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**2016**



**CARBIDE CUTTING TOOL & SOLUTIONS**

**ENDMILLS and DRILLS  
METRIC & INCH**



# The future of WIDIN is always bright.

WIDIN will share the same vision with customers by providing top quality products at competitive price, best service and pursue the core management doctrine of "Customer-based management".

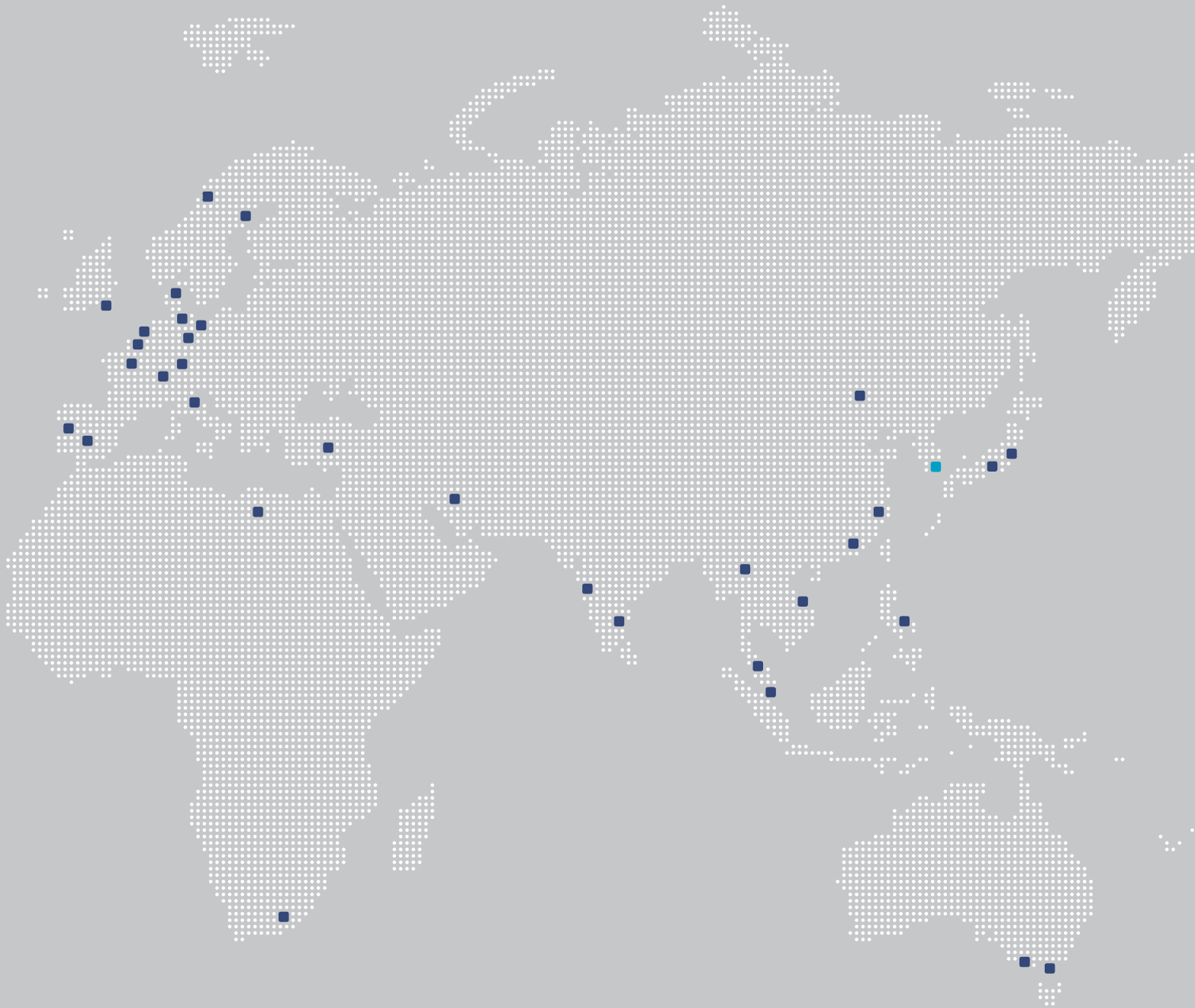
With the WIDIN's rapid growth, its export is also increasing every year through steady improvement in technology, quality and great efforts for opening up a new market.

As WIDIN's mission, endless growth and development, WIDIN will make steady progress to the world.





# G l o b a l



- Argentina
- Australia
- Austria
- Belgium
- Brazil
- Canada
- China
- Colombia
- Czech
- Denmark
- Egypt
- France
- Germany
- Greece
- Hong Kong
- Hungary
- India
- Indonesia
- Iran
- Italy
- Japan
- Malaysia
- Mexico
- Netherlands
- New Zealand
- Norway
- Philippines
- Poland
- Portugal
- Russia
- Singapore
- Slovenia
- South Africa
- Spain
- Sweden
- Switzerland
- Thailand
- Turkey
- U.S.A
- United Kingdom
- Vietnam





WIDIN will continuously expand its business in the whole world as our market.

Our experts started in the late of 80's are growing fast by ceaseless activities to find a new market with our high quality products.

 Certificate No. : KQM1743

### Quality Management System Certificate

This is to certify that  
the quality management system of  
**WIDIN CO.,LTD.**  
at  
(Paryong-dong), #172, Sahwa-ro, Uichang-gu, Changwon-si, Gyeongnam, Korea  
Has been found to conform to the Quality Management System Standards  
*KS Q ISO 9001:2009 / ISO 9001:2008*

This Certificate is valid for the following product or service ranges:  
*Design, Manufacture and Servicing of Precision Cutting Tools*

Issue Date  
**Jun. 20, 2016**

Certification Date : Jul. 12, 2016      Valid Date : Sep. 14, 2018

 Authorized By   
**Ki Ho Park, President**

- K+ Mark indicates that KMAR is accredited by the KAS, KAS-QC-173
- IAF Mark indicates that KMAR is Accredited to the member of the International Accreditation Forum Multilateral Recognition Arrangement
- KSC CODE : 171 Initial certification date: Jul. 12, 2009




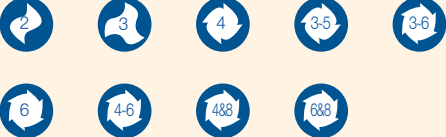
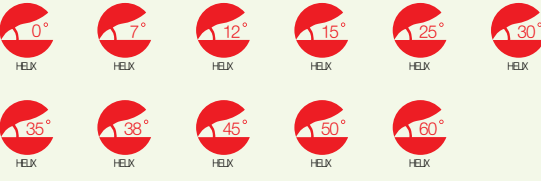
















KMAR! 1dong, 12F, Aco High Tech City, #375, Gyeongh-ro, Yeongdeungpo-gu, Seoul, 150-972, Korea







# Guide Line to Icons

<h2>Raw-Material</h2>	<ul style="list-style-type: none"> <li> <b>Ultra fine grade</b> is used in the tool</li> <li> <b>Micro grain grade</b> is used in the tool</li> <li> <b>K10~K20 grade</b> is used in the tool</li> </ul>
<h2>Number of Teeth</h2>	
<h2>Helix Angle</h2>	
<h2>Coating</h2>	<ul style="list-style-type: none"> <li> <b>ALTiN + HH</b>     <b>TiAlN + SH</b>     <b>CRN Coating</b></li> <li> <b>ALTiN + H</b>     <b>TiAlN + HH</b>     <b>Diamond Coating</b></li> <li> <b>ALTiN</b>     <b>TiAlN</b>     <b>D.L.C. Coating</b></li> </ul>
<h2>The Type of End Teeth</h2>	<ul style="list-style-type: none"> <li> <b>Ball Nose</b>     <b>Corner Radius</b>     <b>Chamfer</b></li> </ul>
<h2>The Type of Periphery</h2>	<ul style="list-style-type: none"> <li> <b>Fine Pitch Type</b>     <b>Flat Shallow Pitch Type</b></li> <li> <b>Chamfered Pitch Type</b>     <b>Coarse Pitch Type</b></li> </ul>



# Product Content



ENDMILL  
SERIES

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DRILL  
SERIES

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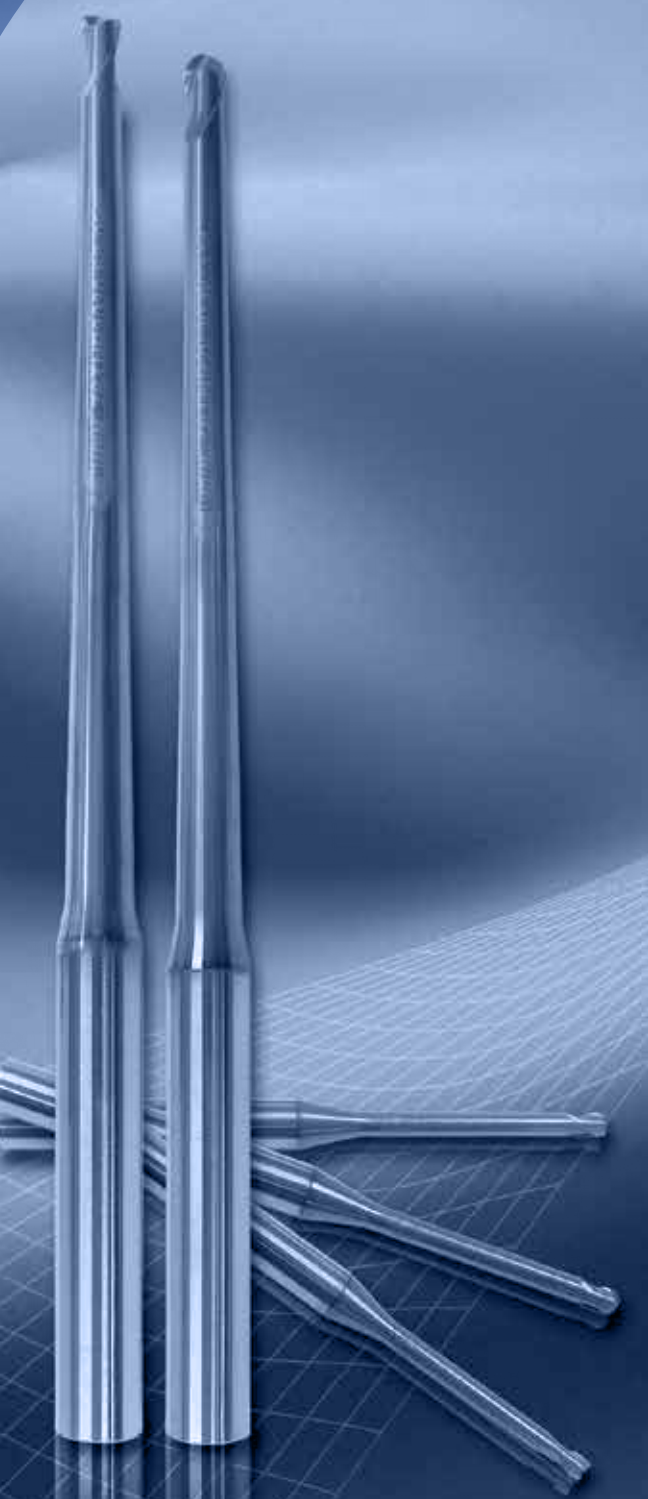
CENTERING  
TOOL SERIES

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ENDMILL SERIES

# Z-Star Series

Zamus is High Performance end mill series for Harden application



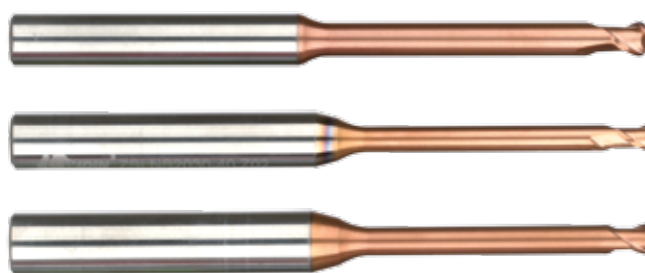
## Zamus star best selling item

### ▶ DB702 (METRIC) DA702 (INCH)



- Designed to machine high hardened materials up to HRc70.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.
- Excellent workpiece finishes.

### ▶ ZSLNB (BALL), ZSLNS (SQUARE), ZSLNR (CORNER RADIUS) METRIC ONLY



- Hardened Steels
- ~HRc55 SKD61. HRc55 SKD11-
- Best Performance
- The effective precise size [ZSLNS,ZSLNB] Best Performance for Harden Steel (H13, P20) Best for Rib processing

### ▶ Variable Index Geometry for Harden Steel ZS204 series (Metric and Inch size)



- Variable Index
- Reducing cycle time for high feed rates.
- Capable of bottom machining operations during flat bottom cutting.

### ▶ ZE (REG. SQUAR) ZR (CORNER RADIUS)



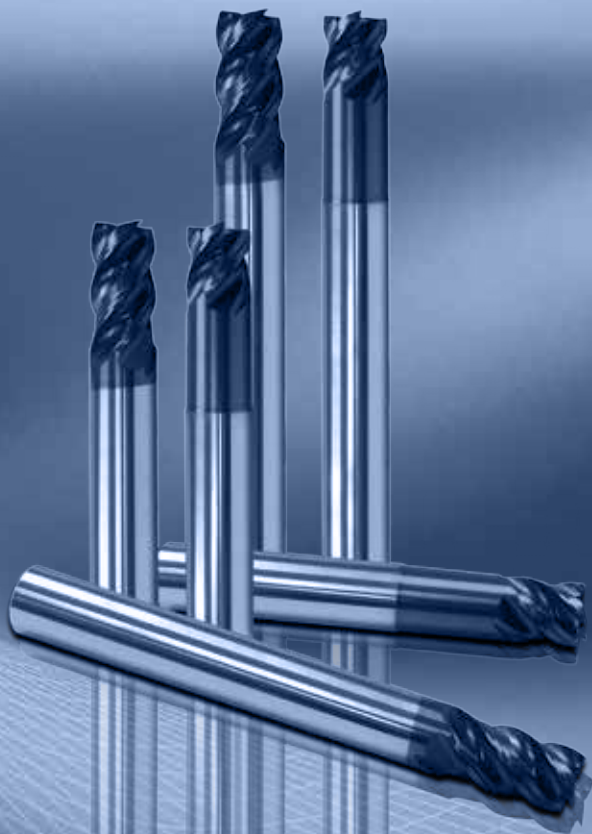
- ZE SERIES : Square End mill for Harden Steel HRc55 ~65 Available for 2fl, 4fl and 6fl.
- ZR SERIES : Corner Radius End Mill for Harden Steel Available for 2fl, 4fl and 6fl.

ENDMILL SERIES



# Neo Classic X - Star Series

X-star is High Performance end mill series for soft and mild application



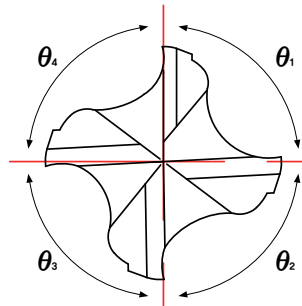
- High Performance & High Effectiveness in slotting!
- The unique patented design decrease chatter and resonance, can achieve a **Axial Depth 1XD** slotting operation

## X-STAR

All X-STAR Series Are Variable Index & Helix Geometry

1. series has unique index & helix geometry (44,45,46 Degree) The unique patented design decrease chatter & resonance.
2. Reinforced bending moment Easy access of chipping, Double core geometry
3. Sharp edge of flute, Best surface roughness

## Unique Patented Design



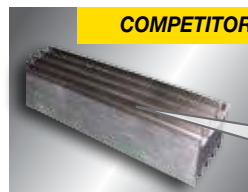
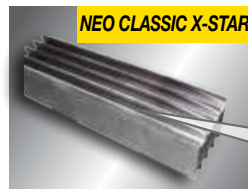
- High precision and excellent surface roughness due to each 4F variable helix geometry.
- The unique patented design decrease chatter and resonance, can achieve a **Axial Depth 1XD** slotting operation

$$\theta_1 \neq \theta_2 \neq \theta_3 \neq \theta_4$$

## Test Report

### \* Cutting Condition

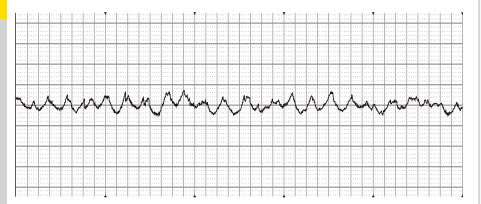
- RPM : 3,210
- Feed : 560 mm/min
- Tool : XE504100(Ø10)
- Slotting : 1xD
- (Ad : 10mm, Rd : 10mm)
- Workpiece : SUS304



## Workpiece Surface

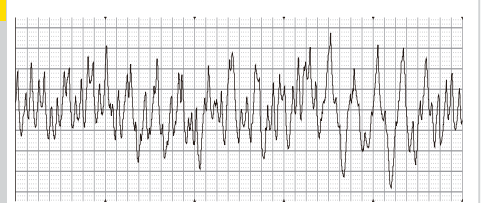
### R-PROFILE\_Neo Classic X-Star

EVA-L 4.0mm  
 $\lambda_c$  0.8mmX5  
 -----  
 Ra 0.19 $\mu$ m  
 Rz 1.00 $\mu$ m  
 Rq 0.24 $\mu$ m  
 Ver. 2.0 $\mu$ m/cm  
 Hor. 200.0 $\mu$ m/cm







































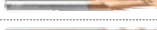

### R-PROFILE\_Competitor

EVA-L 4.0mm  
 $\lambda_c$  0.8mmX5  
 -----  
 Ra 1.02 $\mu$ m  
 Rz 5.87 $\mu$ m  
 Rq 1.26 $\mu$ m  
 Ver. 2.0Hor. 200.0



# ENDMILL SERIES

## INCH & METRIC SIZE






































Class	Feature	Type	Appearance	No. of Teeth	Item	INCH & METRIC	Item Series	Page		
<b>ZAMUS STAR</b>	* Hardened Steels (~HRc70) * High Speed Cutting	BALL		2FLUTE	STUB CUT LENGTH with EXTENDED NECK	INCH	DA702	28		
				2FLUTE	12° STUB CUT LENGTH, BALL NOSE with EXTENDED NECK	INCH	ZB702A	29		
				3FLUTE	STUB CUT LENGTH for FINISHING	INCH	DA703	30		
				4FLUTE	BALL NOSE, FINISHING for MOLD & DIE	INCH	DA734	31		
		CORNER RADIUS		4FLUTE	CORNER RADIUS VARIABLE HELIX	INCH	ZS204A	32		
				2FLUTE	35° HELIX REGULAR LENGTH	INCH	ZE712A	33		
		SQUARE		4FLUTE	45° HELIX REGULAR LENGTH	INCH	ZE714A	34		
				6FLUTE	50° HELIX REGULAR LENGTH	INCH	ZE716A	35		
		SQUARE and RADIUS		6FLUTE	45° HELIX STUB CUT LENGTH with EXTENDED NECK	INCH	ZR706A	36		
		SQUARE		2FLUTE	LONG NECK	METRIC	ZSLNS20	37		
				4FLUTE	LONG NECK	METRIC	ZSLNS40	42		
		BALL		2FLUTE	LONG NECK	METRIC	ZSLNB	44		
		RADIUS		2FLUTE	LONG NECK & BACK DRAFT TYPE	METRIC	ZSLNR	48		
				2FLUTE	TAPER NECK & BACK DRAFT TYPE	METRIC	ZSTNB20	52		
		BALL		3FLUTE	TAPER NECK & BACK DRAFT TYPE	METRIC	ZSTNB30	56		
				2FLUTE	TAPER NECK & BACK DRAFT TYPE	METRIC	ZSTNR	57		
		SQUARE		4FLUTE	LONG LENGTH CUT, VARIABLE FLUTE	METRIC	ZS124	59		
		SQUARE & RADIUS		4FLUTE	CORNER RADIUS, VARIABLE HELIX	METRIC	ZS1(2)04	60		
				4FLUTE	CORNER RADIUS, VARIABLE HELIX	METRIC	ZS204	61		
		* High speed & High feed rates	RADIUS		4FLUTE	STUB CUT LENGTH, with EXTENDED NECK	METRIC	ZSPM4	63	
				2FLUTE	STUB CUT LENGTH, BALL NOSE with EXTENDED NECK	METRIC	DB702	64		
	BALL			2FLUTE	REGULAR LENGTH, BALL NOSE	METRIC	DB712	65		
				3FLUTE	BALL NOSE for FINISHING MOLD & DIE	METRIC	DB703	66		
				4FLUTE	TAPER NECK for FINISHING MOLD & DIE	METRIC	DB734	67		
				2FLUTE	STUB CUT LENGTH, with EXTENDED NECK	METRIC	ZE702	68		
	* Hardened Steels (~ HRc 70) * High Speed Cutting		RADIUS		4FLUTE	STUB CUT LENGTH, with EXTENDED NECK	METRIC	ZE704	69	
					4&6 FLUTE	FINISHING for MOLD & DIE	METRIC	ZE724(6)	70	
					2FLUTE	STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK	METRIC	ZR702	71	
					2FLUTE	CORNER RADIUS with LONG SHANK	METRIC	ZR732	76	
					4FLUTE	STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK	METRIC	ZR704	78	
					4FLUTE	45° HELIX FINISHING MOLD & DIE	METRIC	ZR714	81	
					4FLUTE	STUB CUT LENGTH, CORNER RADIUS with LONG SHANK	METRIC	ZR724	82	
					4FLUTE	CORNER RADIUS with LONG SHANK	METRIC	ZR734	83	
					6FLUTE	45° HELIX STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK	METRIC	ZR706	85	
					6FLUTE	45° HELIX, LONG SHANK, CORNER RADIUS	METRIC	ZR736	86	
				SQUARE		2FLUTE	35° HELIX REGULAR LENGTH	METRIC	ZE712	87
						4FLUTE	45° HELIX REGULAR LENGTH	METRIC	ZE714	88
			6FLUTE		50° HELIX REGULAR LENGTH	METRIC	ZE716	89		



Carbon Steels (S45C,S55C...) ~ HB225	Alloy Steels (SCM,SK...) HB225~325	Prehardened Steels(NAK..) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400.500~	Aluminum	Stainless Steels
			~HRc55 SKD61	HRc55~ SKD11					
○	○	◎	◎	○					

# ENDMILL SERIES

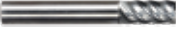



























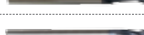


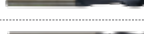
## INCH & METRIC SIZE

Class	Feature	Type	Appearance	No. of Teeth	Item	INCH & METRIC	Item Series	Page
Z-STAR POWER MILL	*Hardened Steels (~HRc70)	CORNER RADIUS		4FLUTE	STUB CUT LENGTH with EXTENDED NECK	INCH	ZSPM4A	92
ZAMUS PLUS		BALL		2FLUTE	15° HELIX STUB CUT LENGTH with EXTENDED NECK	INCH	DA412	95
NEO CLASSIC X-STAR	* High performance & High efficiency (~HRc45)	BALL		4FLUTE	30° TAPER RIB BALL, SHORT LENGTH	INCH	TPRB604A-05	99
				4FLUTE	1° TAPER RIB BALL, SHORT LENGTH	INCH	TPRB604A-10	100
				4FLUTE	1° 30' TAPER RIB BALL, SHORT LENGTH	INCH	TPRB604A-15	101
				4FLUTE	2° TAPER RIB BALL, SHORT LENGTH	INCH	TPRB604A-20	102
				4FLUTE	3° TAPER RIB BALL, SHORT LENGTH	INCH	TPRB604A-30	103
				4FLUTE	30° TAPER RIB BALL, LONG LENGTH	INCH	TPRB624A-05	104
				4FLUTE	1° TAPER RIB BALL, LONG LENGTH	INCH	TPRB624A-10	105
				4FLUTE	1° 30' TAPER RIB BALL, LONG LENGTH	INCH	TPRB624A-15	106
				4FLUTE	2° TAPER RIB BALL, LONG LENGTH	INCH	TPRB624A-20	107
				4FLUTE	3° TAPER RIB BALL, LONG LENGTH	INCH	TPRB624A-30	108
		SQUARE		4FLUTE	30° TAPER RIB, SHORT LENGTH	INCH	TPRE604A-05	109
				4FLUTE	1° TAPER RIB, SHORT LENGTH	INCH	TPRE604A-10	110
				4FLUTE	1° 30' TAPER RIB, SHORT LENGTH	INCH	TPRE604A-15	111
				4FLUTE	2° TAPER RIB, SHORT LENGTH	INCH	TPRE604A-20	112
				4FLUTE	3° TAPER RIB, SHORT LENGTH	INCH	TPRE604A-30	113
		CORNER RADIUS		4FLUTE	REGULAR LENGTH, VARIABLE HELIX	INCH	XE504A	114
				4FLUTE	SHORT LENGTH, CORNER RADIUS, VARIABLE HELIX	INCH	XR404A	115
				4FLUTE	REGULAR LENGTH, CORNER RADIUS, VARIABLE HELIX	INCH	XR504A	116
				4FLUTE	REGULAR LENGTH, CORNER RADIUS VARIABLE HELIX	INCH	XR514A	117
		SQUARE		4FLUTE	LONG REACH, CORNER RADIUS VARIABLE HELIX	INCH	XR524A	119
				4FLUTE	REGULAR LENGTH, VARIABLE HELIX	INCH	XXE504A	120
				4FLUTE	STUB CUT with LONG REACH, VARIABLE HELIX	INCH	XXE524A	121
		BALL		4FLUTE	STUB CUT with EXTENDED NECK, VARIABLE HELIX	INCH	XXE534A	122
				4FLUTE	REGULAR LENGTH, BALL NOSE, VARIABLE HELIX	INCH	XXB504A	123
		CORNER RADIUS		4FLUTE	STUB CUT with LONG REACH, BALL NOSE, VARIABLE HELIX	INCH	XXB524A	124
				4FLUTE	SHORT LENGTH, CORNER RADIUS, VARIABLE HELIX	INCH	XXR404A	125
				4FLUTE	REGULAR LENGTH, CORNER RADIUS, VARIABLE HELIX	INCH	XXR514A	126
				4FLUTE	STUB CUT with LONG REACH, CORNER RADIUS, VARIABLE HELIX	INCH	XXR524A	127
		SQUARE		4FLUTE	STUB CUT with EXTENDED NECK, CORNER RADIUS, VARIABLE HELIX	INCH	XXR534A	128
				5FLUTE	STUB CUT LENGTH, VARIABLE HELIX	INCH	XE505A	129
		CORNER RADIUS		5FLUTE	REGULAR CUT LENGTH, VARIABLE HELIX	INCH	XE515A	130
				5FLUTE	STUB CUT LENGTH CORNER RADIUS	INCH	XR505A	131
	5FLUTE		REGULAR CUT LENGTH CORNER RADIUS, VARIABLE HELIX	INCH	XR515A	132		
	5FLUTE		REGULAR CUT LENGTH with EXTENDED NECK, CORNER RADIUS	INCH	XR525A	133		
CHAMFER		5FLUTE	REGULAR CUT LENGTH with LONG EXTENDED NECK, CORNER RADIUS	INCH	XR535A	134		

	Carbon Steels (S45C,S55C...) ~ HB225	Alloy Steels (SCM,SK...) HB225~325	Prehardened Steels(NAK..) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400.500~	Aluminum	Stainless Steels
				~HRc55 SKD61	HRc55~ SKD11					
		○	○	◎	◎	○				
	○	○	◎	○	○	○		○		○
	○	○	◎	○	○	○		○		○
	◎	◎	○							
	◎	◎	○							

# ENDMILL SERIES

## INCH & METRIC SIZE













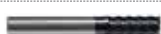
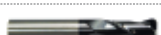























Class	Feature	Type	Appearance	No. of Teeth	Item	INCH & METRIC	Item Series	Page		
NEO CLASSIC X-STAR	* High performance & High efficiency (~HRc45)	SQUARE		5FLUTE	REGULAR CUT LENGTH, VARIABLE HELIX	METRIC	XE505	135		
				5FLUTE	LONG CUT LENGTH	METRIC	XE515	136		
		RADIUS		5FLUTE	REGULAR CUT LENGTH, CORNER RADIUS, VARIABLE HELIX	METRIC	XR505	137		
		BALL		4FLUTE	REGULAR CUT LENGTH, VARIABLE HELIX	METRIC	XXB504	138		
				4FLUTE	REGULAR CUT LENGTH, VARIABLE HELIX	METRIC	XCE504	139		
		SQUARE		4FLUTE	REGULAR CUT LENGTH, CORNER CHAMFER, VARIABLE HELIX	METRIC	XCC504	140		
				4FLUTE	REGULAR CUT LENGTH, CORNER RADIUS, VARIABLE HELIX	METRIC	XCR504	141		
				3FLUTE	REGULAR CUT LENGTH	METRIC	XCE503	142		
				3FLUTE	REGULAR CUT LENGTH, CORNER CHAMFER	METRIC	XCC503	143		
				3FLUTE	REGULAR CUT LENGTH, CORNER RADIUS	METRIC	XCR503	144		
				4FLUTE	REGULAR CUT LENGTH, VARIABLE HELIX	METRIC	XE504	145		
		RADIUS		4FLUTE	REGULAR CUT LENGTH, CORNER RADIUS, VARIABLE HELIX	METRIC	XR504	146		
				4FLUTE	STUB CUT LENGTH with EXTENDED NECK, VARIABLE HELIX	METRIC	XE514	147		
				4FLUTE	STUB CUT LENGTH with EXTENDED LONG NECK	METRIC	XE524	148		
				4FLUTE	REGULAR CUT LENGTH, VARIABLE HELIX	METRIC	XR514	149		
		ZAMUS THUNDER	* Hardened Steels (~HRc45) * High Speed Cutting * General Speed Cutting	BALL		2FLUTE	REGULAR LENGTH, BALL NOSE	INCH	DA302	152
				SQUARE		2FLUTE	REGULAR LENGTH	INCH	ZA302	153
						4FLUTE	4 FLUTE, REGULAR LENGTH	INCH	ZA304	154
				BALL		2FLUTE	LONG LENGTH, BALL NOSE	METRIC	DB312	155
	2FLUTE				BALL NOSE with TAPER NECK	METRIC	DB342	156		
SQUARE				2FLUTE	REGULAR LENGTH	METRIC	ZE302	157		
				4FLUTE	REGULAR LENGTH	METRIC	ZE304	158		
				4FLUTE	LONG and X-LONG LENGTHS	METRIC	ZE324	159		
RADIUS				2FLUTE	CORNER RADIUS LONG LENGTH	METRIC	ZR322	160		
				4FLUTE	45° HELIX STUB CUT LENGTH, CORNER RADIUS, EXTENDED NECK	METRIC	ZR304H	161		
				4FLUTE	45° HELIX STUB CUT LENGTH, CORNER RADIUS, LONG SHANK	METRIC	ZR324H	162		
SQUARE				4FLUTE	REGULAR LENGTH	METRIC	TX304	163		
BALL				2FLUTE	REGULAR LENGTH, BALL NOSE	METRIC	TXB302	164		
				4FLUTE	REGULAR LENGTH, BALL NOSE	METRIC	TXB304	165		
SQUARE		4FLUTE	SHORT LENGTH	METRIC	TX204	166				
BALL		2FLUTE	REGULAR LENGTH, BALL NOSE	METRIC	TXB202	167				
		4FLUTE	REGULAR LENGTH, BALL NOSE	METRIC	TXB204	168				
	* Hardened Steels (~HRc45) * High Speed Cutting * General Speed Cutting * Economic Type									



	Carbon Steels (S45C,S55C...) ~ HB225	Alloy Steels (SCM,SK...) HB225~325	Prehardened Steels(NAK..) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400.500~	Aluminum	Stainless Steels
				~HRc55 SKD61	HRc55~ SKD11					
	◎	◎	○			○				○
	◎	◎	○							

# ENDMILL SERIES


























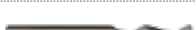













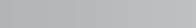
## INCH & METRIC SIZE

Class	Feature	Type	Appearance	No. of Teeth	Item	INCH & METRIC	Item Series	Page
ZAMUS CLASSIC	<ul style="list-style-type: none"> <li>* Hardened Steels (~HRc55)</li> <li>* High Speed Cutting</li> <li>* General Speed Cutting</li> </ul>	BALL		2 FLUTE	LONG LENGTH, BALL NOSE	INCH	DA512	172
				4 FLUTE	LONG LENGTH, BALL NOSE	INCH	DA514	173
				2 FLUTE	LONG LENGTH, BALL NOSE with EXTENDED NECK	INCH	DA522	174
				2 FLUTE	MINIATURE, BALL NOSE	INCH	MD502	175
				2 FLUTE	BALL NOSE with TAPER NECK	INCH	DA542	176
				2 FLUTE	BALL NOSE with PENCIL NECK	INCH	DA552	177
		SQUARE		2 FLUTE	REGULAR LENGTH	INCH	ZA502	178
				2 FLUTE	LONG LENGTH	INCH	ZA522	179
				2 FLUTE	MINIATURE	INCH	MZ502	180
				4 FLUTE	REGULAR LENGTH	INCH	ZA504	181
				4 FLUTE	LONG LENGTH	INCH	ZA524	182
				6&8 FLUTE	45° HELIX, LONG LENGTH	INCH	ZA506&8	183
		RADIUS		2 FLUTE	45° HELIX, EXTRA LONG LENGTH	INCH	ZA526&8	184
				2 FLUTE	STUB LENGTH, CORNER RADIUS	INCH	ZR502A	185
				2 FLUTE	LONG LENGTH, CORNER RADIUS	INCH	ZR522A	186
				2 FLUTE	LONG LENGTH, CORNER RADIUS	INCH	ZR532A	187
				4 FLUTE	STUB LENGTH, CORNER RADIUS	INCH	ZR504A	188
				4 FLUTE	REGULAR LENGTH, CORNER RADIUS	INCH	ZR524A	189
		ROUGHING		4 FLUTE	LONG LENGTH, CORNER RADIUS	INCH	ZR534A	190
				6&8 FLUTE	50° HELIX, LONG LENGTH, CORNER RADIUS	INCH	ZR506(8)A	191
		BALL		3&5 FLUTE	ROUGHING LONG LENGTH	INCH	FA50	192
				2 FLUTE	SHORT LENGTH, BALL NOSE	METRIC	DB402	193
				2 FLUTE	LONG LENGTH, BALL NOSE	METRIC	DB512	194
				4 FLUTE	LONG LENGTH, BALL NOSE	METRIC	DB514	195
		SQUARE		2 FLUTE	STUB CUT LENGTH, BALL NOSE with EXTENDED NECK	METRIC	DB502	196
				2 FLUTE	BALL NOSE with TAPER NECK	METRIC	DB54(5)2	197
				4 FLUTE	REGULAR LENGTH	METRIC	ZE504	198
				6 FLUTE	REGULAR & LONG LENGTH	METRIC	ZE506	199
		LONG NECK SQUARE		4 FLUTE	45° HELIX REGULAR LENGTH	METRIC	ZE514	200
		LONG NECK BALL		2 FLUTE	for RIB PROCESSING	METRIC	ZE612	201
		RADIUS		2 FLUTE	for RIB PROCESSING	METRIC	DB612	205
				2 FLUTE	STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK	METRIC	ZR502	209
	4 FLUTE		STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK	METRIC	ZR504	210		
	2 FLUTE		REGULAR LENGTH, CORNER RADIUS	METRIC	ZR512	211		
	4 FLUTE		REGULAR LENGTH, CORNER RADIUS	METRIC	ZR514	212		
	2 FLUTE		LONG LENGTH, CORNER RADIUS	METRIC	ZR522	213		
		4 FLUTE	LONG LENGTH, CORNER RADIUS	METRIC	ZR524	214		

Carbon Steels (S45C,S55C...) ~HB225	Alloy Steels (SCM,SK...) HB225~325	Prehardened Steels(NAK..) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400.500~	Aluminum	Stainless Steels
			~HRc55 SKD61	HRc55~ SKD11					
○	○	◎	○				○		○

# ENDMILL SERIES

## INCH & METRIC SIZE








Class	Feature	Type	Appearance	No. of Teeth	Item	INCH & METRIC	Item Series	Page			
ZAMUS CLASSIC	<ul style="list-style-type: none"> <li>* Hardened Steels (~HRc55)</li> <li>* High Speed Cutting</li> <li>* General Speed Cutting</li> </ul>	BALL		MULTIPLE	30° TAPER BALL, RIB PROCESSING	METRIC	TPRB4-050	215			
				MULTIPLE	45° TAPER BALL, RIB PROCESSING	METRIC	TPRB4-075	216			
				MULTIPLE	1° TAPER BALL, RIB PROCESSING	METRIC	TPRB4-100	217			
				MULTIPLE	1°30' TAPER BALL, RIB PROCESSING	METRIC	TPRB4-150	219			
				MULTIPLE	2° TAPER BALL, RIB PROCESSING	METRIC	TPRB4-200	221			
		SQUARE		MULTIPLE	30° TAPER BALL, RIB PROCESSING	METRIC	TPRE4-050	223			
				MULTIPLE	45° TAPER, RIB PROCESSING	METRIC	TPRE4-075	225			
				MULTIPLE	1° TAPER, RIB PROCESSING	METRIC	TPRE4-100	227			
				MULTIPLE	1°30' TAPER, RIB PROCESSING	METRIC	TPRE4-150	229			
				MULTIPLE	2° TAPER, RIB PROCESSING	METRIC	TPRE4-200	231			
				MULTIPLE	3° TAPER BALL, RIB PROCESSING	METRIC	TPRE4-300	233			
			ZAMUS SUS MATE	<ul style="list-style-type: none"> <li>* Stainless Steels</li> <li>* Titanium</li> <li>* Inconell</li> </ul>	BALL		2FLUTE	BALL NOSE REGULAR & LONG LENGTH	METRIC	DS502	237
					SQUARE		3FLUTE	REGULAR LENGTH	METRIC	SM503	238
RADIUS		4FLUTE			REGULAR LENGTH, CORNER RADIUS	METRIC	SM504	239			
ROUGHING		4-6FLUTE			ROUGHING END MILL	METRIC	ZF62	240			
ZAMUS COPPER MATE	* Copper & non-ferrous material	BALL		2FLUTE	STUB CUT with EXTENDED NECK	METRIC	BC502	243			
		RADIUS		2FLUTE	STUB CUT with EXTENDED NECK	METRIC	RC502	244			
ZAMUS GRA MATE	* Graphite & non-ferrous material	BALL		2FLUTE	DIAMOND COATING BALL NOSE	METRIC	G	247			
		SQUARE		2FLUTE	DIAMOND COATING END MILL	METRIC	GE	250			
ALU-WAVE SERIES	<ul style="list-style-type: none"> <li>* Aluminum</li> <li>* Non-Ferrous Material</li> <li>* Graphite</li> <li>* Plastics</li> </ul>	SQUARE		2FLUTE	STUB LENGTH, UNCOATED	INCH	WAE302A	253			
				2FLUTE	STUB LENGTH, DLC COATED	INCH	WAE502A	253			
				2FLUTE	REGULAR LENGTH, UNCOATED	INCH	WAE312A	254			
				2FLUTE	REGULAR LENGTH, DLC COATED	INCH	WAE512A	254			
				2FLUTE	LONG LENGTH, UNCOATED	INCH	WAE322A	255			
				2FLUTE	LONG LENGTH, DLC COATED	INCH	WAE522A	255			
		CORNER RADIUS		2FLUTE	STUB LENGTH, UNCOATED	INCH	WAR302A	256			
				2FLUTE	STUB LENGTH, DLC COATED	INCH	WAR502A	256			
				2FLUTE	REGULAR LENGTH, UNCOATED	INCH	WAR312A	257			
				2FLUTE	REGULAR LENGTH, DLC COATED	INCH	WAR512A	257			
				2FLUTE	LONG LENGTH, UNCOATED	INCH	WAR322A	258			
				2FLUTE	LONG LENGTH, DLC COATED	INCH	WAR522A	258			
		SQUARE		3FLUTE	STUB LENGTH, UNCOATED	INCH	WAE303A	259			
				3FLUTE	STUB LENGTH, DLC COATED	INCH	WAE503A	259			
		CORNER RADIUS		3FLUTE	STUB LENGTH, UNCOATED	INCH	WAR303A	260			
				3FLUTE	STUB LENGTH, DLC COATED	INCH	WAR503A	260			
		SQUARE		3FLUTE	STUB LENGTH, UNCOATED	INCH	WAE313A	261			
				3FLUTE	STUB LENGTH, DLC COATED	INCH	WAR503A	261			
		CORNER RADIUS		3FLUTE	REGULAR LENGTH, UNCOATED	INCH	WAR313A	262			
				3FLUTE	REGULAR LENGTH, DLC COATED	INCH	WAR513A	262			
		BALL		2FLUTE	STUB BALL NOSE	INCH	WAB302A	263			
		ROUGHING		3FLUTE	ROUGHING ENDMILL FOR ALUMINNM	INCH	WAF303A	264			
				3FLUTE	ROUGHING ENDMILL FOR ALUMINNM	INCH	WAF313A	265			



	Carbon Steels (S45C,S55C...) ~ HB225	Alloy Steels (SCM,SK...) HB225~325	Prehardened Steels(NAK..) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400.500~	Aluminum	Stainless Steels
				~HRc55 SKD61	HRc55~ SKD11					
	○	○	◎	○				○		○
	○	○	○			○				◎
	○	○				◎			○	
							◎		○	
						○			◎	






# DRILL SERIES

## INCH & METRIC SIZE

Class	Feature	Type	Appearance	No. of Teeth	Item	INCH & METRIC	Item Series	Page
POWER MAX DRILL	* High Speed & General Speed Cutting	FACET		2FLUTE	3 X D	INCH& METRIC	PF503	326
				2FLUTE	5 X D	INCH& METRIC	PF505	330
				2FLUTE	3 X D / INTERNAL COOLANT	INCH& METRIC	SF503	334
				2FLUTE	5 X D / INTERNAL COOLANT	INCH& METRIC	SF505	337
				2FLUTE	10 X D / INTERNAL COOLANT ,DOUBLE MARGIN	METRIC	SF510	341
				2FLUTE	20 X D / INTERNAL COOLANT ,DOUBLE MARGIN	METRIC	SF520	343
				2FLUTE	HIGH PRECISION 3 X D ,DOUBLE MARGIN	INCH& METRIC	HP503	344
				2FLUTE	HIGH PRECISION 3 X D INTERNAL COOLANT, DOUBLE MARGIN	INCH& METRIC	HPI503	348
				2FLUTE	HIGH PRECISION 5 X D INTERNAL COOLANT, DOUBLE MARGIN	INCH& METRIC	HPI505	351
				2FLUTE	HIGH PRECISION 8 X D INTERNAL COOLANT, DOUBLE MARGIN	INCH& METRIC	HPI508	356
				2FLUTE	REGULAR LENGTH(3XD)	METRIC	SSTD	359
POWER DRILL	* General Speed Cutting	RELIEF		2FLUTE	STUB TYPE - 3 X D	METRIC	PDS	364
		FACET		2FLUTE	MEDIUM TYPE - 5 X D	METRIC	PDM	366
				2FLUTE	STUB TYPE - 3 x D	METRIC	PDSI	368
				2FLUTE	MEDIUM TYPE - 5 x D	METRIC	PDMI	370
SOLID SPIRAL DRILL	* General Purpose	FACET		2FLUTE	REGULAR LENGTH	METRIC	SSD	374
				2FLUTE	LONG LENGTH	METRIC	SSDL	376

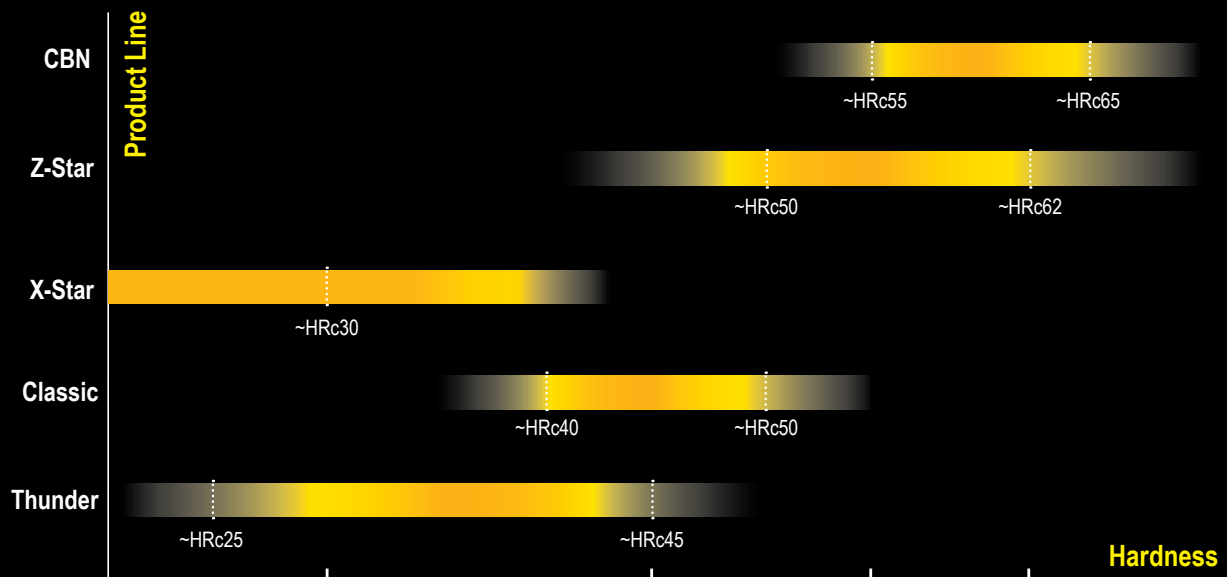
# CENTERING TOOL SERIES

## METRIC SIZE

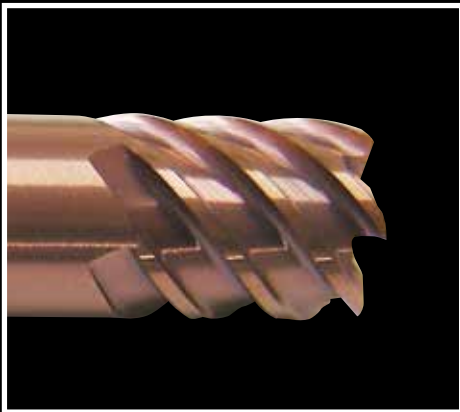
Class	Feature	Type	Appearance	No. of Teeth	Item	INCH & METRIC	Item Series	Page
CENTERING TOOLS	Multi-Purpose			2FLUTE	Center Drill Solid	METRIC	CDS	376
				2FLUTE	NC Spotting Drill - 90°, 120°	METRIC	LDS	377
				2FLUTE	Centering End Mill Solid - 90°	METRIC	CES302	378
				2FLUTE	Centering End Mill Brazed Type - 90°	METRIC	CEM	379
				2FLUTE	CORNER ROUNDING CUTTER	METRIC	CRC	380



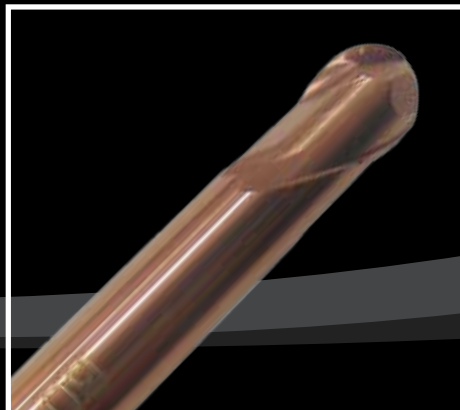
# Cutting Tools Category Table



# ENDMILL SERIES



<b>Zamus Star Series</b> High Speed Cutting & High Hardened Steel(from HRc50 to HRc70)	<b>28</b>
<b>Z-Star Power Mill Series</b> High Speed Cutting & High Hardened Steel(from HRc50 up to HRc70)	<b>92</b>
<b>Zamus Plus Series</b> High Speed Cutting & High Hardened Steel(from HRc30 up to HRc62)	<b>95</b>
<b>Neo Classic X-STAR Series</b> High performance & High efficiency (up to HRc45)	<b>99</b>
<b>Zamus Thunder Series</b> High Speed Cutting & High Hardened Steel(from HRc25 to HRc50)	<b>152</b>
<b>Zamus Classic Series</b> High Speed Cutting & High Hardened Steel(from HRc30 to HRc55)	<b>172</b>
<b>Zamus Sus-Mate Series</b> Stainless Steel, Titanium, Inconel and Steels up to HRc45	<b>237</b>
<b>Zamus Copper Mate Series</b> Copper, Copper Alloy and Non-ferrous Material	<b>243</b>
<b>Zamus Gra-Mate Series</b> Graphite and Non-ferrous	<b>247</b>
<b>Alu-Wave Series</b> Aluminum and Non-ferrous	<b>253</b>
<b>Technical Data</b>	<b>267</b>











































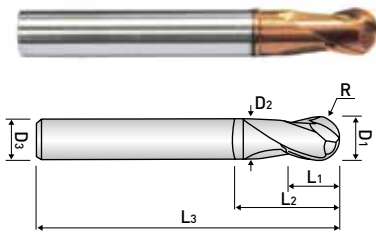
# Zamus Star Series



**ENDMILL  
SERIES**



ITEM SERIES	APPEARANCE	FEATURE	INCH & METRIC	PAGE
DA702 ...series		STUB CUT LENGTH with EXTENDED NECK	INCH	28
ZB702A ...series		12° STUB CUT LENGTH, BALL NOSE with EXTENDED NECK	INCH	29
DA703 ...series		STUB CUT LENGTH for FINISHING	INCH	30
DA734 ...series		BALL NOSE, FINISHING for MOLD & DIE	INCH	31
ZS204A ...series		CORNER RADIUS, VARIABLE HELIX	INCH	32
ZE712A ...series		35° HELIX REGULAR LENGTH	INCH	33
ZE714A ...series		45° HELIX REGULAR LENGTH	INCH	34
ZE716A ...series		50° HELIX REGULAR LENGTH	INCH	35
ZR706A ...series		45° HELIX STUB CUT LENGTH with EXTENDED NECK	INCH	36
ZSLNS20 ...series		LONG NECK	METRIC	37
ZSLNS40 ...series		LONG NECK	METRIC	42
ZSLNB ...series		LONG NECK	METRIC	44
ZSLNR ...series		LONG NECK & BACK DRAFT TYPE	METRIC	48
ZSTNB20 ...series		TAPER NECK & BACK DRAFT TYPE	METRIC	52
ZSTNB30 ...series		TAPER NECK & BACK DRAFT TYPE	METRIC	56
ZSTNR ...series		TAPER NECK & BACK DRAFT TYPE	METRIC	57
ZS124 ...series		LONG LENGTH CUT, VARIABLE HELIX	METRIC	59
ZS1(2)04 ...series		CORNER RADIUS, VARIABLE HELIX	METRIC	60
ZS204 ...series		CORNER RADIUS, VARIABLE HELIX	METRIC	61
ZSPM4 ...series		STUB CUT LENGTH, with EXTENDED NECK	METRIC	63
DB702 ...series		STUB CUT LENGTH, BALL NOSE with EXTENDED NECK	METRIC	64
DB712 ...series		REGULAR LENGTH, BALL NOSE	METRIC	65
DB703 ...series		BALL NOSE for FINISHING MOLD & DIE	METRIC	66
DB734 ...series		TAPER NECK for FINISHING MOLD & DIE	METRIC	67
ZE702 ...series		STUB CUT LENGTH, with EXTENDED NECK	METRIC	68
ZE704 ...series		STUB CUT LENGTH, with EXTENDED NECK	METRIC	69
ZE724(6) ...series		FINISHING for MOLD & DIE	METRIC	70
ZR702 ...series		STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK	METRIC	71
ZR732 ...series		CORNER RADIUS with LONG SHANK	METRIC	76
ZR704 ...series		STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK	METRIC	78
ZR714 ...series		45° HELIX FINISHING MOLD & DIE	METRIC	81
ZR724 ...series		STUB CUT LENGTH, CORNER RADIUS with LONG SHANK	METRIC	82
ZR734 ...series		CORNER RADIUS with LONG SHANK	METRIC	83
ZR706 ...series		45° HELIX STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK	METRIC	85
ZR736 ...series		45° HELIX, LONG SHANK, CORNER RADIUS	METRIC	86
ZE712 ...series		35° HELIX REGULAR LENGTH	METRIC	87
ZE714 ...series		45° HELIX REGULAR LENGTH	METRIC	88
ZE716 ...series		50° HELIX REGULAR LENGTH	METRIC	89



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

- Designed to machine high hardened materials up to HRC70.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.
- Excellent workpiece finishes.

## DA702 ...series



ULTRA FINE



HELIX



R1/64~R1/8

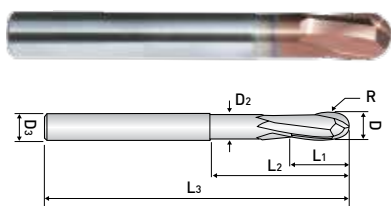


R5/32~R1/4



EDP. No.	D <sub>1</sub>	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
DA702001	1/32	1/64	1/32	1/16	2	.029	1/4	
DA702002	1/16	1/32	1/16	1/8	2	.059	1/4	
DA702003	3/32	3/64	3/32	3/16	2	.090	1/4	
DA702004	1/8	1/16	1/8	1/4	2-1/2	.121	1/4	
DA702006	3/16	3/32	3/16	3/8	3	.184	1/4	
DA702008	1/4	1/8	1/4	1/2	3-1/2	.246	1/4	
DA702010	5/16	5/32	5/16	5/8	4	.309	5/16	
DA702012	3/8	3/16	3/8	3/4	4	.371	3/8	
DA702016	1/2	1/4	1/2	1	4-1/2	.496	1/2	

Data. P270



## 2 FLUTE, 12° HELIX STUB CUT LENGTH, BALL NOSE with EXTENDED NECK

- Designed for high hardened materials up to HRc70.
- Suitable for high speed machining.

## ZB702A ...series



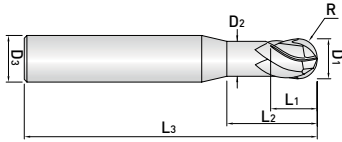
EDP. No.	D <sub>1</sub>	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
ZB702A012093	3/16	3/32	.265	.650	2	.184	3/16	
ZB702A012093L	3/16	3/32	.265	1.3	4	.184	3/16	
ZB702A016125	1/4	1/8	.350	.800	3	.245	1/4	
ZB702A016125L	1/4	1/8	.350	1.6	6	.245	1/4	
ZB702A024187	3/8	3/16	.460	1.27	3	.368	3/8	
ZB702A024187L	3/8	3/16	.460	2.1	6	.368	3/8	
ZB702A032250	1/2	1/4	.625	1.39	4	.490	1/2	
ZB702A032250L	1/2	1/4	.625	2.3	6	.490	1/2	
ZB702A040312	5/8	5/16	.750	1.66	4	.610	5/8	
ZB702A040312L	5/8	5/16	.750	2.6	6	.610	5/8	

Data. P270

# Zamus Star

END MILLS  
> Metric & Inch

Zamus Star Series



## 3 FLUTE, STUB CUT LENGTH, BALL NOSE, for FINISHING

- Designed to machine high hardened materials up to HRC70.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.
- Excellent workpiece finishes.



ULTRA FINE



HELIX



R1/64~R1/8



R5/32~R1/4

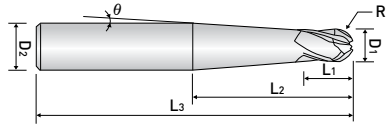


## DA703 ...series

EDP. No.	D <sub>1</sub>	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
DA703002	1/16	1/32	1/16	1/8	2	.059	1/4	
DA703003	3/32	3/64	3/32	3/16	2	.090	1/4	
DA703004	1/8	1/16	1/8	1/4	2	.121	1/4	
DA703006	3/16	3/32	3/16	3/8	2	.184	1/4	
DA703008	1/4	1/8	1/4	1/2	2-1/4	.246	1/4	
DA703010	5/16	5/32	5/16	5/8	2-1/2	.309	5/16	
DA703012	3/8	3/16	3/8	3/4	3	.371	3/8	
DA703016	1/2	1/4	1/2	1	3	.496	1/2	

Data. P270





## 4 FLUTE, BALL NOSE, FINISHING for DIE & MOLD

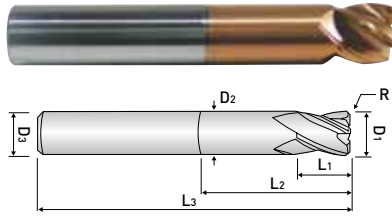
- Designed to machine high hardened materials up to HRc70.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.
- Excellent workpiece finishes.

## DA734 ...series



EDP. No.	D <sub>1</sub>	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	θ	D <sub>2</sub>	STOCK
DA734004	1/8	1/16	1/8	1.57	3	2.5	1/4	
DA734005	5/32	5/64	5/32	1.25	3	2.5	1/4	
DA734006	3/16	3/32	3/16	.92	3	2.5	1/4	
DA734008	1/4	1/8	1/4	1.70	4	2.5	3/8	
DA734010	5/16	5/32	5/16	1.04	4	2.5	3/8	
DA734012	3/8	3/16	3/8	1.82	5	2.5	1/2	
DA734016	1/2	1/4	1/2	1.95	5	-	1/2	

Data. P270



## 4 FLUTE, CORNER RADIUS VARIABLE HELIX

- The impacting debut of new type endmill for high hardened steels up to HRC70 and high speed machining up to 200m/min.
- High precision and excellent surface due to each 4F variable helix geometry.
- Longer tool life over 50% as reducing chatter and resonance.

## ZS204A ...series



EDP. No.	D <sub>1</sub>	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
ZS204A008010	1/8	.010	5/32	3/4	1-1/2	.115	1/8	
ZS204A008015	1/8	.015	5/32	3/4	1-1/2	.115	1/8	
ZS204A012010	3/16	.010	1/4	1	2	.175	3/16	
ZS204A012015	3/16	.015	1/4	1	2	.175	3/16	
ZS204A016020	1/4	.020	5/16	1	2-1/2	.230	1/4	
ZS204A016060	1/4	.060	5/16	1	2-1/2	.230	1/4	
ZS204A016060L	1/4	.060	5/16	1-1/2	3	.230	1/4	
ZS204A020020	5/16	.020	3/8	1	2-1/2	.288	5/16	
ZS204A020060	5/16	.060	3/8	1	2-1/2	.288	5/16	
ZS204A024030	3/8	.030	7/16	1	2-1/2	.345	3/8	
ZS204A024080	3/8	.080	7/16	1	2-1/2	.345	3/8	
ZS204A024080L	3/8	.080	7/16	2	3-1/2	.345	3/8	
ZS204A028030	7/16	.030	1/2	1-1/8	3	.403	7/16	
ZS204A028080	7/16	.080	1/2	1-1/8	3	.403	7/16	
ZS204A032030	1/2	.030	9/16	1-1/4	3	.460	1/2	
ZS204A032060	1/2	.060	9/16	1-1/4	3	.460	1/2	
ZS204A032090	1/2	.090	9/16	1-1/4	3	.460	1/2	
ZS204A032090L	1/2	.090	9/16	2-1/4	4	.460	1/2	

Data, P288

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

\* Items can be changed for quality improvement without notice.



## 2 FLUTE, 35° HELIX, REGULAR LENGTH

- Designed to machine high hardened materials up to HRc70.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.

## ZE712A ....series



ULTRA FINE



HELIX



EDP. No.	Dia.	C.L	OAL	SH.Dia.	STOCK
ZE712A004	1/16	3/16	1-1/2	1/8	
ZE712A008	1/8	1/2	1-1/2	1/8	
ZE712A012	3/16	5/8	2	3/16	
ZE712A016	1/4	3/4	2-1/2	1/4	
ZE712A020	5/16	13/16	2-1/2	5/16	
ZE712A024	3/8	1	2-1/2	3/8	
ZE712A032	1/2	1	3	1/2	

Data. P287

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

\* Items can be changed for quality improvement without notice.

# Zamus Star

END MILLS  
> Metric & Inch

Zamus Star Series



## 4 FLUTE, 45° HELIX, REGULAR LENGTH

- Designed to machine high hardened materials up to HRC70.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.

## ZE714A ....series



EDP. No.	Dia.	C.L	OAL	SH.Dia.	STOCK
ZE714A004	1/16	3/16	1-1/2	1/8	
ZE714A008	1/8	1/2	1-1/2	1/8	
ZE714A012	3/16	5/8	2	3/16	
ZE714A016	1/4	3/4	2-1/2	1/4	
ZE714A020	5/16	13/16	2-1/2	5/16	
ZE714A024	3/8	1	2-1/2	3/8	
ZE714A032	1/2	1	3	1/2	

Data, P288

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

※ Items can be changed for quality improvement without notice.



## 6 FLUTE, 50° HELIX REGULAR LENGTH

- Designed to machine high hardened materials up to HRc70.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.

## ZE716A ....series

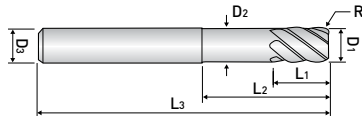


EDP. No.	Dia.	C.L	OAL	SH.Dia.	STOCK
ZE716A016	1/4	1/2	2-1/4	1/4	
ZE716A020	5/16	3/4	2-1/2	5/16	
ZE716A024	3/8	7/8	2-7/8	3/8	
ZE716A032	1/2	1	3-1/4	1/2	
ZE716A040	5/8	1-1/4	3-5/8	5/8	
ZE716A048	3/4	1-1/2	4-1/8	3/4	

Data. P286

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

\* Items can be changed for quality improvement without notice.



## 6 FLUTE, 45° HELIX STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK

- Applied various corner "R" and effected length.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.

## ZR706A .....series



ULTRA FINE



HELIX



$\phi 1/8 \sim \phi 1/4$



$\phi 5/16 \sim \phi 1/2$



EDP. No.	D <sub>1</sub>	Corner R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
ZR706A01220	3/16	.020	.265	.650	2	.184	1/4	•
ZR706A01230	3/16	.030	.265	.650	2	.184	1/4	•
ZR706A01220L	3/16	.020	.265	1.3	4	.184	1/4	•
ZR706A01230L	3/16	.030	.265	1.3	4	.184	1/4	•
ZR706A01620	1/4	.020	.350	.800	3	.245	1/4	•
ZR706A01630	1/4	.030	.350	.800	3	.245	1/4	•
ZR706A01620L	1/4	.020	.350	1.6	6	.245	1/4	•
ZR706A01630L	1/4	.030	.350	1.6	6	.245	1/4	•
ZR706A02020	5/16	.020	.400	1.130	3	.306	5/16	•
ZR706A02020	5/16	.030	.400	1.130	3	.306	5/16	•
ZR706A02030L	5/16	.020	.400	1.8	6	.306	5/16	•
ZR706A02030L	5/16	.030	.400	1.8	6	.306	5/16	•
ZR706A02420	3/8	.020	.460	1.270	3	.368	3/8	•
ZR706A02430	3/8	.030	.460	1.270	3	.368	3/8	•
ZR706A02420L	3/8	.020	.460	2.1	6	.368	3/8	•
ZR706A02430L	3/8	.030	.460	2.1	6	.368	3/8	•
ZR706A03230S**	1/2	.030	.625	1.390	3	.490	1/2	•
ZR706A03230	1/2	.030	.625	1.390	4	.490	1/2	•
ZR706A03260	1/2	.060	.625	1.390	4	.490	1/2	•
ZR706A03230L	1/2	.030	.625	2.3	6	.490	1/2	•
ZR706A03260L	1/2	.060	.625	2.3	6	.490	1/2	•

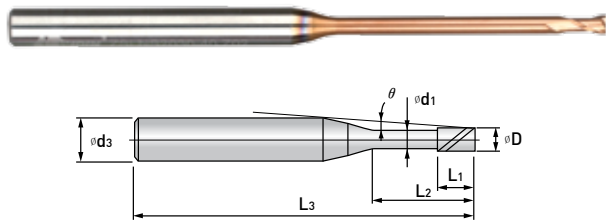
\*\* : Available while supplies last

Data, P286

Tolerance of Radius(Inch)	Tolerance of Shank Dia.
±.0004	h6

\* Items can be changed for quality improvement without notice.





## 2 FLUTE, LONG NECK, SQUARE

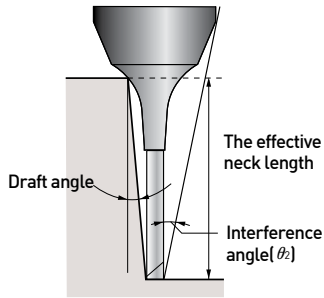
The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length.

## ZSLNS20..... series



EDP. No.	Dimension(mm)						Effective Neck Length					STOCK	
	D	L <sub>2</sub>	L <sub>1</sub>	d <sub>1</sub>	L <sub>3</sub>	d <sub>3</sub>	θ	0.5°	1°	1.5°	2°		3°
ZSLNS2001-0.3	0.1	0.3	0.15	0.08	45	4	11.6	0.4	0.4	0.5	0.5	0.5	•
ZSLNS2001-0.5		0.5						0.6	0.7	0.7	0.7	0.8	•
ZSLNS2001-1		1						1.2	1.2	1.2	1.3	1.4	•
ZSLNS2002-0.5	0.2	0.5	0.3	0.17	50	4	11.3	1.2	1.3	1.5	1.7	2.0	•
ZSLNS2002-1		1						1.7	1.9	2.2	2.4	2.7	•
ZSLNS2002-1.5		1.5						2.3	2.5	2.8	3.0	3.4	•
ZSLNS2003-1	0.3	1	0.45	0.27	50	4	10.8	1.7	1.9	2.2	2.4	2.7	•
ZSLNS2003-1.5		1.5						2.3	2.5	2.8	3.0	3.4	•
ZSLNS2003-2		2						2.8	3.1	3.4	3.6	4.1	•
ZSLNS2003-2.5		2.5						3.4	3.7	4.0	4.3	4.7	•
ZSLNS2003-3	3	3.9	4.3	4.6	4.9	5.4	•						
ZSLNS2004-1	0.4	1	0.6	0.37	50	4	10.7	1.7	1.9	2.2	2.4	2.7	•
ZSLNS2004-1.5		1.5						2.3	2.5	2.8	3.0	3.4	•
ZSLNS2004-2		2						2.8	3.1	3.4	3.6	4.1	•
ZSLNS2004-2.5		2.5						3.4	3.7	4.0	4.3	4.7	•
ZSLNS2004-3		3						3.9	4.3	4.6	4.9	5.4	•
ZSLNS2004-3.5		3.5						4.5	4.9	5.2	5.5	6.0	•
ZSLNS2004-4		4						5.0	5.4	5.8	6.1	6.6	•
ZSLNS2004-5	5	6.1	6.6	6.9	7.3	7.8	•						
ZSLNS2004-6	6	7.1	7.7	8.1	8.4	9.0	•						
ZSLNS2005-1	0.5	1	0.75	0.47	50	4	10.7	1.7	1.9	2.2	2.4	2.7	•
ZSLNS2005-1.5		1.5						2.3	2.5	2.8	3.0	3.4	•
ZSLNS2005-2		2						2.8	3.1	3.4	3.6	4.1	•
ZSLNS2005-2.5		2.5						3.4	3.7	4.0	4.3	4.7	•
ZSLNS2005-3		3						3.9	4.3	4.6	4.9	5.4	•
ZSLNS2005-4		4						5.0	5.4	5.8	6.1	6.6	•
ZSLNS2005-5		5						6.1	6.6	6.9	7.3	7.8	•
ZSLNS2005-6		6						7.0	7.7	8.1	8.4	9.0	•
ZSLNS2005-8	8	9.3	9.9	10.3	10.7	11.4	•						
ZSLNS2006-2	0.6	2	0.9	0.57	50	4	9.6	2.8	3.1	3.4	3.6	4.1	•
ZSLNS2006-4		4						5.0	5.4	5.8	6.1	6.6	•
ZSLNS2006-6		6						6.9	7.7	8.1	8.4	9.0	•
ZSLNS2006-8		8						9.3	9.9	10.3	10.7	11.4	•
ZSLNS2006-10		10						11.5	12.1	12.6	13.0	13.7	•

Data, P289



## 2 FLUTE, LONG NECK, SQUARE

- If the workpiece has draft angle, the interference length will be longer than the  $L_2$ .
- Please refer to the effective neck length for the various draft angles.
- In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle  $\theta_2$ ", and should also be referred to.



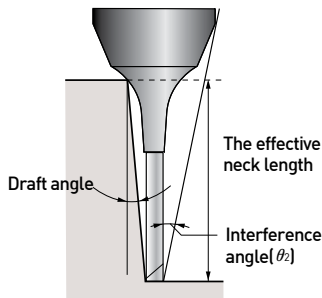
※The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length.

## ZSLNS20..... series

EDP. No.	Dimension(mm)							Effective Neck Length					STOCK
	D	L <sub>2</sub>	L <sub>1</sub>	d <sub>1</sub>	L <sub>3</sub>	d <sub>3</sub>	$\theta$	0.5°	1°	1.5°	2°	3°	
ZSLNS2007-2	0.7	2	1.05	0.67	50	4	9.6	2.8	3.1	3.4	3.6	4.1	•
ZSLNS2007-4		4					8.0	5.0	5.4	5.8	6.1	6.6	•
ZSLNS2007-6		6					6.9	7.2	7.7	8.1	8.4	9.0	•
ZSLNS2007-8		8					6.0	9.3	9.9	10.3	10.7	11.4	•
ZSLNS2007-10		10					5.3	11.5	12.1	12.6	13.0	13.7	•
ZSLNS2008-4	0.8	4	1.2	0.77	50	4	7.9	5.0	5.4	5.8	6.1	6.6	•
ZSLNS2008-6		6					6.8	7.2	7.7	8.1	8.4	9.0	•
ZSLNS2008-8		8					5.9	9.3	9.9	10.3	10.7	11.4	•
ZSLNS2008-10		10					5.2	11.5	12.1	12.6	13.0	13.7	•
ZSLNS2008-12		12					4.7	13.6	14.2	14.8	15.2	16.0	•
ZSLNS2009-6	0.9	6	1.35	0.86	50	4	6.7	7.2	7.7	8.1	8.4	9.1	•
ZSLNS2009-8		8					5.8	9.4	9.9	10.4	10.7	11.4	•
ZSLNS2009-10		10					5.1	11.5	12.1	12.6	13.0	13.7	•
ZSLNS2009-12		12					4.6	13.6	14.3	14.8	15.2	16.0	•
ZSLNS2010-2	1	2	1.5	0.96	50	4	9.4	2.9	3.2	3.4	3.7	4.1	•
ZSLNS2010-4		4					7.7	5.1	5.5	5.8	6.1	6.6	•
ZSLNS2010-6		6					6.6	7.2	7.7	8.1	8.4	9.1	•
ZSLNS2010-8		8					5.7	9.4	9.9	10.4	10.7	11.4	•
ZSLNS2010-10		10					5.0	11.5	12.1	12.6	13.0	13.7	•
ZSLNS2010-12		12			4.5		13.6	14.3	14.8	15.2	16.0	•	
ZSLNS2010-14		14			4.1		15.7	16.4	17.0	17.4	18.7	•	
ZSLNS2010-16		16			3.8		17.8	18.6	19.1	19.6	21.3	•	
ZSLNS2010-20		20			3.2		22.0	22.8	23.5	24.0	26.6	•	
ZSLNS2012-6		1.2			6		1.8	1.15	50	4	6.3	7.3	7.7
ZSLNS2012-8	8		5.5	9.4	9.9	10.4					10.8	11.4	•
ZSLNS2012-10	10		4.8	11.5	12.1	12.6					13.0	13.7	•
ZSLNS2012-12	12		4.3	13.6	14.3	14.8					15.2	16.0	•
ZSLNS2012-16	16		3.6	17.8	18.6	19.2					19.7	21.3	•
ZSLNS2014-6	1.4	6	2.1	1.34	50	4	6.1	7.3	7.8	8.1	8.5	9.1	•
ZSLNS2014-8		8					5.3	9.4	10.0	10.4	10.8	11.5	•
ZSLNS2014-10		10					4.6	11.6	12.1	12.6	13.0	13.8	•
ZSLNS2014-12		12			4.1		13.7	14.3	14.8	15.3	16.1	•	
ZSLNS2014-14		14			3.7		15.8	16.5	17.0	17.5	18.7	•	
ZSLNS2014-16		16			3.4		17.9	18.6	19.2	19.7	21.4	•	

- - - No interference

Data, P289



## 2 FLUTE, LONG NECK, SQUARE

- If the workpiece has draft angle, the interference length will be longer than the  $L_2$ .
- Please refer to the effective neck length for the various draft angles.
- In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle  $\theta_2$ ", and should also be referred to.



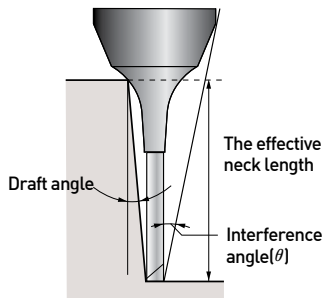
※The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length.

## ZSLNS20..... series

EDP. No.	Dimension(mm)							Effective Neck Length					STOCK
	D	L <sub>2</sub>	L <sub>1</sub>	d <sub>1</sub>	L <sub>3</sub>	d <sub>3</sub>	$\theta$	0.5°	1°	1.5°	2°	3°	
ZSLNS2015-4	1.5	4	2.25	1.44	50	4	7.2	5.2	5.5	5.9	6.2	6.7	•
ZSLNS2015-6		6					6.0	7.3	7.8	8.1	8.5	9.1	•
ZSLNS2015-8		8					5.1	9.4	10.0	10.4	10.8	11.5	•
ZSLNS2015-10		10					4.5	11.6	12.1	12.6	13.0	13.8	•
ZSLNS2015-12		12					4.0	13.7	14.3	14.8	15.3	16.1	•
ZSLNS2015-14		14			3.6		15.8	16.5	17.0	17.5	18.7	•	
ZSLNS2015-16		16			3.3		17.9	18.6	19.2	19.7	-	•	
ZSLNS2015-18		18			3.0		20.0	20.7	21.3	21.9	-	•	
ZSLNS2015-20		20			2.8		22.0	22.9	23.5	24.1	-	•	
ZSLNS2015-25		25			2.4		27.3	28.1	28.8	30.0	-	•	
ZSLNS2016-6	1.6	6	2.4	1.54	50	4	5.9	7.3	7.8	8.1	8.5	9.1	•
ZSLNS2016-8		8					5.0	9.4	10.0	10.4	10.8	11.5	•
ZSLNS2016-10		10					4.4	11.6	12.1	12.6	13.0	13.8	•
ZSLNS2016-12		12					3.9	13.7	14.3	14.8	15.3	16.1	•
ZSLNS2016-14		14			3.5		15.8	16.5	17.0	17.5	18.7	•	
ZSLNS2016-16		16			3.2		17.9	18.6	19.2	19.7	21.4	•	
ZSLNS2016-18		18			2.9		20.0	20.7	21.3	21.9	-	•	
ZSLNS2016-20		20			2.7		22.0	22.9	23.5	24.1	-	•	
ZSLNS2018-6	1.8	6	2.7	1.73	50	4	5.6	7.4	7.8	8.2	8.5	9.1	•
ZSLNS2018-8		8					4.8	9.5	10.0	10.4	10.8	11.5	•
ZSLNS2018-10		10					4.2	11.6	12.2	12.6	13.0	13.8	•
ZSLNS2018-12		12					3.7	13.7	14.3	14.8	15.3	16.1	•
ZSLNS2018-14		14			3.3		15.8	16.5	17.0	17.5	18.8	•	
ZSLNS2018-16		16			3.0		17.9	18.6	19.2	19.7	-	•	
ZSLNS2018-18		18			2.7		20.0	20.7	21.3	21.9	-	•	
ZSLNS2018-20		20			2.5		22.1	22.9	23.5	24.1	-	•	
ZSLNS2020-4	2	4	3	1.92	50	4	6.5	5.3	5.6	5.9	6.2	6.7	•
ZSLNS2020-6		6					5.3	7.4	7.8	8.2	8.5	9.1	•
ZSLNS2020-8		8					4.5	9.5	10.0	10.4	10.8	11.5	•
ZSLNS2020-10		10					3.9	11.6	12.2	12.7	13.1	13.8	•
ZSLNS2020-12		12			3.4		13.7	14.3	14.9	15.3	16.1	•	
ZSLNS2020-14		14			3.1		15.8	16.5	17.0	17.5	18.8	•	

- No interference

Data, P289



## 2 FLUTE, LONG NECK, SQUARE

- If the workpiece has draft angle, the interference length will be longer than the  $L_2$ .
- Please refer to the effective neck length for the various draft angles.
- In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle  $\theta$ ", and should also be referred to.



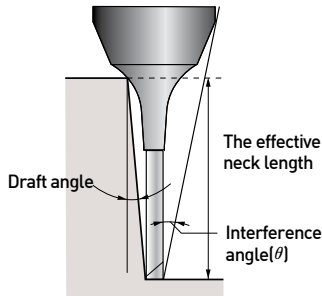
※The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length.

