, shell end mills, counter bores and tool bits.

You can find our unique products that meet your satisfaction.

[www.yg1.co.kr](http://www.yg1.co.kr)



# X5070

## ULTRA MICRO GRAIN CARBIDE END MILLS

- *High Speed Cutting in Dry Conditions*
- *Hardened Mold, Die, Alloy Steels  
and Most Alloys up to HRc70*












# X5070 CARBIDE END MILLS SELECTION GUIDE

## INCH

EDP No.	APPEARANCE	SPECIFICATION	STOCK	PAGE
G8A43		2 FLUTE, STUB CUT LENGTH, BALL NOSE with EXTENDED NECK	★	9

## METRIC

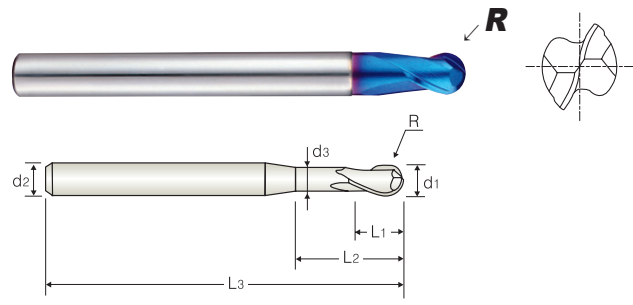
EDP No.	APPEARANCE	SPECIFICATION	STOCK	PAGE
G8A36		2 FLUTE, STUB CUT LENGTH with EXTENDED NECK	★	10
G8A37		4 FLUTE, STUB CUT LENGTH with EXTENDED NECK	★	11
G8A38		2 FLUTE, STUB CUT LENGTH, BALL NOSE with EXTENDED NECK	★	12
G8A39		6 FLUTE, 45° HELIX with CORNER RADIUS	★	13
SPEED & FEED DATA			14 ~ 16	

★:U.S.A Stock



# X5070

## 2 FLUTE, STUB CUT LENGTH, BALL NOSE with EXTENDED NECK



MG 2 30° ±.0002 ±.0004 PLAIN  
 R1/64~R1/8 R5/32~R1/4

- ▶ Designed to machine high hardened materials.
- ▶ Suitable for dry cutting, high speed cutting due to newly developed raw-material and new coating.
- ▶ Excellent workpiece finishes.
- ▶ Designed for high precision milling operation.
- ▶ Higher wear-resistance.

◇ U.S.A Stock

X5070

### G8A43 Series

Unit : inch

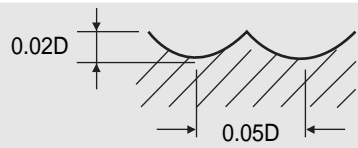
EDP No.	R	MILL DIAMETER d1	SHANK DIAMETER d2	LENGTH OF CUT L1	LENGTH BELOW SHANK L2	OVERALL LENGTH L3	NECK DIAMETER d3
G8A43002	R1/64	1/32	1/4	1/32	1/16	2	.029
G8A43004	R1/32	1/16	1/4	1/16	1/8	2	.059
G8A43006	R3/64	3/32	1/4	1/32	3/16	2	.090
G8A43008	R1/16	1/8	1/4	1/8	1/4	2-1/2	.121
G8A43012	R3/32	3/16	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

TOLERANCE OF MILL DIA. (inch)			TOLERANCE OF SHANK DIA.
DIAMETER	TOLERANCE	RADIUS TOLERANCE	
up to 1/4	0 ~ -.0005	±.0002	h6
over 1/4	0 ~ -.0006	±.0004	

## CUTTING CONDITION

### G8A43 Series

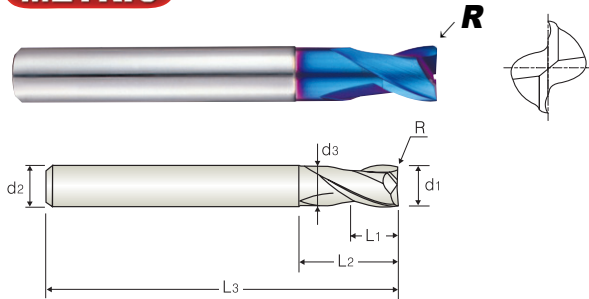
MATERIAL	HARDENED STEELS HEAT RESISTANT STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS	
	HARDNESS		HARDNESS		HARDNESS		HARDNESS		HARDNESS		HARDNESS	
	HRc 30 ~ HRc 40		HRc 40 ~ HRc 50		HRc 50 ~ HRc 55		HRc 55 ~ HRc 60		HRc 60 ~ HRc 65		HRc 65 ~ HRc 70	
DIAMETER(mm)	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 = REVOLUTION PER MIN.  
FEED = inch/min.



**X5070****2 FLUTE, STUB CUT LENGTH  
with EXTENDED NECK****METRIC****MG****2****30°****R**  
 $\pm 0.01$ **R**  
 $\pm 0.015$ **PLAIN****DATA**

P.14,15

 $\emptyset 0.3 - \emptyset 0.6$   $\emptyset 8 - \emptyset 20$ 

- ▶ Designed to machine high hardened materials.
- ▶ Suitable for dry cutting, high speed cutting due to newly developed raw-material and new coating.
- ▶ Excellent workpiece finishes.
- ▶ Deep slotting is possible by reduced neck.
- ▶ Corner radius against chipping in high speed machining.
- ▶ Higher wear-resistance.

◇ *U.S.A Stock***G8A36 Series**

Unit : mm

EDP No.	CORNER RADIUS R	MILL DIAMETER d <sub>1</sub>	SHANK DIAMETER d <sub>2</sub>	LENGTH OF CUT L <sub>1</sub>	LENGTH BELOW SHANK L <sub>2</sub>	OVERALL LENGTH L <sub>3</sub>	NECK DIAMETER d <sub>3</sub>
G8A36003	-	0.3	3	0.45	-	40	-
G8A36004	-	0.4	3	0.6	-	40	-
G8A36005	0.05	0.5	3	0.7	-	40	-
G8A36006	0.05	0.6	3	0.9	-	40	-
G8A36008	0.05	0.8	3	1.2	-	40	-
G8A36010	0.1	1	3	1.5	-	40	-
G8A36901	0.1	1	4	1.5	-	40	-
G8A36015	0.1	1.5	3	2.2	-	40	-
G8A36020	0.1	2	3	3	6	40	1.9
G8A36902	0.1	2	4	3	6	40	1.9
G8A36025	0.1	2.5	3	4	6	40	2.4
G8A36030	0.1	3	6	4	7	45	2.9
G8A36035	0.1	3.5	6	5	9	45	3.3
G8A36040	0.1	4	6	5	9	45	3.8
G8A36045	0.1	4.5	6	6	10	45	4.3
G8A36050	0.2	5	6	6	11	50	4.8
G8A36060	0.2	6	6	7	14	50	5.8
G8A36080	0.2	8	8	9	18	60	7.8
G8A36100	0.2	10	10	12	25	75	9.7
G8A36120	0.3	12	12	15	30	75	11.7
G8A36160	0.3	16	16	18	38	90	15.7
G8A36200	0.3	20	20	24	45	100	19.7

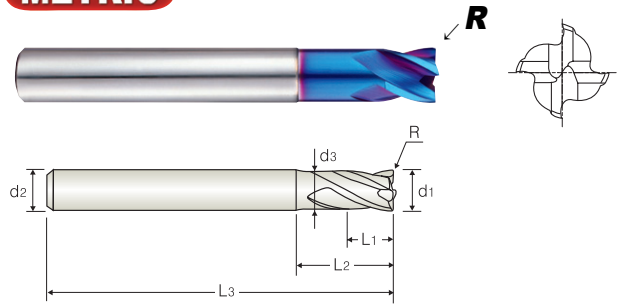
TOLERANCE OF MILL DIA.(mm)		TOLERANCE OF SHANK DIA.
DIAMETER	TOLERANCE	
up to 6	0 ~ -0.012	h6
over 6 ~	0 ~ -0.015	



# X5070

# 4 FLUTE, STUB CUT LENGTH with EXTENDED NECK

**METRIC**



MG
4
30°
R ±0.01
R ±0.015
PLAIN
DATA
P.15

$\varnothing 1 \sim \varnothing 6$      $\varnothing 8 \sim \varnothing 20$

- ▶ Designed to machine high hardened materials.
- ▶ Suitable for dry cutting, high speed cutting due to newly developed raw-material and new coating. Excellent workpiece finishes.
- ▶ Deep slotting is possible by reduced neck.
- ▶ Corner radius against chipping in high speed machining.
- ▶ Higher wear-resistance.

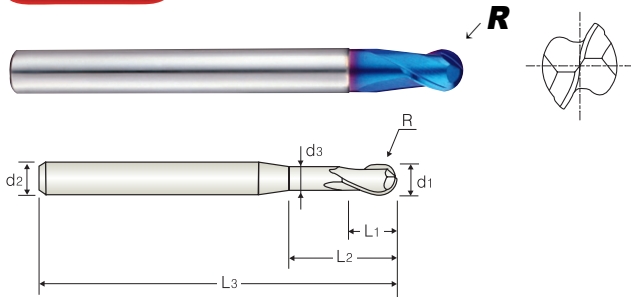
◇ U.S.A Stock

**G8A37 Series**

Unit : mm

EDP No.	CORNER RADIUS R	MILL DIAMETER d1	SHANK DIAMETER d2	LENGTH OF CUT L1	LENGTH BELOW SHANK L2	OVERALL LENGTH L3	NECK DIAMETER d3
G8A37010	0.1	1	3	1.5	-	40	-
G8A37015	0.1	1.5	3	2.2	-	40	-
G8A37020	0.1	2	3	3	6	40	1.9
G8A37025	0.1	2.5	3	4	6	40	2.4
G8A37030	0.1	3	6	4	7	45	2.9
G8A37035	0.1	3.5	6	5	9	45	3.3
G8A37040	0.1	4	6	5	9	45	3.8
G8A37045	0.1	4.5	6	6	10	45	4.3
G8A37050	0.2	5	6	6	11	50	4.8
G8A37060	0.2	6	6	7	14	50	5.8
G8A37080	0.2	8	8	9	18	60	7.8
G8A37100	0.2	10	10	12	25	75	9.7
G8A37120	0.3	12	12	15	30	75	11.7
G8A37160	0.3	16	16	18	38	90	15.7
G8A37200	0.3	20	20	24	45	100	19.7

TOLERANCE OF MILL DIA. (mm)		TOLERANCE OF SHANK DIA.
DIAMETER	TOLERANCE	
up to 6	0 ~ -0.012	h6
over 6 ~	0 ~ -0.015	

**X5070****2 FLUTE, STUB CUT LENGTH, BALL NOSE  
with EXTENDED NECK****METRIC****MG****2****30°****R**  
±0.005**R**  
±0.01**PLAIN**

P.16

R0.5~R3 R4~R12.5

- ▶ Designed to machine high hardened materials.
- ▶ Suitable for dry cutting, high speed cutting due to newly developed raw-material and new coating.
- ▶ Excellent workpiece finishes.
- ▶ Designed for high precision milling operation.
- ▶ Higher wear-resistance.

◇ *U.S.A Stock***G8A38 Series**

Unit : mm

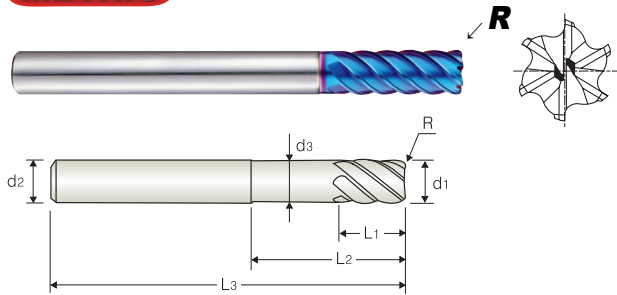
EDP No.	R	MILL DIAMETER d <sub>1</sub>	SHANK DIAMETER d <sub>2</sub>	LENGTH OF CUT L <sub>1</sub>	LENGTH BELOW SHANK L <sub>2</sub>	OVERALL LENGTH L <sub>3</sub>	NECK DIAMETER d <sub>3</sub>
G8A38010	0.5	1	4	1	2.2	50	0.95
G8A38012	0.6	1.2	4	1.2	2.6	50	1.1
G8A38015	0.75	1.5	4	1.5	3.0	50	1.4
G8A38020	1.0	2	6	2	4.0	50	1.9
G8A38030	1.5	3	6	3	6.0	60	2.9
G8A38040	2.0	4	6	4	8.0	70	3.9
G8A38050	2.5	5	6	5	10.0	80	4.9
G8A38060	3.0	6	6	6	12.0	90	5.9
G8A38070	3.5	7	8	7	14.0	90	6.9
G8A38080	4.0	8	8	8	16.0	100	7.9
G8A38090	4.5	9	10	9	18.0	100	8.9
G8A38100	5.0	10	10	10	20.0	100	9.9
G8A38120	6.0	12	12	12	24.0	110	11.9
G8A38140	7.0	14	14	14	28.0	110	13.8
G8A38160	8.0	16	16	16	32.0	140	15.8
G8A38180	9.0	18	18	18	36.0	140	17.8
G8A38200	10.0	20	20	20	40.0	160	19.8
G8A38250	12.5	25	25	25	50.0	180	24.8

TOLERANCE OF MILL DIA. (mm)			TOLERANCE OF SHANK DIA.
DIAMETER	TOLERANCE	RADIUS TOLERANCE	
up to 6	0 ~ -0.012	±0.005	h6
over 6 ~	0 ~ -0.015	±0.01	



# X5070 6 FLUTE, 45° HELIX with CORNER RADIUS

**METRIC**



MG
6
45°
R ±0.01
R ±0.015
PLAIN
DATA
P.16

$\emptyset 6$ 
 $\emptyset 8 - \emptyset 20$

- ▶ Designed to machine high hardened materials.
- ▶ Suitable for dry cutting, high speed cutting due to newly developed raw-material and new coating.
- ▶ Excellent workpiece finishes.
- ▶ Deep slotting is possible by reduced neck.
- ▶ Corner radius against chipping in high speed machining.
- ▶ Higher wear-resistance.

◇ U.S.A Stock

X5070

**G8A39 Series**

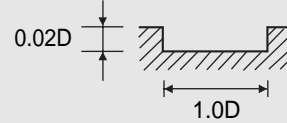
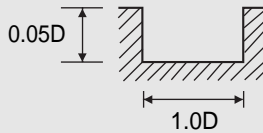
Unit : mm

EDP No.	CORNER RADIUS R	MILL DIAMETER d1	SHANK DIAMETER d2	LENGTH OF CUT L1	LENGTH BELOW SHANK L2	OVERALL LENGTH L3	NECK DIAMETER d3
G8A39060	0.5	6	6	6	14	50	5.7
G8A39080	0.5	8	8	8	24	60	7.65
G8A39100	1.0	10	10	10	30	70	9.65
G8A39120	1.0	12	12	12	30	75	11.6
G8A39901	0.5	6	6	13	-	70	-
G8A39910	0.5	6	6	26	-	70	-
G8A39902	0.5	8	8	19	-	90	-
G8A39911	0.5	8	8	36	-	90	-
G8A39903	0.5	10	10	22	-	100	-
G8A39904	1.0	10	10	22	-	100	-
G8A39912	1.0	10	10	46	-	100	-
G8A39905	0.5	12	12	26	-	110	-
G8A39906	1.0	12	12	26	-	110	-
G8A39913	1.0	12	12	56	-	110	-
G8A39160	1.0	16	16	32	-	130	-
G8A39907	1.5	16	16	32	-	130	-
G8A39914	1.5	16	16	66	-	130	-
G8A39200	1.0	20	20	38	-	140	-
G8A39908	1.5	20	20	38	-	140	-
G8A39909	2.0	20	20	38	-	140	-
G8A39915	2.0	20	20	76	-	140	-

TOLERANCE OF MILL DIA. (mm)	TOLERANCE OF SHANK DIA.
0 - 0.020	h6

### G8A36 Series

MATERIAL	HARDENED STEELS HEAT RESISTANT STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED 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(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
0.3	50000	7.48	45000	5.51	40000	4.53	33000	2.76	25000	1.57
0.4	50000	9.25	45000	7.09	40000	5.51	33000	3.54	25000	2.17
0.5	50000	14.57	45000	11.02	40000	8.66	33000	5.51	25000	3.35
0.6	50000	18.50	45000	14.17	40000	11.22	30000	6.30	25000	4.13
0.8	50000	23.62	40000	17.32	30000	11.61	25000	7.28	19000	4.33
1.0	48000	29.53	38000	22.44	25500	14.17	20500	8.46	16000	5.31
1.2	42000	31.10	34000	25.20	22500	14.96	20000	9.84	14500	5.71
1.5	37000	31.50	30500	26.38	21000	16.14	17000	9.84	13000	6.10
2.0	33300	33.46	26000	26.77	17500	16.54	14500	10.24	11000	6.30

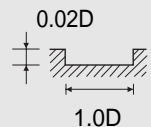
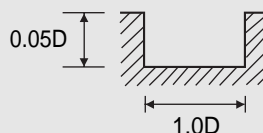


※ The FEED, in long & extra long types, should be reduced by about 50%

RPM = REVOLUTION PER MIN.  
FEED = inch/ min.

### G8A36 Series

MATERIAL	HARDENED STEELS HEAT RESISTANT STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED 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(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1	48000	29.53	38000	22.44	25500	14.17	20500	8.46	16000	5.31	12500	3.46
2	33300	33.46	26000	26.77	17500	16.54	14500	10.24	11000	6.30	9500	4.53
3	21800	33.46	17300	26.77	11500	16.54	9500	10.24	7500	6.30	6400	4.53
4	16700	34.65	13200	27.56	8800	17.32	7200	10.61	5600	6.69	4750	4.65
5	15700	39.37	12500	31.69	8300	19.69	6400	11.22	5100	7.09	4450	5.20
6	13100	37.40	10350	30.31	6900	18.90	5300	11.02	4200	7.09	3700	5.10
8	9880	36.61	7800	28.35	5200	17.52	4000	10.04	3200	6.50	2800	4.72
10	7800	33.46	6150	26.77	4100	16.34	3200	9.45	2550	6.10	2200	4.41
12	6650	33.46	5250	26.77	3500	16.34	2650	9.45	2100	6.10	1860	4.41
16	4900	28.74	3900	22.83	2600	14.37	2000	8.27	1600	5.31	1400	3.86
20	3900	25.98	3100	20.67	2050	13.19	1600	7.68	1300	4.92	1100	3.44



※ The FEED, in long & extra long types, should be reduced by about 50%

RPM = REVOLUTION PER MIN.  
FEED = inch/ min.



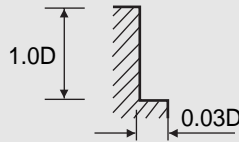


## 2 FLUTE, STUB CUT LENGTH, SIDE CUTTING

X5070

### G8A36 Series

MATERIAL	HARDENED STEELS HEAT RESISTANT STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS	
	HARDNESS		HRC 40 ~ HRC 50		HRC 50 ~ HRC 55		HRC 55 ~ HRC 60		HRC 60 ~ HRC 65		HRC 65 ~ HRC 70	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1	48000	41.34	38000	32.28	25500	20.08	20500	12.20	16000	7.48	12500	4.92
2	33300	47.24	26000	38.19	17500	23.62	14500	14.57	11000	9.06	9500	6.50
3	21800	47.24	17300	38.19	11500	23.62	9500	14.57	7500	9.06	6400	6.50
4	16700	49.21	13200	39.37	8800	24.41	7200	15.16	5600	9.45	4750	6.69
5	15700	57.09	12500	45.28	8300	27.95	6400	16.14	5100	10.24	4450	7.48
6	13100	53.15	10350	43.31	6900	27.17	5300	15.75	4200	10.04	3700	7.28
8	9880	51.97	7800	40.55	5200	25.00	4000	14.37	3200	9.25	2800	6.69
10	7800	47.24	6150	38.19	4100	23.23	3200	13.39	2550	8.66	2200	6.30
12	6650	47.24	5250	38.19	3500	23.23	2650	13.39	2100	8.66	1860	6.30
16	4900	41.34	3900	33.07	2600	20.47	2000	11.81	1600	7.48	1400	5.51
20	3900	37.40	3100	29.53	2050	18.70	1600	10.83	1300	6.89	1100	4.92



※ The FEED, in long & extra long types, should be reduced by about 50%

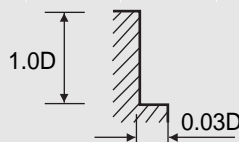
RPM = REVOLUTION PER MIN.  
FEED = inch/min.



## 4 FLUTE, STUB CUT LENGTH, SIDE CUTTING

### G8A37 Series

MATERIAL	HARDENED STEELS HEAT RESISTANT STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS	
	HARDNESS		HRC 40 ~ HRC 50		HRC 50 ~ HRC 55		HRC 55 ~ HRC 60		HRC 60 ~ HRC 65		HRC 65 ~ HRC 70	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1	48000	58.27	38000	41.34	25500	27.95	20500	16.93	16000	10.63	12500	6.89
2	33300	68.90	26000	49.21	17500	33.07	14500	20.47	11000	12.60	9500	9.06
3	21800	68.90	17300	49.21	11500	33.07	9500	20.47	7500	12.60	6400	9.06
4	16700	70.87	13200	51.18	8800	34.65	7200	21.26	5600	13.19	4750	9.45
5	15700	78.74	12500	59.06	8300	39.37	6400	22.83	5100	14.57	4450	10.63
6	13100	76.77	10350	55.12	6900	37.40	5300	22.05	4200	13.78	3700	10.24
8	9880	74.02	7800	53.15	5200	35.43	4000	22.47	3200	12.99	2800	9.45
10	7800	68.90	6150	49.61	4100	33.07	3200	18.90	2550	12.20	2200	8.66
12	6650	68.90	5250	49.61	3500	33.07	2650	18.90	2100	11.81	1860	8.66
16	4900	59.06	3900	43.31	2600	28.74	2000	16.54	1600	10.63	1400	7.87
20	3900	51.18	3100	38.19	2050	25.59	1600	14.96	1300	9.84	1100	7.09

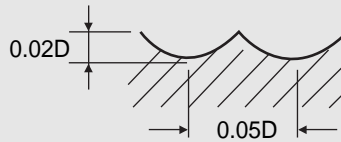


※ The FEED, in long & extra long types, should be reduced by about 50%

RPM = REVOLUTION PER MIN.  
FEED = inch/min.

**X5070****2 FLUTE, STUB CUT, BALL NOSE****G8A38 Series**

MATERIAL	HARDENED STEELS HEAT RESISTANT STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS	
	HRc 30 ~ HRc 40		HRc 40 ~ HRc 50		HRc 50 ~ HRc 55		HRc 55 ~ HRc 60		HRc 60 ~ HRc 65		HRc 65 ~ HRc 70	
HARDNESS												
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1	50000	188.98	50000	165.35	45000	149.61	40000	118.11	35000	102.36	35000	90.55
2	49700	224.41	47800	188.98	40000	157.48	35000	124.02	32000	110.24	28500	90.55
3	33100	236.22	31800	208.66	26500	157.48	23500	124.02	21000	110.24	19000	90.55
4	24900	236.22	23900	208.66	20000	157.48	17500	124.02	16000	110.24	14500	90.55
6	18600	228.35	17800	192.91	15000	147.64	13500	120.08	11500	100.39	10500	82.68
8	13900	190.94	13400	161.42	11000	122.05	10000	98.43	8800	84.65	8000	68.90
10	11100	165.35	10700	137.80	9000	106.30	8000	84.65	7000	72.83	6500	61.02
12	9300	145.67	8900	122.05	7500	94.49	6600	74.80	5800	64.96	5300	54.33
16	6950	116.14	6680	98.43	5600	74.80	5000	61.02	4400	49.21	4000	41.34
20	5570	104.33	5350	86.61	4500	66.93	4000	53.15	3500	39.37	3200	33.46
25	4450	92.52	4300	76.77	3600	59.06	3200	47.24	2800	31.50	2550	25.98

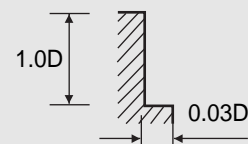
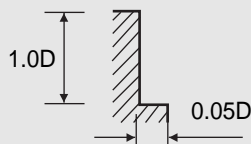


※ The FEED, in long & extra long types, should be reduced by about 50%

RPM = REVOLUTION PER MIN.  
FEED = inch/min.

**X5070****6 FLUTE, 45° HELIX with CORNER RADIUS****G8A39 Series**

MATERIAL	HARDENED STEELS HEAT RESISTANT STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS	
	HRc 30 ~ HRc 40		HRc 40 ~ HRc 50		HRc 50 ~ HRc 55		HRc 55 ~ HRc 60		HRc 60 ~ HRc 65		HRc 65 ~ HRc 70	
HARDNESS												
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
6	24800	210.63	23500	192.91	16000	192.91	13500	129.92	10500	82.68	8000	57.09
8	20000	216.54	19000	196.85	12000	181.10	10000	122.05	8000	78.74	6000	55.12
10	16000	192.91	15500	177.17	9500	161.42	8000	114.17	6400	70.87	4800	51.18
12	13000	177.17	12500	161.42	8000	149.61	6600	98.43	5300	62.99	4000	45.28
16	10000	157.48	9700	145.67	6000	133.86	5000	90.55	4000	49.21	3000	34.25
20	8000	131.89	7800	133.86	4800	125.98	4000	82.68	3200	40.16	2400	27.17



※ The FEED, in long & extra long types, should be reduced by about 50%

RPM = REVOLUTION PER MIN.  
FEED = inch/min.



# X-POWER<sup>®</sup>

## ULTRA MICRO GRAIN CARBIDE END MILLS
















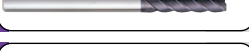

- *High Speed Cutting in Dry Conditions*
- *Hardened Mold, Die, Alloy Steels  
and Most Alloys up to HRc70*





# X-POWER CARBIDE END MILLS SELECTION GUIDE

## INCH

EDP No.	APPEARANCE	SPECIFICATION	STOCK	PAGE
EM154 EM206		2 FLUTE, REGULAR & LONG LENGTH	★	23
EM959		2 FLUTE, MINIATURE	★	23
EM153 EM207		4 FLUTE, REGULAR & LONG LENGTH	★	24
EM636		2 FLUTE, STUB LENGTH, CORNER RADIUS	★	25
EM639		4 FLUTE, STUB LENGTH, CORNER RADIUS	★	25
EM637		2 FLUTE, REGULAR LENGTH, CORNER RADIUS	★	26
EM649		4 FLUTE, REGULAR LENGTH, CORNER RADIUS	★	26
EM211		2 FLUTE, LONG LENGTH, CORNER RADIUS	★	27
EM212		4 FLUTE, LONG LENGTH, CORNER RADIUS	★	27
EM102		4 FLUTE, 45°HELIX, LONG REACH	★	28
EM103		4 FLUTE, 45°HELIX, LONG REACH, CORNER RADIUS	★	28
EM965		4 FLUTE, 55°HELIX, STUB LENGTH, CORNER RADIUS	★	29
EM208		6&8 FLUTE, 45°HELIX, LONG LENGTH	★	30
EM208 EM999		6&8 FLUTE, 45°HELIX, EXTRA LONG LENGTH	★	30
EM668		6&8 FLUTE, 45°HELIX, LONG LENGTH, CORNER RADIUS	★	30
EM209		2 FLUTE, LONG LENGTH, BALL NOSE	★	31
EM210		4 FLUTE, LONG LENGTH, BALL NOSE	★	31
















★:U.S.A Stock ○:Call for Availability





# X-POWER CARBIDE END MILLS SELECTION GUIDE

## INCH

EDP No.	APPEARANCE	SPECIFICATION	STOCK	PAGE
EM961		2 FLUTE, MEDIUM LENGTH, BALL NOSE	★	32
EM962		2 FLUTE, LONG REACH, BALL NOSE	★	32
EM960		2 FLUTE, MINIATURE, BALL NOSE	★	33
EM109		2 FLUTE, 15° HELIX, STUB CUT LENGTH, BALL NOSE for OVER HRc55	★	33
EM963		2 FLUTE, BALL NOSE with TAPER NECK	★	34
EM979		2 FLUTE, BALL NOSE with PENCIL NECK	★	34
EM084		2 FLUTE, LONG LENGTH, BALL NOSE (MMC-ECONOMY TYPE)	★	36
EM093		4 FLUTE, LONG LENGTH, BALL NOSE (MMC-ECONOMY TYPE)	★	36
EM096		2 FLUTE, LONG LENGTH, BALL NOSE (MMC-SPHERE TYPE)	★	37
EM097		4 FLUTE, LONG LENGTH, BALL NOSE (MMC-SPHERE TYPE)	★	37
EM666		MULTI FLUTE, 20° HELIX, STUB LENGTH, FINE PITCH ROUGHING	★	38
EM156		MULTI FLUTE, 20° HELIX, LONG LENGTH, FINE PITCH ROUGHING	★	38
EM662		MULTI FLUTE, 20° HELIX, LONG LENGTH, FINE PITCH ROUGHING, BALL NOSE	★	38
EM966		2 FLUTE for RIB PROCESSING	★	39
EM967		2 FLUTE, BALL NOSE for RIB PROCESSING	★	40

★:U.S.A Stock ○:Call for Availability



# X-POWER CARBIDE END MILLS SELECTION GUIDE

## METRIC

EDP No.	APPEARANCE	SPECIFICATION	STOCK	PAGE
EM810 EM816		2 FLUTE, SHORT & LONG LENGTH	○	41
EM811 EM817		4 FLUTE, SHORT & LONG LENGTH	○	42
EM895		3 FLUTE, 38° HELIX, SHORT LENGTH	○	43
EM810		2 FLUTE, MINIATURE	○	43
EM818		2 FLUTE, LONG LENGTH, CORNER RADIUS	○	44
EM819		4 FLUTE, LONG LENGTH, CORNER RADIUS	○	44
EM905		4 FLUTE, 45° HELIX, SHORT LENGTH, CORNER RADIUS	○	45
EM839		4 FLUTE, STUB CUT LENGTH, CORNER RADIUS	○	45
EM812		6&8 FLUTE, 45° HELIX, LONG LENGTH	○	46
EM834		6&8 FLUTE, 45° HELIX, EXTRA LONG LENGTH	○	46
EM835		6 FLUTE, 45° HELIX, LONG LENGTH, CORNER RADIUS	○	47
EM897		6 FLUTE, 45° HELIX, STUB CUT LENGTH, CORNER RADIUS	○	47
EM876		2 FLUTE, SHORT LENGTH, BALL NOSE	○	48
EM813 EM823		2 FLUTE, LONG LENGTH, BALL NOSE	★	49
EM815 EM825		4 FLUTE, LONG LENGTH, BALL NOSE	★	49
EM899		2 FLUTE, MEDIUM LENGTH, BALL NOSE	○	50
EM838		2 FLUTE, LONG REACH, BALL NOSE	○	51














★:U.S.A Stock ○:Call for Availability





# X-POWER CARBIDE END MILLS SELECTION GUIDE

## METRIC

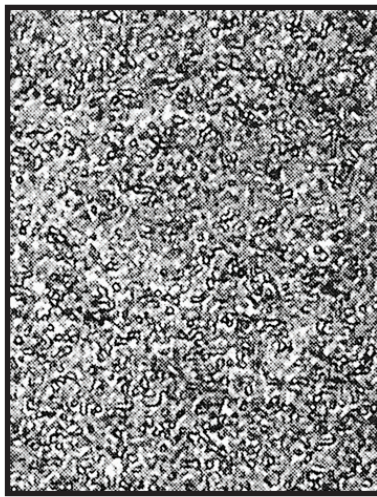
EDP No.	APPEARANCE	SPECIFICATION	STOCK	PAGE
EM865		2 FLUTE, MINIATURE, BALL NOSE	★	52
EM868		2 FLUTE, 15° HELIX, STUB CUT LENGTH, BALL NOSE for OVER HRc55	○	53
EM902		2 FLUTE, BALL NOSE with TAPER NECK	○	54
EM669		2 FLUTE, LONG LENGTH, BALL NOSE (MMC-ECONOMY TYPE)	○	56
EM673		4 FLUTE, LONG LENGTH, BALL NOSE (MMC-ECONOMY TYPE)	○	56
EM863		2 FLUTE, LONG LENGTH, BALL NOSE (MMC- SPHERE TYPE)	○	57
EM864		4 FLUTE, LONG LENGTH, BALL NOSE (MMC- SPHERE TYPE)	○	57
EM832		MULTI FLUTE, 20° HELIX, SHORT LENGTH, FINE PITCH ROUGHING	○	58
EM814		MULTI FLUTE, 20° HELIX, LONG LENGTH, FINE PITCH ROUGHING	○	58
EM833		3&4 FLUTE, 20° HELIX, LONG LENGTH, FINE PITCH ROUGHING, BALL NOSE	○	59
EM837		2 FLUTE, TAPER	○	59
EM883		2 FLUTE for RIB PROCESSING	○	60
EM886		2 FLUTE, BALL NOSE for RIB PROCESSING	○	61

SPEED & FEED DATA

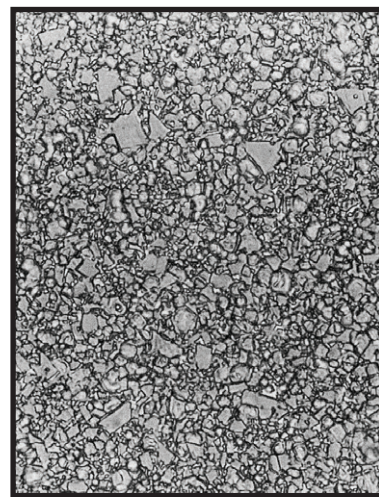
62 ~ 82

★:U.S.A Stock ○:Call for Availability

- YG-1 X-POWER END MILLS ARE MADE FROM THE FINEST MICROGRAIN CARBIDE. THE CARBIDE IS SINTERED USING THE HOT ISOSTATIC PROCESS.
- THIS PROCESS ALLOWS PRESSING OF THE CARBIDE AT HIGH TEMPERATURES THEREBY ELIMINATING POROSITY AND INCREASING TOUGHNESS.



X-POWER Carbide Grain Structure  
Carbide Grain size =  $0 < 0.5\mu\text{m}$  Consistent



General Carbide Grain Structure

## ***X-POWER USES AND ADVANTAGES***

- \* THE HARD PVD COATING ALLOWS EFFECTIVE MACHINING OF HARD MOLD, DIE, AND TOOL STEELS UP TO 70HRc IN DRY OR WET CONDITION.
- \* THE COATING QUALITIES OF HIGH HARDNESS, HIGH THERMAL AND CHEMICAL STABILITY, PROTECTS THE TOOLS FROM PREMATURE WEAR, EVEN UNDER EXTREME CONDITIONS.
- \* SUPERIOR WORKPIECE FINISHES.
- \* GEOMETRIES DESIGNED FOR GOOD CHIP EJECTION ON HARD STEEL.



# X-POWER 2 FLUTE, REGULAR & LONG LENGTH



MG 2 30° PLAIN DATA P.62

- ▶ Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- ▶ Superior workpiece finishes.
- ▶ Increased feed rate.

◇ 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

TOLERANCE OF MILL DIA.(mm)	TOLERANCE OF SHANK DIA.
0 -.0012	0 -.0003

## 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

# X-POWER 2 FLUTE, MINIATURE



MG 2 30° PLAIN DATA P.64

- ▶ High precision milling in medical, optical, electronics and aero space industries.
- ▶ Excellent performance on high hardened steel(HRc70).

◇ U.S.A Stock

## EM959 Series

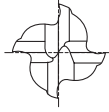
Unit : inch

EDP No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH	EDP No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
93495	.016	1/8	.031	1-1/2	93501	.040	1/8	.100	1-1/2
93496	.020	1/8	.040	1-1/2	93502	.043	1/8	.100	1-1/2
93497	.024	1/8	.047	1-1/2	93503	.047	1/8	.157	1-1/2
93498	.028	1/8	.055	1-1/2	93504	.052	1/8	.157	1-1/2
93499	.031	1/8	.063	1-1/2	93505	.055	1/8	.157	1-1/2
93500	.035	1/8	.080	1-1/2	93506	.062	1/8	.157	1-1/2

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
±.0005	0 -.0003

# X-POWER 4 FLUTE, REGULAR & LONG LENGTH

X-POWER



MG
4
30°
PLAIN
DATA
P.63

- ▶ Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- ▶ 4 flute allows for better workpiece finishes.
- ▶ Increased production.

◇ *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

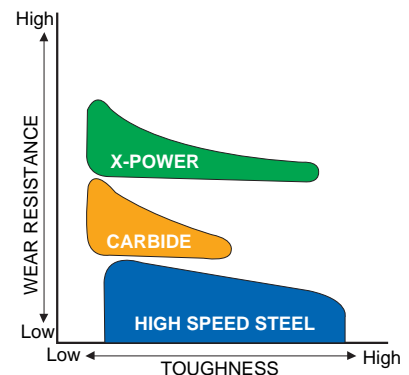
## EM207 Series

■ 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

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 - .0012	0 - .0003





# X-POWER 2&4 FLUTE, STUB LENGTH, CORNER RADIUS



MG
2&4
30°
R ±.001
PLAIN
DATA
P.64,65

- ▶ Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- ▶ Superior workpiece finishes.
- ▶ Increased feed rate.

◇ U.S.A Stock

## EM636, EM639 Series

Unit : inch

EDP No. 2 FLUTE EM636	EDP No. 4 FLUTE EM639	CORNER RADIUS R	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
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



TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0012	0 -.0003

# X-POWER 2&4 FLUTE, REGULAR LENGTH, CORNER RADIUS

X-POWER



MG
2&4
30°
R ±.001
PLAIN
DATA
P.64,65

- ▶ Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- ▶ Superior workpiece finishes.
- ▶ Increased feed rate.

◇ U.S.A Stock

## EM637, EM649 Series

Unit : inch

EDP No. 2 FLUTE EM637	EDP No. 4 FLUTE EM649	CORNER RADIUS R	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
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



TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 - .0012	0 - .0003

**X-POWER****2&4 FLUTE, LONG LENGTH, CORNER RADIUS**

MG
2&4
30°
R ±.001
PLAIN
DATA
P.64,65

- ▶ Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- ▶ Superior workpiece finishes.
- ▶ Increased feed rate.

◇ *U.S.A Stock*

X-POWER

**EM211, EM212 Series**

Unit : inch

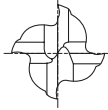
EDP No. 2 FLUTE EM211	EDP No. 4 FLUTE EM212	CORNER RADIUS R	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
93143	93157	R.020	1/4	1/4	1-1/8	3
93144	93158	R.030	1/4	1/4	1-1/8	3
93145	93159	R.020	5/16	5/16	1-1/8	3
93146	93160	R.030	5/16	5/16	1-1/8	3
93147	93161	R.060	5/16	5/16	1-1/8	3
93148	93162	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



TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0012	0 -.0003



# X-POWER 4 FLUTE, 45° HELIX, LONG REACH



MG
4
45°
PLAIN
DATA
P.65

- ▶ Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- ▶ 4 flute allows for better workpiece finishes.
- ▶ Increased production.

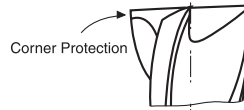
◇ U.S.A Stock

## EM102 Series

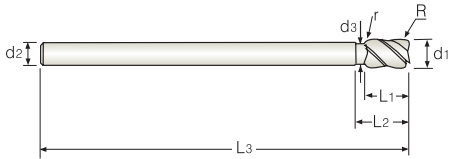
Unit : inch

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

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0012	0 -.0003



# X-POWER 4 FLUTE, 45° HELIX, LONG REACH, CORNER RADIUS



MG
4
45°
R ±.001
PLAIN
DATA
P.66

- ▶ Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- ▶ Superior workpiece finishes.
- ▶ Increased feed rate.

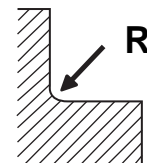
◇ U.S.A Stock

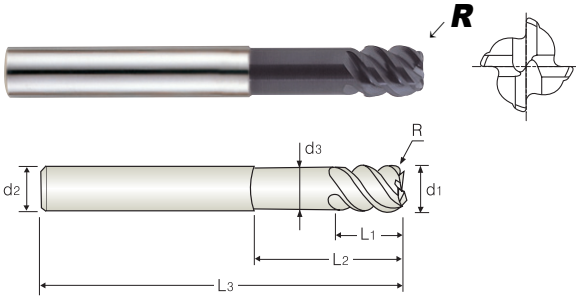
## EM103 Series

Unit : inch

EDP No.	CORNER RADIUS R	MILL DIAMETER d <sub>1</sub>	SHANK DIAMETER d <sub>2</sub>	LENGTH OF CUT L <sub>1</sub>	LENGTH BELOW SHANK L <sub>2</sub>	OVERALL LENGTH L <sub>3</sub>	NECK DIAMETER d <sub>3</sub>
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

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0012	0 -.0003



**X-POWER****4 FLUTE, 55° HELIX, STUB LENGTH, CORNER RADIUS**

MG
4
55°
R ±.001
PLAIN
DATA
P.67,68

- ▶ Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- ▶ Corner radius and corner protection against chipping.

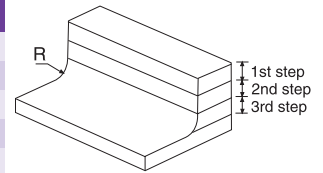
◇ *U.S.A Stock*

X-POWER

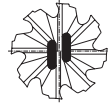
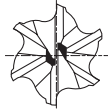
**EM965 Series**

Unit : inch

EDP No.	CORNER RADIUS R	MILL DIAMETER d <sub>1</sub>	SHANK DIAMETER d <sub>2</sub>	LENGTH OF CUT L <sub>1</sub>	LENGTH BELOW SHANK L <sub>2</sub>	OVERALL LENGTH L <sub>3</sub>	NECK DIAMETER d <sub>3</sub>
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



TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0012	0 -.0003

**X-POWER****6&8 FLUTE, 45° HELIX, LONG & EXTRA LONG LENGTH**

P.69,70

- ▶ 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.

◇ 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

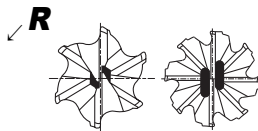
TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 - .0012	0 - .0003

**EM208, EM999 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

**X-POWER****6&8 FLUTE 45° HELIX, LONG LENGTH, CORNER RADIUS**

P.70

- ▶ 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.

◇ U.S.A Stock

**EM668 Series**

Unit : inch

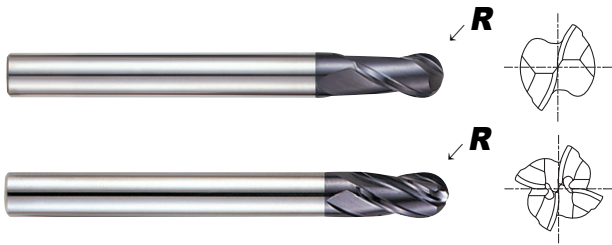
EDP No.	CORNER RADIUS R	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH	NO. OF FLUTE
93277	R.020	1/4	1/4	1/2	2-1/4	6
93278	R.020	5/16	5/16	3/4	2-1/2	6
93279	R.020	3/8	3/8	7/8	2-7/8	6
93280	R.030	3/8	3/8	7/8	2-7/8	6
93281	R.020	1/2	1/2	1	3-1/4	6
93282	R.030	1/2	1/2	1	3-1/4	6
93283	R.030	5/8	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



TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 - .0012	0 - .0003



# X-POWER 2&4 FLUTE, LONG LENGTH, BALL NOSE



MG
2&4
30°
R ±.001
PLAIN
DATA
P.71,72

- ▶ Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- ▶ For copy-milling machines.

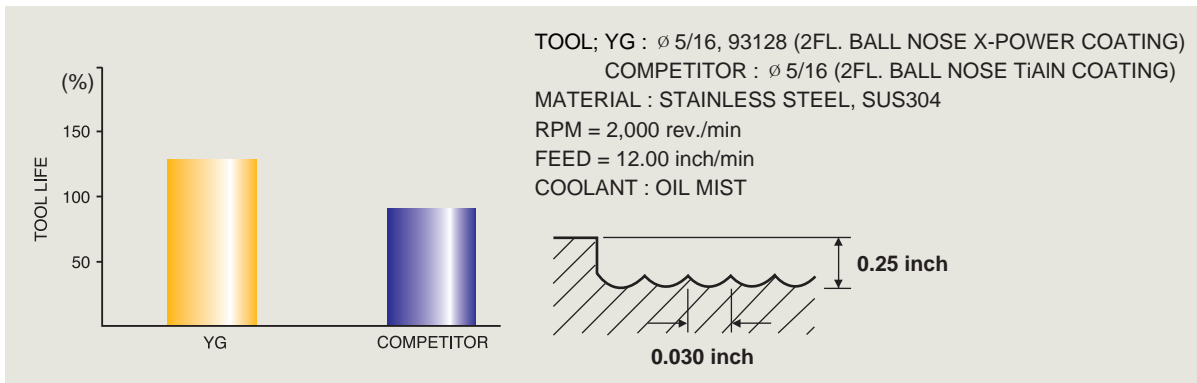
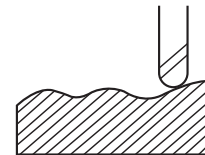
◇ U.S.A Stock

X-POWER

## EM209, EM210 Series

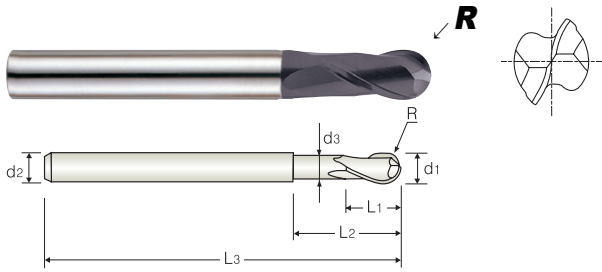
Unit : inch

EDP No. 2 FLUTE EM209	EDP No. 4 FLUTE EM210	R ±.001	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
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



TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0012	0 -.0003

# X-POWER 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.

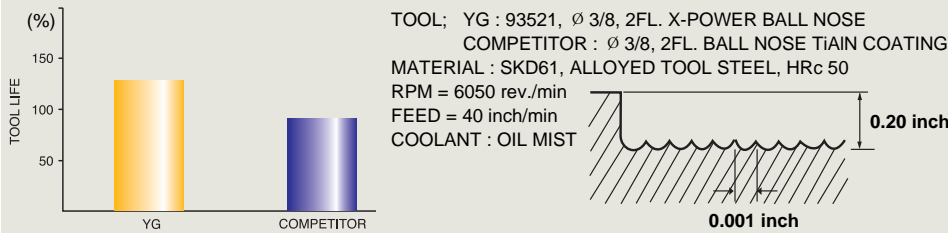
◇ U.S.A Stock

## EM961 Series

Unit : inch

EDP No.	R ±.0005	MILL DIAMETER d1	SHANK DIAMETER d2	LENGTH OF CUT L1	LENGTH BELOW SHANK L2	OVERALL LENGTH L3	NECK DIAMETER 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

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0012	0 -.0003



# X-POWER 2 FLUTE, LONG REACH, BALL NOSE



- ▶ Longer overall length than EM209, EM210, type and suitable for machining deeply located area.

◇ U.S.A Stock

## EM962 Series

Unit : inch

EDP No.	R ±.0005	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

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0012	0 -.0003

# X-POWER 2 FLUTE, MINIATURE, BALL NOSE



MG 2 30° R ±.0005 PLAIN DATA P.80

- ▶ High precision milling in medical, optical, electronics and aerospace industrials.
- ▶ Excellent performance at dry cutting condition.
- ▶ Excellent performance on high hardened steel up to HRc70.

◇ U.S.A Stock

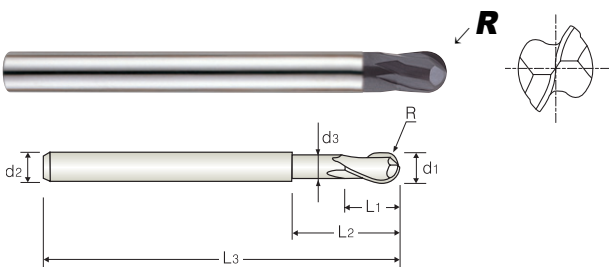
## EM960 Series

Unit : inch

EDP No.	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

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0	0
-.0010	-.0003

# X-POWER 2 FLUTE, 15° HELIX, STUB CUT LENGTH, BALL NOSE for OVER HRc55



MG 2 15° R ±.0005 PLAIN DATA P.75

## HRc55 ~ HRc70

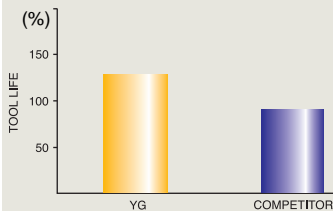
- ▶ Suitable for HRc55~HRc70 high hardened materials.
- ▶ Strong cutting edges and higher tool rigidity.

◇ U.S.A Stock

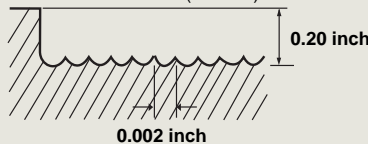
## EM109 Series

Unit : inch

EDP No.	R ±.0005	MILL DIAMETER d1	SHANK DIAMETER d2	LENGTH OF CUT L1	LENGTH BELOW SHANK L2	OVERALL LENGTH L3	NECK DIAMETER 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



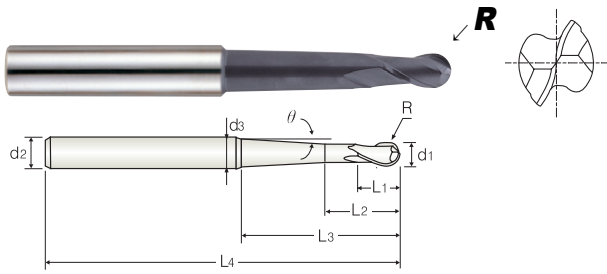
TOOL: YG : 93492,  $\phi$  3/8, 2FL. X-POWER BALL NOSE  
 COMPETITOR :  $\phi$  3/8, 2FL. BALL NOSE, TiAIN COATING  
 MATERIAL : SKD11, ALLOYED TOOL STEEL (HRc 60)  
 RPM = 3820 rev./min  
 FEED = 36 inch/min  
 COOLANT : OIL MIST



TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0	0
-.0012	-.0003



# X-POWER 2 FLUTE, BALL NOSE with TAPER NECK



MG 2 30° ±.0005 PLAIN DATA P.76

► High efficiency milling is possible in deep slotting with projection of the end mill being long.

◇ U.S.A Stock

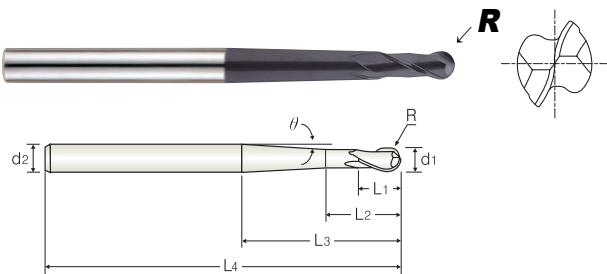
## EM963 Series

Unit : inch

EDP No.	R ±.0005	MILL DIAMETER d1	SHANK DIAMETER d2	NECK DIAMETER d3	LENGTH OF CUT L1	L2	LENGTH BELOW SHANK L3	OVERALL LENGTH L4	NECK TAPER ANGLE θ
93526	R1/32	1/16	1/4	.096	5/32	15/64	7/8	2-3/8	1°30'
93527	R1/32	1/16	1/4	.208	5/32	15/64	1-5/8	3-1/8	3°
93528	R1/16	1/8	1/4	.216	1/4	21/64	2-1/16	3-5/8	1°30'
93529	R3/32	3/16	3/8	.288	3/8	29/64	2-3/8	4-3/8	1°30'
93530	R1/8	1/4	3/8	.325	1/2	5/8	2-1/16	4-3/8	1°30'
93531	R5/32	5/16	1/2	.385	9/16	11/16	2-1/16	4-3/4	1°30'
93532	R3/16	3/8	1/2	.458	11/16	13/16	2-3/8	5-1/16	1°30'
93533	R1/4	1/2	3/4	.618	7/8	1"	3-1/4	6-3/8	1°30'

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0012	0 -.0003

# X-POWER 2 FLUTE, BALL NOSE with PENCIL NECK



MG 2 30° ±.0005 PLAIN DATA P.77

► High efficiency milling is possible in deep slotting with projection of the end mill being long.

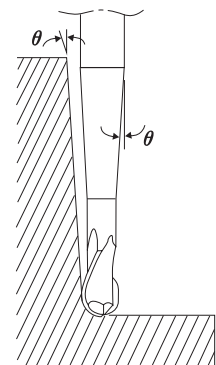
◇ U.S.A Stock

## EM979 Series

Unit : inch

EDP No.	R ±.0005	MILL DIAMETER d1	SHANK DIAMETER d2	LENGTH OF CUT L1	L2	LENGTH BELOW SHANK L3	OVERALL LENGTH L4	NECK TAPER ANGLE 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'

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0012	0 -.0003



MILLING ON TAPERED WALL



### Useful Field Area

- Die & Mold making, Turbine manufacturing and Aircraft Industry, etc.
- Difficult 3-D Forms.
- Profiling of up to HRc 70 high hardened steels and Alloy steels, Nickel base alloys, Titanium alloys.

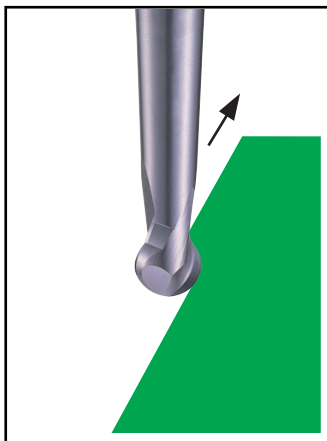


### Characteristic

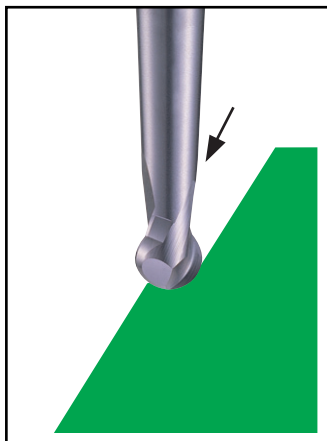
- Ultra micro grain carbide which increases both toughness and hardness.
- YG-1's unique X-POWER coating suitable for dry cutting and high speed cutting.
- Outstanding tool geometry and sphere shape ball enables more increased tool life and higher speed and feed operation.



### Surpassing Milling Operation

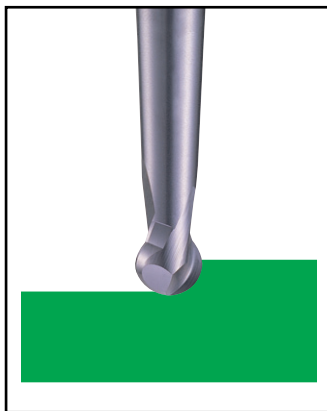


(Favorable Back Milling)

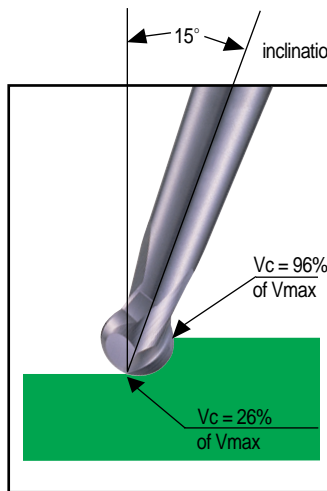


(Unfavorable Drilling)

- Operating angle  $14^{\circ} \sim 16^{\circ}$ , higher speed and feed can be achieved by decreased cutting resistance at cutting edges contacting the workpiece.
- Excellent surface roughness and higher milling process.
- Enable to milling with higher speed and feed when Back Milling.



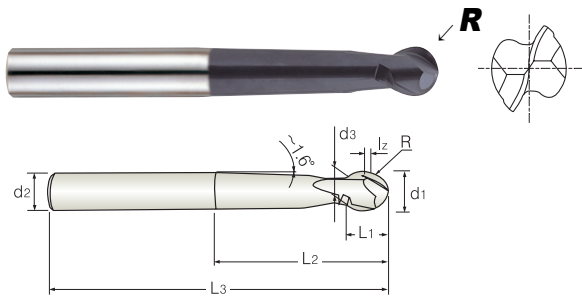
(Unfavorable Profiling)



(Favorable Profiling)

- When  $15^{\circ}$  inclination milling operation, more productivity and higher speed and feed are possible.
- Decreased cutting force.
- Excellent surface roughness and brightness.

# X-POWER 2 FLUTE, LONG LENGTH, BALL NOSE



MG
2
30°
±.0005
PLAIN
DATA
P.78

- ▶ Designed for copy milling.
- ▶ Increased feed rates.
- ▶ 15° inclination.
- ▶ Easy to regrind.

◇ U.S.A Stock

EM084 Series

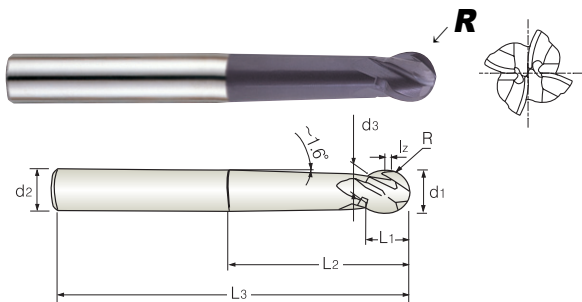
■ MMC-ECONOMY TYPE

Unit : inch

EDP No.	R ±.0005	MILL DIAMETER d1	SHANK DIAMETER d2	LENGTH OF CUT L1	LENGTH BELOW SHANK L2	OVERALL LENGTH L3	NECK DIAMETER d3	lz
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

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0010	0 -.0003

# X-POWER 4 FLUTE, LONG LENGTH, BALL NOSE



MG
4
30°
±.0005
PLAIN
DATA
P.79

- ▶ Designed for copy milling.
- ▶ Increased feed rates.
- ▶ 15° inclination.
- ▶ Easy to regrind.

◇ U.S.A Stock

EM093 Series

■ MMC-ECONOMY TYPE

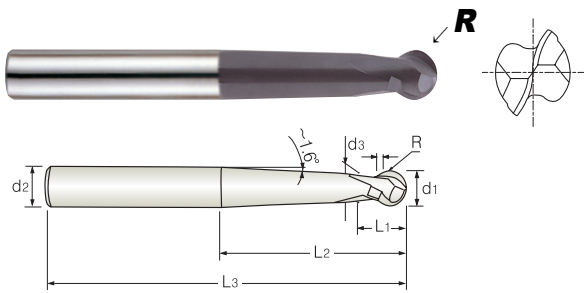
Unit : inch

EDP No.	R ±.0005	MILL DIAMETER d1	SHANK DIAMETER d2	LENGTH OF CUT L1	LENGTH BELOW SHANK L2	OVERALL LENGTH L3	NECK DIAMETER d3	lz
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

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0010	0 -.0003



# X-POWER 2 FLUTE, LONG LENGTH, BALL NOSE



MG 2 30° R ±.0005 PLAIN DATA P.78

- ▶ Designed for copy milling.
- ▶ Increased feed rates.
- ▶ 15° inclination.

◇ U.S.A Stock

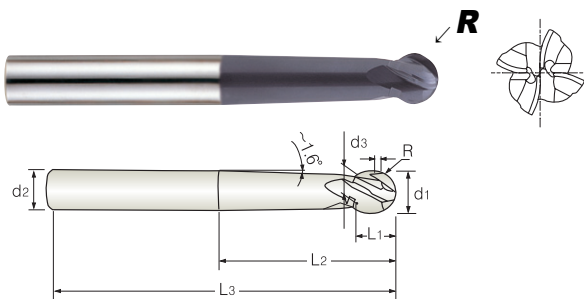
## EM096 Series ■ MMC-SPHERE TYPE

Unit : inch

EDP No.	R ±.0005	MILL DIAMETER d1	SHANK DIAMETER d2	LENGTH OF CUT L1	LENGTH BELOW SHANK L2	OVERALL LENGTH L3	NECK DIAMETER 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

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0010	0 -.0003

# X-POWER 4 FLUTE, LONG LENGTH, BALL NOSE



MG 4 30° R ±.0005 PLAIN DATA P.79

- ▶ Designed for copy milling.
- ▶ Increased feed rates.
- ▶ 15° inclination.

◇ U.S.A Stock

## EM097 Series ■ MMC-SPHERE TYPE

Unit : inch

EDP No.	R ±.0005	MILL DIAMETER d1	SHANK DIAMETER d2	LENGTH OF CUT L1	LENGTH BELOW SHANK L2	OVERALL LENGTH L3	NECK DIAMETER 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

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0010	0 -.0003

**X-POWER****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.

◇ *U.S.A Stock*

X-POWER

**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

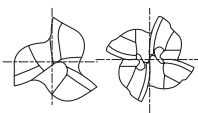
**EM156 Series**

■ 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.	1/4 ~ 3/8	1/2 ~ 5/8	3/4 ~ 1
TOLERANCE OF MILL DIA.	0 ~ -.0022	0 ~ -.0027	0 ~ -.0033
TOLERANCE OF SHANK DIA.	0 -.0003		

**X-POWER****MULTI FLUTE, 20° HELIX, LONG LENGTH, FINE PITCH ROUGHING, BALL NOSE**

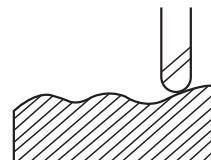
- ▶ Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- ▶ High velocity milling of hardened steels.
- ▶ For dry and wet milling.
- ▶ Fast chip ejection.

◇ *U.S.A Stock***EM662 Series**

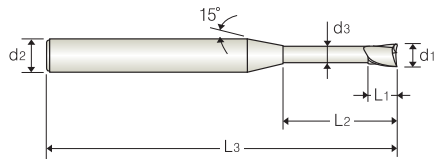
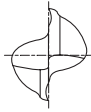
Unit : inch

EDP No.	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.	1/4 ~ 3/8	1/2 ~ 5/8	3/4 ~ 1
TOLERANCE OF MILL DIA.	0 ~ -.0022	0 ~ -.0027	0 ~ -.0033
TOLERANCE OF SHANK DIA.	0 -.0003		



# X-POWER 2 FLUTE for RIB PROCESSING



MG
2
30°
PLAIN
DATA
P.81

- ▶ 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.

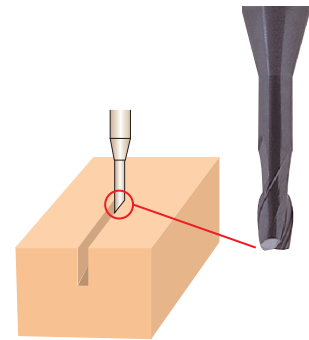
◆ U.S.A Stock

X-POWER

## EM966 Series

Unit : inch

EDP No.	MILL DIAMETER d <sub>1</sub>	SHANK DIAMETER d <sub>2</sub>	LENGTH OF CUT L <sub>1</sub>	LENGTH BELOW SHANK L <sub>2</sub>	OVERALL LENGTH L <sub>3</sub>	NECK DIAMETER d <sub>3</sub>
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

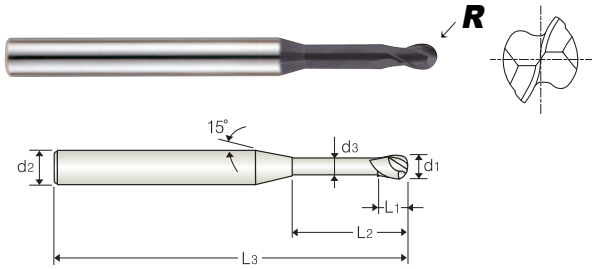


TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0006	0 -.0003



# X-POWER 2 FLUTE, BALL NOSE for RIB PROCESSING

X-POWER



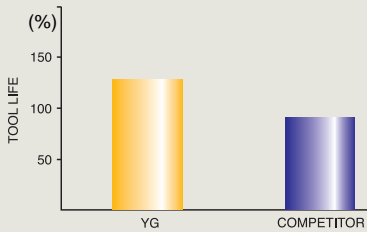
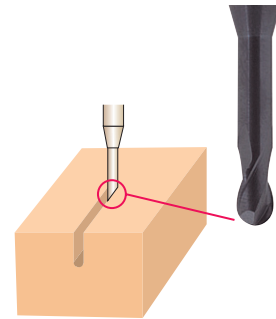
- ▶ For 3-D milling, deep slotting and pocketing.
- ▶ For depths of 6 to 10X cutting diameter.
- ▶ Machine carbon steel, alloy steel, tool steel, die and mold steels.
- ▶ Suitable for high speed cutting and high precision machining.
- ▶ Designed with reinforced shank for higher stability and rigidity.
- ▶ Long neck design for deep machining near walls.

◇ U.S.A Stock

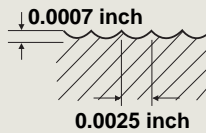
## EM967 Series

Unit : inch

EDP No.	R ±.0005	MILL DIAMETER d1	SHANK DIAMETER d2	LENGTH OF CUT L1	LENGTH BELOW SHANK L2	OVERALL LENGTH L3	NECK DIAMETER 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



TOOL: YG : 93565,  $\phi$  3/64 (2FL. RIB BALL NOSE)  
 COMPETITOR :  $\phi$  3/64 (2FL. RIB BALL NOSE)  
 MATERIAL : ALLOYED TOOL STEEL (SKD61) HRc 40  
 RPM = 20,000 rev./min  
 FEED = 28 inch/min  
 COOLANT : OIL MIST



TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0006	0 -.0003

# X-POWER 2 FLUTE, SHORT & LONG LENGTH

**METRIC**



- ▶ Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- ▶ Superior workpiece finishes.
- ▶ Increased feed rate.

◇ *Call for Availability*

X-POWER

## EM810 Series ■ SHORT LENGTH

Unit : mm

EDP No.	MILL DIAMETER	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH
EM810901	1.0	6	2.5	40
EM810902	1.5	6	4	40
EM810020	2.0	4	6	40
EM810903	2.0	6	6	40
EM810025	2.5	4	8	40
EM810904	2.5	6	8	40
EM810030	3.0	6	8	45
EM810035	3.5	6	10	45
EM810040	4.0	6	11	45
EM810045	4.5	6	11	45
EM810050	5.0	6	13	50
EM810055	5.5	6	13	50
EM810060	6.0	6	13	50
EM810065	6.5	8	16	60
EM810070	7.0	8	16	60
EM810075	7.5	8	16	60
EM810080	8.0	8	19	60
EM810085	8.5	10	19	70
EM810090	9.0	10	19	70
EM810095	9.5	10	19	70
EM810100	10.0	10	22	70
EM810105	10.5	12	22	75
EM810110	11.0	12	22	75
EM810115	11.5	12	22	75
EM810120	12.0	12	26	75
EM810906	13.0	12	26	85
EM810140	14.0	14	26	85
EM810905	14.0	16	26	85
EM810908	15.0	16	26	90
EM810160	16.0	16	32	100
EM810909	17.0	16	32	100
EM810180	18.0	18	32	100
EM810911	19.0	20	32	100
EM810200	20.0	20	38	105
EM810220	22.0	20	38	105
EM810240	24.0	25	45	120
EM810250	25.0	25	45	120

## EM816 Series ■ LONG LENGTH

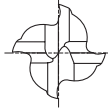
Unit : mm

EDP No.	MILL DIAMETER	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH
EM816020	2.0	4	8	40
EM816030	3.0	6	12	50
EM816040	4.0	6	15	50
EM816050	5.0	6	20	60
EM816060	6.0	6	20	60
EM816080	8.0	8	25	70
EM816100	10.0	10	30	90
EM816120	12.0	12	30	90
EM816140	14.0	16	40	110
EM816160	16.0	16	50	110
EM816180	18.0	20	50	110
EM816200	20.0	20	55	110
EM816250	25.0	25	75	140

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.02	h6

# X-POWER 4 FLUTE, SHORT & LONG LENGTH

**METRIC**



- ▶ Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- ▶ 4 flute allows for better workpiece finishes.
- ▶ Increased production.

◇ *Call for Availability*

X-POWER

## EM811 Series ■ SHORT LENGTH

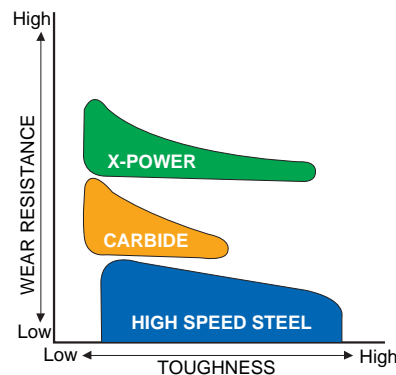
Unit : mm

EDP No.	MILL DIAMETER	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH
EM811020	2.0	4	6	40
EM811901	2.0	6	6	40
EM811025	2.5	4	8	40
EM811902	2.5	6	8	40
EM811030	3.0	6	8	45
EM811035	3.5	6	10	45
EM811040	4.0	6	11	45
EM811045	4.5	6	11	45
EM811050	5.0	6	13	50
EM811055	5.5	6	13	50
EM811060	6.0	6	13	50
EM811065	6.5	8	16	60
EM811070	7.0	8	16	60
EM811075	7.5	8	16	60
EM811080	8.0	8	19	60
EM811085	8.5	10	19	70
EM811090	9.0	10	19	70
EM811095	9.5	10	19	70
EM811100	10.0	10	22	70
EM811105	10.5	12	22	75
EM811110	11.0	12	22	75
EM811115	11.5	12	22	75
EM811120	12.0	12	26	75
EM811904	13.0	12	26	85
EM811140	14.0	14	26	85
EM811905	14.0	12	26	85
EM811903	14.0	16	26	85
EM811906	15.0	16	26	90
EM811160	16.0	16	32	100
EM811907	17.0	16	32	100
EM811180	18.0	18	32	100
EM811908	18.0	16	32	100
EM811909	19.0	20	32	100
EM811200	20.0	20	38	105
EM811220	22.0	20	38	105
EM811240	24.0	25	45	120
EM811250	25.0	25	45	120

## EM817 Series ■ LONG LENGTH

Unit : mm

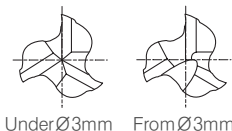
EDP No.	MILL DIAMETER	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH
EM817020	2.0	4	8	40
EM817030	3.0	6	12	50
EM817040	4.0	6	15	50
EM817050	5.0	6	20	60
EM817060	6.0	6	20	60
EM817080	8.0	8	25	70
EM817100	10.0	10	30	90
EM817120	12.0	12	30	90
EM817140	14.0	16	40	110
EM817160	16.0	16	50	110
EM817180	18.0	20	50	110
EM817200	20.0	20	55	110
EM817250	25.0	25	75	140



TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.02	h6

# X-POWER 3 FLUTE, 38° HELIX, SHORT LENGTH

**METRIC**



- ▶ Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- ▶ Possesses the advantage of 2 flute and 4 flute end mill.
- ▶ Superior workpiece finishes.

◇ *Call for Availability*

X-POWER

## EM895 Series

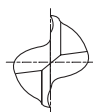
Unit : mm

EDP No.	MILL DIAMETER	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH	EDP No.	MILL DIAMETER	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH
EM895010	1.0	3	2.5	38	EM895050	5.0	5	14	50
EM895015	1.5	4	5	50	EM895904	5.0	6	14	57
EM895025	2.5	3	7	38	EM895060	6.0	6	16	57
EM895030	3.0	3	10	38	EM895080	8.0	8	20	63
EM895901	3.0	6	10	50	EM895100	10.0	10	22	72
EM895035	3.5	4	12	50	EM895120	12.0	12	25	73
EM895902	3.5	6	12	50	EM895140	14.0	14	25	75
EM895040	4.0	4	12	50	EM895160	16.0	16	32	82
EM895903	4.0	6	12	50	EM895180	18.0	18	32	92
EM895045	4.5	6	14	57	EM895200	20.0	20	38	92

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.02	h6

# X-POWER 2 FLUTE, MINIATURE

**METRIC**



- ▶ High precision milling in medical, optical, electronics and aero space industries.
- ▶ Excellent performance on high hardened steel(HRC70).

◇ *Call for Availability*

## EM810 Series

Unit : mm

EDP No.	MILL DIAMETER	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH	EDP No.	MILL DIAMETER	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH
EM810004	0.4	3	0.8	40	EM810010	1.0	4	2.5	40
EM810005	0.5	3	1.0	40	EM810011	1.1	4	2.5	40
EM810006	0.6	3	1.2	40	EM810012	1.2	4	4.0	40
EM810007	0.7	3	1.4	40	EM810013	1.3	4	4.0	40
EM810008	0.8	3	1.6	40	EM810014	1.4	4	4.0	40
EM810009	0.9	3	2.0	40	EM810015	1.5	4	4.0	40

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.02	h6



# X-POWER 2&4 FLUTE, LONG LENGTH, CORNER RADIUS

**METRIC**



- ▶ Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- ▶ 4 flute allows for better workpiece finishes.
- ▶ Increased production.

◇ *Call for Availability*

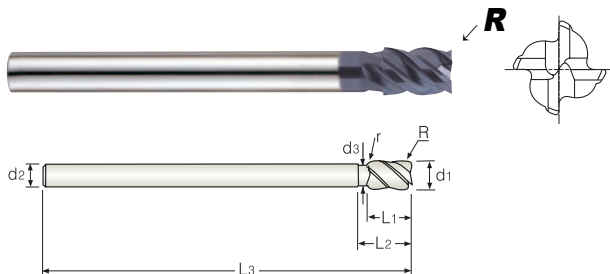
## EM818, EM819 Series

Unit : mm

EDP No. 2FLUTE EM818	EDP No. 4FLUTE EM819	CORNER RADIUS R	MILL DIAMETER	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH
EM818030	EM819030	R0.3	3.0	6	12	50
EM818040	EM819040	R0.3	4.0	6	15	50
EM818911	EM819911	R0.5	4.0	6	15	50
EM818050	EM819050	R0.3	5.0	6	20	60
EM818912	EM819912	R0.5	5.0	6	20	60
EM818913	EM819913	R0.3	6.0	6	20	60
EM818060	EM819060	R0.5	6.0	6	20	60
EM818901	EM819901	R1.0	6.0	6	20	60
EM818914	EM819914	R0.3	8.0	8	25	70
EM818080	EM819080	R0.5	8.0	8	25	70
EM818902	EM819902	R1.0	8.0	8	25	70
EM818903	EM819903	R1.5	8.0	8	25	70
EM818904	EM819904	R2.0	8.0	8	25	70
EM818915	EM819915	R0.3	10.0	10	30	90
EM818100	EM819100	R0.5	10.0	10	30	90
EM818905	EM819905	R1.0	10.0	10	30	90
EM818906	EM819906	R1.5	10.0	10	30	90
EM818907	EM819907	R2.0	10.0	10	30	90
EM818120	EM819120	R0.5	12.0	12	30	90
EM818908	EM819908	R1.0	12.0	12	30	90
EM818909	EM819909	R1.5	12.0	12	30	90
EM818910	EM819910	R2.0	12.0	12	30	90
EM818160	EM819160	R0.5	16.0	16	50	110
EM818916	EM819916	R1.0	16.0	16	50	110
EM818917	EM819917	R1.5	16.0	16	50	110
EM818918	EM819918	R2.0	16.0	16	50	110
EM818200	EM819200	R0.5	20.0	20	55	110
EM818919	EM819919	R1.0	20.0	20	55	110
EM818920	EM819920	R1.5	20.0	20	55	110
EM818921	EM819921	R2.0	20.0	20	55	110



TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.02	h6

**X-POWER****4 FLUTE, 45° HELIX, SHORT LENGTH, CORNER RADIUS****METRIC**

- ▶ Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- ▶ 4 flute allows for better workpiece finishes.
- ▶ Increased productivity.

◇ *Call for Availability*

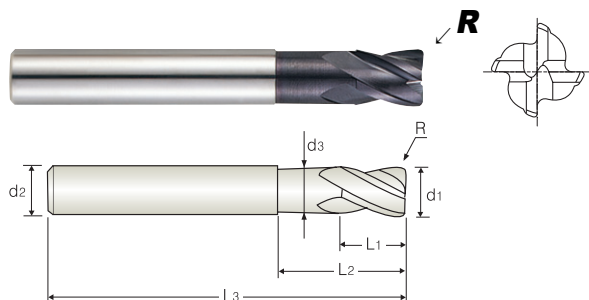
X-POWER

**EM905 Series**

Unit : mm

EDP No.	CORNER RADIUS R	MILL DIAMETER d <sub>1</sub>	SHANK DIAMETER d <sub>2</sub>	LENGTH OF CUT L <sub>1</sub>	LENGTH BELOW SHANK L <sub>2</sub>	OVERALL LENGTH L <sub>3</sub>	NECK DIAMETER d <sub>3</sub>
EM905100	R0.5	10.0	8	15	19.2	130	7.5
EM905901	R1.0	10.0	8	15	19.2	130	7.5
EM905120	R0.5	12.0	10	18	22.2	150	9.5
EM905902	R1.0	12.0	10	18	22.2	150	9.5
EM905140	R0.5	14.0	12	21	25.2	160	11.5
EM905903	R1.0	14.0	12	21	25.2	160	11.5
EM905180	R0.5	18.0	16	27	31.2	180	15.5
EM905904	R1.0	18.0	16	27	31.2	180	15.5
EM905220	R0.5	22.0	20	33	37.2	200	19.5
EM905905	R1.0	22.0	20	33	37.2	200	19.5

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.02	h6

**X-POWER****4 FLUTE, STUB CUT LENGTH, CORNER RADIUS****METRIC**

- ▶ Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- ▶ Superior workpiece finishes.
- ▶ Increased feed rate.

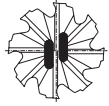
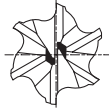
◇ *Call for Availability*

**EM839 Series**

Unit : mm

EDP No.	CORNER RADIUS R	MILL DIAMETER d <sub>1</sub>	SHANK DIAMETER d <sub>2</sub> (h6)	LENGTH OF CUT L <sub>1</sub>	LENGTH BELOW SHANK L <sub>2</sub>	OVERALL LENGTH L <sub>3</sub>	NECK DIAMETER d <sub>3</sub>
EM839020	R0.2	2.0	6	2.5	5	50	1.9
EM839025	R0.25	2.5	6	3	6	50	2.4
EM839030	R0.3	3.0	6	4	7	50	2.8
EM839035	R0.35	3.5	6	4.5	8	50	3.2
EM839040	R0.4	4.0	6	5	9	50	3.7
EM839050	R0.5	5.0	6	6	12	50	4.6
EM839060	R0.6	6.0	6	7	14	55	5.6
EM839080	R0.8	8.0	8	10	18	60	7.4
EM839100	R1.0	10.0	10	12	25	70	9.4
EM839120	R1.2	12.0	12	15	30	80	11.4
EM839160	R1.6	16.0	16	18	35	90	15.4

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.02	h6

**X-POWER****6&8 FLUTE, 45° HELIX,  
LONG & EXTRA LONG LENGTH****METRIC**

- ▶ 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.

◇ *Call for Availability*

X-POWER

**EM812 Series** ■ LONG LENGTH

Unit : mm

EDP No.	MILL DIAMETER	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH	NO. OF FLUTE
EM812060	6.0	6	13	57	6
EM812070	7.0	8	16	63	6
EM812080	8.0	8	19	63	6
EM812090	9.0	10	19	72	6
EM812100	10.0	10	22	72	6
EM812120	12.0	12	26	83	6
EM812140	14.0	14	26	83	6
EM812901	14.0	16	26	83	6
EM812160	16.0	16	32	92	6
EM812180	18.0	18	32	92	8
EM812200	20.0	20	38	104	8
EM812250	25.0	25	44	104	8

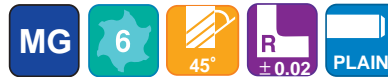
**EM834 Series** ■ EXTRA LONG LENGTH

Unit :mm

EDP No.	MILL DIAMETER	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH	NO. OF FLUTE
EM834060	6.0	6	26	70	6
EM834080	8.0	8	36	90	6
EM834100	10.0	10	46	100	6
EM834120	12.0	12	56	110	6
EM834160	16.0	16	66	130	6
EM834200	20.0	20	76	140	6
EM834250	25.0	25	92	180	6

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.03	h6



**X-POWER****6 FLUTE, 45° HELIX, LONG LENGTH, CORNER RADIUS****METRIC**

- ▶ Designed to machine high hardened materials.
- ▶ Suitable for dry cutting, high speed cutting thanks to newly developed raw-material and new coating.
- ▶ Excellent workpiece finishes.
- ▶ Corner radius against chipping in high speed machining.
- ▶ Higher wear-resistance.

◇ *Call for Availability*

X-POWER

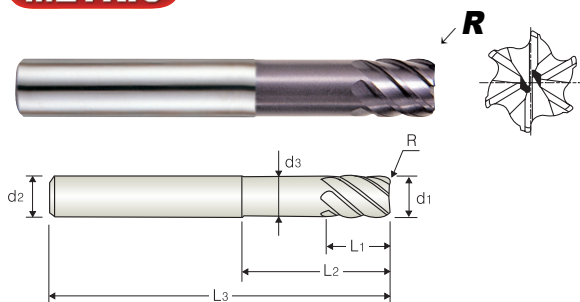
**EM835 Series**

Unit : mm

EDP No.	CORNER RADIUS R	MILL DIAMETER	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH
EM835060	R0.5	6.0	6	13	70
EM835080	R0.5	8.0	8	19	90
EM835100	R0.5	10.0	10	22	100
EM835901	R1.0	10.0	10	22	100
EM835120	R0.5	12.0	12	26	110
EM835902	R1.0	12.0	12	26	110
EM835160	R1.0	16.0	16	32	130
EM835903	R1.5	16.0	16	32	130
EM835200	R1.0	20.0	20	38	140
EM835904	R1.5	20.0	20	38	140
EM835905	R2.0	20.0	20	38	140



TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.03	h6

**X-POWER****6 FLUTE, 45° HELIX, STUB CUT LENGTH, CORNER RADIUS****METRIC**

- ▶ 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.
- ▶ Cutting up to the dimension three times as much as the diameter by reduced Neck

◇ *Call for Availability*

**EM897 Series**

Unit : mm

EDP No.	CORNER RADIUS R	MILL DIAMETER d1	SHANK DIAMETER d2(h6)	LENGTH OF CUT L1	LENGTH BELOW SHANK L2	OVERALL LENGTH L3	NECK DIAMETER d3
EM897060	R0.5	6.0	6	6	14	50	5.7
EM897080	R0.5	8.0	8	8	24	60	7.65
EM897100	R1.0	10.0	10	10	30	70	9.65
EM897120	R1.0	12.0	12	12	30	75	11.6

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.02	h6



# X-POWER 2 FLUTE, SHORT LENGTH, BALL NOSE

**METRIC**



- ▶ Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- ▶ For copy-milling machines.

◇ *Call for Availability*

X-POWER

## EM876 Series

Unit : mm

EDP No. PLAIN	R ±0.01	MILL DIAMETER	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH
EM876010	R0.5	1.0	3	3	38
EM876012	R0.6	1.2	3	3	38
EM876015	R0.75	1.5	3	3	38
EM876020	R1.0	2.0	6	3	50
EM876030	R1.5	3.0	6	4	50
EM876040	R2.0	4.0	6	5	54
EM876050	R2.5	5.0	6	6	54
EM876060	R3.0	6.0	6	7	54
EM876070	R3.5	7.0	8	8	58
EM876080	R4.0	8.0	8	9	58
EM876090	R4.5	9.0	10	10	66
EM876100	R5.0	10.0	10	11	66
EM876120	R6.0	12.0	12	12	73
EM876140	R7.0	14.0	14	14	75
EM876160	R8.0	16.0	16	16	82
EM876180	R9.0	18.0	18	18	84
EM876200	R10.0	20.0	20	20	92
EM876250	R12.5	25.0	25	25	104

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.02	h6

# X-POWER 2&4 FLUTE, LONG LENGTH, BALL NOSE

**METRIC**



- ▶ Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- ▶ For copy-milling machines.

◇ *U.S.A Stock*

## EM813, EM823, EM815, EM825 Series

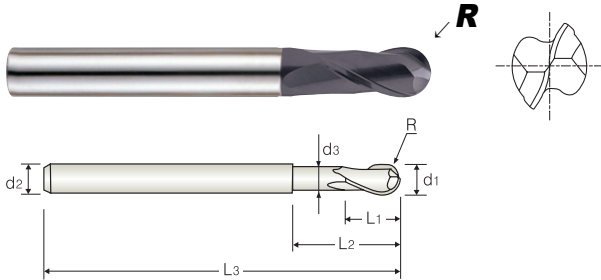
Unit :mm

EDP No. (2 FLUTE)		EDP No. (4 FLUTE)		R ±0.01	MILL DIAMETER	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH
PLAIN EM813	FLAT EM823	PLAIN EM815	FLAT EM825					
93302	—	93335	—	R0.5	1.0	4	2.5	50
93303	—	—	—	R0.6	1.2	4	3	50
93304	—	93336	—	R0.75	1.5	4	4	50
93305	93320	93337	93352	R1.0	2.0	6	5	50
93306	93321	93338	93353	R1.5	3.0	6	8	60
93307	93322	93339	93354	R2.0	4.0	6	8	70
93308	93323	93340	93355	R2.5	5.0	6	10	80
93309	93324	93341	93356	R3.0	6.0	6	12	90
93310	93325	93342	93357	R3.5	7.0	8	14	90
93311	93326	93343	93358	R4.0	8.0	8	14	100
93312	93327	93344	93359	R4.5	9.0	10	18	100
93313	93328	93345	93360	R5.0	10.0	10	18	100
93314	93329	93346	93361	R6.0	12.0	12	22	110
93315	93330	93347	93362	R7.0	14.0	14	26	110
93316	93331	93348	93363	R8.0	16.0	16	30	140
93317	93332	93349	93364	R9.0	18.0	18	34	140
93318	93333	93350	93365	R10.0	20.0	20	38	160
93319	93334	93351	93366	R12.5	25.0	25	50	180

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.02	h6

# X-POWER 2 FLUTE, MEDIUM LENGTH, BALL NOSE

**METRIC**



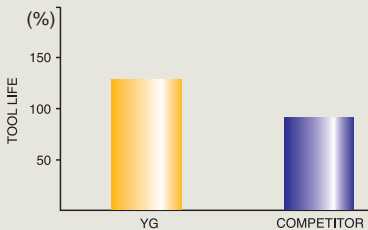
- ▶ Deep slotting milling is possible by reduced neck.
- ▶ High efficiency milling is possible in deep slotting with projection of the end mill being long.

◇ *Call for Availability*

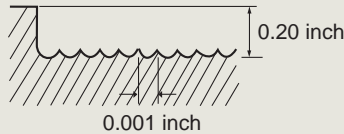
## EM899 Series

Unit : mm

EDP No.	R ±0.01	MILL DIAMETER d1	SHANK DIAMETER d2(h6)	LENGTH OF CUT L1	LENGTH BELOW SHANK L2	OVERALL LENGTH L3	NECK DIAMETER d3
EM899030	R1.5	3.0	6	8	—	70	—
EM899040	R2.0	4.0	6	8	—	70	—
EM899050	R2.5	5.0	6	12	—	80	—
EM899060	R3.0	6.0	6	12	22	80	5.8
EM899070	R3.5	7.0	8	14	—	90	—
EM899080	R4.0	8.0	8	14	27	90	7.8
EM899100	R5.0	10.0	10	18	31	100	9.8
EM899120	R6.0	12.0	12	22	35	110	11.8
EM899140	R7.0	14.0	12	26	—	120	—
EM899160	R8.0	16.0	16	30	50	140	15.8
EM899180	R9.0	18.0	16	34	—	140	—
EM899200	R10.0	20.0	20	38	58	160	19.8
EM899250	R12.5	25.0	25	55	75	180	24.8



TOOL: YG : 93521,  $\phi$  3/8, 2FL. X-POWER BALL NOSE  
 COMPETITOR :  $\phi$  3/8, 2FL. BALL NOSE TiAIN COATING  
 MATERIAL : SKD61, ALLOYED TOOL STEEL, HRC 50  
 RPM = 6050 rev./min  
 FEED = 40 inch/min  
 COOLANT : OIL MIST



TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.02	h6

# X-POWER 2 FLUTE, LONG REACH, BALL NOSE

**METRIC**



► Longer overall length than EM813, EM823 type and suitable for machining deeply located area.

◇ *Call for Availability*

## EM838 Series

Unit : mm

EDP No.	R ±0.01	MILL DIAMETER	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH
EM838020	R1.0	2.0	3	6	80
EM838030	R1.5	3.0	3	8	100
EM838040	R2.0	4.0	4	8	100
EM838050	R2.5	5.0	6	10	120
EM838060	R3.0	6.0	6	10	120
EM838080	R4.0	8.0	8	14	140
EM838100	R5.0	10.0	10	18	180
EM838120	R6.0	12.0	12	22	200
EM838160	R8.0	16.0	16	30	250
EM838200	R10.0	20.0	20	38	250

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.02	h6



# X-POWER 2 FLUTE, MINIATURE, BALL NOSE

**METRIC**



- ▶ 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.

◇ *U.S.A Stock*

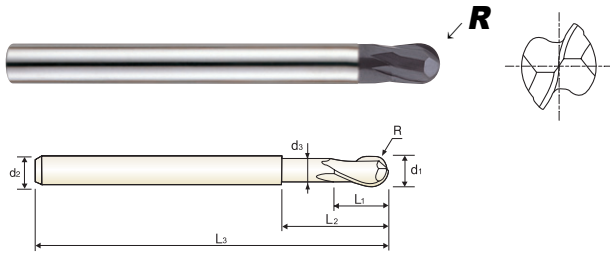
X-POWER

**EM865 Series**

Unit : mm

EDP No.	R ±0.01	MILL DIAMETER	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH
93424	R0.30	0.6	3	1.1	40
93425	R0.35	0.7	3	1.5	40
93426	R0.40	0.8	3	2.0	40
93427	R0.45	0.9	3	2.2	40
93428	R0.50	1.0	3	2.5	40
93429	R0.55	1.1	3	3.0	40
93430	R0.60	1.2	3	3.0	40
93431	R0.65	1.3	3	3.5	40
93432	R0.70	1.4	3	3.5	40
93433	R0.75	1.5	3	4.0	40

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.02	h6

**X-POWER****2 FLUTE, 15° HELIX, STUB CUT LENGTH, BALL NOSE for OVER HRC55****METRIC****HRc55 ~ HRc70**

- ▶ Suitable for HRc55~HRc70 high hardened materials.
- ▶ Strong cutting edges and higher tool rigidity.

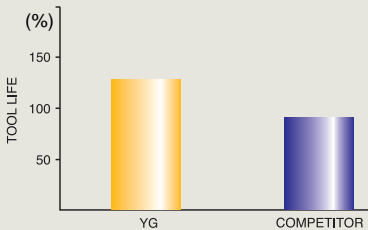
◇ *Call for Availability*

X-POWER

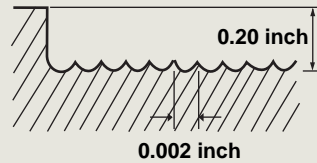
**EM868 Series**

Unit : mm

EDP No.	R ±0.01	MILL DIAMETER d <sub>1</sub>	SHANK DIAMETER d <sub>2</sub> (h6)	LENGTH OF CUT L <sub>1</sub>	LENGTH BELOW SHANK L <sub>2</sub>	OVERALL LENGTH L <sub>3</sub>	NECK DIAMETER d <sub>3</sub>
EM868010	R0.5	1.0	4	1	2.2	50	0.95
EM868901	R0.5	1.0	6	1	2.2	50	0.95
EM868012	R0.6	1.2	4	1.2	2.6	50	1.1
EM868015	R0.75	1.5	4	1.5	3	50	1.4
EM868020	R1.0	2.0	6	2	4	50	1.9
EM868030	R1.5	3.0	6	3	6	60	2.9
EM868040	R2.0	4.0	6	4	8	70	3.9
EM868050	R2.5	5.0	6	5	10	80	4.9
EM868060	R3.0	6.0	6	6	12	90	5.9
EM868070	R3.5	7.0	8	7	14	90	6.9
EM868080	R4.0	8.0	8	8	16	100	7.9
EM868090	R4.5	9.0	10	9	18	100	8.9
EM868100	R5.0	10.0	10	10	20	100	9.9
EM868120	R6.0	12.0	12	12	24	110	11.9
EM868140	R7.0	14.0	14	14	28	110	13.8
EM868160	R8.0	16.0	16	16	32	140	15.8
EM868180	R9.0	18.0	18	18	36	140	17.8
EM868200	R10.0	20.0	20	20	40	160	19.8
EM868250	R12.5	25.0	25	25	50	180	24.8



TOOL : YG : 93492,  $\phi$  3/8, 2FL. X-POWER BALL NOSE  
 COMPETITOR :  $\phi$  3/8, 2FL. BALL NOSE, TiAIN COATING  
 MATERIAL : SKD11, ALLOYED TOOL STEEL (HRc 60)  
 RPM = 3820 rev./min  
 FEED = 36 inch/min  
 COOLANT : OIL MIST



TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.02	h6

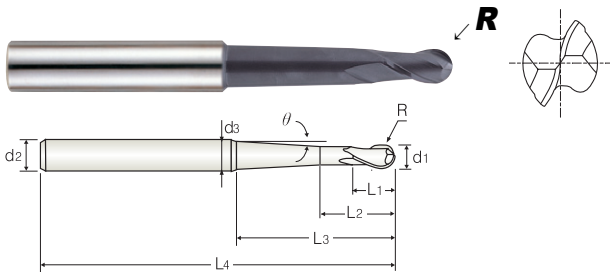
# X-POWER 2 FLUTE, BALL NOSE with TAPER NECK

**METRIC**



► High efficiency milling is possible in deep slotting with projection of the end mill being long.

◇ *Call for Availability*



## EM902 Series

Unit : mm

EDP No.	R ±0.01	MILL DIAMETER d <sub>1</sub>	SHANK DIAMETER d <sub>2</sub> (h6)	LENGTH OF CUT L <sub>1</sub>	L <sub>2</sub>	LENGTH BELOW SHANK L <sub>3</sub>	OVERALL LENGTH L <sub>4</sub>	NECK DIAMETER d <sub>3</sub>	NECK TAPER ANGLE θ
EM902010	R0.5	1.0	6	2	4	23	60	2.0	1°30'
EM902901	R0.5	1.0	6	2	4	23	60	4.3	5°
EM902902	R0.5	1.0	6	2	4	42	80	5.0	3°
EM902020	R1.0	2.0	6	4	6	23	60	2.9	1°30'
EM902903	R1.0	2.0	6	4	6	23	60	5.0	5°
EM902904	R1.0	2.0	6	4	6	41	80	5.7	3°
EM902030	R1.5	3.0	6	6	8	32	70	5.6	3°
EM902905	R1.5	3.0	6	6	8	52	90	5.3	1°30'
EM902040	R2.0	4.0	6	8	10	28	70	6.0	3°
EM902906	R2.0	4.0	6	8	10	49	90	6.0	1°30'
EM902050	R2.5	5.0	8	10	12	41	90	8.0	3°
EM902907	R2.5	5.0	8	10	12	61	110	7.6	1°30'
EM902060	R3.0	6.0	8	12	15	34	90	8.0	3°
EM902908	R3.0	6.0	8	12	15	53	110	8.0	1°30'
EM902080	R4.0	8.0	10	14	17	36	100	10.0	3°
EM902909	R4.0	8.0	10	14	17	55	120	10.0	1°30'
EM902100	R5.0	10.0	12	18	21	40	110	12.0	3°
EM902910	R5.0	10.0	12	18	21	59	130	12.0	1°30'
EM902120	R6.0	12.0	16	22	25	63	140	16.0	3°
EM902911	R6.0	12.0	16	22	25	83	160	15.0	1°30'

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.02	h6



### Useful Field Area

- Die & Mold making, Turbine manufacturing and Aircraft Industry, etc.
- Difficult 3-D Forms.
- Profiling of up to HRc 70 high hardened steels and Alloy steels, Nickel base alloys, Titanium alloys.

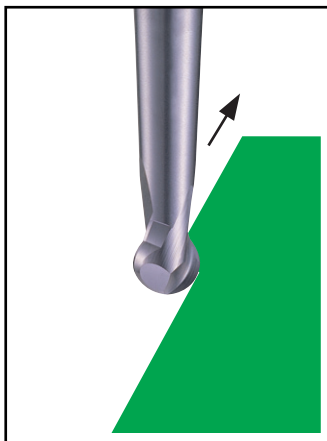


### Characteristic

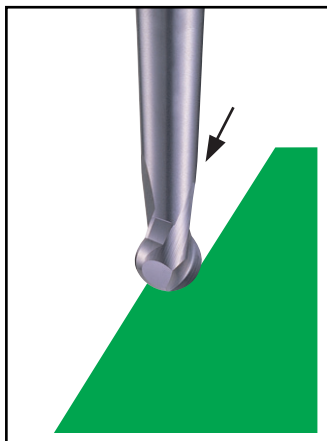
- Ultra micro grain carbide which increases both toughness and hardness.
- YG-1's unique X-POWER coating suitable for dry cutting and high speed cutting.
- Outstanding tool geometry and sphere shape ball enables more increased tool life and higher speed and feed operation.



### Surpassing Milling Operation

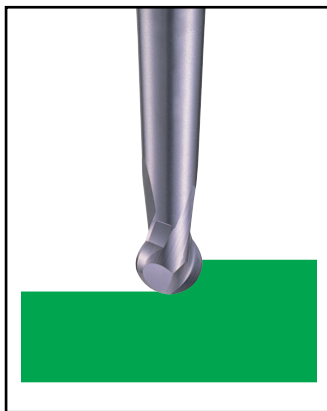


(Favorable Back Milling)

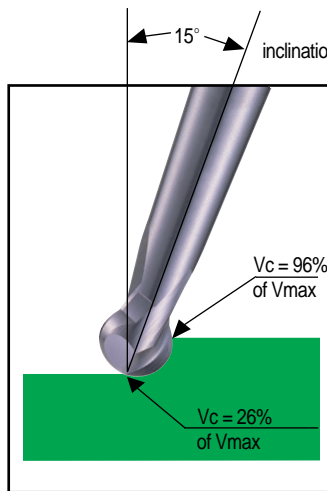


(Unfavorable Drilling)

- Operating angle  $14^{\circ} \sim 16^{\circ}$ , higher speed and feed can be achieved by decreased cutting resistance at cutting edges contacting the workpiece.
- Excellent surface roughness and higher milling process.
- Enable to milling with higher speed and feed when Back Milling.



(Unfavorable Profiling)



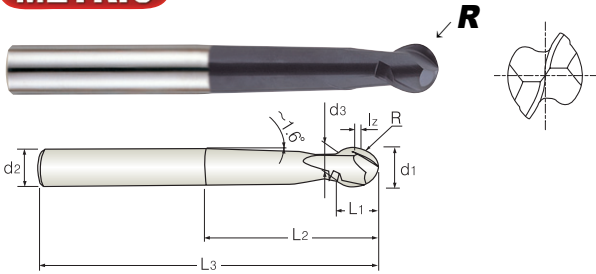
(Favorable Profiling)

- When  $15^{\circ}$  inclination milling operation, more productivity and higher speed and feed are possible.
- Decreased cutting force.
- Excellent surface roughness and brightness.



# X-POWER 2 FLUTE, LONG LENGTH, BALL NOSE

**METRIC**



- ▶ Designed for copy milling.
- ▶ Increased feed rates.
- ▶ 15° inclination.
- ▶ Easy to regrind.

◇ *Call for Availability*

**EM669 Series** ■ MMC-ECONOMY TYPE

Unit : mm

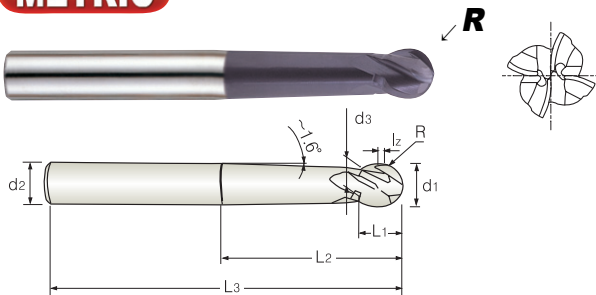
EDP No.	R ±0.01	MILL DIAMETER d1	SHANK DIAMETER d2(h6)	LENGTH OF CUT L1	LENGTH BELOW SHANK L2	OVERALL LENGTH L3	NECK DIAMETER d3	lz
EM669030	R1.5	3.0	6	4	30	80	2.5	1.5
EM669040	R2.0	4.0	6	5	30	80	3.3	1.5
EM669050	R2.5	5.0	6	6	43	80	4.1	2.0
EM669060	R3.0	6.0	6	7	30	100	4.7	2.0
EM669080	R4.0	8.0	8	9	36	100	6.5	3.0
EM669100	R5.0	10.0	10	11	43	100	8.2	3.0
EM669120	R6.0	12.0	12	13	52	100	9.8	3.0
EM669160	R8.0	16.0	16	15	61	150	13.4	3.0

※ ECONOMIC TYPE HAS MORE ADVANTAGE IN RESHARPENING THAN SPHERE TYPE.

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.02	h6

# X-POWER 4 FLUTE, LONG LENGTH, BALL NOSE

**METRIC**



- ▶ Designed for copy milling.
- ▶ Increased feed rates.
- ▶ 15° inclination.
- ▶ Easy to regrind.

◇ *Call for Availability*

**EM673 Series** ■ MMC-ECONOMY TYPE

Unit : mm

EDP No.	R ±0.01	MILL DIAMETER d1	SHANK DIAMETER d2(h6)	LENGTH OF CUT L1	LENGTH BELOW SHANK L2	OVERALL LENGTH L3	NECK DIAMETER d3	lz
EM673050	R2.5	5.0	6	6	43	80	4.1	2.0
EM673060	R3.0	6.0	6	7	30	100	4.7	2.0
EM673080	R4.0	8.0	8	9	36	100	6.5	3.0
EM673100	R5.0	10.0	10	11	43	100	8.2	3.0
EM673120	R6.0	12.0	12	13	52	100	9.8	3.0
EM673160	R8.0	16.0	16	15	61	150	13.4	3.0

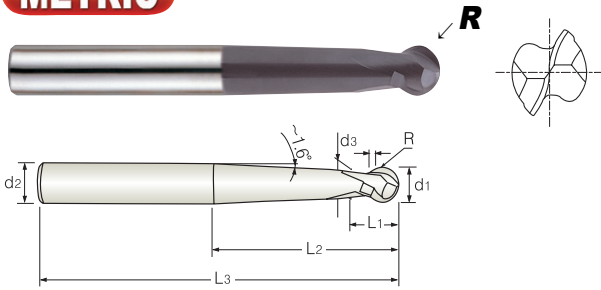
※ ECONOMIC TYPE HAS MORE ADVANTAGE IN RESHARPENING THAN SPHERE TYPE.

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.02	h6

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.02	h6

# X-POWER 2 FLUTE, LONG LENGTH, BALL NOSE

**METRIC**



- ▶ Designed for copy milling.
- ▶ Increased feed rates.
- ▶ 15° inclination.

◇ Call for Availability

**EM863 Series** ■ MMC-SPHERE TYPE

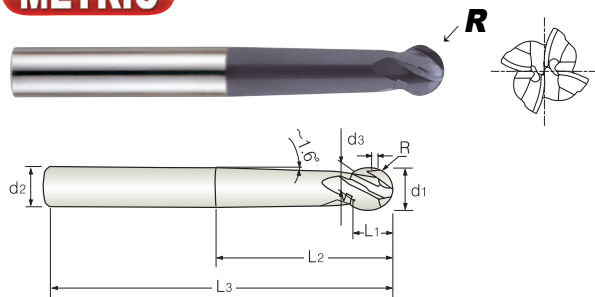
Unit : mm

EDP No.	R ±0.01	MILL DIAMETER d <sub>1</sub>	SHANK DIAMETER d <sub>2</sub> (h6)	LENGTH OF CUT L <sub>1</sub>	LENGTH BELOW SHANK L <sub>2</sub>	OVERALL LENGTH L <sub>3</sub>	NECK DIAMETER d <sub>3</sub>
EM863030	R1.5	3.0	6	2.3	30	80	2.5
EM863040	R2.0	4.0	6	3.1	30	80	3.3
EM863050	R2.5	5.0	6	3.9	38	80	4.1
EM863060	R3.0	6.0	6	4.9	28	100	4.7
EM863080	R4.0	8.0	8	6.3	33	100	6.5
EM863100	R5.0	10.0	10	7.9	40	100	8.2
EM863120	R6.0	12.0	12	9.5	49	100	9.8
EM863160	R8.0	16.0	16	12.4	59	150	13.4

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.02	h6

# X-POWER 4 FLUTE, LONG LENGTH, BALL NOSE

**METRIC**



- ▶ Designed for copy milling.
- ▶ Increased feed rates.
- ▶ 15° inclination.

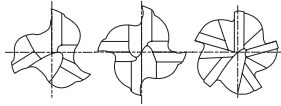
◇ Call for Availability

**EM864 Series** ■ MMC-SPHERE TYPE

Unit : mm

EDP No.	R ±0.01	MILL DIAMETER d <sub>1</sub>	SHANK DIAMETER d <sub>2</sub> (h6)	LENGTH OF CUT L <sub>1</sub>	LENGTH BELOW SHANK L <sub>2</sub>	OVERALL LENGTH L <sub>3</sub>	NECK DIAMETER d <sub>3</sub>
EM864050	R2.5	5.0	6	3.9	38	80	4.1
EM864060	R3.0	6.0	6	4.9	28	100	4.7
EM864080	R4.0	8.0	8	6.3	33	100	6.5
EM864100	R5.0	10.0	10	7.9	40	100	8.2
EM864120	R6.0	12.0	12	9.5	49	100	9.8
EM864160	R8.0	16.0	16	12.4	59	150	13.4

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.02	h6

**X-POWER****MULTI FLUTE, 20° HELIX, SHORT LENGTH, FINE PITCH ROUGHING****METRIC**

- ▶ 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.

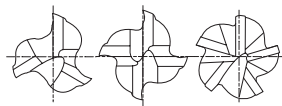
◇ *Call for Availability***EM832 Series**

Unit : mm

EDP No.	MILL DIAMETER h10	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH	NO. OF FLUTE
EM832060	6.0	6	7	54	3
EM832070	7.0	8	8	58	3
EM832080	8.0	8	9	58	3
EM832090	9.0	10	13	66	4
EM832100	10.0	10	14	66	4
EM832120	12.0	12	16	73	4
EM832140	14.0	14	18	75	4
EM832160	16.0	16	22	82	4
EM832180	18.0	18	24	84	4
EM832200	20.0	20	26	92	4
EM832250	25.0	25	25	110	5

**Tolerances according to DIN 7160 & 7161**

Tolerance range in $\mu\text{m}$					
Nominal-Diameter in mm					
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
<b>h10</b>	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
<b>h6</b>	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

 $\mu\text{m} = 1/1000\text{mm}$ **X-POWER****MULTI FLUTE, 20° HELIX, LONG LENGTH, FINE PITCH ROUGHING****METRIC**

- ▶ 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.

◇ *Call for Availability***EM814 Series**

Unit : mm

EDP No.	MILL DIAMETER h10	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH	NO. OF FLUTE
EM814060	6.0	6	16	57	3
EM814070	7.0	8	16	63	3
EM814080	8.0	8	16	63	3
EM814090	9.0	10	19	72	4
EM814100	10.0	10	22	72	4
EM814120	12.0	12	26	83	4
EM814140	14.0	14	26	83	4
EM814901	14.0	16	26	83	4
EM814160	16.0	16	32	92	4
EM814180	18.0	18	32	92	4
EM814200	20.0	20	38	104	4
EM814250	25.0	25	45	121	5

**Tolerances according to DIN 7160 & 7161**

Tolerance range in $\mu\text{m}$					
Nominal-Diameter in mm					
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
<b>h10</b>	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
<b>h6</b>	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

 $\mu\text{m} = 1/1000\text{mm}$

# X-POWER

## 3&4 FLUTE, 20° HELIX, LONG LENGTH, FINE PITCH ROUGHING, BALL NOSE

**METRIC**



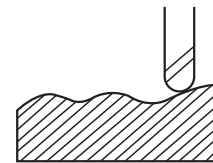
- ▶ Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- ▶ High velocity milling of hardened steels.
- ▶ For dry and wet milling.
- ▶ Fast chip ejection.

◇ *Call for Availability*

Unit : mm

**EM833 Series**

EDP No.	R ±0.02	MILL DIAMETER h10	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH	NO. OF FLUTE
EM833060	R3.0	6.0	6	16	57	3
EM833080	R4.0	8.0	8	16	63	3
EM833100	R5.0	10.0	10	22	72	4
EM833120	R6.0	12.0	12	26	83	4
EM833140	R7.0	14.0	14	26	83	4
EM833160	R8.0	16.0	16	32	92	4
EM833180	R9.0	18.0	18	32	92	4
EM833200	R10.0	20.0	20	38	104	4



**Tolerances according to DIN 7160 & 7161**

Tolerance range in $\mu\text{m}$					
Nominal-Diameter in mm					
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
<b>h10</b>	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
<b>h6</b>	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

$\mu\text{m} = 1/1000\text{mm}$

# X-POWER

## 2 FLUTE, TAPER

**METRIC**



- ▶ Designed for milling die cavity.
- ▶ Suitable for machining tool steels alloy steels, mold steels and other high hardened materials.

◇ *Call for Availability*

Unit :mm

**EM837 Series**

EDP No.	MILL DIAMETER	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH	TAPER ANGLE	EDP No.	MILL DIAMETER	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH	TAPER ANGLE
EM837913	2.0	4	6	45	30'	EM837916	5.0	6	15	60	30'
EM837020	2.0	4	6	45	1°	EM837050	5.0	6	15	60	1°
EM837901	2.0	4	6	45	2°	EM837907	5.0	6	15	60	2°
EM837902	2.0	4	6	45	3°	EM837908	5.0	6	15	60	3°
EM837914	3.0	6	10	55	30'	EM837917	6.0	6	20	60	30'
EM837030	3.0	6	10	55	1°	EM837060	6.0	6	20	60	1°
EM837903	3.0	6	10	55	2°	EM837909	6.0	6	20	60	2°
EM837904	3.0	6	10	55	3°	EM837910	6.0	8	20	65	3°
EM837915	4.0	6	15	55	30'	EM837918	8.0	8	25	70	30'
EM837040	4.0	6	15	55	1°	EM837080	8.0	8	25	70	1°
EM837905	4.0	6	15	55	2°	EM837911	8.0	8	25	70	2°
EM837906	4.0	6	15	55	3°	EM837912	8.0	10	25	75	3°

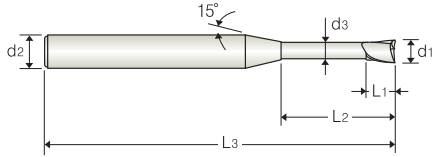
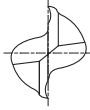
▶ We can supply various sizes and taper angle.