## ZSLNS20..... series

EDP. No.	Dimension(mm)							Effective Neck Length					STOCK
	D	$L_2$	$L_1$	$d_1$	$L_3$	$d_3$	$\theta$	0.5°	1°	1.5°	2°	3°	
ZSLNS2020-16	2	16	3	1.92	55	4	2.8	17.9	18.6	19.2	19.7	-	•
ZSLNS2020-18		18			60		2.6	20.0	20.8	21.4	21.9	-	•
ZSLNS2020-20		20			65		2.4	22.1	22.9	23.5	24.1	-	•
ZSLNS2020-25		25			70		2.0	27.3	28.2	28.9	-	-	•
ZSLNS2020-30		30			1.7		32.5	33.4	34.4	-	-	•	
ZSLNS2025-8	2.5	8	3.75	2.4	50	4	3.7	9.6	10.1	10.5	10.9	11.5	•
ZSLNS2025-10		10			55		3.1	11.7	12.2	12.7	13.1	13.8	•
ZSLNS2025-12		12			60		2.7	13.8	14.4	14.9	15.3	-	•
ZSLNS2025-14		14			65		2.4	15.9	16.5	17.1	17.5	-	•
ZSLNS2025-16		16			70		2.2	18.0	18.7	19.2	19.7	-	•
ZSLNS2025-18		18			5.6		9.6	10.1	10.5	10.9	11.5	•	
ZSLNS2025-20		20			5.0		11.7	12.3	12.7	13.1	13.8	•	
ZSLNS2025-25		25			4.5		13.8	14.4	14.9	15.4	16.3	•	
ZSLNS2025-30		30			4.1		15.9	16.6	17.1	17.6	18.9	•	
ZSLNS2030-8		3			8		4.5	2.88	55	6	3.7	18.0	18.7
ZSLNS2030-10	10		60	3.4	20.1	20.8			21.4		21.9	24.2	•
ZSLNS2030-12	12		65	3.2	22.2	23.0			23.6		24.2	26.9	•
ZSLNS2030-14	14		70	2.7	27.4	28.2			28.9		30.2	-	•
ZSLNS2030-16	16		75	2.4	32.6	33.5			34.5		36.2	-	•
ZSLNS2030-18	18		80	2.1	37.7	38.7			40.2		42.2	-	•
ZSLNS2030-20	20		85	1.9	42.9	43.9			45.9		-	-	•
ZSLNS2030-25	25		90	-	-	-			-		-	-	•
ZSLNS2030-30	30		-	-	-	-			-		-	-	•
ZSLNS2030-35	35		-	-	-	-			-		-	-	•
ZSLNS2030-40	40		-	-	-	-			-		-	-	•

- - - No interference

Data, P289



## 2 FLUTE, LONG NECK, SQUARE

- If the workpiece has draft angle, the interference length will be longer than the  $L_2$ .
- Please refer to the effective neck length for the various draft angles.
- In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle  $\theta$ ", and should also be referred to.



※The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length.

## ZSLNS20..... series

EDP. No.	Dimension(mm)							Effective Neck Length					STOCK
	D	$L_2$	$L_1$	$d_1$	$L_3$	$d_3$	$\theta$	0.5°	1°	1.5°	2°	3°	
ZSLNS2040-12	4	12	6	3.85	60	6	3.4	13.9	14.5	15.0	15.4	16.3	•
ZSLNS2040-16		16					2.8	18.1	18.8	19.3	19.8	-	•
ZSLNS2040-20		20					2.3	22.3	23.0	23.6	24.3	-	•
ZSLNS2040-25		25			2.0		27.4	28.3	28.9	-	-	•	
ZSLNS2040-30		30			1.7		32.6	33.5	34.6	-	-	•	
ZSLNS2040-35		35			1.5		37.8	38.8	-	-	-	•	
ZSLNS2040-40		40			1.3		42.9	44.0	-	-	-	•	
ZSLNS2040-45		45			1.2		48.1	49.4	-	-	-	•	
ZSLNS2040-50		50			1.1		53.2	54.8	-	-	-	•	
ZSLNS2050-16		5			16		7.5	4.85	60	6	1.5	18.1	18.8
ZSLNS2050-20	20		1.3	22.3	23.0	-					-	-	•
ZSLNS2050-25	25		1.1	27.4	28.3	-			-		-	•	
ZSLNS2050-30	30		0.9	32.6	-	-			-		-	•	
ZSLNS2050-35	35		0.8	37.8	-	-			-		-	•	
ZSLNS2050-40	40		0.7	42.9	-	-			-		-	•	
ZSLNS2050-50	50		0.6	53.2	-	-			-		-	•	

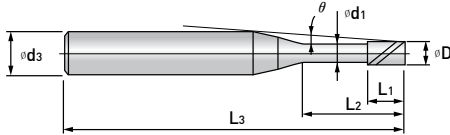
Data, P289

- No interference

### ■ Tolerance

Diameter	Mill Dia. (mm)	Shank Dia.
0,1 ~ 0,5	0 ~ -0,012	h5
0,6 ~ 4	0 ~ -0,015	

※Items can be changed for quality improvement without notice.



## 4 FLUTE, LONG NECK, SQUARE

The effective length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length.

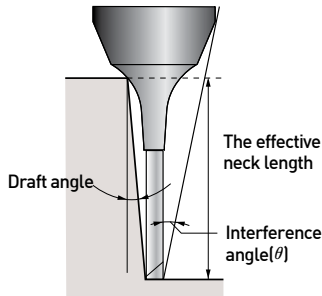
## ZSLNS40..... series



EDP. No.	Dimension(mm)						Effective Neck Length					STOCK	
	D	L <sub>2</sub>	L <sub>1</sub>	d <sub>1</sub>	L <sub>3</sub>	d <sub>3</sub>	θ	0.5°	1°	1.5°	2°		3°
ZSLNS4010-4	1	4	1.5	0.96	50	4	7.7	5.1	5.5	5.8	6.1	6.6	•
ZSLNS4010-6		6					6.6	7.2	7.7	8.1	8.4	9.1	•
ZSLNS4010-8		8					5.7	9.4	9.9	10.4	10.7	11.4	•
ZSLNS4010-10		10					5.0	11.5	12.1	12.6	13.0	13.7	•
ZSLNS4015-4	1.5	4	2.25	1.44	50	4	7.2	5.2	5.5	5.9	6.2	6.7	•
ZSLNS4015-6		6					6.0	7.3	7.8	8.1	8.5	9.1	•
ZSLNS4015-8		8					5.1	9.4	10.0	10.4	10.8	11.5	•
ZSLNS4015-10		10					4.5	11.6	12.1	12.6	13.0	13.8	•
ZSLNS4015-12		12			4.0	13.7	14.3	14.8	15.3	16.1	•		
ZSLNS4015-14		14			3.6	15.8	16.5	17.0	17.5	18.7	•		
ZSLNS4015-16		16			3.3	17.9	18.6	19.2	19.7	-	•		
ZSLNS4015-18		18			3.0	20.0	20.7	21.3	21.9	-	•		
ZSLNS4015-20		20			2.8	22.0	22.9	23.5	24.1	-	•		
ZSLNS4015-25		25			2.4	27.3	28.1	28.8	30.0	-	•		
ZSLNS4020-4	2	4	3	1.92	50	4	6.5	5.3	5.6	5.9	6.2	6.7	•
ZSLNS4020-6		6					5.3	7.4	7.8	8.2	8.5	9.1	•
ZSLNS4020-8		8					4.5	9.5	10.0	10.4	10.8	11.5	•
ZSLNS4020-10		10					3.9	11.6	12.2	12.7	13.1	13.8	•
ZSLNS4020-12		12			3.4	13.7	14.3	14.9	15.3	16.1	•		
ZSLNS4020-14		14			3.1	15.8	16.5	17.0	17.5	18.8	•		
ZSLNS4020-16		16			2.8	17.9	18.6	19.2	19.7	-	•		
ZSLNS4020-18		18			2.6	20.0	20.8	21.4	21.9	-	•		
ZSLNS4020-20		20			2.4	22.1	22.9	23.5	24.1	-	•		
ZSLNS4020-25		25			2.0	27.3	28.2	28.9	-	-	•		
ZSLNS4020-30	30	1.7	32.5	33.4	34.4	-	-	•					
ZSLNS4025-8	2.5	8	3.75	2.4	50	4	3.7	9.6	10.1	10.5	10.9	11.5	•
ZSLNS4025-10		10					3.1	11.7	12.2	12.7	13.1	13.8	•
ZSLNS4025-12		12					2.7	13.8	14.4	14.9	15.3	-	•
ZSLNS4025-14		14					2.4	15.9	16.5	17.1	17.5	-	•
ZSLNS4025-16		16			2.2	18.0	18.7	19.2	19.7	-	•		
ZSLNS4025-18		18			2.0	20.1	20.8	21.4	-	-	•		
ZSLNS4025-20		20			1.8	22.1	22.9	23.5	-	-	•		
ZSLNS4025-25		25			1.5	27.3	28.2	-	-	-	•		
ZSLNS4025-30		30			1.3	32.6	33.5	-	-	-	•		

- - - No interference

Data, P289



## 4 FLUTE, LONG NECK, SQUARE

- If the workpiece has draft angle, the interference length will be longer than the  $L_2$ .
- Please refer to the effective neck length for the various draft angles.
- In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle  $\theta$ ", and should also be referred to.



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## ZSLNS40..... series

EDP. No.	Dimension(mm)							Effective Neck Length					STOCK
	D	L <sub>2</sub>	L <sub>1</sub>	d <sub>1</sub>	L <sub>3</sub>	d <sub>3</sub>	$\theta$	0.5°	1°	1.5°	2°	3°	
ZSLNS4030-8	3	8	4.5	2.88	55	6	5.6	9.6	10.1	10.5	10.9	11.5	•
ZSLNS4030-10		10					5.0	11.7	12.3	12.7	13.1	13.8	•
ZSLNS4030-12		12					4.5	13.8	14.4	14.9	15.4	16.3	•
ZSLNS4030-14		14			4.1		15.9	16.6	17.1	17.6	18.9	•	
ZSLNS4030-16		16			3.7		18.0	18.7	19.3	19.8	21.6	•	
ZSLNS4030-18		18			3.4		20.1	20.8	21.4	21.9	24.2	•	
ZSLNS4030-20		20			3.2		22.2	23.0	23.6	24.2	26.9	•	
ZSLNS4030-25		25			2.7		27.4	28.2	28.9	30.2	-	•	
ZSLNS4030-30		30			2.4		32.6	33.5	34.5	36.2	-	•	
ZSLNS4030-35		35			2.1		37.7	38.7	40.2	42.2	-	•	
ZSLNS4030-40		40			1.9		42.9	43.9	45.9	-	-	•	
ZSLNS4040-12		4			12		6	3.85	60	6	3.4	13.9	14.5
ZSLNS4040-16	16		2.8	18.1	18.8	19.3					19.8	-	•
ZSLNS4040-20	20		2.3	22.3	23.0	23.6			24.3		-	•	
ZSLNS4040-25	25		2.0	27.4	28.3	28.9			-		-	•	
ZSLNS4040-30	30		1.7	32.6	33.5	34.6			-		-	•	
ZSLNS4040-35	35		1.5	37.8	38.8	-			-		-	•	
ZSLNS4040-40	40		1.3	42.9	44.0	-			-		-	•	
ZSLNS4040-45	45		1.2	48.1	49.4	-			-		-	•	
ZSLNS4040-50	50		1.1	53.2	54.8	-			-		-	•	
ZSLNS4050-16	5		16	7.5	4.85	60			6		1.5	18.1	18.8
ZSLNS4050-20		20	1.3				22.3	23.0		-	-	-	•
ZSLNS4050-25		25	1.1			27.4	28.3	-		-	-	•	
ZSLNS4050-30		30	0.9			32.6	-	-		-	-	•	
ZSLNS4050-35		35	0.8			37.8	-	-		-	-	•	
ZSLNS4050-40		40	0.7			42.9	-	-		-	-	•	
ZSLNS4050-40		40	0.7			42.9	-	-		-	-	•	
ZSLNS4050-50		50	0.6			53.2	-	-		-	-	•	

- No interference

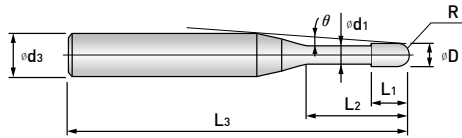
Data, P289

### ■ Tolerance

Diameter	Mill Dia. (mm)	Shank Dia.
0,1 ~ 0,5	0 ~ -0,012	h5
0,6 ~ 4	0 ~ -0,015	

※Items can be changed for quality improvement without notice.





## 2 FLUTE, LONG NECK, BALL

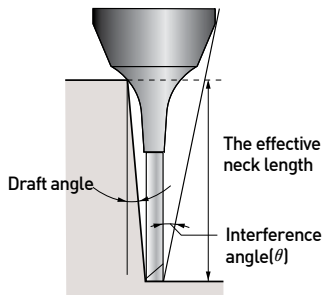
The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length.

## ZSLNB..... series



EDP. No.	Dimension(mm)							Effective Neck Length					STOCK	
	R	D	L <sub>2</sub>	L <sub>1</sub>	d <sub>1</sub>	L <sub>3</sub>	d <sub>3</sub>	θ	0.5°	1°	1.5°	2°		3°
ZSLNB2001-0.2	0.05	0.1	0.2	0.08	0.08	45	4	11.8	0.3	0.3	0.3	0.4	0.4	•
ZSLNB2001-0.3			0.3						0.4	0.4	0.5	0.5	0.5	•
ZSLNB2001-0.5			0.5						0.6	0.7	0.7	0.7	0.8	•
ZSLNB2002-0.5	0.1	0.2	0.5	0.15	0.17	50	4	11.5	1.2	1.3	1.5	1.6	2.0	•
ZSLNB2002-1			1						1.7	1.9	2.1	2.3	2.7	•
ZSLNB2002-1.5			1.5						2.3	2.5	2.8	3.0	3.4	•
ZSLNB2002-2			2						2.8	3.1	3.4	3.6	4.1	•
ZSLNB2002-2.5			2.5						3.4	3.7	4.0	4.2	4.7	•
ZSLNB2002-3.0			3						3.9	4.3	4.6	4.9	5.4	•
ZSLNB2003-1			0.15						0.3	1	0.25	0.27	50	4
ZSLNB2003-1.5	1.5	2.3		2.5	2.7	3.0	3.4	•						
ZSLNB2003-2	2	2.8		3.1	3.4	3.6	4.0	•						
ZSLNB2003-2.5	2.5	3.4		3.7	4.0	4.2	4.7	•						
ZSLNB2003-3	3	3.9		4.3	4.6	4.8	5.3	•						
ZSLNB2004-1	0.2	0.4	1	0.3	0.37	50	4	11.0	1.7	1.9	2.1	2.3	2.7	•
ZSLNB2004-1.5			1.5						2.3	2.5	2.7	2.9	3.4	•
ZSLNB2004-2			2						2.8	3.1	3.4	3.6	4.0	•
ZSLNB2004-2.5			2.5						3.4	3.7	4.0	4.2	4.7	•
ZSLNB2004-3			3						3.9	4.3	4.6	4.8	5.3	•
ZSLNB2004-3.5			3.5						4.5	4.8	5.2	5.4	6.0	•
ZSLNB2004-4			4						5.0	5.4	5.7	6.0	6.6	•
ZSLNB2004-4.5			4.5						5.6	6.0	6.3	6.6	7.2	•
ZSLNB2005-1	0.25	0.5	1	0.35	0.47	50	4	11.0	1.7	1.9	2.1	2.3	2.6	•
ZSLNB2005-2			2						2.8	3.1	3.3	3.6	4.0	•
ZSLNB2005-3			3						3.9	4.3	4.6	4.8	5.3	•
ZSLNB2005-4			4						5.0	5.4	5.7	6.0	6.6	•
ZSLNB2005-5			5						6.1	6.5	6.9	7.2	7.8	•
ZSLNB2005-6			6						7.1	7.6	8.0	8.4	9.0	•
ZSLNB2005-7			7						8.1	8.6	9.0	9.4	10.0	•
ZSLNB2005-8			8						9.3	9.9	10.3	10.7	11.4	•

Data, P289



## 2 FLUTE, LONG NECK, BALL

- If the workpiece has draft angle, the interference length will be longer than the  $L_2$ .
- Please refer to the effective neck length for the various draft angles.
- In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle  $\theta$ ", and should also be referred to.

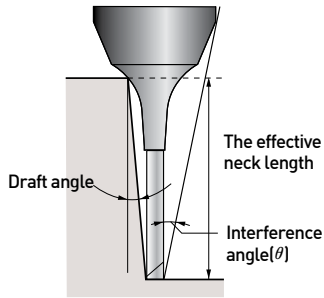


## ZSLNB..... series

※The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length.

EDP. No.	Dimension(mm)								Effective Neck Length					STOCK
	R	D	L <sub>2</sub>	L <sub>1</sub>	d <sub>1</sub>	L <sub>3</sub>	d <sub>3</sub>	$\theta$	0.5°	1°	1.5°	2°	3°	
ZSLNB2006-1	0.3	0.6	1	0.4	0.57	50	4	11.0	1.7	1.9	2.1	2.3	2.6	•
ZSLNB2006-2			2					9.9	2.8	3.1	3.3	3.6	4.0	•
ZSLNB2006-3			3					9.0	3.9	4.3	4.5	4.8	5.3	•
ZSLNB2006-4			4					8.3	5.0	5.4	5.7	6.0	6.6	•
ZSLNB2006-5			5					7.6	6.1	6.5	6.9	7.2	7.8	•
ZSLNB2006-6			6					7.1	7.2	7.6	8.0	8.4	9.0	•
ZSLNB2006-7			7					6.6	8.3	8.8	9.2	9.5	10.2	•
ZSLNB2006-8			8					6.2	9.3	9.9	10.3	10.7	11.4	•
ZSLNB2006-9			9					5.8	10.4	10.9	11.4	11.8	12.5	•
ZSLNB2006-10			10					5.5	11.4	12.0	12.5	12.9	13.7	•
ZSLNB2006-12			12					5.0	13.6	14.2	14.7	15.2	16.0	•
ZSLNB2008-2			0.4					0.8	2	0.5	0.77	50	4	9.9
ZSLNB2008-4	4	8.2		5.0	5.4	5.7	6.0		6.5					•
ZSLNB2008-5	5	7.5		6.1	6.5	6.9	7.2		7.8					•
ZSLNB2008-6	6	7.0		7.2	7.6	8.0	8.4		9.0					•
ZSLNB2008-8	8	6.1		9.3	9.8	10.3	10.7		11.3					•
ZSLNB2008-10	10	5.4	11.4	12.0	12.5	12.9	13.7	•						
ZSLNB2010-2	0.5	1	2	0.8	0.96	50	4	9.9	2.9	3.1	3.3	3.5	4.0	•
ZSLNB2010-3			3					8.9	4.0	4.3	4.5	4.8	5.3	•
ZSLNB2010-4			4					8.1	5.0	5.4	5.7	6.0	6.5	•
ZSLNB2010-5			5					7.4	6.1	6.5	6.9	7.2	7.8	•
ZSLNB2010-6			6					6.8	7.2	7.7	8.0	8.4	9.0	•
ZSLNB2010-7			7					6.3	8.3	8.8	9.2	9.5	10.2	•
ZSLNB2010-8			8			5.9		9.3	9.9	10.3	10.7	11.3	•	
ZSLNB2010-9			9			5.5		10.4	11.0	11.4	11.8	12.5	•	
ZSLNB2010-10			10			5.2		11.5	12.0	12.5	12.9	13.7	•	
ZSLNB2010-12			12			4.6		13.6	14.2	14.7	15.2	15.9	•	
ZSLNB2010-14			14			4.2		15.7	16.4	16.9	17.4	18.5	•	
ZSLNB2010-16			16			3.8		17.8	18.5	19.1	19.6	21.2	•	
ZSLNB2010-18	18	3.5	19.9	20.7	21.3	21.8	23.8	•						
ZSLNB2010-20	20	3.3	22.0	22.8	23.4	24.0	26.5	•						
ZSLNB2012-4	0.6	1.2	4	1.1	1.15	50	4	7.9	5.1	5.4	5.7	6.0	6.5	•
ZSLNB2012-6			6					6.6	7.2	7.7	8.0	8.4	9.0	•
ZSLNB2012-8			8					5.7	9.4	9.9	10.3	10.7	11.3	•
ZSLNB2012-10			10			5.0		11.5	12.1	12.5	12.9	13.7	•	
ZSLNB2012-12			12			4.5		13.6	14.2	14.7	15.2	15.9	•	

Data, P289



## 2 FLUTE, LONG NECK, BALL

- If the workpiece has draft angle, the interference length will be longer than the  $L_2$ .
- Please refer to the effective neck length for the various draft angles.
- In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle  $\theta$ ", and should also be referred to.



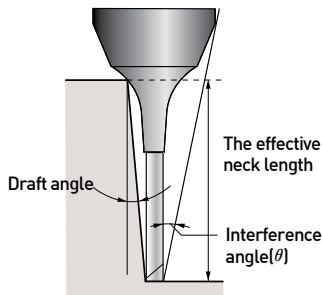
※The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length.

## ZSLNB..... series

EDP. No.	Dimension(mm)								Effective Neck Length					STOCK					
	R	D	L <sub>2</sub>	L <sub>1</sub>	d <sub>1</sub>	L <sub>3</sub>	d <sub>3</sub>	$\theta$	0.5°	1°	1.5°	2°	3°						
ZSLNB2014-8	0.7	1.4	8	1.3	1.34	50	4	5.5	9.4	9.9	10.3	10.7	11.3	•					
ZSLNB2014-12			12						13.6	14.2	14.7	15.2	15.9	•					
ZSLNB2014-16			16						17.8	18.5	19.1	19.6	21.2	•					
ZSLNB2015-4	0.75	1.5	4	1.35	1.44	50	4	7.7	5.1	5.4	5.7	6.0	6.5	•					
ZSLNB2015-6			6					7.3	7.7	8.0	8.4	9.0	•						
ZSLNB2015-8			8					9.4	9.9	10.3	10.7	11.3	•						
ZSLNB2015-10			10					11.5	12.1	12.5	12.9	13.7	•						
ZSLNB2015-12			12					13.6	14.2	14.7	15.2	15.9	•						
ZSLNB2015-14			14			15.7		16.4	16.9	17.4	18.5	•							
ZSLNB2015-16			16			17.8		18.5	19.1	19.6	21.1	•							
ZSLNB2015-20			20			22.0		22.8	23.4	24.0	-	•							
ZSLNB2016-8			0.8			1.6		8	1.4	1.54	50	4	5.3	9.4	9.9	10.3	10.7	11.3	•
ZSLNB2016-10								10			4.6		11.5	12.1	12.5	12.9	13.7	•	
ZSLNB2016-12	12	4.1		13.6	14.2		14.7	15.2			15.9		•						
ZSLNB2016-16	16	3.3		17.8	18.5		19.1	19.6			21.1		•						
ZSLNB2016-20	20	2.8		22.0	22.8		23.4	24.0			-		•						
ZSLNB2018-8	0.9	1.8	8	1.6	1.73	50	4	5.1	9.4	9.9	10.3	10.7	11.3	•					
ZSLNB2018-12			12			3.9		13.7	14.3	14.7	15.2	15.9	•						
ZSLNB2018-16			16			3.1		17.9	18.6	19.1	19.6	21.1	•						
ZSLNB2018-20			20			2.6		22.0	22.8	23.4	24.0	-	•						
ZSLNB2020-3	1	2	3	1.7	1.92	50	4	8.3	4.1	4.4	4.6	4.8	5.2	•					
ZSLNB2020-4			4	7.3				5.2	5.5	5.8	6.0	6.5	•						
ZSLNB2020-6			6	5.8				7.3	7.7	8.1	8.4	9.0	•						
ZSLNB2020-8			8	4.9				9.5	9.9	10.3	10.7	11.3	•						
ZSLNB2020-10			10	4.2				11.6	12.1	12.6	12.9	13.6	•						
ZSLNB2020-12			12	3.7		13.7		14.3	14.8	15.2	15.9	•							
ZSLNB2020-14			14	3.2		15.8		16.4	16.9	17.4	18.5	•							
ZSLNB2020-16			16	2.9		17.9		18.6	19.1	19.6	-	•							
ZSLNB2020-18			18	2.7		20.0		20.7	21.3	21.8	-	•							
ZSLNB2020-20			20	2.4		22.1		22.8	23.4	24.0	-	•							
ZSLNB2020-22			22	2.3		24.1		24.9	25.6	26.3	-	•							
ZSLNB2020-25			25	2.0		27.3		28.1	28.8	-	-	•							
ZSLNB2020-30			30	1.7		32.4		33.4	34.2	-	-	•							

Data, P289

- No interference



## 2 FLUTE, LONG NECK, BALL

- If the workpiece has draft angle, the interference length will be longer than the  $L_2$ .
- Please refer to the effective neck length for the various draft angles.
- In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle  $\theta$ ", and should also be referred to.



※The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length.

## ZSLNB..... series

EDP. No.	Dimension(mm)								Effective Neck Length					STOCK
	R	D	$L_2$	$L_1$	$d_1$	$L_3$	$d_3$	$\theta$	0.5°	1°	1.5°	2°	3°	
ZSLNB2020-35	1	2	35	*3	1.92	75	4	1.5	37.6	38.6	-	-	-	•
ZSLNB2020-40			40			80		1.4	42.8	43.8	-	-	-	•
ZSLNB2025-10	1.25	2.5	10	4	2.4	50	4	3.4	11.6	12.1	12.6	13	13.6	•
ZSLNB2025-16			16			55		2.3	17.9	18.6	19.1	19.6	-	•
ZSLNB2025-20			20			60		1.9	22.1	22.8	23.5	-	-	•
ZSLNB2030-8	1.5	3	8	*4	2.88	55	6	6.2	9.6	10.0	10.4	10.7	11.3	•
ZSLNB2030-10			10					5.5	11.7	12.2	12.6	13.0	13.6	•
ZSLNB2030-13			13			4.6		14.8	15.4	15.9	16.3	17.1	•	
ZSLNB2030-16			16			4.0		18.0	18.6	19.1	19.6	21.1	•	
ZSLNB2030-18			18			3.6		20.0	20.7	21.3	21.8	23.7	•	
ZSLNB2030-20			20			3.4		22.1	22.9	23.5	24.0	26.4	•	
ZSLNB2030-25			25			2.8		27.3	28.2	28.8	29.9	-	•	
ZSLNB2030-30			30			2.5		32.5	33.4	34.3	35.9	-	•	
ZSLNB2030-35			35			2.2		37.7	38.7	40.0	41.9	-	•	
ZSLNB2040-10			2			4		10	*5	3.9	55	6	4.5	11.6
ZSLNB2040-13	13	3.6		14.7	15.3		15.8	16.2					17.0	•
ZSLNB2040-16	16	3.1		17.9	18.5		19.1	19.5			20.9		•	
ZSLNB2040-20	20	2.5		22.1	22.8		23.4	23.9			-		•	
ZSLNB2040-25	25	2.1		27.3	28.1		28.8	29.8			-		•	
ZSLNB2040-30	30	1.8		32.4	33.4		34.2	-			-		•	
ZSLNB2040-35	35	1.6		37.6	38.6		39.9	-			-		•	
ZSLNB2040-40	40	1.4		42.8	43.8		-	-			-		•	
ZSLNB2040-45	45	1.2		47.9	49.1		-	-			-		•	
ZSLNB2040-50	50	1.1		53.1	54.5		-	-			-		•	
ZSLNB2050-20	2.5	5	20	*6	4.9	65	6	1.4	22.0	22.8	-	-	-	•
ZSLNB2050-25			25			70		1.2	27.2	28.1	-	-	-	•
ZSLNB2050-30			30			75		1.0	32.4	-	-	-	-	•
ZSLNB2050-35			35			80		0.8	42.8	-	-	-	-	•
ZSLNB2050-40			40			90		0.7	42.8	-	-	-	-	•

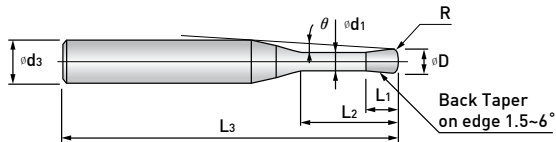
- No interference

Data, P289

■ Tolerance

Radius (mm)	Shank Dia.
±0,005	h5

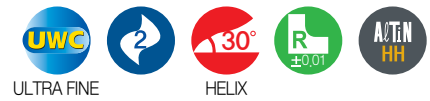
※Items can be changed for quality improvement without notice.



## 2 FLUTE, LONG NECK, RADIUS BACK DRAFT TYPE

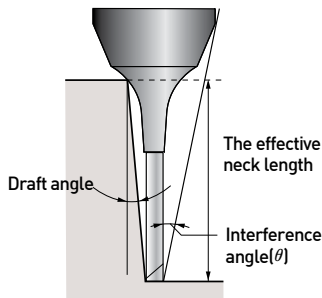
The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length.

## ZSLNR..... series



EDP. No.	Dimension(mm)							Effective Neck Length					STOCK		
	D	R	L <sub>2</sub>	L <sub>1</sub>	d <sub>1</sub>	L <sub>3</sub>	d <sub>3</sub>	θ	0.5°	1°	1.5°	2°		3°	
ZSLNR2002-0.5-005	0.2	0.05	0.5	0.15	0.17	50	4	11.4	0.9	1.0	1.0	1.1	1.2	•	
ZSLNR2002-1-005			1						1.6	1.7	1.9	2.0	2.3	•	
ZSLNR2002-1.5-005			1.5						2.1	2.3	2.5	2.7	3.0	•	
ZSLNR2002-2-005			2						2.8	3.1	3.4	3.6	4.1	•	
ZSLNR2003-1-005	0.3	0.05	1	0.25	0.27	50	4	10.8	1.4	1.5	1.6	1.7	1.9	•	
ZSLNR2003-1.5-005			1.5						2.1	2.3	2.5	2.7	3.0	•	
ZSLNR2003-2-005			2						2.7	2.9	3.1	3.3	3.6	•	
ZSLNR2003-2.5-005			2.5						3.2	3.5	3.7	3.9	4.3	•	
ZSLNR2003-3-005			3						3.9	4.3	4.6	4.9	5.4	•	
ZSLNR2004-1-005	0.4	0.05	1	0.3	0.37	50	4	10.8	1.4	1.5	1.6	1.7	1.9	•	
ZSLNR2004-1.5-005			1.5						2.0	2.1	2.2	2.3	2.5	•	
ZSLNR2004-2-005			2						2.7	2.9	3.1	3.3	3.6	•	
ZSLNR2004-2.5-005			2.5						3.2	3.5	3.7	3.9	4.3	•	
ZSLNR2004-3-005			3						3.8	4.0	4.3	4.5	4.9	•	
ZSLNR2004-3.5-005			3.5						4.3	4.6	4.9	5.1	5.5	•	
ZSLNR2004-4-005			4						5.0	5.4	5.8	6.1	6.6	•	
ZSLNR2004-2-01			0.1						2	2.7	2.9	3.1	3.3	3.6	•
ZSLNR2004-3-01									3	3.8	4.0	4.3	4.5	4.9	•
ZSLNR2004-4-01									4	5.0	5.4	5.8	6.1	6.6	•
ZSLNR2005-1-005	0.5	0.05		1	0.35	0.47	50	4	10.8	1.4	1.5	1.6	1.7	1.9	•
ZSLNR2005-2-005			2	2.5						2.6	2.8	2.9	3.1	•	
ZSLNR2005-3-005			3	3.8						4.0	4.3	4.5	4.9	•	
ZSLNR2005-4-005			4	4.8						5.2	5.4	5.7	6.1	•	
ZSLNR2005-5-005			5	6.1						6.6	6.9	7.3	7.8	•	
ZSLNR2005-6-005			6	7.0						7.2	7.7	8.1	8.4	9.0	•
ZSLNR2005-1-01		0.1	1	1.4						1.5	1.6	1.7	1.9	•	
ZSLNR2005-2-01			2	2.5						2.6	2.8	2.9	3.1	•	
ZSLNR2005-3-01			3	3.8						4.0	4.3	4.5	4.9	•	

Data\_P296~298



## 2 FLUTE, LONG NECK, RADIUS BACK DRAFT TYPE

- If the workpiece has draft angle, the interference length will be longer than the  $L_2$ .
- Please refer to the effective neck length for the various draft angles.
- In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle  $\theta$ ", and should also be referred to.

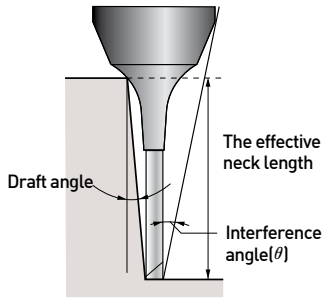


## ZSLNR..... series

※The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length.

EDP. No.	Dimension(mm)								Effective Neck Length					STOCK
	D	R	$L_2$	$L_1$	$d_1$	$L_3$	$d_3$	$\theta$	0.5°	1°	1.5°	2°	3°	
ZSLNR2005-4-01	0.5	0.1	4	0.35	0.47	50	4	8.2	4.8	5.2	5.4	5.7	6.1	•
ZSLNR2005-5-01			5					7.6	6.1	6.5	6.9	7.2	7.8	•
ZSLNR2005-6-01			6					7.1	7.2	7.7	8.1	8.4	9.0	•
ZSLNR2006-2-01	0.6	0.1	2	0.4	0.57	50	4	9.7	2.5	2.6	2.8	2.9	3.1	•
ZSLNR2006-4-01			4					8.1	4.8	5.2	5.4	5.7	6.1	•
ZSLNR2006-6-01			6					7.0	7.2	7.7	8.1	8.4	9.0	•
ZSLNR2006-8-01			8					6.1	9.3	9.9	10.3	10.7	11.4	•
ZSLNR2006-10-01			10					5.5	11.5	12.1	12.5	13.0	13.7	•
ZSLNR2008-4-01	0.8	0.1	4	0.5	0.77	50	4	8.0	4.8	5.2	5.4	5.7	6.1	•
ZSLNR2008-6-01			6					6.8	7.0	7.4	7.7	7.9	8.4	•
ZSLNR2008-8-01			8					5.9	9.3	9.9	10.3	10.7	11.4	•
ZSLNR2008-12-01		12	4.7			13.6		14.2	14.7	15.2	16.0	•		
ZSLNR2008-4-02		0.2	4			50		8.0	4.8	5.1	5.4	5.6	6.1	•
ZSLNR2008-6-02			6					6.9	7.0	7.3	7.7	7.9	8.4	•
ZSLNR2010-4-01	1	0.1	4	0.8	0.94	50	4	7.7	4.7	4.9	5.1	5.2	5.5	•
ZSLNR2010-6-01			6					6.6	7.1	7.4	7.7	8.0	8.5	•
ZSLNR2010-8-01			8					5.7	9.2	9.6	9.9	10.2	10.8	•
ZSLNR2010-10-01			10			5.1		11.6	12.1	12.6	13.0	13.7	•	
ZSLNR2010-12-01			12			4.5		13.7	14.3	14.8	15.3	16.0	•	
ZSLNR2010-16-01			16			3.8		17.9	18.6	19.2	19.7	21.3	•	
ZSLNR2010-20-01		20	3.2			22.0		22.8	23.5	24.0	26.7	•		
ZSLNR2010-4-02		0.2	4			50		7.8	4.7	4.9	5.1	5.2	5.5	•
ZSLNR2010-6-02			6					6.6	7.1	7.4	7.7	8.0	8.5	•
ZSLNR2010-8-02			8					5.8	9.2	9.6	9.9	10.2	10.8	•
ZSLNR2010-10-02			10			5.1		11.6	12.1	12.6	13.0	13.7	•	
ZSLNR2010-12-02			12			4.6		13.7	14.3	14.8	15.2	16.0	•	
ZSLNR2010-16-02			16			3.8		17.9	18.6	19.2	19.7	21.3	•	
ZSLNR2010-20-02			20			3.2		22.0	22.8	23.5	24.0	26.6	•	

Data, P296~298



## 2 FLUTE, LONG NECK, RADIUS BACK DRAFT TYPE

- If the workpiece has draft angle, the interference length will be longer than the  $L_2$ .
- Please refer to the effective neck length for the various draft angles.
- In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle  $\theta$ ", and should also be referred to.



※The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length.

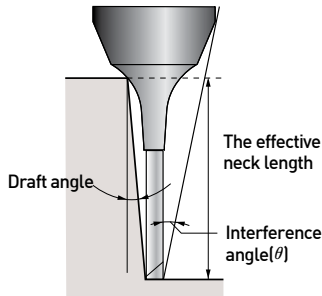
## ZSLNR..... series

EDP. No.	Dimension(mm)								Effective Neck Length					STOCK						
	D	R	$L_2$	$L_1$	$d_1$	$L_3$	$d_3$	$\theta$	0.5°	1°	1.5°	2°	3°							
ZSLNR2010-6-03	1	0.3	6	0.8	0.94	50	4	6.7	7.1	7.4	7.7	8.0	8.4	•						
ZSLNR2010-10-03			10					5.1	11.5	12.1	12.6	13.0	13.7	•						
ZSLNR2010-16-03			16			3.8		17.9	18.6	19.1	19.6	21.3	•							
ZSLNR2010-20-03			20			3.2		22.0	22.8	23.5	24.0	26.6	•							
ZSLNR2015-4-01	1.5	0.1	4	1.35	1.42	50	4	7.2	4.8	4.9	5.1	5.3	5.5	•						
ZSLNR2015-8-01			8					5.2	9.2	9.6	10.0	10.3	10.8	•						
ZSLNR2015-12-01			12			4.0		13.4	13.9	14.3	14.7	16.1	•							
ZSLNR2015-15-01			15			3.5		16.9	17.6	18.1	18.6	20.1	•							
ZSLNR2015-20-01		20	2.8			22.1		22.9	23.5	24.1	-	•								
ZSLNR2015-4-02		0.2	4			1.35		1.42	50	4	7.3	4.7	4.9	5.1	5.3	5.5	•			
ZSLNR2015-8-02			8								5.2	9.2	9.6	10.0	10.3	10.8	•			
ZSLNR2015-12-02			12						4.1		13.4	13.9	14.3	14.7	16.1	•				
ZSLNR2015-15-02			15						3.5		16.9	17.5	18.1	18.6	20.0	•				
ZSLNR2015-20-02		20	2.8			22.1		22.9	23.5		24.1	-	•							
ZSLNR2015-8-03		0.3	8			1.35		1.42	50		4	5.2	9.2	9.6	10.0	10.3	10.8	•		
ZSLNR2015-15-03			15									3.5	16.9	17.5	18.1	18.6	20.0	•		
ZSLNR2015-20-03			20						2.8			22.1	22.9	23.5	24.0	-	•			
ZSLNR2020-6-02			2						0.2			6	1.7	1.92	50	4	5.4	6.8	7.1	7.3
ZSLNR2020-8-02		8				4.6		8.9				9.2					9.4	9.7	10.8	•
ZSLNR2020-12-02		12				3.5		13.4				13.9			14.3		14.7	16.1	•	
ZSLNR2020-16-02	16	2.8		17.6	18.1	18.6	19.3	-				•								
ZSLNR2020-20-02	20	2.4		22.1	22.9	23.5	24.1	-	•											
ZSLNR2020-25-02	25	2.0		27.3	28.2	28.8	-	-	•											
ZSLNR2020-30-02	30	1.7		32.5	33.4	34.4	-	-	•											
ZSLNR2020-8-03	0.3	8		1.7	1.92	50	4	4.6	8.9			9.2			9.4		9.7	10.7	•	
ZSLNR2020-16-03		16						2.8	17.6	18.1		18.6			19.3		-	•		
ZSLNR2020-20-03		20				2.4		22.1	22.9	23.5		24.0			-		•			
ZSLNR2020-6-05		0.5				6		1.7	1.92	50		4			5.5		6.8	7.1	7.3	7.4
ZSLNR2020-8-05	8			4.7	8.9	9.2									9.4		9.6	10.7	•	

Data, P296~298

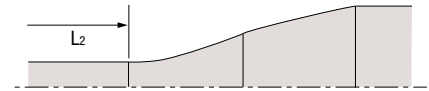
- No interference





## 2 FLUTE, LONG NECK, RADIUS BACK DRAFT TYPE

- If the workpiece has draft angle, the interference length will be longer than the  $L_2$ .
- Please refer to the effective neck length for the various draft angles.
- In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle  $\theta$ ", and should also be referred to.



※The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length.

## ZSLNR..... series

EDP. No.	Dimension(mm)								Effective Neck Length					STOCK	
	D	R	$L_2$	$L_1$	$d_1$	$L_3$	$d_3$	$\theta$	0.5°	1°	1.5°	2°	3°		
ZSLNR2020-12-05	2	0.5	12	1.7	1.92	55	4	3.5	13.4	13.9	14.3	14.6	16.0	•	
ZSLNR2020-16-05			16					2.9	17.6	18.1	18.6	19.2	-	•	
ZSLNR2020-20-05			20					2.4	22.1	22.9	23.5	24.0	-	•	
ZSLNR2020-25-05			25					2.0	27.3	28.1	28.8	-	-	•	
ZSLNR2020-30-05		30	1.7			32.5		33.4	34.3	-	-	•			
ZSLNR2020-8-08		0.8	8			50		4.8	8.9	9.2	9.4	9.6	10.6	•	
ZSLNR2020-16-08			16			55		2.9	17.6	18.1	18.6	19.2	-	•	
ZSLNR2020-20-08			20			60		2.4	22.1	22.8	23.5	24.0	-	•	
ZSLNR2030-8-02	3		0.2	8	2.5	2.86	55	6	5.7	9.0	9.3	9.5	9.9	10.9	•
ZSLNR2030-12-02		12		60			4.5		13.1	13.5	14.0	14.7	16.2	•	
ZSLNR2030-16-02		16		65			3.8		17.7	18.2	18.7	19.5	21.6	•	
ZSLNR2030-20-02		20		75			3.2		21.8	22.4	23.1	24.2	26.9	•	
ZSLNR2030-30-02		30		80			2.4		32.6	33.5	34.5	36.2	-	•	
ZSLNR2030-35-02		35		80			2.1		37.7	38.7	40.2	42.2	-	•	
ZSLNR2030-8-03		0.3		8			55		5.7	9.0	9.3	9.5	9.9	10.9	•
ZSLNR2030-16-03				16			60		3.8	17.7	18.2	18.7	19.4	21.5	•
ZSLNR2030-20-03			20	65			3.2		21.8	22.4	23.1	24.2	26.8	•	
ZSLNR2030-30-03			30	75			2.4		32.6	33.5	34.5	36.2	-	•	
ZSLNR2030-8-05		0.5	8	55			5.8		9.0	9.3	9.5	9.8	10.8	•	
ZSLNR2030-12-05			12	60			4.6		13.1	13.5	13.9	14.6	16.2	•	
ZSLNR2030-16-05			16	65			3.8		17.7	18.2	18.7	19.4	21.5	•	
ZSLNR2030-20-05			20	75			3.2		21.8	22.4	23.1	24.2	26.8	•	
ZSLNR2030-30-05			30	80			2.4		32.6	33.5	34.5	36.1	-	•	
ZSLNR2030-35-05			35	80			2.1		37.7	38.7	40.2	42.1	-	•	

Data, P296~298

- No interference

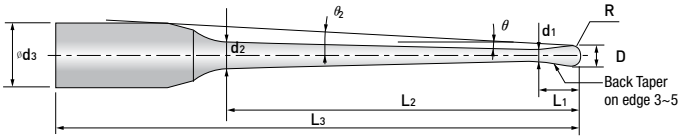
■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.015	h5

※Items can be changed for quality improvement without notice.



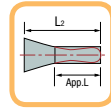
## 2 FLUTE, TAPER NECK, BALL BACK DRAFT TYPE



※R2 or higher is not applied to Back draft type.



The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length.



## ZSTNB20... series

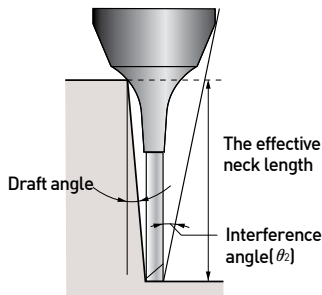


EDP. No.	Dimension(mm)										Effective Neck Length					STOCK	
	R	D	L <sub>2</sub>	θ	L <sub>1</sub>	d <sub>1</sub>	d <sub>2</sub>	L <sub>3</sub>	d <sub>3</sub>	App.L	θ <sub>2</sub>	0.5°	1°	1.5°	2°		3°
ZSTNB2002-1-04	0.1	0.2	1	0.4	0.15	0.17	0.18	50	4	1.35	10.9	1.5	1.7	1.8	2.0	2.3	
ZSTNB2002-1.5-04			1.5	0.4			0.19			1.77	10.4	2.0	2.2	2.4	2.6	2.9	
ZSTNB2002-2-09			2	0.9			0.23			1.10	10.1	x	2.8	3.1	3.4	3.9	
ZSTNB2002-2.5-09			2.5	0.9			0.24			1.10	9.6	x	3.3	3.7	4.0	4.5	
ZSTNB2003-2-04	0.15	0.3	2	0.4	0.25	0.28	0.29	50	4	2.19	10.0	2.5	2.8	3.0	3.2	3.5	
ZSTNB2003-3-09			3	0.9			0.36			1.20	9.3	x	3.8	4.2	4.5	5.1	
ZSTNB2003-4-09			4	0.9			0.39			1.20	8.6	x	4.8	5.3	5.7	6.3	
ZSTNB2004-2-04	0.2	0.4	2	0.4	0.3	0.37	0.39	50	4	2.20	10.0	2.5	2.8	3.0	3.2	3.5	
ZSTNB2004-3-04			3	0.4			0.41			2.44	9.1	3.6	3.9	4.1	4.4	4.8	
ZSTNB2004-4-04			4	0.4			0.42			2.44	8.4	4.7	5.2	5.6	5.9	6.5	
ZSTNB2004-4-09			4	0.9			0.49			1.25	8.5	x	4.8	5.3	5.7	6.3	
ZSTNB2004-5-04			5	0.4			0.44			2.44	7.8	5.7	6.3	6.7	7.1	7.7	
ZSTNB2004-5-09			5	0.9			0.52			1.25	7.9	x	5.9	6.4	6.8	7.5	
ZSTNB2005-4-04	0.25	0.5	4	0.4	0.35	0.47	0.52	50	4	2.49	8.4	4.6	5.0	5.3	5.5	5.9	
ZSTNB2005-8-09			8	0.9			0.71			1.30	6.5	x	8.9	9.6	10.1	10.9	
ZSTNB2005-12-09			12				0.84			1.30	5.3	x	13.0	13.9	14.5	15.4	
ZSTNB20054-2-04	0.27	0.54	2	0.4	0.37	0.52	0.54	50	4	1.80	10.0	2.3	2.5	2.7	2.8	3.0	
ZSTNB20054-4-04			4				0.57			1.80	8.4	4.5	4.9	5.2	5.5	5.9	
ZSTNB20054-5-04			5				0.59			1.80	7.8	5.5	6.0	6.3	6.6	7.1	
ZSTNB20054-6-04			6				0.60			1.80	7.2	6.7	7.3	7.8	8.2	8.8	
ZSTNB20054-6.5-04			6.5				0.61			1.80	7.0	7.2	7.9	8.3	8.7	9.4	
ZSTNB20054-7-04			7				0.61			1.80	6.8	7.7	8.4	8.9	9.3	10.0	
ZSTNB2006-2-04	0.3	0.6	2	0.4	0.4	0.57	0.59	50	4	2.17	10.0	2.4	2.5	2.7	2.8	3.0	
ZSTNB2006-4-04			4				0.62			2.54	8.4	4.6	5.0	5.2	5.5	5.9	
ZSTNB2006-6-04			6				0.65			2.54	7.2	6.8	7.4	7.8	8.2	8.8	
ZSTNB2006-6-09			6				0.75			1.35	7.3	x	6.9	7.5	7.9	8.6	
ZSTNB2006-8-09			8				0.81			1.35	6.4	x	8.9	9.6	10.1	10.9	
ZSTNB2006-10-04			10				0.70			2.54	5.6	10.8	11.7	12.2	12.7	13.5	
ZSTNB2006-10-09			10				0.87			1.35	5.7	x	11.0	11.8	12.3	13.2	
ZSTNB2006-12-09			12				0.93			1.35	5.2	x	13.0	13.9	14.5	15.4	
ZSTNB2006-15-04			15				0.77			2.54	4.4	15.9	17.0	17.6	18.2	19.2	
ZSTNB2006-15-09			15				1.03			1.35	4.5	x	16.1	17.1	17.7	18.8	

※ These tools are manufactured based on order received.

Data, P290~293

X No application  
- No interference



## 2 FLUTE, TAPER NECK, BALL BACK DRAFT TYPE

- If the workpiece has draft angle, the interference length will be longer than the  $L_2$ .
- Please refer to the effective neck length for the various draft angles.
- In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle  $\theta_2$ ", and should also be referred to.



※The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length.

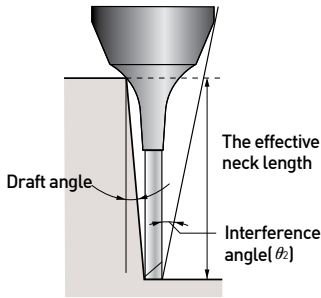
## ZSTNB20... series

EDP. No.	Dimension(mm)										Effective Neck Length					STOCK						
	R	D	L <sub>2</sub>	$\theta$	L <sub>1</sub>	d <sub>1</sub>	d <sub>2</sub>	L <sub>3</sub>	d <sub>3</sub>	App. L	$\theta_2$	0.5°	1°	1.5°	2°		3°					
ZSTNB2008-4-04	0.4	0.8	4	0.4	0.5	0.77	0.82	50	4	2.64	8.3	4.6	4.9	5.2	5.5	5.9						
ZSTNB2008-6-04			6				0.85			2.64	7.1	6.6	7.1	7.5	7.7	8.3						
ZSTNB2008-8-09			8	1.01			1.45	6.3		x	8.9	9.6	10.1	10.9								
ZSTNB2008-12-09			12	1.13			1.45	5.0		x	13.0	13.9	14.5	15.4								
ZSTNB2008-16-09			16	1.26			1.45	4.2		x	17.1	18.1	18.8	19.9								
ZSTNB2009-4-04	0.45	0.9	4	0.4	0.6	0.86	0.91	55	4	3.46	8.2	4.5	4.7	4.9	5.1	5.4						
ZSTNB2009-8-04			8				0.96			3.46	6.1	8.7	9.3	9.7	10.0	10.6						
ZSTNB2009-12-04			12				1.02	3.46		4.8	12.9	13.8	14.4	14.9	15.7							
ZSTNB2009-16-04			16				1.08	3.46		4.0	17.0	18.0	18.7	19.3	20.5							
ZSTNB2009-18-04			18				1.10	3.46		3.7	19.1	20.1	20.9	21.5	23.1							
ZSTNB2009-20-04			20				1.13	3.46		3.4	21.1	22.2	23.0	23.6	25.6							
ZSTNB2009-22-04			22				1.16	3.46		3.2	23.1	24.3	25.1	25.8	28.2							
ZSTNB2009-24-04			24				1.19	3.46		3.0	25.2	26.4	27.2	27.9	-							
ZSTNB2010-6-04	0.5	1	6	0.4	0.8	0.94	1.01	55	6	5.09	8.3	6.8	7.2	7.5	7.8	8.3						
ZSTNB2010-8-04			8				1.04			5.09	7.5	8.8	9.3	9.7	10.0	10.6						
ZSTNB2010-10-04			10				1.07	5.09		6.8	11.0	11.7	12.3	12.7	13.5							
ZSTNB2010-10-09			10	1.23			2.70	6.9		x	11.2	11.9	12.4	13.2								
ZSTNB2010-15-09			15	1.39			2.70	5.7		x	16.2	17.1	17.8	18.8								
ZSTNB2010-20-04			20	1.21			5.09	4.7		21.2	22.3	23.0	23.6	25.7								
ZSTNB2010-20-09			20	1.54			2.70	4.8		x	21.3	22.4	23.1	24.6								
ZSTNB2010-25-09			25	1.70			2.70	4.2		x	26.4	27.6	28.4	30.8								
ZSTNB2010-30-04			30	1.35			5.09	3.6		31.3	32.7	33.6	34.8	38.5								
ZSTNB2010-30-09			30	1.86			2.70	3.7		x	31.4	32.8	33.7	36.9								
ZSTNB2010-35-09			35	2.02			2.70	3.3		x	36.5	38.0	39.0	43.1								
ZSTNB2010-40-09			40	2.17			2.70	3.0		x	41.6	43.2	44.4	-								
ZSTNB2010-50-09			50	2.49			2.70	2.5		x	51.7	53.5	55.5	-								
ZSTNB2010-60-09			60	2.80			2.70	2.2		x	61.8	63.8	66.6	-								
ZSTNB2010-70-09			70	3.11			2.70	1.9		x	71.9	74.0	-	-								
ZSTNB2015-8-04			0.75	1.5			8	0.4		1.35	1.42	1.51	55	6	7.07	7.3	8.9	9.4	9.7	10.0	10.6	
ZSTNB2015-10-04							10					1.54			7.07	6.6	10.9	11.5	11.9	12.2	12.9	

※ These tools are manufactured based on order received.

Data, P290~293

X No application  
- No interference



## 2 FLUTE, TAPER NECK, BALL BACK DRAFT TYPE

- If the workpiece has draft angle, the interference length will be longer than the  $L_2$ .
- Please refer to the effective neck length for the various draft angles.
- In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle  $\theta_2$ ", and should also be referred to.



※The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length.

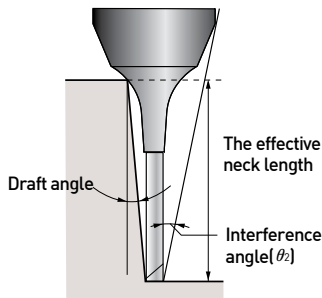
## ZSTNB20... series

EDP. No.	Dimension(mm)										Effective Neck Length					STOCK	
	R	D	$L_2$	$\theta$	$L_1$	$d_1$	$d_2$	$L_3$	$d_3$	App.L	$\theta_2$	0.5°	1°	1.5°	2°		3°
ZSTNB2015-12-04	0.75	1.5	12	0.4	1.35	1.42	1.57	55	6	7.07	6.0	13.0	13.6	14.4	15.4		
ZSTNB2015-15-09			15	0.9			1.85	60		3.89	5.4	x	16.4	17.2	17.8	18.8	
ZSTNB2015-20-09			20	0.9			2.01	65		3.89	4.5	x	21.4	22.4	23.2	24.7	
ZSTNB2015-30-09			30	0.9			2.32	75		3.89	3.4	x	31.5	32.9	33.7	37.0	
ZSTNB2018-4-04	0.9	1.8	4	0.4	1.6	1.73	1.76	50	6	4.38	9.2	4.6	4.8	4.9	5.1	5.4	
ZSTNB2018-8-04			8				1.82			60	6.61	7.1	8.6	9.0	9.2	9.4	10.2
ZSTNB2018-12-04			12				1.88			55	6.61	5.8	12.9	13.5	14.0	14.4	15.4
ZSTNB2018-16-04			16				1.93	60		6.61	4.9	17.0	17.7	18.3	18.7	20.5	
ZSTNB2018-20-04			20				1.99	65		6.61	4.3	21.2	22.3	23.0	23.6	25.6	
ZSTNB2018-24-04			24				2.04			6.61	3.8	25.3	26.5	27.3	27.9	30.8	
ZSTNB2018-28-04			28				2.10	70		6.61	3.4	29.4	30.6	31.5	32.4	35.9	
ZSTNB2018-32-04			32				2.15			6.61	3.0	33.4	34.8	35.7	37.1	-	
ZSTNB2018-36-04			36				2.21	75		6.61	2.8	37.5	38.9	39.9	41.7	-	
ZSTNB2018-38-04			38				2.24	80		6.61	2.7	39.5	41.0	42.0	44.0	-	
ZSTNB2018-40-04			40				2.27			6.61	2.6	41.5	43.1	44.2	46.3	-	
ZSTNB2020-8-04			1				2	8		0.4	1.7	1.92	2.01	50	6	7.42	7.0
ZSTNB2020-12-04	12	2.06		55	7.42	5.7		13.0	13.6				14.0	14.4		15.4	
ZSTNB2020-16-04	16	2.12		60	7.42	4.8		17.0	17.7				18.3	18.7		20.5	
ZSTNB2020-20-04	20	2.18		65	7.42	4.1		21.3	22.3				23.0	23.6		25.6	
ZSTNB2020-20-09	20	2.50			4.24	4.2		x	21.4				22.4	23.2		24.6	
ZSTNB2020-25-09	25	2.65		70	4.24	3.6		x	26.5				27.7	28.5		30.8	
ZSTNB2020-30-04	30	2.32			7.42	3.1		31.4	32.7				33.6	34.8		38.5	
ZSTNB2020-30-09	30	2.81		80	4.24	3.2		x	31.6				32.9	33.7		36.9	
ZSTNB2020-35-09	35	2.97			4.24	2.8		x	36.6				38.0	39.0		-	
ZSTNB2020-40-04	40	2.46		90	7.42	2.5		41.5	43.1				44.2	46.3		-	
ZSTNB2020-40-09	40	3.12			4.24	2.6		x	41.7				43.2	44.5		-	
ZSTNB2020-50-09	50	3.44		100	4.24	2.1		x	51.8				53.5	55.5		-	
ZSTNB2020-60-09	60	3.75	4.24		1.8	x	61.9	63.8	-	-							
ZSTNB2020-70-09	70	4.07	110	4.24	1.6	x	72.0	74.1	-	-							
ZSTNB2030-8-04	1.5	3	8	0.4	2.5	2.86	2.94	50	6	8.50	6.3	8.8	9.1	9.3	9.5	10.3	
ZSTNB2030-16-04			16				3.05	55		12.52	4.1	17.2	17.8	18.3	18.7	20.6	

※ These tools are manufactured based on order received.

Data\_P290~293

X No application  
- No interference



## 2 FLUTE, TAPER NECK, BALL BACK DRAFT TYPE

- If the workpiece has draft angle, the interference length will be longer than the  $L_2$ .
- Please refer to the effective neck length for the various draft angles.
- In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle  $\theta_2$ ", and should also be referred to.



※The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length.

## ZSTNB20... series

EDP. No.	Dimension(mm)										Effective Neck Length					STOCK								
	R	D	L <sub>2</sub>	$\theta$	L <sub>1</sub>	d <sub>1</sub>	d <sub>2</sub>	L <sub>3</sub>	d <sub>3</sub>	App. L	$\theta_2$	0.5°	1°	1.5°	2°		3°							
ZSTNB2030-20-04	1.5	3	20	0.4	2.5	2.86	3.10	60	6	12.52	3.4	21.2	22.0	22.6	23.3	25.7								
ZSTNB2030-30-04			30				3.24	70				12.52	2.5	31.6	32.8	33.7	34.9	-						
ZSTNB2030-30-09			30				3.72	70				6.95	2.6	x	31.8	33.0	33.8	-						
ZSTNB2030-40-04			40	0.4			3.38	80				12.52	2.0	41.7	43.2	44.3	-	-						
ZSTNB2030-40-09			40				4.04	80				6.95	2.0	x	41.9	43.3	-	-						
ZSTNB2030-50-09			50	0.9			4.35	90				6.95	1.7	x	52.0	53.6	-	-						
ZSTNB2030-60-09			60				4.67	100				6.95	1.4	x	62.1	-	-	-						
ZSTNB2030-70-09			70				4.98	110				6.95	1.2	x	72.1	-	-	-						
ZSTNB2040-20-10			2				4	20				1	8	3.86	4.28	70	8	12.01	5.0	20.5	21.6	22.3	22.8	23.5
ZSTNB2040-30-10				30				4.63							80	12.01				3.51	22.0	31.6	32.5	33.2
ZSTNB2040-40-10	40	4.98		90	12.01	2.7		22.0	42.0	43.4	44.3				-									
ZSTNB2040-50-10	50	5.33		100	12.01	2.2		22.0	52.0	53.6	54.7				-									
ZSTNB2040-60-10	60	5.68		110	12.01	1.9		22.0	62.0	63.8	-				-									
ZSTNB2050-30-10	2.5	5		30	1	10		4.86	5.56	80	8				14.01	2.8				25.5	31.7	32.6	33.2	-
ZSTNB2050-40-10			40	5.91			90		14.01	2.1		25.5	41.7	42.8			43.5	-						
ZSTNB2050-60-10			60	6.61			110		14.01	1.5		25.5	62.1	-			-	-						
ZSTNB2060-30-10	3	6	30	1	12	5.86	6.49	80	8	16.01	1.9	29.0	31.8	32.6	-	-								
ZSTNB2060-40-10			40				6.84	90				16.01	1.5	29.0	41.8	-	-	-						
ZSTNB2060-50-10			50				7.19	100				16.01	1.2	29.0	51.8	-	-	-						
ZSTNB2060-60-10			60				7.54	110	16.01			1.9	29.0	62.2	63.9	-	-							
ZSTNB2060-70-10			70				7.89	120	10			16.01	1.7	29.0	72.2	74.1	-	-						
ZSTNB2060-80-10			80				8.23	130						16.01	1.5	29.0	82.2	-	-	-				
ZSTNB2080-50-10			4				8	50	1			14	7.86	9.12	110	10	18.01	1.2	32.0	51.9	-	-	-	
ZSTNB2080-60-10	60	9.47		120	18.01	1.0		32.0		-	-			-	-									
ZSTNB2080-70-10	70	9.82		130	18.01	0.9		32.0		-	-			-	-									
ZSTNB2080-80-10	80	10.16		140	12	18.01		1.5		32.0	82.3			-	-	-								
ZSTNB2100-60-10	5	10	60	1	18	9.86	11.33	130	12	22.01	1.1	39.0	62.1	-	-	-								
ZSTNB2100-75-10			75				11.85	140				22.01	0.9	39.0	-	-	-	-						

※ These tools are manufactured based on order received.

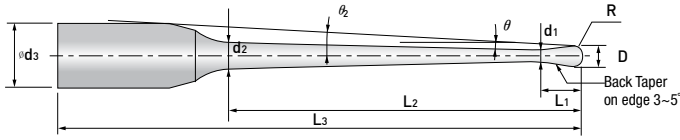
Data, P290~293

X No application  
- No interference

### ■ Tolerance

Diameter	Tolerance	Shank Dia.
up to 6	±0.005	h6
over 6	±0.01	

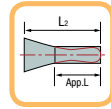
※Items can be changed for quality improvement without notice.



### 3 FLUTE, TAPER NECK, BALL BACK DRAFT TYPE



The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length.



※ R2 or higher is not applied to Back draft type.

## ZSTNB30..... series



EDP. No.	Dimension(mm)										Effective Neck Length						STOCK	
	R	D	L <sub>2</sub>	θ	L <sub>1</sub>	d <sub>1</sub>	d <sub>2</sub>	L <sub>3</sub>	d <sub>3</sub>	App.L	θ	0.5°	1°	1.5°	2°	3°		
ZSTNB3020-8-04	1	2	8	0.4	1.7	1.92	2.01	50	6	6	7.42	7.0	8.7	9.0	9.2	9.5	10.2	
ZSTNB3020-12-04			12				2.06	55			7.42	5.7	13.0	13.6	14.0	14.4	15.4	
ZSTNB3020-16-04			16				2.12	60			7.42	4.8	17.0	17.7	18.3	18.7	20.5	
ZSTNB3020-20-04			20				2.18	65			7.42	4.1	21.3	22.3	23.0	23.6	25.6	
ZSTNB3020-20-09			20				2.50				4.2	x	21.4	22.4	23.2	24.6		
ZSTNB3020-25-09			25				2.65	4.2			3.6	x	26.5	27.7	28.5	30.8		
ZSTNB3020-30-04			30	2.32			70	7.42			3.1	31.4	32.7	33.6	34.8	38.5		
ZSTNB3020-30-09			30	2.81				4.2			3.2	x	31.6	32.9	33.7	36.9		
ZSTNB3020-35-09			35	2.97			75	4.2			2.8	x	36.6	38.0	39.0	-		
ZSTNB3020-40-04			40	2.46			80	7.42			2.5	41.5	43.1	44.2	46.3	-		
ZSTNB3020-40-09			40	3.12			80	4.2			2.6	x	41.7	43.2	44.5	-		
ZSTNB3020-50-09			50	3.44			90	4.2			2.1	x	51.8	53.5	55.5	-		
ZSTNB3020-60-09			60	3.75			100	4.2			1.8	x	61.9	63.8	-	-		
ZSTNB3020-70-09			70	4.07			110	4.2			1.6	x	72.0	74.1	-	-		
ZSTNB3030-8-04	1.5	3	8	0.4	2.5	2.86	2.94	50	6	6	8.50	6.3	8.8	9.1	9.3	9.5	10.3	
ZSTNB3030-16-04			16				3.05	55			12.52	4.1	17.2	17.8	18.3	18.7	20.6	
ZSTNB3030-20-04			20				3.10	60			12.52	3.4	21.2	22.0	22.6	23.3	25.7	
ZSTNB3030-30-04			30				3.24	70			12.52	2.5	31.6	32.8	33.7	34.9	-	
ZSTNB3030-30-09			30				3.72				6.95	2.6	x	31.8	33.0	33.8	-	
ZSTNB3030-40-04			40				3.38	80			12.52	2.0	41.7	43.2	44.3	-	-	
ZSTNB3030-40-09			40	4.04			6.95				2.0	x	41.9	43.3	-	-		
ZSTNB3030-50-09			50	4.35			90	6.95			1.7	x	52.0	53.6	-	-		
ZSTNB3030-60-09			60	4.67			100	6.95			1.4	x	62.1	-	-	-		
ZSTNB3030-70-09			70	4.98			110	6.95			1.2	x	72.1	-	-	-		
ZSTNB3040-20-10	2	4	20	1	8	3.86	4.28	70	8	8	12.01	5.0	20.5	21.6	22.3	22.8	23.5	
ZSTNB3040-30-10			30				4.63	80			12.01	3.6	22.0	31.6	32.5	33.2	34.1	
ZSTNB3040-40-10			40				4.98	90			12.01	2.7	22.0	42.0	43.4	44.3	-	
ZSTNB3040-50-10			50				5.33	100			12.01	2.2	22.0	52.0	53.6	54.7	-	
ZSTNB3040-60-10			60				5.68	110			12.01	1.9	22.0	62.0	63.8	-	-	
ZSTNB3050-30-10	2.5	5	30	1	10	4.86	5.56	80	8	8	14.01	2.8	25.5	31.7	32.6	33.2	-	
ZSTNB3050-40-10			40				5.91	90			14.01	2.1	25.5	41.7	42.8	43.5	-	
ZSTNB3050-60-10			60				6.61	110			12.52	1.5	25.5	62.1	-	-	-	

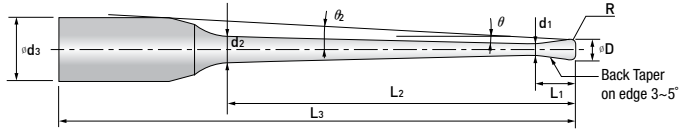
※ These tools are manufactured based on order received.

Data, P290~293

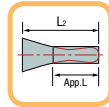
X No application  
- No interference



## 2 FLUTE, TAPER NECK, RADIUS BACK DRAFT TYPE

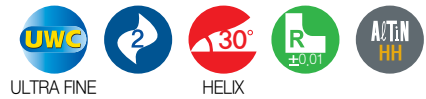


The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length.



※ R2 or higher is not applied to Back draft type.

## ZSTNR..... series



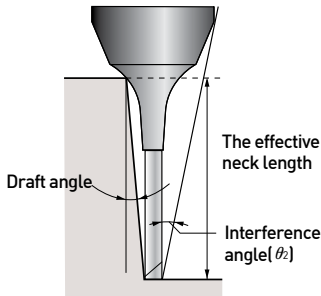
EDP. No.	Dimension(mm)										Effective Neck Length					STOCK		
	R	D	L <sub>2</sub>	θ	L <sub>1</sub>	d <sub>1</sub>	d <sub>2</sub>	L <sub>3</sub>	d <sub>3</sub>	App.L	φ <sub>2</sub>	0.5°	1°	1.5°	2°		3°	
ZSTNR2002-2-09005	0.2	0.05	2	0.9	0.15	0.17	0.23	50	4	1.10	10.0	x	2.8	3.1	3.4	3.9		
ZSTNR2004-4-09005	0.4	0.05	4	0.9	0.3	0.37	0.49	50	4	1.25	8.4	x	4.9	5.3	5.7	6.3		
ZSTNR2004-5-09005			5	0.9			0.52			1.25	7.8	x	5.9	6.4	6.8	7.5		
ZSTNR2004-4-0901		0.1	4	0.9	0.49	1.25	8.5			x	4.9	5.3	5.7	6.3				
ZSTNR2004-5-0901			5	0.9	0.52	1.25	7.9			x	5.9	6.4	6.8	7.5				
ZSTNR2005-5-0901	0.5	0.1	5	0.9	0.35	0.47	0.62	50	4	1.30	7.8	x	5.9	6.4	6.8	7.5		
ZSTNR2005-8-0901			8	0.9			0.71			1.30	6.4	x	9.0	9.7	10.2	11.0		
ZSTNR2005-10-0901			10	0.9			0.77			1.30	5.8	x	11.0	11.8	12.4	13.2		
ZSTNR2006-12-0901	0.6	0.1	12	0.9	0.4	0.57	0.93	55	4	1.35	5.1	x	13.0	13.9	14.5	15.5		
ZSTNR2006-15-0901			15	0.9			1.03			1.35	4.5	x	16.1	17.1	17.8	18.8		
ZSTNR2008-6-0402	0.8	0.2	6	0.4	0.5	0.77	0.85	50	4	2.64	7.0	6.6	7.1	7.5	7.8	8.3		
ZSTNR2008-12-0902			12	0.9			1.13			55	1.45	5.0	x	13.0	13.9	14.5	15.5	
ZSTNR2010-8-0402	1	0.2	8	0.4	0.8	0.94	1.04	55	6	5.09	7.4	8.8	9.3	9.7	10.1	10.6		
ZSTNR2010-10-0902			10	0.9			1.23			5.09	6.8	x	11.2	11.9	12.4	13.3		
ZSTNR2010-15-0902			15	0.9			1.39			60	2.70	5.6	x	16.3	17.2	17.8	18.8	
ZSTNR2010-20-0902			20	0.9			1.54			65	2.70	4.8	x	21.3	22.4	23.2	24.7	
ZSTNR2010-25-0902			25	0.9			1.70			70	2.70	4.1	x	26.4	27.6	28.5	30.9	
ZSTNR2010-30-0902		30	0.9	1.86	75	2.70	3.7	x	31.5	32.8	33.7	37.0						
ZSTNR2010-35-0902		35	0.9	2.02	80	2.70	3.3	x	36.5	38.0	39.0	43.2						
ZSTNR2010-8-0403		0.3	8	0.4	0.8	0.94	1.04	55	6	2.70	7.4	8.8	9.3	9.7	10.0	10.6		
ZSTNR2010-15-0903			15	0.9			1.39			60	2.70	5.6	x	16.3	17.2	17.8	18.8	
ZSTNR2010-25-0903			25	0.9			1.70			70	2.70	4.2	x	26.4	27.6	28.5	30.8	
ZSTNR2010-30-0903	30		0.9	1.86			75			2.70	3.7	x	31.5	32.8	33.7	37.0		
ZSTNR2015-10-0402	1.5		0.2	10			0.4			1.35	1.42	1.54	55	6	7.07	6.4	11.0	11.5
ZSTNR2015-15-0902		15		0.9	1.85	60	7.07	5.3	x			16.4			17.3	17.9	18.9	
ZSTNR2015-20-0902		20		0.9	2.01	65	3.89	4.5	x			21.5			22.5	23.2	24.9	
ZSTNR2015-25-0902		25	0.9	2.16	70	3.89	3.9	x	26.6			27.7			28.5	31.0		
ZSTNR2015-30-0902		30	0.9	2.32	75	3.89	3.4	x	31.6			32.9			33.8	37.1		
ZSTNR2015-10-0403		0.3	10	0.4	1.54	55	3.89	6.4	11.0			11.5			11.9	12.3	13.0	

※ These tools are manufactured based on order received.

Data, P294~295

X No application  
- No interference





## 2 FLUTE, TAPER NECK, RADIUS BACK DRAFT TYPE

- If the workpiece has draft angle, the interference length will be longer than the  $L_2$ .
- Please refer to the effective neck length for the various draft angles.
- In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle  $\theta_2$ ", and should also be referred to.



※The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length.

## ZSTNR..... series

EDP. No.	Dimension(mm)											Effective Neck Length					STOCK							
	R	D	$L_2$	$\theta$	$L_1$	$d_1$	$d_2$	$L_3$	$d_3$	App.L	$\theta_2$	0.5°	1°	1.5°	2°	3°								
ZSTNR2015-20-0903	1.5	0.3	20	0.9	1.35	1.42	2.01	65	6	3.89	4.5	x	21.5	22.5	23.2	24.8	•							
ZSTNR2015-25-0903			25				2.16	70				3.9	x	26.5	27.7	28.5	31.0	•						
ZSTNR2015-30-0903			30				2.32	75				3.4	x	31.6	32.9	33.8	37.1	•						
ZSTNR2020-30-0902	2	0.2	30	0.9	1.7	1.92	2.81	70	6	7.42	3.1	x	31.6	32.9	33.8	37.2	•							
ZSTNR2020-40-0902			40				3.12	80				2.5	x	41.8	43.3	44.6	-	•						
ZSTNR2020-50-0902			50				3.44	90				2.1	x	51.9	53.6	55.7	-	•						
ZSTNR2020-12-0403			0.3				12	0.4				2.06	55	5.5	13.0	13.6	14.1	14.5	15.6	•				
ZSTNR2020-20-0903							20					2.50	65	4.1	x	21.5	22.5	23.2	24.9	•				
ZSTNR2020-30-0903							30					2.81	70	3.1	x	31.6	32.9	33.8	37.1	•				
ZSTNR2020-40-0903		40		3.12			80				2.5	x	41.7	43.3	44.6	-	•							
ZSTNR2020-50-0903		50		3.44			90				2.1	x	51.8	53.6	55.7	-	•							
ZSTNR2020-8-0405		0.5		8			0.9				2.01	50	6.8	8.7	9.0	9.3	9.5	10.4	•					
ZSTNR2020-12-0405			12	2.06				55			5.6	13.0	13.6	14.1	14.4	15.5	•							
ZSTNR2020-16-0405			16	2.12				60			4.7	17.0	17.8	18.3	18.7	20.7	•							
ZSTNR2020-20-0905			20	2.50				65			4.2	x	21.5	22.5	23.2	24.8	•							
ZSTNR2020-25-0905			25	2.65				65			3.6	x	26.6	27.7	28.5	30.9	•							
ZSTNR2020-30-0905			30	2.81				70			3.1	x	31.6	32.9	33.8	37.1	•							
ZSTNR2020-40-0905		0.5	40	0.9			3.12	80			2.5	x	41.7	43.2	44.6	-	•							
ZSTNR2020-50-0905			50				3.44	90			2.1	x	51.8	53.6	55.6	-	•							
ZSTNR2030-40-0902			3				0.2	40			0.9	2.5	2.86	4.04	80	6	6.95	2.0	x	42.0	43.4	-	-	•
ZSTNR2030-50-0902								50						4.35	90				1.6	x	52.1	53.7	-	-
ZSTNR2030-60-0902	60				4.67	100		1.4	x	62.2				-	-				-	•				
ZSTNR2030-40-0903	0.3				40	4.04		80	2.0	x				42.0	43.4				-	-	•			
ZSTNR2030-50-0903		50		4.35	90	1.7		x	52.1	53.7				-	-				•					
ZSTNR2030-60-0903		60		4.67	100	1.4		x	62.2	-				-	-				•					
ZSTNR2030-40-0905		0.5		40	4.04	80	2.0	x	42.0	43.4				-	-			•						
ZSTNR2030-50-0905				50	4.35	90	1.7	x	52.1	53.7				-	-			•						
ZSTNR2030-60-0905				60	4.67	100	1.4	x	62.1	-				-	-			•						

※ These tools are manufactured based on order received.

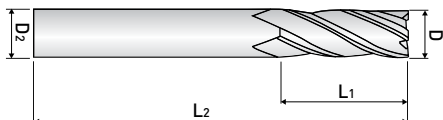
Data, P294~295

X No application  
- No interference

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.015	h5

※Items can be changed for quality improvement without notice.



## 4 FLUTE, LONG CUT LENGTH VARIABLE HELIX

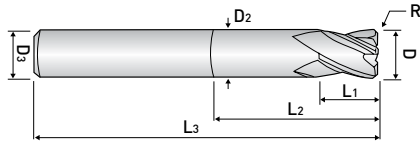
- High precision and excellent surface due to each 4F variable helix geometry.
- Longer tool life over 50% as reducing chatter and resonance.

## ZS124 ...series



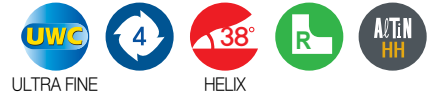
EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
ZS124 020	2	5	45	4	•
ZS124 030	3	8	45	6	•
ZS124 040	4	10	45	6	•
ZS124 060	6	16	50	6	•
ZS124 080	8	20	60	8	•
ZS124 100	10	25	75	10	•
ZS124 120	12	35	85	12	•

Data, P299



## 4 FLUTE, CORNER RADIUS VARIABLE HELIX

- The impacting debut of new type endmill for high hardened steels up to HRC70 and high speed machining up to 200m/min.
- High precision and excellent surface due to each 4F variable helix geometry.
- Longer tool life over 50% as reducing chatter and resonance.



## ZS1(2)04 ...series

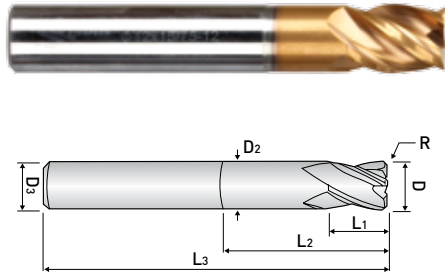
EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
ZS104010	1	-	1.5	4	45	0.9	4	•
ZS204010		0.05						•
ZS104020	2	-	3	6	45	1.9	4	•
ZS204020		0.05						•
ZS104030	3	-	4	7	45	2.9	6	•
ZS204030		0.1						•
ZS104040	4	-	5	9	45	3.8	6	•
ZS204040		0.1						•
ZS104060	6	-	7	14	50	5.8	6	•
ZS204060		0.2						•
ZS104080	8	-	9	18	60	7.8	8	•
ZS204080		0.2						•
ZS104100	10	-	12	25	75	9.7	10	•
ZS204100		0.2						•
ZS104120	12	-	15	30	75	11.7	12	•
ZS204120		0.3						•

Data, P299

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.02	h6

※Items can be changed for quality improvement without notice.



## 4 FLUTE, CORNER RADIUS VARIABLE HELIX

- The impacting debut of new type endmill for high hardened steels up to HRC70 and high speed machining up to 200m/min.
- High precision and excellent surface due to each 4F variable helix geometry.
- Longer tool life over 50% as reducing chatter and resonance.

## ZS204 .....series



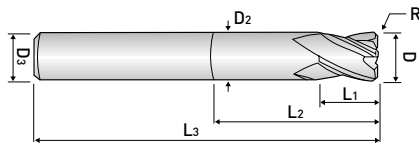
EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
ZS20402000507	2	0.05	2.5	7	50	1.9	4	•
ZS2040200107		0.1						•
ZS2040300109	3	0.1	4	9	55	2.9	6	•
ZS2040300209		0.2						•
ZS2040300309		0.3		12				•
ZS2040300312								•
ZS2040300316	16	•						
ZS2040400212	4	0.2	5	12	55	3.8	6	•
ZS2040400312		0.3		16				•
ZS2040400316				20				•
ZS2040400320		0.5		12				•
ZS2040400512				16				•
ZS2040400516				20				•
ZS2040400520	1	12	•					
ZS2040401012	5	0.1	6	16	60	4.8	6	•
ZS2040500116		0.2						•
ZS2040500216		0.3						•
ZS2040500316		0.5						•
ZS2040500516		1						•
ZS2040600120	6	0.1	7	20	60	5.8	6	•
ZS2040600220		0.2						•
ZS2040600320		0.3						•
ZS2040600520		0.5						•
ZS2040601020		1						•
ZS2040601520		1.5						•

Data, P299

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※Items can be changed for quality improvement without notice.



## 4 FLUTE, CORNER RADIUS VARIABLE HELIX

- The impacting debut of new type endmill for high hardened steels up to HRC70 and high speed machining up to 200m/min.
- High precision and excellent surface due to each 4F variable helix geometry.
- Longer tool life over 50% as reducing chatter and resonance.



## ZS204 .....series

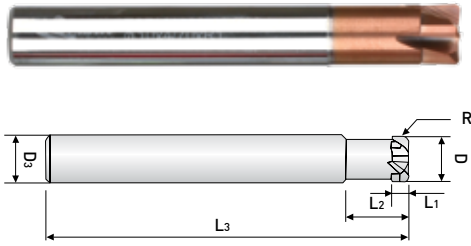
EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
ZS2040800125	8	0.1	9	25	60	8	7.8	•
ZS2040800225		0.2						•
ZS2040800325		0.3						•
ZS2040800525		0.5						•
ZS2040801025		1						•
ZS2040801525		1.5						•
ZS2040802025		2						•
ZS2041000232	10	0.2	11	32	75	10	9.7	•
ZS2041000332		0.3						•
ZS2041000532		0.5						•
ZS2041001032		1						•
ZS2041001532		1.5						•
ZS2041002032		2						•
ZS2041200238	12	0.2	12	38	75	12	11.7	•
ZS2041200338		0.3						•
ZS2041200538		0.5						•
ZS2041201038		1						•
ZS2041201538		1.5						•
ZS2041202038		2						•

Data, P299

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.02	h6

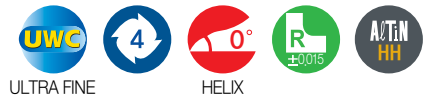
※Items can be changed for quality improvement without notice.



## 4 FLUTE, STUB CUT LENGTH, with EXTENDED NECK

- Designed to machine high hardened material by using newly developed raw-material and new coating.
- Applying straight flute design on the tool to minimize the corner radius breakage.
- Applying back draft type on the tool to maximize the reducing chatter and preventing deflection.

## ZSPM4...-... series



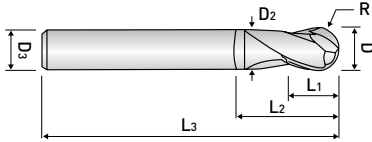
EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>	STOCK
ZSPM4030-05	3	0.5	1.2	8	50	6	•
ZSPM4040-05	4	0.5	1.5	10	50	6	•
ZSPM4060-05	6	0.5	2.5	12	60	6	•
ZSPM4060-10		1					•
ZSPM4060-15		1.5					•
ZSPM4060-15L							90
ZSPM4080-10	8	1	3.5	16	60	8	•
ZSPM4080-20		2					•
ZSPM4080-20L							100
ZSPM4100-10	10	1	4	20	70	10	•
ZSPM4100-20		2					•
ZSPM4100-20L							100
ZSPM4120-20	12	2	5	25	80	12	•
ZSPM4120-30		3					•
ZSPM4120-30L							110

Data, P299

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※Items can be changed for quality improvement without notice.



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

- Designed to machine high hardened materials up to HRc 70.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.
- Excellent workpiece finishes.

## DB702 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
DB702001	0.1	0.05	0.15	-	40	-	4	•
DB702002	0.2	0.1	0.3	-	40	-	4	•
DB702003	0.3	0.15	0.5	-	40	-	4	•
DB702004	0.4	0.2	0.6	-	40	-	4	•
DB702005	0.5	0.25	0.7	-	40	-	4	•
DB702006	0.6	0.3	0.9	-	40	-	4	•
DB702007	0.7	0.35	1.1	-	40	-	4	•
DB702008	0.8	0.4	1.2	-	40	-	4	•
DB702009	0.9	0.45	1.4	-	40	-	4	•
DB702010S4	1	0.5	1.5	-	45	-	4	•
DB702010				3	50	0.95	6	•
DB702015S4	1.5	0.75	2	-	45	-	4	•
DB702015				4	50	1.45	6	•
DB702020S4	2	1	2.5	-	45	-	4	•
DB702020				5	50	1.9	6	•
DB702025	2.5	1.25	3	7	50	2.45	6	•
DB702030S4	3	1.5	4	-	45	-	4	•
DB702030S				10	50	2.9	6	•
DB702030					60			•
DB702031					70			•
DB702040S4	4	2	5	-	45	-	4	•
DB702040S				10	50	3.7	6	•
DB702040					60			•
DB702041					70			•
DB702050	5	2.5	6	12	60	4.7	6	•
DB702060	6	3	7	12	60	5.9	6	•
DB702061					90	5.9		•
DB702080	8	4	9	15	70	7.9	8	•
DB702081					100	7.9		•
DB702100	10	5	11	25	75	9.9	10	•
DB702101					100	9.9		•
DB702120	12	6	12	25	80	11.9	12	•
DB702121					110	11.9		•

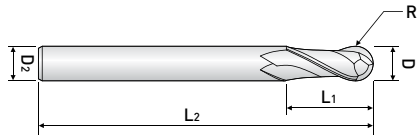
Data, P300

■ Tolerance

Radius (mm)		Shank Dia.
up to R3	±0,005	
over R3	±0,01	

※Items can be changed for quality improvement without notice.





## 2 FLUTE, REGULAR LENGTH, BALL NOSE

- Designed to machine high hardened material up to HRc 70.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.
- Excellent workpiece finishes.

## DB712 ...series



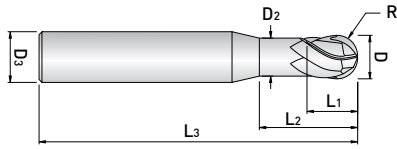
EDP. No.	Dia.	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
DB712010S	1	0.5	1.5	40	6	•
DB712010S4			2.5	50	4	•
DB712010					6	•
DB712012	1.2	0.6	3	50	6	•
DB712015S	1.5	0.75	2.5	40	6	•
DB712015S4			4	50	4	•
DB712015					6	•
DB712020S	2	1	3	40	6	•
DB712020S4			5	50	4	•
DB712020					6	•
DB712025	2.5	1.25	7	60	6	•
DB712030S	3	1.5	4.5	50	6	•
DB712030S4			8	60	4	•
DB712030					6	•
DB712040S	4	2	6	50	6	•
DB712040			8	70		•
DB712050S	5	2.5	7.5	50	6	•
DB712050			10	80		•
DB712060S	6	3	9	50	6	•
DB712060			12	90		•
DB712080S	8	4	12	50	8	•
DB712081			14	100		•
DB712100S	10	5	15	60	10	•
DB712100			18	100		•
DB712120S	12	6	18	60	12	•
DB712120			22	110		•

Data, P300

### ■ Tolerance

Radius (mm)		Shank Dia.
up to R3	±0,005	
over R3	±0,01	

※Items can be changed for quality improvement without notice.



## 3FLUTE, BALL NOSE for finishing MOLD & DIE

- Designed to machine high hardened material up to HRC 70.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.
- Excellent workpiece finishes.



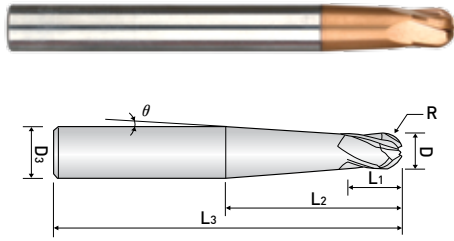
## DB703 ...series

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
DB703020	2	1	2.5	5	50	1.9	6	•
DB703025	2.5	1.25	3	7	50	2.4	6	•
DB703030S	3	1.5	4	10	50	2.9	6	•
DB703030					60			•
DB703031					70			•
DB703040S	4	2	5	10	50	3.7	6	•
DB703040					60			•
DB703041					70			•
DB703050	5	2.5	6	12	60	4.7	6	•
DB703060	6	3	7	12	60	5.6	6	•
DB703061					90			•
DB703080	8	4	9	15	70	7.4	8	•
DB703081					100			•
DB703100	10	5	11	25	75	9.4	10	•
DB703101					100			•
DB703120	12	6	12	25	80	11.4	12	•
DB703121					110			•

### ■ Tolerance

Radius (mm)		Shank Dia.
up to R3	±0,005	
over R3	±0,01	

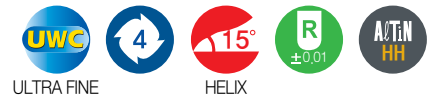
※Items can be changed for quality improvement without notice.



## 4FLUTE, TAPER NECK, FINISHING MOLD & DIE

- Designed to machine high hardened material up to HRc 70.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.
- Excellent workpiece finishes.

## DB734 ...series

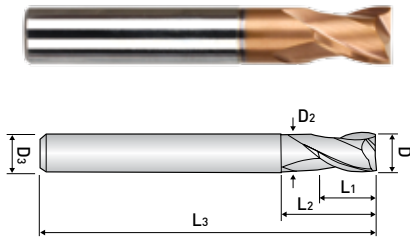


EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	θ	D <sub>3</sub>	STOCK
DB734020-2.5	2	1	2	25	60	2.5	4	•
DB734020-3.5				18		3.5		•
DB734025-2.5	2.5	1.25	3	20	60	2.5	4	•
DB734025-3.0				17		3		•
DB734030-2.0	3	1.5	3	46	70	2	6	•
DB734030-2.5				37		2.5		•
DB734040-2.0	4	2.0	4	33	70	2	6	•
DB734040-2.5				27		2.5		•
DB734050-2.5	5	2.5	5	16	70	2.5	6	•
DB734060-1.5	6	3.0	6	44	100	1.5	8	•
DB734060-2.5				29		2.5		•
DB734080-1.5	8	4.0	8	46	100	1.5	10	•
DB734080-2.5				31		2.5		•
DB734100-1.5	10	5.0	10	48	110	1.5	12	•
DB734100-2.5				33		2.5		•

### ■ Tolerance

Radius (mm)	Shank Dia.
±0.01	h6

※Items can be changed for quality improvement without notice.



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

- Designed to machine high hardened materials up to HRc 70.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.

## ZE702 ...series



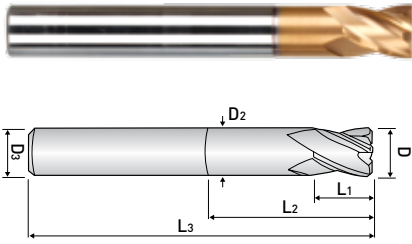
EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
ZE702001	0.1	0.2	-	40	-	4	•
ZE702002	0.2	0.4	-	40	-	4	•
ZE702003	0.3	0.5	-	40	-	4	•
ZE702004	0.4	0.7	-	40	-	4	•
ZE702005	0.5	1	-	40	-	4	•
ZE702006	0.6	1.2	-	40	-	4	•
ZE702007	0.7	1.4	-	40	-	4	•
ZE702008	0.8	1.6	-	40	-	4	•
ZE702009	0.9	2	-	40	-	4	•
ZE702010S4	1	1.5	-	40	-	4	•
ZE702010						6	•
ZE702015	1.5	2.2	-	40	-	6	•
ZE702020S4	2	3	6	40	1.9	4	•
ZE702020s						6	•
ZE702025	2.5	4	6	40	2.4	6	•
ZE702030	3	4	7	45	2.9	6	•
ZE702035	3.5	6	9	45	3.3	6	•
ZE702040	4	6	9	45	3.8	6	•
ZE702045	4.5	6	10	45	4.3	6	•
ZE702050	5	6	11	50	4.8	6	•
ZE702060	6	7	14	50	5.8	6	•
ZE702080	8	9	18	60	7.8	8	•
ZE702100	10	12	25	75	9.7	10	•
ZE702120	12	15	30	75	11.7	12	•
ZE702160	16	18	38	90	15.7	16	•
ZE702200	20	24	45	100	19.7	20	•

Data\_P300~301

■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0,012	h6
over 6	0 ~ -0,015	

※Items can be changed for quality improvement without notice.



## 4 FLUTE, STUB CUT LENGTH, with EXTENDED NECK

- Designed to machine high hardened materials up to HRc 70.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.

## ZE704 ...series



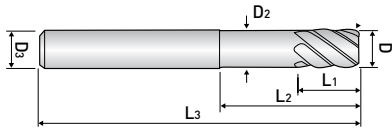
EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
ZE704010S4	1	1.5	-	40	-	4	•
ZE704010						6	•
ZE704015	1.5	2.2	-	40	-	6	•
ZE704020S4	2	3	6	40	1.9	4	•
ZE704020						6	•
ZE704025	2.5	4	6	40	2.4	6	•
ZE704030	3	4	7	45	2.9	6	•
ZE704035	3.5	5	9	45	3.3	6	•
ZE704040	4	5	9	45	3.8	6	•
ZE704045	4.5	6	10	45	4.3	6	•
ZE704050	5	6	11	50	4.8	6	•
ZE704060	6	7	14	50	5.8	6	•
ZE704080	8	9	18	60	7.8	8	•
ZE704100	10	12	25	75	9.7	10	•
ZE704120	12	15	30	75	11.7	12	•
ZE704160	16	18	38	90	15.7	16	•
ZE704200	20	24	45	100	19.7	20	•

Data, P301

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0,012	h6
over 6	0 ~ -0,015	

※Items can be changed for quality improvement without notice.



## 4 & 6 FLUTE, FINISHING for MOLD & DIE

- Designed to machine high hardened materials up to HRC 70.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.
- Corner radius (below 0.05) against chipping in high speed machining.



ULTRA FINE  $\phi 1 \sim \phi 5$   $\phi 6 \sim \phi 12$  4 FLUTE 6 FLUTE

## ZE724(6) ...series

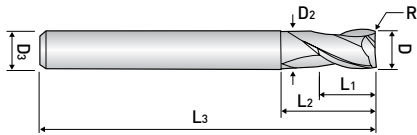
EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	Z	STOCK
ZE724010	1	1.5	5	45	0.95	6	4	•
ZE724015	1.5	2.2	6	45	1.45	6	4	•
ZE724020	2	3	8	45	1.9	6	4	•
ZE724030	3	4	9	50	2.9	6	4	•
ZE724040	4	5	12	50	3.8	6	4	•
ZE724050	5	6	15	50	4.8	6	4	•
ZE726060	6	7	20	60	5.8	6	6	•
ZE726080	8	9	25	70	7.8	8	6	•
ZE726100	10	12	32	75	9.7	10	6	•
ZE726120	12	15	38	80	11.7	12	6	•

Data, P301

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.015	h6
over 6	0 ~ -0.02	

※Items can be changed for quality improvement without notice.



## 2 FLUTE, STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK

- Applied various corner "Radius" and effected length.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.

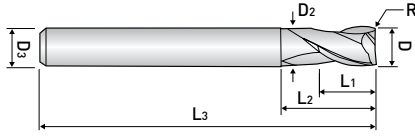
## ZR702 .....series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
ZR702 010 005 03 S4	1	0.05	1.5	3	50	0.95	4	•
ZR702 010 005 04 S4				4				•
ZR702 010 005 06 S4				6				•
ZR702 010 005 08 S4				8				•
ZR702 010 005 10 S4				10				•
ZR702 010 01 03 S4				3				•
ZR702 010 01 04 S4		4		•				
ZR702 010 01 06 S4		6		•				
ZR702 010 01 08 S4		8		•				
ZR702 010 01 10 S4		10		•				
ZR702 010 02 03 S4		0.2		3				•
ZR702 010 02 04 S4				4				•
ZR702 010 02 06 S4				6				•
ZR702 010 02 08 S4				8				•
ZR702 010 02 10 S4				10				•
ZR702 010 03 03 S4				0.3				3
ZR702 010 03 04 S4	4	•						
ZR702 010 03 06 S4	6	•						
ZR702 010 03 08 S4	8	•						
ZR702 010 03 10 S4	10	•						
ZR702 010 01 04	1	0.1	1.5		4	50	0.95	6
ZR702 010 01 06				6	•			
ZR702 010 02 04		0.2		4	•			
ZR702 010 02 06				6	•			
ZR702 010 02 10				10	•			
ZR702 010 02 12				12	•			
ZR702 012 02 08	1.2	0.2	2	8	50	1.15	6	•
ZR702 012 02 12				12				•
ZR702 015 005 04 S4	1.5	0.05	2.5	4	50	1.45	4	•
ZR702 015 005 06 S4				6				•
ZR702 015 005 08 S4				8				•
ZR702 015 005 10 S4				10				•
ZR702 015 005 12 S4				12				•
ZR702 015 01 04 S4				0.1				4
ZR702 015 01 06 S4		6						•
ZR702 015 01 08 S4		8						•
ZR702 015 01 10 S4		10						•
ZR702 015 01 12 S4		12						•

Data, P302





## 2 FLUTE, STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK

- Applied various corner "Radius" and effected length.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.



ULTRA FINE



4 FLUTE



up to 6



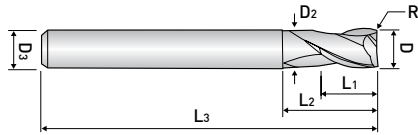
over Ø6



## ZR702 .....series

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
ZR702 015 02 04 S4	1.5	0.2	2.5	4	50	1.45	4	•
ZR702 015 02 06 S4				6				•
ZR702 015 02 08 S4				8				•
ZR702 015 02 10 S4				10				•
ZR702 015 02 12 S4				12				•
ZR702 015 03 04 S4				0.3				4
ZR702 015 03 06 S4		6						•
ZR702 015 03 08 S4		8						•
ZR702 015 03 10 S4		10						•
ZR702 015 03 12 S4		12						•
ZR702 015 05 04 S4		0.5						4
ZR702 015 05 06 S4				6				•
ZR702 015 05 08 S4	8		•					
ZR702 015 05 10 S4	10		•					
ZR702 015 05 12 S4	12		•					
ZR702 015 02 04	1.5		0.2	2.5	4	50	1.45	6
ZR702 015 02 06		6			•			
ZR702 015 02 08		8			•			
ZR702 015 02 10		10			•			
ZR702 015 02 15		15			•			
ZR702 020 01 06 S4	2	0.1	3	6	50	1.9	4	•
ZR702 020 01 08 S4				8				•
ZR702 020 01 10 S4				10				•
ZR702 020 01 12 S4				12				•
ZR702 020 01 16 S4				16				•
ZR702 020 01 20 S4				20				•
ZR702 020 02 06 S4		0.2		6				•
ZR702 020 02 08 S4				8				•
ZR702 020 02 10 S4				10				•
ZR702 020 02 12 S4				12				•
ZR702 020 02 16 S4				16				•
ZR702 020 02 20 S4				20				•
ZR702 020 03 06 S4	0.3	6	•					
ZR702 020 03 08 S4		8	•					
ZR702 020 03 10 S4		10	•					
ZR702 020 03 12 S4		12	•					
ZR702 020 03 16 S4		16	•					
ZR702 020 03 20 S4		2	•					

Data, P302



## 2 FLUTE, STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK

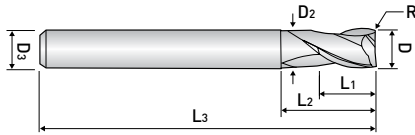
- Applied various corner "Radius" and effected length.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.

## ZR702 .....series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK						
ZR702 020 05 06 S4	2	0.5	3	6	50	1.9	4	•						
ZR702 020 05 08 S4				8				•						
ZR702 020 05 10 S4				10				•						
ZR702 020 05 12 S4				12				•						
ZR702 020 05 16 S4				16				•						
ZR702 020 05 20 S4				20				•						
ZR702 020 01 08	2	0.1	3	8	50	1.9	6	•						
ZR702 020 01 12				12				•						
ZR702 020 02 06		0.2		6				•						
ZR702 020 02 09				9				•						
ZR702 020 02 16		0.3		16				•						
ZR702 020 03 06				6				•						
ZR702 020 05 06		0.5		6				•						
ZR702 020 05 09				9				•						
ZR702 020 05 12				12				•						
ZR702 020 05 16				16				•						
ZR702 025 02 08 S4				2.5				0.2	3.5	8	50	2.4	4	•
ZR702 025 02 10 S4										10				•
ZR702 025 02 12 S4		12								•				
ZR702 025 02 16 S4		16								•				
ZR702 025 03 08 S4	0.3	8	•											
ZR702 025 03 10 S4		10	•											
ZR702 025 03 12 S4		12	•											
ZR702 025 03 16 S4		16	•											
ZR702 025 05 08 S4		0.5	8		•									
ZR702 025 05 10 S4			10		•									
ZR702 025 05 12 S4	12		•											
ZR702 025 05 16 S4	16		•											
ZR702 030 01 08	3	0.1	*4.5		8	55	2.9	6		•				
ZR702 030 01 10					10					•				
ZR702 030 01 12				12	•									
ZR702 030 01 16				16	•									
ZR702 030 01 20				20	•									
ZR702 030 02 08				0.2	8				•					
ZR702 030 02 09		9			•									
ZR702 030 02 10		10			•									

Data, P302



## 2 FLUTE, STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK

- Applied various corner "Radius" and effected length.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.



ULTRA FINE



4 FLUTE



up to 6



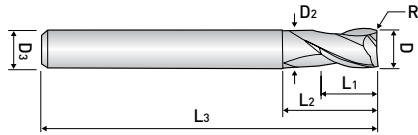
over Ø6



## ZR702 .....series

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK					
ZR702 030 02 12	3	0.2	4.5	12	55	2.9	6	•					
ZR702 030 02 16				16				•					
ZR702 030 02 20				20				•					
ZR702 030 03 08	3	0.3	4.5	8	55	2.9	6	•					
ZR702 030 03 09				9				•					
ZR702 030 03 10				10				•					
ZR702 030 03 12				12				•					
ZR702 030 03 14				14				•					
ZR702 030 03 16				16				•					
ZR702 030 03 20		20	60	•									
ZR702 030 05 08		3	0.5	4.5	8			55	2.9	6	•		
ZR702 030 05 09					9						•		
ZR702 030 05 10					10						•		
ZR702 030 05 12					12						•		
ZR702 030 05 16					16						•		
ZR702 030 05 20	20				60	•							
ZR702 030 10 08	3	1.0	4.5	8	55	2.9	6	•					
ZR702 030 10 10				10				•					
ZR702 030 10 12				12				•					
ZR702 030 10 16				16				•					
ZR702 030 10 20				20				60			•		
ZR702 030 10 25				25				60			•		
ZR702 040 01 10	4	1.0	6	10	55			3.8	6	•			
ZR702 040 01 12				12						•			
ZR702 040 01 16				16						•			
ZR702 040 01 20				20						60	•		
ZR702 040 01 25		25	60	•									
ZR702 040 02 10		4	0.2	6	10					55	3.8	6	•
ZR702 040 02 12					12	•							
ZR702 040 02 16					16	•							
ZR702 040 02 20					20	60	•						
ZR702 040 02 25					25	60	•						
ZR702 040 03 10					4	0.3	6						10
ZR702 040 03 12		12	•										
ZR702 040 03 16	16	•											
ZR702 040 03 20	20	60	•										
ZR702 040 03 25	25	60	•										
ZR702 040 03 25	25	60	•										

Data, P302



## 2 FLUTE, STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK

- Applied various corner "Radius" and effected length.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.

## ZR702 .....series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK	
ZR702 040 05 10	4	0.5	6	10	55	3.8	6	•	
ZR702 040 05 12				12				•	
ZR702 040 05 16				16				•	
ZR702 040 05 20				20				•	
ZR702 040 05 25				25				•	
ZR702 040 05 30				30				•	
ZR702 040 10 10		1.0	6	6	10	55	3.8	6	•
ZR702 040 10 12					12				•
ZR702 040 10 16					16				•
ZR702 040 10 20					20				•
ZR702 040 10 25					25				•
ZR702 040 10 30					30				•
ZR702 050 03 18	5	0.3	8	18	60	4.8	6	•	
ZR702 060 02 20	6	0.2	9	20	60	5.8	6	•	
ZR702 060 03 20		0.3						•	
ZR702 060 05 20		0.5						•	
ZR702 060 10 20		1.0						•	
ZR702 060 15 20		1.5						•	
ZR702 060 20 20		2.0						•	
ZR702 080 02 25	8	0.2	12	25	60	7.8	8	•	
ZR702 080 03 25		0.3						•	
ZR702 080 05 25		0.5						•	
ZR702 080 10 25		1.0						•	
ZR702 080 15 25		1.5						•	
ZR702 100 02 32		10						0.2	15
ZR702 100 03 32	0.3		•						
ZR702 100 05 32	0.5		•						
ZR702 100 10 32	1.0		•						
ZR702 100 15 32	1.5		•						
ZR702 100 20 32	2.0		•						
ZR702 120 03 38	12	0.3	18	38	80	11.7	12	•	
ZR702 120 05 38		0.5						•	
ZR702 120 10 38		1.0						•	
ZR702 120 15 38		1.5						•	
ZR702 120 20 38		2.0						•	
ZR702 120 20 38		2.0						•	

Data, P302

■ Tolerance

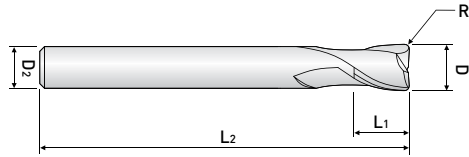
Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0,012	h6
over 6	0 ~ -0,015	

※Items can be changed for quality improvement without notice.

# Zamus Star

END MILLS  
> Metric & Inch

Zamus Star Series



## 2 FLUTE, LONG SHANK, CORNER RADIUS

- Applied various corner "Radius" and effected length.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.



ULTRA FINE



4 FLUTE



up to 6



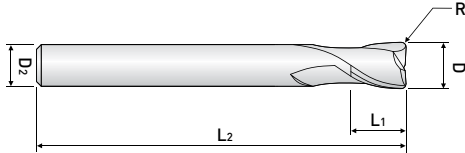
over Ø6



## ZR732 .....series

EDP. No.	Dia.	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
ZR732 010 01	1	0.1	2	50	6	•
ZR732 010 02		0.2				•
ZR732 010 03		0.3				•
ZR732 015 01	1.5	0.1	3	50	6	•
ZR732 015 02		0.2				•
ZR732 015 03		0.3				•
ZR732 015 05		0.5				•
ZR732 020 01	2	0.1	5	50	6	•
ZR732 020 02		0.2				•
ZR732 020 03		0.3				•
ZR732 020 05		0.5				•
ZR732 025 01	2.5	0.1	7	60	6	•
ZR732 025 02		0.2				•
ZR732 025 03		0.3				•
ZR732 025 05		0.5				•
ZR732 030 01	3	0.1	8	60	6	•
ZR732 030 02		0.2				•
ZR732 030 03		0.3				•
ZR732 030 05		0.5				•
ZR732 040 01	4	0.1	10	70	6	•
ZR732 040 02		0.2				•
ZR732 040 03		0.3				•
ZR732 040 05		0.5				•
ZR732 040 10		1.0				•

Data, P302



## 2 FLUTE, LONG SHANK, CORNER RADIUS

- Applied various corner "Radius" and effected length.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.

## ZR732 .....series



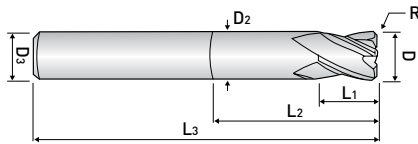
EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
ZR732 050 01	5	0.1	13	80	6	•
ZR732 050 02		0.2				•
ZR732 050 03		0.3				•
ZR732 050 05		0.5				•
ZR732 050 10		1.0				•
ZR732 060 01	6	0.1	15	90	6	•
ZR732 060 02		0.2				•
ZR732 060 03		0.3				•
ZR732 060 05		0.5				•
ZR732 060 10		1.0				•
ZR732 080 01	8	0.1	20	100	8	•
ZR732 080 02		0.2				•
ZR732 080 03		0.3				•
ZR732 080 05		0.5				•
ZR732 080 10		1.0				•
ZR732 080 20		2.0				•
ZR732 100 02	10	0.2	25	100	10	•
ZR732 100 03		0.3				•
ZR732 100 05		0.5				•
ZR732 100 10		1.0				•
ZR732 100 20		2.0				•
ZR732 120 02	12	0.2	30	110	12	•
ZR732 120 03		0.3				•
ZR732 120 05		0.5				•
ZR732 120 10		1.0				•
ZR732 120 20		2.0				•

Data, P302

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0,012	h6
over 6	0 ~ -0,015	

※Items can be changed for quality improvement without notice.



## 4 FLUTE, STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK

- Applied various corner "Radius" and effected length.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.

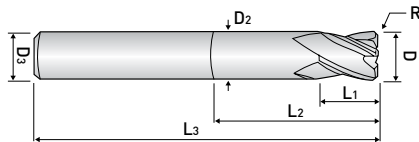


## ZR704 .....series

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK	
ZR704 010 01 03 S4	1	0.1	2	3	50	0.95	4	•	
ZR704 010 01 04 S4				4				•	
ZR704 010 01 06 S4				6				•	
ZR704 010 02 03 S4		0.2		3				•	
ZR704 010 02 04 S4				4				•	
ZR704 010 02 06 S4				6				•	
ZR704 010 03 03 S4		0.3		3				•	
ZR704 010 03 04 S4				4				•	
ZR704 010 03 06 S4				6				•	
ZR704 015 01 04 S4	1.5	0.1	2.5	4	50	1.45	4	•	
ZR704 015 01 06 S4				6				•	
ZR704 015 02 04 S4		0.2		4				•	
ZR704 015 02 06 S4				6				•	
ZR704 015 03 04 S4				4				•	
ZR704 015 03 06 S4	6	•							
ZR704 020 01 06 S4	2	0.1	3	6	50	1.9	4	•	
ZR704 020 01 08 S4				8				•	
ZR704 020 02 06 S4		0.2		6				•	
ZR704 020 02 08 S4				8				•	
ZR704 020 03 06 S4				6				•	
ZR704 020 03 08 S4		8		•					
ZR704 020 05 06 S4		0.5		6				•	
ZR704 020 05 08 S4				8				•	
ZR704 020 02 08	2	0.2	3	8	50	1.9	6	•	
ZR704 020 02 10				10				•	
ZR704 020 02 12				12				•	
ZR704 025 01 06 S4	2.5	0.1	3.5	6	50	2.4	4	•	
ZR704 030 01 08	3	0.1	4	8	55	2.9	6	•	
ZR704 030 01 10				10				•	
ZR704 030 01 12				12				•	
ZR704 030 01 16				16				•	
ZR704 030 01 20				20				•	
ZR704 030 02 08		0.2		8	55			8	•
ZR704 030 02 10				10				•	
ZR704 030 02 12				12				•	
ZR704 030 02 16				16				•	
ZR704 030 02 20				20				•	

Data, P303





## 4 FLUTE, STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK

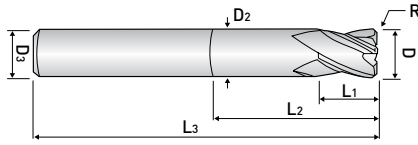
- Applied various corner "Radius" and effected length.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.

## ZR704 .....series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK								
ZR704 030 03 08	3	0.3	4	8	55	2.9	6	•								
ZR704 030 03 09				9				•								
ZR704 030 03 10				10				•								
ZR704 030 03 12				12				•								
ZR704 030 03 16				16				•								
ZR704 030 03 20				20				60	•							
ZR704 030 05 08		0.5		8	4			8	55	2.9	6	•				
ZR704 030 05 09				9				9				•				
ZR704 030 05 10				10				10				•				
ZR704 030 05 12				12				12				•				
ZR704 030 05 16				16				16				•				
ZR704 030 05 20				20				60				•				
ZR704 030 10 08	1.0	1.0	4	8	55	2.9	6	•								
ZR704 030 10 10				10				10	•							
ZR704 030 10 12				12				12	•							
ZR704 030 10 16				16				16	•							
ZR704 030 10 20				20				60	•							
ZR704 040 01 10				4				0.1	6			10	55	3.8	6	•
ZR704 040 01 12	12	12			•											
ZR704 040 01 16	16	16			•											
ZR704 040 01 20	20	20			•											
ZR704 040 01 25	25	60			•											
ZR704 040 02 10	0.2	10			6					10	55	3.8				6
ZR704 040 02 12		12						12		•						
ZR704 040 02 16		16	16			•										
ZR704 040 02 20		20	20			•										
ZR704 040 02 25		25	60			•										
ZR704 040 03 10		0.3	10			6	10	55		3.8			6			
ZR704 040 03 12	12		12		•											
ZR704 040 03 16	16		16		•											
ZR704 040 03 20	20		20		•											
ZR704 040 03 25	25		60		•											
ZR704 040 05 10	0.5		10		6		10				55					
ZR704 040 05 12		12	12			•										
ZR704 040 05 16		16	16			•										
ZR704 040 05 20		20	20			•										
ZR704 040 05 25		25	60			•										

Data, P303



## 4 FLUTE, STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK

- Applied various corner "Radius" and effected length.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.



ULTRA FINE



4 FLUTE



up to Ø6



over Ø6



## ZR704 .....series

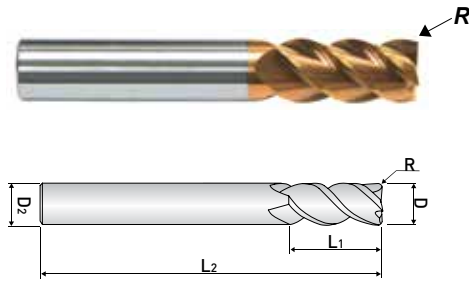
EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
ZR704 040 10 10	4	1.0	6	10	55	3.8	6	•
ZR704 040 10 12				12				•
ZR704 040 10 16				16				•
ZR704 040 10 20				20				•
ZR704 040 10 25				25				•
ZR704 060 02 20	6	0.2	9	20	60	5.8	6	•
ZR704 060 03 20		0.3						•
ZR704 060 05 20		0.5						•
ZR704 060 10 20		1.0						•
ZR704 060 15 20		1.5						•
ZR704 060 20 20		2.0						•
ZR704 080 02 25	8	0.2	12	25	60	7.8	8	•
ZR704 080 03 25		0.3						•
ZR704 080 05 25		0.5						•
ZR704 080 10 25		1.0						•
ZR704 080 15 25		1.5						•
ZR704 080 20 25		2.0						•
ZR704 100 02 32	10	0.2	15	32	70	9.7	10	•
ZR704 100 03 32		0.3						•
ZR704 100 05 32		0.5						•
ZR704 100 10 32		1.0						•
ZR704 100 15 32		1.5						•
ZR704 100 20 32		2.0						•
ZR704 120 03 38	12	0.3	18	38	80	11.7	12	•
ZR704 120 05 38		0.5						•
ZR704 120 10 38		1.0						•
ZR704 120 15 38		1.5						•
ZR704 120 20 38		2.0						•

Data, P303

■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0,012	h6
over 6	0 ~ -0,015	

※Items can be changed for quality improvement without notice.



## 4FLUTE, 45° HELIX FINISHING MOLD & DIE

- Designed to machine high hardened material up to HRc 70.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.
- Possible to reduce machining cycle time by 2 x D finishing performance.

## ZR714..... series



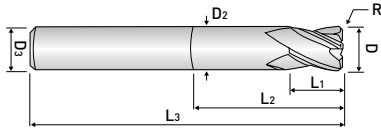
EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
ZR7140303	3	0.3	8	50	6	•
ZR7140305		0.5				•
ZR7140403	4	0.3	11	50	6	•
ZR7140405		0.5				•
ZR7140410		1.0				•
ZR7140603	6	0.3	15	60	6	•
ZR7140605		0.5				•
ZR7140610		1.0				•
ZR7140803	8	0.3	20	60	8	•
ZR7140805		0.5				•
ZR7140810		1.0				•
ZR7140815		1.5				•
ZR7140820		2.0				•
ZR7141003	10	0.3	25	70	10	•
ZR7141005		0.5				•
ZR7141010		1.0				•
ZR7141015		1.5				•
ZR7141020		2.0				•
ZR7141025		2.5				•
ZR7141030	3.0	•				
ZR7141203	12	0.3	30	80	12	•
ZR7141205		0.5				•
ZR7141210		1.0				•
ZR7141215		1.5				•
ZR7141220		2.0				•
ZR7141225		2.5				•
ZR7141230		3.0				•

Data, P303

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0,012	h6
over 6	0 ~ -0,015	

※Items can be changed for quality improvement without notice.



### 4 FLUTE, STUB CUT LENGTH, CORNER RADIUS with LONG SHANK

- Applied various corner "Radius" and effected length.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.



ULTRA FINE



HELIX



up to  $\phi 6$



over  $\phi 6$



## ZR724 .....series

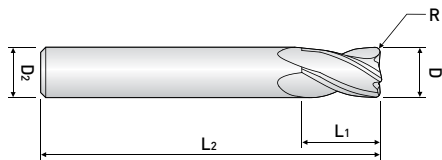
EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
ZR7240600520	6	0.5	9	20	90	5.8	6	•
ZR7240601020		1.0						•
ZR7240800525	8	0.5	12	25	100	7.7	8	•
ZR7240801025		1.0						•
ZR7241000532	10	0.5	15	32	100	9.7	10	•
ZR7241001032		1.0						•
ZR7241002032		2.0						•
ZR7241200538	12	0.5	18	38	110	11.7	12	•
ZR7241201038		1.0						•
ZR7241202038		2.0						•

Data, P303

#### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0,012	h6
over 6	0 ~ -0,015	

※Items can be changed for quality improvement without notice.



## 4 FLUTE, LONG SHANK, CORNER RADIUS

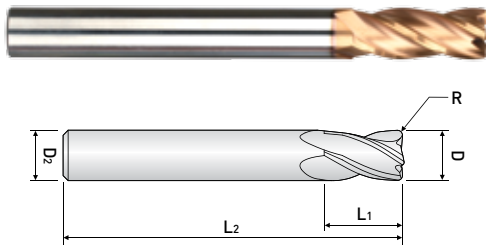
- Applied various corner "Radius" and effected length.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.

## ZR734..... series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
ZR734 010 01	1	0.1	2	50	6	•
ZR734 010 02		0.2				•
ZR734 010 03		0.3				•
ZR734 015 01	1.5	0.1	3	50	6	•
ZR734 015 02		0.2				•
ZR734 015 03		0.3				•
ZR734 015 05		0.5				•
ZR734 020 01	2	0.1	5	50	6	•
ZR734 020 02		0.2				•
ZR734 020 03		0.3				•
ZR734 020 05		0.5				•
ZR734 025 01	2.5	0.1	7	60	6	•
ZR734 025 02		0.2				•
ZR734 025 03		0.3				•
ZR734 025 05		0.5				•
ZR734 030 01	3	0.1	8	60	6	•
ZR734 030 02		0.2				•
ZR734 030 03		0.3				•
ZR734 030 05		0.5				•
ZR734 040 01	4	0.1	10	70	6	•
ZR734 040 02		0.2				•
ZR734 040 03		0.3				•
ZR734 040 05		0.5				•
ZR734 040 10		1.0				•

Data, P303



## 4 FLUTE, LONG SHANK, CORNER RADIUS

- Applied various corner "Radius" and effected length.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.

## ZR734..... series



ULTRA FINE



HELIX



up to Ø6



over Ø6



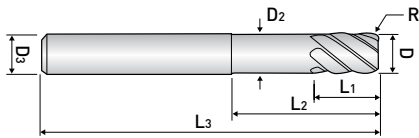
EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
ZR734 050 01	5	0.1	13	80	6	•
ZR734 050 02		0.2				•
ZR734 050 03		0.3				•
ZR734 050 05		0.5				•
ZR734 050 10		1.0				•
ZR734 060 01	6	0.1	15	90	6	•
ZR734 060 02		0.2				•
ZR734 060 03		0.3				•
ZR734 060 05		0.5				•
ZR734 060 10		1.0				•
ZR734 080 01	8	0.1	20	100	8	•
ZR734 080 02		0.2				•
ZR734 080 03		0.3				•
ZR734 080 05		0.5				•
ZR734 080 10		1.0				•
ZR734 080 20		2.0				•
ZR734 100 02	10	0.2	25	100	10	•
ZR734 100 03		0.3				•
ZR734 100 05		0.5				•
ZR734 100 10		1.0				•
ZR734 100 20		2.0				•
ZR734 120 02	12	0.2	30	110	12	•
ZR734 120 03		0.3				•
ZR734 120 05		0.5				•
ZR734 120 10		1.0				•
ZR734 120 20		2.0				•

Data, P303

■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0,012	h6
over 6	0 ~ -0,015	

※Items can be changed for quality improvement without notice.



## 6 FLUTE, 45° HELIX STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK

- Applied various corner "Radius" and effected length.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.

## ZR706 .....series



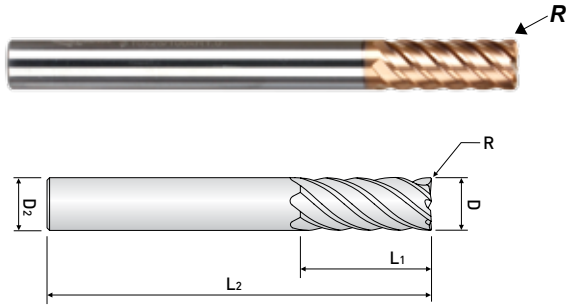
EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
ZR7060600314	6	0.3	12	14	50	5.8	6	•
ZR7060600514		0.5						•
ZR7060800524	8	0.5	8	24	60	7.8	8	•
ZR7060801024		1.0						•
ZR7061000530	10	0.5	10	30	70	9.8	10	•
ZR7061001030		1.0						•
ZR7061200530	12	0.5	12	30	75	11.8	12	•
ZR7061201030		1.0						•

Data, P303

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※Items can be changed for quality improvement without notice.



## 6 FLUTE, 45° HELIX, LONG SHANK, CORNER RADIUS

- Applied various corner "Radius" and effected length.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.

## ZR736 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
ZR736 060 05	6	0.5	15	90	6	•
ZR736 060 10		1.0				•
ZR736 080 05	8	0.5	20	100	8	•
ZR736 080 10		1.0				•
ZR736 100 05	10	0.5	25	100	10	•
ZR736 100 10		1.0				•
ZR736 120 05	12	0.5	30	110	12	•
ZR736 120 10		1.0				•

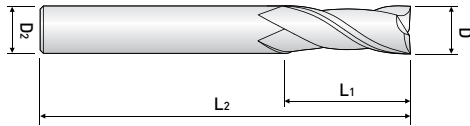
Data, P303

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.02	h6

※Items can be changed for quality improvement without notice.





## 2 FLUTE, 35° HELIX REGULAR LENGTH

- Designed to machine high hardened materials up to HRc 70.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.

## ZE712 ...series



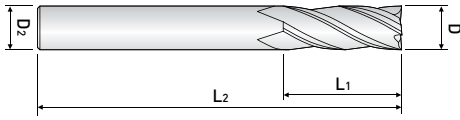
EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK	
ZE712010-02	1.0	2	40	6	•	
ZE712010		3			•	
ZE712010-04		4			•	
ZE712012	1.2	3	40	6	•	
ZE712015	1.5	4	40	6	•	
ZE712015-06		6			•	
ZE712015-08		8			•	
ZE712020	2.0	5	40	6	•	
ZE712020-08		8			•	
ZE712020-10		10			50	•
ZE712025	2.5	6	40	6	•	
ZE712030	3.0	8	45	6	•	
ZE712030-10		10			50	•
ZE712030-12		12			•	
ZE712035	3.5	10	45	6	•	
ZE712040	4.0	10	45	6	•	
ZE712040-12		12			50	•
ZE712040-16		16			60	•
ZE712045	4.5	11	45	6	•	
ZE712050	5.0	13	50	6	•	
ZE712055	5.5	13	50	6	•	
ZE712060	6.0	13	50	6	•	
ZE712060-15		15	60		•	
ZE712065	6.5	16	60	8	•	
ZE712070	7.0	18	60	8	•	
ZE712080	8.0	19	60	8	•	
ZE712100	10.0	22	70	10	•	
ZE712100-25		25			•	
ZE712120	12.0	26	75	12	•	
ZE712120-30		30			80	•

Data, P300~301

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※Items can be changed for quality improvement without notice.



## 4 FLUTE, 45° HELIX REGULAR LENGTH

- Designed to machine high hardened materials up to HRC 70.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.

## ZE714 ...series



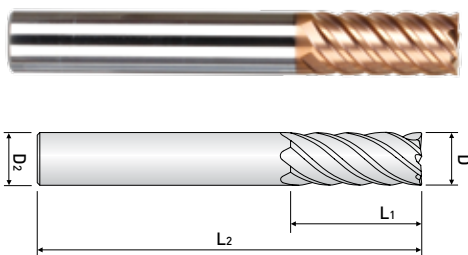
EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
ZE714 010	1.0	2.5	40	6	•
ZE714 012	1.2	3	40	6	•
ZE714 015	1.5	4	40	6	•
ZE714020	2.0	5	40	6	•
ZE714025	2.5	6	40	6	•
ZE714030	3.0	8	45	6	•
ZE714 035	3.5	9	45	6	•
ZE714040	4.0	10	45	6	•
ZE714050	5.0	13	50	6	•
ZE714060	6.0	13	50	6	•
ZE714 060-15		15	60		•
ZE714080	8.0	19	60	8	•
ZE714100	10.0	22	70	10	•
ZE714 100-25		25			•
ZE714120	12.0	26	75	12	•
ZE714 120-30		30	80		•

Data, P301

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.02	h6

※Items can be changed for quality improvement without notice.



## 6 FLUTE, 50° HELIX REGULAR LENGTH

- Designed to machine high hardened materials up to HRc 70.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.

## ZE716 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
ZE716060	6	13	50	6	•
ZE716080	8	18	60	8	•
ZE716100	10	22	70	10	•
ZE716120	12	26	75	12	•
ZE716160	16	35	90	16	•
ZE716200	20	44	100	20	•

Data, P303

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※Items can be changed for quality improvement without notice.

# Z-Star Power Mill Series



**ENDMILL  
SERIES**

## Z-Star Power Mill Series

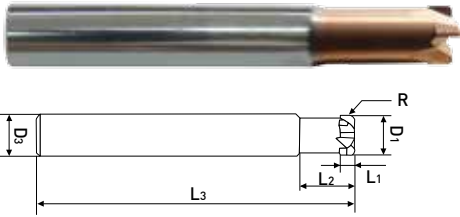


ITEM SERIES	APPEARANCE	FEATURE	INCH & METRIC	PAGE
<b>ZSPM4A ...series</b>		STUB CUT LENGTH with EXTENDED NECK	INCH	92

# Z-Star PowerMill

END MILLS  
> Metric & Inch

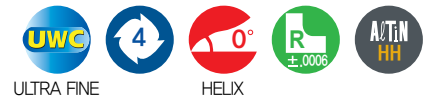
Z - Star Power Mill Series



## 4 FLUTE, STUB CUT LENGTH, with EXTENDED NECK

- Designed to machine high hardened material by using newly developed raw-material and new coating.
- Applying straight flute design on the tool to minimize the corner radius breakage.
- Applying backdraft type on the tool to maximize the reducing chatter and preventing deflection.

## ZSPM4A ...series



EDP. No.	D <sub>1</sub>	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>	STOCK
ZSPM4A008	1/8	1/32	.063	3/8	2-1/4	1/4	•
ZSPM4A012	3/16	1/16	.094	9/16	2-1/4	1/4	•
ZSPM4A016	1/4	1/16	.10	1/2	2-1/4	1/4	•
ZSPM4A016L	1/4	1/16	.10	1	3	1/4	•
ZSPM4A020	5/16	3/32	.13	5/8	2-1/2	5/16	•
ZSPM4A020L	5/16	3/32	.13	1-1/4	3	5/16	•
ZSPM4A024	3/8	3/32	.15	3/4	3	3/8	•
ZSPM4A024L	3/8	3/32	.15	1-1/2	4	3/8	•
ZSPM4A032	1/2	1/8	.20	1	3	1/2	•
ZSPM4A032L	1/2	1/8	.20	2	5	1/2	•

Data, P283

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

※ Items can be changed for quality improvement without notice.

# Zamus Plus Series




**ENDMILL  
SERIES**

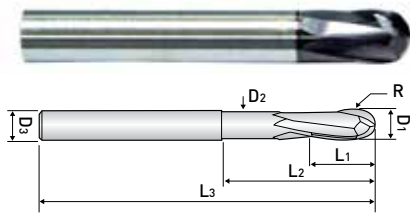


## Zamus Plus Series



ITEM SERIES	APPEARANCE	FEATURE	INCH & METRIC	PAGE
DA412 ...series		15° HELIX STUB CUT LENGTH with EXTENDED NECK	INCH	95

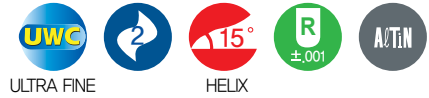




## 2 FLUTE, 15° HELIX STUB CUT LENGTH, BALL NOSE with EXTENDED NECK

- Designed for high hardened materials up to HRC62.
- Suitable for high speed machining.

## DA412 ...series



EDP. No.	D <sub>1</sub>	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
DA412001	1/32	1/64	1/32	1/16	2	.029	1/4	•
DA412002	1/16	1/32	1/16	1/8	2	.059	1/4	•
DA412003	3/32	3/64	3/32	3/16	2	.090	1/4	•
DA412004	1/8	1/16	1/8	1/4	2-1/2	.121	1/4	•
DA412006	3/16	3/32	3/16	3/8	3	.184	1/4	•
DA412008	1/4	1/8	1/4	1/2	3-1/2	.246	1/4	•
DA412010	5/16	5/32	5/16	5/8	4	.309	5/16	•
DA412012	3/8	3/16	3/8	3/4	4	.371	3/8	•
DA412012L	3/8	3/16	1	1-3/8	6	.371	3/8	•
DA412016	1/2	1/4	1/2	1	4-1/2	.496	1/2	•
DA412016L	1/2	1/4	1	1-1/2	6	.496	1/2	•

Data, P270~271

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

\* Items can be changed for quality improvement without notice.

Neo			
Classic			
X-STAR			
Series			
	<b>ENDMILL SERIES</b>		
			


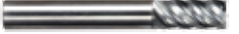



















ITEM SERIES	APPEARANCE	FEATURE	INCH & METRIC	PAGE
TPRB604A ....05series		30° TAPER RIB BALL, SHORT LENGTH	INCH	99
TPRB604A ....10series		1° TAPER RIB BALL, SHORT LENGTH	INCH	100
TPRB604A ....15series		1° 30' TAPER RIB BALL, SHORT LENGTH	INCH	101
TPRB604A ....20series		2° TAPER RIB BALL, SHORT LENGTH	INCH	102
TPRB604A ....30series		3° TAPER RIB BALL, SHORT LENGTH	INCH	103
TPRB624A ....05series		30° TAPER RIB BALL, LONG LENGTH	INCH	104
TPRB624A ....10series		1° TAPER RIB BALL, LONG LENGTH	INCH	105
TPRB624A ....15series		1° 30' TAPER RIB BALL, LONG LENGTH	INCH	106
TPRB624A ....20series		2° TAPER RIB BALL, LONG LENGTH	INCH	107
TPRB624A ....30series		3° TAPER RIB BALL, LONG LENGTH	INCH	108
TPRE604A ....05series		30° TAPER RIB, SHORT LENGTH	INCH	109
TPRE604A ....10series		1° TAPER RIB, SHORT LENGTH	INCH	110
TPRE604A ....15series		1° 30' TAPER RIB, SHORT LENGTH	INCH	111
TPRE604A ....20series		2° TAPER RIB, SHORT LENGTH	INCH	112
TPRE604A ....30series		3° TAPER RIB, SHORT LENGTH	INCH	113
XE504A ...series		REGULAR LENGTH, VARIABLE HELIX	INCH	114
XR404A ...series		SHORT LENGTH, CORNER RADIUS VARIABLE HELIX	INCH	115
XR504A ...series		REGULAR LENGTH, CORNER RADIUS, VARIABLE HELIX	INCH	116
XR514A ... series		REGULAR LENGTH, CORNER RADIUS, VARIABLE HELIX	INCH	117
XR524A ...series		LONG REACH, CORNER RADIUS, VARIABLE HELIX	INCH	119
XXE504A ...series		REGULAR LENGTH, VARIABLE HELIX	INCH	120
XXE524A ...series		STUB CUT with LONG REACH, VARIABLE HELIX	INCH	121
XXE534A ...series		STUB CUT with EXTENDED NECK, VARIABLE HELIX	INCH	122
XXB504A ...series		REGULAR LENGTH, BALL NOSE, VARIABLE HELIX	INCH	123
XXB524A ...series		STUB CUT with LONG REACH, BALL NOSE, VARIABLE HELIX	INCH	124
XXR404A ...series		SHORT LENGTH, CORNER RADIUS, VARIABLE HELIX	INCH	125
XXR514A ...series		REGULAR LENGTH, CORNER RADIUS, VARIABLE HELIX	INCH	126
XXR524A ...series		STUB CUT with LONG REACH, CORNER RADIUS, VARIABLE HELIX	INCH	127
XXR534A ...series		STUB CUT with EXTENDED NECK, CORNER RADIUS, VARIABLE HELIX	INCH	128

# Neo Classic X-STAR Series



END MILLS  
> Metric & Inch

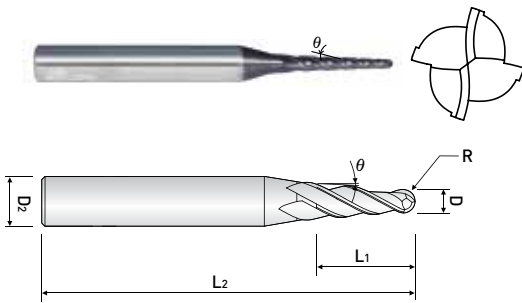
Neo Classic X-STAR Series

ITEM SERIES	APPEARANCE	FEATURE	INCH & METRIC	PAGE
XE505A ...series		STUB CUT LENGTH, VARIABLE HELIX	INCH	129
XE515A ...series		REGULAR CUT LENGTH, VARIABLE HELIX	INCH	130
XR505A ...series		STUB CUT LENGTH CORNER RADIUS	INCH	131
XR515A ...series		REGULAR CUT LENGTH CORNER RADIUS, VARIABLE HELIX	INCH	132
XR525A ...series		REGULAR CUT LENGTH with EXTENDED NECK, CORNER RADIUS	INCH	133
XR535A ...series		REGULAR CUT LENGTH with LONG EXTENDED NECK, CORNER RADIUS	INCH	134
XE505 ...series		REGULAR CUT LENGTH, VARIABLE HELIX	METRIC	135
XE515 ...series		LONG CUT LENGTH	METRIC	136
XR505 ...series		REGULAR CUT LENGTH CORNER RADIUS, VARIABLE HELIX	METRIC	137
XXB504 ...series		REGULAR CUT LENGTH, VARIABLE HELIX	METRIC	138
XCE504 ...series		REGULAR CUT LENGTH, VARIABLE HELIX	METRIC	139
XCC504 ...series		REGULAR CUT LENGTH, CORNER CHAMFER, VARIABLE HELIX	METRIC	140
XCR504 ...series		REGULAR CUT LENGTH, CORNER RADIUS, VARIABLE HELIX	METRIC	141
XCE503 ...series		REGULAR CUT LENGTH	METRIC	142
XCC503 ...series		REGULAR CUT LENGTH, CORNER CHAMFER	METRIC	143
XCR503 ...series		REGULAR CUT LENGTH, CORNER RADIUS	METRIC	144
XE504 ...series		REGULAR CUT LENGTH, VARIABLE HELIX	METRIC	145
XR504 ...series		REGULAR CUT LENGTH, CORNER RADIUS, VARIABLE HELIX	METRIC	146
XE514 ...series		STUB CUT LENGTH with EXTENDED NECK, VARIABLE HELIX	METRIC	147
XE524 ...series		STUB CUT LENGTH with EXTENDED LONG NECK	METRIC	148
XR514 ...series		REGULAR CUT LENGTH, VARIABLE HELIX	METRIC	149

# Neo Classic X-STAR

END MILLS  
 > Metric & Inch

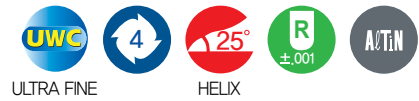
Neo Classic X-STAR Series



## 4 FLUTE TAPER RIB BALL, SHORT LENGTH

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

## TPRB604A ....05series



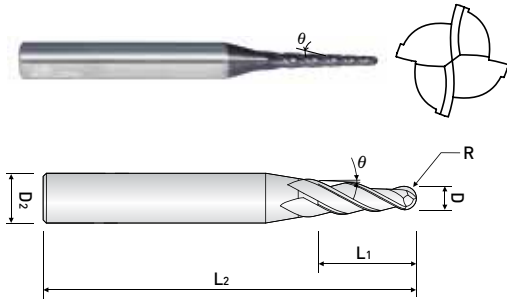
EDP. No.	D	R	$\theta$	C.L	OAL	SH.Dia.	STOCK
TPRB604A-0030-05	.030	.015	30°	.210	3	3/16	•
TPRB604A-0040-05	.040	.020	30°	.280	3	3/16	•
TPRB604A-0050-05	.050	.025	30°	.350	3	3/16	•
TPRB604A-0060-05	.060	.030	30°	.420	3	3/16	•
TPRB604A-0070-05	.070	.035	30°	.490	3	3/16	•
TPRB604A-0080-05	.080	.040	30°	.560	3	3/16	•
TPRB604A-0090-05	.090	.045	30°	.630	3	3/16	•
TPRB604A-0100-05	.100	.050	30°	.700	3	3/16	•
TPRB604A-0125-05	.125	.0625	30°	.875	3	3/16	•

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

\* Items can be changed for quality improvement without notice.

# Neo Classic X-STAR

END MILLS  
> Metric & Inch



## 4 FLUTE TAPER RIB BALL, SHORT LENGTH

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



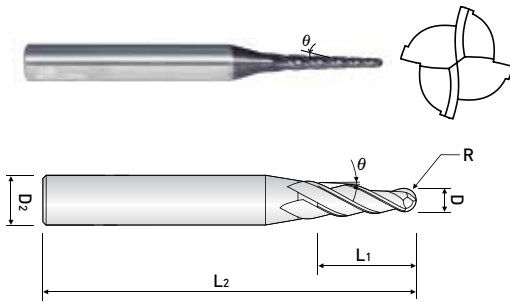
## TPRB604A ....10series

EDP. No.	D	R	$\theta$	C.L	OAL	SH.Dia.	STOCK
TPRB604A-0030-10	.030	.015	1°	.210	3	3/16	•
TPRB604A-0040-10	.040	.020	1°	.280	3	3/16	•
TPRB604A-0050-10	.050	.025	1°	.350	3	3/16	•
TPRB604A-0060-10	.060	.030	1°	.420	3	3/16	•
TPRB604A-0070-10	.070	.035	1°	.490	3	3/16	•
TPRB604A-0080-10	.080	.040	1°	.560	3	3/16	•
TPRB604A-0090-10	.090	.045	1°	.630	3	3/16	•
TPRB604A-0100-10	.100	.050	1°	.700	3	3/16	•
TPRB604A-0125-10	.125	.0625	1°	.875	3	3/16	•

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

※ Items can be changed for quality improvement without notice.

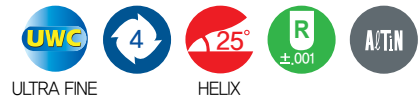
# Neo Classic X-STAR



## 4 FLUTE TAPER RIB BALL, SHORT LENGTH

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

## TPRB604A ....15series



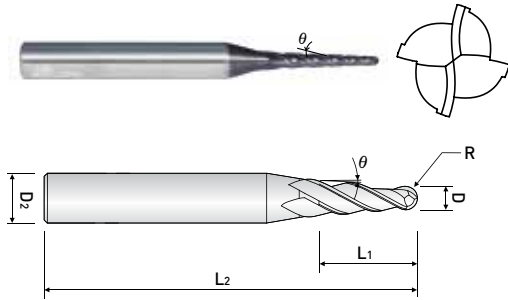
EDP. No.	D	R	$\theta$	C.L	OAL	SH.Dia.	STOCK
TPRB604A-0030-05	.030	.015	1° 30'	.210	3	3/16	•
TPRB604A-0040-05	.040	.020	1° 30'	.280	3	3/16	•
TPRB604A-0050-05	.050	.025	1° 30'	.350	3	3/16	•
TPRB604A-0060-05	.060	.030	1° 30'	.420	3	3/16	•
TPRB604A-0070-05	.070	.035	1° 30'	.490	3	3/16	•
TPRB604A-0080-05	.080	.040	1° 30'	.560	3	3/16	•
TPRB604A-0090-05	.090	.045	1° 30'	.630	3	3/16	•
TPRB604A-0100-05	.100	.050	1° 30'	.700	3	3/16	•
TPRB604A-0125-05	.125	.0625	1° 30'	.875	3	3/16	•

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

\* Items can be changed for quality improvement without notice.

# Neo Classic X-STAR

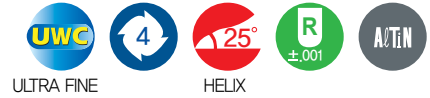
END MILLS  
> Metric & Inch



## 4 FLUTE TAPER RIB BALL, SHORT LENGTH

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

## TPRB604A ....20series



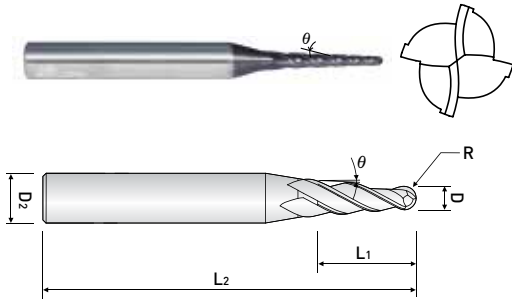
EDP. No.	D	R	$\theta$	C.L	OAL	SH.Dia.	STOCK
TPRB604A-0030-20	.030	.015	2°	.210	3	3/16	•
TPRB604A-0040-20	.040	.020	2°	.280	3	3/16	•
TPRB604A-0050-20	.050	.025	2°	.350	3	3/16	•
TPRB604A-0060-20	.060	.030	2°	.420	3	3/16	•
TPRB604A-0070-20	.070	.035	2°	.490	3	3/16	•
TPRB604A-0080-20	.080	.040	2°	.560	3	3/16	•
TPRB604A-0090-20	.090	.045	2°	.630	3	3/16	•
TPRB604A-0100-20	.100	.050	2°	.700	3	3/16	•
TPRB604A-0125-20	.125	.0625	2°	.875	3	3/16	•

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

※ Items can be changed for quality improvement without notice.



# Neo Classic X-STAR



## 4 FLUTE TAPER RIB BALL, SHORT LENGTH

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

## TPRB604A ....30series



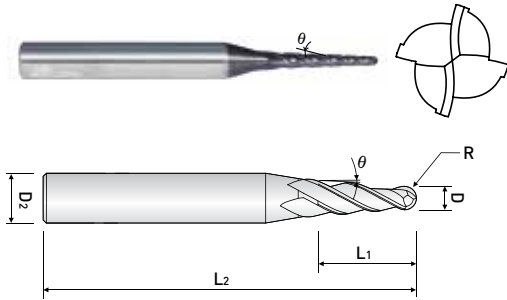
EDP. No.	D	R	$\theta$	C.L	OAL	SH.Dia.	STOCK
TPRB604A-0030-30	.030	.015	3°	.210	3	3/16	•
TPRB604A-0040-30	.040	.020	3°	.280	3	3/16	•
TPRB604A-0050-30	.050	.025	3°	.350	3	3/16	•
TPRB604A-0060-30	.060	.030	3°	.420	3	3/16	•
TPRB604A-0070-30	.070	.035	3°	.490	3	3/16	•
TPRB604A-0080-30	.080	.040	3°	.560	3	3/16	•
TPRB604A-0090-30	.090	.045	3°	.630	3	3/16	•
TPRB604A-0100-30	.100	.050	3°	.700	3	3/16	•
TPRB604A-0125-30	.125	.0625	3°	.875	3	3/16	•

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

\* Items can be changed for quality improvement without notice.

# Neo Classic X-STAR

END MILLS  
> Metric & Inch



## 4 FLUTE TAPER RIB BALL, LONG LENGTH

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

## TPRB624A ....05series

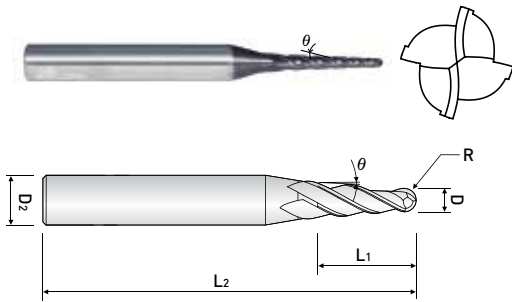


EDP. No.	D	R	$\theta$	C.L	OAL	SH.Dia.	STOCK
TPRB624A-0030-05	.030	.015	30'	.420	3	3/16	•
TPRB624A-0040-05	.040	.020	30'	.260	3	3/16	•
TPRB624A-0050-05	.050	.025	30'	.700	3	3/16	•
TPRB624A-0060-05	.060	.030	30'	.840	3	3/16	•
TPRB624A-0070-05	.070	.035	30'	.980	3	3/16	•
TPRB624A-0080-05	.080	.040	30'	1.120	3	3/16	•
TPRB624A-0090-05	.090	.045	30'	1.260	3	3/16	•
TPRB624A-0100-05	.100	.050	30'	1.400	3	3/16	•
TPRB624A-0125-05	.125	.0625	30'	1.750	3	3/16	•

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

※ Items can be changed for quality improvement without notice.

# Neo Classic X-STAR



## 4 FLUTE TAPER RIB BALL, LONG LENGTH

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

## TPRB624A ....10series



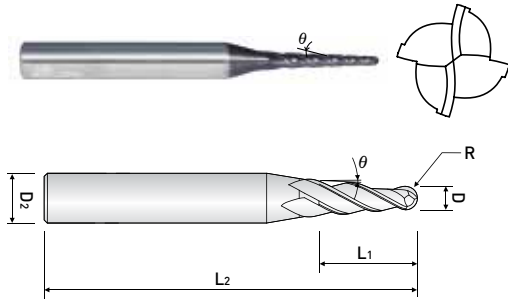
EDP. No.	D	R	$\theta$	C.L	OAL	SH.Dia.	STOCK
TPRB624A-0030-10	.030	.015	1°	.420	3	3/16	•
TPRB624A-0040-10	.040	.020	1°	.560	3	3/16	•
TPRB624A-0050-10	.050	.025	1°	.700	3	3/16	•
TPRB624A-0060-10	.060	.030	1°	.840	3	3/16	•
TPRB624A-0070-10	.070	.035	1°	.980	3	3/16	•
TPRB624A-0080-10	.080	.040	1°	1.120	3	3/16	•
TPRB624A-0090-10	.090	.045	1°	1.260	3	3/16	•
TPRB624A-0100-10	.100	.050	1°	1.400	3	3/16	•
TPRB624A-0125-10	.125	.0625	1°	1.750	3	3/16	•

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

\* Items can be changed for quality improvement without notice.

# Neo Classic X-STAR

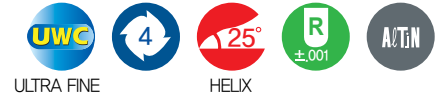
END MILLS  
> Metric & Inch



## 4 FLUTE TAPER RIB BALL, LONG LENGTH

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

## TPRB624A ....15series

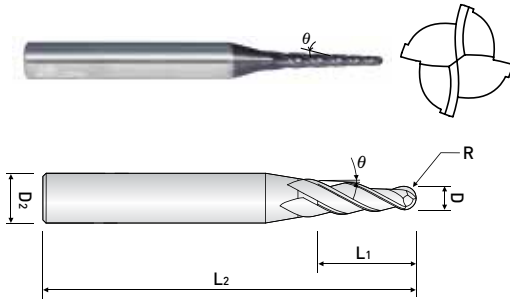


EDP. No.	D	R	$\theta$	C.L	OAL	SH.Dia.	STOCK
TPRB624A-0030-15	.030	.015	1°30'	.420	3	3/16	•
TPRB624A-0040-15	.040	.020	1°30'	.260	3	3/16	•
TPRB624A-0050-15	.050	.025	1°30'	.700	3	3/16	•
TPRB624A-0060-15	.060	.030	1°30'	.840	3	3/16	•
TPRB624A-0070-15	.070	.035	1°30'	.980	3	3/16	•
TPRB624A-0080-15	.080	.040	1°30'	1.120	3	3/16	•
TPRB624A-0090-15	.090	.045	1°30'	1.260	3	3/16	•
TPRB624A-0100-15	.100	.050	1°30'	1.400	3	3/16	•
TPRB624A-0125-15	.125	.0625	1°30'	1.750	3	3/16	•

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

※ Items can be changed for quality improvement without notice.

# Neo Classic X-STAR



## 4 FLUTE TAPER RIB BALL, LONG LENGTH

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

## TPRB624A ....20series



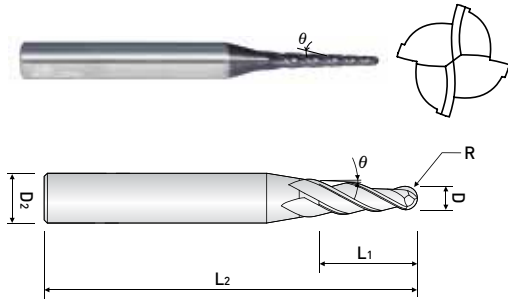
EDP. No.	D	R	$\theta$	C.L	OAL	SH.Dia.	STOCK
TPRB624A-0030-20	.030	.015	2°	.420	3	3/16	•
TPRB624A-0040-20	.040	.020	2°	.260	3	3/16	•
TPRB624A-0050-20	.050	.025	2°	.700	3	3/16	•
TPRB624A-0060-20	.060	.030	2°	.840	3	3/16	•
TPRB624A-0070-20	.070	.035	2°	.980	3	3/16	•
TPRB624A-0080-20	.080	.040	2°	1.120	3	3/16	•
TPRB624A-0090-20	.090	.045	2°	1.260	3	3/16	•
TPRB624A-0100-20	.100	.050	2°	1.400	3	3/16	•
TPRB624A-0125-20	.125	.0625	2°	1.750	3	3/16	•

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

\* Items can be changed for quality improvement without notice.

# Neo Classic X-STAR

END MILLS  
> Metric & Inch



## 4 FLUTE TAPER RIB BALL, LONG LENGTH

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

## TPRB624A ....30series

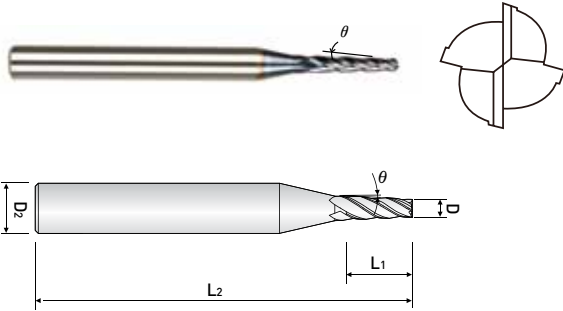


EDP. No.	D	R	$\theta$	C.L	OAL	SH.Dia.	STOCK
TPRB624A-0030-30	.030	.015	3°	.420	3	3/16	•
TPRB624A-0040-30	.040	.020	3°	.260	3	3/16	•
TPRB624A-0050-30	.050	.025	3°	.700	3	3/16	•
TPRB624A-0060-30	.060	.030	3°	.840	3	3/16	•
TPRB624A-0070-30	.070	.035	3°	.980	3	3/16	•
TPRB624A-0080-30	.080	.040	3°	1.120	3	3/16	•
TPRB624A-0090-30	.090	.045	3°	1.260	3	3/16	•
TPRB624A-0100-30	.100	.050	3°	1.400	3	3/16	•
TPRB624A-0125-30	.125	.0625	3°	1.750	3	3/16	•

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

※ Items can be changed for quality improvement without notice.

# Neo Classic X-STAR



## 4FLUTE TAPER ENDMILLS

- Rigid taper end mill for highly productive rib processing.

## TPRE604A ....05series



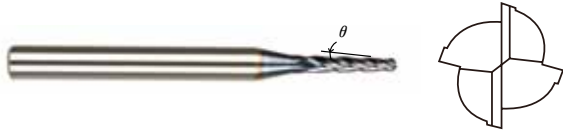
EDP. No.	D	$\theta$	C.L	OAL	SH.Dia.	STOCK
TPRE4A604-0030-05	.030	30'	.210	3	3/16	•
TPRE4A604-0040-05	.040	30'	.280	3	3/16	•
TPRE4A604-0050-05	.050	30'	.350	3	3/16	•
TPRE4A604-0060-05	.060	30'	.420	3	3/16	•
TPRE4A604-0070-05	.070	30'	.490	3	3/16	•
TPRE4A604-0080-05	.080	30'	.560	3	3/16	•
TPRE4A604-0090-05	.090	30'	.630	3	3/16	•
TPRE4A604-0100-05	.100	30'	.700	3	3/16	•
TPRE4A604-0125-05	.125	30'	.875	3	3/16	•

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

\* Items can be changed for quality improvement without notice.

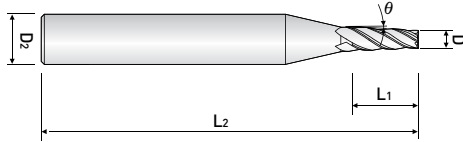
# Neo Classic X-STAR

END MILLS  
> Metric & Inch



## 4FLUTE TAPER ENDMILLS

- Rigid taper end mill for highly productive rib processing.



## TPRE604A ....10series



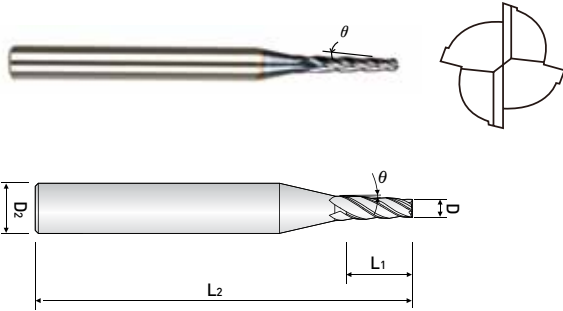
EDP. No.	D	$\theta$	C.L	OAL	SH.Dia.	STOCK
TPRE4A604-0030-10	.030	1°	.210	3	3/16	•
TPRE4A604-0040-10	.040	1°	.280	3	3/16	•
TPRE4A604-0050-10	.050	1°	.350	3	3/16	•
TPRE4A604-0060-10	.060	1°	.420	3	3/16	•
TPRE4A604-0070-10	.070	1°	.490	3	3/16	•
TPRE4A604-0080-10	.080	1°	.560	3	3/16	•
TPRE4A604-0090-10	.090	1°	.630	3	3/16	•
TPRE4A604-0100-10	.100	1°	.700	3	3/16	•
TPRE4A604-0125-10	.125	1°	.875	3	3/16	•

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

※ Items can be changed for quality improvement without notice.



# Neo Classic X-STAR



## 4FLUTE TAPER ENDMILLS

- Rigid taper end mill for highly productive rib processing.

## TPRE604A ....15series



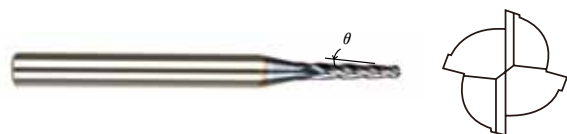
EDP. No.	D	$\theta$	C.L	OAL	SH.Dia.	STOCK
TPRE4A604-0030-15	.030	1°30'	.210	3	3/16	•
TPRE4A604-0040-15	.040	1°30'	.280	3	3/16	•
TPRE4A604-0050-15	.050	1°30'	.350	3	3/16	•
TPRE4A604-0060-15	.060	1°30'	.420	3	3/16	•
TPRE4A604-0070-15	.070	1°30'	.490	3	3/16	•
TPRE4A604-0080-15	.080	1°30'	.560	3	3/16	•
TPRE4A604-0090-15	.090	1°30'	.630	3	3/16	•
TPRE4A604-0100-15	.100	1°30'	.700	3	3/16	•
TPRE4A604-0125-15	.125	1°30'	.875	3	3/16	•

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

\* Items can be changed for quality improvement without notice.