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.02	h6



# X-POWER 2 FLUTE for RIB PROCESSING

**METRIC**



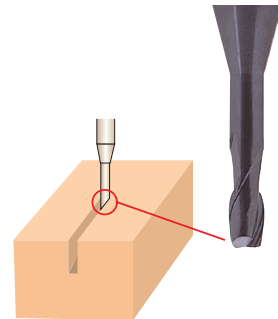
- ▶ For deep slotting & pocketing.
- ▶ For depths of 6 to 10X cutting diameter.
- ▶ Machine carbon steel, alloy steel, tool steel, die and mold steels.
- ▶ Suitable for high speed cutting and high precision machining.
- ▶ Designed with reinforced shank for higher stability and rigidity.
- ▶ Long neck design for deep machining near walls.

◇ *Call for Availability*

## EM883 Series

Unit : mm

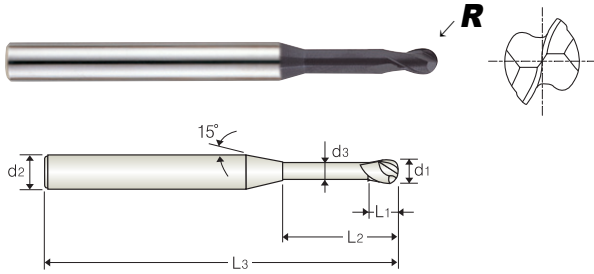
EDP No.	MILL DIAMETER d <sub>1</sub>	SHANK DIAMETER d <sub>2</sub> (h6)	LENGTH OF CUT L <sub>1</sub>	LENGTH BELOW SHANK L <sub>2</sub>	OVERALL LENGTH L <sub>3</sub>	NECK DIAMETER d <sub>3</sub>
EM883908	0.8	4	1.2	6	45	0.75
EM883909	0.8	4	1.2	8	45	0.75
EM883010	1.0	4	1.5	6	45	0.97
EM883912	1.0	4	1.5	8	45	0.95
EM883914	1.0	4	1.5	12	45	0.93
EM883915	1.2	4	1.8	8	45	1.15
EM883917	1.2	4	1.8	12	45	1.13
EM883920	1.4	4	2.1	12	45	1.33
EM883923	1.5	4	2.3	8	45	1.45
EM883924	1.5	4	2.3	10	45	1.45
EM883925	1.5	4	2.3	12	45	1.43
EM883927	1.5	4	2.3	16	50	1.41
EM883932	1.6	4	2.4	12	45	1.53
EM883946	1.8	4	2.7	12	45	1.73
EM883960	2.0	4	3.0	12	45	1.93
EM883962	2.0	4	3.0	16	50	1.91
EM883968	2.5	4	3.7	12	45	2.40
EM883970	2.5	4	3.7	16	55	2.40
EM883977	3.0	6	4.5	14	50	2.85
EM883979	3.0	6	4.5	18	55	2.85



TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.015	h6

# X-POWER 2 FLUTE, BALL NOSE for RIB PROCESSING

**METRIC**



- ▶ 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.

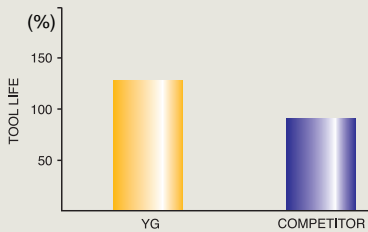
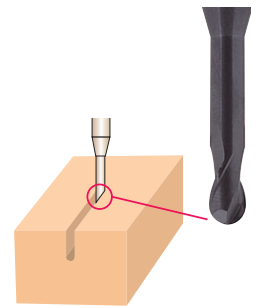
◇ Call for Availability

X-POWER

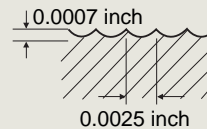
**EM886 Series**

Unit : mm

EDP No.	R ±0.01	MILL DIAMETER d1	SHANK DIAMETER d2(h6)	LENGTH OF CUT l1	LENGTH BELOW SHANK l2	OVERALL LENGTH l3	NECK DIAMETER d3
EM886006	R0.3	0.6	3	0.9	6	35	0.55
EM886008	R0.4	0.8	4	1.2	6	45	0.75
EM886901	R0.4	0.8	4	1.2	8	45	0.75
EM886010	R0.5	1.0	4	1.5	6	45	0.97
EM886902	R0.5	1.0	4	1.5	8	45	0.95
EM886904	R0.5	1.0	4	1.5	12	45	0.93
EM886012	R0.6	1.2	4	1.8	8	45	1.15
EM886905	R0.6	1.2	4	1.8	12	45	1.13
EM886014	R0.7	1.4	4	2.1	12	45	1.33
EM886015	R0.75	1.5	4	2.3	8	45	1.45
EM886906	R0.75	1.5	4	2.3	12	45	1.43
EM886907	R0.75	1.5	4	2.3	16	50	1.41
EM886016	R0.8	1.6	4	2.4	16	50	1.51
EM886018	R0.9	1.8	4	2.7	16	50	1.71
EM886020	R1.0	2.0	4	3.0	8	45	1.95
EM886909	R1.0	2.0	4	3.0	16	50	1.91
EM886910	R1.0	2.0	4	3.0	20	55	1.89
EM886030	R1.5	3.0	6	4.5	16	55	2.85
EM886911	R1.5	3.0	6	4.5	20	60	2.85
EM886040	R2.0	4.0	6	6.0	16	60	3.85
EM886912	R2.0	4.0	6	6.0	20	65	3.85



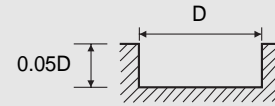
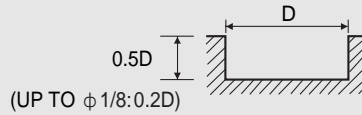
TOOL: YG : 93565,  $\phi$  3/64 (2FL. RIB BALL NOSE)  
 COMPETITOR :  $\phi$  3/64 (2FL. RIB BALL NOSE)  
 MATERIAL : ALLOYED TOOL STEEL (SKD61) HRc 40  
 RPM = 20,000 rev./min  
 FEED = 28 inch/min  
 COOLANT : OIL MIST



TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.02	h6

### EM154 Series

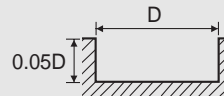
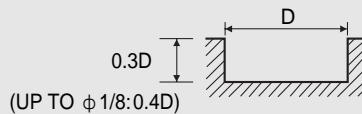
MATERIAL	CARBON STEELS ALLOY STEELS CAST IRON		ALLOY STEELS TOOL STEELS		STAINLESS STEELS		HARDENED STEELS		HARDENED STEELS	
HARDNESS	~HRc30		HRc30 ~ HRc45				HRc45 ~ HRc55		HRc55 ~ HRc65	
STRENGTH	~1000N/mm <sup>2</sup>		1000 ~ 1500N/mm <sup>2</sup>				1500 ~ 2000N/mm <sup>2</sup>		2000N/mm <sup>2</sup> ~	
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



RPM=REVOLUTION PER MIN.  
FEED=inch/min.

### EM206 Series

MATERIAL	CARBON STEELS ALLOY STEELS CAST IRON		ALLOY STEELS TOOL STEELS		STAINLESS STEELS	
HARDNESS	~HRc30		HRc30 ~ HRc45		HRc45 ~ HRc55	
STRENGTH	~1000N/mm <sup>2</sup>		1000 ~ 1500N/mm <sup>2</sup>		1500 ~ 2000N/mm <sup>2</sup>	
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



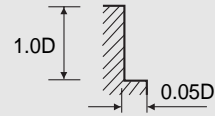
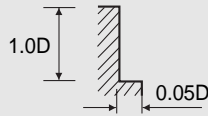
RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## 4 FLUTE, FINISH, SIDE CUTTING

### EM153 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/mm <sup>2</sup>		1000 ~ 1500N/mm <sup>2</sup>				1500 ~ 2000N/mm <sup>2</sup>		2000N/mm <sup>2</sup> ~	
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



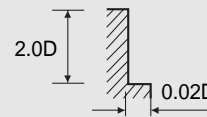
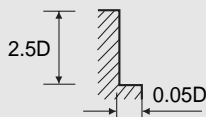
RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## 4 FLUTE, LONG LENGTH, SIDE CUTTING

### EM207 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/mm <sup>2</sup>		1000 ~ 1500N/mm <sup>2</sup>		1500 ~ 2000N/mm <sup>2</sup>		2000N/mm <sup>2</sup> ~	
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



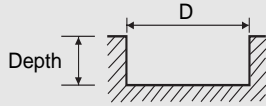
RPM=REVOLUTION PER MIN.  
FEED=inch/min.



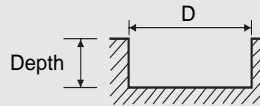
### EM959 Series

MATERIAL	ALLOY STEELS TOOL STEELS		HARDENED STEELS	
HARDNESS	HRc30 ~ HRc45		HRc45 ~ HRc55	
STRENGTH	1000 ~ 1500N/mm <sup>2</sup>		1500 ~ 2000N/mm <sup>2</sup>	
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



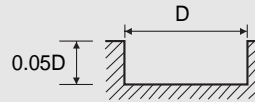
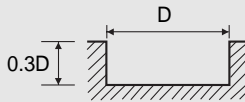
D < .040  
Depth = 0.02 × D  
D ≥ .040  
Depth = 0.05 × D



RPM = REVOLUTION PER MIN.  
FEED = inch/min.

### 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/mm <sup>2</sup>		1000 ~ 1750N/mm <sup>2</sup>		1750 ~ 2000N/mm <sup>2</sup>		2000N/mm <sup>2</sup> ~	
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

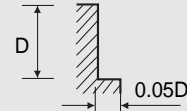
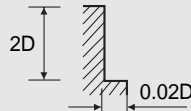
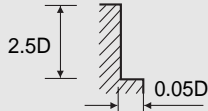


RPM = REVOLUTION PER MIN.  
FEED = inch/min.

## 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/mm <sup>2</sup>		1000 ~ 1750N/mm <sup>2</sup>		1750 ~ 2000N/mm <sup>2</sup>		2000N/mm <sup>2</sup> ~	
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



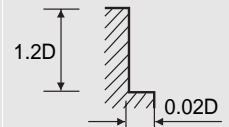
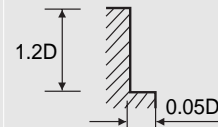
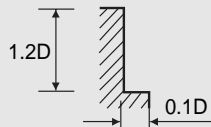
RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## 4 FLUTE, 45° HELIX, SIDE CUTTING

### EM102 Series

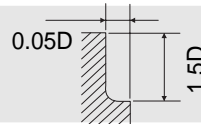
RPM=REVOLUTION PER MIN.  
FEED=inch/min.

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 ~ HRc60	
STRENGTH	~1000N/mm <sup>2</sup>		1000 ~ 1500N/mm <sup>2</sup>				1500 ~ 2000N/mm <sup>2</sup>		2000N/mm <sup>2</sup> ~	
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



**X-POWER****4 FLUTE, 45° HELIX, CORNER RADIUS,  
SIDE CUTTING****EM103 Series**RPM=REVOLUTION PER MIN.  
FEED=inch/min.

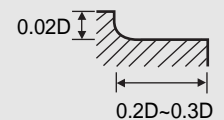
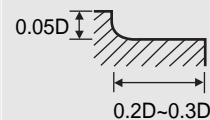
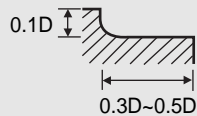
MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON		ALLOY STEELS HEAT RESISTANT STEELS		STAINLESS STEELS		HARDENED STEELS		HARDENED STEELS	
HARDNESS	~HRc30		HRc30 ~ HRc45				HRc45 ~ HRc55		HRc55 ~ HRc65	
STRENGTH	~1000N/mm <sup>2</sup>		1000 ~ 1500N/mm <sup>2</sup>				1500 ~ 2000N/mm <sup>2</sup>		2000N/mm <sup>2</sup> ~	
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



X-POWER

**X-POWER****4 FLUTE, 45° HELIX, CORNER RADIUS,  
CONTOURING****EM103 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/mm <sup>2</sup>		1000 ~ 1500N/mm <sup>2</sup>				1500 ~ 2000N/mm <sup>2</sup>		2000N/mm <sup>2</sup> ~	
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

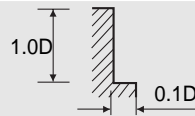
RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## 4 FLUTE, 55° HELIX, SIDE CUTTING

### EM964 Series

MATERIAL	ALLOY STEELS HEAT RESISTANT STEELS		STAINLESS STEELS		HARDENED STEELS		HARDENED STEELS	
HARDNESS	HRc30 ~ HRc40				HRc40 ~ HRc50		HRc50 ~ HRc65	
STRENGTH	1000 ~ 1250N/mm <sup>2</sup>				1250 ~ 1700N/mm <sup>2</sup>		1500N/mm <sup>2</sup> ~	
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=REVOLUTION PER MIN.  
FEED=inch/min.

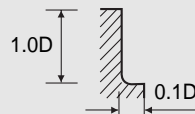
X-POWER



## 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/mm <sup>2</sup>				1250 ~ 1700N/mm <sup>2</sup>		1500N/mm <sup>2</sup> ~	
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

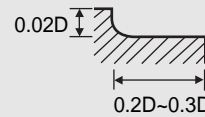
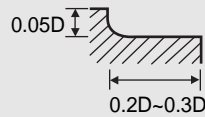
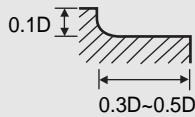


RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## 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/mm <sup>2</sup>				1250 ~ 1700N/mm <sup>2</sup>		1500N/mm <sup>2</sup> ~	
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=REVOLUTION PER MIN.  
FEED=inch/min.



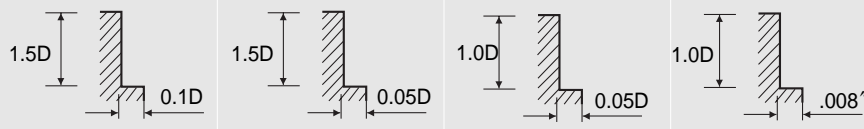


# 6&8 FLUTE, 45° HELIX, LONG LENGTH, SIDE CUTTING

X-POWER

## EM208 Series

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/mm <sup>2</sup>		1000 ~ 1750N/mm <sup>2</sup>		1750 ~ 2080N/mm <sup>2</sup>		2080N/mm <sup>2</sup> ~	
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

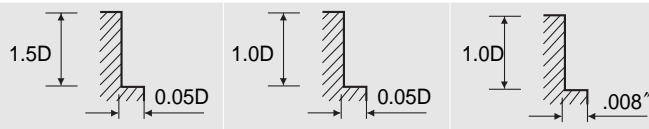


RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## EM208 Series

(HIGH SPEED CUTTING)

MATERIAL	CARBON STEELS TOOL STEELS		HARDENED STEELS		HARDENED STEELS	
HARDNESS	~HRc50		HRc50 ~ HRc60		HRc60 ~	
STRENGTH	~1750N/mm <sup>2</sup>		1750N/mm <sup>2</sup>		1750N/mm <sup>2</sup> ~	
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

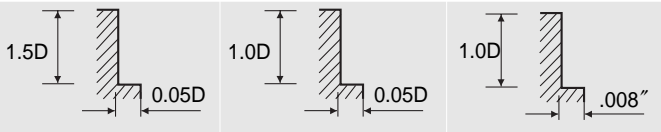


RPM=REVOLUTION PER MIN.  
FEED=inch/min.

**X-POWER****6&8 FLUTE, 45° HELIX, CORNER RADIUS, SIDE CUTTING****EM668 Series**

(HIGH SPEED CUTTING)

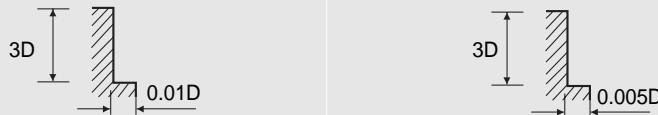
MATERIAL	CARBON STEELS ALLOY STEELS CAST IRON		ALLOY STEELS TOOL STEELS		HARDENED STEELS	
HARDNESS	~ HRC50		HRC50 ~ HRC60		HRC60 ~ HRC65	
STRENGTH	~ 1750N/mm <sup>2</sup>		1750 ~ 2080N/mm <sup>2</sup>		2080N/mm <sup>2</sup> ~	
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED
1/4	16800	240.00	8400	120.00	4200	58.00
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=REVOLUTION PER MIN.  
FEED=inch/min.

X-POWER

**X-POWER****6&8 FLUTE, 45° HELIX, EXTRA LONG LENGTH, SIDE CUTTING****EM208, EM999 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/mm <sup>2</sup>		1250 ~ 1750N/mm <sup>2</sup>		1750 ~ 2080N/mm <sup>2</sup>		2080N/mm <sup>2</sup> ~	
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=REVOLUTION PER MIN.  
FEED=inch/min.

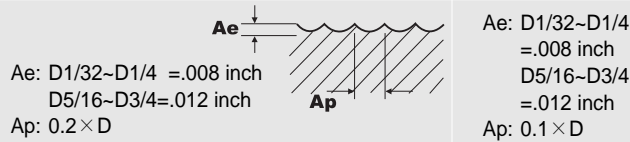


# 2 FLUTE, LONG LENGTH, BALL NOSE

X-POWER

## EM209 Series

MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON		ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS	
HARDNESS	~HRc30		HRc30 ~ HRc40		HRc45 ~ HRc65	
STRENGTH	~1000N/mm <sup>2</sup>		1000 ~ 1250N/mm <sup>2</sup>		1500N/mm <sup>2</sup> ~	
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

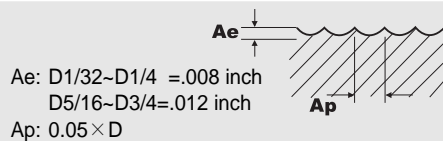


RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## EM209 Series

(HIGH SPEED CUTTING)

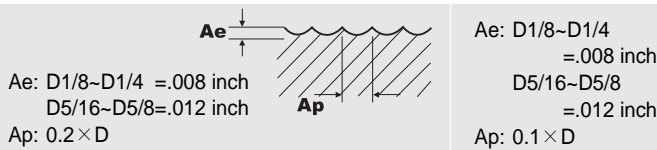
MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON		HARDENED STEELS	
HARDNESS	~HRc45		HRc45 ~ HRc65	
STRENGTH	~1500N/mm <sup>2</sup>		1500N/mm <sup>2</sup> ~	
DIAMETER	RPM	FEED	RPM	FEED
R1/64 × 1/32	25000	25.60	25000	15.70
R1/32 × 1/16	23000	27.50	23000	16.90
R3/64 × 3/32	21000	34.60	19000	19.30
R1/16 × 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



RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## EM210 Series

MATERIAL	CARBON STEELS ALLOY STEELS CAST IRON		ALLOY STEELS TOOL STEELS		HARDENED STEELS	
HARDNESS	~HRc30		HRc30 ~ HRc40		HRc45 ~ HRc65	
STRENGTH	~1000N/mm <sup>2</sup>		1000~1250N/mm <sup>2</sup>		1500N/mm <sup>2</sup> ~	
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

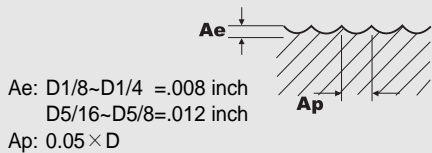


RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## EM210 Series

(HIGH SPEED CUTTING)

MATERIAL	CARBON STEELS ALLOY STEELS CAST IRON		ALLOY STEELS TOOL STEELS	
HARDNESS	~HRc45		HRc45 ~ HRc65	
STRENGTH	~1500N/mm <sup>2</sup>		1500N/mm <sup>2</sup> ~	
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



RPM=REVOLUTION PER MIN.  
FEED=inch/min.



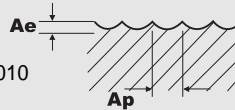
## 2 FLUTE, MEDIUM LENGTH, BALL NOSE

### EM961 Series

MATERIAL	ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS		HARDENED STEELS	
	HRc30 ~ HRc40		HRc45 ~ HRc50		HRc50 ~ HRc55	
STRENGTH	1000 ~ 1250N/mm <sup>2</sup>		1500 ~ 1750N/mm <sup>2</sup>		1750N/mm <sup>2</sup> ~ 2000N/mm <sup>2</sup>	
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

Ae: D1/8 ~ D1/4 =.008  
D5/16 ~ D1=.012  
Ap: 0.2 × D

Ae: D1/8 =.006  
D3/16 ~ D5/16=.010  
D3/8 ~ D1=.012  
Ap: 0.1 × D



RPM=REVOLUTION PER MIN.  
FEED=inch/min.

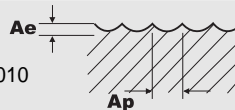
### EM961 Series

(HIGH SPEED CUTTING)

MATERIAL	ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS		HARDENED STEELS	
	~ HRc45		HRc45 ~ HRc50		HRc50 ~ HRc55	
STRENGTH	1000 ~ 1250N/mm <sup>2</sup>		1500 ~ 1750N/mm <sup>2</sup>		1750N/mm <sup>2</sup> ~ 2000N/mm <sup>2</sup>	
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

Ae: D1/8 ~ D1/4 =.008  
D5/16 ~ D1=.012  
Ap: 0.05 × D

Ae: D1/8 =.006  
D3/16 ~ D5/16=.010  
D3/8 ~ D1=.012  
Ap: 0.05 × D

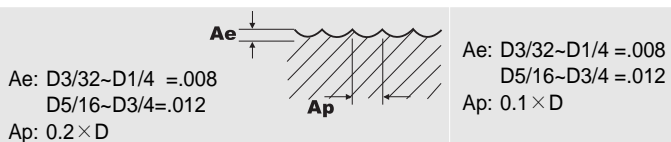


RPM=REVOLUTION PER MIN.  
FEED=inch/min.



### EM962 Series

MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON		ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS	
HARDNESS	~HRc30		HRc30 ~ HRc40		HRc45 ~ HRc65	
STRENGTH	~1000N/mm <sup>2</sup>		1000 ~ 1250N/mm <sup>2</sup>		1500N/mm <sup>2</sup> ~	
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

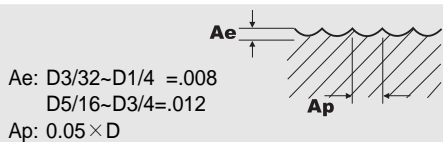


RPM=REVOLUTION PER MIN.  
FEED=inch/min.

### EM962 Series

(HIGH SPEED CUTTING)

MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON		HARDENED STEELS	
HARDNESS	~HRc45		HRc45 ~ HRc65	
STRENGTH	~1500N/mm <sup>2</sup>		1500N/mm <sup>2</sup> ~	
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



RPM=REVOLUTION PER MIN.  
FEED=inch/min.

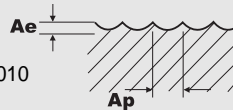


## 2 FLUTE, BALL NOSE for OVER HRC55

### EM109 Series

MATERIAL	HARDENED STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS	
HARDNESS	HRc45 ~ HRc50		HRc50 ~ HRc55		HRc55 ~ HRc60		HRc60 ~ HRc65	
STRENGTH	1500 ~ 1750N/mm <sup>2</sup>		1750 ~ 2000N/mm <sup>2</sup>		2000 ~ 2080N/mm <sup>2</sup>		2080N/mm <sup>2</sup> ~	
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

Ae: D1/8 = .006  
 D3/16 ~ D5/16 = .010  
 D3/8 ~ D1 = .012  
 Ap: 0.1 × D



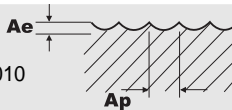
RPM=REVOLUTION PER MIN.  
 FEED=inch/min.

### EM109 Series

(HIGH SPEED CUTTING)

MATERIAL	HARDENED STEELS		HARDENED STEELS		HARDENED STEELS	
HARDNESS	HRc45 ~ HRc50		HRc50 ~ HRc55		HRc55 ~ HRc65	
STRENGTH	1500 ~ 1750N/mm <sup>2</sup>		1750 ~ 2000N/mm <sup>2</sup>		2000 ~ 2080N/mm <sup>2</sup>	
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

Ae: D1/8 = .006  
 D3/16 ~ D5/16 = .010  
 D3/8 ~ D1 = .012  
 Ap: 0.05 × D



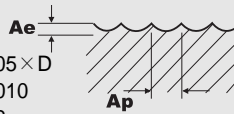
RPM=REVOLUTION PER MIN.  
 FEED=inch/min.

### EM963 Series

MATERIAL	ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS		HARDENED STEELS	
HARDNESS	HRc30 ~ HRc40		HRc40 ~ HRc50		HRc50 ~ HRc55	
STRENGTH	1000 ~ 1250N/mm <sup>2</sup>		1250 ~ 1750N/mm <sup>2</sup>		1750N/mm <sup>2</sup> ~ 2000N/mm <sup>2</sup>	
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

Ae: D1/16 ~ D1/4 =.008  
D5/16 ~ D1/2 =.012  
Ap: 0.2×D

Ae: D1/16 ~ D1/8=0.05×D  
D3/16 ~ D5/16=.010  
D3/8 ~ D1/2=.012  
Ap: 0.1×D



RPM=REVOLUTION PER MIN.  
FEED=inch/min.

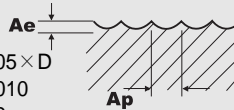
### EM963 Series

(HIGH SPEED CUTTING)

MATERIAL	ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS		HARDENED STEELS	
HARDNESS	~ HRc45		HRc45 ~ HRc50		HRc50 ~ HRc55	
STRENGTH	1500N/mm <sup>2</sup>		1250 ~ 1750N/mm <sup>2</sup>		1750N/mm <sup>2</sup> ~ 2000N/mm <sup>2</sup>	
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

Ae: D1/16 ~ D1/4 =.008  
D5/16 ~ D1/2 =.012  
Ap: 0.05×D

Ae: D1/16 ~ D1/8=0.05×D  
D3/16 ~ D5/16=.010  
D3/8 ~ D1/2=.012  
Ap: 0.05×D



RPM=REVOLUTION PER MIN.  
FEED=inch/min.



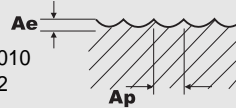
## 2 FLUTE, BALL NOSE with PENCIL NECK

### EM979 Series

MATERIAL	ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS		HARDENED STEELS	
HARDNESS	HRc30 ~ HRc40		HRc40 ~ HRc50		HRc50 ~ HRc55	
STRENGTH	1000 ~ 1250N/mm <sup>2</sup>		1250 ~ 1750N/mm <sup>2</sup>		1750N/mm <sup>2</sup> ~ 2000N/mm <sup>2</sup>	
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED
<b>R3/12 × 3/16</b>	4670	14.50	6000	27.70	5760	26.80
<b>R1/8 × 1/4</b>	4030	15.80	5520	29.00	5200	27.70
<b>R5/32 × 5/16</b>	2830	16.70	4480	26.50	4240	25.20
<b>R3/16 × 3/8</b>	2420	17.90	3880	25.20	3720	24.20
<b>R1/4 × 1/2</b>	1880	16.70	3480	25.20	3320	24.20

Ae: D3/16 ~ D1/4 =.008  
D5/16 ~ D1/2 =.012  
Ap: 0.2 × D

Ae: D3/16 ~ D5/16=.010  
D3/8 ~ D1/2=.012  
Ap: 0.1 × D



RPM=REVOLUTION PER MIN.  
FEED=inch/min.

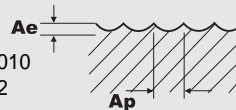
### EM979 Series

(HIGH SPEED CUTTING)

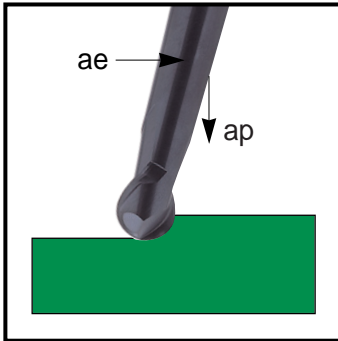
MATERIAL	ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS		HARDENED STEELS	
HARDNESS	~ HRc45		HRc45 ~ HRc50		HRc50 ~ HRc55	
STRENGTH	~ 1500N/mm <sup>2</sup>		1250 ~ 1750N/mm <sup>2</sup>		1750N/mm <sup>2</sup> ~ 2000N/mm <sup>2</sup>	
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED
<b>R3/12 × 3/16</b>	13440	45.40	6000	41.60	5760	39.40
<b>R1/8 × 1/4</b>	13440	58.20	5520	44.10	5200	42.50
<b>R5/32 × 5/16</b>	10080	71.50	4480	39.40	4240	36.20
<b>R3/16 × 3/8</b>	8740	76.90	3880	36.30	3720	34.60
<b>R1/4 × 1/2</b>	6720	66.20	3480	35.60	3320	33.00

Ae: D3/16 ~ D1/4 =.008  
D5/16 ~ D1/2 =.012  
Ap: 0.05 × D

Ae: D3/16 ~ D5/16=.010  
D3/8 ~ D1/2=.012  
Ap: 0.05 × D



RPM=REVOLUTION PER MIN.  
FEED=inch/min.



**RECOMMENDED CUTTING CONDITIONS**

- ▶  $ae = 0.05 \times d1$
- ▶  $ap = 0.02 \times d1$

**EM084, EM096 Series**

MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON		ALLOYED STEELS HEAT RESISTANT STEELS		HARDENED STEELS	
HARDNESS	~HRc30		HRc30 ~ HRc40		HRc45 ~ HRc65	
STRENGTH	~1000N/mm <sup>2</sup>		1000 ~ 1250N/mm <sup>2</sup>		1500N/mm <sup>2</sup>	
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=REVOLUTION PER MIN.  
FEED=inch/min.

**EM084, EM096 Series**

(HIGH SPEED CUTTING)

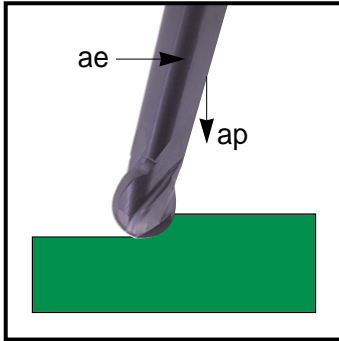
MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON		ALLOYED STEELS HEAT RESISTANT STEELS		HARDENED STEELS	
HARDNESS	~HRc30		HRc30 ~ HRc40		HRc45 ~ HRc65	
STRENGTH	~1000N/mm <sup>2</sup>		1000 ~ 1250N/mm <sup>2</sup>		1500N/mm <sup>2</sup>	
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED
R1/16 × 1/8	47000	145.70	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=REVOLUTION PER MIN.  
FEED=inch/min.





# 4 FLUTE, BALL NOSE-MMC



## RECOMMENDED CUTTING CONDITIONS

- ▶  $ae = 0.05 \times d1$
- ▶  $ap = 0.02 \times d1$

### EM093, EM097 Series

MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON		ALLOYED STEELS HEAT RESISTANT STEELS		HARDENED STEELS	
HARDNESS	~HRc30		HRc30 ~ HRc40		HRc45 ~ HRc65	
STRENGTH	~1000N/mm <sup>2</sup>		1000 ~ 1250N/mm <sup>2</sup>		1500N/mm <sup>2</sup>	
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=REVOLUTION PER MIN.  
FEED=inch/min.

### EM093, EM097 Series

(HIGH SPEED CUTTING)

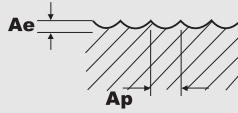
MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON		ALLOYED STEELS HEAT RESISTANT STEELS		HARDENED STEELS	
HARDNESS	~HRc30		HRc30 ~ HRc40		HRc45 ~ HRc65	
STRENGTH	~1000N/mm <sup>2</sup>		1000 ~ 1250N/mm <sup>2</sup>		1500N/mm <sup>2</sup>	
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED
R3/32 × 3/16	28000	220.50	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=REVOLUTION PER MIN.  
FEED=inch/min.

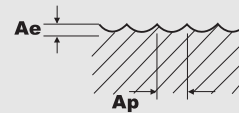
### EM960 Series

MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON		HARDENED STEELS	
HARDNESS	HRc30 ~ HRc45		HRc45 ~ HRc55	
STRENGTH	1000 ~ 1500N/mm <sup>2</sup>		1500 ~ 2000N/mm <sup>2</sup>	
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  
Ae: 0.05 × D  
Ap: 0.15 × D  
D ≥ .040  
Ae: 0.075 × D  
Ap: 0.15 × D



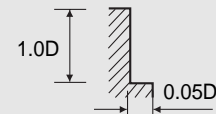
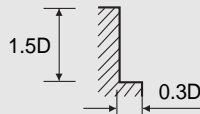
D < .040  
Ae: 0.05 × D  
Ap: 0.1 × D  
D ≥ .040  
Ae: 0.05 × D  
Ap: 0.15 × D



RPM=REVOLUTION PER MIN.  
FEED=inch/min.

### EM666, EM156 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/mm <sup>2</sup>		1000 ~ 1200N/mm <sup>2</sup>		1200 ~ 1400N/mm <sup>2</sup>		1400 ~ 2000N/mm <sup>2</sup>		2000N/mm <sup>2</sup> ~	
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



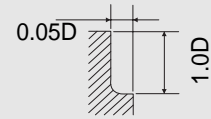
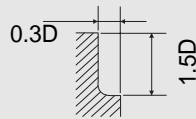
RPM=REVOLUTION PER MIN.  
FEED=inch/min.



# MULTI FLUTE, ROUGHING, BALL NOSE, SIDE CUTTING

## EM662 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/mm <sup>2</sup>		1000 ~ 1200N/mm <sup>2</sup>		1200 ~ 1400N/mm <sup>2</sup>		1400 ~ 2000N/mm <sup>2</sup>		2000N/mm <sup>2</sup> ~	
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
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=REVOLUTION PER MIN.  
FEED=inch/min.

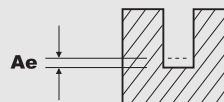


# 2 FLUTE, FINISH for RIB PROCESSING

## EM966 Series

MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON			ALLOY STEELS HEAT RESISTANT STEELS			HARDENED STEELS		
HARDNESS	~ HRc30			HRc30 ~ HRc45			HRc45 ~ HRc55		
STRENGTH	~ 1000N/mm <sup>2</sup>			1000 ~ 1500N/mm <sup>2</sup>			1500 ~ 2000N/mm <sup>2</sup>		
DIAMETER	RPM	FEED	Ae (inch)	RPM	FEED	Ae (inch)	RPM	FEED	Ae (inch)
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

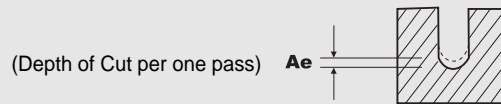
(Depth of Cut per one pass)



RPM=REVOLUTION PER MIN.  
FEED=inch/min.

### EM967 Series

MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON			ALLOY STEELS HEAT RESISTANT STEELS			HARDENED STEELS		
HARDNESS	~ HRC30			HRC30 ~ HRC45			HRC45 ~ HRC55		
STRENGTH	~ 1000N/mm <sup>2</sup>			1000 ~ 1500N/mm <sup>2</sup>			1500 ~ 2000N/mm <sup>2</sup>		
DIAMETER	RPM	FEED	Ae (inch)	RPM	FEED	Ae (inch)	RPM	FEED	Ae (inch)
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



RPM=REVOLUTION PER MIN.  
FEED=inch/min.



# V7 MILL™

SOLID CARBIDE END MILLS

Patent pending

● **Completely New Milling Generation**

- Breakup of the chattering and Minimized tool deflection by optimum design for faster & deeper machining
- Supreme surface finish
- Increased cutting depth and feed rates

● **Outstanding Tool Life**

- Made from Prime Grade Carbide
- Improved Oxidation resistance and Toughness with AlTiN coated
- Corner Protection against chipping

● **Application materials**

- Mild Steels
- Cast Iron
- Tool steels
- Titanium Alloys
- Prehardened Steels
- Low hardness material under HRc 40
- Stainless Steels





# V7 MILL SOLID CARBIDE END MILLS SELECTION GUIDE



Low amplitude sine wave design eliminates vibration. Allowing deeper cuts, higher speeds and increased metal removal rates.

Patent pending

## INCH

EDP No.	APPEARANCE	SPECIFICATION	STOCK	PAGE
EMB12 EMB37		4 FLUTE, REGULAR LENGTH END MILL		85
EMB13 EMB38		4 FLUTE, REGULAR LENGTH, CORNER RADIUS END MILL		86
EMB20		4 FLUTE EXTENDED LENGTH, LONG REACH END MILL		87
EMB78 EMB79		4 FLUTE REGULAR LENGTH BALL END MILL		88
EMB76 EMB77		5 FLUTE REGULAR LENGTH END MILL		89

## METRIC

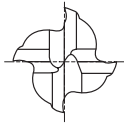
EDP No.	APPEARANCE	SPECIFICATION	STOCK	PAGE
EMB14 EMB39		4 FLUTE, LONG LENGTH END MILL		90
EMB15 EMB40		4 FLUTE, LONG LENGTH, CORNER RADIUS END MILL		91
EMB74 EMB75		4 FLUTE LONG LENGTH BALL END MILL		92
EMB72 EMB73		5 FLUTE LONG LENGTH END MILL		93

SPEED & FEED DATA

94 ~ 96



# 4 FLUTE, REGULAR LENGTH END MILL



MG
4
PLAIN
FLAT
DATA
P.94

- ▶ Higher speeds, deeper cuts and metal removal rates.
- ▶ Improved surface finishes
- ▶ New "NANO" AlTiN coating
- ▶ Machining of most materials under 40Rc.

## EMB12, EMB37 Series

Unit : inch

EDP No. (PLAIN)	EDP No. (FLAT)	MILL DIAMETER	SHANK DIAMETER h6	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.

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0012	0 -.0003

# V7 MILL

## 4 FLUTE, REGULAR LENGTH, CORNER RADIUS END MILL



MG
4
R
PLAIN
FLAT
DATA
P.94

- ▶ Higher speeds, deeper cuts and metal removal rates.
- ▶ Improved surface finishes
- ▶ New "NANO" AITIN coating
- ▶ Machining of most materials under 40Rc.

V7 MILL

### EMB13, EMB38 Series

Unit : inch

EDP No. (PLAIN)	EDP No. (FLAT)	CORNER RADIUS R	MILL DIAMETER	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH
EMB13008	-	.010~.015	1/8	1/8	3/8	1-1/2
EMB13012	-	.010~.015	3/16	3/16	7/16	2
EMB13016	-	.015~.020	1/4	1/4	1/2	2-1/2
EMB13020	-	.015~.020	5/16	5/16	13/16	2-1/2
-	EMB38024	.015~.020	3/8	3/8	7/8	2-1/2
-	EMB38028	.015~.020	7/16	7/16	1	2-3/4
-	EMB38032	.025~.030	1/2	1/2	1	3
-	EMB38036	.025~.030	9/16	9/16	1-1/8	3-1/2
-	EMB38040	.035~.040	5/8	5/8	1-1/4	3-1/2
-	EMB38048	.035~.040	3/4	3/4	1-1/2	4
-	EMB38064	.035~.040	1	1	1-1/2	4

\* Shanks 3/8" and over come standard with Flats.

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0012	0 -.0003



# 4 FLUTE EXTENDED LENGTH, LONG REACH END MILL



P.94

- ▶ Higher speeds, deeper cuts and metal removal rates.
- ▶ Improved surface finishes
- ▶ New "NANO" AlTiN coating
- ▶ Machining of most materials under 40Rc.

V7 MILL

## EMB20 Series

Unit : inch

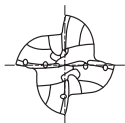
EDP No. (PLAIN)	EDP No. (FLAT)	MILL DIAMETER	SHANK DIAMETER h6	LENGTH OF CUT	REACH LENGTH	OVERALL LENGTH
EMB20160	-	1/4	1/4	3/8	1-1/4	4
-	EMB20240	3/8	3/8	1/2	1-7/8	4
-	EMB20320	1/2	1/2	5/8	2-1/4	4
-	EMB20400	5/8	5/8	3/4	2-1/4	4-1/8
-	EMB20401	5/8	5/8	3/4	3-1/4	5
-	EMB20480	3/4	3/4	1	2-1/4	4-1/4
-	EMB20481	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.

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0012	0 -.0003

# V7 MILL

# 4 FLUTE REGULAR LENGTH BALL END MILL



MG
4
R
PLAIN
FLAT
DATA
P.95

- ▶ Higher speeds, deeper cuts and metal removal rates.
- ▶ Improved surface finishes
- ▶ New "NANO" AlTiN coating
- ▶ Machining of most materials under 40Rc.

V7 MILL

## EMB78, EMB79 Series

Unit : mm

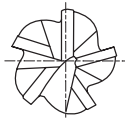
EDP No. (PLAIN)	EDP No. (FLAT)	MILL DIAMETER	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH
EMB78008	-	1/8	1/8	3/8	1 1/2
EMB78010	-	5/32	3/16	7/16	2
EMB78012	-	3/16	3/16	7/16	2
EMB78016	-	1/4	1/4	1/2	2 1/2
EMB78020	-	5/16	5/16	13/16	2 1/2
-	EMB79024	3/8	3/8	7/8	2 1/2
-	EMB79032	1/2	1/2	1	3
-	EMB79040	5/8	5/8	1-1/4	3 1/2
-	EMB79048	3/4	3/4	1-1/2	4
-	EMB79064	1	1	1-1/2	4

\* Shanks 3/8" and over come standard with Flats.

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0012	0 -.0003



# V7 MILL 5 FLUTE REGULAR LENGTH END MILL



MG
5
PLAIN
FLAT
DATA
P.96

- ▶ Higher speeds, deeper cuts and metal removal rates.
- ▶ Improved surface finishes
- ▶ New "NANO" AITiN coating
- ▶ Machining of most materials under 40Rc.

## EMB76, EMB77 Series

Unit : mm

EDP No. (PLAIN)	EDP No. (FLAT)	MILL DIAMETER	SHANK DIAMETER h6	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
-	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

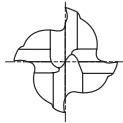
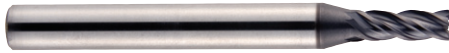
\* Shanks 3/8 " and over come standard with Flats.

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0012	0 -.0003

# V7 MILL

# 4 FLUTE, LONG LENGTH END MILL

**METRIC**



MG
4
PLAIN
FLAT
DATA
P.94

- ▶ Higher speeds, deeper cuts and metal removal rates.
- ▶ Improved surface finishes
- ▶ New "NANO" AlTiN coating
- ▶ Machining of most materials under 40Rc.

V7 MILL

**EMB14, EMB39 Series**

Unit : mm

EDP No. (PLANT)	EDP No. (FLAT)	MILL DIAMETER	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH
EMB14030	-	3	6	8	57
EMB14040	-	4	6	11	57
EMB14050	-	5	6	13	57
EMB14060	-	6	6	13	57
EMB14080	-	8	8	19	63
EMB14100	-	10	10	22	72
-	EMB39120	12	12	26	83
-	EMB39140	14	14	26	83
-	EMB39160	16	16	32	92
-	EMB39180	18	18	32	92
-	EMB39200	20	20	38	104
-	EMB39250	25	25	38	104

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.03	h6



# 4 FLUTE, LONG LENGTH, CORNER RADIUS END MILL

**METRIC**



MG
4
PLAIN
FLAT
DATA
P.94

- ▶ Higher speeds, deeper cuts and metal removal rates.
- ▶ Improved surface finishes
- ▶ New "NANO" AlTiN coating
- ▶ Machining of most materials under 40Rc.

**EMB15, EMB40 Series**

Unit : mm

EDP No. (PLANT)	EDP No. (FLAT)	CORNER RADIUS R	MILL DIAMETER	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH
EMB15030	-	0.25~0.38	3	6	8	57
EMB15040	-	0.25~0.38	4	6	11	57
EMB15050	-	0.25~0.38	5	6	13	57
EMB15060	-	0.38~0.51	6	6	13	57
EMB15080	-	0.38~0.51	8	8	19	63
EMB15100	-	0.38~0.51	10	10	22	72
-	EMB40120	0.64~0.76	12	12	26	83
-	EMB40140	0.64~0.76	14	14	26	83
-	EMB40160	0.89~1.02	16	16	32	92
-	EMB40180	0.89~1.02	18	18	32	92
-	EMB40200	0.89~1.02	20	20	38	104
-	EMB40250	0.89~1.02	25	25	38	104

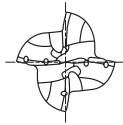
V7 MILL

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.03	h6

# V7 MILL

# 4 FLUTE LONG LENGTH BALL END MILL

**METRIC**



MG
4
R
PLAIN
FLAT
DATA
P.95

- ▶ Higher speeds, deeper cuts and metal removal rates.
- ▶ Improved surface finishes
- ▶ New "NANO" AlTiN coating
- ▶ Machining of most materials under 40Rc.

V7 MILL

## EMB74, EMB75 Series

Unit : mm

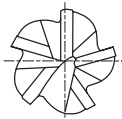
EDP No. (PLAIN)	EDP No. (FLAT)	MILL DIAMETER	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH
EMB74030	EMB75030	3	6	8	57
EMB74040	EMB75040	4	6	11	57
EMB74050	EMB75050	5	6	13	57
EMB74060	EMB75060	6	6	13	57
EMB74080	EMB75080	8	8	19	63
EMB74100	EMB75100	10	10	22	72
EMB74120	EMB75120	12	12	26	83
EMB74160	EMB75160	16	16	32	92
EMB74200	EMB75200	20	20	38	104
EMB74250	EMB75250	25	25	38	104

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.03	h6

# V7 MILL

# 5 FLUTE LONG LENGTH END MILL

**METRIC**



MG
5
PLAIN
FLAT
DATA
P.96

- ▶ Higher speeds, deeper cuts and metal removal rates.
- ▶ Improved surface finishes
- ▶ New "NANO" AlTiN coating
- ▶ Machining of most materials under 40Rc.

V7 MILL

**EMB72, EMB73 Series**

Unit : mm

EDP No. (PLAIN)	EDP No. (FLAT)	MILL DIAMETER	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH
EMB72060	EMB73060	6	6	13	57
EMB72080	EMB73080	8	8	19	63
EMB72100	EMB73100	10	10	22	72
EMB72120	EMB73120	12	12	26	83
EMB72140	EMB73140	14	14	26	83
EMB72160	EMB73160	16	16	32	92
EMB72180	EMB73180	18	18	32	92
EMB72200	EMB73200	20	20	38	104
EMB72250	EMB73250	25	25	38	104

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.03	h6





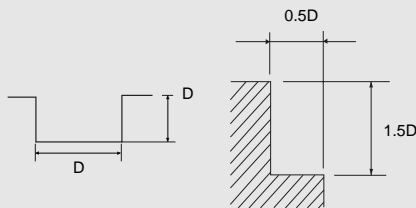
# 4 FLUTE, SQUARE END MILL & CORNER RADIUS END MILL

V7 MILL

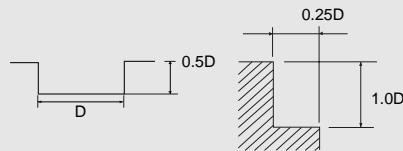
## EMB12, EMB13, EMB14, EMB15, EMB20, EMB37, EMB38, EMB39, EMB40 Series

MATERIAL	ALLOY STEELS CAST IRON		STAINLESS STEELS 300SERIES		STAINLESS STEELS 400SERIES		TITANIUM		INCONEL	
HARDNESS	~ HB 230									
STRENGTH	~ 1000N/mm <sup>2</sup>									
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
3	13475	10.83	8700	7.48	10400	9.45	8700	7.48	3080	1.69
4	10105	12.99	6525	9.84	7800	12.20	6525	9.84	2305	2.20
5	8085	14.57	5220	12.01	6240	14.96	5220	12.01	1850	2.68
6	6735	17.13	4355	13.98	5170	17.32	4355	13.98	1540	3.15
8	5050	21.85	3265	18.11	3900	22.44	3260	17.91	1155	4.06
10	4455	27.17	2665	20.28	2880	21.85	2665	20.28	890	2.72
12	3710	27.36	2230	20.47	2335	21.42	2230	20.47	745	2.72
14	3180	24.41	1910	18.90	2000	19.88	1910	18.90	640	2.52
16	2785	23.23	1670	17.32	1750	18.11	1670	17.32	555	2.32
18	2475	23.03	1485	17.20	1555	18.11	1485	17.32	495	2.28
20	2225	22.83	1340	17.13	1400	17.91	1340	17.13	445	2.28
25	1780	17.72	1070	13.78	1120	14.57	1070	13.78	355	1.85

• ALLOY STEELS CAST IRON / STAINLESS STEELS 300, 400SERIES / TITANIUM



• INCONEL



RPM = REVOLUTION PER MIN.  
FEED = inch/min.

### \* Titanium Machining

- On full slot cuts, Reduce R.P.M and I.P.M by 35%
- Speeds and feeds subject to coolant quality, quantity and pressure.



# 4 FLUTE SINUSOIDAL HELIX BALL END MILL CUTTING CONDITION

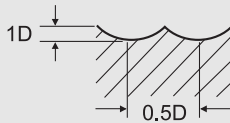


V7 MILL

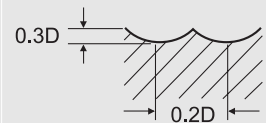
## EMB74, EMB75, EMB78, EMB79 Series

MATERIAL	ALLOY STEELS CAST IRON		STAINLESS STEELS 300SERIES		STAINLESS STEELS 400SERIES		TITANIUM		INCONEL	
HARDNESS	~ HB 230									
STRENGTH	~ 1000N/mm <sup>2</sup>									
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
3	14324	56.30	8220	25.59	7420	17.32	5830	11.02	3180	5.51
4	10740	42.13	6160	19.29	5570	12.99	4370	8.27	2380	3.94
5	8590	40.55	4930	19.29	4450	17.32	3500	8.27	1910	3.15
6	7460	44.88	4110	26.38	3710	17.32	2910	9.06	1590	3.94
8	5370	50.39	3080	21.65	2780	17.32	2180	10.24	1190	4.72
10	4290	40.55	2460	19.29	2220	15.75	1750	8.27	950	3.94
12	3580	39.37	2050	17.72	1850	14.57	1450	9.06	790	4.72
16	2680	31.50	1540	14.57	1390	11.81	1090	7.48	590	4.33
18	2380	29.92	1370	13.78	1230	11.42	970	7.48	530	4.33
20	2140	30.31	1230	12.60	1110	10.24	870	8.27	470	3.94
25	1710	26.77	980	10.63	890	8.27	700	7.48	380	3.15

• ALLOY STEELS CAST IRON / STAINLESS STEELS 300, 400SERIES / TITANIUM



• INCONEL



RPM = REVOLUTION PER MIN.  
FEED = inch/min.



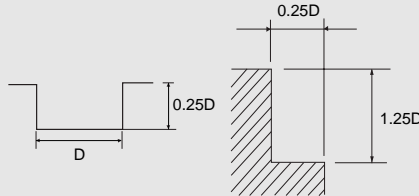
# 5 FLUTE SINUSOIDAL HELIX END MILL CUTTING CONDITION

V7 MILL

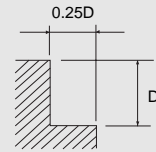
## EMB72, EMB73, EMB76, EMB77 Series

MATERIAL	ALLOY STEELS CAST IRON		STAINLESS STEELS 300SERIES		STAINLESS STEELS 400SERIES		TITANIUM		INCONEL	
HARDNESS	~ HB 230									
STRENGTH	~ 1000N/mm <sup>2</sup>									
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
6	7270	48.82	6060	36.22	5660	33.86	4440	26.38	1450	4.72
8	5450	40.94	4540	28.35	4240	26.38	3330	20.47	1090	4.33
10	4360	43.31	3630	27.17	3390	25.20	2660	19.69	870	4.33
12	3630	45.28	3030	37.80	3830	32.28	2220	22.05	720	5.12
14	3110	42.52	2600	33.46	2420	30.31	1900	21.26	620	5.51
16	2720	40.94	2270	30.71	2120	28.35	1660	20.47	540	5.12
18	2420	39.37	2020	27.95	1880	26.38	1480	20.08	480	5.12
20	2180	38.19	1810	27.17	1690	25.20	1330	19.69	430	5.12
25	1740	34.65	1450	25.20	1350	23.62	1060	18.50	340	5.12

• ALLOY STEELS CAST IRON / STAINLESS STEELS 300, 400SERIES / TITANIUM



• INCONEL



RPM = REVOLUTION PER MIN.  
FEED = inch/ min.

# JET-POWER END MILLS

- *For Stainless steel, Titanium, Inconel*
- *For general steels up to HRc 45*







# JET-POWER END MILLS SELECTION GUIDE

★:U.S.A Stock ○:Call for Availability

## INCH

EDP No.	APPEARANCE	SPECIFICATION	STOCK	PAGE
EH108		CARBIDE, 3&4 FLUTE, 50° HELIX, REGULAR LENGTH	★	99
EE882		YPM, 6 FLUTE, 35° HELIX, REGULAR LENGTH	★	99
E5075 E5105		CARBIDE, 3 FLUTE, 35° HELIX, STUB LENGTH, CORNER RADIUS - "HOSS"	★	100
E5074 E5104		CARBIDE, 3 FLUTE, 35° HELIX, REGULAR LENGTH, CORNER RADIUS - "HOSS"	★	101
EH094		CARBIDE, MULTI FLUTE, STUB LENGTH, FINE PITCH ROUGHING	★	103
EH095		CARBIDE, MULTI FLUTE, LONG LENGTH, FINE PITCH ROUGHING	★	103
EH969		CARBIDE, MULTI FLUTE, 45° HELIX, LONG LENGTH, FINE PITCH ROUGHING	★	104
EH970		CARBIDE, MULTI FLUTE, 45° HELIX, LONG REACH, FINE PITCH ROUGHING	★	105

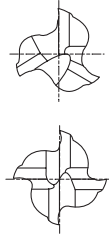
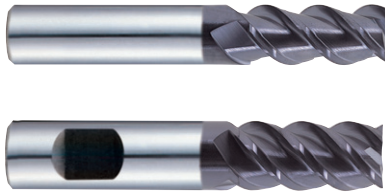
## METRIC

EDP No.	APPEARANCE	SPECIFICATION	STOCK	PAGE
EH830		CARBIDE, 3 FLUTE, 50° HELIX, LONG LENGTH	○	106
EH830		CARBIDE, 4 FLUTE, 50° HELIX, LONG LENGTH	○	106
EE515		YPM, 4&6 FLUTE, SHORT LENGTH	○	106
EH852		CARBIDE, MULTI FLUTE, SHORT, FINE PITCH ROUGHING	○	107
EH831		CARBIDE, MULTI FLUTE, LONG LENGTH, FINE PITCH ROUGHING	○	107
EH917 EH919		CARBIDE, MULTI FLUTE, 45° HELIX, SHORT & LONG LENGTH, FINE PITCH ROUGHING	○	108
EH921		CARBIDE, MULTI FLUTE, 45° HELIX, LONG REACH, FINE PITCH ROUGHING	○	109

SPEED & FEED DATA

110~112

# JET-POWER 3&4 FLUTE, 50° HELIX, REGULAR LENGTH



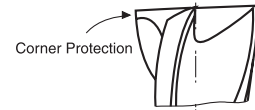
- ▶ Suitable for low hardness materials (under HRC 45), alloy steels, tool steels, carbon steels, prehardened steels, stainless steels, inconel, nimonic, etc.
- ▶ Corner Protection against chipping.

◇ U.S.A Stock

## EH108 Series

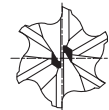
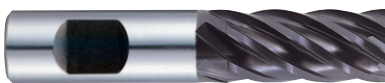
Unit : inch

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



TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0012	0 -.0003

# JET-POWER 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.

◇ U.S.A Stock

## EE882 Series

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

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
+0.0010 0	0 -.0003



# 3 FLUTE, 35° HELIX, STUB LENGTH, CORNER RADIUS - "HOSS"



MG
3
35°
R
~5/16
11/32-1"
DATA
P.102

- ▶ #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).

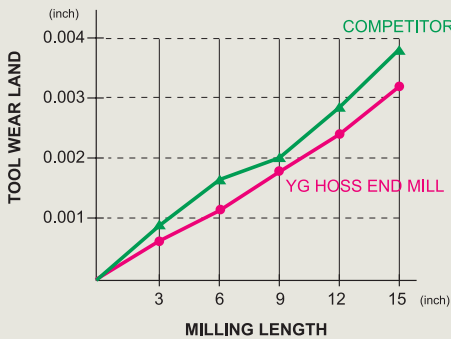
◇ *U.S.A Stock*

**E5075 (~5/16), E5105(11/32 ~ 1") Series**

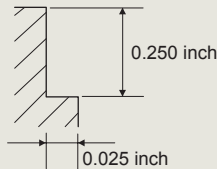
Unit : inch

EDP No. UNCOATED	EDP No. TIN COATED	EDP No. TiCN COATED	EDP No. YG:TYLON F	EDP No. YG:TYLON E	CORNER RADIUS R	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
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

JET-POWER



TOOL ; YG :  $\phi$  1/4, 3FL. STUB, UN-COATED  
 COMPETITOR :  $\phi$  1/4, 3FL. STUB, UN-COATING  
 MATERIAL : STAINLESS STEEL, SUS304  
 RPM : 4100 rev/min  
 Feed : 12.50 inch/min  
 COOLANT : WATER SOLUBLE OIL



TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.012	0 -0.003

# 3 FLUTE, 35° HELIX, REGULAR LENGTH, CORNER RADIUS - "HOSS"



MG
3
35°
R
~5/16
11/32~1"
DATA
P.102

- ▶ #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).

◇ *U.S.A Stock*

**E5074( ~5/16), E5104(11/32 ~1" ) Series**

Unit : inch

EDP No. UNCOATED	EDP No. TIN COATED	EDP No. TICN COATED	EDP No. YG:TYLON F	EDP No. YG:TYLON E	CORNER RADIUS R	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
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

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0012	0 -.0003



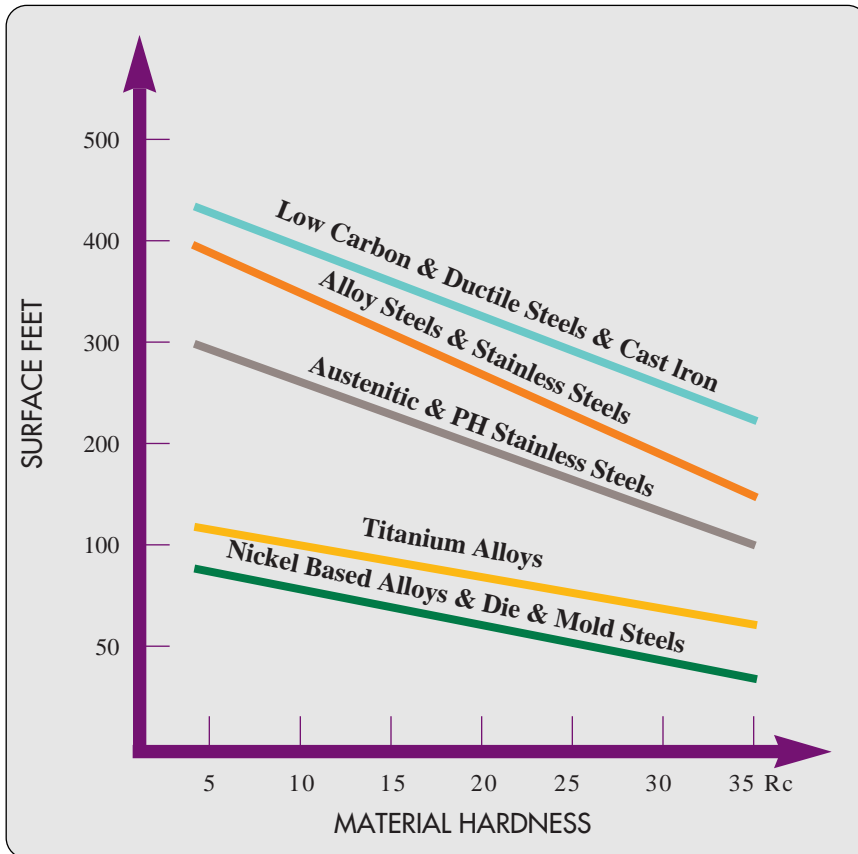
## RECOMMENDED CUTTING CONDITIONS

- ▶ 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	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	1.00
.0003-.0015	.0004-.002	.001-.0025	.0015-.003	.0015-.0035	.002-.004	.0025-.0045	.0025-.005	.003-.006	.003-.007

JET-POWER



# JET-POWER MULTI FLUTE, STUB LENGTH, FINE PITCH ROUGHING



MG
3-5
30°
PLAIN
FINE
DATA P.112

- ▶ 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.

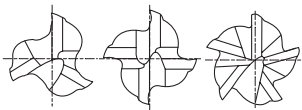
◇ U.S.A Stock

## EH094 Series

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

# JET-POWER MULTI FLUTE, LONG LENGTH, FINE PITCH ROUGHING



MG
3-5
30°
PLAIN
FINE
DATA P.112

- ▶ 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.

◇ U.S.A Stock

## EH095 Series

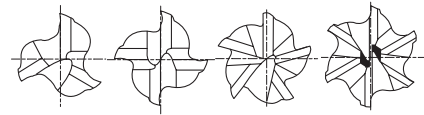
Unit : inch

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.	1/4 ~ 3/8	1/2 ~ 5/8	3/4 ~ 1
TOLERANCE OF MILL DIA.	0 ~ -.0022	0 ~ -.0027	0 ~ -.0033
TOLERANCE OF SHANK DIA.	0 ~ -.0003		

# JET-POWER

## MULTI FLUTE, 45° HELIX, LONG LENGTH, FINE PITCH ROUGHING



MG
3-6
45°
PLAIN
FINE
DATA
P.112

- ▶ 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.

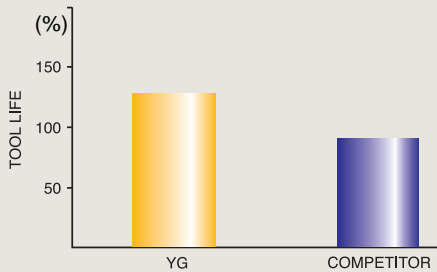
◇ *U.S.A Stock*

### EH969 Series

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

JET-POWER



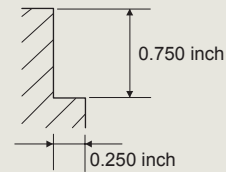
TOOL; YG :  $\varnothing$  3/4, 95113 (6FL. Jet-Power COATING)  
 COMPETITOR :  $\varnothing$  3/4 (6FL. 45° HELIX ROUGHING & FINISHING END MILL, TiAIN COATING)

MATERIAL : STAINLESS STEEL, SUS304

RPM = 4,000 rev./min

FEED = 60 inch/min

COOLANT : WATER SOLUBLE OIL



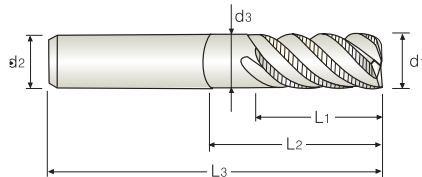
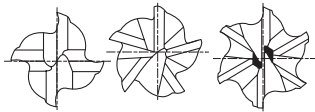
MILL DIA.	1/4 ~ 3/8	1/2 ~ 5/8	3/4 ~ 1
TOLERANCE OF MILL DIA.	0 ~ -.0022	0 ~ -.0027	0 ~ -.0033
TOLERANCE OF SHANK DIA.	0 ~ -.0003		







# MULTI FLUTE, 45° HELIX, LONG REACH, FINE PITCH ROUGHING



MG
4-6
45°
PLAIN
FINE
DATA
P.112

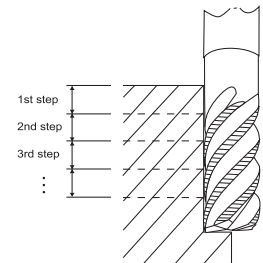
- ▶ Suitable for low hardness materials (under HRc45), alloy steels, tool steels, carbon steels, prehardened steels, stainless steel, titanium, inconel, nimonic, etc.
- ▶ High chip removed and minimizing breakages of cutting edges.
- ▶ Corner Protection against chipping.

◇ U.S.A Stock

## EH970 Series

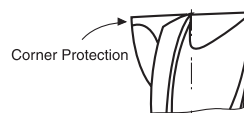
Unit : inch

EDP No.	MILL DIAMETER d1	SHANK DIAMETER d2	LENGTH OF CUT L1	LENGTH BELOW SHANK L2	OVERALL LENGTH L3	NECK DIAMETER d3	NO. OF FLUTE
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



JET-POWER

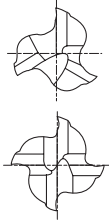
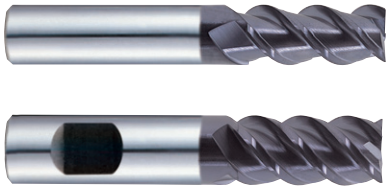
MILL DIA.	1/4 ~ 3/8	1/2 ~ 5/8	3/4 ~ 1
TOLERANCE OF MILL DIA.	0 ~ -.0022	0 ~ -.0027	0 ~ -.0033
TOLERANCE OF SHANK DIA.	0 ~ -.0003		



**JET-POWER**

# 3&4 FLUTE, 50° HELIX, LONG LENGTH

**METRIC**



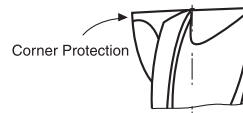
- ▶ Suitable for low hardness materials (under HRc 45), alloy steels, tool steels, carbon steels, prehardened steels, stainless steels, inconel, nimonic, etc.
- ▶ Corner Protection against chipping.

◇ *Call for Availability*

**EH830 Series**

Unit : mm

EDP No. PLAIN	MILL DIAMETER	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH	NO. OF FLUTE
EH830060	6.0	6	13	50	3
EH830901	6.0	6	13	50	4
EH830080	8.0	8	19	60	3
EH830100	10.0	10	22	70	3
EH830120	12.0	12	25	75	3
EH830160	16.0	16	32	90	3
EH830180	18.0	18	32	90	3
EH830200	20.0	20	38	100	4
EH830250	25.0	25	45	120	4



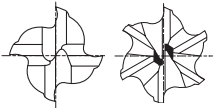
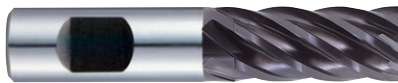
TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 - 0.03	h6

JET-POWER

**JET-POWER**

# 4&6 FLUTE, SHORT LENGTH

**METRIC**



- ▶ 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.

◇ *Call for Availability*

**EE515 Series**

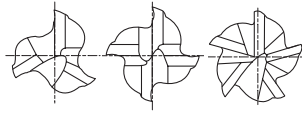
Unit :mm

EDP No.	MILL DIAMETER	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH	NO. OF FLUTE
EE515030	3.0	6	8	52	4
EE515040	4.0	6	11	55	4
EE515050	5.0	6	13	57	4
EE515060	6.0	6	13	57	4
EE515080	8.0	10	19	69	4
EE515100	10.0	10	22	72	4
EE515120	12.0	12	26	83	4
EE515140	14.0	12	26	83	4
EE515160	16.0	16	32	92	6
EE515180	18.0	16	32	92	6
EE515200	20.0	20	38	104	6
EE515250	25.0	25	45	121	6

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
+ 0.03 0	h6

**METRIC**

MG 3-5 30° PLAIN FINE



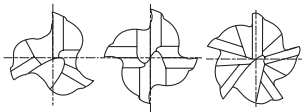
- ▶ Designed to machine low hardness materials (under HRc45), alloy steels, tool steels, carbon steels, prehardened steels, stainless steel, inconel, nimonic.
- ▶ High velocity milling operation.
- ▶ Fast chip ejection.

◆ *Call for Availability*

**EH852 Series** ■ SHORT LENGTH

Unit :mm

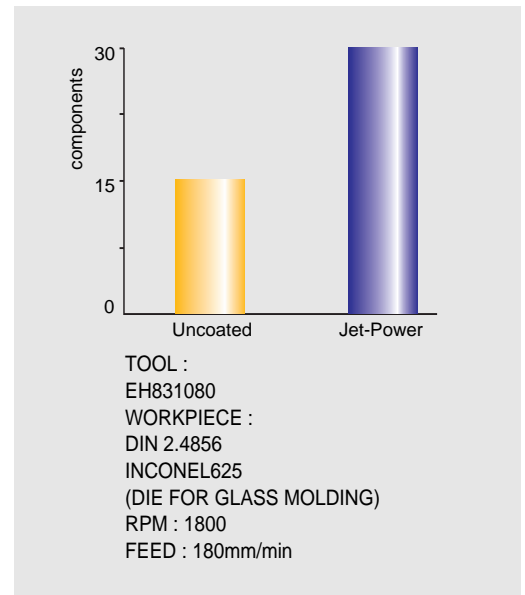
EDP No.	MILL DIAMETER h10	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH	NO. OF FLUTE
EH852060	6.0	6	7	54	3
EH852070	7.0	8	8	58	3
EH852080	8.0	8	9	58	3
EH852090	9.0	10	13	66	4
EH852100	10.0	10	14	66	4
EH852120	12.0	12	16	73	4
EH852140	14.0	14	18	75	4
EH852160	16.0	16	22	82	4
EH852180	18.0	18	24	84	4
EH852200	20.0	20	26	92	4
EH852250	25.0	25	25	110	5



**EH831 Series** ■ LONG LENGTH

Unit :mm

EDP No.	MILL DIAMETER h10	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH	NO. OF FLUTE
EH831060	6.0	6	16	57	3
EH831070	7.0	8	16	63	3
EH831080	8.0	8	16	63	3
EH831090	9.0	10	19	72	4
EH831100	10.0	10	22	72	4
EH831120	12.0	12	26	83	4
EH831140	14.0	14	26	83	4
EH831160	16.0	16	32	92	4
EH831180	18.0	18	32	92	4
EH831200	20.0	20	38	104	4
EH831250	25.0	25	45	121	5



**Tolerances according to DIN 7160 & 7161**

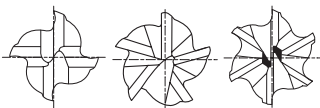
Tolerance range in $\mu\text{m}$					
Nominal-Diameter in mm					
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
<b>h10</b>	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
<b>h6</b>	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

$\mu\text{m} = 1/1000\text{mm}$

**JET-POWER**

# MULTI FLUTE, 45° HELIX, SHORT & LONG LENGTH, FINE PITCH ROUGHING

**METRIC**



- ▶ 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.

◇ *Call for Availability*

**EH917 Series**

■ SHORT LENGTH

Unit : mm

EDP No.	MILL DIAMETER h10	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH	NO. OF FLUTE
EH917060	6.0	6	7	54	4
EH917080	8.0	8	9	58	4
EH917100	10.0	10	14	66	4
EH917120	12.0	12	16	73	4
EH917160	16.0	16	22	82	5
EH917200	20.0	20	26	92	6

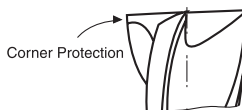
JET-POWER

**EH919 Series**

■ LONG LENGTH

Unit :mm

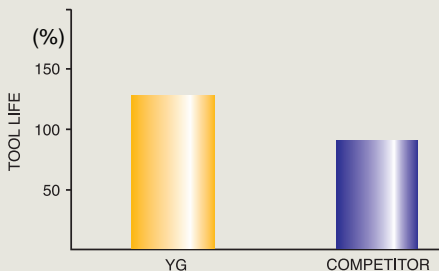
EDP No.	MILL DIAMETER h10	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH	NO. OF FLUTE
EH919040	4.0	6	11	57	3
EH919050	5.0	6	13	57	4
EH919060	6.0	6	16	57	4
EH919070	7.0	8	16	63	4
EH919080	8.0	8	16	63	4
EH919090	9.0	10	19	72	4
EH919100	10.0	10	22	72	4
EH919120	12.0	12	26	83	4
EH919140	14.0	14	26	83	5
EH919160	16.0	16	32	92	5
EH919200	20.0	20	38	104	6
EH919250	25.0	25	45	121	6



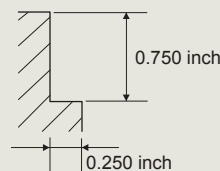
**Tolerances according to DIN 7160 & 7161**

		Tolerance range in $\mu\text{m}$				
		Nominal-Diameter in mm				
		from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
<b>h10</b>	0	0	0	0	0	0
	- 40	- 48	- 58	- 70	- 84	
<b>h6</b>	0	0	0	0	0	0
	- 6	- 8	- 9	- 11	- 13	

$\mu\text{m} = 1/1000\text{mm}$



TOOL; YG :  $\phi$  3/4, 95113 (6FL. Jet-Power COATING)  
 COMPETITOR :  $\phi$  3/4 (6FL. 45° HELIX ROUGHING & FINISHING END MILL, TiAIN COATING)  
 MATERIAL : STAINLESS STEEL, SUS304  
 RPM = 4,000 rev./min  
 FEED = 60 inch/min  
 COOLANT : WATER SOLUBLE OIL

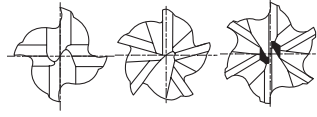




# MULTI FLUTE, 45° HELIX, LONG REACH, FINE PITCH ROUGHING

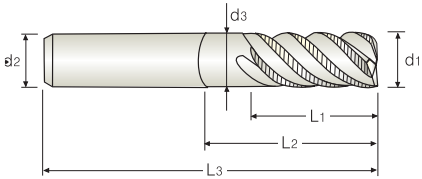
**METRIC**

MG
4-6
45°
PLAIN
FINE



- ▶ 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.

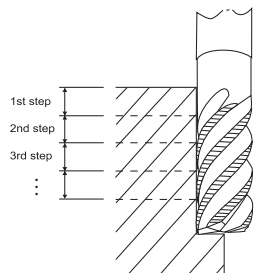
◇ *Call for Availability*



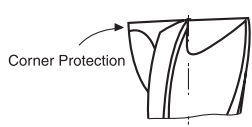
**EH921 Series**

Unit : mm

EDP No.	MILL DIAMETER d1 (h10)	SHANK DIAMETER d2 (h6)	LENGTH OF CUT L1	LENGTH BELOW SHANK L2	OVERALL LENGTH L3	NECK DIAMETER d3	NO. OF FLUTE
EH921060	6.0	6	16	20	57	5.5	4
EH921080	8.0	8	16	26	63	7.5	4
EH921100	10.0	10	22	31	72	9.5	4
EH921120	12.0	12	26	37	83	11.5	4
EH921160	16.0	16	32	51	100	15.5	5
EH921200	20.0	20	38	59	110	19.2	6



JET-POWER



**Tolerances according to DIN 7160 & 7161**

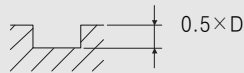
Tolerance range in $\mu\text{m}$					
Nominal-Diameter in mm					
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
<b>h10</b>	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
<b>h6</b>	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

$\mu\text{m} = 1/1000\text{mm}$

# 3&4 FLUTE, FINISH, SLOTTING

## EH108 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/mm <sup>2</sup>		1000 ~ 1500N/mm <sup>2</sup>							
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%

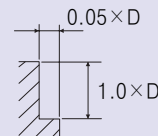
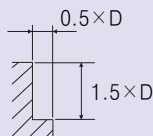
RPM=REVOLUTION PER MIN.  
FEED=inch/min.

JET-POWER

# 3&4 FLUTE, FINISH, SIDE CUTTING

## EH108 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/mm <sup>2</sup>		1000 ~ 1500N/mm <sup>2</sup>							
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=REVOLUTION PER MIN.  
FEED=inch/min.

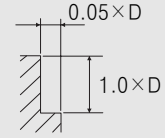
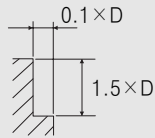




# 6 FLUTE, SUPER POWDER METALLURGY(YPM), SIDE CUTTING

## 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/mm <sup>2</sup>		1000 ~ 1500N/mm <sup>2</sup>							
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=REVOLUTION PER MIN.  
FEED=inch/min.

JET-POWER

### EH094, EH095, EH969, EH970 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/mm <sup>2</sup>		1000 ~ 1500N/mm <sup>2</sup>							
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

\*The FEED, in long & extra long types, should be reduced by around 50%

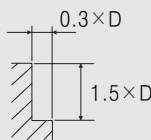
RPM=REVOLUTION PER MIN.  
FEED=mm/min.

### EH094, EH095, EH969, EH970 Series

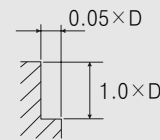
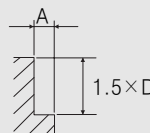
MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		STAINLESS STEELS		TITANIUM ALLOY		INCONEL	
HARDNESS	~HRc30		HRc30 ~ HRc45							
STRENGTH	~1000N/mm <sup>2</sup>		1000 ~ 1500N/mm <sup>2</sup>							
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1/4	15600	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

\*The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.



A: D1/4-D3/8: 0.15 × D  
D1/2-D5/8: 0.10 × D  
D3/4-D1: 0.05 × D



# ALU-POWER

MICRO GRAIN CARBIDE END MILLS

● *For Aluminum and Non-Ferrous Materials.*








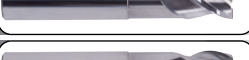
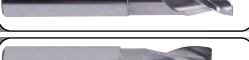
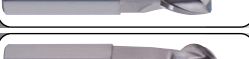
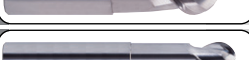
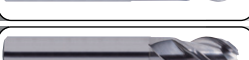









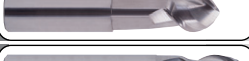
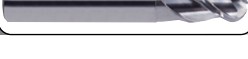
# ALU-POWER CARBIDE END MILLS SELECTION GUIDE

★:U.S.A Stock ○:Call for Availability

## INCH

EDP No.	APPEARANCE	SPECIFICATION	STOCK	PAGE
E5253 E5254		2 FLUTE, 42° HELIX, REGULAR & LONG LENGTH - "BANSHEE"	★	115
E5976		2 FLUTE, 37° HELIX with EXTENDED NECK	★	116
E5980		3 FLUTE, 45° HELIX, STUB LENGTH	★	117
E5981		3 FLUTE, 45° HELIX, REGULAR LENGTH	★	118
E5983		3 FLUTE, 45° HELIX, REGULAR LENGTH, CORNER RADIUS	★	118
E5982		3 FLUTE, 45° HELIX, LONG LENGTH	★	119
E5984		3 FLUTE, 45° HELIX, LONG LENGTH, CORNER RADIUS	★	119
E5977		3 FLUTE, 37° HELIX with EXTENDED NECK	★	120
E5985		3 FLUTE, 37° HELIX with EXTENDED NECK, CORNER RADIUS	★	121
E5973		2 FLUTE, CORNER RADIUS with NECK	★	122
E5974		2 FLUTE, 50° HELIX, STUB CUT LENGTH, BALL NOSE with NECK	★	123
E5978		2 FLUTE, 37° HELIX, LONG REACH, BALL NOSE	★	124
E5975		3 FLUTE, 40° HELIX, LONG LENGTH, BALL NOSE with NECK		125

## METRIC

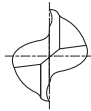
EDP No.	APPEARANCE	SPECIFICATION	STOCK	PAGE
E5522		2 FLUTE, 45° HELIX, LONG LENGTH	○	126
EI926		2 FLUTE, 45° HELIX, LONG LENGTH, DIAMOND COATED	○	127
EG930		2 FLUTE, 25° HELIX, STUB CUT LENGTH, CORNER RADIUS, TiCN COATED	○	128
EG909		2 FLUTE, STUB CUT LENGTH, CORNER RADIUS with NECK, TiCN COATED	○	129
EG910		2 FLUTE, 50° HELIX, STUB CUT LENGTH, BALL NOSE with NECK, TiCN COATED	○	130
EG908		3 FLUTE, 40° HELIX, LONG LENGTH, BALL NOSE with NECK, TiCN COATED	○	131

SPEED & FEED DATA

132 ~ 137



# ALU-POWER 2 FLUTE, 42° HELIX, REGULAR - "BANSHEE"



MG
2
42°
PLAIN
FLAT
DATA
P.132

- ▶ High velocity milling of aluminum & other non ferrous materials.
- ▶ Excellent plunging capabilities.
- ▶ Improved surface roughness-cylindrical margin which is controlled tightly.
- ▶ Maximum-stock removal, chip ejection, stability.

◆ **U.S.A Stock**

Unit : inch

## E5253 Series ■ FLAT SHANK

EDP No. UNCOATED	EDP No. TIN COATED	EDP No. TiCN COATED	EDP No. YG:TYLON F	EDP No. YG:TYLON E	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
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

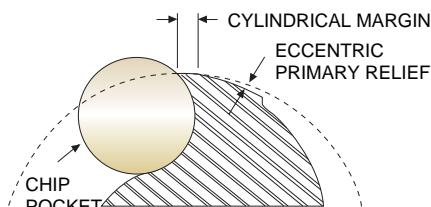
## E5254 Series ■ PLAIN SHANK

Unit : inch

EDP No. UNCOATED	EDP No. TIN COATED	EDP No. TiCN COATED	EDP No. YG:TYLON F	EDP No. YG:TYLON E	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
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

ALUMINUM MACHINING DATA		
Diameter	Speed(RPM)	Feed(inch/tooth)
1/4	10,000	.002~.006
5/16	8,000	.002~.006
3/8	8,000	.002~.008
1/2	8,000	.002~.008
5/8	6,000	.002~.010
3/4	4,000	.002~.010
1	4,000	.002~.010

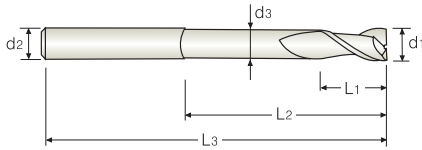
TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0012	0 -.0003



- 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.



# 2 FLUTE, 37° HELIX with EXTENDED NECK



P.135

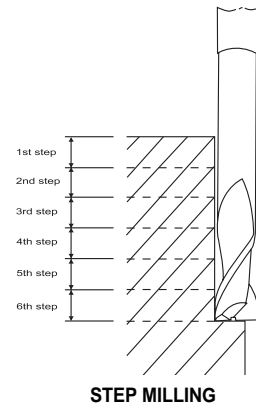
- ▶ High velocity milling of aluminum & other non-ferrous materials.
- ▶ Excellent plunging capabilities.
- ▶ Improved surface roughness-cylindrical margin which is controlled tightly(see page 111).
- ▶ Maximum - stock removal, chip ejection, stability.

◇ *U.S.A Stock*

## E5976 Series

Unit : inch

EDP No. UNCOATED	EDP No. TiCN COATED	MILL DIAMETER d <sub>1</sub>	SHANK DIAMETER d <sub>2</sub>	LENGTH OF CUT L <sub>1</sub>	LENGTH BELOW SHANK L <sub>2</sub>	OVERALL LENGTH L <sub>3</sub>	NECK DIAMETER d <sub>3</sub>
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



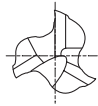
ALU-POWER

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 - .0005	0 - .0003





# 3 FLUTE, 45° HELIX, STUB LENGTH



P.133

- ▶ Designed to machine aluminium at high speed condition.
- ▶ Improved surface roughness-cylindrical margin which is controlled tightly.

◇ U.S.A Stock

## E5980 Series

Unit : inch

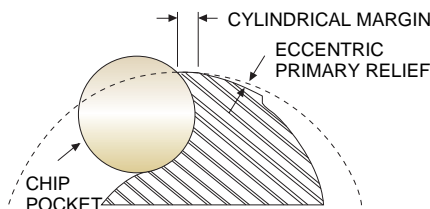
EDP No. UNCOATED	EDP No. TiCN COATED	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
25558	25558TC	1/8	1/8	1/4	1-1/2
25565	25565TC	3/16	3/16	5/16	2
25573	25573TC	1/4	1/4	3/8	2
25579	25579TC	5/16	5/16	7/16	2
25584	25584TC	3/8	3/8	1/2	2
25588	25588TC	7/16	7/16	9/16	2-1/2
25593	25593TC	1/2	1/2	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

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0005	0 -.0003

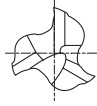
ALU-POWER



- 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.



# ALU-POWER 3 FLUTE, 45° HELIX, REGULAR LENGTH



MG
3
45°
PLAIN
DATA
P.133

- ▶ 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-stock removal, chip ejection, stability.

◇ *U.S.A Stock*

## E5981 Series

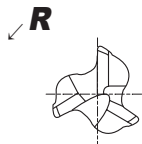
Unit : inch

EDP No. UNCOATED	EDP No. TiCN COATED	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
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

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0005	0 -.0003

ALU-POWER

# ALU-POWER 3 FLUTE, 45° HELIX, REGULAR LENGTH, CORNER RADIUS



MG
3
45°
PLAIN
DATA
P.133

- ▶ 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-stock removal, chip ejection, stability.

◇ *U.S.A Stock*

## E5983 Series

Unit : inch

EDP No. UNCOATED	EDP No. TiCN COATED	CORNER RADIUS	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
EA50321	EA50321C	.060	1/2	1/2	1 1/4	3
EA50401	EA50401C	.060	5/8	5/8	1 5/8	3 1/2
EA50481	EA50481C	.060	3/4	3/4	1 5/8	4
EA50641	EA50641C	.060	1	1	2	5
EA20321	EA20321C	.120	1/2	1/2	1 1/4	3
EA20401	EA20401C	.120	5/8	5/8	1 5/8	3 1/2
EA20481	EA20481C	.120	3/4	3/4	1 5/8	4
EA20641	EA20641C	.120	1	1	2	5

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0005	0 -.0003

# ALU-POWER 3 FLUTE, 45° HELIX, LONG LENGTH



MG
3
45°
PLAIN
DATA
P.133

- ▶ 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-stock removal, chip ejection, stability.

◇ *U.S.A Stock*

## E5982 Series

Unit : inch

EDP No. UNCOATED	EDP No. TiCN COATED	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
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

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0	0
-.0005	-.0003

# ALU-POWER 3 FLUTE, 45° HELIX, LONG LENGTH, CORNER RADIUS



MG
3
45°
PLAIN
DATA
P.133

- ▶ 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-stock removal, chip ejection, stability.

◇ *U.S.A Stock*

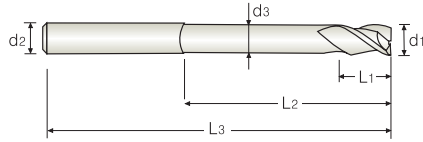
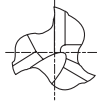
## E5984 Series

Unit : inch

EDP No. UNCOATED	EDP No. TiCN COATED	CORNER RADIUS	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
EA60321	EA60321C	.060	1/2	1/2	2	4
EA60401	EA60401C	.060	5/8	5/8	2 1/2	5
EA60481	EA60481C	.060	3/4	3/4	3 1/4	6
EA60641	EA60641C	.060	1	1	3 1/4	6
EA30321	EA30321C	.120	1/2	1/2	2	4
EA30401	EA30401C	.120	5/8	5/8	2 1/2	5
EA30481	EA30481C	.120	3/4	3/4	3 1/4	6
EA30641	EA30641C	.120	1	1	3 1/4	6

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0	0
-.0005	-.0003

# ALU-POWER 3 FLUTE, 37° HELIX with EXTENDED NECK



MG
3
37°
PLAIN
DATA
P.134

- ▶ 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(see page 113).
- ▶ Maximum-stock removal, chip ejection, stability.

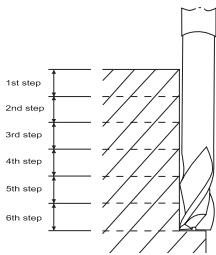
◇ *U.S.A Stock*

## E5977 Series

Unit : inch

EDP No. UNCOATED	EDP No. TiCN COATED	MILL DIAMETER d1	SHANK DIAMETER d2	LENGTH OF CUT L1	LENGTH BELOW SHANK L2	OVERALL LENGTH L3	NECK DIAMETER d3
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

ALU-POWER

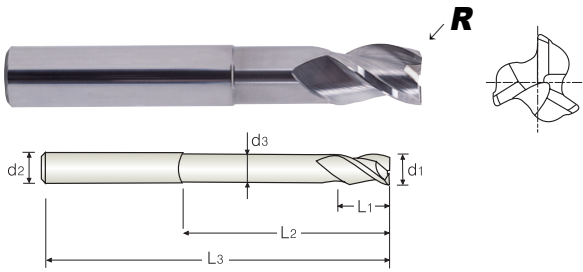


STEP MILLING

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0	0
-.0005	-.0003



# 3 FLUTE, 37° HELIX with EXTENDED NECK, CORNER RADIUS



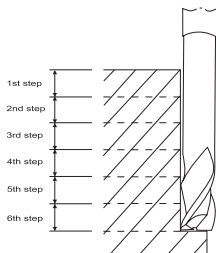
- ▶ High velocity milling of aluminum & other non-ferrous materials.
- ▶ 3flute and 37° helix allow harmonic balance at high speed condition and smooth cutting.
- ▶ Improved surface roughness-cylindrical margin which is controlled tightly(see page 115).
- ▶ Maximum-stock removal, chip ejection, stability.

◇ U.S.A Stock

## E5985Series

Unit : inch

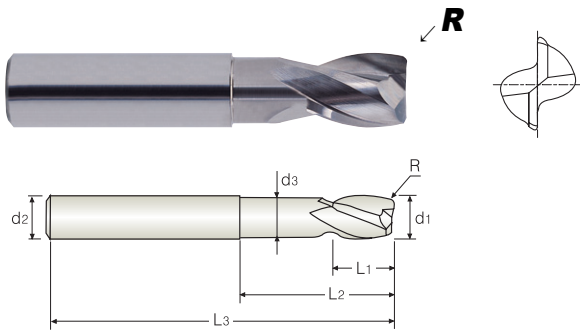
EDP No. UNCOATED	EDP No. TiCN COATED	CORNER RADIUS R	MILL DIAMETER d1	SHANK DIAMETER d2	LENGTH OF CUT L1	LENGTH BELOW SHANK L2	OVERALL LENGTH L3	NECK DIAMETER d3
EA40321	EA40321C	.060	1/2	1/2	5/8	3 1/4	6	.470
EA40322	EA40322C	.060	1/2	1/2	5/8	4	6	.470
EA40401	EA40401C	.060	5/8	5/8	3/4	2 1/4	5	.585
EA40402	EA40402C	.060	5/8	5/8	3/4	3 1/4	6	.585
EA40403	EA40403C	.060	5/8	5/8	3/4	4 1/4	7	.585
EA40481	EA40481C	.060	3/4	3/4	1	2 1/4	5	.710
EA40482	EA40482C	.060	3/4	3/4	1	3 1/4	6	.710
EA40483	EA40483C	.060	3/4	3/4	1	4 1/4	7	.710
EA40641	EA40641C	.060	1	1	1 1/8	2 1/4	5	.960
EA40642	EA40642C	.060	1	1	1 1/8	3 1/4	6	.960
EA40643	EA40643C	.060	1	1	1 1/8	4 1/4	7	.960
EA10321	EA10321C	.120	1/2	1/2	5/8	3 1/4	6	.470
EA10322	EA10322C	.120	1/2	1/2	5/8	4	6	.470
EA10401	EA10401C	.120	5/8	5/8	3/4	2 1/4	5	.585
EA10402	EA10402C	.120	5/8	5/8	3/4	3 1/4	6	.585
EA10403	EA10403C	.120	5/8	5/8	3/4	4 1/4	7	.585
EA10481	EA10481C	.120	3/4	3/4	1	2 1/4	5	.710
EA10482	EA10482C	.120	3/4	3/4	1	3 1/4	6	.710
EA10483	EA10483C	.120	3/4	3/4	1	4 1/4	7	.710
EA10641	EA10641C	.120	1	1	1 1/8	2 1/4	5	.960
EA10642	EA10642C	.120	1	1	1 1/8	3 1/4	6	.960
EA10643	EA10643C	.120	1	1	1 1/8	4 1/4	7	.960



STEP MILLING

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0005	0 -.0003

# ALU-POWER 2 FLUTE, CORNER RADIUS with NECK



- ▶ Excellent cutting qualities on stainless steel, aluminum, copper.
- ▶ Increased tool life and higher cutting accuracy.

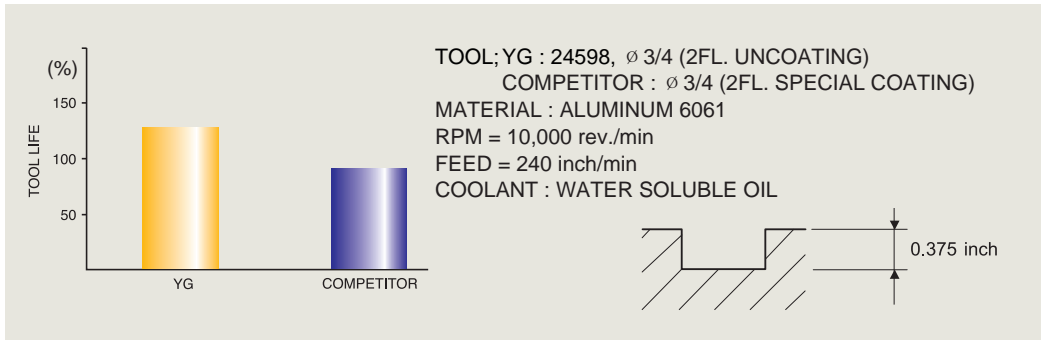
◇ U.S.A Stock

## E5973 Series

Unit : inch

EDP No. UNCOATED	EDP No. TiCN COATED	CORNER RADIUS R	MILL DIAMETER d1	SHANK DIAMETER d2	LENGTH OF CUT L1	LENGTH BELOW SHANK L2	OVERALL LENGTH L3	NECK DIAMETER 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

ALU-POWER

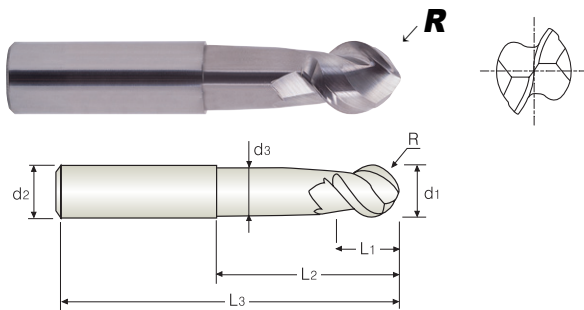


TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 - .0012	0 - .0003





# 2 FLUTE, 50° HELIX, STUB CUT LENGTH, BALL NOSE with NECK



MG
2
50°
R ±.0005
PLAIN
DATA
P.137

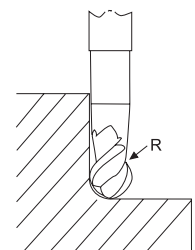
- ▶ Excellent cutting qualities on stainless steel, aluminum, copper.
- ▶ Increased tool life and higher cutting accuracy.

◇ U.S.A Stock

## E5974 Series

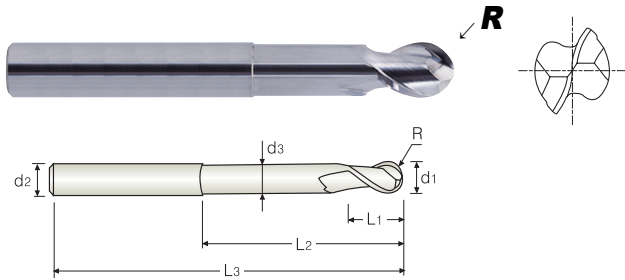
Unit : inch

EDP No. UNCOATED	EDP No. TiCN COATED	R ±.0005	MILL DIAMETER d <sub>1</sub>	SHANK DIAMETER d <sub>2</sub>	LENGTH OF CUT L <sub>1</sub>	LENGTH BELOW SHANK L <sub>2</sub>	OVERALL LENGTH L <sub>3</sub>	NECK DIAMETER d <sub>3</sub>
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



TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0010	0 -.0003

# ALU-POWER 2 FLUTE, 37° HELIX, LONG REACH, BALL NOSE



MG
2
37°
±.0010
PLAIN
DATA
P.136

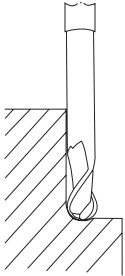
- ▶ High velocity milling of aluminum & other non-ferrous materials.
- ▶ Extended neck design which is suitable for step milling.
- ▶ Improved surface roughness-cylindrical margin which is controlled tightly
- ▶ Maximum-stock removal, chip ejection, stability.

◇ *U.S.A Stock*

## E5978 Series

Unit : inch

EDP No. UNCOATED	EDP No. TiCN COATED	R ±.0010	MILL DIAMETER d <sub>1</sub>	SHANK DIAMETER d <sub>2</sub>	LENGTH OF CUT L <sub>1</sub>	LENGTH BELOW SHANK L <sub>2</sub>	OVERALL LENGTH L <sub>3</sub>	NECK DIAMETER d <sub>3</sub>
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	R 1/2	1	1	1-1/8	2-1/4	5	.960
89907	89907TC	R 1/2	1	1	1-1/8	3-1/4	6	.960
89908	89908TC	R 1/2	1	1	1-1/8	4-1/4	7	.960

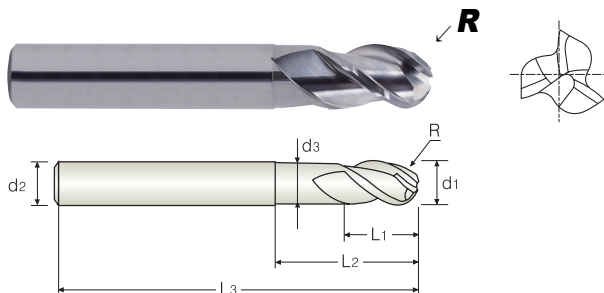


ALU-POWER

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 - .0012	0 - .0003



# 3 FLUTE, 40° HELIX, LONG LENGTH, BALL NOSE with NECK



MG
3
40°
R ±.0005
PLAIN
DATA
P.137

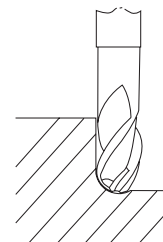
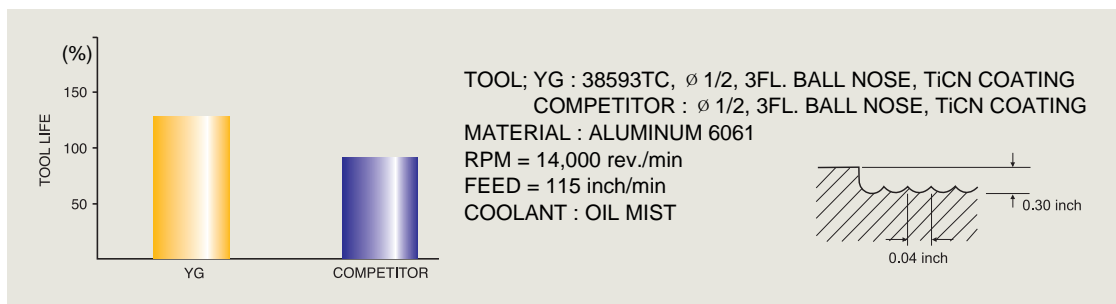
- ▶ Excellent cutting qualities on stainless steel, aluminum, copper.
  - ▶ Increased tool life and higher cutting accuracy.
- ◇ *U.S.A Stock*

## E5975 Series

Unit : inch

EDP No. UNCOATED	EDP No. TiCN COATED	R ±.0005	MILL DIAMETER d1	SHANK DIAMETER d2	LENGTH OF CUT L1	LENGTH BELOW SHANK L2	OVERALL LENGTH L3	NECK DIAMETER 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

ALU-POWER



TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0012	0 -.0003

# ALU-POWER 2 FLUTE, 45° HELIX, LONG LENGTH

**METRIC**



► Suitable for high speed machining in aluminum and other non-ferrous materials, excellent surface finishes, superior chip removal.

◇ *Call for Availability*

## E5522 Series

Unit : mm

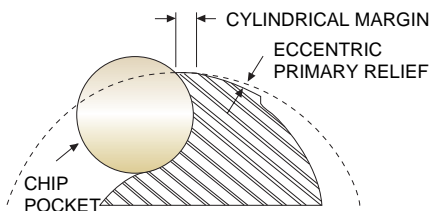
EDP No.	MILL DIAMETER	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH
E5522030	3.0	6	8	57
E5522040	4.0	6	11	57
E5522050	5.0	6	13	57
E5522060	6.0	6	13	57
E5522080	8.0	8	19	63
E5522100	10.0	10	22	72
E5522120	12.0	12	26	83
E5522140	14.0	14	26	83
E5522160	16.0	16	32	92
E5522180	18.0	18	32	92
E5522200	20.0	20	38	104

ALU-POWER

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.03	h6



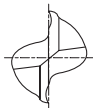
- High performance in machining aluminum and non-ferrous materials
- Special designed geometry with high rigidity cutting edge
- Improved surface roughness - cylindrical margin which is controlled tightly.
- Excellent chip removal - higher rake angle, higher helix angle(45°), bigger chip pocket.





# 2 FLUTE, 45° HELIX, LONG LENGTH, DIAMOND COATED

**METRIC**



**Diamond**



- ▶ Designed for the machining aluminum and its alloys, non-ferrous materials.
- ▶ YG-1's newly developed diamond film coating increases the tool life surprisingly due to Hv4,500-5,500 high hardness of diamond film.
- ▶ Maximum-stock removal, chip ejection, stability.
- ▶ Corner Protection against chipping.

◇ *Call for Availability*

**EI926 Series**

Unit : mm

EDP No.	MILL DIAMETER	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH
EI926010	1.0	4	3	40
EI926015	1.5	4	4	40
EI926020	2.0	4	6	40
EI926025	2.5	4	8	40
EI926030	3.0	6	8	45
EI926035	3.5	6	10	45
EI926040	4.0	6	11	45
EI926045	4.5	6	11	50
EI926050	5.0	6	13	50
EI926055	5.5	6	13	50
EI926060	6.0	6	13	50
EI926070	7.0	8	16	60
EI926080	8.0	8	19	60
EI926090	9.0	10	19	70
EI926100	10.0	10	22	70
EI926110	11.0	12	22	75
EI926120	12.0	12	26	75
EI926160	16.0	16	32	90
EI926200	20.0	20	38	100



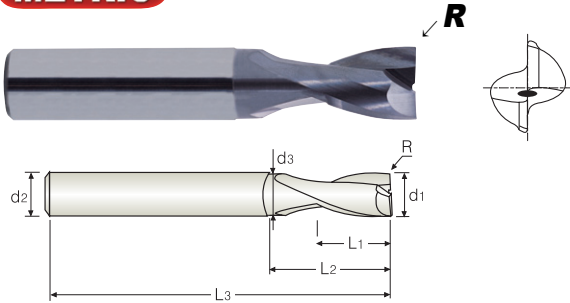
ALU-POWER

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.03	h6

**ALU-POWER**

**2 FLUTE, 25° HELIX, STUB CUT LENGTH, CORNER RADIUS, TiCN COATED**

**METRIC**



- ▶ Designed to machine aluminium at high speed condition.
- ▶ Improved surface roughness-cylindrical margin which is controlled tightly (see page 123).
- ▶ Corner radius against chipping.

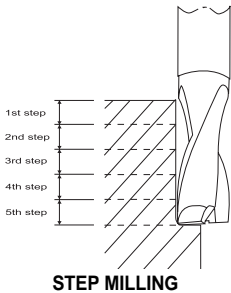
◇ *Call for Availability*

**EG930 Series**

Unit : mm

EDP. No TiCN COATED	CORNER RADIUS R	MILL DIAMETER d1	SHANK DIAMETER d2(h6)	LENGTH OF CUT L1	LENGTH BELOW SHANK L2	OVERALL LENGTH L3	NECK DIAMETER d3
EG930020	R0.2	2.0	3	3	6	40	1.9
EG930030	R0.2	3.0	3	4	8	40	2.9
EG930040	R0.2	4.0	4	5	12	50	3.8
EG930050	R0.2	5.0	5	8	14	50	4.8
EG930060	R0.2	6.0	6	8	18	65	5.7
EG930080	R0.2	8.0	8	10	22	70	7.7
EG930100	R0.2	10.0	10	14	28	80	9.7
EG930120	R0.2	12.0	12	16	35	90	11.5
EG930160	R0.2	16.0	16	20	40	90	15.5
EG930200	R0.2	20.0	20	25	50	100	19.5

ALU-POWER



**STEP MILLING**

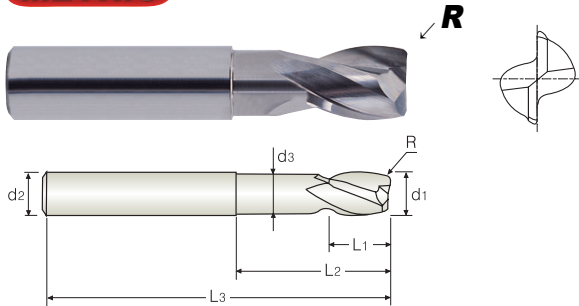
TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.03	h6





# 2 FLUTE, STUB CUT LENGTH, CORNER RADIUS with NECK, TiCN COATED

**METRIC**



- ▶ Excellent cutting qualities on stainless steel, aluminum, copper.
- ▶ Increased tool life and higher cutting accuracy.

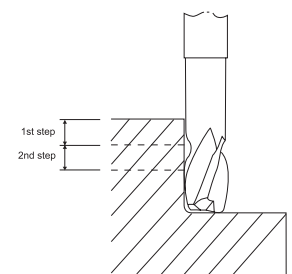
◆ *Call for Availability*

**EG909 Series**

Unit :mm

EDP No. TiCN COATED	CORNER RADIUS R	MILL DIAMETER d1	SHANK DIAMETER d2(h6)	LENGTH OF CUT L1	LENGTH BELOW SHANK L2	OVERALL LENGTH L3	NECK DIAMETER d3
EG909040	R0.3	4.0	6	5	10	50	3.6
EG909060	R0.5	6.0	6	8	20	60	5.4
EG909080	R0.6	8.0	8	10	30	70	7.2
EG909100	R0.8	10.0	10	12	36	80	9.0
EG909120	R1.0	12.0	12	14	40	90	11.0
EG909160	R1.3	16.0	16	18	45	100	14.5
EG909200	R1.6	20.0	20	24	45	100	18.0

ALU-POWER

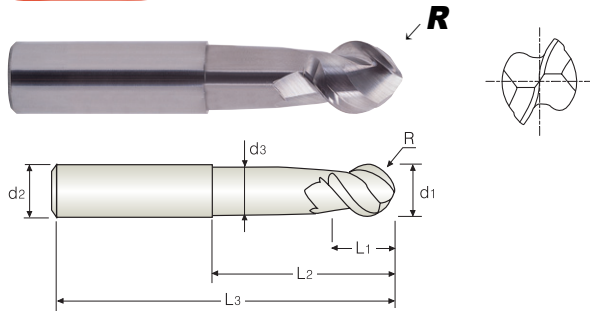


TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.03	h6

**ALU-POWER**

# 2 FLUTE, 50° HELIX, STUB CUT LENGTH, BALL NOSE with NECK, TiCN COATED

**METRIC**



- ▶ Excellent cutting qualities on stainless steel, aluminum, copper.
- ▶ Increased tool life and higher cutting accuracy.