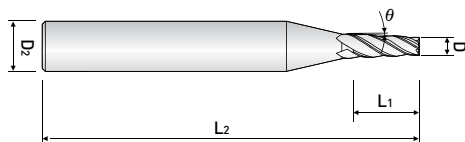
# Neo Classic X-STAR

END MILLS  
> Metric & Inch



## 4FLUTE TAPER ENDMILLS

- Rigid taper end mill for highly productive rib processing.



## TPRE604A ....20series

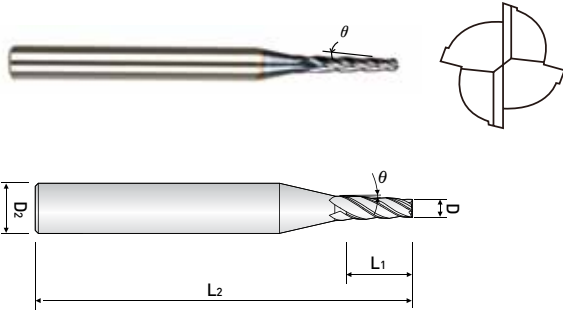


EDP. No.	D	$\theta$	C.L	OAL	SH.Dia.	STOCK
TPRE4A604-0030-20	.030	2°	.210	3	3/16	•
TPRE4A604-0040-20	.040	2°	.280	3	3/16	•
TPRE4A604-0050-20	.050	2°	.350	3	3/16	•
TPRE4A604-0060-20	.060	2°	.420	3	3/16	•
TPRE4A604-0070-20	.070	2°	.490	3	3/16	•
TPRE4A604-0080-20	.080	2°	.560	3	3/16	•
TPRE4A604-0090-20	.090	2°	.630	3	3/16	•
TPRE4A604-0100-20	.100	2°	.700	3	3/16	•
TPRE4A604-0125-20	.125	2°	.875	3	3/16	•

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

※ Items can be changed for quality improvement without notice.

# Neo Classic X-STAR



## 4FLUTE TAPER ENDMILLS

- Rigid taper end mill for highly productive rib processing.

## TPRE604A ....30series



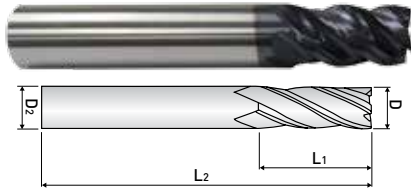
EDP. No.	D	$\theta$	C.L	OAL	SH.Dia.	STOCK
TPRE4A604-0030-30	.030	3°	.210	3	3/16	•
TPRE4A604-0040-30	.040	3°	.280	3	3/16	•
TPRE4A604-0050-30	.050	3°	.350	3	3/16	•
TPRE4A604-0060-30	.060	3°	.420	3	3/16	•
TPRE4A604-0070-30	.070	3°	.490	3	3/16	•
TPRE4A604-0080-30	.080	3°	.560	3	3/16	•
TPRE4A604-0090-30	.090	3°	.630	3	3/16	•
TPRE4A604-0100-30	.100	3°	.700	3	3/16	•
TPRE4A604-0125-30	.125	3°	.875	3	3/16	•

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

\* Items can be changed for quality improvement without notice.

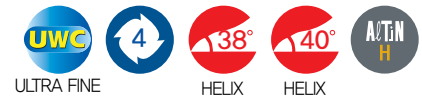
# Neo Classic X-STAR

END MILLS  
> Metric & Inch



## 4 FLUTE, REGULAR LENGTH, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry.
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Sharp cutting edge geometry designed for excellent performance on mild mold steel and stainless steel



## XE504A ...series

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
XE504A008	1/8	3/8	1-1/2	1/8	●
XE504A010	5/32	7/16	2	3/16	●
XE504A012	3/16	7/16	2	3/16	●
XE504A014	7/32	7/16	2-1/2	1/4	●
XE504A016	1/4	1/2	2-1/2	1/4	●
XE504A017	1/4	3/4	2-1/2	1/4	●
XE504A018	9/32	5/8	2-1/2	5/16	●
XE504A020	5/16	13/16	2-1/2	5/16	●
XE504A022	11/32	13/16	2-1/2	3/8	●
XE504A024	3/8	7/8	2-1/2	3/8	●
XE504A026	13/32	15/16	2-3/4	7/16	●
XE504A028	7/16	1	2-3/4	7/16	●
XE504A030	15/32	1	3	1/2	●
XE504A032	1/2	1	3	1/2	●
XE504A033	1/2	1-1/4	3-1/4	1/2	●
XE504A036	9/16	1-1/8	3-1/2	9/16	●
XE504A040	5/8	1-1/4	3-1/2	5/8	●
XE504A048	3/4	1-1/2	4	3/4	●
XE504A064	1	1-1/2	4	1	●

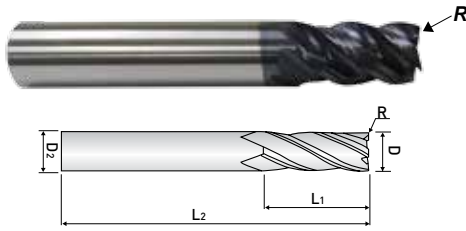
※ Flat shank is available upon request  
ex) XE504A032F : Flat shank

Data, P284~286

Tolerance of Mill Dia. (inch)		Tolerance of Shank Dia.
from 1/8 up to 1/4	0 ~ -.0012	-.0001 ~ -.0003
over 1/4 up to 3/8	0 ~ -.0016	
over 3/8 up to 1	0 ~ -.002	-.0001 ~ -.0004

※ Items can be changed for quality improvement without notice.

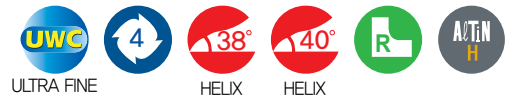
# Neo Classic X-STAR



## 4 FLUTE, SHORT LENGTH, CORNER RADIUS, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Sharp cutting edge geometry designed for excellent performance on mild mold steel and stainless steel

## XR404A ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
XR404A008	1/8	.015	1/4	1-1/2	1/8	•
XR404A010	5/32	.015	5/16	2	3/16	•
XR404A012	3/16	.015	3/8	2	3/16	•
XR404A014	7/32	.020	3/8	2	1/4	•
XR404A016	1/4	.020	7/16	2	1/4	•
XR404A020	5/16	.020	1/2	2	5/16	•
XR404A024	3/8	.020	5/8	2	3/8	•
XR404A028	7/16	.020	5/8	2-1/2	7/16	•
XR404A032	1/2	.030	5/8	2-1/2	1/2	•
XR404A040	5/8	.040	3/4	3	5/8	•
XR404A048	3/4	.040	1	3	3/4	•

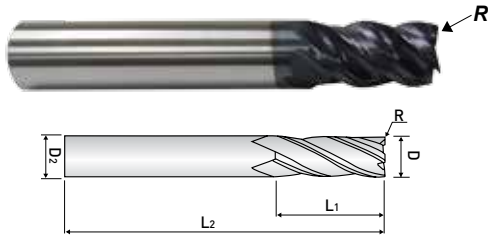
※ Flat shank is available upon request  
ex) XR404A032F : Flat shank

Data. P284~286

Tolerance of Mill Dia. (inch)		Tolerance of Shank Dia.
from 1/8 up to 1/4	0 ~ -.0012	-.0001 ~ -.0003
over 1/4 up to 3/8	0 ~ -.0016	
over 3/8 up to 1	0 ~ -.002	-.0001 ~ -.0004

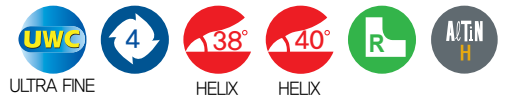
※ Items can be changed for quality improvement without notice.

# Neo Classic X-STAR



## 4 FLUTE, REGULAR LENGTH, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Sharp cutting edge geometry designed for excellent performance on mild mold steel and stainless steel



## XR504A ...series

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
XR504A008	1/8	.015	3/8	1-1/2	1/8	•
XR504A012	3/16	.015	7/16	2	3/16	•
XR504A016	1/4	.020	1/2	2-1/2	1/4	•
XR504A017	1/4	.020	3/4	2-1/2	1/4	•
XR504A020	5/16	.020	13/16	2-1/2	5/16	•
XR504A024	3/8	.020	7/8	2-1/2	3/8	•
XR504A028	7/16	.020	1	2-3/4	7/16	•
XR504A032	1/2	.030	1	3	1/2	•
XR504A033	1/2	.030	1-1/4	3-1/4	1/2	•
XR504A036	9/16	.030	1-1/8	3-1/2	9/16	•
XR504A040	5/8	.040	1-1/4	3-1/2	5/8	•
XR504A048	3/4	.040	1-1/2	4	3/4	•
XR504A064	1	.040	1-1/2	4	1	•

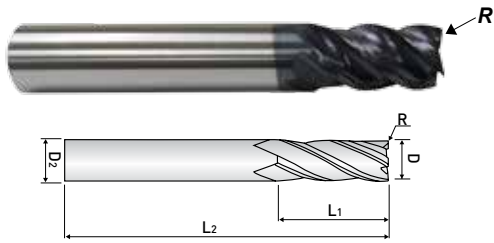
※ Flat shank is available upon request  
ex) XR504A032F : Flat shank

Data. P284~286

Tolerance of Mill Dia. (inch)		Tolerance of Shank Dia.
from 1/8 up to 1/4	0 ~ -.0012	-.0001 ~ -.0003
over 1/4 up to 3/8	0 ~ -.0016	
over 3/8 up to 1	0 ~ -.002	-.0001 ~ -.0004

※ Items can be changed for quality improvement without notice.

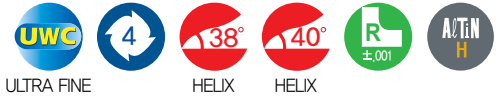
# Neo Classic X-STAR



## 4 FLUTE, REGULAR LENGTH, CORNER RADIUS, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Sharp cutting edge geometry designed for excellent performance on mild mold steel and stainless steel

## XR514A ... series

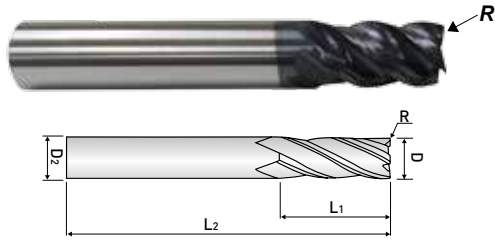


EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
XR514A008010	1/8	.010	3/8	2-1/2	1/8	•
XR514A008015		.015				•
XR514A012010	3/16	.010	7/16	2	3/16	•
XR514A012015		.015				•
XR514A012030		.030				•
XR514A016010	1/4	.010	1/2	2-1/2	1/4	•
XR514A016015		.015				•
XR514A016030		.030				•
XR514A017010		.010	3/4			•
XR514A017015		.015				•
XR514A017030		.030				•
XR514A020015	5/16	.015	13/16	2-1/2	5/16	•
XR514A020030		.030				•
XR514A024010	3/8	.010	7/8	2-1/2	3/8	•
XR514A024015		.015				•
XR514A024030		.030				•
XR514A024045		.045				•
XR514A024060		.060				•
XR514A028015	7/16	.015	1	2-3/4	7/16	•
XR514A028030		.030				•
XR514A032010	1/2	.010	1	3	12	•
XR514A032015		.015				•
XR514A032030		.030				•
XR514A032045		.045				•
XR514A032060		.060				•
XR514A032090		.090				•
XR514A032125		.125				•

Data. P284~286

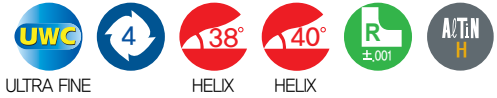
# Neo Classic X-STAR

END MILLS  
> Metric & Inch



## 4 FLUTE, REGULAR LENGTH, CORNER RADIUS, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Sharp cutting edge geometry designed for excellent performance on mild mold steel and stainless steel



## XR514A ... series

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
XR514A033010	1/2	.010	1-1/4	3-1/4	1/2	•
XR514A033015		.015				•
XR514A033030		.030				•
XR514A033045		.045				•
XR514A033060		.060				•
XR514A033090		.090				•
XR514A033125		.125				•
XR514A036030	9/16	.030	1-1/8	3-1/2	9/16	•
XR514A040030	5/8	.030	1-1/4	3-1/2	5/8	•
XR514A040045		.045				•
XR514A040060		.060				•
XR514A040090		.090				•
XR514A040125		.125				•
XR514A048030	3/4	.030	1-1/2	4	3/4	•
XR514A048045		.045				•
XR514A048060		.060				•
XR514A048090		.090				•
XR514A048125		.125				•
XR514A064030	1	.030	1-1/2	4	1	•
XR514A064045		.045				•
XR514A064060		.060				•
XR514A064090		.090				•
XR514A064125		.125				•

Data. P284~286

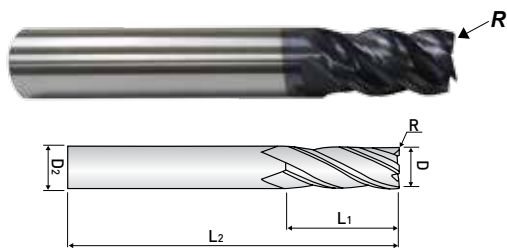
※ Flat shank is available upon request  
ex) XR514A032010F : Flat shank

Tolerance of Mill Dia. (inch)		Tolerance of Shank Dia.
from 1/8 up to 1/4	0 ~ -.0012	-.0001 ~ -.0003
over 1/4 up to 3/8	0 ~ -.0016	
over 3/8 up to 1	0 ~ -.002	-.0001 ~ -.0004

※ Items can be changed for quality improvement without notice.



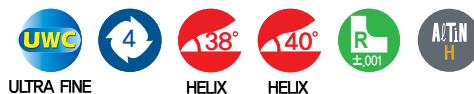
# Neo Classic X-STAR



## 4 FLUTE, LONG REACH, CORNER RADIUS, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Sharp cutting edge geometry designed for excellent performance on mild mold steel and stainless steel

## XR524A ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
XR524A016	1/4	.020	1/2	4	1/4	•
XR524A020	5/16	.020	13/16	4	5/16	•
XR524A024	3/8	.020	7/8	5	3/8	•
XR524A028	7/16	.020	1	6	7/16	•
XR524A032	1/2	.030	1	6	1/2	•
XR524A036	9/16	.030	1-1/8	6	9/16	•
XR524A040	5/8	.040	1-1/4	6	5/8	•
XR524A048	3/4	.040	1-1/2	6	3/4	•
XR524A064	1	.040	1-1/2	6	1	•

Data, P284~286

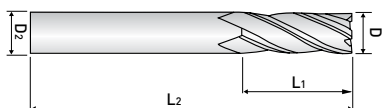
※ Flat shank is available upon request  
ex) XR524A032F : Flat shank

Tolerance of Mill Dia. (inch)		Tolerance of Shank Dia.
from 1/8 up to 1/4	0 ~ -.0012	-.0001 ~ -.0003
over 1/4 up to 3/8	0 ~ -.0016	
over 3/8 up to 1	0 ~ -.002	-.0001 ~ -.0004

※ Items can be changed for quality improvement without notice.

# Neo Classic X-STAR

END MILLS  
> Metric & Inch



## 4 FLUTE, REGULAR LENGTH, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Strengthened cutting edge geometry designed for excellent performance on high-temp alloys, high tensile stainless steel, inconel and titanium.



## XXE504A ...series

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
XXE504A008	1/8	3/8	1-1/2	1/8	•
XXE504A010	5/32	7/16	2	3/16	•
XXE504A012	3/16	7/16	2	3/16	•
XXE504A016	1/4	1/2	2-1/2	1/4	•
XXE504A017	1/4	3/4	2-1/2	1/4	•
XXE504A020	5/16	13/16	2-1/2	5/16	•
XXE504A024	3/8	7/8	2-1/2	3/8	•
XXE504A028	7/16	1	2-3/4	7/16	•
XXE504A032	1/2	1	3	1/2	•
XXE504A033	1/2	1-1/4	3-1/4	1/2	•
XXE504A036	9/16	1-1/8	3-1/2	9/16	•
XXE504A040	5/8	1-1/4	3-1/2	5/8	•
XXE504A048	3/4	1-1/2	4	3/4	•
XXE504A064	1	1-1/2	4	1	•

Data. P284~286

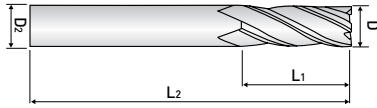
※ Flat shank is available upon request  
ex) XXE504A032F

### ■ Tolerance

Mill Dia. (inch)		Shank Dia.
from 1/8 up to 1/4	0 ~ -.0012	-.0001 ~ -.0003
over 1/4 up to 3/8	0 ~ -.0016	
over 3/8 up to 1	0 ~ -.002	-.0001 ~ -.0004

※ Items can be changed for quality improvement without notice.

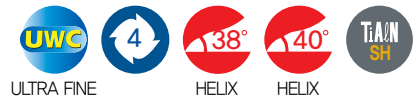
# Neo Classic X-STAR



## 4 FLUTE, STUB CUT with LONG REACH, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Strengthened cutting edge geometry designed for excellent performance on high-temp alloys, high tensile stainless steel, inconel and titanium.

## XXE524A ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
XXE524A016	1/4	3/8	4	1/4	•
XXE524A024	3/8	1/2	4	3/8	•
XXE524A032	1/2	5/8	5	1/2	•
XXE524A033	1/2	5/8	6	1/2	•
XXE524A040	5/8	3/4	5	5/8	•
XXE524A041	5/8	3/4	6	5/8	•
XXE524A048	3/4	1	5	3/4	•
XXE524A049	3/4	1	6	3/4	•

Data, P284~286

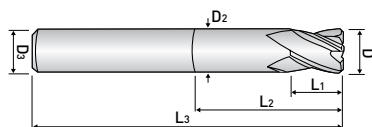
※ Flat shank is available upon request  
ex) XXE524A032F

### ■ Tolerance

Mill Dia. (inch)		Shank Dia.
from 1/8 up to 1/4	0 ~ -.0012	-.0001 ~ -.0003
over 1/4 up to 3/8	0 ~ -.0016	
over 3/8 up to 1	0 ~ -.002	-.0001 ~ -.0004

※ Items can be changed for quality improvement without notice.

# Neo Classic X-STAR



## 4 FLUTE, STUB CUT LENGTH with EXTENDED NECK, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Strengthened cutting edge geometry designed for excellent performance on high-temp alloys, high tensile stainless steel, inconel and titanium.

## XXE534A ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
XXE534A016	1/4	3/8	1-1/4	4	.240	1/4
XXE534A024	3/8	1/2	1-7/8	4	.365	3/8
XXE534A032	1/2	5/8	2-1/4	4	.490	1/2
XXE534A040	5/8	3/4	2-1/4	4-1/8	.615	5/8
XXE534A048	3/4	1	2-1/4	4-1/4	.740	3/4
XXE534A064	1	1-1/8	2-1/4	4-1/2	.990	1

Data. P284~286

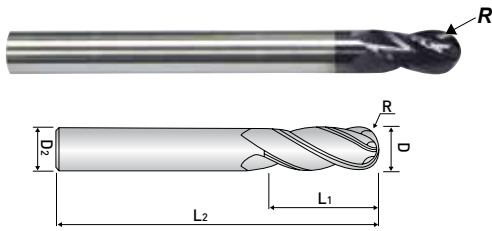
※ Flat shank is available upon request  
ex) XXE534A032F

### ■ Tolerance

Mill Dia. (inch)		Shank Dia.
from 1/8 up to 1/4	0 ~ -.0012	-.0001 ~ -.0003
over 1/4 up to 3/8	0 ~ -.0016	
over 3/8 up to 1	0 ~ -.002	-.0001 ~ -.0004

※ Items can be changed for quality improvement without notice.

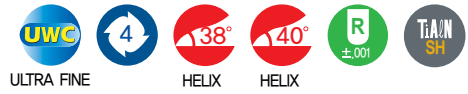
# Neo Classic X-STAR



## 4 FLUTE, REGULAR LENGTH, BALL NOSE, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance.
- Strengthened cutting edge geometry designed for excellent performance on high-temp alloys, high tensile stainless steel, inconel and titanium.

## XXB504A ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
XXB504A008	1/8	1/16	1/2	2	1/8
XXB504A012	3/16	3/32	5/8	2-1/4	3/16
XXB504A016	1/4	1/8	3/4	2-1/2	1/4
XXB504A020	5/16	5/32	3/4	2-1/2	5/16
XXB504A024	3/8	3/16	7/8	2-1/2	3/8
XXB504A032	1/2	1/4	1	3	1/2
XXB504A033	1/2	1/4	1-1/4	3-1/4	1/2
XXB504A040	5/8	5/16	1-1/4	3-1/2	5/8
XXB504A048	3/4	3/8	1-1/2	4	3/4
XXB504A064	1	1/2	1-1/2	4	1

Data. P284~286

※ Flat shank is available upon request  
ex) XXB504A032F

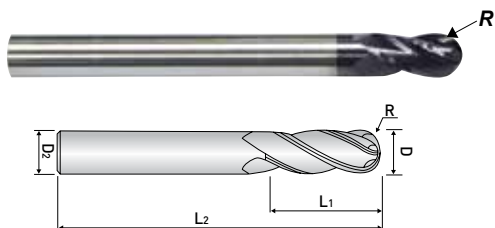
### ■ Tolerance

Mill Dia. (inch)		Shank Dia.
from 1/8 up to 1/4	0 ~ -.0012	-.0001 ~ -.0003
over 1/4 up to 3/8	0 ~ -.0016	
over 3/8 up to 1	0 ~ -.002	-.0001 ~ -.0004

※ Items can be changed for quality improvement without notice.

# Neo Classic X-STAR

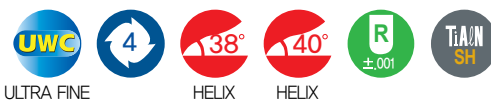
END MILLS  
> Metric/Inch



## 4 FLUTE, STUB CUT with LONG REACH, BALL NOSE, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance.
- Strengthened cutting edge geometry designed for excellent performance on high-temp alloys, high tensile stainless steel, inconel and titanium.

## XXB524A ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
XXB524A016	1/4	1/8	3/8	4	1/4
XXB524A024	3/8	3/16	1/2	4	3/8
XXB524A032	1/2	1/4	5/8	5	1/2
XXB524A041	5/8	5/16	3/4	6	5/8
XXB524A049	3/4	3/8	1	6	3/4

Data. P284~286

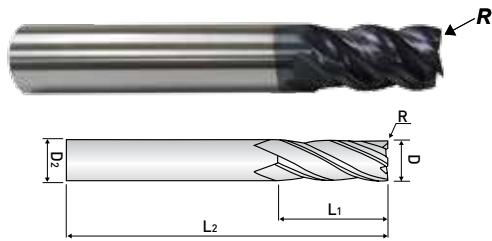
※ Flat shank is available upon request  
ex) XXB524A032F

### ■ Tolerance

Mill Dia. (inch)		Shank Dia.
from 1/8 up to 1/4	0 ~ -.0012	-.0001 ~ -.0003
over 1/4 up to 3/8	0 ~ -.0016	
over 3/8 up to 1	0 ~ -.002	-.0001 ~ -.0004

※ Items can be changed for quality improvement without notice.

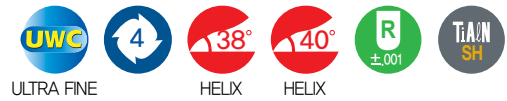
# Neo Classic X-STAR



## 4 FLUTE, SHORT LENGTH, CORNER RADIUS, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Strengthened cutting edge geometry designed for excellent performance on high-temp alloys, high tensile stainless steel, inconel and titanium.

## XXR404A ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
XXR404A008	1/8	.015	1/4	1-1/2	1/8
XXR404A010	5/32	.015	5/16	2	3/16
XXR404A012	3/16	.015	3/8	2	3/16
XXR404A016	1/4	.020	7/16	2	1/4
XXR404A020	5/16	.020	1/2	2	5/16
XXR404A024	3/8	.020	5/8	2	3/8
XXR404A032	1/2	.030	5/8	2-1/2	1/2
XXR404A040	5/8	.030	3/4	3	5/8
XXR404A048	3/4	.030	1	3	3/4

Data. P284~286

※ Flat shank is available upon request  
ex) XXR404A032F

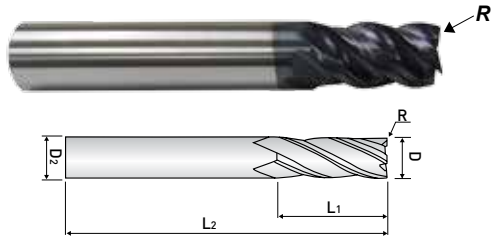
### ■ Tolerance

Mill Dia. (inch)		Shank Dia.
from 1/8 up to 1/4	0 ~ -.0012	-.0001 ~ -.0003
over 1/4 up to 3/8	0 ~ -.0016	
over 3/8 up to 1	0 ~ -.002	-.0001 ~ -.0004

※ Items can be changed for quality improvement without notice.

# Neo Classic X-STAR

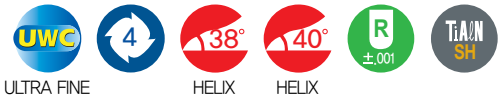
END MILLS  
> Metric/Inch



## 4 FLUTE, REGULAR LENGTH, CORNER RADIUS, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Strengthened cutting edge geometry designed for excellent performance on high-temp alloys, high tensile stainless steel, inconel and titanium.

## XXR514A .....series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
XXR514A008015	1/8	.015	3/8	1-1/2	1/8
XXR514A012015	3/16	.015	7/16	2	3/16
XXR514A016015	1/4	.015	1/2	2-1/2	1/4
XXR514A016030		.030			
XXR514A017015		.015			
XXR514A017030		.030			
XXR514A020015	5/16	.015	13/16	2-1/2	5/16
XXR514A024015	3/8	.015	7/8	2-1/2	3/8
XXR514A024030		.030			
XXR514A032030	1/2	.030	1	3	1/2
XXR514A032045		.045			
XXR514A032060		.060			
XXR514A032125		.125			
XXR514A033015	1/2	.015	1-1/4	3-1/4	1/2
XXR514A033030		.030			
XXR514A033045		.045			
XXR514A033060		.060			
XXR514A033125		.125			
XXR514A040030	5/8	.030	1-1/4	3-1/2	5/8
XXR514A040060		.060			
XXR514A048030	3/4	.030	1-1/2	4	3/4
XXR514A048060		.060			
XXR514A064030	1	.030	1-1/2	4	1
XXR514A064060		.060			

※ Flat shank is available upon request  
ex) XXR514A032030F

Data. P284~286

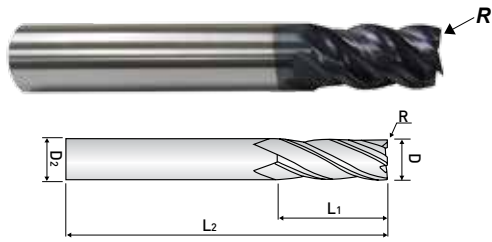
### ■ Tolerance

Mill Dia. (inch)		Shank Dia.
from 1/8 up to 1/4	0 ~ -.0012	-.0001 ~ -.0003
over 1/4 up to 3/8	0 ~ -.0016	
over 3/8 up to 1	0 ~ -.002	-.0001 ~ -.0004

※ Items can be changed for quality improvement without notice.



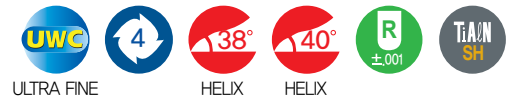
# Neo Classic X-STAR



## 4 FLUTE, STUB CUT with LONG REACH, CORNER RADIUS, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Strengthened cutting edge geometry designed for excellent performance on high-temp alloys, high tensile stainless steel, inconel and titanium.

## XXR524A ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
XXR524A016	1/4	.015	3/8	4	1/4
XXR524A024	3/8	.020	1/2	4	3/8
XXR524A032	1/2	.030	5/8	5	1/2
XXR524A033	1/2	.030	5/8	6	1/2
XXR524A040	5/8	.030	3/4	5	5/8
XXR524A041	5/8	.030	3/4	6	5/8
XXR524A048	3/4	.030	1	5	3/4
XXR524A049	3/4	.030	1	6	3/4

Data, P284~286

※ Flat shank is available upon request  
ex) XXR524A032F

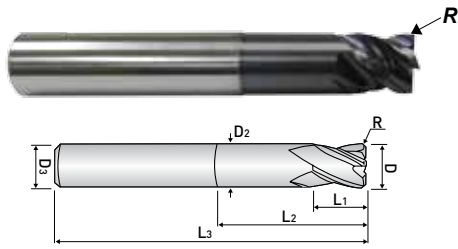
### ■ Tolerance

Mill Dia. (inch)		Shank Dia.
from 1/8 up to 1/4	0 ~ -.0012	-.0001 ~ -.0003
over 1/4 up to 3/8	0 ~ -.0016	
over 3/8 up to 1	0 ~ -.002	-.0001 ~ -.0004

※ Items can be changed for quality improvement without notice.

# Neo Classic X-STAR

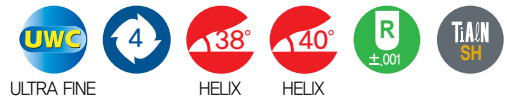
END MILLS  
> Metric & Inch



## 4 FLUTE, STUB CUT with EXTENDED NECK, CORNER RADIUS, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Strengthened cutting edge geometry designed for excellent performance on high-temp alloys, high tensile stainless steel, inconel and titanium.

## XXR534A ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
XXR534A016	1/4	.015	3/8	1-1/4	4	.240	1/4
XXR534A024	3/8	.020	1/2	1-7/8	4	.365	3/8
XXR534A032	1/2	.020	5/8	2-1/4	4	.490	1/2
XXR534A040	5/8	.030	3/4	2-1/4	4-1/8	.615	5/8
XXR534A048	3/4	.030	1	2-1/4	4-1/4	.740	3/4
XXR534A064	1	.030	1-1/8	2-1/4	4-1/2	.990	1

Data. P284~286

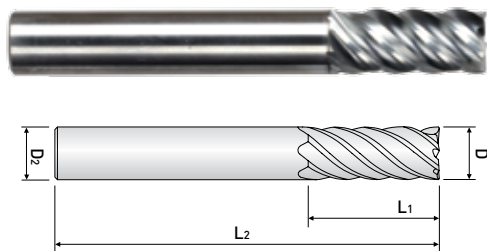
※ Flat shank is available upon request  
ex) XXR534A032F

### ■ Tolerance

Mill Dia. (inch)		Shank Dia.
from 1/8 up to 1/4	0 ~ -.0012	-.0001 ~ -.0003
over 1/4 up to 3/8	0 ~ -.0016	
over 3/8 up to 1	0 ~ -.002	-.0001 ~ -.0004

※ Items can be changed for quality improvement without notice.

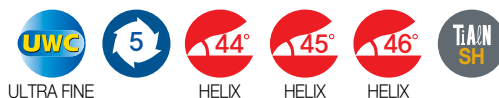
# Neo Classic X-STAR



## 5 FLUTES, STUB CUT LENGTH, VARIABLE HELIX

- Maintains Cutting Edge Strength & Sharpness for Improved Tool Life
- Strong Cutting Edges Allowing for Increased depths of cut at Elevated Cutting Speeds & Feeds
- Higher Feeds and Speeds for increased Productivity. Reduced Vibration Harmonics.

## XE505A ... series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
XE505 A 016	1/4	3/8	2	1/4	•
XE505 A 020	5/16	7/16	2	5/16	•
XE505 A 024	3/8	1/2	2	3/8	•
XE505 A 028	7/16	9/16	2-1/2	7/16	•
XE505 A 032	1/2	5/8	2-1/2	1/2	•
XE505 A 040	5/8	3/4	3	5/8	•
XE505 A 048	3/4	1	3	3/4	•
XE505 A 064	1	1	4	1	•

Data, P284~286

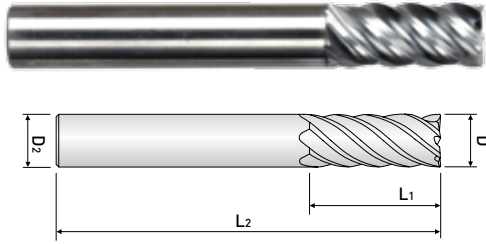
### ■ Tolerance

Mill Dia. (inch)		Shank Dia.
from 1/8 up to 1/4	0 ~ -.0012	-.0001 ~ -.0003
over 1/4 up to 3/8	0 ~ -.0016	
over 3/8 up to 1	0 ~ -.002	-.0001 ~ -.0004

※Items can be changed for quality improvement without notice.

# Neo Classic X-STAR

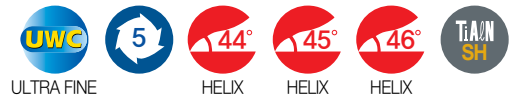
END MILLS  
> Metric & Inch



## 5 FLUTES, REGULAR CUT LENGTH, VARIABLE HELIX

- Maintains Cutting Edge Strength & Sharpness for Improved Tool Life
- Strong Cutting Edges Allowing for Increased depths of cut at Elevated Cutting Speeds & Feeds
- Higher Feeds and Speeds for increased Productivity. Reduced Vibration Harmonics.

## XE515A ... series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
XE515 A 016	1/4	5/8	2-1/2	1/4	•
XE515 A 018	9/32	5/8	2-1/2	5/16	•
XE515 A 020	5/16	13/16	2-1/2	5/16	•
XE515 A 022	11/32	13/16	2-1/2	3/8	•
XE515 A 024	3/8	7/8	2-1/2	3/8	•
XE515 A 026	13/32	7/8	2-3/4	7/16	•
XE515 A 028	7/16	1	2-3/4	7/16	•
XE515 A 030	15/32	1	3	1/2	•
XE515 A 032	1/2	1-1/4	3	1/2	•
XE515 A 036	9/16	1-1/4	3-1/2	9/16	•
XE515 A 040	5/8	1-1/4	3-1/2	5/8	•
XE515 A 048	3/4	1-1/2	4	3/4	•
XE515 A 064	1	1-1/2	4	1	•

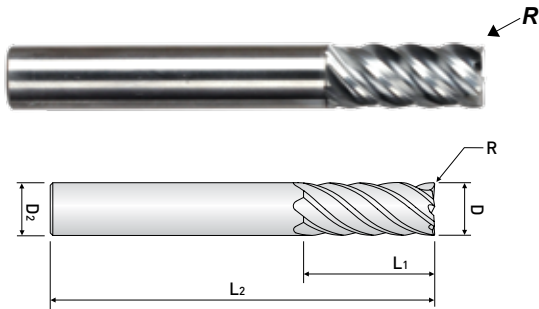
Data, P284~286

### ■ Tolerance

Mill Dia. (inch)		Shank Dia.
from 1/8 up to 1/4	0 ~ -.0012	-.0001 ~ -.0003
over 1/4 up to 3/8	0 ~ -.0016	
over 3/8 up to 1	0 ~ -.002	-.0001 ~ -.0004

※Items can be changed for quality improvement without notice.

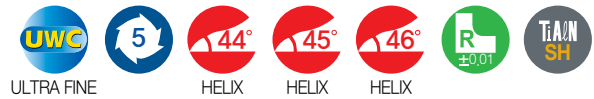
# Neo Classic X-STAR



## 5 FLUTES, STUB CUT LENGTH CORNER RADIUS, VARIABLE HELIX

- Maintains Cutting Edge Strength & Sharpness for Improved Tool Life
- Strong Cutting Edges Allowing for Increased depths of cut at Elevated Cutting Speeds & Feeds
- Higher Feeds and Speeds for increased Productivity. Reduced Vibration Harmonics.

## XR505A ... series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
XR505 A 016 015	1/4	.015	3/8	2	1/4	•
XR505 A 016 030		.030				•
XR505 A 020 015	5/16	.015	7/16	2	5/16	•
XR505 A 020 030		.030				•
XR505 A 024 015	3/8	.015	1/2	2	3/8	•
XR505 A 024 030		.030				•
XR505 A 028 015	7/16	.015	9/16	2-1/2	7/16	•
XR505 A 028 030		.030				•
XR505 A 032 015	1/2	.015	5/8	2-1/2	1/2	•
XR505 A 032 030		.030				•
XR505 A 040 015	5/8	.015	3/4	3	5/8	•
XR505 A 040 030		.030				•
XR505 A 040 045		.045				•
XR505 A 048 015	3/4	.015	1	3	3/4	•
XR505 A 048 030		.030				•
XR505 A 048 045		.045				•
XR505 A 064 015	1	.015	1-1/2	4	1	•
XR505 A 064 030		.030				•
XR505 A 064 045		.045				•
XR505 A 064 060		.060				•
XR505 A 064 090		.090				•
XR505 A 064 125		.125				•

Data. P284~286

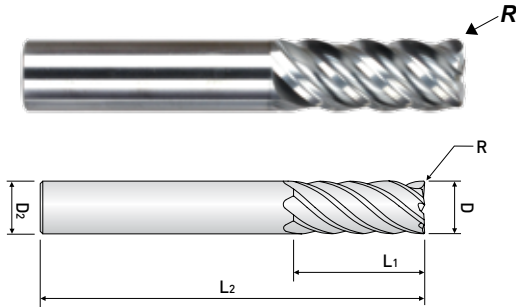
### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
from 1/8 up to 1/4	0 ~ -.0012
over 1/4 up to 3/8	0 ~ -.0016
over 3/8 up to 1	0 ~ -.002

※Items can be changed for quality improvement without notice.

# Neo Classic X-STAR

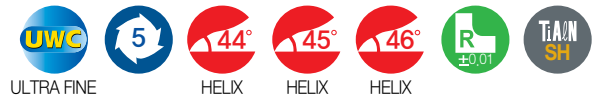
END MILLS  
> Metric & Inch



## 5 FLUTES, REGULAR CUT LENGTH CORNER RADIUS, VARIABLE HELIX

- Maintains Cutting Edge Strength & Sharpness for Improved Tool Life
- Strong Cutting Edges Allowing for Increased depths of cut at Elevated Cutting Speeds & Feeds
- Higher Feeds and Speeds for increased Productivity. Reduced Vibration Harmonics.

## XR515A ... series

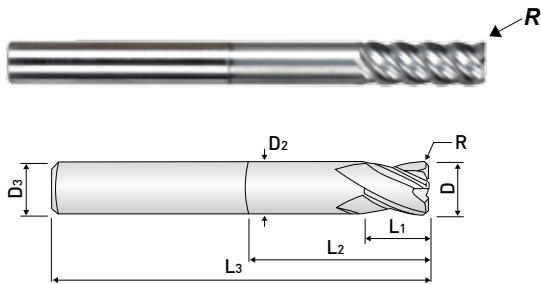


EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
XR515 A 016 015	1/4	.015	5/8	2-1/2	1/4	•
XR515 A 016 030		.030				•
XR515 A 018 015	9/32	.015	5/8	2-1/2	5/16	•
XR515 A 018 030		.030				•
XR515 A 020 015	5/16	.015	13/16	2-1/2	5/16	•
XR515 A 020 030		.030				•
XR515 A 022 015	11/32	.015	13/16	2-1/2	3/8	•
XR515 A 022 030		.030				•
XR515 A 024 015	3/8	.015	7/8	2-1/2	3/8	•
XR515 A 024 030		.030				•
XR515 A 026 015	13/32	.015	7/8	2-3/4	7/16	•
XR515 A 026 030		.030				•
XR515 A 028 015	7/16	.015	1	2-3/4	7/16	•
XR515 A 028 030		.030				•
XR515 A 030 015	15/32	.015	1	3	1/2	•
XR515 A 030 030		.030				•
XR515 A 032 015	1/2	.015	1-1/4	3	1/2	•
XR515 A 032 030		.030				•
XR515 A 032 045		.045				•
XR515 A 032 060		.060				•
XR515 A 032 090		.090				•
XR515 A 032 125		.125				•
XR515 A 036 015	9/16	.015	1-1/4	3	9/16	•
XR515 A 036 030		.030				•
XR515 A 040 015	5/8	.015	1-1/4	3	5/8	•
XR515 A 040 030		.030				•
XR515 A 040 045		.045				•
XR515 A 040 060		.060				•
XR515 A 040 090		.090				•
XR515 A 040 125		.125				•
XR515 A 048 015	3/4	.015	1-1/2	4	3/4	•
XR515 A 048 030		.030				•
XR515 A 048 045		.045				•
XR515 A 048 060		.060				•
XR515 A 048 090		.090				•
XR515 A 048 125		.125				•

Data, P284~286

Neo Classic X-STAR Series

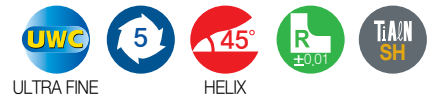
# Neo Classic X-STAR



## 5FLUTE, REGULAR CUT LENGTH WITH EXTENDED NECK, CORNER RADIUS

- Maintains Cutting Edge Strength & Sharpness for Improved Tool Life
- Strong Cutting Edges Allowing for Increased depths of cut at Elevated Cutting Speeds & Feeds
- Higher Feeds and Speeds for increased Productivity. Reduced Vibration Harmonics.

## XR525A ... series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
XR525 A 016 015	1/4	.015	3/4	2-1/8	4	.242	1/4	•
XR525 A 016 030		.030						•
XR525 A 020 015	5/16	.015	1	2-1/8	4	.305	5/16	•
XR525 A 020 030		.030						•
XR525 A 024 015	3/8	.015	1	2-1/8	4	.367	3/8	•
XR525 A 024 030		.030						•
XR525 A 028 015	7/16	.015	-1/4	2-1/8	4	.430	7/16	•
XR525 A 028 030		.030						•
XR525 A 032 015	1/2	.015	1-1/4	2-1/8	4	.492	1/2	•
XR525 A 032 030		.030						•
XR525 A 032 015L		.015	1-3/8	3-1/8	5			•
XR525 A 032 030L		.030						•
XR525 A 040 015	5/8	.015	1-1/2	2-1/8	4	.617	5/8	•
XR525 A 040 030		.030						•
XR525 A 040 045		.045						•
XR525 A 040 015L		.015	1-3/4	3-1/8	5			•
XR525 A 040 030L		.030						•
XR525 A 040 045L		.045						•
XR525 A 048 015	3/4	.015	1-7/8	3	5	.742	3/4	•
XR525 A 048 030		.030						•
XR525 A 048 045		.045						•
XR525 A 064 015	1	.015	2-1/4	3	5	.992	1	•
XR525 A 064 030		.030						•
XR525 A 064 045		.045						•

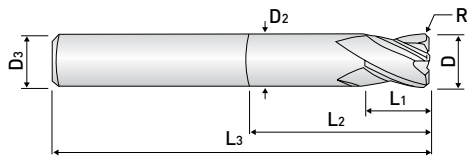
Data, P284~286

### ■ Tolerance

Mill Dia. (inch)		Shank Dia.
from 1/8 up to 1/4	0 ~ -.0012	-.0001 ~ -.0003
over 1/4 up to 3/8	0 ~ -.0016	
over 3/8 up to 1	0 ~ -.002	

※Items can be changed for quality improvement without notice.

# Neo Classic X-STAR



## 5 FLUTE, REGULAR CUT LENGTH WITH LONG EXTENDED NECK, CORNER RADIUS

- Maintains Cutting Edge Strength & Sharpness for Improved Tool Life
- Strong Cutting Edges Allowing for Increased depths of cut at Elevated Cutting Speeds & Feeds
- Higher Feeds and Speeds for increased Productivity. Reduced Vibration Harmonics.



## XR535A ...series

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
XR535 A 024 015	3/8	.015	1-1/4	3-3/8	6	.367	3/8	•
XR535 A 024 030		.030						•
XR535 A 028 015	7/16	.015	1-1/2	3-3/8	6	.430	7/16	•
XR535 A 028 030		.030						•
XR535 A 032 015	1/2	.015	1-1/2	4-1/8	6	.492	1/2	•
XR535 A 032 030		.030						•
XR535 A 040 015	5/8	.015	2	4	6	.617	5/8	•
XR535 A 040 030		.030						•
XR535 A 040 045		.045						•
XR535 A 048 015	3/4	.015	2-1/4	4	6	.742	3/4	•
XR535 A 048 030		.030						•
XR535 A 048 045		.045						•
XR535 A 064 015	1	.015	3	4	6	.992	1	•
XR535 A 064 030		.030						•
XR535 A 064 045		.045						•

Data. P284~286

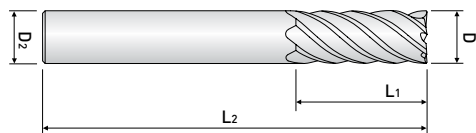
■ Tolerance

Mill Dia. (inch)		Shank Dia.
from 1/8 up to 1/4	0 ~ -.0012	-.0001 ~ -.0003
over 1/4 up to 3/8	0 ~ -.0016	
over 3/8 up to 1	0 ~ -.002	-.0001 ~ -.0004

※Items can be changed for quality improvement without notice.



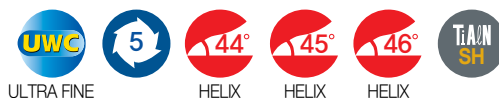
# Neo Classic X-STAR



## 5 FLUTE, REGULAR CUT LENGTH, VARIABLE HELIX

- Maintains Cutting Edge Strength & Sharpness for Improved Tool Life
- Strong Cutting Edges Allowing for Increased depths of cut at Elevated Cutting Speeds & Feeds
- Higher Feeds and Speeds for increased Productivity. Reduced Vibration Harmonics.

## XE505 ... series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
XE505 060	6	13	57	6	•
XE505 080	8	19	63	8	•
XE505 100	10	22	72	10	•
XE505 120	12	26	83	12	•
XE505 140	14	26	83	14	•
XE505 160	16	32	92	16	•
XE505 180	18	32	92	18	•
XE505 200	20	38	104	20	•
XE505 250	25	38	104	25	•

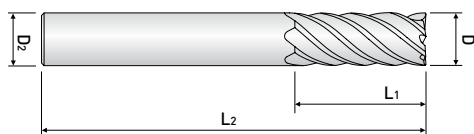
Data, P284~286

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 8	0 ~ -0,04	h6
over 8	0 ~ -0,05	

※Items can be changed for quality improvement without notice.

# Neo Classic X-STAR



## 5 FLUTES, LONG CUT LENGTH

- Maintains Cutting Edge Strength & Sharpness for Improved Tool Life
- Strong Cutting Edges Allowing for Increased depths of cut at Elevated Cutting Speeds & Feeds
- Higher Feeds and Speeds for increased Productivity. Reduced Vibration Harmonics.



## XE515 ... series

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
XE515 060	6	25	75	6	•
XE515 080	8	30	75	8	•
XE515 100	10	45	100	10	•
XE515 120	12	75	150	12	•
XE515 160	16	75	150	16	•
XE515 200	20	75	150	20	•

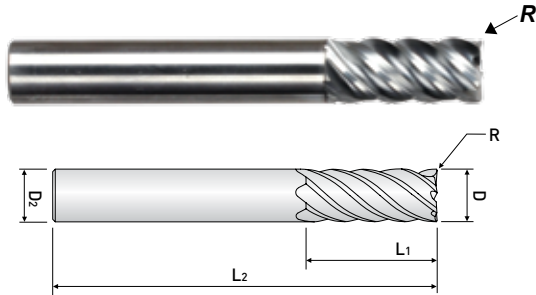
Data. P284~286

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 8	0 ~ -0,04	
over 8	0 ~ -0,05	

※Items can be changed for quality improvement without notice.

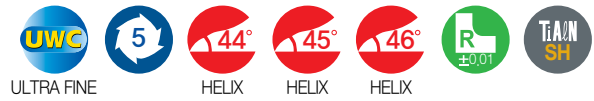
# Neo Classic X-STAR



## 5 FLUTES, REGULAR CUT LENGTH CORNER RADIUS, VARIABLE HELIX

- Maintains Cutting Edge Strength & Sharpness for Improved Tool Life
- Strong Cutting Edges Allowing for Increased depths of cut at Elevated Cutting Speeds & Feeds
- Higher Feeds and Speeds for increased Productivity. Reduced Vibration Harmonics.

## XR505 ... series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
XR505 06 050	6	0.5	13	57	6	•
XR505 08 050	8	0.5	19	63	8	•
XR505 10 050	10	0.5	22	72	10	•
XR505 12 075	12	0.75	26	83	12	•
XR505 14 075	14	0.75	26	83	14	•
XR505 14 075 S16				92	16	•
XR505 16 100	16	1.0	32	92	16	•
XR505 18 100	18	1.0	32	92	18	•
XR505 18 100 S20				104	20	•
XR505 20 100	20	1.0	38	104	20	•
XR505 25 100	25	1.0	38	104	25	•

Data. P284~286

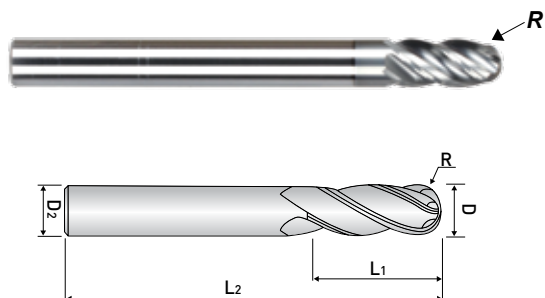
### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 8	0 ~ -0.04	h6
over 8	0 ~ -0.05	

※Items can be changed for quality improvement without notice.

# Neo Classic X-STAR

END MILLS  
> Metric/Inch



## 4 FLUTE, REGULAR LENGTH, BALL NOSE, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance.
- Strengthened cutting edge geometry designed for excellent performance on high-temp alloys, high tensile stainless steel, inconel and titanium.



ULTRA FINE



HELIX



HELIX



±0.01



TiAlN SH

## XXB504 ...series

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
XXB504040	4	2	8	70	4	•
XXB504060	6	3	12	90	6	•
XXB504080	8	4	15	100	8	•
XXB504100	10	5	20	100	10	•
XXB504120	12	6	25	110	12	•

Data. P284~286

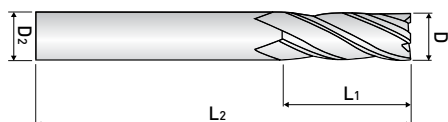
※ Flat shank is available upon request  
ex) XXB504100F : Flat shank

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.02	h6

※Items can be changed for quality improvement without notice.

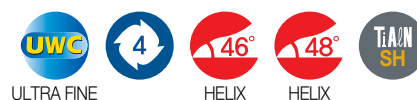
# Neo Classic X-STAR



## 4 FLUTE, REGULAR LENGTH, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Reinforced bending moment because of double core geometry

## XCE504 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
XCE504060	6	15	50	6	•
XCE504080	8	20	60	8	•
XCE504100	10	25	70	10	•
XCE504120	12	30	75	12	•
XCE504160	16	40	90	16	•
XCE504200	20	45	100	20	•
XCE504250	25	50	120	25	•

Data, P284~286

※ Flat shank is available upon request  
ex) XCE504100F : Flat shank

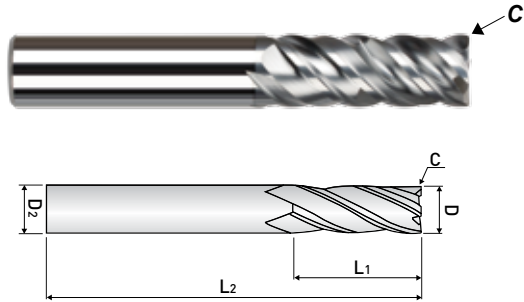
### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※Items can be changed for quality improvement without notice.

# Neo Classic X-STAR

END MILLS  
> Metric & Inch



## 4 FLUTE, REGULAR LENGTH, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
  - The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
  - Reinforced bending moment because of double core geometry
- \* corner chamfer type



## XCC504 ...series

EDP. No.	D	C	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
XCC504060	6	0.075	15	50	6	•
XCC504080	8	0.1	20	60	8	•
XCC504100	10	0.125	25	70	10	•
XCC504120	12	0.15	30	75	12	•
XCC504160	16	0.2	40	90	16	•
XCC504200	20	0.3	45	100	20	•
XCC504250	25	0.3	50	120	25	•

Data, P284~286

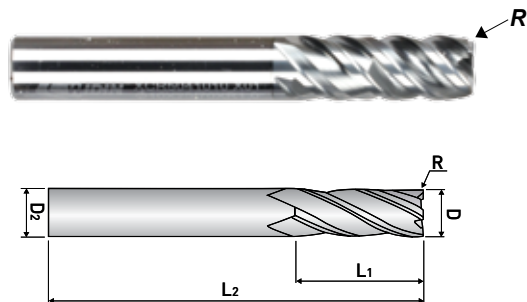
※ Flat shank is available upon request  
ex) XCC504100F : Flat shank

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.02	h6

※Items can be changed for quality improvement without notice.

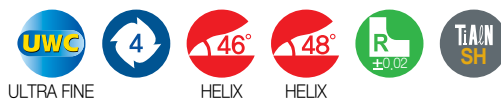
# Neo Classic X-STAR



## 4 FLUTE, REGULAR LENGTH, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Reinforced bending moment because of double core geometry

## XCR504 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
XCR5040602	6	0.2	15	50	6	•
XCR5040605		0.5				•
XCR5040610		1				•
XCR5040805	8	0.5	20	60	8	•
XCR5040810		1				•
XCR5041005	10	0.5	25	70	10	•
XCR5041010		1				•
XCR5041205	12	0.5	30	75	12	•
XCR5041210		1				•
XCR5041605	16	0.5	40	90	16	•
XCR5041610		1				•
XCR5042005	20	0.5	45	100	20	•
XCR5042010		1				•
XCR5042505	25	0.5	50	120	25	•
XCR5042510		1				•

Data, P284~286

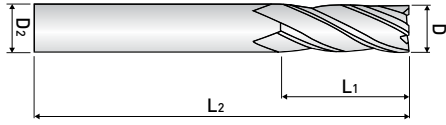
※ Flat shank is available upon request  
ex) XCR5041010F : Flat shank

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※Items can be changed for quality improvement without notice.

# Neo Classic X-STAR



## 3 FLUTE, REGULAR LENGTH

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Reinforced bending moment because of double core geometry

## XCE503 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
XCE503020	2	6	50	6	•
XCE503025	2.5	8	50	6	•
XCE503030	3	10	50	6	•
XCE503035	3.5	10	50	6	•
XCE503040	4	12	50	6	•
XCE503045	4.5	14	50	6	•
XCE503050	5	15	50	6	•
XCE503055	5.5	15	50	6	•
XCE503060	6	15	50	6	•
XCE503080	8	20	60	8	•
XCE503100	10	25	70	10	•
XCE503120	12	30	75	12	•
XCE503160	16	40	90	16	•
XCE503200	20	45	100	20	•
XCE503250	25	50	120	25	•

Data. P284~286

※ Flat shank is available upon request  
ex) XCE503100F : Flat shank

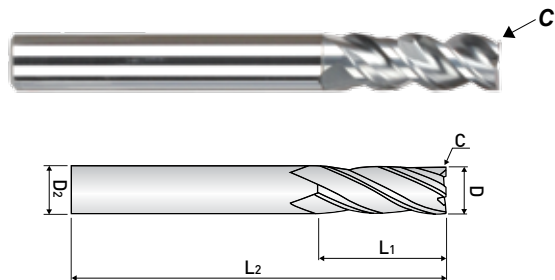
### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.02	h6

※Items can be changed for quality improvement without notice.



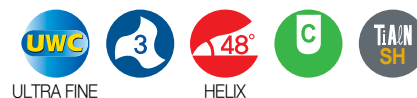
# Neo Classic X-STAR



## 3 FLUTE, REGULAR LENGTH

- High precision and excellent surface due to each 4F variable helix geometry
  - The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
  - Reinforced bending moment because of double core geometry
- \* corner chamfer type

## XCC503 ...series



EDP. No.	D	C	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
XCC503020	2	0.025	6	50	6	•
XCC503025	2.5	0.025	8	50	6	•
XCC503030	3	0.035	10	50	6	•
XCC503035	3.5	0.035	10	50	6	•
XCC503040	4	0.045	12	50	6	•
XCC503045	4.5	0.045	14	50	6	•
XCC503050	5	0.055	15	50	6	•
XCC503055	5.5	0.055	15	50	6	•
XCC503060	6	0.075	15	50	6	•
XCC503080	8	0.1	20	60	8	•
XCC503100	10	0.125	25	70	10	•
XCC503120	12	0.150	30	75	12	•
XCC503160	16	0.200	40	90	16	•
XCC503200	20	0.250	45	100	20	•
XCC503250	25	0.300	50	120	25	•

Data, P284~286

※ Flat shank is available upon request  
ex) XCC503100F : Flat shank

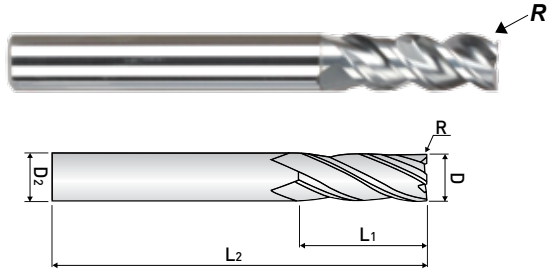
### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※Items can be changed for quality improvement without notice.

# Neo Classic X-STAR

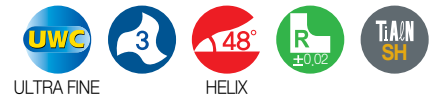
END MILLS  
> Metric & Inch



## 3 FLUTE, REGULAR LENGTH

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Reinforced bending moment because of double core geometry

## XCR503 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
XCR5030502	5	0.2	15	50	6	•
XCR5030602	6	0.2	15	50	6	•
XCR5030605		0.5				•
XCR5030610		1				•
XCR5030805	8	0.5	20	60	8	•
XCR5030810		1				•
XCR5031005	10	0.5	25	70	10	•
XCR5031010		1				•
XCR5031205	12	0.5	30	75	12	•
XCR5031210		1				•
XCR5031605	16	0.5	40	90	16	•
XCR5031610		1				•
XCR5032005	20	0.5	45	100	20	•
XCR5032010		1				•
XCR5032505	25	0.5	50	120	25	•
XCR5032510		1				•

Data, P284~286

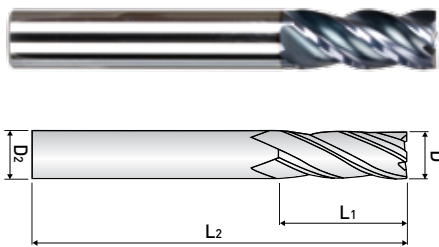
※ Flat shank is available upon request  
ex) XCR5031010F : Flat shank

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.02	h6

※Items can be changed for quality improvement without notice.

# Neo Classic X-STAR



## 4 FLUTE, REGULAR LENGTH, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Sharp cutting edge geometry designed for excellent performance on mild mold steel and stainless steel

## XE504 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
XE504010	1	2.5	45	4	•
XE504020	2	5	45	4	•
XE504030	3	8	50	6	•
XE504040	4	11	50	6	•
XE504050	5	13	50	6	•
XE504060	6	13	50	6	•
XE504070	7	16	60	8	•
XE504080	8	19	60	8	•
XE504090	9	19	70	10	•
XE504100	10	22	70	10	•
XE504110	11	22	75	12	•
XE504120	12	26	75	12	•
XE504130	13	26	80	12	•
XE504140	14	26	80	14	•
XE504160	16	32	90	16	•
XE504180	18	32	100	18	•
XE504200	20	38	100	20	•
XE504250	25	45	120	25	•

Data. P284~286

※ Flat shank is available upon request  
ex) XE504100F : Flat shank

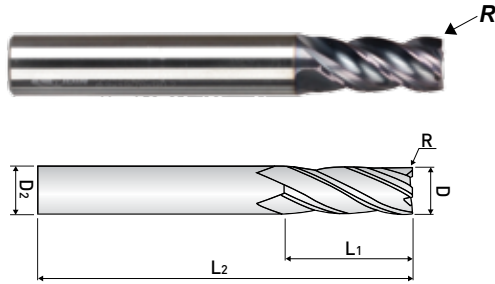
### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 12	0 ~ -0,02	h6
over 12	0 ~ -0,03	

※Items can be changed for quality improvement without notice.

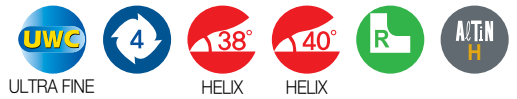
# Neo Classic X-STAR

END MILLS  
> Metric & Inch



## 4 FLUTE, REGULAR LENGTH, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Sharp cutting edge geometry designed for excellent performance on mild mold steel and stainless steel



## XR504 ...series

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
XR504020	2	0.1	5	45	4	•
XR504030	3	0.1	8	50	6	•
XR504040	4	0.2	11	50	6	•
XR504050	5	0.2	13	50	6	•
XR504060	6	0.2	13	50	6	•
XR504070	7	0.2	16	60	8	•
XR504080	8	0.2	19	60	8	•
XR504090	9	0.2	19	70	10	•
XR504100	10	0.3	22	70	10	•
XR504110	11	0.3	22	75	12	•
XR504120	12	0.3	26	75	12	•
XR504130	13	0.3	26	80	12	•
XR504140	14	0.3	26	80	14	•
XR504160	16	0.3	32	90	16	•
XR504180	18	0.3	32	100	18	•
XR504200	20	0.3	38	100	20	•
XR504250	25	0.3	45	120	25	•

Data. P284~286

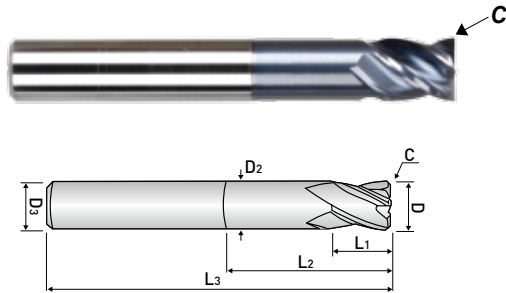
※ Flat shank is available upon request  
ex) XR504100F : Flat shank

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 12	0 ~ -0,02	h6
over 12	0 ~ -0,03	

※Items can be changed for quality improvement without notice.

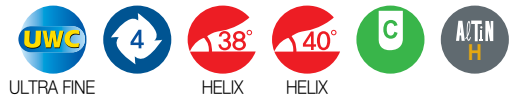
# Neo Classic X-STAR



## 4 FLUTE, STUB CUT LENGTH with EXTENDED NECK, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
  - The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
  - Sharp cutting edge geometry designed for excellent performance on mild mold steel and stainless steel
- \* corner chamfer type

## XE514 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
XE514010	1	2	10	45	0.8	4	•
XE514020	2	3	12	45	1.8	4	•
XE514030	3	4	14	50	2.8	6	•
XE514040	4	5	16	50	3.8	6	•
XE514050	5	6	18	50	4.8	6	•
XE514060	6	7	20	50	5.8	6	•
XE514080	8	9	26	60	7.8	8	•
XE514100	10	11	31	70	9.8	10	•
XE514120	12	13	37	75	11.8	12	•
XE514160	16	17	43	90	15.8	16	•
XE514200	20	21	53	100	19.8	20	•

Data. P284~286

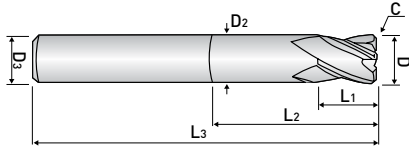
※ Flat shank is available upon request  
ex) XE514100F : Flat shank

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 12	0 ~ -0,02	h6
over 12	0 ~ -0,03	

※Items can be changed for quality improvement without notice.

# Neo Classic X-STAR



## 4 FLUTE, STUB CUT LENGTH with EXTENDED LONG NECK

- High precision and excellent surface due to each 4F variable helix geometry
  - The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
  - Sharp cutting edge geometry designed for excellent performance on mild mold steel and stainless steel
- \* corner chamfer type



## XE524 ...series

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
XE524060	6	7	33	70	5.8	6	•
XE524080	8	9	43	80	7.8	8	•
XE524100	10	11	43	84	9.8	10	•
XE524120	12	13	51	97	11.8	12	•
XE524160	16	17	66	115	15.8	16	•

Data. P284~286

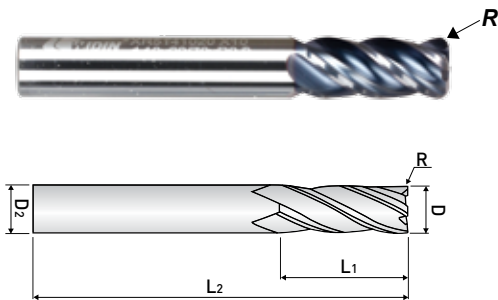
※ Flat shank is available upon request  
ex) XE524100F : Flat shank

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 12	0 ~ -0,02	h6
over 12	0 ~ -0,03	

※Items can be changed for quality improvement without notice.

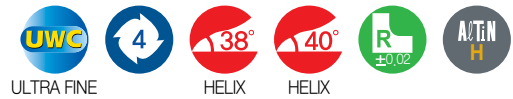
# Neo Classic X-STAR



## 4 FLUTE, REGULAR LENGTH, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Applied various corner radius.
- Sharp cutting edge geometry designed for excellent performance on mild mold steel and stainless steel

## XR514 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
XR5140201	2	0.1	5	45	4	•
XR5140202		0.2				•
XR5140302	3	0.2	8	50	6	•
XR5140303		0.3				•
XR5140305		0.5				•
XR5140403	4	0.3	10	50	6	•
XR5140405		0.5				•
XR5140410		1.0				•
XR5140505	5	0.5	13	50	6	•
XR5140510		1.0				•
XR5140605	6	0.5	13	50	6	•
XR5140610		1.0				•
XR5140615		1.5				•
XR5140805	8	0.5	19	60	8	•
XR5140810		1.0				•
XR5140815		1.5				•
XR5140820		2.0				•
XR5141005	10	0.5	22	70	10	•
XR5141010		1.0				•
XR5141015		1.5				•
XR5141020		2.0				•
XR5141205	12	0.5	26	75	12	•
XR5141210		1.0				•
XR5141215		1.5				•
XR5141220		2.0				•
XR5141230		3.0				•
XR5141615	16	1.5	32	90	16	•
XR5141620		2.0				•
XR5141630		3.0				•
XR5142030	20	3.0	38	100	20	•
XR5142040		4.0				•
XR5142050		5.0				•

Data, P284~286

※ Flat shank is available upon request ex) XR514100F : Flat shank

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 12	0 ~ -0.02	h6
over 12	0 ~ -0.03	

※ Items can be changed for quality improvement without notice.

# Zamus Thunder Series










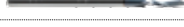









**ENDMILL  
SERIES**





## Zamus Thunder Series



ITEM SERIES	APPEARANCE	FEATURE	INCH & METRIC	PAGE
DA302 ...series		REGULAR LENGTH, BALL NOSE	INCH	152
ZA302 ...series		REGULAR LENGTH	INCH	153
ZA304 ...series		4 FLUTE, REGULAR LENGTH	INCH	154
DB312 ...series		LONG LENGTH, BALL NOSE	METRIC	155
DB342 ...series		BALL NOSE with TAPER NECK	METRIC	156
ZE302 ...series		REGULAR LENGTH	METRIC	157
ZE304 ...series		REGULAR LENGTH	METRIC	158
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ZR322 ...series		CORNER RADIUS LONG LENGTH	METRIC	160
ZR304H ...series		45° HELIX STUB CUT LENGTH, CORNER RADIUS, EXTENDED NECK	METRIC	161
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# Zamus Thunder

END MILLS  
> Metric & Inch



## 2 FLUTE, REGULAR LENGTH, BALL NOSE

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.

## DA302 ...series



EDP. No.	Dia.	R	C.L	OAL	SH.Dia.	STOCK
DA302001	1/32	1/64	1/32	1-1/2	1/8	
DA302002	1/16	1/32	1/16	1-1/2	1/8	
DA302003	3/32	3/64	3/32	1-1/2	1/8	
DA302004	1/8	1/16	5/16	1-1/2	1/8	
DA302006	3/16	3/32	3/8	2	3/16	
DA302008	1/4	1/8	1/2	2-1/2	1/4	
DA302010	5/16	5/32	9/16	2-1/2	5/16	
DA302012	3/8	3/16	3/4	2-1/2	3/8	
DA302016	1/2	1/4	7/8	3	1/2	
DA302020	5/8	5/16	1-1/4	3-1/2	5/8	
DA302024	3/4	3/8	1-1/2	4	3/4	
DA302032	1	1/2	1-1/2	4	1	

Data. P271~272

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

※ Items can be changed for quality improvement without notice.

# Zamus Thunder



## 2 FLUTE, REGULAR LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.

## ZA302 ...series



EDP. No.	Dia.	C.L	OAL	SH.Dia.	STOCK
ZA302002	1/32	1/8	1-1/2	1/8	
ZA302004	1/16	3/16	1-1/2	1/8	
ZA302008	1/8	1/2	1-1/2	1/8	
ZA302012	3/16	5/8	2	3/16	
ZA302016	1/4	3/4	2-1/2	1/4	
ZA302020	5/16	13/16	2-1/2	5/16	
ZA302024	3/8	1	2-1/2	3/8	
ZA302032	1/2	1	3	1/2	
ZA302040	5/8	1-1/4	3-1/2	5/8	
ZA302048	3/4	1-1/2	4	3/4	
ZA302064	1	1-1/2	4	1	

Data. P277

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

\* Items can be changed for quality improvement without notice.

# Zamus Thunder

END MILLS  
> Metric & Inch



## 4 FLUTE, REGULAR LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.

## ZA304 ...series

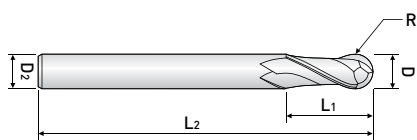


EDP. No.	Dia.	C.L	OAL	SH.Dia.	STOCK
ZA304004	1/16	3/16	1-1/2	1/8	
ZA304008	1/8	1/2	1-1/2	1/8	
ZA304012	3/16	5/8	2	3/16	
ZA304016	1/4	3/4	2-1/2	1/4	
ZA304020	5/16	13/16	2-1/2	5/16	
ZA304024	3/8	1	2-1/2	3/8	
ZA304032	1/2	1	3	1/2	
ZA304040	5/8	1-1/4	3-1/2	5/8	
ZA304048	3/4	1-1/2	4	3/4	
ZA304064	1	1-1/2	4	1	

Data. P278

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

※ Items can be changed for quality improvement without notice.



## 2 FLUTE, LONG LENGTH, BALL NOSE

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Suitable for copy milling.

## DB312 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
DB312010S4	1	0.5	2.5	50	4	•
DB312010					6	•
DB312012	1.2	0.6	3	50	6	•
DB312015	1.5	0.75	4	50	6	•
DB312020S4	2	1	5	50	4	•
DB312020					6	•
DB312025	2.5	1.25	6	60	6	•
DB312030S3	3	1.5	8	60	3	•
DB312030S4					4	•
DB312030					6	•
DB312035	3.5	1.75	8	70	6	•
DB312040S4	4	2	8	70	4	•
DB312040					6	•
DB312045	4.5	2.25	8	70	6	•
DB312050	5	2.5	10	80	6	•
DB312055	5.5	2.75	10	80	6	•
DB312060S	6	3	12	60	6	•
DB312060				90		•
DB312065	6.5	3.25	12	90	8	•
DB312070	7	3.5	14	90	8	•
DB312080S	8	4	14	60	8	•
DB312080				100		•
DB312090	9	4.5	18	100	10	•
DB312100S	10	5	18	60	10	•
DB312100				100		•
DB312120	12	6	22	110	12	•
DB312140	14	7	26	110	14	•
DB312160	16	8	30	140	16	•
DB312180	18	9	34	140	18	•
DB312200	20	10	38	160	20	•

Data. P305~306

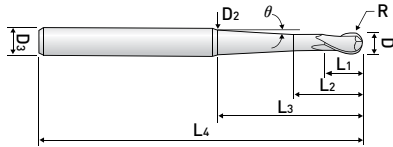
### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※Items can be changed for quality improvement without notice.

# Zamus Thunder

END MILLS  
> Metric & Inch



## 2 FLUTE, BALL NOSE with TAPER NECK

- Suitable for deep slotting machining performance as long size shape with taper neck.

## DB342 .....series



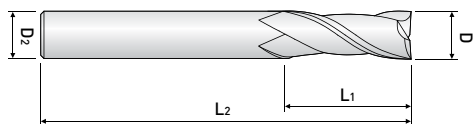
EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	D <sub>2</sub>	D <sub>3</sub>	θ	STOCK
DB34201015	1	0.5	2	4	23	60	2	6	1°30'	•
4.3							3°		•	
5							5°		•	
DB34202015	2	1	4	6	23	60	2.9	6	1°30'	•
5							5°		•	
5.7							3°		•	
DB34202050	3	1.5	6	8	32	70	5.6	6	3°	•
5.3							1°30'		•	
28							3°		•	
DB34203030	4	2	8	10	28	70	6	6	3°	•
49							1°30'		•	
41							3°		•	
DB34204030	5	2.5	10	12	41	90	8	8	3°	•
61							1°30'		•	
34							3°		•	
DB34205030	6	3	12	15	34	90	8	8	3°	•
53							1°30'		•	
36							3°		•	
DB34206030	8	4	14	17	36	100	10	10	3°	•
55							1°30'		•	
40							3°		•	
DB34208030	10	5	18	21	40	110	12	12	3°	•
59							1°30'		•	
63							3°		•	
DB34210030	12	6	22	25	63	140	16	16	3°	•
83							1°30'		•	
83							1°30'		•	

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.02	h6

※Items can be changed for quality improvement without notice.

Zamus Thunder Series



## 2 FLUTE, REGULAR LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.

## ZE302 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
ZE302010	1	2.5	40	6	•
ZE302015	1.5	4	40	6	•
ZE302020	2	6	40	6	•
ZE302025	2.5	8	40	6	•
ZE302030	3	8	45	6	•
ZE302035	3.5	10	45	6	•
ZE302040	4	11	45	6	•
ZE302045	4.5	11	45	6	•
ZE302050	5	13	50	6	•
ZE302055	5.5	13	50	6	•
ZE302060	6	13	50	6	•
ZE302065	6.5	16	60	8	•
ZE302070	7	16	60	8	•
ZE302075	7.5	16	60	8	•
ZE302080	8	19	60	8	•
ZE302085	8.5	19	70	10	•
ZE302090	9	19	70	10	•
ZE302095	9.5	19	70	10	•
ZE302100	10	22	70	10	•
ZE302105	10.5	22	75	12	•
ZE302110	11	22	75	12	•
ZE302115	11.5	22	75	12	•
ZE302120	12	26	75	12	•
ZE302130	13	26	80	12	•
ZE302140	14	26	80	14	•
ZE302150	15	32	90	16	•
ZE302160	16	32	90	16	•
ZE302180	18	32	100	18	•
ZE302200	20	38	100	20	•

Data. P306~307

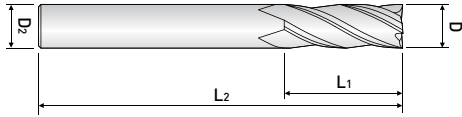
■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※Items can be changed for quality improvement without notice.

# Zamus Thunder

END MILLS  
> Metric & Inch



## 4 FLUTE, REGULAR LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.

## ZE304 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
ZE304020	2	6	40	6	•
ZE304025	2.5	8	40	6	•
ZE304030	3	8	45	6	•
ZE304035	3.5	10	45	6	•
ZE304040	4	11	45	6	•
ZE304045	4.5	11	45	6	•
ZE304050	5	13	50	6	•
ZE304055	5.5	13	50	6	•
ZE304060	6	13	50	6	•
ZE304065	6.5	16	60	8	•
ZE304070	7	16	60	8	•
ZE304075	7.5	16	60	8	•
ZE304080	8	19	60	8	•
ZE304085	8.5	19	70	10	•
ZE304090	9	19	70	10	•
ZE304095	9.5	19	70	10	•
ZE304100	10	22	70	10	•
ZE304105	10.5	22	75	12	•
ZE304110	11	22	75	12	•
ZE304115	11.5	22	75	12	•
ZE304120	12	26	75	12	•
ZE304130	13	26	80	12	•
ZE304140	14	26	80	14	•
ZE304150	15	32	90	16	•
ZE304160	16	32	90	16	•
ZE304180	18	32	100	18	•
ZE304200	20	38	100	20	•

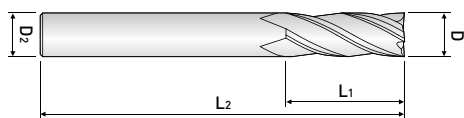
Data. P308~309

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.02	h6

※Items can be changed for quality improvement without notice.





## 4 FLUTE, LONG & EXTRA LONG LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.

## ZE324 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
ZE324030	3	15	60	6	•
ZE324031		20	70	6	
ZE324030S		100	3		
ZE324040	4	15	60	6	•
ZE324041		20	70	6	
ZE324040S		100	4		
ZE324050	5	20	60	6	•
ZE324051		20	80		
ZE324052		25	100		
ZE324060	6	20	80	6	•
ZE324061		30	100		
ZE324062		40	150		
ZE324080	8	30	90	8	•
ZE324081		35	100		
ZE324082		40	150		
ZE324100	10	30	90	10	•
ZE324101		35	100		
ZE324102		45	150		
ZE324103		55	180		
ZE324120	12	30	90	12	•
ZE324121		40	110		
ZE324122		50	150		
ZE324123		60	200		
ZE324140	14	40	120	14	•
ZE324141		60	150		
ZE324160	16	50	140	16	•
ZE324161		70	160		
ZE324162		80	200		
ZE324180	18	50	140	18	•
ZE324200	20	60	150	20	•
ZE324201		100	200		
ZE324202		130	250		

Data. P308~309

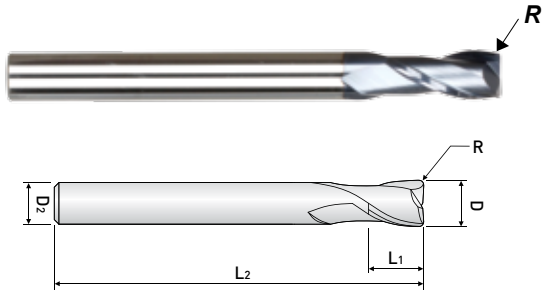
■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,03	h6

※Items can be changed for quality improvement without notice.

# Zamus Thunder

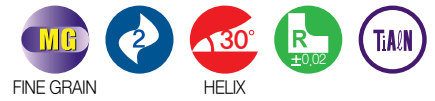
END MILLS  
> Metric & Inch



## 2 FLUTE, CORNER RADIUS LONG LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- TiALN coated for high wear resistance.

## ZR322 ....series



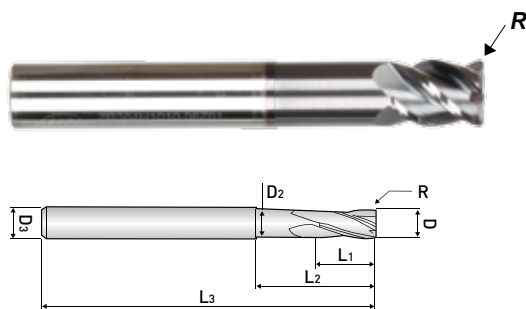
EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
ZR3220302	3	0.2	8	60	4	•
ZR3220302					6	•
ZR3220303		0.3			6	•
ZR3220305					4	•
ZR3220305					6	•
ZR3220402	4	0.2	11	70	4	•
ZR3220402					6	
ZR3220403		0.3			6	
ZR3220405					0.5	
ZR3220405		6				
ZR3220410		1.0			4	
ZR3220410	6					
ZR3220502	5	0.2	13	80	6	•
ZR3220503		0.3				•
ZR3220505		0.5				•
ZR3220510		1.0				•
ZR3220602	6	0.2	13	90	6	•
ZR3220603		0.3				•
ZR3220605		0.5				•
ZR3220610		1.0				•
ZR3220803	8	0.3	19	100	8	•
ZR3220805		0.5				•
ZR3220810		1.0				•
ZR3220815		1.5				•
ZR3220820		2.0				•
ZR3221003	10	0.3	22	100	10	•
ZR3221005		0.5				
ZR3221010		1.0				
ZR3221015		1.5				
ZR3221020		2.0				
ZR3221025		2.5				
ZR3221205	12	0.5	26	110	12	•
ZR3221210		1.0				
ZR3221215		1.5				
ZR3221220		2.0				
ZR3221225		2.5				
ZR3221230		3.0				

Data. P309~310

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.03	h6

※Items can be changed for quality improvement without notice.



## 4 FLUTE, 45° HELIX STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK

- Designed for high hardened materials up to HRc 45.
- Suitable for high speed machining.

## ZR304H ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
ZR304H0303	3	0.3	4	12	55	2.8	6	•
ZR304H0305		0.5						•
ZR304H0403	4	0.3	5	16	55	3.8	6	•
ZR304H0405		0.5						•
ZR304H0605	6	0.5	7	20	60	5.8	6	•
ZR304H0610		1.0						•
ZR304H0805	8	0.5	10	25	65	7.8	8	•
ZR304H0810		1.0						•
ZR304H1005	10	0.5	12	30	70	9.8	10	•
ZR304H1010		1.0						•
ZR304H1015		1.5						•
ZR304H1020		2.0						•
ZR304H1205	12	0.5	15	30	80	11.8	12	•
ZR304H1210		1.0						•
ZR304H1215		1.5						•
ZR304H1220		2.0						•

Data, P310

※ These tools are manufactured based on order received.

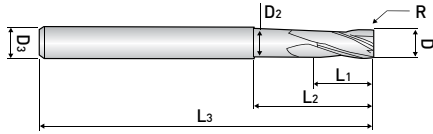
### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,03	h6

※Items can be changed for quality improvement without notice.

# Zamus Thunder

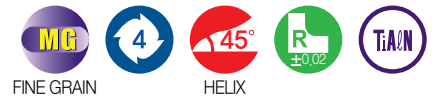
END MILLS  
> Metric & Inch



## 4 FLUTE, 45° HELIX STUB CUT LENGTH, CORNER RADIUS LONG SHANK

- Designed for high hardened materials up to HRC 45.
- Suitable for high speed machining.

## ZR324H ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
ZR324H0605	6	0.5	9	20	90	5.8	6	•
ZR324H0610		1.0						•
ZR324H0805	8	0.5	12	25	100	7.8	8	•
ZR324H0810		1.0						•
ZR324H1005	10	0.5	15	32	100	9.8	10	•
ZR324H1010		1.0						•
ZR324H1015		1.5						•
ZR324H1020		2.0						•
ZR324H1205	12	0.5	18	38	110	11.8	12	•
ZR324H1210		1.0						•
ZR324H1215		1.5						•
ZR324H1220		2.0						•

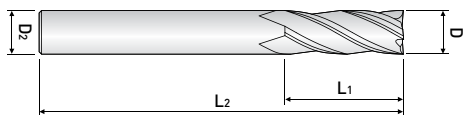
Data, P310

※ These tools are manufactured based on order received.

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.03	h6

※ Items can be changed for quality improvement without notice.



## 4 FLUTE, REGULAR LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Excellent high-performance Endmills.

## TX304...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
TX304010	1	3	50	4	•
TX304015	1.5	4	50	4	•
TX304020	2	6	50	4	•
TX304025	2.5	8	50	4	•
TX304030	3	9	50	4	•
TX304040	4	11	50	4	•
TX304050	5	13	50	6	•
TX304060	6	16	50	6	•
TX304070	7	16	60	8	•
TX304080	8	19	60	8	•
TX304090	9	19	60	10	•
TX304100	10	25	75	10	•
TX304120	12	30	75	12	•
TX304140	14	32	75	14	•
TX304160	16	32	100	16	•
TX304180	18	32	100	18	•
TX304200	20	38	100	20	•

Data. P312

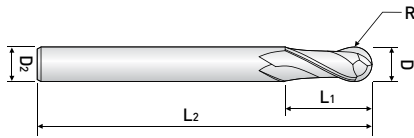
### ■ Tolerance

μm = 1/1000mm

Tolerance	Dia.	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
Cutting Edge(d11)		-14	-20	-25	-32	-40
		-28	-38	-47	-59	-73
Shank(h6)		0	0	0	0	0
		-6	-8	-9	-11	-13

# Zamus Thunder

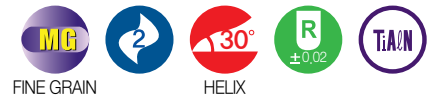
END MILLS  
> Metric & Inch



## 2FLUTE, REGULAR LENGTH, BALL NOSE

- Designed to machine tool steel, alloy, mold steel and other high hardened material.
- Suitable to profile processing.

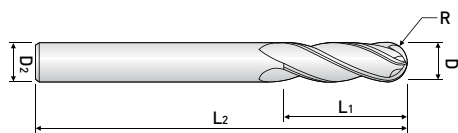
## TXB302...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
TXB302010	1	0.5	2	50	4	•
TXB302015	1.5	0.75	3	50	4	•
TXB302020	2	1	4	50	4	•
TXB302025	2.5	1.25	6	50	4	•
TXB302030	3	1.5	6	50	4	•
TXB302040	4	2	8	50	4	•
TXB302050	5	2.5	10	50	6	•
TXB302060	6	3	12	50	6	•
TXB302080	8	4	14	60	8	•
TXB302100	10	5	18	75	10	•
TXB302120	12	6	22	75	12	•
TXB302140	14	7	32	75	14	•
TXB302160	16	8	32	100	16	•
TXB302180	18	9	32	100	18	•
TXB302200	20	10	38	100	20	•

Data, P311

Zamus Thunder Series



## 4 FLUTE, REGULAR LENGTH, BALL NOSE

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Excellent workpiece finishes.

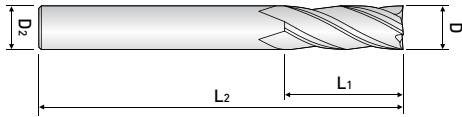
## TXB304...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
TXB304010	1	0.5	2	50	4	•
TXB304015	1.5	0.75	3	50	4	•
TXB304020	2	1	4	50	4	•
TXB304030	3	1.5	6	50	4	•
TXB304040	4	2	8	50	4	•
TXB304050	5	2.5	10	50	6	•
TXB304060	6	3	12	50	6	•
TXB304080	8	4	14	60	8	•
TXB304100	10	5	18	75	10	•
TXB304120	12	6	22	75	12	•
TXB304140	14	7	32	75	14	•
TXB304160	16	8	32	100	16	•
TXB304180	18	9	32	100	18	•
TXB304200	20	10	38	100	20	•

# Zamus Thunder

END MILLS  
> Metric/Inch



## 4 FLUTE, SHORT LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Excellent workpiece finishes.

## TX204...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
TX204010	1	3	39	3	•
TX204015	1.5	5	39	3	•
TX204020	2	7	39	3	•
TX204025	2.5	8	39	3	•
TX204030	3	10	39	3	•
TX204040	4	14	51	4	•
TX204050	5	16	51	5	•
TX204060	6	19	64	6	•
TX204080	8	21	64	8	•
TX204100	10	25	70	10	•
TX204120	12	25	76	12	•
TX204160	16	32	89	16	•
TX204200	20	38	102	20	•

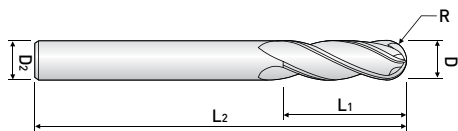
Data. P312

### ■ Tolerance

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

Tolerance \ Dia.	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
Cutting Edge(d11)	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73
Shank(h6)	0 -6	0 -8	0 -9	0 -11	0 -13





## 2 FLUTE, REGULAR LENGTH, BALL NOSE

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

## TXB202...series

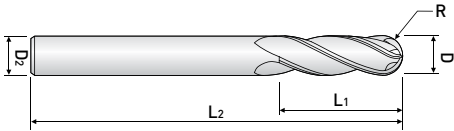


EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
TXB202010	1	0.5	3	39	3	•
TXB202015	1.5	0.75	5	39	3	•
TXB202020	2	1	7	39	3	•
TXB202025	2.5	1.25	8	39	3	•
TXB202030	3	1.5	10	39	3	•
TXB202040	4	2	14	51	4	•
TXB202050	5	2.5	16	51	5	•
TXB202060	6	3	19	64	6	•
TXB202080	8	4	21	64	8	•
TXB202100	10	5	25	70	10	•
TXB202120	12	6	25	76	12	•
TXB202160	16	8	32	89	16	•
TXB202200	20	10	38	100	20	•

Data. P311

# Zamus Thunder

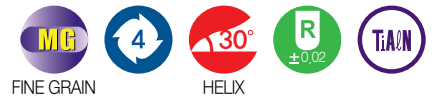
END MILLS  
> Metric & Inch



## 4 FLUTE, REGULAR LENGTH, BALL NOSE

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Excellent workpiece finishes.

## TXB204...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
TXB204020	2	1	7	39	3	•
TXB204030	3	1.5	10	39	3	•
TXB204040	4	2	14	51	4	•
TXB204050	5	2.5	16	51	5	•
TXB204060	6	3	19	64	6	•
TXB204080	8	4	21	64	8	•
TXB204100	10	5	25	70	10	•
TXB204120	12	6	25	76	12	•
TXB204160	16	8	32	89	16	•
TXB204200	20	10	38	100	20	•

Zamus Thunder Series

# Zamus Classic Series






**ENDMILL  
SERIES**




























## Zamus Classic Series



ITEM SERIES	APPEARANCE	FEATURE	INCH & METRIC	PAGE
DA512 ... series		LONG LENGTH, BALL NOSE	INCH	172
DA514 ... series		LONG LENGTH, BALL NOSE	INCH	173
DA522 ... series		BALL NOSE with PENCIL NECK	INCH	174
MD502 ... series		MINIATURE, BALL NOSE	INCH	175
DA542 ... series		BALL NOSE with TAPER NECK	INCH	176
DA552 ... series		BALL NOSE with TAPER NECK	INCH	177
ZA502 ... series		REGULAR LENGTH	INCH	178
ZA522 ... series		LONG LENGTH	INCH	179
MZ502 ... series		MINIATURE	INCH	180
ZA504 ... series		REGULAR LENGTH	INCH	181
ZA524 ... series		LONG LENGTH	INCH	182
ZA506&8 ... series		45° HELIX, LONG LENGTH	INCH	183
ZA526&8 ... series		45° HELIX, EXTRA LONG LENGTH	INCH	184
ZR502A ... series		STUB LENGTH, CORNER RADIUS	INCH	185
ZR522A ... series		LONG LENGTH, CORNER RADIUS	INCH	186
ZR532A ... series		LONG LENGTH, CORNER RADIUS	INCH	187
ZR504A ... series		STUB LENGTH, CORNER RADIUS	INCH	188
ZR524A ... series		REGULAR LENGTH, CORNER RADIUS	INCH	189
ZR534A ... series		LONG LENGTH, CORNER RADIUS	INCH	190
ZR506(8)A ... series		50° HELIX, LONG LENGTH, CORNER RADIUS	INCH	191
FA50 ... series		ROUGHING LONG LENGTH	INCH	192
DB402 ... series		SHORT LENGTH, BALL NOSE	METRIC	193
DB512 ... series		LONG LENGTH, BALL NOSE	METRIC	194

## Zamus Classic Series



ITEM SERIES	APPEARANCE	FEATURE	INCH & METRIC	PAGE
DB514 ... series		LONG LENGTH, BALL NOSE	METRIC	195
DB502 ... series		STUB CUT LENGTH, BALL NOSE with EXTENDED NECK	METRIC	196
DB54(5)2 ... series		BALL NOSE with TAPER NECK	METRIC	197
ZE504 ... series		REGULAR LENGTH	METRIC	198
ZE506 ... series		REGULAR & LONG LENGTH	METRIC	199
ZE514 ... series		45° HELIX REGULAR LENGTH	METRIC	200
ZE612 ... series		for RIB PROCESSING	METRIC	201
DB612 ... series		for RIB PROCESSING	METRIC	205
ZR502 ... series		STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK	METRIC	209
ZR504 ... series		STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK	METRIC	210
ZR512 ... series		REGULAR LENGTH, CORNER RADIUS	METRIC	211
ZR514 ... series		REGULAR LENGTH, CORNER RADIUS	METRIC	212
ZR522 ... series		LONG LENGTH, CORNER RADIUS	METRIC	213
ZR524 ... series		LONG LENGTH, CORNER RADIUS	METRIC	214
TPRB4-050 ... series		30° TAPER BALL, RIB PROCESSING	METRIC	215
TPRB4-075 ... series		45° TAPER BALL, RIB PROCESSING	METRIC	216
TPRB4-100 ... series		1° TAPER BALL, RIB PROCESSING	METRIC	217
TPRB4-150 ... series		1° 30' TAPER BALL, RIB PROCESSING	METRIC	219
TPRB4-200 ... series		2° TAPER BALL, RIB PROCESSING	METRIC	221
TPRE4-050 ... series		30° TAPER BALL, RIB PROCESSING	METRIC	223
TPRE4-075 ... series		45° TAPER, RIB PROCESSING	METRIC	225
TPRE4-100 ... series		1° TAPER, RIB PROCESSING	METRIC	227
TPRE4-150 ... series		1° 30' TAPER, RIB PROCESSING	METRIC	229
TPRE4-200 ... series		2° TAPER, RIB PROCESSING	METRIC	231
TPRE4-300 ... series		3° TAPER BALL, RIB PROCESSING	METRIC	233

# Zamus Classic

END MILLS  
> Metric & Inch



## 2 FLUTE, LONG LENGTH, BALL NOSE

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Suitable for copy milling.

## DA512 ...series



EDP. No.	Dia.	R	C.L	OAL	SH.Dia.	STOCK
DA512001	1/32	1/64	1/32	2-1/2	1/4	•
DA512002	1/16	1/32	1/16	2-1/2	1/4	•
DA512003	3/32	3/64	3/32	2-1/2	1/4	•
DA512004	1/8	1/16	5/16	2-3/8	1/8	•
DA512006	3/16	3/32	3/8	3-1/8	3/16	•
DA512008	1/4	1/8	1/2	3-1/2	1/4	•
DA512010	5/16	5/32	9/16	4	5/16	•
DA512012	3/8	3/16	3/4	4	3/8	•
DA512016	1/2	1/4	7/8	4-1/4	1/2	•
DA512020	5/8	5/16	1-1/4	5-1/2	5/8	•
DA512024	3/4	3/8	1-1/2	6-1/4	3/4	•
DA512032	1	1/2	2	7-1/8	1	•

Data. P271~272

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

※ Items can be changed for quality improvement without notice.



## 4 FLUTE, LONG LENGTH, BALL NOSE

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

## DA514 ...series



EDP. No.	Dia.	R	C.L	OAL	SH.Dia.	STOCK
DA514002	1/16	1/32	1/16	2-1/2	1/4	•
DA514003	3/32	3/64	3/32	2-1/2	1/4	•
DA514004	1/8	1/16	5/16	2-3/8	1/8	•
DA514006	3/16	3/32	3/8	3-1/8	3/16	•
DA514008	1/4	1/8	1/2	3-1/2	1/4	•
DA514010	5/16	5/32	9/16	4	5/16	•
DA514012	3/8	3/16	3/4	4	3/8	•
DA514016	1/2	1/4	7/8	4-1/4	1/2	•
DA514020	5/8	5/16	1-1/4	5-1/2	5/8	•
DA514024	3/4	3/8	1-1/2	6-1/4	3/4	•
DA514032	1	1/2	2	7-1/8	1	•

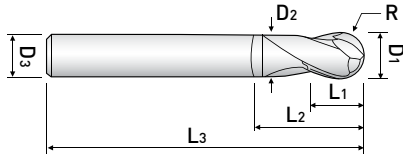
Data. P272~273

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

\* Items can be changed for quality improvement without notice.

# Zamus Classic

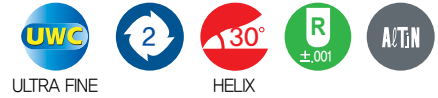
END MILLS  
> Metric/Inch



## 2 FLUTE, LONG LENGTH, BALL NOSE with EXTENDED NECK

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Suitable for copy milling.
- Suitable for deep copy milling with long neck type

## DA522 ...series



EDP. No.	D <sub>1</sub>	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
DA522004	1/8	1/16	5/16	-	2-3/4	-	1/4	•
DA522006	3/16	3/32	1/2	-	3-1/8	-	1/4	•
DA522008	1/4	1/8	1/2	7/8	3-1/8	.242	1/4	•
DA522010	5/16	5/32	9/16	1-1/16	3-1/2	.305	5/16	•
DA522012	3/8	3/16	3/4	1-1/4	4	.367	3/8	•
DA522016	1/2	1/4	7/8	1-3/8	4-1/4	.492	1/2	•
DA522020	5/8	5/16	1-1/4	2	5-1/2	.617	5/8	•
DA522024	3/4	3/8	1-1/2	2-1/4	6-1/4	.742	3/4	•
DA522032	1	1/2	2-1/8	3	7	.992	1	•

Data. P273~274

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

※ Items can be changed for quality improvement without notice.





## 2 FLUTE, MINIATURE, BALL NOSE

- High precision milling in medical, optical, electronics and aerospace industrials.
- Excellent performance at dry cutting conditon.
- Excellent performance on high hardened steel.

## MD502 ...series



EDP. No.	Dia.	R	C.L	OAL	SH.Dia.	STOCK
MD502024	.024	.012	.043	1-1/2	1/8	•
MD502028	.028	.014	.060	1-1/2	1/8	•
MD502031	.031	.0155	.080	1-1/2	1/8	•
MD502035	.035	.0175	.087	1-1/2	1/8	•
MD502040	.040	.020	.100	1-1/2	1/8	•
MD502043	.043	.0215	.118	1-1/2	1/8	•
MD502047	.047	.0235	.118	1-1/2	1/8	•
MD502052	.052	.026	.138	1-1/2	1/8	•
MD502055	.055	.0275	.138	1-1/2	1/8	•
MD502062	.062	.031	.157	1-1/2	1/8	•

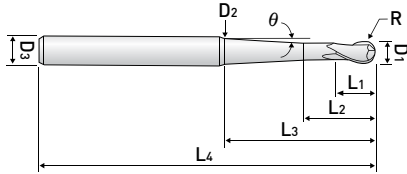
Data, P274

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

\* Items can be changed for quality improvement without notice.

# Zamus Classic

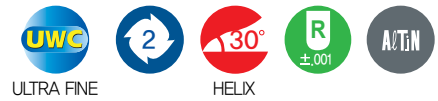
END MILLS  
> Metric & Inch



## 2 FLUTE, BALL NOSE with TAPER NECK

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Suitable for copy milling.
- Suitable for deep copy milling with taper long neck type

## DA542 ...series

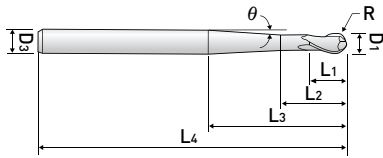


EDP. No.	D <sub>1</sub>	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	L <sub>4</sub>	θ	STOCK
DA522004	1/16	1/32	5/32	15/64	7/8	.096	1/4	2-3/8	1°30'	•
DA522006	1/16	1/32	5/32	15/64	1-5/8	.208	1/4	3-1/8	3°	•
DA522008	1/8	1/16	1/4	21/64	2-1/16	.216	1/4	3-5/8	1°30'	•
DA522010	3/16	3/32	3/8	29/64	2-3/8	.288	3/8	4-3/8	1°30'	•
DA522012	1/4	1/8	1/2	5/8	2-1/16	.325	3/8	4-3/8	1°30'	•
DA522016	5/16	5/32	9/16	11/16	2-1/16	.385	1/2	4-3/4	1°30'	•
DA522020	3/8	3/16	11/16	13/16	2-3/8	.458	1/2	5-1/16	1°30'	•
DA522024	1/2	1/4	7/8	1	3-1/4	.618	3/4	6-3/8	1°30'	•

Data, P275

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

※ Items can be changed for quality improvement without notice.



## 2 FLUTE, BALL NOSE with PENCIL NECK

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Suitable for copy milling.
- Suitable for deep copy milling with taper long neck type

## DA552 ...series



ULTRA FINE

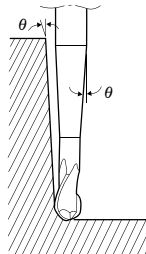


HELIX



EDP. No.	D <sub>1</sub>	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>	L <sub>4</sub>	θ	STOCK
DA552006	3/16	3/32	9/16	.659	3-11/32	3/8	7-3/4	2°	•
DA552007	3/16	3/32	9/16	.666	2-13/16	3/8	6	2°30'	•
DA552008	1/4	1/8	3/4	.859	4-7/16	1/2	7-3/4	2°	•
DA552009	1/4	1/8	3/4	.856	3-23/32	1/2	6	2°30'	•
DA552010	5/16	5/32	3/4	.868	4-29/32	1/2	7-3/4	1°20'	•
DA552011	5/16	5/32	3/4	.870	3-15/16	1/2	6	1°45'	•
DA552012	3/8	3/16	1-3/16	1.326	4-29/32	5/8	7-3/4	2°	•
DA552013	3/8	3/16	1-3/16	1.325	4-3/16	5/8	6	2°30'	•
DA552016	1/2	1/4	1-3/16	1.309	4	5/8	7-3/4	1°20'	•
DA552017	1/2	1/4	1-3/16	1.329	3-3/8	5/8	6	1°45'	•

Data, P276



MILLING ON TAPERED WALL

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

\* Items can be changed for quality improvement without notice.

# Zamus Classic



## 2 FLUTE, REGULAR LENGTH

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

## ZA502 ...series



EDP. No.	Dia.	C.L	OAL	SH.Dia.	STOCK
ZA502002	1/32	1/8	1-1/2	1/8	•
ZA502004	1/16	3/16	1-1/2	1/8	•
ZA502006	3/32	5/16	1-1/2	1/8	•
ZA502008	1/8	1/2	1-1/2	1/8	•
ZA502010	5/32	9/16	2	3/16	•
ZA502012	3/16	5/8	2	3/16	•
ZA502014	7/32	5/8	2-1/2	1/4	•
ZA502016	1/4	3/4	2-1/2	1/4	•
ZA502018	9/32	3/4	2-1/2	5/16	•
ZA502020	5/16	13/16	2-1/2	5/16	•
ZA502024	3/8	1	2-1/2	3/8	•
ZA502026	13/32	1	2-3/4	7/16	•
ZA502028	7/16	1	2-3/4	7/16	•
ZA502032	1/2	1	3	1/2	•
ZA502036	9/16	1-1/8	3-1/2	9/16	•
ZA502040	5/8	1-1/4	3-1/2	5/8	•
ZA502048	3/4	1-1/2	4	3/4	•
ZA502064	1	1-1/2	4	1	•

Data. P277

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

※ Items can be changed for quality improvement without notice.



## 2 FLUTE, LONG LENGTH

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

## ZA522 ...series



EDP. No.	Dia.	C.L	OAL	SH.Dia.	STOCK
ZA522008	1/8	3/4	2-1/4	1/8	•
ZA522012	3/16	3/4	2-1/2	3/16	•
ZA522016	1/4	1-1/8	3	1/4	•
ZA522020	5/16	1-1/8	3	5/16	•
ZA522024	3/8	1-1/8	3	3/8	•
ZA522032	1/2	2	4	1/2	•
ZA522040	5/8	2-1/4	5	5/8	•
ZA522048	3/4	2-1/4	5	3/4	•
ZA522064	1	2-1/4	5	1	•

Data, P277

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

\* Items can be changed for quality improvement without notice.

# Zamus Classic

END MILLS  
> Metric/Inch



## 2 FLUTE, MINIATURE

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

## MZ502 ...series



EDP. No.	Dia.	C.L	OAL	SH.Dia.	STOCK
MZ502016	.016	.031	1-1/2	1/8	•
MZ502020	.020	.040	1-1/2	1/8	•
MZ502024	.024	.047	1-1/2	1/8	•
MZ502028	.028	.055	1-1/2	1/8	•
MZ502031	.031	.063	1-1/2	1/8	•
MZ502035	.035	.080	1-1/2	1/8	•
MZ502040	.040	.100	1-1/2	1/8	•
MZ502043	.043	.100	1-1/2	1/8	•
MZ502047	.047	.157	1-1/2	1/8	•
MZ502052	.052	.157	1-1/2	1/8	•
MZ502055	.055	.157	1-1/2	1/8	•
MZ502062	.062	.157	1-1/2	1/8	•

Data. P278

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.001	h6

※ Items can be changed for quality improvement without notice.



## 4 FLUTE, REGULAR LENGTH

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

## ZA504 ...series



EDP. No.	Dia.	C.L	OAL	SH.Dia.	STOCK
ZA504004	1/16	3/16	1-1/2	1/8	•
ZA504008	1/8	1/2	1-1/2	1/8	•
ZA504012	3/16	5/8	2	3/16	•
ZA504016	1/4	3/4	2-1/2	1/4	•
ZA504020	5/16	13/16	2-1/2	5/16	•
ZA504024	3/8	1	2-1/2	3/8	•
ZA504028	7/16	1	2-3/4	7/16	•
ZA504032	1/2	1	3	1/2	•
ZA504040	5/8	1-1/4	3-1/2	5/8	•
ZA504048	3/4	1-1/2	4	3/4	•
ZA504064	1	1-1/2	4	1	•

Data. P278

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

\* Items can be changed for quality improvement without notice.

# Zamus Classic

END MILLS  
> Metric & Inch



## 4 FLUTE, LONG LENGTH

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

## ZA524 ...series



EDP. No.	Dia.	C.L	OAL	SH.Dia.	STOCK
ZA524004	1/16	1/4	1-1/2	1/8	•
ZA524008	1/8	3/4	2-1/4	1/8	•
ZA524012	3/16	3/4	2-1/2	3/16	•
ZA524016	1/4	1-1/8	3	1/4	•
ZA524020	5/16	1-1/8	3	5/16	•
ZA504022	11/32	7/8	2-1/2	3/8	•
ZA524024	3/8	1-1/8	3	3/8	•
ZA524032	1/2	2	4	1/2	•
ZA524040	5/8	2-1/4	5	5/8	•
ZA524048	3/4	2-1/4	5	3/4	•
ZA524064	1	2-1/4	5	1	•

Data. P279

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

※ Items can be changed for quality improvement without notice.





## 6&8 FLUTE, 45° HELIX LONG LENGTH

- Designed to machine tool steel, hardened materials.
- High speed cutting and finish milling with high feed rate.
- Superior workpiece finishes.
- Superior wear resistant.

## ZA506 & 8 ...series



EDP. No.	Dia.	C.L	OAL	SH.Dia.	NO. OF FLUTE	STOCK
ZA506016	1/4	1/2	2-1/4	1/4	6	•
ZA506020	5/16	3/4	2-1/2	5/16	6	•
ZA506024	3/8	7/8	2-7/8	3/8	6	•
ZA506032	1/2	1	3-1/4	1/2	6	•
ZA506040	5/8	1-1/4	3-5/8	5/8	6	•
ZA508048	3/4	1-1/2	4-1/8	3/4	8	•
ZA508064	1	1-3/4	4-1/4	1	8	•

Data. P279~280

Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

\* Items can be changed for quality improvement without notice.

# Zamus Classic

END MILLS  
> Metric & Inch



## 6&8 FLUTE, 45° HELIX EXTRA LONG LENGTH

- Designed to machine tool steel, hardened materials.
- High speed cutting and finish milling with high feed rate.
- Superior workpiece finishes.
- Superior wear resistant.

## ZA526 & 8 ...series



EDP. No.	Dia.	C.L	OAL	SH.Dia.	NO. OF FLUTE	STOCK
ZA526016	1/4	1	2-3/4	1/4	6	•
ZA526020	5/16	1-1/2	3-5/8	5/16	6	•
ZA526024	3/8	1-3/4	4	3/8	6	•
ZA526032	1/2	2-3/16	4-3/8	1/2	6	•
ZA526040	5/8	2-5/8	5-1/8	5/8	6	•
ZA528048	3/4	2-1/4	5	3/4	8	•
ZA528049	3/4	3-1/4	6	3/4	8	•
ZA528050	3/4	4-1/8	7	3/4	8	•
ZA528064	1	4-1/8	7	1	8	•

Data, P280

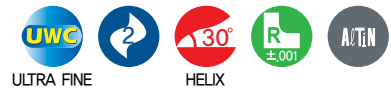
Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

※ Items can be changed for quality improvement without notice.



## 2 FLUTE, STUB LENGTH, CORNER RADIUS

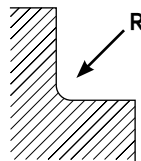
- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.



## ZR502A .....series

EDP. No.	Dia.	R	C.L	OAL	SH.Dia.	STOCK
ZR502A00408	1/16	.008	1/8	2-1/4	1/4	•
ZR502A00810	1/8	.010	1/4	2-1/4	1/4	•
ZR502A00820		.020				
ZR502A00830		.030				
ZR502A01210	3/16	.010	3/8	2-1/2	1/4	•
ZR502A01220		.020				
ZR502A01230		.030				
ZR502A01610	1/4	.010	1/2	3	1/4	•
ZR502A01620		.020				
ZR502A01630		.030				
ZR502A01660		.040				
ZR502A02020	5/16	.020	1/2	3	5/16	•
ZR502A02030		.030				
ZR502A02060		.060				
ZR502A02090		.090				
ZR502A02420	3/8	.020	5/8	3	3/8	•
ZR502A02430		.030				
ZR502A02460		.060				
ZR502A02490		.090				
ZR502A03220	1/2	.020	5/8	4	1/2	•
ZR502A03230		.030				
ZR502A03260		.060				
ZR502A03290		.090				

Data. P281



Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

\* Items can be changed for quality improvement without notice.

# Zamus Classic

END MILLS  
> Metric/Inch



## 2 FLUTE, REGULAR LENGTH, CORNER RADIUS

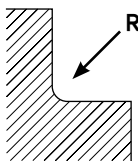
- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.

## ZR522A ...series



EDP. No.	Dia.	R	C.L	OAL	SH.Dia.	STOCK
ZR522A00408	1/16	.008	3/16	2-1/4	1/4	•
ZR522A00810	1/8	.010	1/2	2-1/4	1/4	•
ZR522A00820		.020				
ZR522A00830		.030				
ZR522A01210	3/16	.010	5/8	2-1/2	1/4	•
ZR522A01220		.020				
ZR522A01230		.030				
ZR522A01610	1/4	.010	3/4	3	1/4	•
ZR522A01620		.020				
ZR522A01630		.030				
ZR522A01660		.060				
ZR522A02020	5/16	.020	13/16	3	5/16	•
ZR522A02030		.030				
ZR522A02060		.060				
ZR522A02090		.090				
ZR522A02420	3/8	.020	1	3	3/8	•
ZR522A02430		.030				
ZR522A02460		.060				
ZR522A02490		.090				
ZR522A02820	7/16	.020	1	4	7/16	•
ZR522A02830		.030				
ZR522A02860		.060				
ZR522A02890		.090				
ZR522A03220	1/2	.020	1	4	1/2	•
ZR522A03230		.030				
ZR522A03260		.060				
ZR522A03290		.090				

Data. P281



Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

※ Items can be changed for quality improvement without notice.



## 2 FLUTE, LONG LENGTH, CORNER RADIUS

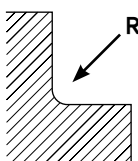
- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.

## ZR532A .....series



EDP. No.	Dia.	R	C.L	OAL	SH.Dia.	STOCK
ZR532A01620	1/4	.020	1-1/8	3	1/4	•
ZR532A01630		.030				
ZR532A01660		.060				
ZR532A02020	5/16	.020	1-1/8	3	5/16	•
ZR532A02030		.030				
ZR532A02060		.060				
ZR532A02090		.090				
ZR532A02420	3/8	.020	1-1/8	3	3/8	•
ZR532A02430		.030				
ZR532A02460		.060				
ZR532A02490		.090				
ZR532A03220	1/2	.020	2	4	1/2	•
ZR532A03230		.030				
ZR532A03260		.060				
ZR532A03290		.090				

Data. P281



Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

\* Items can be changed for quality improvement without notice.

# Zamus Classic

END MILLS  
> Metric & Inch



## 4 FLUTE, STUB LENGTH, CORNER RADIUS

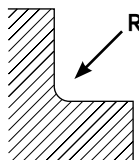
- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.

## ZR504A .....series



EDP. No.	Dia.	R	C.L	OAL	SH.Dia.	STOCK
ZR504A00408	1/16	.008	1/8	2-1/4	1/4	•
ZR504A00810	1/8	.010	1/4	2-1/4	1/4	•
ZR504A00820		.020				
ZR504A00830		.030				
ZR504A01210	3/16	.010	3/8	2-1/2	1/4	•
ZR504A01220		.020				
ZR504A01230		.030				
ZR504A01610	1/4	.010	1/2	3	1/4	•
ZR504A01620		.020				
ZR504A01630		.030				
ZR504A01660		.060				
ZR504A02020	5/16	.020	1/2	3	5/16	•
ZR504A02030		.030				
ZR504A02060		.060				
ZR504A02090		.090				
ZR504A02420	3/8	.020	5/8	3	3/8	•
ZR504A02430		.030				
ZR504A02460		.060				
ZR504A02490		.090				
ZR504A03220	1/2	.020	5/8	4	1/2	•
ZR504A03230		.030				
ZR504A03260		.060				
ZR504A03290		.090				

Data. P281



Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

※ Items can be changed for quality improvement without notice.



## 4 FLUTE, REGULAR LENGTH, CORNER RADIUS

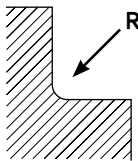
- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.



## ZR524A .....series

EDP. No.	Dia.	R	C.L	OAL	SH.Dia.	STOCK
ZR524A00408	1/16	.008	3/16	2-1/4	1/4	•
ZR524A00810	1/8	.010	1/2	2-1/4	1/4	•
ZR524A00820		.020				
ZR524A00830		.030				
ZR524A01210	3/16	.010	5/8	2-1/2	1/4	•
ZR524A01220		.020				
ZR524A01230		.030				
ZR524A01610	1/4	.010	3/4	3	1/4	•
ZR524A01620		.020				
ZR524A01630		.030				
ZR524A01660		.060				
ZR524A02020	5/16	.020	13/16	3	5/16	•
ZR524A02030		.030				
ZR524A02060		.060				
ZR524A02090		.090				
ZR524A02420	3/8	.020	1	3	3/8	•
ZR524A02430		.030				
ZR524A02460		.060				
ZR524A02490		.090				
ZR524A02820	7/16	.020	1	4	7/16	•
ZR524A02830		.030				
ZR524A02860		.060				
ZR524A02890		.090				
ZR524A03220	1/2	.020	1	4	1/2	•
ZR524A03230		.030				
ZR524A03260		.060				
ZR524A03290		.090				

Data, P281



Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

\* Items can be changed for quality improvement without notice.

# Zamus Classic

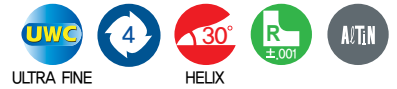
END MILLS  
> Metric & Inch



## 4 FLUTE, LONG LENGTH, CORNER RADIUS

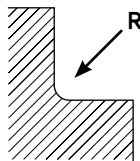
- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.

## ZR534A .....series



EDP. No.	Dia.	R	C.L	OAL	SH.Dia.	STOCK
ZR534A01620	1/4	.020	1-1/8	3	1/4	•
ZR534A01630		.030				
ZR534A01660		.060				
ZR534A02020	5/16	.020	1-1/8	3	5/16	•
ZR534A02030		.030				
ZR534A02060		.060				
ZR534A02090		.090				
ZR534A02420	3/8	.020	1-1/8	3	3/8	•
ZR534A02430		.030				
ZR534A02460		.060				
ZR534A02490		.090				
ZR534A03220	1/2	.020	2	4	1/2	•
ZR534A03230		.030				
ZR534A03260		.060				
ZR534A03290		.090				

Data, P281



Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

※ Items can be changed for quality improvement without notice.

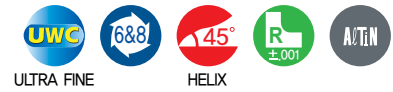




## 6&8 FLUTE, 45° HELIX, LONG LENGTH, CORNER RADIUS

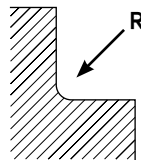
- Designed to machine tool steel, hardened materials.
- High speed cutting and finish milling with high feed rates.
- Superior workpiece finishes.

## ZR506(8)A .....series



EDP. No.	Dia.	R	C.L	OAL	SH.Dia.	Z	STOCK
ZR506A01620	1/4	.020	1/2	2-1/4	1/4	6	•
ZR506A02020	5/16	.020	3/4	2-1/2	5/16	6	•
ZR506A02420	3/8	.020	7/8	2-7/8	3/8	6	•
ZR506A02430		.030					
ZR506A03220	1/2	.020	1	3-1/4	1/2	6	•
ZR506A03230		.030					
ZR506A04030	5/8	.030	1-1/4	3-5/8	5/8	6	•
ZR506A04060		.060					
ZR508A04830	3/4	.030	1-1/2	4-1/8	3/4	6	•
ZR508A04860		.060					
ZR508A04890		.090					

Data, P282



Tolerance of Mill Dia. (inch)	Tolerance of Shank Dia.
0 ~ -.0012	h6

\* Items can be changed for quality improvement without notice.

# Zamus Classic



## ROUGHING END MILL - LONG LENGTH

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

## FA50 ....series



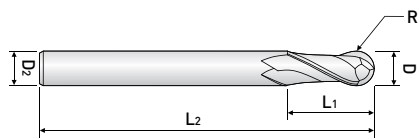
EDP. No.	Dia.	C.L	OAL	SH.Dia.	Z	STOCK
FA503016	1/4	3/4	2-1/2	1/4	3	•
FA503020	5/16	3/4	2-1/2	5/16	3	•
FA503024	3/8	7/8	2-1/2	3/8	3	•
FA504032	1/2	1	3	1/2	4	•
FA504040	5/8	1-1/4	3-1/2	5/8	4	•
FA504048	3/4	1-5/8	4	3/4	4	•
FA505064	1	1-3/4	4	1	5	•

Data, P282

unit : inch

Mill Dia.	1/4 ~ 3/8	1/2 ~ 5/8	3/4 ~ 1
Tolerance of Mill Dia.	0 ~ -.0022	0 ~ -.0022	0 ~ -.0033

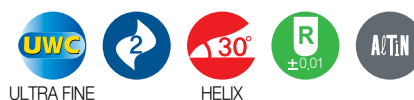
※Items can be changed for quality improvement without notice.



## 2 FLUTE, SHORT LENGTH, BALL NOSE

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Suitable for copy milling.

## DB402 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
DB402010	1	0.5	3	38	4	•
DB402012	1.2	0.6	3	38	4	•
DB402015	1.5	0.75	3	42	4	•
DB402020	2	1	3	42	6	•
DB402025	2.5	1.25	3	42	6	•
DB402030	3	1.5	4	50	6	•
DB402035	3.5	1.75	4	50	6	•
DB402040	4	2	5	50	6	•
DB402045	4.5	2.25	5	50	6	•
DB402050	5	2.5	6	50	6	•
DB402055	5.5	2.75	6	50	6	•
DB402060	6	3	7	50	6	•
DB402070	7	3.5	8	60	8	•
DB402080	8	4	9	60	8	•
DB402090	9	4.5	10	70	10	•
DB402100	10	5	11	70	10	•
DB402120	12	6	12	75	12	•
DB402140	14	7	14	80	14	•
DB402160	16	8	16	82	16	•
DB402200	20	10	20	100	20	•

Data. P305~306

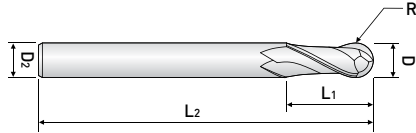
■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※Items can be changed for quality improvement without notice.

# Zamus Classic

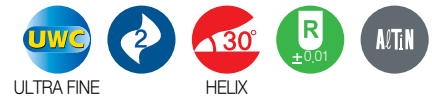
END MILLS  
> Metric & Inch



## 2 FLUTE, LONG LENGTH, BALL NOSE

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Suitable for copy milling.

## DB512 ...series



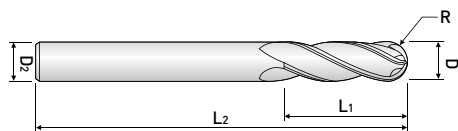
EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
DB512010	1	0.5	3	50	4	•
DB512010					6	•
DB512015	1.5	0.75	4	50	6	•
DB512020	2	1	5	60	4	•
DB512020					6	•
DB512025	2.5	1.25	6	60	6	•
DB512030	3	1.5	8	70	4	•
DB512030					6	•
DB512035	3.5	1.75	8	70	6	•
DB512040	4	2	8	70	4	•
DB512040					6	•
DB512045	4.5	2.25	10	70	6	•
DB512050	5	2.5	12	80	6	•
DB512055	5.5	2.75	12	80	6	•
DB512060	6	3	12	90	6	•
DB512065	6.5	3.25	12	90	8	•
DB512070	7	3.5	15	90	8	•
DB512080	8	4	15	100	8	•
DB512090	9	4.5	20	100	10	•
DB512100	10	5	20	100	10	•
DB512101			25	150		•
DB512110	11	5.5	25	110	12	•
DB512120	12	6	25	110	12	•
DB512121			30	150		•
DB512122			35	200		•
DB512130	13	6.5	30	110	14	•
DB512140	14	7	30	110	14	•
DB512150	15	7.5	35	140	16	•
DB512160	16	8	35	140	16	•
DB512161			40	200		•
DB512162			45	250		•
DB512180	18	9	40	150	18	•
DB512200	20	10	40	160	20	•
DB512201			45	200		•
DB512202			50	250		•
DB512250	25	12.5	50	180	25	•

Data. P305~306

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.02	h6

※Items can be changed for quality improvement without notice.



## 4 FLUTE, LONG LENGTH, BALL NOSE

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Suitable for copy milling.

## DB514 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
DB514030	3	1.5	8	70	6	•
DB514040	4	2	8	70	6	•
DB514050	5	2.5	10	80	6	•
DB514060	6	3	12	90	6	•
DB514070	7	3.5	15	90	8	•
DB514080	8	4	15	100	8	•
DB514090	9	4.5	20	100	10	•
DB514100	10	5	20	100	10	•
DB514110	11	5.5	25	110	12	•
DB514120	12	6	25	110	12	•
DB514130	13	6.5	30	110	14	•
DB514140	14	7	30	110	14	•
DB514150	15	7.5	35	140	16	•
DB514160	16	8	35	140	16	•
DB514180	18	9	40	150	18	•
DB514200	20	10	40	160	20	•
DB514250	25	12.5	50	180	25	•

Data. P313

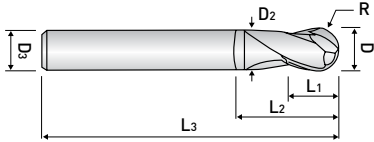
■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※Items can be changed for quality improvement without notice.

# Zamus Classic

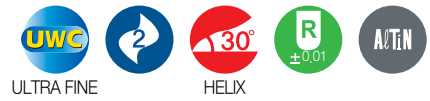
END MILLS  
> Metric & Inch



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

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Suitable for copy milling.
- Designed to high strength.

## DB502 ...series



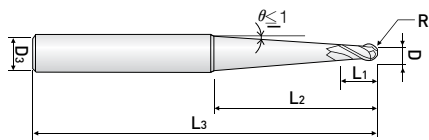
EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
DB502010	1	0.5	1	3	50	0.95	6	•
DB502015	1.5	0.75	1.5	4	50	1.45	6	•
DB502020	2	1	2	6	60	1.9	6	•
DB502030	3	1.5	4	9	70	2.85	6	•
DB502040	4	2	5	12	70	3.85	6	•
DB502050	5	2.5	6	15	80	4.7	6	•
DB502060	6	3	7	18	90	5.7	6	•
DB502080	8	4	10	24	90	7.7	8	•
DB502100	10	5	12	30	100	9.5	10	•
DB502120	12	6	14	36	110	11.5	12	•

Data. P305~306

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.02	h6

※Items can be changed for quality improvement without notice.



## 2 FLUTE, BALL NOSE with TAPER NECK

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Suitable for copy milling.
- Suitable for deep copy milling with taper long neck type.

## DB54(5)2 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>	STOCK
DB542020	2	1.0	3	63	110	6	•
DB552020			5	85	155		•
DB542030	3	1.5	5	65	110	6	•
DB552030			7	87	155		•
DB542040	4	2.0	7	67	110	6	•
DB552040			10	90	155	8	•
DB542050	5	2.5	10	70	110	6	•
DB552050			15	95	155	8	•
DB542060	6	3.0	18	78	155	10	•
DB552060			20	110	200		•
DB542080	8	4.0	30	100	155	12	•
DB552080				120	200		•
DB542100	10	5.0	40	100	155	12	•
DB552100				120	200		•
DB542120	12	6.0	50	110	155	16	•
DB552120				130	200		•

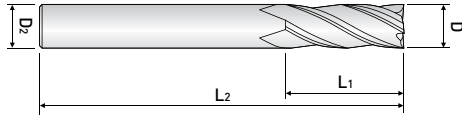
■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※Items can be changed for quality improvement without notice.

# Zamus Classic

END MILLS  
> Metric & Inch



## 4 FLUTE, REGULAR LENGTH

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

## ZE504 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
ZE504010	1	2.5	42	6	•
ZE504015	1.5	4	42	6	•
ZE504020S4	2	6	42	4	•
ZE504020				6	•
ZE504025	2.5	8	42	6	•
ZE504030S4	3	10	50	4	•
ZE504030				6	•
ZE504035	3.5	10	50	6	•
ZE504040S4	4	12	50	4	•
ZE504040				6	•
ZE504045	4.5	14	50	6	•
ZE504050	5	15	50	6	•
ZE504055	5.5	15	50	6	•
ZE504060	6	15	50	6	•
ZE504065	6.5	18	60	8	•
ZE504070	7	20	60	8	•
ZE504075	7.5	20	60	8	•
ZE504080	8	20	60	8	•
ZE504085	8.5	23	70	10	•
ZE504090	9	25	70	10	•
ZE504095	9.5	25	70	10	•
ZE504100	10	25	70	10	•
ZE504105	10.5	28	75	12	•
ZE504110	11	30	75	12	•
ZE504115	11.5	30	75	12	•
ZE504120	12	30	75	12	•
ZE504125S12	12.5	30	80	12	•
ZE504130S12	13	30	80	12	•
ZE504130		35	85	14	•
ZE504130S16			90	16	•
ZE504140	14	35	85	14	•
ZE504140S16			90	16	•
ZE504150	15	40	90	16	•
ZE504160	16	40	90	16	•
ZE504170	17	40	100	16	•
ZE504180	18	45	100	18	•
ZE504190	19	45	100	20	•
ZE504200	20	45	100	20	•
ZE504220	22	45	100	20	•
ZE504240	24	50	120	25	•
ZE504250	25	50	120	25	•

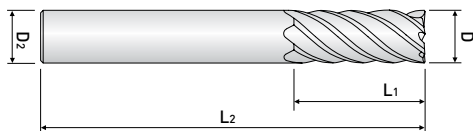
Data. P308~309

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.02	h6

※Items can be changed for quality improvement without notice.





## 6 FLUTE, REGULAR & LONG LENGTH

- Designed for highly hardened materials up to HRc 55.
- Suitable for high speed & finishing machining.

## ZE506 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
ZE506060	6	15	50	6	•
ZE506061		26	70		•
ZE506070	7	18	60	8	•
ZE506080	8	18	60	8	•
ZE506081		36	90		•
ZE506090	9	22	70	10	•
ZE506100	10	22	70	10	•
ZE506101		46	100		•
ZE506110	11	26	75	12	•
ZE506120	12	26	75	12	•
ZE506121		56	110		•
ZE506130	13	32	85	14	•
ZE506140	14	32	85	14	•
ZE506150	15	35	90	16	•
ZE506160	16	35	90	16	•
ZE506161		66	130		•
ZE506180	18	44	100	18	•
ZE506200	20	44	100	20	•
ZE506201		76	150		•
ZE506250	25	50	120	25	•
ZE506251		92	180		•
ZE506320	32	70	150	32	•

Data. P314

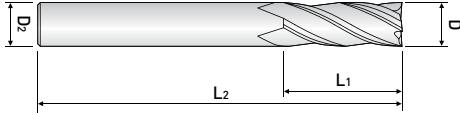
### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,03	h6

※Items can be changed for quality improvement without notice.

# Zamus Classic

END MILLS  
> Metric & Inch



## 4 FLUTE, 45° HELIX REGULAR LENGTH

- Designed for high hardened materials up to HRC 62.
- Suitable for high speed machining.

## ZE514 ...series



ULTRA FINE



HELIX

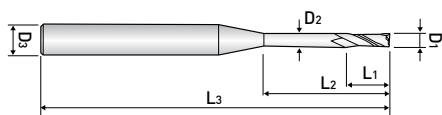


EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
ZE514020	2	5	40	6	•
ZE514025	2.5	6	40	6	•
ZE514030	3	8	45	6	•
ZE514040	4	10	45	6	•
ZE514050	5	13	50	6	•
ZE514060	6	13	50	6	•
ZE514080	8	19	60	8	•
ZE514100	10	22	70	10	•
ZE514120	12	26	75	12	•

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.02	h6

※Items can be changed for quality improvement without notice.



## 2 FLUTE, for RIB PROCESSING

- Designed for machine tool steel, alloy steel, mold steel and other high hardened materials.
- Long neck design for deep machining near walls.

## ZE612 ...series

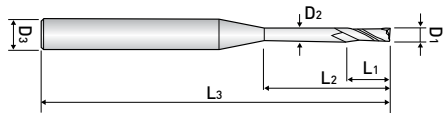


EDP. No.	D <sub>1</sub>	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
ZE6120402	0.4	0.6	2	45	0.37	4	•
ZE6120403			3				•
ZE6120404			4				•
ZE6120405			5				•
ZE6120406			6				•
ZE6120408			8				•
ZE6120502	0.5	0.7	2	45	0.45	4	•
ZE6120503			3				•
ZE6120504			4				•
ZE6120505			5				•
ZE6120506			6				•
ZE6120508			8				•
ZE6120510	10	•					
ZE6120602	0.6	0.9	2	45	0.55	4	•
ZE6120603			3				•
ZE6120604			4				•
ZE6120605			5				•
ZE6120606			6				•
ZE6120608			8				•
ZE6120610	10	•					
ZE6120612	12	•					
ZE6120702	0.7	1	2	45	0.65	4	•
ZE6120704			4				•
ZE6120706			6				•
ZE6120708			8				•
ZE6120710	10	•					
ZE6120802	0.8	1.2	2	45	0.75	4	•
ZE6120804			4				•
ZE6120806			6				•
ZE6120808			8				•
ZE6120810			10				•
ZE6120812	12	•					
ZE6120906	0.9	1.4	6	45	0.85	4	•
ZE6120908			8				•
ZE6120910			10				•
ZE6121003	1	1.5	3	45	0.95	4	•

Data. P315

# Zamus Classic

END MILLS  
> Metric & Inch



## 2 FLUTE, for RIB PROCESSING

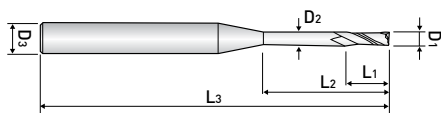
- Designed for machine tool steel, alloy steel, mold steel and other high hardened materials.
- Long neck design for deep machining near walls.

## ZE612 ...series



EDP. No.	D <sub>1</sub>	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
ZE6121004	1	1.5	4	45	0.95	4	•
ZE6121005			5				•
ZE6121006			6				•
ZE6121008			8				•
ZE6121010			10				•
ZE6121012			12				•
ZE6121014			14	•			
ZE6121016			16	50			•
ZE6121018			18				•
ZE6121020			20				•
ZE6121025			25	60			•
ZE6121206			1.2	1.8			6
ZE6121208	8	•					
ZE6121210	10	•					
ZE6121212	12	•					
ZE6121216	16	50			•		
ZE6121220	20				•		
ZE6121225	25	60			•		
ZE6121406	1.4	2.1	6	45	1.35	4	•
ZE6121408			8				•
ZE6121410			10				•
ZE6121412			12	•			
ZE6121414			14	50			•
ZE6121416			16				•
ZE6121420			20				•
ZE6121506	1.5	2.3	6	45	1.45	4	•
ZE6121508			8				•
ZE6121510			10				•
ZE6121512			12	•			
ZE6121514			14	•			
ZE6121516			16	50			•
ZE6121518			18	55			•
ZE6121520			20				•
ZE6121525			25	60			•
ZE6121606	1.6	2.5	6	45	1.55	4	•
ZE6121608			8				•

Data. P315



## 2 FLUTE, for RIB PROCESSING

- Designed for machine tool steel, alloy steel, mold steel and other high hardened materials.
- Long neck design for deep machining near walls.

## ZE612 ...series

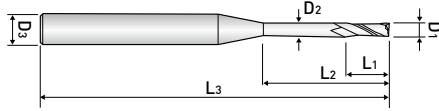


EDP. No.	D <sub>1</sub>	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
ZE6121610	1.6	2.5	10	45	1.55	4	•
ZE6121612			12				•
ZE6121614			14	•			
ZE6121616			16	•			
ZE6121618			18	•			
ZE6121620			20	•			
ZE6121806	1.8	2.8	6	45	1.75	4	•
ZE6121808			8				•
ZE6121810			10				•
ZE6121812			12				•
ZE6121814			14	50			•
ZE6121816			16				•
ZE6121818			18	55			•
ZE6121820			20				•
ZE6122006	2	3	6	45	1.95	4	•
ZE6122008			8				•
ZE6122010			10				•
ZE6122012			12				•
ZE6122014			14	50			•
ZE6122016			16				•
ZE6122018			18	55			•
ZE6122020			20				•
ZE6122022			22	60			•
ZE6122025			25				•
ZE6122030			30	70			•
ZE6122035			35				•
ZE6122040			40	80			•
ZE6122508			2.5	3.7			8
ZE6122510	10	•					
ZE6122512	12	•					
ZE6122514	14	50			•		
ZE6122516	16				•		
ZE6122518	18	55			•		
ZE6122520	20				•		
ZE6122525	25	60			•		
ZE6122530	30				70	•	

Data, P315

# Zamus Classic

END MILLS  
> Metric & Inch



## 2 FLUTE, for RIB PROCESSING

- Designed for machine tool steel, alloy steel, mold steel and other high hardened materials.
- Long neck design for deep machining near walls.

## ZE612 ...series



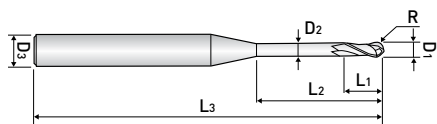
EDP. No.	D <sub>1</sub>	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
ZE6122535	2.5	3.7	35	70	2.45	4	•
ZE6122540			40	80			•
ZE6123008	3	4.5	8	45	2.85	6	•
ZE6123010			10				•
ZE6123012			12				•
ZE6123014			14	50			•
ZE6123016			16				•
ZE6123018			18	55			•
ZE6123020			20				•
ZE6123025			25	60			•
ZE6123030			30	70			•
ZE6123035			35	80			•
ZE6123040	40	90	•				
ZE6123045	45		•				
ZE6123050	50	100	•				
ZE6124010	4	6	10	50	3.85	6	•
ZE6124012			12				•
ZE6124016			16	60			•
ZE6124020			20				•
ZE6124025			25	70			•
ZE6124030			30				•
ZE6124035			35	80			•
ZE6124040			40	90			•
ZE6124045			45				•
ZE6124050			50	100			•
ZE6125016	5	7.5	16	60	4.85	6	•
ZE6125020			20				•
ZE6125025			25	70			•
ZE6125030			30				•
ZE6125035			35	80			•
ZE6125040			40	90			•
ZE6125050			50	100			•

Data, P315

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.02	h6

※Items can be changed for quality improvement without notice.



## 2 FLUTE, for RIB PROCESSING

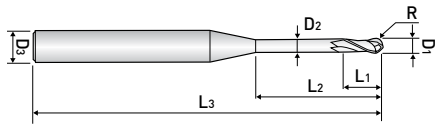
- Designed for machine tool steel, alloy steel, mold steel and other high hardened materials.
- Long neck design for deep machining near walls.

## DB612 ...series



EDP. No.	D <sub>1</sub>	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK	
DB6120502	0.5	0.25	0.5	2	45	0.45	4	•	
DB6120503				3				•	
DB6120504				4				•	
DB6120505				5				•	
DB6120506				6				•	
DB6120508				8				•	
DB6120510				10				•	
DB6120602	0.6	0.3	0.6	2	45	0.55	4	•	
DB6120603				3				•	
DB6120604				4				•	
DB6120605				5				•	
DB6120606				6				•	
DB6120608				8				•	
DB6120610				10				•	
DB6120612	12	•							
DB6120702	0.7	0.35	0.7	2	45	0.65	4	•	
DB6120704				4				•	
DB6120708				8				•	
DB6120802	0.8	0.4	0.8	2	45	0.75	4	•	
DB6120804				4				•	
DB6120805				5				•	
DB6120806				6				•	
DB6120807				7				•	
DB6120808				8				•	
DB6120810				10				•	
DB6120812				12				•	
DB6120816				16				50	•
DB6121003				1				0.5	1
DB6121004	4	•							
DB6121005	5	•							
DB6121006	6	•							
DB6121007	7	•							
DB6121008	8	•							
DB6121009	9	•							
DB6121010	10	•							
DB6121012	12	•							

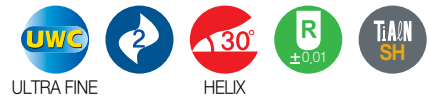
Data. P315



## 2 FLUTE, for RIB PROCESSING

- Designed for machine tool steel, alloy steel, mold steel and other high hardened materials.
- Long neck design for deep machining near walls.

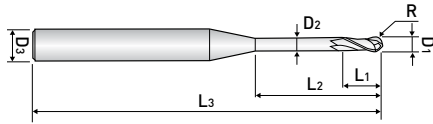
## DB612 ...series



EDP. No.	D <sub>1</sub>	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK	
DB6121014	1	0.5	1	14	50	0.95	4	•	
DB6121016				16				•	
DB6121018				18				•	
DB6121020				20	55			•	
DB6121022				22	60			•	
DB6121025				25				•	
DB6121204	1.2	0.6	1.2	4	45	1.15	4	•	
DB6121206				6				•	
DB6121208				8				•	
DB6121210				10				•	
DB6121212				12	50			•	
DB6121216				16				•	
DB6121220				20				55	•
DB6121224				24				60	•
DB6121406	1.4	0.7	1.4	6	45	1.35	4	•	
DB6121408				8				•	
DB6121412				12	50			•	
DB6121416				16				•	
DB6121503	1.5	0.75	1.5	3	45	1.45	4	•	
DB6121504				4				•	
DB6121506				6				•	
DB6121508				8				•	
DB6121510				10				50	•
DB6121512				12					•
DB6121514				14	55			•	
DB6121516				16				•	
DB6121518				18				•	
DB6121520				20				•	
DB6121522				22	60			•	
DB6121525				25				•	
DB6121530				30				70	•
DB6121535				35	•				
DB6121606	1.6	0.8	1.6	6	45	1.55	4	•	
DB6121608				8				•	
DB6121610				10				•	
DB6121612				12				•	

Data. P315

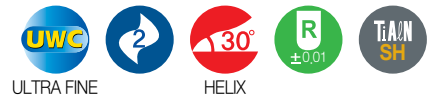




## 2 FLUTE, for RIB PROCESSING

- Designed for machine tool steel, alloy steel, mold steel and other high hardened materials.
- Long neck design for deep machining near walls.

## DB612 ...series

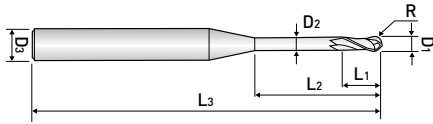


EDP. No.	D <sub>1</sub>	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
DB6121616	1.6	0.8	1.6	16	50	1.55	4	•
DB6121620				20	55			•
DB6121806	1.8	0.9	1.8	6	45	1.75	4	•
DB6121808				8				•
DB6121812				12				•
DB6121816				16	50			•
DB6121820				20	55			•
DB6122004	2	1	2	4	45	1.95	4	•
DB6122006				6				•
DB6122008				8				•
DB6122010				10				•
DB6122012				12				•
DB6122014				14	50			•
DB6122016				16	55			•
DB6122018				18				•
DB6122020				20				•
DB6122022				22	60			•
DB6122025				25	65			•
DB6122030				30	70			•
DB6122035				35				•
DB6122040				40	80			•
DB6122045				45				•
DB6122508	2.5	1.25	2.5	8	50	2.4	4	•
DB6122510				10				•
DB6122516				16				•
DB6122520				20	60			•
DB6122525				25	70			•
DB6122530				30				•
DB6122535	35	•						
DB6123006	3	1.5	3	6	50	2.85	6	•
DB6123008				8				•
DB6123010				10				•
DB6123012				12	55			•
DB6123014				14				•
DB6123016				16	60			•
DB6123018				18	•			

Data, P315

# Zamus Classic

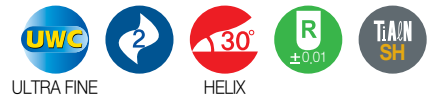
END MILLS  
> Metric & Inch



## 2 FLUTE, for RIB PROCESSING

- Designed for machine tool steel, alloy steel, mold steel and other high hardened materials.
- Long neck design for deep machining near walls.

## DB612 ...series



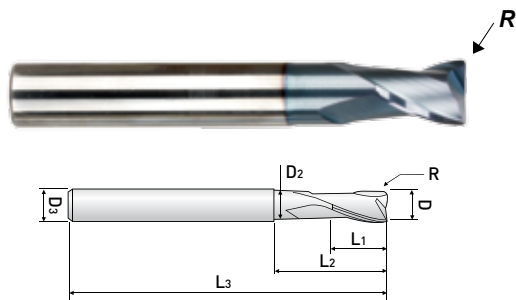
EDP. No.	D <sub>1</sub>	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
DB6123020	3	1.5	3	20	60	2.85	6	•
DB6123025				25	65			•
DB6123030				30	70			•
DB6123035				35	80			•
DB6123040				40				•
DB6123045				45	90			•
DB6123050				50	100			•
DB6123060				60				•
DB6124008	4	2	4	8	60	3.85	6	•
DB6124010				10				•
DB6124012				12				•
DB6124016				16				•
DB6124020				20	65			•
DB6124025				25	70			•
DB6124030				30	80			•
DB6124035				35				•
DB6124040				40	90			•
DB6124045				45	100			•
DB6124050				50				•
DB6124060				60	•			
DB6125015	5	2.5	5	15	60	4.85	6	•
DB6125020				20	•			
DB6125025				25	70			•
DB6125030				30	80			•
DB6125035				35				•
DB6125040				40	90			•
DB6125045				45	100			•
DB6125050				50				•
DB6125060	60	•						

Data, P315

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.02	h6

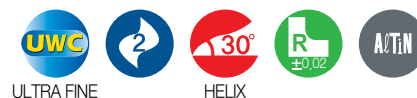
※Items can be changed for quality improvement without notice.



## 2 FLUTE, STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK

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

## ZR502 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
ZR5020405	4	0.5	6	10	55	3.7	6	•
ZR5020410		1						•
ZR5020605	6	0.5	8	15	55	5.7	6	•
ZR5020610		1						•
ZR5020805	8	0.5	10	20	65	7.7	8	•
ZR5020810		1						•
ZR5020815		1.5						•
ZR5020820		2						•
ZR5021005	10	0.5	12	28	80	9.5	10	•
ZR5021010		1						•
ZR5021015		1.5						•
ZR5021020		2						•
ZR5021205	12	0.5	15	30	82	11.5	12	•
ZR5021210		1						•
ZR5021215		1.5						•
ZR5021220		2						•

Data, P309~310

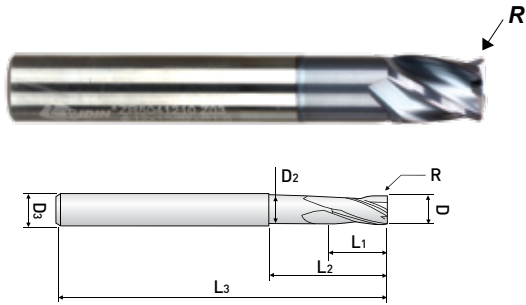
### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※Items can be changed for quality improvement without notice.

# Zamus Classic

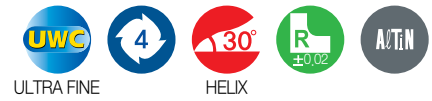
END MILLS  
> Metric & Inch



## 4 FLUTE, STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK

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

## ZR504 ...series



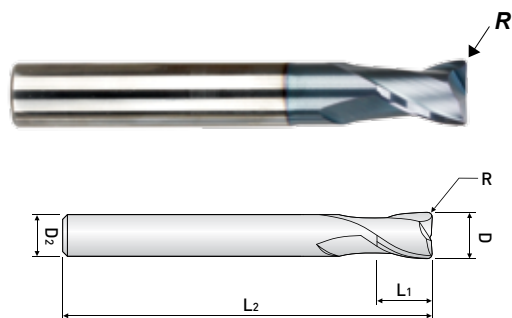
EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
ZR5040405	4	0.5	6	10	55	3.7	6	•
ZR5040410		1						•
ZR5040605	6	0.5	8	15	55	5.7	6	•
ZR5040610		1						•
ZR5040805	8	0.5	10	20	65	7.7	8	•
ZR5040810		1						•
ZR5040815		1.5						•
ZR5040820		2						•
ZR5041005	10	0.5	12	28	80	9.5	10	•
ZR5041010		1						•
ZR5041015		1.5						•
ZR5041020		2						•
ZR5041205	12	0.5	15	30	82	11.5	12	•
ZR5041210		1						•
ZR5041215		1.5						•
ZR5041220		2						•

Data, P310

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.02	h6

※Items can be changed for quality improvement without notice.



## 2 FLUTE, REGULAR LENGTH, CORNER RADIUS

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

## ZR512 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
ZR5120605	6	0.5	15	55	6	•
ZR5120610		1				•
ZR5120805	8	0.5	20	65	8	•
ZR5120810		1				•
ZR5120815		1.5				•
ZR5120820		2				•
ZR5121005	10	0.5	25	80	10	•
ZR5121010		1				•
ZR5121015		1.5				•
ZR5121020		2				•
ZR5121025		2.5				•
ZR5121030		3				•
ZR5121205	12	0.5	30	82	12	•
ZR5121210		1				•
ZR5121215		1.5				•
ZR5121220		2				•
ZR5121225		2.5				•
ZR5121230		3				•
ZR5121605	16	0.5	40	100	16	•
ZR5121610		1				•
ZR5121615		1.5				•
ZR5121620		2				•
ZR5121630		3				•
ZR5122005	20	0.5	45	110	20	•
ZR5122010		1				•
ZR5122015		1.5				•
ZR5122020		2				•
ZR5122030		3				•

Data. P309~310

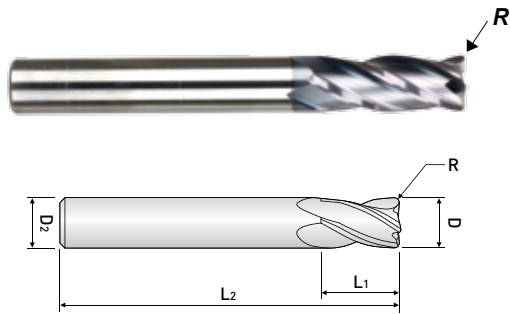
■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.03	h6

※Items can be changed for quality improvement without notice.

# Zamus Classic

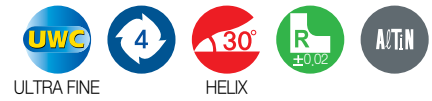
END MILLS  
> Metric & Inch



## 4 FLUTE, REGULAR LENGTH, CORNER RADIUS

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

## ZR514 ...series



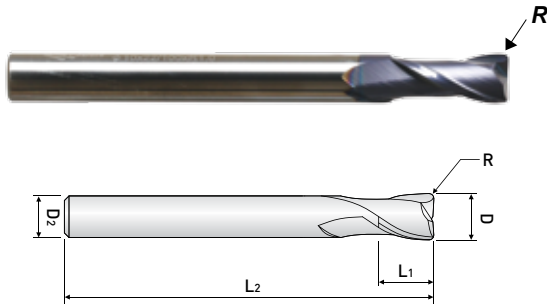
EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
ZR5140605	6	0.5	15	55	6	•
ZR5140610		1				•
ZR5140805	8	0.5	20	65	8	•
ZR5140810		1				•
ZR5140815		1.5				•
ZR5140820		2				•
ZR5141005	10	0.5	25	80	10	•
ZR5141010		1				•
ZR5141015		1.5				•
ZR5141020		2				•
ZR5141025		2.5				•
ZR5141030		3				•
ZR5141205	12	0.5	30	82	12	•
ZR5141210		1				•
ZR5141215		1.5				•
ZR5141220		2				•
ZR5141225		2.5				•
ZR5141230		3				•
ZR5141605	16	0.5	40	100	16	•
ZR5141610		1				•
ZR5141615		1.5				•
ZR5141620		2				•
ZR5141630		3				•
ZR5142005	20	0.5	45	110	20	•
ZR5142010		1				•
ZR5142015		1.5				•
ZR5142020		2				•
ZR5142030		3				•

Data. P310

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.03	h6

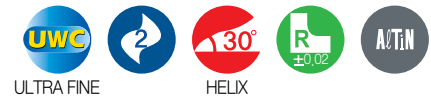
※Items can be changed for quality improvement without notice.



## 2 FLUTE, LONG LENGTH, CORNER RADIUS

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

## ZR522 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
ZR5220302S4	3	0.2	8	60	4	•
ZR5220302					6	•
ZR5220305S4		0.5			4	•
ZR5220305					6	•
ZR5220402S4	4	0.2	11	70	4	•
ZR5220402	4	0.2	11	70	6	•
ZR5220405S4		0.5			4	•
ZR5220405		0.5			6	•
ZR5220410		1			6	•
ZR5220502	5	0.2	13	80	6	•
ZR5220505		0.5			6	•
ZR5220510		1			6	•
ZR5220602	6	0.2	13	90	6	•
ZR5220605		0.5			6	•
ZR5220610		1			6	•
ZR5220805	8	0.5	19	100	8	•
ZR5220810		1			8	•
ZR5220815		1.5			8	•
ZR5220820		2			8	•
ZR5221005	10	0.5	22	100	10	•
ZR5221010		1			10	•
ZR5221015		1.5			10	•
ZR5221020		2			10	•
ZR5221025		2.5			10	•
ZR5221205	12	0.5	26	110	12	•
ZR5221210		1			12	•
ZR5221215		1.5			12	•
ZR5221220		2			12	•
ZR5221225		2.5			12	•
ZR5221230		3			12	•

Data. P310

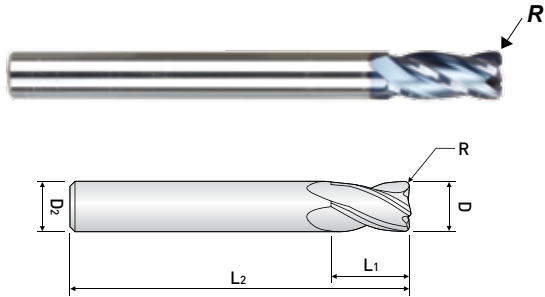
■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※Items can be changed for quality improvement without notice.

# Zamus Classic

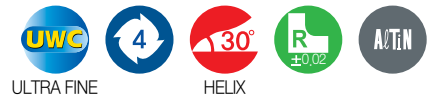
END MILLS  
> Metric & Inch



## 4 FLUTE, LONG LENGTH, CORNER RADIUS

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

## ZR524 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK	
ZR5240302S4	3	0.2	8	60	4	•	
ZR5240302					6	•	
ZR5240305S4		0.5			4	•	
ZR5240305					6	•	
ZR5240402S4	4	0.2	11	70	4	•	
ZR5240402					6	•	
ZR5240405S4		0.5			4	•	
ZR5240405					6	•	
ZR5240410S4					1	4	•
ZR5240410						6	•
ZR5240502	5	0.2	13	80	6	•	
ZR5240505		0.5			6	•	
ZR5240510		1			6	•	
ZR5240602	6	0.2	13	90	6	•	
ZR5240605		0.5				•	
ZR5240610		1				•	
ZR5240805	8	0.5	19	100	8	•	
ZR5240810		1				•	
ZR5240815		1.5				•	
ZR5240820		2				•	
ZR5241005	10	0.5	22	100	10	•	
ZR5241010		1				•	
ZR5241015		1.5				•	
ZR5241020		2				•	
ZR5241025		2.5				•	
ZR5241205	12	0.5	26	110	12	•	
ZR5241210		1				•	
ZR5241215		1.5				•	
ZR5241220		2				•	
ZR5241225		2.5				•	
ZR5241230		3				•	

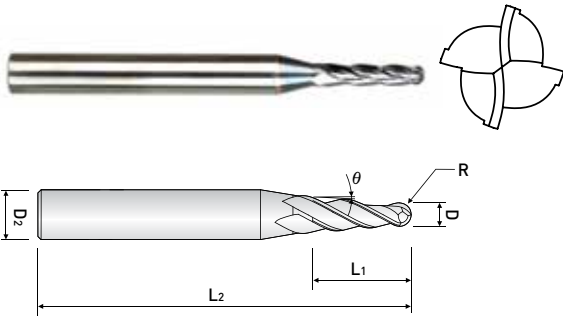
Data. P310

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.02	h6

※Items can be changed for quality improvement without notice.





## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Applying high hardened taper angle on the tool leads to highly efficient Rib processing
- Suitable to do machining performance on the inclined workpiece for electricity and electronic precise mold

■ Taper Tolerance :  $\pm 10'$

## TPRB4...-...-050 series



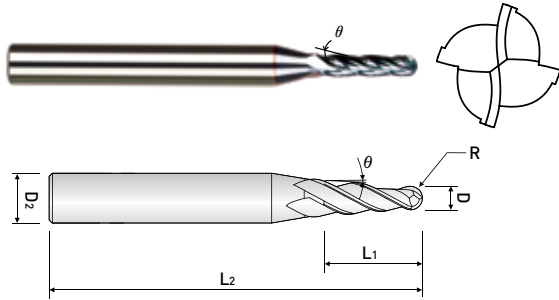
EDP. No.	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
TPRB4006-04-050	0.3	30'	4	40	4	
TPRB4006-06-050			6			
TPRB4008-06-050	0.4	30'	6	45	4	
TPRB4008-08-050			8			
TPRB4008-10-050			10			
TPRB4010-06-050	0.5	30'	6	45	4	
TPRB4010-08-050			8			
TPRB4010-10-050			10			
TPRB4010-12-050			12	50		
TPRB4010-16-050			16			
TPRB4012-06-050	0.6	30'	6	45	4	
TPRB4012-08-050			8			
TPRB4012-10-050			10			
TPRB4012-12-050			12	50		
TPRB4012-16-050			16			
TPRB4015-08-050	0.75	30'	8	45	4	
TPRB4015-10-050			10			
TPRB4015-12-050			12			
TPRB4015-16-050			16			
TPRB4015-20-050			20	55		
TPRB4016-08-050	0.8	30'	8	45	4	
TPRB4016-10-050			10			
TPRB4016-12-050			12			
TPRB4016-16-050			16			
TPRB4016-20-050			20	55		
TPRB4018-08-050	0.9	30'	8	45	4	
TPRB4018-10-050			10			
TPRB4018-12-050			12			
TPRB4018-16-050			16			
TPRB4018-20-050			20	55		
TPRB4020-10-050	1.0	30'	10	45	4	
TPRB4020-12-050			12			
TPRB4020-16-050			16			
TPRB4020-20-050			20			
TPRB4020-25-050			25	55		
TPRB4025-10-050	1.25	30'	10	45	4	
TPRB4025-12-050			12			
TPRB4025-16-050			16			
TPRB4025-20-050			20			
TPRB4025-25-050			25	55		

※ These tools are manufactured based on order received.