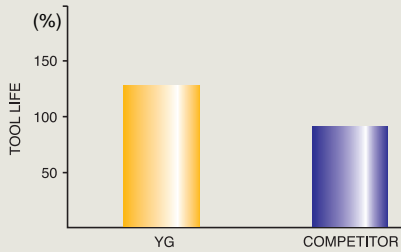
◇ *Call for Availability*

**EG910 Series**

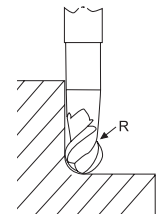
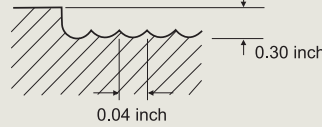
Unit : mm

EDP. No TiCN COATED	R ±0.01	MILL DIAMETER d <sub>1</sub>	SHANK DIAMETER d <sub>2</sub> (h6)	LENGTH OF CUT L <sub>1</sub>	LENGTH BELOW SHANK L <sub>2</sub>	OVERALL LENGTH L <sub>3</sub>	NECK DIAMETER d <sub>3</sub>
EG910060	R 3.0	6.0	6	5.5	25	55	5.4
EG910080	R 4.0	8.0	8	7	30	65	7.2
EG910100	R 5.0	10.0	10	8.5	35	75	9.0
EG910120	R 6.0	12.0	12	10.5	40	75	11.0
EG910160	R 8.0	16.0	16	14	50	90	14.5
EG910200	R 10.0	20.0	20	17	50	100	18.0

ALU-POWER



TOOL; YG : EG974048,  $\phi$  1/2, 2FL. BALL NOSE, TiCN COATING  
 COMPETITOR :  $\phi$  1/2, 2FL. BALL NOSE, TiCN COATING  
 MATERIAL : ALUMINUM 6061  
 RPM = 10,000 rev./min  
 FEED = 45 inch/min  
 COOLANT : WATER SOLUBLE OIL

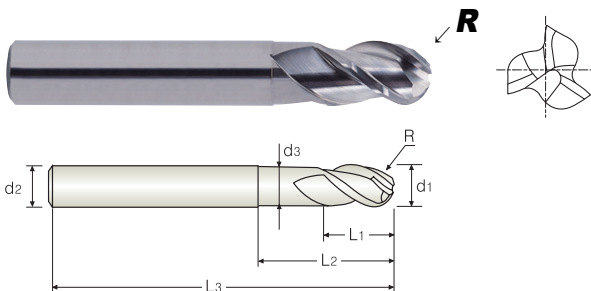


TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
± 0.02	h6



# 3 FLUTE, 40° HELIX, LONG LENGTH, BALL NOSE with NECK, TiCN COATED

**METRIC**



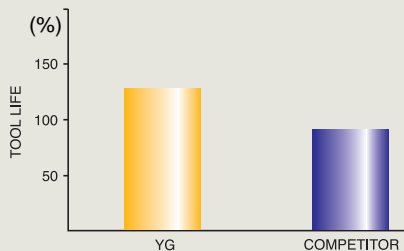
- ▶ Excellent cutting qualities on stainless steel, aluminum, copper.
  - ▶ Increased tool life and higher cutting accuracy.
- ◇ *Call for Availability*

**EG908 Series**

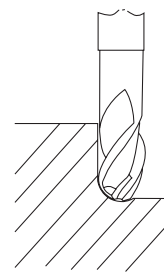
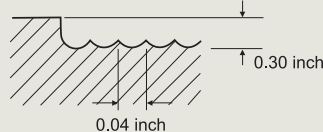
Unit : mm

EDP. No TiCN COATED	R ±0.01	MILL DIAMETER d1	SHANK DIAMETER d2(h6)	LENGTH OF CUT L1	LENGTH BELOW SHANK L2	OVERALL LENGTH L3	NECK DIAMETER d3
EG908020	1.0	2.0	6	3	2.5	60	1.9
EG908025	1.25	2.5	6	4	6	60	2.4
EG908030	1.5	3.0	6	4.5	6.5	60	2.8
EG908035	1.75	3.5	6	5	7	65	3.2
EG908040	2.0	4.0	6	6	8	65	3.7
EG908050	2.5	5.0	6	7.5	10	65	4.6
EG908060	3.0	6.0	6	9	12	75	5.6
EG908080	4.0	8.0	8	12	25	75	7.4
EG908100	5.0	10.0	10	15	30	80	9.4
EG908120	6.0	12.0	12	18	36	90	11.4
EG908160	8.0	16.0	16	24	40	100	15.4

ALU-POWER



TOOL : YG : EG975040,  $\phi$  1/2, 3FL. BALL NOSE, TiCN COATING  
 COMPETITOR :  $\phi$  1/2, 3FL. BALL NOSE, TiCN COATING  
 MATERIAL : ALUMINUM 6061  
 RPM = 14,000 rev./min  
 FEED = 115 inch/min  
 COOLANT : OIL MIST



TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.03	h6



## 2 FLUTE, 42° HELIX - "BANSHEE"

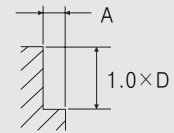
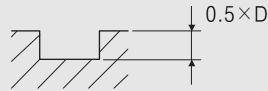
### E5253, E5254 Series

Slotting

Side Cutting

MATERIAL	ALUMINUM NONFERROUS METALS	
DIAMETER	RPM	FEED
1/8	10000	27.56
5/32	10000	35.43
3/16	10000	39.37
1/4	10000	47.24
5/16	8000	55.12
3/8	8000	66.93
1/2	8000	82.68
9/16	6000	70.87
5/8	6000	74.80
11/16	4000	55.12
13/16	4000	62.99

MATERIAL	ALUMINUM NONFERROUS METALS	
DIAMETER	RPM	FEED
1/8	10000	35.43
5/32	10000	43.31
3/16	10000	51.18
1/4	10000	59.06
5/16	8000	70.87
3/8	8000	82.68
1/2	8000	102.40
9/16	6000	86.61
5/8	6000	94.49
11/16	4000	70.87
13/16	4000	74.80



A:  $\varnothing 1/8 \sim \varnothing 3/8 = 0.25 \times D$   
 $\varnothing 1/2 \sim \varnothing 13/16 = 0.5 \times D$

RPM=REVOLUTION PER MIN.  
FEED=inch/min.

\* The FEED, in long & extra long types, should be reduced by around 50%

ALU-POWER



## 2 FLUTE, 42° HELIX, TiCN COATED - "BANSHEE"

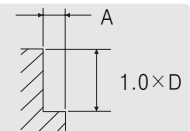
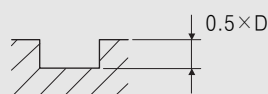
### EG253, EG254 Series

Slotting

Side Cutting

MATERIAL	ALUMINUM NONFERROUS METALS	
DIAMETER	RPM	FEED
1/8	15600	42.52
5/32	15600	56.69
3/16	15600	61.42
1/4	15600	70.87
5/16	12000	85.05
3/8	12000	103.93
1/2	12000	127.56
9/16	9600	108.66
5/8	9600	118.12
11/16	6000	85.04
13/16	6000	94.49

MATERIAL	ALUMINUM NONFERROUS METALS	
DIAMETER	RPM	FEED
1/8	12000	56.69
5/32	12000	66.14
3/16	12000	80.32
1/4	12000	94.49
5/16	9600	108.66
3/8	9600	127.56
1/2	9600	160.56
9/16	7200	132.24
5/8	7200	146.52
11/16	4800	108.66
13/16	4800	118.12



A:  $\varnothing 1/8 \sim \varnothing 3/8 = 0.25 \times D$   
 $\varnothing 1/2 \sim \varnothing 13/16 = 0.5 \times D$

RPM=REVOLUTION PER MIN.  
FEED=inch/min.

\* The FEED, in long & extra long types, should be reduced by around 50%



## 3 FLUTE, 45° HELIX, FINISH

### E5980, E5981, E5982, E5983, 5984 Series Slotting

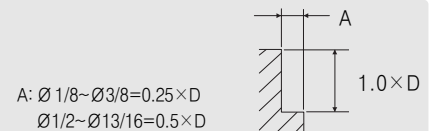
MATERIAL	ALUMINUM NONFERROUS METALS	
DIAMETER	RPM	FEED
1/8	10000	33.05
5/32	10000	42.50
3/16	10000	47.25
1/4	10000	56.70
5/16	8000	66.15
3/8	8000	80.30
1/2	8000	99.15
9/16	6000	85.05
5/8	6000	89.75
11/16	4000	66.15
13/16	4000	75.60



※ The FEED, in long & extra long types, should be reduced by around 50%

### E5980, E5981, E5982, E5983, 5984 Series Side Cutting

MATERIAL	ALUMINUM NONFERROUS METALS	
DIAMETER	RPM	FEED
1/8	10000	42.50
5/32	10000	52.00
3/16	10000	61.40
1/4	10000	70.90
5/16	8000	85.05
3/8	8000	99.20
1/2	8000	122.90
9/16	6000	103.95
5/8	6000	113.40
11/16	4000	85.05
13/16	4000	89.75



RPM=REVOLUTION PER MIN.  
FEED=inch/min.

ALU-POWER



## 3 FLUTE, 45° HELIX, FINISH, TiCN COATED

### EG980, EG981, EG982, EG983, EG984 Series Slotting

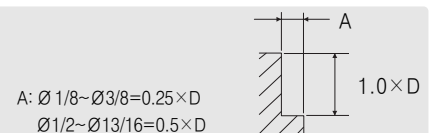
MATERIAL	ALUMINUM NONFERROUS METALS	
DIAMETER	RPM	FEED
1/8	15600	43.00
5/32	15600	55.25
3/16	15600	61.40
1/4	15600	73.70
5/16	12000	86.00
3/8	12000	104.40
1/2	12000	128.90
9/16	9600	110.55
5/8	9600	116.65
11/16	6000	86.00
13/16	6000	98.30



※ The FEED, in long & extra long types, should be reduced by around 50%

### EG980, EG981, EG982, EG983, EG984 Series Side Cutting

MATERIAL	ALUMINUM NONFERROUS METALS	
DIAMETER	RPM	FEED
1/8	12000	55.25
5/32	12000	67.60
3/16	12000	79.80
1/4	12000	92.20
5/16	9600	110.55
3/8	9600	129.00
1/2	9600	159.80
9/16	7200	135.15
5/8	7200	147.40
11/16	4800	110.55
13/16	4800	116.65



RPM=REVOLUTION PER MIN.  
FEED=inch/min.



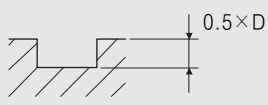
## 3 FLUTE, 37° HELIX with EXTENDED NECK

### E5977, E5985 Series

Slotting

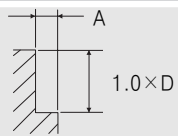
Side Cutting

MATERIAL	ALUMINUM NONFERROUS METALS	
DIAMETER	RPM	FEED
1/4	8000	45.35
3/8	6400	64.25
1/2	6400	79.40
5/8	4800	71.80
3/4	3200	70.85
1	2600	63.80



※ The FEED, in long & extra long types, should be reduced by around 50%

MATERIAL	ALUMINUM NONFERROUS METALS	
DIAMETER	RPM	FEED
1/4	8000	56.70
3/8	6400	79.40
1/2	6400	98.25
5/8	4800	90.70
3/4	3200	87.40
1	2600	78.65



A :  $\varnothing 1/4 \sim \varnothing 3/8 = 0.25 \times D$   
 $\varnothing 1/2 \sim \varnothing 1 = 0.5 \times D$

RPM=REVOLUTION PER MIN.  
FEED=inch/min.

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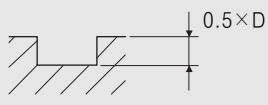
## 3 FLUTE, 37° HELIX with EXTENDED NECK, TiCN COATED

### EG977, EG985 Series

Slotting

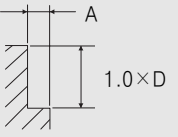
Side Cutting

MATERIAL	ALUMINUM NONFERROUS METALS	
DIAMETER	RPM	FEED
1/4	10500	58.95
3/8	8300	83.50
1/2	8300	103.20
5/8	6200	93.35
3/4	4200	92.10
1	3400	82.95



※ The FEED, in long & extra long types, should be reduced by around 50%

MATERIAL	ALUMINUM NONFERROUS METALS	
DIAMETER	RPM	FEED
1/4	10500	73.70
3/8	8300	103.20
1/2	8300	127.70
5/8	6200	117.90
3/4	4200	113.60
1	3400	102.00



A :  $\varnothing 1/4 \sim \varnothing 3/8 = 0.25 \times D$   
 $\varnothing 1/2 \sim \varnothing 1 = 0.5 \times D$

RPM=REVOLUTION PER MIN.  
FEED=inch/min.

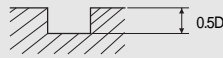




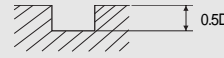
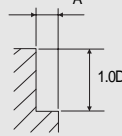
## 2 FLUTE, CORNER RADIUS with NECK

### E5973 Series

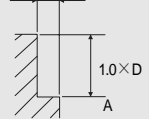
MATERIAL	ALUMINUM ALUMINUM ALLOY				COPPER ALLOY				
	DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
R.012 × 5/32	10000	36.35	10000	42.40	3000	9.10	3000	10.60	10.60
R.020 × 1/4	10000	45.40	10000	60.60	3000	11.50	3000	15.15	15.15
R.024 × 5/16	8000	54.50	8000	69.60	2300	13.60	2300	17.55	17.55
R.031 × 3/8	8000	66.60	8000	81.75	2300	16.65	2300	20.60	20.60
R.040 × 1/2	8000	81.75	8000	103.00	2300	20.55	2300	25.75	25.75
R.051 × 5/8	6000	75.70	6000	93.90	1800	19.05	1800	23.60	23.60
R.063 × 3/4	4000	60.60	4000	75.70	1150	15.15	1150	19.10	19.10



A :  $\varnothing 5/32 \sim \varnothing 3/8 = 0.25 \times D$   
 $\varnothing 1/2 \sim \varnothing 3/4 = 0.5 \times D$



A :  $\varnothing 5/32 \sim \varnothing 3/8 = 0.25 \times D$   
 $\varnothing 1/2 \sim \varnothing 3/4 = 0.5 \times D$



※ The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
 FEED=inch/min.

ALU-POWER

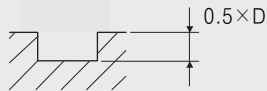


## 2 FLUTE, 37° HELIX with EXTENDED NECK

### E5976 Series

Slotting

MATERIAL	ALUMINUM NONFERROUS METALS	
	DIAMETER	FEED
1/4	8000	37.80
3/8	6400	53.55
1/2	6400	66.15
5/8	4800	59.85
3/4	3200	59.05
1	2600	53.15



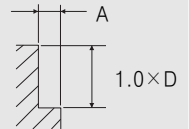
※ The FEED, in long & extra long types, should be reduced by around 50%

### E5976 Series

Side Cutting

MATERIAL	ALUMINUM NONFERROUS METALS	
	DIAMETER	FEED
1/4	8000	47.25
3/8	6400	66.15
1/2	6400	81.90
5/8	4800	75.60
3/4	3200	72.85
1	2600	65.55

A :  $\varnothing 1/4 \sim \varnothing 3/8 = 0.25 \times D$   
 $\varnothing 1/2 \sim \varnothing 1 = 0.5 \times D$



RPM=REVOLUTION PER MIN.  
 FEED=inch/min.



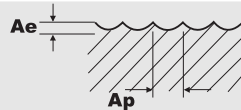
## 2 FLUTE, 37° HELIX, LONG REACH, BALL NOSE

### 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

$$A_e = 0.2 \times D$$

$$A_p = 0.5 \times D$$



RPM=REVOLUTION PER MIN.  
FEED=inch/min.

※ The FEED, in long & extra long types, should be reduced by around 50%

ALU-POWER



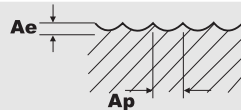
## 2 FLUTE, 37° HELIX, LONG REACH, BALL NOSE, TiCN COATED

### 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

$$A_e = 0.2 \times D$$

$$A_p = 0.5 \times D$$



RPM=REVOLUTION PER MIN.  
FEED=inch/min.

※ The FEED, in long & extra long types, should be reduced by around 50%



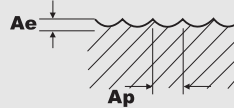
## 2 FLUTE, 50° HELIX, BALL NOSE with NECK

### E5974 Series

MATERIAL	ALUMINUM ALUMINUM ALLOY		COPPER ALLOY	
	DIAMETER	RPM	FEED	RPM
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

$$Ae = 0.2 \times D$$

$$Ap = 0.5 \times D$$



※ The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.

ALU-POWER



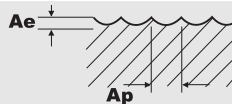
## 3 FLUTE, 40° HELIX, BALL NOSE with NECK

### E5975 Series

MATERIAL	ALUMINUM ALUMINUM ALLOY		COPPER ALLOY	
	DIAMETER	RPM	FEED	RPM
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

$$Ae = 0.2 \times D$$

$$Ap = 0.5 \times D$$



※ The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## Technology and Quality

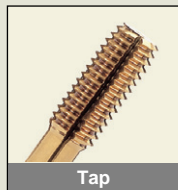
....**YG-1** Strives for technological advancements and superior quality 24 hours a day.



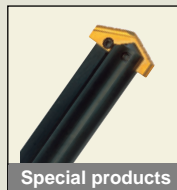
End Mill



Drill



Tap



Special products

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**X5070 / X-POWER / V7 MILL / JET-POWER / ALU-POWER / D-POWER / STANDARD & HIGH PERFORMANCE / CARBIDE END MILLS / TANK-POWER & ADDITIONAL POWDERED METAL / COBALT AND HSS END MILLS / TAPS / DRILLS, SPADE DRILL INSERTS HOLDERS AND ACCESSORIES / ROTARY TOOLING**

# D-POWER

## DIAMOND COATED CARBIDE END MILLS

- *Diamond coating for longer tool life*
- *Suitable for Machining graphite*
- *Dry cutting & High speed cutting*



















# D-POWER CARBIDE END MILLS SELECTION GUIDE

## INCH

EDP No.	APPEARANCE	SPECIFICATION	STOCK	PAGE
EI107		4 FLUTE, REGULAR LENGTH	★	141
EI099		2 FLUTE, REGULAR LENGTH, BALL NOSE	★	141
EI106		4 FLUTE, REGULAR LENGTH, BALL NOSE	★	141
EI971		2 FLUTE, LONG LENGTH, BALL NOSE	★	142
EI972		2 FLUTE, LONG REACH, BALL NOSE	★	143
EIB07		4 FLUTE, REGULAR LENGTH, BALL NOSE with NECK	★	144
EIB05		4 FLUTE, REGULAR LENGTH, CORNER RADIUS	★	145
EIB06		4 FLUTE, REGULAR LENGTH, CORNER RADIUS with NECK	★	146

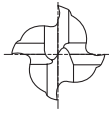
## METRIC

EDP No.	APPEARANCE	SPECIFICATION	STOCK	PAGE
EI880		2 FLUTE, SHORT LENGTH, BALL NOSE	○	147
EI881		3 FLUTE, SHORT LENGTH, BALL NOSE	○	147
EI451		2 FLUTE, LONG LENGTH, BALL NOSE	★	148
EI450		2 FLUTE, LONG REACH, BALL NOSE	★	149

★:U.S.A Stock ○:Call for Availability



# D-POWER 4 FLUTE, REGULAR LENGTH



for GRAPHITE

- ▶ 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.

◇ U.S.A Stock

## EI107 Series

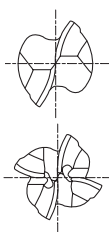
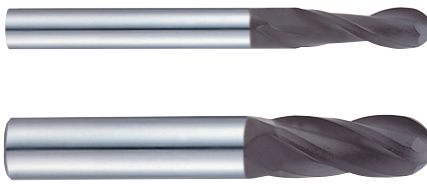
Unit : inch

EDP No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
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

- ▶ Recommended Cutting Condition
- ▶ Cutting speed : 500~1200 SFPM
- ▶ Feed : .002~.006 inch/teeth

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0	0
-.0012	-.0003

# D-POWER 2&4 FLUTE, REGULAR LENGTH, BALL NOSE



for GRAPHITE

- ▶ 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.

◇ U.S.A Stock

## EI099(2 FLUTE), EI106(4 FLUTE) Series

Unit : inch

※ EI106 Cutting Condition

Unit : inch

EDP No.		R ± .0008	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
2 FLUTE	4 FLUTE					
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

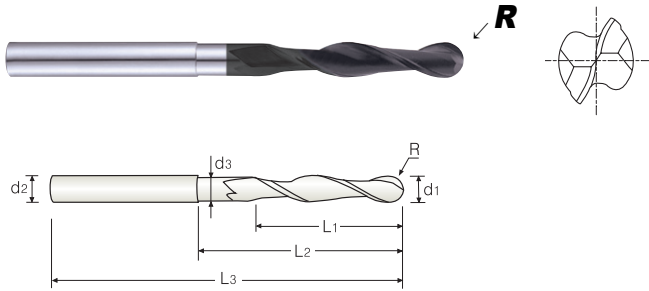
MATERIAL	GRAPHITE	
DIAMETER	RPM	FEED
5/64	16000	62.99
3/32	16000	88.19
1/8	16000	114.17
9/64	16000	137.80
5/32	16000	165.35
3/16	15500	200.79
1/4	15000	232.28
6/16	13000	236.22
3/8	11500	324.16
1/2	10500	248.03

▶ For E1099 series cutting condition, refer E1971 series

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0	0
-.0012	-.0003

FRPM=REVOLUTION PER MIN. FEED=inch/min

# D-POWER 2 FLUTE, LONG LENGTH, BALL NOSE



MG
2
30°
R ±.0008
PLAIN
**for GRAPHITE**

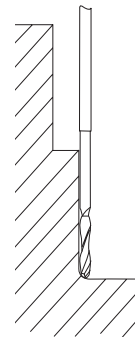
- ▶ Higher hardness of film and excellent wear-resistance increase the tool life surprisingly.
- ▶ Ultra fine film of YG-1's diamond coated carbide ball end mills ensure the smooth and excellent surface on work materials.
- ▶ High performance on graphite, wrought aluminum, bakelite, plastics, wood, brass, 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.

◇ *U.S.A Stock*

## EI971 Series

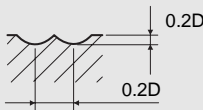
Unit : inch

EDP No.	R ±.0008	MILL DIAMETER d1	SHANK DIAMETER d2	LENGTH OF CUT L1	LENGTH BELOW SHANK L2	OVERALL LENGTH L3	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
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



Unit : inch

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

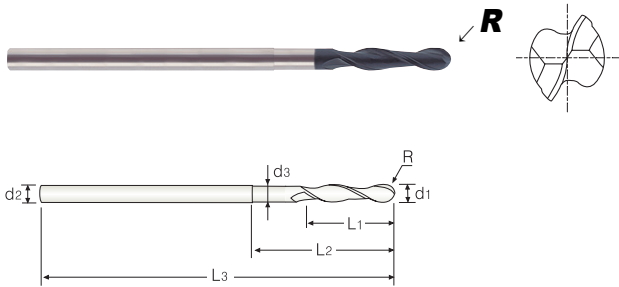


FRPM=REVOLUTION PER MIN.  
FEED=inch/min

D-POWER

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0012	0 -.0003

# D-POWER 2 FLUTE, LONG REACH, BALL NOSE



MG
2
30°
±.0008
PLAIN
**for GRAPHITE**

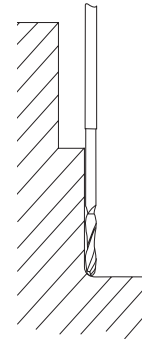
- ▶ Higher hardness of film and excellent wear-resistance increase the tool life surprisingly.
- ▶ Ultra fine film of YG-1's diamond coated carbide ball end mills ensure the smooth and excellent surface on work materials.
- ▶ High performance on graphite, wrought aluminum, bakelite, plastics, wood, brass, 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.

◇ U.S.A Stock

## EI972 Series

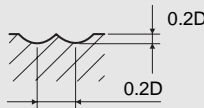
Unit : inch

EDP No.	R ± .0008	MILL DIAMETER d1	SHANK DIAMETER d2	LENGTH OF CUT L1	LENGTH BELOW SHANK L2	OVERALL LENGTH L3	NECK DIAMETER 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
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



Unit : inch

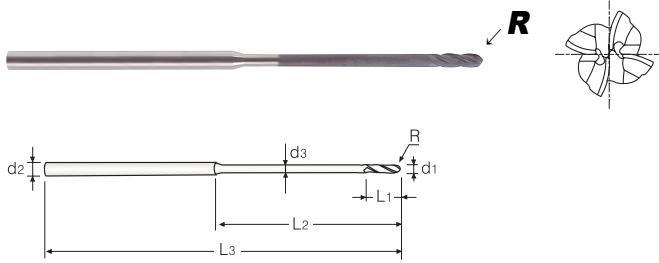
MATERIAL	GRAPHITE	
DIAMETER	RPM	FEED
5/64	16000	31.50
3/32	16000	44.09
1/8	16000	57.09
9/64	16000	58.90
5/32	16000	82.68
3/16	15500	100.39
1/4	15000	116.14
6/16	13000	118.11
3/8	11500	120.08
1/2	10500	124.02



FRPM=REVOLUTION PER MIN.  
FEED=inch/min

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0012	0 -.0003

# D-POWER 4 FLUTE, REGULAR LENGTH, BALL NOSE with NECK



for GRAPHITE

- ▶ 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.

◇ U.S.A Stock

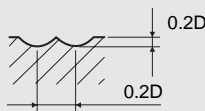
## EIB07 Series

Unit : inch

EDP No.	R ± .0008	MILL DIAMETER d1	SHANK DIAMETER d2(h6)	LENGTH OF CUT L1	LENGTH BELOW SHANK L2	OVERALL LENGTH L3	NECK DIAMETER d3
EIB07002	.0156	1/32	1/8	3/32	3/8	3	.028
EIB07901	.0156	1/32	1/8	3/32	1/2	3	.028
EIB07003	.0234	3/64	1/8	9/64	9/16	3	.043
EIB07902	.0234	3/64	1/8	9/64	3/4	3	.043
EIB07004	.0312	1/16	1/8	3/16	3/4	3	.057
EIB07903	.0312	1/16	1/8	3/16	1	3	.057
EIB07006	.0469	3/32	1/8	9/32	1	3	.086
EIB07904	.0469	3/32	1/8	9/32	1-1/2	3	.086
EIB07008	.0625	1/8	1/8	3/8	1-1/2	3	.115
EIB07905	.0625	1/8	1/8	3/8	2	3	.115

Unit : inch

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	



FRPM=REVOLUTION PER MIN.  
FEED=inch/min

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 - .0012	0 - .0003

# D-POWER 4 FLUTE, REGULAR LENGTH, CORNER RADIUS



for GRAPHITE

- ▶ 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.

◇ U.S.A Stock

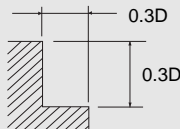
## EIB05 Series

Unit : inch

EDP No.	CORNER RADIUS R	MILL DIAMETER	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH
EIB05004	0.010	1/16	1/8	3/16	1-1/2
EIB05901	0.015	1/16	1/8	3/16	1-1/2
EIB05008	0.015	1/8	1/8	1/2	1-1/2
EIB05902	0.020	1/8	1/8	1/2	1-1/2
EIB05012	0.020	3/16	3/16	5/8	2
EIB05903	0.030	3/16	3/16	5/8	2
EIB05016	0.020	1/4	1/4	3/4	2-1/2
EIB05904	0.030	1/4	1/4	3/4	2-1/2
EIB05024	0.020	3/8	3/8	7/8	2-1/2
EIB05905	0.030	3/8	3/8	7/8	2-1/2
EIB05032	0.030	1/2	1/2	1	3
EIB05906	0.060	1/2	1/2	1	3

Unit : inch

MATERIAL	GRAPHITE	
	DIAMETER	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

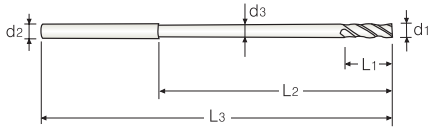


FRPM=REVOLUTION PER MIN.  
FEED=inch/min

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0012	0 -.0003

**D-POWER**

# 4 FLUTE, REGULAR LENGTH, CORNER RADIUS with NECK

**for GRAPHITE**

- ▶ 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.

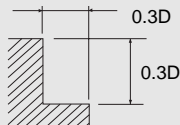
◇ *U.S.A Stock***EIB06 Series**

Unit : inch

EDP No.	CORNER RADIUS R	MILL DIAMETER d1	SHANK DIAMETER d2(h6)	LENGTH OF CUT L1	LENGTH BELOW SHANK L2	OVERALL LENGTH L3	NECK DIAMETER d3
EIB06002	.005	1/32	1/8	3/32	3/8	3	.028
EIB06901	.005	1/32	1/8	3/32	1/2	3	.028
EIB06003	.010	3/64	1/8	9/64	9/16	3	.043
EIB06902	.010	3/64	1/8	9/64	3/4	3	.043
EIB06004	.010	1/16	1/8	3/16	3/4	3	.057
EIB06903	.010	1/16	1/8	3/16	1	3	.057
EIB06006	.010	3/32	1/8	9/32	1	3	.086
EIB06904	.010	3/32	1/8	9/32	1-1/2	3	.086
EIB06008	.010	1/8	1/8	3/8	1-1/2	3	.115
EIB06905	.010	1/8	1/8	3/8	2	3	.115

Unit : inch

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
3/8	26000	316.14
1/2	21000	301.41

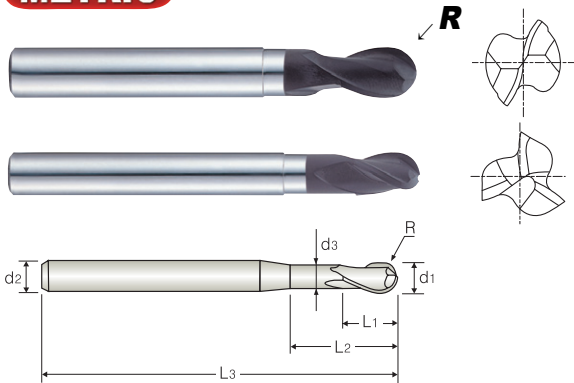
FRPM=REVOLUTION PER MIN.  
FEED=inch/min

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0012	0 -.0003



# D-POWER 2&3 FLUTE, SHORT LENGTH, BALL NOSE

**METRIC**



MG 2&3 30° ±0.01 PLAIN for GRAPHITE

- ▶ 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.

◇ Call for Availability

**EI880(2 FLUTE), EI881(3 FLUTE) Series**

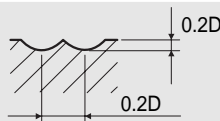
Unit : mm

EDP No.		R ± 0.01	MILL DIAMETER d <sub>1</sub>	SHANK DIAMETER d <sub>2</sub> (h6)	LENGTH OF CUT L <sub>1</sub>	LENGTH BELOW SHANK L <sub>2</sub>	OVERALL LENGTH L <sub>3</sub>	NECK DIAMETER d <sub>3</sub>
2 FLUTE	3 FLUTE							
EI880020	EI881020	R1.0	2.0	6	3	5	60	1.9
EI880025	EI881025	R1.25	2.5	6	4	6	60	2.4
EI880030	EI881030	R1.5	3.0	6	4.5	6.5	60	2.8
EI880035	EI881035	R1.75	3.5	6	5	7	65	3.2
EI880040	EI881040	R2.0	4.0	6	6	8	65	3.7
EI880050	EI881050	R2.5	5.0	6	7.5	10	65	4.6
EI880060	EI881060	R3.0	6.0	6	9	12	75	5.6
EI880080	EI881080	R4.0	8.0	8	12	25	75	7.4
EI880100	EI881100	R5.0	10.0	10	15	30	80	9.4
EI880120	EI881120	R6.0	12.0	12	18	36	90	11.4

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.03	h6

## CUTTING CONDITION

MATERIAL	GRAPHITE	
DIAMETER	RPM	FEED
2	16000	800
2.5	16000	1120
3	16000	1450
3.5	16000	1750
4	16000	2100
5	15500	2550
6	15000	2950
8	13000	3000
10	11500	3050
12	10500	3150

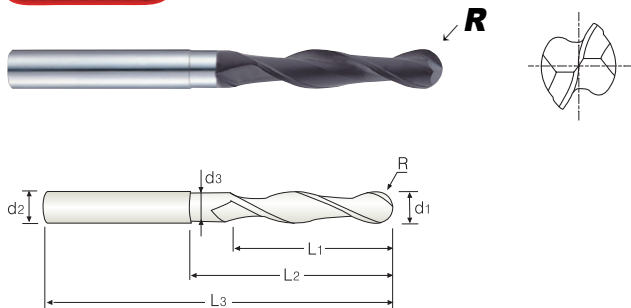


RPM=REVOLUTION PER MIN.  
FEED=mm/min.

※ The FEED, in long & extra long types, should be raduced by around 50%

# D-POWER 2 FLUTE, LONG LENGTH, BALL NOSE

**METRIC**



**for GRAPHITE**

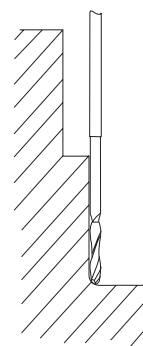
- ▶ Higher hardness of film and excellent wear-resistance increase the tool life surprisingly.
- ▶ Ultra fine film of YG-1's diamond coated carbide ball end mills ensure the smooth and excellent surface on work materials.
- ▶ High performance on graphite, wrought aluminum, bakelite, plastics, wood, brass, 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.

◇ *U.S.A Stock*

**EI451 Series**

Unit : mm

EDP No.	R ± 0.01	MILL DIAMETER d1	SHANK DIAMETER d2(h6)	LENGTH OF CUT L1	LENGTH BELOW SHANK L2	OVERALL LENGTH L3	NECK DIAMETER d3
99558	R1.0	2.0	4	10	20	80	1.95
99559	R1.5	3.0	4	15	25	80	2.9
99560	R2.0	4.0	4	20	30	80	3.9
99561	R2.5	5.0	6	30	50	100	4.9
99562	R3.0	6.0	6	30	50	100	5.5
99563	R4.0	8.0	8	40	60	110	7.5
99564	R5.0	10.0	10	50	70	120	9.5
99565	R6.0	12.0	12	55	75	130	11.5

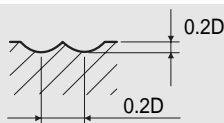


TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.03	h6

D-POWER

## CUTTING CONDITION

MATERIAL	GRAPHITE	
DIAMETER	RPM	FEED
2	16000	800
2.5	16000	1120
3	16000	1450
3.5	16000	1750
4	16000	2100
5	15500	2550
6	15000	2950
8	13000	3000
10	11500	3050
12	10500	3150

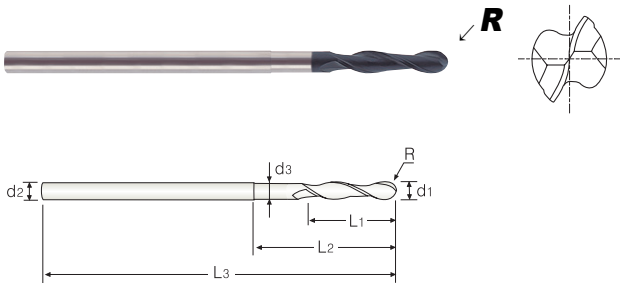


RPM=REVOLUTION PER MIN.  
FEED=mm/min.

※ The FEED, in long & extra long types, should be reduced by around 50%

# D-POWER 2 FLUTE, LONG REACH, BALL NOSE

**METRIC**



MG
2
30°
R ±0.01
PLAIN
for GRAPHITE

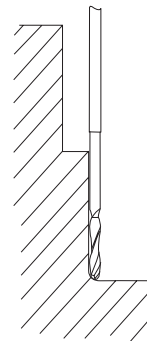
- ▶ Higher hardness of film and excellent wear-resistance increase the tool life surprisingly.
- ▶ Ultra fine film of YG-1's diamond coated carbide ball end mills ensure the smooth and excellent surface on work materials.
- ▶ High performance on graphite, wrought aluminum, bakelite, plastics, wood, brass, 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.

◇ U.S.A Stock

**EI450 Series**

Unit : mm

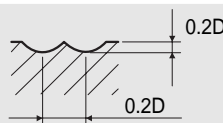
EDP No.	R ± 0.01	MILL DIAMETER d1	SHANK DIAMETER d2(h6)	LENGTH OF CUT L1	LENGTH BELOW SHANK L2	OVERALL LENGTH L3	NECK DIAMETER d3
99566	R1.0	2	4	10	20	100	1.95
99567	R1.5	3	4	15	25	100	2.9
99568	R2.0	4	4	20	30	100	3.9
99569	R2.5	5	6	30	50	120	4.9
99570	R3.0	6	6	30	50	150	5.5
99571	R4.0	8	8	40	60	150	7.5



TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0	
-0.03	h6

## CUTTING CONDITION

MATERIAL	GRAPHITE	
DIAMETER	RPM	FEED
2	16000	800
2.5	16000	1120
3	16000	1450
3.5	16000	1750
4	16000	2100
5	15500	2550
6	15000	2950
8	13000	3000
10	11500	3050
12	10500	3150



RPM=REVOLUTION PER MIN.  
FEED=mm/min.

※ The FEED, in long & extra long types, should be raduced by around 50%



## Technology and Quality

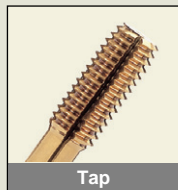
....**YG-1** Strives for technological advancements and superior quality 24 hours a day.



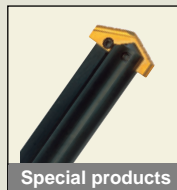
End Mill



Drill



Tap



Special products

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**X5070 / X-POWER / V7 MILL / JET-POWER / ALU-POWER / D-POWER / STANDARD & HIGH PERFORMANCE / CARBIDE END MILLS / TANK-POWER & ADDITIONAL POWDERED METAL / COBALT AND HSS END MILLS / TAPS / DRILLS, SPADE DRILL INSERTS HOLDERS AND ACCESSORIES / ROTARY TOOLING**











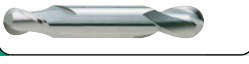




# CARBIDE END MILLS

- *General milling operation*
- *Slotting, Side cutting, Machining die cavity*
- *Suitable for most of materials*





## INCH








EDP No.	APPEARANCE	SPECIFICATION	PAGE
E5020		2 FLUTE, REGULAR LENGTH	155
E5021		4 FLUTE, REGULAR LENGTH	156
E5244 E5245		2&4 FLUTE, STUB LENGTH	157
E5011 E5012		2&4 FLUTE, LONG LENGTH	158
E5026 E5065		2&4 FLUTE, EXTRA LONG LENGTH	159
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# CARBIDE END MILLS SELECTION GUIDE

## INCH

EDP No.	APPEARANCE	SPECIFICATION	PAGE
E5246		3 FLUTE, 60° HELIX, REGULAR LENGTH	170
E5066 E5067		5 FLUTE, 45° HELIX, STUB & REGULAR LENGTH	171
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SPEED & FEED DATA

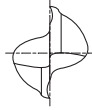
177~182



# CARBIDE END MILLS SELECTION GUIDE

Selection	Tool Name	Slotting	Profiling	Material	Page
TOLERANCE: CUTTING DIAMETER: 0 to -.0012 SHANK DIAMETER: -.0001 to -.0005					
	<b>30° HELIX 2&amp;4 FLUTE</b>	<input type="checkbox"/>	<input type="checkbox"/>	Alloy Steel Mold Steel Cast Iron Hard Exotic Alloys	<b>155</b> ~ <b>165</b>
	<b>30° HELIX 4 FLUTE CORNER RADIUS</b>	<input type="checkbox"/>	<input type="checkbox"/>	Alloy Steel Mold Steel Cast Iron Hard Exotic Alloys	<b>166</b>
	<b>45° HELIX 3 FLUTE</b>	<input type="checkbox"/>	<input type="checkbox"/>	Stainless & Exotic Alloys & Titanium	<b>167</b>
	<b>50° HELIX 3 FLUTE</b>	<input type="checkbox"/>	<input type="checkbox"/>	Stainless & Exotic Alloys	<b>168</b>
	<b>60° HELIX 3 FLUTE</b>	<input type="checkbox"/>	<input type="checkbox"/>	Stainless & Exotic Alloys	<b>169</b>
	<b>45° HELIX 5 FLUTE</b>		<input type="checkbox"/>	Alloy Steel Cast Iron & Stainless	<b>170</b> ~ <b>171</b>
	<b>40° HELIX 6 FLUTE</b>		<input type="checkbox"/>	Alloy Steel Cast Iron & Stainless	<b>172</b>
	<b>45° HELIX 5 FLUTE Fine Pitch Rougher</b>		<input type="checkbox"/>	Alloy Steel Stainless	<b>173</b>
	<b>30° HELIX Tapered End Mills Square end &amp; Ball end</b>		<input type="checkbox"/>	Alloy Steel Mold Steel Cast Iron Alloys	<b>174</b> ~ <b>175</b>

# CARBIDE 2 FLUTE, REGULAR LENGTH



MG
2
30°
PLAIN
DATA
P.178

- ▶ 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.

## E5020 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				
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

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0012	0 -.0005

# CARBIDE 4 FLUTE, REGULAR LENGTH



P.179

► Possible for high-speed cutting, suitable for high efficiency machining 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.

## E5021 Series

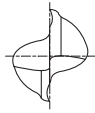
Unit : inch

EDP No.					MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
UNCOATED	TIN COATED	TiCN COATED	YG:TYLON F	YG:TYLON E				
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

GENERAL & HIGH PERFORMANCE CARBIDE END MILLS

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.012	0 -0.005

# CARBIDE 2&4 FLUTE, STUB LENGTH



P.178,179

► 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.

## E5244 Series ■ 2 FLUTE

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



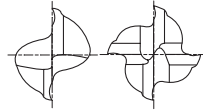
## E5245 Series ■ 4 FLUTE

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

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0012	0 -.0005

# CARBIDE 2&4 FLUTE, LONG LENGTH



P.178,179

► 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.

## E5011 Series ■ 2 FLUTE

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 Series ■ 4 FLUTE

Unit : inch

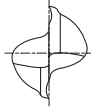
EDP No.					MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
UNCOATED	TIN COATED	TiCN COATED	YG:TYLON F	YG:TYLON E				
08558	08558TN	08558TC	08558TF	08558TE	1/8	1/8	3/4	2-1/4
08565	08565TN	08565TC	08565TF	08565TE	3/16	3/16	3/4	2-1/2
08573	08573TN	08573TC	08573TF	08573TE	1/4	1/4	1-1/8	3
08579	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

GENERAL & HIGH PERFORMANCE CARBIDE END MILLS

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -0.012	0 -0.005



# CARBIDE 2&4 FLUTE, EXTRA LONG LENGTH



P.178,179

► 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.

## E5026 Series ■ 2 FLUTE

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



## E5065 Series ■ 4 FLUTE

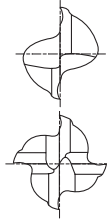
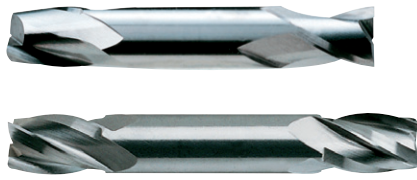
Unit : inch

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

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0012	0 -.0005

GENERAL & HIGH PERFORMANCE CARBIDE END MILLS

# CARBIDE 2&4 FLUTE, STUB LENGTH, DOUBLE



P.178,179

- ▶ 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.

## E5022 Series

■ 2 FLUTE

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

## E5023 Series

■ 4 FLUTE

Unit : inch

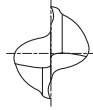
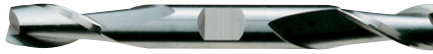
EDP No.					MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
UNCOATED	TiN COATED	TiCN COATED	YG:TYLON F	YG:TYLON E				
33554	33554TN	33554TC	33554TF	33554TE	1/16	1/8	1/8	1-1/2
33555	33555TN	33555TC	33555TF	33555TE	5/64	1/8	1/8	1-1/2
33556	33556TN	33556TC	33556TF	33556TE	3/32	1/8	3/16	1-1/2
33557	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

### TOLERANCE OF MILL DIA.

+ 0	** 0
-.0012	-.0020

\*\*The shank of end mills is the same diameter as the cutting portion.

# CARBIDE 2&4 FLUTE, REGULAR LENGTH, DOUBLE



P.178,179

- ▶ 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.

## E5025 Series ■ 2 FLUTE

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 Series ■ 4 FLUTE

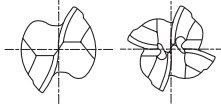
Unit : inch

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

TOLERANCE OF MILL DIA.	** 0 — .0020
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\*\*The shank of end mills is the same diameter as the cutting portion.

# CARBIDE 2&4 FLUTE, REGULAR LENGTH, BALL NOSE



MG
2&4
30°
R ±.0008
PLAIN
DATA
P.180,181

► 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.

## E5249 Series

■ 2 FLUTE

Unit : inch

EDP No.					MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
UNCOATED	TiN COATED	TiCN COATED	YG:TYLON F	YG:TYLON E				
41558	41558TN	41558TC	41558TF	41558TE	1/8	1/8	1/2	1-1/2
41561	41561TN	41561TC	41561TF	41561TE	5/32	3/16	9/16	2
41565	41565TN	41565TC	41565TF	41565TE	3/16	3/16	5/8	2
41570	41570TN	41570TC	41570TF	41570TE	7/32	1/4	5/8	2-1/2
41573	41573TN	41573TC	41573TF	41573TE	1/4	1/4	3/4	2-1/2
41579	41579TN	41579TC	41579TF	41579TE	5/16	5/16	13/16	2-1/2
41584	41584TN	41584TC	41584TF	41584TE	3/8	3/8	1	2-1/2
41588	41588TN	41588TC	41588TF	41588TE	7/16	7/16	1	2-3/4
41593	41593TN	41593TC	41593TF	41593TE	1/2	1/2	1	3
41595	41595TN	41595TC	41595TF	41595TE	5/8	5/8	1-1/4	3-1/2
41598	41598TN	41598TC	41598TF	41598TE	3/4	3/4	1-1/2	4
41600	41600TN	41600TC	41600TF	41600TE	1	1	1-1/2	4

## E5250 Series

■ 4 FLUTE

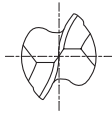
Unit : inch

EDP No.					MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
UNCOATED	TiN COATED	TiCN COATED	YG:TYLON F	YG:TYLON E				
43558	43558TN	43558TC	43558TF	43558TE	1/8	1/8	1/2	1-1/2
43561	43561TN	43561TC	43561TF	43561TE	5/32	3/16	9/16	2
43565	43565TN	43565TC	43565TF	43565TE	3/16	3/16	5/8	2
43570	43570TN	43570TC	43570TF	43570TE	7/32	1/4	5/8	2-1/2
43573	43573TN	43573TC	43573TF	43573TE	1/4	1/4	3/4	2-1/2
43579	43579TN	43579TC	43579TF	43579TE	5/16	5/16	13/16	2-1/2
43584	43584TN	43584TC	43584TF	43584TE	3/8	3/8	1	2-1/2
43588	43588TN	43588TC	43588TF	43588TE	7/16	7/16	1	2-3/4
43593	43593TN	43593TC	43593TF	43593TE	1/2	1/2	1	3
43595	43595TN	43595TC	43595TF	43595TE	5/8	5/8	1-1/4	3-1/2
43598	43598TN	43598TC	43598TF	43598TE	3/4	3/4	1-1/2	4
43600	43600TN	43600TC	43600TF	43600TE	1	1	1-1/2	4

GENERAL & HIGH PERFORMANCE CARBIDE END MILLS

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 - .0012	0 - .0005

# CARBIDE 2&4 FLUTE, LONG LENGTH, BALL NOSE



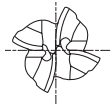
MG
2&4
30°
R ±.0008
PLAIN
DATA
P.180,181

► 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.

## E5014 Series ■ 2 FLUTE

Unit : inch

EDP No.					MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
UNCOATED	TIN COATED	TiCN COATED	YG:TYLON F	YG:TYLON E				
50558	50558TN	50558TC	50558TF	50558TE	1/8	1/8	3/4	2-1/4
50565	50565TN	50565TC	50565TF	50565TE	3/16	3/16	3/4	2-1/2
50573	50573TN	50573TC	50573TF	50573TE	1/4	1/4	1-1/8	3
50579	50579TN	50579TC	50579TF	50579TE	5/16	5/16	1-1/8	3
50584	50584TN	50584TC	50584TF	50584TE	3/8	3/8	1-1/8	3
50588	50588TN	50588TC	50588TF	50588TE	7/16	7/16	2	4
50593	50593TN	50593TC	50593TF	50593TE	1/2	1/2	2	4
50595	50595TN	50595TC	50595TF	50595TE	5/8	5/8	2-1/4	5
50598	50598TN	50598TC	50598TF	50598TE	3/4	3/4	2-1/4	5
50600	50600TN	50600TC	50600TF	50600TE	1	1	2-1/4	5



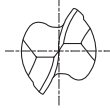
## E5060 Series ■ 4 FLUTE

Unit : inch

EDP No.					MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
UNCOATED	TIN COATED	TiCN COATED	YG:TYLON F	YG:TYLON E				
51558	51558TN	51558TC	51558TF	51558TE	1/8	1/8	3/4	2-1/4
51565	51565TN	51565TC	51565TF	51565TE	3/16	3/16	3/4	2-1/2
51573	51573TN	51573TC	51573TF	51573TE	1/4	1/4	1-1/8	3
51579	51579TN	51579TC	51579TF	51579TE	5/16	5/16	1-1/8	3
51584	51584TN	51584TC	51584TF	51584TE	3/8	3/8	1-1/8	3
51588	51588TN	51588TC	51588TF	51588TE	7/16	7/16	2	4
51593	51593TN	51593TC	51593TF	51593TE	1/2	1/2	2	4
51595	51595TN	51595TC	51595TF	51595TE	5/8	5/8	2-1/4	5
51598	51598TN	51598TC	51598TF	51598TE	3/4	3/4	2-1/4	5
51600	51600TN	51600TC	51600TF	51600TE	1	1	2-1/4	5

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0012	0 -.0005

# CARBIDE 2&4 FLUTE, EXTRA LONG LENGTH, BALL NOSE



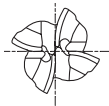
MG
2&4
30°
R ±.0008
PLAIN
DATA
P.180,181

► 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.

## E5018 Series ■ 2 FLUTE

Unit : inch

EDP No.					MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
UNCOATED	TIN COATED	TiCN COATED	YG:TYLON F	YG:TYLON E				
52558	52558TN	52558TC	52558TF	52558TE	1/8	1/8	1	3
52565	52565TN	52565TC	52565TF	52565TE	3/16	3/16	1-1/8	3
52904	52904TN	52904TC	52904TF	52904TE	3/16	3/16	1	4
52573	52573TN	52573TC	52573TF	52573TE	1/4	1/4	1-1/2	4
52901	52901TN	52901TC	52901TF	52901TE	1/4	1/4	1-1/2	6
52579	52579TN	52579TC	52579TF	52579TE	5/16	5/16	1-5/8	4
52584	52584TN	52584TC	52584TF	52584TE	3/8	3/8	1-3/4	4
52902	52902TN	52902TC	52902TF	52902TE	3/8	3/8	1-1/2	6
52588	52588TN	52588TC	52588TF	52588TE	7/16	7/16	3	6
52903	52903TN	52903TC	52903TF	52903TE	1/2	1/2	1-1/2	6
52593	52593TN	52593TC	52593TF	52593TE	1/2	1/2	3	6
52595	52595TN	52595TC	52595TF	52595TE	5/8	5/8	3	6
52598	52598TN	52598TC	52598TF	52598TE	3/4	3/4	3	6
52600	52600TN	52600TC	52600TF	52600TE	1	1	3	6



## E5062 Series ■ 4 FLUTE

Unit : inch

EDP No.					MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
UNCOATED	TIN COATED	TiCN COATED	YG:TYLON F	YG:TYLON E				
53558	53558TN	53558TC	53558TF	53558TE	1/8	1/8	1	3
53565	53565TN	53565TC	53565TF	53565TE	3/16	3/16	1-1/8	3
53573	53573TN	53573TC	53573TF	53573TE	1/4	1/4	1-1/2	4
53901	53901TN	53901TC	53901TF	53901TE	1/4	1/4	1-1/2	6
53579	53579TN	53579TC	53579TF	53579TE	5/16	5/16	1-5/8	4
53584	53584TN	53584TC	53584TF	53584TE	3/8	3/8	1-3/4	4
53902	53902TN	53902TC	53902TF	53902TE	3/8	3/8	1-1/2	6
53588	53588TN	53588TC	53588TF	53588TE	7/16	7/16	3	6
53903	53903TN	53903TC	53903TF	53903TE	1/2	1/2	1-1/2	6
53593	53593TN	53593TC	53593TF	53593TE	1/2	1/2	3	6
53595	53595TN	53595TC	53595TF	53595TE	5/8	5/8	3	6
53904	53904TN	53904TC	53904TF	53904TE	5/8	5/8	1-1/2	6
53598	53598TN	53598TC	53598TF	53598TE	3/4	3/4	3	6
53905	53905TN	53905TC	53905TF	53905TE	3/4	3/4	1-1/2	6
53600	53600TN	53600TC	53600TF	53600TE	1	1	3	6
53906	53906TN	53906TC	53906TF	53906TE	1	1	1-1/2	6

TOLERANCE OF MILL DIA.

TOLERANCE OF SHANK DIA.

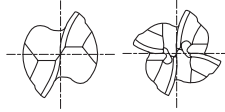
0  
- .0012

0  
- .0005

GENERAL & HIGH PERFORMANCE CARBIDE END MILLS



# CARBIDE 2&4 FLUTE, STUB LENGTH, DOUBLE BALL NOSE



MG
2&4
30°
R ±.0008
PLAIN
DATA
P.180,181

- ▶ 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.

## E5251 Series ■ 2 FLUTE

Unit : inch

EDP No.					MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
UNCOATED	TIN COATED	TiCN COATED	YG:TYLON F	YG:TYLON E				
47570	47570TN	47570TC	47570TF	47570TE	7/32	1/4	1/2	2-1/2
47573	47573TN	47573TC	47573TF	47573TE	1/4	1/4	1/2	2-1/2
47579	47579TN	47579TC	47579TF	47579TE	5/16	5/16	1/2	2-1/2
47584	47584TN	47584TC	47584TF	47584TE	3/8	3/8	9/16	2-1/2
47588	47588TN	47588TC	47588TF	47588TE	7/16	7/16	9/16	2-3/4
47593	47593TN	47593TC	47593TF	47593TE	1/2	1/2	5/8	3

## E5252 Series ■ 4 FLUTE

Unit : inch

EDP No.					MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
UNCOATED	TIN COATED	TiCN COATED	YG:TYLON F	YG:TYLON E				
48570	48570TN	48570TC	48570TF	48570TE	7/32	1/4	1/2	2-1/2
48573	48573TN	48573TC	48573TF	48573TE	1/4	1/4	1/2	2-1/2
48579	48579TN	48579TC	48579TF	48579TE	5/16	5/16	1/2	2-1/2
48584	48584TN	48584TC	48584TF	48584TE	3/8	3/8	9/16	2-1/2
48588	48588TN	48588TC	48588TF	48588TE	7/16	7/16	9/16	2-3/4
48593	48593TN	48593TC	48593TF	48593TE	1/2	1/2	5/8	3

GENERAL & HIGH PERFORMANCE CARBIDE END MILLS

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0012	0 -.0005

# CARBIDE 4 FLUTE, REGULAR LENGTH, CORNER RADIUS



MG
4
30°
R ±.001
PLAIN
DATA
P.179

► 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.

E5216 Series

■ 4 FLUTE

Unit : inch

EDP No.		CORNER RADIUS R	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
UNCOATED WITH RADIUS	YG:TYLON F WITH RADIUS					
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
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

GENERAL & HIGH PERFORMANCE CARBIDE END MILLS

**CARBIDE****5 FLUTE, 45° HELIX, REGULAR LENGTH,  
CORNER RADIUS**

MG
5
30°
R ±.001
PLAIN
DATA
P.177

- ▶ Designed to machine stainless steels, Inconols and other alloys.
- ▶ 5 Flute and 45° medium helix allow harmonic balance and smooth cutting.

**E5067 Series**

Unit : inch

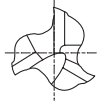
EDP No.	CORNER RADIUS R	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
86573TF-030R	R.030	1/4	1/4	3/4	2-1/2
86584TF-030R	R.030	3/8	3/8	1	2-1/2
86584TF-060R	R.060	3/8	3/8	1	2-1/2
86593TF-030R	R.030	1/2	1/2	1-1/4	3
86593TF-060R	R.060	1/2	1/2	1-1/4	3
86593TF-090R	R.090	1/2	1/2	1-1/4	3
86595TF-030R	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

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0012	0 -.0005

GENERAL &amp; HIGH PERFORMANCE CARBIDE END MILLS

# CARBIDE 3 FLUTE, 45° HELIX, REGULAR LENGTH



MG
3
45°
UPTO5/16
3/8 - 1
DATA
P.177

- ▶ 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.

## E5243 Series

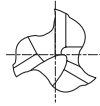
Unit : inch

EDP No.					MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
UNCOATED	TiN COATED	TiCN COATED	YG:TYLON F	YG:TYLON E				
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

GENERAL & HIGH PERFORMANCE CARBIDE END MILLS

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0012	0 -.0005

# CARBIDE 3 FLUTE, 50° HELIX, STUB, REGULAR & LONG LENGTH



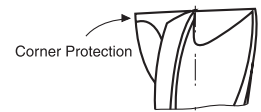
MG
3
50°
PLAIN
DATA
P.177

- ▶ 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.

## E5059 Series

Unit : inch

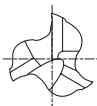
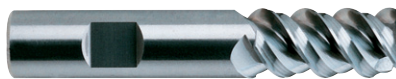
EDP No.					MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
UNCOATED	TiN COATED	TiCN COATED	YG:TYLON F	YG:TYLON E				
83573	83573TN	83573TC	83573TF	83573TE	1/4	1/4	1/2	2
83901	83901TN	83901TC	83901TF	83901TE	1/4	1/4	3/4	2-1/2
83902	83902TN	83902TC	83902TF	83902TE	1/4	1/4	1-1/4	3
83584	83584TN	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



GENERAL & HIGH PERFORMANCE CARBIDE END MILLS

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0012	0 -.0005

# CARBIDE 3 FLUTE, 60° HELIX, REGULAR LENGTH



MG
3
60°
UNDER3/8
3/8 - 1
DATA
P.177

- ▶ Excellent shearing and chip ejection due to 60° Helix.
- ▶ 20% ~ 30% increase in chip load recommended over 30° helix tools.

## E5246 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				
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

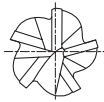


GENERAL & HIGH PERFORMANCE CARBIDE END MILLS

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 - .0012	0 - .0005



# CARBIDE 5 FLUTE, 45° HELIX, STUB & REGULAR LENGTH



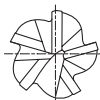
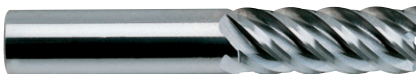
MG
5
45°
PLAIN
DATA
P.177

- ▶ 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.

## E5066 Series ■ STUB LENGTH

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

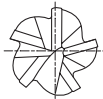


## E5067 Series ■ REGULAR LENGTH

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

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0012	0 -.0003

**CARBIDE****5 FLUTE, 45° HELIX, MEDIUM,  
LONG & EXTRA LONG LENGTH****MG****5****45°****PLAIN****DATA**

P.177

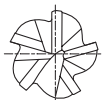
- ▶ Designed to machine stainless steel, inconels and other alloys.
- ▶ The new design of stub length allows cutting at maximum speeds and feeds with minimum deflection
- ▶ 5 Flute and 45° medium helix allow harmonic balance and smooth cutting.

**E5068 Series**

■ MEDIUM &amp; LONG LENGTH

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

**E5073 Series**

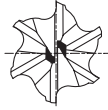
■ EXTRA LONG LENGTH

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

TOLERANCE  
OF MILL DIA.TOLERANCE  
OF SHANK DIA.0  
- .00120  
- .0003

# CARBIDE 6 FLUTE, 40° HELIX, REGULAR LENGTH



P.177

- ▶ 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.

## E5058 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				
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

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.0012	0 -.0005

**CARBIDE****5 FLUTE, 45° HELIX, STUB & REGULAR LENGTH, FINE PITCH ROUGHING**

P.177

- ▶ 5 flute design gives minimum harmonic vibration.
- ▶ Stub tools for minimum deflection and maximum rigidity.
- ▶ Ideal for profile milling.
- ▶ Not recommended for slotting.

**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					
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					
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

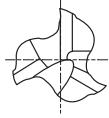
**TECHNICAL NOTES**

MATERIAL	Speed SFM	Chip Load Per Tooth(Inches)					Recommended Coating
		3/8	1/2	5/8	3/4	1	
Steel Alloys	100~500	.001~.003	.002~.004				TF
Stainless Steel Alloys	100~400	.001~.003	.002~.004				TF
Nickel Based Alloys	20~150	.001~.003	.002~.004				TE

TOLERANCE OF MILL DIA.	TOLERANCE OF SHANK DIA.
0 -.003	0 -.0005

GENERAL &amp; HIGH PERFORMANCE CARBIDE END MILLS

# CARBIDE 3 FLUTE, TAPER



MG
3
30°
PLAIN
DATA
P.177

- ▶ Designed for milling die cavity.
- ▶ Many different center line angles are available on your job requirement.

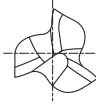
## E5077 Series ■ SQUARE END

Unit : inch

EDP No.					SHANK DIAMETER	CENTER LINE ANGLE	CUTTING SMALL DIAMETER	LENGTH OF CUT	OVERALL LENGTH
UNCOATED	TiN COATED	TiCN COATED	YG:TYLON F	YG:TYLON E					
87552	87552TN	87552TC	87552TF	87552TE	1/4	1°	1/8	1-1/2	3
87553	87553TN	87553TC	87553TF	87553TE	1/4	1.5°	1/8	1-1/2	3
87554	87554TN	87554TC	87554TF	87554TE	1/4	2°	1/8	1-1/4	3
87556	87556TN	87556TC	87556TF	87556TE	1/4	3°	1/8	1	3
87560	87560TN	87560TC	87560TF	87560TE	1/4	5°	1/8	3/4	3
87564	87564TN	87564TC	87564TF	87564TE	1/4	7°	1/8	1/2	3
87570	87570TN	87570TC	87570TF	87570TE	1/4	10°	3/32	1/2	3
87572	87572TN	87572TC	87572TF	87572TE	3/8	1°	3/16	1-3/4	3-1/2
87573	87573TN	87573TC	87573TF	87573TE	3/8	1.5°	3/16	1-3/4	3-1/2
87574	87574TN	87574TC	87574TF	87574TE	3/8	2°	3/16	1-3/4	3-1/2
87576	87576TN	87576TC	87576TF	87576TE	3/8	3°	5/32	1-3/4	3-1/2
87580	87580TN	87580TC	87580TF	87580TE	3/8	5°	1/8	1-1/2	3-1/2
87584	87584TN	87584TC	87584TF	87584TE	3/8	7°	1/8	1	3-1/2
87590	87590TN	87590TC	87590TF	87590TE	3/8	10°	1/8	3/4	3-1/2
87592	87592TN	87592TC	87592TF	87592TE	1/2	1°	1/4	2	4
87594	87594TN	87594TC	87594TF	87594TE	1/2	2°	1/4	2	4
87596	87596TN	87596TC	87596TF	87596TE	1/2	3°	1/4	2	4
87600	87600TN	87600TC	87600TF	87600TE	1/2	5°	1/4	1-1/4	4
87902	87902TN	87902TC	87902TF	87902TE	1/2	7°	3/16	1-1/4	4
87903	87903TN	87903TC	87903TF	87903TE	1/2	10°	1/8	1	4

O.D RANGE TOLERANCE	1/64~1/4	17/64~1
	0~- .0020	0~- .0030
TOLERANCE OF SHANK DIA	0 -.0005	

# CARBIDE 3 FLUTE, TAPER, BALL NOSE



P.177

- ▶ Designed for milling die cavity.
- ▶ Many different center line angles are available on your job requirement.

E5078 Series

■ RADIUS END

Unit : inch

EDP No.					SHANK DIAMETER	CENTER LINE ANGLE	TIP RADIUS	LENGTH OF CUT	OVERALL LENGTH
UNCOATED	TiN COATED	TiCN COATED	YG:TYLON F	YG:TYLON E					
88552	88552TN	88552TC	88552TF	88552TE	1/4	1°	.062	1-1/2	3
88553	88553TN	88553TC	88553TF	88553TE	1/4	1.5°	.062	1-1/2	3
88554	88554TN	88554TC	88554TF	88554TE	1/4	2°	.062	1-1/4	3
88556	88556TN	88556TC	88556TF	88556TE	1/4	3°	.062	1	3
88560	88560TN	88560TC	88560TF	88560TE	1/4	5°	.062	3/4	3
88564	88564TN	88564TC	88564TF	88564TE	1/4	7°	.062	1/2	3
88570	88570TN	88570TC	88570TF	88570TE	1/4	10°	.047	1/2	3
88572	88572TN	88572TC	88572TF	88572TE	3/8	1°	.093	1-3/4	3-1/2
88573	88573TN	88573TC	88573TF	88573TE	3/8	1.5°	.093	1-3/4	3-1/2
88574	88574TN	88574TC	88574TF	88574TE	3/8	2°	.093	1-3/4	3-1/2
88576	88576TN	88576TC	88576TF	88576TE	3/8	3°	.078	1-3/4	3-1/2
88580	88580TN	88580TC	88580TF	88580TE	3/8	5°	.062	1-1/2	3-1/2
88584	88584TN	88584TC	88584TF	88584TE	3/8	7°	.062	1	3-1/2
88590	88590TN	88590TC	88590TF	88590TE	3/8	10°	.062	3/4	3-1/2
88592	88592TN	88592TC	88592TF	88592TE	1/2	1°	.125	2	4
88594	88594TN	88594TC	88594TF	88594TE	1/2	2°	.125	2	4
88596	88596TN	88596TC	88596TF	88596TE	1/2	3°	.125	2	4
88600	88600TN	88600TC	88600TF	88600TE	1/2	5°	.125	1-1/4	4
88902	88902TN	88902TC	88902TF	88902TE	1/2	7°	.093	1-1/4	4
88903	88903TN	88903TC	88903TF	88903TE	1/2	10°	.062	1	4

GENERAL & HIGH PERFORMANCE CARBIDE END MILLS

O.D RANGE TOLERANCE	1/64~1/4	17/64~1
	0~- .0020	0~- .0030
TOLERANCE OF SHANK DIA	0 -.0005	

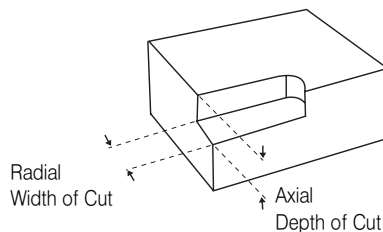




# SPEED & FEED RECOMMENDATIONS

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	600-1000	.0005-.002	.002-.003	.003-.006	TiCN
Graphite	600-1000	.0005-.005	.001-.008	.002-.010	D
Plastic	600-1200	.0006-.003	.003-.006	.006-.012	TF

**TF** = YG:TYLON F  
**TE** = YG:TYLON E  
**D** = DIAMOND  
**CrN** = CROME NITRIDE



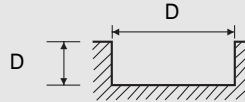
- SPEED & FEED DETERMINANTS**
1. MATERIAL HARDNESS
  2. MACHINE RIGIDITY
  3. TYPE OF COATING
  4. TOOL GEOMETRY
  5. FINISH REQUIREMENTS
  6. DEPTH & WIDTH OF CUT

GENERAL & HIGH PERFORMANCE CARBIDE END MILLS

## 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	~HRc20		HRc20 ~ HRc30		HRc30 ~ HRc40									
STRENGTH	500~800N/mm <sup>2</sup>		800 ~ 1000N/mm <sup>2</sup>		1000 ~ 1300N/mm <sup>2</sup>									
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



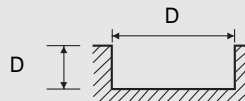
\*The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## 2 FLUTE, TiAIN "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	~HRc20		HRc20 ~ HRc30		HRc30 ~ HRc40									
STRENGTH	500~800N/mm <sup>2</sup>		800 ~ 1000N/mm <sup>2</sup>		1000 ~ 1300N/mm <sup>2</sup>									
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%

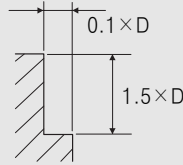
RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## 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	~HRc20		HRc20 ~ HRc30		HRc30 ~ HRc40									
STRENGTH	500~800N/mm <sup>2</sup>		800 ~ 1000N/mm <sup>2</sup>		1000 ~ 1300N/mm <sup>2</sup>									
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%

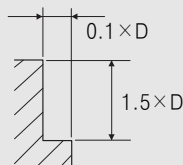
RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## 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	~HRc20		HRc20 ~ HRc30		HRc30 ~ HRc40									
STRENGTH	500~800N/mm <sup>2</sup>		800 ~ 1000N/mm <sup>2</sup>		1000 ~ 1300N/mm <sup>2</sup>									
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%

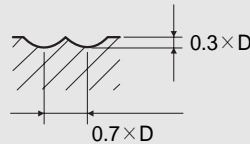
RPM=REVOLUTION PER MIN.  
FEED=inch/min.

**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/mm <sup>2</sup>		1000 ~ 1300N/mm <sup>2</sup>					
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%

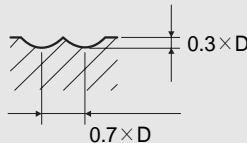
RPM=REVOLUTION PER MIN.  
FEED=inch/min.

**CARBIDE**

## 2 FLUTE, BALL NOSE, TiAIN "F" COATED

### EH249, EH014, EH018, EH251 Series

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CAST IRON		ALUMINUM ALLOYS	
HARDNESS	~HRc30		HRc30 ~ HRc40					
STRENGTH	~1000N/mm <sup>2</sup>		1000 ~ 1300N/mm <sup>2</sup>					
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=REVOLUTION PER MIN.  
FEED=inch/min.

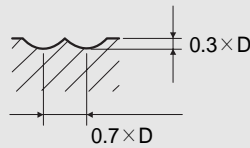
GENERAL &amp; HIGH PERFORMANCE CARBIDE END MILLS

**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/mm <sup>2</sup>		1000 ~ 1300N/mm <sup>2</sup>					
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%

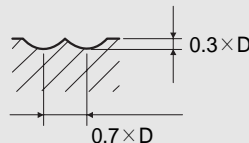
RPM=REVOLUTION PER MIN.  
FEED=inch/min.

**CARBIDE**

## 4 FLUTE, BALL NOSE, TiAIN "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/mm <sup>2</sup>		1000 ~ 1300N/mm <sup>2</sup>					
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=REVOLUTION PER MIN.  
FEED=inch/min.

	Titanium Nitride	Titanium Carbonitride	Super TiAlN "F" Coatings	Super TiAlN "E" Coatings
<b>Hardness</b>	82 Rc	92 Rc	92 Rc	95 Rc
<b>Coefficient of Friction Against Dry Steel (.8)</b>	.4	.4	.4	.4
<b>Coating Thickness 3 Microns = .0001</b>	1- 4	1- 4	1- 5	1- 3
<b>Maximum Working Temperature</b>	1100 F	750 F	1470 F	1470 F
<b>Coating Color</b>	Gold	Blue - Gray	Violet - Gray	Violet - Gray
<b>Key Characteristics</b>	Good General Purpose	Good Wear Resistance Good Toughness Moderate Heat Resistance	Enhanced Toughness High Heat Resistance	High Hardness Enhanced Toughness High Heat Resistance
<b>Primary Applications</b>	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
<p><b>YG:TYLON SUPER TiAlN COATED TOOLS CAN BE RUN 20% - 50% FASTER THAN TiN or TiCN ON MOST MATERIALS</b></p>				

GENERAL & HIGH PERFORMANCE CARBIDE END MILLS



# TANK POWER

The Next Generation  
of Powered Metal End Mills






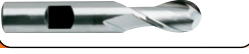





● *HIGHER EDGE STRENGTH & FEED RATES*










# TANK-POWER & POWDERED METAL END MILLS SELECTION GUIDE

## TANK-POWER

EDP No.	APPEARANCE	SPECIFICATION	PAGE
E9983		2 FLUTE, REGULAR LENGTH	187
E9984		2 FLUTE, REGULAR LENGTH, DOUBLE	188
E9985		4 FLUTE, REGULAR LENGTH	189
E9986		4 FLUTE, REGULAR LENGTH, DOUBLE	190
E9988		3&4 FLUTE, 60° HELIX, REGULAR LENGTH	191
E9992		2 FLUTE, REGULAR LENGTH, BALL NOSE	192
E9990		MULTI FLUTE, REGULAR LENGTH, FINE PITCH ROUGHING	193
E9991		MULTI FLUTE, REGULAR LENGTH, COARSE PITCH ROUGHING	194
E9A86		MULTI FLUTE, LONG LENGTH, FINE PITCH ROUGHING	195
E9A87		MULTI FLUTE, LONG LENGTH, COARSE PITCH ROUGHING	196
E9921		YPM MULTI FLUTE FINE PITCH ROUGHING EXTENDED NECK, CENTER CUTTING	197

## POWDERED METAL

EDP No.	APPEARANCE	SPECIFICATION	PAGE
E3086		PM, MULTI FLUTE, STUB LENGTH, FINE PITCH ROUGHING	198
E3085		PM, MULTI FLUTE, REGULAR LENGTH, FINE PITCH ROUGHING	198
E3079		PM, MULTI FLUTE, LONG LENGTH, FINE PITCH ROUGHING	199
E3180		PM, 4&5 FLUTE, REGULAR LENGTH, ROUGHING & FINISHING	200
E3030		PM, 2 FLUTE, REGULAR LENGTH	201



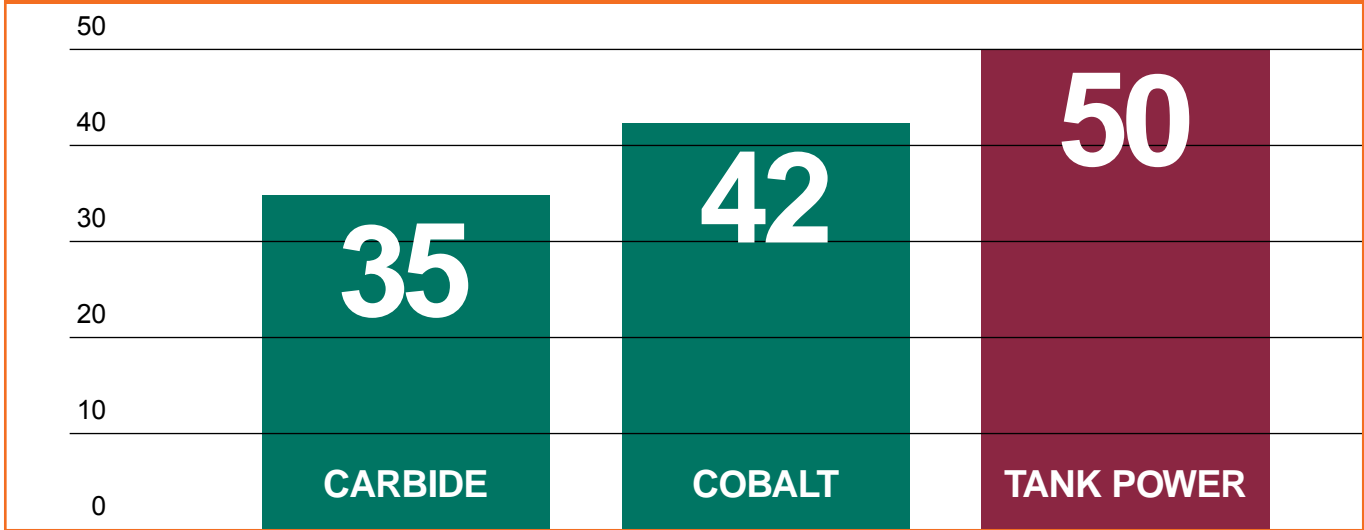
## POWDERED METAL

EDP No.	APPERANCE	SPECIFICATION	STOCK	PAGE
E3050		PM, 2 FLUTE, REGULAR LENGTH, DOUBLE		202
E3039		PM, 4 FLUTE, REGULAR LENGTH		203
E3053		PM, 4 FLUTE, REGULAR LENGTH, DOUBLE		204
E3120		PM, 3 FLUTE, 60° HELIX, REGULAR LENGTH		205
E3121		PM, 4 FLUTE, 60° HELIX, REGULAR LENGTH		205
EK191		T15, 3 FLUTE, 42° HELIX, REGULAR LENGTH, ROUGHING with CORNER RADIUS for ALUMINUM		206
EK226		T15, 3 FLUTE, 42° HELIX, MEDIUM LENGTH, ROUGHING with CORNER RADIUS for ALUMINUM		206
EK192		T15, 3 FLUTE, 42° HELIX, LONG LENGTH, ROUGHING with CORNER RADIUS for ALUMINUM		207
EK191		T15, 3 FLUTE, 42° HELIX, REGULAR LENGTH, ROUGHING for ALUMINUM		208
EK226		T15, 3 FLUTE, 42° HELIX, MEDIUM LENGTH, ROUGHING for ALUMINUM		208
EK192		T15, 3 FLUTE, 42° HELIX, LONG LENGTH, ROUGHING for ALUMINUM		208
EK196		3 FLUTE BALL NOSE, 42° HELIX ROUGHING BALL NOSE REGULAR LENGTH FOR ALUMINUM		209
EK193		3 FLUTE FINISHING WITH CORNER RADIUS & WITHOUT CORNER RADIUS END REGULAR LENGTH		210
EK194		3 FLUTE FINISHING WITH CORNER RADIUS & WITHOUT CORNER RADIUS END MEDIUM LENGTH		210
EK195		3 FLUTE FINISHING WITH CORNER RADIUS & WITHOUT CORNER RADIUS END LONG LENGTH		210
EP922		YPM, 3 FLUTE, 42° HELIX, SHORT LENGTH, ROUGHING for ALUMINUM - METRIC		211
EP924		YPM, 3 FLUTE, 42° HELIX, LONG LENGTH, ROUGHING for ALUMINUM - METRIC		211

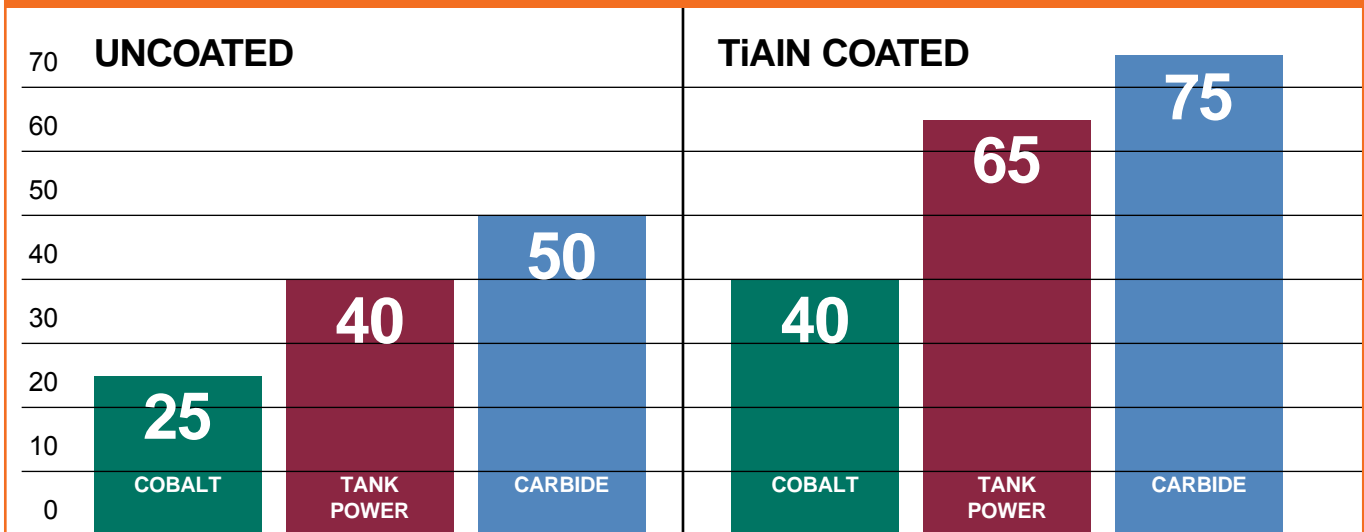
SPEED & FEED DATA

212 ~ 218

## TOUGHNESS VALUE AND EDGE STRENGTH



## APPROXIMATE WEAR VALUES

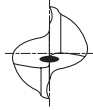


### WHEN TO USE TANK POWER

- Cobalt Tools Wear Rapidly
- Carbide Tools Chip or Break
- Higher Feed Rates Desired

### MATERIALS SUCCESSFULLY MACHINED...up to Rc45

- Alloy and Tool Steels
- Stainless Steels
- Titanium
- Nickel Based Alloys



► 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.

◇ *U.S.A Stock*

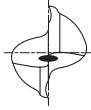
**E9983, E9983TF Series**

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

TOLERANCE OF MILL DIA.	
+ .0010	** + .0015
-.0000	-.0000

\*\*The shank of end mills is the same diameter as the cutting portion.



P.213

► 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.

◇ *U.S.A Stock*

**E9984, E9984TF Series**

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

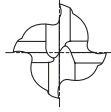
TANK-POWER & ADDITIONAL POWDERED METAL

**TOLERANCE OF MILL DIA.**

0	** 0
-.0010	-.0020

\*\*The shank of end mills is the same diameter as the cutting portion.



**TANK-POWER****4 FLUTE, REGULAR LENGTH**

P.213

- 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.

◇ *U.S.A Stock*

**TANK-POWER & ADDITIONAL POWDERED METAL**
**E9985, E9985TF Series**

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

**TOLERANCE OF MILL DIA.**

+ .0010	* * + .0015
0	0

\*\*The shank of end mills is the same diameter as the cutting portion.



P.213

► 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.

◇ *U.S.A Stock*

**E9986, E9986TF Series**

Unit : inch

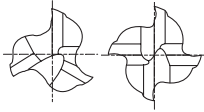
EDP No.		MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
UNCOATED	TANK-POWER COATED				
E9986008	E9986008TF	1/8	3/8	3/8	3-1/16
E9986012	E9986012TF	3/16	3/8	1/2	3-1/4
E9986016	E9986016TF	1/4	3/8	5/8	3-3/8
E9986020	E9986020TF	5/16	3/8	3/4	3-1/2
E9986024	E9986024TF	3/8	3/8	3/4	3-1/2
E9986032	E9986032TF	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

TANK-POWER & ADDITIONAL POWDERED METAL

**TOLERANCE OF MILL DIA.**

0	** 0
-.0010	-.0020

\*\*The shank of end mills is the same diameter as the cutting portion.



► 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.

◇ *U.S.A Stock*

TANK-POWER & ADDITIONAL POWDERED METAL

**E9988, E9988TF Series**

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

**TOLERANCE OF MILL DIA.**

+ .0010	* * + .0015
0	0

\*\*The shank of end mills is the same diameter as the cutting portion.



YPM
2
30°
±.001
FLAT
DATA
P.215

► 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.

◇ *U.S.A Stock*

E9992, E9992TF Series

Unit : inch

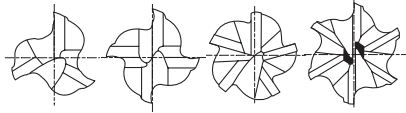
EDP No.		R ±.001	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
UNCOATED	TANK-POWER COATED					
E9992008	E9992008TF	R1/16	1/8	3/8	3/8	2-5/16
E9992012	E9992012TF	R3/32	3/16	3/8	1/2	2-3/8
E9992016	E9992016TF	R1/8	1/4	3/8	5/8	2-7/16
E9992020	E9992020TF	R5/32	5/16	3/8	3/4	2-1/2
E9992024	E9992024TF	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

TANK-POWER & ADDITIONAL POWDERED METAL

TOLERANCE OF MILL DIA.	0 - .0015
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**TANK-POWER**

# MULTI FLUTE, REGULAR LENGTH, FINE PITCH ROUGHING



YPM
3-6
30°
FLAT
FINE
DATA
P.214

► 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.

◇ *U.S.A Stock*

TANK-POWER & ADDITIONAL POWDERED METAL

**E9990, E9990TF Series**

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

**TOLERANCE OF MILL DIA.**

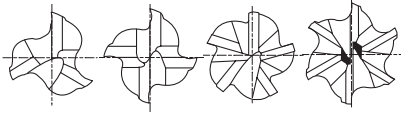
up to 1"	+ .0030 0
over 1"	+ .0060 0

**TANK-POWER**

# MULTI FLUTE, REGULAR LENGTH, COARSE PITCH ROUGHING



P.213



► 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.

◇ *U.S.A Stock*

TANK-POWER & ADDITIONAL POWDERED METAL

### E9991, E9991TF Series

Unit : inch

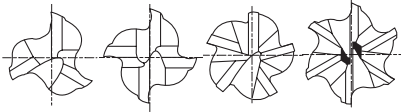
EDP No.		MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH	NO. OF FLUTE
UNCOATED	TANK-POWER COATED					
E9991016	E9991016TF	1/4	3/8	5/8	2-7/16	3
E9991902	E9991902TF	1/4	3/8	1-1/8	2-15/16	3
E9991020	E9991020TF	5/16	3/8	3/4	2-1/2	3
E9991024	E9991024TF	3/8	3/8	3/4	2-1/2	4
E9991028	E9991028TF	7/16	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

TOLERANCE OF MILL DIA.	+ .0030 0
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**TANK-POWER**

# MULTI FLUTE, LONG LENGTH, FINE PITCH ROUGHING



P.214

► 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.

◇ *U.S.A Stock*

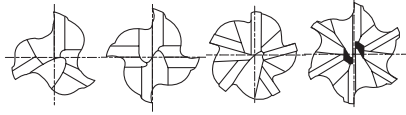
TANK-POWER & ADDITIONAL POWDERED METAL

**E9A86, E9A86TF Series**

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

TOLERANCE OF MILL DIA.	+ .0030 0
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**TANK-POWER****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.

◇ *U.S.A Stock*

**E9A87, E9A87TF Series**

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

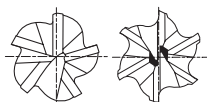
TANK-POWER &amp; ADDITIONAL POWDERED METAL

TOLERANCE OF MILL DIA.	+ .0030 0
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# MULTI FLUTE FINE PITCH ROUGHING EXTENDED NECK, CENTER CUTTING

P.212



- ▶ High performance metal removal in Titanium
- ▶ Corner radius against chipping

◇ *U.S.A Stock*

TANK-POWER & ADDITIONAL POWDERED METAL

## E9921 Series

Unit : inch

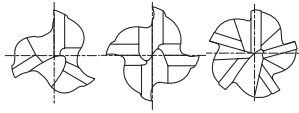
EDP No. UNCOATED	EDP No. TITAN COATED	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	REACH EXTENDED NECK	OVERALL LENGTH	NO.OF FLUTE
EP20322	EP20322F	1/2	1/2	1 1/4	3	5	5
EP20402	EP20402F	5/8	5/8	1 5/8	4	6 1/8	5
EP20482	EP20482F	3/4	3/4	1 5/8	4	6 1/4	5
EP20484	EP20484F	3/4	3/4	1 5/8	6	8 1/4	5
EP20642	EP20642F	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

### TOLERANCE OF MILL DIA.

up to 1"	+ .0030 0
over 1"	+ .0060 0

**POWDERED METAL**

**MULTI FLUTE, STUB & REGULAR LENGTH, FINE PITCH ROUGHING**



PM
3-5
30°
FLAT
FINE
DATA
P.218

- ▶ Faster feed & speed than normal HSS can be applied to even hardened steels over HRc 35. Accordingly, powdered metallurgy makes much higher productivity possible.
- ▶ Suitable for high-feed roughing milling.

◇ *U.S.A Stock*

TANK-POWER & ADDITIONAL POWDERED METAL

**E3086 Series** ■ STUB LENGTH

Unit : inch

EDP No.		MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH	NO.OF FLUTE
UNCOATED	TiAIN COATED					
75507	75507 PE	1/4	3/8	1/4	2-1/16	3
75511	75511 PE	3/8	3/8	3/8	2-5/32	3
75515	75515 PE	1/2	1/2	1/2	2-1/2	3
75519	75519 PE	5/8	5/8	5/8	2-3/4	3
75524	75524 PE	3/4	3/4	3/4	2-7/8	3
75529	75529 PE	7/8	3/4	7/8	3-1/8	3
75540	75540 PE	1	1	1	3-1/2	3

**E3085 Series** ■ REGULAR LENGTH

Unit : inch

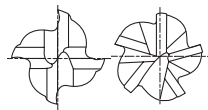
EDP No.		MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH	NO.OF FLUTE
UNCOATED	TiAIN COATED					
77507	77507 PE	1/4	3/8	5/8	2-7/16	3
77511	77511 PE	3/8	3/8	3/4	2-1/2	4
77515	77515 PE	1/2	1/2	1-1/4	3-1/4	4
77519	77519 PE	5/8	5/8	1-5/8	3-3/4	4
77524	77524 PE	3/4	3/4	1-5/8	3-7/8	4
77529	77529 PE	7/8	3/4	1-7/8	4-1/8	5
77540	77540 PE	1	1	2	4-1/2	5

- Coating Codes for Powdered Metal Tools(PM)  
Uncoated EDP No. +PN (TiN), PC(TiCN), PF(TiAIN F), PE(TiAIN E),PH(Hardslick)
- ▶ Coated Price Shown in Price List, Call for Availability

TOLERANCE OF MILL DIA.	+ .0030 0
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**POWDERED METAL**

**MULTI FLUTE, LONG LENGTH, FINE PITCH ROUGHING**



PM
4&5
30°
FLAT
FINE
DATA
P.218

- ▶ Faster feed & speed than normal HSS can be applied to even hardened steels over HRc 35. Accordingly, powdered metallurgy makes much higher productivity possible.
- ▶ Suitable for high-feed roughing milling.

◇ *U.S.A Stock*

TANK-POWER & ADDITIONAL POWDERED METAL

**E3079 Series**

Unit : inch

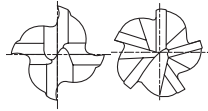
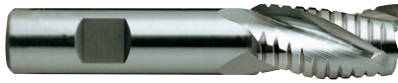
EDP No.		MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH	NO.OF FLUTE
UNCOATED	TiAIN COATED					
78507	78507 PE	1/4	3/8	1-1/4	3-1/16	4
78511	78511 PE	3/8	3/8	1-1/2	3-1/8	4
78515	78515 PE	1/2	1/2	2	4	4
78519	78519 PE	5/8	5/8	2-1/2	4-5/8	4
78524	78524 PE	3/4	3/4	3	5-1/4	4
78529	78529 PE	7/8	7/8	3-1/2	5-3/4	5
78540	78540 PE	1	1	4	6-1/2	5

- Coating Codes for Powdered Metal Tools(PM)  
Uncoated EDP No. +PN (TiN), PC(TiCN), PF(TiAIN F), PE(TiAIN E),PH(Hardslick)
- ▶ Coated Price Shown in Price List, Call for Availability

TOLERANCE OF MILL DIA.	+ .0030 0
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**POWDERED  
METAL**

# 4&5 FLUTE, REGULAR LENGTH, ROUGHING & FINISHING



- ▶ Faster feed & speed than normal HSS can be applied to even hardened steels over HRc 35. Accordingly, powdered metallurgy makes much higher productivity possible.
- ▶ Suitable for high-feed roughing milling.

◇ *U.S.A Stock*

## E3180 Series

Unit : inch

EDP No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH	NO.OF FLUTE
79507	1/4	3/8	5/8	2-7/16	4
79511	3/8	3/8	3/4	2-1/2	4
79515	1/2	1/2	1-1/4	3-1/4	4
79519	5/8	5/8	1-5/8	3-3/4	4
79524	3/4	3/4	1-5/8	3-3/4	4
79529	7/8	3/4	1-7/8	4-1/8	5
79540	1	1	2	4-1/2	5

- The TiN coated, TiCN Coated or TiAlN coated is available on your request.
- Coating Codes for Powdered Metal Tools(PM)  
Uncoated EDP No. +PN (TiN), PC(TiCN), PF(TiAlN F), PE(TiAlN E),PH(Hardslick)
- ▶ Coated Price Shown in Price List, Call for Availability

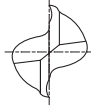
TANK-POWER & ADDITIONAL POWDERED METAL

TOLERANCE OF MILL DIA.	+ .0025 - .0005
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# POWDERED METAL

## 2 FLUTE, REGULAR LENGTH



PM
2
30°
FLAT
DATA

P.217

► Faster feed & speed than normal HSS can be applied to even hardened steels over HRc 35. Accordingly, powdered metallurgy makes much higher productivity possible.

◇ U.S.A Stock

TANK-POWER & ADDITIONAL POWDERED METAL

### E3030(P2SRS) Series

Unit : inch

EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
01503	P2SRS-0803	1/8	3/8	3/8	2-5/16
01505	P2SRS-1203	3/16	3/8	7/16	2-5/16
01507	P2SRS-1603	1/4	3/8	1/2	2-5/16
01509	P2SRS-2003	5/16	3/8	9/16	2-5/16
01511	P2SRS-2403	3/8	3/8	9/16	2-5/16
01515	P2SRS-3204	1/2	1/2	1	3
01519	P2SRS-4005	5/8	5/8	1-5/16	3-7/16
01524	P2SRS-4806	3/4	3/4	1-5/16	3-7/16
01530	P2SRS-5607	7/8	7/8	1-1/2	3-3/4
01540	P2SRS-6408	1	1	1-5/8	4-1/8

- The TiN coated, TiCN coated or TiAlN coated is available on your request.
- Coating Codes for Powdered Metal Tools(PM)  
Uncoated EDP No. +PN (TiN), PC(TiCN), PF(TiAlN F), PE(TiAlN E),PH(Hardslick)
- Coated Price Shown in Price List, Call for Availability

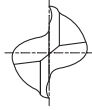
#### TOLERANCE OF MILL DIA.

+ .0010	** + .0015
0	0

\*\*The shank of end mills is the same diameter as the cutting portion.

**POWDERED METAL**

## 2 FLUTE, REGULAR LENGTH, DOUBLE



PM
2
30°
FLAT
DATA
P.217

► Series P2DRS two flute end mills are the double end version of P2SRS single-end tools. Faster feed & speed than normal HSS can be applied to even hardened steels over HRc 35. Accordingly, powdered metallurgy makes much higher productivity possible.

◇ *U.S.A Stock*

### E3050(P2DRS) Series

Unit : inch

EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
11503	P2DRS-0803	1/8	3/8	3/8	3-1/16
11505	P2DRS-1203	3/16	3/8	7/16	3-1/8
11507	P2DRS-1603	1/4	3/8	1/2	3-1/8
11509	P2DRS-2003	5/16	3/8	9/16	3-1/8
11511	P2DRS-2403	3/8	3/8	9/16	3-1/8
11515	P2DRS-3204	1/2	1/2	13/16	3-3/4
11519	P2DRS-4005	5/8	5/8	1-1/8	4-1/2
11524	P2DRS-4806	3/4	3/4	1-5/16	5
11530	P2DRS-5607	7/8	7/8	1-9/16	5-1/2
11540	P2DRS-6408	1	1	1-5/8	5-7/8

- The TiN coated, TiCN coated or TiAlN coated is available on your request.
- Coating Codes for Powdered Metal Tools(PM)  
Uncoated EDP No. +PN (TiN), PC(TiCN), PF(TiAlN F), PE(TiAlN E),PH(Hardslick)
- Coated Price Shown in Price List, Call for Availability

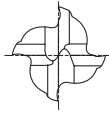
#### TOLERANCE OF MILL DIA.

0	* * — .0002
— .0010	— .0015

\*\*The shank of end mills is the same diameter as the cutting portion.

# POWDERED METAL

## 4 FLUTE, REGULAR LENGTH



PM
4
30°
FLAT
DATA

P.217

► Faster feed & speed than normal HSS can be applied to even hardened steels over HRc 35. Accordingly, powdered metallurgy makes much higher productivity possible.

◇ *U.S.A Stock*

TANK-POWER & ADDITIONAL POWDERED METAL

### E3039(P4SRC) Series

Unit : inch

EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
07503	P4SRC-0803	1/8	3/8	3/8	2-5/16
07505	P4SRC-1203	3/16	3/8	1/2	2-3/8
07507	P4SRC-1603	1/4	3/8	5/8	2-7/16
07509	P4SRC-2003	5/16	3/8	3/4	2-1/2
07511	P4SRC-2403	3/8	3/8	3/4	2-1/2
07515	P4SRC-3204	1/2	1/2	1-1/4	3-1/4
07519	P4SRC-4005	5/8	5/8	1-5/8	3-3/4
07524	P4SRC-4806	3/4	3/4	1-5/8	3-7/8
07530	P4SRC-5607	7/8	7/8	1-7/8	4-1/8
07540	P4SRC-6408	1	1	2	4-1/2

- The TiN coated, TiCN coated or TiAlN coated is available on your request.
- Coating Codes for Powdered Metal Tools(PM)  
Uncoated EDP No. +PN (TiN), PC(TiCN), PF(TiAlN F), PE(TiAlN E),PH(Hardslick)
- Coated Price Shown in Price List, Call for Availability

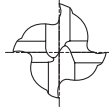
#### TOLERANCE OF MILL DIA.

+ .0010	** + .0015
0	0

\*\*The shank of end mills is the same diameter as the cutting portion.

**POWDERED  
METAL**

# 4 FLUTE, REGULAR LENGTH, DOUBLE



PM
4
30°
FLAT
DATA
P.217

► Series P4DRC four flute end mills are the double end version of P4SRC single-end tools. Faster feed & speed than normal HSS can be applied to even hardened steels over HRc 35. Accordingly, powdered metallurgy makes much higher productivity possible.

◇ *U.S.A Stock*

## E3053(P4DRC) Series

Unit : inch

EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
13503	P4DRC-0803	1/8	3/8	3/8	3-1/16
13505	P4DRC-1203	3/16	3/8	1/2	3-1/4
13507	P4DRC-1603	1/4	3/8	5/8	3-3/8
13509	P4DRC-2003	5/16	3/8	3/4	3-1/2
13511	P4DRC-2403	3/8	3/8	3/4	3-1/2
13515	P4DRC-3204	1/2	1/2	1	4-1/8
13519	P4DRC-4005	5/8	5/8	1-3/8	5
13524	P4DRC-4806	3/4	3/4	1-5/8	5-5/8
13530	P4DRC-5607	7/8	7/8	1-7/8	6-1/8
13540	P4DRC-6408	1	1	1-7/8	6-3/8

- The TiN coated, TiCN coated or TiAlN coated is available on your request.
- Coating Codes for Powdered Metal Tools(PM)  
Uncoated EDP No. +PN (TiN), PC(TiCN), PF(TiAlN F), PE(TiAlN E),PH(Hardslick)
- Coated Price Shown in Price List, Call for Availability

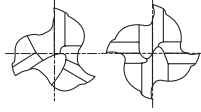
### TOLERANCE OF MILL DIA.

0	* * — .0002
— .0010	— .0015

\*\*The shank of end mills is the same diameter as the cutting portion.

**POWDERED METAL**

# 3&4 FLUTE, 60° HELIX, REGULAR LENGTH



PM
3&4
60°
FLAT
DATA

P.217

► Faster feed & speed than normal HSS can be applied to even hardened steels over HRC 35. Accordingly, powdered metallurgy makes much higher productivity possible.

◇ *U.S.A Stock*

TANK-POWER & ADDITIONAL POWDERED METAL

**E3120(P3SRH) Series**

■ 3 FLUTE

Unit : inch

EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
20507	P3SRH-1603	1/4	3/8	5/8	2-7/16
20509	P3SRH-2003	5/16	3/8	3/4	2-1/2
20511	P3SRH-2403	3/8	3/8	3/4	2-1/2
20513	P3SRH-2803	7/16	3/8	1	2-11/16
20515	P3SRH-3204	1/2	1/2	1-1/4	3-1/4
20519	P3SRH-4005	5/8	5/8	1-5/8	3-3/4
20524	P3SRH-4806	3/4	3/4	1-5/8	3-7/8

**E3121(P4SRH) Series**

■ 4 FLUTE

Unit : inch

EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
20529	P4SRH-5606	7/8	3/4	1-7/8	4-1/8
20530	P4SRH-5607	7/8	7/8	1-7/8	4-1/8
20540	P4SRH-6408	1	1	2	4-1/2

- The TiN coated, TiCN coated or TiAlN coated is available on your request.
- Coating Codes for Powdered Metal Tools(PM)  
Uncoated EDP No. +PN (TiN), PC(TiCN), PF(TiAlN F), PE(TiAlN E),PH(Hardslick)
- Coated Price Shown in Price List, Call for Availability

**TOLERANCE OF MILL DIA.**

+ .0010	* * + .0015
0	0

\*\*The shank of end mills is the same diameter as the cutting portion.

**SPEED  
FREEK**

**3 FLUTE, 42° HELIX, REGULAR & MEDIUM LENGTH, ROUGHING with CORNER RADIUS for ALUMINUM**



POWDER T15   3   42°   R ±.001   FLAT   AI   DATA P.212

- ▶ High performance metal removal in aluminum alloys.
- ▶ Corner radius against chipping

◇ U.S.A Stock

TANK-POWER & ADDITIONAL POWDERED METAL

**EK191 Series** ■ REGULAR LENGTH – “Speed freek”

Unit : inch

EDP No. UNCOATED	EDP No. TiCN COATED	CORNER RADIUS R	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
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

**EK226 Series** ■ MEDIUM LENGTH – “Speed freek”

Unit : inch

EDP No. UNCOATED	EDP No. TiCN COATED	CORNER RADIUS R	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
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.

**TOLERANCE OF MILL DIA.**

up to 1"	+ .0030 0
over 1"	+ .0060 0



**SPEED  
FREEK**

# 3 FLUTE, 42° HELIX, LONG LENGTH, ROUGHING with CORNER RADIUS for ALUMINUM



POWDER  
T15

3

42°

R  
±.001

FLAT

AI

DATA

P.212

- ▶ High performance metal in aluminum alloys.
- ▶ Corner radius against chipping

◇ *U.S.A Stock*

TANK-POWER & ADDITIONAL POWDERED METAL

**EK192 Series** ■ LONG LENGTH – “Speed freek”

Unit : inch

EDP No.		CORNER RADIUS R	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
UNCOATED	TiCN COATED					
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

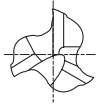
■ The TiN coated or TiAlN coated is available on your request.

**TOLERANCE OF MILL DIA.**

up to 1"	+ .0030 0
over 1"	+ .0060 0

# SPEED FREEK

## 3 FLUTE, 42° HELIX, REGULAR, MEDIUM & LONG LENGTH, ROUGHING for ALUMINUM



POWDER T15
3
42°
FLAT
AI
DATA
P.212

► High performance metal removal in aluminum alloys.

◇ U.S.A Stock

TANK-POWER & ADDITIONAL POWDERED METAL

### EK191 Series ■ REGULAR LENGTH – “Speed freek”

Unit : inch

EDP No. UNCOATED	EDP No. TiCN COATED	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
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

### EK226 Series ■ MEDIUM LENGTH – “Speed freek”

Unit : inch

EDP No. UNCOATED	EDP No. TiCN COATED	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
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

### EK192 Series ■ LONG LENGTH – “Speed freek”

Unit : inch

EDP No. UNCOATED	EDP No. TiCN COATED	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
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

#### TOLERANCE OF MILL DIA.

up to 1"	+ .0030 0
over 1"	+ .0060 0

■ The TiN coated, or TiAlN coated is available on your request.

**SPEED  
FREEK**

## 3 FLUTE, 42° HELIX ROUGHING BALL NOSE REGULAR LENGTH FOR ALUMINUM



POWDER T15
3
42°
FLAT
AI
DATA
P.215

- ▶ High performance metal removal in aluminum alloys.
- ▶ Corner radius against chipping

◇ *U.S.A Stock*

TANK-POWER & ADDITIONAL POWDERED METAL

### EK196 Series

Unit : inch

EDP No. UNCOATED	EDP No. TiCN COATED	R±.001	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
EP12032	EP12032C	1/4	1/2	1/2	1 1/4	3 1/4
EP12040	EP12040C	5/16	5/8	5/8	1 5/8	3 3/4
EP12048	EP12048C	3/8	3/4	3/4	1 5/8	3 7/8
EP12064	EP12064C	1/2	1	1	2	4 1/2
EP12110	EP12110C	5/8	1 1/4	1 1/4	2	4 1/2

■ The TiN coated, or TiAlN coated is available on your request.

#### TOLERANCE OF MILL DIA.

up to 1"	+ .0030 0
over 1"	+ .0060 0

# SPEED FREEK

## 3 FLUTE FINISHING WITH CORNER RADIUS END REGULAR LENGTH & MEDIUM LENGTH & LONG LENGTH



POWDER T15
3
42°
FLAT
DATA
P.216

- ▶ High performance metal removal in aluminum alloys.
- ▶ Corner radius against chipping

◇ *U.S.A Stock*

TANK-POWER & ADDITIONAL POWDERED METAL

### EK193 Series

Unit : inch

EDP No. UNCOATED	EDP No. TiCN COATED	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH	CORNER RADIUS
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 1/4	1 1/4	2	4 1/2	-
EP11325	EP11325C	1 1/4	1 1/4	3	5 1/2	-
EP11326	EP11326C	1 1/4	1 1/4	4	6 1/2	-
EP10321	EP10321C	1/2	1/2	1 1/4	3 1/4	R.120
EP10322	EP10322C	1/2	1/2	2	4	R.120
EP10401	EP10401C	5/8	5/8	1 5/8	3 3/4	R.120
EP10402	EP10402C	5/8	5/8	2 1/2	4 5/8	R.120
EP10481	EP10481C	3/4	3/4	1 5/8	3 7/8	R.120
EP10482	EP10482C	3/4	3/4	2 1/4	4 5/8	R.120
EP10483	EP10483C	3/4	3/4	3	5 1/4	R.120
EP10641	EP10641C	1	1	2	4 1/2	R.120
EP10642	EP10642C	1	1	3	5 1/2	R.120
EP10643	EP10643C	1	1	4	6 1/2	R.120
EP11162	EP11162C	1 1/4	1 1/4	2	4 1/2	R.120
EP11163	EP11163C	1 1/4	1 1/4	3	5 1/2	R.120
EP11164	EP11164C	1 1/4	1 1/4	4	6 1/2	R.120
EP11321	EP11321C	1 1/4	1 1/4	2	4 1/2	R.120
EP11322	EP11322C	1 1/4	1 1/4	3	5 1/2	R.120
EP11323	EP11323C	1 1/4	1 1/4	4	6 1/2	R.120

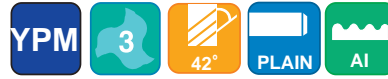
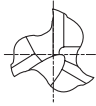
■ The TiN coated, or TiAlN coated is available on your request.

TOLERANCE OF MILL DIA.	
up to 1"	+ .0030 0
over 1"	+ .0060 0

**SPEED  
FREEK**

**3 FLUTE, 42° HELIX, SHORT & LONG LENGTH,  
ROUGHING for ALUMINUM**

**METRIC**



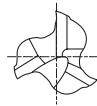
- ▶ Maximum stock removal rates at High Speed Condition.
- ▶ Reduces vibrations and improves surface roughness.

◆ *Call for Availability*

TANK-POWER & ADDITIONAL POWDERED METAL

**EP922 Series** ■ SHORT LENGTH - "Speed freek" Unit :mm

EDP No. TAIN COATED	MILL DIAMETER js12	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH
EP922120	12.0	12	26	83
EP922140	14.0	12	26	83
EP922160	16.0	16	32	92
EP922180	18.0	16	32	92
EP922200	20.0	20	38	104
EP922220	22.0	20	38	104
EP922250	25.0	25	45	121
EP922280	28.0	25	45	121
EP922320	32.0	32	53	133



**EP924 Series** ■ LONG LENGTH - "Speed freek" Unit : mm

EDP No. TAIN COATED	MILL DIAMETER js12	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH
EP924120	12.0	12	53	110
EP924140	14.0	12	53	110
EP924160	16.0	16	63	123
EP924180	18.0	16	63	123
EP924200	20.0	20	75	141
EP924220	22.0	20	75	141
EP924250	25.0	25	90	166
EP924280	28.0	25	90	166
EP924320	32.0	32	106	186

**Tolerances according to DIN 7160 & 7161**

Tolerance range in $\mu\text{m}$						
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

$\mu\text{m} = 1/1000\text{mm}$

## YG T-15 3 FLUTE ALUMINUM ROUGHER

TANK-POWER & ADDITIONAL POWDERED METAL

### 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	$0.262 \times \text{CUTTER DIA} \times \text{RPM}$
RPM	$3.82 \times \frac{\text{SFM}}{\text{CUTTER DIA}}$
IPM	$\text{FPT} \times \text{N} \times \text{RPM}$
FPT	$\frac{\text{IPM}}{\text{N} \times \text{RPM}}$
IPR	$\frac{\text{IPM}}{\text{RPM}}$
CUTTING TIME	$\frac{\text{LENGTH OF CUT}}{\text{IPM}}$

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

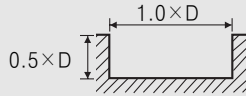




## 2 FLUTE, FINISH, SLOTTING

### 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/mm <sup>2</sup>		500~800N/mm <sup>2</sup>		800~1000N/mm <sup>2</sup>		1000~1100N/mm <sup>2</sup>		1100~1300N/mm <sup>2</sup>	
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%

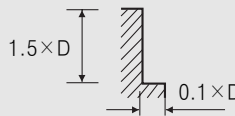
RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## 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/mm <sup>2</sup>		500~800N/mm <sup>2</sup>		800~1000N/mm <sup>2</sup>		1000~1100N/mm <sup>2</sup>		1100~1300N/mm <sup>2</sup>	
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1/8	6100	14.59	5500	12.16	4050	8.94	2700	6.24	2250	4.47
3/16	4400	17.14	4000	14.38	2950	10.69	2000	7.34	1650	5.42
1/4	3600	18.71	3250	15.56	2400	11.46	1650	7.94	1350	6.14
5/16	3000	19.65	2550	16.50	1900	12.56	1300	8.26	1100	6.29
3/8	2400	21.19	2100	17.74	1600	12.90	1050	8.87	910	6.75
1/2	1850	19.41	1650	16.26	1250	12.32	815	8.13	660	6.16
5/8	1550	17.42	1300	14.64	959	11.44	655	7.50	525	5.72
3/4	1300	15.33	1100	13.16	800	10.01	550	6.38	450	4.91
7/8	995	14.06	895	10.98	645	8.60	445	5.48	375	4.51
1	935	12.40	785	10.24	590	7.74	395	5.05	335	4.27



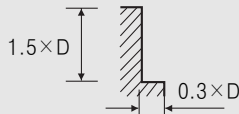
※The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## 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/mm <sup>2</sup>		800 ~ 1000N/mm <sup>2</sup>		1000 ~ 1300N/mm <sup>2</sup>	
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%

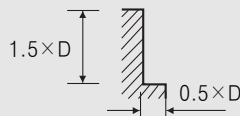
RPM=REVOLUTION PER MIN.  
FEED=inch/min.

TANK-POWER & ADDITIONAL POWDERED METAL

## 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	
HARDNESS	~HRC20		HRC20 ~ HRC30		HRC30 ~ HRC35		HRC35 ~ HRC40	
STRENGTH	~800N/mm <sup>2</sup>		800 ~ 1000N/mm <sup>2</sup>		1000 ~ 1100N/mm <sup>2</sup>		1100 ~ 1300N/mm <sup>2</sup>	
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1/4	2650	7.81	2050	6.25	1450	4.38	1200	3.44
3/8	1900	13.14	1500	10.13	1050	6.41	885	5.23
1/2	1450	14.17	1100	11.42	805	7.87	665	6.10
5/8	1150	14.17	905	11.42	630	7.87	525	6.10
3/4	960	14.38	780	11.42	540	7.87	445	6.10
7/8	845	14.54	615	11.37	445	7.84	375	6.10
1	740	13.98	560	10.64	395	7.39	315	6.01



※ The FEED, in long & extra long types, should be reduced by around 50%

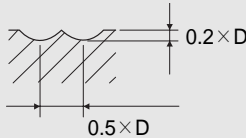
RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## 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			~ Rc20		Rc20 ~ Rc30		Rc30 ~ Rc40	
STRENGTH	~500N/mm <sup>2</sup>		500 ~ 800N/mm <sup>2</sup>		800 ~ 1000N/mm <sup>2</sup>		1000 ~ 1300N/mm <sup>2</sup>	
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=REVOLUTION PER MIN.  
FEED=inch/min.

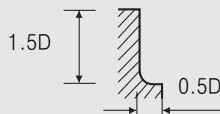
TANK-POWER & ADDITIONAL POWDERED METAL



## 3 FLUTE, 42° HELIX SPEED-FREAK BALL NOSE

### EK196 Series

MATERIAL		Aluminum Aluminum Alloys	
DIAMETER	F/L	RPM	FEED
1/4	3	4500	7.90
5/16	3	3100	9.10
3/8	3	2500	13.80
1/2	3	2000	15.80
5/8	3	1600	17.70



※ The FEED, in long & extra long types, should be reduced by around 50%

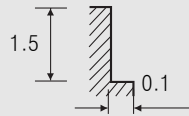
RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## 3 FLUTE, 42° FINISHING WITH CORNER RADIUS

TANK-POWER & ADDITIONAL POWDERED METAL

### EK193 Series

MATERIAL	M42	Aluminum Aluminum Alloys	
DIAMETER	F/L	RPM	FEED
1/2	3	4500	38
5/8	2	3500	26
3/4	2	2300	27
1	2	2000	27
1 1/4	2	1600	26
1 1/2	2	1350	25



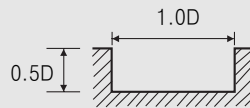
※ The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## 3 FLUTE, 42° FINISHING WITH CORNER RADIUS

### EK193 Series

MATERIAL	M42	Aluminum Aluminum Alloys	
DIAMETER	F/L	RPM	FEED
1/2	3	4095	38
5/8	3	3185	39
3/4	3	2093	41
1	3	1820	40
1 1/4	3	1456	38
1 1/2	3	1229	38



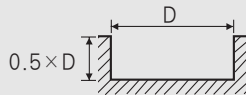
※ The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## PM, 2 FLUTE, FINISH, SLOTTING

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS	
	~HRc20		HRc20 ~ HRc30		HRc30 ~ HRc40	
STRENGTH	500 ~ 800N/mm <sup>2</sup>		800 ~ 1000N/mm <sup>2</sup>		1000 ~ 1300N/mm <sup>2</sup>	
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED
1/8	3500	2.00	2800	1.80	1800	0.80
3/16	2000	3.00	1800	2.60	1000	1.60
1/4	1800	3.50	1300	2.60	900	1.80
5/16	1200	4.00	1000	3.00	600	2.00
3/8	1000	4.00	900	3.50	500	2.00
1/2	900	4.30	700	3.50	450	2.20
5/8	600	4.00	500	3.00	300	2.00
11/16	550	4.00	450	3.00	280	2.00
7/8	500	4.00	400	3.00	250	2.00
1	450	3.50	350	2.60	200	1.60

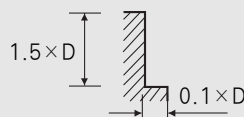


RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## PM, MULTI FLUTE, FINISH, SIDE CUTTING

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS	
	~HRc20		HRc20 ~ HRc30		HRc30 ~ HRc40	
STRENGTH	500 ~ 800N/mm <sup>2</sup>		800 ~ 1000N/mm <sup>2</sup>		1000 ~ 1300N/mm <sup>2</sup>	
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED
1/8	3500	90	2800	2.60	1800	1.40
3/16	2000	5.50	1800	4.00	1000	2.20
1/4	1800	6.30	1300	4.00	900	2.60
5/16	1200	7.10	1000	4.50	600	2.80
3/8	1000	7.10	900	5.10	500	2.80
1/2	900	7.90	700	5.10	450	3.10
5/8	600	7.10	500	4.50	300	2.80
11/16	550	7.10	450	4.50	280	2.80
7/8	500	7.10	400	4.50	250	2.80
1	450	6.30	350	4.00	200	2.20



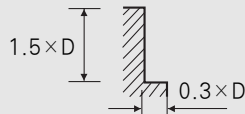
RPM=REVOLUTION PER MIN.  
FEED=inch/min.

**POWDERED METAL**

**PM, MULTI FLUTE, 60° HELIX, FINISH, SIDE CUTTING**

TANK-POWER & ADDITIONAL POWDERED METAL

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS	
HARDNESS	~HRC20		HRC20 ~ HRC30		HRC30 ~ HRC40	
STRENGTH	500 ~ 800N/mm <sup>2</sup>		800 ~ 1000N/mm <sup>2</sup>		1000 ~ 1300N/mm <sup>2</sup>	
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED
1/4	2000	4.00	1600	2.60	1200	1.80
5/16	1500	4.00	1300	3.10	1000	1.80
3/8	1300	4.30	1000	3.10	800	2.00
1/2	1000	4.70	800	3.10	600	2.00
5/8	800	5.10	650	3.10	500	2.20
13/16	660	5.50	520	4.30	400	2.80
1	500	7.10	400	5.50	310	4.00
1-1/4	400	7.50	330	6.30	250	4.00

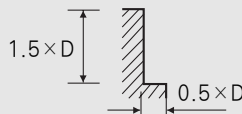


RPM=REVOLUTION PER MIN.  
FEED=inch/min.

**POWDERED METAL**

**PM, MULTI FLUTE, ROUGHING, SIDE CUTTING**

MATERIAL	CARBON STEELS ALLOY STEELS CAST IRON		ALLOY STEELS TOOL STEELS		HARDENED STEELS		HARDENED STEELS	
HARDNESS	~HRC20		HRC20 ~ HRC30		HRC30 ~ HRC35		HRC35 ~ HRC40	
STRENGTH	~800N/mm <sup>2</sup>		800 ~ 1000N/mm <sup>2</sup>		1000 ~ 1100N/mm <sup>2</sup>		1100 ~ 1300N/mm <sup>2</sup>	
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1/4	2300	3.94	2000	2.95	1500	2.76	1000	1.38
5/16	1800	5.12	1400	3.74	1100	3.15	700	1.77
3/8	1400	7.48	1100	5.90	1000	5.51	560	2.95
1/2	1100	9.06	1000	7.07	800	5.51	500	3.35
5/8	900	9.06	700	7.07	560	5.51	350	3.35
11/16	800	9.06	600	7.07	500	5.51	300	3.35
7/8	600	11.02	560	8.27	450	7.09	300	4.13
1	560	11.02	500	8.27	400	7.09	230	4.13
1-1/8	500	10.24	450	7.87	350	7.09	200	4.13
1-1/4	450	10.24	400	7.87	300	7.09	200	4.13



RPM=REVOLUTION PER MIN.  
FEED=inch/min.



# COBALT 8% & HSS END MILLS















- *Suitable for general-purpose operation slotting, drilling, profiling.*
- *Good performance in machining General Steel, Stainless Steel, Aluminum, non ferrous materials  
Finishing Cutter, Roughing Cutter*





# HSS END MILLS SELECTION GUIDE

## INCH















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E2050 E1050		2 FLUTE, REGULAR LENGTH, DOUBLE		230
E2110 E1110		2 FLUTE, REGULAR LENGTH, BALL NOSE		232
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E2036 E1036		4 FLUTE, EXTRA LONG LENGTH		239
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# HSS END MILLS SELECTION GUIDE















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E2004 E1004		4 FLUTE, MINIATURE, REGULAR LENGTH, DOUBLE		258
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E2008 E1008		2 FLUTE, MINIATURE, STUB LENGTH, BALL NOSE, DOUBLE		259
E2013 E1013		2 FLUTE, MINIATURE, REGULAR LENGTH, BALL NOSE, DOUBLE		260
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E1070		2 FLUTE, 42° HELIX, REGULAR & MEDIUM LENGTH for ALUMINUM		261
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E1072		2 FLUTE, 42° HELIX, EXTRA LONG LENGTH for ALUMINUM		263
E2086		MULTI FLUTE, STUB LENGTH, FINE PITCH ROUGHING, CENTER CUTTING		264
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# HSS END MILLS SELECTION GUIDE

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E2172		MULTI FLUTE, LONG LENGTH, COARSE PITCH ROUGHING		269
E2241		3 FLUTE, STUB LENGTH, COARSE PITCH ROUGHING, CENTER CUTTING		270
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E2193		MULTI FLUTE, REGULAR LENGTH, COARSE PITCH ROUGHING, BALL NOSE		273
E2125		MULTI FLUTE, LONG LENGTH, COARSE PITCH ROUGHING, BALL NOSE		273
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E2191		3 FLUTE, 37° HELIX, REGULAR LENGTH, ROUGHING for ALUMINUM		275
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## INCH

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END MILL NOMENCLATURE

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TROUBLE SHOOTING

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# SUPER CUTTING END MILLS



## YG-1 STANDARD END MILLS WITH CLOSER TOLERANCE

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 * ( - .0002 ) - .0015	.0000 - .0015	
	4	ALL	CENTER CUTTING	.0000 - .0010 * ( - .0002 ) - .0015	.0000 - .0015	
	4	ALL	NON CENTER CUTTING	+ .0010 .0000 * ( - .0002 ) - .0015	+ .0030 .0000 * ( .0000 ) - .0025	
3/16" SHANK DOUBLE END	2	STUB REGULAR	ALL	.0000 - .0010 * ( - .0002 ) - .0015	.0000 - .0015	
		LONG	ALL	+ .0010 .0000 * ( - .0002 ) - .0015	+ .0030 .0000 * ( .0000 ) - .0025	
	4	ALL	ALL	+ .0010 .0000 * ( - .0002 ) - .0015	+ .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 AND HSS END MILLS



# 2 FLUTE, REGULAR LENGTH



P.285,291,295



► These end mills are furnished as regular with right-hand cutting and right-hand helical flutes. All shanks are flattened for holder set screw. These are designed for slotting, drilling, pocketing and general-purpose operation.

## E2030(C2SRS), E1030(2SRS) Series

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
01289	C2SRS-0803	01039	2SRS-0803	1/8	3/8	3/8	2-5/16
01291	C2SRS-1003	01041	2SRS-1003	5/32	3/8	7/16	2-5/16
01293	C2SRS-1203	01043	2SRS-1203	3/16	3/8	7/16	2-5/16
01295	C2SRS-1403	01045	2SRS-1403	7/32	3/8	1/2	2-5/16
01297	C2SRS-1603	01047	2SRS-1603	1/4	3/8	1/2	2-5/16
01299	C2SRS-1803	01049	2SRS-1803	9/32	3/8	9/16	2-5/16
01301	C2SRS-2003	01051	2SRS-2003	5/16	3/8	9/16	2-5/16
01303	C2SRS-2203	01053	2SRS-2203	11/32	3/8	9/16	2-5/16
01305	C2SRS-2403	01055	2SRS-2403	3/8	3/8	9/16	2-5/16
01308	C2SRS-2603	01058	2SRS-2603	13/32	3/8	13/16	2-1/2
01312	C2SRS-2803	01062	2SRS-2803	7/16	3/8	13/16	2-1/2
01316	C2SRS-3003	01066	2SRS-3003	15/32	3/8	13/16	2-1/2
01320	C2SRS-3203	01070	2SRS-3203	1/2	3/8	13/16	2-1/2
01321	C2SRS-3204	01071	2SRS-3204	1/2	1/2	1	3
01328	C2SRS-3604	01078	2SRS-3604	9/16	1/2	1-1/8	3-1/8
01336	C2SRS-4004	01086	2SRS-4004	5/8	1/2	1-1/8	3-1/8
01337	C2SRS-4005	01087	2SRS-4005	5/8	5/8	1-5/16	3-7/16
01348	C2SRS-4405	01098	2SRS-4405	11/16	5/8	1-5/16	3-7/16
01357	C2SRS-4804	01107	2SRS-4804	3/4	1/2	1-5/16	3-5/16
01358	C2SRS-4805	01108	2SRS-4805	3/4	5/8	1-5/16	3-7/16
01359	C2SRS-4806	01109	2SRS-4806	3/4	3/4	1-5/16	3-7/16
01373	C2SRS-5205	01123	2SRS-5205	13/16	5/8	1-1/2	3-5/8
01391	C2SRS-5606	01141	2SRS-5606	7/8	3/4	1-1/2	3-3/4
01394	C2SRS-5607	01144	2SRS-5607	7/8	7/8	1-1/2	3-3/4
01409	C2SRS-6007	01159	2SRS-6007	15/16	7/8	1-1/2	3-3/4
01420	C2SRS-6405	01170	2SRS-6405	1	5/8	1-1/2	3-5/8
01422	C2SRS-6406	01172	2SRS-6406	1	3/4	1-1/2	3-3/4
01426	C2SRS-6408	01176	2SRS-6408	1	1	1-5/8	4-1/8

COBALT AND HSS END MILLS

- 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.

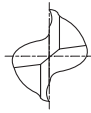
### TOLERANCE OF MILL DIA.

+ .0010	** + .0015
0	0

\*\* The shank of End Mills is the same diameter as the cutting portion.



# 2 FLUTE, REGULAR LENGTH



P.285,291,295

► These end mills are furnished as regular with right-hand cutting and right-hand helical flutes. All shanks are flattened for holder set screw. These are designed for slotting, drilling, pocketing and general-purpose operation.

## E2030(C2SRS), E1030(2SRS) Series

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
01435	C2SRS-B0808	01185	2SRS-B0808	1-1/8	1	1-5/8	4-1/8
01445	C2SRS-B1610	01195	2SRS-B1610	1-1/4	1-1/4	1-5/8	4-1/8
01451	C2SRS-B2408	01201	2SRS-B2408	1-3/8	1	1-5/8	4-1/8
01453	C2SRS-B2410	01203	2SRS-B2410	1-3/8	1-1/4	1-5/8	4-1/8
01459	C2SRS-B3208	01209	2SRS-B3208	1-1/2	1	1-5/8	4-1/8
01461	C2SRS-B3210	01211	2SRS-B3210	1-1/2	1-1/4	1-5/8	4-1/8
01469	C2SRS-B4810	01219	2SRS-B4810	1-3/4	1-1/4	1-5/8	4-1/8
01477	C2SRS-B6410	01227	2SRS-B6410	2	1-1/4	1-5/8	4-1/8
01480	C2SRS-B6416	01230	2SRS-B6416	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)

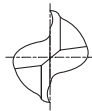
► Coated Price Shown in Price List. Call for Availability.

### TOLERANCE OF MILL DIA.

+ .0010	** + .0015
0	0

\*\* The shank of End Mills is the same diameter as the cutting portion.

# HSS 2 FLUTE, LONG LENGTH



HSS Co8
HSS
2
30°
FLAT
DATA

P.285,291,295

► Longer flute length than E2030 type and allows deeper cutting.

## E2080(C2SLE), E1080(2SLE) Series

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
02297	C2SLE-1603	02047	2SLE-1603	1/4	3/8	1-1/4	3-1/8
02301	C2SLE-2003	02051	2SLE-2003	5/16	3/8	1-3/8	3-1/8
02305	C2SLE-2403	02055	2SLE-2403	3/8	3/8	1-1/2	3-1/4
02321	C2SLE-3204	02071	2SLE-3204	1/2	1/2	2	4
02337	C2SLE-4005	02087	2SLE-4005	5/8	5/8	2	4-1/8
02359	C2SLE-4806	02109	2SLE-4806	3/4	3/4	2-1/4	4-1/2
02394	C2SLE-5607	02144	2SLE-5607	7/8	7/8	2-1/2	4-3/4
02426	C2SLE-6408	02176	2SLE-6408	1	1	3	5-1/2
02435	C2SLE-B0808	02185	2SLE-B0808	1-1/8	1	3	5-1/2
02443	C2SLE-B1608	02193	2SLE-B1608	1-1/4	1	3	5-1/2
02445	C2SLE-B1610	02195	2SLE-B1610	1-1/4	1-1/4	3	5-1/2
02461	C2SLE-B3210	02211	2SLE-B3210	1-1/2	1-1/4	3	5-1/2
02469	C2SLE-B4810	02219	2SLE-B4810	1-3/4	1-1/4	3	5-1/2
02477	C2SLE-B6410	02227	2SLE-B6410	2	1-1/4	3	5-1/2
02482	C2SLE-B6416	02232	2SLE-B6416	2	2	3	6-3/4

COBALT AND HSS END MILLS

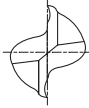
- The TiN coated, TiCN coated or TiAlN coated is available on your request.
- Coating Codes for Cobalt  
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
- Coating Codes for HSS  
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
- Coated Price Shown in Price List. Call for Availability.

TOLERANCE OF MILL DIA.	
+ .0010	* * + .0015
0	0

\*\* The shank of End Mills is the same diameter as the cutting portion.



# 2 FLUTE, EXTENDED LENGTH



P.285,291,295

► Provided with the longest flute length and suitable for high accuracy machining of deep step.

## E2033(C2SLS), E1033(2SLS) Series

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	LENGTH BELOW SHANK	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)						
03289	C2SLS-0803	03039	2SLS-0803	1/8	3/8	3/8	13/16	2-3/8
03293	C2SLS-1203	03043	2SLS-1203	3/16	3/8	1/2	1-1/8	2-11/16
03297	C2SLS-1603	03047	2SLS-1603	1/4	3/8	5/8	1-1/2	3-1/16
03301	C2SLS-2003	03051	2SLS-2003	5/16	3/8	3/4	1-3/4	3-5/16
03305	C2SLS-2403	03055	2SLS-2403	3/8	3/8	3/4	1-3/4	3-5/16
03321	C2SLS-3204	03071	2SLS-3204	1/2	1/2	1	2-7/32	4
03337	C2SLS-4005	03087	2SLS-4005	5/8	5/8	1-3/8	2-23/32	4-5/8
03359	C2SLS-4806	03109	2SLS-4806	3/4	3/4	1-5/8	3-11/32	5-3/8
03394	C2SLS-5607	03144	2SLS-5607	7/8	7/8	2	4	6
03426	C2SLS-6408	03176	2SLS-6408	1	1	2-1/2	4-31/32	7-1/4
03445	C2SLS-B1610	03195	2SLS-B1610	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)

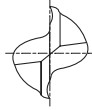
► Coated Price Shown in Price List. Call for Availability.

COBALT AND HSS END MILLS

### TOLERANCE OF MILL DIA.

+ .0010	** + .0015
0	0

\*\* The shank of End Mills is the same diameter as the cutting portion.

**HSS****2 FLUTE, REGULAR LENGTH, DOUBLE**

P.285,291,295

- 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.

**E2050(C2DRS), E1050(2DRS) Series**

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
11289	C2DRS-0803	11039	2DRS-0803	1/8	3/8	3/8	3-1/16
11290	C2DRS-0903	11040	2DRS-0903	9/64	3/8	7/16	3-1/8
11291	C2DRS-1003	11041	2DRS-1003	5/32	3/8	7/16	3-1/8
11292	C2DRS-1103	11042	2DRS-1103	11/64	3/8	7/16	3-1/8
11293	C2DRS-1203	11043	2DRS-1203	3/16	3/8	7/16	3-1/8
11294	C2DRS-1303	11044	2DRS-1303	13/64	3/8	1/2	3-1/8
11295	C2DRS-1403	11045	2DRS-1403	7/32	3/8	1/2	3-1/8
11296	C2DRS-1503	11046	2DRS-1503	15/64	3/8	1/2	3-1/8
11297	C2DRS-1603	11047	2DRS-1603	1/4	3/8	1/2	3-1/8
11298	C2DRS-1703	11048	2DRS-1703	17/64	3/8	9/16	3-1/8
11299	C2DRS-1803	11049	2DRS-1803	9/32	3/8	9/16	3-1/8
11300	C2DRS-1903	11050	2DRS-1903	19/64	3/8	9/16	3-1/8
11301	C2DRS-2003	11051	2DRS-2003	5/16	3/8	9/16	3-1/8
11302	C2DRS-2103	11052	2DRS-2103	21/64	3/8	9/16	3-1/8
11303	C2DRS-2203	11053	2DRS-2203	11/32	3/8	9/16	3-1/8
11304	C2DRS-2303	11054	2DRS-2303	23/64	3/8	9/16	3-1/8
11305	C2DRS-2403	11055	2DRS-2403	3/8	3/8	9/16	3-1/8
11307	C2DRS-2504	11057	2DRS-2504	25/64	1/2	13/16	3-3/4
11309	C2DRS-2604	11059	2DRS-2604	13/32	1/2	13/16	3-3/4
11311	C2DRS-2704	11061	2DRS-2704	27/64	1/2	13/16	3-3/4
11313	C2DRS-2804	11063	2DRS-2804	7/16	1/2	13/16	3-3/4
11315	C2DRS-2904	11065	2DRS-2904	29/64	1/2	13/16	3-3/4
11317	C2DRS-3004	11067	2DRS-3004	15/32	1/2	13/16	3-3/4
11319	C2DRS-3104	11069	2DRS-3104	31/64	1/2	13/16	3-3/4
11321	C2DRS-3204	11071	2DRS-3204	1/2	1/2	13/16	3-3/4
11326	C2DRS-3405	11076	2DRS-3405	17/32	5/8	1-1/8	4-1/2
11330	C2DRS-3605	11080	2DRS-3605	9/16	5/8	1-1/8	4-1/2

COBALT AND HSS END MILLS

- 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.

**TOLERANCE OF MILL DIA.**

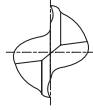
0	* * -.0002
-.0010	-.0015

\*\* The shank of End Mills is the same diameter as the cutting portion.





# 2 FLUTE, REGULAR LENGTH, DOUBLE



P.285,291,295

► 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.

## E2050(C2DRS), E1050(2DRS) Series

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
11334	C2DRS-3805	11084	2DRS-3805	19/32	5/8	1-1/8	4-1/2
11337	C2DRS-4005	11087	2DRS-4005	5/8	5/8	1-1/8	4-1/2
11344	C2DRS-4206	11094	2DRS-4206	21/32	3/4	1-5/16	5
11350	C2DRS-4406	11100	2DRS-4406	11/16	3/4	1-5/16	5
11354	C2DRS-4606	11104	2DRS-4606	23/32	3/4	1-5/16	5
11359	C2DRS-4806	11109	2DRS-4806	3/4	3/4	1-5/16	5
11368	C2DRS-5007	11118	2DRS-5007	25/32	7/8	1-9/16	5-1/2
11377	C2DRS-5207	11127	2DRS-5207	13/16	7/8	1-9/16	5-1/2
11384	C2DRS-5407	11134	2DRS-5407	27/32	7/8	1-9/16	5-1/2
11394	C2DRS-5607	11144	2DRS-5607	7/8	7/8	1-9/16	5-1/2
11402	C2DRS-5808	11152	2DRS-5808	29/32	1	1-5/8	5-7/8
11410	C2DRS-6008	11160	2DRS-6008	15/16	1	1-5/8	5-7/8
11417	C2DRS-6208	11167	2DRS-6208	31/32	1	1-5/8	5-7/8
11426	C2DRS-6408	11176	2DRS-6408	1	1	1-5/8	5-7/8

■ 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.

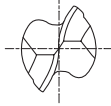
### TOLERANCE OF MILL DIA.

0	** -.0002
-.0010	-.0015

\*\* The shank of End Mills is the same diameter as the cutting portion.

# HSS

## 2 FLUTE, REGULAR LENGTH, BALL NOSE



P.288,293,297

► 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.

### E2110(C2SRB), E1110(2SRB) Series

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
41289	C2SRB-0803	41039	2SRB-0803	1/8	3/8	3/8	2-5/16
41293	C2SRB-1203	41043	2SRB-1203	3/16	3/8	1/2	2-3/8
41297	C2SRB-1603	41047	2SRB-1603	1/4	3/8	5/8	2-7/16
41301	C2SRB-2003	41051	2SRB-2003	5/16	3/8	3/4	2-1/2
41305	C2SRB-2403	41055	2SRB-2403	3/8	3/8	3/4	2-1/2
41313	C2SRB-2804	41063	2SRB-2804	7/16	1/2	1	3
41321	C2SRB-3204	41071	2SRB-3204	1/2	1/2	1	3
41328	C2SRB-3604	41078	2SRB-3604	9/16	1/2	1-1/8	3-1/8
41336	C2SRB-4004	41086	2SRB-4004	5/8	1/2	1-1/8	3-1/8
41337	C2SRB-4005	41087	2SRB-4005	5/8	5/8	1-3/8	3-1/2
41357	C2SRB-4804	41107	2SRB-4804	3/4	1/2	1-5/16	3-5/16
41359	C2SRB-4806	41109	2SRB-4806	3/4	3/4	1-5/8	3-7/8
41391	C2SRB-5606	41141	2SRB-5606	7/8	3/4	2	4-1/4
41394	C2SRB-5607	41144	2SRB-5607	7/8	7/8	2	4-1/4
41422	C2SRB-6406	41172	2SRB-6406	1	3/4	2-1/4	4-1/2
41426	C2SRB-6408	41176	2SRB-6408	1	1	2-1/4	4-3/4
41431	C2SRB-B0806	41181	2SRB-B0806	1-1/8	3/4	1-5/8	3-7/8
41435	C2SRB-B0808	41185	2SRB-B0808	1-1/8	1	2-1/4	4-3/4
41439	C2SRB-B1606	41189	2SRB-B1606	1-1/4	3/4	1-5/8	3-7/8
41445	C2SRB-B1610	41195	2SRB-B1610	1-1/4	1-1/4	2-1/2	5
41449	C2SRB-B2406	41199	2SRB-B2406	1-3/8	3/4	1-5/8	4-1/8
41453	C2SRB-B2410	41203	2SRB-B2410	1-3/8	1-1/4	2-1/2	5
41457	C2SRB-B3206	41207	2SRB-B3206	1-1/2	3/4	1-5/8	4-1/8
41461	C2SRB-B3210	41211	2SRB-B3210	1-1/2	1-1/4	2-1/2	5
41478	C2SRB-B6410	41227	2SRB-B6410	2	1-1/4	2-1/2	5

COBALT AND HSS END MILLS

- 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.

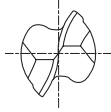
#### TOLERANCE OF MILL DIA.

+ .0010	** + .0015
0	0

\*\* The shank of End Mills is the same diameter as the cutting portion.



# 2 FLUTE, EXTENDED LENGTH, BALL NOSE



P.288,293,297

► Longer flute length than E2110 type and suitable for high efficient copying process and deep cutting of die mold corner radius.

## E2111(C2SLB), E1111(2SLB) Series

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	LENGTH BELOW SHANK	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)						
42289	C2SLB-0803	42039	2SLB-0803	1/8	3/8	3/8	13/16	2-3/8
42293	C2SLB-1203	42043	2SLB-1203	3/16	3/8	1/2	1-1/8	2-11/16
42297	C2SLB-1603	42047	2SLB-1603	1/4	3/8	5/8	1-1/2	3-1/16
42301	C2SLB-2003	42051	2SLB-2003	5/16	3/8	3/4	1-3/4	3-5/16
42305	C2SLB-2403	42055	2SLB-2403	3/8	3/8	3/4	1-3/4	3-5/16
42313	C2SLB-2804	42063	2SLB-2804	7/16	1/2	1	1-7/8	3-11/16
42321	C2SLB-3204	42071	2SLB-3204	1/2	1/2	1	2-1/4	4
42337	C2SLB-4005	42087	2SLB-4005	5/8	5/8	1-3/8	2-3/4	4-5/8
42359	C2SLB-4806	42109	2SLB-4806	3/4	3/4	1-5/8	3-3/8	5-3/8
42426	C2SLB-6408	42176	2SLB-6408	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.

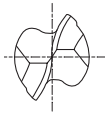
COBALT AND HSS END MILLS

### TOLERANCE OF MILL DIA.

+ .0010	* * + .0015
0	0

\*\* The shank of End Mills is the same diameter as the cutting portion.

# HSS 2 FLUTE, REGULAR LENGTH, BALL NOSE, DOUBLE



HSS Co8
HSS
2
30°
FLAT
DATA
P.288,293,297

► 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.

## E2112(C2DRB), E1112(2DRB) Series

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
45289	C2DRB-0803	45039	2DRB-0803	1/8	3/8	3/8	3-1/16
45293	C2DRB-1203	45043	2DRB-1203	3/16	3/8	7/16	3-1/8
45297	C2DRB-1603	45047	2DRB-1603	1/4	3/8	1/2	3-1/8
45301	C2DRB-2003	45051	2DRB-2003	5/16	3/8	9/16	3-1/8
45305	C2DRB-2403	45055	2DRB-2403	3/8	3/8	9/16	3-1/8
45313	C2DRB-2804	45063	2DRB-2804	7/16	1/2	13/16	3-3/4
45321	C2DRB-3204	45071	2DRB-3204	1/2	1/2	13/16	3-3/4
45337	C2DRB-4005	45087	2DRB-4005	5/8	5/8	1-1/8	4-1/2
45359	C2DRB-4806	45109	2DRB-4806	3/4	3/4	1-5/16	5
45426	C2DRB-6408	45176	2DRB-6408	1	1	1-5/8	5-7/8

COBALT AND HSS END MILLS

- 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.

### TOLERANCE OF MILL DIA.

0	* * -.0002
-.0010	-.0015

\*\* The shank of End Mills is the same diameter as the cutting portion.



# 4 FLUTE, REGULAR LENGTH



P.287,292,296

► Possible for high-speed cutting, suitable for high efficiency machining. Easy to regrind.

## E2031(C4SRS), E1031(4SRS) Series

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
04289	C4SRS-0803	04039	4SRS-0803	1/8	3/8	3/8	2-5/16
04290	C4SRS-0903	04040	4SRS-0903	9/64	3/8	7/16	2-3/8
04291	C4SRS-1003	04041	4SRS-1003	5/32	3/8	7/16	2-3/8
04292	C4SRS-1103	04042	4SRS-1103	11/64	3/8	1/2	2-3/8
04293	C4SRS-1203	04043	4SRS-1203	3/16	3/8	1/2	2-3/8
04294	C4SRS-1303	04044	4SRS-1303	13/64	3/8	9/16	2-7/16
04295	C4SRS-1403	04045	4SRS-1403	7/32	3/8	9/16	2-7/16
04296	C4SRS-1503	04046	4SRS-1503	15/64	3/8	5/8	2-7/16
04297	C4SRS-1603	04047	4SRS-1603	1/4	3/8	5/8	2-7/16
04298	C4SRS-1703	04048	4SRS-1703	17/64	3/8	11/16	2-1/2
04299	C4SRS-1803	04049	4SRS-1803	9/32	3/8	11/16	2-1/2
04300	C4SRS-1903	04050	4SRS-1903	19/64	3/8	3/4	2-1/2
04301	C4SRS-2003	04051	4SRS-2003	5/16	3/8	3/4	2-1/2
04302	C4SRS-2103	04052	4SRS-2103	21/64	3/8	3/4	2-1/2
04303	C4SRS-2203	04053	4SRS-2203	11/32	3/8	3/4	2-1/2
04304	C4SRS-2303	04054	4SRS-2303	23/64	3/8	3/4	2-1/2
04305	C4SRS-2403	04055	4SRS-2403	3/8	3/8	3/4	2-1/2
04306	C4SRS-2503	04056	4SRS-2503	25/64	3/8	1	2-11/16
04308	C4SRS-2603	04058	4SRS-2603	13/32	3/8	1	2-11/16
04310	C4SRS-2703	04060	4SRS-2703	27/64	3/8	1	2-11/16
04312	C4SRS-2803	04062	4SRS-2803	7/16	3/8	1	2-11/16
04315	C4SRS-2904	04065	4SRS-2904	29/64	1/2	1-1/4	3-1/4
04317	C4SRS-3004	04067	4SRS-3004	15/32	1/2	1-1/4	3-1/4
04319	C4SRS-3104	04069	4SRS-3104	31/64	1/2	1-1/4	3-1/4
04320	C4SRS-3203	04070	4SRS-3203	1/2	3/8	1	2-11/16
04321	C4SRS-3204	04071	4SRS-3204	1/2	1/2	1-1/4	3-1/4

COBALT AND HSS END MILLS

- 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.

### TOLERANCE OF MILL DIA.

+ .0010	* * + .0015
0	0

\*\* The shank of End Mills is the same diameter as the cutting portion.



# 4 FLUTE, REGULAR LENGTH

P.287,292,296



► Possible for high-speed cutting, suitable for high efficiency machining. Easy to regrind.

## E2031(C4SRS), E1031(4SRS) Series

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
04324	C4SRS-3404	04074	4SRS-3404	17/32	1/2	1-3/8	3-3/8
04328	C4SRS-3604	04078	4SRS-3604	9/16	1/2	1-3/8	3-3/8
04332	C4SRS-3804	04082	4SRS-3804	19/32	1/2	1-3/8	3-3/8
04336	C4SRS-4004	04086	4SRS-4004	5/8	1/2	1-3/8	3-3/8
04337	C4SRS-4005	04087	4SRS-4005	5/8	5/8	1-5/8	3-3/4
04340	C4SRS-4204	04090	4SRS-4204	21/32	1/2	1-5/8	3-5/8
04348	C4SRS-4405	04098	4SRS-4405	11/16	5/8	1-5/8	3-3/4
04352	C4SRS-4604	04102	4SRS-4604	23/32	1/2	1-5/8	3-5/8
04357	C4SRS-4804	04107	4SRS-4804	3/4	1/2	1-5/8	3-5/8
04358	C4SRS-4805	04108	4SRS-4805	3/4	5/8	1-5/8	3-3/4
04359	C4SRS-4806	04109	4SRS-4806	3/4	3/4	1-5/8	3-7/8
04364	C4SRS-5005	04114	4SRS-5005	25/32	5/8	1-7/8	4
04375	C4SRS-5206	04125	4SRS-5206	13/16	3/4	1-7/8	4-1/8
04380	C4SRS-5405	04130	4SRS-5405	27/32	5/8	1-7/8	4
04391	C4SRS-5606	04141	4SRS-5606	7/8	3/4	1-7/8	4-1/8
04394	C4SRS-5607	04144	4SRS-5607	7/8	7/8	1-7/8	4-1/8
04399	C4SRS-5806	04149	4SRS-5806	29/32	3/4	1-7/8	4-1/8
04407	C4SRS-6006	04157	4SRS-6006	15/16	3/4	1-7/8	4-1/8
04414	C4SRS-6206	04164	4SRS-6206	31/32	3/4	1-7/8	4-1/8
04420	C4SRS-6405	04170	4SRS-6405	1	5/8	1-7/8	4
04422	C4SRS-6406	04172	4SRS-6406	1	3/4	1-7/8	4-1/8
04426	C4SRS-6408	04176	4SRS-6408	1	1	2	4-1/2

COBALT AND HSS END MILLS

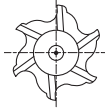
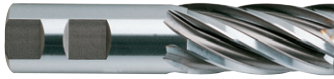
- The TiN coated, TiCN coated or TiAlN coated is available on your request.
- Coating Codes for Cobalt  
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
- Coating Codes for HSS  
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
- Coated Price Shown in Price List. Call for Availability.

### TOLERANCE OF MILL DIA.

+ .0010	* * + .0015
0	0

\*\* The shank of End Mills is the same diameter as the cutting portion.



**HSS****6 FLUTE, REGULAR LENGTH**

P.287,292,296

► Possible for high-speed cutting, suitable for high efficiency machining. Easy to regrind.

**E2032(C6SRS), E1032(6SRS) Series**

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
04338	C6SRS-4005	04088	6SRS-4005	5/8	5/8	1-5/8	3-3/4
04360	C6SRS-4806	04110	6SRS-4806	3/4	3/4	1-5/8	3-7/8
04376	C6SRS-5206	04126	6SRS-5206	13/16	3/4	1-7/8	4-1/8
04390	C6SRS-5605	04140	6SRS-5605	7/8	5/8	1-7/8	4
04395	C6SRS-5607	04145	6SRS-5607	7/8	7/8	1-7/8	4-1/8
04405	C6SRS-6005	04155	6SRS-6005	15/16	5/8	1-7/8	4
04421	C6SRS-6405	04171	6SRS-6405	1	5/8	1-7/8	4
04427	C6SRS-6408	04177	6SRS-6408	1	1	2	4-1/2
04432	C6SRS-B0806	04182	6SRS-B0806	1-1/8	3/4	2	4-1/4
04436	C6SRS-B0808	04186	6SRS-B0808	1-1/8	1	2	4-1/2
04440	C6SRS-B1606	04190	6SRS-B1606	1-1/4	3/4	2	4-1/4
04444	C6SRS-B1608	04194	6SRS-B1608	1-1/4	1	2	4-1/2
04446	C6SRS-B1610	04196	6SRS-B1610	1-1/4	1-1/4	2	4-1/2
04452	C6SRS-B2408	04202	6SRS-B2408	1-3/8	1	2	4-1/2
04460	C6SRS-B3208	04210	6SRS-B3208	1-1/2	1	2	4-1/2
04462	C6SRS-B3210	04212	6SRS-B3210	1-1/2	1-1/4	2	4-1/2
04470	C6SRS-B4810	04220	6SRS-B4810	1-3/4	1-1/4	2	4-1/2
04478	C6SRS-B6410	04228	6SRS-B6410	2	1-1/4	2	4-1/2
04481	C6SRS-B6416	04231	6SRS-B6416	2	2	2	5-3/4

COBALT AND HSS END MILLS

■ 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.

**TOLERANCE OF MILL DIA.**

+ .0010	* * + .0015
0	0

\*\* The shank of End Mills is the same diameter as the cutting portion.

# HSS

## 4&6 FLUTE, LONG LENGTH



P.287,292,296

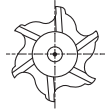
► Longer flute length than E2031 type and allows deeper cutting. Easy to regrind.

### E2034(C4SLS), E1034(4SLS) Series

■ 4 FLUTE

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
05297	C4SLS-1603	05047	4SLS-1603	1/4	3/8	1-1/4	3-1/16
05301	C4SLS-2003	05051	4SLS-2003	5/16	3/8	1-3/8	3-1/8
05305	C4SLS-2403	05055	4SLS-2403	3/8	3/8	1-1/2	3-1/4
05313	C4SLS-2804	05063	4SLS-2804	7/16	1/2	1-3/4	3-3/4
05321	C4SLS-3204	05071	4SLS-3204	1/2	1/2	2	4
05337	C4SLS-4005	05087	4SLS-4005	5/8	5/8	2-1/2	4-5/8
05359	C4SLS-4806	05109	4SLS-4806	3/4	3/4	3	5-1/4
05394	C4SLS-5607	05144	4SLS-5607	7/8	7/8	3-1/2	5-3/4
05426	C4SLS-6408	05176	4SLS-6408	1	1	4	6-1/2



### E2035(C6SLS), E1035(6SLS) Series

■ 6 FLUTE

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
05436	C6SLS-B0808	05186	6SLS-B0808	1-1/8	1	4	6-1/2
05444	C6SLS-B1608	05194	6SLS-B1608	1-1/4	1	4	6-1/2
05446	C6SLS-B1610	05196	6SLS-B1610	1-1/4	1-1/4	4	6-1/2
05460	C6SLS-B3208	05210	6SLS-B3208	1-1/2	1	4	6-1/2
05462	C6SLS-B3210	05212	6SLS-B3210	1-1/2	1-1/4	4	6-1/2
05470	C6SLS-B4810	05220	6SLS-B4810	1-3/4	1-1/4	4	6-1/2
05478	C6SLS-B6410	05228	6SLS-B6410	2	1-1/4	4	6-1/2
05485	C6SLS-B6416	05235	6SLS-B6416	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.

#### TOLERANCE OF MILL DIA.

+ .0010	** + .0015
0	0

\*\* The shank of End Mills is the same diameter as the cutting portion.

COBALT AND HSS END MILLS



# 4&6 FLUTE, EXTRA LONG LENGTH

HSS Co8
HSS
4&6
30°
FLAT
DATA

P.287,292,296

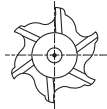


► Provided with the longest flute length and suitable for high accuracy machining of deep step. Easy to regrind.

## E2036(C4SES), E1036(4SES) Series ■ 4 FLUTE

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
06297	C4SES-1603	06047	4SES-1603	1/4	3/8	1-3/4	3-9/16
06301	C4SES-2003	06051	4SES-2003	5/16	3/8	2	3-3/4
06305	C4SES-2403	06055	4SES-2403	3/8	3/8	2-1/2	4-1/4
06321	C4SES-3204	06071	4SES-3204	1/2	1/2	3	5
06337	C4SES-4005	06087	4SES-4005	5/8	5/8	4	6-1/8
06359	C4SES-4806	06109	4SES-4806	3/4	3/4	4	6-1/4
06394	C4SES-5607	06144	4SES-5607	7/8	7/8	5	7-1/4
06426	C4SES-6408	06176	4SES-6408	1	1	6	8-1/2



## E2037(C6SES), E1037(6SES) Series ■ 6 FLUTE

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
06446	C6SES-B1610	06196	6SES-B1610	1-1/4	1-1/4	6	8-1/2
06462	C6SES-B3210	06212	6SES-B3210	1-1/2	1-1/4	8	10-1/2
06491	C6SES-B6416	06241	6SES-B6416	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.

### TOLERANCE OF MILL DIA.

+ .0010	* * + .0015
0	0

\*\* The shank of End Mills is the same diameter as the cutting portion.

**HSS****4 FLUTE, REGULAR LENGTH, DOUBLE**HSS  
Co8

HSS

4

30°

FLAT

DATA

P.287,292,296

- 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.

**E2051(C4DRS), E1051(4DRS) Series**

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
12289	C4DRS-0803	12039	4DRS-0803	1/8	3/8	3/8	3-1/16
12290	C4DRS-0903	12040	4DRS-0903	9/64	3/8	7/16	3-1/8
12291	C4DRS-1003	12041	4DRS-1003	5/32	3/8	7/16	3-1/8
12292	C4DRS-1103	12042	4DRS-1103	11/64	3/8	1/2	3-1/4
12293	C4DRS-1203	12043	4DRS-1203	3/16	3/8	1/2	3-1/4
12294	C4DRS-1303	12044	4DRS-1303	13/64	3/8	9/16	3-1/4
12295	C4DRS-1403	12045	4DRS-1403	7/32	3/8	9/16	3-1/4
12296	C4DRS-1503	12046	4DRS-1503	15/64	3/8	5/8	3-3/8
12297	C4DRS-1603	12047	4DRS-1603	1/4	3/8	5/8	3-3/8
12298	C4DRS-1703	12048	4DRS-1703	17/64	3/8	11/16	3-3/8
12299	C4DRS-1803	12049	4DRS-1803	9/32	3/8	11/16	3-3/8
12300	C4DRS-1903	12050	4DRS-1903	19/64	3/8	3/4	3-1/2
12301	C4DRS-2003	12051	4DRS-2003	5/16	3/8	3/4	3-1/2
12302	C4DRS-2103	12052	4DRS-2103	21/64	3/8	3/4	3-1/2
12303	C4DRS-2203	12053	4DRS-2203	11/32	3/8	3/4	3-1/2
12304	C4DRS-2303	12054	4DRS-2303	23/64	3/8	3/4	3-1/2
12305	C4DRS-2403	12055	4DRS-2403	3/8	3/8	3/4	3-1/2
12307	C4DRS-2504	12057	4DRS-2504	25/64	1/2	1	4-1/8
12309	C4DRS-2604	12059	4DRS-2604	13/32	1/2	1	4-1/8
12311	C4DRS-2704	12061	4DRS-2704	27/64	1/2	1	4-1/8
12313	C4DRS-2804	12063	4DRS-2804	7/16	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.

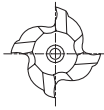
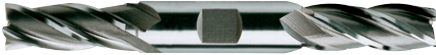
**TOLERANCE OF MILL DIA.**

0	* * —.0002
— .0010	— .0015

\*\* The shank of End Mills is the same diameter as the cutting portion.



# 4 FLUTE, REGULAR LENGTH, DOUBLE



P.287,292,296

► 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.

## E2051(C4DRS), E1051(4DRS) Series

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
12315	C4DRS-2904	12065	4DRS-2904	29/64	1/2	1	4-1/8
12317	C4DRS-3004	12067	4DRS-3004	15/32	1/2	1	4-1/8
12319	C4DRS-3104	12069	4DRS-3104	31/64	1/2	1	4-1/8
12321	C4DRS-3204	12071	4DRS-3204	1/2	1/2	1	4-1/8
12330	C4DRS-3605	12080	4DRS-3605	9/16	5/8	1-3/8	5
12337	C4DRS-4005	12087	4DRS-4005	5/8	5/8	1-3/8	5
12350	C4DRS-4406	12100	4DRS-4406	11/16	3/4	1-5/8	5-5/8
12359	C4DRS-4806	12109	4DRS-4806	3/4	3/4	1-5/8	5-5/8
12377	C4DRS-5207	12127	4DRS-5207	13/16	7/8	1-7/8	6-1/8
12394	C4DRS-5607	12144	4DRS-5607	7/8	7/8	1-7/8	6-1/8
12410	C4DRS-6008	12160	4DRS-6008	15/16	1	1-7/8	6-3/8
12426	C4DRS-6408	12176	4DRS-6408	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.

### TOLERANCE OF MILL DIA.

0	* * —.0002
— .0010	— .0015

\*\* The shank of End Mills is the same diameter as the cutting portion.



# 4, 6&8 FLUTE, REGULAR LENGTH, 3/4" SHANK



HSS Co8
HSS
4-8
30°
FLAT
DATA

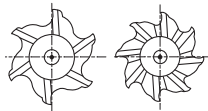
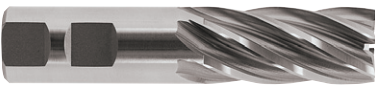
P.287,292,296

► E2031(3/4" shank, multiple flute, general purpose end mills) are recommended for finishing operations for Bridgeport machines and other similar operations. Easy to regrind.

## E2031(C4SRS), E1031(4SRS) Series ■ 4 FLUTE

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH	NO. OF FLUTE
8% COBALT (M42)		HSS (M2)						
04359	C4SRS-4806	04109	4SRS-4806	3/4	3/4	1-5/8	3-7/8	4
04375	C4SRS-5206	04125	4SRS-5206	13/16	3/4	1-7/8	4-1/8	4
04391	C4SRS-5606	04141	4SRS-5606	7/8	3/4	1-7/8	4-1/8	4
04407	C4SRS-6006	04157	4SRS-6006	15/16	3/4	1-7/8	4-1/8	4
04422	C4SRS-6406	04172	4SRS-6406	1	3/4	1-7/8	4-1/8	4



## E2032(C6SRS), E1032(6SRS) Series ■ 6&8 FLUTE

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH	NO. OF FLUTE
8% COBALT (M42)		HSS (M2)						
04432	C6SRS-B0806	04182	6SRS-B0806	1-1/8	3/4	2	4-1/4	6
04440	C6SRS-B1606	04190	6SRS-B1606	1-1/4	3/4	2	4-1/4	6
04458	C6SRS-B3206	04208	6SRS-B3206	1-1/2	3/4	2	4-1/4	6
04468	C6SRS-B4806	04218	6SRS-B4806	1-3/4	3/4	2	4-1/2	6
04476	C8SRS-B6406	04226	8SRS-B6406	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.

### TOLERANCE OF MILL DIA.

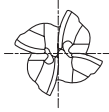
+ .0010	* * + .0015
0	0

\*\* The shank of End Mills is the same diameter as the cutting portion.





# 4 FLUTE, REGULAR LENGTH, BALL NOSE



P.288,293,297

► 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.

## E2020(C4SRB) Series

Unit : inch

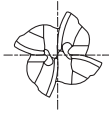
EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)					
43289	C4SRB-0803	1/8	3/8	3/8	2-5/16
43293	C4SRB-1203	3/16	3/8	1/2	2-3/8
43297	C4SRB-1603	1/4	3/8	5/8	2-7/16
43301	C4SRB-2003	5/16	3/8	3/4	2-1/2
43305	C4SRB-2403	3/8	3/8	3/4	2-1/2
43312	C4SRB-2803	7/16	3/8	1	2-11/16
43321	C4SRB-3204	1/2	1/2	1-1/4	3-1/4
43337	C4SRB-4005	5/8	5/8	1-5/8	3-3/4
43350	C4SRB-4405	11/16	5/8	1-5/8	3-3/4
43359	C4SRB-4806	3/4	3/4	1-5/8	3-7/8
43394	C4SRB-5607	7/8	7/8	1-7/8	4-1/8
43426	C4SRB-6408	1	1	2	4-1/2
43435	C4SRB-B0808	1-1/8	1	2	4-1/2
43445	C4SRB-B1610	1-1/4	1-1/4	2	4-1/2
43461	C4SRB-B3210	1-1/2	1-1/4	2	4-1/2
43477	C4SRB-B6410	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.

### TOLERANCE OF MILL DIA.

+ .0010	* * + .0015
0	0

\*\* The shank of End Mills is the same diameter as the cutting portion.

**HSS****4 FLUTE, LONG LENGTH, BALL NOSE**HSS  
Co8

4

30°

FLAT

DATA

P.288,293,297

- Longer flute length than E2020 type and suitable for high efficient copying process and deep cutting of die mold corner radius.

**E2021(C4SLB) Series**

Unit : inch

EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)					
44297	C4SLB-1603	1/4	3/8	1-1/4	3-1/16
44301	C4SLB-2003	5/16	3/8	1-3/8	3-1/8
44305	C4SLB-2403	3/8	3/8	1-1/2	3-1/4
44321	C4SLB-3204	1/2	1/2	2	4
44337	C4SLB-4005	5/8	5/8	2-1/2	4-5/8
44359	C4SLB-4806	3/4	3/4	3	5-1/4
44394	C4SLB-5607	7/8	7/8	3-1/2	5-3/4
44426	C4SLB-6408	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.

COBALT AND HSS END MILLS

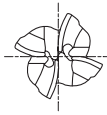
**TOLERANCE OF MILL DIA.**

+ .0010	* * + .0015
0	0

\*\* The shank of End Mills is the same diameter as the cutting portion.



# 4 FLUTE, REGULAR LENGTH, BALL NOSE, DOUBLE



P.288,293,297

► 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.

## E2069(C4DRB) Series

Unit : inch

EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)					
46289	C4DRB-0803	1/8	3/8	3/8	3-1/16
46293	C4DRB-1203	3/16	3/8	1/2	3-1/4
46297	C4DRB-1603	1/4	3/8	5/8	3-3/8
46301	C4DRB-2003	5/16	3/8	3/4	3-1/2
46305	C4DRB-2403	3/8	3/8	3/4	3-1/2
46313	C4DRB-2804	7/16	1/2	1	4-1/8
46321	C4DRB-3204	1/2	1/2	1	4-1/8
46337	C4DRB-4005	5/8	5/8	1-3/8	5
46359	C4DRB-4806	3/4	3/4	1-5/8	5-5/8
46426	C4DRB-6408	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.

COBALT AND HSS END MILLS

### TOLERANCE OF MILL DIA.

0	** -.0002
-.0010	-.0015

\*\* The shank of End Mills is the same diameter as the cutting portion.

# HSS

## 4 FLUTE, REGULAR LENGTH, CENTER CUTTING



P.287,292,296

► 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.

### E2039(C4SRC), E1039(4SRC) Series

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
07289	C4SRC-0803	07039	4SRC-0803	1/8	3/8	3/8	2-5/16
07291	C4SRC-1003	07041	4SRC-1003	5/32	3/8	7/16	2-3/8
07293	C4SRC-1203	07043	4SRC-1203	3/16	3/8	1/2	2-3/8
07295	C4SRC-1403	07045	4SRC-1403	7/32	3/8	9/16	2-7/16
07297	C4SRC-1603	07047	4SRC-1603	1/4	3/8	5/8	2-7/16
07299	C4SRC-1803	07049	4SRC-1803	9/32	3/8	11/16	2-1/2
07301	C4SRC-2003	07051	4SRC-2003	5/16	3/8	3/4	2-1/2
07303	C4SRC-2203	07053	4SRC-2203	11/32	3/8	3/4	2-1/2
07305	C4SRC-2403	07055	4SRC-2403	3/8	3/8	3/4	2-1/2
07308	C4SRC-2603	07058	4SRC-2603	13/32	3/8	1	2-11/16
07312	C4SRC-2803	07062	4SRC-2803	7/16	3/8	1	2-11/16
07316	C4SRC-3003	07066	4SRC-3003	15/32	3/8	1	2-11/16
07320	C4SRC-3203	07070	4SRC-3203	1/2	3/8	1	2-11/16
07321	C4SRC-3204	07071	4SRC-3204	1/2	1/2	1-1/4	3-1/4

- 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.

#### TOLERANCE OF MILL DIA.

+ .0010	* * + .0015
0	0

\*\* The shank of End Mills is the same diameter as the cutting portion.

COBALT AND HSS END MILLS



# 4 FLUTE, REGULAR LENGTH, CENTER CUTTING



P.287,292,296

► 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.

## E2039(C4SRC), E1039(4SRC) Series

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
07336	C4SRC-4004	07086	4SRC-4004	5/8	1/2	1-3/8	3-3/8
07337	C4SRC-4005	07087	4SRC-4005	5/8	5/8	1-5/8	3-3/4
07348	C4SRC-4405	07098	4SRC-4405	11/16	5/8	1-5/8	3-3/4
07357	C4SRC-4804	07107	4SRC-4804	3/4	1/2	1-5/8	3-5/8
07358	C4SRC-4805	07108	4SRC-4805	3/4	5/8	1-5/8	3-3/4
07359	C4SRC-4806	07109	4SRC-4806	3/4	3/4	1-5/8	3-7/8
07391	C4SRC-5606	07141	4SRC-5606	7/8	3/4	1-7/8	4-1/8
07394	C4SRC-5607	07144	4SRC-5607	7/8	7/8	1-7/8	4-1/8
07420	C4SRC-6405	07170	4SRC-6405	1	5/8	1-7/8	4
07422	C4SRC-6406	07172	4SRC-6406	1	3/4	1-7/8	4-1/8
07426	C4SRC-6408	07176	4SRC-6408	1	1	2	4-1/2
07435	C4SRC-B0808	07185	4SRC-B0808	1-1/8	1	2	4-1/2
07445	C4SRC-B1610	07195	4SRC-B1610	1-1/4	1-1/4	2	4-1/2
07461	C4SRC-B3210	07211	4SRC-B3210	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)

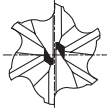
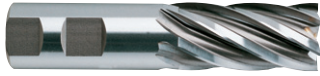
► Coated Price Shown in Price List. Call for Availability.

### TOLERANCE OF MILL DIA.

+ .0010	* * + .0015
0	0

\*\* The shank of End Mills is the same diameter as the cutting portion.

# HSS 6 FLUTE, REGULAR LENGTH, CENTER CUTTING



HSS Co8
HSS
6
30°
FLAT
DATA
P.287,292,296

► 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.

## E2042(C6SRC), E1042(6SRC) Series

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
07322	C6SRC-3204	07072	6SRC-3204	1/2	1/2	1-1/4	3-1/4
07338	C6SRC-4005	07088	6SRC-4005	5/8	5/8	1-5/8	3-3/4
07349	C6SRC-4405	07099	6SRC-4405	11/16	5/8	1-5/8	3-3/4
07360	C6SRC-4806	07110	6SRC-4806	3/4	3/4	1-5/8	3-7/8
07395	C6SRC-5607	07145	6SRC-5607	7/8	7/8	1-7/8	4-1/8
07427	C6SRC-6408	07177	6SRC-6408	1	1	2	4-1/2
07436	C6SRC-B0808	07186	6SRC-B0808	1-1/8	1	2	4-1/2
07446	C6SRC-B1610	07196	6SRC-B1610	1-1/4	1-1/4	2	4-1/2
07462	C6SRC-B3210	07212	6SRC-B3210	1-1/2	1-1/4	2	4-1/2
07478	C6SRC-B6410	07228	6SRC-B6410	2	1-1/4	2	4-1/2
07481	C6SRC-B6416	07231	6SRC-B6416	2	2	2	5-3/4

COBALT AND HSS END MILLS

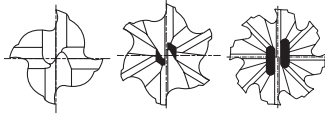
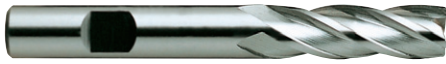
- The TiN coated, TiCN coated or TiAlN coated is available on your request.
- Coating Codes for Cobalt  
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
- Coating Codes for HSS  
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
- Coated Price Shown in Price List. Call for Availability.

### TOLERANCE OF MILL DIA.

+ .0010 0	* * + .0015 0
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\* \* The shank of End Mills is the same diameter as the cutting portion.



**HSS****MULTI FLUTE, MEDIUM LENGTH, CENTER CUTTING****HSS  
Co8****4-8****30°****FLAT****DATA**

P.287,292,296

- 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.

**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.

**TOLERANCE OF MILL DIA.**

+ .0010	* * + .0015
0	0

\*\* The shank of End Mills is the same diameter as the cutting portion.



# 4&6 FLUTE, LONG LENGTH, CENTER CUTTING



P.287,292,296



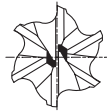
► Longer flute length than E2039 type, E2042 and allows deeper cutting.

## E2040(C4SLC), E1040(4SLC) Series

■ 4 FLUTE

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
08297	C4SLC-1603	08047	4SLC-1603	1/4	3/8	1-1/4	3-1/16
08301	C4SLC-2003	08051	4SLC-2003	5/16	3/8	1-3/8	3-1/8
08305	C4SLC-2403	08055	4SLC-2403	3/8	3/8	1-1/2	3-1/4
08321	C4SLC-3204	08071	4SLC-3204	1/2	1/2	2	4
08337	C4SLC-4005	08087	4SLC-4005	5/8	5/8	2-1/2	4-5/8
08359	C4SLC-4806	08109	4SLC-4806	3/4	3/4	3	5-1/4
08394	C4SLC-5607	08144	4SLC-5607	7/8	7/8	3-1/2	5-3/4
08426	C4SLC-6408	08176	4SLC-6408	1	1	4	6-1/2
08445	C4SLC-B1610	08195	4SLC-B1610	1-1/4	1-1/4	4	6-1/2
08461	C4SLC-B3210	08211	4SLC-B3210	1-1/2	1-1/4	4	6-1/2



## E2162(C6SLC), E1162(6SLC) Series

■ 6 FLUTE

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
08322	C6SLC-3204	08072	6SLC-3204	1/2	1/2	2	4
08338	C6SLC-4005	08088	6SLC-4005	5/8	5/8	2-1/2	4-5/8
08360	C6SLC-4806	08110	6SLC-4806	3/4	3/4	3	5-1/4
08395	C6SLC-5607	08145	6SLC-5607	7/8	7/8	3-1/2	5-3/4
08427	C6SLC-6408	08177	6SLC-6408	1	1	4	6-1/2
08446	C6SLC-B1610	08196	6SLC-B1610	1-1/4	1-1/4	4	6-1/2
08462	C6SLC-B3210	08212	6SLC-B3210	1-1/2	1-1/4	4	6-1/2
08478	C6SLC-B6410	08228	6SLC-B6410	2	1-1/4	4	6-1/2
08485	C6SLC-B6416	08235	6SLC-B6416	2	2	4	7-3/4
08489	C6SLC-B6401	08239	6SLC-B6401	2	2	6	9-3/4

- 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.

### TOLERANCE OF MILL DIA.

+ .0010	* * + .0015
0	0

\* \* The shank of End Mills is the same diameter as the cutting portion.

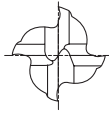
COBALT AND HSS END MILLS



# 4&6 FLUTE, EXTRA LONG LENGTH, CENTER CUTTING



P.287,292,296

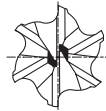


► Provided with longest flute length and suitable for high accuracy machining of deep step.

## E2041(C4SEC), E1041(4SEC) Series ■ 4 FLUTE

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
09297	C4SEC-1603	09047	4SEC-1603	1/4	3/8	1-3/4	3-9/16
09301	C4SEC-2003	09051	4SEC-2003	5/16	3/8	2	3-3/4
09305	C4SEC-2403	09055	4SEC-2403	3/8	3/8	2-1/2	4-1/4
09321	C4SEC-3204	09071	4SEC-3204	1/2	1/2	3	5
09337	C4SEC-4005	09087	4SEC-4005	5/8	5/8	4	6-1/8
09359	C4SEC-4806	09109	4SEC-4806	3/4	3/4	4	6-1/4
09394	C4SEC-5607	09144	4SEC-5607	7/8	7/8	5	7-1/4
09426	C4SEC-6408	09176	4SEC-6408	1	1	6	8-1/2
09445	C4SEC-B1610	09195	4SEC-B1610	1-1/4	1-1/4	6	8-1/2



## E2175(C6SEC), E1175(6SEC) Series ■ 6 FLUTE

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
09322	C6SEC-3204	09072	6SEC-3204	1/2	1/2	3	5
09338	C6SEC-4005	09088	6SEC-4005	5/8	5/8	4	6-1/8
09360	C6SEC-4806	09110	6SEC-4806	3/4	3/4	4	6-1/4
09395	C6SEC-5607	09145	6SEC-5607	7/8	7/8	5	7-1/4
09427	C6SEC-6408	09177	6SEC-6408	1	1	6	8-1/2
09446	C6SEC-B1610	09196	6SEC-B1610	1-1/4	1-1/4	6	8-1/2
09462	C6SEC-B3210	09212	6SEC-B3210	1-1/2	1-1/4	8	10-1/2
09491	C6SEC-B6416	09241	6SEC-B6416	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.

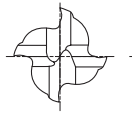
### TOLERANCE OF MILL DIA.

+ .0010	** + .0015
0	0

\*\* The shank of End Mills is the same diameter as the cutting portion.



# 4 FLUTE, REGULAR LENGTH, DOUBLE, CENTER CUTTING



P.287,292,296

► 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.

## E2053(C4DRC), E1053(4DRC) Series

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
13289	C4DRC-0803	13039	4DRC-0803	1/8	3/8	3/8	3-1/16
13290	C4DRC-0903	13040	4DRC-0903	9/64	3/8	7/16	3-1/8
13291	C4DRC-1003	13041	4DRC-1003	5/32	3/8	7/16	3-1/8
13292	C4DRC-1103	13042	4DRC-1103	11/64	3/8	1/2	3-1/4
13293	C4DRC-1203	13043	4DRC-1203	3/16	3/8	1/2	3-1/4
13294	C4DRC-1303	13044	4DRC-1303	13/64	3/8	9/16	3-1/4
13295	C4DRC-1403	13045	4DRC-1403	7/32	3/8	9/16	3-1/4
13296	C4DRC-1503	13046	4DRC-1503	15/64	3/8	5/8	3-3/8
13297	C4DRC-1603	13047	4DRC-1603	1/4	3/8	5/8	3-3/8
13298	C4DRC-1703	13048	4DRC-1703	17/64	3/8	11/16	3-3/8
13299	C4DRC-1803	13049	4DRC-1803	9/32	3/8	11/16	3-3/8
13300	C4DRC-1903	13050	4DRC-1903	19/64	3/8	3/4	3-1/2
13301	C4DRC-2003	13051	4DRC-2003	5/16	3/8	3/4	3-1/2
13302	C4DRC-2103	13052	4DRC-2103	21/64	3/8	3/4	3-1/2
13303	C4DRC-2203	13053	4DRC-2203	11/32	3/8	3/4	3-1/2
13304	C4DRC-2303	13054	4DRC-2303	23/64	3/8	3/4	3-1/2
13305	C4DRC-2403	13055	4DRC-2403	3/8	3/8	3/4	3-1/2
13307	C4DRC-2504	13057	4DRC-2504	25/64	1/2	1	4-1/8
13309	C4DRC-2604	13059	4DRC-2604	13/32	1/2	1	4-1/8

COBALT AND HSS END MILLS

- 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.

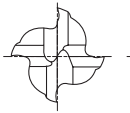
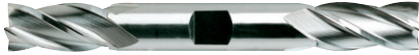
### TOLERANCE OF MILL DIA.

0	* * -.0002
-.0010	-.0015

\* \* The shank of End Mills is the same diameter as the cutting portion.



# 4 FLUTE, REGULAR LENGTH, DOUBLE, CENTER CUTTING



P.287,292,296

► 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.

## E2053(C4DRC), E1053(4DRC) Series

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
13311	C4DRC-2704	13061	4DRC-2704	27/64	1/2	1	4-1/8
13313	C4DRC-2804	13063	4DRC-2804	7/16	1/2	1	4-1/8
13315	C4DRC-2904	13065	4DRC-2904	29/64	1/2	1	4-1/8
13317	C4DRC-3004	13067	4DRC-3004	15/32	1/2	1	4-1/8
13319	C4DRC-3104	13069	4DRC-3104	31/64	1/2	1	4-1/8
13321	C4DRC-3204	13071	4DRC-3204	1/2	1/2	1	4-1/8
13330	C4DRC-3605	13080	4DRC-3605	9/16	5/8	1-3/8	5
13337	C4DRC-4005	13087	4DRC-4005	5/8	5/8	1-3/8	5
13350	C4DRC-4406	13100	4DRC-4406	11/16	3/4	1-5/8	5-5/8
13359	C4DRC-4806	13109	4DRC-4806	3/4	3/4	1-5/8	5-5/8
13377	C4DRC-5207	13127	4DRC-5207	13/16	7/8	1-7/8	6-1/8
13394	C4DRC-5607	13144	4DRC-5607	7/8	7/8	1-7/8	6-1/8
13426	C4DRC-6408	13176	4DRC-6408	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.

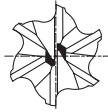
### TOLERANCE OF MILL DIA.

0	** —.0002
— .0010	— .0015

\* \* The shank of End Mills is the same diameter as the cutting portion.

COBALT AND HSS END MILLS

# HSS 6 FLUTE, REGULAR with COMBINATION 2" SHANK, CENTER CUTTING



HSS Co8
HSS
6
30°
FLAT
DATA
P.287,292,296

► 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.

## E2100(C6ERC), E1100(6ERC) Series

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
10481	C6ERC-B6402	10231	6ERC-B6402	2	2	2	5-3/4
10485	C6ERC-B6404	10235	6ERC-B6404	2	2	4	7-3/4
10487	C6ERC-B6405	10237	6ERC-B6405	2	2	5	8-3/4
10489	C6ERC-B6406	10239	6ERC-B6406	2	2	6	9-3/4
10491	C6ERC-B6408	10241	6ERC-B6408	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.

COBALT AND HSS END MILLS

### TOLERANCE OF MILL DIA.

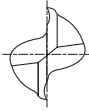
+ .0010	* * + .0015
0	0

\*\* The shank of End Mills is the same diameter as the cutting portion.





# 2 FLUTE, MINIATURE, STUB LENGTH, DOUBLE



HSS Co8
HSS
2
39°
7/64-
30°
PLAIN
DATA
P.290

► 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.

## E2001(C2MSS), E1001(2MSS) Series

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
49252	C2MSS-0201	49002	2MSS-0201	1/32	3/16	3/64	2
49254	C2MSS-0301	49004	2MSS-0301	3/64	3/16	1/16	2
49256	C2MSS-0401	49006	2MSS-0401	1/16	3/16	3/32	2
49258	C2MSS-0501	49008	2MSS-0501	5/64	3/16	1/8	2
49260	C2MSS-0601	49010	2MSS-0601	3/32	3/16	9/64	2
49262	C2MSS-0701	49012	2MSS-0701	7/64	3/16	5/32	2
49264	C2MSS-0801	49014	2MSS-0801	1/8	3/16	3/16	2
49266	C2MSS-0901	49016	2MSS-0901	9/64	3/16	7/32	2
49268	C2MSS-1001	49018	2MSS-1001	5/32	3/16	15/64	2
49270	C2MSS-1101	49020	2MSS-1101	11/64	3/16	1/4	2
49272	C2MSS-1201	49022	2MSS-1201	3/16	3/16	9/32	2

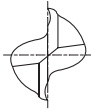
- The TiN coated, TiCN coated or TiAlN coated is available on your request.
- Coating Codes for Cobalt  
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
- Coating Codes for HSS  
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
- Coated Price Shown in Price List. Call for Availability.

TOLERANCE OF MILL DIA.	
0	** -.0002
-.0010	-.0015

\* \* The shank of End Mills is the same diameter as the cutting portion.



# 2 FLUTE, MINIATURE, REGULAR LENGTH, DOUBLE



HSS Co8
HSS
2
~3/32 39°
7/64~ 30°
PLAIN
DATA
P.290

► Suitable for finishing of precision components such as watch, camera electronic apparatus molds, etc.

## E2003(C2MRS), E1003(2MRS) Series

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
50252	C2MRS-0201	50002	2MRS-0201	1/32	3/16	3/32	2-1/4
50254	C2MRS-0301	50004	2MRS-0301	3/64	3/16	9/64	2-1/4
50256	C2MRS-0401	50006	2MRS-0401	1/16	3/16	3/16	2-1/4
50258	C2MRS-0501	50008	2MRS-0501	5/64	3/16	15/64	2-1/4
50260	C2MRS-0601	50010	2MRS-0601	3/32	3/16	9/32	2-1/4
50262	C2MRS-0701	50012	2MRS-0701	7/64	3/16	21/64	2-1/4
50264	C2MRS-0801	50014	2MRS-0801	1/8	3/16	3/8	2-1/4
50266	C2MRS-0901	50016	2MRS-0901	9/64	3/16	13/32	2-1/4
50268	C2MRS-1001	50018	2MRS-1001	5/32	3/16	7/16	2-1/4
50270	C2MRS-1101	50020	2MRS-1101	11/64	3/16	1/2	2-1/4
50272	C2MRS-1201	50022	2MRS-1201	3/16	3/16	1/2	2-1/4

COBALT AND HSS END MILLS

- 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.

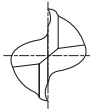
### TOLERANCE OF MILL DIA.

0	* * -.0002
-.0010	-.0015

\*\* The shank of End Mills is the same diameter as the cutting portion.



# 2 FLUTE, MINIATURE, LONG LENGTH, DOUBLE



P.290

► Suitable for finishing of precision components such as watch, camera electronic apparatus molds, etc.

## E2005(C2MLS), E1005(2MLS) Series

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
51256	C2MLS-0401	51006	2MLS-0401	1/16	3/16	7/32	2-1/2
51258	C2MLS-0501	51008	2MLS-0501	5/64	3/16	1/4	2-1/2
51260	C2MLS-0601	51010	2MLS-0601	3/32	3/16	9/32	2-5/8
51262	C2MLS-0701	51012	2MLS-0701	7/64	3/16	9/32	2-5/8
51264	C2MLS-0801	51014	2MLS-0801	1/8	3/16	3/4	3-1/8
51266	C2MLS-0901	51016	2MLS-0901	9/64	3/16	3/4	3-1/8
51268	C2MLS-1001	51018	2MLS-1001	5/32	3/16	7/8	3-1/4
51270	C2MLS-1101	51020	2MLS-1101	11/64	3/16	7/8	3-1/4
51272	C2MLS-1201	51022	2MLS-1201	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.

### TOLERANCE OF MILL DIA.

0	** -.0002
-.0010	-.0015

\* \* The shank of End Mills is the same diameter as the cutting portion.



# 4FLUTE, MINIATURE, STUB LENGTH, DOUBLE



HSS Co8
HSS
4
~3/32
39°
7/64~
30°
PLAIN
DATA
P.290

► Suitable for finishing of precision components such as watch, camera electronic apparatus molds, etc.

## E2002(C4MSS), E1002(4MSS) Series

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
52256	C4MSS-0401	52006	4MSS-0401	1/16	3/16	3/32	2
52258	C4MSS-0501	52008	4MSS-0501	5/64	3/16	1/8	2
52260	C4MSS-0601	52010	4MSS-0601	3/32	3/16	9/64	2
52262	C4MSS-0701	52012	4MSS-0701	7/64	3/16	5/32	2
52264	C4MSS-0801	52014	4MSS-0801	1/8	3/16	3/16	2
52266	C4MSS-0901	52016	4MSS-0901	9/64	3/16	7/32	2
52268	C4MSS-1001	52018	4MSS-1001	5/32	3/16	15/64	2
52270	C4MSS-1101	52020	4MSS-1101	11/64	3/16	1/4	2
52272	C4MSS-1201	52022	4MSS-1201	3/16	3/16	9/32	2



# 4 FLUTE, MINIATURE, REGULAR LENGTH, DOUBLE



HSS Co8
HSS
4
~3/32
39°
7/64~
30°
PLAIN
DATA
P.284

► Suitable for finishing of precision components such as watch, camera electronic apparatus molds, etc.

## E2004(C4MRS), E1004(4MRS) Series

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
53256	C4MRS-0401	53006	4MRS-0401	1/16	3/16	3/16	2-1/4
53258	C4MRS-0501	53008	4MRS-0501	5/64	3/16	15/64	2-1/4
53260	C4MRS-0601	53010	4MRS-0601	3/32	3/16	9/32	2-1/4
53262	C4MRS-0701	53012	4MRS-0701	7/64	3/16	21/64	2-1/4
53264	C4MRS-0801	53014	4MRS-0801	1/8	3/16	3/8	2-1/4
53266	C4MRS-0901	53016	4MRS-0901	9/64	3/16	13/32	2-1/4
53268	C4MRS-1001	53018	4MRS-1001	5/32	3/16	7/16	2-1/4
53270	C4MRS-1101	53020	4MRS-1101	11/64	3/16	1/2	2-1/4
53272	C4MRS-1201	53022	4MRS-1201	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.

### TOLERANCE OF MILL DIA.

+ .0010	* * -.0002
0	-.0015

\*\* The shank of End Mills is the same diameter as the cutting portion.



# 4 FLUTE, MINIATURE, LONG LENGTH, DOUBLE



P.290

► Suitable for finishing of precision components such as watch, camera electronic apparatus molds, etc.

## E2006(C4MLS), E1006(4MLS) Series

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
54256	C4MLS-0401	54006	4MLS-0401	1/16	3/16	7/32	2-1/2
54258	C4MLS-0501	54008	4MLS-0501	5/64	3/16	1/4	2-1/2
54260	C4MLS-0601	54010	4MLS-0601	3/32	3/16	9/32	2-5/8
54262	C4MLS-0701	54012	4MLS-0701	7/64	3/16	9/32	2-5/8
54264	C4MLS-0801	54014	4MLS-0801	1/8	3/16	3/4	3-1/8
54266	C4MLS-0901	54016	4MLS-0901	9/64	3/16	3/4	3-1/8
54268	C4MLS-1001	54018	4MLS-1001	5/32	3/16	7/8	3-1/4
54270	C4MLS-1101	54020	4MLS-1101	11/64	3/16	7/8	3-1/4
54272	C4MLS-1201	54022	4MLS-1201	3/16	3/16	1	3-3/8

### TOLERANCE OF MILL DIA.

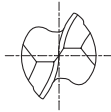
+ .0010	** -.0002
0	-.0015

\* \* 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.



# 2 FLUTE, MINIATURE, STUB LENGTH, BALL NOSE, DOUBLE



P.284

► Helical flute in the nose radius.  
Suitable for high efficient copying process and cutting of die mold corner radius.

## E2008(C2MSB), E1008(2MSB) Series

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
55256	C2MSB-0401	55006	2MSB-0401	1/16	3/16	3/32	2
55260	C2MSB-0601	55010	2MSB-0601	3/32	3/16	9/64	2
55264	C2MSB-0801	55014	2MSB-0801	1/8	3/16	3/16	2
55268	C2MSB-1001	55018	2MSB-1001	5/32	3/16	15/64	2
55272	C2MSB-1201	55022	2MSB-1201	3/16	3/16	9/32	2

### TOLERANCE OF MILL DIA.

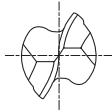
0	** -.0002
-.0010	-.0015

\* \* 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.



# 2 FLUTE, MINIATURE, REGULAR & LONG LENGTH, BALL NOSE, DOUBLE



HSS Co8
HSS
2
39° -3/32
30° 7/64-
PLAIN
DATA
P.290

► Helical flute in the nose radius.  
Suitable for high efficient copying process and cutting of die mold corner radius.

## E2013(C2MRB), E1013(2MRB) Series

■ REGULAR LENGTH

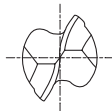
Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
56252	C2MRB-0201	56002	2MRB-0201	1/32	3/16	3/32	2-1/4
56254	C2MRB-0301	56004	2MRB-0301	3/64	3/16	9/64	2-1/4
56256	C2MRB-0401	56006	2MRB-0401	1/16	3/16	3/16	2-1/4
56258	C2MRB-0501	56008	2MRB-0501	5/64	3/16	15/64	2-1/4
56260	C2MRB-0601	56010	2MRB-0601	3/32	3/16	9/32	2-1/4
56262	C2MRB-0701	56012	2MRB-0701	7/64	3/16	21/64	2-1/4
56264	C2MRB-0801	56014	2MRB-0801	1/8	3/16	3/8	2-1/4
56266	C2MRB-0901	56016	2MRB-0901	9/64	3/16	13/32	2-1/4
56268	C2MRB-1001	56018	2MRB-1001	5/32	3/16	7/16	2-1/4
56270	C2MRB-1101	56020	2MRB-1101	11/64	3/16	1/2	2-1/4
56272	C2MRB-1201	56022	2MRB-1201	3/16	3/16	1/2	2-1/4

### TOLERANCE OF MILL DIA.

0	* * -.0002
-.0010	-.0015

\*\* The shank of End Mills is the same diameter as the cutting portion.



## E2015(C2MLB), E1015(2MLB) Series

■ LONG LENGTH

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
57256	C2MLB-0401	57006	2MLB-0401	1/16	3/16	7/32	2-1/2
57260	C2MLB-0601	57010	2MLB-0601	3/32	3/16	9/32	2-5/8
57264	C2MLB-0801	57014	2MLB-0801	1/8	3/16	3/4	3-1/8
57268	C2MLB-1001	57018	2MLB-1001	5/32	3/16	7/8	3-1/4
57272	C2MLB-1201	57022	2MLB-1201	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.

### TOLERANCE OF MILL DIA.

+ .0010	* * -.0002
0	-.0015

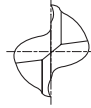
\*\* The shank of End Mills is the same diameter as the cutting portion.

COBALT AND HSS END MILLS





# 2 FLUTE, 42° HELIX, REGULAR & MEDIUM LENGTH for ALUMINUM



HSS
2
42°
FLAT
DATA
P.285

► 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 H.S.S.(M2), which is good for aluminum cutting.

## E1070(2SRA) Series

### REGULAR LENGTH

Unit : inch

EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
HSS (M2)					
17047	2SRA-1603	1/4	3/8	5/8	2-7/16
17051	2SRA-2003	5/16	3/8	3/4	2-1/2
17055	2SRA-2403	3/8	3/8	3/4	2-1/2
17062	2SRA-2803	7/16	3/8	1	2-11/16
17071	2SRA-3204	1/2	1/2	1-1/4	3-1/4
17087	2SRA-4005	5/8	5/8	1-5/8	3-3/4
17109	2SRA-4806	3/4	3/4	1-5/8	3-7/8
17141	2SRA-5606	7/8	3/4	1-7/8	4-1/8
17144	2SRA-5607	7/8	7/8	1-7/8	4-1/8
17172	2SRA-6406	1	3/4	1-7/8	4-1/8
17176	2SRA-6408	1	1	2	4-1/2
17195	2SRA-B1610	1-1/4	1-1/4	2	4-1/2
17211	2SRA-B3210	1-1/2	1-1/4	2	4-1/2
17219	2SRA-B4810	1-3/4	1-1/4	2	4-1/2
17227	2SRA-B6410	2	1-1/4	2	4-1/2

## E1070 Series

### MEDIUM LENGTH

Unit : inch

EDP No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
HSS (M2)				
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

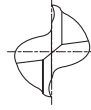
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

#### TOLERANCE OF MILL DIA.

+ .0010	* * + .0015
0	0

\* \* The shank of End Mills is the same diameter as the cutting portion.

**HSS****2 FLUTE, 42° HELIX, LONG LENGTH for ALUMINUM**

HSS
2
42°
FLAT
DATA
P.285

- ▶ Sharp cutting most suitable flute shape for cutting aluminum alloy, etc.  
These tools are made from regular H.S.S(M2), which is good for aluminum cutting.

**E1071(2SLA) Series**

Unit : inch

EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
HSS (M2)					
18047	2SLA-1603	1/4	3/8	1-1/4	3-1/16
18051	2SLA-2003	5/16	3/8	1-3/8	3-1/8
18055	2SLA-2403	3/8	3/8	1-1/2	3-1/4
18063	2SLA-2803	7/16	1/2	1-3/4	3-3/4
18071	2SLA-3204	1/2	1/2	2	4
18087	2SLA-4005	5/8	5/8	2-1/2	4-5/8
18109	2SLA-4806	3/4	3/4	3	5-1/4
18176	2SLA-6408	1	1	4	6-1/2
18195	2SLA-B1610	1-1/4	1-1/4	4	6-1/2
18211	2SLA-B3210	1-1/2	1-1/4	4	6-1/2
18227	2SLA-B6410	2	1-1/4	4	6-1/2

- 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.

**TOLERANCE OF MILL DIA.**

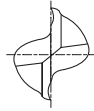
+ .0010	** + .0015
0	0

\* \* The shank of End Mills is the same diameter as the cutting portion.

COBALT AND HSS END MILLS



# 2 FLUTE, 42° HELIX, EXTRA LONG LENGTH for ALUMINUM



HSS
2
42°
FLAT
DATA
P.285

► Sharp cutting most suitable flute shape for cutting aluminum alloy, etc.  
 These tools are made from regular H.S.S(M2), which is good for aluminum cutting.

## E1072(2SEA) Series

Unit : inch

EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
HSS (M2)					
19047	2SEA-1603	1/4	3/8	1-3/4	3-9/16
19051	2SEA-2003	5/16	3/8	2	3-3/4
19055	2SEA-2403	3/8	3/8	2-1/2	4-1/4
19071	2SEA-3204	1/2	1/2	3	5
19087	2SEA-4005	5/8	5/8	4	6-1/8
19109	2SEA-4806	3/4	3/4	4	6-1/4
19176	2SEA-6408	1	1	6	8-1/2
19195	2SEA-B1610	1-1/4	1-1/4	6	8-1/2
19211	2SEA-B3210	1-1/2	1-1/4	8	10-1/2

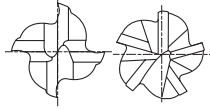
- The TiN coated, TiCN coated or TiAlN coated is available on your request.
- Coating Codes for HSS  
 Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
- Coated Price Shown in Price List. Call for Availability.

COBALT AND HSS END MILLS

### TOLERANCE OF MILL DIA.

+ .0010	* * + .0015
0	0

\* \* The shank of End Mills is the same diameter as the cutting portion.

**HSS****MULTI FLUTE, STUB & REGULAR LENGTH,  
FINE PITCH ROUGHING, CENTER CUTTING****HSS  
Co8****3-5****30°****FLAT****FINE****DATA**

P.289,294,298

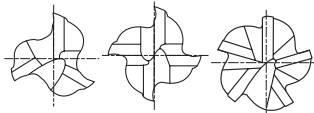
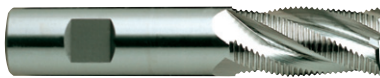
► This general purpose rougher is designed for high production metal removal in a wide range of work piece material. It is suitable for a very broad spectrum of materials having up to high tensile strengths. In many cases, the milled surfaces are of acceptable quality.

**E2086 Series**

## ■ STUB LENGTH

Unit : inch

EDP NO.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH	NO. OF FLUTE
8% COBALT (M42)					
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

**E2085 Series**

## ■ REGULAR LENGTH

Unit : inch

EDP NO.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH	NO. OF FLUTE
8% COBALT (M42)					
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)

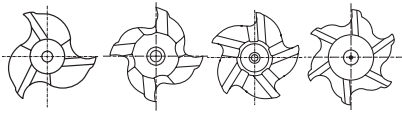
► Coated Price Shown in Price List. Call for Availability.

**TOLERANCE OF MILL DIA.**

up to 1"	+ .0030 0
over 1"	+ .0060 0



# MULTI FLUTE, REGULAR LENGTH, FINE PITCH ROUGHING



P.289,294,298

► 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.

## E2079 Series

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.

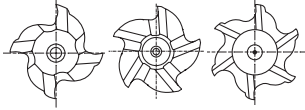
■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

### TOLERANCE OF MILL DIA.

up to 1"	+ .0030 0
over 1"	+ .0060 0

**HSS****MULTI FLUTE, LONG LENGTH,  
FINE PITCH ROUGHING****HSS  
Co8****4&6****30°****FLAT****FINE****DATA**

P.289,294,298

► 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.

**E2077 Series**

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.

COBALT AND HSS END MILLS

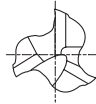
**TOLERANCE OF MILL DIA.**

up to 1"	+ .0030 0
over 1"	+ .0060 0





# 3 FLUTE, STUB LENGTH, FINE PITCH ROUGHING, CENTER CUTTING



P.289,294,298

► 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.

## E2086 Series

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.

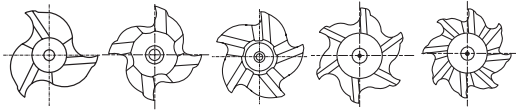
■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

### TOLERANCE OF MILL DIA.

up to 1"	+ .0030 0
over 1"	+ .0060 0

**HSS****MULTI FLUTE, REGULAR LENGTH,  
COARSE PITCH ROUGHING****HSS  
Co8****3-8****30°****FLAT****COARSE****DATA**

P.289,294,298

► 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.

**E2170 Series**

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

■ 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.

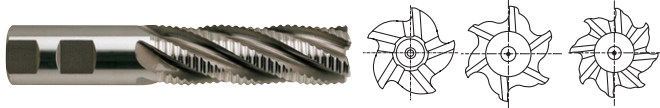
**TOLERANCE OF MILL DIA.**

up to 1"	+ .0030 - .0000
over 1"	+ .0060 - .0000

\*\* The shank of End Mills is the same diameter as the cutting portion.



# MULTI FLUTE, MEDIUM & LONG LENGTH, COARSE PITCH ROUGHING



HSS Co8
4-8
30°
FLAT
COARSE
DATA

P.289,294,298

► 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.

## E2171 Series ■ MEDIUM LENGTH

Unit : inch

EDP No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH	NO. OF FLUTE
8% COBALT (M42)					
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



## E2172 Series ■ LONG LENGTH

Unit : inch

EDP No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH	NO. OF FLUTE
8% COBALT (M42)					
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 TiAlN coated is available on your request.

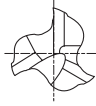
■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

### TOLERANCE OF MILL DIA.

up to 1"	+ .0030 - .0000
over 1"	+ .0060 - .0000

**HSS****3FLUTE, STUB LENGTH, COARSE PITCH ROUGHING,  
CENTER CUTTING****HSS  
Co8****3****30°****FLAT****COARSE****DATA**

P.289,294,298

- 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.

**E2241 Series**

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 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.

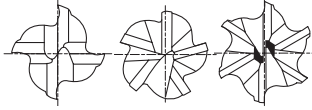
COBALT AND HSS END MILLS

**TOLERANCE OF MILL DIA.**

up to 1"	+ .0030 - .0000
over 1"	+ .0060 - .0000



# MULTI FLUTE, REGULAR LENGTH, COARSE PITCH ROUGHING, CENTER CUTTING



P.289,294,298

► 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.

## E2195 Series

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

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

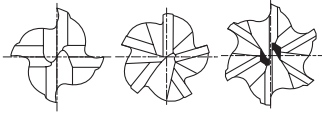
■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

### TOLERANCE OF MILL DIA.

up to 1"	+ .0030
	— .0000
over 1"	+ .0060
	— .0000

**HSS****MULTI FLUTE, LONG LENGTH,  
COARSE PITCH ROUGHING, CENTER CUTTING****HSS  
Co8****4-6****30°****FLAT****COARSE****DATA**

P.289,294,298

- 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.

**E2197 Series**

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.

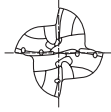
COBALT AND HSS END MILLS

**TOLERANCE OF MILL DIA.**

up to 1"	+ .0030 - .0000
over 1"	+ .0060 - .0000



# MULTI FLUTE, REGULAR & LONG LENGTH, COARSE PITCH ROUGHING, BALL NOSE



P.289,294,298

► 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.

COBALT AND HSS END MILLS

## E2193 Series

### REGULAR LENGTH

Unit : inch

EDP No. 8% COBALT (M42)	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH	NO. OF FLUTE
68297	1/4	3/8	5/8	2-7/16	3
68301	5/16	3/8	3/4	2-1/2	3
68305	3/8	3/8	3/4	2-1/2	4
68321	1/2	1/2	1-1/4	3-1/4	4
68337	5/8	5/8	1-5/8	3-3/4	4
68359	3/4	3/4	1-3/4	4	4
68422	1	3/4	2	4-1/2	5
68426	1	1	2	4-1/2	5
68439	1-1/4	3/4	2	4-1/2	6
68445	1-1/4	1-1/4	2	4-1/2	6
68457	1-1/2	3/4	2	4-1/2	6
68461	1-1/2	1-1/4	2	4-1/2	6

## E2125 Series

### LONG LENGTH

Unit : inch

EDP No. 8% COBALT (M42)	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH	NO. OF FLUTE
69321	1/2	1/2	2-1/2	4-1/2	4
69337	5/8	5/8	2-1/2	4-5/8	4
69359	3/4	3/4	3	5-1/4	4
69426	1	1	4	6-1/2	5
69445	1-1/4	1-1/4	4	6-1/2	6
69461	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

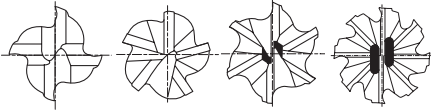
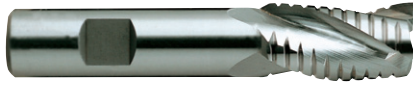
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

#### TOLERANCE OF MILL DIA.

up to 1"	+ .0030
	- .0000
over 1"	+ .0060
	- .0000



**HSS****MULTI FLUTE, REGULAR LENGTH,  
ROUGHING & FINISHING****HSS  
Co8****4-8****30°****FLAT****NF****DATA**

P.289,294,298

► 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.

**E2248 Series**

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

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Cobalt

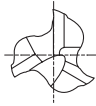
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

TOLERANCE OF MILL DIA.	+ .0025 + .0005
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# 3 FLUTE, 37° HELIX, REGULAR LENGTH, ROUGHING for ALUMINUM



P.289,294,298

► 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.

## E2191 Series

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 TiAIN coated is available on your request.

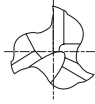
■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAIN F), CE(TiAIN E), CH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

### TOLERANCE OF MILL DIA.

up to 1"	+ .0030
	- .0000
over 1"	+ .0060
	- .0000

**HSS****3 FLUTE, 37° HELIX, MEDIUM & LONG LENGTH, ROUGHING for ALUMINUM****HSS Co8****3****37°****FLAT****AI****DATA**

P.289,294,298

► 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.

**E2226 Series**

■ MEDIUM LENGTH

Unit : inch

EDP No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)				
66901	1	1	3	5-1/2
66902	1-1/4	1-1/4	3	5-1/2

**E2192 Series**

■ LONG LENGTH

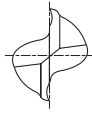
Unit : inch

EDP No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)				
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.

**TOLERANCE OF MILL DIA.**

up to 1"	+ .0030 - .0000
over 1"	+ .0060 - .0000

**HSS****2 FLUTE, 15° HELIX for KEYWAY CUTTING****HSS  
Co8****HSS****2****15°****FLAT****DATA**

P.285,291,295

- 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.

**E2163(C2SKS), E1163(2SKS) Series**

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
14289	C2SKS-0803	14039	2SKS-0803	1/8	3/8	3/8	2-5/16
14293	C2SKS-1203	14043	2SKS-1203	3/16	3/8	7/16	2-5/16
14297	C2SKS-1603	14047	2SKS-1603	1/4	3/8	1/2	2-5/16
14301	C2SKS-2003	14051	2SKS-2003	5/16	3/8	9/16	2-5/16
14305	C2SKS-2403	14055	2SKS-2403	3/8	3/8	9/16	2-5/16
14312	C2SKS-2803	14062	2SKS-2803	7/16	3/8	13/16	2-1/2
14321	C2SKS-3204	14071	2SKS-3204	1/2	1/2	1	3
14337	C2SKS-4005	14087	2SKS-4005	5/8	5/8	1-5/16	3-7/16
14359	C2SKS-4806	14109	2SKS-4806	3/4	3/4	1-5/16	3-9/16
14394	C2SKS-5607	14144	2SKS-5607	7/8	7/8	1-1/2	3-3/4
14426	C2SKS-6408	14176	2SKS-6408	1	1	1-5/8	4-1/8

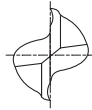
- The TiN coated, TiCN coated or TiAlN coated is available on your request.
- Coating Codes for Cobalt  
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
- Coating Codes for HSS  
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
- Coated Price Shown in Price List. Call for Availability.

COBALT AND HSS END MILLS

TOLERANCE OF MILL DIA.	0 — .0015
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# HSS 2 FLUTE, REGULAR LENGTH

**METRIC**



HSS Co8
HSS
2
30°
FLAT

► 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.

**E2482(C2TRA), E1482(2TRA) Series**

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER mm	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
15252	C2TRA-02003	15002	2TRA-02003	2.0	3/8	5/16	2-5/16
15253	C2TRA-02503	15003	2TRA-02503	2.5	3/8	5/16	2-5/16
15254	C2TRA-03003	15004	2TRA-03003	3.0	3/8	5/16	2-5/16
15255	C2TRA-03503	15005	2TRA-03503	3.5	3/8	7/16	2-5/16
15256	C2TRA-04003	15006	2TRA-04003	4.0	3/8	7/16	2-5/16
15257	C2TRA-04503	15007	2TRA-04503	4.5	3/8	1/2	2-5/16
15258	C2TRA-05003	15008	2TRA-05003	5.0	3/8	1/2	2-5/16
15259	C2TRA-05503	15009	2TRA-05503	5.5	3/8	1/2	2-5/16
15260	C2TRA-06003	15010	2TRA-06003	6.0	3/8	1/2	2-5/16
15261	C2TRA-07003	15011	2TRA-07003	7.0	3/8	9/16	2-5/16
15262	C2TRA-08003	15012	2TRA-08003	8.0	3/8	9/16	2-5/16
15263	C2TRA-09003	15013	2TRA-09003	9.0	3/8	9/16	2-5/16
15264	C2TRA-10003	15014	2TRA-10003	10.0	3/8	13/16	2-1/2
15265	C2TRA-11003	15015	2TRA-11003	11.0	3/8	13/16	2-1/2
15266	C2TRA-12003	15016	2TRA-12003	12.0	3/8	13/16	2-1/2
15267	C2TRA-12504	15017	2TRA-12504	12.5	1/2	1-1/8	3-1/8
15268	C2TRA-13004	15018	2TRA-13004	13.0	1/2	1-1/8	3-1/8
15270	C2TRA-14004	15020	2TRA-14004	14.0	1/2	1-1/8	3-1/8
15276	C2TRA-16005	15026	2TRA-16005	16.0	5/8	1-5/16	3-7/16
15280	C2TRA-18005	15030	2TRA-18005	18.0	5/8	1-5/16	3-7/16
15282	C2TRA-20005	15032	2TRA-20005	20.0	5/8	1-1/2	3-3/4
15284	C2TRA-22006	15034	2TRA-22006	22.0	3/4	1-1/2	3-3/4
15288	C2TRA-24006	15038	2TRA-24006	24.0	3/4	2	4-1/2
15290	C2TRA-25008	15040	2TRA-25008	25.0	1	2	4-1/2
15296	C2TRA-32008	15046	2TRA-32008	32.0	1	2	4-1/2
15298	C2TRA-36008	15048	2TRA-36008	36.0	1	2	4-1/2
15300	C2TRA-40010	15050	2TRA-40010	40.0	1-1/4	2	4-1/2
15302	C2TRA-45010	15052	2TRA-45010	45.0	1-1/4	2	4-1/2

COBALT AND HSS END MILLS

- 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.

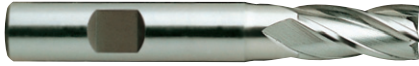
TOLERANCE OF MILL DIA.	
+ .0010	* * + .0015
0	0

\* \* The shank of End Mills is the same diameter as the cutting portion.



# 4 FLUTE, REGULAR LENGTH

**METRIC**



HSS  
Co8

HSS

4

30°

FLAT

- ▶ 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.

## E2483(C4TRA), E1483(4TRA) Series

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	MILL DIAMETER mm	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
16252	C4TRA-02003	16002	4TRA-02003	2.0	3/8	3/8	2-5/16
16253	C4TRA-02503	16003	4TRA-02503	2.5	3/8	3/8	2-5/16
16254	C4TRA-03003	16004	4TRA-03003	3.0	3/8	3/8	2-5/16
16255	C4TRA-03503	16005	4TRA-03503	3.5	3/8	1/2	2-3/8
16256	C4TRA-04003	16006	4TRA-04003	4.0	3/8	1/2	2-3/8
16257	C4TRA-04503	16007	4TRA-04503	4.5	3/8	9/16	2-1/2
16258	C4TRA-05003	16008	4TRA-05003	5.0	3/8	9/16	2-1/2
16259	C4TRA-05503	16009	4TRA-05503	5.5	3/8	5/8	2-1/2
16260	C4TRA-06003	16010	4TRA-06003	6.0	3/8	5/8	2-1/2
16261	C4TRA-07003	16011	4TRA-07003	7.0	3/8	11/16	2-1/2
16262	C4TRA-08003	16012	4TRA-08003	8.0	3/8	3/4	2-1/2
16263	C4TRA-09003	16013	4TRA-09003	9.0	3/8	3/4	2-1/2
16264	C4TRA-10003	16014	4TRA-10003	10.0	3/8	1	2-11/16
16265	C4TRA-11003	16015	4TRA-11003	11.0	3/8	1	2-11/16
16266	C4TRA-12003	16016	4TRA-12003	12.0	3/8	1	2-11/16
16267	C4TRA-12504	16017	4TRA-12504	12.5	1/2	1-1/4	3-1/4
16268	C4TRA-13004	16018	4TRA-13004	13.0	1/2	1-1/4	3-1/4
16270	C4TRA-14004	16020	4TRA-14004	14.0	1/2	1-3/8	3-3/8
16276	C4TRA-16005	16026	4TRA-16005	16.0	5/8	1-5/8	3-3/4
16280	C4TRA-18005	16030	4TRA-18005	18.0	5/8	1-5/8	3-3/4
16282	C4TRA-20005	16032	4TRA-20005	20.0	5/8	1-7/8	4-1/8
16284	C4TRA-22006	16034	4TRA-22006	22.0	3/4	1-7/8	4-1/8
16288	C4TRA-24006	16038	4TRA-24006	24.0	3/4	2	4-1/2
16290	C4TRA-25008	16040	4TRA-25008	25.0	1	2	4-1/2
16296	C4TRA-32008	16046	4TRA-32008	32.0	1	2	4-1/2
16298	C4TRA-36008	16048	4TRA-36008	36.0	1	2	4-1/2
16300	C4TRA-40010	16050	4TRA-40010	40.0	1-1/4	2	4-1/2
16302	C4TRA-45010	16052	4TRA-45010	45.0	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.

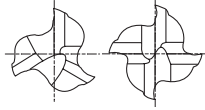
### TOLERANCE OF MILL DIA.

+ .0010	* * + .0015
0	0

\* \* The shank of End Mills is the same diameter as the cutting portion.

# HSS

## 3&4 FLUTE, 60° HELIX, REGULAR LENGTH



HSS  
Co8

3&4

60°

FLAT

DATA

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- Provided with high helix angle(60°)  
Smooth cutting and small cutting resistance.  
Suitable for machining of difficult-to-cut materials.

### E2120(C3SRH) Series

■ 3 FLUTE

Unit : inch

EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)					
20297	C3SRH-1603	1/4	3/8	5/8	2-7/16
20301	C3SRH-2003	5/16	3/8	3/4	2-1/2
20305	C3SRH-2403	3/8	3/8	3/4	2-1/2
20312	C3SRH-2803	7/16	3/8	1	2-11/16
20321	C3SRH-3204	1/2	1/2	1-1/4	3-1/4
20337	C3SRH-4005	5/8	5/8	1-5/8	3-3/4
20359	C3SRH-4806	3/4	3/4	1-5/8	3-7/8

### E2121(C4SRH) Series

■ 4 FLUTE

Unit : inch

EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)					
20394	C4SRH-5607	7/8	7/8	1-7/8	4-1/8
20426	C4SRH-6408	1	1	2	4-1/2
20445	C4SRH-B1610	1-1/4	1-1/4	2	4-1/2
20461	C4SRH-B3210	1-1/2	1-1/4	2	4-1/2
20477	C4SRH-B6410	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.

#### TOLERANCE OF MILL DIA.

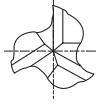
+ .0010	* * + .0015
0	0

\*\* The shank of End Mills is the same diameter as the cutting portion.





# 3 FLUTE, SHORT & LONG LENGTH, THROW AWAY



P.286

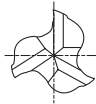
- ▶ Well balanced web design to minimize deflection & chattering. High accuracy for O.D. is guaranteed under the strict tolerance control. Much higher(50%) table speed than 2 Flute is allowed.

## E2160(C3CSC) Series

### SHORT LENGTH

Unit : inch

EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)					
22257	C3CSC-0402	1/16	1/4	3/32	31/32
22261	C3CSC-0602	3/32	1/4	5/32	1-1/64
22265	C3CSC-0802	1/8	1/4	3/16	1-3/32
22269	C3CSC-1002	5/32	1/4	1/4	1-9/32
22273	C3CSC-1202	3/16	1/4	9/32	1-11/32
22277	C3CSC-1402	7/32	1/4	5/16	1-13/32
22281	C3CSC-1602	1/4	1/4	3/8	1-13/32



## E2161(C3CLC) Series

### LONG LENGTH

Unit : inch

EDP No.	ITEM No.	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
8% COBALT (M42)					
23257	C3CLC-0402	1/16	1/4	5/32	1-3/32
23261	C3CLC-0602	3/32	1/4	1/4	1-1/4
23265	C3CLC-0802	1/8	1/4	5/16	1-11/32
23269	C3CLC-1002	5/32	1/4	3/8	1-17/32
23273	C3CLC-1202	3/16	1/4	7/16	1-21/32
23277	C3CLC-1402	7/32	1/4	1/2	1-3/4
23281	C3CLC-1602	1/4	1/4	5/8	1-3/4

■ 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)

▶ Coated Price Shown in Price List. Call for Availability.

TOLERANCE OF MILL DIA.	— .0005 — .0013
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# 4 FLUTE, CORNER ROUNDING



► This general corner rounding end mills are designed for machining fillets on workpiece.

## E2237(C4RDG), E1237(4RDG) Series

Unit : inch

EDP No.	ITEM No.	EDP No.	ITEM No.	RADIUS	MILL DIAMETER	SHANK DIAMETER	OVERALL LENGTH
8% COBALT (M42)		HSS (M2)					
29251	C4RDG-2803	29001	4RDG-2803	1/16	7/16	3/8	2-1/2
29252	C4RDG-3203	29002	4RDG-3203	3/32	1/2	3/8	2-1/2
29253	C4RDG-4004	29003	4RDG-4004	1/8	5/8	1/2	3
29254	C4RDG-4804	29004	4RDG-4804	5/32	3/4	1/2	3
29255	C4RDG-5604	29005	4RDG-5604	3/16	7/8	1/2	3
29256	C4RDG-5606	29006	4RDG-5606	3/16	7/8	3/4	3-1/8
29257	C4RDG-5604R	29007	4RDG-5604R	7/32	7/8	1/2	3-1/4
29258	C4RDG-6404	29008	4RDG-6404	1/4	1	1/2	3
29259	C4RDG-6405	29009	4RDG-6405	9/32	1	5/8	3
29260	C4RDG-6406	29010	4RDG-6406	1/4	1	3/4	3-1/4
29261	C4RDG-B0804	29011	4RDG-B0804	5/16	1-1/8	1/2	3-1/4
29262	C4RDG-B0805	29012	4RDG-B0805	5/16	1-1/8	5/8	3-1/2
29263	C4RDG-B0806	29013	4RDG-B0806	5/16	1-1/8	3/4	3-1/2
29264	C4RDG-B0807	29014	4RDG-B0807	5/16	1-1/8	7/8	3-1/2
29265	C4RDG-B1604	29015	4RDG-B1604	3/8	1-1/4	1/2	3-1/2
29266	C4RDG-B1606	29016	4RDG-B1606	3/8	1-1/4	3/4	3-3/4
29267	C4RDG-B1607	29017	4RDG-B1607	3/8	1-1/4	7/8	3-3/4
29268	C4RDG-B2406	29018	4RDG-B2406	7/16	1-3/8	3/4	3-3/4
29269	C4RDG-B2408	29019	4RDG-B2408	7/16	1-3/8	1	4
29270	C4RDG-B3206	29020	4RDG-B3206	1/2	1-1/2	3/4	3-7/8
29271	C4RDG-B3208	29021	4RDG-B3208	1/2	1-1/2	1	4-1/8
29272	C4RDG-B4006	29022	4RDG-B4006	5/8	1-5/8	3/4	4
29273	C4RDG-B4008	29023	4RDG-B4008	5/8	1-5/8	1	4
29274	C4RDG-B6006	29024	4RDG-B6006	5/8	1-15/16	3/4	4
29275	C4RDG-B6008	29025	4RDG-B6008	5/8	1-15/16	1	4-1/4
29276	C4RDG-B5606	29026	4RDG-B5606	3/4	1-7/8	3/4	4
29277	C4RDG-B5608	29027	4RDG-B5608	3/4	1-7/8	1	4
29278	C4RDG-C1606	29028	4RDG-C1606	3/4	2-1/4	3/4	4-1/8
29279	C4RDG-C1608	29029	4RDG-C1608	3/4	2-1/4	1	4-5/16
29280	C4RDG-C3206	29030	4RDG-C3206	7/8	2-1/2	3/4	4-1/2
29281	C4RDG-C4006	29031	4RDG-C4006	1	2-5/8	3/4	4-1/2
29282	C4RDG-C4808	29032	4RDG-C4808	1	2-3/4	1	4-3/4

COBALT AND HSS END MILLS

- 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.



# END MILL SET SERIES

► Various range of sizes in these end mill sets gives you a plenty of opportunities of 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 FLUTES
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.

\* WITH TRANSPARENT PLASTIC CASE

■ 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.

## ■ SET OF 3/8" SHANK, (WELDON) SINGLE

EDP NO.	ITEM NO.	EDP NO.	ITEM NO.	TYPE	LENGTH	MILL DIAMETER	NO. OF FLUTES
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	4

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

\* WITH TRANSPARENT PLASTIC CASE

■ 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.

COBALT AND 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 FLUTES
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.

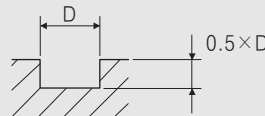
\* WITH TRANSPARENT PLASTIC CASE

COBALT AND HSS END MILLS



## 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/mm <sup>2</sup>		500~800N/mm <sup>2</sup>		800~1000N/mm <sup>2</sup>		1000~1300N/mm <sup>2</sup>			
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%

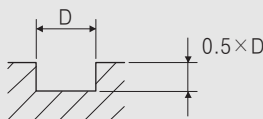
RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## 2 FLUTE, 42° HELIX, FINISH for ALUMINUM

<Slotting>

MATERIAL	ALUMINUM NONFERROUS METALS	
DIAMETER	RPM	FEED
1/8	8000	22.50
3/16	7400	25.00
1/4	6800	28.50
5/16	5200	43.50
7/16	5000	47.00
1/2	4500	47.00
9/16	3500	49.00
5/8	3500	49.00
3/4	2300	51.00
13/16	2000	51.00

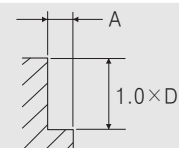


RPM=REVOLUTION PER MIN.  
FEED=inch/min.

<Side Cutting>

MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON	
DIAMETER	RPM	FEED
1/8	8000	29.00
3/16	7400	32.50
1/4	6800	37.00
5/16	5200	55.00
7/16	5000	47.00
1/2	4500	61.00
9/16	3500	63.00
5/8	3500	63.00
3/4	2300	67.00
13/16	2000	67.00

A :  $\phi 1/8 \sim \phi 5/16 = 0.25 \times D$   
 $\phi 7/16 \sim \phi 13/16 = 0.5 \times D$

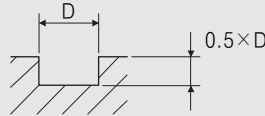


RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## 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/mm <sup>2</sup>		500~800N/mm <sup>2</sup>		800~1000N/mm <sup>2</sup>		1000~1300N/mm <sup>2</sup>			
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



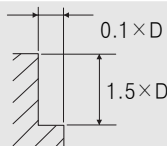
※The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## 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/mm <sup>2</sup>		500~800N/mm <sup>2</sup>		800~1000N/mm <sup>2</sup>		1000~1300N/mm <sup>2</sup>			
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



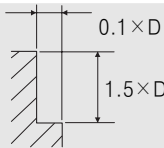
※The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## 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/mm <sup>2</sup>		500~800N/mm <sup>2</sup>		800~1000N/mm <sup>2</sup>		1000~1300N/mm <sup>2</sup>			
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%

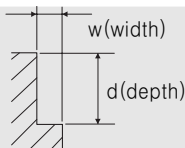
RPM=REVOLUTION PER MIN.  
FEED=inch/min.

COBALT AND HSS END MILLS



## 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



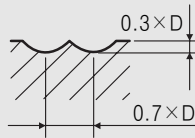
※ The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.



**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/mm <sup>2</sup>		500~800N/mm <sup>2</sup>		800~1000N/mm <sup>2</sup>		1000~1300N/mm <sup>2</sup>			
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



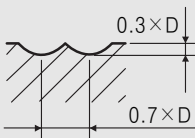
※ The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.