■ Tolerance

Radius (mm)	Shank Dia.
$\pm 0.01$	h6

※ Items can be changed for quality improvement without notice.



## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Applying high hardened taper angle on the tool leads to highly efficient Rib processing
- Suitable to do machining performance on the inclined workpiece for electricity and electronic precise mold
- Taper Tolerance :  $\pm 10'$

## TPRB4....-075 series



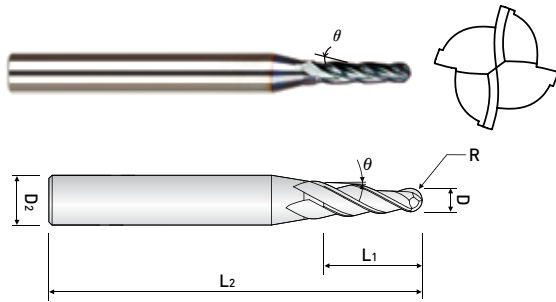
EDP. No.	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
TPRB4006-04-075	0.3	45'	4	40	4	
TPRB4006-06-075			6			
TPRB4008-06-075	0.4	45'	6	45	4	
TPRB4008-08-075			8			
TPRB4008-10-075			10			
TPRB4010-08-075	0.5	45'	8	45	4	
TPRB4010-10-075			10			
TPRB4010-12-075			12			
TPRB4012-08-075	0.6	45'	8	45	4	
TPRB4012-10-075			10			
TPRB4012-12-075			12			
TPRB4012-16-075			16			
TPRB4015-08-075	0.75	45'	8	45	4	
TPRB4015-10-075			10			
TPRB4015-12-075			12			
TPRB4015-16-075			16			
TPRB4015-20-075			20			
TPRB4016-08-075	0.8	45'	8	45	4	
TPRB4016-10-075			10			
TPRB4016-12-075			12			
TPRB4016-16-075			16			
TPRB4016-20-075			20			
TPRB4018-08-075	0.9	45'	8	45	4	
TPRB4018-10-075			10			
TPRB4018-12-075			12			
TPRB4018-16-075			16			
TPRB4018-20-075			20			
TPRB4020-10-075	1.0	45'	10	45	4	
TPRB4020-12-075			12			
TPRB4020-16-075			16			
TPRB4020-20-075			20			
TPRB4020-25-075			25			
TPRB4025-10-075	1.25	45'	10	45	4	
TPRB4025-12-075			12			
TPRB4025-16-075			16			
TPRB4025-20-075			20			
TPRB4025-25-075			25			

※ These tools are manufactured based on order received.

■ Tolerance

Radius (mm)	Shank Dia.
$\pm 0,01$	h6

※ Items can be changed for quality improvement without notice.

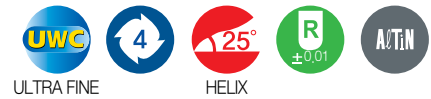


## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Applying high hardened taper angle on the tool leads to highly efficient Rib processing
- Suitable to do machining performance on the inclined workpiece for electricity and electronic precise mold

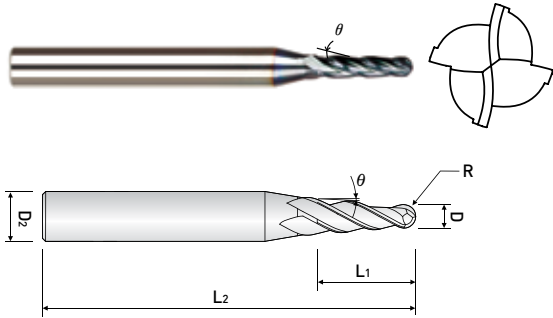
■ Taper Tolerance :  $\pm 10'$

## TPRB4...-...-100 series



EDP. No.	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
TPRB4006-04-100	0.3	1°00'	4	40	4	
TPRB4006-06-100			6			
TPRB4008-06-100	0.4	1°00'	6	45	4	
TPRB4008-08-100			8			
TPRB4008-10-100			10			
TPRB4010-06-100	0.5	1°00'	6	45	4	
TPRB4010-08-100			8			
TPRB4010-10-100			10			
TPRB4010-12-100			12			
TPRB4010-16-100			16			
TPRB4012-06-100	0.6	1°00'	6	45	4	
TPRB4012-08-100			8			
TPRB4012-10-100			10			
TPRB4012-12-100			12			
TPRB4012-16-100			16			
TPRB4015-08-100	0.75	1°00'	8	45	4	
TPRB4015-10-100			10			
TPRB4015-12-100			12			
TPRB4015-16-100			16	50		
TPRB4015-20-100			20	55		
TPRB4016-08-100	0.8	1°00'	8	45	4	
TPRB4016-10-100			10			
TPRB4016-12-100			12			
TPRB4016-16-100			16	50		
TPRB4016-20-100			20	55		
TPRB4018-08-100	0.9	1°00'	8	45	4	
TPRB4018-10-100			10			
TPRB4018-12-100			12			
TPRB4018-16-100			16	50		
TPRB4018-20-100			20	55		

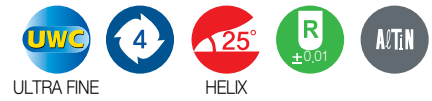
※ These tools are manufactured based on order received.



## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Applying high hardened taper angle on the tool leads to highly efficient Rib processing
- Suitable to do machining performance on the inclined workpiece for electricity and electronic precise mold
- Taper Tolerance :  $\pm 10'$

## TPRB4....-100 series



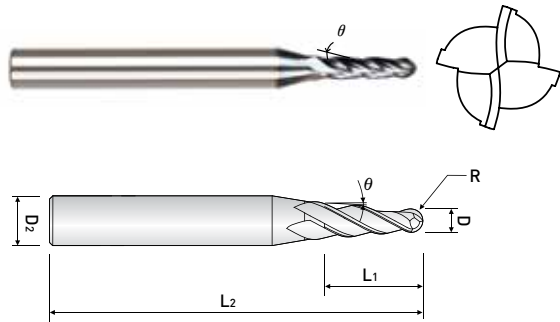
EDP. No.	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
TPRB4020-10-100	1.0	1°00'	10	45	4	
TPRB4020-12-100			12			
TPRB4020-16-100			16	50		
TPRB4020-20-100			20			
TPRB4020-25-100			25	55		
TPRB4025-10-100	1.25	1°00'	10	45	4	
TPRB4025-12-100			12			
TPRB4025-16-100			16	50		
TPRB4025-20-100			20			
TPRB4025-25-100			25	55		

※ These tools are manufactured based on order received.

■ Tolerance

Radius (mm)	Shank Dia.
$\pm 0,01$	h6

※ Items can be changed for quality improvement without notice.



## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Applying high hardened taper angle on the tool leads to highly efficient Rib processing
- Suitable to do machining performance on the inclined workpiece for electricity and electronic precise mold

■ Taper Tolerance :  $\pm 10'$

## TPRB4...-...-150 series

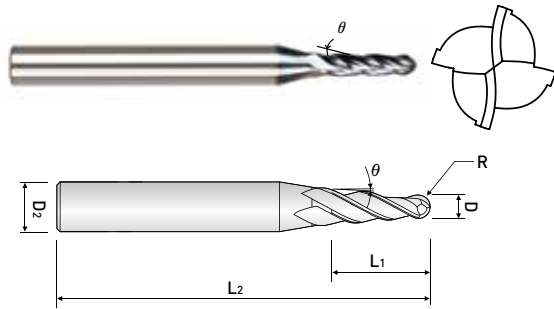


EDP. No.	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
TPRB4006-04-150	0.3	1°30'	4	40	4	
TPRB4006-06-150			6			
TPRB4008-06-150	0.4	1°30'	6	45	4	
TPRB4008-08-150			8			
TPRB4008-10-150			10			
TPRB4010-06-150	0.5	1°30'	6	45	4	
TPRB4010-08-150			8			
TPRB4010-10-150			10			
TPRB4010-12-150			12			
TPRB4010-16-150			16			
TPRB4012-06-150	0.6	1°30'	6	45	4	
TPRB4012-08-150			8			
TPRB4012-10-150			10			
TPRB4012-12-150			12			
TPRB4012-16-150			16	50		
TPRB4015-08-150	0.75	1°30'	8	45	4	
TPRB4015-10-150			10			
TPRB4015-12-150			12			
TPRB4015-16-150			16	50		
TPRB4015-20-150			20	55		
TPRB4016-08-150	0.8	1°30'	8	45	4	
TPRB4016-10-150			10			
TPRB4016-12-150			12			
TPRB4016-16-150			16	50		
TPRB4016-20-150			20	55		
TPRB4018-08-150	0.9	1°30'	8	45	4	
TPRB4018-10-150			10			
TPRB4018-12-150			12			
TPRB4018-16-150			16	50		
TPRB4018-20-150			20	55		

※ These tools are manufactured based on order received.

# Zamus Classic

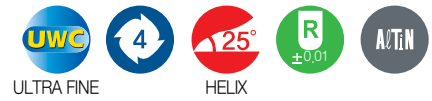
END MILLS  
> Metric & Inch



## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Applying high hardened taper angle on the tool leads to highly efficient Rib processing
- Suitable to do machining performance on the inclined workpiece for electricity and electronic precise mold
- Taper Tolerance :  $\pm 10'$

## TPRB4....-150 series



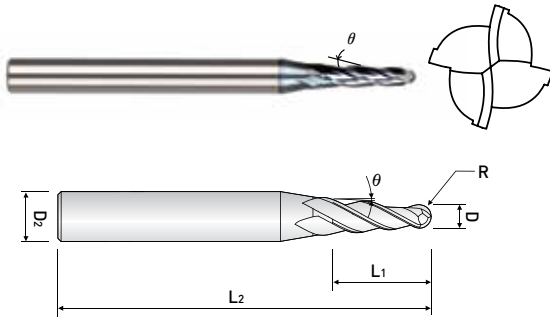
EDP. No.	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
TPRB4020-10-150	1.0	1°30'	10	45	4	
TPRB4020-12-150			12			
TPRB4020-16-150			16	50		
TPRB4020-20-150			20	55		
TPRB4020-25-150			25			
TPRB4020-30-150			30	60		
TPRB4025-10-150	1.25	1°30'	10	45	4	
TPRB4025-12-150			12			
TPRB4025-16-150			16	50		
TPRB4025-20-150			20	55		
TPRB4025-25-150			25			
TPRB4025-30-150			30	60		

※ These tools are manufactured based on order received.

### ■ Tolerance

Radius (mm)	Shank Dia.
$\pm 0,01$	h6

※ Items can be changed for quality improvement without notice.

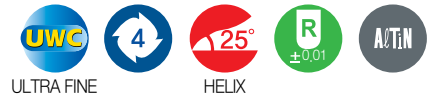


## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Applying high hardened taper angle on the tool leads to highly efficient Rib processing
- Suitable to do machining performance on the inclined workpiece for electricity and electronic precise mold

■ Taper Tolerance :  $\pm 10'$

## TPRB4...-...-200 series

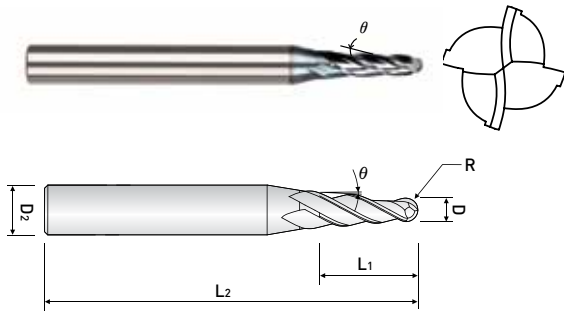


EDP. No.	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
TPRB4006-04-200	0.3	2°00'	4	40	4	
TPRB4006-06-200			6			
TPRB4008-06-200	0.4	2°00'	6	45	4	
TPRB4008-08-200			8			
TPRB4008-10-200			10			
TPRB4010-06-200	0.5	2°00'	6	45	4	
TPRB4010-08-200			8			
TPRB4010-10-200			10			
TPRB4010-12-200			12			
TPRB4010-16-200			16			
TPRB4012-06-200	0.6	2°00'	6	45	4	
TPRB4012-08-200			8			
TPRB4012-10-200			10			
TPRB4012-12-200			12			
TPRB4012-16-200			16			
TPRB4015-08-200	0.75	2°00'	8	45	4	
TPRB4015-10-200			10			
TPRB4015-12-200			12			
TPRB4015-16-200			16	50		
TPRB4015-20-200			20	55		
TPRB4016-08-200	0.8	2°00'	8	45	4	
TPRB4016-10-200			10			
TPRB4016-12-200			12			
TPRB4016-16-200			16	50		
TPRB4016-20-200			20	55		
TPRB4018-08-200	0.9	2°00'	8	45	4	
TPRB4018-10-200			10			
TPRB4018-12-200			12			
TPRB4018-16-200			16	50		
TPRB4018-20-200			20	55		

※ These tools are manufactured based on order received.

# Zamus Classic

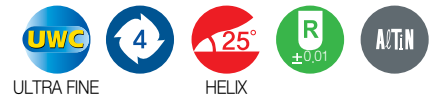
END MILLS  
> Metric & Inch



## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Applying high hardened taper angle on the tool leads to highly efficient Rib processing
- Suitable to do machining performance on the inclined workpiece for electricity and electronic precise mold
- Taper Tolerance :  $\pm 10'$

## TPRB4....-200 series



EDP. No.	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
TPRB4020-10-200	1.0	2°00'	10	45	4	
TPRB4020-12-200			12			
TPRB4020-16-200			16	50		
TPRB4020-20-200			20	55		
TPRB4020-25-200			25			
TPRB4020-30-200			30	60		
TPRB4025-10-200	1.25	2°00'	10	45	4	
TPRB4025-12-200			12			
TPRB4025-16-200			16	50		
TPRB4025-20-200			20	55		
TPRB4025-25-200			25			
TPRB4025-30-200			30	60		

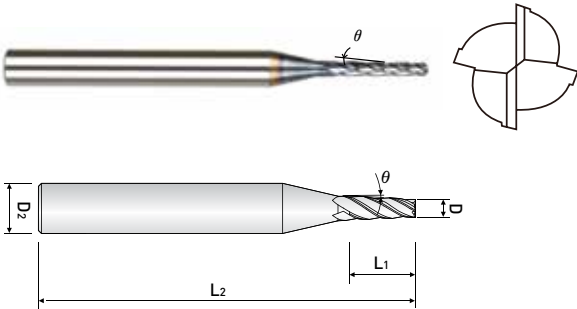
※ These tools are manufactured based on order received.

### ■ Tolerance

Radius (mm)	Shank Dia.
$\pm 0,01$	h6

※ Items can be changed for quality improvement without notice.





## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Rigid taper end mill for highly productive rib processing.
- Can also be used for side milling operation.

■ Taper Tolerance :  $\pm 10'$

## TPRE4...-...-050 series

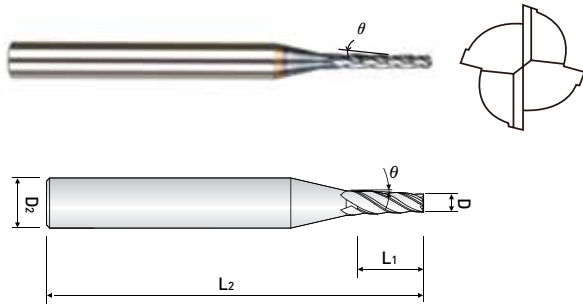


EDP. No.	D	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
TPRE4004-02-050	0.4	30'	2	40	4	
TPRE4004-03-050			3			
TPRE4004-04-050			4			
TPRE4005-02-050	0.5	30'	2	40	4	
TPRE4005-04-050			4			
TPRE4005-06-050			6			
TPRE4006-04-050	0.6	30'	4	40	4	
TPRE4006-06-050			6			
TPRE4007-06-050	0.7	30'	6	40	4	
TPRE4007-08-050			8			
TPRE4008-06-050	0.8	30'	6	45	4	
TPRE4008-08-050			8			
TPRE4008-10-050			10			
TPRE4009-06-050	0.9	30'	6	45	4	
TPRE4009-08-050			8			
TPRE4009-10-050			10			
TPRE4010-06-050	1.0	30'	6	45	4	
TPRE4010-08-050			8			
TPRE4010-10-050			10			
TPRE4010-12-050			12			
TPRE4010-16-050			16	50		
TPRE4012-06-050	1.2	30'	6	45	4	
TPRE4012-08-050			8			
TPRE4012-10-050			10			
TPRE4012-12-050			12			
TPRE4012-16-050			16	50		
TPRE4014-08-050	1.4	30'	8	45	4	
TPRE4014-12-050			12			
TPRE4014-16-050			16	50		

※ These tools are manufactured based on order received.

# Zamus Classic

END MILLS  
> Metric & Inch



## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Rigid taper end mill for highly productive rib processing.
- Can also be used for side milling operation.

■ Taper Tolerance :  $\pm 10'$

## TPRE4...-...-050 series



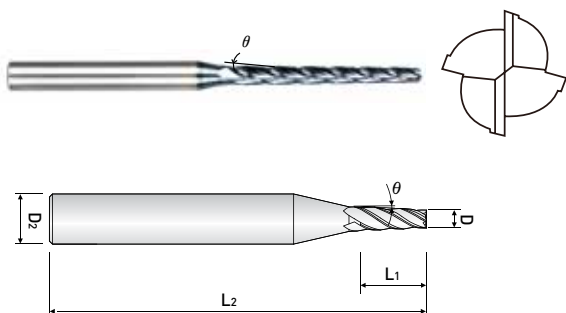
EDP. No.	D	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
TPRE4015-08-050	1.5	30'	8	45	4	
TPRE4015-10-050			10			
TPRE4015-12-050			12			
TPRE4015-16-050			16	50		
TPRE4015-20-050			20	55		
TPRE4016-08-050	1.6	30'	8	45	4	
TPRE4016-10-050			10			
TPRE4016-12-050			12			
TPRE4016-16-050			16	50		
TPRE4016-20-050			20	55		
TPRE4018-08-050	1.8	30'	8	45	4	
TPRE4018-10-050			10			
TPRE4018-12-050			12			
TPRE4018-16-050			16	50		
TPRE4018-20-050			20	55		
TPRE4020-10-050	2.0	30'	10	45	4	
TPRE4020-12-050			12			
TPRE4020-16-050			16	50		
TPRE4020-20-050			20	55		
TPRE4020-25-050			25			
TPRB4025-10-050	2.5	30'	10	45	4	
TPRB4025-12-050			12			
TPRB4025-16-050			16	50		
TPRB4025-20-050			20	55		
TPRB4025-25-050			25			
TPRB4025-30-050			30	60		

※ These tools are manufactured based on order received.

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.03	h6

※ Items can be changed for quality improvement without notice.



## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Rigid taper end mill for highly productive rib processing.
- Can also be used for side milling operation.

■ Taper Tolerance :  $\pm 10'$

## TPRE4...-...-075 series

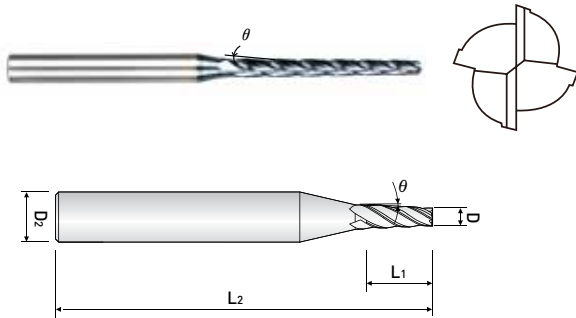


EDP. No.	D	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
TPRE4004-02-075	0.4	45'	2	40	4	
TPRE4004-03-075			3			
TPRE4004-04-075			4			
TPRE4005-04-075	0.5	45'	4	40	4	
TPRE4005-06-075			6			
TPRE4006-04-075	0.6	45'	4	40	4	
TPRE4006-06-075			6			
TPRE4007-06-075	0.7	45'	6	40	4	
TPRE4007-08-075			8			
TPRE4008-06-075	0.8	45'	6	45	4	
TPRE4008-08-075			8			
TPRE4008-10-075			10			
TPRE4009-06-075	0.9	45'	6	45	4	
TPRE4009-08-075			8			
TPRE4009-10-075			10			
TPRE4010-08-075	1.0	45'	8	45	4	
TPRE4010-10-075			10			
TPRE4010-12-075			12			
TPRE4012-08-075	1.2	45'	8	45	4	
TPRE4012-10-075			10			
TPRE4012-12-075			12			
TPRE4012-16-075			16	50		
TPRE4015-08-075	1.5	45'	8	45	4	
TPRE4015-10-075			10			
TPRE4015-12-075			12			
TPRE4015-16-075			16	50		
TPRE4015-20-075			20	55		

※ These tools are manufactured based on order received.

# Zamus Classic

END MILLS  
> Metric & Inch



## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Rigid taper end mill for highly productive rib processing.
- Can also be used for side milling operation.

■ Taper Tolerance :  $\pm 10'$

## TPRE4...-...-075 series



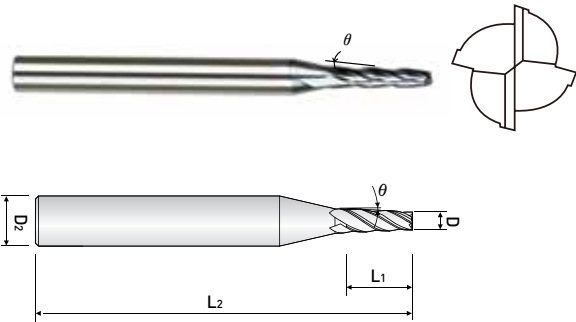
EDP. No.	D	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
TPRE4016-08-075	1.6	45'	8	45	4	
TPRE4016-10-075			10			
TPRE4016-12-075			12			
TPRE4016-16-075			16	50		
TPRE4016-20-075			20	55		
TPRE4018-08-075	1.8	45'	8	45	4	
TPRE4018-10-075			10			
TPRE4018-12-075			12			
TPRE4018-16-075			16	50		
TPRE4018-20-075			20	55		
TPRE4020-10-075	2.0	45'	10	45	4	
TPRE4020-12-075			12			
TPRE4020-16-075			16	50		
TPRE4020-20-075			20	55		
TPRE4020-25-075			25			
TPRE4025-10-075	2.5	45'	10	45	4	
TPRE4025-12-075			12			
TPRE4025-16-075			16	50		
TPRE4025-20-075			20	55		
TPRE4025-25-075			25			
TPRE4025-30-075			30	60		
TPRE4030-25-075	3.0	45'	25	55	4	
TPRE4030-40-075			40	80	6	

※ These tools are manufactured based on order received.

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.03	h6

※Items can be changed for quality improvement without notice.



## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Rigid taper end mill for highly productive rib processing.
- Can also be used for side milling operation.

■ Taper Tolerance :  $\pm 10'$

## TPRE4...-100 series

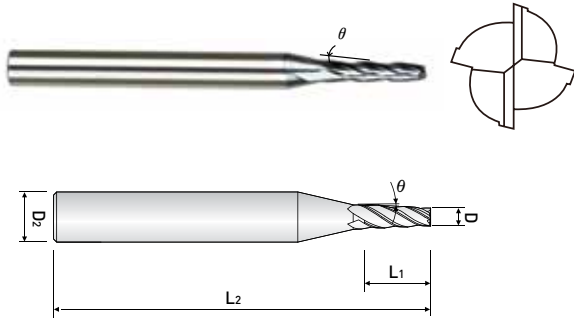


EDP. No.	D	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
TPRE4004-02-100	0.4	1°00'	2	40	4	
TPRE4004-03-100			3			
TPRE4004-04-100			4			
TPRE4005-02-100	0.5	1°00'	2	40	4	
TPRE4005-04-100			4			
TPRE4005-06-100			6			
TPRE4006-04-100	0.6	1°00'	4	40	4	
TPRE4006-06-100			6			
TPRE4007-06-100	0.7	1°00'	6	40	4	
TPRE4007-08-100			8			
TPRE4008-06-100	0.8	1°00'	6	45	4	
TPRE4008-08-100			8			
TPRE4008-10-100			10			
TPRE4009-06-100	0.9	1°00'	6	45	4	
TPRE4009-08-100			8			
TPRE4009-10-100			10			
TPRE4010-06-100	1.0	1°00'	6	45	4	
TPRE4010-08-100			8			
TPRE4010-10-100			10			
TPRE4010-12-100			12			
TPRE4010-16-100			16	50		
TPRE4012-06-100	1.2	1°00'	6	45	4	
TPRE4012-08-100			8			
TPRE4012-10-100			10			
TPRE4012-12-100			12			
TPRE4012-16-100			16	50		
TPRE4014-08-100	1.4	1°00'	8	45	4	
TPRE4014-12-100			12			
TPRE4014-16-100			16	50		

※ These tools are manufactured based on order received.

# Zamus Classic

END MILLS  
> Metric & Inch



## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Rigid taper end mill for highly productive rib processing.
- Can also be used for side milling operation.

■ Taper Tolerance :  $\pm 10'$

## TPRE4...-100 series



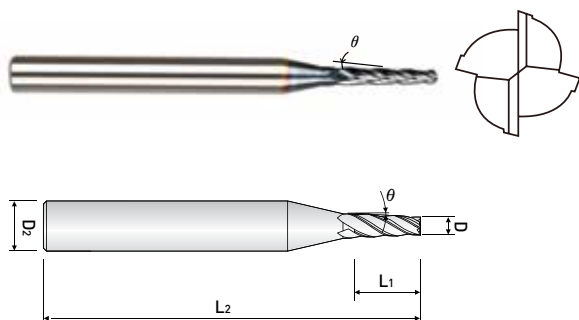
EDP. No.	D	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
TPRE4015-08-100	1.5	1°00'	8	45	4	
TPRE4015-10-100			10			
TPRE4015-12-100			12			
TPRE4015-16-100			16			
TPRE4015-20-100			20			
TPRE4016-08-100	1.6	1°00'	8	45	4	
TPRE4016-10-100			10			
TPRE4016-12-100			12			
TPRE4016-16-100			16			
TPRE4016-20-100			20			
TPRE4018-08-100	1.8	1°00'	8	45	4	
TPRE4018-10-100			10			
TPRE4018-12-100			12			
TPRE4018-16-100			16			
TPRE4018-20-100			20			
TPRE4020-10-100	2.0	1°00'	10	45	4	
TPRE4020-12-100			12			
TPRE4020-16-100			16			
TPRE4020-20-100			20			
TPRE4020-25-100			25			
TPRE4025-10-100	2.5	1°00'	10	45	4	
TPRE4025-12-100			12			
TPRE4025-16-100			16			
TPRE4025-20-100			20	55		
TPRE4025-25-100			25			
TPRE4025-30-100			30			
TPRE4030-25-100	3.0	1°00'	25	55	4	
TPRE4030-40-100			40	80	6	

※ These tools are manufactured based on order received.

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.03	h6

※Items can be changed for quality improvement without notice.



## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Rigid taper end mill for highly productive rib processing.
- Can also be used for side milling operation.

■ Taper Tolerance :  $\pm 10'$

## TPRE4...-...-150 series

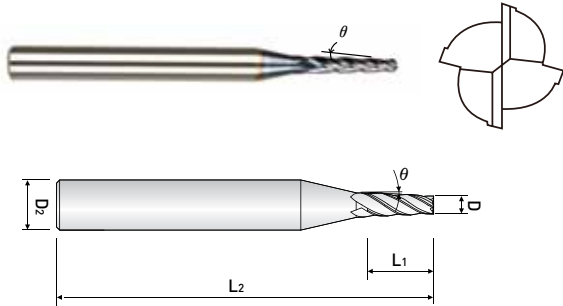


EDP. No.	D	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
TPRE4004-02-150	0.4	1°30'	2	40	4	
TPRE4004-03-150			3			
TPRE4004-04-150			4			
TPRE4005-04-150	0.5	1°30'	4	40	4	
TPRE4005-06-150			6			
TPRE4006-04-150	0.6	1°30'	4	40	4	
TPRE4006-06-150			6			
TPRE4007-06-150	0.7	1°30'	6	40	4	
TPRE4007-08-150			8			
TPRE4008-06-150	0.8	1°30'	6	45	4	
TPRE4008-08-150			8			
TPRE4008-10-150			10			
TPRE4009-06-150	0.9	1°30'	6	45	4	
TPRE4009-08-150			8			
TPRE4009-10-150			10			
TPRE4010-06-150	1.0	1°30'	6	45	4	
TPRE4010-08-150			8			
TPRE4010-10-150			10			
TPRE4010-12-150			12			
TPRE4010-16-150			16	50		
TPRE4012-06-150	1.2	1°30'	6	45	4	
TPRE4012-08-150			8			
TPRE4012-10-150			10			
TPRE4012-12-150			12			
TPRE4012-16-150			16	50		
TPRE4014-08-150	1.4	1°30'	8	45	4	
TPRE4014-12-150			12			
TPRE4014-16-150			16	50		

※ These tools are manufactured based on order received.

# Zamus Classic

END MILLS  
> Metric/Inch



## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Rigid taper end mill for highly productive rib processing.
- Can also be used for side milling operation.

■ Taper Tolerance :  $\pm 10'$

## TPRE4...-150 series



EDP. No.	D	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
TPRE4015-08-150	1.5	1°30'	8	45	4	
TPRE4015-10-150			10			
TPRE4015-12-150			12			
TPRE4015-16-150			16			
TPRE4015-20-150			20			
TPRE4016-08-150	1.6	1°30'	8	45	4	
TPRE4016-10-150			10			
TPRE4016-12-150			12			
TPRE4016-16-150			16			
TPRE4016-20-150			20			
TPRE4018-08-150	1.8	1°30'	8	45	4	
TPRE4018-10-150			10			
TPRE4018-12-150			12			
TPRE4018-16-150			16			
TPRE4018-20-150			20			
TPRE4020-10-150	2.0	1°30'	10	45	4	
TPRE4020-12-150			12			
TPRE4020-16-150			16			
TPRE4020-20-150			20			
TPRE4020-25-150			25			
TPRE4025-10-150	2.5	1°30'	10	45	4	
TPRE4025-12-150			12			
TPRE4025-16-150			16			
TPRE4025-20-150			20			
TPRE4025-25-150			25			
TPRE4025-30-150			30			
TPRE4030-25-150	3.0	1°30'	25	60	6	
TPRE4030-40-150			40	80		

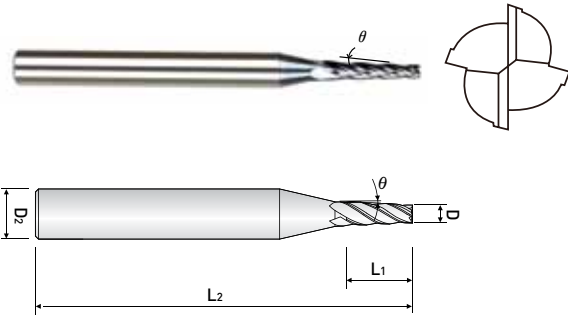
※ These tools are manufactured based on order received.

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.03	h6

※Items can be changed for quality improvement without notice.





## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Rigid taper end mill for highly productive rib processing.
- Can also be used for side milling operation.

■ Taper Tolerance :  $\pm 10'$

## TPRE4...-...-200 series

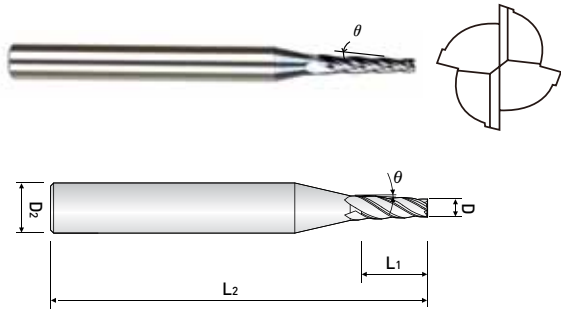


EDP. No.	D	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
TPRE4004-02-200	0.4	2°00'	2	40	4	
TPRE4004-03-200			3			
TPRE4004-04-200			4			
TPRE4005-04-200	0.5	2°00'	4	40	4	
TPRE4005-06-200			6			
TPRE4006-04-200	0.6	2°00'	4	40	4	
TPRE4006-06-200			6			
TPRE4007-06-200	0.7	2°00'	6	40	4	
TPRE4007-08-200			8			
TPRE4008-06-200	0.8	2°00'	6	45	4	
TPRE4008-08-200			8			
TPRE4008-10-200			10			
TPRE4009-06-200	0.9	2°00'	6	45	4	
TPRE4009-08-200			8			
TPRE4009-10-200			10			
TPRE4010-06-200	1.0	2°00'	6	45	4	
TPRE4010-08-200			8			
TPRE4010-10-200			10			
TPRE4010-12-200			12			
TPRE4010-16-200			16	50		
TPRE4012-06-200	1.2	2°00'	6	45	4	
TPRE4012-08-200			8			
TPRE4012-10-200			10			
TPRE4012-12-200			12			
TPRE4012-16-200			16			
TPRE4014-08-200	1.4	2°00'	8	45	4	
TPRE4014-12-200			12			
TPRE4014-16-200			16			

※ These tools are manufactured based on order received.

# Zamus Classic

END MILLS  
> Metric/Inch



## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Rigid taper end mill for highly productive rib processing.
- Can also be used for side milling operation.

■ Taper Tolerance :  $\pm 10'$

## TPRE4...-...-200 series



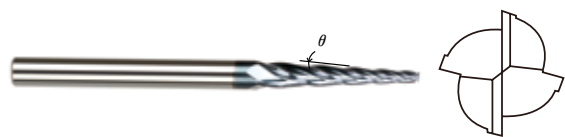
EDP. No.	D	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
TPRE4015-08-200	1.5	2°00'	8	45	4	
TPRE4015-10-200			10			
TPRE4015-12-200			12			
TPRE4015-16-200			16			
TPRE4015-20-200			20			
TPRE4016-08-200	1.6	2°00'	8	45	4	
TPRE4016-10-200			10			
TPRE4016-12-200			12			
TPRE4016-16-200			16			
TPRE4016-20-200			20			
TPRE4018-08-200	1.8	2°00'	8	45	4	
TPRE4018-10-200			10			
TPRE4018-12-200			12			
TPRE4018-16-200			16			
TPRE4018-20-200			20			
TPRE4020-10-200	2.0	2°00'	10	45	4	
TPRE4020-12-200			12			
TPRE4020-16-200			16			
TPRE4020-20-200			20			
TPRE4020-25-200			25			
TPRE4025-10-200	2.5	2°00'	10	45	4	
TPRE4025-12-200			12			
TPRE4025-16-200			16			
TPRE4025-20-200			20	55	6	
TPRE4025-25-200			25			
TPRE4025-30-200			30			
TPRE4030-25-200	3.0	2°00'	25	60	6	
TPRE4030-40-200			40			

※ These tools are manufactured based on order received.

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.03	h6

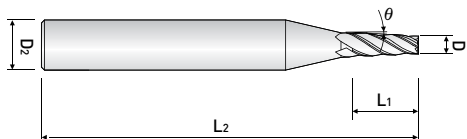
※Items can be changed for quality improvement without notice.



## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Rigid taper end mill for highly productive rib processing.
- Can also be used for side milling operation.

■ Taper Tolerance :  $\pm 10'$



## TPRE4...-...-300 series



EDP. No.	D	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
TPRE4005-04-300	0.5	3°00'	4	40	4	
TPRE4006-04-300	0.6	3°00'	4	40	4	
TPRE4007-06-300	0.7	3°00'	6	40	4	
TPRE4008-06-300	0.8	3°00'	6	45	4	
TPRE4008-10-300			10			
TPRE4009-08-300	0.9	3°00'	8	45	4	
TPRE4010-08-300	1.0	3°00'	8	45	4	
TPRE4010-12-300			12			
TPRE4012-10-300	1.2	3°00'	10	45	4	
TPRE4012-16-300			16	50		
TPRE4015-12-300	1.5	3°00'	12	45	4	
TPRE4015-20-300			20	55		
TPRE4016-12-300	1.6	3°00'	12	45	4	
TPRE4016-20-300			20	55		
TPRE4018-12-300	1.8	3°00'	12	45	4	
TPRE4018-20-300			20	55		
TPRE4020-16-300	2.0	3°00'	16	50	4	
TPRE4020-25-300			25	60	6	
TPRE4025-20-300	2.5	3°00'	20	60	6	
TPRE4025-30-300			30	65		
TPRE4030-25-300	3.0	3°00'	25	60	6	
TPRE4030-40-300			40	80	8	

※ These tools are manufactured based on order received.

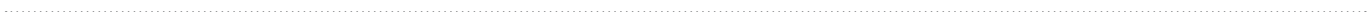
■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,03	h6

※ Items can be changed for quality improvement without notice.



# MEMO



Zamus





Sus

mate

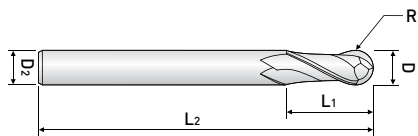
Series

**ENDMILL  
SERIES**

## Zamus Sus Mate Series

ITEM SERIES	APPEARANCE	FEATURE	INCH & METRIC	PAGE
<b>DS502 ...series</b>		BALL NOSE REGULAR & LONG LENGTH	METRIC	237
<b>SM503 ...series</b>		REGULAR LENGTH	METRIC	238
<b>SM504 ...series</b>		REGULAR LENGTH, CORNER RADIUS	METRIC	239
<b>ZF62 ...series</b>		ROUGHING END MILL	METRIC	240

# Zamus Sus mate



## 2 FLUTE, BALL NOSE REGULAR & LONG LENGTH

- Suitable for Stainless steel, Titanium, Inconel.

## DS502 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
DS502010	1	0.5	3	50	6	•
DS502020	2	1	6	50	6	•
DS502030	3	1.5	8	50	6	•
DS502031				70		•
DS502040	4	2	10	50	6	•
DS502041				70		•
DS502050	5	2.5	13	50	6	•
DS502051				80		•
DS502060	6	3	13	50	6	•
DS502061				90		•
DS502080	8	4	19	60	8	•
DS502081				100		•
DS502100	10	5	22	70	10	•
DS502101				100		•
DS502120	12	6	26	75	12	•
DS502121				110		•

■ Tolerance

Radius (mm)	Shank Dia.
±0.01	h6

※Items can be changed for quality improvement without notice.

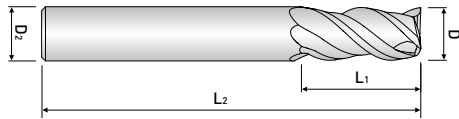
# Zamus Sus mate

END MILLS  
> Metric & Inch

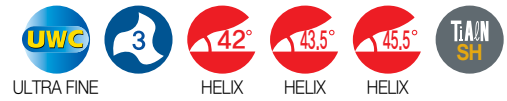


## 3 FLUTE, REGULAR LENGTH

- Suitable for Stainless steel, Titanium, Inconel.



## SM503 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
SM503010	1	2	45	4	•
SM503015	1.5	3	45	4	•
SM503020	2	4	50	6	•
SM503030	3	6	50	6	•
SM503040	4	8	50	6	•
SM503050	5	10	50	6	•
SM503060	6	13	60	6	•
SM503080	8	19	70	8	•
SM503100	10	22	80	10	•
SM503120	12	26	90	12	•
SM503140	14	26	90	12	•
SM503160	16	30	110	16	•
SM503180	18	32	110	18	•
SM503200	20	32	140	20	•

Data. P316

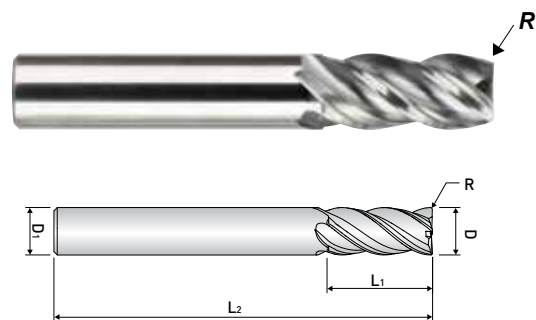
### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0~-0,02	h6

※Items can be changed for quality improvement without notice.



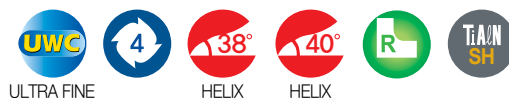
# Zamus Sus mate



## 4 FLUTE, REGULAR LENGTH

- Suitable for Stainless steel, Titanium, Inconel.
- Variable helix Type.

## SM504 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>1</sub>	STOCK
SM504020	2	0.1	6	45	6	•
SM504030	3	0.1	10	45	6	•
SM504040	4	0.2	12	50	6	•
SM504050	5	0.2	13	50	6	•
SM504060	6	0.2	13	50	6	•
SM504070	7	0.2	16	60	8	•
SM504080	8	0.2	16	60	8	•
SM504090	9	0.2	19	70	10	•
SM504100	10	0.3	22	70	10	•
SM504120	12	0.3	26	75	12	•
SM504140	14	0.3	26	82	14	•
SM504160	16	0.3	32	90	16	•
SM504180	18	0.3	32	100	18	•
SM504200	20	0.3	38	100	20	•

Data. P316

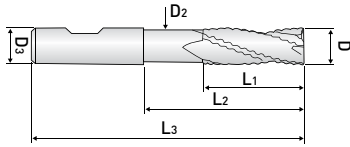
### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 12	0 ~ -0,02	h6
over 12	0 ~ -0,03	

※Items can be changed for quality improvement without notice.

# Zamus Sus mate

END MILLS  
> Metric & Inch



## 4~6 FLUTE, ROUGHING END MILL DIN6527 / DIN6535-HA, DIN6535-HB

- Designed to machine tool steel, alloy steel, stainless steel and other low hardness materials.
- Fast chip ejection.

## ZF62 ....series



EDP. No.		D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>	Z	STOCK
PLAIN SHANK	FLAT SHANK								
ZF624060	ZF624060F	6	7	-	-	54	6	4	•
ZF624061	ZF624061F		16	-	-	57			•
ZF624062	ZF624062F		20	5.5	57	•			
ZF624080	ZF624080F	8	9	-	-	58	8	4	•
ZF624081	ZF624081F		16	-	-	63			•
ZF624082	ZF624082F		26	7.5	63	•			
ZF624100	ZF624100F	10	14	-	-	66	10	4	•
ZF624101	ZF624101F		22	-	-	72			•
ZF624102	ZF624102F		31	9.5	72	•			
ZF624120	ZF624120F	12	16	-	-	73	12	4	•
ZF624121	ZF624121F		26	-	-	83			•
ZF624122	ZF624122F		37	11.5	83	•			
ZF625160	ZF625160F	16	22	-	-	82	16	5	•
ZF625161	ZF625161F		32	-	-	92			•
ZF625162	ZF625162F		51	15.5	100	•			
ZF626200	ZF626200F	20	26	-	-	92	20	6	•
ZF626201	ZF626201F		38	-	-	104			•
ZF626202	ZF626202F		59	19.2	110	•			

Data. P317

■ Tolerance

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

Tolerance \ Dia.	$\phi 1\sim\phi 3$	$\phi 3\sim\phi 6$	$\phi 6\sim\phi 10$	$\phi 10\sim\phi 18$	$\phi 18\sim\phi 30$
Cutting Edge(h10)	0 -40	0 -48	0 -58	0 -70	0 -84
Shank(h6)	0 -6	0 -8	0 -9	0 -11	0 -13

# Zamus Copper mate





**ENDMILL  
SERIES**

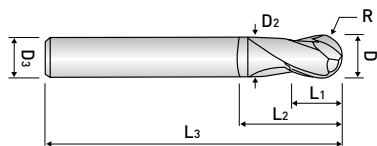


## Zamus Copper Mate Series



ITEM SERIES	APPEARANCE	FEATURE	INCH & METRIC	PAGE
<b>BC502 ...series</b>		STUB CUT with EXTENDED NECK	METRIC	243
<b>RC502 ...series</b>		STUB CUT with EXTENDED NECK	METRIC	244

# Zamus Copper mate



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

- Suitable for copper & non-ferrous material.

## BC502 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
BC502010	1	0.5	1.5	3	50	0.95	6	•
BC502015	1.5	0.75	2	4	50	1.45	6	•
BC502020	2	1	2.5	5	50	1.95	6	•
BC502025	2.5	1.25	3	7	50	2.45	6	•
BC502030	3	1.5	4	10	60	2.9	6	•
BC502040	4	2	5	10	60	3.9	6	•
BC502050	5	2.5	6	12	60	4.9	6	•
BC502060	6	3	7	12	60	5.9	6	•
BC502061					90			
BC502080	8	4	9	15	70	7.9	8	•
BC502081				16	100			
BC502100	10	5	11	25	75	9.9	10	•
BC502101					100			
BC502120	12	6	12	25	80	11.9	12	•
BC502121					110			

Data. P317

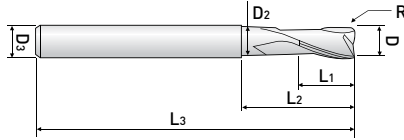
### ■ Tolerance

Radius (mm)	Shank Dia.
±0.01	h6

※Items can be changed for quality improvement without notice.

# Zamus Copper mate

END MILLS  
> Metric & Inch



**2 FLUTE, STUB CUT LENGTH,  
CORNER RADIUS with EXTENDED NECK**

- Suitable for copper & non-ferrous material.

## RC502 .....series



ULTRA FINE



HELIX



up to  $\varnothing 6$



over 6



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
RC5020200509	2	0.5	3	9	55	1.8	6	•
RC5020300509	3	0.5	4	9	55	2.8	6	•
RC5020300516				16				
RC5020300520				20				
RC5020400512	4	0.5	5	12	55	3.7	6	•
RC5020400516				16				
RC5020400520				20				
RC5020600520	6	0.5	7	20	60	5.5	6	•
RC5020601020		1						
RC5020800525	8	0.5	9	25	60	7.4	8	•
RC5020801025		1						
RC5021000532	10	0.5	11	32	70	9.2	10	•
RC5021001032		1						
RC5021200538	12	0.5	12	38	80	11	12	•
RC5021201038		1						

Data, P318

■ Tolerance

Mill Dia., (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0,012	h6
over 6	0 ~ -0,015	

※Items can be changed for quality improvement without notice.

# Zamus Gra mate Series





**ENDMILL  
SERIES**

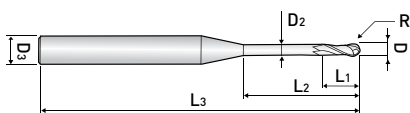


## Zamus Gra Mate Series



ITEM SERIES	APPEARANCE	FEATURE	INCH & METRIC	PAGE
G ...series		DIAMOND COATING BALL NOSE	METRIC	247
GE ...series		DIAMOND COATING END MILL	METRIC	250





## 2 FLUTE, DIAMOND COATING BALL NOSE

- High performance on graphite, wrought aluminum, bakelite, plastics, wood, brass etc.

## G .....series

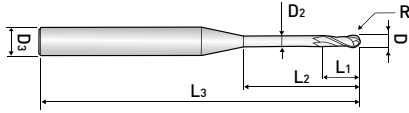


EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
G00501003	0.5	0.25	1	3	50	0.45	4	•
G00501006				6				•
G00501010				10				•
G00601203	0.6	0.3	1.2	3	50	0.55	4	•
G00601206				6				•
G00601208				8				•
G00601210				10				•
G00601212				12				•
G0080164	0.8	0.4	1.6	4	50	0.75	4	•
G0080166				6				•
G0080168				8				•
G0100306	1	0.5	3	6	60	0.95	4	•
G0100308				8				•
G0100310				10				•
G0100312				12				•
G0100314				14				•
G0100316				16				•
G0100318				18				•
G0100320				20				•
G0120410	1.2	0.6	4	10	70	1.15	4	•
G0150510	1.5	0.75	5	10	60	1.45	4	•
G0150512				12				•
G0150516				16				•
G0150520				20				•
G0150525				25	70			•
G0150530				30				•

Data, P318

# Zamus Gra mate

END MILLS  
> Metric & Inch



## 2 FLUTE, DIAMOND COATING BALL NOSE

- High performance on graphite, wrought aluminum, bakelite, plastics, wood, brass etc.

## G .....series

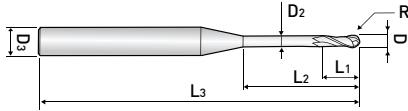


HELIX DIAMOND

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK		
G0200812	2	1	8	12	60	1.95	4	•		
G0200816				16				•		
G0200820				20				•		
G0200825				25	•					
G0200830				30	•					
G0200835				35	•					
G0200840			40	•						
G0201020			10	1.25	10			20	80	•
G0201020L								100	•	
G0251020			2.5	1.25	10			20	80	2.43
G0301216	3	1.5	12	16	60	2.9	6	•		
G0301220				20	70			•		
G0301225				25	•					
G0301230				30	80			•		
G0301235				35	•					
G0301240				40	90			•		
G0301245			45	•						
G0301525			15	25	80			4	•	
G04015S	4	2	15	-	50	-	4	•		
G04015M				-	80	-		•		
G04015L				-	120	-		•		
G0401520				20	60	3.9	6	•		
G0401525				25	70			•		
G0401530				30	80			•		
G0401535				35	•					
G0401540				40	90			•		
G0401545				45	•					
G0401550				50	100			•		
G0402030				20	30			80	4	•

Data. P318

Zamus Gra mate Series



## 2 FLUTE, DIAMOND COATING BALL NOSE

- High performance on graphite, wrought aluminum, bakelite, plastics, wood, brass etc.

## G .....series



HELIX

DIAMOND

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK	
G0503050	5	2.5	30	50	100	4.8	6	•	
G0503050L					150			•	
G06020S	6	3	20	-	70	-	6	•	
G06020M					100			•	
G06020L			150	•					
G0603050			30	50	-	100		5.8	•
G0603050L	150	•							
G08025S	8	4	25	-	70	-	8	•	
G08025M					110			•	
G08025L					160			•	
G0804060			40	60	-	110		7.8	•
G0804060L						200			•
G10030S	10	5	30	-	80	-	10	•	
G10030M					120			•	
G10030L					170			•	
G1005070			50	70	-	120		9.7	•
G1005070L						200			•
G12035S	12	6	35	-	80	-	12	•	
G12035M					130			•	
G12035L					180			•	
G1205575			55	75	-	130		11.7	•
G1205575L						200			•

Data. P318

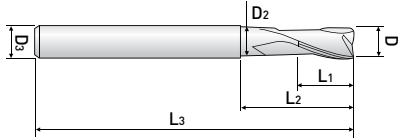
■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,03	h6

※Items can be changed for quality improvement without notice.

# Zamus Gra mate

END MILLS  
> Metric & Inch



## 2 FLUTE, DIAMOND COATING END MILL

- High performance on graphite, wrought aluminum, bakelite, plastics, wood, brass etc.



HELIX

DIAMOND

## GE .....series

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	STOCK
GE00501006	0.5	1	6	50	0.45	4	•
GE00601206	0.6	1.2	6	50	0.55	4	•
GE00601210			10				•
GE00701506	0.7	1.5	6	50	0.65	4	•
GE00802006	0.8	2	6	50	0.75	4	•
GE0100308	1	3	8	60	0.95	4	•
GE0100310			10				•
GE0100312			12				•
GE0150412	1.5	4	12	60	1.45	4	•
GE0200612	2	6	12	60	1.95	4	•
GE0200612S6						6	•
GE0250812	2.5	8	12	60	2.43	4	•
GE0301012	3	10	12	60	2.9	4	•
GE0301016			16				•
GE0301012S6			12			6	•
GE0301016S6			16				•
GE04012S	4	12	-	60	-	6	•
GE0401216			16		3.9		•
GE0401220			20		•		
GE0501520	5	15	20	60	4.8	6	•
GE06020S	6	20	-	60	-	6	•
GE0602030			30	80	5.8		•
GE0603050			50	150	•		
GE08025S	8	25	-	70	-	8	•
GE0802540			40	100	7.8		•
GE0804070			70	150	•		
GE10030S	10	30	-	80	-	10	•
GE1003050			50	100	9.7		•
GE1004580			80	160	•		
GE12030S	12	30	-	80	-	12	•
GE1203050			50	110	11.7		•
GE1205080			80	160	•		

Data. P319

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.03	h6
























※Items can be changed for quality improvement without notice.

# Alu wave Series

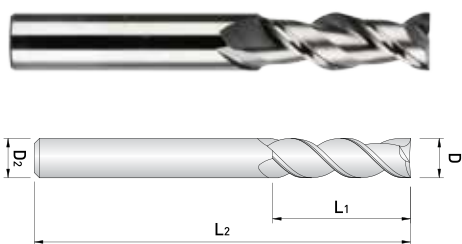
**ENDMILL  
SERIES**

## Alu-wave Series



ITEM SERIES	APPEARANCE	FEATURE	INCH & METRIC	PAGE
WAE302A ...series		STUB LENGTH, UNCOATED	INCH	253
WAE502A ...series		STUB LENGTH, DLC COATED	INCH	253
WAE312A ...series		REGULAR LENGTH, UNCOATED	INCH	254
WAE512A ...series		REGULAR LENGTH, DLC COATED	INCH	254
WAE322A ...series		LONG LENGTH, UNCOATED	INCH	255
WAE522A ...series		LONG LENGTH, DLC COATED	INCH	255
WAR302A ...series		STUB LENGTH, UNCOATED	INCH	256
WAR502A ...series		STUB LENGTH, DLC COATED	INCH	256
WAR312A ...series		REGULAR LENGTH, UNCOATED	INCH	257
WAR512A ...series		REGULAR LENGTH, DLC COATED	INCH	257
WAR322A ...series		LONG LENGTH, UNCOATED	INCH	258
WAR522A ...series		LONG LENGTH, DLC COATED	INCH	258
WAE303A ...series		STUB LENGTH, UNCOATED	INCH	259
WAE503A ...series		STUB LENGTH, DLC COATED	INCH	259
WAR303A ...series		STUB LENGTH, UNCOATED	INCH	260
WAR503A ...series		STUB LENGTH, DLC COATED	INCH	260
WAE313A ...series		STUB LENGTH, UNCOATED	INCH	261
WAR503A ...series		STUB LENGTH, DLC COATED	INCH	261
WAR313A ...series		REGULAR LENGTH, UNCOATED	INCH	262
WAR513A ...series		REGULAR LENGTH, DLC COATED	INCH	262
WAB302A ...series		STUB BALL NOSE	INCH	263
WAF303A ...series		ROUGHING ENDMILL FOR ALUMINUM	INCH	264
WAF313A ...series		ROUGHING ENDMILL FOR ALUMINUM	INCH	265

# Alu-wave Series



## 2 FLUTE, Stub Length, Square - for Aluminum

- High performance geometry and polished flutes on Aluminum, Non-Ferrous Materials, Graphite & Plastics.
- Available both Uncoated and Diamond Like Coated for more performance options.

## WAE302A .....series



NON-COATED EDP NO.	Dimension (mm)				STOCK	D.L.C.Coated	STOCK
	D	C.L	OAL	SH.Dia		EDP.NO	
WAE302A008	1/8	1/4	1-1/2	1/8	•	WAE502A008	•
WAE302A012	3/16	5/16	2	3/16	•	WAE502A012	•
WAE302A016	1/4	3/8	2-1/2	1/4	•	WAE502A016	•
WAE302A020	5/16	7/16	2-1/2	5/16	•	WAE502A020	•
WAE302A024	3/8	1/2	2-1/2	3/8	•	WAE502A024	•
WAE302A028	7/16	9/16	2-3/4	7/16	•	WAE502A028	•
WAE302A032	1/2	3/4	3	1/2	•	WAE502A032	•
WAE302A040	5/8	7/8	3-1/2	5/8	•	WAE502A040	•
WAE302A048	3/4	1	4	3/4	•	WAE502A048	•
WAE302A064	1	1-1/2	4	1	•	WAE502A064	•

# Alu-wave Series

END MILLS  
> Metric & Inch



## 2 FLUTE, REGULAR CUT LENGTH, SQUARE - FOR ALUMINUM

- High performance geometry and polished flutes on Aluminum, Non-Ferrous Materials, Graphite & Plastics.
- Available both Uncoated and Diamond Like Coated for more performance options.

## WAE312A .....series



FINE GRAIN



HELIX



SHARP EDGE



uncoated



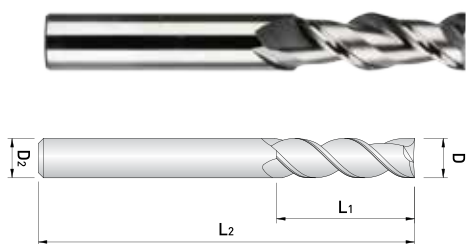
D.L.C.

NON-COATED		Dimension (mm)				STOCK	D.L.C.Coated	
EDP NO.	D	C.L	OAL	SH.Dia	EDP NO.		STOCK	
WAE312A008	1/8	3/8	1-1/2	1/8	•	WAE512A008	•	
WAE312A012	3/16	9/16	2	3/16	•	WAE512A012	•	
WAE312A016	1/4	3/4	2-1/2	1/4	•	WAE512A016	•	
WAE312A020	5/16	13/16	2-1/2	5/16	•	WAE512A020	•	
WAE312A024	3/8	1	2-1/2	3/8	•	WAE512A024	•	
WAE312A028	7/16	1	2-3/4	7/16	•	WAE512A028	•	
WAE312A032	1/2	1-1/4	3	1/2	•	WAE512A032	•	
WAE312A040	5/8	1-5/8	3-1/2	5/8	•	WAE512A040	•	
WAE312A048	3/4	1-5/8	4	3/4	•	WAE512A048	•	
WAE312A064	1	2	5	1	•	WAE512A064	•	

Alu-wave Series



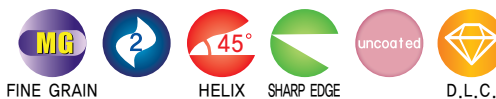
# Alu-wave Series



## 2 FLUTE, LONG CUT LENGTH, SQUARE - FOR ALUMINUM

- High performance geometry and polished flutes on Aluminum, Non-Ferrous Materials, Graphite & Plastics.
- Available both Uncoated and Diamond Like Coated for more performance options.

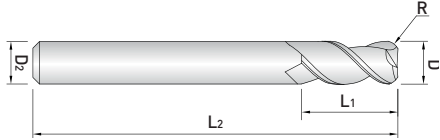
## WAE322A .....series



NON-COATED EDP NO.	Dimension (mm)				STOCK	D.L.C.Coated	STOCK
	D	C.L	OAL	SH.Dia		EDP NO.	
WAE322A016	1/4	1-1/2	4	1/4	•	WAE522A016	•
WAE322A020	5/16	1-1/2	4	5/16	•	WAE522A020	•
WAE322A024	3/8	1-1/2	4	3/8	•	WAE522A024	•
WAE322A032	1/2	2	4	1/2	•	WAE522A032	•
WAE322A040	5/8	2-1/2	5	5/8	•	WAE522A040	•
WAE322A048	3/4	2-1/2	5	3/4	•	WAE522A048	•
WAE322A064	1	3-1/4	6	1	•	WAE522A064	•

# Alu-wave Series

END MILLS  
> Metric & Inch



## 2 FLUTE, Stub Length, Corner Radius - for Aluminum

- High performance geometry and polished flutes on Aluminum, Non-Ferrous Materials, Graphite & Plastics.
- Available both Uncoated and Diamond Like Coated for more performance options.

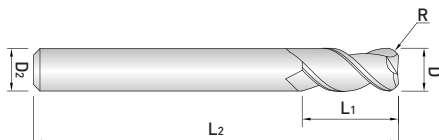
## WAR302A .....series



NON-COATED	Dimension (mm)					STOCK	D.L.C.Coated	STOCK
EDP NO.	D	R	C.L	OAL	SH.Dia		EDP NO.	
WAR302A008	1/8	.010	1/4	1-1/2	1/8	•	WAR502A008	•
WAR302A012	3/16	.010	5/16	2	3/16	•	WAR502A012	•
WAR302A016	1/4	.010	3/8	2-1/2	1/4	•	WAR502A016	•
WAR302A020	5/16	.020	7/16	2-1/2	5/16	•	WAR502A020	•
WAR302A024	3/8	.020	1/2	2-1/2	3/8	•	WAR502A024	•
WAR302A028	7/16	.020	9/16	2-3/4	7/16	•	WAR502A028	•
WAR302A032	1/2	.020	3/4	3	1/2	•	WAR502A032	•
WAR302A040	5/8	.030	7/8	3-1/2	5/8	•	WAR502A040	•
WAR302A048	3/4	.030	1	4	3/4	•	WAR502A048	•
WAR302A064	1	.030	1-1/2	4	1	•	WAR502A064	•

Alu-wave Series

# Alu-wave Series



## 2 FLUTE, REGULAR CUT LENGTH, CORNER RADIUS - FOR ALUMINUM

- High performance geometry and polished flutes on Aluminum, Non-Ferrous Materials, Graphite & Plastics.
- Available both Uncoated and Diamond Like Coated for more performance options.

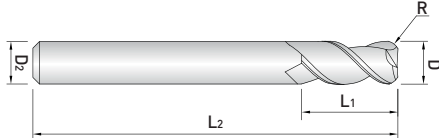
## WAR312A .....series



NON-COATED EDP NO.	Dimension (mm)					STOCK	D.L.C.Coated	STOCK
	D	R	C.L	OAL	SH.Dia		EDP NO.	
WAR312A008	1/8	.010	3/8	1-1/2	1/8	•	WAR512A008	•
WAR312A012	3/16	.010	9/16	2	3/16	•	WAR512A012	•
WAR312A016	1/4	.010	3/4	2-1/2	1/4	•	WAR512A016	•
WAR312A020	5/16	.020	13/16	2-1/2	5/16	•	WAR512A020	•
WAR312A024	3/8	.020	1	2-1/2	3/8	•	WAR512A024	•
WAR312A028	7/16	.020	1	2-3/4	7/16	•	WAR512A028	•
WAR312A032	1/2	.020	1-1/4	3	1/2	•	WAR512A032	•
WAR312A040	5/8	.030	1-5/8	3-1/2	5/8	•	WAR512A040	•
WAR312A048	3/4	.030	1-5/8	4	3/4	•	WAR512A048	•
WAR312A064	1	.030	2	5	1	•	WAR512A064	•

# Alu-wave Series

END MILLS  
> Metric & Inch



## 2 FLUTE, LONG CUT LENGTH, CORNER RADIUS - FOR ALUMINUM

- High performance geometry and polished flutes on Aluminum, Non-Ferrous Materials, Graphite & Plastics.
- Available both Uncoated and Diamond Like Coated for more performance options.

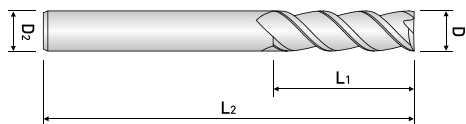
## WAR322A .....series



NON-COATED EDP NO.	Dimension (mm)					STOCK	D.L.C.Coated	STOCK
	D	R	C.L	OAL	SH.Dia		EDP NO.	
WAR322A016	1/4	.010	1-1/2	4	1/4	•	WAR522A016	•
WAR322A020	5/16	.020	1-1/2	4	5/16	•	WAR522A020	•
WAR322A024	3/8	.020	1-1/2	4	3/8	•	WAR522A024	•
WAR322A032	1/2	.020	2	4	1/2	•	WAR522A032	•
WAR322A040	5/8	.030	2-1/2	5	5/8	•	WAR522A040	•
WAR322A048	3/4	.030	2-1/2	5	3/4	•	WAR522A048	•
WAR322A064	1	.030	3-1/4	6	1	•	WAR522A064	•

Alu-wave Series

# Alu-wave Series



## 3 FLUTE, Stub Length, Square - for Aluminum

- High performance geometry and polished flutes on Aluminum, Non-Ferrous Materials, Graphite & Plastics.
- Available both Uncoated and Diamond Like Coated for more performance options.

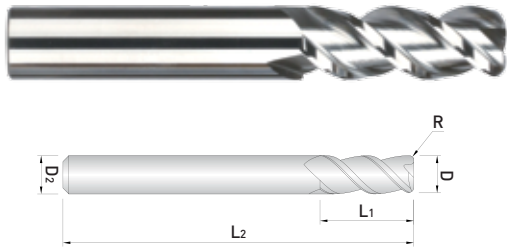
## WAE303A .....series



NON-COATED EDP NO.	Dimension (mm)				STOCK	D.L.C.Coated	STOCK
	D	C.L	OAL	SH.Dia		EDP NO.	
WAE303A008	1/8	1/4	1-1/2	1/8	•	WAE503A008	•
WAE303A012	3/16	5/16	2	3/16	•	WAE503A012	•
WAE303A016	1/4	3/8	2-1/2	1/4	•	WAE503A016	•
WAE303A020	5/16	7/16	2-1/2	5/16	•	WAE503A020	•
WAE303A024	3/8	1/2	2-1/2	3/8	•	WAE503A024	•
WAE303A028	7/16	9/16	2-3/4	7/16	•	WAE503A028	•
WAE303A032	1/2	5/8	3	1/2	•	WAE503A032	•
WAE303A040	5/8	3/4	3-1/2	5/8	•	WAE503A040	•
WAE303A048	3/4	1	4	3/4	•	WAE503A048	•
WAE303A064	1	1-1/4	4	1	•	WAE503A064	•

# Alu-wave Series

END MILLS  
> Metric & Inch



## 3 FLUTE, Stub Length, Corner Radius - for Aluminum

- Suitable for Aluminum, Aluminum Alloy, Copper & Non-Ferrous Material
- Suitable for High Speed Cutting
- Optimized design for reducing cutting load and effective chip evacuation

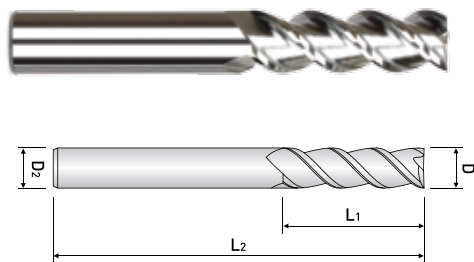
## WAR303A .....series



NON-COATED EDP NO.	Dimension (mm)					STOCK	D.L.C.Coated	STOCK
	D	R	C.L	OAL	SH.Dia		EDP NO.	
WAR303A00801	1/8	.010	1/4	1-1/2	1/8	•	WAR503A00801	•
WAR303A01202	3/16	.020	5/16	2	3/16	•	WAR503A01202	•
WAR303A01602	1/4	.020	3/8	2-1/2	1/4	•	WAR503A01602	•
WAR303A01603	1/4	.030	3/8	2-1/2	1/4	•	WAR503A01603	•
WAR303A01606	1/4	.060	3/8	2-1/2	1/4	•	WAR503A01606	•
WAR303A02002	5/16	.020	7/16	2-1/2	5/16	•	WAR503A02002	•
WAR303A02003	5/16	.030	7/16	2-1/2	5/16	•	WAR503A02003	•
WAR303A02402	3/8	.020	1/2	2-1/2	3/8	•	WAR503A02402	•
WAR303A02403	3/8	.030	1/2	2-1/2	3/8	•	WAR503A02403	•
WAR303A02406	3/8	.060	1/2	2-1/2	3/8	•	WAR503A02406	•
WAR303A02802	7/16	.020	9/16	2-3/4	7/16	•	WAR503A02802	•
WAR303A03202	1/2	.020	5/8	3	1/2	•	WAR503A03202	•
WAR303A03203	1/2	.030	5/8	3	1/2	•	WAR503A03203	•
WAR303A03206	1/2	.060	5/8	3	1/2	•	WAR503A03206	•
WAR303A04003	5/8	.030	3/4	3-1/2	5/8	•	WAR503A04003	•
WAR303A04006	5/8	.060	3/4	3-1/2	5/8	•	WAR503A04006	•
WAR303A04009	5/8	.090	3/4	3-1/2	5/8	•	WAR503A04009	•
WAR303A04806	3/4	.060	1	4	3/4	•	WAR503A04806	•
WAR303A04809	3/4	.090	1	4	3/4	•	WAR503A04809	•
WAR303A04812	3/4	.120	1	4	3/4	•	WAR503A04812	•
WAR303A06406	1	.060	1-1/4	4	1	•	WAR503A06406	•
WAR303A06409	1	.090	1-1/4	4	1	•	WAR503A06409	•
WAR303A06412	1	.120	1-1/4	4	1	•	WAR503A06412	•

Alu-wave Series

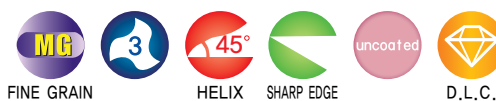
# Alu-wave Series



## 3 FLUTE, Regular Length, Square - for Aluminum

- High performance geometry and polished flutes on Aluminum, Non-Ferrous Materials, Graphite & Plastics.
- Available both Uncoated and Diamond Like Coated for more performance options.

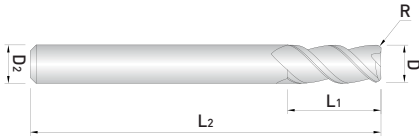
## WAE313A .....series



NON-COATED EDP NO.	Dimension (mm)				STOCK	D.L.C.Coated	STOCK
	D	C.L	OAL	SH.Dia		EDP NO.	
WAE313A008	1/8	3/8	1-1/2	1/8	•	WAE513A008	•
WAE313A012	3/16	9/16	2	3/16	•	WAE513A012	•
WAE313A016	1/4	3/4	2-1/2	1/4	•	WAE513A016	•
WAE313A020	5/16	13/16	2-1/2	5/16	•	WAE513A020	•
WAE313A024	3/8	1	2-1/2	3/8	•	WAE513A024	•
WAE313A028	7/16	1-1/4	2-3/4	7/16	•	WAE513A028	•
WAE313A032	1/2	1-1/4	3	1/2	•	WAE513A032	•
WAE313A040	5/8	1-5/8	3-1/2	5/8	•	WAE513A040	•
WAE313A048	3/4	1-5/8	4	3/4	•	WAE513A048	•
WAE313A064	1	2	5	1	•	WAE513A064	•

# Alu-wave Series

END MILLS  
> Metric & Inch



## 3 FLUTE, Regular Length, Corner Radius - for Aluminum

- High performance geometry and polished flutes on Aluminum, Non-Ferrous Materials, Graphite & Plastics.
- Available both Uncoated and Diamond Like Coated for more performance options.

## WAR313A .....series



NON-COATED EDP NO.	Dimension (mm)					STOCK	D.L.C.Coated	STOCK
	D	R	C.L	OAL	SH.Dia		EDP NO.	
WAR313A00801	1/8	.010	3/8	1-1/2	1/8	•	WAR513A00801	•
WAR313A01202	3/16	.020	9/16	2	3/16	•	WAR513A01202	•
WAR313A01602	1/4	.020	5/8	2-1/2	1/4	•	WAR513A01602	•
WAR313A01603	1/4	.030	5/8	2-1/2	1/4	•	WAR513A01603	•
WAR313A01606	1/4	.060	5/8	2-1/2	1/4	•	WAR513A01606	•
WAR313A02002	5/16	.020	13/16	2-1/2	5/16	•	WAR513A02002	•
WAR313A02003	5/16	.030	13/16	2-1/2	5/16	•	WAR513A02003	•
WAR313A02402	3/8	.020	1	2-1/2	3/8	•	WAR513A02402	•
WAR313A02403	3/8	.030	1	2-1/2	3/8	•	WAR513A02403	•
WAR313A02406	3/8	.060	1	2-1/2	3/8	•	WAR513A02406	•
WAR313A02802	7/16	.020	1-1/4	2-3/4	7/16	•	WAR513A02802	•
WAR313A03202	1/2	.020	1-1/4	3	1/2	•	WAR513A03202	•
WAR313A03203	1/2	.030	1-1/4	3	1/2	•	WAR513A03203	•
WAR313A03206	1/2	.060	1-1/4	3	1/2	•	WAR513A03206	•
WAR313A04003	5/8	.030	1-5/8	3-1/2	5/8	•	WAR513A04003	•
WAR313A04006	5/8	.060	1-5/8	3-1/2	5/8	•	WAR513A04006	•
WAR313A04009	5/8	.090	1-5/8	3-1/2	5/8	•	WAR513A04009	•
WAR313A04806	3/4	.060	1-5/8	4	3/4	•	WAR513A04806	•
WAR313A04809	3/4	.090	1-5/8	4	3/4	•	WAR513A04809	•
WAR313A04812	3/4	.120	1-5/8	4	3/4	•	WAR513A04812	•
WAR313A06406	1	.060	2	5	1	•	WAR513A06406	•
WAR313A06409	1	.090	2	5	1	•	WAR513A06409	•
WAR313A06412	1	.120	2	5	1	•	WAR513A06412	•

Alu-wave Series



# Alu-wave Series



## 2 FLUTES, STUB BALL NOSE - for Aluminum

- High performance geometry and polished flutes on Aluminum, Non-Ferrous Materials, Graphite & Plastics.
- Available both Uncoated and Diamond Like Coated for more performance options.

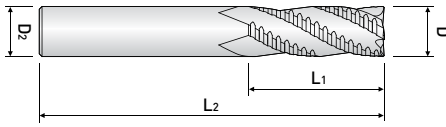
## WAB302A .....series



EDP NO.	Dimension(mm)							STOCK
	Dia.	R	L1	L2	L3	d <sub>2</sub>	SH.Dia	
WAB302A	1/32	R1/64	1/32	3/32	2-1/2	.027	1/8	•
WAB302A	1/16	R1/32	1/16	3/16	2-1/2	.053	1/8	•
WAB302A	1/8	R1/16	1/8	3/8	3	.115	1/8	•
WAB302A	3/16	R3/32	3/16	9/16	3	.175	3/16	•
WAB302A	1/4	R1/8	1/4	2	3	.230	1/4	•
WAB302A	3/8	R3/16	3/8	2-1/4	3-1/2	.345	3/8	•
WAB302A	1/2	R1/4	1/2	2-1/2	4	.460	1/2	•

# Alu-wave Series

END MILLS  
> Metric/Inch



## Roughing Endmill - for Aluminum

DIN6527L / DIN6535-HA, DIN6535-HB

- Suitable for Aluminum, Aluminum Alloy, Copper & Non-Ferrous Material

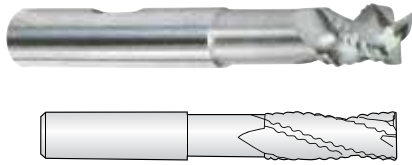
## WAF303A .....series



EDP NO.	Dimension (mm)			
	D	C.L	OAL	SH.Dia
WAF303A024	3/8	1	3	3/8
WAF303A024L	3/8	1-1/2	3-1/2	3/8
WAF303A032	1/2	1-1/4	3-1/4	1/2
WAF303A032L	1/2	2	4	1/2
WAF303A040	5/8	1-1/4	3-1/2	5/8
WAF303A040L	5/8	2-1/2	5	5/8
WAF303A048	3/4	1-1/2	4	3/4
WAF303A048L	3/4	2-1/2	5	3/4
WAF303A064	1	1-1/2	4	1

Alu-wave Series

# Alu-wave Series



## 3 Flutes, Roughing Endmill - for Aluminum

- High performance geometry and polished flutes on Aluminum, Non-Ferrous Materials, Graphite & Plastics.
- Available both Uncoated and Diamond Like Coated for more performance options.