COBALT AND HSS END MILLS

**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/mm <sup>2</sup>		500~800N/mm <sup>2</sup>		800~1000N/mm <sup>2</sup>		1000~1300N/mm <sup>2</sup>			
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



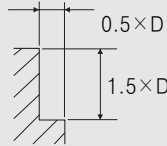
※ The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## 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/mm <sup>2</sup>		500~800N/mm <sup>2</sup>		800~1000N/mm <sup>2</sup>		1000~1300N/mm <sup>2</sup>			
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%

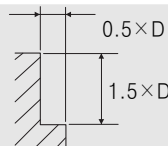
RPM=REVOLUTION PER MIN.  
FEED=inch/min.

COBALT AND HSS END MILLS



## 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/mm <sup>2</sup>		500~800N/mm <sup>2</sup>		800~1000N/mm <sup>2</sup>		1000~1300N/mm <sup>2</sup>			
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



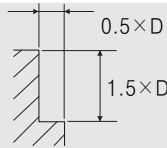
※ The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.



# 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/mm <sup>2</sup>		500~800N/mm <sup>2</sup>		800~1000N/mm <sup>2</sup>		1000~1300N/mm <sup>2</sup>			
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=REVOLUTION PER MIN.  
FEED=inch/min.

COBALT AND HSS END MILLS



# 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

NOTES:

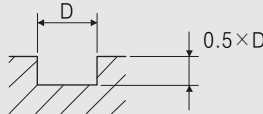
- (1) The cutting conditions in this table are given for reference, which should be varied depending on the machine, tooling, depth of cut, cutting fluid and other conditions.
- (2) Use a holder of strong gripping force and machine of high stiffness

RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## 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/mm <sup>2</sup>		500~800N/mm <sup>2</sup>		800~1000N/mm <sup>2</sup>		1000~1300N/mm <sup>2</sup>			
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%

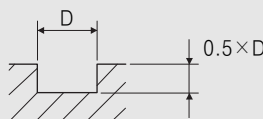
RPM=REVOLUTION PER MIN.  
FEED=inch/min.

COBALT AND HSS END MILLS



## 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/mm <sup>2</sup>		500~800N/mm <sup>2</sup>		800~1000N/mm <sup>2</sup>		1000~1300N/mm <sup>2</sup>			
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



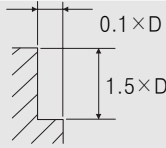
※ The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## 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/mm <sup>2</sup>		500~800N/mm <sup>2</sup>		800~1000N/mm <sup>2</sup>		1000~1300N/mm <sup>2</sup>			
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%

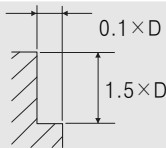
RPM=REVOLUTION PER MIN.  
FEED=inch/min.

COBALT AND HSS END MILLS



## 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/mm <sup>2</sup>		500~800N/mm <sup>2</sup>		800~1000N/mm <sup>2</sup>		1000~1300N/mm <sup>2</sup>			
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



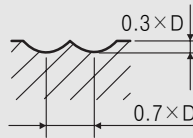
※ The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## 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/mm <sup>2</sup>		500~800N/mm <sup>2</sup>		800~1000N/mm <sup>2</sup>		1000~1300N/mm <sup>2</sup>			
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1/8	5400	4.44	4080	3.36	2400	1.44	1680	0.96	13200	10.92
5/32	3840	5.40	2880	3.72	1680	1.68	1200	1.20	9600	12.24
1/2	2640	6.36	2040	4.20	720	2.16	840	1.20	6720	13.20
5/16	1920	7.56	1440	4.92	840	2.40	600	1.44	4800	16.56
3/8	1560	8.52	1200	5.64	672	2.88	480	1.68	3840	17.04
1/2	1200	8.04	960	4.92	540	2.64	384	1.68	3330	16.08
5/8	960	7.20	720	4.80	420	2.64	300	1.68	2400	14.16
13/16	720	6.60	600	4.08	360	2.40	240	1.68	1923	13.20
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%

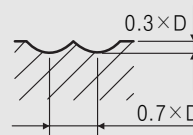
RPM=REVOLUTION PER MIN.  
FEED=inch/min.

COBALT AND HSS END MILLS



## 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/mm <sup>2</sup>		500~800N/mm <sup>2</sup>		800~1000N/mm <sup>2</sup>		1000~1300N/mm <sup>2</sup>			
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1/4	2640	9.48	2040	6.36	1200	3.36	840	1.92	6720	19.80
5/16	1920	11.28	1440	7.56	840	3.60	600	2.16	4800	25.08
3/8	1560	12.72	1200	8.52	672	4.20	480	2.40	3840	25.56
1/2	1200	12.24	960	7.56	540	3.72	384	2.40	3000	24.12
5/8	960	10.92	720	7.20	420	3.72	300	2.40	2400	21.24
13/16	720	9.96	600	6.12	380	3.60	240	2.40	1920	19.80
1	600	9.48	480	4.80	264	2.88	192	2.16	1560	18.00



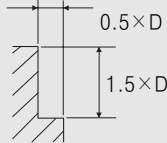
※ The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## 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/mm <sup>2</sup>		500~800N/mm <sup>2</sup>		800~1000N/mm <sup>2</sup>		1000~1300N/mm <sup>2</sup>			
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%

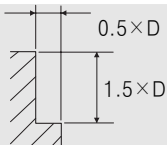
RPM=REVOLUTION PER MIN.  
FEED=inch/min.

COBALT AND HSS END MILLS



## 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/mm <sup>2</sup>		500~800N/mm <sup>2</sup>		800~1000N/mm <sup>2</sup>		1000~1300N/mm <sup>2</sup>			
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%

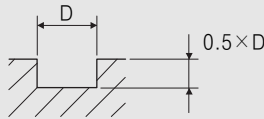
RPM=REVOLUTION PER MIN.  
FEED=inch/min.





## 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/mm <sup>2</sup>		500~800N/mm <sup>2</sup>		800~1000N/mm <sup>2</sup>		1000~1300N/mm <sup>2</sup>			
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



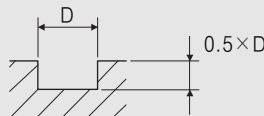
※ The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## 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/mm <sup>2</sup>		500~800N/mm <sup>2</sup>		800~1000N/mm <sup>2</sup>		1000~1300N/mm <sup>2</sup>			
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



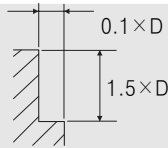
※ The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## 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/mm <sup>2</sup>		500~800N/mm <sup>2</sup>		800~1000N/mm <sup>2</sup>		1000~1300N/mm <sup>2</sup>			
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%

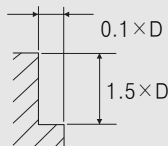
RPM=REVOLUTION PER MIN.  
FEED=inch/min.

COBALT AND HSS END MILLS



## 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/mm <sup>2</sup>		500~800N/mm <sup>2</sup>		800~1000N/mm <sup>2</sup>		1000~1300N/mm <sup>2</sup>			
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



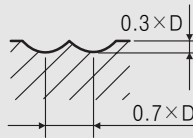
※ The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## 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/mm <sup>2</sup>		500~800N/mm <sup>2</sup>		800~1000N/mm <sup>2</sup>		1000~1300N/mm <sup>2</sup>			
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1/8	5850	4.81	4420	3.64	2600	1.56	1820	1.04	14300	11.83
5/32	4160	5.85	3120	4.03	1820	1.82	1300	1.30	10400	13.26
1/2	2860	6.89	2210	4.55	1300	2.34	910	1.30	7280	12.30
5/16	2080	8.19	1560	5.33	910	2.60	650	1.56	5200	17.94
3/8	1690	9.23	1300	6.11	728	3.12	520	1.82	4160	18.46
1/2	1300	8.71	1040	5.33	585	2.86	416	1.82	3250	17.42
5/8	1043	7.80	780	5.20	455	2.86	325	1.82	2600	15.34
13/16	780	7.15	650	4.42	390	2.60	263	1.82	2080	14.80
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%

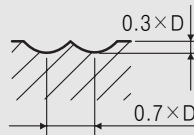
RPM=REVOLUTION PER MIN.  
FEED=inch/min.

COBALT AND HSS END MILLS



## 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/mm <sup>2</sup>		500~800N/mm <sup>2</sup>		800~1000N/mm <sup>2</sup>		1000~1300N/mm <sup>2</sup>			
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1/4	2860	10.27	2210	6.89	1300	3.64	910	2.08	7280	21.45
5/16	2080	12.22	1560	8.19	910	3.90	650	2.34	5200	27.17
3/8	1690	13.78	1300	9.23	728	4.55	520	2.60	4160	27.69
1/2	1300	13.26	1040	8.19	585	4.03	416	2.60	3250	26.13
5/8	1040	11.83	780	7.80	455	4.03	325	2.60	2600	23.01
13/16	780	10.79	650	6.63	390	3.90	260	2.60	2080	21.45
1	650	10.27	520	5.20	286	3.12	208	2.34	1690	19.50



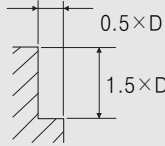
※ The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## MULTI FLUTE, SIDE CUTTING, ROUGHING, 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/mm <sup>2</sup>		500~800N/mm <sup>2</sup>		800~1000N/mm <sup>2</sup>		1000~1300N/mm <sup>2</sup>			
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%

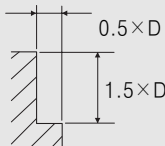
RPM=REVOLUTION PER MIN.  
FEED=inch/min.

COBALT AND HSS END MILLS



## 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/mm <sup>2</sup>		500~800N/mm <sup>2</sup>		800~1000N/mm <sup>2</sup>		1000~1300N/mm <sup>2</sup>			
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



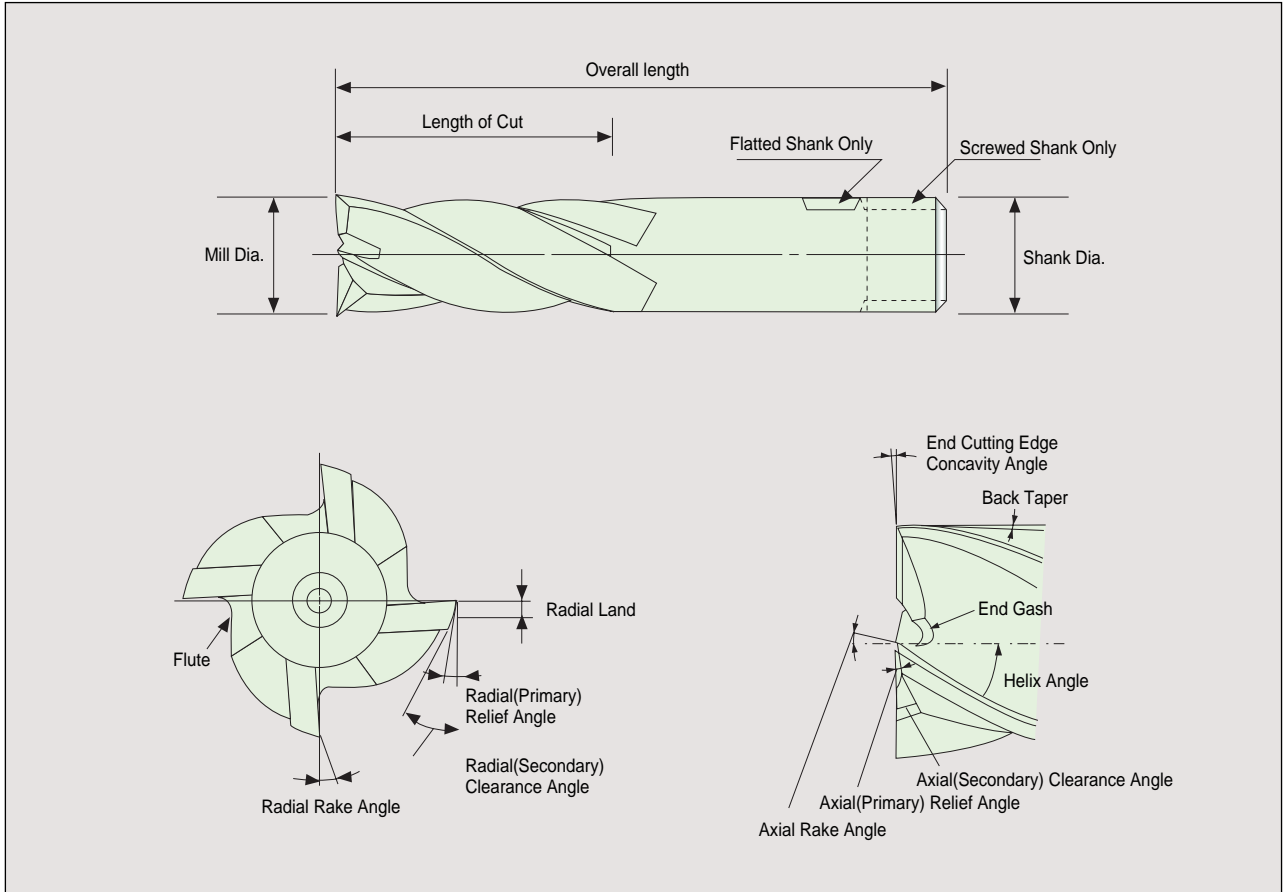
※ The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.



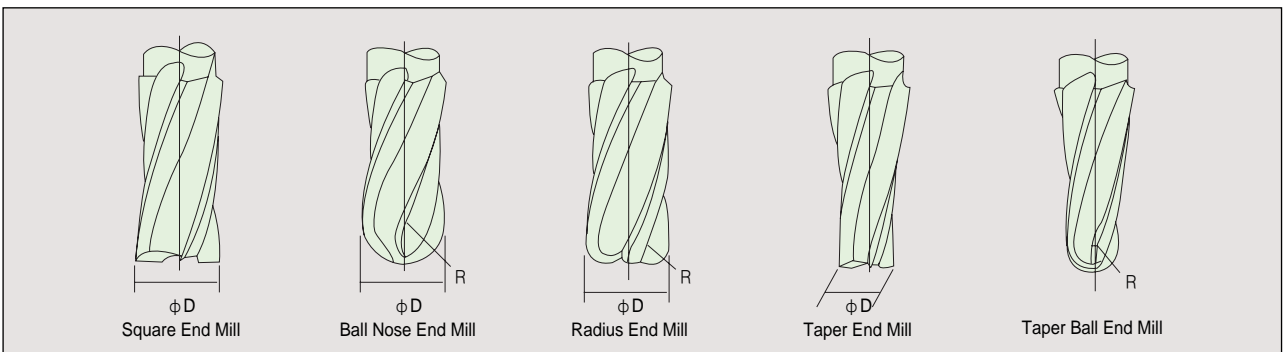
# SUPER CUTTING END MILLS

## 1. Names of End Mill Parts



COBALT AND HSS END MILLS

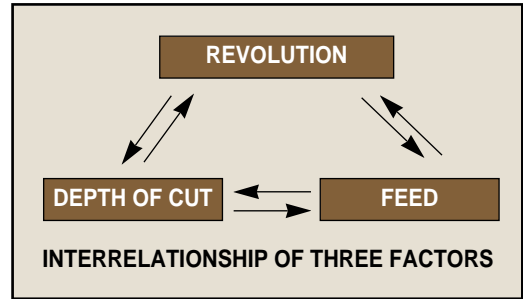
## 2. Type of End Mill





# SUPER CUTTING END MILLS

Speed, feeds, 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.



## 3. SPEEDS

In milling, SPEED is measured in peripheral feet per minute.(revolution per minute times cutter circumference in feet) This is frequently referred to as "peripheral speed." "cutting speed." or "surface speed."

Revolutions per Minute  $R.P.M = \frac{S.F.M. \times 12}{D \times 3.1416}$

D:Diameter of Tool(Inch)  
S.F.M.:Surface Speed(Feet per Minute)

They will have to be tempered to suit the conditons ON THE JOB. For example:

### Use Lower Speed Ranges For

- Hard materials
- Tough materials
- Abrasive materials
- Heavy cuts
- Minimum tool wear
- Maximum cutter life

### Use Higher Speed Ranges For

- Softer materials
- Better finishes
- Smaller diameter cutters
- Light cuts
- Frail work pieces or set-ups
- Hand feed operations
- Maximum production rates
- Non-metallics

## 4. FEEDS

Feed is usually measured in inches 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.



# SUPER CUTTING END MILLS

Feed in inches  
per Minute

$$F.M = F.R. \times R.P.M$$

F.R. : Feed per Revolutions in inches

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

- Heavy, roughing cuts
- Rigid set-ups
- Easy-to-machine work materials
- Rugged cutters
- Slab milling cuts
- Low tensile strength materials
- Coarse tooth cutters
- Abrasive materials

### Use Lower Feeds For

- Light, and finishing cuts
- Frail set-ups
- Hard to machine work materials
- Frail and small cutters
- Deep slots
- High tensile strength materials
- Fine tooth cutters

## SPEED AND FEED CALCULATIONS FOR MILLING CUTTERS AND OTHER ROTATING TOOLS

TO FIND	HAVING	FORMULA
Surface(or Periphery) Speed in Feet Per Minute=S.F.M.	Diameter of Tool in inches =D Revolutions per Minute =R.P.M.	$S.F.M. = \frac{D \times 3.1416 \times R.P.M.}{12}$
Revolutions Per Minute=R.P.M.	Surface Speed Feet per Minute =S.F.M. Diameter of Tool in inches =D	$R.P.M. = \frac{S.F.M. \times 12}{D \times 3.1416}$
Feed per Revolution inches-F.R.	Feed in inches per Minute =F.M. Revolution per Minute =R.P.M.	$F.R. = \frac{F.M.}{R.P.M.}$
Feed in inches Per Minute-F.M.	Feed per Revolution in inches =F.R. Revolution per Minute =R.P.M.	$F.M. = F.R. \times R.P.M.$
Number of Cutting Teeth per Minute=T.M.	Number of Teeth in Tool =T Revolution per Minute =R.P.M.	$T.M. = T \times R.P.M.$
Feed per tooth=F.T.	Number of Teeth in Tool =T Feed per Revolution in inches =R.P.M.	$F.T. = \frac{F.R.}{T}$
Feed per Tooth=F.T.	Number of Teeth in Tool =T Feed in inches per Minute =F.M. Speed in Revolution per Minute =R.P.M.	$F.T. = \frac{F.M.}{T \times R.P.M.}$





# SUPER CUTTING END MILLS

## 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, a end mill must be resharpened. The following are the damages of end mills when the resharpening is required.

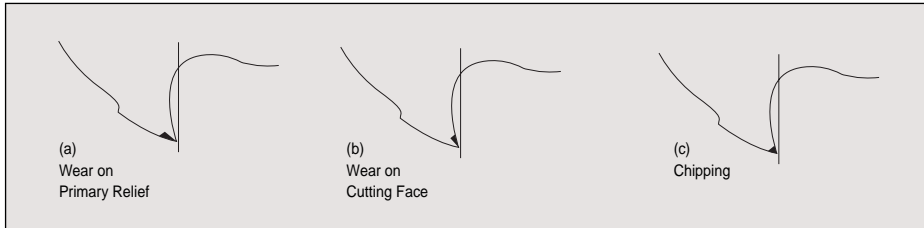


Fig. 1. Damages of Cutting Edge

## 6. SHARPEN AT PREDETERMINED WEARLAND

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 thousandth to 1/16 inch, 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.

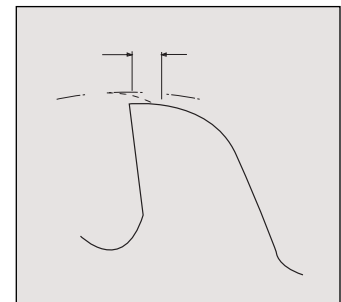


Fig. 2. Wear Land

## 7. RESHARPENING PERIPHERAL CUTTING EDGE

### 1) RESHARPENING PRIMARY LAND

The geometry of relief angle in an end mill consist 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.

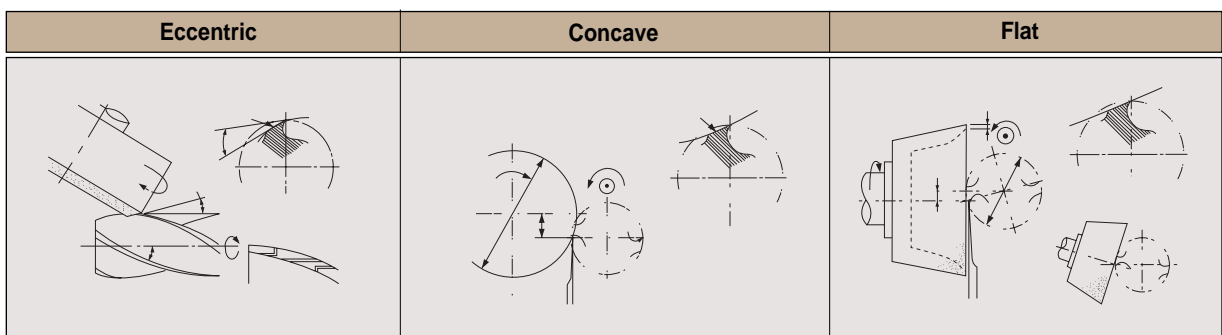


Fig. 3. Three Types of Primary Relief



# SUPER CUTTING END MILLS

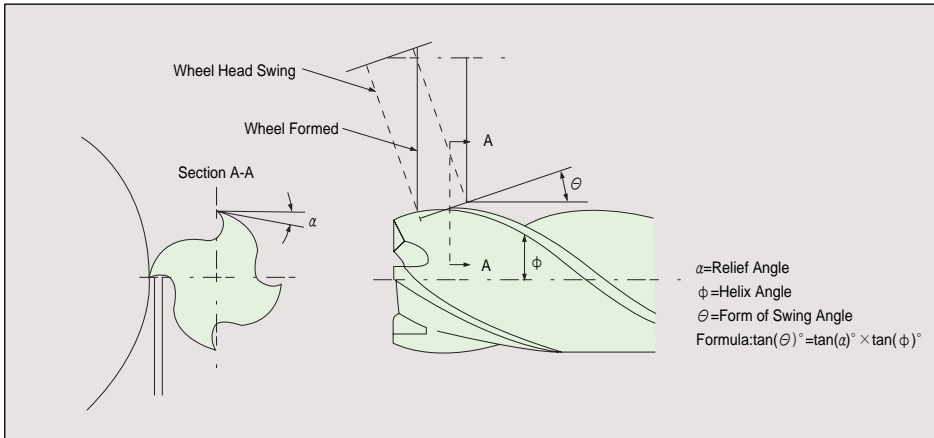


Fig. 4. Tothing of Eccentric Relief Angle

## 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.) $\theta$			Radial Relief Angles( $\alpha_1$ )	Clearance Angles( $\alpha_2$ )
				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.



# SUPER CUTTING END MILLS

## 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.

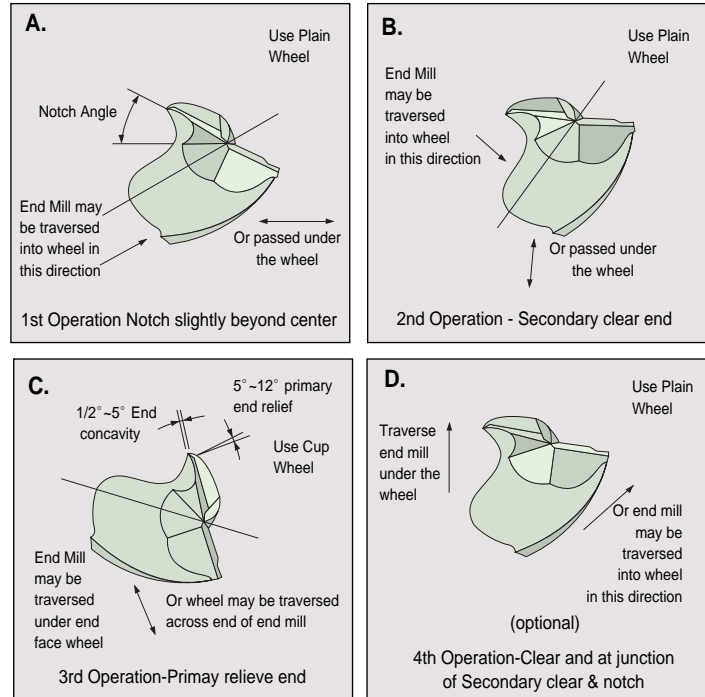


Fig 5. PROCEDURE FOR SHARPENING END OF 2 FLUTE SQUARE END MILLS

## 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 tabulated 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.

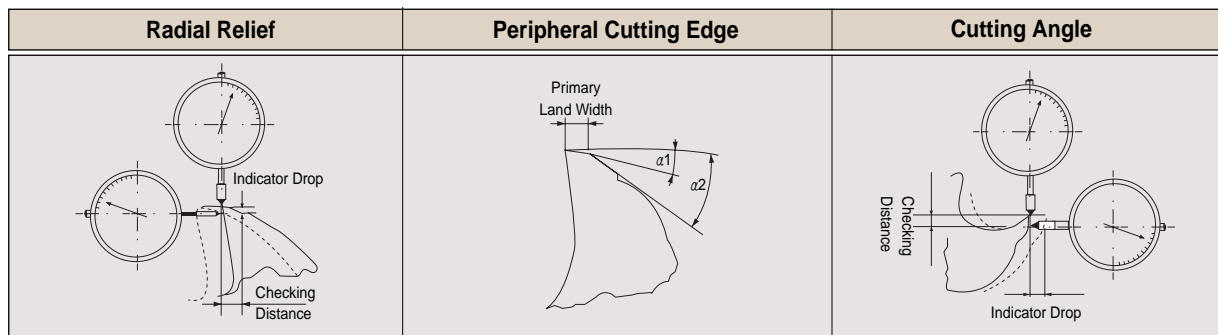
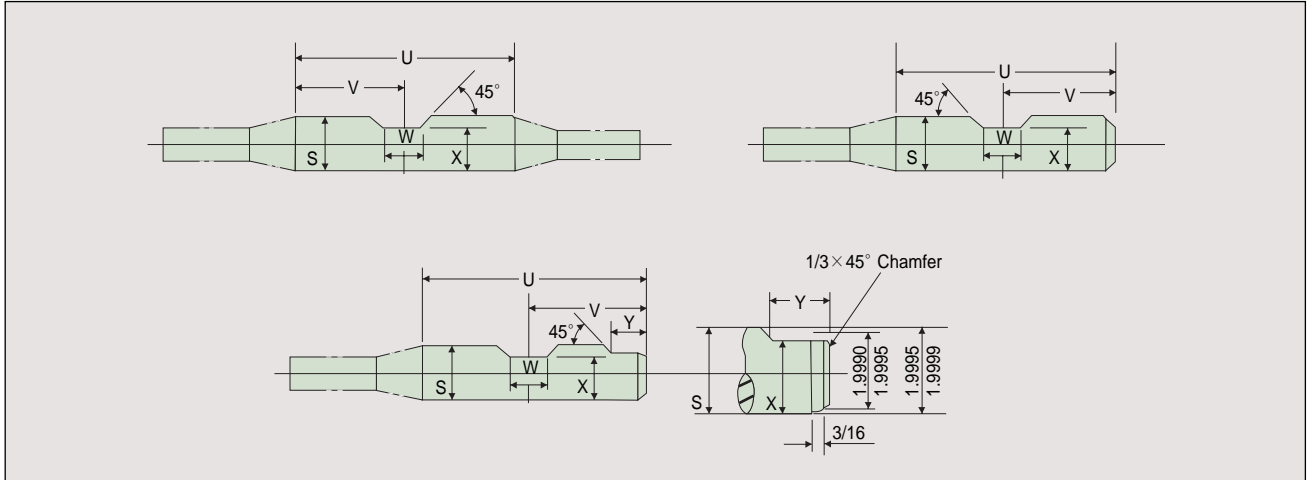


Fig. 6. Indicator Set-Up for Checking



# SUPER CUTTING END MILLS

## 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

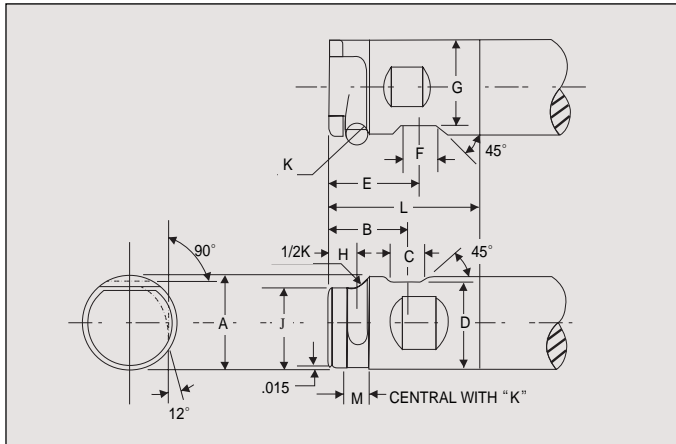
Extracted from Milling Cutters and End Mills. MCTI 1989.



# SUPER CUTTING END MILLS

## 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.



# SUPER CUTTING END MILLS

## 16. TROUBLESHOOTING

Trouble	Occurrences of trouble	Countermeasures
Breaking of tool	<ul style="list-style-type: none"> <li>· At time of engaging with work material</li> <li>· When ending cut</li> </ul>	<ol style="list-style-type: none"> <li>1. Decrease feed rate.</li> <li>2. Decrease projection amount</li> <li>3. Shorten cutting edge length to required minimum limit</li> </ol>
	<ul style="list-style-type: none"> <li>· During normal cutting</li> </ul>	<ol style="list-style-type: none"> <li>1. Decrease feed rate</li> <li>2. Control wear → replace tool early</li> <li>3. Replace chuck or collet</li> <li>4. Decrease projection amount</li> <li>5. Carry out honing</li> <li>6. If 4 flute, reduce to 2 flute(clogging of chipping)</li> <li>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.</li> </ol>
	<ul style="list-style-type: none"> <li>· When changing direction of feed</li> </ul>	<ol style="list-style-type: none"> <li>1. Utilize circular interpolation(in case of NC machine) or temporarily stop feed(Dowelling)</li> <li>2. Reduce feed rate before and after change of directions</li> <li>3. Replace chuck or collect</li> </ol>
Fracture of cutting edge	<ul style="list-style-type: none"> <li>· Fracture of corners</li> </ul>	<ol style="list-style-type: none"> <li>1. Carry out chamfering or nose with hand lapper.</li> <li>2. Down cut → Up cut</li> </ol>
	<ul style="list-style-type: none"> <li>· Fracture at boundary of depth of cut</li> </ul>	<ol style="list-style-type: none"> <li>1. Down cut → Up cut</li> <li>2. Reduce cutting speed</li> </ol>
	<ul style="list-style-type: none"> <li>· Chipping at center part or overall</li> </ul>	<ol style="list-style-type: none"> <li>1. Carry out honing. Or enlarge.</li> <li>2. Change number of rotation(in case machine vibrates)</li> <li>3. Increase cutting speed</li> <li>4. In ease of squeaking noise during cutting, increase feed.</li> <li>5. It dry cutting use cutting fluid or blow air.</li> <li>6. Replace chuck or collet</li> <li>7. Reduce cutting speed</li> </ol>
	<ul style="list-style-type: none"> <li>· Large fracturing of cutting edge</li> </ul>	<ol style="list-style-type: none"> <li>1. Decrease feed rate</li> <li>2. If 4 flute reduce to 2 flute</li> <li>3. Carry out honing. Or enlarge</li> <li>4. Replace chuck or collet</li> <li>5. Reduce cutting speed</li> <li>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.</li> </ol>
Rapid tool wear		<ol style="list-style-type: none"> <li>1. Reduce cutting speed</li> <li>2. Up cut → Down cut</li> <li>3. Increase feed</li> <li>4. Utilize wet cutting or air</li> <li>5. If reground tool, improve surface roughness of flank.</li> </ol>
Inferior finished surface	<ul style="list-style-type: none"> <li>· Surface is good but rough</li> </ul>	<ol style="list-style-type: none"> <li>1. Decrease feed</li> <li>2. In case using 2 flute, increse to 4 flute</li> </ol>



# SUPER CUTTING END MILLS

## 16. TROUBLESHOOTING

Trouble	Occurrences of trouble	Countermeasures
Inferior finished surface	· Small chip welding	<ol style="list-style-type: none"> <li>1. Increase cutting speed</li> <li>2. Utilize wet cutting air blow(ample supply)</li> <li>3. Carry out fine honing</li> <li>4. Up cut → Down cut</li> <li>5. Increase feed or enlarge finish allowance</li> </ol>
	· With transverse streaks	<ol style="list-style-type: none"> <li>1. Carry out fine honing</li> <li>2. Use water insoluble cutting fluid</li> <li>3. Down cut → Up cut</li> </ol>
	· Signs of excessive cutting	<ol style="list-style-type: none"> <li>1. Reduce finishing depth of cut</li> <li>2. Increase cutting speed</li> <li>3. Reduce feed</li> </ol>
Poor machining accuracy	· Finish dimensions are on minus side	<ol style="list-style-type: none"> <li>1. Up cut → Down cut</li> <li>2. Reduce finishing depth of cut</li> <li>3. Replace chuck or collet</li> <li>4. Reduce projection amount</li> <li>5. Increase cutting speed</li> </ol>
	· Poor perpendicularity	<ol style="list-style-type: none"> <li>1. Reduce finishing depth of cut</li> <li>2. Replace chuck or collet</li> <li>3. Reduce projection amount</li> <li>4. Increase cutting speed</li> <li>5. 2Flute → 4 Flute</li> <li>6. Reduce feed</li> <li>7. Check wear rate → Replace tool</li> </ol>
Chattering		<ol style="list-style-type: none"> <li>1. Increase feed rate(in case over .002 inch/tooth, try reducing)</li> <li>2. Change cutting speed</li> <li>3. Replace chuck or collet</li> <li>4. Reduce projection amount</li> <li>5. Use 2 flute cutter for rough cutting and 4 flute for finishing</li> <li>6. Down cut → Up cut</li> </ol>



# HARDstick

## 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

TAP SUBSTRATE -  
67Rc .8 Coefficient of Friction

TIALN - 90Rc

WC/C - .2 Coefficient of Friction

## CONTENTS HIGH PERFORMANCE TAP

### UNIFIED THREAD TAPS

#### TAPS FINDER

#### SPIRAL FLUTED TAPS

<b>ANSI</b>	Steels & Stainless Steels up to 35RC	316
	Steels < 45Rc	317
	Titanium & Nickel < 44Rc	318
	Stainless Steels < 28Rc	319
	Steels < 38Rc	321
	Aluminium Alloys	322
	Multi Purpose	323
<b>DIN Length ANSI Shank</b>	Steels & Stainless Steels up to 35Rc	316
	Multi Purpose	324
<b>Long Shank Taps</b>	Stainless Steels < 28Rc	320
<b>Maching Canter Taps</b>	Stainless Steels < 28Rc	320

#### SPIRAL POINTED TAPS

<b>ANSI</b>	Steels & Stainless Steels up to 35RC	325
	Steels < 45Rc	326
	Titanium & Nickel < 44Rc	327
	Stainless Steels < 28Rc	328
	Steels < 38Rc	330
	Multi Purpose	331
<b>DIN Length ANSI Shank</b>	Steels & Stainless Steels up to 35Rc	325
	Multi Purpose	332
<b>Long Shank Taps</b>	Stainless Steels < 28Rc	329

#### TAPER PIPE TAPS

<b>ANSI</b>	15° Spiral Fluted Taps	Steels & Stainless Steels	333
	15° Spiral Fluted Taps	Cast Iron & Steels	334
	Straight Fluted Taps	Cast Iron & Steels	335
	Straight Fluted Taps	Cast Iron & Steels	336

#### FORMING TAPS

<b>ANSI</b>	Multi Purpose	337
	Multi Purpose	338
	Multi Purpose	339

#### STANDARD TAPS

<b>ANSI</b>	Spiral Fluted Taps	Multi Purpose	340
	Spiral Pointed Taps	Multi Purpose	341

## HIGH PERFORMANCE TAPS

### METRIC THREAD TAPS

#### HAND TAPS

<b>ANSI</b>	Taper	Multi Purpose	342
	Plug	Multi Purpose	342
	Bottoming	Multi Purpose	342

#### SPIRAL FLUTED TAPS

<b>ANSI</b>	Steels & Stainless Steels up to 35RC	343
	Stainless Steels < 28Rc	344
	Steels < 35Rc	345
	Aluminium Alloys	346
	Multi Purpose	347
<b>DIN Length ANSI Shank</b>	Steels & Stainless Steels up to 35Rc	343
	Stainless Steels < 28Rc	344
	Steels < 35Rc	345
	Aluminium Alloys	346

#### SPIRAL POINTED TAPS

<b>ANSI</b>	Steels & Stainless Steels up to 35RC	348
	Stainless Steels < 28Rc	349
	Steels < 35Rc	350
	Multi Purpose	351
<b>DIN Length ANSI Shank</b>	Steels & Stainless Steels up to 35Rc	348
	Stainless Steels < 28Rc	349
	Steels < 35Rc	350



# HIGH PERFORMANCE TAPS RECOMMENDATION TABLE

Super HSS : Premium HSS Metallurgy

P-HSS : Powdered Metallurgy

HSSE-V3 : 3% Vanadium Alloy HSS

HSS-V : Vanadium Alloy HSS

● = RECOMMENDED

○ = SUITABLE

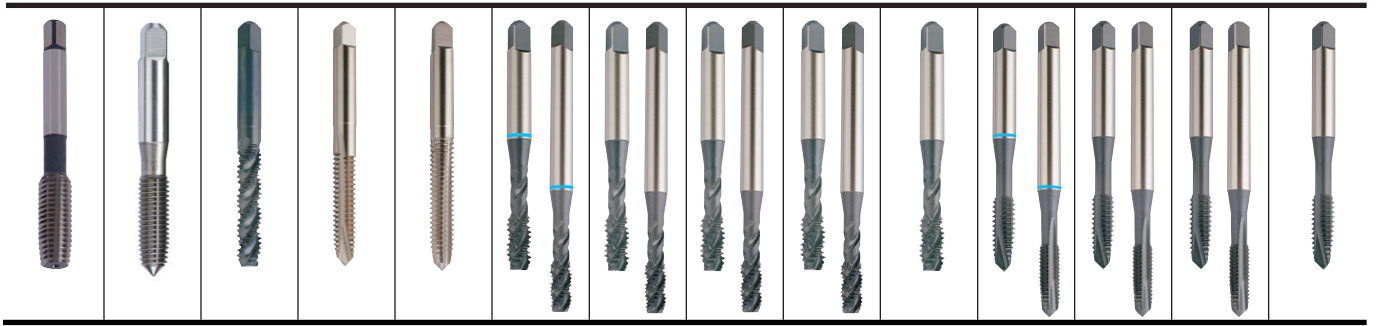
STANDARD TAPS	ANSI / DIN LENGTH ANSI SHANK																
	316	317	318	319-320	321	322	323-324	325	326	327	328-329	330	331-332	333	334-335	336	337
DESCRIPTION																	
PAGE	316	317	318	319-320	321	322	323-324	325	326	327	328-329	330	331-332	333	334-335	336	337
THREADS	UNC/UNF	UNC/UNF	UNC/UNF	UNC/UNF	UNC/UNF	UNC/UNF	UNC/UNF	UNC/UNF	UNC/UNF	UNC/UNF	UNC/UNF	UNC/UNF	UNC/UNF	NPT/F	NPT/F	NPTF	UNC/UNF
TAP MATERIALS	Super HSS	P-HSS	P-HSS	HSSE-V3 P-HSS	HSSE-V3	HSSE-V3	HSS-V	Super HSS	P-HSS	P-HSS	HSSE-V3 P-HSS	HSSE-V3	HSS-V	HSSE-V3	HSSE-V3	HSSE-V3	HSSE-V3
CHAMFER LENGTH	2-3P	2-3P	2-3P	2-3P 4-5P	2-3P	2-3P	1.5-2P 2-3P	4-5P	4-5P	4-5P	4-5P	4-5P	4-5P	2-3P	2-3P	2-3P	4-5P 1.5-2P
SURFACE TREATMENT	Steam Oxide Hardslick	Bright Finish TiN Coated Hardslick	Steam Oxide TiN Coated Hardslick	Steam Oxide TiN Coated Hardslick	Steam Oxide Hardslick	Bright Finish Hardslick	Steam Oxide Bright Finish TiN/Hardslick	Steam Oxide Hardslick	Bright Finish TiN Coated Hardslick	Steam Oxide TiN Coated Hardslick	Steam Oxide TiN Coated Hardslick	Steam Oxide Hardslick	Bright Finish TiN Coated Hardslick	Steam Oxide Bright Finish Hardslick	Bright Finish Ni-Steam Oxide TiN/Hardslick	Bright Finish TiN Coated	Bright Finish TiN Coated
SPIRAL FLUTE ANGLE	R40°	R15°	R15°	R45°/L15°	R45°	R50°	R50°/R45°	-	-	-	-	-	-	R15°	R15° / -	-	-
HOLE TYPE	Blind	Blind	Blind	Blind	Blind	Blind	Blind	Through	Through	Through	Through	Through	Through	Blind	Blind Through	Through	Blind Through
REMARK																	

Material Group	Material Sub-Group	Hardness (HRc)	Hardness (BHN)	Cutting Speed (SFM)															
				Uncoated	Coated														
Steel	Low carbon steels	<15	<180	25 - 50	50 - 80	○				●	○			○		●	○	●	
	Free machining carbon steels																		
	Medium to high carbon steels	<23	<240	25 - 50	50 - 80	●				●	●			●	●	●	●	●	
	Low alloyed steels	>24	>250																
	Steel castings & forgings	≤38	≤350	6 - 30	10 - 35	●	○			●		○		●	○	○	○	○	○
	Heat-treatable alloy steels	>38	>350																
Stainless Steel	Alloyed tool steels	≤44	≤420	6 - 12	-					●									
	Mold steels																		
	Hardened steels	≤63	-	-	-														
	Free machining stainless steels	<23	<240	12 - 35	20 - 50	●				●				●	○	○	○	○	●
	Heat-and corrosion-resistant stainless steels	>24	>250																
	Valve stainless steels	≤38	≤350	12 - 15	12 - 15	●	○			○	●	○			○	○	○	○	○
Cast Iron	Stainless steel castings	>38	>350							●									
	Precipitation hardening stainless steels	≤44	≤420																
	Grey cast iron	-	≤220	35 - 50	50 - 65											●	●		
	Nodular cast iron	-	≥250	12 - 45	25 - 55											○	○	●	
Aluminium	Meehanite iron																		
	Pure aluminium	-	-	50 - 65	-					○								●	
Nickel Alloys	Aluminium alloys																		
	Aluminium alloy castings	-	-	40 - 65	45 - 90					●	○				○	○	○	●	
	718 & 625 INCO	≤38	≤350	10 - 15	-														
	Hastelloy																		
Titanium	Monel	≤38	≤350																
	Inconel																		
Copper	718 Inconel	>38	>350	10 - 12	-														
	A286	≤44	≤420																
Brass	Magnesium	≤38	≤350	3 - 15	-														
	Pure and alloyed copper	-	-	50 - 60	65 - 100	○				○				○				●	
Bronze	Free machining brass	-	-	30 - 65	-													●	
	Alloyed brass																		
Zinc		<44	<420	12 - 20	35 - 80														
		-	-	25 - 65	50 - 80													●	
Magnesium		-	-	-	45 - 100													●	
		-	-	-	25 - 150														
Plastics	Thermoplastics	-	-	5 - 30	-														
	Thermosetting / Reinforced Plastics																		

# TAPS

- Spiral Flute and Spiral Point
- Machine TAPS and Hand Taps
- High Performance in various work materials





ANSI / DIN LENGTH ANSI SHANK

338	339	340	341	342	343	344	345	346	347	348	349	350	351
UNC/UNF	M/MF	UNC/UNF	UNC/UNF	UNC/UNF	M/MF	M/MF	M/MF	M/MF	M/MF	M/MF	M/MF	M/MF	M/MF
HSSE-V3	HSSE-V3	HSSE-V3	HSSE-V3	HSS-V	Super HSS	HSSE-V3	HSSE-V3	HSSE-V3	HSS-V	Super HSS	HSSE-V3	HSSE-V3	HSS-V
4-5P 1.5-2P	4-5P 1.5-2P	1.5-2P	4-5P	9.0/4.0/1.5P	2-3P	2-3P	2-3P	2-3P	1.5-2P	4-5P	4-5P	4-5P	4-5P
Bright Finish TiN Coated	Bright Finish TiN Coated TiCN Coated	Steam Oxide Bright Finish TiN/Hardslick	Steam Oxide Bright Finish TiN Coated	Bright Finish	Steam Oxide Hardslick	Steam Oxide TiCN Coated Hardslick	Steam Oxide TiCN Coated Hardslick	Bright Finish Hardslick	Bright Finish TiCN Coated Hardslick	Steam Oxide Hardslick	Steam Oxide TiCN Coated Hardslick	Steam Oxide TiCN Coated Hardslick	Bright Finish TiCN Coated Hardslick
-	-	R45°	-	-	R40°	R45°	R45°	R50°	R50°	-	-	-	-
Blind Through	Blind Through	Blind	Through	Blind Through	Blind	Blind	Blind	Blind	Blind	Through	Through	Through	Through
●	●	●	●	●	○	○			●	○			●
●	●	●	●	●	●	●	○		●	●	●	●	●
		○	○				●		○	●	○	○	○
●	●	○	○	●	●	●	○		●	●	●	●	●
		○	○				●		○	●	○	○	○
		○	○						○				○
●	●			○	○	○		●		○			
●	●	○	○	●			○	●	○		○	○	○
●	●			●	○	○				○			
●	●			●	○	○				○			
●	●			●	○	○				○			
●	●			●	○	○				○			

TAPS

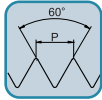
# TAPS

## SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE

for Steels & Stainless Steels up to 35HRc

Super  
HSS

UNC  
UNF



BB/BI ANSI



BF/BK DIN Length  
ANSI Shank

EDP No.				Size	Thread Per Inch		No. of Flutes	Limit
Steam Oxide	Hardstick Coated	Steam Oxide	Hardstick Coated		UNC	UNF		
BB082	BI082	BF082	BK082	2	56		2	H2
BB162	BI162	BF162	BK162	4	40		2	H2
BB202	BI202	BF202	BK202	5	40		3	H2
BB243	BI243	BF243	BK243	6	32		3	H3
BB283	BI283	BF283	BK283	8	32		3	H3
BB323	BI323	BF323	BK323	10	24		3	H3
BB343	BI343	BF343	BK343			32	3	H3
BB403	BI403	BF403	BK403	1/4	20		3	H3
BB405	BI405	BF405	BK405				3	H5
BB423	BI423	BF423	BK423			28	3	H3
BB424	BI424	BF424	BK424				3	H4
BB445	BI445	BF445	BK445	5/16	18		3	H5
BB464	BI464	BF464	BK464			24	3	H4
BB485	BI485	BF485	BK485	3/8	16		3	H5
BB504	BI504	BF504	BK504			24	3	H4
BB525	BI525	BF525	BK525	7/16	14		3	H5
BB545	BI545	BF545	BK545			20	3	H5
BB565	BI565	BF565	BK565	1/2	13		3	H5
BB585	BI585	BF585	BK585			20	3	H5
BB605	BI605	BF605	BK605	9/16	12		3	H5
BB625	BI625	BF625	BK625			18	3	H5
BB645	BI645	BF645	BK645	5/8	11		4	H5
BB665	BI665	BF665	BK665			18	4	H5
BB705	BI705	BF705	BK705	3/4	10		4	H5
BB725	BI725	BF725	BK725			16	4	H5
BB746	BI746	BF746	BK746	7/8	9		4	H6
BB766	BI766	BF766	BK766			14	4	H6
BB786	BI786	BF786	BK786	1	8		4	H6
BB806	BI806	BF806	BK806			12	4	H6
BB836	BI836	BF836	BK836	1*1/8	8		4	H6
BB876	BI876	BF876	BK876	1*1/4	8		4	H6
BB916	BI916	BF916	BK916	1*3/8	8		4	H6
BB956	BI956	BF956	BK956	1*1/2	8		4	H6

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

\* For tapping depth on DIN / ANSI Shank Taps, refer to DIN Table on page 355 & 356.

TAPS



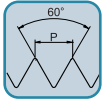
# TAPS

## SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE

**Steels up to 45HRc**

**P-HSS**

**UNC  
UNF**

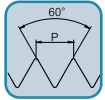


H6/H7/H8 | ANSI

Bright Finish	EDP No.		Size	Thread Per Inch		No. of Flutes	Limit
	TiCN Coated	Hardslick Coated		UNC	UNF		
H6082	H7082	H8082	2	56		3	H2
H6162	H7162	H8162	4	40		3	H2
H6202	H7202	H8202	5	40		3	H2
H6243	H7243	H8243	6	32		3	H3
H6283	H7283	H8283	8	32		3	H3
H6323	H7323	H8323	10	24		3	H3
H6343	H7343	H8343			32	3	H3
H6405	H7405	H8405	1/4	20		3	H5
H6424	H7424	H8424			28	3	H4
H6445	H7445	H8445	5/16	18		3	H5
H6464	H7464	H8464			24	3	H4
H6485	H7485	H8485	3/8	16		3	H5
H6504	H7504	H8504			24	3	H4
H6525	H7525	H8525	7/16	14		3	H5
H6545	H7545	H8545			20	3	H5
H6565	H7565	H8565	1/2	13		3	H5
H6585	H7585	H8585			20	3	H5
H6645	H7645	H8645	5/8	11		4	H5
H6665	H7665	H8665			18	4	H5
H6705	H7705	H8705	3/4	10		4	H5
H6725	H7725	H8725			16	4	H5

\* For tapping depth on ANSI Length Taps, refer to MCT1 302 on page 357.

TAPS

**TAPS****SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE****for Titanium Alloys & Nickel Base Alloys  
up to 44HRc****P-HSS****UNC  
UNF****B3/H9/B5/D6 | ANSI**

EDP No.				Size	Thread Per Inch		No. of Flutes	Limit
Steam Oxide	TiN Coated	TiCN Coated	Hardstick Coated		UNC	UNF		
B3082	H9082	B5082	D6082	2	56		3	H2
B3162	H9162	B5162	D6162	4	40		3	H2
B3202	H9202	B5202	D6202	5	40		3	H2
B3243	H9243	B5243	D6243	6	32		3	H3
B3283	H9283	B5283	D6283	8	32		3	H3
B3323	H9323	B5323	D6323	10	24		3	H3
B3343	H9343	B5343	D6343			32	3	H3
B3403	H9403	B5403	D6403	1/4	20		3	H3
B3405	H9405	B5405	D6405				3	H5
B3423	H9423	B5423	D6423			28	3	H3
B3424	H9424	B5424	D6424				3	H4
B3443	H9443	B5443	D6443	5/16	18		3	H3
B3445	H9445	B5445	D6445				3	H5
B3463	H9463	B5463	D6463			24	3	H3
B3483	H9483	B5483	D6483	3/8	16		3	H3
B3485	H9485	B5485	D6485				3	H5
B3503	H9503	B5503	D6503			24	3	H3
B3504	H9504	B5504	D6504				3	H4
B3523	H9523	B5523	D6523	7/16	14		3	H3
B3525	H9525	B5525	D6525				3	H5
B3543	H9543	B5543	D6543			20	3	H3
B3545	H9545	B5545	D6545				3	H5
B3563	H9563	B5563	D6563	1/2	13		3	H3
B3565	H9565	B5565	D6565				3	H5
B3583	H9583	B5583	D6583			20	3	H3
B3585	H9585	B5585	D6585				3	H5
B3603	H9603	B5603	D6603	9/16	12		3	H3
B3605	H9605	B5605	D6605				3	H5
B3623	H9623	B5623	D6623			18	3	H3
B3625	H9625	B5625	D6625				3	H5
B3643	H9643	B5643	D6643	5/8	11		4	H3
B3645	H9645	B5645	D6645				4	H5
B3663	H9663	B5663	D6663			18	4	H3
B3665	H9665	B5665	D6665				4	H5
B3703	H9703	B5703	D6703	3/4	10		4	H3
B3705	H9705	B5705	D6705				4	H5
B3723	H9723	B5723	D6723			16	4	H3
B3725	H9725	B5725	D6725				4	H5

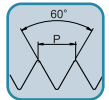
\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

TAPS

for Stainless Steels up to 28HRc

HSSE-V3

UNC  
UNF



B0/B2/D2

ANSI

EDP No.			Size	Thread Per Inch		No. of Flutes	Limit
Steam Oxide	TiN Coated	Hardslick Coated		UNC	UNF		
B0082	B2082	D2082	2	56		2	H2
B0162	B2162	D2162	4	40		2	H2
B0202	B2202	D2202	5	40		3	H2
B0203	B2203	D2203				3	H3
B0243	B2243	D2243	6	32		3	H3
B0283	B2283	D2283	8	32		3	H3
B0323	B2323	D2323	10	24		3	H3
B0343	B2343	D2343			32	3	H3
B0403	B2403	D2403	1/4	20		3	H3
B0405	B2405	D2405				3	H5
B0423	B2423	D2423			28	3	H3
B0443	B2443	D2443	5/16	18		3	H3
B0445	B2445	D2445				3	H5
B0463	B2463	D2463			24	3	H3
B0483	B2483	D2483	3/8	16		3	H3
B0485	B2485	D2485				3	H5
B0503	B2503	D2503			24	3	H3
B0523	B2523	D2523	7/16	14		3	H3
B0525	B2525	D2525				3	H5
B0543	B2543	D2543			20	3	H3
B0545	B2545	D2545				3	H5
B0563	B2563	D2563	1/2	13		3	H3
B0565	B2565	D2565				3	H5
B0583	B2583	D2583			20	3	H3
B0603	B2603	D2603	9/16	12		3	H3
B0623	B2623	D2623			18	3	H3
B0625	B2625	D2625				3	H5
B0643	B2643	D2643	5/8	11		4	H3
B0645	B2645	D2645				4	H5
B0663	B2663	D2663			18	4	H3
B0665	B2665	D2665				4	H5
B0703	B2703	D2703	3/4	10		4	H3
B0705	B2705	D2705				4	H5
B0723	B2723	D2723			16	4	H3
B0725	B2725	D2725				4	H5
B0744	B2744	D2744	7/8	9		4	H4
B0746	B2746	D2746				4	H6
B0764	B2764	D2764			14	4	H4
B0766	B2766	D2766				4	H6
B0784	B2784	D2784	1	8		4	H4
B0786	B2786	D2786				4	H6
B0804	B2804	D2804			12	4	H4
B0806	B2806	D2806				4	H6
B0824	B2824	D2824	1 × 1/8	7		4	H4
B0864	B2864	D2864	1 × 1/4	7		4	H4
B0904	B2904	D2904	1 × 3/8	6		4	H4
B0944	B2944	D2944	1 × 1/2	6		4	H4

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.



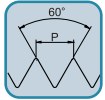
# TAPS

## SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE

for Stainless Steels up to 28HRc

P-HSS

UNC  
UNF



G7/G8/G9/H0 ANSI Long Shank

Maximum Tapping Depth is 50% Deeper than Standard ANSI Taps.

EDP No.				Size	Thread Per Inch		No. of Flutes	Limit
TiN Coated 4" OAL	TiN Coated 6" OAL	Hardslick Coated 4" OAL	Hardslick Coated 6" OAL		UNC	UNF		
G7162	—	G9162	—	4	40		3	H2
G7243	G8243	G9243	H0243	6	32		3	H3
G7283	G8283	G9283	H0283	8	32		3	H3
G7323	G8323	G9323	H0323	10	24		3	H3
G7343	G8343	G9343	H0343			32	3	H3
G7403	G8403	G9403	H0403	1/4	20		3	H3
—	G8423	—	H0423			28	3	H3
—	G8443	—	H0443	5/16	18		3	H3
—	G8463	—	H0463			24	3	H3
—	G8483	—	H0483	3/8	16		3	H3
—	G8503	—	H0503			24	3	H3
—	G8523	—	H0523	7/16	14		3	H3
—	G8543	—	H0543			20	3	H3
—	G8563	—	H0563	1/2	13		3	H3
—	G8583	—	H0583			20	3	H3
—	G8643	—	H0643	5/8	11		4	H3



H1/H2/H3/H4 ANSI Long Shank

### 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.

EDP No.				Size	Thread Per Inch		No. of Flutes	Limit
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		2	H3
—	H2423	—	H4423			28	3	H3
—	H2443	—	H4443	5/16	18		3	H3
—	H2483	—	H4483	3/8	16		3	H3
—	H2523	—	H4523	7/16	14		3	H3
—	H2563	—	H4563	1/2	13		3	H3
—	H2643	—	H4643	5/8	11		3	H3

TAPS

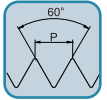
# TAPS

## SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE

**Steels up to 38HRC**

HSSE-V3

UNC  
UNF



D4/E0

ANSI

EDP No.		Size	Thread Per Inch		No. of Flutes	Limit
Bright Finish	Hardstick Coated		UNC	UNF		
D4082	E0082	2	56		2	H2
D4162	E0162	4	40		2	H2
D4202	E0202	5	40		3	H2
D4243	E0243	6	32		3	H3
D4283	E0283	8	32		3	H3
D4323	E0323	10	24		3	H3
D4343	E0343			32	3	H3
D4403	E0403	1/4	20		3	H3
D4405	E0405				3	H5
D4423	E0423			28	3	H3
D4425	E0425				3	H5
D4443	E0443	5/16	18		3	H3
D4445	E0445				3	H5
D4463	E0463			24	3	H3
D4465	E0465				3	H5
D4483	E0483	3/8	16		3	H3
D4485	E0485				3	H5
D4503	E0503			24	3	H3
D4505	E0505				3	H5
D4523	E0523	7/16	14		3	H3
D4525	E0525				3	H5
D4543	E0543			20	3	H3
D4545	E0545				3	H5
D4563	E0563	1/2	13		3	H3
D4565	E0565				3	H5
D4583	E0583			20	3	H3
D4585	E0585				3	H5
D4605	E0605	9/16	12		3	H5
D4625	E0625			18	3	H5
D4643	E0643	5/8	11		4	H3
D4645	E0645				4	H5
D4663	E0663			18	4	H3
D4665	E0665				4	H5
D4703	E0703	3/4	10		4	H3
D4705	E0705				4	H5
D4723	E0723			16	4	H3
D4725	E0725				4	H5

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

TAPS

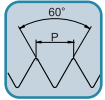
# TAPS

## SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE

*for Aluminum Alloys or Die Cast Aluminium*

HSSE-V3

UNC  
UNF



C0/D8

ANSI

EDP No.		Size	Thread Per Inch		No. of Flutes	Limit
Bright Finish	Hardslick Coated		UNC	UNF		
C0162	D8162	4	40		2	H2
C0242	D8242	6	32		2	H2
C0243	D8243				2	H3
C0283	D8283	8	32		2	H3
C0323	D8323	10	24		2	H3
C0343	D8343			32	2	H3
C0403	D8403	1/4	20		2	H3
C0405	D8405				2	H5
C0423	D8423			28	2	H3
C0443	D8443	5/16	18		2	H3
C0445	D8445				2	H5
C0463	D8463			24	2	H3
C0465	D8465				2	H5
C0483	D8483	3/8	16		2	H3
C0485	D8485				2	H5
C0503	D8503			24	2	H3
C0505	D8505				2	H5

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

# TAPS

## SPIRAL FLUTED TAPS BOTTOMING STYLE

**for Multi Purpose**



F4/F8/F6 / ANSI

EDP No.			Size	Thread Per Inch		No. of Flutes	Limit
Steam Oxide	TiN Coated	Hardslick Coated		UNC	UNF		
F4082	F8082	F6082	2	56		2	H2
F4162	F8162	F6162	4	40		2	H2
F4202	F8202	F6202	5	40		2	H2
F4243	F8243	F6243	6	32		2	H3
F4283	F8283	F6283	8	32		3	H3
F4323	F8323	F6323	10	24		3	H3
F4343	F8343	F6343			32	3	H3
F4403	F8403	F6403	1/4	20		3	H3
F4405	F8405	F6405				3	H5
F4423	F8423	F6423			28	3	H3
F4443	F8443	F6443	5/16	18		3	H3
F4445	F8445	F6445				3	H5
F4463	F8463	F6463			24	3	H3
F4483	F8483	F6483	3/8	16		3	H3
F4485	F8485	F6485				3	H5
F4503	F8503	F6503			24	3	H3
F4523	F8523	F6523	7/16	14		3	H3
F4525	F8525	F6525				3	H5
F4543	F8543	F6543			20	3	H3
F4545	F8545	F6545				3	H5
F4563	F8563	F6563	1/2	13		3	H3
F4565	F8565	F6565				3	H5
F4583	F8583	F6583			20	3	H3
F4585	F8585	F6585				3	H5
F4603	F8603	F6603	9/16	12		3	H3
F4605	F8605	F6605				3	H5
F4623	F8623	F6623			18	3	H3
F4625	F8625	F6625				3	H5
F4643	F8643	F6643	5/8	11		4	H3
F4645	F8645	F6645				4	H5
F4663	F8663	F6663			18	4	H3
F4665	F8665	F6665				4	H5
F4703	F8703	F6703	3/4	10		4	H3
F4705	F8705	F6705				4	H5
F4723	F8723	F6723			16	4	H3
F4725	F8725	F6725				4	H5
F4744	F8744	F6744	7/8	9		4	H4
F4746	F8746	F6746				4	H6
F4764	F8764	F6764			14	4	H4
F4766	F8766	F6766				4	H6
F4784	F8784	F6784	1	8		4	H4
F4786	F8786	F6786				4	H6
F4806	F8806	F6806			12	4	H6

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

TAPS

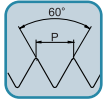
# TAPS

## SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE

**for Multi Purpose**

HSS-V

UNC  
UNF



G0/G1/G2

DIN Length  
ANSI Shank

EDP No.			Size	Thread Per Inch		No. of Flutes	Limit
Bright Finish	TiN Coated	Hardslick Coated		UNC	UNF		
G0082	G1082	G2082	2	56		2	H2
G0162	G1162	G2162	4	40		2	H2
G0202	G1202	G2202	5	40		3	H2
G0243	G1243	G2243	6	32		3	H3
G0283	G1283	G2283	8	32		3	H3
G0323	G1323	G2323	10	24		3	H3
G0343	G1343	G2343			32	3	H3
G0403	G1403	G2403	1/4	20		3	H3
G0405	G1405	G2405				3	H5
G0423	G1423	G2423			28	3	H3
G0443	G1443	G2443	5/16	18		3	H3
G0445	G1445	G2445				3	H5
G0463	G1463	G2463			24	3	H3
G0483	G1483	G2483	3/8	16		3	H3
G0485	G1485	G2485				3	H5
G0503	G1503	G2503			24	3	H3
G0523	G1523	G2523	7/16	14		3	H3
G0525	G1525	G2525				3	H5
G0543	G1543	G2543			20	3	H3
G0545	G1545	G2545				3	H5
G0563	G1563	G2563	1/2	13		3	H3
G0565	G1565	G2565				3	H5
G0583	G1583	G2583			20	3	H3
G0585	G1585	G2585				3	H5
G0603	G1603	G2603	9/16	12		3	H3
G0605	G1605	G2605				3	H5
G0623	G1623	G2623			18	3	H3
G0625	G1625	G2625				3	H5
G0643	G1643	G2643	5/8	11		4	H3
G0645	G1645	G2645				4	H5
G0663	G1663	G2663			18	4	H3
G0665	G1665	G2665				4	H5
G0703	G1703	G2703	3/4	10		4	H3
G0705	G1705	G2705				4	H5
G0723	G1723	G2723			16	4	H3
G0725	G1725	G2725				4	H5
G0746	G1746	G2746	7/8	9		4	H6
G0764	G1764	G2764			14	4	H4
G0766	G1766	G2766				4	H6
G0786	G1786	G2786	1	8		4	H6
G0804	G1804	G2804			12	4	H4
G0806	G1806	G2806				4	H6

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

TAPS

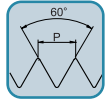
# TAPS

## SPIRAL POINTED TAPS PLUG STYLE

**for Steels & Stainless Steels up to 35HRc**

Super  
HSS

UNC  
UNF



M9/O1 | ANSI



N4/O5 | DIN Length  
ANSI Shank

EDP No.				Size	Thread Per Inch		No. of Flutes	Limit
Steam Oxide	Hardslick Coated	Steam Oxide	Hardslick Coated		UNC	UNF		
M9082	O1082	N4082	O5082	2	56		2	H2
M9162	O1162	N4162	O5162	4	40		2	H2
M9202	O1202	N4202	O5202	5	40		3	H2
M9243	O1243	N4243	O5243	6	32		3	H3
M9283	O1283	N4283	O5283	8	32		3	H3
M9323	O1323	N4323	O5323	10	24		3	H3
M9343	O1343	N4343	O5343			32	3	H3
M9403	O1403	N4403	O5403	1/4	20		3	H3
M9405	O1405	N4405	O5405				3	H5
M9423	O1423	N4423	O5423			28	3	H3
M9445	O1445	N4445	O5445	5/16	18		3	H5
M9464	O1464	N4464	O5464			24	3	H4
M9485	O1485	N4485	O5485	3/8	16		3	H5
M9504	O1504	N4504	O5504			24	3	H4
M9525	O1525	N4525	O5525	7/16	14		3	H5
M9545	O1545	N4545	O5545			20	3	H5
M9565	O1565	N4565	O5565	1/2	13		3	H5
M9585	O1585	N4585	O5585			20	3	H5
M9605	O1605	N4605	O5605	9/16	12		3	H5
M9625	O1625	N4625	O5625			18	3	H5
M9645	O1645	N4645	O5645	5/8	11		3	H5
M9665	O1665	N4665	O5665			18	3	H5
M9705	O1705	N4705	O5705	3/4	10		3	H5
M9725	O1725	N4725	O5725			16	3	H5
M9746	O1746	N4746	O5746	7/8	9		3	H6
M9766	O1766	N4766	O5766			14	3	H6
M9786	O1786	N4786	O5786	1	8		3	H6
M9806	O1806	N4806	O5806			12	3	H6
M9836	O1836	N4836	O5836	1*1/8	8		4	H6
M9876	O1876	N4876	O5876	1*1/4	8		4	H6
M9916	O1916	N4916	O5916	1*3/8	8		4	H6
M9956	O1956	N4956	O5956	1*1/2	8		4	H6

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

\* For tapping depth on DIN / ANSI Shank Taps, refer to DIN Table on page 355 & 356.

TAPS

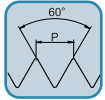
# TAPS

## SPIRAL POINTED TAPS PLUG STYLE

Steels up to 45HRc

P-HSS

UNC  
UNF



M5/M6/M7 | ANSI

Bright Finish	EDP No.		Size	Thread Per Inch		No. of Flutes	Limit
	TiCN Coated	Hardslick Coated		UNC	UNF		
M5082	M6082	M7082	2	56		2	H2
M5162	M6162	M7162	4	40		2	H2
M5202	M6202	M7202	5	40		3	H2
M5243	M6243	M7243	6	32		3	H3
M5283	M6283	M7283	8	32		3	H3
M5323	M6323	M7323	10	24		3	H3
M5343	M6343	M7343			32	3	H3
M5405	M6405	M7405	1/4	20		3	H5
M5424	M6424	M7424			28	3	H4
M5445	M6445	M7445	5/16	18		3	H5
M5464	M6464	M7464			24	3	H4
M5485	M6485	M7485	3/8	16		3	H5
M5504	M6504	M7504			24	3	H4
M5525	M6525	M7525	7/16	14		3	H5
M5545	M6545	M7545			20	3	H5
M5565	M6565	M7565	1/2	13		3	H5
M5585	M6585	M7585			20	3	H5
M5605	M6605	M7605	9/16	12		3	H5
M5625	M6625	M7625			18	3	H5
M5645	M6645	M7645	5/8	11		3	H5
M5665	M6665	M7665				3	H5
M5705	M6705	M7705	3/4	10		3	H5
M5725	M6725	M7725			16	3	H5

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.



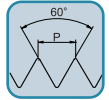
# TAPS

## SPIRAL POINTED TAPS PLUG STYLE

**for Titanium Alloys & Nickel Base Alloys  
up to 44HRc**

**P-HSS**

**UNC  
UNF**



I3/M8/I5/J6

ANSI

EDP No.				Size	Thread Per Inch		No. of Flutes	Limit
Steam Oxide	TiN Coated	TiCN Coated	Hardslick Coated		UNC	UNF		
I3082	M8082	I5082	J6082	2	56		2	H2
I3162	M8162	I5162	J6162	4	40		2	H2
I3202	M8202	I5202	J6202	5	40		3	H2
I3243	M8243	I5243	J6243	6	32		3	H3
I3283	M8283	I5283	J6283	8	32		3	H3
I3323	M8323	I5323	J6323	10	24		3	H3
I3343	M8343	I5343	J6343			32	3	H3
I3403	M8403	I5403	J6403	1/4	20		3	H3
I3405	M8405	I5405	J6405				3	H5
I3423	M8423	I5423	J6423			28	3	H3
I3424	M8424	I5424	J6424				3	H4
I3443	M8443	I5443	J6443	5/16	18		3	H3
I3445	M8445	I5445	J6445				3	H5
I3463	M8463	I5463	J6463			24	3	H3
I3483	M8483	I5483	J6483	3/8	16		3	H3
I3485	M8485	I5485	J6485				3	H5
I3503	M8503	I5503	J6503			24	3	H3
I3504	M8504	I5504	J6504				3	H4
I3523	M8523	I5523	J6523	7/16	14		3	H3
I3525	M8525	I5525	J6525				3	H5
I3543	M8543	I5543	J6543			20	3	H3
I3545	M8545	I5545	J6545				3	H5
I3563	M8563	I5563	J6563	1/2	13		3	H3
I3565	M8565	I5565	J6565				3	H5
I3583	M8583	I5583	J6583			20	3	H3
I3585	M8585	I5585	J6585				3	H5
I3603	M8603	I5603	J6603	9/16	12		3	H3
I3605	M8605	I5605	J6605				3	H5
I3623	M8623	I5623	J6623			18	3	H3
I3625	M8625	I5625	J6625				3	H5
I3643	M8643	I5643	J6643	5/8	11		3	H3
I3645	M8645	I5645	J6645				3	H5
I3663	M8663	I5663	J6663			18	3	H3
I3665	M8665	I5665	J6665				3	H5
I3703	M8703	I5703	J6703	3/4	10		3	H3
I3705	M8705	I5705	J6705				3	H5
I3723	M8723	I5723	J6723			16	3	H3
I3725	M8725	I5725	J6725				3	H5

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

TAPS

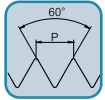
# TAPS

## SPIRAL POINTED TAPS PLUG STYLE

for Stainless Steels up to 28HRc

HSSE-V3

UNC  
UNF



I0/I2/J2

ANSI

EDP No.			Size	Thread Per Inch		No. of Flutes	Limit
Steam Oxide	TiN Coated	Hardslick Coated		UNC	UNF		
I0082	I2082	J2082	2	56		2	H2
I0162	I2162	J2162	4	40		2	H2
I0202	I2202	J2202	5	40		3	H2
I0203	I2203	J2203				3	H3
I0243	I2243	J2243	6	32		3	H3
I0283	I2283	J2283	8	32		3	H3
I0323	I2323	J2323	10	24		3	H3
I0343	I2343	J2343			32	3	H3
I0403	I2403	J2403	1/4	20		3	H3
I0405	I2405	J2405				3	H5
I0423	I2423	J2423			28	3	H3
I0443	I2443	J2443	5/16	18		3	H3
I0445	I2445	J2445				3	H5
I0463	I2463	J2463			24	3	H3
I0483	I2483	J2483	3/8	16		3	H3
I0485	I2485	J2485				3	H5
I0503	I2503	J2503			24	3	H3
I0523	I2523	J2523	7/16	14		3	H3
I0525	I2525	J2525				3	H5
I0543	I2543	J2543			20	3	H3
I0545	I2545	J2545				3	H5
I0563	I2563	J2563	1/2	13		3	H3
I0565	I2565	J2565				3	H5
I0583	I2583	J2583			20	3	H3
I0603	I2603	J2603	9/16	12		3	H3
I0623	I2623	J2623			18	3	H3
I0643	I2643	J2643	5/8	11		3	H3
I0645	I2645	J2645				3	H5
I0665	I2665	J2665			18	3	H5
I0703	I2703	J2703	3/4	10		3	H3
I0705	I2705	J2705				3	H5
I0744	I2744	J2744	7/8	9		3	H4
I0746	I2746	J2746				3	H6
I0766	I2766	J2766			14	3	H6
I0784	I2784	J2784	1	8		3	H4
I0786	I2786	J2786				3	H6
I0806	I2806	J2806			12	3	H6

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

TAPS

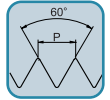
# TAPS

## SPIRAL POINTED TAPS PLUG STYLE

for Stainless Steels up to 28HRc

P-HSS

UNC  
UNF



M0/M1/M2/M3 ANSI Long Shank

EDP No.				Size	Thread Per Inch		No. of Flutes	Limit	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		2	H2	0.844
M0243	M1243	M2243	M3243	6	32		2	H3	1.031
M0283	M1283	M2283	M3283	8	32		3	H3	1.125
M0323	M1323	M2323	M3323	10	24		3	H3	1.312
M0343	M1343	M2343	M3343			32	3	H3	1.312
M0403	M1403	M2403	M3403	1/4	20		3	H3	1.500
—	M1423	—	M3423			28	3	H3	1.500
—	M1443	—	M3443	5/16	18		3	H3	1.688
—	M1463	—	M3463			24	3	H3	1.688
—	M1483	—	M3483	3/8	16		3	H3	1.875
—	M1503	—	M3503			24	3	H3	
—	M1523	—	M3523	7/16	14		3	H3	
—	M1543	—	M3543			20	3	H3	
—	M1563	—	M3563	1/2	13		3	H3	
—	M1583	—	M3583			20	3	H3	
—	M1603	—	M3603	9/16	12		3	H3	
—	M1623	—	M3623			18	3	H3	
—	M1643	—	M3643	5/8	11		3	H3	

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

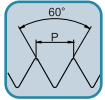
# TAPS

## SPIRAL POINTED TAPS PLUG STYLE

**Steels up to 38HRc**

HSSE-V3

UNC  
UNF



J4/J8

ANSI

EDP No.		Size	Thread Per Inch		No. of Flutes	Limit
Bright Finish	Hardstick Coated		UNC	UNF		
J4082	J8082	2	56		2	H2
J4162	J8162	4	40		2	H2
J4202	J8202	5	40		3	H2
J4243	J8243	6	32		3	H3
J4283	J8283	8	32		3	H3
J4323	J8323	10	24		3	H3
J4343	J8343			32	3	H3
J4403	J8403	1/4	20		3	H3
J4405	J8405				3	H5
J4423	J8423			28	3	H3
J4425	J8425				3	H5
J4443	J8443	5/16	18		3	H3
J4445	J8445				3	H5
J4463	J8463			24	3	H3
J4465	J8465				3	H5
J4483	J8483	3/8	16		3	H3
J4485	J8485				3	H5
J4503	J8503			24	3	H3
J4505	J8505				3	H5
J4523	J8523	7/16	14		3	H3
J4525	J8525				3	H5
J4543	J8543			20	3	H3
J4545	J8545				3	H5
J4563	J8563	1/2	13		3	H3
J4565	J8565				3	H5
J4583	J8583			20	3	H3
J4585	J8585				3	H5
J4605	J8605	9/16	12		3	H5
J4625	J8625			18	3	H5
J4643	J8643	5/8	11		3	H3
J4645	J8645				3	H5
J4663	J8663			18	3	H3
J4665	J8665				3	H5
J4703	J8703	3/4	10		3	H3
J4705	J8705				3	H5
J4723	J8723			16	3	H3
J4725	J8725				3	H5

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

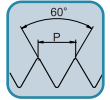
# TAPS

## SPIRAL POINTED TAPS PLUG STYLE

*for Multi Purpose*

HSS-V

UNC  
UNF



K9/L0/L1

ANSI

EDP No.			Size	Thread Per Inch		No. of Flutes	Limit
Bright Finish	TiN Coated	Hardslick Coated		UNC	UNF		
K9082	L0082	L1082	2	56		2	H2
K9162	L0162	L1162	4	40		2	H2
K9202	L0202	L1202	5	40		2	H2
K9243	L0243	L1243	6	32		2	H3
K9283	L0283	L1283	8	32		2	H3
K9323	L0323	L1323	10	24		2	H3
K9343	L0343	L1343			32	2	H3
K9403	L0403	L1403	1/4	20		2	H3
K9405	L0405	L1405				2	H5
K9423	L0423	L1423			28	3	H3
K9443	L0443	L1443	5/16	18		2	H3
K9445	L0445	L1445				3	H5
K9463	L0463	L1463			24	3	H3
K9483	L0483	L1483	3/8	16		3	H3
K9485	L0485	L1485				3	H5
K9503	L0503	L1503			24	3	H3
K9523	L0523	L1523	7/16	14		3	H3
K9525	L0525	L1525				3	H5
K9543	L0543	L1543			20	3	H3
K9545	L0545	L1545				3	H5
K9563	L0563	L1563	1/2	13		3	H3
K9565	L0565	L1565				3	H5
K9583	L0583	L1583			20	3	H3
K9585	L0585	L1585				3	H5
K9603	L0603	L1603	9/16	12		3	H3
K9623	L0623	L1623			18	3	H3
K9625	L0625	L1625				3	H5
K9643	L0643	L1643	5/8	11		3	H3
K9645	L0645	L1645				3	H5
K9663	L0663	L1663			18	3	H3
K9665	L0665	L1665				3	H5
K9703	L0703	L1703	3/4	10		3	H3
K9705	L0705	L1705				3	H5
K9723	L0723	L1723			16	3	H3
K9725	L0725	L1725				3	H5
K9746	L0746	L1746	7/8	9		3	H6
K9764	L0764	L1764			14	3	H4
K9766	L0766	L1766				3	H6
K9786	L0786	L1786	1	8		3	H6
K9806	L0806	L1806			12	3	H6

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

TAPS

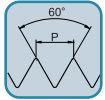
# TAPS

## SPIRAL POINTED TAPS PLUG STYLE

**for Multi Purpose**

HSS-V

UNC  
UNF



L3/L4/L5

DIN Length  
ANSI Shank

EDP No.			Size	Thread Per Inch		No. of Flutes	Limit
Bright Finish	TiN Coated	Hardslick Coated		UNC	UNF		
L3082	L4082	L5082	2	56		2	H2
L3162	L4162	L5162	4	40		2	H2
L3202	L4202	L5202	5	40		3	H2
L3243	L4243	L5243	6	32		3	H3
L3283	L4283	L5283	8	32		3	H3
L3323	L4323	L5323	10	24		3	H3
L3343	L4343	L5343			32	3	H3
L3403	L4403	L5403	1/4	20		3	H3
L3405	L4405	L5405				3	H5
L3423	L4423	L5423			28	3	H3
L3443	L4443	L5443	5/16	18		3	H3
L3445	L4445	L5445				3	H5
L3463	L4463	L5463			24	3	H3
L3483	L4483	L5483	3/8	16		3	H3
L3485	L4485	L5485				3	H5
L3503	L4503	L5503			24	3	H3
L3523	L4523	L5523	7/16	14		3	H3
L3525	L4525	L5525				3	H5
L3543	L4543	L5543			20	3	H3
L3545	L4545	L5545				3	H5
L3563	L4563	L5563	1/2	13		3	H3
L3565	L4565	L5565				3	H5
L3583	L4583	L5583			20	3	H3
L3585	L4585	L5585				3	H5
L3605	L4605	L5605	9/16	12		3	H5
L3625	L4625	L5625			18	3	H5
L3643	L4643	L5643	5/8	11		3	H3
L3645	L4645	L5645				3	H5
L3703	L4703	L5703	3/4	10		3	H3
L3705	L4705	L5705				3	H5
L3746	L4746	L5746	7/8	9		3	H6
L3766	L4766	L5766			14	3	H6
L3786	L4786	L5786	1	8		3	H6
L3806	L4806	L5806			12	3	H6

\* For tapping depth on DIN / ANSI shank Taps, refer to DIN Table on page 355 & 356.

TAPS

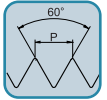
# TAPS

## TAPER PIPE TAPS : SPIRAL FLUTED

**for Steels & Stainless Steels**

HSSE-V3

NPT/F



Q0/Q1/Q6 | ANSI

EDP No.			Size	Thread Per Inch	No. of Flutes
Steam Oxide NPTF	Bright Finish NPTF	Hardslick Coated NPTF			
Q0020	Q1020	Q6020	1/16	27	4
Q0200	Q1200	Q6200	1/8(Lg)	27	4
Q0210	Q1210	Q6210	1/8(Sm)	27	4
Q0400	Q1400	Q6400	1/4	18	4
Q0480	Q1480	Q6480	3/8	18	4
Q0560	Q1560	Q6560	1/2	14	4
Q0700	Q1700	Q6700	3/4	14	4
Q0780	Q1780	Q6780	1	11*1/2	4
Q0860	Q1860	Q6860	1*1/4	11*1/2	5
Q0960	Q1960	Q6960	1*1/2	11*1/2	7
Q0D20	Q1D20	Q6D20	2	11*1/2	7

※ These Taps meet both NPT and NPTF Standards.



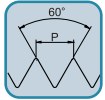
# TAPS

## TAPER PIPE TAPS : SPIRAL FLUTED

**for Cast Irons & Steels**

HSSE-V3

NPT/F



Q9/R0/R1 ANSI

Bright Finish	EDP No.		Size	Thread Per Inch	No. of Flutes
	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.

TAPS

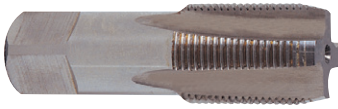
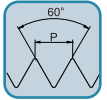
# TAPS

## TAPER PIPE TAPS : STRAIGHT FLUTED

**for Cast Irons & Steels**

HSSE-V3

NPT/F



R7/R8/R9/S0 | ANSI

Bright Finish	EDP No.			Size	Thread Per Inch	No. of Flutes
	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.

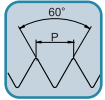
# TAPS

## TAPER PIPE TAPS : INTERRUPTED NPT/F

**for Cast Irons & Steels**

HSSE-V3

NPTF



S10/S27 ANSI

EDP No.		Size	Thread Per Inch	No. of Flutes
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 NPTF Standards.

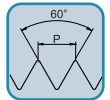
# TAPS

## FORMING TAPS PLUG & BOTTOMING STYLE

*for Multi Purpose*

HSSE-V3

UNC  
UNF



Z0/Z1/Z2/Z3 ANSI

EDP No.				Size	Thread Per Inch		No. of Flutes	Limit
Bright Finish Plug	TiN Coated Plug	Bright Finish Bottoming	TiN Coated Bottoming		UNC	UNF		
Z0163	Z1163	Z2163	Z3163	4	40		4	H3
Z0165	Z1165	Z2165	Z3165				4	H5
Z0185	Z1185	Z2185	Z3185			48	4	H5
Z0203	Z1203	Z2203	Z3203	5	40		4	H3
Z0205	Z1205	Z2205	Z3205				4	H5
Z0225	Z1225	Z2225	Z3225			44	4	H5
Z0243	Z1243	Z2243	Z3243	6	32		4	H3
Z0245	Z1245	Z2245	Z3245				4	H5
Z0265	Z1265	Z2265	Z3265			40	4	H5
Z0283	Z1283	Z2283	Z3283	8	32		4	H3
Z0285	Z1285	Z2285	Z3285				4	H5
Z0305	Z1305	Z2305	Z3305			36	4	H5
Z0324	Z1324	Z2324	Z3324	10	24		4	H4
Z0326	Z1326	Z2326	Z3326				4	H6
Z0344	Z1344	Z2344	Z3344			32	4	H4
Z0346	Z1346	Z2346	Z3346				4	H6
Z0404	Z1404	Z2404	Z3404	1/4	20		4	H4
Z0406	Z1406	Z2406	Z3406				4	H6
Z0424	Z1424	Z2424	Z3424			28	4	H4
Z0426	Z1426	Z2426	Z3426				4	H6
Z0445	Z1445	Z2445	Z3445	5/16	18		4	H5
Z0447	Z1447	Z2447	Z3447				4	H7
Z0465	Z1465	Z2465	Z3465			24	4	H5
Z0467	Z1467	Z2467	Z3467				4	H7
Z0485	Z1485	Z2485	Z3485	3/8	16		4	H5
Z0487	Z1487	Z2487	Z3487				4	H7
Z0505	Z1505	Z2505	Z3505			24	4	H5
Z0507	Z1507	Z2507	Z3507				4	H7
Z0528	Z1528	Z2528	Z3528	7/16	14		4	H8
Z0548	Z1548	Z2548	Z3548			20	4	H8
Z0568	Z1568	Z2568	Z3568	1/2	13		4	H8
Z0588	Z1588	Z2588	Z3588			20	4	H8

\* For tapping depth on ANSI Length Taps, refer to MCT1 302 on page 357.

TAPS

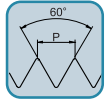
# TAPS

## FORMING TAPS WITH OIL GROOVE PLUG & BOTTOMING STYLE

*for Multi Purpose*

HSSE-V3

UNC  
UNF



Z4/Z5/Z6/Z7 ANSI

EDP No.				Size	Thread Per Inch		No. of Flutes	Limit
Bright Finish Plug	TiN Coated Plug	Bright Finish Bottoming	TiN Coated Bottoming		UNC	UNF		
Z4163	Z5163	Z6163	Z7163	4	40		4	H3
Z4165	Z5165	Z6165	Z7165				4	H5
Z4185	Z5185	Z6185	Z7185			48	4	H5
Z4203	Z5203	Z6203	Z7203	5	40		4	H3
Z4205	Z5205	Z6205	Z7205				4	H5
Z4225	Z5225	Z6225	Z7225			44	4	H5
Z4243	Z5243	Z6243	Z7243	6	32		4	H3
Z4245	Z5245	Z6245	Z7245				4	H5
Z4265	Z5265	Z6265	Z7265			40	4	H5
Z4283	Z5283	Z6283	Z7283	8	32		4	H3
Z4285	Z5285	Z6285	Z7285				4	H5
Z4305	Z5305	Z6305	Z7305			36	4	H5
Z4324	Z5324	Z6324	Z7324	10	24		4	H4
Z4326	Z5326	Z6326	Z7326				4	H6
Z4344	Z5344	Z6344	Z7344			32	4	H4
Z4346	Z5346	Z6346	Z7346				4	H6
Z4404	Z5404	Z6404	Z7404	1/4	20		4	H4
Z4406	Z5406	Z6406	Z7406				4	H6
Z4424	Z5424	Z6424	Z7424			28	4	H4
Z4426	Z5426	Z6426	Z7426				4	H6
Z4445	Z5445	Z6445	Z7445	5/16	18		4	H5
Z4447	Z5447	Z6447	Z7447				4	H7
Z4465	Z5465	Z6465	Z7465			24	4	H5
Z4467	Z5467	Z6467	Z7467				4	H7
Z4485	Z5485	Z6485	Z7485	3/8	16		4	H5
Z4487	Z5487	Z6487	Z7487				4	H7
Z4505	Z5505	Z6505	Z7505			24	4	H5
Z4507	Z5507	Z6507	Z7507				4	H7
Z4528	Z5528	Z6528	Z7528	7/16	14		4	H8
Z4548	Z5548	Z6548	Z7548			20	4	H8
Z4568	Z5568	Z6568	Z7568	1/2	13		4	H8
Z4588	Z5588	Z6588	Z7588			20	4	H8

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

TAPS

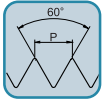
# TAPS

## FORMING TAPS WITH OIL GROOVE PLUG & BOTTOMING STYLE

**for Multi Purpose**

HSSE-V3

M/MF



Z8/ZA/ZC

ANSI

EDP No.						Size	Pitch	No. of Flutes	Limit
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	4	D5
Z8246	Z9246	ZA246	ZB246	ZC246	ZD246	M4	0.7	4	D6
Z8287	Z9287	ZA287	ZB287	ZC287	ZD287	M5	0.8	4	D7
Z8318	Z9318	ZA318	ZB318	ZC318	ZD318	M6	1.0	4	D8
Z8369	Z9369	ZA369	ZB369	ZC369	ZD369	M8	1.25	4	D9
Z8420	Z9420	ZA420	ZB420	ZC420	ZD420	M10	1.5	4	D10
Z850A	Z950A	ZA50A	ZB50A	ZC50A	ZD50A	M12	1.75	4	D11

※ For tapping depth on ANSI length taps, refer to MCTI 302 on page357

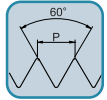
# TAPS

## STANDARD TAPS : SPIRAL FLUTED BOTTOMING STYLE

*for Multi Purpose*

HSSE-V3

UNC  
UNF



C2/C3/C4/D9 | ANSI

EDP No.				Size	Thread Per Inch		No. of Flutes	Limit
Steam Oxide	Bright Finish	TiN Coated	Hardlick Coated		UNC	UNF		
C2162	C3162	C4162	D9162	4	40		3	H2
C2202	C3202	C4202	D9202	5	40		3	H2
C2243	C3243	C4243	D9243	6	32		3	H3
C2283	C3283	C4283	D9283	8	32		3	H3
C2323	C3323	C4323	D9323	10	24		3	H3
C2343	C3343	C4343	D9343			32	3	H3
C2403	C3403	C4403	D9403	1/4	20		3	H3
C2405	C3405	C4405	D9405				3	H5
C2423	C3423	C4423	D9423			28	3	H3
C2443	C3443	C4443	D9443	5/16	18		3	H3
C2445	C3445	C4445	D9445				3	H5
C2463	C3463	C4463	D9463			24	3	H3
C2483	C3483	C4483	D9483	3/8	16		3	H3
C2485	C3485	C4485	D9485				3	H5
C2503	C3503	C4503	D9503			24	3	H3
C2523	C3523	C4523	D9523	7/16	14		3	H3
C2525	C3525	C4525	D9525				3	H5
C2543	C3543	C4543	D9543			20	3	H3
C2545	C3545	C4545	D9545				3	H5
C2563	C3563	C4563	D9563	1/2	13		3	H3
C2565	C3565	C4565	D9565				3	H5
C2583	C3583	C4583	D9583			20	3	H3
C2585	C3585	C4585	D9585				3	H5
C2605	C3605	C4605	D9605	9/16	12		3	H5
C2625	C3625	C4625	D9625			18	3	H5
C2643	C3643	C4643	D9643	5/8	11		4	H3
C2645	C3645	C4645	D9645				4	H5
C2663	C3663	C4663	D9663			18	4	H3
C2703	C3703	C4703	D9703	3/4	10		4	H3
C2705	C3705	C4705	D9705				4	H5
C2723	C3723	C4723	D9723			16	4	H3
C2744	C3744	C4744	D9744	7/8	9		4	H4
C2766	C3766	C4766	D9766			14	4	H6
C2784	C3784	C4784	D9784	1	8		4	H4

\* For tapping depth on ANSI Length Taps, refer to MCT1 302 on page 357.

TAPS



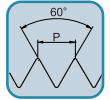
# TAPS

## STANDARD TAPS : SPIRAL POINTED PLUG STYLE

*for Multi Purpose*

HSSE-V3

UNC  
UNF



I9/J0/J1

ANSI

EDP No.				Size	Thread Per Inch		No. of Flutes	Limit
Steam Oxide	Bright Finish	TiN Coated	Hardslick Coated		UNC	UNF		
I9082	J0082	J1082	J7082	2	56		2	H2
I9162	J0162	J1162	J7162	4	40		2	H2
I9202	J0202	J1202	J7202	5	40		2	H2
I9243	J0243	J1243	J7243	6	32		2	H3
I9283	J0283	J1283	J7283	8	32		2	H3
I9323	J0323	J1323	J7323	10	24		2	H3
I9343	J0343	J1343	J7343			32	2	H3
I9403	J0403	J1403	J7403	1/4	20		2	H3
I9405	J0405	J1405	J7405				2	H5
I9423	J0423	J1423	J7423			28	2	H3
I9443	J0443	J1443	J7443	5/16	18		2	H3
I9445	J0445	J1445	J7445				2	H5
I9463	J0463	J1463	J7463			24	2	H3
I9483	J0483	J1483	J7483	3/8	16		3	H3
I9485	J0485	J1485	J7485				3	H5
I9503	J0503	J1503	J7503			24	3	H3
I9523	J0523	J1523	J7523	7/16	14		3	H3
I9525	J0525	J1525	J7525				3	H5
I9543	J0543	J1543	J7543			20	3	H3
I9545	J0545	J1545	J7545				3	H5
I9563	J0563	J1563	J7563	1/2	13		3	H3
I9565	J0565	J1565	J7565				3	H5
I9583	J0583	J1583	J7583			20	3	H3
I9585	J0585	J1585	J7585				3	H5
I9603	J0603	J1603	J7603	9/16	12		3	H3
I9625	J0625	J1625	J7625			18	3	H5
I9643	J0643	J1643	J7643	5/8	11		3	H3
I9645	J0645	J1645	J7645				3	H5
I9665	J0665	J1665	J7665			18	3	H5
I9703	J0703	J1703	J7703	3/4	10		3	H3
I9705	J0705	J1705	J7705				3	H5
I9725	J0725	J1725	J7725			16	3	H5
I9744	J0744	J1744	J7744	7/8	9		3	H4
I9766	J0766	J1766	J7766			14	3	H6
I9784	J0784	J1784	J7784	1	8		3	H4

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

TAPS

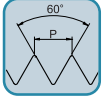
# TAPS

## HAND TAPS TAPER, PLUG & BOTTOMING STYLE

*for Multi Purpose*

HSS-V

UNC  
UNF



A3/A5/A7 ANSI

EDP No.			Size	Thread Per Inch		No. of Flutes	Limit
Bright Finish Taper	Bright Finish Plug	Bright Finish Bottoming		UNC	UNF		
A3082	A5082	A7082	2	56		3	H2
A3162	A5162	A7162	4	40		3	H2
A3202	A5202	A7202	5	40		3	H2
A3243	A5243	A7243	6	32		3	H3
A3262	A5262	A7262			40	3	H2
A3283	A5283	A7283	8	32		4	H3
A3323	A5323	A7323	10	24		4	H3
A3343	A5343	A7343			32	4	H3
A3403	A5403	A7403	1/4	20		4	H3
A3423	A5423	A7423			28	4	H3
A3443	A5443	A7443	5/16	18		4	H3
A3463	A5463	A7463			24	4	H3
A3483	A5483	A7483	3/8	16		4	H3
A3503	A5503	A7503			24	4	H3
A3523	A5523	A7523	7/16	14		4	H3
A3543	A5543	A7543			20	4	H3
A3563	A5563	A7563	1/2	13		4	H3
A3583	A5583	A7583			20	4	H3
A3603	A5603	A7603	9/16	12		4	H3
A3623	A5623	A7623			18	4	H3
A3643	A5643	A7643	5/8	11		4	H3
A3663	A5663	A7663			18	4	H3
A3703	A5703	A7703	3/4	10		4	H3
A3723	A5723	A7723			16	4	H3
A3744	A5744	A7744	7/8	9		4	H4
A3764	A5764	A7764			14	4	H4
A3784	A5784	A7784	1	8		4	H4
A3804	A5804	A7804			12	4	H4

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

TAPS

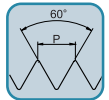
# TAPS

## METRIC SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE

for Steels & Stainless Steels up to 35HRc

Super  
HSS

M  
MF



BH/BM ANSI



BD/BO DIN Length  
ANSI Shank

EDP No.				Size	Pitch	No. of Flutes	Limit
Steam Oxide	Hardslick Coated	Steam Oxide	Hardslick Coated				
BH203	BM203	BD203	BO203	M3	0.5	3	D3
BH224	BM224	BD224	BO224	M3.5	0.6	3	D4
BH244	BM244	BD244	BO244	M4	0.7	3	D4
BH284	BM284	BD284	BO284	M5	0.8	3	D4
BH315	BM315	BD315	BO315	M6	1.0	3	D5
BH345	BM345	BD345	BO345	M7	1.0	3	D5
BH365	BM365	BD365	BO365	M8	1.25	3	D5
BH375	BM375	BD375	BO375	M8	1.0	3	D5
BH426	BM426	BD426	BO426	M10	1.5	3	D6
BH435	BM435	BD435	BO435	M10	1.25	3	D5
BH506	BM506	BD506	BO506	M12	1.75	3	D6
BH525	BM525	BD525	BO525	M12	1.25	3	D5
BH547	BM547	BD547	BO547	M14	2.0	3	D7
BH556	BM556	BD556	BO556	M14	1.5	3	D6
BH607	BM607	BD607	BO607	M16	2.0	3	D7
BH616	BM616	BD616	BO616	M16	1.5	3	D6
BH657	BM657	BD657	BO657	M18	2.5	4	D7
BH676	BM676	BD676	BO676	M18	1.5	4	D6

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

\* For tapping depth on DIN / ANSI Shank Taps, refer to DIN Table on page 355 & 356.

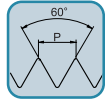
# TAPS

## METRIC SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE

for Stainless Steels up to 28HRc

HSSE-V3

M  
MF



BS/BT ANSI



E6/E8/E9 DIN Length  
ANSI Shank

EDP No.					Size	Pitch	No. of Flutes	Limit
Steam Oxide	Hardslick Coated	Steam Oxide	TiCN Coated	Hardslick Coated				
BS203	BT203	E6203	E8203	E9203	M3	0.5	3	D3
BS224	BT224	E6224	E8224	E9224	M3.5	0.6	3	D4
BS244	BT244	E6244	E8244	E9244	M4	0.7	3	D4
BS284	BT284	E6284	E8284	E9284	M5	0.8	3	D4
BS315	BT315	E6315	E8315	E9315	M6	1.0	3	D5
BS345	BT345	E6345	E8345	E9345	M7	1.0	3	D5
BS365	BT365	E6365	E8365	E9365	M8	1.25	3	D5
BS375	BT375	E6375	E8375	E9375	M8	1.0	3	D5
BS426	BT426	E6426	E8426	E9426	M10	1.5	3	D6
BS435	BT435	E6435	E8435	E9435	M10	1.25	3	D5
BS506	BT506	E6506	E8506	E9506	M12	1.75	3	D6
BS525	BT525	E6525	E8525	E9525	M12	1.25	3	D5
BS547	BT547	E6547	E8547	E9547	M14	2.0	3	D7
BS556	BT556	E6556	E8556	E9556	M14	1.5	3	D6
BS607	BT607	E6607	E8607	E9607	M16	2.0	3	D7
BS616	BT616	E6616	E8616	E9616	M16	1.5	3	D6
BS657	BT657	E6657	E8657	E9657	M18	2.5	4	D7
BS676	BT676	E6676	E8676	E9676	M18	1.5	4	D6

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

\* For tapping depth on DIN / ANSI Shank Taps, refer to DIN Table on page 355 & 356.

※ Tapping depth for DIN and ANSI style are the same, refer to MCTI talbe 302

TAPS

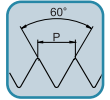
# TAPS

## METRIC SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE

**Steels up to 35HRc**

HSSE-V3

M  
MF



BU/BV / ANSI



E2/E4/E5 / DIN Length  
ANSI Shank

EDP No.					Size	Pitch	No. of Flutes	Limit
Steam Oxide	Hardslick Coated	Steam Oxide	TiCN Coated	Hardslick Coated				
BU203	BV203	E2203	E4203	E5203	M3	0.5	3	D3
BU224	BV224	E2224	E4224	E5224	M3.5	0.6	3	D4
BU244	BV244	E2244	E4244	E5244	M4	0.7	3	D4
BU284	BV284	E2284	E4284	E5284	M5	0.8	3	D4
BU315	BV315	E2315	E4315	E5315	M6	1.0	3	D5
BU345	BV345	E2345	E4345	E5345	M7	1.0	3	D5
BU365	BV365	E2365	E4365	E5365	M8	1.25	3	D5
BU375	BV375	E2375	E4375	E5375	M8	1.0	3	D5
BU426	BV426	E2426	E4426	E5426	M10	1.5	3	D6
BU435	BV435	E2435	E4435	E5435	M10	1.25	3	D5
BU506	BV506	E2506	E4506	E5506	M12	1.75	3	D6
BU525	BV525	E2525	E4525	E5525	M12	1.25	3	D5
BU547	BV547	E2547	E4547	E5547	M14	2.0	3	D7
BU556	BV556	E2556	E4556	E5556	M14	1.5	3	D6
BU607	BV607	E2607	E4607	E5607	M16	2.0	3	D7
BU616	BV616	E2616	E4616	E5616	M16	1.5	3	D6
BU657	BV657	E2657	E4657	E5657	M18	2.5	4	D7
BU676	BV676	E2676	E4676	E5676	M18	1.5	4	D6

\* For tapping depth on ANSI Length Taps, refer to MCT1 302 on page 357.

\* For tapping depth on DIN / ANSI Shank Taps, refer to DIN Table on page 355 & 356.

TAPS

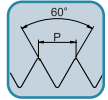
# TAPS

## METRIC SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE

*for Aluminium Alloys or Die Cast Aluminium*

HSSE-V3

M  
MF



BW/BX ANSI



F1/F3  
DIN Length  
ANSI Shank

EDP No.				Size	Pitch	No. of Flutes	Limit
Bright Finish	Hardslick Coated	Bright Finish	Hardslick Coated				
BW203	BX203	F1203	F3203	M3	0.5	2	D3
BW244	BX244	F1244	F3244	M4	0.7	2	D4
BW285	BX285	F1285	F3285	M5	0.8	2	D5
BW315	BX315	F1315	F3315	M6	1.0	2	D5
BW365	BX365	F1365	F3365	M8	1.25	2	D5
BW426	BX426	F1426	F3426	M10	1.5	2	D6
BW435	BX435	F1435	F3435	M10	1.25	2	D5

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

\* For tapping depth on DIN / ANSI Shank Taps, refer to DIN Table on page 355 & 356.

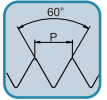
# TAPS

## METRIC SPIRAL FLUTED TAPS BOTTOMING STYLE

**for Multi Purpose**

HSS-V

M  
MF



G4/G5/G6 ANSI

Bright Finish	EDP No.		Size	Pitch	No. of Flutes	Limit
	TiCN Coated	Hardslick Coated				
G4203	G5203	G6203	M3	0.5	2	D3
G4224	G5224	G6224	M3.5	0.6	2	D4
G4244	G5244	G6244	M4	0.7	3	D4
G4284	G5284	G6284	M5	0.8	3	D4
G4315	G5315	G6315	M6	1.0	3	D5
G4345	G5345	G6345	M7	1.0	3	D5
G4365	G5365	G6365	M8	1.25	3	D5
G4375	G5375	G6375	M8	1.0	3	D5
G4426	G5426	G6426	M10	1.5	3	D6
G4435	G5435	G6435	M10	1.25	3	D5
G4506	G5506	G6506	M12	1.75	3	D6
G4525	G5525	G6525	M12	1.25	3	D5

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.



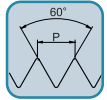
# TAPS

## METRIC SPIRAL POINTED TAPS PLUG STYLE

**for Steels & Stainless Steels up to 35HRc**

Super  
HSS

M  
MF



N7/N8 ANSI



N3/O3 DIN Length  
ANSI Shank

EDP No.				Size	Pitch	No. of Flutes	Limit
Steam Oxide	Hardlick Coated	Steam Oxide	Hardlick Coated				
N7203	N8203	N3203	O3203	M3	0.5	3	D3
N7224	N8224	N3224	O3224	M3.5	0.6	3	D4
N7244	N8244	N3244	O3244	M4	0.7	3	D4
N7284	N8284	N3284	O3284	M5	0.8	3	D4
N7315	N8315	N3315	O3315	M6	1.0	3	D5
N7345	N8345	N3345	O3345	M7	1.0	3	D5
N7365	N8365	N3365	O3365	M8	1.25	3	D5
N7375	N8375	N3375	O3375	M8	1.0	3	D5
N7426	N8426	N3426	O3426	M10	1.5	3	D6
N7435	N8435	N3435	O3435	M10	1.25	3	D5
N7506	N8506	N3506	O3506	M12	1.75	3	D6
N7525	N8525	N3525	O3525	M12	1.25	3	D5
N7547	N8547	N3547	O3547	M14	2.0	3	D7
N7556	N8556	N3556	O3556	M14	1.5	3	D6
N7607	N8607	N3607	O3607	M16	2.0	3	D7
N7616	N8616	N3616	O3616	M16	1.5	3	D6
N7657	N8657	N3657	O3657	M18	2.5	3	D7
N7676	N8676	N3676	O3676	M18	1.5	3	D6

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

\* For tapping depth on DIN / ANSI Shank Taps, refer to DIN Table on page 355 & 356.

TAPS

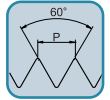
# TAPS

## METRIC SPIRAL POINTED TAPS PLUG STYLE

**for Stainless Steels up to 28HRc**

HSSE-V3

M  
MF



O9/IA ANSI



K3/K5/K6 DIN Length  
ANSI Shank

Steam Oxide	Hardslick Coated	EDP No.			Size	Pitch	No. of Flutes	Limit
		Steam Oxide	TiCN Coated	Hardslick Coated				
O9203	IA203	K3203	K5203	K6203	M3	0.5	3	D3
O9224	IA224	K3224	K5224	K6224	M3.5	0.6	3	D4
O9244	IA244	K3244	K5244	K6244	M4	0.7	3	D4
O9284	IA284	K3284	K5284	K6284	M5	0.8	3	D4
O9315	IA315	K3315	K5315	K6315	M6	1.0	3	D5
O9345	IA345	K3345	K5345	K6345	M7	1.0	3	D5
O9365	IA365	K3365	K5365	K6365	M8	1.25	3	D5
O9375	IA375	K3375	K5375	K6375	M8	1.0	3	D5
O9426	IA426	K3426	K5426	K6426	M10	1.5	3	D6
O9435	IA435	K3435	K5435	K6435	M10	1.25	3	D5
O9506	IA506	K3506	K5506	K6506	M12	1.75	3	D6
O9525	IA525	K3525	K5525	K6525	M12	1.25	3	D5
O9547	IA547	K3547	K5547	K6547	M14	2.0	3	D7
O9556	IA556	K3556	K5556	K6556	M14	1.5	3	D6
O9607	IA607	K3607	K5607	K6607	M16	2.0	3	D7
O9616	IA616	K3616	K5616	K6616	M16	1.5	3	D6
O9657	IA657	K3657	K5657	K6657	M18	2.5	3	D7
O9676	IA676	K3676	K5676	K6676	M18	1.5	3	D6

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

\* For tapping depth on DIN / ANSI Shank Taps, refer to DIN Table on page 355 & 356.

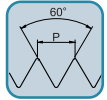
# TAPS

## METRIC SPIRAL POINTED TAPS PLUG STYLE

**Steels up to 35HRc**

HSSE-V3

M  
MF



IB/IC    ANSI



J9/K7/K2    DIN Length  
ANSI Shank

EDP No.					Size	Pitch	No. of Flutes	Limit
Steam Oxide	Hardslick Coated	Steam Oxide	TiCN Coated	Hardslick Coated				
IB203	IC203	J9203	K7203	K2203	M3	0.5	3	D3
IB224	IC224	J9224	K7224	K2224	M3.5	0.6	3	D4
IB244	IC244	J9244	K7244	K2244	M4	0.7	3	D4
IB284	IC284	J9284	K7284	K2284	M5	0.8	3	D4
IB315	IC315	J9315	K7315	K2315	M6	1.0	3	D5
IB345	IC345	J9345	K7345	K2345	M7	1.0	3	D5
IB365	IC365	J9365	K7365	K2365	M8	1.25	3	D5
IB375	IC375	J9375	K7375	K2375	M8	1.0	3	D5
IB426	IC426	J9426	K7426	K2426	M10	1.5	3	D6
IB435	IC435	J9435	K7435	K2435	M10	1.25	3	D5
IB506	IC506	J9506	K7506	K2506	M12	1.75	3	D6
IB525	IC525	J9525	K7525	K2525	M12	1.25	3	D5
IB547	IC547	J9547	K7547	K2547	M14	2.0	3	D7
IB556	IC556	J9556	K7556	K2556	M14	1.5	3	D6
IB607	IC607	J9607	K7607	K2607	M16	2.0	3	D7
IB616	IC616	J9616	K7616	K2616	M16	1.5	3	D6
IB657	IC657	J9657	K7657	K2657	M18	2.5	4	D7
IB676	IC676	J9676	K7676	K2676	M18	1.5	4	D6

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

\* For tapping depth on DIN / ANSI Shank Taps, refer to DIN Table on page 355 & 356.