## WAF313A .....series



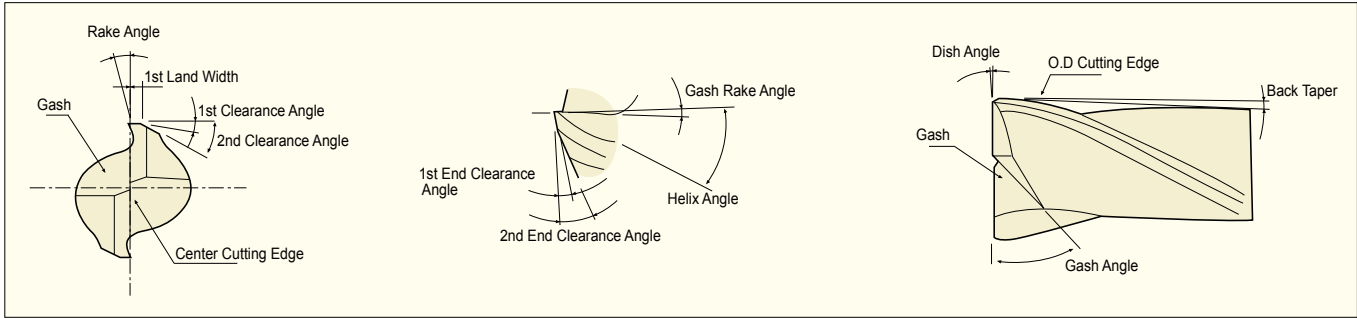
EDP NO.	Dimension (mm)					
	Dia	C.L	Neck Length	OAL	Neck Dia.	SH.Dia
WAF313A024	3/8	7/16	2-1/4	3-1/2	0.345	3/8
WAF313A032	1/2	9/16	2-1/2	4	0.460	1/2
WAF313A040	5/8	3/4	3	5	0.575	5/8
WAF313A048	3/4	13/16	4	6	0.710	3/4
WAF313A064	1	15/16	4	6	0.960	1

Technical

Data



## ▣ Nomenclature of End Mill



## ▣ Application range of Grade

WORKPIECE	GRADE
Carbon Steel, Alloy Steel, Tool Steel, Metal Mold Steel	* Micro Grain Carbide * P30
Cast Iron, Ductile	* Micro Grain Carbide * K10
Heat Treatment Steel(HRc40-60)	* Ultrafinest Carbide
Aluminium, Nonferrous Material	* Micro Grain Carbide * K10

## ▣ Formula of End Milling

1) Cutting Speed $V = \frac{\pi \times D \times N}{1000}$ (m/min)	V : Cutting Speed (m/min) D : Diameter of End Mill (mm) N : End Mill revolution (RPM)
2) Feed per tooth $fz = \frac{F}{Z \times N}$ (mm/tooth)	fz : Feed per tooth (mm/tooth) Z : No. of teeth N : End Mill revolution (RPM)
3) Table Feed rate $F = fz \times Z \times N$	F : Feed rate (mm/min) fz : Feed per tooth (mm/tooth) Z : No. of teeth N : End Mill revolution (RPM)
4) Cutting Time $Tc = \frac{L}{F}$	Tc: Cutting Time (min) F : Table feed rate (mm/min) L : Length of cut (workpiece Length+Diameter of Endmill+ $\alpha$ )

## ▣ Formula of End Milling - INCH

INPUTS / ELEMENTS	ABBREVIATION
Speed (Surface Feet per Minute)	SFM
Feed (Inches per Minute)	IPM
Feed per Tooth	FPT
Feed per Revolution	FPR
Tool Diameter	D
# of Teeth in Cutter	Z

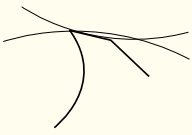
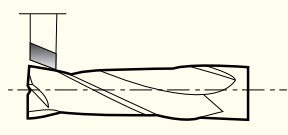
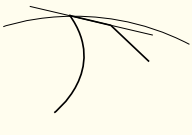
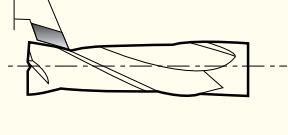

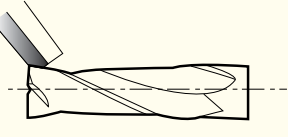
TO Get:	ABBREVIATION
Speed(RPM)	$\frac{(SFM \times 3.82)}{D}$
Feed (Inches per Minute)	$RPM \times FPT \times Z$
SFM (Surface Feet per Minute)	$\frac{(RPM \times D)}{3.82}$
IPT (Inches per Tooth)	$\frac{(IPM / RPM)}{Z}$

## ■ For Regrinding

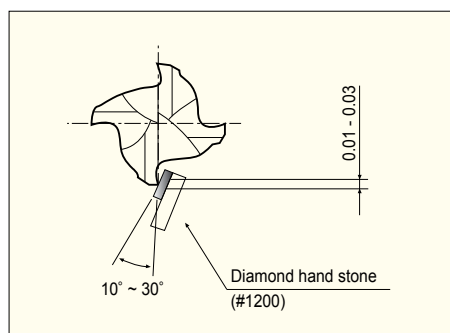
### 1. Regrinding range

APPLICATION RANGE	CUTTER Dia.	AMOUNT OF FLANK WEAR
Finish Machining	~ $\phi$ 10	.05 ~ .10
	$\phi$ 11 ~ $\phi$ 30	.10 ~ .25
	$\phi$ 31 ~ $\phi$ 50	.20 ~ .35
Rough Machining	~ $\phi$ 10	.08 ~ .15
	$\phi$ 11 ~ $\phi$ 30	.15 ~ .35
	$\phi$ 31 ~ $\phi$ 50	.30 ~ .45

### 2. Regrinding Method of Relief

		<p><b>(1) Concave method</b></p> <ul style="list-style-type: none"> <li>• In case when precise outer diameter dimension is required.</li> <li>• In case of aluminium machining.</li> </ul>
		<p><b>(2) Flat method</b></p> <ul style="list-style-type: none"> <li>• Excellent machinability</li> <li>- Applicable to ball end mill and taper end mill.</li> <li>• Secondary clearance angle work is required.</li> <li>- When Diameter is large.</li> </ul>
		<p><b>(3) Eccentric method</b></p> <ul style="list-style-type: none"> <li>• Excellent toughness and surface roughness.</li> <li>• Secondary clearance angle work is not required.</li> </ul>

### 3. Honing



- 1) Recommend honing for machining mold metal and high hardness workpiece.  
-The amount of honing shall be less than that of feed per blade.
- 2) When using end mill without honing, machine for 10 to 30 seconds at feed rate of less than 0.01 mm/blade and then machine at normal feed rate.
- 3) Honing is not required for machining aluminium and non-ferrous metal.

## ■ Trouble Shooting for Endmilling

Problems		Solution Cause	Cutting Conditions					Tool shape					Grade		The Others			
			Cutting Speed	Feed Rate	Depth of Cut	Coolant	Up & Down Cut	Relief Angle	Lead Angle	Cutting Length	Numbers of Teeth	Honing	Chip Pocket	Toughness	Hardness	Mechanical Rigidity	Mechanical Chattering	Workpiece Setting
Cutting edge breakage	Excessive wear on periphery	· Improper cutting conditions	▼	▲		●								▲				
	Chipping	· Improper cutting conditions · Generation of built-up edge · Improper tool grade		▼			▼	▼		●			▲			▼	▲	▼
	Breakage while cutting	· Improper cutting conditions · Excessive cutting load · Excessive overhang		▼	▼				▼				▲		▲		▲	▼
Poor surface finish	· Generation of built-up edge		▲	▲		●		▲		●								
	· generation of chattering		▼			○	▼		▼					▲	●	▲	▼	
	· Surface Squarence			▼	▼		▲	▲	▼								▼	
Oversize or undersize	· Improper cutting conditions · Improper choice of endmill type	▲	▼			▼		▼	▲					▲	▼		▼	
Poor chip control	· Excessive cutting rate · Improper chip Pocket · Improper cutting conditions		▼	▼					▼			▲						

▲ : Increase

▼ : Decrease

○ : Application

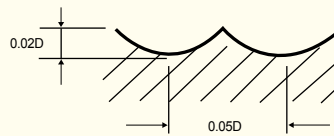
● : Proper application

## ■ DA702, ZB702A, DA703, DA734 series

MATERIAL	HARDENED STEELS HEAT RESISTANT STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS	
	HRC30 ~ HRC40		HRC40 ~ HRC50		HRC50 ~ HRC55		HRC55 ~ HRC60		HRC60 ~ HRC65		HRC65 ~ HRC70	
DIAMETER(inch)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
R1/64 X 1/32	50000	188.98	50000	165.35	45000	149.61	40000	118.11	35000	102.36	35000	90.55
R1/32 X 1/16	49700	224.41	47800	188.98	40000	157.48	35000	124.02	32000	110.24	28500	90.55
R3/64 X 3/32	49700	224.41	47800	188.98	40000	157.48	35000	124.02	32000	110.24	28500	90.55
R1/16 X 1/8	33100	236.22	31800	208.66	26500	157.48	23500	124.02	21000	110.24	19000	90.55
R3/32 X 3/16	18600	228.35	17800	192.91	15000	147.64	13500	120.08	11500	100.39	10500	82.68
R1/8 X 1/4	13900	190.94	13400	161.42	11000	122.05	10000	98.43	8800	84.65	8000	68.90
R5/32 X 5/16	11100	165.35	10700	137.80	9000	106.30	8000	84.65	7000	72.83	6500	61.02
R3/16 X 3/8	9300	145.67	8900	122.05	7500	94.49	6600	74.80	5800	64.96	5300	54.33
R1/4 X 1/2	6950	116.14	6680	98.43	5600	74.80	5000	61.02	4400	49.21	4000	41.34

RPM : Revolution Per Min  
FEED : inch/min

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

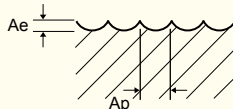


## ■ DA412 series ▶ General Speed Cutting

MATERIAL	HARDENED STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS	
	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(inch)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
R1/16 X 1/8	12700	43.30	12300	41.30	11800	39.40	8400	26.00
R3/32 X 3/16	9400	43.30	9050	41.30	8600	37.40	5600	26.80
R1/8 X 1/4	8600	45.30	8250	43.30	7850	37.40	4850	27.60
R5/32 X 5/16	7000	41.30	6700	39.40	6350	37.40	3800	25.60
R3/16 X 3/8	6050	39.40	5800	37.80	5450	35.40	3200	24.40
R1/4 X 1/2	5450	39.40	5200	37.80	4900	35.40	2750	24.40
R5/16 X 5/8	4350	34.30	4150	32.70	3900	32.30	2150	10.40
R3/8 X 3/4	3500	27.20	3300	25.60	3150	24.80	1700	8.70
R1/2 X 1	2800	27.20	2650	25.60	2520	24.80	1360	8.70

RPM : Revolution Per Min  
FEED : inch/min

Ae: D1/8=0.06  
D3/16~D5/16=0.10  
D3/8~D1=0.12  
Ap: 0.1 X D



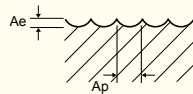


## ■ DA412 series ▶ High Speed Cutting

MATERIAL	HARDENED STEELS		HARDENED STEELS		HARDENED STEELS	
HARDNESS	HRc45 ~ HRc50		HRc50 ~ HRc55		HRc55 ~ HRc60	
STRENGTH	1500 ~ 1750N/mm <sup>2</sup>		1750 ~ 2000N/mm <sup>2</sup>		2000 ~ 2080N/mm <sup>2</sup>	
DIAMETER(inch)	RPM	FEED	RPM	FEED	RPM	FEED
R1/16 X 1/8	12700	68.90	12300	65.70	11800	39.90
R3/32 X 3/16	9400	65.00	9050	61.80	8600	29.50
R1/8 X 1/4	8600	68.90	8250	65.70	7850	27.60
R5/32 X 5/16	7000	61.00	6700	57.50	6350	25.60
R3/16 X 3/8	6050	57.10	5800	53.50	5450	24.40
R1/4 X 1/2	5450	55.90	5200	52.40	4900	24.00
R5/16 X 5/8	4350	48.40	4150	44.50	3900	10.40
R3/8 X 3/4	3500	39.40	3300	35.40	3150	8.70
R1/2 X 1	2800	39.40	2640	35.40	2520	8.70

RPM=rev. / min.  
FEED=inch / min.

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

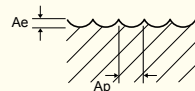


## ■ DA512, DA302 series ▶ General Speed Cutting

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(inch)	RPM	FEED	RPM	FEED	RPM	FEED
R1/64 X 1/32	15760	9.80	12720	7.80	5800	3.80
R1/32 X 1/16	15760	13.80	12140	1.60	5320	4.70
R3/64 X 3/32	14400	29.50	10700	19.30	4680	5.90
R1/16 X 1/8	13100	26.70	10000	18.10	4520	5.90
R3/32 X 3/16	9140	32.30	7300	22.80	3680	7.10
R1/8 X 1/4	7780	33.00	6300	24.80	3160	7.50
R5/32 X 5/16	5260	37.50	4420	26.00	2100	7.50
R3/16 X 3/8	4620	40.10	3780	28.00	1780	7.50
R1/4 X 1/2	3780	35.40	2940	26.00	1360	7.50
R5/16 X 5/8	2740	36.20	2320	26.00	1160	7.50
R3/8 X 3/4	2100	33.00	1900	25.00	840	7.50

RPM=rev. / min.  
FEED=inch / min.

Ae: D1/32~D1/4=.008inch  
D5/16~D3/4=.012inch  
Ap: 0.2 X D



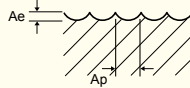
Ae: D1/32~D1/4=.008inch  
D5/16~D3/4=.012inch  
Ap: 0.1 X D

## ■ DA512, DA302 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(inch)	RPM	FEED	RPM	FEED
R1/64 X 1/32	25000	25.60	12720	15.70
R1/32 X 1/16	23000	27.50	12140	16.90
R3/64 X 3/32	21000	34.60	10700	19.30
R1/16 X 1/8	21000	39.40	10000	20.50
R3/32 X 3/16	21000	70.90	7300	23.60
R1/8 X 1/4	21000	90.90	6300	24.80
R5/32 X 5/16	15760	111.80	4420	29.10
R3/16 X 3/8	13660	120.00	3780	33.00
R1/4 X 1/2	10500	103.50	2940	33.00
R5/16 X 5/8	8200	103.50	2320	28.00
R3/8 X 3/4	6300	99.00	1900	20.80

RPM=rev./min.  
FEED=inch/min.

Ae: D1/32~D1/4=.008 inch  
D5/16~D3/4=.012 inch  
Ap: 0.05 X D

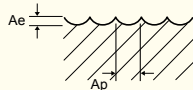


## ■ DA514 series ▶ General Speed Cutting

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(inch)	RPM	FEED	RPM	FEED	RPM	FEED
R1/16 X 1/8	13100	40.10	10000	27.00	4520	8.85
R3/32 X 3/16	9140	48.50	7300	34.00	3680	10.50
R1/8 X 1/4	7780	49.50	6300	37.00	3160	11.25
R5/32 X 5/16	5260	56.00	4420	39.00	2100	11.25
R3/16 X 3/8	4620	60.00	3780	42.00	1780	11.25
R1/4 X 1/2	3780	53.00	2940	39.00	1360	11.25
R5/16 X 5/8	2740	54.50	2320	38.50	1160	11.25

RPM=rev./min.  
FEED=inch/min.

Ae: D1/8~D1/4=.008 inch  
D5/16~D5/8=.012 inch  
Ap: 0.02 X D



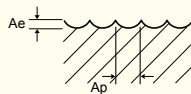
Ae: D1/8~D1/4=.008 inch  
D5/16~D5/8=.012 inch  
Ap: 0.1 X D

## ■ DA514 series ▶ High Speed Cutting

MATERIAL	NON-ALLOYED STEELS ALLOY STEELS · CAST IRON		ALLOY STEELS HEAT RESISTANT STEELS	
HARDNESS	~ HRc45		HRc45 ~ HRc65	
STRENGTH	~ 1500N/mm <sup>2</sup>		~ 1500N/mm <sup>2</sup>	
DIAMETER(inch)	RPM	FEED	RPM	FEED
R1/16 X 1/8	21000	59.00	17000	30.50
R3/32 X 3/16	21000	106.25	12000	35.50
R1/8 X 1/4	21000	136.50	10500	37.00
R5/32 X 5/16	15760	167.50	7800	43.50
R3/16 X 3/8	13660	180.00	6300	49.50
R1/4 X 1/2	10500	155.50	5260	49.50
R5/16 X 5/8	8200	155.50	3780	42.00

RPM=rev. / min.  
FEED=inch / min.

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

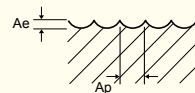


## ■ DA522 series ▶ General Speed Cutting

MATERIAL	ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS		HARDENED STEELS	
HARDNESS	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(inch)	RPM	FEED	RPM	FEED	RPM	FEED
R1/16 X 1/8	10000	18.10	12700	43.30	12300	41.30
R3/32 X 3/16	7300	22.80	9400	43.30	9050	41.30
R1/8 X 1/4	6300	24.80	8600	45.30	8250	43.30
R5/32 X 5/16	4420	26.00	7000	41.30	6700	39.40
R3/16 X 3/8	3780	28.00	6050	39.40	5800	37.80
R1/4 X 1/2	2940	26.00	5450	39.40	5200	37.80
R5/16 X 5/8	2320	26.00	4350	34.30	4150	32.70
R3/8 X 3/4	1900	25.00	3500	27.20	3300	25.60
R1/2 X 1	1520	25.00	2800	27.20	2650	25.60

RPM=rev. / min.  
FEED=inch / min.

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

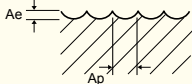


Ae: D1/8=.006  
D3/16~D5/16=.010  
D3/8~D1=.012  
Ap: 0.1 X D

## ■ DA522 series ▶ High Speed Cutting

MATERIAL	ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS		HARDENED STEELS	
HARDNESS	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(inch)	RPM	FEED	RPM	FEED	RPM	FEED
R1/16 X 1/8	21000	39.40	12700	68.90	12300	65.70
R3/32 X 3/16	21000	70.90	9400	65.00	9050	61.80
R1/8 X 1/4	21000	90.90	8600	69.00	8250	65.70
R5/32 X 5/16	15760	111.80	7000	61.00	6700	57.50
R3/16 X 3/8	13660	120.10	6050	57.10	5800	53.50
R1/4 X 1/2	10500	103.50	5450	55.90	5200	52.40
R5/16 X 5/8	8200	103.50	4350	48.40	4150	44.50
R3/8 X 3/4	6300	99.20	3500	39.40	3300	35.40
R1/2 X 1	5040	99.20	2800	39.40	2650	35.40

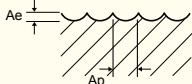
  

RPM=rev. / min. FEED=inch / min.  Ae: D1/8~D1/4=008 D5/16~D1=.012 Ap: 0.05 X D		Ae: D1/8=.006 D3/16~D5/16=.010 D3/8~D1=.012 Ap: 0.05 X D
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## ■ MD502 series ▶ High Speed Cutting

MATERIAL	NON-ALLOYED STEELS ALLOY STEELS · CAST IRON		ALLOY STEELS HEAT RESISTANT STEELS	
HARDNESS	HRc30 ~ HRc45		HRc45 ~ HRc55	
STRENGTH	1000 ~ 1500N/mm <sup>2</sup>		1500 ~ 2000N/mm <sup>2</sup>	
DIAMETER(inch)	RPM	FEED	RPM	FEED
R.012X.024	30000	23.60	30000	11.80
R.0155X.031	27000	25.60	27000	15.00
R.020X.040	25000	25.60	25000	15.70
R.0235X.047	24000	26.40	24000	16.50
R.031X.062	23000	27.60	23000	16.90

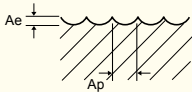
  

RPM=rev. / min. FEED=inch / min.  D < .040 Ae: 0.05 X D Ap: 0.15 X D D ≥ .040 Ae: 0.075 X D Ap: 0.15 X D		D < .040 Ae: 0.05 X D Ap: 0.1 X D D ≥ .040 Ae: 0.05 X D Ap: 0.15 X D
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## ■ DA542 series ▶ General Speed Cutting

MATERIAL	ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS		HARDENED STEELS	
HARDNESS	HRc30 ~ HRc40		HRc45 ~ 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(inch)	RPM	FEED	RPM	FEED	RPM	FEED
R1/32 X 1/16	97000	8.30	13800	19.90	13600	17.90
R1/16 X 1/8	8000	14.60	10200	34.60	9800	33.50
R3/32 X 3/16	5840	18.10	7500	34.60	7200	33.50
R1/8 X 1/4	5040	19.70	6900	36.20	6500	34.60
R5/32 X 5/16	3540	20.90	5600	33.10	5300	31.50
R3/16 X 3/8	3020	22.40	4850	31.50	4650	30.30
R1/4 X 1/2	2350	20.90	4350	31.50	4150	30.30

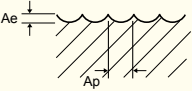
  

RPM=rev. / min. FEED=inch / min.	Ae: D1/16~D1/4=.008 D5/16~D1/2=.012 Ap: 0.2 X D		Ae: D1/16~D1/8=0.05 X D D3/16~D5/16=.010 D3/8~D1/2=.012 Ap: 0.1 X D
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## ■ DA542 series ▶ High Speed Cutting

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(inch)	RPM	FEED	RPM	FEED	RPM	FEED
R1/32 X 1/16	18400	21.90	13800	28.90	13600	30.10
R1/16 X 1/8	16800	31.50	10200	55.10	9800	51.20
R3/32 X 3/16	16800	56.70	7500	52.00	7200	49.20
R1/8 X 1/4	16800	72.80	6900	55.10	6500	53.10
R5/32 X 5/16	12600	89.40	5600	49.20	5300	45.30
R3/16 X 3/8	10930	96.10	4850	45.30	4650	43.30
R1/4 X 1/2	8400	82.70	4350	44.50	4150	41.30

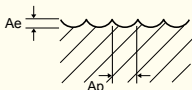
  

RPM=rev. / min. FEED=inch / min.	Ae: D1/16~D1/4=.008 D5/16~D1/2=.012 Ap: 0.05 X D		Ae: D1/16~D1/8=0.05 X D D3/16~D5/16=.010 D3/8~D1/2=.012 Ap: 0.05 X D
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■ **DA552 series** ▶ General Speed Cutting

MATERIAL	ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS		HARDENED STEELS	
HARDNESS	HRc30 ~ HRc40		HRc45 ~ 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(inch)	RPM	FEED	RPM	FEED	RPM	FEED
R3/32 X3/16	4670	14.50	6000	27.70	5760	26.80
R1/8 X 1/4	4030	15.80	5520	29.00	5200	27.70
R5/32 X 5/16	2830	16.70	4480	26.50	4240	25.20
R3/16 X 3/8	2420	17.90	3880	25.20	3720	24.20
R1/4 X 1/2	1880	16.70	3480	25.20	3320	24.20

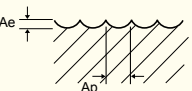
  

<p>RPM=rev. / min. FEED=inch / min.</p> <p>Ae: D3/16~D1/4=.008 D5/16~D1/2=.012 Ap: 0.2 X D</p>	 <p>Ae: D3/16~D5/16=.010 D3/8~D1/2=.012 Ap: 0.1 X D</p>
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■ **DA552 series** ▶ High Speed Cutting

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(inch)	RPM	FEED	RPM	FEED	RPM	FEED
R3/32 X3/16	13440	45.40	6000	41.60	5760	39.40
R1/8 X 1/4	13440	58.20	5520	44.10	5200	42.50
R5/32 X 5/16	10080	71.50	4480	39.40	4240	36.20
R3/16 X 3/8	8740	76.90	3880	36.30	3720	34.60
R1/4 X 1/2	6720	66.20	3480	35.60	3320	33.00

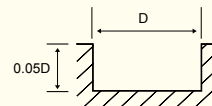
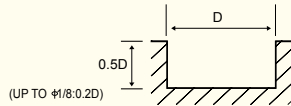
  

<p>RPM=rev. / min. FEED=inch / min.</p> <p>Ae: D3/16~D1/4=.008 D5/16~D1/2=.012 Ap: 0.5 X D</p>	 <p>Ae: D3/16~D5/16=.010 D3/8~D1/2=.012 Ap: 0.05 X D</p>
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## ■ ZA302, ZA502 series

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(inch)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1/16	11560	11560	7560	4.70	6300	3.55	5040	1.40		
1/8	8920	8920	5560	5.50	4620	4.70	3360	1.55	1900	1.55
3/16	6300	6300	3780	7.50	3160	6.30	2320	1.95	1260	1.55
1/4	5560	5560	3360	8.65	2840	7.10	2000	2.15	1100	1.55
5/16	4200	4200	2520	7.85	2100	7.10	1680	2.95	840	1.55
3/8	3260	3260	2000	6.30	1680	6.30	1360	2.35	680	1.40
1/2	2740	2740	1680	5.10	1360	5.10	1160	2.15	560	1.40
5/8	2200	2200	1360	4.30	1060	4.30	900	1.55	440	0.80
3/4	1680	1680	1060	3.15	840	3.15	680	1.20	320	0.80
1	1360	1360	840	2.75	680	2.35	540	0.80	260	0.60

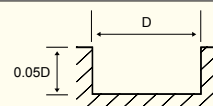
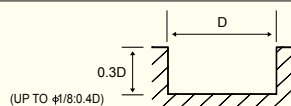
RPM=rev. / min.  
FEED=inch / min.



## ■ ZA522 series ▶ General Speed Cutting

MATERIAL	CARBON STEELS ALLOY STEELS-CAST IRON		ALLOY STEELS TOOL 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(inch)	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

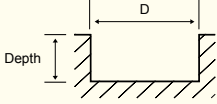
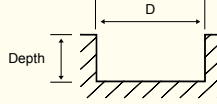
RPM=rev. / min.  
FEED=inch / min.



## ■ MZ502 series ▶ High Speed Cutting

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(inch)	RPM	FEED	RPM	FEED
.016	30000	23.60	23000	3.90
.031	27000	25.60	18000	5.10
.040	25000	25.60	15000	5.90
.047	24000	26.40	12000	5.90
.062	23000	27.60	9000	5.50

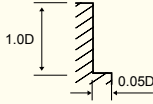
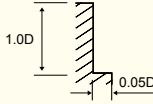
  

RPM=rev./min. FEED=inch./min.	<p>D &lt; .040 Depth=0.15 X D D ≥ .040 Depth=0.25 X D</p> 	<p>D &lt; .040 Depth=0.02 X D D ≥ .040 Depth=0.05 X D</p> 
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## ■ ZA304, ZA504 series

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(inch)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1/16	11560	11.00	7560	6.70	6300	5.50	5040	1.95		
1/8	8920	12.60	5560	7.85	4620	6.70	3360	2.35	1900	2.35
3/16	6300	23.60	3780	14.15	3160	11.80	2320	2.75	1260	2.35
1/4	5560	26.00	3360	16.15	2840	13.00	2000	3.15	1100	2.35
5/16	4200	27.95	2520	14.95	2100	13.80	1680	4.30	840	2.35
3/8	3260	24.00	2000	11.80	1680	11.80	1360	3.55	680	1.95
1/2	2740	20.50	1680	9.85	1360	9.45	1160	3.15	560	1.95
5/8	2200	16.15	1360	7.85	1060	7.85	900	2.35	440	1.20
3/4	1680	12.60	1060	6.30	840	5.90	680	1.55	320	1.20
1	1360	9.85	840	5.10	680	4.70	540	1.20	260	0.80

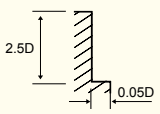
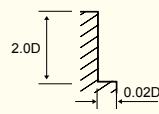
RPM=rev./min. FEED=inch./min.		
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## ■ ZA524 series ▶ General Speed Cutting

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(inch)	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

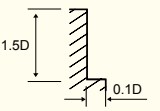
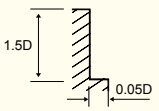
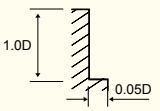
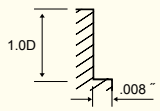
  

<p>RPM=rev. / min. FEED=inch / min.</p> 	
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## ■ ZA506 & 8 series ▶ General Speed Cutting

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(inch)	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

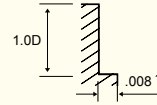
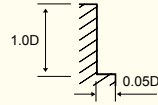
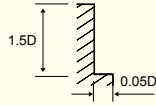
  

<p>RPM=rev. / min. FEED=inch / min.</p> 			
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## ■ ZA506 & 8 series ▶ High Speed Cutting

MATERIAL	CARBON STEELS TOOL STEELS		HARDENED STEELS		HARDENED STEELS	
HARDNESS	~ HRc50		HRc50 ~ HRc60		HRc60 ~	
STRENGTH	1750N/mm <sup>2</sup>		1750~ 2080N/mm <sup>2</sup>		2080N/mm <sup>2</sup>	
DIAMETER(inch)	RPM	FEED	RPM	FEED	RPM	FEED
1/8	16800	240.00	8400	120.00	4200	58.00
3/16	12600	240.00	6300	120.00	3160	58.00
1/4	9980	235.00	5040	120.00	2520	58.00
5/16	8400	199.00	4200	100.00	2100	50.00
3/8	6300	149.00	3160	75.00	1580	37.00
1/2	5040	120.00	2520	58.00	1260	30.00
5/8	3790	75.00	1890	38.00	950	19.00

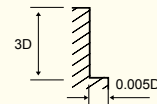
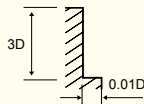
RPM=rev. / min.  
FEED=inch / min.



## ■ ZA526 & 8 series ▶ General Speed Cutting

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(inch)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1/4	2230	19.00	1670	14.00	1390	10.00	1110	8.00
5/16	1670	18.00	1250	13.00	1050	9.50	840	7.00
3/8	1330	17.00	1000	12.00	840	9.00	680	6.30
1/2	1110	16.00	840	11.00	690	8.50	560	6.00
5/8	840	13.00	630	9.00	530	6.50	420	5.00
3/4	670	11.00	500	8.00	420	6.00	320	4.70
1	540	9.50	400	6.50	340	5.00	270	3.70

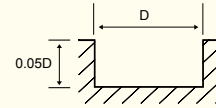
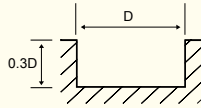
RPM=rev. / min.  
FEED=inch / min.



## ■ ZR502A, ZR522A, ZR532A series ▶ General Speed Cutting

MATERIAL	CARBON STEELS ALLOY STEELS · CAST IRON		ALLOY STEELS TOOL STEELS		HARDENED STEELS		HARDENED STEELS	
HARDNESS	~ HRc30		HRc30 ~ HRc38		HRc45 ~ HRc55		HRc55 ~ HRc65	
STRENGTH	~ 1000N/mm <sup>2</sup>		1000 ~ 1200N/mm <sup>2</sup>		1400 ~ 2000N/mm <sup>2</sup>		2000N/mm <sup>2</sup>	
DIAMETER(inch)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1/4	2630	4.90	2100	4.20	1370	2.00	1160	1.40
5/16	2000	5.30	1580	4.20	1050	2.00	840	1.40
3/8	1680	5.30	1370	4.20	840	2.00	670	1.40
1/2	1370	4.20	1160	3.80	700	1.50	550	1.00

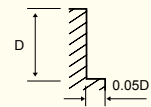
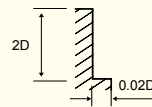
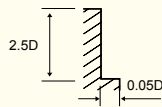
RPM=rev. / min.  
FEED=inch / min.



## ■ ZR504A, ZR524A, ZR534A series ▶ General Speed Cutting

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(inch)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1/4	2630	8.50	2100	7.10	1370	3.30	1160	2.00
5/16	2000	9.00	1580	7.10	1050	3.30	840	2.00
3/8	1680	9.00	1370	7.10	840	3.30	670	2.00
1/2	1370	7.10	1160	6.30	700	2.80	550	1.50

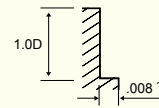
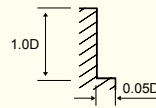
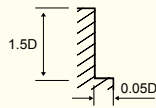
RPM=rev. / min.  
FEED=inch / min.



## ■ ZR506(8)A 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>		1750N/mm <sup>2</sup>		2080N/mm <sup>2</sup>	
DIAMETER(inch)	RPM	FEED	RPM	FEED	RPM	FEED
1/4	16800	240.00	8400	120.00	4200	58.00
5/16	12600	240.00	6300	120.00	3200	58.00
3/8	10000	235.00	5000	120.00	2500	58.00
1/2	8400	200.00	4200	100.00	2100	50.00
5/8	6300	150.00	3150	75.00	1600	37.00
3/4	5000	120.00	2500	58.00	1260	30.00

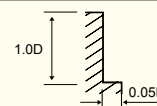
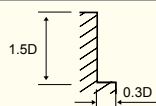
RPM=rev. / min.  
FEED=inch / min.



## ■ FA50 series ▶ General Speed Cutting

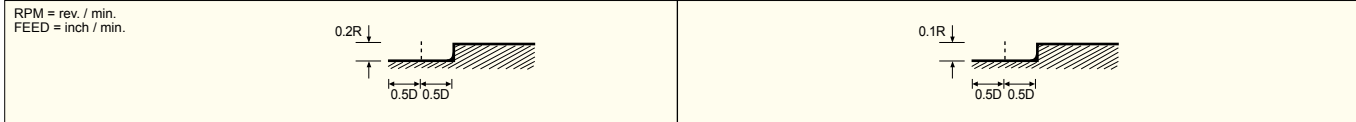
MATERIAL	NON-ALLOYED STEELS ALLOY STEELS · CAST IRON		ALLOY STEELS HEAT RESISTANT STEELS		ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS		HARDENED STEELS	
HARDNESS	~ HRc30		HRc30 ~ HRc38		HRc38 ~ HRc45		HRc45 ~ HRc55		HRc55 ~ HRc65	
STRENGTH	~ 1000N/mm <sup>2</sup>		1000 ~ 1200N/mm <sup>2</sup>		1200 ~ 1400N/mm <sup>2</sup>		1400 ~ 2000N/mm <sup>2</sup>		2000N/mm <sup>2</sup>	
DIAMETER(inch)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1/4	15600	91.35	12400	33.10	8400	22.45	3400	10.25	2400	7.50
5/16	11600	91.35	9200	33.10	6300	22.45	2400	9.50	1800	7.10
3/8	9200	91.35	7600	33.10	5100	22.45	2000	11.40	1300	7.50
1/2	8000	94.50	6000	31.50	4200	22.45	1680	10.25	1200	7.50
5/8	6000	94.50	4800	29.90	3300	20.05	1200	6.30	800	4.35
3/4	5200	91.35	4400	28.35	2700	16.55	1100	5.90	700	3.95
1	4800	85.05	3600	22.05	2400	14.15	1000	5.90	660	3.95

RPM=rev. / min.  
FEED=inch / min.



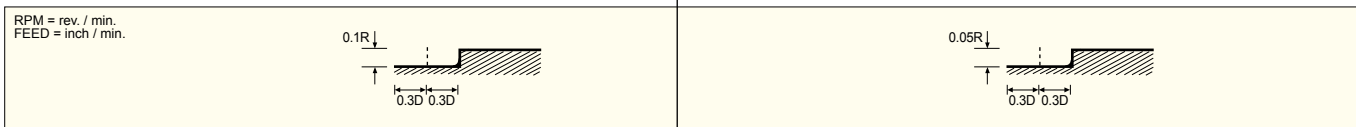
## ■ ZSPM ...-.. series (GENERAL SPEED M/C), Fractional

MATERIAL	HARDENED STEELS									
	~ HRc40		HRc40 ~ HRc50		HRc50 ~ HRc55		HRc55 ~ HRc60		HRc60 ~ HRc65	
	D X R(Fractional)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM
1/8	9,070	243	6,550	155	4,320	103	2,710	43	1,800	23
3/16	6,680	232	4,830	152	3,360	106	2,140	45	1,470	23
1/4	5,450	283	3,850	182	2,740	130	1,740	69	1,270	30
5/16	4,350	300	3,050	193	2,200	138	1,400	73	995	31
3/8	3,670	316	2,570	200	1,840	145	1,160	76	840	33
1/2	2,740	284	1,940	182	1,370	130	870	69	630	30



## ■ ZSPM ...-.. series (HIGH SPEED M/C), Fractional

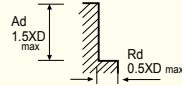
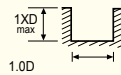
MATERIAL	HARDENED STEELS									
	~ HRc40		HRc40 ~ HRc50		HRc50 ~ HRc55		HRc55 ~ HRc60		HRc60 ~ HRc65	
	D X R(Fractional)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM
1/8	20,800	590	16,000	370	11,800	298	8,970	170	6,520	9
3/16	14,280	578	10,900	394	9,250	304	6,720	180	4,700	96
1/4	12,700	685	9,870	508	8,460	405	6,000	236	4,230	133
5/16	10,000	728	8,000	551	6,800	433	4,800	264	3,400	160
3/8	8,400	768	6,720	579	5,670	453	4,000	280	2,850	157
1/2	6,230	687	5,000	520	4,250	408	3,020	260	2,120	134



## ■ X-STAR series, Fractional

WORKPIECE	LOW CARBON STEELS		LOW CARBON STEELS		MED ALLOY STEELS		MOLD&DIE STEELS		CAST IRON-GRAY		CAST IRON-DUCTILE	
HARDNESS	~HB175		~HB275		~HB275		~HB275		~HB200		~HB300	
D(Fractional)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1/8	15585	12	12835	10	10695	8	5500	4	14515	11	7335	5
3/16	10360	20	8560	17	7150	14	3670	8	9690	19	4880	9
1/4	7795	24	6420	20	5350	17	2750	8	7260	23	3665	11
5/16	6235	29	5135	24	4280	20	2200	10	5805	27	2935	14
3/8	5195	39	4280	32	3565	27	1835	13	4840	36	2445	18
7/16	4455	38	3665	31	3055	26	1570	13	4145	35	2095	18
1/2	3895	37	3210	30	2675	25	1375	13	3630	34	1835	17
9/16	3465	35	2850	29	2375	24	1220	12	3225	32	1630	16
5/8	3115	33	2565	27	2140	23	1100	11	2905	31	1465	15
3/4	2600	31	2140	25	1785	21	915	11	2420	29	1220	14
1	1950	25	1605	21	1335	17	690	9	1815	24	915	12

RPM = rev. / min.  
FEED = inch / min.

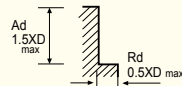
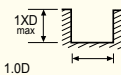


- ※ Use a rigid and precise machines and holders.
- ※ Use a suitable cutting oil.

## ■ X-STAR series, Fractional

WORKPIECE	CAST IRON-MALLEABLE		STAINLESS 300 SERIES		STAINLESS 400 SERIES		STAINLESS PH SERIES		TITANIUM ALLOYS		HIGH TEMP ALLOYS	
HARDNESS	~HB300		~HB275		~HB185		~HB325		~HB295		~HB300	
D(Fractional)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1/8	4585	4	9170	7	12835	10	7640	5	9170	9	2445	2
3/16	3070	6	6080	12	8550	17	5080	10	6080	14	1600	3
1/4	2290	7	4585	14	6420	22	3820	12	4585	16	1220	3
5/16	1835	8	3665	16	5135	25	3055	14	3665	18	980	4
3/8	1530	11	3055	16	4280	25	2545	14	3055	18	815	4
7/16	1310	11	2620	16	3665	25	2185	14	2620	18	700	4
1/2	1145	11	2290	16	3210	25	1910	14	2290	18	610	4
9/16	1020	10	2035	20	2850	29	1700	17	2035	20	545	6
5/8	915	9	1835	16	2565	25	1530	14	1835	18	490	4
3/4	765	9	1520	15	2410	22	1275	12	1520	16	400	4
1	575	7	1145	15	1605	22	955	12	1145	16	305	3

RPM = rev. / min.  
FEED = inch / min.

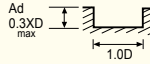


- ※ Use a rigid and precise machines and holders.
- ※ Use a suitable cutting oil.

## ■ X-STAR series (Slotting), Fractional

WORKPIECE	HARDENED STEELS	
HARDNESS	HRc30~45	
D(Fractional)	RPM	FEED
1/8	6573	16
3/16	4382	16
1/4	3287	17
5/16	2629	17
3/8	2191	17
7/16	1878	17
1/2	1643	16
9/16	1461	16
5/8	1315	16
3/4	1096	17
1	822	16

RPM = rev. / min.  
 FEED = inch / min.

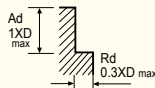


- ※ Use a rigid and precise machines and holders.
- ※ Use a suitable cutting oil.

## ■ X-STAR series (Side Cutting), Fractional

WORKPIECE	HARDENED STEELS	
HARDNESS	HRc30~45	
D(Fractional)	RPM	FEED
1/8	6573	16
3/16	4382	16
1/4	3287	17
5/16	2629	17
3/8	2191	17
7/16	1878	17
1/2	1643	16
9/16	1461	16
5/8	1315	16
3/4	1096	17
1	822	16

RPM = rev. / min.  
 FEED = inch / min.

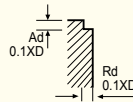


- ※ Use a rigid and precise machines and holders.
- ※ Use a suitable cutting oil.

## ■ X-STAR series (High Speed Cutting), Fractional

WORKPIECE	HARDENED STEELS		
	HARDNESS D(Fractional)	HRc30~45	
		RPM	FEED
1/8	17121	75	
3/16	11414	78	
1/4	8561	75	
5/16	6848	77	
3/8	5707	75	
7/16	4892	76	
1/2	4280	75	
9/16	3805	75	
5/8	3424	75	
3/4	2854	75	
1	2140	73	

RPM = rev. / min.  
FEED = inch / min.

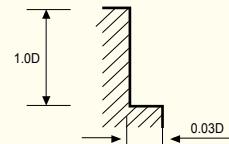
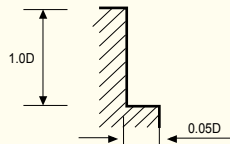


- ※ Use a rigid and precise machines and holders.
- ※ Use a suitable cutting oil.

## ■ ZE716A, ZR706A series

MATERIAL	HARDENED STEELS HEAT RESISTANT STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS	
	HRc30~ HRc40	HRc40~ HRc50	HRc50~ HRc55	HRc55~ HRc60	HRc60~ HRc65	HRc65~ HRc70	RPM	FEED	RPM	FEED	RPM	FEED
6(1/4)	24800	5350	23500	4900	16000	4900	13500	3300	10500	2100	8000	1450
8(5/16)	20000	5500	19000	5000	12000	4600	10000	3100	8000	2000	6000	1400
10(3/8)	16000	4900	15500	4500	9500	4100	8000	2900	6400	1800	4800	1300
12(1/2)	13000	4500	12500	4100	8000	3800	6600	2500	5300	1600	4000	1150
16(5/8)	10000	4000	9700	3700	6000	3400	5000	2300	4000	1250	3000	870
20(3/4)	8000	3350	7800	3400	4800	3200	4000	2100	3200	1020	2400	690

RPM = rev. / min.  
FEED = inch / min.

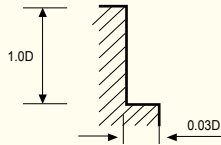




## ■ ZE712A series ▶ Side Cutting

MATERIAL	HARDENED STEELS HEAT RESISTANT STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS	
	HARDNESS	HRc30~ HRc40	HRc40~ HRc50		HRc50~ HRc55		HRc55~ HRc60		HRc60~ HRc65		HRc65~ HRc70	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1	48000	1050	38000	820	25500	510	20500	310	16000	190	12500	125
2(1/16)	33300	1200	26000	970	17500	600	14500	370	11000	230	9500	165
3(1/8)	21800	1200	17300	970	11500	600	9500	370	7500	230	6400	165
4	16700	1250	13200	1000	8800	625	7200	385	5600	240	4750	170
5(3/16)	15700	1450	12500	1150	8300	710	6400	410	5100	260	4450	190
6(1/4)	13100	1350	10350	1100	6900	690	5300	400	4200	255	3700	185
8(5/16)	9880	1320	7800	1030	5200	635	4000	365	3200	235	2800	170
10(3/8)	7800	1200	6150	970	4100	590	3200	340	2550	220	2200	160
12(1/2)	6650	1200	5250	970	3500	590	2650	340	2100	220	1860	160
16	4900	1050	3900	840	2600	520	2000	300	1600	190	1400	140
20	3900	950	3100	750	2050	475	1600	275	1300	175	1100	125

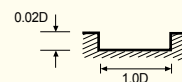
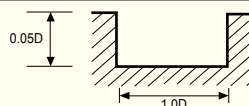
RPM = rev. / min.  
FEED = inch / min.



## ■ ZE712A series ▶ Slotting

MATERIAL	HARDENED STEELS HEAT RESISTANT STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS	
	HARDNESS	HRc30~ HRc40	HRc40~ HRc50		HRc50~ HRc55		HRc55~ HRc60		HRc60~ HRc65		HRc65~ HRc70	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
0.2	50000	130	45000	115	40000	95	33000	310	16000	190	12500	125
0.3	50000	190	45000	140	40000	115	33000	370	11000	230	9500	165
0.4	50000	235	45000	180	40000	140	33000	370	7500	230	6400	165
0.5	50000	370	45000	280	40000	220	33000	385	5600	240	4750	170
0.6	50000	470	45000	360	40000	285	30000	410	5100	260	4450	190
0.8	50000	600	40000	440	30000	295	25000	400	4200	255	3700	185
0.9	49000	655	39000	520	27800	330	22700	365	3200	235	2800	170
1	48000	750	38000	570	25500	360	20500	340	2550	220	2200	160
2(1/16)	33300	850	26000	680	17500	420	14500	340	2100	220	1860	160
3(1/8)	21800	850	17300	680	11500	420	9500	300	1600	190	1400	140
4	16700	880	13200	700	8800	440	7200	275	1300	175	1100	125
5(3/16)	15700	1000	12500	805	8300	500	6400	0	0	0	0	0
6(1/4)	13100	950	10350	770	6900	480	5300	0	0	0	0	0
8(5/16)	9880	930	7800	720	5200	445	4000	0	0	0	0	0
10(3/8)	7800	850	6150	680	4100	415	3200	0	0	0	0	0
12(1/2)	6650	850	5250	680	3500	415	2650	0	0	0	0	0
16	4900	730	3900	580	2600	365	2000	0	0	0	0	0
20	3900	660	3100	525	2050	335	1600	0	0	0	0	0

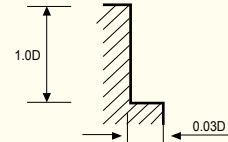
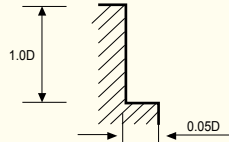
RPM = rev. / min.  
FEED = inch / min.



## ■ ZE714A series ▶ Side Cutting

MATERIAL	HARDENED STEELS HEAT RESISTANT STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS	
	HRC30~ HRC40		HRC40~ HRC50		HRC50~ HRC55		HRC55~ HRC60		HRC60~ HRC65		HRC65~ HRC70	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1	48000	1480	38000	1050	25500	710	20500	430	16000	270	12500	175
2(1/16)	33300	1750	26000	1250	17500	840	14500	520	11000	320	9500	230
3(1/8)	21800	1750	17300	1250	11500	840	9500	520	7500	320	6400	230
4	16700	1800	13200	1300	8800	880	7200	540	5600	335	4750	240
5(3/16)	15700	2000	12500	1500	8300	1000	6400	580	5100	370	4450	270
6(1/4)	13100	1950	10350	1400	6900	950	5300	560	4200	350	3700	260
8(5/16)	9880	1880	7800	1350	5200	900	4000	520	3200	330	2800	240
10(3/8)	7800	1750	6150	1260	4100	840	3200	480	2550	310	2200	220
12(1/2)	6650	1750	5250	1260	3500	840	2650	480	2100	300	1860	220
16	4900	1500	3900	1100	2600	730	2000	420	1600	270	1400	200
20	3900	1300	3100	970	2050	650	1600	380	1300	250	1100	180

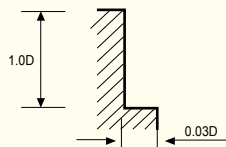
RPM = rev. / min.  
FEED = inch / min.



## ■ ZS204A series ▶ Side Cutting

MATERIAL	HARDENED STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS	
	HRC40~ HRC50		HRC50~ HRC55		HRC55~ HRC60		HRC60~ HRC65		HRC65~ HRC70	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
4(3/16)	17200	1690	11440	1140	9360	700	7280	430	6170	310
6(1/4)	13450	1820	8970	1230	6890	720	5460	450	4810	330
8(5/16)	9100	1750	6760	1170	5200	670	4160	420	3640	310
10(3/8)	8000	1630	5330	1090	4160	620	3320	400	2860	280
12(1/2)	6830	1630	4550	1010	3450	580	2730	370	2420	260

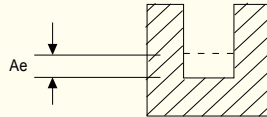
RPM = rev. / min.  
FEED = inch / min.



## ZSLNS20, ZSLNS40 series

MATERIAL	ALLOY STEELS HEAT RESISTANT STEELS			HARDENED STEELS			HARDENED STEELS			COPPER		
HARDNESS	HRc 30~ HRc 45			HRc 45~ HRc 55			HRc 55~ HRc 65					
DIAMETER(mm)	RPM	FEED	Ae(mm)	RPM	FEED	Ae(mm)	RPM	FEED	Ae(mm)	RPM	FEED	Ae(mm)
0.4	34100-50000	350-590	0.005-0.028	30500-35200	295-340	0.003-0.020	18300-24600	120-200	0.002-0.012	48000-50000	790-920	0.008-0.048
0.5	25650-33000	370-470	0.006-0.035	23750-26000	285-315	0.004-0.025	14200-18000	115-130	0.003-0.015	44000-50000	800-1150	0.010-0.060
0.6	20900-35200	330-560	0.007-0.030	19900-22000	260-290	0.005-0.021	11900-15500	100-120	0.003-0.013	37500-50000	770-1250	0.011-0.051
0.8	16150-26400	360-590	0.009-0.040	15200-16700	280-310	0.006-0.028	9000-11700	110-125	0.004-0.017	28500-47000	770-1300	0.015-0.068
1.0	12300-18700	350-540	0.011-0.028	10500-11500	250-280	0.008-0.020	6300-8050	100-115	0.005-0.012	22500-34000	810-1300	0.018-0.048
1.2	10450-17600	350-590	0.025-0.070	9100-10000	250-280	0.015-0.042	5400-7000	100-115	0.009-0.026	22500-31500	950-1350	0.036-0.101
1.5	9100-17600	430-830	0.017-0.077	7000-8000	250-280	0.012-0.055	4300-5500	100-115	0.007-0.033	14500-25000	770-1320	0.028-0.132
2.0	6350-10550	340-570	0.021-0.140	6100-6700	270-300	0.015-0.100	3600-4700	100-120	0.009-0.060	11500-18500	770-1250	0.036-0.240
3.0	4300-7050	550-900	0.056-0.210	3990-4600	445-515	0.040-0.150	2400-3200	105-310	0.024-0.090	9000-13000	1400-2110	0.096-0.360
4.0	3200-5300	400-675	0.074-0.280	3000-3400	335-380	0.053-0.200	1800-2400	75-230	0.032-0.120	6750-9750	1050-1575	0.128-0.480

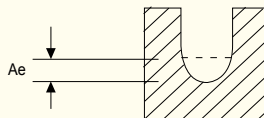
RPM = rev. / min.  
FEED = mm / min.



## ZSLNB series

MATERIAL	ALLOY STEELS HEAT RESISTANT STEELS			HARDENED STEELS			HARDENED STEELS			COPPER		
HARDNESS	HRc30~ HRc45			HRc45~ HRc55			HRc55~ HRc65					
DIAMETER(mm)	RPM	FEED	Ae(mm)	RPM	FEED	Ae(mm)	RPM	FEED	Ae(mm)	RPM	FEED	Ae(mm)
0.5	34100-49500	600-870	0.007-0.028	31900-35200	490-540	0.005-0.023	31900-35200	440-480	0.005-0.021	49000-50000	1100-1400	0.010-0.042
0.6	28600-40700	590-850	0.007-0.034	26400-29700	480-540	0.006-0.028	26400-29700	400-480	0.006-0.025	42000-50000	1100-1700	0.011-0.050
0.8	22000-30800	640-890	0.016-0.064	19800-22000	490-550	0.013-0.052	19800-22000	440-500	0.012-0.048	31000-50000	1100-2250	0.024-0.096
1.0	17600-24200	600-850	0.008-0.080	15400-17600	470-540	0.007-0.065	15400-17600	440-500	0.006-0.060	24000-49500	1100-2200	0.012-0.120
1.2	14300-18700	590-780	0.024-0.032	12000-14000	480-540	0.020-0.026	12000-14000	420-480	0.018-0.024	28500-38500	1480-1950	0.036-0.048
1.5	11000-14300	580-760	0.031-0.048	10000-11500	480-540	0.025-0.039	10000-11500	420-480	0.023-0.036	17000-28500	1100-1950	0.046-0.072
2.0	8500-11000	590-800	0.024-0.160	7900-8800	470-530	0.020-0.130	7900-8800	440-480	0.018-0.120	12600-24000	1100-2150	0.036-0.240
3.0	5700-8200	730-1000	0.064-0.24	5300-5800	590-650	0.052-0.195	5300-5800	550-620	0.048-0.120	11900-17000	1850-2700	0.096-0.360
4.0	4300-6200	680-990	0.080-0.320	3950-4400	550-620	0.065-0.260	3850-4400	530-570	0.060-0.240	6600-12500	1260-2500	0.120-0.480

RPM = rev. / min.  
FEED = mm / min.



# ZSTNB series

END MILLS  
> Metric/Inch

Technical Data

Work					Carbon Steels, Alloy Steels (180~250HB)	Pre-harden Steels (35~45HRC)	Hardened Steels (45~55HRC)	Hardened Steels (55~65HRC)				
Ratio to standard depth of cut					Depth of Cut X 100%	Depth of Cut X 80%	Depth of Cut X 65%	Depth of Cut X 60%				
R (mm)	Mill Dia (mm)	Neck Length (mm)	Neck Angle (°)	Depth of Cut (mm)	n (min <sup>-1</sup> )	Vf (mm/min)	n (min <sup>-1</sup> )	Vf (mm/min)	n (min <sup>-1</sup> )	Vf (mm/min)	n (min <sup>-1</sup> )	Vf (mm/min)
0.1	0.2	1	0.4	0.017	40,000	800	28,000	504	26,000	416	26,000	364
		1.5	0.4	0.009	40,000	800	28,000	504	26,000	416	26,000	364
		2	0.9	0.007	32,000	461	22,400	323	20,800	266	20,800	233
		2.5	0.9	0.004	26,000	333	18,200	204	16,900	189	16,900	162
0.15	0.3	2	0.4	0.025	40,000	1,200	28,000	756	26,000	624	26,000	546
		3	0.9	0.013	32,000	691	22,400	484	20,800	399	20,800	349
		4	0.9	0.010	26,000	499	18,200	306	16,900	284	16,900	243
0.2	0.4	2	0.4	0.035	40,000	1,600	28,000	1,008	26,000	832	26,000	728
		3	0.4	0.020	40,000	1,600	28,000	1,008	26,000	832	26,000	728
		4	0.4	0.007	32,000	922	22,400	645	20,800	532	20,800	466
		4	0.9	0.009	32,000	922	22,400	645	20,800	532	20,800	466
		5	0.4	0.006	26,000	666	18,200	408	16,900	379	16,900	324
		5	0.9	0.007	26,000	666	18,200	408	16,900	379	16,900	324
0.25	0.5	4	0.4	0.040	40,000	2,000	28,000	1,260	26,000	1,040	26,000	910
		8	0.9	0.010	26,000	728	18,200	446	16,900	414	16,900	355
		12	0.9	0.005	22,400	627	15,680	384	14,560	357	14,560	306
0.27	0.54	2	0.4	0.050	40,000	2,160	28,000	1,361	26,000	1,123	26,000	983
		4	0.4	0.037	40,000	2,160	28,000	1,361	26,000	1,123	26,000	983
		5	0.4	0.031	40,000	1,512	28,000	1,176	26,000	1,040	26,000	832
		6	0.4	0.025	26,000	1,244	18,200	871	16,900	676	16,900	629
		6.5	0.4	0.020	26,000	1,011	18,200	619	16,900	575	16,900	493
		7	0.4	0.015	26,000	899	18,200	585	16,900	543	16,900	465
0.3	0.6	2	0.4	0.055	40,000	2,400	28,000	1,512	26,000	1,248	26,000	1,092
		4	0.4	0.035	40,000	2,400	28,000	1,512	26,000	1,248	26,000	1,092
		6	0.4	0.018	32,000	1,382	22,400	968	20,800	799	20,800	699
		6	0.9	0.020	32,000	1,382	22,400	968	20,800	799	20,800	699
		8	0.9	0.020	26,000	998	18,200	612	16,900	568	16,900	487
		10	0.4	0.013	26,000	874	18,200	535	16,900	497	16,900	426
		10	0.9	0.015	26,000	874	18,200	535	16,900	497	16,900	426
		12	0.9	0.010	26,000	874	18,200	535	16,900	497	16,900	426
		15	0.4	0.005	22,400	753	15,680	461	14,560	367	14,560	367
		15	0.9	0.006	22,400	753	15,680	461	14,560	367	14,560	367

# ZSTNB series

Work					Carbon Steels, Alloy Steels (180~250HB)		Pre-harden Steels (35~45HRC)		Hardened Steels (45~55HRC)		Hardened Steels (55~65HRC)	
Ratio to standard depth of cut					Depth of Cut X 100%		Depth of Cut X 80%		Depth of Cut X 65%		Depth of Cut X 60%	
R (mm)	Mill Dia (mm)	NeckLength (mm)	NeckAngle (°)	Depth of Cut (mm)	n (min <sup>-1</sup> )	Vf (mm/min)	n (min <sup>-1</sup> )	Vf (mm/min)	n (min <sup>-1</sup> )	Vf (mm/min)	n (min <sup>-1</sup> )	Vf (mm/min)
0.4	0.8	4	0.4	0.062	32,000	2,560	22,400	1,613	20,800	1,331	20,800	1,165
		6	0.4	0.045	32,000	2,560	22,400	1,613	20,800	1,331	20,800	1,165
		8	0.9	0.026	25,600	1,475	17,920	1,032	16,640	852	16,640	745
		12	0.9	0.020	20,800	1,065	14,560	699	13,520	606	13,520	519
		16	0.9	0.018	20,800	932	14,560	612	13,520	530	13,520	454
0.45	0.9	4	0.4	0.063	28,300	2,547	19,810	1,605	18,395	1,324	18,395	1,159
		8	0.4	0.050	28,300	2,547	19,810	1,605	18,395	1,324	18,395	1,159
		12	0.4	0.037	18,400	1,325	12,880	811	11,960	753	11,960	646
		16	0.4	0.024	18,400	1,325	12,880	811	11,960	753	11,960	646
		18	0.4	0.018	18,400	1,325	12,880	811	11,960	753	11,960	646
		20	0.4	0.015	15,850	1,141	11,095	699	10,303	649	10,303	556
		22	0.4	0.012	15,850	1,141	11,095	699	10,303	649	10,303	556
		24	0.4	0.009	14,150	1,019	9,905	624	9,198	579	9,198	497
0.5	1	6	0.4	0.055	25,600	2,560	17,920	1,613	16,640	1,331	16,640	1,165
		8	0.4	0.055	25,600	2,560	17,920	1,613	16,640	1,331	16,640	1,165
		10	0.4	0.032	20,800	1,872	14,560	1,310	13,520	1,082	13,520	946
		10	0.9	0.035	20,800	1,872	14,560	1,310	13,520	1,082	13,520	946
		15	0.9	0.028	16,640	1,331	11,648	874	10,816	757	10,816	649
		20	0.4	0.018	16,640	1,331	11,648	874	10,816	757	10,816	649
		20	0.9	0.020	16,640	1,331	11,648	874	10,816	757	10,816	649
		25	0.9	0.017	14,560	1,165	10,192	764	9,464	662	9,464	568
		30	0.4	0.015	12,480	874	8,736	568	8,112	487	8,112	406
		30	0.9	0.017	12,480	874	8,736	568	8,112	487	8,112	406
		35	0.9	0.010	10,400	728	7,280	473	6,760	406	6,760	338
		40	0.9	0.009	10,000	700	7,000	455	6,500	390	6,500	325
		50	0.9	0.007	9,500	665	6,650	432	6,175	371	6,175	309
		60	0.9	0.005	9,000	630	6,300	410	5,850	351	5,850	293
		70	0.9	0.003	8,500	595	5,950	387	5,525	332	5,525	276
0.75	1.5	8	0.4	0.070	16,960	2,544	11,872	1,603	11,024	1,323	11,024	1,158
		10	0.4	0.070	16,960	2,544	11,872	1,603	11,024	1,323	11,024	1,158
		12	0.4	0.070	16,960	2,544	11,872	1,603	11,024	1,323	11,024	1,158
		15	0.9	0.045	13,568	1,832	9,498	1,282	8,819	1,058	8,819	926
		20	0.9	0.040	11,024	1,323	7,717	810	7,166	752	7,166	645
		30	0.9	0.028	11,024	1,323	7,717	810	7,166	752	7,166	645

END MILLS  
> Metric & Inch

Technical Data

# ZSTNB series

END MILLS  
> Metric & Inch

Technical Data

Work					Carbon Steels, Alloy Steels (180~250HB)	Pre-harden Steels (35~45HRC)	Hardened Steels (45~55HRC)	Hardened Steels (55~65HRC)				
Ratio to standard depth of cut					Depth of Cut X 100%	Depth of Cut X 80%	Depth of Cut X 65%	Depth of Cut X 60%				
R (mm)	Mill Dia (mm)	Neck Length (mm)	Neck Angle (°)	Depth of Cut (mm)	n (min <sup>-1</sup> )	Vf (mm/min)	n (min <sup>-1</sup> )	Vf (mm/min)	n (min <sup>-1</sup> )	Vf (mm/min)	n (min <sup>-1</sup> )	Vf (mm/min)
0.9	1.8	4	0.4	0.120	14,200	2,556	9,940	1,610	9,230	1,329	9,230	1,163
		8	0.4	0.100	14,200	2,556	9,940	1,610	9,230	1,329	9,230	1,163
		12	0.4	0.080	14,200	2,556	9,940	1,610	9,230	1,329	9,230	1,163
		16	0.4	0.071	14,200	2,556	9,940	1,610	9,230	1,329	9,230	1,163
		20	0.4	0.062	9,230	1,329	6,461	814	6,000	756	6,000	648
		24	0.4	0.053	9,230	1,329	6,461	814	6,000	756	6,000	648
		28	0.4	0.044	9,230	1,329	6,461	814	6,000	756	6,000	648
		32	0.4	0.036	9,230	1,329	6,461	814	6,000	756	6,000	648
		36	0.4	0.028	9,230	1,329	6,461	814	6,000	756	6,000	648
		38	0.4	0.020	8,000	1,152	5,600	706	5,200	655	5,200	562
		40	0.4	0.015	8,000	1,152	5,600	706	5,200	655	5,200	562
1	2	8	0.4	0.150	15,200	3,040	10,640	1,915	9,880	1,581	9,880	1,383
		12	0.4	0.090	15,200	3,040	10,640	1,915	9,880	1,581	9,880	1,383
		16	0.4	0.090	15,200	3,040	10,640	1,915	9,880	1,581	9,880	1,383
		20	0.4	0.060	12,160	2,189	8,512	1,532	7,904	1,265	7,904	1,107
		20	0.9	0.070	12,160	2,189	8,512	1,532	7,904	1,265	7,904	1,107
		25	0.9	0.070	9,880	1,581	6,916	968	6,442	899	6,422	771
		30	0.4	0.040	9,880	1,581	6,916	968	6,442	899	6,422	771
		30	0.9	0.045	9,880	1,581	6,916	968	6,442	899	6,422	771
		35	0.9	0.045	9,880	1,581	6,916	968	6,442	899	6,422	771
		40	0.4	0.030	9,880	1,581	6,916	968	6,442	899	6,422	771
		40	0.9	0.035	9,880	1,581	6,916	968	6,442	899	6,422	771
		50	0.9	0.170	8,512	1,192	5,958	775	5,533	664	5,533	553
		60	0.9	0.009	7,235	1,013	5,065	658	4,703	564	4,703	470
		70	0.9	0.005	6,150	861	4,305	560	3,997	480	3,997	400
1.5	3	8	0.4	0.320	12,720	3,816	8,904	2,404	8,268	1,984	8,268	1,736
		16	0.4	0.220	12,720	3,816	8,904	2,404	8,268	1,984	8,268	1,736
		20	0.4	0.150	12,720	3,434	8,904	2,137	8,268	1,736	8,268	1,488
		30	0.4	0.080	10,176	2,748	7,123	1,496	6,614	1,389	6,614	1,191
		30	0.9	0.090	10,176	2,748	7,123	1,496	6,614	1,389	6,614	1,191
		40	0.4	0.060	8,268	1,984	5,788	1,215	5,374	1,129	5,374	967
		40	0.9	0.070	8,268	1,984	5,788	1,215	5,374	1,129	5,374	967
		50	0.9	0.050	8,268	1,984	5,788	1,215	5,374	1,129	5,374	967
		60	0.9	0.030	7,123	1,710	4,986	1,047	4,630	972	4,630	833
		70	0.9	0.020	6,233	1,496	4,363	916	4,051	851	4,051	729

## ZSTNB series

Work					Carbon Steels, Alloy Steels (180~250HB)	Pre-hardened Steels (35~45HRC)	Hardened Steels (45~55HRC)	Hardened Steels (55~65HRC)				
Ratio to standard depth of cut					Depth of Cut X 100%	Depth of Cut X 80%	Depth of Cut X 65%	Depth of Cut X 60%				
R (mm)	Mill Dia (mm)	NeckLength (mm)	NeckAngle (°)	Depth of Cut (mm)	n (min <sup>-1</sup> )	Vf (mm/min)	n (min <sup>-1</sup> )	Vf (mm/min)	n (min <sup>-1</sup> )	Vf (mm/min)	n (min <sup>-1</sup> )	Vf (mm/min)
2	4	20	1	0.32	11,900	2,860	9,000	2,050	7,800	1,680	7,800	1,590
		30	1	0.23	11,900	2,570	9,000	1,850	7,800	1,520	7,800	1,430
		40	1	0.14	9,500	1,940	7,200	1,400	6,200	1,140	6,200	1,080
		50	1	0.11	7,800	1,590	5,800	1,120	5,000	920	5,000	870
		60	1	0.07	7,800	1,590	5,800	1,120	5,000	920	5,000	870
2.5	5	30	1	0.34	9,500	2,140	7,200	1,540	6,200	1,260	6,200	1,190
		40	1	0.25	9,500	2,140	7,200	1,540	6,200	1,260	6,200	1,190
		60	1	0.15	6,200	1,320	4,700	950	4,000	770	4,000	720
3	6	30	1	0.45	8,000	2,000	6,000	1,430	5,200	1,170	5,200	1,110
		40	1	0.40	8,000	1,800	6,000	1,280	5,200	1,050	5,200	990
		50	1	0.32	8,000	1,800	6,000	1,280	5,200	1,050	5,200	990
		60	1	0.22	6,400	1,360	4,800	970	4,100	780	4,100	740
		70	1	0.18	5,200	1,110	3,900	790	3,400	650	3,400	610
		80	1	0.14	5,200	1,110	3,900	790	3,400	650	3,400	610
4	8	50	1	0.50	6,000	1,460	4,500	1,040	3,900	850	3,900	810
		60	1	0.43	6,000	1,460	4,500	1,040	3,900	850	3,900	810
		70	1	0.33	6,000	1,460	4,500	1,040	3,900	850	3,900	810
		80	1	0.25	4,800	1,100	3,600	780	3,100	640	3,100	600
5	10	60	1	0.70	4,800	1,300	3,600	920	3,100	750	3,100	710
		75	1	0.50	4,800	1,300	3,600	920	3,100	750	3,100	710

- Please adjust the cutting depth index according to the cutting depth factors of above table.
- For Rib or Slotting machining process which are not easy for chip ejection, please reduce the cutting depth by 20~30% from the above cutting condition.  
ex) ZSTNB2040-20-10, HRC 55, Rib processing  
Cutting depth : 0.32(standard cutting depth) X 0.65 X 0.8 = 0.17mm
- In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
- If RPM of the machine is low, the feed rate should be low in the same ratio as RPM.

# ZSTNR series

END MILLS  
> Metric & Inch

Technical Data

Work				Carbon Steels, Alloy Steels (180~250HB)	Pre-harden Steels (35~45HRC)	Hardened Steels (45~55HRC)	Hardened Steels (55~65HRC)						
Ratio to standard depth of cut				Depth of Cut X 100%	Depth of Cut X 80%	Depth of Cut X 65%	Depth of Cut X 60%						
Mill Dia (mm)	R (mm)	Neck Length (mm)	Depth of Cut (mm)	n (min <sup>-1</sup> )	Vf (mm/min)	n (min <sup>-1</sup> )	Vf (mm/min)	n (min <sup>-1</sup> )	Vf (mm/min)	n (min <sup>-1</sup> )	Vf (mm/min)		
0.2	0.05	2	0.007	39,660	887	33,660	754	29,700	591	27,720	483		
0.4	0.05	4	0.009	30,096	899	25,582	764	22,572	599	21,067	489		
		5	0.007	26,752	710	22,739	528	20,064	466	18,726	373		
	0.1	4	0.009	31,680	946	26,928	804	23,760	631	22,176	515		
		5	0.007	28,160	747	23,936	556	21,120	490	19,712	392		
0.5	0.1	5	0.013	30,413	1,090	25,851	753	22,810	562	21,289	453		
		8	0.008	24,330	678	20,681	468	18,248	350	17,031	282		
		10	0.007	18,248	509	15,511	351	13,686	262	12,773	211		
0.6	0.1	12	0.010	20,377	791	17,320	546	15,282	408	14,264	329		
		15	0.006	16,727	649	14,218	448	12,545	335	11,709	270		
0.8	0.2	6	0.045	31,680	1,084	26,928	921	23,760	723	22,176	590		
		12	0.020	28,160	943	23,936	695	21,120	613	19,712	490		
1	0.2	8	0.040	28,512	1,463	24,235	1,244	21,384	976	19,958	797		
		10	0.035	28,512	1,596	24,235	1,357	21,384	1,064	19,958	869		
		15	0.028	25,344	1,261	21,542	938	19,008	828	17,741	662		
		20	0.020	19,008	828	16,157	653	14,256	532	13,306	414		
		25	0.017	15,840	690	13,464	544	11,880	443	11,088	345		
		30	0.017	15,840	690	13,464	544	11,880	443	11,088	345		
		35	0.010	15,840	690	13,464	544	11,880	443	11,088	345		
	0.3	8	0.040	28,512	1,463	24,235	1,244	21,384	976	19,958	797		
		15	0.028	25,344	1,261	21,542	938	19,008	828	17,741	662		
		25	0.017	15,840	690	13,464	544	11,880	443	11,088	345		
		30	0.017	15,840	690	13,464	544	11,880	443	11,088	345		
		1.5	0.2	10	0.050	21,683	1,079	18,431	803	16,262	708	15,178	567
				15	0.045	19,712	981	16,755	730	14,784	644	13,798	515
				20	0.042	17,347	863	14,745	642	13,010	567	12,143	453
25	0.032			14,784	644	12,566	508	11,088	414	10,349	322		
0.3	30		0.028	12,320	536	10,472	423	9,240	345	8,624	268		
	10		0.050	21,683	1,079	18,431	803	16,262	708	15,178	567		
	20		0.042	17,347	863	14,745	642	13,010	567	12,143	453		
	25		0.032	14,784	644	12,566	508	11,088	414	10,349	322		
30	0.028	12,320	536	10,472	423	9,240	345	8,624	268				



## ZSTNR series

Work				Carbon Steels, Alloy Steels (180~250HB)		Pre-harden Steels (35~45HRC)		Hardened Steels (45~55HRC)		Hardened Steels (55~65HRC)		
Ratio to standard depth of cut				Depth of Cut X 100%		Depth of Cut X 80%		Depth of Cut X 65%		Depth of Cut X 60%		
Mill Dia (mm)	R (mm)	NeckLength (mm)	Depth of Cut (mm)	n (min <sup>-1</sup> )	Vf (mm/min)	n (min <sup>-1</sup> )	Vf (mm/min)	n (min <sup>-1</sup> )	Vf (mm/min)	n (min <sup>-1</sup> )	Vf (mm/min)	
2	0.2	30	0.045	13,440	1,254	11,424	933	10,080	823	9,408	658	
		40	0.035	10,080	823	8,568	650	7,560	529	7,056	412	
		50	0.017	8,400	686	7,140	541	6,300	441	5,880	343	
	0.3	12	0.088	22,680	1,814	19,278	1,427	17,010	1,191	15,876	1,048	
		20	0.054	18,144	1,452	15,422	1,141	13,608	953	12,701	838	
		30	0.045	13,440	1,393	11,424	1,036	10,080	914	9,408	732	
		40	0.035	10,080	914	8,568	722	7,560	588	7,056	457	
		50	0.017	8,400	762	7,140	601	6,300	490	5,880	381	
	0.5	8	0.170	22,680	1,814	19,278	1,427	17,010	1,191	15,876	1,048	
		12	0.088	22,680	1,814	19,278	1,427	17,010	1,191	15,876	1,048	
		16	0.088	19,278	1,542	16,386	1,213	14,459	1,012	13,495	891	
		20	0.054	18,114	1,452	15,422	1,141	13,608	953	12,701	838	
		25	0.054	15,876	1,270	13,495	999	11,907	833	11,113	733	
		30	0.045	13,440	1,393	11,424	1,036	10,080	914	9,408	732	
		40	0.035	10,080	914	8,568	722	7,560	588	7,056	457	
	50	0.017	8,400	762	7,140	601	6,300	490	5,880	381		
	3	0.2	40	0.070	10,240	956	8,704	711	7,680	627	7,168	502
			50	0.050	7,680	627	6,528	495	5,760	403	5,376	314
60			0.030	6,400	523	5,440	412	4,800	336	4,480	261	
0.3		40	0.070	10,240	1,062	8,704	790	7,680	697	7,168	557	
		50	0.050	7,680	697	6,528	550	5,760	448	5,376	348	
		60	0.030	6,400	581	5,440	458	4,800	373	4,480	290	
0.5		40	0.070	10,240	1,062	8,704	790	7,680	697	7,168	557	
		50	0.050	7,680	697	6,528	550	5,760	448	5,376	348	
		60	0.030	6,400	581	5,440	458	4,800	373	4,480	290	

- Please adjust the cutting depth index according to the cutting depth factors of above table.
- In actual machining, the condition should be adjusted according to the machining shape, purpose and machine type.
- If RPM of the machine is low, the feed rate should be low in the same ratio as RPM.