TAPS

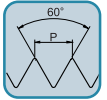
# TAPS

## METRIC SPIRAL POINTED TAPS PLUG STYLE

*for Multi Purpose*

HSS-V

M  
MF



L7/L8/L9

ANSI

Bright Finish	EDP No.		Size	Pitch	No. of Flutes	Limit
	TiCN Coated	Hardslick Coated				
L7203	L8203	L9203	M3	0.5	2	D3
L7224	L8224	L9224	M3.5	0.6	2	D4
L7244	L8244	L9244	M4	0.7	2	D4
L7284	L8284	L9284	M5	0.8	2	D4
L7315	L8315	L9315	M6	1.0	3	D5
L7345	L8345	L9345	M7	1.0	3	D5
L7365	L8365	L9365	M8	1.25	3	D5
L7375	L8375	L9375	M8	1.0	3	D5
L7426	L8426	L9426	M10	1.5	3	D6
L7435	L8435	L9435	M10	1.25	3	D5
L7506	L8506	L9506	M12	1.75	3	D6
L7525	L8525	L9525	M12	1.25	3	D5

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

**WAGNER  
G-T-TECH CO., LTD.**

# **TECHNICAL INFORMATION**

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## **DIMENSIONS**

HIGH PERFORMANCE TAPS  
DIN LENGTH ANSI SHANK TAPS  
MCTI TABLE 302

## **TAP RECOMMENDATION**

## **THREAD LIMITS**

## **TAP DRILL SIZES**

## **CONVERSION TABLE**

## **TROUBLE SHOOTING GUIDE**







# 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

TAPS

- \* 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

TAPS

- \* 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 (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

\* 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

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

TAPS



## 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

\* Maximum tapping depth = Thread length unless shank diameter is smaller than minor diameter



## 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 Class2	Max Class3	Max Class2B	Max Class3B
0		80	GH1	GH1	GH2	GH1	.0519	.0536	.0532	.0542	.0536
1	64	72	GH1	GH1	GH2	GH1	.0629	.0648	.0643	.0655	.0648
			GH1	GH1	GH2	GH1	.0640	.0658	.0653	.0665	.0659
2	56	64	GH1	GH1	GH2	GH1	.0744	.0764	.0759	.0772	.0765
			GH1	GH1	GH2	GH1	.0759	.0778	.0773	.0786	.0779
3	48	56	GH1	GH1	GH2	GH1	.0855	.0877	.0871	.0885	.0877
			GH1	GH1	GH2	GH1	.0874	.0894	.8890	.0902	.0895
4	40	48	GH2	GH1	GH2	GH2	.0958	.0982	.0975	.0991	.0982
			GH1	GH1	GH2	GH1	.0985	.1007	.1001	.1016	.1008
5	40	44	GH2	GH1	GH2	GH2	.1088	.1112	.1105	.1121	.1113
			GH1	GH1	GH2	GH1	.1102	.1125	.1118	.1134	.1126
6	32	40	GH2	GH1	GH3	GH2	.1177	.1204	.1196	.1214	.1204
			GH2	GH1	GH2	GH2	.1218	.1242	.1235	.1252	.1243
8	32	36	GH2	GH1	GH3	GH2	.1437	.1464	.1456	.1475	.1465
			GH2	GH1	GH2	GH2	.1460	.1485	.1478	.1496	.1487
10	24	32	GH3	GH1	GH3	GH3	.1629	.1662	.1653	.1672	.1661
			GH2	GH1	GH3	GH2	.1697	.1724	.1716	.1736	.1726
12	24	28	GH3	GH1	GH3	GH3	.1889	.1922	.1913	.1933	.1922
			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 Class2	Max Class3	Max Class2B	Max Class3B
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	24	GH3	GH2	GH5	GH3	.2764	.2805	.2794	.2817	.2803
			GH3	GH1	GH4	GH3	.2854	.2887	.2878	.2902	.2890
3/8	16	24	GH3	GH2	GH5	GH3	.3344	.3389	.3376	.3401	.3387
			GH3	GH1	GH4	GH3	.3479	.3512	.3503	.3528	.3516
7/16	14	20	GH5	GH3	GH5	GH3	.3911	.3960	.3947	.3972	.3957
			GH3	GH1	GH5	GH3	.4050	.4086	.4076	.4104	.4091
1/2	13	20	GH5	GH3	GH5	GH3	.4500	.4552	.4537	.4565	.4548
			GH3	GH1	GH5	GH3	.4675	.4711	.4701	.4731	.4717
9/16	12	18	GH5	GH3	GH5	GH3	.5084	.5140	.5124	.5152	.5135
			GH3	GH2	GH5	GH3	.5264	.5305	.5294	.5323	.5308
5/8	11	18	GH5	GH3	GH5	GH3	.5660	.5719	.5702	.5732	.5714
			GH3	GH2	GH5	GH3	.5889	.5930	.5919	.5949	.5934
3/4	10	16	GH5	GH3	GH5	GH3	.6850	.6914	.6895	.6927	.6907
			GH3	GH2	GH5	GH3	.7094	.7139	.7126	.7159	.7143
7/8	9	14	GH6	GH4	GH6	GH4	.8028	.8098	.8077	.8110	.8089
			GH4	GH2	GH6	GH4	.8286	.8335	.8322	.8356	.8339
1	8	12	GH6	GH4	GH6	GH4	.9188	.9264	.9242	.9276	.9254
			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 error of plus or minus .0005" in one inch of thread 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

20 to 80 threads per inch incl. = 30' plus or minus in 1/2 angle.



# THREAD LIMITS

## Unified Thread, Fractional 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		H4 Limit		H5 Limit		H6 Limit	
								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 error of plus or minus .0005" in one inch of thread 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	Error in Half Angle
6 to 9 Incl.	25' Plus or Minus
10 to 28 Incl.	30' Plus or Minus



# THREAD LIMITS

## Metric Thread - Ground Thread

Size	Pitch		Major Diameter(Inches)			Pitch Diameter Limits(Inches)										
	Coarse	Fine	Basic	Min.	Max.	Basic Pitch Dia.	D2 Limit		D3 Limit		D4 Limit		D5 Limit		D6 Limit	
							Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
M2	0.4	—	.078740	.0801	.0811	.068511	.0690	.0696	.0695	.0701	.0700	.0706	—	—	—	—
M2.2	0.45	—	.086614	.0881	.0891	.075107	.0756	.0762	.0761	.0767	.0766	.0772	—	—	—	—
M2.3	0.4	—	.090551	.0919	.0929	.080322	.0808	.0814	.0813	.0819	.0818	.0824	—	—	—	—
M2.6	0.45	—	.102362	.1038	.1048	.090855	.0913	.0919	.0918	.0924	.0923	.0929	—	—	—	—
M3	0.5	—	.118110	.1198	.1208	.105324	.1058	.1064	.1063	.1069	.1068	.1074	.1073	.1079	—	—
	—	0.35	.118110	.1193	.1203	.109160	.1096	.1102	.1101	.1107	.1106	.1112	.1111	.1117	—	—
M3.5	0.6	—	.137795	.1397	.1407	.122452	.1227	.1235	.1232	.1240	.1237	.1245	.1242	.1250	—	—
	—	0.35	.137795	.1389	.1399	.128845	.1293	.1299	.1298	.1304	.1303	.1309	.1308	.1314	—	—
M4	0.7	—	.157480	.1597	.1613	.139580	.1398	.1406	.1403	.1411	.1408	.1416	.1413	.1421	—	—
	—	0.5	.157480	.1591	.1601	.144694	.1451	.1457	.1456	.1462	.1461	.1467	.1466	.1472	—	—
M5	0.8	—	.196850	.1994	.2010	.176393	.1766	.1774	.1771	.1779	.1776	.1784	.1781	.1789	—	—
	—	0.5	.196850	.1985	.1995	.184064	.1845	.1851	.1850	.1856	.1855	.1861	.1861	.1866	—	—
M6	1	—	.236220	.2395	.2411	.210648	.2107	.2117	.2112	.2122	.2117	.2127	.2122	.2132	.2127	.2137
	—	0.75	.236220	.2387	.2403	.217041	.2173	.2181	.2178	.2186	.2183	.2191	.2188	.2196	.2193	.2201
M7	1	—	.275590	.2788	.2804	.250018	.2501	.2511	.2506	.2516	.2511	.2521	.2516	.2526	.2521	.2531
	—	0.75	.275590	.2780	.2796	.256411	.2565	.2575	.2570	.2580	.2575	.2585	.2580	.2590	.2585	.2595
M8	1.25	—	.314960	.3189	.3214	.282995	.2828	.2840	.2833	.2845	.2838	.2850	.2843	.2855	.2848	.2860
	—	1	.314960	.3182	.3198	.289388	.2894	.2904	.2899	.2909	.2904	.2914	.2909	.2919	.2914	.2924
M10	1.5	—	.393700	.3984	.4009	.355343	.3552	.3564	.3557	.3569	.3562	.3574	.3567	.3579	.3572	.3584
	—	1.25	.393700	.3976	.4001	.361735	.3616	.3628	.3621	.3633	.3626	.3638	.3631	.3643	.3636	.3648
	—	1	.393700	.3969	.3985	.368128	.3682	.3692	.3687	.3697	.3692	.3702	.3697	.3707	.3702	.3712
M12	1.75	—	.472440	.4780	.4805	.427690	.4275	.4287	.4280	.4292	.4285	.4297	.4290	.4302	.4295	.4307
	—	1.5	.472440	.4772	.4797	.434083	.4339	.4351	.4344	.4356	.4349	.4361	.4354	.4366	.4359	.4371
	—	1.25	.472440	.4764	.4789	.440475	.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  $\pm 0.013\text{mm}$  within any two threads not further apart than 25mm 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





# THREAD LIMITS

## 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	—	.551180	.5575	.5600	.500037	.5015	.5031	.5020	.5036	.5025	.5041	—	—
	—	1.5	.551180	.5559	.5584	.512823	.5147	.5159	.5152	.5164	.5157	.5169	—	—
	—	1.25	.551180	.5551	.5576	.519215	.5211	.5223	.5216	.5228	.5221	.5233	—	—
M16	2	—	.629920	.6363	.6388	.578777	.5802	.5818	.5807	.5823	.5812	.5828	—	—
	—	1.5	.629920	.6347	.6372	.591563	.5934	.5946	.5939	.5951	.5944	.5956	—	—
M18	2.5	—	.708660	.7166	.7191	.644731	.6462	.6478	.6467	.6483	.6472	.6488	—	—
	—	2	.708660	.7150	.7175	.657517	.6590	.6606	.6595	.6611	.6600	.6616	—	—
	—	1.5	.708660	.7134	.7159	.670303	.6722	.6734	.6727	.6739	.6732	.6744	—	—
M20	2.5	—	.787400	.7953	.7976	.723471	.7249	.7265	.7254	.7270	.7259	.7275	—	—
	—	2	.787400	.7937	.7962	.736257	.7377	.7393	.7382	.7398	.7387	.7403	—	—
	—	1.5	.787400	.7921	.7946	.749043	.7509	.7521	.7514	.7526	.7519	.7531	—	—
	—	1	.787400	.7906	.7922	.761828	.7639	.7649	.7644	.7654	.7649	.7659	—	—
M22	2.5	—	.866140	.8741	.8766	.802211	.8037	.8053	.8042	.8058	.8047	.8063	—	—
	—	2	.866140	.8725	.8750	.814997	.8164	.8180	.8169	.8185	.8174	.8190	—	—
	—	1.5	.866140	.8709	.8734	.827783	.8296	.8308	.8301	.8313	.8306	.8318	—	—
	—	1	.866140	.8694	.8710	.840568	.8426	.8436	.8431	.8441	.8436	.8446	—	—
M24	3	—	.944880	.9544	.9583	.868165	.8696	.8712	.8701	.8717	.8706	.8722	.8711	.8727
	—	2	.944880	.9512	.9537	.893737	.8952	.8968	.8957	.8973	.8962	.8978	—	—
	—	1.5	.944880	.9496	.9521	.906523	.9084	.9096	.9089	.9101	.9094	.9106	—	—
	—	1	.944880	.9481	.9497	.919308	.9214	.9224	.9219	.9229	.9224	.9234	—	—
M27	3	—	1.062990	1.0725	1.0764	.986275	.9873	.9893	.9878	.9898	.9883	.9903	.9888	.9908
	—	2	1.062990	1.0693	1.0718	1.011847	1.0133	1.0149	1.0138	1.0154	1.0143	1.0159	—	—
	—	1.5	1.062990	1.0677	1.0702	1.024633	1.0265	1.0277	1.0270	1.0282	1.0275	1.0287	—	—
	—	1	1.062990	1.0662	1.0678	1.037418	1.0393	1.0405	1.0398	1.0410	1.0403	1.0415	—	—
M28	—	2	1.102360	1.1087	1.1112	1.051217	1.0527	1.0543	1.0532	1.0548	1.0537	1.0553	—	—
	—	1.5	1.102360	1.1071	1.1096	1.064003	1.0659	1.0671	1.0664	1.0676	1.0669	1.0681	—	—
	—	1	1.102360	1.1056	1.1072	1.076788	1.0786	1.0798	1.0791	1.0803	1.0796	1.0808	—	—
M30	3.5	—	1.181100	1.1921	1.1961	1.091599	1.0926	1.0946	1.0931	1.0951	1.0936	1.0956	1.0941	1.0961
	—	3	1.181100	1.1906	1.1945	1.104385	1.1054	1.1074	1.1059	1.1079	1.1064	1.1084	1.1069	1.1089
	—	2	1.181100	1.1874	1.1899	1.129957	1.1314	1.1330	1.1319	1.1335	1.1324	1.1340	—	—
	—	1.5	1.181100	1.1858	1.1883	1.142743	1.1446	1.1458	1.1451	1.1463	1.1456	1.1468	—	—
M33	3.5	—	1.299210	1.3103	1.3142	1.209709	1.2108	1.2128	1.2113	1.2133	1.2118	1.2138	1.2123	1.2143
	—	3	1.299210	1.3088	1.3127	1.222495	1.2235	1.2255	1.2240	1.2260	1.2245	1.2265	1.2250	1.2270
	—	2	1.299210	1.3056	1.3081	1.248067	1.2495	1.2511	1.2500	1.2516	1.2505	1.2521	—	—
	—	1.5	1.299210	1.3040	1.3065	1.260853	1.2627	1.2639	1.2632	1.2644	1.2637	1.2649	—	—

TAPS



# TAP DRILL SIZES - UNIFIED THREAD

Size	Threads Per Inch		Drills for Regular 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	72	53	.0595	.0610	59	51 or 1.7mm
		72	53	.0595	.0610	67	51 or 1.75mm
2	56	64	50	.0700	.0717	62	47 or 2.0mm
		64	50	.0700	.0717	70	2.0mm
3	48	56	47	.0785	.0804	69	2.3mm
		56	45	.0820	.0839	65	2.3mm
4	40	48	43	.0890	.0910	65	39
		48	42	.0935	.0955	61	37
5	40	44	38	.1015	.1038	65	33 or 2.9mm
		44	37	.1040	.1063	63	33 or 2.9mm
6	32	40	36	.1065	.1088	72	3.1mm
		40	33	.1130	.1156	69	1/8 or 3.2mm
8	32	36	29	.1360	.1389	62	25 or 3.8mm
		36	29	.1360	.1389	70	24
10	24	32	25	.1495	.1527	69	11/64
		32	21	.1590	.1622	68	16 or .176
12	24	28	16	.1770	.1805	66	9 or 5.0mm
		28	14	.1820	.1855	66	7 or 5.1mm
1/4	20	28	7	.2010	.2048	70	5.75mm
		28	3	.2130	.2168	72	A
5/16	18	24	F	.2570	.2608	72	7.25mm
		24	1	.2720	.2761	67	.293
3/8	16	24	5/16	.3125	.3169	72	S or 11/32mm
		24	Q	.3320	.3364	71	9.0mm
7/16	14	20	U	.3680	.3726	70	Y
		20	25/64	.3906	.3952	65	Z or 10.5mm
1/2	13	20	27/64	.4219	.4266	73	.463
		20	29/64	.4531	.4578	65	.476
9/16	12	18	31/64	.4844	.4892	68	.521
		18	33/64	.5156	.5204	58	.536
5/8	11	18	17/32	.5312	.5362	75	37/64
		18	37/64	.5781	.5831	58	.598
3/4	10	16	21/32	.6562	.6613	68	45/64
		16	11/16	.6875	.6925	71	23/32
7/8	9	14	49/64	.7656	.7708	72	.823
		14	13/16	.8125	.8177	62	27/32
1	8	12	7/8	.8750	.8809	73	15/16
		12	59/64	.9219	.9279	67	.963
1*1/8	7	12	63/64	.9844	.9911	72	
1*1/4	7	12	1*3/64	1.0469	1.0541	65	
		12	1*7/64	1.1094	—	—	
1*3/8	6	16	1*11/64	1.1719	—	—	
		16	1*7/32	1.2187	—	—	
1*1/2	6	12	1*19/64	1.2969	—	—	
		12	1*11/32	1.3437	—	—	
			1*27/64	1.4219	—	—	

TAPS



# TAP DRILL SIZES - METRIC THREAD

Size	Pitch	Recommended Metric Drill				Closest Recommended Inch Drill			
		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
M1.6	0.35	1.25	.0492	.0507	69	—	—	—	—
M1.8	0.35	1.45	.0571	.0586	69	—	—	—	—
M2	0.40	1.6	.0630	.0647	69	52	.0635	.0652	66
M2.2	0.45	1.75	.0689	.0706	70	—	—	—	—
M2.5	0.45	2.05	.0807	.0826	69	46	.0810	.0829	67
M3	0.50	2.5	.0984	.1007	68	40	.0980	.1003	70
M3.5	0.60	2.9	.1142	.1168	68	33	.1130	.1156	72
M4	0.70	3.3	.1299	.1328	69	30	.1285	.1314	73
M4.5	0.75	3.7	.1457	.1486	74	26	.1470	.1502	70
M5	0.80	4.2	.1654	.1686	69	19	.1660	.1692	68
M6	1.00	5.0	.1968	.2006	70	9	.1960	.1998	71
M7	1.00	6.0	.2362	.2400	70	15/64	.2344	.2382	73
M8	1.25	6.7	.2638	.2679	74	17/64	.2656	.2697	71
M10	1.00	7.0	.2756	.2797	69	J	.2770	.2811	66
	1.50	8.5	.3346	.3390	71	Q	.3320	.3364	75
M12	1.25	8.7	.3425	.3471	73	11/32	.3438	.3483	71
	1.75	10.2	.4016	.4063	74	Y	.4040	.4087	71
M14	1.25	10.8	.4252	.4299	67	27/64	.4219	.4266	72
	2.00	12.0	.4724	.4772	72	15/32	.4688	.4736	76
M16	1.50	12.5	.4921	.4969	71	—	—	—	—
	2.00	14.0	.5512	.5561	72	35/64	.5469	.5518	76
M18	1.50	14.5	.5709	.5758	71	—	—	—	—
	2.50	15.5	.6102	.6152	73	39/64	.6094	.6144	74
M20	1.50	16.5	.6496	.6546	70	—	—	—	—
	2.50	17.5	.6890	.6942	73	11/16	.6875	.6925	74
M22	1.50	18.5	.7283	.7335	70	—	—	—	—
	2.50	19.5	.7677	.7729	73	49/64	.7656	.7708	75
M24	1.50	20.5	.8071	.8123	70	—	—	—	—
	3.00	21.0	.8268	.8327	73	53/64	.8281	.8340	72
M27	2.00	22.0	.8661	.8720	71	—	—	—	—
	3.00	24.0	.9449	.9511	73	15/16	.9375	.9435	78
M30	2.00	25.0	.9843	.9913	70	63/64	.9844	.9914	70
	3.00	26.5	1.0433						
M33	2.00	28.0	1.1024						
	3.50	29.5	1.1614						
M36	2.00	31.0	1.2205						
	4.00	32.0	1.2598						
M39	3.00	33.0	1.2992						
	4.00	35.0	1.3780						
	3.00	36.0	1.4173						

Reaming Recommended to the Drill Size Shown

TAPS



# 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	4422	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	3667	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

TAPS



# TROUBLE SHOOTING GUIDE

Specific Problem	Cause	Solution
<b>Dimensional Accuracy</b>		
Oversize Pitch Diameter	Incorrect Tap	<ol style="list-style-type: none"> <li>1. Use proper GH limits of taps</li> <li>2. Use longer chamfered taps</li> </ol>
	Chip Packing	<ol style="list-style-type: none"> <li>1. Use spiral point or spiral fluted taps</li> <li>2. Reduce number of flutes to provide extra chip room</li> <li>3. Use larger hole size</li> <li>4. If tapping a hole, allow deeper hole where applicable or shorten the thread length of the parts</li> <li>5. Use proper lubricant</li> </ol>
	Galling	<ol style="list-style-type: none"> <li>1. Apply proper surface treatment such as Hardslick or chrome</li> <li>2. Use proper cutting lubricant</li> <li>3. Reduce tapping speed</li> <li>4. Use proper cutting angle in accordance with material being tapped</li> <li>5. Use large hole size</li> </ol>
	Operating Conditions	<ol style="list-style-type: none"> <li>1. Apply proper tapping speed</li> <li>2. Correct alignment of tap and drill hole</li> <li>3. Free cutting either tap or workpiece</li> <li>4. Use proper tapping speed to avoid torn or rough threads</li> <li>5. Use lead screw tapper</li> <li>6. Use proper tapping machine with suitable power</li> <li>7. Avoid misalignment of the tap and drill hole from loose spindle or worn holder</li> </ol>
	Tool Condition	<ol style="list-style-type: none"> <li>1. Obtain proper indexing angle for the flutes at the cutting edge</li> <li>2. Grind proper cutting angle and chamfer angle</li> <li>3. Avoid too narrow a land width</li> <li>4. Remove burrs from regrinding</li> </ol>
Oversize Internal Diameter	Hole Size	<ol style="list-style-type: none"> <li>1. Use minimum hole size</li> <li>2. Avoid tapered hole</li> <li>3. Use proper chamfered taps</li> </ol>
	Galling	<ol style="list-style-type: none"> <li>1. Galling solutions 1 through 4 above can be applied to this specific problem</li> </ol>
Undersize Pitch Diameter	Incorrect Tap	<ol style="list-style-type: none"> <li>1. Use oversize taps</li> <li>2. Apply proper chamfer angle</li> <li>3. Increase cutting angle</li> </ol>
	Damaged Thread	<ol style="list-style-type: none"> <li>1. Use proper reversing speed to avoid damaging tapped thread on the way out of the hole</li> </ol>
	Left-over Chips	<ol style="list-style-type: none"> <li>1. Increase cutting performance to avoid any left over chips in the hole</li> <li>2. Remove left over chips from the hole for gage checking</li> </ol>
Undersize Internal Diameter	Hole Size	<ol style="list-style-type: none"> <li>1. Use maximum drill size</li> </ol>

TAPS



# TROUBLE SHOOTING GUIDE

Specific Problem	Cause	Solution
<b>Tool Life</b>		
Breakage	Incorrect Tap Selection	<ol style="list-style-type: none"> <li>1. Avoid chip packing in the flutes or the bottom of the hole. Use spiral pointed or spiral fluted taps or fluteless taps.</li> <li>2. Apply correct surface treatment such as Hardslick or bright</li> </ol>
	Excessive Tapping Torque	<ol style="list-style-type: none"> <li>1. Use larger drill size</li> <li>2. Try to shorten thread length</li> <li>3. Increase cutting angle</li> <li>4. Apply a tap with more thread relief and reduced land width</li> <li>5. Apply correct surface treatment such as Hardslick</li> </ol>
	Operating Conditions	<ol style="list-style-type: none"> <li>1. Reduce tapping speed</li> <li>2. Avoid misalignment between tap and the hole and tapered hole</li> <li>3. Use floating type of tapping holder</li> <li>4. Use tapping holder with torque adjustment</li> <li>5. Avoid hitting bottom of the hole with tap</li> </ol>
	Tool Condition	<ol style="list-style-type: none"> <li>1. Do not grind the bottom of the flute</li> <li>2. Avoid too narrow a land width</li> <li>3. Remove all worn sections when regrinding the flutes</li> <li>4. Regrind tool more frequently</li> </ol>
Chipping	Incorrect Tap Selection	<ol style="list-style-type: none"> <li>1. Reduce cutting angle</li> <li>2. Use a different kind of high-speed steel tap</li> <li>3. Reduce hardness of the tap</li> <li>4. Increase chamfer length</li> <li>5. Avoid chip packing in the flutes or in the bottom of the hole by using spiral fluted or spiral pointed taps</li> </ol>
	Operating Conditions	<ol style="list-style-type: none"> <li>1. Reduce tapping speed</li> <li>2. Avoid misalignment between tap and hole</li> <li>3. Avoid sudden return of reverse in blind hole tapping</li> <li>4. Avoid galling</li> <li>5. Use larger hole size</li> </ol>
Wear	Incorrect Tap Selection	<ol style="list-style-type: none"> <li>1. Apply specially designed tap for tapping heat treated material</li> <li>2. Change to a type of high-speed steel tap that contains vanadium</li> <li>3. Apply special surface treatment such as TiCN or Hardslick</li> <li>4. Increase chamfer length</li> </ol>
	Operating Conditions	<ol style="list-style-type: none"> <li>1. Reduce tapping speed</li> <li>2. Apply proper cutting lubricants</li> <li>3. Avoid work hardened hole</li> <li>4. Use larger hole size</li> </ol>
	Tool Condition	<ol style="list-style-type: none"> <li>1. Grind proper cutting angle</li> <li>2. Avoid hardness reduction from grinding process</li> </ol>

TAPS



# TROUBLE SHOOTING GUIDE

Specific Problem	Cause	Solution
<b>Surface Finish</b>		
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 2. Reduce land width 3. Apply surface treatment such as Hardslick or chrome 4. Use proper cutting lubricant 5. Reduce tapping speed 6. Use larger hole size 7. Obtain proper alignment between tap and work
	Chip Packing	1. Use spiral pointed or spiral fluted taps 2. Use larger drill size
Chattering on Tapped Thread	Tool Free Cutting	1. Reduce cutting angle 2. Reduce amount of thread relief
	Tool Condition	1. Avoid too narrow a land width 2. Do not grind the bottom of the flute



# CARBIDE AND COBALT / HSS DRILLS





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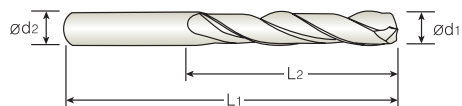
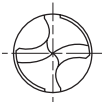
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# DREAM DRILLS

## CARBIDE without COOLANT HOLES, SHORT LENGTH, TiAIN-COATED



3 x D



P.414,415

- ▶ **Application** : Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.
- ▶ **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
- ▶ **Tolerance** : Dia. Tolerance  $\phi d_1$ : See page 385 Shank Tolerance  $\phi d_2$ : -.0001 -.0005

### DH414 Series

Unit : inch

EDP No.	Diameter ( $\phi d_1=\phi d_2$ )		Flute Length (L <sub>2</sub> )	Overall Length (L <sub>1</sub> )
	Fractional	Decimal		
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

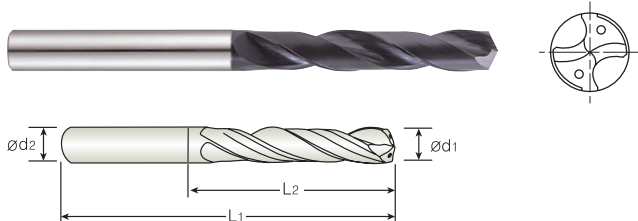
EDP No.	Diameter ( $\phi d_1=\phi d_2$ )		Flute Length (L <sub>2</sub> )	Overall Length (L <sub>1</sub> )
	Fractional	Decimal		
0221ATF	11/32	.3438	2-3/16	3-7/8
0231ATF	23/64	.3594	2-9/32	4
2211ATF	U	.3680	2-9/32	4
0241ATF	3/8	.3750	2-3/8	4-1/8
0251ATF	25/64	.3906	2-3/8	4-1/8
0261ATF	13/32	.4062	2-5/8	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

CARBIDE AND COBALT / HSS DRILLS



# DREAM DRILLS

# CARBIDE with COOLANT HOLES, SHORT & LONG LENGTH, TiAIN-COATED



3 x D

### DH416 Series

EDP No.	Diameter (ød1)		Shank Diameter (ød2)	Flute Length (L2)	Overall Length (L1)
	Fractional	Decimal			
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

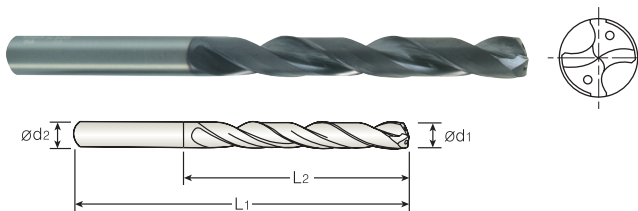


- ▶ **Application** : Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.
- ▶ **Advantage** : Self centering - center drilling is not required  
Excellent positioning - bush is not necessary  
Special Design - reaming is not required  
- good chip removal  
- powerful drilling
- ▶ **Tolerance** : Dia. Tolerance ød1: See page 385 Shank Tolerance ød2: -.0001 -.0005 Plain Shank: DIN6535-HA

Unit : inch

EDP No.	Diameter (ød1)		Shank Diameter (ød2)	Flute Length (L2)	Overall Length (L1)
	Fractional	Decimal			
0241BTF	3/8	.3705	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

CARBIDE AND COBALT / HSS DRILLS



5 x D

### DH418 Series

EDP No.	Diameter (ød.)		Shank Diameter (ød.)	Flute Length (L2)	Overall Length (L1)
	Fractional	Decimal			
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



- ▶ **Application** : Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.
- ▶ **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
- ▶ **Tolerance** : Dia. Tolerance ød1: See page 385 Shank Tolerance ød2: -.0001 -.0005 Plain Shank: DIN6535-HA

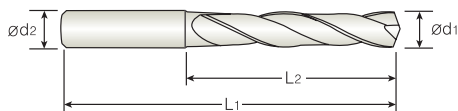
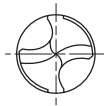
Unit : inch

EDP No.	Diameter (ød.)		Shank Diameter (ød.)	Flute Length (L2)	Overall Length (L1)
	Fractional	Decimal			
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

\* See Coolant Recommendations on Page 415

# DREAM DRILLS

## CARBIDE without COOLANT HOLES, SHORT LENGTH, TiAIN-COATED



3 x D

### DH404 Series

Unit : mm

EDP No.	Diameter ( $\varnothing d_1 = \varnothing d_2$ )		Flute Length (L <sub>2</sub> )	Overall Length (L <sub>1</sub> )
	Metric	Inch		
DH404030	3.0	.1181	16	46
DH404031	3.1	.1220	18	49
DH404032	3.2	.1260	18	49
DH404033	3.3	.1299	18	49
DH404034	3.4	.1339	20	52
DH404035	3.5	.1378	20	52
DH404036	3.6	.1417	20	52
DH404037	3.7	.1457	20	52
DH404038	3.8	.1496	22	55
DH404039	3.9	.1535	22	55
DH404040	4.0	.1575	22	55
DH404041	4.1	.1614	22	55
DH404042	4.2	.1654	22	55
DH404043	4.3	.1693	24	58
DH404044	4.4	.1732	24	58
DH404045	4.5	.1772	24	58
DH404046	4.6	.1811	24	58
DH404047	4.7	.1850	24	58
DH404048	4.8	.1890	26	62
DH404049	4.9	.1929	26	62
DH404050	5.0	.1969	26	62
DH404051	5.1	.2008	26	62
DH404052	5.2	.2047	26	62
DH404053	5.3	.2087	26	62
DH404054	5.4	.2126	28	66
DH404055	5.5	.2165	28	66
DH404056	5.6	.2205	28	66
DH404057	5.7	.2244	28	66
DH404058	5.8	.2283	28	66
DH404059	5.9	.2323	28	66
DH404060	6.0	.2362	28	66
DH404061	6.1	.2402	31	70
DH404062	6.2	.2441	31	70
DH404063	6.3	.2480	31	70
DH404064	6.4	.2520	31	70
DH404065	6.5	.2559	31	70
DH404066	6.6	.2598	31	70
DH404067	6.7	.2638	31	70
DH404068	6.8	.2677	34	74
DH404069	6.9	.2717	34	74
DH404070	7.0	.2756	34	74
DH404071	7.1	.2795	34	74
DH404072	7.2	.2835	34	74
DH404073	7.3	.2874	34	74
DH404074	7.4	.2913	34	74
DH404075	7.5	.2953	34	74

DIN 6539
CARBIDE
30° N
h6
h7
140°
DATA
P.414,415

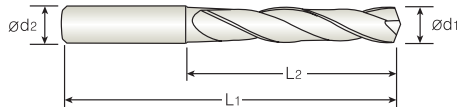
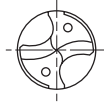
- ▶ **Application** : Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.
- ▶ **Advantage** : Self centering - center drilling is not required  
 Excellent positioning - bush is not necessary  
 Special Design - reaming is not required  
 - good chip removal  
 - powerful drilling

EDP No.	Diameter ( $\varnothing d_1 = \varnothing d_2$ )		Flute Length (L <sub>2</sub> )	Overall Length (L <sub>1</sub> )
	Metric	Inch		
DH404076	7.6	.2992	37	79
DH404077	7.7	.3031	37	79
DH404078	7.8	.3071	37	79
DH404079	7.9	.3110	37	79
DH404080	8.0	.3150	37	79
DH404081	8.1	.3189	37	79
DH404082	8.2	.3228	37	79
DH404083	8.3	.3268	37	79
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
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	.5511	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	.7086	62	123
DH404185	18.5	.7283	64	127
DH404190	19.0	.7480	64	127
DH404195	19.5	.7676	66	131
DH404200	20.0	.7873	66	131

CARBIDE AND COBALT / HSS DRILLS

# DREAM DRILLS

# CARBIDE with COOLANT HOLES, SHORT LENGTH, TiAIN COATED



3 x D



P.414,415

- ▶ **Application** : Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.
- ▶ **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

## DH406 Series

Unit : mm

EDP No.	Diameter		Shank Diameter (ød2)	Flute Length (L2)	Overall Length (L1)
	Metric (ød1)	Inch (ød1)			
DH406030	3.0	.1181	6.0	20	62
DH406031	3.1	.1220	6.0	20	62
DH406032	3.2	.1260	6.0	20	62
DH406033	3.3	.1299	6.0	20	62
DH406034	3.4	.1339	6.0	20	62
DH406035	3.5	.1378	6.0	20	62
DH406036	3.6	.1417	6.0	20	62
DH406037	3.7	.1457	6.0	20	62
DH406038	3.8	.1496	6.0	24	66
DH406039	3.9	.1535	6.0	24	66
DH406040	4.0	.1575	6.0	24	66
DH406041	4.1	.1614	6.0	24	66
DH406042	4.2	.1654	6.0	24	66
DH406043	4.3	.1693	6.0	24	66
DH406044	4.4	.1732	6.0	24	66
DH406045	4.5	.1772	6.0	24	66
DH406046	4.6	.1811	6.0	24	66
DH406047	4.7	.1850	6.0	24	66
DH406048	4.8	.1890	6.0	28	66
DH406049	4.9	.1929	6.0	28	66
DH406050	5.0	.1969	6.0	28	66
DH406051	5.1	.2008	6.0	28	66
DH406052	5.2	.2047	6.0	28	66
DH406053	5.3	.2087	6.0	28	66
DH406054	5.4	.2126	6.0	28	66
DH406055	5.5	.2165	6.0	28	66
DH406056	5.6	.2205	6.0	28	66
DH406057	5.7	.2244	6.0	28	66
DH406058	5.8	.2283	6.0	28	66

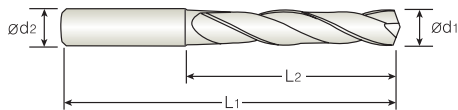
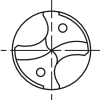
EDP No.	Diameter		Shank Diameter (ød2)	Flute Length (L2)	Overall Length (L1)
	Metric (ød1)	Inch (ød1)			
DH406059	5.9	.2323	6.0	28	66
DH406060	6.0	.2362	6.0	28	66
DH406061	6.1	.2402	8.0	34	79
DH406062	6.2	.2441	8.0	34	79
DH406063	6.3	.2480	8.0	34	79
DH406064	6.4	.2520	8.0	34	79
DH406065	6.5	.2559	8.0	34	79
DH406066	6.6	.2598	8.0	34	79
DH406067	6.7	.2638	8.0	34	79
DH406068	6.8	.2677	8.0	34	79
DH406069	6.9	.2717	8.0	34	79
DH406070	7.0	.2756	8.0	34	79
DH406071	7.1	.2795	8.0	41	79
DH406072	7.2	.2835	8.0	41	79
DH406073	7.3	.2874	8.0	41	79
DH406074	7.4	.2913	8.0	41	79
DH406075	7.5	.2953	8.0	41	79
DH406076	7.6	.2992	8.0	41	79
DH406077	7.7	.3031	8.0	41	79
DH406078	7.8	.3071	8.0	41	79
DH406079	7.9	.3110	8.0	41	79
DH406080	8.0	.3150	8.0	41	79
DH406081	8.1	.3189	10.0	47	89
DH406082	8.2	.3228	10.0	47	89
DH406083	8.3	.3268	10.0	47	89
DH406084	8.4	.3307	10.0	47	89
DH406085	8.5	.3346	10.0	47	89
DH406086	8.6	.3386	10.0	47	89
DH406087	8.7	.3425	10.0	47	89

CARBIDE AND COBALT / HSS DRILLS

\* See Coolant Recommendations on Page 415

# DREAM DRILLS

# CARBIDE with COOLANT HOLES, SHORT LENGTH, TiAIN COATED



3 x D

DIN 6537

CARBIDE

30° N

h6

m7

140°

DATA

P.414,415

- ▶ **Application** : Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.
- ▶ **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

## DH406 Series

Unit : mm

EDP No.	Diameter		Shank Diameter (ød2)	Flute Length (L2)	Overall Length (L1)
	Metric (ød1)	Inch (ød1)			
DH406088	8.8	.3465	10.0	47	89
DH406089	8.9	.3504	10.0	47	89
DH406090	9.0	.3543	10.0	47	89
DH406091	9.1	.3583	10.0	47	89
DH406092	9.2	.3622	10.0	47	89
DH406093	9.3	.3661	10.0	47	89
DH406094	9.4	.3701	10.0	47	89
DH406095	9.5	.3740	10.0	47	89
DH406096	9.6	.3780	10.0	47	89
DH406097	9.7	.3819	10.0	47	89
DH406098	9.8	.3858	10.0	47	89
DH406099	9.9	.3898	10.0	47	89
DH406100	10.0	.3937	10.0	47	89
DH406101	10.1	.3976	12.0	55	102
DH406102	10.2	.4016	12.0	55	102
DH406103	10.3	.4055	12.0	55	102
DH406104	10.4	.4094	12.0	55	102
DH406105	10.5	.4134	12.0	55	102
DH406106	10.6	.4173	12.0	55	102
DH406107	10.7	.4212	12.0	55	102
DH406108	10.8	.4252	12.0	55	102
DH406109	10.9	.4291	12.0	55	102
DH406110	11.0	.4330	12.0	55	102
DH406111	11.1	.4370	12.0	55	102
DH406112	11.2	.4409	12.0	55	102

EDP No.	Diameter		Shank Diameter (ød2)	Flute Length (L2)	Overall Length (L1)
	Metric (ød1)	Inch (ød1)			
DH406113	11.3	.4448	12.0	102	55
DH406114	11.4	.4488	12.0	102	55
DH406115	11.5	.4527	12.0	102	55
DH406116	11.6	.4566	12.0	102	55
DH406117	11.7	.4606	12.0	102	55
DH406118	11.8	.4645	12.0	102	55
DH406119	11.9	.4685	12.0	102	55
DH406120	12.0	.4724	12.0	102	55
DH406125	12.5	.4921	14.0	107	60
DH406130	13.0	.5118	14.0	107	60
DH406135	13.5	.5314	14.0	107	60
DH406140	14.0	.5511	14.0	107	60
DH406145	14.5	.5708	16.0	115	65
DH406150	15.0	.5905	16.0	115	65
DH406155	15.5	.6102	16.0	115	65
DH406160	16.0	.6299	16.0	115	65
DH406165	16.5	.6495	18.0	123	73
DH406170	17.0	.6692	18.0	123	73
DH406175	17.5	.6889	18.0	123	73
DH406180	18.0	.7086	18.0	123	73
DH406185	18.5	.7283	20.0	131	79
DH406190	19.0	.7480	20.0	131	79
DH406195	19.5	.7676	20.0	131	79
DH406200	20.0	.7873	20.0	131	79

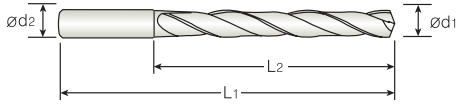
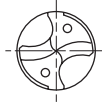
CARBIDE AND COBALT / HSS DRILLS

\* See Coolant Recommendations on Page 415



# DREAM DRILLS

# CARBIDE with COOLANT HOLES, LONG LENGTH, TiAIN COATED



DIN 6537

CARBIDE

30° N

h6

m7

140°

DATA

P.414,415

- ▶ **Application** : Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.
- ▶ **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

5 x D

## DH408 Series

Unit : mm

EDP No.	Diameter		Shank Diameter (ød <sub>2</sub> )	Flute Length (L <sub>2</sub> )	Overall Length (L <sub>1</sub> )
	Metric (ød <sub>1</sub> )	Inch (ød <sub>1</sub> )			
DH408030	3.0	.1181	6.0	28	66
DH408031	3.1	.1220	6.0	28	66
DH408032	3.2	.1260	6.0	28	66
DH408033	3.3	.1299	6.0	28	66
DH408034	3.4	.1339	6.0	28	66
DH408035	3.5	.1378	6.0	28	66
DH408036	3.6	.1417	6.0	28	66
DH408037	3.7	.1457	6.0	28	66
DH408038	3.8	.1496	6.0	36	74
DH408039	3.9	.1535	6.0	36	74
DH408040	4.0	.1575	6.0	36	74
DH408041	4.1	.1614	6.0	36	74
DH408042	4.2	.1654	6.0	36	74
DH408043	4.3	.1693	6.0	36	74
DH408044	4.4	.1732	6.0	36	74
DH408045	4.5	.1772	6.0	36	74
DH408046	4.6	.1811	6.0	36	74
DH408047	4.7	.1850	6.0	36	74
DH408048	4.8	.1890	6.0	44	82
DH408049	4.9	.1929	6.0	44	82
DH408050	5.0	.1969	6.0	44	82
DH408051	5.1	.2008	6.0	44	82
DH408052	5.2	.2047	6.0	44	82
DH408053	5.3	.2087	6.0	44	82
DH408054	5.4	.2126	6.0	44	82
DH408055	5.5	.2165	6.0	44	82
DH408056	5.6	.2205	6.0	44	82
DH408057	5.7	.2244	6.0	44	82
DH408058	5.8	.2283	6.0	44	82
DH408059	5.9	.2323	6.0	44	82

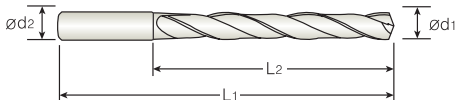
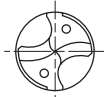
EDP No.	Diameter		Shank Diameter (ød <sub>2</sub> )	Flute Length (L <sub>2</sub> )	Overall Length (L <sub>1</sub> )
	Metric (ød <sub>1</sub> )	Inch (ød <sub>1</sub> )			
DH408060	6.0	.2362	6.0	44	82
DH408061	6.1	.2402	8.0	53	91
DH408062	6.2	.2441	8.0	53	91
DH408063	6.3	.2480	8.0	53	91
DH408064	6.4	.2520	8.0	53	91
DH408065	6.5	.2559	8.0	53	91
DH408066	6.6	.2598	8.0	53	91
DH408067	6.7	.2638	8.0	53	91
DH408068	6.8	.2677	8.0	53	91
DH408069	6.9	.2717	8.0	53	91
DH408070	7.0	.2756	8.0	53	91
DH408071	7.1	.2795	8.0	53	91
DH408072	7.2	.2835	8.0	53	91
DH408073	7.3	.2874	8.0	53	91
DH408074	7.4	.2913	8.0	53	91
DH408075	7.5	.2953	8.0	53	91
DH408076	7.6	.2992	8.0	53	91
DH408077	7.7	.3031	8.0	53	91
DH408078	7.8	.3071	8.0	53	91
DH408079	7.9	.3110	8.0	53	91
DH408080	8.0	.3150	8.0	53	91
DH408081	8.1	.3189	10.0	61	103
DH408082	8.2	.3228	10.0	61	103
DH408083	8.3	.3268	10.0	61	103
DH408084	8.4	.3307	10.0	61	103
DH408085	8.5	.3346	10.0	61	103
DH408086	8.6	.3386	10.0	61	103
DH408087	8.7	.3425	10.0	61	103
DH408088	8.8	.3465	10.0	61	103
DH408089	8.9	.3504	10.0	61	103

CARBIDE AND COBALT / HSS DRILLS

\* See Coolant Recommendations on Page 415

# DREAM DRILLS

## CARBIDE with COOLANT HOLES, LONG LENGTH, TiAIN COATED



5 x D

### DH408 Series

EDP No.	Diameter		Shank Diameter (ød2)	Flute Length (L2)	Overall Length (L1)
	Metric (ød1)	Inch (ød1)			
DH408090	9.0	.3543	10.0	61	103
DH408091	9.1	.3583	10.0	61	103
DH408092	9.2	.3622	10.0	61	103
DH408093	9.3	.3661	10.0	61	103
DH408094	9.4	.3701	10.0	61	103
DH408095	9.5	.3740	10.0	61	103
DH408096	9.6	.3780	10.0	61	103
DH408097	9.7	.3819	10.0	61	103
DH408098	9.8	.3858	10.0	61	103
DH408099	9.9	.3898	10.0	61	103
DH408100	10.0	.3937	10.0	61	103
DH408101	10.1	.3976	12.0	71	118
DH408102	10.2	.4016	12.0	71	118
DH408103	10.3	.4055	12.0	71	118
DH408104	10.4	.4094	12.0	71	118
DH408105	10.5	.4134	12.0	71	118
DH408106	10.6	.4173	12.0	71	118
DH408107	10.7	.4212	12.0	71	118
DH408108	10.8	.4252	12.0	71	118
DH408109	10.9	.4291	12.0	71	118
DH408110	11.0	.4330	12.0	71	118
DH408111	11.1	.4370	12.0	71	118
DH408112	11.2	.4409	12.0	71	118
DH408113	11.3	.4448	12.0	71	118

DIN 6537
CARBIDE
30° N
h6
m7
140°
DATA
P.414,415

- ▶ **Application** : Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.
- ▶ **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

Unit : mm

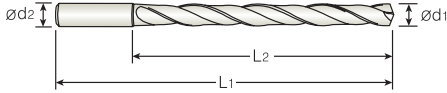
EDP No.	Diameter		Shank Diameter (ød2)	Flute Length (L2)	Overall Length (L1)
	Metric (ød1)	Inch (ød1)			
DH408114	11.4	.4488	12.0	71	118
DH408115	11.5	.4527	12.0	71	118
DH408116	11.6	.4566	12.0	71	118
DH408117	11.7	.4606	12.0	71	118
DH408118	11.8	.4645	12.0	71	118
DH408119	11.9	.4685	12.0	71	118
DH408120	12.0	.4724	12.0	71	118
DH408125	12.5	.4921	14.0	77	124
DH408130	13.0	.5118	14.0	77	124
DH408135	13.5	.5314	14.0	77	124
DH408140	14.0	.5511	14.0	77	124
DH408145	14.5	.5708	16.0	83	133
DH408150	15.0	.5905	16.0	83	133
DH408155	15.5	.6102	16.0	83	133
DH408160	16.0	.6299	16.0	83	133
DH408165	16.5	.6495	18.0	93	143
DH408170	17.0	.6692	18.0	93	143
DH408175	17.5	.6889	18.0	93	143
DH408180	18.0	.7086	18.0	93	143
DH408185	18.5	.7283	20.0	101	153
DH408190	19.0	.7480	20.0	101	153
DH408195	19.5	.7676	20.0	101	153
DH408200	20.0	.7873	20.0	101	153

CARBIDE AND COBALT / HSS DRILLS

\* See Coolant Recommendations on Page 415

# DREAM DRILLS

# CARBIDE with COOLANT HOLES, EXTRA LONG LENGTH, TiAIN COATED



8 x D

## DH421 Series

EDP No.	Diameter		Shank Diameter (ød2)	Flute Length (L2)	Overall Length (L1)
	Metric (ød1)	Inch (ød1)			
DH421030	3.0	.1181	6.0	34	72
DH421031	3.1	.1220	6.0	34	72
DH421032	3.2	.1260	6.0	34	72
DH421033	3.3	.1299	6.0	34	72
DH421034	3.4	.1339	6.0	34	72
DH421035	3.5	.1378	6.0	34	72
DH421036	3.6	.1417	6.0	34	72
DH421037	3.7	.1457	6.0	34	72
DH421038	3.8	.1496	6.0	43	81
DH421039	3.9	.1535	6.0	43	81
DH421040	4.0	.1575	6.0	43	81
DH421041	4.1	.1614	6.0	43	81
DH421042	4.2	.1654	6.0	43	81
DH421043	4.3	.1693	6.0	43	81
DH421044	4.4	.1732	6.0	43	81
DH421045	4.5	.1772	6.0	43	81
DH421046	4.6	.1811	6.0	43	81
DH421047	4.7	.1850	6.0	43	81
DH421048	4.8	.1890	6.0	57	95
DH421049	4.9	.1929	6.0	57	95
DH421050	5.0	.1969	6.0	57	95
DH421051	5.1	.2008	6.0	57	95
DH421052	5.2	.2047	6.0	57	95
DH421053	5.3	.2087	6.0	57	95
DH421054	5.4	.2126	6.0	57	95
DH421055	5.5	.2165	6.0	57	95
DH421056	5.6	.2205	6.0	57	95
DH421057	5.7	.2244	6.0	57	95
DH421058	5.8	.2283	6.0	57	95
DH421059	5.9	.2323	6.0	57	95
DH421060	6.0	.2362	6.0	57	95
DH421061	6.1	.2402	8.0	76	114
DH421062	6.2	.2441	8.0	76	114
DH421063	6.3	.2480	8.0	76	114
DH421064	6.4	.2520	8.0	76	114
DH421065	6.5	.2559	8.0	76	114
DH421066	6.6	.2598	8.0	76	114
DH421067	6.7	.2638	8.0	76	114
DH421068	6.8	.2677	8.0	76	114
DH421069	6.9	.2717	8.0	76	114
DH421070	7.0	.2756	8.0	76	114
DH421071	7.1	.2795	8.0	76	114
DH421072	7.2	.2835	8.0	76	114
DH421073	7.3	.2874	8.0	76	114
DH421074	7.4	.2913	8.0	76	114
DH421075	7.5	.2953	8.0	76	114



P.414,415

- ▶ **Application** : Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.
- ▶ **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

Unit : mm

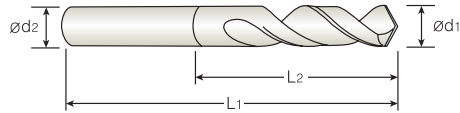
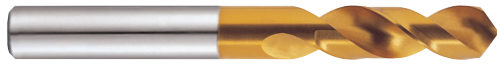
EDP No.	Diameter		Shank Diameter (ød2)	Flute Length (L2)	Overall Length (L1)
	Metric (ød1)	Inch (ød1)			
DH421076	7.6	.2992	8.0	76	114
DH421077	7.7	.3031	8.0	76	114
DH421078	7.8	.3071	8.0	76	114
DH421079	7.9	.3110	8.0	76	114
DH421080	8.0	.3150	8.0	76	114
DH421081	8.1	.3189	10.0	95	142
DH421082	8.2	.3228	10.0	95	142
DH421083	8.3	.3268	10.0	95	142
DH421084	8.4	.3307	10.0	95	142
DH421085	8.5	.3346	10.0	95	142
DH421086	8.6	.3386	10.0	95	142
DH421087	8.7	.3425	10.0	95	142
DH421088	8.8	.3465	10.0	95	142
DH421089	8.9	.3504	10.0	95	142
DH421090	9.0	.3543	10.0	95	142
DH421091	9.1	.3583	10.0	95	142
DH421092	9.2	.3622	10.0	95	142
DH421093	9.3	.3661	10.0	95	142
DH421094	9.4	.3701	10.0	95	142
DH421095	9.5	.3740	10.0	95	142
DH421096	9.6	.3780	10.0	95	142
DH421097	9.7	.3819	10.0	95	142
DH421098	9.8	.3858	10.0	95	142
DH421099	9.9	.3898	10.0	95	142
DH421100	10.0	.3937	10.0	95	142
DH421101	10.1	.3976	12.0	114	162
DH421102	10.2	.4016	12.0	114	162
DH421103	10.3	.4055	12.0	114	162
DH421104	10.4	.4094	12.0	114	162
DH421105	10.5	.4134	12.0	114	162
DH421106	10.6	.4173	12.0	114	162
DH421107	10.7	.4212	12.0	114	162
DH421108	10.8	.4252	12.0	114	162
DH421109	10.9	.4291	12.0	114	162
DH421110	11.0	.4330	12.0	114	162
DH421111	11.1	.4370	12.0	114	162
DH421112	11.2	.4409	12.0	114	162
DH421113	11.3	.4448	12.0	114	162
DH421114	11.4	.4488	12.0	114	162
DH421115	11.5	.4527	12.0	114	162
DH421116	11.6	.4566	12.0	114	162
DH421117	11.7	.4606	12.0	114	162
DH421118	11.8	.4645	12.0	114	162
DH421119	11.9	.4685	12.0	114	162
DH421120	12.0	.4724	12.0	114	162

\* See Coolant Recommendations on Page 415

CARBIDE AND COBALT / HSS DRILLS



# HSS-EX, HPD-SUS, STUB LENGTH



four facet

HSS-EX
38° W
h7
h8
130°
120°
DATA P.415

up to 4mm bis 4mm    over 4mm über 4mm

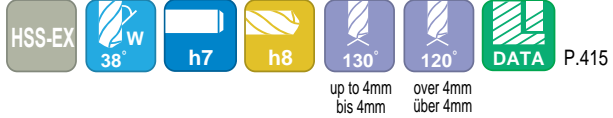
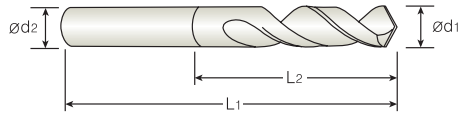
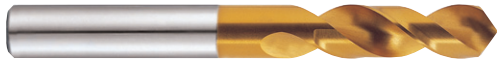
- ▶ **Application** : Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.
- ▶ **Advantage** : Self centering - center drilling is not required  
 Excellent positioning - bush is not necessary  
 Special Design - reaming is not required  
 - good chip removal  
 - powerful drilling
- ▶ **Plain Shank** : DIN6535-HA

Unit : mm

EDP No.	Diameter ( $\varnothing d_1 = \varnothing d_2$ )		Flute Length (L <sub>2</sub> )	Overall Length (L <sub>1</sub> )
	Metric	Inch		
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
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

EDP No.	Diameter ( $\varnothing d_1 = \varnothing d_2$ )		Flute Length (L <sub>2</sub> )	Overall Length (L <sub>1</sub> )
	Metric	Inch		
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
0761JCN	7.6	.2992	37	81
0771JCN	7.7	.3031	37	81
0781JCN	7.8	.3071	37	81
0791JCN	7.9	.3110	37	81
0801JCN	8.0	.3150	37	81
0811JCN	8.1	.3189	37	87
0821JCN	8.2	.3228	37	87
0831JCN	8.3	.3268	37	87
0841JCN	8.4	.3307	37	87
0851JCN	8.5	.3346	37	87
0861JCN	8.6	.3386	40	90
0871JCN	8.7	.3425	40	90
0881JCN	8.8	.3465	40	90
0891JCN	8.9	.3504	40	90
0901JCN	9.0	.3543	40	90
0911JCN	9.1	.3583	40	90
0921JCN	9.2	.3622	40	90
0931JCN	9.3	.3661	40	90
0941JCN	9.4	.3701	40	90
0951JCN	9.5	.3740	40	90
0961JCN	9.6	.3780	43	93
0971JCN	9.7	.3819	43	93
0981JCN	9.8	.3858	43	93
0991JCN	9.9	.3898	43	93
1001JCN	10.0	.3937	43	93
1011JCN	10.1	.3976	43	100
1021JCN	10.2	.4016	43	100
1031JCN	10.3	.4055	43	100

CARBIDE AND COBALT / HSS DRILLS

**HPD****HSS-EX, HPD-SUS, STUB LENGTH****Stub series**

- ▶ **Application** : Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.
- ▶ **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

Unit : mm

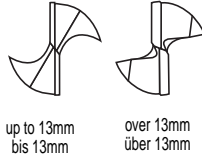
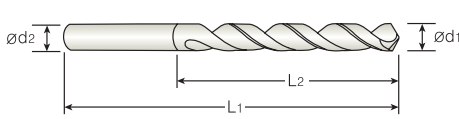
EDP No.	Diameter (ød1=ød2)		Flute Length (L2)	Overall Length (L1)
	Metric	Inch		
1041JCN	10.4	.4094	43	100
1051JCN	10.5	.4134	43	100
1061JCN	10.6	.4173	43	100
1071JCN	10.7	.4213	47	104
1081JCN	10.8	.4252	47	104
1091JCN	10.9	.4291	47	104
1101JCN	11.0	.4331	47	104
1111JCN	11.1	.4370	47	104
1121JCN	11.2	.4409	47	104
1131JCN	11.3	.4449	47	104
1141JCN	11.4	.4488	47	104
1151JCN	11.5	.4528	47	104
1161JCN	11.6	.4567	47	104
1171JCN	11.7	.4606	47	104

EDP No.	Diameter (ød1=ød2)		Flute Length (L2)	Overall Length (L1)
	Metric	Inch		
1181JCN	11.8	.4646	47	104
1191JCN	11.9	.4685	51	108
1201JCN	12.0	.4724	51	108
1211JCN	12.1	.4764	51	108
1221JCN	12.2	.4803	51	108
1231JCN	12.3	.4843	51	108
1241JCN	12.4	.4882	51	108
1251JCN	12.5	.4921	51	108
1261JCN	12.6	.4961	51	108
1271JCN	12.7	.5000	51	108
1281JCN	12.8	.5039	51	108
1291JCN	12.9	.5079	51	108
1301JCN	13.0	.5118	51	108

CARBIDE AND COBALT / HSS DRILLS

# HPD

## HSS-EX, HPD-SUS, JOBBER LENGTH



HSS-EX
38°
h7
h8
130°
120°
DATA
P.415

up to 4mm  
bis 4mm

over 4mm  
über 4mm

- ▶ **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 deflection.  
High vanadium HSS-EX material with superior TiN coating  
- higher speed and feed, longer service life  
High quality-good surface finishes, high productivity.

### Jobber series

Unit : mm

EDP No.	Diameter (ød1=ød2)		Flute Length (L2)	Overall Length (L1)
	Metric	Inch		
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
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

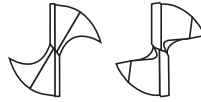
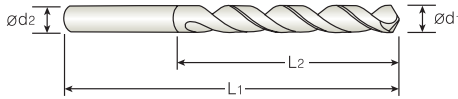
EDP No.	Diameter (ød1=ød2)		Flute Length (L2)	Overall Length (L1)
	Metric	Inch		
0621KCN	6.2	.2441	63	107
0631KCN	6.3	.2480	63	107
0641KCN	6.4	.2520	63	107
0651KCN	6.5	.2559	63	107
0661KCN	6.6	.2598	63	107
0671KCN	6.7	.2638	63	107
0681KCN	6.8	.2677	69	113
0691KCN	6.9	.2717	69	113
0701KCN	7.0	.2756	69	113
0711KCN	7.1	.2795	69	113
0721KCN	7.2	.2835	69	113
0731KCN	7.3	.2874	69	113
0741KCN	7.4	.2913	69	113
0751KCN	7.5	.2953	69	113
0761KCN	7.6	.2992	75	119
0771KCN	7.7	.3031	75	119
0781KCN	7.8	.3071	75	119
0791KCN	7.9	.3110	75	119
0801KCN	8.0	.3150	75	119
0811KCN	8.1	.3189	75	125
0821KCN	8.2	.3228	75	125
0831KCN	8.3	.3268	75	125
0841KCN	8.4	.3307	75	125
0851KCN	8.5	.3346	75	125
0861KCN	8.6	.3386	81	131
0871KCN	8.7	.3425	81	131
0881KCN	8.8	.3465	81	131
0891KCN	8.9	.3504	81	131
0901KCN	9.0	.3543	81	131
0911KCN	9.1	.3583	81	131
0921KCN	9.2	.3622	81	131
0931KCN	9.3	.3661	81	131
0941KCN	9.4	.3701	81	131
0951KCN	9.5	.3740	81	131
0961KCN	9.6	.3780	87	137
0971KCN	9.7	.3819	87	137
0981KCN	9.8	.3858	87	137
0991KCN	9.9	.3898	87	137
1001KCN	10.0	.3937	87	137
1011KCN	10.1	.3976	87	144
1021KCN	10.2	.4016	87	144
1031KCN	10.3	.4055	87	144

CARBIDE AND COBALT / HSS DRILLS



up to 4mm  
bis 4mm

over 4mm  
über 4mm



up to 13mm

over 13mm

## Jobber series

- **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 deflection.  
High vanadium HSS-EX material with superior TiN coating  
- higher speed and feed, longer service life  
High quality-good surface finishes, high productivity.

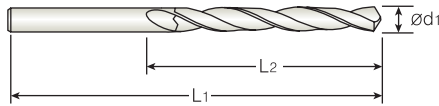
Unit : mm

EDP No.	Diameter ( $\varnothing d_1 = \varnothing d_2$ )		Flute Length (L <sub>2</sub> )	Overall Length (L <sub>1</sub> )
	Metric	Inch		
1041KCN	10.4	.4094	87	144
1051KCN	10.5	.4134	87	144
1061KCN	10.6	.4173	87	144
1071KCN	10.7	.4213	94	151
1081KCN	10.8	.4252	94	151
1091KCN	10.9	.4291	94	151
1101KCN	11.0	.4331	94	151
1111KCN	11.1	.4370	94	151
1121KCN	11.2	.4409	94	151
1131KCN	11.3	.4449	94	151
1141KCN	11.4	.4488	94	151
1151KCN	11.5	.4528	94	151
1161KCN	11.6	.4567	94	151
1171KCN	11.7	.4606	94	151
1181KCN	11.8	.4646	94	151
1191KCN	11.9	.4685	101	158
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

EDP No.	Diameter ( $\varnothing d_1 = \varnothing d_2$ )		Flute Length (L <sub>2</sub> )	Overall Length (L <sub>1</sub> )
	Metric	Inch		
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	.5315	106	166
1401KCN	14.0	.5512	106	166
1411KCN	14.1	.5551	109	169
1451KCN	14.5	.5709	109	169
1501KCN	15.0	.5906	109	169
1551KCN	15.5	.6102	112	172
1561KCN	15.6	.6141	112	172
1601KCN	16.0	.6299	112	172
1651KCN	16.5	.6496	115	181
1701KCN	17.0	.6693	115	181
1751KCN	17.5	.6890	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	.7677	125	191
1961KCN	19.6	.7716	125	191
2001KCN	20.0	.7874	125	191



# GOLD-P DRILLS HSS, STRAIGHT SHANK, JOBBER LENGTH, GOLD-P COATED



- ▶ **Flute Geometry** : Right hand spiral, wider flutes
- ▶ **Point Angle** : 135°:Split point... .059 diameter and over.
- ▶ **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

## ▶ Fractional sizes

Unit:inch

EDP No.	SIZE	D	L2	L1
** 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

## ▶ Letter sizes

Unit:inch

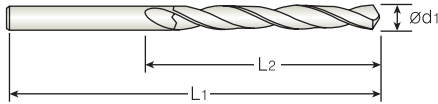
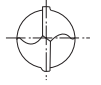
EDP No.	SIZE	D	L2	L1
** D1GP139101	A	.2340	2-5/8	3-7/8
** D1GP139102	B	.2380	2-3/4	4
** D1GP139103	C	.2420	2-3/4	4
** D1GP139104	D	.2460	2-3/4	4
** D1GP139105	E	.2500	2-3/4	4
** D1GP139106	F	.2570	2-7/8	4-1/8
** D1GP139107	G	.2610	2-7/8	4-1/8
** D1GP139108	H	.2660	2-7/8	4-1/8
** D1GP139109	I	.2720	2-7/8	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

- \* 5per package
- \*\* 10per package

Tolerance of D /	upto 1/8(.1250)	0~ -.0005
	over 1/8(.1250) ~ upto 1/4(.2500)	0~ -.0007
	over 1/4(.2500) ~ upto 1/2(.5000)	0~ -.0010

# GOLD-P DRILLS

# HSS, STRAIGHT SHANK, JOBBER LENGTH, GOLD-P COATED



ANSI HSS N 30° h8 135° DATA P.416

- ▶ **Flute Geometry** : Right hand spiral, wider flutes
- ▶ **Point Angle** : 135°:Split point... .059 diameter and over.
- ▶ **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

## ▶ Wire gauge sizes

Unit:inch

EDP No.	SIZE	D	L2	L1
** 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

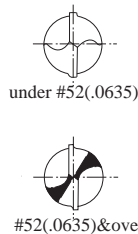
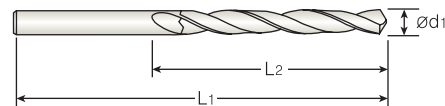
EDP No.	SIZE	D	L2	L1
** D1GP138228	29	.1360	1-3/4	2-7/8
** D1GP138227	30	.1285	1-5/8	2-3/4
** D1GP138226	31	.1200	1-5/8	2-3/4
** D1GP138225	32	.1160	1-5/8	2-3/4
** D1GP138224	33	.1130	1-1/2	2-5/8
** D1GP138223	34	.1110	1-1/2	2-5/8
** D1GP138222	35	.1100	1-1/2	2-5/8
** D1GP138221	36	.1065	1-7/16	2-1/2
** 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

- \* 5per package
- \*\* 10per package

Tolerance of D /	upto 1/8(.1250)	0~- .0005
	over 1/8(.1250) ~ upto 1/4(.2500)	0~- .0007
	over 1/4(.2500) ~ upto 1/2(.5000)	0~- .0010

CARBIDE AND COBALT / HSS DRILLS

# GOLD-P DRILLS HSSCo8, STRAIGHT SHANK, JOBBER LENGTH, GOLD-P COATED



ANSI HSS Co8 N 30° h8 135° DATA P.416

- ▶ **Flute Geometry** : Right hand spiral, wider flutes
- ▶ **Point Angle** : 135°:Split point... .059 diameter and over.
- ▶ **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

## ▶ Fractional sizes

Unit:inch

EDP No.	SIZE	D	L2	L1
** 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
** 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

## ▶ Letter sizes

Unit:inch

EDP No.	SIZE	D	L2	L1
** 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
** D2GP185016	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
** 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

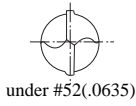
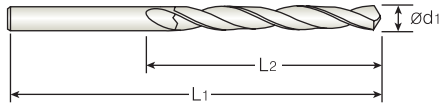
- \* 5per package
- \*\* 10per package

CARBIDE AND COBALT / HSS DRILLS

Tolerance of D /	upto 1/8(.1250)
	0~ -.0005
	over 1/8(.1250) ~ upto 1/4(.2500)
	0~ -.0007
	over 1/4(.2500) ~ upto 1/2(.5000)
	0~ -.0010

# GOLD-P DRILLS

# HSSCo8, STRAIGHT SHANK, JOBBER LENGTH, GOLD-P COATED



ANSI
HSS Co8
N 30°
h8
135°
DATA
P.416

- ▶ **Flute Geometry** : Right hand spiral, wider flutes
- ▶ **Point Angle** : 135°:Split point... .059 diameter and over.
- ▶ **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

## ▶ Wire gauge sizes

Unit:inch

EDP No.	SIZE	D	L2	L1
** 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

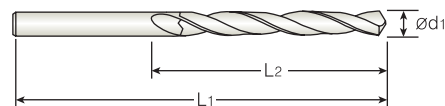
EDP No.	SIZE	D	L2	L1
** D2GP187228	29	.1360	1-3/4	2-7/8
** D2GP187227	30	.1285	1-5/8	2-3/4
** D2GP187226	31	.1200	1-5/8	2-3/4
** D2GP187225	32	.1160	1-5/8	2-3/4
** D2GP187224	33	.1130	1-1/2	2-5/8
** D2GP187223	34	.1110	1-1/2	2-5/8
** D2GP187222	35	.1100	1-1/2	2-5/8
** D2GP187221	36	.1065	1-7/16	2-1/2
** 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

\*\* 10per package

Tolerance of D /	upto 1/8(.1250)
	0~ -.0005
	over 1/8(.1250) ~ upto 1/4(.2500)
0~ -.0007	
over 1/4(.2500) ~ upto 1/2(.5000)	
0~ -.0010	

CARBIDE AND COBALT / HSS DRILLS

# GOLD-P DRILLS HSSCo5, STRAIGHT SHANK, JOBBER LENGTH, PARABOLIC FLUTE, GOLD-P COATED



ANSI
HSS Co5
N 38°
h8
130°
DATA
P.417

- ▶ **Flute Geometry** : Right hand spiral, 38° helix, parabolic flute.
- ▶ **Point Angle** : 130°:Split point... .059 diameter and over.
- ▶ **Surface treatment** : Bright body TiN coating on working part
- ▶ **Application** : Improved chip removal in most materials, especially in deep drilling applications.

## ▶ Fractional sizes

Unit:inch

EDP No.	SIZE	D	L2	L1
** 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
** 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

## ▶ Letter sizes

Unit:inch

EDP No.	SIZE	D	L2	L1
** 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
** DLGP511016	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
** 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

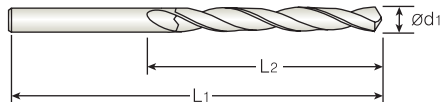
- \* 5per package
- \*\* 10per package

CARBIDE AND COBALT / HSS DRILLS

Tolerance of D	upto 1/8(.1250)
	0~ -.0005
	over 1/8(.1250) ~ upto 1/4(.2500)
	0~ -.0007
	over 1/4(.2500) ~ upto 1/2(.5000)
	0~ -.0010

# GOLD-P DRILLS

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



ANSI
HSS Co5
N 38°
h8
130°
DATA
P.417

- ▶ **Flute Geometry** : Right hand spiral, 38° helix, parabolic flute.
- ▶ **Point Angle** : 130°:Split point... .059 diameter and over.
- ▶ **Surface treatment** : Bright body TiN coating on working part
- ▶ **Application** : Improved chip removal in most materials, especially in deep drilling applications.

## ▶ Wire gauge sizes

Unit:inch

EDP No.	SIZE	D	L2	L1
** 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.	SIZE	D	L2	L1
** 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

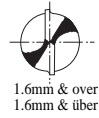
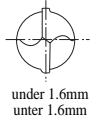
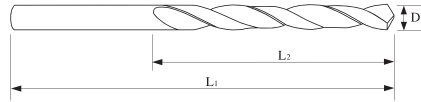
- \* 5per package
- \*\* 10per package

CARBIDE AND COBALT / HSS DRILLS

Tolerance of D /	upto 1/8(.1250)
	0~ -.0005
	/over 1/8(.1250) ~ upto 1/4(.2500)
	0~ -.0007
	/over 1/4(.2500) ~ upto 1/2(.5000)
	0~ -.0010



# GOLD-P DRILLS HSS Co5, STRAIGHT SHANK, JOBBER LENGTH, GOLD-P COATED HSS DRILLS-METRIC



- ▶ **Flute Geometry** : Right hand spiral, wider flutes.
- ▶ **Point Angle** : 130°:under 1.6mm-Normal point.  
form 1.6mm-Split point.
- ▶ **Surface treatment** : Bright body TiN coating on working part
- ▶ **Application** : Drilling in steel, cast steel, alloyed and non-alloyed, gray cast iron, graphite, malleable cast iron.

Unit:mm

EDP No.	SIZE	D	L <sub>2</sub>	L <sub>1</sub>
DLGP195010	1	.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	.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	.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	.1575	43	75
DLGP195041	4.1	.1614	43	75
DLGP195042	4.2	.1654	43	75
DLGP195043	4.3	.1693	37	80
DLGP195044	4.4	.1732	37	80
DLGP195045	4.5	.1772	37	80

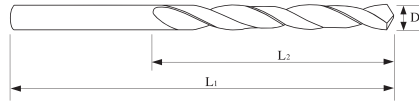
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DLGP195046	4.6	.1811	37	80
DLGP195047	4.7	.1850	37	80
DLGP195048	4.8	.1890	52	86
DLGP195049	4.9	.1929	52	86
DLGP195050	5	.1969	52	86
DLGP195051	5.1	.2008	52	86
DLGP195052	5.2	.2047	52	86
DLGP195053	5.3	.2087	52	86
DLGP195054	5.4	.2126	57	93
DLGP195055	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	.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	.2756	69	109
DLGP195071	7.1	.2795	69	109
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	.3150	75	117
DLGP195081	8.1	.3189	75	117

CARBIDE AND COBALT / HSS DRILLS



# GOLD-P DRILLS

# HSS Co5, STRAIGHT SHANK, JOBBER LENGTH, GOLD-P COATED HSS DRILLS-METRIC



under 1.6mm  
unter 1.6mm



1.6mm & over  
1.6mm & über

DIN 338	HSS Co5	N 33°	h8	133°	DATA
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- ▶ **Flute Geometry** : Right hand spiral, wider flutes.
- ▶ **Point Angle** : 130°:under 1.6mm-Normal point.  
form 1.6mm-Split point.
- ▶ **Surface treatment** : Bright body TiN coating on working part
- ▶ **Application** : Drilling in steel, cast steel, alloyed and non-alloyed, gray cast iron, graphite, malleable cast iron.

Unit:mm

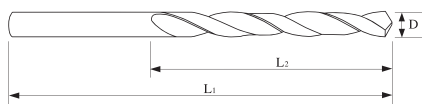
EDP No.	SIZE	D	L2	L1
DLGP195082	8.2	.3228	75	117
DLGP195083	8.3	.3268	75	117
DLGP195084	8.4	.3307	75	117
DLGP195085	8.5	.3346	75	117
DLGP195086	8.6	.3386	81	125
DLGP195087	8.7	.3425	81	125
DLGP195088	8.8	.3465	81	125
DLGP195089	8.9	.3504	81	125
DLGP195090	9	.3543	81	125
DLGP195091	9.1	.3583	81	125
DLGP195092	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	.3937	87	133
DLGP195101	10.1	.3976	87	133
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

EDP No.	SIZE	D	L2	L1
DLGP195107	10.7	.4213	94	142
DLGP195108	10.8	.4252	94	142
DLGP195109	10.9	.4291	94	142
DLGP195110	11	.4331	94	142
DLGP195111	11.1	.4370	94	142
DLGP195112	11.2	.4409	94	142
DLGP195113	11.3	.4449	94	142
DLGP195114	11.4	.4488	94	142
DLGP195115	11.5	.4528	94	142
DLGP195116	11.6	.4567	94	142
DLGP195117	11.7	.4606	94	142
DLGP195118	11.8	.4646	94	142
DLGP195119	11.9	.4685	101	151
DLGP195120	12	.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	.4961	101	151
DLGP195127	12.7	.5000	101	151
DLGP195128	12.8	.5039	101	151
DLGP195129	12.9	.5079	101	151
DLGP195130	13	.5118	101	151

CARBIDE AND COBALT / HSS DRILLS

# GOLD-P DRILLS

## HSS Co5, STRAIGHT SHANK, JOBBER LENGTH, PARABOLIC FLUTE FOR DEEP HOLES, GOLD-P COATED HSS DRILLS-METRIC



- ▶ **Flute Geometry** : Right hand spiral, 38helix, Parabolic flutes.
- ▶ **Point Angle** : 130°:Split point.  
form 1.6mm-Split point.
- ▶ **Surface treatment** : Bright body TiN coating on working part
- ▶ **Application** : Improved chip removal in most materials, especially in deep drilling applications.

Unit:mm

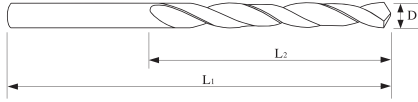
EDP No.	SIZE	D	L <sub>2</sub>	L <sub>1</sub>
DLGP506020	2	.0787	24	49
DLGP506021	2.1	.0827	24	49
DLGP506022	2.2	.0866	27	53
DLGP506023	2.3	.0906	27	53
DLGP506024	2.4	.0945	30	57
DLGP506025	2.5	.0984	30	57
DLGP506026	2.6	.1024	30	57
DLGP506027	2.7	.1063	33	61
DLGP506028	2.8	.1102	33	61
DLGP506029	2.9	.1142	33	61
DLGP506030	3	.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	.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
DLGP506048	4.8	.1890	52	86
DLGP506049	4.9	.1929	52	86
DLGP506050	5	.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

EDP No.	SIZE	D	L <sub>2</sub>	L <sub>1</sub>
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	.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	.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
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	.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	.3543	81	125
DLGP506091	9.1	.3583	81	125

CARBIDE AND COBALT / HSS DRILLS

# GOLD-P DRILLS

## HSS Co5, STRAIGHT SHANK, JOBBER LENGTH, PARABOLIC FLUTE FOR DEEP HOLES, GOLD-P COATED HSS DRILLS-METRIC



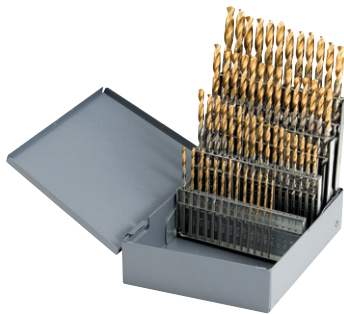
- ▶ **Flute Geometry** : Right hand spiral, 38helix, Parabolic flutes.
- ▶ **Point Angle** : 130°:Split point.  
form 1.6mm-Split point.
- ▶ **Surface treatment** : Bright body TiN coating on working part
- ▶ **Application** : Improved chip removal in most materials, especially in deep drilling applications.

Unit:mm

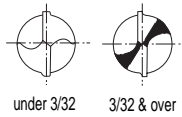
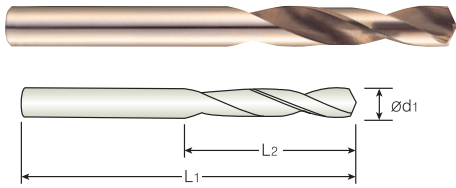
EDP No.	SIZE	D	L2	L1
DLGP506092	9.2	.3622	81	125
DLGP506093	9.3	.3661	81	125
DLGP506094	9.4	.3701	81	125
DLGP506095	9.5	.3740	81	125
DLGP506096	9.6	.3780	87	133
DLGP506097	9.7	.3919	87	133
DLGP506098	9.8	.3858	87	133
DLGP506099	9.9	.3898	87	133
DLGP506100	10	.3937	87	133
DLGP506101	10.1	.3936	87	133
DLGP506102	10.2	.4016	87	133
DLGP506103	10.3	.4055	87	133
DLGP506104	10.4	.4094	87	133
DLGP506105	10.5	.4134	87	133
DLGP506106	10.6	.4173	87	133
DLGP506107	10.7	.4213	94	142
DLGP506108	10.8	.4252	94	142
DLGP506109	10.9	.4291	94	142
DLGP506110	11	.4331	94	142
DLGP506111	11.1	.4370	94	142

EDP No.	SIZE	D	L2	L1
DLGP506112	11.2	.4409	94	142
DLGP506113	11.3	.4449	94	142
DLGP506114	11.4	.4488	94	142
DLGP506115	11.5	.4528	94	142
DLGP506116	11.6	.4567	94	142
DLGP506117	11.7	.4606	94	142
DLGP506118	11.8	.4646	94	142
DLGP506119	11.9	.4685	101	151
DLGP506120	12	.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	.4961	101	151
DLGP506127	12.7	.5000	101	151
DLGP506128	12.8	.5039	101	151
DLGP506129	12.9	.5079	101	151
DLGP506130	13	.5118	101	151

CARBIDE AND COBALT / HSS DRILLS



SET NO.	Series NO.	DESCRIPTON	SIZE	Q'TY
D1GP SET924	D1GP138 Series	HSS Straight Shank, Split Point ( # 53 ~ # 56 : NORMAL point)	# 1~ # 56(Wire gauge)	56 pcs
D1GP SET925	D1GP139 Series	HSS Straight Shank, Split Point	A~Z(Letter)	26 pcs
D1GP SET926	DLGP182 Series	HSS Straight Shank, Split Point (3/64 : NORMAL point)	Ø 1/16~Ø 1/2(Fracitional)	30 pcs
D2GP SET927	D2GP185 Series	HSSCo8 Straight Shank, Split Point (3/64 : NORMAL point)	Ø 1/16~Ø 1/2(Fracitional)	29 pcs
D1GP SET928	D2GP186 Series	HSSCo8 Straight Shank, Split Point	A~Z(Letter)	26 pcs
D1GP SET930	D2GP187 Series	HSSCo8 Straight Shank, Split Point ( # 53 ~ # 56 : NORMAL point)	# 1~ # 56(Wire gauge)	56 pcs
DLGP SET931	DLGP511 Series	HSSCo5 Straight Shank, Split Point	Ø 5/64~Ø 1/2(Fracitional)	28 pcs
DLGP SET932	DLGP512 Series	HSSCo5 Straight Shank, Split Point	# 1~ # 47(Wire gauge)	47 pcs
DLGP SET933	DLGP513 Series	HSSCo5 Straight Shank, Split Point	A~Z(Letter)	26 pcs



► **Flute Geometry** : Right hand spiral, wider flutes  
 ► **Point Angle** : 135°:Split point... .059 diameter and over.  
 ► **Application** : Drilling in steel, cast steel alloyed and Non-alloyed, grey cast iron, graphite, malleable cast iron

**D1118 Series**

► **Fractional sizes**

Unit:inch

EDP No.	Diameter (Ød <sub>1</sub> )	Flute Length (L <sub>2</sub> )	Overall Length (L <sub>1</sub> )
** D1118003	3/64	1/2	1-3/8
** D1118004	1/16	5/8	1-5/8
** D1118005	5/64	11/16	1-11/16
** D1118006	3/32	3/4	1-3/4
** D1118007	7/64	13/16	1-13/16
** D1118008	1/8	7/8	1-7/8
** D1118009	9/64	15/16	1-15/16
** D1118010	5/32	1	2-1/16
** D1118011	11/64	1-1/16	2-1/8
** D1118012	3/16	1-1/8	2-3/16
** D1118013	13/64	1-3/16	2-1/4
** D1118014	7/32	1-1/4	2-3/8
** D1118015	15/64	1-5/16	2-7/16
** D1118016	1/4	1-3/8	2-1/2
** D1118017	17/64	1-7/16	2-5/8

EDP No.	Diameter (Ød <sub>1</sub> )	Flute Length (L <sub>2</sub> )	Overall Length (L <sub>1</sub> )
** D1118018	9/32	1-1/2	2-11/16
** D1118019	19/64	1-9/16	2-3/4
** D1118020	5/16	1-5/8	2-13/16
** D1118021	21/64	1-11/16	2-15/16
* D1118022	11/32	1-11/16	3
* D1118023	23/64	1-3/4	3-1/16
* D1118024	3/8	1-13/16	3-1/8
* D1118025	25/64	1-7/8	3-1/4
* D1118026	13/32	1-15/16	3-5/16
* D1118027	27/64	2	3-3/8
* D1118028	7/16	2-1/16	3-7/16
* D1118029	29/64	2-1/8	3-9/16
* D1118030	15/32	2-1/8	3-5/8
* D1118031	31/64	2-3/16	3-11/16
* D1118032	1/2	2-1/4	3-3/4

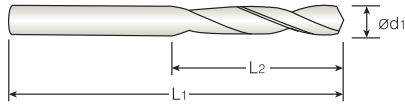
\* 5per package  
 \*\* 10per package

CARBIDE AND COBALT / HSS DRILLS

Tolerance of D /	upto 1/8(.1250)	0~ -.0005
	/over 1/8(.1250) ~ upto 1/4(.2500)	0~ -.0007
	/over 1/4(.2500) ~ upto 1/2(.5000)	0~ -.0010

# STRAIGHT SHANK DRILLS

# HSS, STRAIGHT SHANK, SCREW MACHINE



ANSI
HSS
20°~30°
ANSI
135°
DATA
P.418

- ▶ **Flute Geometry** : Right hand spiral, wider flutes
- ▶ **Point Angle** : 135° : Split point... .059 diameter and over.
- ▶ **Application** : Drilling in steel, cast steel alloyed and Non-alloyed, grey cast iron, graphite, malleable cast iron

## D1115 Series

### ▶ Letter sizes

Unit : inch

EDP No.	SIZE	Diameter (Ød1)	Flute Length (L2)	Overall Length (L1)
** 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.	SIZE	Diameter (Ød1)	Flute Length (L2)	Overall Length (L1)
** 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

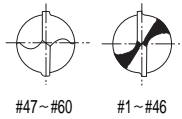
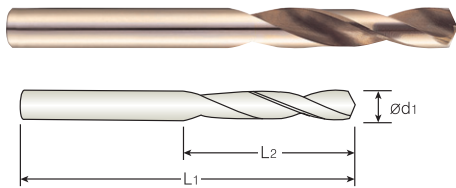
- \* 5per package
- \*\* 10per package

CARBIDE AND COBALT / HSS DRILLS

Tolerance of D /	upto 1/8(.1250)
	0~ -.0005
	/over 1/8(.1250) ~ upto 1/4(.2500)
0~ -.0007	
/over 1/4(.2500) ~ upto 1/2(.5000)	
0~ -.0010	

# STRAIGHT SHANK DRILLS

# HSS, STRAIGHT SHANK, SCREW MACHINE



- ▶ **Flute Geometry** : Right hand spiral, wider flutes
- ▶ **Point Angle** : 135°:Split point... .059 diameter and over.
- ▶ **Application** : Drilling in steel, cast steel alloyed and Non-alloyed, grey cast iron, graphite, malleable cast iron

## D1119 Series

### ▶ Wire gauge sizes

Unit : inch

EDP No.	SIZE	Diameter (Ød1)	Flute Length (L2)	Overall Length (L1)
** 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.	SIZE	Diameter (Ød1)	Flute Length (L2)	Overall Length (L1)
** 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

\*\* 10per package

#### Tolerance of D

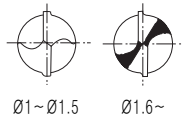
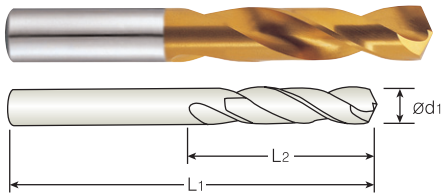
upto 1/8(.1250)  
0~ -.0005

over 1/8(.1250) ~ upto 1/4(.2500)  
0~ -.0007

over 1/4(.2500) ~ upto 1/2(.5000)  
0~ -.0010

CARBIDE AND COBALT / HSS DRILLS





- ▶ **Flute Geometry** : Coloring(Gold color)
- ▶ **Application** : Drills suitable for drilling in thin materials with portable drills.  
Special twist drills for automatic and turret lathes.

**D4107 Series**

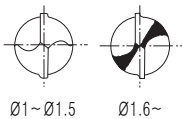
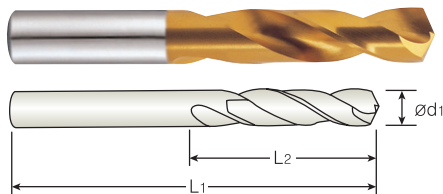
Unit : inch

EDP No.	Diameter (Ød1)	Flute Length (L2)	Overall Length (L1)
** D4107010	1.0	6	26
** D4107011	1.1	7	28
** D4107012	1.2	8	30
** D4107912	1.25	8	30
** D4107013	1.3	8	30
** D4107014	1.4	9	32
** D4107015	1.5	9	32
** D4107016	1.6	10	34
** D4107017	1.7	10	34
** D4107917	1.75	11	36
** D4107018	1.8	11	36
** D4107019	1.9	11	36
** D4107020	2.0	12	38
** D4107021	2.1	12	38
** D4107022	2.2	13	40
** D4107925	2.25	13	40
** D4107023	2.3	13	40
** D4107024	2.4	14	43
** D4107025	2.5	14	43
** D4107026	2.6	14	43
* D4107027	2.7	16	46
* D4107927	2.75	16	46
* D4107028	2.8	16	46
* D4107029	2.9	16	46
* D4107030	3.0	16	46
* D4107031	3.1	18	49
* D4107032	3.2	18	49
* D4107932	3.25	18	49
* D4107033	3.3	18	49
* D4107034	3.4	20	52
* D4107035	3.5	20	52
* D4107036	3.6	20	52
* D4107037	3.7	20	52

EDP No.	Diameter (Ød1)	Flute Length (L2)	Overall Length (L1)
* D4107937	3.75	20	52
* D4107038	3.8	22	55
* D4107039	3.9	22	55
* D4107040	4.0	22	55
* D4107041	4.1	22	55
* D4107042	4.2	22	55
* D4107942	4.25	22	55
* D4107043	4.3	24	58
* D4107044	4.4	24	58
* D4107045	4.5	24	58
* D4107046	4.6	24	58
* D4107946	4.65	24	58
* D4107047	4.7	24	58
* D4107947	4.75	24	58
* D4107048	4.8	26	62
* D4107049	4.9	26	62
* D4107050	5.0	26	62
* D4107051	5.1	26	62
* D4107052	5.2	26	62
* D4107952	5.25	26	62
* D4107053	5.3	26	62
* D4107054	5.4	28	66
* D4107055	5.5	28	66
* D4107955	5.55	28	66
* D4107056	5.6	28	66
* D4107057	5.7	28	66
* D4107957	5.75	28	66
* D4107058	5.8	28	66
* D4107059	5.9	28	66
* D4107060	6.0	28	66
* D4107061	6.1	31	70
* D4107062	6.2	31	70
* D4107962	6.25	31	70

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

- \* 5per package
- \*\* 10per package



► **Flute Geometry**  
► **Application**

: Coloring(Gold color)  
: Drills suitable for drilling in thin materials with portable drills.  
Special twist drills for automatic and turret lathes.

**D4107 Series**

Unit : inch

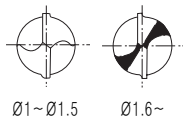
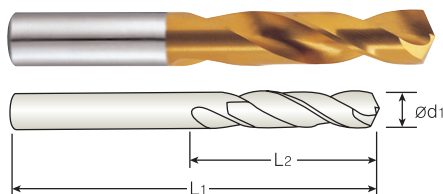
EDP No.	Diameter ( $\varnothing d_1$ )	Flute Length ( $L_2$ )	Overall Length ( $L_1$ )
* D4107063	6.3	31	70
* D4107064	6.4	31	70
* D4107065	6.5	31	70
* D4107066	6.6	31	70
* D4107067	6.7	31	70
* D4107967	6.75	34	74
* D4107068	6.8	34	74
* D4107069	6.9	34	74
* D4107070	7.0	34	74
* D4107071	7.1	34	74
* D4107072	7.2	34	74
* D4107972	7.25	34	74
* D4107073	7.3	34	74
* D4107074	7.4	34	74
* D4107974	7.45	34	74
* D4107075	7.5	34	74
* D4107076	7.6	37	79
* D4107077	7.7	37	79
* D4107977	7.75	37	79
* D4107078	7.8	37	79
* D4107079	7.9	37	79
* D4107080	8.0	37	79
* D4107081	8.1	37	79
* D4107082	8.2	37	79
* D4107982	8.25	37	79
* D4107083	8.3	37	79
* D4107084	8.4	37	79
* D4107085	8.5	37	79
* D4107086	8.6	40	84
* D4107087	8.7	40	84
* D4107987	8.75	40	84
* D4107088	8.8	40	84
* D4107089	8.9	40	84

EDP No.	Diameter ( $\varnothing d_1$ )	Flute Length ( $L_2$ )	Overall Length ( $L_1$ )
* D4107090	9.0	40	84
* D4107091	9.1	40	84
* D4107092	9.2	40	84
* D4107992	9.25	40	84
* D4107093	9.3	40	84
* D4107993	9.35	40	84
* D4107094	9.4	40	84
* D4107095	9.5	40	84
* D4107096	9.6	43	89
* D4107097	9.7	43	89
* D4107997	9.75	43	89
* D4107098	9.8	43	89
* D4107099	9.9	43	89
* D4107100	10.0	43	89
* D4107102	10.2	43	89
* D4107802	10.25	43	89
* D4107105	10.5	43	89
* D4107807	10.75	47	95
* D4107110	11.0	47	95
* D4107812	11.25	47	95
* D4107115	11.5	47	95
* D4107817	11.75	47	95
* D4107118	11.8	47	95
* D4107120	12.0	51	102
* D4107822	12.25	51	102
* D4107125	12.5	51	102
* D4107827	12.75	51	102
- D4107130	13.0	51	102
- D4107832	13.25	54	107
- D4107135	13.5	54	107
- D4107837	13.75	54	107
- D4107138	13.8	54	107
- D4107140	14.0	54	107

CARBIDE AND COBALT / HSS DRILLS

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

\* 5per package  
- 1per package



- ▶ **Flute Geometry** : Coloring(Gold color)
- ▶ **Application** : Drills suitable for drilling in thin materials with portable drills.  
Special twist drills for automatic and turret lathes.

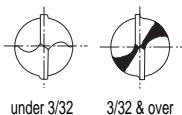
**D4107 Series**

Unit : inch

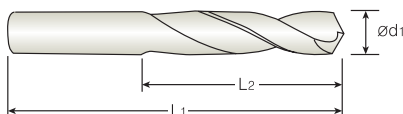
EDP No.	Diameter (Ød1)	Flute Length (L2)	Overall Length (L1)	EDP No.	Diameter (Ød1)	Flute Length (L2)	Overall Length (L1)
- D4107842	14.25	56	111	- D4107892	19.25	66	131
- D4107145	14.5	56	111	- D4107195	19.5	66	131
- D4107847	14.75	56	111	- D4107897	19.75	66	131
- D4107150	15.0	56	111	- D4107200	20.0	66	131
- D4107852	15.25	58	115	- D4107205	20.5	68	136
- D4107155	15.5	58	115	- D4107210	21.0	68	136
- D4107857	15.75	58	115	- D4107215	21.5	70	141
- D4107160	16.0	58	115	- D4107220	22.0	70	141
- D4107862	16.25	60	119	- D4107225	22.5	72	146
- D4107165	16.5	60	119	- D4107230	23.0	72	146
- D4107867	16.75	60	119	- D4107235	23.5	72	146
- D4107170	17.0	60	119	- D4107240	24.0	75	151
- D4107872	17.25	62	123	- D4107245	24.5	75	151
- D4107175	17.5	62	123	- D4107250	25.0	75	151
- D4107877	17.75	62	123	- D4107260	26.0	78	156
- D4107180	18.0	62	123	- D4107270	27.0	81	162
- - D4107882	18.25	64	127	- - D4107280	28.0	81	162
- D4107185	18.5	64	127	- D4107290	29.0	84	168
- D4107887	18.75	64	127	- D4107300	30.0	84	168
- D4107190	19.0	64	127	- D4107310	31.0	87	174

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

- 1per package



- ▶ **Flute Geometry** : Right hand spiral, wider flutes
- ▶ **Point Angle** : 135°:Split point... .059 diameter and over.
- ▶ **Application** : Drilling in steel, cast steel alloyed and Non-alloyed, grey cast iron, graphite, malleable cast iron



**D2146 Series** ▶ **Fractional sizes**

Unit : inch

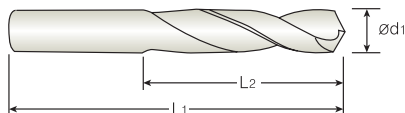
EDP No.		Diameter (Ød1)	Flute Length (L2)	Overall Length (L1)	
UN-COATED	TIN-COATED				
**	D2146003	D4146003	3/64	1/2	1-3/8
**	D2146004	D4146004	1/16	5/8	1-5/8
**	D2146005	D4146005	5/64	11/16	1-11/16
**	D2146006	D4146006	3/32	3/4	1-3/4
*	D2146007	D4146007	7/64	13/16	1-13/16
*	D2146008	D4146008	1/8	7/8	1-7/8
*	D2146009	D4146009	9/64	15/16	1-15/16
*	D2146010	D4146010	5/32	1	2-1/16
*	D2146011	D4146011	11/64	1-1/16	2-1/8
*	D2146012	D4146012	3/16	1-1/8	2-3/16
*	D2146013	D4146013	13/64	1-3/16	2-1/4
*	D2146014	D4146014	7/32	1-1/4	2-3/8
*	D2146015	D4146015	15/64	1-5/16	2-7/16
*	D2146016	D4146016	1/4	1-3/8	2-1/2
*	D2146017	D4146017	17/64	1-7/16	2-5/8

EDP No.		Diameter (Ød1)	Flute Length (L2)	Overall Length (L1)	
UN-COATED	TIN-COATED				
*	D2146018	D4146018	9/32	1-1/2	2-11/16
*	D2146019	D4146019	19/64	1-9/16	2-3/4
*	D2146020	D4146020	5/16	1-5/8	2-13/16
*	D2146021	D4146021	21/64	1-11/16	2-15/16
*	D2146022	D4146022	11/32	1-11/16	3
*	D2146023	D4146023	23/64	1-3/4	3-1/16
*	D2146024	D4146024	3/8	1-13/16	3-1/8
*	D2146025	D4146025	25/64	1-7/8	3-1/4
*	D2146026	D4146026	13/32	1-15/16	3-5/16
*	D2146027	D4146027	27/64	2	3-3/8
*	D2146028	D4146028	7/16	2-1/16	3-7/16
*	D2146029	D4146029	29/64	2-1/8	3-9/16
*	D2146030	D4146030	15/32	2-1/8	3-5/8
*	D2146031	D4146031	31/64	2-3/16	3-11/16
*	D2146032	D4146032	1/2	2-1/4	3-3/4

- \* 5per package
- \*\* 10per package

CARBIDE AND COBALT / HSS DRILLS

Tolerance of D /	upto 1/8(.1250)	0~ -.0005
	over 1/8(.1250) ~ upto 1/4(.2500)	0~ -.0007
	over 1/4(.2500) ~ upto 1/2(.5000)	0~ -.0010



ANSI
HSS Co8
20°~30° N
ANSI
135°
DATA
P.418

- ▶ **Flute Geometry** : Right hand spiral, wider flutes
- ▶ **Point Angle** : 135° :Split point... .059 diameter and over.
- ▶ **Application** : Drilling in steel, cast steel alloyed and Non-alloyed, grey cast iron, graphite, malleable cast iron

**D2147 Series ▶ Letter sizes**

Unit : inch

EDP No.		SIZE	Diameter (Ød1)	Flute Length(L2)	Overall Length(L1)
UN-COATED	TIN-COATED				
* 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

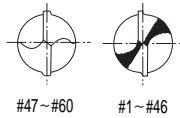
EDP No.		SIZE	Diameter (Ød1)	Flute Length(L2)	Overall Length(L1)
UN-COATED	TIN-COATED				
* D2147214	D4147214	N	.3020	1-5/8	2-13/16
* D2147215	D4147215	O	.3160	1-11/16	2-15/16
* D2147216	D4147216	P	.3230	1-11/16	2-15/16
* D2147217	D4147217	Q	.3320	1-11/16	3
* D2147218	D4147218	R	.3390	1-11/16	3
* D2147219	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

- \* 5per package
- \*\* 10per package

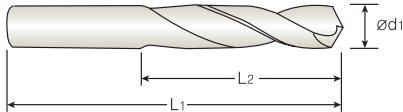
Tolerance of D /	upto 1/8(.1250)
	0~ -.0005
	over 1/8(.1250) ~ upto 1/4(.2500)
	0~ -.0007
	over 1/4(.2500) ~ upto 1/2(.5000)
	0~ -.0010

# STRAIGHT SHANK DRILLS

# HSSCo8, STRAIGHT SHANK, SCREW MACHINE



- ▶ **Flute Geometry** : Right hand spiral, wider flutes
- ▶ **Point Angle** : 135°: Split point... .059 diameter and over.
- ▶ **Application** : Drilling in steel, cast steel alloyed and Non-alloyed, grey cast iron, graphite, malleable cast iron



## D2148 Series

### ▶ Wire gauge sizes

Unit : inch

EDP No.		SIZE	Diameter (Ød1)	Flute Length (L2)	Overall Length (L1)
UN-COATED	TiN-COATED				
* 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

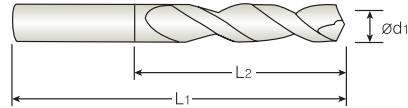
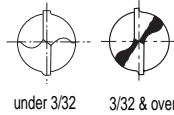
EDP No.		SIZE	Diameter (Ød1)	Flute Length (L2)	Overall Length (L1)
UN-COATED	TiN-COATED				
* D2148131	D4148131	31	.1200	7/8	1-7/8
* D2148132	D4148132	32	.1160	7/8	1-7/8
* D2148133	D4148133	33	.1130	7/8	1-7/8
* D2148134	D4148134	34	.1110	7/8	1-7/8
* D2148135	D4148135	35	.1100	7/8	1-7/8
* D2148136	D4148136	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 of D	
upto 1/8(.1250)	0~ -.0005
over 1/8(.1250) ~ upto 1/4(.2500)	0~ -.0007
over 1/4(.2500) ~ upto 1/2(.5000)	0~ -.0010

- \* 5per package
- \*\* 10per package

**STRAIGHT SHANK DRILLS**

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



ANSI HSS Co5 38° ANSI 130° DATA P.419

- ▶ **Flute Geometry** : Right hand spiral, **PARABOLIC FLUTE**  
38° helix
- ▶ **Point Angle** : 130°: Split point... .059 diameter and over.
- ▶ **Application** : Improved chip removal in most materials, especially in deep drilling applications.

DN514 Series

## ▶ Fractional sizes

Unit:inch

TiN-COATED EDP No.	Diameter (Ød1)	Flute Length (L2)	Overall Length (L1)
** DN514006	3/32	3/4	1-3/4
* DN514007	7/64	13/16	1-13/16
* DN514008	1/8	7/8	1-7/8
* DN514009	9/64	15/16	1-15/16
* DN514010	5/32	1	2-1/16
* DN514011	11/64	1-1/16	2-1/8
* DN514012	3/16	1-1/8	2-3/16
* DN514013	13/64	1-3/16	2-1/4
* DN514014	7/32	1-1/4	2-3/8
* DN514015	15/64	1-5/16	2-7/16
* DN514016	1/4	1-3/8	2-1/2
* DN514017	17/64	1-7/16	2-5/8
* DN514018	9/32	1-1/2	2-11/16
* DN514019	19/64	1-9/16	2-3/4

TiN-COATED EDP No.	Diameter (Ød1)	Flute Length (L2)	Overall Length (L1)
* DN514020	5/16	1-5/8	2-13/16
* DN514021	21/64	1-11/16	2-15/16
* DN514022	11/32	1-11/16	3
* DN514023	23/64	1-3/4	3-1/16
* DN514024	3/8	1-13/16	3-1/8
* DN514025	25/64	1-7/8	3-1/4
* DN514026	13/32	1-15/16	3-5/16
* DN514027	27/64	2	3-3/8
* DN514028	7/16	2-1/16	3-7/16
* DN514029	29/64	2-1/8	3-9/16
* DN514030	15/32	2-1/8	3-5/8
* DN514031	31/64	2-3/16	3-11/16
* DN514032	1/2	2-1/4	3-3/4

- \* 5per package
- \*\* 10per package

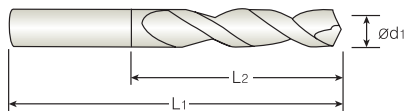
CARBIDE AND COBALT / HSS DRILLS

Tolerance of D /	upto 1/8(.1250)
	0~ -.0005
	over 1/8(.1250) ~ upto 1/4(.2500)
	0~ -.0007
	over 1/4(.2500) ~ upto 1/2(.5000)
	0~ -.0010



# STRAIGHT SHANK DRILLS

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



ANSI
HSS Co5
38°
ANSI
130°
DATA
P.419

- **Flute Geometry** : Right hand spiral, **PARABOLIC FLUTE**  
38° helix
- **Point Angle** : 130°:Split point... .059 diameter and over.
- **Application** : Improved chip removal in most materials, especially in deep drilling applications.

## DN516 Series

## ► Letter sizes

Unit:inch

EDP No. TiN-COATED	SIZE	Diameter (Ød1)	Flute Length (L2)	Overall Length (L1)
* 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. TiN-COATED	SIZE	Diameter (Ød1)	Flute Length (L2)	Overall Length (L1)
* 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

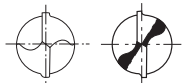
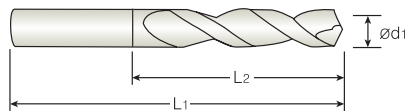
\* 5per package

CARBIDE AND COBALT / HSS DRILLS

Tolerance of D /	upto 1/8(.1250)
	0~ -.0005
	/over 1/8(.1250) ~ upto 1/4(.2500)
	0~ -.0007
	/over 1/4(.2500) ~ upto 1/2(.5000)
	0~ -.0010

**STRAIGHT SHANK DRILLS**

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



under #47 #1 ~ #46 & over

ANSI HSS Co5 38° ANSI 130° DATA P.419

- ▶ **Flute Geometry** : Right hand spiral, **PARABOLIC FLUTE**  
38° helix
- ▶ **Point Angle** : 130°:Split point... .059 diameter and over.
- ▶ **Application** : Improved chip removal in most materials, especially in deep drilling applications.

**DN515 Series**

▶ **Wire gauge sizes**

Unit:inch

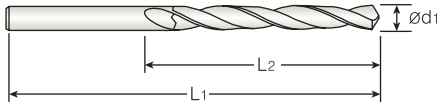
EDP No. TiN-COATED	SIZE	Diameter (Ød1)	Flute Length (L2)	Overall Length (L1)
* DN515201	1	.2280	1-5/16	2-7/16
* DN515202	2	.2210	1-5/16	2-7/16
* DN515203	3	.2130	1-1/4	2-3/8
* DN515204	4	.2090	1-1/4	2-3/8
* DN515205	5	.2055	1-1/4	2-3/8
* DN515206	6	.2040	1-1/4	2-3/8
* DN515207	7	.2010	1-3/16	2-1/4
* 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. TiN-COATED	SIZE	Diameter (Ød1)	Flute Length (L2)	Overall Length (L1)
* 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

- \* 5per package
- \*\* 10per package

CARBIDE AND COBALT / HSS DRILLS

Tolerance of D /	upto 1/8(.1250)
	0~ -.0005
	over 1/8(.1250) ~ upto 1/4(.2500)
	0~ -.0007
	over 1/4(.2500) ~ upto 1/2(.5000)
	0~ -.0010



ANSI HSS Co5 38° ANSI 130° DATA P.420

- ▶ **Flute Geometry** : Right hand spiral, **PARABOLIC FLUTE**  
38° helix
- ▶ **Point Angle** : 130°:Split point... .059 diameter and over.
- ▶ **Application** : Improved chip removal in most materials, especially in deep drilling applications.

**DX517 Series**

▶ **Fractional sizes**

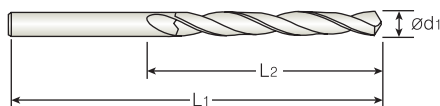
Unit:inch

EDP No. TiCN-COATED	Diameter (Ød1)	Flute Length (L2)	Overall Length (L1)
DX517005	5/64	2"	3-3/4
DX517006	3/32	2-1/4	4-1/4
DX517007	7/64	2-1/2	4-5/8
DX517008	1/8	2-3/4	5-1/8
DX517009	9/64	3"	5-3/8
DX517010	5/32	3"	5-3/8
DX517011	11/64	3-3/8	5-3/4
DX517012	3/16	3-3/8	5-3/4
DX517013	13/64	3-5/8	6"
DX517014	7/32	3-5/8	6"
DX517015	15/64	3-3/4	6-1/8
DX517016	1/4	3-3/4	6-1/8
DX517017	17/64	3-7/8	6-1/4
DX517018	9/32	3-7/8	6-1/4

EDP No. TiCN-COATED	Diameter (Ød1)	Flute Length (L2)	Overall Length (L1)
DX517019	19/64	4"	6-3/8
DX517020	5/16	4"	6-3/8
DX517021	21/64	4-1/8	6-1/2
DX517022	11/32	4-1/8	6-3/4
DX517023	23/64	4-1/4	6-3/4
DX517024	3/8	4-1/4	6-3/4
DX517025	25/64	4-3/8	7"
DX517026	13/32	4-3/8	7"
DX517027	27/64	4-5/8	7-1/4
DX517028	7/16	4-5/8	7-1/4
DX517029	29/64	4-3/4	7-1/2
DX517030	15/32	4-3/4	7-1/2
DX517031	31/64	4-3/4	7-3/4
DX517032	1/2	4-3/4	7-3/4

CARBIDE AND COBALT / HSS DRILLS

Tolerance of D /	upto 1/8(.1250)	0~ -.0005
	over 1/8(.1250) ~ upto 1/4(.2500)	0~ -.0007
	over 1/4(.2500) ~ upto 1/2(.5000)	0~ -.0010



- ▶ **Flute Geometry** : Right hand spiral, **PARABOLIC FLUTE**  
38° helix
- ▶ **Point Angle** : 130°:Split point... .059 diameter and over.
- ▶ **Application** : Improved chip removal in most materials, especially in deep drilling applications.

**DL517 Series**

▶ **Fractional sizes**

Unit:inch

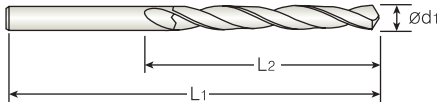
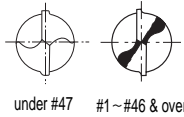
EDP No. UN-COATED	Diameter (Ød1)	Flute Length (L2)	Overall Length (L1)
DL517005	5/64	2"	3-3/4
DL517006	3/32	2-1/4	4-1/4
DL517007	7/64	2-1/2	4-5/8
DL517008	1/8	2-3/4	5-1/8
DL517009	9/64	3"	5-3/8
DL517010	5/32	3"	5-3/8
DL517011	11/64	3-3/8	5-3/4
DL517012	3/16	3-3/8	5-3/4
DL517013	13/64	3-5/8	6"
DL517014	7/32	3-5/8	6"
DL517015	15/64	3-3/4	6-1/8
DL517016	1/4	3-3/4	6-1/8
DL517017	17/64	3-7/8	6-1/4
DL517018	9/32	3-7/8	6-1/4

EDP No. UN-COATED	Diameter (Ød1)	Flute Length (L2)	Overall Length (L1)
DL517019	19/64	4"	6-3/8
DL517020	5/16	4"	6-3/8
DL517021	21/64	4-1/8	6-1/2
DL517022	11/32	4-1/8	6-3/4
DL517023	23/64	4-1/4	6-3/4
DL517024	3/8	4-1/4	6-3/4
DL517025	25/64	4-3/8	7"
DL517026	13/32	4-3/8	7"
DL517027	27/64	4-5/8	7-1/4
DL517028	7/16	4-5/8	7-1/4
DL517029	29/64	4-3/4	7-1/2
DL517030	15/32	4-3/4	7-1/2
DL517031	31/64	4-3/4	7-3/4
DL517032	1/2	4-3/4	7-3/4

Tolerance of D /	upto 1/8(.1250)
	0~ -.0005
	over 1/8(.1250) ~ upto 1/4(.2500)
	0~ -.0007
	over 1/4(.2500) ~ upto 1/2(.5000)
	0~ -.0010

**STRAIGHT SHANK DRILLS**

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



- ▶ **Flute Geometry** : Right hand spiral, 30° helix
- ▶ **Point Angle** : 135° Split point... .059 diameter and over.
- ▶ **Application** : Improved chip removal in most materials, especially in deep drilling applications.

## ► Fractional sizes

Unit:inch

EDP No.	Diameter (Ød1)	Flute Length (L2)	Overall Length (L1)
** DL601005	5/64	1"	6
** DL601006	3/32	1*1/4	6
** DL601007	7/64	1*1/4	6
** DL601008	1/8	1*5/8	6
** DL601009	9/64	1*3/4	6
** DL601010	5/32	2"	6
** DL601011	11/64	2*1/8	6
** DL601012	3/16	2*5/16	6
** DL601013	13/64	2*7/16	6
** DL601014	7/32	2*1/2	6
** DL601015	15/64	2*5/8	6
* DL601016	1/4 6	2*3/4	6
* DL601017	17/64	2*7/8	6
* DL601018	9/32	2*15/16	6
* DL601019	19/64	3*1/16	6
* DL601020	5/16	3*3/16	6
* DL601021	21/64	3*5/16	6
* DL601022	11/32	3*7/16	6
* DL601023	23/64	3*1/2	6
* DL601024	3/8	3*5/8	6
* DL601025	25/64	3*3/4	6
* DL601026	13/32	3*7/8	6
* DL601027	27/64	3*15/16	6
* DL601028	7/16	4*1/16	6

EDP No.	Diameter (Ød1)	Flute Length (L2)	Overall Length (L1)
* DL601029	29/64	4*3/16	6
* DL601030	15/32	4*5/16	6
* DL601031	31/64	4*3/8	6
* DL601032	1/2	4*1/2	6
** DL604014	7/32	2*1/2	12
** DL604015	15/64	2*5/8	12
* DL604016	1/4	2*3/4	12
* DL604017	17/64	2*7/8	12
* DL604018	9/32	2*15/16	12
* DL604019	19/64	3*1/16	12
* DL604020	5/16	3*3/16	12
* DL604021	21/64	3*5/16	12
* DL604022	11/32	3*7/16	12
* DL604023	23/64	3*1/2	12
* DL604024	3/8	3*5/8	12
* DL604025	25/64	3*3/4	12
* DL604026	13/32	3*7/8	12
* DL604027	27/64	3*15/16	12
* DL604028	7/16	4*1/16	12
* DL604029	29/64	4*3/16	12
* DL604030	15/32	4*5/16	12
* DL604031	31/64	4*3/8	12
* DL604032	1/2	4*1/2	12

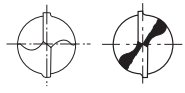
\* 5per package  
\*\* 10per package

CARBIDE AND COBALT / HSS DRILLS

Tolerance of D /	upto 1/8(.1250)	0~ -.0005
	over 1/8(.1250) ~ upto 1/4(.2500)	0~ -.0007
	over 1/4(.2500) ~ upto 1/2(.5000)	0~ -.0010

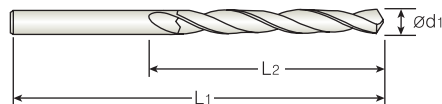
**STRAIGHT SHANK DRILLS**

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



under #47 #1~#46 & over

HSS Co5
30°
135°
DATA P.418



- ▶ **Flute Geometry** : Right hand spiral, 30° helix
- ▶ **Point Angle** : 135°:Split point... .059 diameter and over.
- ▶ **Application** : Improved chip removal in most materials, especially in deep drilling applications.

## ▶ Letter sizes

Unit:inch

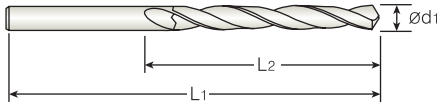
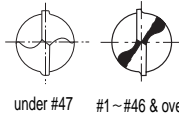
EDP No.	SIZE	Diameter (Ød1)	Flute Length (L2)	Overall Length (L1)	EDP No.	SIZE	Diameter (Ød1)	Flute Length (L2)	Overall Length (L1)
** DL602101	A	.2340	2*5/8	6	** DL605101	A	.2340	2*5/8	12
* DL602102	B	.2380	2*3/4	6	* DL605102	B	.2380	2*3/4	12
* DL602103	C	.2420	2*3/4	6	* DL605103	C	.2420	2*3/4	12
* DL602104	D	.2460	2*3/4	6	* DL605104	D	.2460	2*3/4	12
* DL602105	E	.2500	2*3/4	6	* DL605105	E	.2500	2*3/4	12
* DL602106	F	.2570	2*7/8	6	* DL605106	F	.2570	2*7/8	12
* DL602107	G	.2610	2*7/8	6	* DL605107	G	.2610	2*7/8	12
* DL602108	H	.2660	2*7/8	6	* DL605108	H	.2660	2*7/8	12
* DL602109	I	.2720	2*7/8	6	* DL605109	I	.2720	2*7/8	12
* DL602110	J	.2770	2*7/8	6	* DL605110	J	.2770	2*7/8	12
* DL602111	K	.2810	2*15/16	6	* DL605111	K	.2810	2*15/16	12
* DL602112	L	.2900	2*15/16	6	* DL605112	L	.2900	2*15/16	12
* DL602113	M	.2950	3*1/16	6	* DL605113	M	.2950	3*1/16	12
* DL602114	N	.3020	3*1/16	6	* DL605114	N	.3020	3*1/16	12
* DL602115	O	.3160	3*3/16	6	* DL605115	O	.3160	3*3/16	12
* DL602116	P	.3230	3*5/16	6	* DL605116	P	.3230	3*5/16	12
* DL602117	Q	.3320	3*7/16	6	* DL605117	Q	.3320	3*7/16	12
* DL602118	R	.3390	3*7/16	6	* DL605118	R	.3390	3*7/16	12
* DL602119	S	.3480	3*1/2	6	* DL605119	S	.3480	3*1/2	12
* DL602120	T	.3580	3*1/2	6	* DL605120	T	.3580	3*1/2	12
* DL602121	U	.3680	3*5/8	6	* DL605121	U	.3680	3*5/8	12
* DL602122	V	.3770	3*5/8	6	* DL605122	V	.3770	3*5/8	12
* DL602123	W	.3860	3*3/4	6	* DL605123	W	.3860	3*3/4	12
* DL602124	X	.3970	3*3/4	6	* DL605124	X	.3970	3*3/4	12
* DL602125	Y	.4040	3*7/8	6	* DL605125	Y	.4040	3*7/8	12
* DL602126	Z	.4130	3*7/8	6	* DL605126	Z	.4130	3*7/8	12

\* 5per package  
\*\* 10per package

Tolerance of D /	upto 1/8(.1250) 0~ -.0005
	/over 1/8(.1250) ~ upto 1/4(.2500) 0~ -.0007
	/over 1/4(.2500) ~ upto 1/2(.5000) 0~ -.0010

**STRAIGHT SHANK DRILLS**

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



HSS Co5
30°
135°
DATA
P.418

- **Flute Geometry** : Right hand spiral, **PARABOLIC FLUTE** 30° helix
- **Point Angle** : 135°: Split point... .059 diameter and over.
- **Application** : Improved chip removal in most materials, especially in deep drilling applications.

## ► Number sizes

Unit:inch

EDP No.	SIZE	Diameter (Ød1)	Flute Length (L2)	Overall Length (L1)
** 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.	SIZE	Diameter (Ød1)	Flute Length (L2)	Overall Length (L1)
** 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

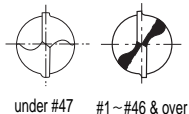
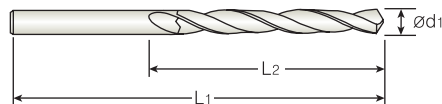
CARBIDE AND COBALT / HSS DRILLS

Tolerance of D /	upto 1/8(.1250)
	0~ -.0005
	over 1/8(.1250) ~ upto 1/4(.2500)
	0~ -.0007
	over 1/4(.2500) ~ upto 1/2(.5000)
	0~ -.0010



**STRAIGHT SHANK DRILLS**

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



HSS
30°
135°
DATA
P.418

- ▶ **Flute Geometry** : Right hand spiral, 30° helix
- ▶ **Point Angle** : 135°:Split point... .059 diameter and over.
- ▶ **Application** : Improved chip removal in most materials, especially in deep drilling applications.

## ▶ Fractional sizes

Unit:inch

EDP No.	Diameter (Ød1)	Flute Length (L2)	Overall Length (L1)
** D1631005	5/64	1"	6
** D1631006	3/32	1*1/4	6
** D1631007	7/64	1*1/4	6
** D1631008	1/8	1*5/8	6
** D1631009	9/64	1*3/4	6
** D1631010	5/32	2"	6
** D1631011	11/64	2*1/8	6
** D1631012	3/16	2*5/16	6
** D1631013	13/64	2*7/16	6
** D1631014	7/32	2*1/2	6
** D1631015	15/64	2*5/8	6
* D1631016	1/4	2*3/4	6
* D1631017	17/64	2*7/8	6
* D1631018	9/32	2*15/16	6
* D1631019	19/64	3*1/16	6
* D1631020	5/16	3*3/16	6
* D1631021	21/64	3*5/16	6
* D1631022	11/32	3*7/16	6
* D1631023	23/64	3*1/2	6
* D1631024	3/8	3*5/8	6
* D1631025	25/64	3*3/4	6
* D1631026	13/32	3*7/8	6
* D1631027	27/64	3*15/16	6
* D1631028	7/16	4*1/16	6

EDP No.	Diameter (Ød1)	Flute Length (L2)	Overall Length (L1)
* D1631029	29/64	4*3/16	6
* D1631030	15/32	4*5/16	6
* D1631031	31/64	4*3/8	6
* D1631032	1/2	4*1/2	6
** D1634014	7/32	2*1/2	12
** D1634015	15/64	2*5/8	12
* D1634016	1/4	2*3/4	12
* D1634017	17/64	2*7/8	12
* D1634018	9/32	2*15/16	12
* D1634019	19/64	3*1/16	12
* D1634020	5/16	3*3/16	12
* D1634021	21/64	3*5/16	12
* D1634022	11/32	3*7/16	12
* D1634023	23/64	3*1/2	12
* D1634024	3/8	3*5/8	12
* D1634025	25/64	3*3/4	12
* D1634026	13/32	3*7/8	12
* D1634027	27/64	3*15/16	12
* D1634028	7/16	4*1/16	12
* D1634029	29/64	4*3/16	12
* D1634030	15/32	4*5/16	12
* D1634031	31/64	4*3/8	12
* D1634032	1/2	4*1/2	12

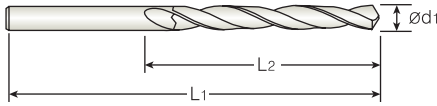
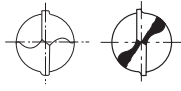
- \* 5per package
- \*\* 10per package

CARBIDE AND COBALT / HSS DRILLS

Tolerance of D /	
upto 1/8(.1250)	0~-.0005
over 1/8(.1250) ~ upto 1/4(.2500)	0~-.0007
over 1/4(.2500) ~ upto 1/2(.5000)	0~-.0010

**STRAIGHT SHANK DRILLS**

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



HSS
30°
135°
DATA P.418

- ▶ **Flute Geometry** : Right hand spiral, 30° helix
- ▶ **Point Angle** : 135°:Split point... .059 diameter and over.
- ▶ **Application** : Improved chip removal in most materials, especially in deep drilling applications.

## ▶ Letter sizes

Unit:inch

EDP No.	SIZE	Diameter (Ød1)	Flute Length (L2)	Overall Length (L1)
** 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.	SIZE	Diameter (Ød1)	Flute Length (L2)	Overall Length (L1)
** 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

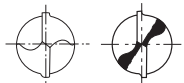
\* 5per package  
\*\* 10per package

CARBIDE AND COBALT / HSS DRILLS

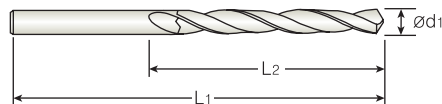
Tolerance of D /	upto 1/8(.1250) 0~ -.0005
	/over 1/8(.1250) ~ upto 1/4(.2500) 0~ -.0007
	/over 1/4(.2500) ~ upto 1/2(.5000) 0~ -.0010

**STRAIGHT SHANK DRILLS**

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



under #47 #1~#46 & over



HSS
30°
135°
DATA
P.418

- ▶ **Flute Geometry** : Right hand spiral, 30° helix
- ▶ **Point Angle** : 135°:Split point... .059 diameter and over.
- ▶ **Application** : Improved chip removal in most materials, especially in deep drilling applications.

## ▶ Number sizes

Unit:inch

EDP No.	SIZE	Diameter (Ød1)	Flute Length (L2)	Overall Length (L1)
** 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.	SIZE	Diameter (Ød1)	Flute Length (L2)	Overall Length (L1)
** 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

- \* 5per package
- \*\* 10per package

CARBIDE AND COBALT / HSS DRILLS



# TECHNICAL INFORMATION FOR CARBIDE DREAM DRILLS

### Application:

Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.

### 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

## 3XD TiAIN Coated Without coolant holes

**30° Helix  
140° Point**

Material	Non Coolant Fed Drills / Inch Diameter											
	1/8~3/16		3/16~5/16		5/16~3/8		3/8~1/2		1/2~9/16		9/16~13/16	
	N	S	N	S	N	S	N	S	N	S	N	S
Cast Iron <240 BHN	13120	0.006	8200	0.008	5970	0.011	4690	0.014	3860	0.016	2980	0.018
Cast Iron >240 BHN	8750	0.005	5470	0.006	3980	0.009	3120	0.011	2570	0.012	1990	0.014
Carbon Steels <300 BHN	7880	0.005	4920	0.006	3560	0.009	2810	0.011	2310	0.012	1790	0.014
Alloy Steels 300 - 400 BHN	7000	0.005	4370	0.006	3190	0.009	2500	0.011	2060	0.012	1590	0.014
Aluminum, Si <10%	13530	0.008	8450	0.010	6140	0.014	4830	0.017	3960	0.020	3080	0.022
Aluminum, Si >10%	11140	0.006	6960	0.008	5060	0.011	3980	0.014	3270	0.016	2530	0.018
Stainless Steels	3070	0.002	1910	0.003	1400	0.004	1090	0.005	910	0.006	700	0.007

N = R.P.M.  
S = Feed per Revolution (inch/rev.)  
Kf  $\frac{3xD}{1.0}$   $\frac{5xD}{0.85}$

## 3XD & 5XD & 8XD TiAIN Coated With coolant holes

**30° Helix  
140° Point**

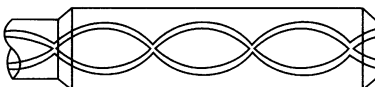
Material	Coolant Fed Drills / Inch Diameter											
	1/8~3/16		3/16~5/16		5/16~3/8		3/8~1/2		1/2~9/16		9/16~13/16	
	N	S	N	S	N	S	N	S	N	S	N	S
Cast Iron <240 BHN	14870	0.006	8200	0.008	6760	0.011	5310	0.014	4370	0.016	3380	0.018
Cast Iron >240 BHN	9620	0.006	6010	0.008	4370	0.011	3440	0.014	2830	0.016	2190	0.018
Carbon Steels <300 BHN	8750	0.006	5470	0.008	3980	0.011	3120	0.014	2570	0.016	1990	0.018
Alloy Steels 300 - 400 BHN	7880	0.005	4920	0.006	3580	0.009	2810	0.011	2310	0.012	1790	0.014
Aluminum, Si <10%	15910	0.008	9940	0.010	7230	0.014	5680	0.017	4680	0.020	3610	0.022
Aluminum, Si >10%	13530	0.008	8450	0.010	6140	0.014	4830	0.017	3980	0.020	3080	0.022
Stainless Steels	3500	0.002	2190	0.003	1590	0.004	1250	0.005	1030	0.006	800	0.007

N = R.P.M.  
S = Feed per Revolution (inch/rev.)  
Kf  $\frac{3xD}{1.0}$   $\frac{5xD}{0.85}$   $\frac{8xD}{0.7}$

up to .118	over .118 up to .236	over .236 up to .394	over .394 up to .709
+0	+0	+0	+0
-.00055	-.00071	-.00087	-.00106

CARBIDE AND COBALT / HSS DRILLS

SHANK TYPE – Form HA



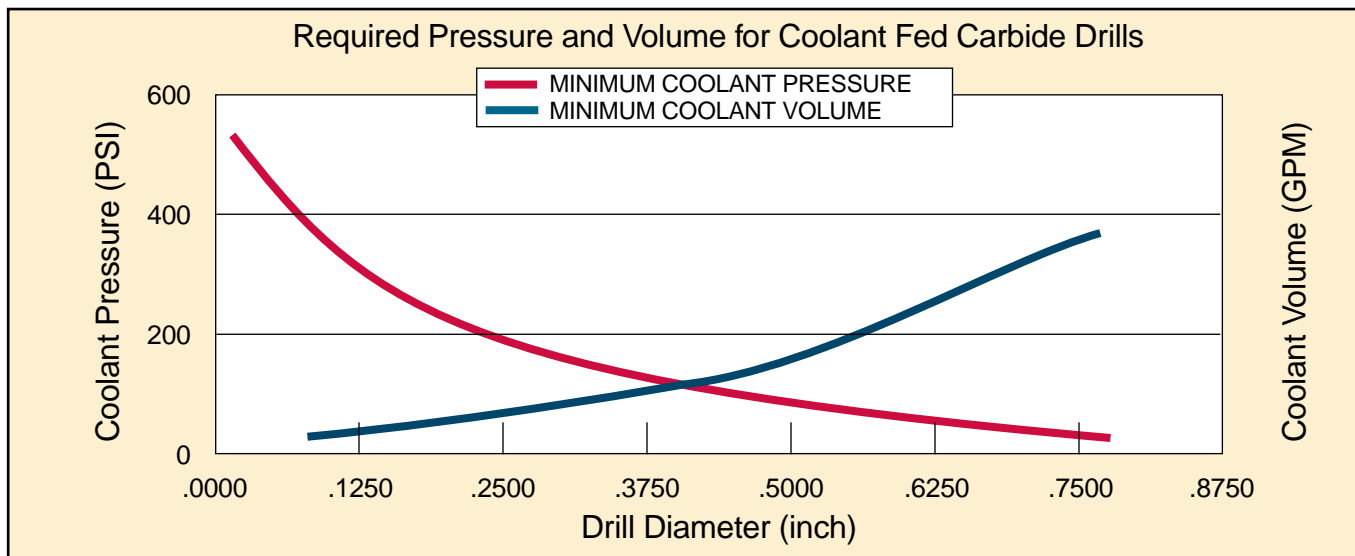
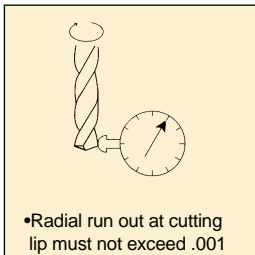
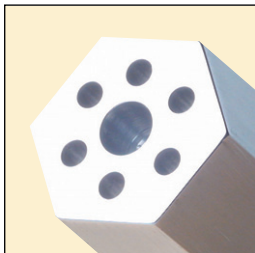
DRILL DIAMETER TOLERANCE METRIC (ød <sub>1</sub> )						mm = 1/1000 mm
Diameter Tolerance	1-3 mm	3-6 mm	6-10 mm	10-18 mm	18-30 mm	
<b>h6</b>	0 -0.0024	0 -0.0032	0 -0.0036	0 -0.0044	0 -0.0052	
<b>h7</b>	0 -0.004	0 -0.0048	0 -0.0059	0 -0.0071	0 -0.0083	
<b>h8</b>	0 -0.0056	0 -0.0071	0 -0.0087	0 -0.0107	0 -0.0130	
<b>m7</b>	+0.0048 +0.0007	+0.0063 +0.0015	+0.0083 +0.0023	+0.0099 +0.0027	+0.0114 +0.0031	

**We recommend you to reduce the feed rate to Kf when you use 5xD drills.  
Note for 8xD Drills reduce speeds & Feeds by 15-20%**



## COOLANT RECOMMENDATIONS FOR CARBIDE DREAM DRILLS

### Drilling Parameters



CARBIDE AND COBALT / HSS DRILLS



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

### TiN Coated Cobalt Metric

Application:

Designed for drilling in stainless steels, mild steels, aluminum, aluminum alloy, aluminum die cast, copper, copper alloy, etc.

**Approx. 60 SFM Stainless**  
**300 SFM Aluminum**  
**130 SFM Mild Steel**

**30° Helix**  
**130° Point – up to 4mm**  
**120° Point – over 4mm**

Material	Stainless Steels (SUS304, 200)		Stainless Steels (SUS420, 440)		Aluminum & Aluminum Alloy		Plastics, Copper, Copper Alloys		Mild Steels, Low Carbon Steels	
	R.P.M.	Inch/Rev.	R.P.M.	Inch/Rev.	R.P.M.	Inch/Rev.	R.P.M.	Inch/Rev.	R.P.M.	Inch/Rev.
2	2600	0.003	3100	0.003	11000	0.004	5600	0.002	6300	0.003
3	1800	0.003	2100	0.003	7350	0.005	3750	0.003	4200	0.005
4	1300	0.004	1600	0.004	7050	0.007	2800	0.004	3200	0.006
5	1050	0.006	1250	0.006	5500	0.009	2250	0.005	2500	0.006
6	900	0.007	1050	0.007	4600	0.010	1850	0.006	2100	0.007
8	650	0.009	800	0.009	3500	0.013	1350	0.008	1550	0.009
10	550	0.010	630	0.012	2800	0.016	1100	0.010	1250	0.010
12	450	0.013	530	0.014	2300	0.020	950	0.012	1050	0.013
14	400	0.014	450	0.017	2050	0.022	800	0.013	900	0.014
16	350	0.016	390	0.019	1750	0.024	700	0.014	790	0.016
18	300	0.017	350	0.020	1600	0.028	620	0.016	700	0.018
20	260	0.018	320	0.021	1450	0.030	560	0.016	620	0.019

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



## JOBBER LENGTH

### D1GP113, D1GP182, D1GP138, D1GP139, D1GP134, D1GP136, D2GP185, D2GP186, D2GP187 Series

Work Material	Carbon Steels		Carbon Steels		Alloy Steels		Stainless Steels	
	~ 570N/mm <sup>2</sup>		~ 830N/mm <sup>2</sup>		830~1110N/mm <sup>2</sup>		~ 830N/mm <sup>2</sup>	
Hardness			~ HRC23		HRC23 ~ 34		~ HRC23	
Strength								
Diameter(inch)	N	S	N	S	N	S	N	S
3/64(.0469)	14000	0.0008	12500	0.0008	7700	0.0008	7000	0.0008
#47(.0785)	7000	0.0023	6100	0.0024	3850	0.0024	3500	0.0024
#32(.1160)	4650	0.0038	4100	0.0031	2550	0.0031	2350	0.0031
#22(.1570)	3500	0.0044	3050	0.0043	1950	0.0039	1750	0.0039
#9(.1960)	2800	0.0049	2450	0.0043	1550	0.0039	1400	0.0039
B(.2380)	2350	0.0056	2050	0.0051	1300	0.0047	1150	0.0047
J(.2770)	2000	0.0064	1750	0.0059	1100	0.0055	1000	0.0055
O(.3160)	1750	0.0072	1550	0.0071	960	0.0059	875	0.0059
T(.3580)	1550	0.0077	1350	0.0087	855	0.0071	780	0.0071
X(.3970)	1400	0.0084	1250	0.0087	770	0.0071	700	0.0071
7/16(.4375)	1250	0.0087	1100	0.0087	700	0.0071	650	0.0071
15/32(.4688)	1150	0.0090	1000	0.0087	650	0.0079	585	0.0079
1/2(.5000)	1050	0.0090	950	0.0087	595	0.0079	540	0.0079

CARBIDE AND COBALT / HSS DRILLS

### D1GP113, D1GP182, D1GP138, D1GP139, D1GP134, D1GP136, D2GP185, D2GP186, D2GP187 Series

Work Material	Titanium Alloys		Aluminum Alloys, Zinc Alloys		Magnesium Alloys	
	~410N/mm <sup>2</sup>					
Hardness						
Strength						
Diameter(inch)	N	S	N	S	N	S
3/64(.0469)	8050	0.0008	30000	0.0008	11500	0.0012
#47(.0785)	4050	0.0024	15000	0.0023	5800	0.0035
#32(.1160)	2700	0.0031	9900	0.0038	3850	0.0051
#22(.1570)	2000	0.0035	7450	0.0044	2900	0.0059
#9(.1960)	1600	0.0039	5950	0.0049	2300	0.0067
B(.2380)	1350	0.0047	4950	0.0056	1950	0.0075
J(.2770)	1150	0.0055	4250	0.0064	1650	0.0087
O(.3160)	1000	0.0059	3700	0.0072	1450	0.0094
T(.3580)	895	0.0067	3300	0.0079	1280	0.0106
X(.3970)	805	0.0071	3000	0.0090	1150	0.0114
7/16(.4375)	730	0.0071	2700	0.0090	1050	0.0118
15/32(.4688)	670	0.0079	2480	0.0090	960	0.0122
1/2(.5000)	620	0.0079	2300	0.0090	890	0.0122

N=rev/min

S=inch/rev



## JOBBER LENGTH, PARABOLIC FLUTE

### DLGP511, DLGP512, DLGP513 Series

Work Material	Carbon Steels Alloy Steels		Tool Steels Hardened Steels		Soft Grey Cast Iron		Hard Grey Cast Iron	
	HRc15 ~ 30		HRc20 ~ 40					
Strength	700 ~ 1000N/mm <sup>2</sup>		800~1200N/mm <sup>2</sup>					
Diameter(inch)	N	S	N	S	N	S	N	S
3/64 (.0469)	8750	0.0008	6300	0.0008	16000	0.0008	9800	0.0008
#47 (.0785)	4400	0.0022	3150	0.0022	7900	0.0027	4900	0.0027
#32 (.1160)	2900	0.0032	2100	0.0032	5250	0.0043	3250	0.0043
#22 (.1570)	2200	0.0036	1600	0.0036	3950	0.0054	2450	0.0054
#9 (.1960)	1750	0.0041	1250	0.0041	3150	0.0054	1950	0.0054
B (.2380)	1450	0.0047	1050	0.0047	2650	0.0069	1650	0.0069
J (.2770)	1250	0.0054	900	0.0054	2250	0.0078	1400	0.0078
O (.3160)	1100	0.0060	790	0.0060	1950	0.0087	1250	0.0087
T (.3580)	975	0.0066	700	0.0066	1750	0.0095	1100	0.0095
X (.3970)	875	0.0071	630	0.0071	1600	0.0108	980	0.0108
7/16 (.4375)	800	0.0077	575	0.0077	1450	0.0108	890	0.0108
15/32 (.4688)	730	0.0077	525	0.0077	1300	0.0108	815	0.0108
1/2 (.5000)	675	0.0077	485	0.0077	1200	0.0108	755	0.0108

N=rev/min  
S=inch/rev

CARBIDE AND COBALT / HSS DRILLS





# RECOMMENDED CUTTING CONDITIONS

## HSS & HSSCo8 STRAIGHT SHANK SCREW MACHINE DRILLS

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

WORK MATERIAL	HARDNESS	STRENGTH	DIAMETER													
			~ 3/32		3/32 ~ 5/32		11/64 ~ 1/4		17/64 ~ 23/64		3/8 ~ 37/64		19/32 ~ 1"		1" ~	
			N	S	N	S	N	S	N	S	N	S	N	S	N	S
CARBON STEELS		~ 570N/mm <sup>2</sup>	3380	0.0010	2700	0.0020	1700	0.0025	1050	0.0051	750	0.0059	440	0.0090	260	0.0110
CARBON STEELS	~ HRc 23	~ 830N/mm <sup>2</sup>	2550	0.0010	2000	0.0020	1280	0.0025	780	0.0051	560	0.0060	330	0.0090	195	0.0110
CARBON STEELS	HRc 23 ~ 28	830 ~ 950N/mm <sup>2</sup>	1900	0.0006	1500	0.0010	960	0.0015	590	0.0030	425	0.0030	255	0.0051	145	0.0070
ALLOY STEELS	HRc 23 ~ 34	830 ~ 1110N/mm <sup>2</sup>	2380	0.0008	1880	0.0020	1190	0.0025	730	0.0051	520	0.0070	300	0.0090	180	0.0070
ALLOY STEELS	HRc 34 ~ 38	1110 ~ 1260N/mm <sup>2</sup>	1400	0.0006	1100	0.0008	700	0.0010	430	0.0015	310	0.0020	180	0.0020	107	0.0030
STAINLESS STEELS	HRc 23	830N/mm <sup>2</sup>	2550	0.0010	2000	0.0020	1280	0.0025	780	0.0051	560	0.0060	330	0.0090	195	0.0110
TITANIUM ALLOYS		410N/mm <sup>2</sup>	1400	0.0008	1100	0.0010	700	0.0015	430	0.0030	430	0.0030	180	0.0051	107	0.0070
TOOL STEELS		270N/mm <sup>2</sup>	3180	0.0016	2500	0.0020	1590	0.0025	970	0.0051	700	0.0070	440	0.0090	240	0.1180
CAST IRON	HRc 21	800N/mm <sup>2</sup>	2250	0.0010	2000	0.0020	1280	0.0025	780	0.0051	560	0.0060	330	0.0090	195	0.0110
ALUMINUM ALLOYS			6400	0.0015	5000	0.0025	3200	0.0030	2000	0.0070	1400	0.0078	820	0.0118	490	0.0150
MAGNESIUM ALLOYS			8600	0.0015	6800	0.0025	4300	0.0030	2600	0.0070	1900	0.0078	1100	0.0118	660	0.0150
ZINC ALLOYS			6400	0.0015	5000	0.0025	3200	0.0030	2000	0.0070	1400	0.0078	820	0.0118	490	0.0150
PLASTIC			3380	0.0010	2700	0.0020	1700	0.0025	1050	0.0051	750	0.0060	440	0.0090	260	0.0110

N=R.P.M  
S=inch/rev.

CARBIDE AND COBALT / HSS DRILLS

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

### DL601, D1631 Series

WORK MATERIAL	HARDNESS	STRENGTH	DIAMETER													
			~ 3/32		3/32 ~ 5/32		11/64 ~ 1/4		17/64 ~ 23/64		3/8 ~ 37/64		19/32 ~ 1"		1" ~	
			N	S	N	S	N	S	N	S	N	S	N	S	N	S
CARBON STEELS		~ 570N/mm <sup>2</sup>	3380	0.0010	2700	0.0020	1700	0.0025	1050	0.0051	750	0.0059	440	0.0090	260	0.0110
CARBON STEELS	~ HRc 23	~ 830N/mm <sup>2</sup>	2550	0.0010	2000	0.0020	1280	0.0025	780	0.0051	560	0.0060	330	0.0090	195	0.0110
CARBON STEELS	HRc 23 ~ 28	830 ~ 950N/mm <sup>2</sup>	1900	0.0006	1500	0.0010	960	0.0015	590	0.0030	425	0.0030	255	0.0051	145	0.0070
ALLOY STEELS	HRc 23 ~ 34	830 ~ 1110N/mm <sup>2</sup>	2380	0.0008	1880	0.0020	1190	0.0025	730	0.0051	520	0.0070	300	0.0090	180	0.0070
ALLOY STEELS	HRc 34 ~ 38	1110 ~ 1260N/mm <sup>2</sup>	1400	0.0006	1100	0.0008	700	0.0010	430	0.0015	310	0.0020	180	0.0020	107	0.0030
STAINLESS STEELS	HRc 23	830N/mm <sup>2</sup>	2550	0.0010	2000	0.0020	1280	0.0025	780	0.0051	560	0.0060	330	0.0090	195	0.0110
TITANIUM ALLOYS		410N/mm <sup>2</sup>	1400	0.0008	1100	0.0010	700	0.0015	430	0.0030	430	0.0030	180	0.0051	107	0.0070
TOOL STEELS		270N/mm <sup>2</sup>	3180	0.0016	2500	0.0020	1590	0.0025	970	0.0051	700	0.0070	440	0.0090	240	0.1180
CAST IRON	HRc 21	800N/mm <sup>2</sup>	2250	0.0010	2000	0.0020	1280	0.0025	780	0.0051	560	0.0060	330	0.0090	195	0.0110
ALUMINUM ALLOYS			6400	0.0015	5000	0.0025	3200	0.0030	2000	0.0070	1400	0.0078	820	0.0118	490	0.0150
MAGNESIUM ALLOYS			8600	0.0015	6800	0.0025	4300	0.0030	2600	0.0070	1900	0.0078	1100	0.0118	660	0.0150
ZINC ALLOYS			6400	0.0015	5000	0.0025	3200	0.0030	2000	0.0070	1400	0.0078	820	0.0118	490	0.0150
PLASTIC			3380	0.0010	2700	0.0020	1700	0.0025	1050	0.0051	750	0.0060	440	0.0090	260	0.0110

N=R.P.M  
S=inch/rev.



## RECOMMENDED CUTTING CONDITIONS

### HSSCo5, PARABOLIC, SCREW MACHINE TiN COATED DRILLS

#### DN514, DN515, DN516 Series

WORK MATERIAL	CARBON STEELS ALLOY STEELS		TOOL STEELS HARDENED STEELS		SOFT GREY CAST IRON		HARD GREY CAST IRON	
	HRC15 ~ HRC30		HRC20 ~ HRC40					
STRENGTH	700 ~ 1000N/mm <sup>2</sup>		800 ~ 1200N/mm <sup>2</sup>					
DIAMETER(mm)	N	S	N	S	N	S	N	S
~ 5/64	2630	0.0012	2100	0.0010	4200	0.0023	1680	0.0500
3/32 ~ 7/64	2100	0.0015	1680	0.0012	3300	0.0031	1310	0.0023
1/8 ~ 5/32	1680	0.0020	1310	0.0015	2630	0.0039	1050	0.0031
11/64 ~ 3/16	1310	0.0023	1050	0.0019	2100	0.0051	840	0.0039
13/64 ~ 15/64	1050	0.0023	840	0.0019	1680	0.0051	660	0.0039
1/4 ~ 9/32	840	0.0031	660	0.0023	1310	0.0063	530	0.0051
19/64 ~ 11/32	660	0.0039	530	0.0031	1050	0.0078	420	0.0067
23/64 ~ 7/16	530	0.0051	420	0.0039	840	0.0098	330	0.0082
29/64 ~ 9/16	420	0.0051	330	0.0039	660	0.0098	260	0.0082
37/64 ~ 45/64	330	0.0059	260	0.0051	530	0.0118	210	0.0098
23/32 ~ 7/8	260	0.0078	210	0.0059	420	0.0157	170	0.0118
57/64 ~ 1-1/8	210	0.0098	170	0.0078	330	0.0196	130	0.0196
1-9/64 ~	170	0.0098	130	0.0078	260	0.0196	110	0.0196

N=R.P.M  
S=inch/rev.



# RECOMMENDED CUTTING CONDITIONS

## HSSCo5, TAPER LENGTH STRAIGHT SHANK DRILL

### DX517 Series

WORK MATERIAL	CARBON STEELS ALLOY STEELS		TOOL STEELS HARDENED STEELS		SOFT GREY CAST IRON		HARD GREY CAST IRON	
HARDNESS	HRc15 ~ HRc30		HRc20 ~ HRc40					
STRENGTH	700 ~ 1000N/mm <sup>2</sup>		800 ~ 1200N/mm <sup>2</sup>					
DIAMETER(mm)	N	S	N	S	N	S	N	S
~ 5/64	4900	0.0023	3400	0.0023	8500	0.0027	5400	0.0027
3/32 ~ 7/64	3000	0.0031	2350	0.0031	5700	0.0043	3500	0.0043
1/8 ~ 5/32	2440	0.0035	1800	0.0035	4300	0.0055	2700	0.0055
11/64 ~ 15/64	1950	0.0039	1400	0.0039	3450	0.0055	2150	0.0055
1/4 ~ 9/32	1400	0.0055	1000	0.0055	2450	0.0078	1550	0.0078
19/64 ~ 5/16	1200	0.0059	850	0.0059	2100	0.0086	1350	0.0086
21/64 ~ 23/64	1100	0.0066	800	0.0066	1950	0.0094	1200	0.0094
3/8 ~ 25/64	950	0.0071	660	0.0071	1750	0.0110	1050	0.0110
13/32 ~ 7/16	900	0.0078	630	0.0078	1600	0.0110	960	0.0110
29/64 ~ 15/32	800	0.0078	575	0.0078	1450	0.0110	900	0.0110
31/64 ~ 1/2	720	0.0078	500	0.0078	1300	0.0110	830	0.0110

N=R.P.M  
S=inch/rev.

CARBIDE AND COBALT / HSS DRILLS

### DN514, DN515, DN516 Series

WORK MATERIAL	CARBON STEELS ALLOY STEELS		TOOL STEELS HARDENED STEELS		SOFT GREY CAST IRON		HARD GREY CAST IRON	
HARDNESS	HRc15 ~ HRc30		HRc20 ~ HRc40					
STRENGTH	700 ~ 1000N/mm <sup>2</sup>		800 ~ 1200N/mm <sup>2</sup>					
DIAMETER(mm)	N	S	N	S	N	S	N	S
~ 5/64	3990	0.0023	2770	0.0023	6920	0.0027	4400	0.0027
3/32 ~ 7/64	2440	0.0031	1910	0.0031	4640	0.0043	2850	0.0043
1/8 ~ 5/32	1990	0.0035	1470	0.0035	3500	0.0055	2200	0.0055
11/64 ~ 15/64	1590	0.0039	1140	0.0039	2810	0.0055	1750	0.0055
1/4 ~ 9/32	1140	0.0055	810	0.0055	1990	0.0078	1260	0.0078
19/64 ~ 5/16	980	0.0059	690	0.0059	1710	0.0086	1100	0.0086
21/64 ~ 23/64	900	0.0066	650	0.0066	1590	0.0094	980	0.0094
3/8 ~ 25/64	770	0.0071	540	0.0071	1420	0.0110	850	0.0110
13/32 ~ 7/16	730	0.0078	510	0.0078	1300	0.0110	780	0.0110
29/64 ~ 15/32	650	0.0078	470	0.0078	1180	0.0110	730	0.0110
31/64 ~ 1/2	590	0.0078	410	0.0078	1060	0.0110	680	0.0110

N=R.P.M  
S=inch/rev.

# COBALT 8% HSS, 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-Spotting drills 90°**



**NC-Spotting drills 120°**

Unit:inch

EDP No.	Diameter Inch	Flute Length Inch	Overall Length Inch
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

EDP No.	Diameter Inch	Flute Length Inch	Overall Length Inch
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



## 90°, 120° HSSCo8 NC-SPOTTING DRILL RECOMMENDED CUTTING CONDITIONS

WORK MATERIAL	CARBON STEELS		ALLOY STEELS		ALLOY STEELS, TOOL STEELS, HARDENED STEELS		CARBON STEELS		CARBON STEELS	
	N	S	N	S	N	S	N	S	N	S
DIAMETER										
1/8~5/32	2460	0.002	2110	0.002	1080	0.002	940	0.002	7040	0.005
11/64~3/16	1850	0.002	1580	0.002	800	0.002	700	0.002	5280	0.006
13/64~15/64	1510	0.003	1300	0.003	670	0.003	580	0.003	4400	0.006
1/4~5/16	1170	0.003	1030	0.003	540	0.003	460	0.003	3520	0.007
21/64~25/64	880	0.004	790	0.004	400	0.004	350	0.004	2640	0.008
13/32~15/32	700	0.004	630	0.004	320	0.004	290	0.004	2110	0.009
31/64~5/8	590	0.005	530	0.005	260	0.005	240	0.005	1760	0.011
41/64~47/64	460	0.007	400	0.007	200	0.007	180	0.007	1320	0.012
3/4~1	350	0.009	320	0.009	150	0.009	140	0.009	1060	0.017

N=R.P.M  
S=inch/rev.



## Technology and Quality

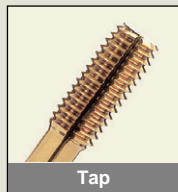
....**YG-1** Strives for technological advancements and superior quality 24 hours a day.



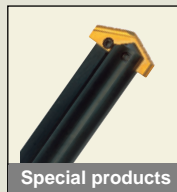
End Mill



Drill



Tap



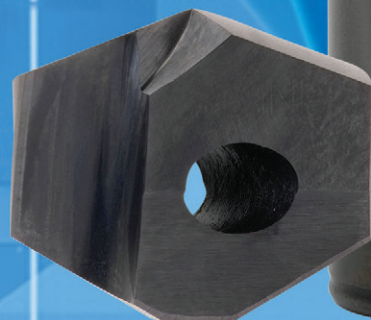
Special products

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**X5070 / X-POWER / V7 MILL / JET-POWER / ALU-POWER / D-POWER / STANDARD & HIGH PERFORMANCE / CARBIDE END MILLS / TANK-POWER & ADDITIONAL POWDERED METAL / COBALT AND HSS END MILLS / TAPS / DRILLS, SPADE DRILL INSERTS HOLDERS AND ACCESSORIES / ROTARY TOOLING**



# *i*-DREAM DRILL INSERTS & HOLDERS



## Feature of *i*-Dream Drill

### *i*-Dream Drill :

- By using advanced drill point technology, centering and reaming are eliminated, and accurate, consistent hole size is easily attainable.
- The newest coatings combined with tough long lasting carbide substrates, allow high penetration rates and long tool life.
- The strong and accurate insert locking system allows easy access and quick insert replacement while the drill is mounted in the machine.

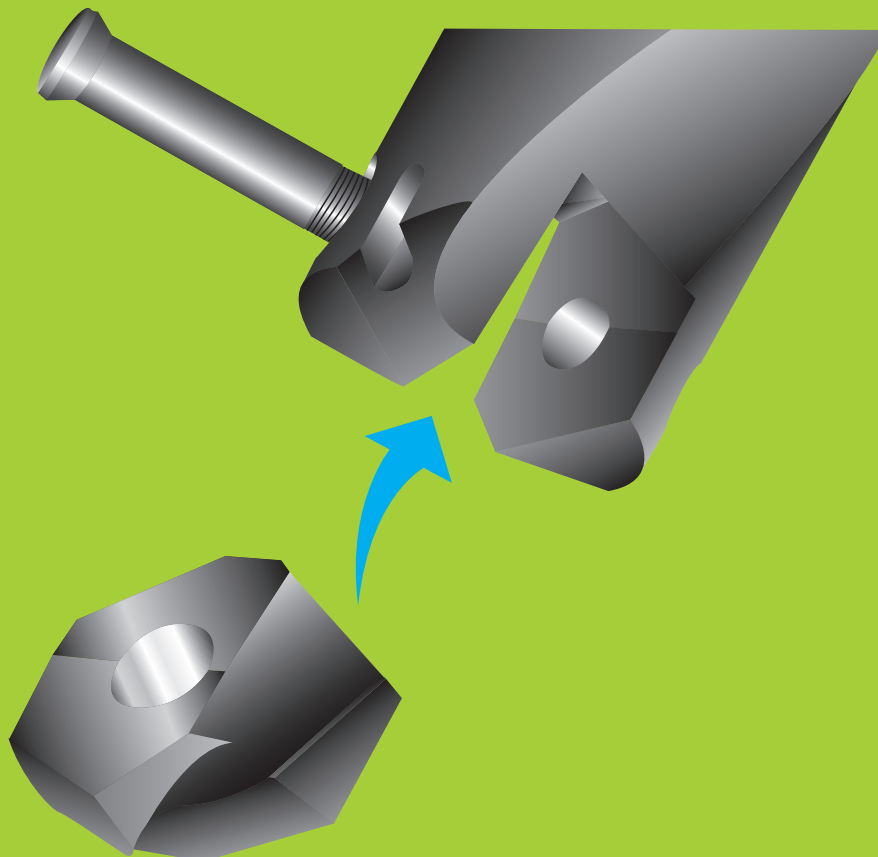
### *i*-Dream Drill Holder :

- The holder, made of a highly wear resistant Steel alloy, is designed to allow maximum coolant flow and unrestricted chip removal during the drilling cycle.

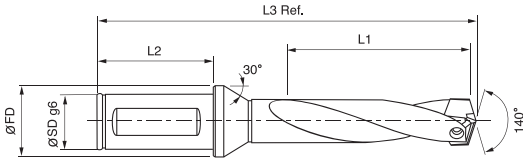
### Speed and Feed :

- The speeds and feeds recommended as shown are for ideal working conditions with adequate coolant pressure.
- It recommended to consider on new jobs 10 ~ 20% lower speeds and feeds as a starting point.

# HIGH PERFORMANCE & OPTIMAL COST

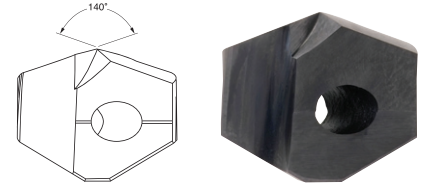






### -Feature of *i-Dream Drill Holder*-

- ▶ Special Alloy Steel that maintains its hardness and toughness under high temperatures.
- ▶ Innovative surface treatment that improves wear resistance and reduces corrosion.
- ▶ High Performance flute design allowing maximum chip evacuation and minimum interference.

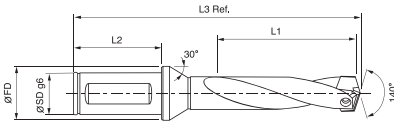


### -Feature of *i-Dream Drill Insert*-

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

Unit : inch

Series Range (mm)	Insert EDP No. (TiAlN)	Insert O.D. (h7)			Drilling Depth	Holder EDP No.	Shank Dia. SD g6	Shank Length L2	Flange Dia. FD	Flute Length(L1)			Overall Length (L3) Ref.			Torx No.
		dec.	frac.	mm						3xD	5xD	7xD	3xD	5xD	7xD	
A Ø12.00 to Ø13.99	Y03A01	0.4724		12.00	3D 5D 7D	ZA0301 ZA0501 ZA0701	3/4"	2"	1"	1-13/16"	2-25/32"	3-3/4"	4-3/4"	5-3/4"	6-11/16"	TA1213
	Y03A02	0.4764		12.10												
	Y03A03	0.4803		12.20												
	Y03A04	0.4844	31/64	12.30	3D 5D 7D	ZA0302 ZA0502 ZA0702	3/4"	2"	1"	1-7/8"	2-29/32"	3-15/16"	4-13/16"	5-13/16"	6-27/32"	
	Y03A05	0.4921		12.50												
	Y03A06	0.4961		12.60												
	Y03A07	0.5000	1/2	12.70	3D 5D 7D	ZA0303 ZA0503 ZA0703	3/4"	2"	1"	1-31/32"	3-1/32"	4-3/32"	4-7/8"	5-15/16"	7"	
	Y03A08	0.5039		12.80												
	Y03A09	0.5079		12.90												
	Y03A10	0.5118		13.00	3D 5D 7D	ZA0304 ZA0504 ZA0704	3/4"	2"	1"	2"	3-1/8"	4-7/32"	4-31/32"	6-3/32"	7-1/4"	
	Y03A11	0.5156	33/64	13.10												
	Y03A12	0.5197		13.20												
	Y03A13	0.5312	17/32	13.49	3D 5D 7D	ZB0301 ZB0501 ZB0701	3/4"	2"	1"	2-3/32"	3-7/32"	4-3/8"	4-31/32"	6-3/32"	7-1/4"	
	Y03A14	0.5315		13.50												
	Y03A15	0.5354		13.60												
	Y03A16	0.5394		13.70	3D 5D 7D	ZB0302 ZB0502 ZB0702	3/4"	2"	1"	2-5/32"	3-11/32"	4-17/32"	5-1/32"	6-7/32"	7-13/32"	
	Y03A17	0.5433		13.80												
	Y03A18	0.5469	35/64	13.89												
B Ø14.00 to Ø15.99	Y03B01	0.5512		14.00	3D 5D 7D	ZB0303 ZB0503 ZB0703	3/4"	2"	1"	2-1/4"	3-15/32"	4-11/16"	5-1/8"	6-11/32"	7-9/16"	
	Y03B02	0.5551		14.10												
	Y03B03	0.5591		14.20												
	Y03B04	0.5625	9/16	14.29	3D 5D 7D	ZB0304 ZB0504 ZB0704	3/4"	2"	1"	2-5/16"	3-19/32"	4-13/16"	5-5/32"	6-13/32"	7-5/8"	
	Y03B05	0.5630		14.30												
	Y03B06	0.5669		14.40												
	Y03B07	0.5709		14.50	3D 5D 7D	ZB0301 ZB0501 ZB0701	3/4"	2"	1"	2-3/32"	3-7/32"	4-3/8"	4-31/32"	6-3/32"	7-1/4"	
	Y03B08	0.5748		14.60												
	Y03B09	0.5781	37/64	14.68												
	Y03B10	0.5827		14.80	3D 5D 7D	ZB0302 ZB0502 ZB0702	3/4"	2"	1"	2-5/32"	3-11/32"	4-17/32"	5-1/32"	6-7/32"	7-13/32"	
	Y03B11	0.5906		15.00												
	Y03B12	0.5938	19/32	15.08												
	Y03B13	0.5945		15.10	3D 5D 7D	ZB0303 ZB0503 ZB0703	3/4"	2"	1"	2-1/4"	3-15/32"	4-11/16"	5-1/8"	6-11/32"	7-9/16"	
	Y03B14	0.5984		15.20												
Y03B15	0.6024		15.30													
Y03B16	0.6094	39/64	15.48	3D 5D 7D	ZB0304 ZB0504 ZB0704	3/4"	2"	1"	2-5/16"	3-19/32"	4-13/16"	5-5/32"	6-13/32"	7-5/8"		
Y03B17	0.6102		15.50													
Y03B18	0.6142		15.60													
Y03B19	0.6181		15.70	3D 5D 7D	ZB0301 ZB0501 ZB0701	3/4"	2"	1"	2-3/32"	3-7/32"	4-3/8"	4-31/32"	6-3/32"	7-1/4"		
Y03B20	0.6220		15.80													
Y03B21	0.6250	5/8	15.87													

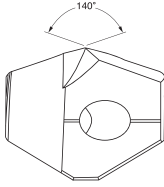
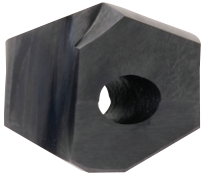


### -Feature of *i-Dream Drill Holder*-

- ▶ Special Alloy Steel that maintains its hardness and toughness under high temperatures.
- ▶ Innovative surface treatment that improves wear resistance and reduces corrosion.
- ▶ High Performance flute design allowing maximum chip evacuation and minimum interference.

Unit : inch

Series Range (mm)	Insert EDP No. (TiAlN)	Insert O.D. (h7)			Drilling Depth	Holder EDP No.	Shank Dia. SD g6	Shank Length L2	Flange Dia. FD	Flute Length(L1)			Overall Length (L3) Ref.			Torx No.
		dec.	frac.	mm						3xD	5xD	7xD	3xD	5xD	7xD	
C Ø16.00 to Ø17.99	Y03C01	0.6299		16.00	3D 5D 7D	ZC0301 ZC0501 ZC0701	3/4"	2"	1"	2-5/16"	3-5/8"	4-29/32"	5-5/32"	6-15/32"	7-3/4"	TC1617
	Y03C02	0.6335		16.09												
	Y03C03	0.6378		16.20												
	Y03C04	0.6406	41/64	16.27	3D 5D 7D	ZC0302 ZC0502 ZC0702	3/4"	2"	1"	2-13/32"	3-3/4"	5-1/32"	5-1/4"	6-9/16"	7-7/8"	
	Y03C05	0.6417		16.30												
	Y03C06	0.6496		16.50												
	Y03C07	0.6562	21/32	16.67	3D 5D 7D	ZC0303 ZC0503 ZC0703	3/4"	2"	1"	2-15/32"	3-27/32"	5-1/4"	5-9/32"	6-21/32"	8-1/32"	
	Y03C08	0.6614		16.80												
	Y03C09	0.6693		17.00												
	Y03C10	0.6919	43/64	17.07	3D 5D 7D	ZC0304 ZC0504 ZC0704	3/4"	2"	1"	2-17/32"	3-15/16"	5-11/32"	5-5/16"	6-23/32"	8-5/32"	
	Y03C11	0.6875	11/16	17.46												
	Y03C12	0.6890		17.50												
	Y03C13	0.7008		17.80	3D 5D 7D	ZD0301 ZD0501 ZD0701	1"	2-3/16"	1-1/4"	2-19/32"	4-1/16"	5-8/16"	5-7/8"	7-5/16"	8-25/32"	
	Y03C14	0.7031	45/64	17.86												
D Ø18.00 to Ø19.99	Y03D01	0.7087		18.00	3D 5D 7D	ZD0302 ZD0502 ZD0702	1"	2-3/16"	1-1/4"	2-11/16"	4-3/16"	5-21/32"	5-29/32"	7-13/32"	8-29/32"	TD1819
	Y03D02	0.7188	23/32	18.26												
	Y03D03	0.7283		18.50												
	Y03D04	0.7344	47/64	18.65	3D 5D 7D	ZD0303 ZD0503 ZD0703	1"	2-3/16"	1-1/4"	2-3/4"	4-9/32"	5-13/16"	5-31/32"	7-17/32"	9-1/16"	
	Y03D05	0.7402		18.80												
	Y03D06	0.7480		19.00												
	Y03D07	0.7500	3/4	19.05	3D 5D 7D	ZD0304 ZD0504 ZD0704	1"	2-3/16"	1-1/4"	2-25/32"	4-3/8"	5-15/16"	6-1/32"	7-19/32"	9-3/16"	
	Y03D08	0.7587		19.27												
	Y03D09	0.7656	49/64	19.45												
	Y03D10	0.7677		19.50	3D 5D 7D	ZE0301 ZE0501 ZE0701	1"	2-3/16"	1-1/4"	2-25/32"	4-13/32"	6-1/32"	5-31/32"	7-19/32"	9-7/32"	
	Y03D11	0.7795		19.80												
	Y03D12	0.7812	25/32	19.84												
E Ø20.00 to Ø21.99	Y03E01	0.7874		20.00	3D 5D 7D	ZF0301 ZF0501 ZF0701	1"	2-3/16"	1-1/4"	3-1/8"	4-27/32"	6-5/8"	6-1/4"	8"	9-3/4"	TF2223
	Y03E02	0.7969	51/64	20.24												
	Y03E03	0.8071		20.50												
	Y03E04	0.8125	13/16	20.64	3D 5D 7D	ZF0302 ZF0502 ZF0702	1"	2-3/16"	1-1/4"	3-5/32"	4-31/32"	6-25/32"	6-1/4"	8-1/16"	9-7/8"	
	Y03E05	0.8150		20.70												
	Y03E06	0.8268		21.00												
	Y03E07	0.8281	53/64	21.03	3D 5D 7D	ZF0303 ZF0503 ZF0703	1"	2-3/16"	1-1/4"	3-7/32"	5-3/32"	6-15/16"	6-11/32"	8-3/16"	10-1/32"	
	Y03E08	0.8438	27/32	21.43												
	Y03E09	0.8465		21.50												
	Y03E10	0.8543		21.70	3D 5D 7D	ZF0304 ZF0504 ZF0704	1"	2-3/16"	1-1/4"	3-1/32"	4-23/32"	6-15/32"	6-3/16"	7-7/8"	9-19/32"	
	Y03E11	0.8594	55/64	21.83												
F Ø22.00 to Ø23.99	Y03F01	0.8661		22.00	3D 5D 7D	ZF0301 ZF0501 ZF0701	1"	2-3/16"	1-1/4"	3-1/8"	4-27/32"	6-5/8"	6-1/4"	8"	9-3/4"	TF2223
	Y03F02	0.8750	7/8	22.22												
	Y03F03	0.8858		22.50												
	Y03F04	0.8906	57/64	22.62	3D 5D 7D	ZF0302 ZF0502 ZF0702	1"	2-3/16"	1-1/4"	3-5/32"	4-31/32"	6-25/32"	6-1/4"	8-1/16"	9-7/8"	
	Y03F05	0.8937		22.70												
	Y03F06	0.9055		23.00												
	Y03F07	0.9062	29/32	23.02	3D 5D 7D	ZF0303 ZF0503 ZF0703	1"	2-3/16"	1-1/4"	3-7/32"	5-3/32"	6-15/16"	6-11/32"	8-3/16"	10-1/32"	
	Y03F08	0.9219	59/64	23.42												
	Y03F09	0.9252		23.50												
	Y03F10	0.9331		23.70	3D 5D 7D	ZF0304 ZF0504 ZF0704	1"	2-3/16"	1-1/4"	3-5/16"	5-5/32"	7-1/16"	6-13/32"	8-9/32"	10-5/32"	
	Y03F11	0.9375	15/16	23.81												



**-Feature of *i-Dream Drill Insert*-**

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

Unit : inch

Series Range (mm)	Insert EDP No. (TiAlN)	Insert O.D. (h7)			Drilling Depth	Holder EDP No.	Shank Dia. SD g6	Shank Length L2	Flange Dia. FD	Flute Length(L1)			Overall Length (L3) Ref.			Torx No.
		dec.	frac.	mm						3xD	5xD	7xD	3xD	5xD	7xD	
G Ø24.00 to Ø25.99	Y03G01	0.9449		24.00	3D 5D 7D	ZG0301 ZG0501 ZG0701	1-1/4"	2-3/8"	1-15/32"	3-11/32"	5-9/32"	7-7/32"	6-25/32"	8-11/16"	10-5/8"	TG2425
	Y03G02	0.9531	61/64	24.21												
	Y03G03	0.9646		24.50	3D	ZG0302										
	Y03G04	0.9688	31/32	24.61	5D	ZG0502	1-1/4"	2-3/8"	1-15/32"	3-7/16"	5-13/32"	7-3/8"	6-13/16"	8-25/32"	10-3/4"	
	Y03G05	0.9724		24.70	7D	ZG0702										
	Y03G06	0.9843		25.00	3D	ZG0303	1-1/4"	2-3/8"	1-15/32"	3-1/2"	5-1/2"	7-17/32"	6-7/8"	8-29/32"	10-29/32"	
	Y03G07	1.0000	1	25.40	5D	ZG0503										
	Y03G08	1.0039		25.50	7D	ZG0703										
	Y03G09	1.0106		25.67	3D	ZG0304	1-1/4"	2-3/8"	1-15/32"	3-19/32"	5-19/32"	7-5/8"	6-31/32"	8-31/32"	11-1/32"	
	Y03G10	1.0118		25.70	5D	ZG0504										
	Y03G11	1.0156	1*1/64	25.80	7D	ZG0704										
H Ø26.00 to Ø27.99	Y03H01	1.0236		26.00	3D 5D 7D	ZH0301 ZH0501 ZH0701	1-1/4"	2-3/8"	1-15/32"	3-5/8"	5-21/32"	7-23/32"	6-31/32"	9-1/32"	11-1/16"	TH2627
	Y03H02	1.0312	1*1/32	26.19												
	Y03H03	1.0433		26.50	3D	ZH0302	1-1/4"	2-3/8"	1-15/32"	3-21/32"	5-3/4"	7-27/32"	7"	9-3/32"	11-3/16"	
	Y03H04	1.0469	1*3/64	26.59	5D	ZH0502										
	Y03H05	1.0625	1*1/16	26.99	7D	ZH0702										
	Y03H06	1.0630		27.00	3D 5D 7D	ZH0303 ZH0503 ZH0703	1-1/4"	2-3/8"	1-15/32"	3-3/4"	5-7/8"	8"	7-3/32"	9-7/32"	11-11/32"	
	Y03H07	1.0827		27.50	3D	ZH0304	1-1/4"	2-3/8"	1-15/32"	3-13/16"	6-1/32"	8-3/16"	7-1/8"	9-11/32"	11-1/2"	
	Y03H08	1.0938	1*3/32	27.78	5D 7D	ZH0504 ZH0704										
I Ø28.00 to Ø29.99	Y03I01	1.1024		28.00	3D 5D 7D	ZI0301 ZI0501 ZI0701	1-1/4"	2-3/8"	1-15/32"	3-29/32"	6-3/32"	8-5/16"	7-7/32"	9-13/32"	11-5/8"	TI2829
	Y03I02	1.1094	1*7/64	28.18												
	Y03I03	1.1220		28.50	3D	ZI0302	1-1/4"	2-3/8"	1-15/32"	3-15/16"	6-3/16"	8-7/16"	7-1/4"	9-1/2"	11-23/32"	
	Y03I04	1.1250	1*1/8	28.58	5D	ZI0502										
	Y03I05	1.1417		29.00	7D	ZI0702										
	Y03I06	1.1562	1*5/32	29.37	3D 5D 7D	ZI0303 ZI0503 ZI0703	1-1/4"	2-3/8"	1-15/32"	4-1/16"	6-3/8"	8-21/32"	7-5/16"	9-21/32"	11-15/16"	
	Y03I07	1.1614		29.50	3D	ZI0304	1-1/4"	2-3/8"	1-15/32"	4-3/32"	6-15/32"	8-25/32"	7-3/8"	9-23/32"	12-1/16"	
	Y03I08	1.1719	1*11/64	29.77	5D 7D	ZI0504 ZI0704										
J Ø30.00 to Ø31.99	Y03J01	1.1811		30.00	3D 5D 7D	ZJ0301 ZJ0501 ZJ0701	1-1/4"	2-3/8"	1-15/32"	4-3/16"	6-17/32"	8-29/32"	7-7/16"	9-13/16"	12-5/32"	TJ2831
	Y03J02	1.1875	1*3/16	30.16												
	Y03J03	1.2008		30.50	3D	ZJ0302	1-1/4"	2-3/8"	1-15/32"	4-1/4"	6-11/16"	9-1/8"	7-15/32"	9-29/32"	12-3/8"	
	Y03J04	1.2031	1*13/64	30.56	5D	ZJ0502										
	Y03J05	1.2188	1*7/32	30.96	7D	ZJ0702										
	Y03J06	1.2205		31.00	3D 5D	ZJ0303 ZJ0503	1-1/4"	2-3/8"	1-15/32"	4-9/32"	6-23/32"	9-3/16"	7-17/32"	9-31/32"	12-13/32"	
	Y03J07	1.2402		31.50	3D	ZJ0304	1-1/4"	2-3/8"	1-15/32"	4-13/32"	6-15/16"	9-7/16"	7-5/8"	10-5/32"	12-11/16"	
	Y03J08	1.2500	1*1/4	31.75	5D 7D	ZJ0504 ZJ0704										

Coating : TiN, TiCN & Hardslick is available on your request.

**METRIC**

Material		Tensile Strength	Hardness		Cutting Speed	Feed [mm/rev]				
		[N/mm <sup>2</sup> ]	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 steel, Cast steel Free-machining steel	1213, 13L13, 1215, 12L14, 1118 etc	~ 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 steel, Cast steel(<5% ) Carbon steel	1015, 1020, 1140, 1025, 1035, 1050, 1045, 1055 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 steel	8620, 4130, 4137, 4140, 6150 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 steel	A355, 9840, 4340 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 steel	A36, A516, A182 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 steel	H13, H21, A2, S1 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
		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
		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
		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 alloy(Wrought)	not heat treatable	200	60		335~420	0.11~0.18	0.17~0.26	0.28~0.35	0.32~0.39	0.36~0.42
		335	100		230~290	0.13~0.22	0.29~0.45	0.38~0.48	0.51~0.61	0.56~0.66
Aluminum alloy(Cast)	≤12% Si , not heat treatable	250	75		335~420	0.21~0.37	0.31~0.49	0.41~0.52	0.47~0.57	0.50~0.59
		300	90		285~360	0.21~0.37	0.30~0.47	0.41~0.52	0.47~0.57	0.50~0.59
		450	130		205~260	0.19~0.33	0.28~0.44	0.37~0.47	0.45~0.54	0.48~0.57
Copper alloys	Free machining(Pb>1%)	370	110		115~145	0.16~0.28	0.23~0.36	0.29~0.36	0.37~0.45	0.41~0.48
		300	90		145~185	0.17~0.29	0.24~0.37	0.30~0.38	0.38~0.46	0.42~0.49
		200	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 materials	Duroplastics									
		Fiber plastics								
		Hard rubber								

※ Recommend Uncoated Inserts for Aluminum and Non-ferrous Materials.

\* Formulas :

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

$$mm/min = (RPM) \cdot (mm/rev)$$

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

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)

- ▶ 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.

**INCH**

Material		Tensile Strength	Hardness		Cutting Speed	Feed [IPR]					
		[N/mm <sup>2</sup> ]	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 steel, Cast steel Free-machining steel	1213, 13L13, 1215, 12L14, 1118 etc	~ 500	100 ~ 150		312-394	0.006-0.011	0.008-0.014	0.011-0.016	0.013-0.020	0.015-0.022	
		500 ~ 850	150 ~ 250	~ 24	262-344	0.006-0.009	0.008-0.014	0.011-0.016	0.013-0.020	0.015-0.022	
Low-alloyed steel, Cast steel(<5% ) Carbon steel	1015, 1020, 1140, 1025, 1035, 1050, 1045, 1055 etc	~ 450	85 ~ 125		295-377	0.006-0.010	0.008-0.013	0.010-0.015	0.012-0.019	0.013-0.020	
		450 ~ 755	125 ~ 225	~ 19	230-295	0.005-0.008	0.007-0.011	0.009-0.013	0.012-0.018	0.013-0.019	
		755 ~ 900	225 ~ 265	19 ~ 27	197-262	0.005-0.008	0.007-0.011	0.009-0.013	0.012-0.018	0.013-0.019	
		900 ~ 1200	265 ~ 350	27 ~ 37	180-230	0.004-0.006	0.006-0.010	0.008-0.012	0.010-0.015	0.011-0.017	
Alloyed steel	8620, 4130, 4137, 4140, 6150 etc	~ 600	125 ~ 175	~ 7	262-328	0.006-0.009	0.007-0.011	0.009-0.013	0.012-0.018	0.013-0.020	
		600 ~ 800	175 ~ 235	7 ~ 22	230-295	0.005-0.008	0.007-0.011	0.009-0.013	0.012-0.018	0.013-0.020	
		800 ~ 950	235 ~ 280	22 ~ 29	197-262	0.005-0.008	0.006-0.010	0.009-0.013	0.012-0.018	0.013-0.020	
		950 ~ 1110	280 ~ 330	29 ~ 35	180-230	0.004-0.006	0.005-0.008	0.008-0.012	0.010-0.015	0.011-0.017	
		1110 ~ 1230	330 ~ 360	35 ~ 39	148-197	0.003-0.005	0.005-0.008	0.008-0.012	0.010-0.015	0.011-0.017	
High-alloyed steel	A355, 9840, 4340 etc	600 ~ 1020	225 ~ 300	19 ~ 32	148-197	0.005-0.008	0.006-0.010	0.008-0.012	0.008-0.012	0.009-0.014	
		1020 ~ 1200	300 ~ 355	32 ~ 38	131-180	0.004-0.006	0.004-0.007	0.008-0.012	0.008-0.012	0.009-0.014	
		1200 ~ 1330	355 ~ 390	38 ~ 42	131-164	0.003-0.005	0.004-0.006	0.007-0.010	0.007-0.011	0.009-0.013	
Structural steel	A36, A516, A182 etc	350 ~ 500	100 ~ 150		246-312	0.006-0.009	0.008-0.014	0.011-0.015	0.011-0.017	0.013-0.019	
		500 ~ 850	150 ~ 250	~ 24	197-246	0.005-0.008	0.008-0.013	0.009-0.013	0.010-0.015	0.011-0.017	
		850 ~ 1200	250 ~ 355	24 ~ 38	164-213	0.004-0.006	0.007-0.011	0.008-0.012	0.008-0.013	0.010-0.015	
Tool steel	H13, H21, A2, S1 etc	500 ~ 705	150 ~ 210	~ 16	164-213	0.004-0.006	0.005-0.008	0.007-0.010	0.008-0.012	0.009-0.014	
		705 ~ 950	210 ~ 280	16 ~ 29	131-164	0.004-0.006	0.005-0.008	0.007-0.010	0.008-0.012	0.009-0.014	
Grey cast iron	Pearlitic, Ferritic	500 ~ 700	150 ~ 210	~ 16	328-410	0.006-0.010	0.008-0.015	0.011-0.017	0.014-0.020	0.016-0.022	
		Pearlitic	700 ~ 850	210 ~ 250	16 ~ 24	246-312	0.004-0.008	0.006-0.011	0.008-0.012	0.010-0.014	0.011-0.016
Cast iron nodular	Ferritic	540	165	4	312-394	0.005-0.009	0.007-0.012	0.008-0.013	0.011-0.016	0.013-0.017	
		Pearlitic	850	250	24	246-312	0.004-0.008	0.006-0.010	0.007-0.011	0.010-0.014	0.011-0.016
Malleable cast iron	Ferritic	450	125		328-410	0.005-0.009	0.007-0.012	0.008-0.013	0.011-0.016	0.013-0.017	
		Pearlitic	780	230	21	246-312	0.004-0.007	0.006-0.010	0.007-0.011	0.010-0.014	0.011-0.016
Aluminum alloy(Wrought)	not heat treatable	200	60		1099-1378	0.004-0.007	0.007-0.010	0.011-0.014	0.013-0.015	0.014-0.017	
		hardened	335	100		755-951	0.005-0.009	0.011-0.018	0.015-0.019	0.020-0.024	0.022-0.026
Aluminum alloy(Cast)	≤12% Si , not heat treatable	250	75		1099-1378	0.008-0.015	0.012-0.019	0.016-0.020	0.019-0.022	0.020-0.023	
		≤12% Si , hardened	300	90		935-1181	0.008-0.015	0.012-0.019	0.016-0.020	0.019-0.022	0.020-0.023
		>12% Si , not heat treatable	450	130		673-853	0.007-0.013	0.011-0.017	0.015-0.019	0.018-0.021	0.019-0.022
Copper alloys	Free machining(Pb>1%)	370	110		377-476	0.006-0.011	0.009-0.014	0.011-0.014	0.015-0.018	0.016-0.019	
		Brass	300	90		476-607	0.007-0.011	0.009-0.015	0.012-0.015	0.015-0.018	0.017-0.019
		Electrolitic copper	200	100		312-394	0.002-0.004	0.004-0.005	0.004-0.005	0.006-0.007	0.007-0.009
Non ferrous materials	Duroplastics										
		Fiber plastics									
		Hard rubber									

※ Recommend Uncoated Inserts for Aluminum and Non-ferrous Materials.

\* Formulas :

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

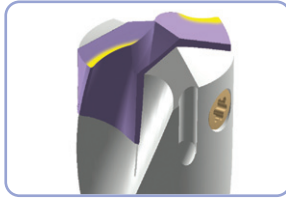
$$\text{SFM} = \frac{(\text{RPM}) \cdot \pi \cdot (\text{DIA.})}{12}$$

$$\text{IPM} = (\text{RPM}) \cdot (\text{IPR})$$

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

► 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 speeds and feeds by 15% for 5XD and 30% for 7XD Drills.



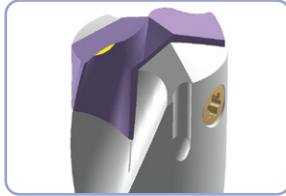
**Heavy flank wear / Fast flank wear**

- Reduce cutting speed
- Increase feed



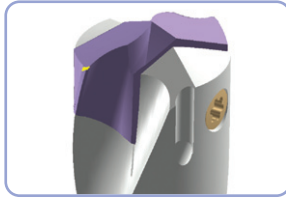
**Chipping on cutting edge**

- Reduce feed
- Check the rigidity of spindle and chuck
- Rigid clamping of workpiece



**Build up on cutting edge**

- Increase cutting speed
- Use a coated insert



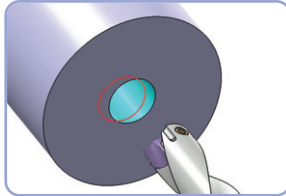
**Chipping or break down on outer corner**

- Reduce feed
- Rigid clamping of workpiece



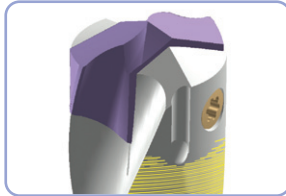
**Wear of land margin**

- Rigid clamping of workpiece
- Reduce cutting speed
- Increase coolant flow



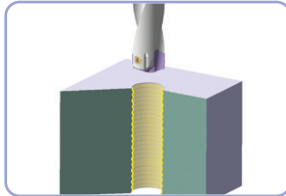
**Unsatisfactory positioning of the hole**

- Rigid clamping of workpiece
- Reduce feed during entrance or exit



**Scratching on holder**

- Rigid clamping of workpiece
- Reduce feed
- Increase coolant flow



**Unsatisfactory surface finish**

- Rigid clamping of workpiece
- Increase coolant flow and pressure





**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.**

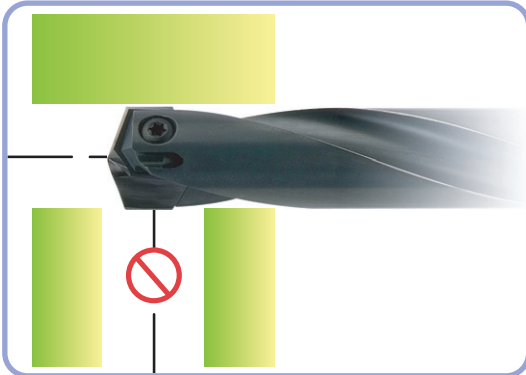


**After confirming the insert is pressed down to the bottom of the slot, tighten the screw using anti-seize compound.**



**Use the wing type or T-type wrench.**





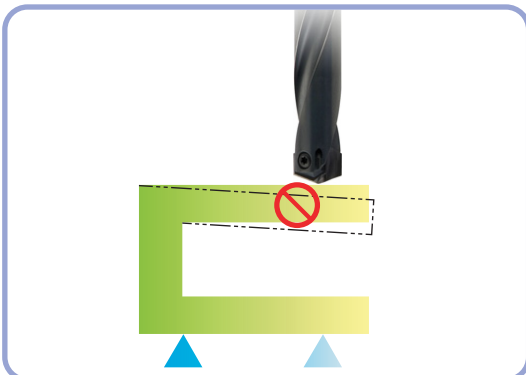
**Intersecting cross hole is bigger than the drill insert's Margin Length.**



**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.**

# THROW-AWAY DRILL INSERTS & HOLDERS

HOLDER & ACCESSORIES





# THROW-AWAY DRILL INSERTS & HOLDERS SELECTION GUIDE

## THROW-AWAY DRILL INSERT HOLDERS

435~441

<b>HOLDER ACCESSORIES</b>	<b>Torx Screws and Drivers / 435</b> <b>Rotary Coolant Inducer / 435</b>
<b>STRAIGHT SHANK</b>	<b>Short Length / 436</b> <b>Intermediate Length / 436</b> <b>Standard Length / 437</b> <b>Extended Length / 438</b> <b>Long Length / 439</b> <b>Extra Long Length / 439</b>
<b>TAPER SHANK</b>	<b>Short Length / 440</b> <b>Intermediate Length/ 440</b> <b>Standard Length / 441</b>

## THROW-AWAY DRILL INSERTS

443~461

<b>Super Cobalt (T15) Spade Drill / 443~445</b>
<b>HSS (M4) Spade Drill / 446~447</b>
<b>Premium Cobalt (M48) Spade Drill / 448~449</b>
<b>Carbide Spade Drill Inserts / 450~452</b>
<b>Super Cobalt (T15) SM-Point DRILL / 453~455</b>
<b>Carbide(C5) SM-Point DRILL / 456~457</b>
<b>Selection and Applications / 458~459</b>
<b>Speeds – Feeds and Coating Recommendations / 458~459</b>
<b>Horsepower Consumption and Metal Removal Rates / 460</b>
<b>Coolant Recommendations / 461</b>



## SPADE DRILL HOLDER ACCESSORIES

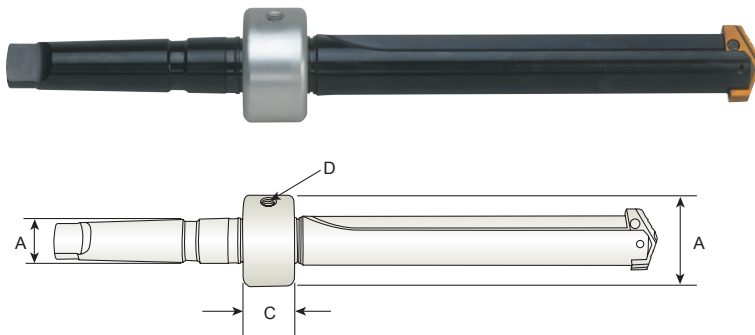
### TORX SCREWS AND PREMIUM TORX HAND DRIVERS

Series	Torx Screws		Torx Screws (Nylon Locking)		Premium Torx Drivers	Inch/Metric Drill Range		Torque in Lbs. 5.5
	Item	PKG EDP No (10 Screws)	Item	PKG EDP No (10 Screws)	EDP No			
Y	2XT7	J7Y001	2XT7N	J7Y006	J5Y007	3/8" – 27/64"	9.5mm – 11.0mm	5.5
Z	2LXT7	J7Z011	2LXT7N	J7Z016	J5Y007	7/16" – 1/2"	11.5mm – 12.5mm	5.5
0	2.5XT8	J80021	2.5XT8N	J80026	J50008	33/64" – 11/16"	13.0mm – 17.5mm	11.0
0.5	2.5LXT8	J80531	2.5LXT8N	J80536	J50008	39/64" – 11/16"	15.5mm – 17.5mm	11.0
1	3XT9	J91041	3XT9N	J91046	J51009	45/64" – 15/16"	18.0mm – 24.0mm	20.0
1.5	3LXT9	J91551	3LXT9N	J91556	J51009	55/64" – 15/16"	22.0mm – 24.0mm	20.0
2	4XT15	JB2061	4XT15N	JB2066	J52015	31/32" – 1-3/8"	25.0mm – 35.0mm	45.0
2.5	4XT15	JB2061	4XT15N	JB2066	J52015	31/32" – 1-3/8"	30.0mm – 35.0mm	45.0
3-4	5XT20	JC3081	5XT20N	JC3086	J53020	1-13/32" – 2-9/16"	36.0mm – 65.0mm	90.0
5-8	6XT25	JD5091	6XT25N	JD5096	J55025	2-1/2" – 4-1/2"	64.0mm – 114.0mm	155.0

**NOTE:** Replacement screws sold in packages (10 screws per package)



## SPADE DRILL HOLDER ACCESSORIES



### ROTARY COOLANT INDUCER (RCI) AND ACCESSORIES



Complete with O'Rings, Flat Washers and Locking Clips.

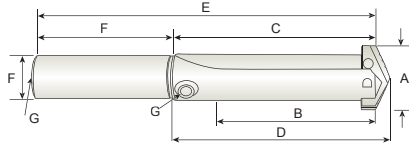
EDP No.	A	B	C	D	Thread for Driving Rod
	I.D.	Pipe O.D.	Length	Tap	
PR1030	3/4"	1-3/4"	7/8"	1/8"	5/16" – NC
PR1031	1"	2-1/8"	1-1/8"	1/8"	5/16" – NC
PR1042	1-1/4"	2-1/2"	1-3/8"	1/4"	3/8" – NC
PR1043	1-3/4"	3"	1-3/8"	1/4"	3/8" – NC
PR1054	2-1/4"	3-3/4"	1-3/4"	1/2"	1/2" – NC

THROW-AWAY DRILL INSERT HOLDERS



# DRILL HOLDERS

## SHORT LENGTH, STRAIGHT SHANK HOLDER, STRAIGHT FLUTE

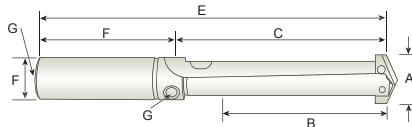


EDP No.	Series	A	B	C	D	E	F		G
		Drill Insert Range	Max. Drill Depth	Flute Length	Ref. Length	Overall Length	Shank		
							Dia.	Length	
P13Y01	Y	3/8" – 27/64"	1-1/4"	2-1/32"	2-1/8"	4-13/32"	3/4"	2-3/8"	1/8"
P13Z01	Z	7/16" – 1/2"	1-1/4"	2-1/32"	2-1/8"	4-13/32"	3/4"	2-3/8"	1/8"
P13001	0	33/64" – 11/16"	1-3/8"	2-3/16"	2-19/64"	4-9/16"	3/4"	2-3/8"	1/8"
P13051	0.5	39/64" – 11/16"	1-3/8"	2-3/16"	2-19/64"	4-9/16"	3/4"	2-3/8"	1/8"
P13101	1	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"
P13151	1.5	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"
P13202	2	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"
P13252	2.5	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"
P13303	3	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"
P13404	4	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"
P13506	5-6	2-1/2" – 3-1/2"	6-3/4"	8-1/2"	8-3/4"	12-1/2"	2"	4"	1/2"
P13708	7-8	3-17/32" – 4-1/2"	6-3/4"	8-7/8"	9-1/8"	13-7/8"	3"	5"	1/2"

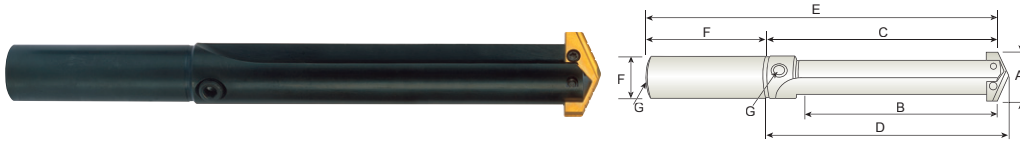
THROW-AWAY DRILL INSERT HOLDERS

# DRILL HOLDERS

## INTERMEDIATE LENGTH, STRAIGHT SHANK HOLDER, STRAIGHT FLUTE



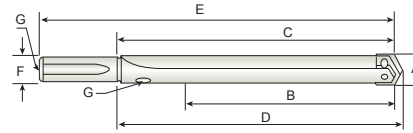
EDP No.	Series	A	B	C	E	F		G
		Drill Insert Range	Max. Drill Depth	Flute Length	Overall Length	Shank		
						Dia.	Length	
P14102	1	45/64" – 15/16"	4-5/8"	5-7/8"	8-7/8"	1"	3"	1/8"
P14152	1.5	55/64" – 15/16"	4-5/8"	5-7/8"	8-7/8"	1"	3"	1/8"
P14203	2	31/32" – 1-3/8"	5-3/8"	6-1/2"	10"	1-1/4"	3-1/2"	1/8"
P14253	2.5	1-3/16" – 1-3/8"	5-3/8"	6-1/2"	10"	1-1/4"	3-1/2"	1/8"
P14304	3	1-13/32" – 1-7/8"	6-1/2"	7-3/4"	11-3/4"	1-1/2"	4"	1/4"



EDP No.	Series	A	B	C	D	E	F		G
		Drill Insert Range	Max. Drill Depth	Flute Length	Ref. Length	Overall Length	Shank		
							Dia.	Length	
P15Y01	Y	3/8" – 27/64"	2-3/8"	3-5/32"	3-1/4"	5-17/32"	3/4"	2-3/8"	1/8"
P15Z01	Z	7/16" – 1/2"	2-3/8"	3-5/32"	3-1/4"	5-17/32"	3/4"	2-3/8"	1/8"
P15001	0	33/64" – 11/16"	2-1/2"	3-5/16"	3-27/64"	5-11/16"	3/4"	2-3/8"	1/8"
P15051	0.5	39/64" – 11/16"	2-1/2"	3-5/16"	3-27/64"	5-11/16"	3/4"	2-3/8"	1/8"
P15101	1	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"
P15151	1.5	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"
P15202	2	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"
P15252	2.5	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"
P15303	3	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"
P15404	4	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"
P15506	5-6	2-1/2" – 3-1/2"	10-3/4"	12-1/2"	12-3/4"	16-1/2"	2"	4"	1/2"
P15708	7-8	3-17/32" – 4-1/2"	10-3/4"	12-7/8"	13-1/8"	17-7/8"	3"	5"	1/2"

# DRILL HOLDERS

## EXTENDED LENGTH, STRAIGHT SHANK HOLDER, STRAIGHT FLUTE



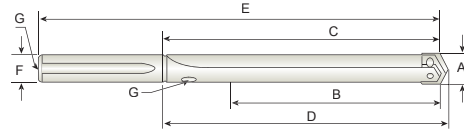
EDP No.	Series	A	B	C	D	E	F		G
		Drill Insert Range	Max. Drill Depth	Flute Length	Ref. Length	Overall Length	Shank		
							Dia.	Length	
P16Y01	Y	3/8" – 27/64"	4-3/8"	5-5/32"	5-1/4"	7-17/32"	3/4"	2-3/8"	1/8"
P16Z01	Z	7/16" – 1/2"	4-3/8"	5-5/32"	5-1/4"	7-17/32"	3/4"	2-3/8"	1/8"
P16001	0	33/64" – 11/16"	4-1/2"	5-5/16"	5-27/64"	7-11/16"	3/4"	2-3/8"	1/8"
P16051	0.5	39/64" – 11/16"	4-1/2"	5-5/16"	5-27/64"	7-11/16"	3/4"	2-3/8"	1/8"
P16102	1	45/64" – 15/16"	10-5/8"	11-7/8"	12-1/64"	14-7/8"	1"	3"	1/8"
P16152	1.5	55/64" – 15/16"	10-5/8"	11-7/8"	12-1/64"	14-7/8"	1"	3"	1/8"
P16203	2	31/32" – 1-3/8"	11-3/8"	12-1/2"	12-41/64"	16"	1-1/4"	3-1/2"	1/8"
P16253	2.5	1-3/16" – 1-3/8"	11-3/8"	12-1/2"	12-41/64"	16"	1-1/4"	3-1/2"	1/8"
P16303	3	1-13/32" – 1-7/8"	13-3/4"	15"	15-3/16"	19"	1-1/4"	4"	1/4"
P16404	4	1-29/32" – 2-9/16"	16-5/8"	18"	18-3/16"	22"	1-1/2"	4"	1/4"
P16506	5	2-1/2" – 3-1/2"	18-1/4"	20"	20-1/4"	24"	2"	4"	1/2"
P16708	7	3-17/32" – 4-1/2"	21-7/8"	24"	24-1/4"	29"	3"	5"	1/2"

THROW-AWAY DRILL INSERT HOLDERS



# DRILL HOLDERS

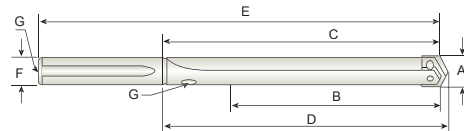
## LONG LENGTH, STRAIGHT SHANK HOLDER, STRAIGHT FLUTE



EDP No.	Series	A	B	C	D	E	F		G
		Drill Insert Range	Max. Drill Depth	Flute Length	Ref. Length	Overall Length	Shank		
							Dia.	Length	
P17001	0	33/64" – 11/16"	7"	7-13/16"	7-59/64"	10-3/16"	3/4"	2-3/8"	1/8"
P17051	0.5	39/64" – 11/16"	7"	7-13/16"	7-59/64"	10-3/16"	3/4"	2-3/8"	1/8"

# DRILL HOLDERS

## XL LENGTH, STRAIGHT SHANK HOLDER, STRAIGHT FLUTE

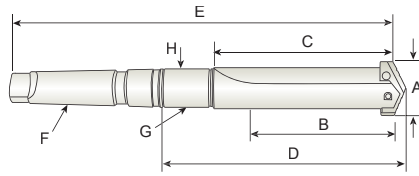


EDP No.	Series	A	B	C	D	E	F		G
		Drill Insert Range	Max. Drill Depth	Flute Length	Ref. Length	Overall Length	Shank		
							Dia.	Length	
P17101	1	45/64" – 15/16"	18"	19-1/4"	19-25/64"	22-1/4"	1"	3"	1/8"
P17202	2	31/32" – 1-3/8"	20-1/8"	21-1/4"	21-25/64"	24-3/4"	1-1/4"	3-1/2"	1/8"
P17303	3	1-13/32" – 1-7/8"	22"	23-1/4"	23-7/16"	27-1/4"	1-1/2"	4"	1/4"
P17404	4	1-29/32" – 2-9/16"	24-5/8"	26"	26-3/16"	30"	1-1/2"	4"	1/4"
P17506	5	2-1/2" – 3-1/2"	26"	27-3/4"	28"	31-3/4"	2"	4"	1/2"
P17708	7	3-17/32" – 4-1/2"	27"	29-1/8"	29-3/8"	34-1/8"	3"	5"	1/2"

THROW-AWAY DRILL INSERT HOLDERS

# DRILL HOLDERS

## SHORT LENGTH, TAPER SHANK HOLDER, STRAIGHT FLUTE

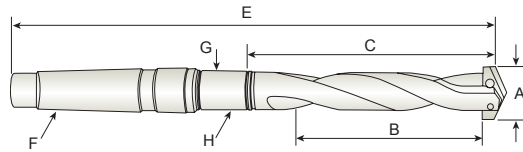


EDP No.	Series	A	B	C	D	E	F	G	H
		Drill Insert Range	Max. Drill Depth	Flute Length	Ref. Length	Overall Length	MT	Pipe Tap	RCI
P01Y02	Y	3/8" – 27/64"	1-1/4"	2-1/32"	3-15/32"	6-5/16"	#2	1/16"	PR1030
P01Z02	Z	7/16" – 1/2"	1-1/4"	2-1/32"	3-15/32"	6-5/16"	#2	1/16"	PR1030
P01002	0	33/64" – 11/16"	1-3/8"	2-3/16"	3-41/64"	6-15/32"	#2	1/16"	PR1030
P01052	0.5	39/64" – 11/16"	1-3/8"	2-3/16"	3-41/64"	6-15/32"	#2	1/16"	PR1030
P01103	1	45/64" – 15/16"	2-3/4"	3-7/8"	5-39/64"	9-5/32"	#3	1/8"	PR1031
P01104	1	45/64" – 15/16"	2-3/4"	3-7/8"	5-43/64"	10-5/32"	#4	1/8"	PR1031
P01153	1.5	55/64" – 15/16"	2-3/4"	3-7/8"	5-39/64"	9-5/32"	#3	1/8"	PR1031
P01154	1.5	55/64" – 15/16"	2-3/4"	3-7/8"	5-43/64"	10-5/32"	#4	1/8"	PR1031
P01203	2	31/32" – 1-3/8"	3-3/8"	4-1/2"	6-15/64"	9-25/32"	#3	1/8"	PR1031
P01204	2	31/32" – 1-3/8"	3-3/8"	4-1/2"	6-19/64"	10-25/32"	#4	1/8"	PR1031
P01253	2.5	1-3/16" – 1-3/8"	3-3/8"	4-1/2"	6-15/64"	9-25/32"	#3	1/8"	PR1031
P01254	2.5	1-3/16" – 1-3/8"	3-3/8"	4-1/2"	6-37/64"	11-1/16"	#4	1/4"	PR1042
P01304	3	1-13/32" – 1-7/8"	4-3/4"	6"	8-1/8"	12-9/16"	#4	1/4"	PR1042
P01305	3	1-13/32" – 1-7/8"	4-3/4"	6"	8-1/8"	13-13/16"	#5	1/4"	PR1043
P01404	4	1-29/32" – 2-9/16"	5-1/8"	6-1/2"	8-5/8"	13-1/16"	#4	1/4"	PR1042
P01405	4	1-29/32" – 2-9/16"	5-1/8"	6-1/2"	8-5/8"	14-5/16"	#5	1/4"	PR1043
P01505	5-6	2-1/2" – 3-1/2"	6-3/4"	8-1/2"	11-5/16"	16-15/16"	#5	1/2"	PR1054
P01705	7-8	3-17/32" – 4-1/2"	6-3/4"	8-7/8"	11-11/16"	17-5/16"	#5	1/2"	PR1054

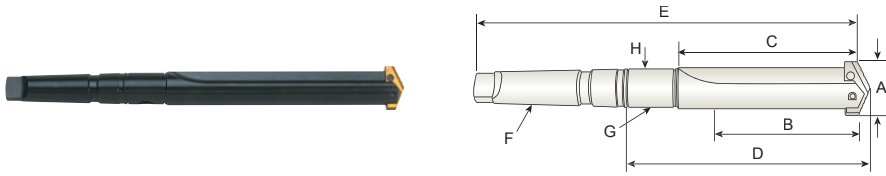
THROW-AWAY DRILL INSERT HOLDERS

# DRILL HOLDERS

## INTERMEDIATE LENGTH, TAPER SHANK HOLDER, HELICAL FLUTE

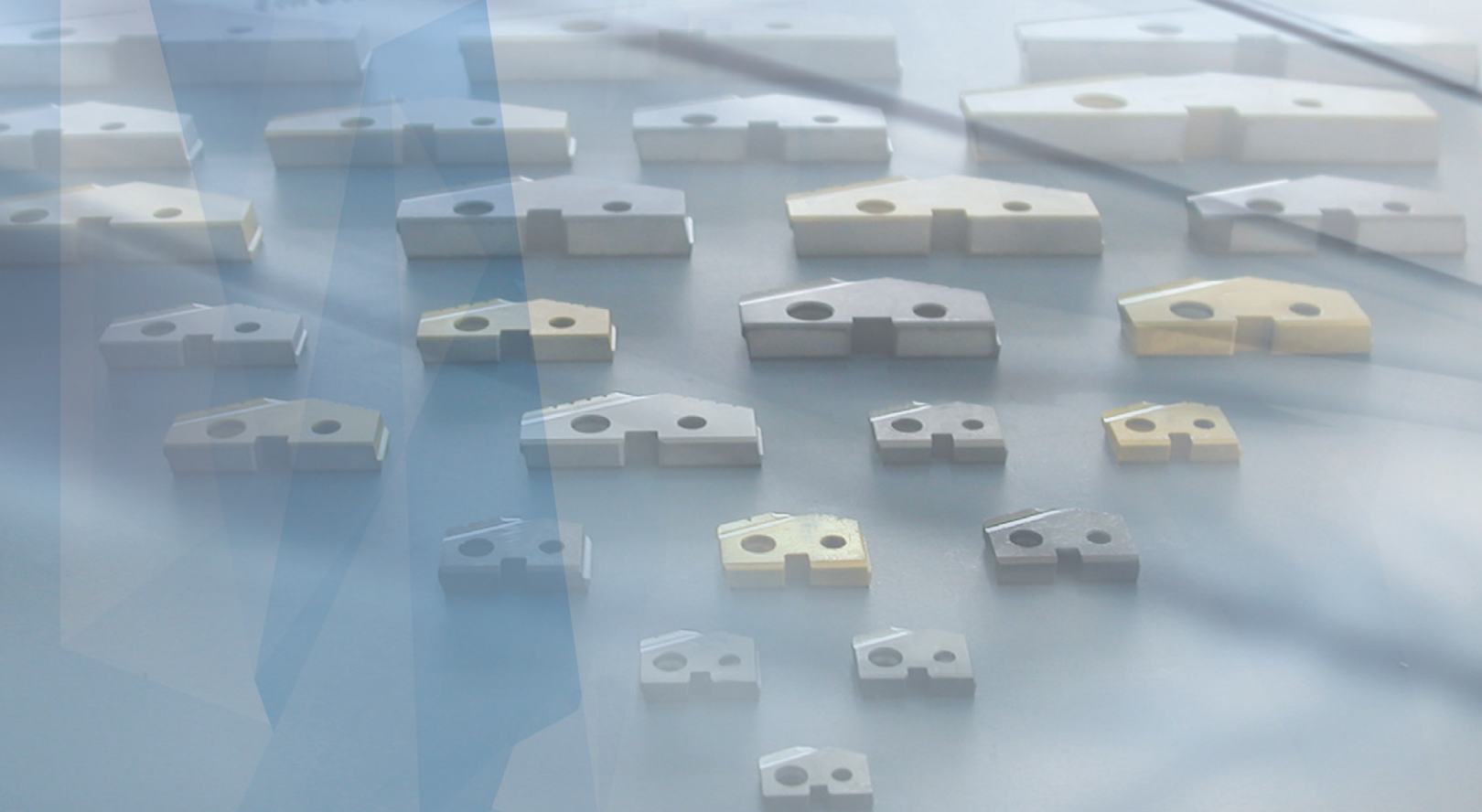


EDP No.	Series	A	B	C	E	F	G	H
		Drill Insert Range	Max. Drill Depth	Flute Length	Overall Length	MT	Pipe Tap	RCI
P08103	1	45/64" – 15/16"	4-3/4"	5-7/8"	11-5/32"	#3	1/8"	PR1031
P08153	1.5	55/64" – 15/16"	4-3/4"	5-7/8"	11-5/32"	#3	1/8"	PR1031
P08204	2	31/32" – 1-3/8"	5-3/8"	6-1/2"	12-25/32"	#4	1/8"	PR1031
P08254	2.5	1-3/16" – 1-3/8"	5-3/8"	6-1/2"	13-1/16"	#4	1/4"	PR1042



EDP No.	Series	A	B	C	D	E	F	G	H
		Drill Insert Range	Max. Drill Depth	Flute Length	Ref. Length	Overall Length	MT	Pipe Tap	RCI
P03Y02	Y	3/8" – 27/64"	2-3/8"	3-5/32"	4-19/32"	7-7/16"	#2	1/16"	PR1030
P03Z02	Z	7/16" – 1/2"	2-3/8"	3-5/32"	4-19/32"	7-7/16"	#2	1/16"	PR1030
P03002	0	33/64" – 11/16"	2-1/2"	3-5/16"	4-49/64"	7-19/32"	#2	1/16"	PR1030
P03052	0.5	39/64" – 11/16"	2-1/2"	3-5/16"	4-49/64"	7-19/32"	#2	1/16"	PR1030
P03103	1	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
P03153	1.5	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
P03203	2	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
P03253	2.5	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
P03304	3	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
P03404	4	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
P03505	5-6	2-1/2" – 3-1/2"	10-3/4"	12-1/2"	15-5/16"	20-15/16"	#5	1/2"	PR1054
P03705	7-8	3-17/32" – 4-1/2"	10-3/4"	12-7/8"	15-11/16"	21-5/16"	#5	1/2"	PR1054

# THROW-AWAY DRILL INSERTS







- Point angle
  - under 2 1/2 : 132 degree
  - over 2 1/2 : 144 degree

- For use in high nickel alloys and materials over 280 Brinell.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available.

SUPER COBALT (T15) SPADE DRILL						SUPER COBALT (T15) SPADE DRILL					
Series Min.to Max (mm/inch)	Diameter		TiN Coated EDP NO.	TiAlN Coated EDP NO.	Hardslick Coated EDP NO.	Series Min.to Max (mm/inch)	Diameter		TiN Coated EDP NO.	TiAlN Coated EDP NO.	Hardslick Coated EDP NO.
	Inch Metric	Decimal (inch)					Inch Metric	Decimal (inch)			
<b>Y</b> .374" to .436" (3/32") Thick	9.50mm	.3740"	*S06Y01	*S08Y01	*S09Y01	<b>1</b> .690" to .960" (5/32") Thick	45/64"	.7031"	S06101	S08101	S09101
	3/8"	.3750"	*S06Y02	*S08Y02	*S09Y02		18mm	.7087"	S06102	S08102	S09102
	9.80mm	.3858"	*S06Y03	*S08Y03	*S09Y03		23/32"	.7188"	S06103	S08103	S09103
	25/64"	.3906"	*S06Y04	*S08Y04	*S09Y04		18.50mm	.7283"	S06104	S08104	S09104
	10mm	.3937"	*S06Y05	*S08Y05	*S09Y05		47/64"	.7344"	S06105	S08105	S09105
	10.20mm	.4016"	*S06Y06	*S08Y06	*S09Y06		19mm	.7480"	S06106	S08106	S09106
	13/32"	.4062"	*S06Y07	*S08Y07	*S09Y07		3/4"	.7500"	S06107	S08107	S09107
	10.50mm	.4134"	*S06Y08	*S08Y08	*S09Y08		49/64"	.7656"	S06108	S08108	S09108
	27/64"	.4219"	*S06Y09	*S08Y09	*S09Y09		19.50mm	.7677"	S06109	S08109	S09109
	10.80mm	.4252"	*S06Y10	*S08Y10	*S09Y10		25/32"	.7812"	S06110	S08110	S09110
<b>Z</b> .437" to .510" (3/32") Thick	11mm	.4331"	*S06Y11	*S08Y11	*S09Y11	20mm	.7874"	S06111	S08111	S09111	
	7/16"	.4375"	*S06Z01	*S08Z01	*S09Z01	51/64"	.7969"	S06160	S08160	S09160	
	11.50mm	.4528"	*S06Z02	*S08Z02	*S09Z02	20.50mm	.8071"	S06112	S08112	S09112	
	29/64"	.4531"	*S06Z03	*S08Z03	*S09Z03	13/16"	.8125"	S06113	S08113	S09113	
	15/32"	.4688"	*S06Z04	*S08Z04	*S09Z04	21mm	.8268"	S06114	S08114	S09114	
	12mm	.4724"	*S06Z05	*S08Z05	*S09Z05	27/32"	.8438"	S06115	S08115	S09115	
	31/64"	.4844"	*S06Z06	*S08Z06	*S09Z06	55/64"	.8594"	S06161	S08161	S09161	
	12.50mm	.4921"	*S06Z07	*S08Z07	*S09Z07	22mm	.8661"	S06116	S08116	S09116	
<b>O</b> .511" to .695" (1/8") Thick	1/2"	.5000"	*S06Z08	*S08Z08	*S09Z08	7/8"	.8750"	S06117	S08117	S09117	
	13mm	.5118"	*S06001	*S08001	*S09001	57/64"	.8906"	S06162	S08162	S09162	
	33/64"	.5156"	*S06002	*S08002	*S09002	23mm	.9055"	S06118	S08118	S09118	
	17/32"	.5312"	*S06003	*S08003	*S09003	29/32"	.9062"	S06119	S08119	S09119	
	13.50mm	.5315"	*S06004	*S08004	*S09004	59/64"	.9219"	S06120	S08120	S09120	
	35/64"	.5469"	*S06060	*S08060	*S09060	15/16"	.9375"	S06121	S08121	S09121	
	14mm	.5512"	*S06005	*S08005	*S09005	24mm	.9449"	S06122	S08122	S09122	
	9/16"	.5625"	*S06006	*S08006	*S09006	31/32"	.9688"	S06201	S08201	S09201	
	14.50mm	.5709"	*S06007	*S08007	*S09007	63/64"	.9843"	S06202	S08202	S09202	
	37/64"	.5781"	*S06008	*S08008	*S09008	1"	1.0000"	S06203	S08203	S09203	
	15mm	.5906"	*S06009	*S08009	*S09009	1-1/64"	1.0156"	S06204	S08204	S09204	
	19/32"	.5938"	*S06010	*S08010	*S09010	26mm	1.0236"	S06205	S08205	S09205	
	39/64"	.6094"	*S06061	*S08061	*S09061	1-1/32"	1.0312"	S06206	S08206	S09206	
	15.50mm	.6102"	*S06011	*S08011	*S09011	1-3/64"	1.0469"	S06260	S08260	S09260	
	5/8"	.6250"	*S06012	*S08012	*S09012	1-1/16"	1.0625"	S06207	S08207	S09207	
	16mm	.6299"	*S06013	*S08013	*S09013	27mm	1.0630"	S06208	S08208	S09208	
	41/64"	.6406"	*S06062	*S08062	*S09062	1-3/32"	1.0938"	S06209	S08209	S09209	
	16.50mm	.6496"	*S06014	*S08014	*S09014	28mm	1.1024"	S06210	S08210	S09210	
21/32"	.6562"	*S06015	*S08015	*S09015	1-7/64"	1.1094"	S06261	S08261	S09261		
17mm	.6693"	*S06016	*S08016	*S09016	1-1/8"	1.1250"	S06211	S08211	S09211		
43/64"	.6719"	*S06063	*S08063	*S09063	29mm	1.1417"	S06212	S08212	S09212		
11/16"	.6875"	*S06017	*S08017	*S09017							
17.50mm	.6890"	*S06018	*S08018	*S09018							

\* 2pcs per package

# DRILL INSERTS

# THROW-AWAY SUPER COBALT(T15) DRILL INSERTS



- Point angle
  - under 2 1/2 : 132 degree
  - over 2 1/2 : 144 degree

- For use in high nickel alloys and materials over 280 Brinell.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available.

THROW-AWAY DRILL INSERT HOLDERS

SUPER COBALT (T15) SPADE DRILL						SUPER COBALT (T15) SPADE DRILL						
Series Min.to Max (mm/inch)	Diameter		TiN Coated EDP NO.	TiAlN Coated EDP NO.	Hardslick Coated EDP NO.	Series Min.to Max (mm/inch)	Diameter			TiN Coated EDP NO.	TiAlN Coated EDP NO.	Hardslick Coated EDP NO.
	Inch Metric	Decimal (inch)					Inch Metric	Metric (mm)	Decimal (inch)			
<b>2</b> .961" to 1.380" (3/16") Thick	1-5/32"	1.1562"	S06213	S08213	S09213	<b>4</b> 46.99 (1.850") to 65.28 (2.570")	1-29/32"	48.42	1.9062"	S06402	S08402	S09402
	30mm	1.1811"	S06214	S08214	S09214		1-15/16"	49.21	1.9375"	S06404	S08404	S09404
	1-3/16"	1.1875"	S06215	S08215	S09215		1-31/32"	50.01	1.9688"	S06406	S08406	S09406
	1-7/32"	1.2188"	S06216	S08216	S09216		2"	50.80	2.0000"	S06407	S08407	S09407
	31mm	1.2205"	S06217	S08217	S09217		2-1/32"	51.59	2.0312"	S06409	S08409	S09409
	1-1/4"	1.2500"	S06218	S08218	S09218		2-3/64"	52.00	2.0472"	S06410	S08410	S09410
	32mm	1.2598"	S06219	S08219	S09219		2-1/16"	52.39	2.0625"	S06411	S08411	S09411
	1-9/32"	1.2812"	S06220	S08220	S09220		2-3/32"	53.18	2.0938"	S06413	S08413	S09413
	33mm	1.2992"	S06221	S08221	S09221		2-1/8"	53.98	2.1250"	S06414	S08414	S09414
	1-5/16"	1.3125"	S06222	S08222	S09222		2-5/32"	54.79	2.1562"	S06416	S08416	S09416
	34mm	1.3386"	S06223	S08223	S09223		2-3/16"	55.56	2.1875"	S06418	S08418	S09418
	1-11/32"	1.3438"	S06224	S08224	S09224		2-7/32"	56.36	2.2188"	S06420	S08420	S09420
	1-3/8"	1.3750"	S06225	S08225	S09225		2-1/4"	57.15	2.2500"	S06422	S08422	S09422
	35mm	1.3780"	S06226	S08226	S09226		2-9/32"	57.94	2.2812"	S06423	S08423	S09423
<b>3</b> 1.353" to 1.882" (1/4") Thick	1-13/32"	1.4062"	S06301	S08301	S09301	2-5/16"	58.74	2.3125"	S06425	S08425	S09425	
	36mm	1.4173"	S06302	S08302	S09302	2-11/32"	59.53	2.3438"	S06427	S08427	S09427	
	1-7/16"	1.4375"	S06303	S08303	S09303	2-3/8"	60.33	2.3750"	S06429	S08429	S09429	
	37mm	1.4567"	S06304	S08304	S09304	2-13/32"	61.12	2.4062"	S06431	S08431	S09431	
	1-15/32"	1.4688"	S06305	S08305	S09305	2-7/16"	61.91	2.4375"	S06432	S08432	S09432	
	38mm	1.4961"	S06306	S08306	S09306	2-15/32"	62.71	2.4688"	S06434	S08434	S09434	
	1-1/2"	1.5000"	S06307	S08307	S09307	2-1/2"	63.50	2.5000"	S06436	S08436	S09436	
	1-17/32"	1.5312"	S06308	S08308	S09308	2-17/32"	64.29	2.5312"	S06438	S08438	S09438	
	39mm	1.5354"	S06309	S08309	S09309	2-9/16"	65.09	2.5625"	S06440	S08440	S09440	
	1-9/16"	1.5625"	S06310	S08310	S09310	2-1/2"	65.00	2.5000"			S09501	
	40mm	1.5748"	S06311	S08311	S09311		64.00	2.5197"			S09502	
	1-19/32"	1.5938"	S06312	S08312	S09312	2-17/32"	64.29	2.5312"			S09503	
	41mm	1.6142"	S06313	S08313	S09313	2-9/16"	65.09	2.5625"			S09504	
	1-5/8"	1.6250"	S06314	S08314	S09314	2-19/32"	65.88	2.5938"			S09505	
	42mm	1.6535"	S06315	S08315	S09315		66.00	2.5984"			S09506	
	1-21/32"	1.6562"	S06316	S08316	S09316	2-5/8"	66.68	2.6250"			S09507	
	1-11/16"	1.6875"	S06317	S08317	S09317	2-21/32"	67.47	2.6562"			S09508	
	43mm	1.6929"	S06318	S08318	S09318		68.00	2.6772"			S09509	
	1-23/32"	1.7188"	S06319	S08319	S09319	2-11/16"	68.26	2.6875"			S09510	
	44mm	1.7323"	S06320	S08320	S09320	2-23/32"	69.09	2.7188"			S09511	
	1-3/4"	1.7500"	S06321	S08321	S09321	2-3/4"	69.85	2.7500"			S09512	
	45mm	1.7717"	S06322	S08322	S09322		70.00	2.7559"			S09513	
	1-25/32"	1.7812"	S06323	S08323	S09323	2-25/32"	70.64	2.7812"			S09514	
	46mm	1.8110"	S06324	S08324	S09324	2-13/16"	71.44	2.8125"			S09515	
1-13/16"	1.8125"	S06325	S08325	S09325		72.00	2.8346"			S09516		
1-27/32"	1.8438"	S06326	S08326	S09326	2-27/32"	72.23	2.8438"			S09517		
47mm	1.8504"	S06327	S08327	S09327	2-7/8"	73.03	2.8750"			S09518		
1-7/8"	1.8750"	S06328	S08328	S09328	2-29/32"	73.82	2.9062"			S09519		



- Point angle
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- Any non-standard size available.

SUPER COBALT (T15) SPADE DRILL							SUPER COBALT (T15) SPADE DRILL						
Series Min. to Max (mm/inch)	Diameter			TiN Coated EDP NO.	TiAIN Coated EDP NO.	Hardslick Coated EDP NO.	Series Min. to Max (mm/inch)	Diameter			TiN Coated EDP NO.	TiAIN Coated EDP NO.	Hardslick Coated EDP NO.
	Inch Metric	Metric (mm)	Decimal (inch)					Inch Metric	Metric (mm)	Decimal (inch)			
<b>5</b> 62.38 (2.456") to 76.20 (3.000")		74.00	2.9134"			S09520	<b>7</b> 87.76 (3.455") to 101.60 (4.000")		98.00	3.8583"			S09716
	2-15/16"	74.61	2.9375"			S09521		3-7/8"	98.43	3.8750"			S09717
	2-31/32"	75.41	2.8688"			S09522		3-29/32"	99.22	3.9062"			S09718
		76.00	2.9921"			S09523			100.00	3.9370"			S09719
	3"	76.20	3.0000"			S09524		3-15/16"	100.01	3.9375"			S09720
<b>6</b> 76.23 (3.001") to 89.08 (3.507")	3-1/32"	76.99	3.0312"			S09601	3-31/32"	100.81	3.9688"			S09721	
	3-1/16"	77.79	3.0625"			S09602	4"	101.60	4.0000"			S09722	
		78.00	3.0709"			S09603	4-1/64"	102.00	4.0156"			S09801	
	3-3/32"	78.58	3.0938"			S09604	4-1/16"	103.19	4.0625"			S09802	
	3-1/8"	79.38	3.1250"			S09605	4-3/32"	104.00	4.0945"			S09803	
		80.00	3.1496"			S09606	4-1/8"	104.78	4.1250"			S09804	
	3-5/32"	80.17	3.1562"			S09607		106.00	4.1732"			S09805	
	3-3/16"	80.96	3.1875"			S09608	4-3/16"	106.36	4.1875"			S09806	
	3-7/32"	81.76	3.2188"			S09609	4-1/4"	107.95	4.2500"			S09807	
		82.00	3.2283"			S09610		108.00	4.2520"			S09808	
	3-1/4"	82.55	3.2500"			S09611	4-5/16"	109.54	4.3125"			S09809	
	3-9/32"	83.34	3.2812"			S09612		110.00	4.3307"			S09810	
		84.00	3.3071"			S09613	4-3/8"	111.13	4.3750"			S09811	
	3-5/16"	84.14	3.3125"			S09614		112.00	4.4094"			S09812	
	3-11/32"	84.93	3.3438"			S09615	4-7/16"	112.71	4.4375"			S09813	
3-3/8"	85.73	3.3750"			S09616		114.00	4.4882"			S09814		
	86.00	3.3858"			S09617	4-1/2"	114.30	4.5000"			S09815		
<b>7</b> 87.76 (3.455") to 101.60 (4.000")	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							
	3-17/32"	89.69	3.5312"			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							
	3-11/16"	93.66	3.6875"			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								





- Point angle
  - under 2 1/2 : 132 degree
  - over 2 1/2 : 144 degree

- For general use in steels and cast irons.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available.

HSS (M4) SPADE DRILL						HSS (M4) SPADE DRILL					
Series Min.to Max (mm/inch)	Diameter		TiN Coated EDP NO.	TiAlN Coated EDP NO.	Hardslick Coated EDP NO.	Series Min.to Max (mm/inch)	Diameter		TiN Coated EDP NO.	TiAlN Coated EDP NO.	Hardslick Coated EDP NO.
	Inch Metric	Decimal (inch)					Inch Metric	Decimal (inch)			
<b>1</b> .690" to .960" (5/32") Thick	45/64"	.7031"	S01101	S03101	S04101	<b>2</b> .961" to 1.380" (3/16") Thick	30mm	1.1811"	S01214	S03214	S04214
	18mm	.7087"	S01102	S03102	S04102		1-3/16"	1.1875"	S01215	S03215	S04215
	23/32"	.7188"	S01103	S03103	S04103		1-7/32"	1.2188"	S01216	S03216	S04216
	18.50mm	.7283"	S01104	S03104	S04104		31mm	1.2205"	S01217	S03217	S04217
	47/64"	.7344"	S01105	S03105	S04105		1-1/4"	1.2500"	S01218	S03218	S04218
	19mm	.7480"	S01106	S03106	S04106		32mm	1.2598"	S01219	S03219	S04219
	3/4"	.7500"	S01107	S03107	S04107		1-9/32"	1.2812"	S01220	S03220	S04220
	49/64"	.7656"	S01108	S03108	S04108		33mm	1.2992"	S01221	S03221	S04221
	19.50mm	.7677"	S01109	S03109	S04109		1-5/16"	1.3125"	S01222	S03222	S04222
	25/32"	.7812"	S01110	S03110	S04110		34mm	1.3386"	S01223	S03223	S04223
	20.00mm	.7874"	S01111	S03111	S04111		1-11/32"	1.3438"	S01224	S03224	S04224
	51/64"	.7969"	S01160	S03160	S04160		1-3/8"	1.3750"	S01225	S03225	S04225
	20.50mm	.8071"	S01112	S03112	S04112		35mm	1.3780"	S01226	S03226	S04226
	13/16"	.8125"	S01113	S03113	S04113		1-13/32"	1.4062"	S01301	S03301	S04301
	21mm	.8268"	S01114	S03114	S04114		36mm	1.4173"	S01302	S03302	S04302
	27/32"	.8438"	S01115	S03115	S04115		1-7/16"	1.4375"	S01303	S03303	S04303
	55/64"	.8594"	S01161	S03161	S04161		37mm	1.4567"	S01304	S03304	S04304
	22mm	.8661"	S01116	S03116	S04116		1-15/32"	1.4688"	S01305	S03305	S04305
	7/8"	.8750"	S01117	S03117	S04117		38mm	1.4961"	S01306	S03306	S04306
	57/64"	.8906"	S01162	S03162	S04162		1-1/2"	1.5000"	S01307	S03307	S04307
23mm	.9055"	S01118	S03118	S04118	1-17/32"	1.5312"	S01308	S03308	S04308		
29/32"	.9062"	S01119	S03119	S04119	39mm	1.5354"	S01309	S03309	S04309		
59/64"	.9219"	S01120	S03120	S04120	1-9/16"	1.5625"	S01310	S03310	S04310		
15/16"	.9375"	S01121	S03121	S04121	40mm	1.5748"	S01311	S03311	S04311		
24mm	.9449"	S01122	S03122	S04122	1-19/32"	1.5938"	S01312	S03312	S04312		
31/32"	.9688"	S01201	S03201	S04201	41mm	1.6142"	S01313	S03313	S04313		
63/64"	.9843"	S01202	S03202	S04202	1-5/8"	1.6250"	S01314	S03314	S04314		
1"	1.0000"	S01203	S03203	S04203	42mm	1.6535"	S01315	S03315	S04315		
1-1/64"	1.0156"	S01204	S03204	S04204	1-21/32"	1.6563"	S01316	S03316	S04316		
26mm	1.0236"	S01205	S03205	S04205	1-11/16"	1.6875"	S01317	S03317	S04317		
1-1/32"	1.0312"	S01206	S03206	S04206	43mm	1.6929"	S01318	S03318	S04318		
1-3/64"	1.0469	S01260	S03260	S04260	1-23/32"	1.7188"	S01319	S03319	S04319		
1-1/16"	1.0625"	S01207	S03207	S04207	44mm	1.7323"	S01320	S03320	S04320		
27mm	1.0630"	S01208	S03208	S04208	1-3/4"	1.7500"	S01321	S03321	S04321		
1-3/32"	1.0938"	S01209	S03209	S04209	45mm	1.7717"	S01322	S03322	S04322		
28mm	1.1024"	S01210	S03210	S04210	1-25/32"	1.7812"	S01323	S03323	S04323		
1-7/64"	1.1094"	S01261	S03261	S04261	46mm	1.8110"	S01324	S03324	S04324		
1-1/8"	1.1250"	S01211	S03211	S04211	1-13/16"	1.8125"	S01325	S03325	S04325		
29mm	1.1417"	S01212	S03212	S04212	1-27/32"	1.8438"	S01326	S03326	S04326		
1-5/32"	1.1562"	S01213	S03213	S04213	47mm	1.8504"	S01327	S03327	S04327		
					1-7/8"	1.8750"	S01328	S03328	S04328		

THROW-AWAY DRILL INSERT HOLDERS



- Point angle
  - under 2 1/2 : 132 degree
  - over 2 1/2 : 144 degree

- For general use in steels and cast irons.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available.

HSS (M4) SPADE DRILL						HSS (M4) SPADE DRILL					
Series Min.to Max (mm/inch)	Diameter		TiN Coated EDP NO.	TiAlN Coated EDP NO.	Hardslick Coated EDP NO.	Series Min.to Max (mm/inch)	Diameter		TiN Coated EDP NO.	TiAlN Coated EDP NO.	Hardslick Coated EDP NO.
	Inch Metric	Decimal (inch)					Inch Metric	Decimal (inch)			
<b>4</b> 1.850" to 2.570" (5/16") Thick	1-29/32"	1.9063"	S01402	S03402	S04402	<b>5</b> 2.456" to 3.000" (7/16") Thick	2-1/2"	2.5000"	S01501	<b>TiAlN and Hardslick not stocked but available on request.</b>	
	1-15/16"	1.9375"	S01404	S03404	S04404		2-5/8"	2.6250"	S01507		
	1-31/32"	1.9688"	S01406	S03406	S04406		2-3/4"	2.7500"	S01512		
	2"	2.0000"	S01407	S03407	S04407		2-25/32"	2.7813"	S01514		
	2-1/32"	2.0313"	S01409	S03409	S04409		2-13/16"	2.8125"	S01515		
	2-3/64"	2.0472"	S01410	S03410	S04410		2-27/32"	2.8438"	S01517		
	2-1/16"	2.0625"	S01411	S03411	S04411		2-7/8"	2.8750"	S01518		
	2-3/32"	2.0938"	S01413	S03413	S04413		2-29/32"	2.9063"	S01519		
	2-1/8"	2.1250"	S01414	S03414	S04414		2-15/16"	2.9375"	S01521		
	2-5/32"	2.1563"	S01416	S03416	S04416		2-31/32"	2.9688"	S01522		
	2-3/16"	2.1875"	S01418	S03418	S04418	3"	3.0000"	S01524			
	2-7/32"	2.2188"	S01420	S03420	S04420	<b>6</b> 3.001" to 3.507" (7/16") Thick	3-1/16"	3.0625"	S01602		
	2-1/4"	2.2500"	S01422	S03422	S04422		3-1/8"	3.1250"	S01605		
	2-9/32"	2.2813"	S01423	S03423	S04423		3-1/4"	3.2500"	S01611		
	2-5/16"	2.3125"	S01425	S03425	S04425		3-3/8"	3.3750"	S01616		
	2-11/32"	2.3438"	S01427	S03427	S04427		3-7/16"	3.4375"	S01619		
	2-3/8"	2.3750"	S01429	S03429	S04429	3-1/2"	3.5000"	S01622			
	2-13/32"	2.4063"	S01431	S03431	S04431	<b>7</b> 3.455" to 4.000" (7/16") Thick	3-9/16"	3.5625"	S01703		
	2-7/16"	2.4375"	S01432	S03432	S04432		3-5/8"	3.6250"	S01706		
	2-15/32"	2.4688"	S01434	S03434	S04434		3-3/4"	3.7500"	S01711		
2-1/2"	2.5000"	S01436	S03436	S04436	3-7/8"		3.8750"	S01717			
2-17/32"	2.5313"	S01438	S03438	S04438	4"		4.0000"	S01722			
2-9/16"	2.5625"	S01440	S03440	S04440	<b>8</b> 4.001" to 4.507" (7/16") Thick	4-1/8"	4.1250"	S01804			
						4-1/4"	4.2500"	S01807			
						4-3/8"	4.3750"	S01811			
						4-1/2"	4.5000"	S01815			

# DRILL INSERTS

# THROW-AWAY PREMIUM COBALT(M48) DRILL INSERTS



- Point angle
  - under 2 1/2 : 132 degree
  - over 2 1/2 : 144 degree
- For use in high temperature alloys and materials with 350~500 Brinell.
  - Reduce set-up time, it easily can be replaced on the machine.
  - Any non-standard size available.

## PREMIUM COBALT (M48) SPADE DRILL

## PREMIUM COBALT (M48) SPADE DRILL

Series Min.to Max (mm/inch)	Diameter			TiN Coated EDP NO.	TiAlN Coated EDP NO.	Hardslick Coated EDP NO.	Series Min.to Max (mm/inch)	Diameter			TiN Coated EDP NO.	TiAlN Coated EDP NO.	Hardslick Coated EDP NO.
	Inch (inch)	Metric (mm)	Decimal (inch)					Inch (inch)	Metric (mm)	Decimal (inch)			
<b>Y</b> 9.50 (.374") to 11.07 (.436")		9.50	.3740"	*S11Y01	*S13Y01	*S14Y01	<b>O</b> 12.98 (.511") to 17.65 (.695")		13.00	.5118"	*S11001	*S13001	*S14001
	3/8"	9.53	.3750"	*S11Y02	*S13Y02	*S14Y02		33/64"		.5156"	*S11002	*S13002	*S14002
		9.80	.3860"	*S11Y03	*S13Y03	*S14Y03		17/32"		.5313"	*S11003	*S13003	*S14003
	25/64"	9.92	.3906"	*S11Y04	*S13Y04	*S14Y04			13.50	.5315"	*S11004	*S13004	*S14004
		10.00	.3937"	*S11Y05	*S13Y05	*S14Y05		35/64"		.5469"	*S11060	*S13060	*S14060
		10.20	.4016"	*S11Y06	*S13Y06	*S14Y06			14.00	.5512"	*S11005	*S13005	*S14005
	13/32"	10.32	.4063"	*S11Y07	*S13Y07	*S14Y07		9/16"		.5625"	*S11006	*S13006	*S14006
		10.50	.4134"	*S11Y08	*S13Y08	*S14Y08			14.50	.5709"	*S11007	*S13007	*S14007
	27/64"	10.72	.4219"	*S11Y09	*S13Y09	*S14Y09		37/64"		.5781"	*S11008	*S13008	*S14008
		10.80	.4252"	*S11Y10	*S13Y10	*S14Y10			15.00	.5906"	*S11009	*S13009	*S14009
		11.00	.4331"	*S11Y11	*S13Y11	*S14Y11		19/32"		.5938"	*S11010	*S13010	*S14010
<b>Z</b> 11.11 (.437") to 12.95 (.510")	7/16"	11.11	.4375"	*S11Z01	*S13Z01	*S14Z01	39/64"		.6094"	*S11061	*S13061	*S14061	
		11.50	.4528"	*S11Z02	*S13Z02	*S14Z02		15.50	.6102"	*S11011	*S13011	*S14011	
	29/64"	11.51	.4531"	*S11Z03	*S13Z03	*S14Z03	5/8"		.6250"	*S11012	*S13012	*S14012	
	15/32"	11.91	.4688"	*S11Z04	*S13Z04	*S14Z04		16.00	.6299"	*S11013	*S13013	*S14013	
		12.00	.4724"	*S11Z05	*S13Z05	*S14Z05	41/64"		.6406"	*S11062	*S13062	*S14062	
	31/64"	12.30	.4844"	*S11Z06	*S13Z06	*S14Z06		16.50	.6496"	*S11014	*S13014	*S14014	
		12.50	.4921"	*S11Z07	*S13Z07	*S14Z07	21/32"		.6563"	*S11015	*S13015	*S14015	
	1/2"	12.70	.5000"	*S11Z08	*S13Z08	*S14Z08		17.00	.6693"	*S11016	*S13016	*S14016	
						43/64"		.6719"	*S11063	*S13063	*S14063		
						11/16"		.6875"	*S11017	*S13017	*S14017		
							17.50	.6890"	*S11018	*S13018	*S14018		

\* 2pcs per package

THROW-AWAY DRILL INSERT HOLDERS



- Point angle
  - under 2 1/2 : 132 degree
  - over 2 1/2 : 144 degree
- For use in high temperature alloys and materials with 350~500 Brinell.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available.

## PREMIUM COBALT (M48) SPADE DRILL

## PREMIUM COBALT (M48) SPADE DRILL

Series Min.to Max (mm/inch)	Diameter			TiN Coated EDP NO.	TiAlN Coated EDP NO.	Hardslick Coated EDP NO.	Series Min.to Max (mm/inch)	Diameter			TiN Coated EDP NO.	TiAlN Coated EDP NO.	Hardslick Coated EDP NO.
	Inch (inch)	Metric (mm)	Decimal (inch)					Inch (inch)	Metric (mm)	Decimal (inch)			
<b>1</b> 17.53 (.690") to 24.38 (.960")	45/64"	17.86	.7031"	S11101	S13101	S14101	<b>2</b> 24.41 (.961") to 35.05 (1.380")	31/32"	24.61	.9688"	S11201	S13201	S14201
		18.00	.7087"	S11102	S13102	S14102		63/64"	25.00	.9843"	S11202	S13202	S14202
	23/32"	18.26	.7188"	S11103	S13103	S14103		1"	25.40	1.0000"	S11203	S13203	S14203
		18.50	.7283"	S11104	S13104	S14104		1-1/64"	25.80	1.0156"	S11204	S13204	S14204
	47/64"	18.65	.7344"	S11105	S13105	S14105			26.00	1.0236"	S11205	S13205	S14205
		19.00	.7480"	S11106	S13106	S14106		1-1/32"	26.19	1.0312"	S11206	S13206	S14206
	3/4"	19.05	.7500"	S11107	S13107	S14107		1-3/64"	26.59	1.0469"	S11260	S13260	S14260
	49/64"	19.45	.7656"	S11108	S13108	S14108		1-1/16"	26.99	1.0625"	S11207	S13207	S14207
		19.50	.7677"	S11109	S13109	S14109			27.00	1.0630"	S11208	S13208	S14208
	25/32"	19.84	.7812"	S11110	S13110	S14110		1-3/32"	27.78	1.0938"	S11209	S13209	S14209
		20.00	.7874"	S11111	S13111	S14111			28.00	1.1024"	S11210	S13210	S14210
	51/64"	20.24	.7969"	S11160	S13160	S14160		1-7/64"	28.18	1.1094"	S11261	S13261	S14261
		20.50	.8071"	S11112	S13112	S14112		1-1/8"	28.58	1.1250"	S11211	S13211	S14211
	13/16"	20.64	.8125"	S11113	S13113	S14113			29.00	1.1417"	S11212	S13212	S14212
		21.00	.8268"	S11114	S13114	S14114		1-5/32"	29.37	1.1562"	S11213	S13213	S14213
	27/32"	21.43	.8438"	S11115	S13115	S14115			30.00	1.1811"	S11214	S13214	S14214
	55/64"	21.83	.8594"	S11161	S13161	S14161		1-3/16"	30.16	1.1875"	S11215	S13215	S14215
		22.00	.8661"	S11116	S13116	S14116		1-7/32"	30.96	1.2188"	S11216	S13216	S14216
	7/8"	22.23	.8750"	S11117	S13117	S14117			31.00	1.2205"	S11217	S13217	S14217
	57/64"	22.62	.8906"	S11162	S13162	S14162		1-1/4"	31.75	1.2500"	S11218	S13218	S14218
	23.00	.9055"	S11118	S13118	S14118		32.00	1.2598"	S11219	S13219	S14219		
29/32"	23.02	.9062"	S11119	S13119	S14119	1-9/32"	32.54	1.2812"	S11220	S13220	S14220		
59/64"	23.42	.9219"	S11120	S13120	S14120		33.00	1.2992"	S11221	S13221	S14221		
15/16"	23.81	.9375"	S11121	S13121	S14121	1-5/16"	33.34	1.3125"	S11222	S13222	S14222		
	24.00	.9449"	S11122	S13122	S14122		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		

- Point angle
  - under 2 1/2 : 132 degree
  - over 2 1/2 : 144 degree
- 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)



## CARBIDE SPADE DRILL

Series Min.to Max (mm/inch)	Diameter		MULTI PURPOSE GEOMETRY				CAST IRON GEOMETRY	
			C2		C5		C3	
	Inch Metric	Decimal (inch)	TiN Coated EDP NO.	TiAlN Coated EDP NO.	TiN Coated EDP NO.	TiAlN Coated EDP NO.	TiN Coated EDP NO.	TiAlN Coated EDP NO.
<b>Y</b> .374" to .436" (3/32") Thick	9.50mm	.3740"	*S21Y01	*S23Y01	*S26Y01	*S28Y01	*S16Y01	*S18Y01
	3/8"	.3750"	*S21Y02	*S23Y02	*S26Y02	*S28Y02	*S16Y02	*S18Y02
	9.80mm	.3858"	*S21Y03	*S23Y03	*S26Y03	*S28Y03	*S16Y03	*S18Y03
	25/64"	.3906"	*S21Y04	*S23Y04	*S26Y04	*S28Y04	*S16Y04	*S18Y04
	10mm	.3937"	*S21Y05	*S23Y05	*S26Y05	*S28Y05	*S16Y05	*S18Y05
	10.20mm	.4016"	*S21Y06	*S23Y06	*S26Y06	*S28Y06	*S16Y06	*S18Y06
	13/32"	.4062"	*S21Y07	*S23Y07	*S26Y07	*S28Y07	*S16Y07	*S18Y07
	10.50mm	.4134"	*S21Y08	*S23Y08	*S26Y08	*S28Y08	*S16Y08	*S18Y08
	27/64"	.4219"	*S21Y09	*S23Y09	*S26Y09	*S28Y09	*S16Y09	*S18Y09
	10.80mm	.4252"	*S21Y10	*S23Y10	*S26Y10	*S28Y10	*S16Y10	*S18Y10
	11.00mm	.4331"	*S21Y11	*S23Y11	*S26Y11	*S28Y11	*S16Y11	*S18Y11
<b>Z</b> .437" to .510" (3/32") Thick	7/16"	.4375"	*S21Z01	*S23Z01	*S26Z01	*S28Z01	*S16Z01	*S18Z01
	11.50mm	.4528"	*S21Z02	*S23Z02	*S26Z02	*S28Z02	*S16Z02	*S18Z02
	29/64"	.4531"	*S21Z03	*S23Z03	*S26Z03	*S28Z03	*S16Z03	*S18Z03
	15/32"	.4688"	*S21Z04	*S23Z04	*S26Z04	*S28Z04	*S16Z04	*S18Z04
	12mm	.4724"	*S21Z05	*S23Z05	*S26Z05	*S28Z05	*S16Z05	*S18Z05
	31/64"	.4844"	*S21Z06	*S23Z06	*S26Z06	*S28Z06	*S16Z06	*S18Z06
	12.50mm	.4921"	*S21Z07	*S23Z07	*S26Z07	*S28Z07	*S16Z07	*S18Z07
	1/2"	.5000"	*S21Z08	*S23Z08	*S26Z08	*S28Z08	*S16Z08	*S18Z08
<b>O</b> .511" to .695" (1/8") Thick	13mm	.5118"	*S21001	*S23001	*S26001	*S28001	*S16001	*S18001
	33/64"	.5156"	*S21002	*S23002	*S26002	*S28002	*S16002	*S18002
	17/32"	.5312"	*S21003	*S23003	*S26003	*S28003	*S16003	*S18003
	13.50mm	.5315"	*S21004	*S23004	*S26004	*S28004	*S16004	*S18004
	35/64"	.5469"	*S21060	*S23060	*S26060	*S28060	*S16060	*S18060
	14mm	.5512"	*S21005	*S23005	*S26005	*S28005	*S16005	*S18005
	9/16"	.5625"	*S21006	*S23006	*S26006	*S28006	*S16006	*S18006
	14.50mm	.5709"	*S21007	*S23007	*S26007	*S28007	*S16007	*S18007
	37/64"	.5781"	*S21008	*S23008	*S26008	*S28008	*S16008	*S18008
	15mm	.5906"	*S21009	*S23009	*S26009	*S28009	*S16009	*S18009
	19/32"	.5938"	*S21010	*S23010	*S26010	*S28010	*S16010	*S18010
	39/64"	.6094"	*S21061	*S23061	*S26061	*S28061	*S16061	*S18061
	15.50mm	.6102"	*S21011	*S23011	*S26011	*S28011	*S16011	*S18011
	15.70mm	.6181"	*S21064	*S23064	*S26064	*S28064	*S16064	*S18064
	5/8"	.6250"	*S21012	*S23012	*S26012	*S28012	*S16012	*S18012
	16mm	.6299"	*S21013	*S23013	*S26013	*S28013	*S16013	*S18013
	41/64"	.6406"	*S21062	*S23062	*S26062	*S28062	*S16062	*S18062
	16.50mm	.6496"	*S21014	*S23014	*S26014	*S28014	*S16014	*S18014
	21/32"	.6563"	*S21015	*S23015	*S26015	*S28015	*S16015	*S18015
	17mm	.6692"	*S21016	*S23016	*S26016	*S28016	*S16016	*S18016
	43/64"	.6719"	*S21063	*S23063	*S26063	*S28063	*S16063	*S18063
	11/16"	.6875"	*S21017	*S23017	*S26017	*S28017	*S16017	*S18017
	17.50mm	.6890"	*S21018	*S23018	*S26018	*S28018	*S16018	*S18018

\* 2pcs per package

THROW-AWAY DRILL INSERT HOLDERS



- Point angle
  - under 2 1/2 : 132 degree
  - over 2 1/2 : 144 degree
- 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)

## CARBIDE SPADE DRILL

Series Min.to Max (mm/inch)	Diameter		MULTI PURPOSE GEOMETRY				CAST IRON GEOMETRY	
			C2		C5		C3	
			TiN Coated EDP NO.	TiAlN Coated EDP NO.	TiN Coated EDP NO.	TiAlN Coated EDP NO.	TiN Coated EDP NO.	TiAlN Coated EDP NO.
<b>1</b> .690" to .960" (5/32") Thick	45/64"	.7031"	S21101	S23101	S26101	S28101	S16101	S18101
	18mm	.7087"	S21102	S23102	S26102	S28102	S16102	S18102
	23/32"	.7188"	S21103	S23103	S26103	S28103	S16103	S18103
	18.50mm	.7283"	S21104	S23104	S26104	S28104	S16104	S18104
	47/64"	.7344"	S21105	S23105	S26105	S28105	S16105	S18105
	19mm	.7480"	S21106	S23106	S26106	S28106	S16106	S18106
	3/4"	.7500"	S21107	S23107	S26107	S28107	S16107	S18107
	49/64"	.7656"	S21108	S23108	S26108	S28108	S16108	S18108
	19.50mm	.7677"	S21109	S23109	S26109	S28109	S16109	S18109
	25/32"	.7812"	S21110	S23110	S26110	S28110	S16110	S18110
	20mm	.7874"	S21111	S23111	S26111	S28111	S16111	S18111
	51/64"	.7969"	S21160	S23160	S26160	S28160	S16160	S18160
	20.50mm	.8071"	S21112	S23112	S26112	S28112	S16112	S18112
	13/16"	.8125"	S21113	S23113	S26113	S28113	S16113	S18113
	21mm	.8268"	S21114	S23114	S26114	S28114	S16114	S18114
	27/32"	.8438"	S21115	S23115	S26115	S28115	S16115	S18115
	55/64"	.8594"	S21161	S23161	S26161	S28161	S16161	S18161
	22mm	.8661"	S21116	S23116	S26116	S28116	S16116	S18116
	7/8"	.8750"	S21117	S23117	S26117	S28117	S16117	S18117
	57/64"	.8906"	S21162	S23162	S26162	S28162	S16162	S18162
23mm	.9055"	S21118	S23118	S26118	S28118	S16118	S18118	
29/32"	.9062"	S21119	S23119	S26119	S28119	S16119	S18119	
59/64"	.9219"	S21120	S23120	S26120	S28120	S16120	S18120	
15/16"	.9375"	S21121	S23121	S26121	S28121	S16121	S18121	
24mm	.9449"	S21122	S23122	S26122	S28122	S16122	S18122	
<b>2</b> .961" to 1.380" (3/16") Thick	31/32"	.9688"	S21201	S23201	S26201	S28201	S16201	S18201
	63/64"	.9843"	S21202	S23202	S26202	S28202	S16202	S18202
	1"	1.0000"	S21203	S23203	S26203	S28203	S16203	S18203
	1-1/64"	1.0156"	S21204	S23204	S26204	S28204	S16204	S18204
	26mm	1.0236"	S21205	S23205	S26205	S28205	S16205	S18205
	1-1/32"	1.0312"	S21206	S23206	S26206	S28206	S16206	S18206
	1-3/64"	1.0469"	S21260	S23260	S26260	S28260	S16260	S18260
	1-1/16"	1.0625"	S21207	S23207	S26207	S28207	S16207	S18207
	27mm	1.0630"	S21208	S23208	S26208	S28208	S16208	S18208
	1-3/32"	1.0938"	S21209	S23209	S26209	S28209	S16209	S18209
	28mm	1.1024"	S21210	S23210	S26210	S28210	S16210	S18210
	1-7/64"	1.1094"	S21261	S23261	S26261	S28261	S16261	S18261
	1-1/8"	1.1250"	S21211	S23211	S26211	S28211	S16211	S18211
	29mm	1.1417"	S21212	S23212	S26212	S28212	S16212	S18212
	1-5/32"	1.1562"	S21213	S23213	S26213	S28213	S16213	S18213
30mm	1.1811"	S21214	S23214	S26214	S28214	S16214	S18214	
1-3/16"	1.1875"	S21215	S23215	S26215	S28215	S16215	S18215	





- Point angle
  - under 2 1/2 : 132 degree
  - over 2 1/2 : 144 degree
- 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)

## CARBIDE SPADE DRILL

Series Min.to Max (mm/inch)	Diameter		MULTI PURPOSE GEOMETRY				CAST IRON GEOMETRY	
			C2		C5		C3	
			TiN Coated EDP NO.	TiAIN Coated EDP NO.	TiN Coated EDP NO.	TiAIN Coated EDP NO.	TiN Coated EDP NO.	TiAIN Coated EDP NO.
2 .961" to 1.380" (3/16") Thick	1-7/32"	1.2188"	S21216	S23216	S26216	S28216	S16216	S18216
	31mm	1.2205"	S21217	S23217	S26217	S28217	S16217	S18217
	1-1/4"	1.2500"	S21218	S23218	S26218	S28218	S16218	S18218
	32mm	1.2598"	S21219	S23219	S26219	S28219	S16219	S18219
	1-9/32"	1.2812"	S21220	S23220	S26220	S28220	S16220	S18220
	33mm	1.2992"	S21221	S23221	S26221	S28221	S16221	S18221
	1-5/16"	1.3125"	S21222	S23222	S26222	S28222	S16222	S18222
	34mm	1.3386"	S21223	S23223	S26223	S28223	S16223	S18223
	1-11/32"	1.3438"	S21224	S23224	S26224	S28224	S16224	S18224
	1-3/8"	1.3750"	S21225	S23225	S26225	S28225	S16225	S18225
35mm	1.3780"	S21226	S23226	S26226	S28226	S16226	S18226	
3 1.353" to 1.882" (1/4") Thick	1-13/32"	1.4062"	S21301	S23301	S26301	S28301		
	36mm	1.4173"	S21302	S23302	S26302	S28302		
	1-7/16"	1.4375"	S21303	S23303	S26303	S28303		
	37mm	1.4567"	S21304	S23304	S26304	S28304		
	1-15/32"	1.4688"	S21305	S23305	S26305	S28305		
	38mm	1.4961"	S21306	S23306	S26306	S28306		
	1-1/2"	1.5000"	S21307	S23307	S26307	S28307		
	1-17/32"	1.5312"	S21308	S23308	S26308	S28308		
	39mm	1.5354"	S21309	S23309	S26309	S28309		
	1-9/16"	1.5938"	S21310	S23310	S26310	S28310		
	40mm	1.5748"	S21311	S23311	S26311	S28311		
	1-19/32"	1.5938"	S21312	S23312	S26312	S28312		
	41mm	1.6142"	S21313	S23313	S26313	S28313		
	1-5/8"	1.6250"	S21314	S23314	S26314	S28314		
	42mm	1.6535"	S21315	S23315	S26315	S28315		
	1-21/32"	1.6562"	S21316	S23316	S26316	S28316		
	1-11/16"	1.6875"	S21317	S23317	S26317	S28317		
	43mm	1.6929"	S21318	S23318	S26318	S28318		
	1-23/32"	1.7188"	S21319	S23319	S26319	S28319		
	44mm	1.7323"	S21320	S23320	S26320	S28320		
	1-3/4"	1.7500"	S21321	S23321	S26321	S28321		
	45mm	1.7717"	S21322	S23322	S26322	S28322		
	1-25/32"	1.7812"	S21323	S23323	S26323	S28323		
46mm	1.8110"	S21324	S23324	S26324	S28324			
1-13/16"	1.8125"	S21325	S23325	S26325	S28325			
1-27/32"	1.8438"	S21326	S23326	S26326	S28326			
47mm	1.8504"	S21327	S23327	S26327	S28327			
1-7/8"	1.8750"	S21328	S23328	S26328	S28328			



**SPECIAL  
OR  
NON-  
STANDARD  
DRILLS  
AVAILABLE  
ON  
REQUEST**

THROW-AWAY DRILL INSERT HOLDERS



# DRILL INSERTS

# THROW-AWAY SUPER COBALT(T15) SM-Point DRILL INSERTS



- Point angle
  - under 2 1/2 : 132 degree
  - over 2 1/2 : 144 degree
- Improved stability and hole straightness by newly developed thinning design.
- Less thrust force and excellent self-centering.
- Any non-standard size available.

SUPER COBALT (T15) SM-Point DRILL				SUPER COBALT (T15) SM-Point DRILL					
Series Min.to Max (mm/inch)	Diameter			TiAlN Coated EDP NO.	Series Min.to Max (mm/inch)	Diameter			TiAlN Coated EDP NO.
	Inch (inch)	Metric (mm)	Decimal (inch)			Inch (inch)	Metric (mm)	Decimal (inch)	
<b>Y</b> 9.50 (.374") to 11.07 (.436")		9.50	.3740"	*SM08Y01	<b>1</b> 17.53 (.690") to 24.38 (.960")	45/64"	17.86	.7031"	SM08101
	3/8"	9.53	.3750"	*SM08Y02			18.00	.7087"	SM08102
		9.80	.3858"	*SM08Y03		23/32"	18.26	.7188"	SM08103
	25/64"	9.92	.3906"	*SM08Y04			18.50	.7283"	SM08104
		10.00	.3937"	*SM08Y05		47/64"	18.65	.7344"	SM08105
		10.20	.4016"	*SM08Y06			19.00	.7480"	SM08106
	13/32"	10.32	.4062"	*SM08Y07		3/4"	19.05	.7500"	SM08107
		10.50	.4134"	*SM08Y08		49/64"	19.45	.7656"	SM08108
	27/64"	10.72	.4219"	*SM08Y09			19.50	.7677"	SM08109
		10.80	.4252"	*SM08Y10		25/32"	19.84	.7812"	SM08110
<b>Z</b> 11.11 (.437") to 12.95 (.510")		11.00	.4331"	*SM08Y11		20.00	.7874"	SM08111	
	7/16"	11.11	.4375"	*SM08Z01	51/64"	20.24	.7969"	SM08160	
		11.50	.4528"	*SM08Z02		20.50	.8071"	SM08112	
	29/64"	11.51	.4531"	*SM08Z03	13/16"	20.64	.8125"	SM08113	
	15/32"	11.91	.4688"	*SM08Z04		21.00	.8268"	SM08114	
		12.00	.4724"	*SM08Z05	27/32"	21.43	.8438"	SM08115	
	31/64"	12.30	.4844"	*SM08Z06	55/64"	21.83	.8594"	SM08161	
		12.50	.4921"	*SM08Z07		22.00	.8661"	SM08116	
1/2"	12.70	.5000"	*SM08Z08	7/8"	22.23	.8750"	SM08117		
<b>O</b> 12.98 (.511") to 17.65 (.695")		13.00	.5118"	*SM08001	57/64"	22.62	.8906"	SM08162	
	33/64"	13.10	.5156"	*SM08002		23.00	.9055"	SM08118	
	17/32"	13.49	.5312"	*SM08003	29/32"	23.02	.9062"	SM08119	
		13.50	.5315"	*SM08004	59/64"	23.42	.9219"	SM08120	
	35/64"	13.89	.5469"	*SM08060	15/16"	23.81	.9375"	SM08121	
		14.00	.5512"	*SM08005		24.00	.9449"	SM08122	
	9/16"	14.29	.5625"	*SM08006	31/32"	24.61	.9688"	SM08201	
		14.50	.5709"	*SM08007	63/64"	25.00	.9843"	SM08202	
	37/64"	14.68	.5781"	*SM08008	1"	25.40	1.0000"	SM08203	
		15.00	.5906"	*SM08009	1-1/64"	25.80	1.0156"	SM08204	
	19/32"	15.08	.5938"	*SM08010		26.00	1.0236"	SM08205	
	39/64"	15.48	.6094"	*SM08061	1-1/32"	26.19	1.0312"	SM08206	
		15.50	.6102"	*SM08011	1-3/64"	26.59	1.0469"	SM08260	
	5/8"	15.88	.6250"	*SM08012	1-1/16"	26.99	1.0625"	SM08207	
		16.00	.6299"	*SM08013		27.00	1.0630"	SM08208	
	41/64"	16.27	.6406"	*SM08062	1-3/32"	27.78	1.0938"	SM08209	
		16.50	.6496"	*SM08014		28.00	1.1024"	SM08210	
	21/32"	16.67	.6562"	*SM08015	1-7/64"	28.18	1.1094"	SM08261	
		17.00	.6693"	*SM08016	1-1/8"	28.58	1.1250"	SM08211	
	43/64"	17.07	.6719"	*SM08063		29.00	1.1417"	SM08212	
11/16"	17.46	.6875"	*SM08017	1-5/32"	29.37	1.1562"	SM08213		
	17.50	.6890"	*SM08018		30.00	1.1811"	SM08214		
				<b>2</b> 24.41 (.961") to 35.05 (1.380")					

\* 2pcs per package

THROW-AWAY DRILL INSERT HOLDERS

# DRILL INSERTS

# THROW-AWAY SUPER COBALT(T15) SM-Point DRILL INSERTS



- Point angle
  - under 2 1/2 : 132 degree
  - over 2 1/2 : 144 degree
- Improved stability and hole straightness by newly developed thinning design.
- Less thrust force and excellent self-centering.
- Any non-standard size available.

SUPER COBALT (T15) SM-Point DRILL					SUPER COBALT (T15) SM-Point DRILL				
Series Min.to Max (mm/inch)	Diameter			TiAlN Coated EDP NO.	Series Min.to Max (mm/inch)	Diameter			TiAlN Coated EDP NO.
	Inch (inch)	Metric (mm)	Decimal (inch)			Inch (inch)	Metric (mm)	Decimal (inch)	
<b>2</b> 24.41 (.961") to 35.05 (1.380")	1-3/16"	30.16	1.1875"	SM08215	<b>4</b> 46.99 (1.850") to 65.28 (2.570")		48.00	1.8898"	SM08401
	1-7/32"	30.96	1.2188"	SM08216		1-29/32"	48.42	1.9062"	SM08402
		31.00	1.2205"	SM08217			49.00	1.9291"	SM08403
	1-1/4"	31.75	1.2500"	SM08218		1-15/16"	49.21	1.9375"	SM08404
		32.00	1.2598"	SM08219			50.00	1.9685"	SM08405
	1-9/32"	32.54	1.2812"	SM08220		1-31/32"	50.01	1.9688"	SM08406
		33.00	1.2992"	SM08221		2"	50.80	2.0000"	SM08407
	1-5/16"	33.34	1.3125"	SM08222			51.00	2.0079"	SM08408
		34.00	1.3386"	SM08223		2-1/32"	51.59	2.0312"	SM08409
	1-11/32"	34.13	1.3438"	SM08224		2-3/64"	52.00	2.0472"	SM08410
1-3/8"	34.93	1.3750"	SM08225	2-1/16"		52.39	2.0625"	SM08411	
	35.00	1.3780"	SM08226			53.00	2.0866"	SM08412	
<b>3</b> 34.37 (1.353") to 47.80 (1.882")	1-13/32"	35.72	1.4062"	SM08301		2-3/32"	53.18	2.0938"	SM08413
		36.00	1.4173"	SM08302		2-1/8"	53.98	2.1250"	SM08414
	1-7/16"	36.51	1.4375"	SM08303			54.00	2.1260"	SM08415
		37.00	1.4567"	SM08304		2-5/32"	54.79	2.1562"	SM08416
	1-15/32"	37.31	1.4688"	SM08305			55.00	2.1654"	SM08417
		38.00	1.4961"	SM08306		2-3/16"	55.56	2.1875"	SM08418
	1-1/2"	38.10	1.5000"	SM08307			56.00	2.2047"	SM08419
	1-17/32"	38.89	1.5312"	SM08308		2-7/32"	56.36	2.2188"	SM08420
		39.00	1.5354"	SM08309		57.00	2.2441"	SM08421	
	1-9/16"	39.69	1.5625"	SM08310	2-1/4"	57.15	2.2500"	SM08422	
		40.00	1.5748"	SM08311	2-9/32"	57.94	2.2812"	SM08423	
	1-19/32"	40.48	1.5938"	SM08312		58.00	2.2835"	SM08424	
		41.00	1.6142"	SM08313	2-5/16"	58.74	2.3125"	SM08425	
	1-5/8"	41.28	1.6250"	SM08314		59.00	2.3228"	SM08426	
		42.00	1.6535"	SM08315	2-11/32"	59.53	2.3438"	SM08427	
	1-21/32"	42.07	1.6562"	SM08316		60.00	2.3622"	SM08428	
	1-11/16"	42.86	1.6875"	SM08317	2-3/8"	60.33	2.3750"	SM08429	
		43.00	1.6929"	SM08318		61.00	2.4016"	SM08430	
	1-23/32"	43.66	1.7188"	SM08319	2-13/32"	61.12	2.4062"	SM08431	
		44.00	1.7323"	SM08320	2-7/16"	61.91	2.4375"	SM08432	
1-3/4"	44.45	1.7500"	SM08321		62.00	2.4409"	SM08433		
	45.00	1.7717"	SM08322	2-15/32"	62.71	2.4688"	SM08434		
1-25/32"	45.24	1.7812"	SM08323		63.00	2.4803"	SM08435		
	46.00	1.8110"	SM08324	2-1/2"	63.50	2.5000"	SM08436		
1-13/16"	46.04	1.8125"	SM08325		64.00	2.5197"	SM08437		
1-27/32"	46.83	1.8438"	SM08326	2-17/32"	64.29	2.5312"	SM08438		
	47.00	1.8504"	SM08327		65.00	2.5591"	SM08439		
1-7/8"	47.63	1.8750"	SM08328	2-9/16"	65.09	2.5625"	SM08440		

THROW-AWAY DRILL INSERT HOLDERS

# DRILL INSERTS

# THROW-AWAY SUPER COBALT(T15) SM-Point DRILL INSERTS



- Point angle
  - under 2 1/2 : 132 degree
  - over 2 1/2 : 144 degree
- Improved stability and hole straightness by newly developed thinning design.
- Less thrust force and excellent self-centering.
- Any non-standard size available.

SUPER COBALT (T15) SM-Point DRILL					SUPER COBALT (T15) SM-Point DRILL				
Series Min.to Max (mm/inch)	Diameter			TiAlN Coated EDP NO.	Series Min.to Max (mm/inch)	Diameter			TiAlN Coated EDP NO.
	Inch (inch)	Metric (mm)	Decimal (inch)			Inch (inch)	Metric (mm)	Decimal (inch)	
<b>5</b> 62.38 (2.456") to 76.20 (3.000")	2-1/2"	63.50	2.5000"	SM08501	<b>7</b> 87.76 (3.455") to 101.60 (4.000")	3-7/16"	87.31	3.4375"	SM08619
		64.00	2.5197"	SM08502			88.00	3.4646"	SM08620
	2-17/32"	64.29	2.5312"	SM08503		3-15/32"	88.11	3.4688"	SM08621
	2-9/16"	65.09	2.5625"	SM08504		3-1/2"	88.90	3.5000"	SM08622
	2-19/32"	65.88	2.5938"	SM08505		3-17/32"	89.69	3.5312"	SM08701
		66.00	2.5984"	SM08506			90.00	3.5433"	SM08702
	2-5/8"	66.68	2.6250"	SM08507		3-9/16"	90.49	3.5625"	SM08703
	2-21/32"	67.47	2.6562"	SM08508		3-19/32"	91.28	3.5938"	SM08704
		68.00	2.6772"	SM08509			92.00	3.6221"	SM08705
	2-11/16"	68.26	2.6875"	SM08510		3-5/8"	92.08	3.6250"	SM08706
	2-23/32"	69.05	2.7188"	SM08511		3-21/32"	92.87	3.6562"	SM08707
	2-3/4"	69.85	2.7500"	SM08512		3-11/16"	93.66	3.6875"	SM08708
		70.00	2.7559"	SM08513			94.00	3.7008"	SM08709
	2-25/32"	70.64	2.7812"	SM08514		3-23/32"	94.46	3.7188"	SM08710
	2-13/16"	71.44	2.8125"	SM08515		3-3/4"	95.25	3.7500"	SM08711
		72.00	2.8346"	SM08516			96.00	3.7795"	SM08712
	2-27/32"	72.23	2.8438"	SM08517		3-25/32"	96.04	3.7812"	SM08713
	2-7/8"	73.03	2.8750"	SM08518		3-13/16"	96.84	3.8125"	SM08714
	2-29/32"	73.82	2.9062"	SM08519		3-27/32"	97.63	3.8438"	SM08715
		74.00	2.9134"	SM08520			98.00	3.8583"	SM08716
	74.61	2.9375"	SM08521	3-7/8"	98.43	3.8750"	SM08717		
2-31/32"	75.41	2.9688"	SM08522	3-29/32"	99.22	3.9062"	SM08718		
	76.00	2.9921"	SM08523		100.00	3.9370"	SM08719		
3"	76.20	3.0000"	SM08524	3-15/16"	100.01	3.9375"	SM08720		
3-1/32"	76.99	3.0312"	SM08601	3-31/32"	100.81	3.9688"	SM08721		
3-1/16"	77.79	3.0625"	SM08602	4"	101.60	4.0000"	SM08722		
	78.00	3.0709"	SM08603	4-1/64"	102.00	4.0156"	SM08801		
3-3/32"	78.58	3.0938"	SM08604	4-1/16"	103.19	4.0625"	SM08802		
3-1/8"	79.38	3.1250"	SM08605	4-3/32"	104.00	4.0945"	SM08803		
	80.00	3.1496"	SM08606	4-1/8"	104.78	4.1250"	SM08804		
3-5/32"	80.17	3.1562"	SM08607		106.00	4.1732"	SM08805		
3-3/16"	80.96	3.1875"	SM08608	4-3/16"	106.36	4.1875"	SM08806		
3-7/32"	81.76	3.2188"	SM08609	4-1/4"	107.95	4.2500"	SM08807		
	82.00	3.2283"	SM08610		108.00	4.2520"	SM08808		
3-1/4"	82.55	3.2500"	SM08611	4-5/16"	109.54	4.3125"	SM08809		
3-9/32"	83.34	3.2812"	SM08612		110.00	4.3307"	SM08810		
	84.00	3.3071"	SM08613	4-3/8"	111.13	4.3750"	SM08811		
3-5/16"	84.14	3.3125"	SM08614		112.00	4.4094"	SM08812		
3-11/32"	84.93	3.3438"	SM08615	4-7/16"	112.71	4.4375"	SM08813		
3-3/8"	85.73	3.3750"	SM08616		114.00	4.4882"	SM08814		
	86.00	3.3858"	SM08617	4-1/2"	114.30	4.5000"	SM08815		
3-13/32"	86.52	3.4063"	SM08618						

THROW-AWAY DRILL INSERT HOLDERS

# DRILL INSERTS

# THROW-AWAY CARBIDE(C5) SM-Point DRILL INSERTS



- Point angle
  - under 2 1/2 : 132 degree
  - over 2 1/2 : 144 degree

- Improved stability and hole straightness by newly developed thinning design.
- Less thrust force and excellent self-centering.
- Any non-standard size available.

CARBIDE (C5) SM-Point DRILL					CARBIDE (C5) SM-Point DRILL				
Series Min.to Max (mm/inch)	Diameter			TiAlN Coated EDP NO.	Series Min.to Max (mm/inch)	Diameter			TiAlN Coated EDP NO.
	Inch (inch)	Metric (mm)	Decimal (inch)			Inch (inch)	Metric (mm)	Decimal (inch)	
<b>Y</b> 9.50 (.374") to 11.07 (.436")		9.50	.3740"	*SM28Y01	<b>0</b> 12.98 (.511") to 17.65 (.695")		16.00	.6299"	*SM28013
	3/8"	9.53	.3750"	*SM28Y02		41/64"	16.27	.6406"	*SM28062
		9.80	.3858"	*SM28Y03			16.50	.6496"	*SM28014
	25/64"	9.92	.3906"	*SM28Y04		21/32"	16.67	.6562"	*SM28015
		10.00	.3937"	*SM28Y05			17.00	.6693"	*SM28016
		10.20	.4016"	*SM28Y06		43/64"	17.07	.6719"	*SM28063
	13/32"	10.32	.4062"	*SM28Y07		11/16"	17.46	.6875"	*SM28017
		10.50	.4134"	*SM28Y08			17.50	.6890"	*SM28018
	27/64"	10.72	.4219"	*SM28Y09		45/64"	17.86	.7031"	SM28101
		10.80	.4252"	*SM28Y10			18.00	.7087"	SM28102
		11.00	.4331"	*SM28Y11		23/32"	18.26	.7188"	SM28103
<b>Z</b> 11.11 (.437") to 12.95 (.510")	7/16"	11.11	.4375"	*SM28Z01		18.50	.7283"	SM28104	
		11.50	.4528"	*SM28Z02	47/64"	18.65	.7344"	SM28105	
	29/64"	11.51	.4531"	*SM28Z03		19.00	.7480"	SM28106	
	15/32"	11.91	.4688"	*SM28Z04	3/4"	19.05	.7500"	SM28107	
		12.00	.4724"	*SM28Z05	49/64"	19.45	.7656"	SM28108	
	31/64"	12.30	.4844"	*SM28Z06		19.50	.7677"	SM28109	
		12.50	.4921"	*SM28Z07	25/32"	19.84	.7812"	SM28110	
	1/2"	12.70	.5000"	*SM28Z08		20.00	.7874"	SM28111	
<b>0</b> 12.98 (.511") to 17.65 (.695")		13.00	.5118"	*SM28001	<b>1</b> 17.53 (.690") to 24.38 (.960")	51/64"	20.24	.7969"	SM28160
	33/64"	13.10	.5156"	*SM28002			20.50	.8071"	SM28112
	17/32"	13.49	.5312"	*SM28003		13/16"	20.64	.8125"	SM28113
		13.50	.5315"	*SM28004			21.00	.8268"	SM28114
	35/64"	13.89	.5469"	*SM28060		27/32"	21.43	.8438"	SM28115
		14.00	.5512"	*SM28005		55/64"	21.83	.8594"	SM28161
	9/16"	14.29	.5625"	*SM28006			22.00	.8661"	SM28116
		14.50	.5709"	*SM28007		7/8"	22.23	.8750"	SM28117
	37/64"	14.68	.5781"	*SM28008		57/64"	22.62	.8906"	SM28162
		15.00	.5906"	*SM28009			23.00	.9055"	SM28118
	19/32"	15.08	.5938"	*SM28010		29/32"	23.02	.9062"	SM28119
	39/64"	15.48	.6094"	*SM28061		59/64"	23.42	.9219"	SM28120
		15.50	.6102"	*SM28011		15/16"	23.81	.9375"	SM28121
	5/8"	15.88	.6250"	*SM28012			24.00	.9449"	SM28122

\* 2pcs per package

THROW-AWAY DRILL INSERT HOLDERS

# DRILL INSERTS

# THROW-AWAY CARBIDE(C5) SM-Point DRILL INSERTS



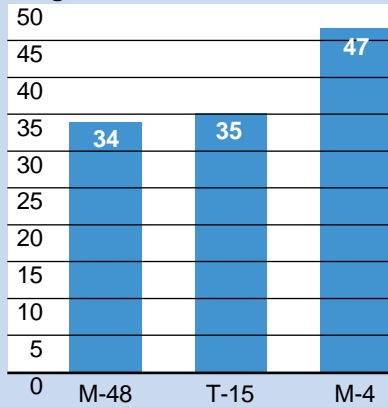
- Point angle
  - under 2 1/2 : 132 degree
  - over 2 1/2 : 144 degree
- Improved stability and hole straightness by newly developed thinning design.
- Less thrust force and excellent self-centering.
- Any non-standard size available.

CARBIDE (C5) SM-Point DRILL				CARBIDE (C5) SM-Point DRILL					
Series Min.to Max (mm/inch)	Diameter			TiAlN Coated EDP NO.	Series Min.to Max (mm/inch)	Diameter			TiAlN Coated EDP NO.
	Inch (inch)	Metric (mm)	Decimal (inch)			Inch (inch)	Metric (mm)	Decimal (inch)	
<b>2</b> 24.41 (.961") to 35.05 (1.380")	31/32"	24.61	.9688"	SM28201	<b>3</b> 34.37 (1.353") to 47.80 (1.882")	1-13/32"	35.72	1.4062"	SM28301
	63/64"	25.00	.9843"	SM28202			36.00	1.4173"	SM28302
	1"	25.40	1.0000"	SM28203		1-7/16"	36.51	1.4375"	SM28303
	1-1/64"	25.80	1.0156"	SM28204			37.00	1.4567"	SM28304
		26.00	1.0236"	SM28205		1-15/32"	37.31	1.4688"	SM28305
	1-1/32"	26.19	1.0312"	SM28206			38.00	1.4961"	SM28306
	1-3/64"	26.59	1.0469"	SM28260		1-1/2"	38.10	1.5000"	SM28307
	1-1/16"	26.99	1.0625"	SM28207		1-17/32"	38.89	1.5312"	SM28308
		27.00	1.0630"	SM28208			39.00	1.5354"	SM28309
	1-3/32"	27.78	1.0938"	SM28209		1-9/16"	39.69	1.5625"	SM28310
		28.00	1.1024"	SM28210			40.00	1.5748"	SM28311
	1-7/64"	28.18	1.1094"	SM28261		1-19/32"	40.48	1.5938"	SM28312
	1-1/8"	28.58	1.1250"	SM28211			41.00	1.6142"	SM28313
		29.00	1.1417"	SM28212		1-5/8"	41.28	1.6250"	SM28314
	1-5/32"	29.37	1.1562"	SM28213			42.00	1.6535"	SM28315
		30.00	1.1811"	SM28214		1-21/32"	42.07	1.6562"	SM28316
	1-3/16"	30.16	1.1875"	SM28215		1-11/16"	42.86	1.6875"	SM28317
	1-7/32"	30.96	1.2188"	SM28216			43.00	1.6929"	SM28318
		31.00	1.2205"	SM28217		1-23/32"	43.66	1.7188"	SM28319
	1-1/4"	31.75	1.2500"	SM28218			44.00	1.7323"	SM28320
	32.00	1.2598"	SM28219	1-3/4"	44.45	1.7500"	SM28321		
1-9/32"	32.54	1.2812"	SM28220		45.00	1.7717"	SM28322		
	33.00	1.2992"	SM28221	1-25/32"	45.24	1.7812"	SM28323		
1-5/16"	33.34	1.3125"	SM28222		46.00	1.8110"	SM28324		
	34.00	1.3386"	SM28223	1-13/16"	46.04	1.8125"	SM28325		
1-11/32"	34.13	1.3438"	SM28224	1-27/32"	46.83	1.8438"	SM28326		
1-3/8"	34.93	1.3750"	SM28225		47.00	1.8504"	SM28327		
	35.00	1.3780"	SM28226	1-7/8"	47.63	1.8750"	SM28328		

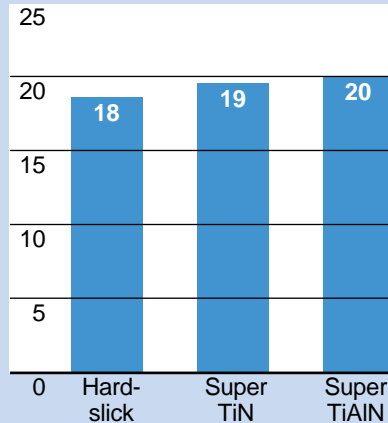
THROW-AWAY DRILL INSERT HOLDERS

## SPADE DRILL SELECTION & APPLICATIONS HSS

**Toughness Values**



**Wear Values**



- **WHEN TO USE M-4**
  - Loose or Manual Machines
  - If T-15 Breaks
- **WHEN TO USE T-15**
  - When M-4 Life needs to be Extended
  - If M-48 Breaks
- **WHEN TO USE M-48**
  - Extend Life T-15
- **WHEN TO USE SM POINT**
  - Reduce Thrust
  - Smoother Entry
  - Improve Hole Quality
  - Higher Speeds and Feeds

## SPEEDS – FEED RECOMMENDATIONS (STD POINT-SM POINT)

Material	Material Hardness (BHN)	SFM Surface Footage		Feed (IPR)													
				3/8" to 1/2"		33/64" to 11/16"		45/64" to 15/16"		31/32 to 1-3/8"		1-13/32" to 1-7/8"		1-29/32" to 2-9/16"		2-19/32" to 4-1/2"	
Free Machining Steel 1118, 1215, 12L14, etc.	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, etc.	125 - 175	240	280	.006	.007	.009	.010	.012	.014	.015	.017	.019	.019	.023	.023	.027	.027
	175 - 225	225	265	.005	.006	.008	.009	.010	.013	.014	.016	.018	.018	.021	.021	.024	.024
	225 - 275	210	245	.005	.006	.008	.009	.010	.013	.014	.016	.018	.018	.021	.021	.024	.024
Alloy Steel 4140, 5140, 8640, etc.	275 - 325	195	230	.004	.005	.007	.008	.009	.012	.012	.015	.016	.016	.019	.019	.022	.022
	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
High Strength Alloy Steel 4340, 4330V, 300M, etc.	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
Structural Steel A36, A285, A516, etc.	225 - 300	110	130	.005	.006	.007	.009	.009	.011	.010	.013	.014	.014	.017	.017	.020	.020
	300 - 350	85	105	.004	.005	.007	.008	.009	.010	.010	.012	.014	.014	.017	.017	.020	.020
	350 - 400	70	85	.003	.004	.006	.007	.008	.009	.009	.011	.012	.012	.015	.015	.018	.018
High Temp, Alloy Hastelloy B, Inconel 600, etc.	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
Stainless Steel 303, 416, 420, 17-4 PH, etc.	140 - 220	40	50	.003	.004	.006	.007	.007	.009	.008	.011	.010	.012	.012	.015	.015	.017
	220 - 310	35	45	.003	.004	.006	.006	.007	.008	.008	.010	.010	.010	.012	.012	.015	.014
Tool Steel H-13, H021, A04, O-2, S-3, etc.	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
Aluminum	150 - 200	110	130	.004	.004	.006	.007	.008	.010	.010	.012	.012	.012	.015	.015	.017	.017
	200 - 250	90	110	.004	.004	.006	.007	.008	.010	.010	.012	.012	.012	.015	.015	.017	.017
Cast Iron Gray, Ductile, Nodular	30	850	-	.008	-	.013	-	.016	-	.020	-	.022	.022	.025	.025	.025	.025
	180	450	-	.008	-	.013	-	.016	-	.018	-	.022	.022	.025	.025	.025	.025
	120 - 150	250	295	.007	.008	.012	.012	.016	.016	.020	.020	.024	.024	.027	.027	.030	.030
	150 - 200	225	265	.006	.007	.011	.011	.014	.015	.018	.019	.022	.022	.025	.025	.028	.028
	200 - 220	195	230	.006	.006	.009	.009	.012	.013	.016	.017	.018	.018	.021	.021	.024	.024
	220 - 260	165	195	.005	.005	.007	.008	.009	.011	.012	.014	.014	.014	.017	.017	.020	.020
	260 - 320	135	160	.004	.005	.006	.007	.007	.010	.009	.011	.012	.012	.014	.014	.016	.016

STANDARD GEOMETRY

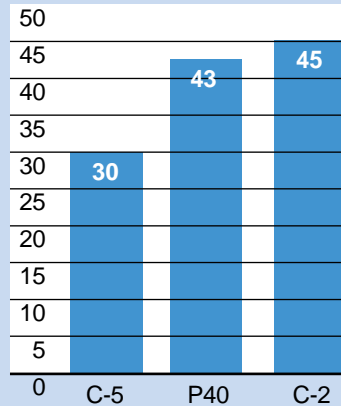
SM POINT

THROW-AWAY DRILL INSERT HOLDERS

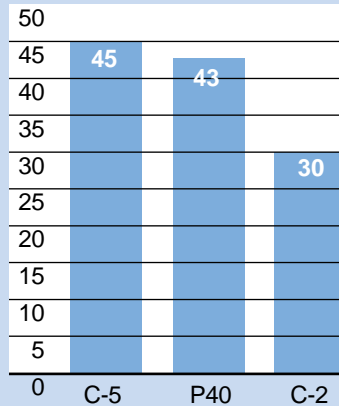


## SPADE DRILL SELECTION & APPLICATIONS **CARBIDE**

### Toughness Values



### Wear Values



If C-5 chips try C-2 at 10% – 20% lower S.F.M. than C-5 rating

Grade	Geometry and Application	Stocked Coatings
P40 & C-5	Steel Cutting	Super TiN TiAlN
C-3	Cast Iron	Super TiN TiAlN
P40 & C-2	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 STANDARD GEOMETRY - SM POINT

Material	Material Hardness (BHN)	SFM Surface Footage		Feed (IPR)									
				3/8" to 1/2"	33/64" to 11/16"	45/64" to 15/16"	31/32 to 1-3/8"	1-13/32" to 1-7/8"					
Free Machining Steel 1118, 1215, 12L14, etc.	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	-
Medium Carbon Steel 1018, 1040, 1140, etc.	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	-
Alloy Steel 4140, 5140, 8640, etc.	275 - 325	230	270	.004	.005	.006	.008	.006	.012	.010	.015	.014	-
	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	-
High Strength Alloy Steel 4340, 4330V, 300M, etc.	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	-
Structural Steel A36, A285, A516, etc.	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	-
High Temp, Alloy Hastelloy B, Inconel 600, etc.	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	-
Stainless Steel 303, 416, 420, 17-4 PH, etc.	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	-
Tool Steel H-13, H021, A04, 0-2, S-3, etc.	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	-
Aluminum	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	-
Cast Iron Gray Ductile Nodular	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	-

STANDARD GEOMETRY

SM POINT



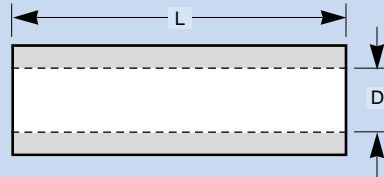
## SPADE DRILL HORSEPOWER CONSUMPTION RATE

### Metal Removal Rates (MRR)

Example: 1.50 Dia. Drill @ 6.412 I.P.M.

### Volume of Cylinder Method: $D^2 \times .785 \times L$

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)

$D^2 (1.5)^2 \times .785 \times L (6.412) = 11.3 \text{ C.U.In./ Min (MRR)}$

**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 <sup>3</sup> /min.))
Carbon Steels	150-200	1.0
	200-250	1.4
	250-350	1.6
Leaded Steels	150-175	0.7
Cast Irons	125-190	0.5
	190-250	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 & I-DREAM DRILL)

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 1118, 1215, 12L14, etc.	100 – 250	175-185 2.5-2.6	100-120 2.8-3.0	105-140 4.4-5.2	80-115 7-8	75-100 12-14	40-50 30-33	65-90 38-44
Low Carbon Steel 1010, 1020, 1025, 1522, etc.	85 – 275	165-170 2.4-2.5	75-90 2.4-2.6	75-95 3.7-4.2	60-80 6-7	55-75 11-12	30-40 26-30	50-65 33-38
Medium Carbon Steel 1030,1040,1050,1527,1140,1151,etc.	125 – 325	160-165 2.3-2.4	70-85 2.3-2.6	70-90 3.6-4.1	55-75 5-6	50-70 10-12	30-40 26-30	50-65 33-38
Alloy Steel 4140, 5140, 8640, etc.	125 – 375	160-165 2.3-2.4	66-75 2.2-2.4	65-80 3.5-3.9	50-70 5-6	45-60 10-11	30-35 26-28	40-50 30-33
High Strength Alloy 4340, 4330V, 300M, etc.	225 – 400	150-155 2.3-2.4	55-60 2.1-2.2	45-50 2.9-3.1	25-30 4-5	25-30 7-8	20-25 21-23	25-30 23-26
Structural Steel A36, A285, A516, etc.	100 – 350	160-165 2.3-2.4	75-85 2.4-2.6	65-80 3.5-3.9	40-55 5-6	40-50 9-10	25-30 23-26	40-50 30-33
High Temp. Alloy Hastelloy B, Inconel 600, etc.	140 – 310	150-155 2.3-2.4	60-65 2.2-2.3	50-55 3.1-3.2	30-35 4-5	25-30 7-8	25-30 23-26	- -
Stainless Steel 301, 316, 330, 17-4PH, etc.	135 – 275	165-170 2.4-2.5	70-85 2.3-2.6	65-75 3.5-3.7	40-55 5-6	40-50 9-10	25-30 23-26	35-45 28-31
Tool Steel H-13, H-21, A-4, 0-2, S-3, etc.	150 – 250	150-155 2.3-2.4	55-60 2.1-2.2	45-50 2.9-3.1	25-30 4-5	25-30 7-8	20-25 21-23	25-30 23-26
Aluminum	30 – 180	190-210 2.6-2.7	140-180 3.3-3.7	150-200 5.3-6.1	115-160 8-9	90-125 14-16	40-50 30-33	60-80 36-42
Cast Iron	120 – 320	155-160 2.3-2.4	60-65 2.2-2.3	50-60 3.1-3.3	30-40 4-5	30-35 8-9	25-30 23-26	30-35 26-28



## Technology and Quality

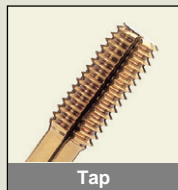
....**YG-1** Strives for technological advancements and superior quality 24 hours a day.



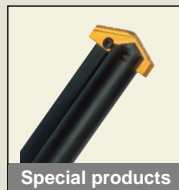
End Mill



Drill



Tap



Special products

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**X5070 / X-POWER / V7 MILL / JET-POWER / ALU-POWER / D-POWER / STANDARD & HIGH PERFORMANCE / CARBIDE END MILLS / TANK-POWER & ADDITIONAL POWDERED METAL / COBALT AND HSS END MILLS / TAPS / DRILLS, SPADE DRILL INSERTS HOLDERS AND ACCESSORIES / ROTARY TOOLING**

# ROTARY TOOL HOLDERS







# TOOL HOLDERS SELECTION GUIDE

## CAT / BT

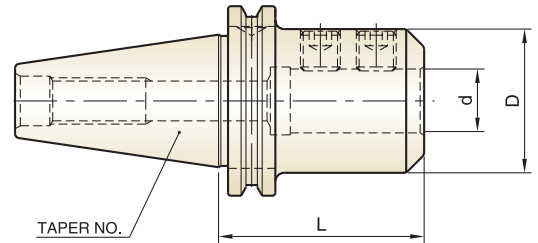
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## TECHNICAL INFORMATION

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## CAT



### STUB

EDP NO	TYPE	TAPER NO.	d	L	D
AK206	CAT40-EMH1/2-1.75	40	.500	1.75	1.25
AK208	CAT40-EMH5/8-1.75	40	.625	1.75	1.50
AK210	CAT40-EMH3/4-1.75	40	.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

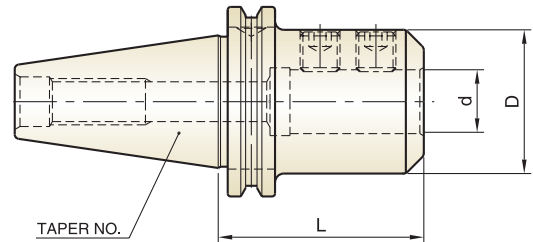
EDP NO	TYPE	TAPER NO.	d	L	D
AK000	CAT40-EMH1/8-2.50	40	.125	2.50	.69
AK001	CAT40-EMH3/16-2.50	40	.187	2.50	.69
AK002	CAT40-EMH1/4-2.50	40	.250	2.50	.78
AK003	CAT40-EMH5/16-2.50	40	.312	2.50	.88
AK004	CAT40-EMH3/8-2.50	40	.375	2.50	1.00
AK005	CAT40-EMH7/16-2.50	40	.437	2.50	1.13
AK006	CAT40-EMH1/2-2.63	40	.500	2.63	1.25
AK008	CAT40-EMH5/8-3.75	40	.625	3.75	1.50
AK010	CAT40-EMH3/4-3.75	40	.750	3.75	1.75
AK012	CAT40-EMH7/8-4.00	40	.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	.250	2.50	.78
AL003	CAT50-EMH5/16-2.50	50	.312	2.50	.88
AL004	CAT50-EMH3/8-2.50	50	.375	2.50	1.00
AL005	CAT50-EMH7/16-2.63	50	.437	2.63	1.13
AL006	CAT50-EMH1/2-2.63	50	.500	2.63	1.25
AL008	CAT50-EMH5/8-3.75	50	.625	3.75	1.50
AL010	CAT50-EMH3/4-3.75	50	.750	3.75	1.75
AL012	CAT50-EMH7/8-3.75	50	.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 496

## CAT



### EXTENDED

EDP NO	TYPE	TAPER NO.	d	L	D
AK104	CAT40-EMH3/8-4.50	40	.375	4.50	1.00
AK106	CAT40-EMH1/2-4.63	40	.500	4.63	1.25
AK108	CAT40-EMH5/8-5.75	40	.625	5.75	1.50
AK110	CAT40-EMH3/4-5.75	40	.750	5.75	1.75
AK112	CAT40-EMH7/8-6.00	40	.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	.375	4.50	1.00
AL106	CAT50-EMH1/2-4.63	50	.500	4.63	1.25
AL108	CAT50-EMH5/8-5.75	50	.625	5.75	1.50
AL110	CAT50-EMH3/4-5.75	50	.750	5.75	1.75
AL112	CAT50-EMH7/8-5.75	50	.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

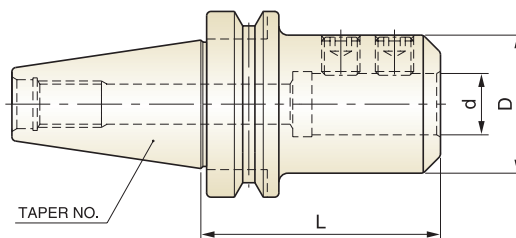
\* BALANCING GRADE : BASED ON G6.3 / 15,000rpm

\* HIGH BALANCED END MILL HOLDERS ARE AVAILABLE ON REQUEST

\* SET SCREWS FOR END MILL HOLDERS ON PAGE 496



## BT



### STUB

EDP NO	TYPE	TAPER NO.	d	L	D
AH206	BT40 - EMH 1/2 - 1.25	40	.500	1.25	1.25
AH208	BT40 - EMH 5/8 - 1.38	40	.625	1.38	1.50
AH210	BT40 - EMH 3/4 - 1.44	40	.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

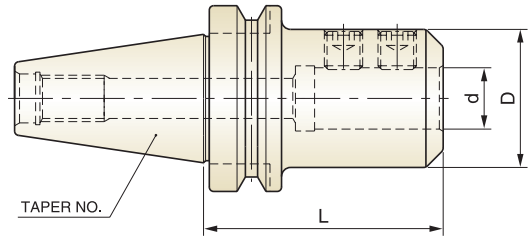
EDP NO	TYPE	TAPER NO.	d	L	D
AH000	BT40 - EMH 1/8 - 2.50	40	.125	2.50	.69
AH001	BT40 - EMH 3/16 - 2.50	40	.187	2.50	.69
AH002	BT40 - EMH 1/4 - 2.50	40	.250	2.50	.78
AH003	BT40 - EMH 5/16 - 2.50	40	.312	2.50	.88
AH004	BT40 - EMH 3/8 - 2.50	40	.375	2.50	1.00
AH005	BT40 - EMH 7/16 - 2.50	40	.437	2.50	1.13
AH006	BT40 - EMH 1/2 - 2.50	40	.500	2.50	1.25
AH008	BT40 - EMH 5/8 - 2.50	40	.625	2.50	1.50
AH010	BT40 - EMH 3/4 - 2.50	40	.750	2.50	1.75
AH012	BT40 - EMH 7/8 - 3.50	40	.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	.250	3.00	.78
AI004	BT50 - EMH 3/8 - 3.00	50	.375	3.00	1.00
AI006	BT50 - EMH 1/2 - 3.00	50	.500	3.00	1.25
AI008	BT50 - EMH 5/8 - 3.00	50	.625	3.00	1.50
AI010	BT50 - EMH 3/4 - 3.00	50	.750	3.00	1.75
AI012	BT50 - EMH 7/8 - 4.00	50	.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 496

BT

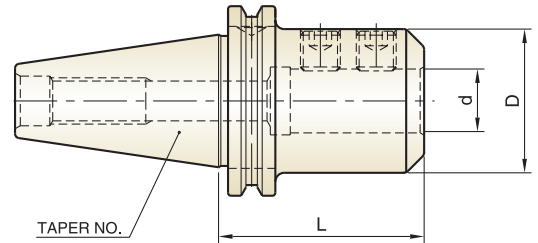


**EXTENDED**

EDP NO	TYPE	TAPER NO.	d	L	D
AH104	BT40 - EMH 3/8 - 4.00	40	.375	4.00	1.00
AH106	BT40 - EMH 1/2 - 4.00	40	.500	4.00	1.25
AH108	BT40 - EMH 5/8 - 4.00	40	.625	4.00	1.50
AH110	BT40 - EMH 3/4 - 4.00	40	.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	.375	6.00	1.00
AI106	BT50 - EMH 1/2 - 6.00	50	.500	6.00	1.25
AI108	BT50 - EMH 5/8 - 6.00	50	.625	6.00	1.50
AI110	BT50 - EMH 3/4 - 6.00	50	.750	6.00	1.75
AI112	BT50 - EMH 7/8 - 6.00	50	.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 496

## CAT



### STUB

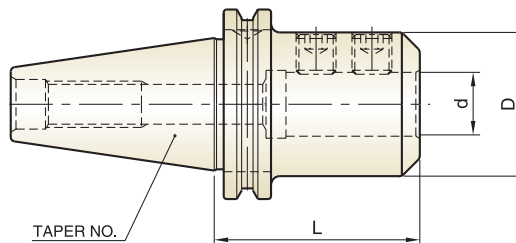
EDP NO	TYPE	TAPER NO.	d	L	D
AK206B25	CAT40 - EMH 1/2 - 1.75	40	.500	1.75	1.25
AK208B25	CAT40 - EMH 5/8 - 1.75	40	.625	1.75	1.50
AK210B25	CAT40 - EMH 3/4 - 1.75	40	.750	1.75	1.75
AK214B25	CAT40 - EMH 1" - 1.75	40	1.000	1.75	1.75
AK217B25	CAT40 - EMH 1 1/4 - 2.00	40	1.250	2.00	2.25

### STANDARD

EDP NO	TYPE	TAPER NO.	d	L	D
AK000B25	CAT40 - EMH 1/8 - 2.50	40	.125	2.50	.69
AK001B25	CAT40 - EMH 3/16 - 2.50	40	.187	2.50	.69
AK002B25	CAT40 - EMH 1/4 - 2.50	40	.250	2.50	.78
AK003B25	CAT40 - EMH 5/16 - 2.50	40	.312	2.50	.88
AK004B25	CAT40 - EMH 3/8 - 2.50	40	.375	2.50	1.00
AK005B25	CAT40 - EMH 7/16 - 2.50	40	.437	2.50	1.13
AK006B25	CAT40 - EMH 1/2 - 2.63	40	.500	2.63	1.25
AK008B25	CAT40 - EMH 5/8 - 3.75	40	.625	3.75	1.50
AK010B25	CAT40 - EMH 3/4 - 3.75	40	.750	3.75	1.75
AK012B25	CAT40 - EMH 7/8 - 4.00	40	.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 496

**CAT**



**EXTENDED**

EDP NO	TYPE	TAPER NO.	d	L	D
AK104B25	CAT40 - EMH 3/8 - 4.50	40	.375	4.50	1.00
AK106B25	CAT40 - EMH 1/2 - 4.63	40	.500	4.63	1.25
AK108B25	CAT40 - EMH 5/8 - 5.75	40	.625	5.75	1.50
AK110B25	CAT40 - EMH 3/4 - 5.75	40	.750	5.75	1.75
AK112B25	CAT40 - EMH 7/8 - 6.00	40	.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

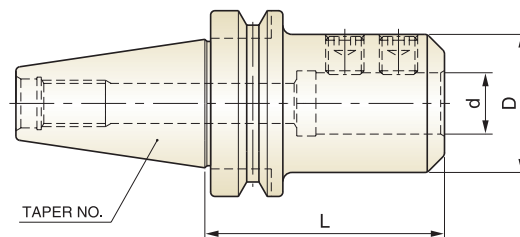
\* HIGH BALANCED END MILL HOLDERS ARE AVAILABLE ON REQUEST

\* 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 496

## BT



### STUB

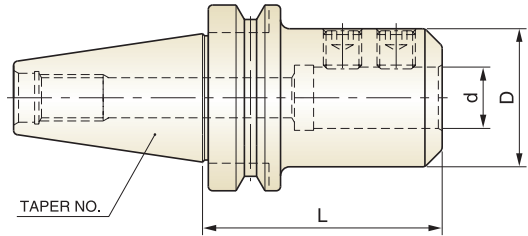
EDP NO	TYPE	TAPER NO.	d	L	D
AH206B25	BT40 - EMH 1/2 - 1.25	40	.500	1.25	1.25
AH208B25	BT40 - EMH 5/8 - 1.38	40	.625	1.38	1.50
AH210B25	BT40 - EMH 3/4 - 1.44	40	.750	1.44	1.75
AH214B25	BT40 - EMH 1" - 2.50	40	1.000	2.50	2.00
AH217B25	BT40 - EMH 1 1/4 - 2.50	40	1.250	2.50	2.50

### STANDARD

EDP NO	TYPE	TAPER NO.	d	L	D
AH000B25	BT40 - EMH 1/8 - 2.50	40	.125	2.50	.69
AH001B25	BT40 - EMH 3/16 - 2.50	40	.187	2.50	.69
AH002B25	BT40 - EMH 1/4 - 2.50	40	.250	2.50	.78
AH003B25	BT40 - EMH 5/16 - 2.50	40	.312	2.50	.88
AH004B25	BT40 - EMH 3/8 - 2.50	40	.375	2.50	1.00
AH005B25	BT40 - EMH 7/16 - 2.50	40	.437	2.50	1.13
AH006B25	BT40 - EMH 1/2 - 2.50	40	.500	2.50	1.25
AH008B25	BT40 - EMH 5/8 - 2.50	40	.625	2.50	1.50
AH010B25	BT40 - EMH 3/4 - 2.50	40	.750	2.50	1.75
AH012B25	BT40 - EMH 7/8 - 3.50	40	.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 496

BT



**EXTENDED**

EDP NO	TYPE	TAPER NO.	d	L	D
AH104B25	BT40 - EMH 3/8 - 4.00	40	.375	4.00	1.00
AH106B25	BT40 - EMH 1/2 - 4.00	40	.500	4.00	1.25
AH108B25	BT40 - EMH 5/8 - 4.00	40	.625	4.00	1.50
AH110B25	BT40 - EMH 3/4 - 4.00	40	.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

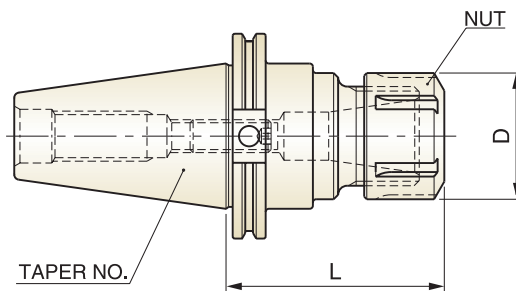
\* HIGH BALANCED END MILL HOLDERS ARE AVAILABLE ON REQUEST

\* 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 496

### CAT



#### STUB

EDP NO	TYPE	TAPER NO.	SIZE RANGE	L	D	COLLET SERIES
BK232	CAT40 - ER20 - 2.55	40	.039-.511	2.55	1.26	ER20
BK233	CAT40 - ER25 - 2.50	40	.039-.629	2.50	1.65	ER25
BK234	CAT40 - ER32 - 2.70	40	.078-.787	2.70	1.88	ER32

#### STANDARD

EDP NO	TYPE	TAPER NO.	SIZE RANGE	L	D	COLLET SERIES
BK030	CAT40 - ER11 - 3.00	40	.019-.275	3.00	.63	ER11
BK031	CAT40 - ER16 - 2.88	40	1/32-13/32	2.88	1.08	ER16
BK032	CAT40 - ER20 - 4.00	40	.039-.511	4.00	1.26	ER20
BK133	CAT40 - ER25 - 4.00	40	.039-.629	4.00	1.65	ER25
BK134	CAT40 - ER32 - 4.00	40	.078-.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	.039-.511	4.00	1.26	ER20
BL033	CAT50 - ER25 - 4.00	50	.039-.629	4.00	1.65	ER25
BL034	CAT50 - ER32 - 4.00	50	.078-.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	.039-.511	6.00	1.26	ER20
BK333	CAT40 - ER25 - 6.00	40	.039-.629	6.00	1.65	ER25
BK334	CAT40 - ER32 - 6.00	40	.078-.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	.039-.511	6.00	1.26	ER20
BL333	CAT50 - ER25 - 6.00	50	.039-.629	6.00	1.65	ER25
BL334	CAT50 - ER32 - 6.00	50	.078-.787	6.00	1.88	ER32

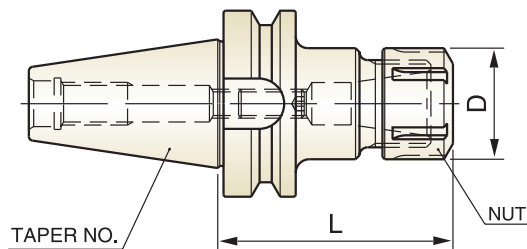
#### EXTRA EXTENDED

EDP NO	TYPE	TAPER NO.	SIZE RANGE	L	D	COLLET SERIES
BK432	CAT40-ER20-8.00	40	.039-.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 477



## BT



### STUB

EDP NO	TYPE	TAPER NO.	SIZE RANGE	L	D	COLLET SERIES
BH232	BT40 - ER20 - 2.20	40	.039-.511	2.20	1.26	ER20
BH233	BT40 - ER25 - 2.50	40	.039-.629	2.50	1.65	ER25
BH234	BT40 - ER32 - 2.40	40	.078-.787	2.40	1.88	ER32

### STANDARD

EDP NO	TYPE	TAPER NO.	SIZE RANGE	L	D	COLLET SERIES
BH030	BT40 - ER11 - 3.00	40	.019-2.75	3.00	.63	ER11
BH031	BT40 - ER16 - 2.88	40	1/32-13/32	2.88	1.08	ER16
BH032	BT40 - ER20 - 4.00	40	.039-.511	4.00	1.26	ER20
BH133	BT40 - ER25 - 4.00	40	.039-.629	4.00	1.65	ER25
BH134	BT40 - ER32 - 4.00	40	.078-.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	.039-.511	2.63	1.26	ER20
BI033	BT50 - ER25 - 2.63	50	.039-.629	2.63	1.65	ER25
BI034	BT50 - ER32 - 4.00	50	.078-.787	4.00	1.88	ER32

### EXTENDED

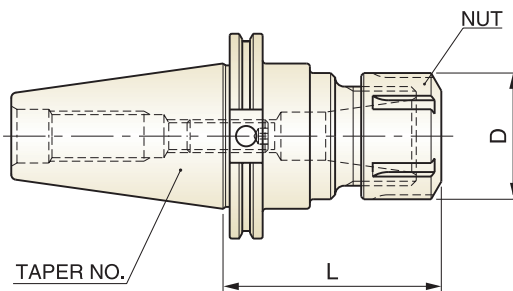
EDP NO	TYPE	TAPER NO.	SIZE RANGE	L	D	COLLET SERIES
BH331	BT40 - ER16 - 4.88	40	1/32-13/32	4.88	1.08	ER16
BH332	BT40 - ER20 - 6.00	40	.039-.511	6.00	1.26	ER20
BH333	BT40 - ER25 - 6.00	40	.039-.629	6.00	1.65	ER25
BH334	BT40 - ER32 - 6.00	40	.078-.787	6.00	1.88	ER32
BI331	BT50 - ER16 - 6.00	50	1/32-13/32	6.00	1.08	ER16
BI332	BT50 - ER20 - 6.00	50	.039-.511	6.00	1.26	ER20
BI333	BT50 - ER25 - 6.00	50	.039-.629	6.00	1.65	ER25
BI334	BT50 - ER32 - 6.00	50	.078-.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	.039-.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 477

## CAT



### STUB

EDP NO	TYPE	TAPER NO.	SIZE RANGE	L	D	COLLET SERIES
BK232B25	CAT40 - ER20 - 2.55	40	.039-.511	2.55	1.26	ER20
BK233B25	CAT40 - ER25 - 2.50	40	.039-.629	2.50	1.65	ER25
BK234B25	CAT40 - ER32 - 2.70	40	.078-.787	2.70	1.88	ER32

### STANDARD

EDP NO	TYPE	TAPER NO.	SIZE RANGE	L	D	COLLET SERIES
BK030B25	CAT40 - ER11 - 3.00	40	.019-.275	3.00	.63	ER11
BK031B25	CAT40 - ER16 - 2.88	40	1/32-13/32	2.88	1.08	ER16
BK032B25	CAT40 - ER20 - 4.00	40	.039-.511	4.00	1.26	ER20
BK133B25	CAT40 - ER25 - 4.00	40	.039-.629	4.00	1.65	ER25
BK134B25	CAT40 - ER32 - 4.00	40	.078-.787	4.00	1.88	ER32

### EXTENDED

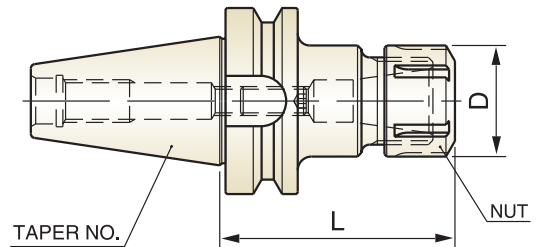
EDP NO	TYPE	TAPER NO.	SIZE RANGE	L	D	COLLET SERIES
BK331B25	CAT40 - ER16 - 4.88	40	1/32-13/32	4.88	1.08	ER16
BK332B25	CAT40 - ER20 - 6.00	40	.039-.511	6.00	1.26	ER20
BK333B25	CAT40 - ER25 - 6.00	40	.039-.629	6.00	1.65	ER25
BK334B25	CAT40 - ER32 - 6.00	40	.078-.787	6.00	1.88	ER32

### EXTRA EXTENDED

EDP NO	TYPE	TAPER NO.	SIZE RANGE	L	D	COLLET SERIES
BK432B25	CAT40 - ER20 - 8.00	40	.039-.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 PAGE477

## BT



### STUB

EDP NO	TYPE	TAPER NO.	SIZE RANGE	L	D	COLLET SERIES
BH232B25	BT40 - ER20 - 2.20	40	.039-.511	2.20	1.26	ER20
BH233B25	BT40 - ER25 - 2.50	40	.039-.629	2.50	1.65	ER25
BH234B25	BT40 - ER32 - 2.40	40	.078-.787	2.40	1.88	ER32

### STANDARD

EDP NO	TYPE	TAPER NO.	SIZE RANGE	L	D	COLLET SERIES
BH030B25	BT40 - ER11 - 3.00	40	.019-2.75	3.00	.63	ER11
BH031B25	BT40 - ER16 - 2.88	40	1/32-13/32	2.88	1.08	ER16
BH032B25	BT40 - ER20 - 4.00	40	.039-.511	4.00	1.26	ER20
BH133B25	BT40 - ER25 - 4.00	40	.039-.629	4.00	1.65	ER25
BH134B25	BT40 - ER32 - 4.00	40	.078-.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	.039-.511	6.00	1.26	ER20
BH333B25	BT40 - ER25 - 6.00	40	.039-.629	6.00	1.65	ER25
BH334B25	BT40 - ER32 - 6.00	40	.078-.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	.039-.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 477

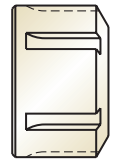
### CAT / BT

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



### 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



### CAT / BT

FIG.1

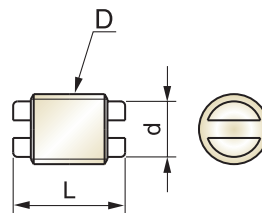
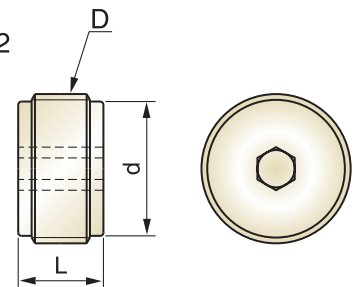
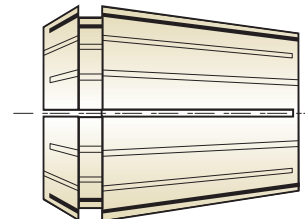


FIG.2



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

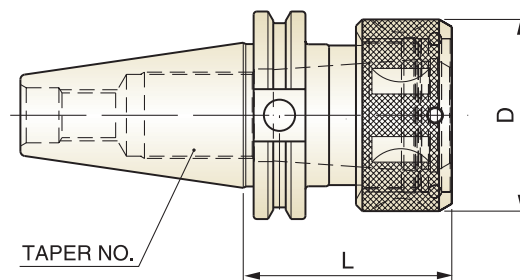


TYPE ER11		TYPE ER16		TYPE ER20		TYPE ER25		TYPE ER32	
CLAMPING CAPACITY	ITEM NO.	CLAMPING CAPACITY	ITEM NO.	CLAMPING CAPACITY	ITEM NO.	CLAMPING CAPACITY	ITEM NO.	CLAMPING CAPACITY	ITEM NO.
1/16	110116	1/16	160116	1/16	200116	1/16	250116	3/32	320332
3/32	110332	3/32	160332	3/32	200332	3/32	250332	1/8	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°»	
7PCS		12PCS		15PCS		19PCS		22PCS	

\* RUBBER SEALED ER COLLETS ARE AVAILABLE ON REQUEST

# ROTARY TOOLING 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

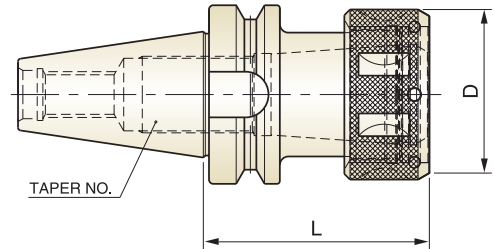
EDP NO	TYPE	TAPER NO.	SIZE RANGE	L	D	COLLET SERIES
UL052	CAT50-TG150-3.50	50	1/2-1 1/2	3.50	3.50	150TG

#### 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 481

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 481





## TG NUT

CAT / BT

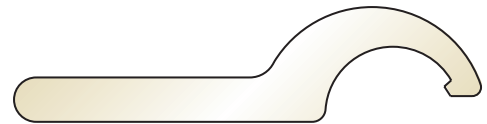
EDP NO	SERIES
ZZ084	TG75-NUT
ZZ081	TG100-NUT
ZZ087	TG150-NUT



## TG WRENCH

CAT / BT

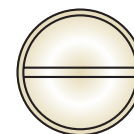
EDP NO	FOR USE WITH
ZZ085	TG75
ZZ082	TG100
ZZ088	TG150



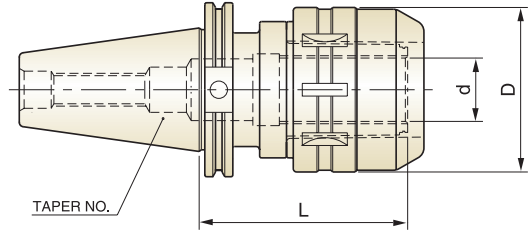
## TG STOP SCREW

CAT / BT

EDP NO	SERIES
ZZ086	TG75
ZZ083	TG100
ZZ089	TG150



**CAT**

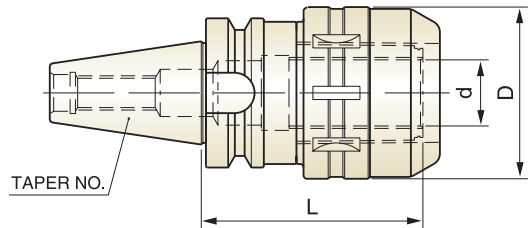


**STANDARD**

EDP NO	TYPE	TAPER NO.	d	L	D
LK010	CAT40 - C 3/4 - 4.13	40	.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	.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 477

**BT**

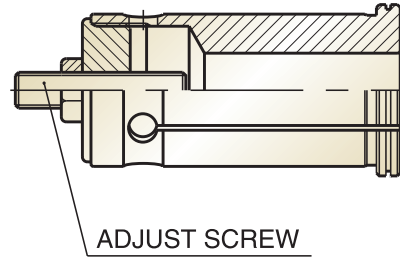


**STANDARD**

EDP NO	TYPE	TAPER NO.	d	L	D
LH010	BT40 -C 3/4 - 3.56	40	.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	.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 483

CAT / BAT

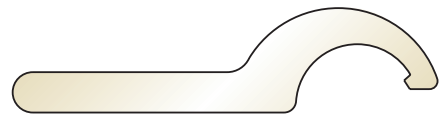


EDP NO	TYPE	HOLE SIZE (D)
MZ002	C3/4	1/4
MZ003	C3/4	5/16
MZ004	C3/4	3/8
MZ006	C3/4	1/2
MZ008	C3/4	5/8

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

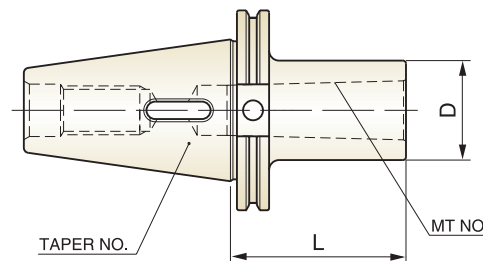
EDP NO	TYPE	HOLE SIZE (D)
MZ302	C1 1/4	1/4
MZ303	C1 1/4	5/16
MZ304	C1 1/4	3/8
MZ306	C1 1/4	1/2
MZ308	C1 1/4	5/8
MZ310	C1 1/4	3/4
MZ312	C1 1/4	7/8
MZ314	C1 1/4	1"

CAT / BAT



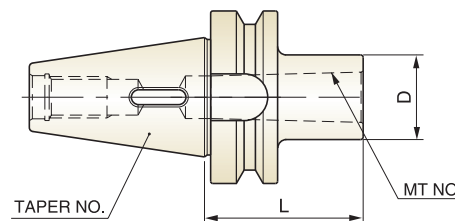
EDP NO	FOR USE WITH
ZZ056	C3/4
ZZ057	C1"
ZZ058	C1 1/4

**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

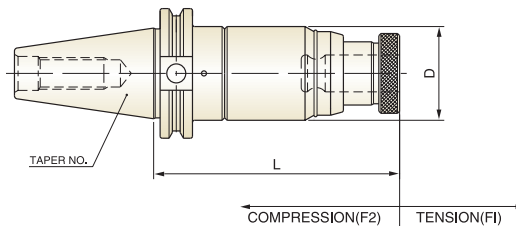
**BT**



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

# ROTARY TOOLING TAPPING CHUCK

## CAT



These holders use Tap System #1 collets.

EDP NO	TYPE	TAPER NO.	D	L	F1	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

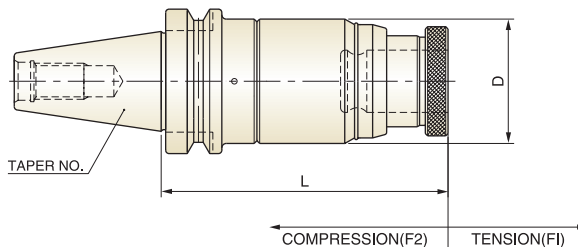
These holders use Tap System #2 collets.

EDP NO	TYPE	TAPER NO.	D	L	F1	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	F1	F2
JL050	CAT50-TC#3-7.75	50	3.86	7.75	0.394	0.984

BT



These holders use Tap System #1 collets.

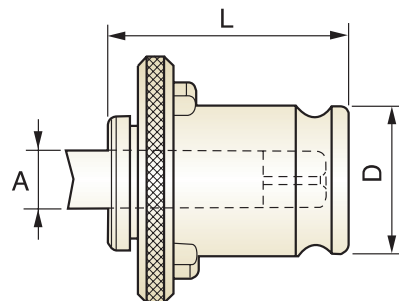
EDP NO	TYPE	TAPER NO.	D	L	F1	F2
JH048	BT40 - TC #1 - 4.53	40	1.77	4.53	0.197	0.591
JI048	BT50 - TC #1 - 4.64	50	1.77	4.64	0.197	0.591

These holders use Tap System #2 collets.

EDP NO	TYPE	TAPER NO.	D	L	F1	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	F1	F2
JI050	BT50 - TC #3 - 8.33	50	3.86	8.33	0.394	0.984



### Bilz Type Tap Chucks

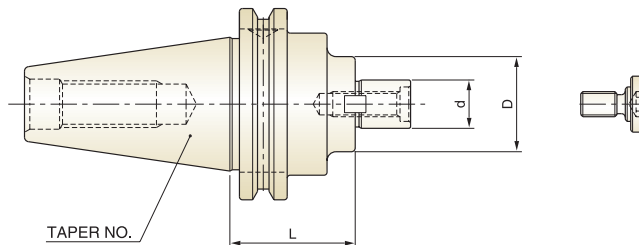
Order no.	Adapter size	Tap size range	tap size	A shank dia	square AF
QCT12001	QCT 12  D = 19mm/0.748" L = 28.5mm/1.122"	0-9/16"	# 0-6	0.141	0.110
QCT12002			# 8	0.168	0.131
QCT12003			# 10	0.194	0.152
QCT12004			# 12	0.220	0.165
QCT12005			1/4	0.255	0.191
QCT12006			5/16	0.318	0.238
QCT12007		3/8	0.381	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  D = 31mm/1.220" L = 46mm/1.811"	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		11/16	0.542	0.406	
QCT24008		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"	1/4p	0.5620	0.421
QCT24012		1/2" PIPE	3/8p	0.7000	0.531
QCT24013			1/2p	0.6875	0.515
QCT32001	QCT 32  D = 48mm/1.890" L = 69.5mm/2.736"	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			1-1/8	0.896	0.672
QCT32006			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 SUTD YOU SELECT.

\*ADDITIONAL PULL STUDS AVAILABLE



## CAT



### STANDARD

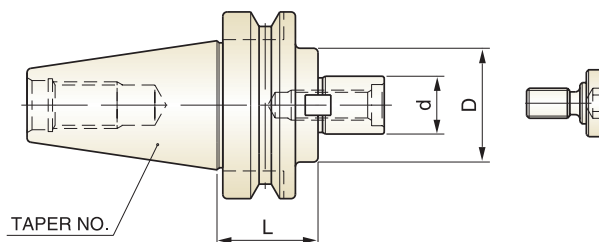
EDP NO	TYPE	TAPER NO.	d	L	D
EK006	CAT40-SMA1/2-1.50	40	.500	1.50	1.44
EK010	CAT40-SMA3/4-1.50	40	.750	1.50	1.69
EK014	CAT40-SMA1"-2.06	40	1.000	2.06	2.19
EK017	CAT40-SMA1 1/4-2.63	40	1.250	2.63	2.75
EK021	CAT40-SMA1 1/2-3.00	40	1.500	3.00	3.81
EL010	CAT50-SMA3/4-1.50	50	.750	1.50	1.69
EL014	CAT50-SMA1"-2.00	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	.500	3.50	1.44
EK310	CAT40-SMA3/4-3.50	40	.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	.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 490

## BT



### STANDARD

EDP NO	TYPE	TAPER NO.	d	L	D
EH006	BT40 - SMA 1/2 - 1.75	40	.500	1.75	1.44
EH010	BT40 - SMA 3/4 - 1.77	40	.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	.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	.500	3.50	1.44
EH310	BT40 - SMA 3/4 - 4.13	40	.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	.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

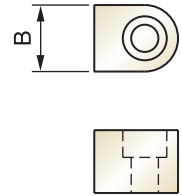
\* BALANCING GRADE : BASED ON G6.3 / 15,000rpm

\* HIGH BALANCED END MILL HOLDERS ARE AVAILABLE ON REQUEST

\* DRIVE KEY / LOCK SCREW FOR SHELL MILL ARBORS ON PAGE 490

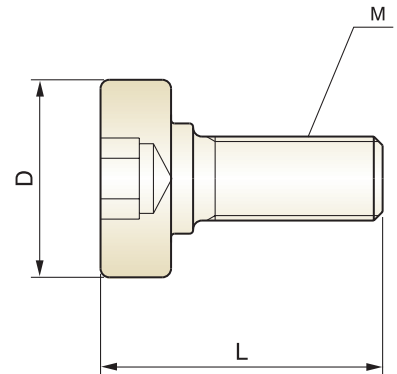
CAT / BT

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

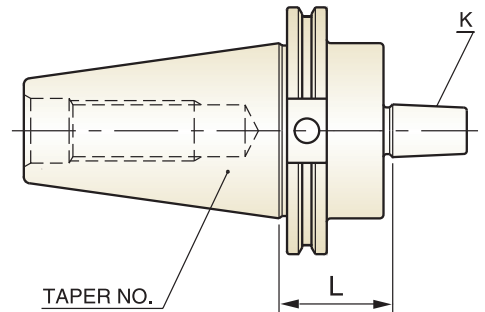


CAT / BT

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

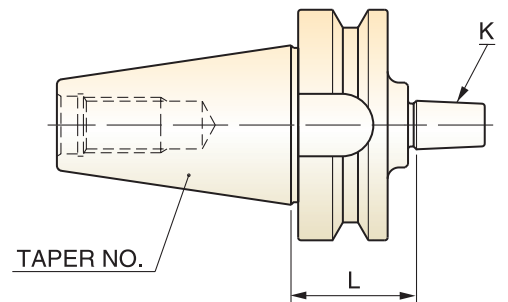


**CAT**



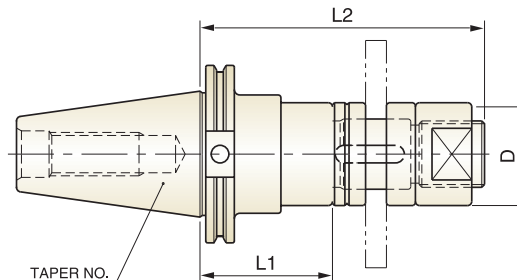
EDP NO	TYPE	TAPER NO.	K	L
GK042	CAT40 - JTA 1 - 1.50	40	#1	1.50
GK043	CAT40 - JTA 2 - 1.50	40	#2	1.50
GK044	CAT40 - JTA 3 - 1.50	40	#3	1.50
GK045	CAT40 - JTA 4 - 1.50	40	#4	1.50
GK046	CAT40 - JTA 6 - 1.50	40	#6	1.50
GK047	CAT40 - JTA 33 - 1.50	40	#33	1.50
GL042	CAT50 - JTA 1 - 1.50	50	#1	1.50
GL043	CAT50 - 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

**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

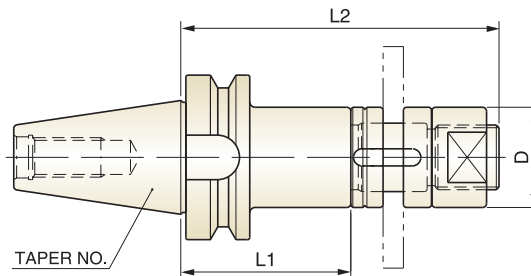
### CAT



#### 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

### BT



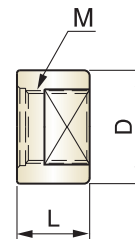
#### STANDARD

EDP NO	TYPE	TAPER NO.	CUTTER SIZE I.D	L1	D	L2
PH014	BT40 - STUB 1 <sup>st</sup> - 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 <sup>st</sup> - 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 TOOLING NUT

CAT / BT

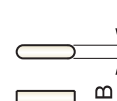
EDP NO	TYPE(M)	L	D	SERIES
ZZ041	1.56	1.00	1.56	STUB 1"
ZZ046	1.87	1.25	1.87	STUB 1 1/4
ZZ052	2.12	1.50	2.12	STUB 1 1/2



# ROTARY TOOLING KEY

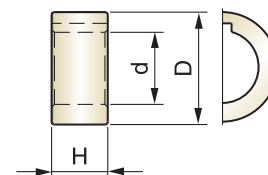
CAT / BT

EDP NO	SERIES	B
ZZ042	STUB 1"	0.25
ZZ047	STUB 1 1/4	0.312
ZZ054	STUB 1 1/2	0.375



# ROTARY TOOLING SPACER

CAT / BT



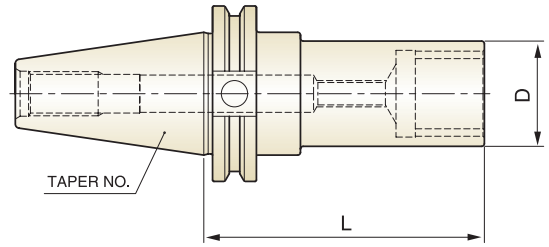
EDP NO	TYPE	H	D	d	SERIES
ZZ048	1/4-SPACER	0.25	1.87	1.25	STUB1 1/4
ZZ049	3/8-SPACER	0.375	1.87	1.25	STUB1 1/4
ZZ050	3/4-SPACER	0.75	1.87	1.25	STUB1 1/4

EDP NO	TYPE	H	D	d	SERIES
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"

EDP NO	TYPE	H	D	d	SERIES
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

ROTARY TOOL HOLDERS

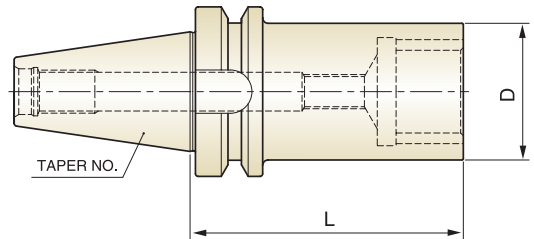
**CAT**



**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

**BT**

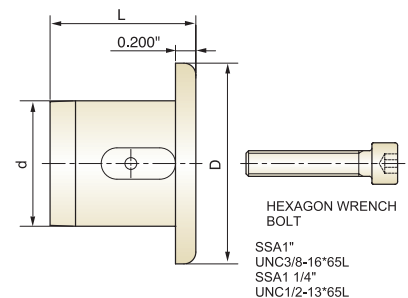


**STANDARD**

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

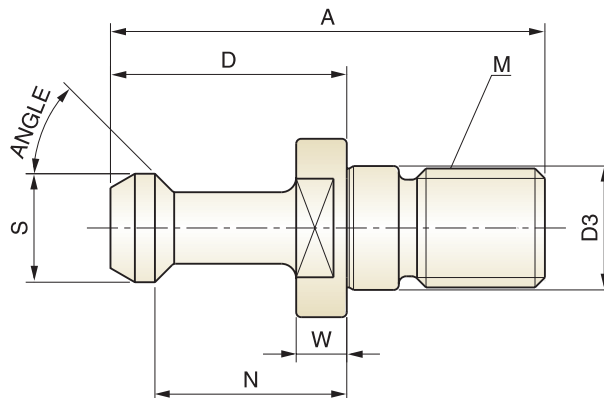
**CAT / BT**

EDP NO	TYPE	L	D	d
ZZ051	SSA 1"	1.02	1.50	1.50
ZZ053	SSA 1 1/4"	1.30	2.00	2.00





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 0	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 TOOLING 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.



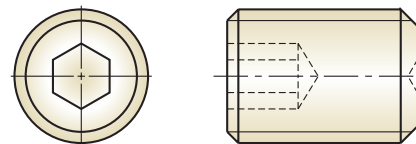
## FEATURES :

- \* ACCESS BOTH ENDS OF YOUR TOOL HOLDERS SIMULTANEOUSLY
- \* MINIMIZES TOOL HOLDERS HANDLING
- \* SPEEDS UP YOUR OPERATIONS
- \* CONVENIENT

# ROTARY TOOLING END MILL HOLDER SCREWS

HEXAGON SOCKET SET SCREW (FLAT TYPE)

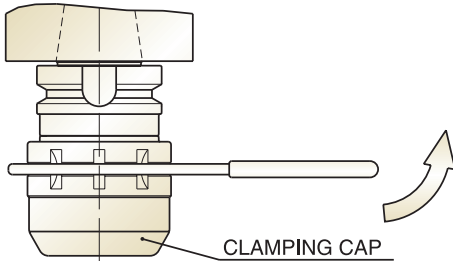
EDP NO	SCREW	END MILL DIA.
ZZ000	UNC#8-32	1/8
ZZ001	UNF#10-32	3/16
ZZ002	UNF1/4-28	1/4
ZZ003	UNF5/16-24	5/16
ZZ004	UNF3/8-24	3/8
ZZ005	UNF3/8-24	7/16
ZZ006	UNF7/16-20	1/2
ZZ007	UNF1/2-20	5/8
ZZ008	UNF5/8-18	3/4
ZZ009	UNF5/8-18	7/8
ZZ010	UNF3/4-16	1"
ZZ011	UNF3/4-16	1 1/4
ZZ012	UNF3/4-16	1 1/2
ZZ013	UN1"-14	2"



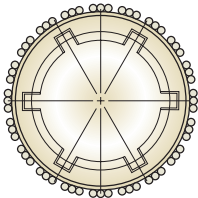
ROTARY TOOL HOLDERS

**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.

**MILLING CHUCK**

**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



## Technology and Quality

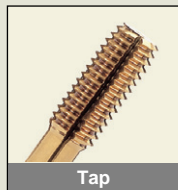
....**YG-1** Strives for technological advancements and superior quality 24 hours a day.



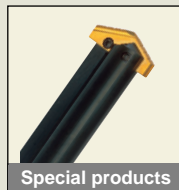
End Mill



Drill



Tap



Special products

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**X5070 / X-POWER / V7 MILL / JET-POWER / ALU-POWER / D-POWER / STANDARD & HIGH PERFORMANCE / CARBIDE END MILLS / TANK-POWER & ADDITIONAL POWDERED METAL / COBALT AND HSS END MILLS / TAPS / DRILLS, SPADE DRILL INSERTS HOLDERS AND ACCESSORIES / ROTARY TOOLING**

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