# ZSLNR series

END MILLS  
> Metric & Inch

Technical Data

Work				Carbon Steels, Alloy Steels (180~250HB)		Pre-hardened Steels (35~45HRC)		Hardened Steels (45~55HRC)		Hardened Steels (55~65HRC)		
Ratio to standard depth of cut				Depth of Cut X 100%		Depth of Cut X 80%		Depth of Cut X 65%		Depth of Cut X 60%		
Mill Dia (mm)	R (mm)	Neck Length (mm)	Depth of Cut (mm)	n (min <sup>-1</sup> )	Vf (mm/min)	n (min <sup>-1</sup> )	Vf (mm/min)	n (min <sup>-1</sup> )	Vf (mm/min)	n (min <sup>-1</sup> )	Vf (mm/min)	
0.2	0.05	0.5	0.020	50,000	258	50,000	205	50,000	180	50,000	160	
		1	0.014	50,000	258	50,000	205	50,000	180	50,000	160	
		1.5	0.008	50,000	240	45,900	202	45,900	170	45,900	153	
		2	0.008	42,000	202	36,700	176	36,700	162	36,700	147	
0.3	0.05	1	0.021	50,000	585	50,000	456	50,000	336	50,000	320	
		1.5	0.016	50,000	585	45,000	456	45,000	336	45,000	320	
		2	0.012	45,000	530	45,000	420	45,000	300	45,000	290	
		2.5	0.010	40,000	471	40,000	373	40,000	267	40,000	258	
		3	0.008	35,000	412	35,000	326	30,000	200	30,000	194	
0.4	0.05	1	0.025	50,000	580	50,000	461	40,000	320	36,000	270	
		1.5	0.020	50,000	580	50,000	461	40,000	320	36,000	270	
		2	0.016	45,000	520	45,000	410	36,000	290	34,000	240	
		2.5	0.015	40,500	480	40,500	370	33,400	270	30,600	220	
		3	0.014	40,000	410	40,000	330	32,800	240	25,600	200	
		3.5	0.012	36,000	380	36,000	300	29,400	200	22,920	180	
		4	0.008	30,000	320	30,000	250	21,600	160	19,200	150	
0.1	0.1	2	0.028	45,000	520	45,000	410	36,000	290	34,000	240	
		3	0.016	40,000	410	40,000	330	32,800	240	25,600	200	
		4	0.010	30,000	320	30,000	250	21,600	160	19,200	150	
0.5	0.05	1	0.030	50,000	898	40,000	464	30,000	378	28,000	315	
		2	0.023	50,000	898	40,000	464	30,000	378	28,000	315	
		3	0.017	45,000	810	36,000	414	27,000	315	24,500	261	
		4	0.017	40,000	820	32,000	378	24,000	279	20,000	234	
		5	0.011	28,800	540	19,400	280	18,000	250	15,000	200	
		6	0.008	28,800	480	19,400	260	18,000	250	15,000	200	
	0.1	0.1	1	0.035	50,000	898	40,000	464	30,000	378	28,000	315
			2	0.030	50,000	898	40,000	464	30,000	378	28,000	315
			3	0.020	45,000	810	36,000	414	27,000	315	24,500	261
			4	0.020	40,000	720	32,000	378	24,000	279	20,000	234
			5	0.013	28,800	540	19,400	280	18,000	250	15,000	200
			6	0.013	28,800	480	19,400	260	18,000	250	15,000	200
0.6	0.1	2	0.035	50,000	1,159	37,830	600	28,200	390	23,000	320	
		4	0.024	40,000	830	27,800	440	23,600	280	21,000	230	
		6	0.015	24,000	490	18,000	300	17,800	240	15,000	210	
		8	0.013	24,000	466	18,000	285	17,800	228	15,000	200	
		10	0.009	24,000	451	18,000	276	17,800	221	15,000	193	

# ZSLNR series

Work				Carbon Steels, Alloy Steels (180~250HB)		Pre-harden Steels (35~45HRC)		Hardened Steels (45~55HRC)		Hardened Steels (55~65HRC)		
Ratio to standard depth of cut				Depth of Cut X 100%		Depth of Cut X 80%		Depth of Cut X 65%		Depth of Cut X 60%		
Mill Dia (mm)	R (mm)	NeckLength (mm)	Depth of Cut (mm)	n (min <sup>-1</sup> )	Vf (mm/min)	n (min <sup>-1</sup> )	Vf (mm/min)	n (min <sup>-1</sup> )	Vf (mm/min)	n (min <sup>-1</sup> )	Vf (mm/min)	
0.8	0.1	4	0.032	48,000	1,102	28,000	518	20,000	320	20,000	288	
		6	0.019	38,700	800	25,000	461	18,000	288	18,000	256	
		8	0.015	29,025	600	20,000	369	16,200	259	16,200	230	
		12	0.012	29,025	570	20,000	350	16,200	246	16,200	219	
	0.2	4	0.056	48,000	1,102	28,000	518	20,000	320	20,000	288	
		6	0.032	38,700	800	25,000	461	18,000	288	18,000	256	
1	0.1	4	0.038	32,400	1,359	27,540	1,039	24,300	815	22,680	666	
		6	0.024	26,244	990	22,307	842	19,683	660	18,371	539	
		8	0.024	23,328	880	19,829	748	17,496	587	16,330	479	
		10	0.015	20,412	770	17,350	655	15,309	514	14,288	419	
		12	0.015	18,144	609	15,422	453	13,608	399	12,701	320	
		16	0.009	18,144	533	15,422	420	13,608	342	12,701	266	
		20	0.006	13,608	399	11,567	315	10,206	257	9,526	200	
		0.2	4	0.070	32,400	1,359	27,540	1,039	24,300	815	22,680	666
	6		0.040	26,244	990	22,307	842	19,683	660	18,371	539	
	8		0.040	23,328	880	19,829	748	17,496	587	16,330	479	
	10		0.025	20,412	770	17,350	655	15,309	514	14,288	419	
	12		0.025	18,144	609	15,422	453	13,608	399	12,701	320	
	16		0.015	18,144	533	15,422	420	13,608	342	12,701	266	
	20		0.010	13,608	399	11,567	315	10,206	257	9,526	200	
	0.3		6	0.040	26,244	990	22,307	842	19,683	660	18,371	539
		10	0.025	20,412	770	17,350	655	15,309	514	14,288	419	
		16	0.015	18,144	533	15,422	420	13,608	342	12,701	266	
		20	0.010	13,608	399	11,567	315	10,206	257	9,526	200	
	1.5	0.1	4	0.042	24,930	1,130	20,956	868	18,711	678	17,364	556
			8	0.036	22,680	1,027	19,278	873	17,010	685	15,876	559
			12	0.036	18,144	822	15,422	698	13,608	548	12,701	447
			15	0.023	14,112	568	11,995	423	10,584	373	9,878	298
			20	0.018	14,112	568	11,995	423	10,584	373	9,878	298
		0.2	4	0.070	24,930	1,130	20,956	868	18,711	678	17,364	556
8			0.060	22,680	1,027	19,278	873	17,010	685	15,876	559	
12			0.060	18,144	822	15,422	698	13,608	548	12,701	447	
15			0.038	14,112	568	11,995	423	10,584	373	9,878	298	
20			0.030	14,112	568	11,995	423	10,584	373	9,878	298	
0.3		8	0.060	22,680	1,027	19,278	873	17,010	685	15,876	559	
		15	0.038	14,112	568	11,995	423	10,584	373	9,878	298	
		20	0.030	14,112	568	11,995	423	10,584	373	9,878	298	

END MILLS  
> Metric & Inch

Technical Data

# ZSLNR series

END MILLS  
> Metric & Inch

Technical Data

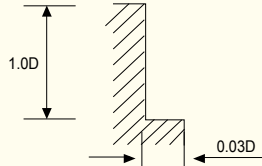
Work				Carbon Steels, Alloy Steels (180~250HB)		Pre-hardened Steels (35~45HRC)		Hardened Steels (45~55HRC)		Hardened Steels (55~65HRC)		
Ratio to standard depth of cut				Depth of Cut X 100%		Depth of Cut X 80%		Depth of Cut X 65%		Depth of Cut X 60%		
Mill Dia (mm)	R (mm)	Neck Length (mm)	Depth of Cut (mm)	n (min <sup>-1</sup> )	Vf (mm/min)	n (min <sup>-1</sup> )	Vf (mm/min)	n (min <sup>-1</sup> )	Vf (mm/min)	n (min <sup>-1</sup> )	Vf (mm/min)	
2	0.2	6	0.080	20,790	1,635	17,672	1,389	15,593	981	14,553	801	
		8	0.070	18,900	1,486	16,065	1,263	14,175	892	13,230	728	
		12	0.040	15,309	1,083	13,013	921	11,482	722	10,716	590	
		16	0.040	13,608	963	11,567	818	10,206	642	9,526	524	
		20	0.035	11,907	843	10,121	716	8,930	562	8,335	459	
		25	0.025	11,907	843	10,121	716	8,930	562	8,335	459	
		30	0.017	11,312	800	9,615	680	8,484	534	7,918	436	
	0.3	8	0.090	18,900	1,651	16,065	1,403	14,175	991	13,230	809	
		16	0.060	13,608	1,070	11,567	909	10,206	713	9,526	583	
		20	0.037	11,907	936	10,121	796	8,930	624	8,335	510	
	0.5	6	0.017	20,709	1,635	17,672	1,389	15,593	981	14,553	801	
		8	0.014	18,900	1,651	16,065	1,403	14,175	991	13,230	809	
		12	0.080	15,309	1,204	13,013	1,023	11,482	802	10,716	655	
		16	0.080	13,608	1,070	11,567	909	10,206	713	9,526	583	
		20	0.050	11,907	936	10,121	796	8,930	624	8,335	510	
		25	0.050	11,907	936	10,121	796	8,930	624	8,335	510	
	0.8	30	0.030	11,312	889	9,615	756	8,484	593	7,918	484	
		8	0.200	18,900	1,651	16,065	1,403	14,175	991	13,230	809	
		16	0.100	13,608	1,070	11,567	909	10,206	713	9,526	583	
	3	0.2	20	0.060	11,907	936	10,121	796	8,930	624	8,335	510
			8	0.090	14,400	1,415	12,240	1,203	10,800	849	10,080	693
			12	0.070	14,400	1,415	12,240	1,203	10,800	849	10,080	693
			16	0.050	14,400	1,415	12,240	1,203	10,800	849	10,080	693
			20	0.050	11,664	1,146	9,914	974	8,748	764	8,165	624
30			0.040	9,072	1,146	7,711	974	6,804	764	6,350	624	
0.3		35	0.035	9,072	1,146	7,711	974	6,804	764	6,350	624	
		8	0.130	14,400	1,572	12,240	1,337	10,800	943	10,080	771	
		16	0.075	14,400	1,572	12,240	1,337	10,800	943	10,080	771	
		20	0.075	11,664	1,274	9,914	1,083	8,748	849	8,165	693	
0.5		30	0.060	9,072	1,274	7,711	1,083	6,804	849	6,350	693	
		8	0.180	14,400	1,572	12,240	1,337	10,800	943	10,080	771	
		12	0.130	14,400	1,572	12,240	1,337	10,800	943	10,080	771	
		16	0.100	14,400	1,572	12,240	1,337	10,800	943	10,080	771	
		20	0.100	11,664	1,274	9,914	1,083	8,748	849	8,165	693	
		30	0.080	9,072	1,274	7,711	1,083	6,804	849	6,350	693	
35		0.065	9,072	1,274	7,711	1,083	6,804	849	6,350	693		

- Please adjust the cutting depth index according to the cutting depth factors of above table.
- In actual machining, the condition should be adjusted according to the machining shape, purpose and machine type.
- If RPM of the machine is low, the feed rate should be low in the same ratio as RPM.

## ■ ZS1(2)04, ZS204 series ▶ Side Cutting

MATERIAL	HARDENED STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS	
HARDNESS	HRc40~HRc50		HRc50~HRc55		HRc55~HRc60		HRc60~HRc65		HRc65~HRc70	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
4	17200	1690	11440	1140	9360	700	7280	430	6170	310
6	13450	1820	8970	1230	6890	720	5460	450	4810	330
8	9100	1750	6760	1170	5200	670	4160	420	3640	310
10	8000	1630	5330	1090	4160	620	3320	400	2860	280
12	6830	1630	4550	1010	3450	580	2730	370	2420	260

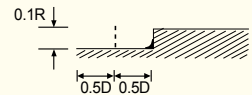
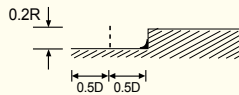
RPM = rev. / min.  
FEED = mm / min.



## ■ ZSPM4... series

MATERIAL	HARDENED STEELS									
HARDNESS	~HRc40		HRc40 ~ HRc50		HRc50 ~ HRc55		HRc55 ~ HRc60		HRc60 ~ HRc65	
D X R(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
3 X R0.5	9550	6500	6900	4150	4550	2750	2850	1150	1900	610
4 X R0.5	7950	7000	5750	4600	4000	3200	2550	1350	1750	700
6 X R0.5	5800	7650	4100	4900	2900	3500	1850	1850	1350	795
6 X R1.0	5800	7650	4100	4900	2900	3500	1850	1850	1350	795
8 X R1.0	4350	7650	3050	4900	2200	3500	1400	1850	995	795
8 X R2.0	4350	7650	3050	4900	2200	3500	1400	1850	995	795
10 X R1.0	3500	7650	2450	4900	1750	3500	1100	1850	795	795
10 X R2.0	3500	7650	2450	4900	1750	3500	1100	1850	795	795
12 X R2.0	2900	7650	2050	4900	1450	3500	925	1850	665	795
12 X R3.0	2900	7650	2050	4900	1450	3500	925	1850	665	795

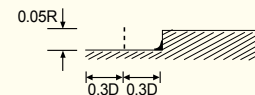
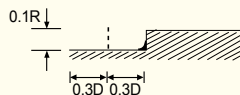
RPM = rev. / min.  
FEED = mm / min.



## ■ ZSPM4... series ▶ High Speed Cutting

MATERIAL	HARDENED STEELS									
HARDNESS	~HRc40		HRc40 ~ HRc50		HRc50 ~ HRc55		HRc55 ~ HRc60		HRc60 ~ HRc65	
D X R(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
3 X R0.5	22000	16000	17000	10000	12500	8000	9500	4600	6900	2500
4 X R0.5	17000	17500	13000	12000	11000	9200	8000	5500	5600	2900
6 X R0.5	13500	18500	10500	13800	9000	11000	6400	6400	4500	3600
6 X R1.0	13500	18500	10500	13800	9000	11000	6400	6400	4500	3600
8 X R1.0	10000	18500	8000	14000	6800	11000	4800	6700	3400	4100
8 X R2.0	10000	18500	8000	14000	6800	11000	4800	6700	3400	4100
10 X R1.0	8000	18500	6400	14000	5400	11000	3800	6800	2700	3800
10 X R2.0	8000	18500	6400	14000	5400	11000	3800	6800	2700	3800
12 X R2.0	6600	18500	5300	14000	4500	11000	3200	7000	2250	3600
12 X R3.0	6600	18500	5300	14000	4500	11000	3200	7000	2250	3600

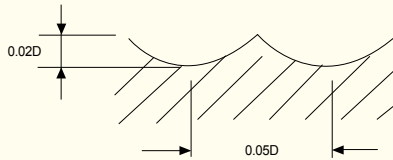
RPM = rev. / min.  
FEED = mm / min.



## ■ DB702, DB712 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
0.2	50000	1200	50000	1050	45000	960	40000	770	35000	674	31500	570
0.3	50000	1500	50000	1350	45000	1200	40000	965	35000	840	31500	700
0.4	50000	1900	50000	1700	45000	1500	40000	1200	35000	1050	31500	890
0.5	50000	2400	50000	2100	45000	1900	40000	1500	35000	1300	31500	1100
0.6	50000	2900	50000	2500	45000	2200	40000	1800	35000	1600	31500	1400
0.8	50000	3900	50000	3300	45000	3000	40000	2400	35000	2100	31500	1800
1	50000	4800	50000	4200	45000	3800	40000	3000	35000	2600	35000	2300
1.5	50000	5400	48000	4500	43000	4000	37000	3100	33000	2700	29700	2300
2	49700	5700	47800	4800	40000	4000	35000	3150	32000	2800	28500	2300
3	33100	6000	31800	5300	26500	4000	23500	3150	21000	2800	19000	2300
4	24900	6000	23900	5300	20000	4000	17500	3150	16000	2800	14500	2300
5	18600	5800	17800	4900	15000	3750	13500	3050	11500	2550	10500	2100
6	13900	4850	13400	4100	11000	3100	10000	2500	8800	2150	8000	1750
8	11100	4200	10700	3500	9000	2700	8000	2150	7000	1850	6500	1550
10	9300	3700	8900	3100	7500	2400	6600	1900	5800	1650	5300	1380
12	6950	2950	6680	2500	5600	1900	5000	1550	4400	1250	4000	1050

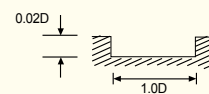
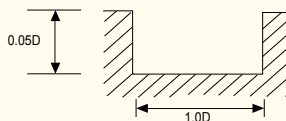
RPM = rev. / min.  
FEED = mm / min.



## ■ ZE702, ZE712 series ▶ Slotting

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
0.2	50000	130	45000	115	40000	95	33000	60	33000	45	26400	30
0.3	50000	190	45000	140	40000	115	33000	70	25000	50	20000	35
0.4	50000	235	45000	180	40000	140	33000	90	25000	55	20000	40
0.5	50000	370	45000	280	40000	220	33000	140	25000	85	20000	60
0.6	50000	470	45000	360	40000	285	30000	160	25000	105	20000	75
0.8	50000	600	40000	440	30000	295	25000	185	19000	110	15200	80
0.9	49000	655	39000	520	27800	330	22700	205	17500	125	14000	90
1	48000	750	38000	570	25500	360	20500	215	16000	135	12500	85
2	33300	850	26000	680	17500	420	14500	260	11000	160	9500	115
3	21800	850	17300	680	11500	420	9500	260	7500	160	6400	115
4	16700	880	13200	700	8800	440	7200	270	5600	170	4750	118
5	15700	1000	12500	805	8300	500	6400	285	5100	180	4450	132
6	13100	950	10350	770	6900	480	5300	280	4200	180	3700	130
8	9880	930	7800	720	5200	445	4000	255	3200	165	2800	120
10	7800	850	6150	680	4100	415	3200	240	2550	155	2200	112
12	6650	850	5250	680	3500	415	2650	240	2100	155	1860	112
16	4900	730	3900	580	2600	365	2000	210	1600	135	1400	95
20	3900	660	3100	525	2050	335	1600	195	1300	125	1100	85

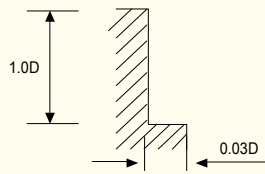
RPM = rev. / min.  
FEED = mm / min.



## ■ ZE702, ZE712 series ▶ Side Cutting

MATERIAL	HARDENED STEELS HEAT RESISTANT STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS	
HARDNESS	HRc30~ HRc40		HRc40~ HRc50		HRc50~ HRc55		HRc55~ HRc60		HRc60~ HRc65		HRc65~ HRc70	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1	48000	1050	38000	820	25500	510	20500	310	16000	190	12500	125
2	33300	1200	26000	970	17500	600	14500	370	11000	230	9500	165
3	21800	1200	17300	970	11500	600	9500	370	7500	230	6400	165
4	16700	1250	13200	1000	8800	625	7200	385	5600	240	4750	170
5	15700	1450	12500	1150	8300	710	6400	410	5100	260	4450	190
6	13100	1350	10350	1100	6900	690	5300	400	4200	255	3700	185
8	9880	1320	7800	1030	5200	635	4000	365	3200	235	2800	170
10	7800	1200	6150	970	4100	590	3200	340	2550	220	2200	160
12	6650	1200	5250	970	3500	590	2650	340	2100	220	1860	160
16	4900	1050	3900	840	2600	520	2000	300	1600	190	1400	140
20	3900	950	3100	750	2050	475	1600	275	1300	175	1100	125

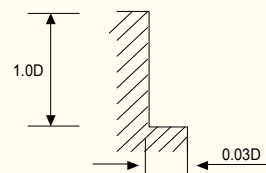
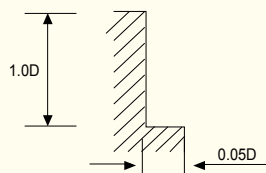
RPM = rev. / min.  
FEED = mm / min.



## ■ ZE704, ZE714, ZE724 series ▶ Side Cutting

MATERIAL	HARDENED STEELS HEAT RESISTANT STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS	
HARDNESS	HRc30~ HRc40		HRc40~ HRc50		HRc50~ HRc55		HRc55~ HRc60		HRc60~ HRc65		HRc65~ HRc70	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1	48000	1480	38000	1050	25500	710	20500	430	16000	270	12500	175
2	33300	1750	26000	1250	17500	840	14500	520	11000	320	9500	230
3	21800	1750	17300	1250	11500	840	9500	520	7500	320	6400	230
4	16700	1800	13200	1300	8800	880	7200	540	5600	335	4750	240
5	15700	2000	12500	1500	8300	1000	6400	580	5100	370	4450	270
6	13100	1950	10350	1400	6900	950	5300	560	4200	350	3700	260
8	9880	1880	7800	1350	5200	900	4000	520	3200	330	2800	240
10	7800	1750	6150	1260	4100	840	3200	480	2550	310	2200	220
12	6650	1750	5250	1260	3500	840	2650	480	2100	300	1860	220
16	4900	1500	3900	1100	2600	730	2000	420	1600	270	1400	200
20	3900	1300	3100	970	2050	650	1600	380	1300	250	1100	180

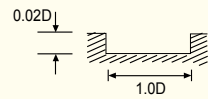
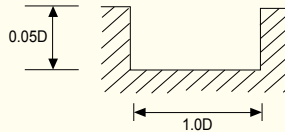
RPM = rev. / min.  
FEED = mm / min.



## ■ ZR702, ZR732 series ▶ Slotting

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	
2	33300	680	26000	544	17500	336	14500	208	11000	128	9500	92	
3	21800	680	17300	544	11500	336	9500	208	7500	128	6400	92	
4	16700	704	13200	560	8800	352	7200	216	5600	136	4750	94	
5	15700	800	12500	644	8300	400	6400	228	5100	144	4450	106	
6	13100	760	10350	616	6900	384	5300	224	4200	144	3700	104	
8	9880	744	7800	576	5200	356	4000	204	3200	132	2800	96	
10	7800	680	6150	544	4100	332	3200	192	2550	124	2200	90	
12	6650	680	5250	544	3500	332	2650	192	2100	124	1860	90	
16	4900	584	3900	464	2600	292	2000	168	1600	108	1400	78	
20	3900	528	3100	420	2050	268	1600	168	1300	100	1100	70	

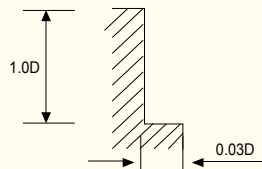
RPM = rev. / min.  
FEED = mm / min.



## ■ ZR702, ZR732 series ▶ Side Cutting

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	
2	33300	960	26000	776	17500	480	14500	296	11000	184	9500	132	
3	21800	960	17300	776	11500	480	9500	296	7500	184	6400	132	
4	16700	1000	13200	800	8800	500	7200	308	5600	192	4750	136	
5	15700	1160	12500	920	8300	568	6400	328	5100	208	4450	152	
6	13100	1080	10350	880	6900	552	5300	320	4200	204	3700	148	
8	9880	1056	7800	824	5200	508	4000	292	3200	188	2800	136	
10	7800	960	6150	776	4100	472	3200	272	2550	176	2200	128	
12	6650	960	5250	776	3500	472	2650	272	2100	176	1860	128	
16	4900	840	3900	672	2600	416	2000	240	1600	152	1400	112	
20	3900	760	3100	600	2050	380	1600	220	1300	140	1100	100	

RPM = rev. / min.  
FEED = mm / min.

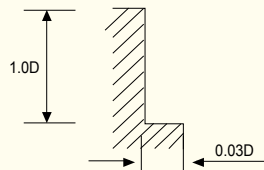




## ■ ZR704, ZR714, ZR724, ZR734 series

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
3	21800	1400	17300	1000	11500	672	9500	416	7500	256	6400	184
4	16700	1440	13200	1040	8800	704	7200	432	5600	268	4750	192
5	15700	1600	12500	1200	8300	800	6400	464	5100	296	4450	216
6	13100	1560	10350	1120	6900	760	5300	448	4200	280	3700	208
8	9880	1504	7800	1080	5200	720	4000	416	3200	264	2800	192
10	7800	1400	6150	1008	4100	672	3200	384	2550	248	2200	176
12	6650	1400	5250	1008	3500	672	2650	384	2100	240	1860	176
16	4900	1200	3900	880	2600	584	2000	336	1600	216	1400	160
20	3900	1040	3100	776	2050	520	1600	304	1300	200	1100	144

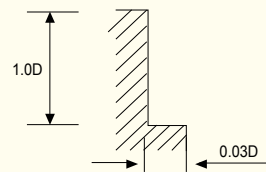
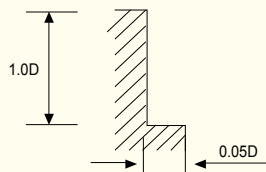
RPM = rev. / min.  
FEED = mm / min.



## ■ ZR706, ZR736, ZE716, ZE726 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
6	24800	5350	23500	4900	16000	4900	13500	3300	10500	2100	8000	1450
8	20000	5500	19000	5000	12000	4600	10000	3100	8000	2000	6000	1400
10	16000	4900	15500	4500	9500	4100	8000	2900	6400	1800	4800	1300
12	13000	4500	12500	4100	8000	3800	6600	2500	5300	1600	4000	1150
16	10000	4000	9700	3700	6000	3400	5000	2300	4000	1250	3000	870
20	8000	3350	7800	3400	4800	3200	4000	2100	3200	1020	2400	690

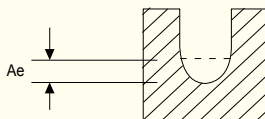
RPM = rev. / min.  
FEED = mm / min.



## ZSLNB series

MATERIAL	ALLOY STEELS HEAT RESISTANT STEELS			HARDENED STEELS			HARDENED STEELS			COPPER		
	HRc 30~ HRc 45			HRc 45~ HRc 55			HRc 55~ HRc 65					
HARDNESS	RPM	FEED	Ae(mm)	RPM	FEED	Ae(mm)	RPM	FEED	Ae(mm)	RPM	FEED	Ae(mm)
0.5	34100-49500	600~870	0.007~0.028	31900-35200	490~540	0.005~0.023	31900-35200	440~480	0.005~0.021	49000-50000	1100~1400	0.010~0.042
0.6	28600-40700	590~850	0.007~0.034	26400-29700	480~540	0.006~0.028	26400-29700	400~480	0.006~0.025	42000-50000	1100~1700	0.011~0.050
0.8	22000-30800	640~890	0.016~0.064	19800-22000	490~550	0.013~0.052	19800-22000	440~500	0.012~0.048	31000-50000	1100~2250	0.024~0.096
1.0	17600-24200	600~850	0.008~0.080	15400-17600	470~540	0.007~0.065	15400-17600	440~500	0.006~0.060	24000-49500	1100~2200	0.012~0.120
1.2	14300-18700	590~780	0.024~0.032	12000-14000	480~540	0.020~0.026	12000-14000	420~480	0.018~0.024	28500-38500	1480~1950	0.036~0.048
1.5	11000-14300	580~760	0.031~0.048	10000-11500	480~540	0.025~0.039	10000-11500	420~480	0.023~0.036	17000-28500	1100~1950	0.046~0.072
2.0	8500-11000	590~800	0.024~0.160	7900-8800	470~530	0.020~0.130	7900-8800	440~480	0.018~0.120	12600-24000	1100~2150	0.036~0.240
3.0	5700-8200	730~1000	0.064~0.24	5300-5800	590~650	0.052~0.195	5300-5800	550~620	0.048~0.120	11900-17000	1850~2700	0.096~0.360
4.0	4300-6200	680~990	0.080~0.320	3950-4400	550~620	0.065~0.260	3850-4400	530~570	0.060~0.240	6600-12500	1260~2500	0.120~0.480

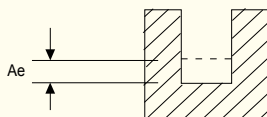
RPM = rev. / min.  
FEED = mm / min.



## ZSLNS20, ZSLNS40 series

MATERIAL	ALLOY STEELS HEAT RESISTANT STEELS			HARDENED STEELS			HARDENED STEELS			COPPER		
	HRc30~ HRc45			HRc45~ HRc55			HRc55~ HRc65					
HARDNESS	RPM	FEED	Ae(mm)	RPM	FEED	Ae(mm)	RPM	FEED	Ae(mm)	RPM	FEED	Ae(mm)
0.4	34100-50000	350~590	0.005~0.028	30500-35200	295~340	0.003~0.020	18300-24600	120~200	0.002~0.012	48000-50000	790~920	0.008~0.048
0.5	25650-33000	370~470	0.006~0.035	23750-26000	285~315	0.004~0.025	14200-18000	115~130	0.003~0.015	44000-50000	800~1150	0.010~0.060
0.6	20900-35200	330~560	0.007~0.030	19900-22000	260~290	0.005~0.021	11900-15500	100~120	0.003~0.013	37500-50000	770~1250	0.011~0.051
0.8	16150-26400	360~590	0.009~0.040	15200-16700	280~310	0.006~0.028	9000-11700	110~125	0.004~0.017	28500-47000	770~1300	0.015~0.068
1.0	12300-18700	350~540	0.011~0.028	10500-11500	250~280	0.008~0.020	6300-8050	100~115	0.005~0.012	22500-34000	810~1300	0.018~0.048
1.2	10450-17600	350~590	0.025~0.070	9100-10000	250~280	0.015~0.042	5400-7000	100~115	0.009~0.026	22500-31500	950~1350	0.036~0.101
1.5	9100-17600	430~830	0.017~0.077	7000-8000	250~280	0.012~0.055	4300-5500	100~115	0.007~0.033	14500-25000	770~1320	0.028~0.132
2.0	6350-10550	340~570	0.021~0.140	6100-6700	270~300	0.015~0.100	3600-4700	100~120	0.009~0.060	11500-18500	770~1250	0.036~0.240
3.0	4300-7050	550~900	0.056~0.210	3990-4600	445~515	0.040~0.150	2400-3200	105~310	0.024~0.090	9000-13000	1400~2110	0.096~0.360
4.0	3200-5300	400~675	0.074~0.280	3000-3400	335~380	0.053~0.200	1800-2400	75~230	0.032~0.120	6750-9750	1050~1575	0.128~0.480

RPM = rev. / min.  
FEED = mm / min.

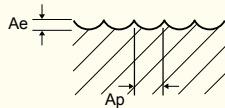


## ■ DB412 series

MATERIAL	HARDENED STEELS		HARDENED STEELS		HARDENED STEELS		HARDENED STEELS	
HARDNESS	HRC45 ~ HRC50		HRC50 ~ HRC55		HRC55 ~ HRC60		HRC60 ~ HRC70	
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(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1	20000	460	20000	400	20000	350	20000	240
1.5	16300	640	16100	580	16000	570	14200	360
2	14500	800	14200	740	13850	760	11300	465
2.5	13400	950	13000	890	12600	920	9600	560
3	12700	1100	12300	1050	11800	1000	8400	660
4	10600	1100	10300	1050	9800	1000	6650	650
5	9400	1100	9050	1050	8600	950	5600	680
6	8600	1150	8250	1100	7850	950	4850	700
8	7000	1050	6700	1000	6350	950	3800	650
10	6050	1000	5800	960	5450	900	3200	620
12	5450	1000	5200	960	4900	900	2750	610

RPM=rev. / min.  
FEED=mm / min.

Ae: D1~D4=0.05XD  
D5~D8=0.025mm  
D10~D20=0.30mm  
Ap: D1~D20=0.1 X D

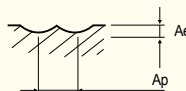


## ■ DB312, DB402, DB502, DB512, DB522 series ▶ General Cutting

MATERIAL	NON-ALLOYED STEELS ALLOY STEELS · CAST IRON		ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS	
HARDNESS	~ HRC30		HRC30 ~ HRC40		HRC40 ~ HRC55	
STRENGTH	~ 1000N/mm <sup>2</sup>		1000 ~ 1250N/mm <sup>2</sup>		1500N/mm <sup>2</sup>	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
1	16500	290	13300	230	6100	105
1.5	16500	405	12700	310	5590	140
2	15100	865	11200	565	4900	175
2.5	15100	865	11200	565	4900	175
3	13800	780	10500	530	4750	175
4	11000	850	8800	610	4410	205
5	9600	945	7600	665	3860	205
6	8900	1150	7200	955	3340	220
8	7500	1500	6050	1060	2590	255
10	6700	1750	5300	1170	2140	260
12	6150	2000	4900	1280	1840	280
16	5000	1950	3900	1220	1420	280
20	4350	1900	3400	1200	1170	290

RPM = rev. / min.  
FEED = mm / min.

Ae: D1~D6=0.2mm  
D8~D20=0.3mm  
Ap: 0.2XD



Ae: D1~D6=0.2mm  
D8~D20=0.3mm  
Ap: 0.1XD

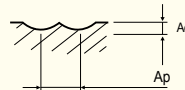
※ Please reduce cutting speed around 20~30% from the above table or DB522 series.

## ■ DB312, DB402, DB502, DB512, DB522 series ▶ High Speed Cutting

MATERIAL	NON-ALLOYED STEELS · ALLOY STEELS · CAST IRON		ALLOY STEELS HEAT RESISTANT STEELS	
HARDNESS	~ HRC45		HRC30 ~ HRC40	
STRENGTH	~ 1500N/mm <sup>2</sup>		1500 ~ 2000N/mm <sup>2</sup>	
DIAMETER(mm)	RPM	FEED	RPM	FEED
1	26000	1500	26000	920
1.5	24000	1600	24000	990
2	22000	1700	22000	1080
2.5	22000	2000	20000	1130
3	22000	2300	17800	1200
4	22000	3350	14300	1300
5	22000	4150	12600	1380
6	22000	4600	11000	1440
8	17500	4600	8800	1440
10	14700	4450	7350	1380
12	12800	4450	6400	1330
16	10000	4000	5000	1150
20	8350	3650	4150	1060

RPM = rev. / min.  
FEED = mm / min.

Ae : D1~D6=0.2mm  
D8~D20=0.3mm  
Ap : 0.2XD

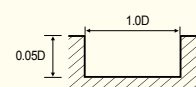
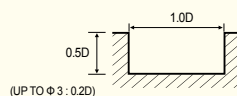


• Please reduce cutting speed around 20~30% from the above table or DB522 series.

## ■ ZE302, ZE322, ZE402, ZE502, ZE522 series ▶ General Cutting

MATERIAL	ALLOY STEELS · HEAT RESISTANT STEELS		HARDENED STEELS		STAINLESS STEELS	
HARDNESS	HRC30 ~ HRC40		HRC40 ~ HRC50			
STRENGTH	1000 ~ 1250N/mm <sup>2</sup>		1250 ~ 1750N/mm <sup>2</sup>			
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
2	9700	220	6350	135	5300	105
3	7500	240	4670	160	3880	135
4	6350	345	3880	205	3250	175
5	5300	370	3170	220	2650	185
6	4670	405	2830	255	2380	205
8	3530	435	2120	230	1760	205
10	2730	380	1680	185	1420	185
12	2310	320	1420	150	1140	150
16	1850	255	1140	125	890	125
20	1420	195	890	90	705	90
25	1150	150	705	80	580	70

RPM = rev. / min.  
FEED = mm / min.

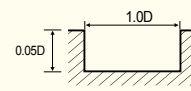
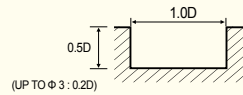


※ Please reduce cutting speed around 20~30% from the above table or ZE522, ZE322 series.

## ■ ZE302, ZE322, ZE402, ZE502, ZE522 series ▶ High Speed Cutting

MATERIAL	ALLOY STEELS-HEAT RESISTANT STEELS		HARDENED STEELS				STAINLESS STEELS	
HARDNESS	HRc30 ~ HRc40		HRc40 ~ HRc50		HRc40 ~ HRc55			
STRENGTH	1000 ~ 1250N/mm <sup>2</sup>		1250 ~ 1750N/mm <sup>2</sup>		1750 ~ 2000N/mm <sup>2</sup>			
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	18000	665	11800	415	8700	175	9800	345
3	11000	655	6800	435	5600	185	6200	370
4	10300	725	6300	430	4300	185	5300	370
5	9350	715	5570	420	3700	185	4620	355
6	8200	750	4930	470	3250	185	4100	390
8	6300	770	3780	410	2470	185	3120	355
10	4830	750	2940	360	2000	160	2470	310
12	4100	750	2520	345	1680	160	2100	300
16	3260	715	2000	355	1890	150	1940	290
20	2520	665	1580	310	1680	150	1630	275
25	2000	635	1260	340	1570	150	1420	290

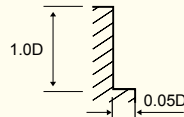
RPM = rev. / min.  
FEED = mm / min.



## ■ ZE503 series ▶ Side Cutting

MATERIAL	NON-ALLOY 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(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
6	5560	500	3360	310	2840	250	2000	60	1100	45
8	4200	530	2520	290	2100	265	1680	80	840	45
10	3260	460	2000	230	1680	230	1360	70	680	35
12	2740	390	1680	190	1360	180	1160	60	560	35
16	2200	310	1360	150	1060	150	900	45	440	20
18	1940	280	1210	135	950	130	790	35	380	20
20	1680	240	1060	120	840	115	680	30	320	20

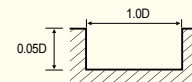
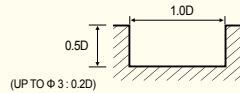
RPM = rev. / min.  
FEED = mm / min.



## ■ ZE503 series ▶ Slotting

MATERIAL	NON-ALLOY 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(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
6	5560	310	3360	200	2840	160	2000	50	1100	35
8	4200	340	2520	180	2100	160	1680	65	840	35
10	3260	300	2000	140	1680	145	1360	55	680	30
12	2740	250	1680	120	1360	120	1160	50	560	30
16	2200	200	1360	100	1060	100	900	35	440	20
18	1940	175	1210	85	950	85	790	30	380	20
20	1680	150	1060	70	840	70	680	25	320	20

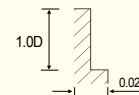
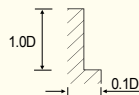
RPM = rev. / min.  
FEED = mm / min.



## ■ ZE304, ZE324, ZE404, ZE504, ZE524 series ▶ General Cutting

MATERIAL	NON-ALLOY STEELS ALLOY STEELS · CAST IRON		HARDENED 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(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	12100	320	7900	195	2700	47	6600	160
3	9400	370	5840	230	2000	58	4850	195
4	7900	655	4850	405	1500	58	4070	320
5	6600	690	3970	415	1300	58	3320	345
6	5830	760	3530	470	1150	58	2980	380
8	4410	815	2650	435	880	58	2200	405
10	3420	700	2100	345	720	46	1760	345
12	2880	600	1760	290	590	46	1430	275
16	2310	470	1430	230	460	29	1150	230
20	1760	370	1110	185	340	29	880	175
25	1430	290	880	150	270	23	715	140

RPM = rev. / min.  
FEED = mm / min.

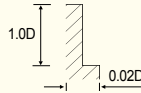


- Please reduce cutting speed around 20~30% from the above table for ZE524 & ZE324 series.

## ■ ZE304, ZE324, ZE404, ZE504, ZE524 series ▶ High Speed Cutting

MATERIAL	NON-ALLOY STEELS ALLOY STEELS · CAST IRON		HARDENED 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(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	31400	1230	23500	520	12600	275	21600	465
3	19300	1210	13600	735	8900	390	13500	660
4	18100	1330	12600	865	7090	465	11800	775
5	16400	1310	11100	1010	6040	530	10300	910
6	14400	1380	9900	1100	5300	580	9100	990
8	11000	1430	7600	1090	3990	575	6900	980
10	8500	1380	5880	1110	3150	580	5420	1000
12	7200	1380	5040	1090	2620	575	4600	985
16	5700	1320	3990	1010	2000	535	3590	910
20	4400	1270	3150	930	1580	490	2840	840
25	3500	1170	2520	755	1260	390	2270	680

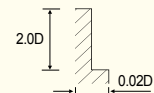
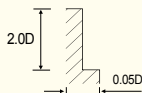
RPM = rev. / min.  
FEED = mm / min.



## ■ ZR322, ZR502, ZR512, ZR522 series ▶ Side Cutting

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(mm)	RPM	FEED	RPM	FEED	RPM	FEED
3	6950	195	4500	150	3300	100
4	5600	240	3600	170	2700	105
5	4800	250	3050	210	2350	125
6	4150	250	2650	210	2050	125
8	3150	265	2000	210	1600	125
10	2150	265	1700	210	1250	125
12	1800	210	1500	185	1050	105
16	1800	185	1100	140	840	90
20	1300	130	860	105	625	65

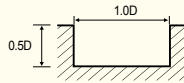
RPM=rev. / min.  
FEED=mm / min.



## ■ ZR322, ZR502, ZR512, ZR522 series ▶ Slotting

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(mm)	RPM	FEED	RPM	FEED	RPM	FEED
3	6950	160	4500	80	3300	55
4	5600	195	3600	100	2700	60
5	4800	240	3050	115	2350	75
6	4150	290	2650	145	2050	90
8	3150	210	2000	145	1600	90
10	2150	250	1700	140	1250	90
12	1800	200	1500	135	1050	75
16	1800	215	1100	100	840	60
20	1300	160	860	70	625	45

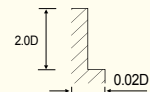
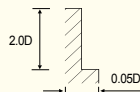
RPM=rev. / min.  
FEED=mm / min.



## ■ ZR324, ZR504, ZR514, ZR524 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(mm)	RPM	FEED	RPM	FEED	RPM	FEED
3	6950	195	4500	150	3300	100
4	5600	240	3600	170	2700	105
5	4800	250	3050	210	2350	125
6	4150	250	2650	210	2050	125
8	3150	265	2000	210	1600	125
10	2150	265	1700	210	1250	125
12	1800	210	1500	185	1050	105
16	1880	185	1100	140	840	90
20	1300	130	860	105	625	65

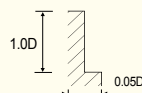
RPM=rev. / min.  
FEED=mm / min.



## ■ ZR304H, ZR324H 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(mm)	RPM	FEED	RPM	FEED	RPM	FEED
6	7000	910	4200	560	3000	140
8	5300	980	3200	530	2500	190
10	4100	840	2500	410	2050	165
12	3500	730	2100	340	1700	140

RPM=rev. / min.  
FEED=mm / min.

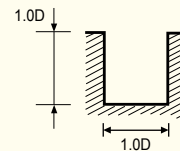
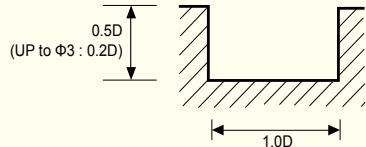




## ■ TX202, 222, 302 ...series

MATERIAL	NON - ALLOYED STEELS ALLOY STEELS TOOLS STEELS		ALLOY STEELS HEAT RESISANT STEELS		STAINLESS STEELS		CAST IRON		ALUMINUM ALLOYS		COPPER, BRASS NON-FERROUS METALS	
HARDNESS	~ HRc 30		HRc 30 ~ HRc 45									
STRENGTH	~ 1000N/mm <sup>2</sup>		1000 ~ 1500N/mm <sup>2</sup>									
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1	14300	105	8500	65	7150	50	18700	205	44000	330	24700	200
1.5	9350	150	5550	85	5600	80	12100	205	27500	385	20300	300
2	7850	160	5150	100	4300	80	9350	220	22000	460	16500	340
3	6100	180	3800	120	3150	100	6050	220	15400	460	11000	340
4	5150	255	3150	155	2650	130	4600	220	11000	460	8800	340
5	4300	270	2550	160	2150	135	3650	220	9150	460	6800	340
6	3800	300	2300	190	1950	155	2950	255	7600	485	5700	375
8	2850	325	1700	170	1450	155	2200	275	5700	485	4400	375
10	2200	280	1350	135	1150	135	1850	285	4600	485	3400	375
12	1850	240	1150	110	950	110	1450	295	3750	485	2850	375
14	1700	215	1050	100	850	100	1300	310	3300	485	2400	375
16	1500	185	950	95	700	95	1100	320	2850	485	2200	375
20	1150	145	700	70	550	70	900	340	2200	485	1700	375

RPM = rev. / min.  
FEED = mm / min.



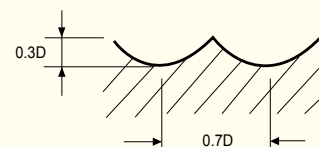
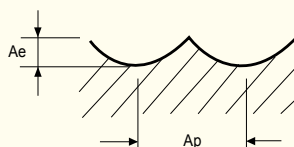
※ The FEED for long & extra long types, should be reduced by around 50%

## ■ TXB202, 222, 232, 302 ...series

MATERIAL	CARBON STEELS ALLOY STEELS TOOLS STEELS		CARBON STEELS ALLOY STEELS TOOLS STEELS		HARDENED STEELS		CAST IRON		ALUMINUM ALLOYS	
HARDNESS	~ HRc 30		HRc 30 ~ HRc 45		HRc 45 ~ HRc 50					
STRENGTH	~ 1000N/mm <sup>2</sup>		1000 ~ 1500N/mm <sup>2</sup>		1500N/mm <sup>2</sup>					
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	12350	640	9150	415	4000	125	10500	220	30800	395
3	11400	575	8550	390	3800	125	7050	230	20500	395
4	8950	630	7150	450	3600	150	5150	285	15400	395
5	7800	700	6200	490	3100	150	4150	330	12100	470
6	7250	870	5900	705	2700	160	3400	360	10300	470
8	6100	1090	4900	785	2050	190	2500	460	7900	540
10	5450	1330	4350	870	1750	190	2050	460	6150	540
12	4990	1500	3950	950	1500	210	1750	460	5150	630
14	4530	1495	3600	925	1300	210	1400	460	4300	630
16	4085	1470	3200	905	1150	210	1300	460	3850	540
18	3800	1425	3000	890	1050	210	1100	460	3400	540
20	3550	1425	2800	885	950	210	1050	420	2950	540

RPM = rev. / min.  
FEED = mm / min.

Ae: D1~D6=0,2mm  
D8~D20=0,3mm  
Ap: 0,2D



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

## ■ TX204, 224, 304 ...series

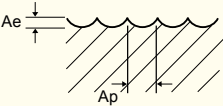
MATERIAL	NON - ALLOYED STEELS ALLOY STEELS TOOLS STEELS		ALLOY STEELS HEAT RESISANT STEELS		STAINLESS STEELS		CAST IRON		ALUMINUM ALLOYS		COPPER, BRASS NON-FERROUS METALS	
HARDNESS	~ HRc 30		HRc 30 ~ HRc 45									
STRENGTH	~ 1000N/mm <sup>2</sup>		1000 ~ 1500N/mm <sup>2</sup>									
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1	17600	150	10250	85	8650	75	18700	620	44000	1050	24700	605
1.5	11800	215	7050	115	7050	120	12100	620	27500	1160	20300	910
2	9850	240	6450	145	5350	120	9350	640	22000	1320	16500	1035
3	7600	270	4750	170	3950	145	6050	640	15400	1320	11000	1035
4	6450	485	3950	300	3300	240	4600	640	11000	1320	8800	1035
5	5350	510	3200	305	2700	255	3650	640	9150	1320	6800	1035
6	4750	560	2850	350	2400	280	2950	770	7600	1430	5700	1100
8	3550	605	2150	325	1800	300	2200	815	5700	1430	4400	1100
10	2750	520	1700	255	1450	255	1850	860	4600	1430	3400	1100
12	2350	440	1450	215	1150	205	1450	900	3750	1430	2850	1100
14	2100	395	1300	195	1050	190	1300	945	3300	1430	2400	1100
16	1850	350	1150	170	950	170	1100	970	2850	1430	2200	1100
20	1450	270	900	135	700	130	900	1035	2200	1430	1700	1100

RPM = rev. / min.  
FEED = mm / min.

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

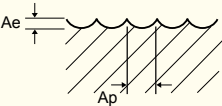
## ■ DB514 series ▶ General Cutting

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(mm)	RPM	FEED	RPM	FEED	RPM	FEED
3	13100	1020	10000	690	4520	220
4	10500	1110	8400	800	4200	270
5	9140	1230	7300	870	3680	270
6	7780	1260	6300	950	3160	280
8	5260	1430	4420	990	2100	280
10	4620	1530	3780	1070	1780	280
12	3780	1350	2940	990	1360	280
16	2740	1380	2320	980	1160	280
20	2100	1260	1900	950	840	280

RPM = rev. / min. FEED = mm / min.	Ae: D1~D6=0.2mm D8~D20=0.3mm Ap: 0.2 X D		Ae: D1~D6=0.2mm D8~D20=0.3mm Ap: 0.1 X D
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## ■ DB514 series ▶ High Speed Cutting

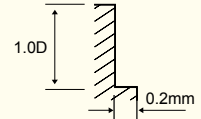
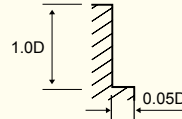
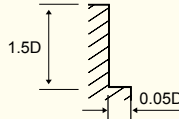
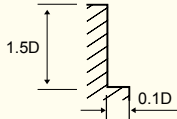
MATERIAL	NON-ALLOYED STEELS ALLOY STEELS · CAST IRON		HARDENED STEELS	
HARDNESS	~ HRC45		HRC45 ~ HRC65	
STRENGTH	~ 1500N/mm <sup>2</sup>		~ 1500N/mm <sup>2</sup>	
DIAMETER(mm)	RPM	FEED	RPM	FEED
3	21000	1500	17000	780
4	21000	2210	13660	870
5	21000	2700	12000	900
6	21000	3470	10500	940
8	15760	4260	7880	1110
10	13660	4580	6300	1260
12	10500	3950	5260	1260
16	8200	3950	3780	1060
20	6300	3780	2940	790

RPM = rev. / min. FEED = mm / min.	Ae: D1~D6=0.2mm D8~D20=0.3mm Ap: 0.05 X D	
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## ■ ZE506, ZE516 series ▶ General Speed Cutting

MATERIAL	NON-ALLOY STEELS ALLOY STEELS · CAST IRON		ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS		HARDENED STEELS	
HARDNESS	~ HRc30		HRc30 ~ HRc50		HRc50 ~ HRc60		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(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
6	5560	2000	3880	1370	1580	210	1100	130
8	4200	2000	2940	1370	1160	210	840	130
10	3360	2000	2320	1370	1000	210	680	130
12	2840	1680	2000	1160	840	180	560	110
16	2100	1260	1480	880	640	130	420	70
20	1680	1010	1160	690	500	110	320	60
25	1500	900	1100	600	430	90	260	50

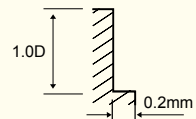
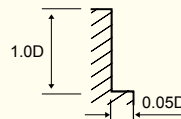
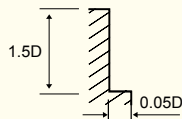
RPM = rev. / min.  
FEED = mm / min.



## ■ ZE506, ZE516 series ▶ High Speed Cutting

MATERIAL	HEAT RESISTANT STEELS HARDENED STEELS		HARDENED 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(mm)	RPM	FEED	RPM	FEED	RPM	FEED
6	16800	6090	8400	3050	4200	1470
8	12600	6090	6300	3050	3160	1470
10	9980	5990	5040	3050	2520	1470
12	8400	5040	4200	2520	2100	1260
16	6300	3780	3160	1890	1580	950
20	5040	3050	2520	1470	1260	760
25	4500	2750	2200	1300	1120	670

RPM = rev. / min.  
FEED = mm / min.

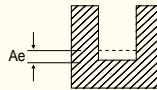


※ Please reduce cutting speed around 20~30% from the above table or Extra long series.

## ■ ZE612 series ▶ Rib Processing

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(mm)	RPM	FEED	Ae(mm)	RPM	FEED	Ae(mm)	RPM	FEED	Ae(mm)
0.4	33000~42000	220~490	0.007~0.018	24000~30000	100~375	0.007~0.018	15000~18000	35~100	0.004~0.008
0.5	33000~42000	220~190	0.009~0.022	24000~30000	100~375	0.009~0.022	15000~18000	35~100	0.004~0.009
0.6	33000~42000	275~630	0.011~0.026	24000~30000	120~485	0.011~0.026	15000~18000	45~120	0.005~0.011
0.7	33000~42000	275~630	0.012~0.031	24000~30000	120~485	0.012~0.031	15000~18000	45~120	0.006~0.013
0.8	28500~37000	310~700	0.014~0.035	20500~26000	130~530	0.014~0.035	13000~15500	50~140	0.007~0.015
0.9	26000~33000	310~800	0.030~0.060	19000~24000	180~600	0.030~0.060	11500~13500	60~145	0.008~0.016
1.0	24000~30000	310~900	0.045~0.090	16500~21000	210~660	0.045~0.090	10500~13500	75~145	0.009~0.018
1.2	19500~24000	310~990	0.055~0.100	14000~17000	210~660	0.055~0.100	9000~11000	75~145	0.010~0.022
1.4	17000~21000	310~990	0.062~0.125	12000~15000	210~660	0.062~0.125	7500~9500	75~145	0.012~0.025
1.5	15500~20000	310~990	0.070~0.135	11000~14500	210~660	0.070~0.135	7000~8500	75~145	0.014~0.028
1.6	15000~19000	310~990	0.075~0.145	11000~13500	210~660	0.075~0.145	6500~8500	75~145	0.015~0.030
1.8	14000~18000	310~990	0.080~0.160	10000~12000	210~660	0.080~0.160	6000~7500	75~145	0.016~0.032
2.0	12500~15500	310~990	0.090~0.180	9000~11000	210~660	0.090~0.180	5500~7000	75~145	0.018~0.035
2.5	10000~13000	310~990	0.112~0.235	7000~9000	210~660	0.112~0.235	4500~5500	75~145	0.022~0.045
3.0	8500~10500	310~990	0.135~0.270	6000~7500	210~660	0.135~0.270	3500~4500	75~145	0.028~0.055
4.0	6500~8000	310~990	0.180~0.360	4500~5500	210~660	0.180~0.360	2700~3500	75~145	0.036~0.072

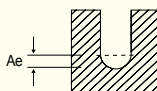
RPM=rev. / min.  
FEED=mm / min.



## ■ DB612 series ▶ Rib Processing

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(mm)	RPM	FEED	Ae(mm)	RPM	FEED	Ae(mm)	RPM	FEED	Ae(mm)
0.5	33000~42000	200~540	0.023~0.045	24000~30000	100~300	0.023~0.045	15000~19000	100~2000	0.005~0.009
0.6	33000~42000	250~700	0.027~0.054	24000~30000	120~385	0.027~0.054	15000~19000	120~250	0.005~0.011
0.8	33000~42000	250~700	0.036~0.072	24000~30000	120~385	0.036~0.072	15000~19000	120~250	0.007~0.014
1.0	30000~38000	275~770	0.045~0.090	22000~27000	140~430	0.045~0.090	13500~17500	140~280	0.009~0.018
1.2	25000~32000	275~860	0.055~0.100	18000~23000	140~430	0.055~0.100	11500~14500	140~280	0.010~0.022
1.4	22000~27000	275~860	0.062~0.125	16000~19000	140~430	0.062~0.125	10000~12500	140~280	0.012~0.025
1.5	20000~25000	275~860	0.070~0.135	14500~18500	140~430	0.070~0.135	9500~11500	140~280	0.014~0.028
1.6	19000~25000	275~860	0.075~0.145	14000~17500	140~430	0.075~0.145	9000~11000	140~280	0.015~0.030
1.8	18000~23000	275~860	0.080~0.160	12500~16000	140~430	0.080~0.160	8000~10000	140~280	0.016~0.032
2	16000~20000	275~860	0.090~0.180	11500~14500	140~430	0.090~0.180	7500~9000	140~280	0.018~0.035
3	11000~14000	275~860	0.135~0.270	7500~9500	140~430	0.135~0.270	5000~6000	140~280	0.028~0.055
4	9000~12000	275~860	0.180~0.360	6100~8200	140~430	0.180~0.360	4000~5000	140~280	0.035~0.070

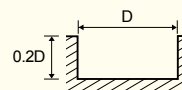
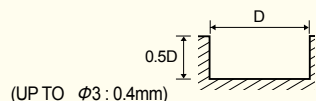
RPM=rev. / min.  
FEED=mm / min.



## ■ SM503 series ▶ Slotting

MATERIAL	CARBON STEELS · ALLOY STEELS · TOOLS STEELS						CAST IRON		STAINLESS STEEL		COPPER ALLOYS		TITANIUM ALLOYS		INCONEL	
HARDNESS	~HRc2040		HRc20 ~ HRc30		HRc30 ~ HRc45											
STRENGTH	1000N/mm <sup>2</sup>		800 ~ 1000N/mm <sup>2</sup>		1500 ~ 1500N/mm <sup>2</sup>											
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
3	10080	950	7750	740	5550	395	6700	520	5550	320	8300	360	5550	395	2200	100
4	7550	1400	5850	1100	4200	595	5050	550	4200	320	6200	400	4200	595	1650	105
6	5050	1650	3850	1250	2800	700	3350	660	2800	370	4100	440	2800	700	1150	130
8	3750	1700	2950	1330	2100	710	2500	665	2100	375	3100	500	2100	710	850	120
10	3050	1650	2300	1250	1650	655	2000	630	1650	355	2500	530	1650	665	650	120
12	2500	1500	2000	1200	1350	605	1650	570	1350	320	2000	550	1350	605	555	110

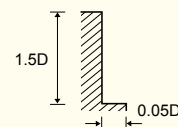
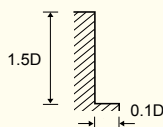
RPM=rev. / min.  
FEED=mm / min.



## ■ SM503 series ▶ Side Cutting

MATERIAL	CARBON STEELS · ALLOY STEELS · TOOLS STEELS						CAST IRON		STAINLESS STEEL		COPPER ALLOYS		TITANIUM ALLOYS		INCONEL	
HARDNESS	~HRc20		HRc20 ~ HRc30		HRc30 ~ HRc45											
STRENGTH	1000N/mm <sup>2</sup>		800 ~ 1000N/mm <sup>2</sup>		1500 ~ 1500N/mm <sup>2</sup>											
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
3	10080	1080	7750	850	5550	450	6700	605	5550	365	8300	390	5550	450	2200	110
4	7550	1630	5850	1260	4200	680	5050	630	4200	365	6200	440	4200	680	1650	125
6	5050	1910	3850	1470	2800	810	3350	755	2800	430	4100	490	2800	810	1150	150
8	3750	1950	2950	1500	2100	810	2500	770	2100	430	3100	550	2100	810	850	140
10	3050	1890	2300	1400	1650	775	2000	720	1650	415	2500	570	1650	775	650	140
12	2500	1700	2000	1340	1350	700	1650	665	1350	365	2000	620	1350	700	555	125

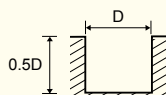
RPM=rev. / min.  
FEED=mm / min.



## ■ SM504 series

MATERIAL	ALLOY STEELS · CAST IRON		STAINLESS STEELS 300 SERIES TITANIUM		STAINLESS STEELS 400 SERIES	
HARDNESS	~HB 230					
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
3	13500	275	6690	105	9350	145
4	10100	370	5050	135	7000	185
5	8090	410	4050	165	5600	230
6	6750	480	3350	190	4700	265
8	5050	620	2500	250	3500	340
10	4050	780	2050	320	2800	430
12	3370	750	1680	310	2350	435
14	2890	670	1400	280	2000	405
16	2500	630	1250	265	1750	370
18	2250	630	1100	260	1550	365
20	2000	620	1000	260	1400	365

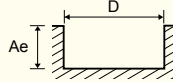
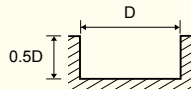
RPM=rev. / min.  
FEED=mm / min.



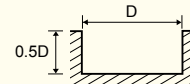
## ZF62 series ▶ Slotting

MATERIAL	NON - ALLOYED STEELS ALLOY STEELS - CAST IRON		ALLOY STEELS HEAT RESISTANT STEELS		STAINLESS STEELS		INCONEL	
HARDNESS	~ HRc30		HRc30 ~ HRc45					
STRENGTH	~ 1000N/mm <sup>2</sup>		1000 ~ 1500N/mm <sup>2</sup>					
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
6	16380	2680	13020	970	8820	670	3000	285
8	12180	2680	9660	970	6615	670	2250	270
10	9660	2680	7980	970	5355	660	1625	285
12	8400	2770	6300	925	4410	660	1500	285
16	6300	2770	5040	880	3465	590	1000	165
20	5040	2495	3780	650	2520	415	825	150

RPM=rev. / min.  
FEED=mm / min.



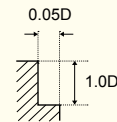
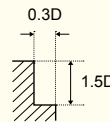
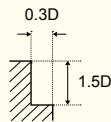
Ae:  $\phi 4 \sim \phi 10 = 0.25 \times D$   
 $\phi 12 \sim \phi 16 = 0.15 \times D$   
 $\phi 18 \sim \phi 20 = 0.10 \times D$



## ZF62 series ▶ Side Cutting

MATERIAL	NON - ALLOYED STEELS ALLOY STEELS - CAST IRON		ALLOY STEELS HEAT RESISTANT STEELS		STAINLESS STEELS		INCONEL	
HARDNESS	~ HRc30		HRc30 ~ HRc45					
STRENGTH	~ 1000N/mm <sup>2</sup>		1000 ~ 1500N/mm <sup>2</sup>					
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
6	16380	2680	13020	970	8820	670	3000	285
8	12180	2680	9660	970	6615	670	2250	270
10	9660	2680	7980	970	5355	660	1625	285
12	8400	2770	6300	925	4410	660	1500	285
16	6300	2770	5040	880	3465	590	1000	165
20	5040	2495	3780	650	2520	415	825	150

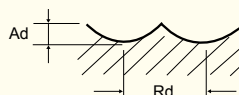
RPM=rev. / min.  
FEED=mm / min.



## BC502 series

MATERIAL		UNALLOYED COPPER			
R	DIAMETER(mm)	RPM	FEED	Rd	Ad
0.5	1	41000	1660	0.040	0.063
0.75	1.5	27000	1830	0.068	0.087
1	2	20000	1780	0.089	0.112
1.25	2.5	16000	1840	0.115	0.090
1.5	3	13000	2220	0.171	0.168
2	4	10000	2080	0.208	0.200
2.5	5	8300	1990	0.240	0.200
3	6	6900	1940	0.281	0.250
4	8	5720	1000	0.175	0.400
5	10	4550	700	0.154	0.500
6	12	3770	600	0.159	0.600

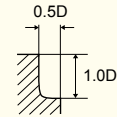
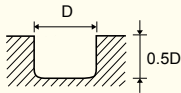
RPM=rev. / min.  
FEED=mm / min.



## ■ RC502 series

MATERIAL	UNALLOYED COPPER			
DIAMETER(mm)	RPM	FEED	RPM	FEED
3	44500	2350	50000	3700
4	33400	2100	50000	4700
6	22300	2100	33400	4900
8	16700	2100	25000	4700
10	13370	2100	20000	4800
12	11100	2100	16700	4700

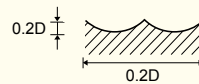
RPM=rev. / min.  
FEED=mm / min.



## ■ G series

MATERIAL	GRAPHITE	
DIAMETER(mm)	RPM	FEED
R0.5	16000	480
R0.75	16000	640
R1	16000	800
R1.5	16000	1450
R2	16000	2100
R3	15000	2950
R4	13000	3000
R5	11500	3050
R6	10500	3150
R8	8555	2960

RPM=rev. / min.  
FEED=mm / min.

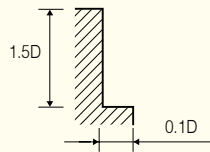




## ■ GE series

MATERIAL	GRAPHITE	
DIAMETER	RPM	FEED
0.4	40000	200
0.6	40000	350
0.8	40000	550
1.0	40000	700
2.0	25000	800
3.0	20000	800
4.0	18000	950
5.0	14000	1200
6.0	11000	1400
8.0	8000	1300
10.0	6500	1200
12.0	5500	1200

RPM=rev. / min.  
FEED=mm / min.

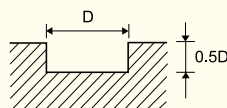


※ Please reduce cutting speed 50% from the above table when using long and extra long type

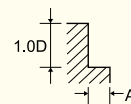
## ■ WAE302 series ▼ Slotting, Side Cutting

▼ General Cutting

MATERIAL	ALLOY STEELS, CAST IRON		ALUMINUM	
HARDNESS	~HB 230			
DIAMETER(mm)	RPM	FEED	RPM	FEED
1.0	16,870	505	16,870	845
1.5	13,150	525	13,150	790
2.0	11,300	565	11,300	790
2.5	10,565	635	10,565	845
3.0	10,000	700	10,000	900
4.0	10,000	900	10,000	1,100
5.0	10,000	1,000	10,000	1,300
6.0	10,000	1,200	10,000	1,500
7.0	8,850	1,240	8,850	1,505
8.0	8,000	1,400	8,000	1,800
9.0	8,000	1,550	8,000	1,680
10.0	8,000	1,700	8,000	2,100
12.0	8,000	2,100	8,000	2,600
14.0	6,000	1,800	6,000	2,200
16.0	6,000	1,900	6,000	2,400
18.0	4,000	1,400	4,000	1,800
20.0	4,000	1,600	4,000	1,900



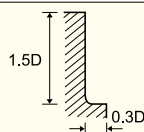
A :  $\phi 3 \sim \phi 10 = 0.25 \times D$   
 $\phi 12 \sim \phi 20 = 0.5 \times D$



## WAR302 series

MATERIAL	Side Cutting				High Speed Cutting			
	ALUMINUM ALLOY (< Si 4%)		ALUMINUM ALLOY (< Si 8%)		ALUMINUM ALLOY (DIE CASTING)		ALUMINUM ALLOY (Cu)	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
4	24,000	4,800	19,900	3,980	16,000	3,200	12,000	2,400
6	16,000	3,840	13,200	3,160	10,600	2,544	8,000	1,920
8	12,000	3,600	9,900	2,970	8,000	2,400	6,000	1,800
10	9,500	3,420	8,000	2,880	6,300	2,260	4,800	1,720
12	8,000	3,200	6,600	2,640	5,300	2,120	4,000	1,600
14	6,800	2,990	5,600	2,460	4,500	1,980	3,400	1,490
16	6,000	3,000	5,000	2,500	4,000	2,000	3,000	1,500
18	5,300	2,600	4,400	2,200	3,500	1,750	2,600	1,300
20	4,800	2,400	4,000	2,000	3,200	1,600	2,400	1,200

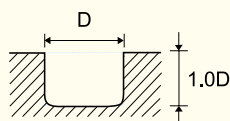
RPM=rev. / min.  
FEED=mm / min.



## WAR302 series

MATERIAL	Slotting				General Cutting			
	ALUMINUM ALLOY (< Si 4%)		ALUMINUM ALLOY (< Si 8%)		ALUMINUM ALLOY (DIE CASTING)		ALUMINUM ALLOY (Cu)	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
4	24,000	3,840	19,900	2,980	16,000	2,240	12,000	1,440
6	16,000	3,072	13,200	2,370	10,600	1,780	8,000	1,150
8	12,000	2,880	9,900	2,230	8,000	1,680	6,000	1,080
10	9,500	2,730	8,000	2,160	6,300	1,580	4,800	1,030
12	8,000	2,560	6,600	1,980	5,300	1,480	4,000	960
14	6,800	2,390	5,600	1,845	4,500	1,380	3,400	890
16	6,000	2,400	5,000	1,870	4,000	1,400	3,000	900
18	5,300	2,080	4,400	1,650	3,500	1,220	2,600	780
20	4,800	1,920	4,000	1,500	3,200	1,260	2,400	720

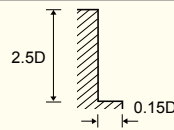
RPM=rev. / min.  
FEED=mm / min.



## ■ WAE30(2)3 series

MATERIAL	Side Cutting	General Cutting
	ALUMINUM, NONFERROUS METALS	
DIAMETER(mm)	RPM	FEED
3	7,000	455
4	7,000	546
5	7,000	651
6	7,000	756
8	5,600	861
10	5,600	1,050
12	5,600	882
14	4,200	1,106
16	4,200	1,211
18	2,800	910
20	2,800	956

RPM=rev. / min.  
FEED=mm / min.

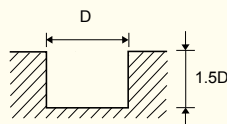


※ Please reduce cutting speed around 20~30% from the above table for AE323 series

## ■ WAE30(2)3 series ▶ Slotting

MATERIAL	ALUMINUM, NONFERROUS METALS	
DIAMETER(mm)	RPM	FEED
3	7,000	350
4	7,000	441
5	7,000	504
6	7,000	606
8	5,600	700
10	5,600	854
12	5,600	1,050
14	4,200	903
16	4,200	945
18	2,800	700
20	2,800	805

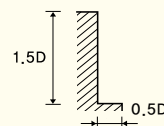
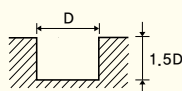
RPM=rev. / min.  
FEED=mm / min.

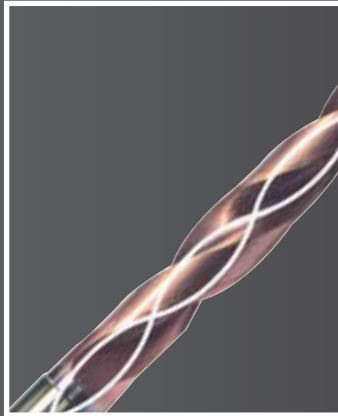
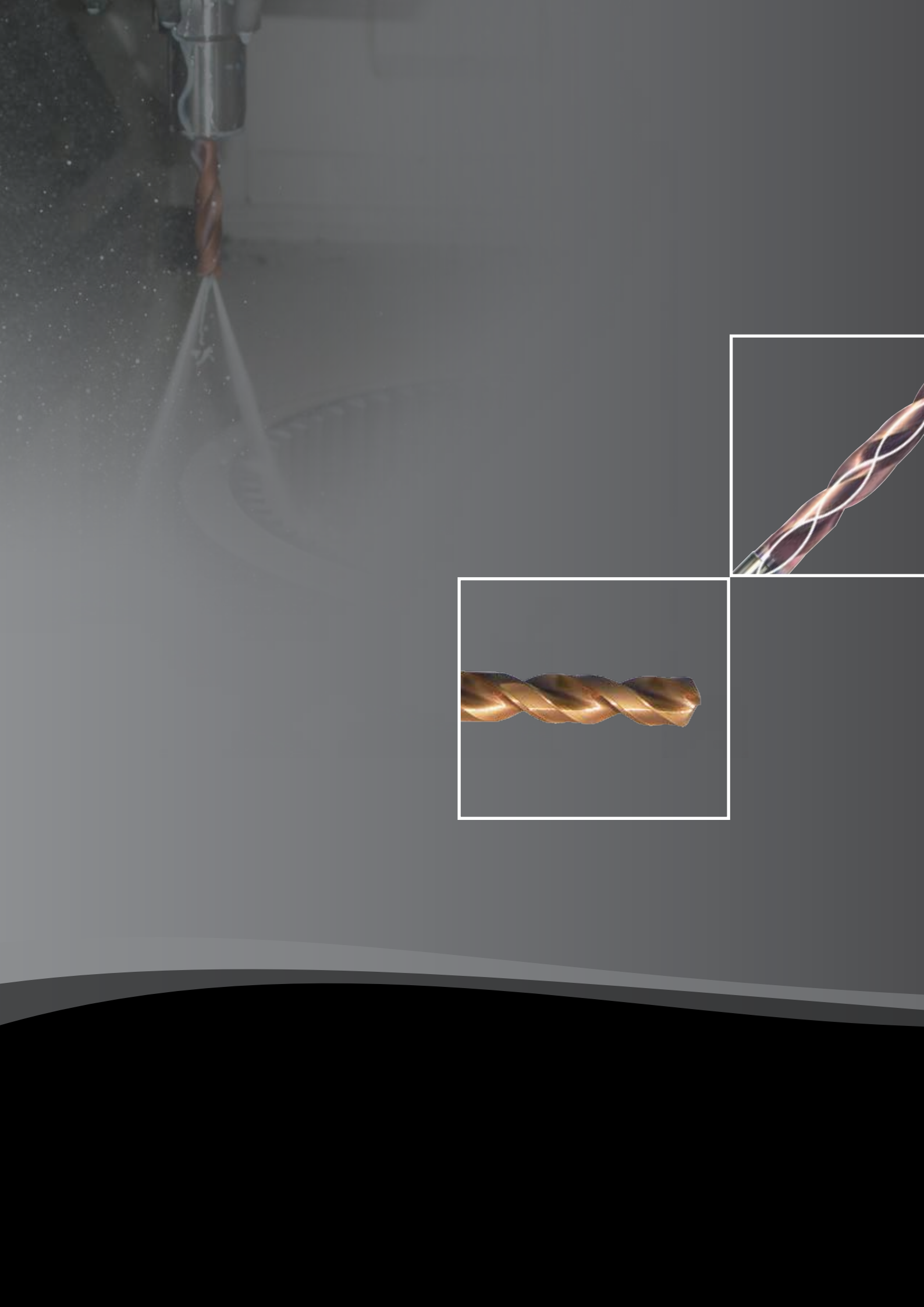


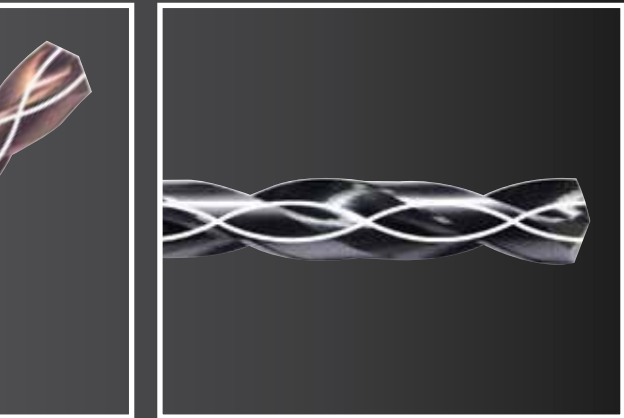
## ■ WAF303 series

MATERIAL	Slotting, Side Cutting		General Cutting	
	ALUMINUM, NONFERROUS METALS			
DIAMETER(mm)	RPM	FEED	RPM	FEED
6	10,500	800	13,500	1,050
8	8,000	700	10,500	900
10	6,500	750	8,500	950
12	5,250	800	6,800	1,050
16	4,000	800	5,200	1,050
20	3,200	800	4,200	1,050

RPM=rev. / min.  
FEED=mm / min.







# DRILL SERIES

<b>Power Max Drill Series</b> Steel, Cast Iron, Stainless Steel	<b>326</b>
<b>Power Drill Series</b> Steel, Cast Iron	<b>364</b>
<b>Solid Spiral Drill Series</b> Multi-purpose	<b>374</b>
<b>Technical Data</b>	<b>377</b>

Power

Max

Drill












Series

DRILL  
SERIES

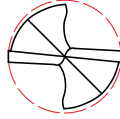
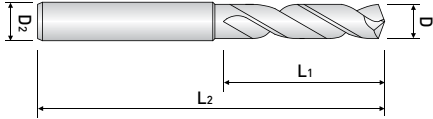


## Power Max Drill



ITEM SERIES	APPEARANCE	FEATURE	INCH & METRIC	PAGE
PF503 ...series		3 X D	INCH& METRIC	326
PF505 ...series		5 X D	INCH& METRIC	330
SF503 ...series		3 X D / INTERNAL COOLANT	INCH& METRIC	334
SF505 ...series		5 X D / INTERNAL COOLANT	INCH& METRIC	337
SF510 ...series		10 X D / INTERNAL COOLANT, DOUBLE MARGIN	METRIC	341
SF520 ...series		20 X D / INTERNAL COOLANT, DOUBLE MARGIN	METRIC	343
HP503 ...series		HIGH PRECISION 3 X D, DOUBLE MARGIN	INCH& METRIC	344
HPI503 ...series		HIGH PRECISION 3 X D INTERNAL COOLANT ,DOUBLE MARGIN	INCH& METRIC	348
HPI505 ...series		HIGH PRECISION 5 X D INTERNAL COOLANT ,DOUBLE MARGIN	INCH& METRIC	351
HPI508 ...series		HIGH PRECISION 8 X D INTERNAL COOLANT ,DOUBLE MARGIN	INCH& METRIC	356
SSTD ...series		REGULAR LENGTH(3XD)	METRIC	359

# Power Max Drill



## 3 X D / POWER MAX DRIL-STUB / HIGH SPEED MACHINING

- Suitable for high speed cutting due to newly developed raw-material and new coating.

## PF503 ...series



EDP. No.	Dia.			L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK		
	mm	fraction	inch						
PF503020	2.0	-	.0796	14	50	3	•		
PF503021	2.1	-	.0835				•		
PF503022	2.2	-	.0875				•		
PF503023	2.3	-	.0915				•		
PF503024	2.4	-	.0955				•		
PF503025	2.5	-	.0994				•		
PF503026	2.6	-	.1034				•		
PF503027	2.7	-	.1074				•		
PF503028	2.8	-	.1114				•		
PF503029	2.9	-	.1154				•		
PF503030	3.0	-	.1193	18	60	•			
PF503031	3.1	-	.1233	20	60	4	•		
PF50303175	3.175	1/8	.1250				•		
PF503032	3.2	-	.1260				•		
PF50303264	3.264	#30	.1285				•		
PF503033	3.3	-	.1299				•		
PF503034	3.4	-	.1339				•		
PF503035	3.5	-	.1378				•		
PF50303572	3.572	9/64	.1406				22	60	•
PF503036	3.6	-	.1417				•		
PF503037	3.7	-	.1457				•		
PF503038	3.8	-	.1496	24	62	5	•		
PF503039	3.9	-	.1535				•		
PF503040	4.0	-	.1575				•		
PF50304039	4.039	#21	.1590				•		
PF503041	4.1	-	.1614				•		
PF503042	4.2	-	.1654				•		
PF503043	4.3	-	.1693				•		
PF503044	4.4	-	.1732				•		
PF503045	4.5	-	.1772				•		
PF503046	4.6	-	.1811				•		
PF503047	4.7	-	.1850	26	66	6	•		
PF50304763	4.763	3/16	.1875				•		
PF503048	4.8	-	.1890				•		
PF503049	4.9	-	.1929				•		
PF503050	5.0	-	.1969				•		
PF503051	5.1	-	.2008				•		
PF50305159	5.159	13/64	.2031				•		
PF503052	5.2	-	.2047				•		
PF503053	5.3	-	.2087				•		
PF503054	5.4	-	.2126				•		
PF503055	5.5	-	.2165	•					

Data, P379



EDP. No.	Dia.			L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
	mm	fraction	inch				
PF50305558	5.558	7/32	.2188	30	66	6	•
PF503056	5.6	-	.2205				•
PF503057	5.7	-	.2244				•
PF503058	5.8	-	.2283				•
PF503059	5.9	-	.2323				•
PF50305953	5.953	15/64	.2344				•
PF503060	6.0	-	.2362				•
PF503061	6.1	-	.2402				•
PF503062	6.2	-	.2441	34	74	7	•
PF503063	6.3	-	.2480				•
PF5030635	6.350	1/4	.2500				•
PF503064	6.4	-	.2520				•
PF503065	6.5	-	.2559				•
PF503066	6.6	-	.2598				•
PF503067	6.7	-	.2638				•
PF50306747	6.747	17/64	.2656				•
PF503068	6.8	-	.2677	37	79	8	•
PF503069	6.9	-	.2717				•
PF503070	7.0	-	.2756				•
PF503071	7.1	-	.2795				•
PF50307145	7.145	9/32	.2795				•
PF503072	7.2	-	.2813	40	79	8	•
PF503073	7.3	-	.2835				•
PF503074	7.4	-	.2874				•
PF503075	7.5	-	.2913				•
PF50307541	7.541	19/64	.2953				•
PF503076	7.6	-	.2969				•
PF503077	7.7	-	.2992				•
PF503078	7.8	-	.3031				•
PF503079	7.9	-	.3071				•
PF50307938	7.938	5/16	.3110				•
PF503080	8.0	-	.3125				•
PF503081	8.1	-	.3150				•
PF503082	8.2	-	.3189	43	84	9	•
PF503083	8.3	-	.3228				•
PF50308334	8.334	21/64	.3268				•
PF503084	8.4	-	.3281				•
PF503085	8.5	-	.3307				•
PF503086	8.6	-	.3346				•
PF503087	8.7	-	.3386				•
PF50308733	8.733	-	.3425				•
PF503088	8.8	-	.3438	•			

Data. P379

EDP. No.	Dia.			L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK			
	mm	fraction	inch							
PF503089	8.9	-	.3504	43	84	9	•			
PF503090	9.0	-	.3543				•			
PF503091	9.1	-	.3583				•			
PF50309129	9.129	23/64	.3594	47	89	10	•			
PF503092	9.2	-	.3622				•			
PF503093	9.3	-	.3661				•			
PF503094	9.4	-	.3701				•			
PF503095	9.5	-	.3740				•			
PF50309525	9.525	3/8	.3750				•			
PF503096	9.6	-	.3780				•			
PF503097	9.7	-	.3819				•			
PF503098	9.8	-	.3858				•			
PF503099	9.9	-	.3898				•			
PF50309921	9.921	25/64	.3906				•			
PF503100	10.0	-	.3937				•			
PF503101	10.1	-	.3976				•			
PF503102	10.2	-	.4016				51	95	11	•
PF503103	10.3	-	.4055							•
PF5031032	10.32	13/32	.4063							•
PF503104	10.4	-	.4094	•						
PF503105	10.5	-	.4134	•						
PF503106	10.6	-	.4173	•						
PF503107	10.7	-	.4213	•						
PF50310716	10.716	27/64	.4219	•						
PF503108	10.8	-	.4252	•						
PF503109	10.9	-	.4291	•						
PF503110	11.0	-	.4331	•						
PF503111	11.1	-	.4370	•						
PF50311113	11.113	7/16	.4375	54	102	12				•
PF503112	11.2	-	.4409							•
PF503113	11.3	-	.4449							•
PF503114	11.4	-	.4488							•
PF503115	11.5	-	.4528				•			
PF503116	11.6	-	.4567				•			
PF503117	11.7	-	.4606				•			
PF503118	11.8	-	.4646				•			
PF503119	11.9	15/32	.4685				•			
PF50311908	11.908	-	.4688				•			
PF503120	12.0	-	.4724				•			
PF503121	12.1	-	.4764				•			
PF503122	12.2	-	.4803				57	102	13	•
PF503123	12.3	-	.4843							•
PF50312304	12.304	31/64	.4844							•
PF503124	12.4	-	.4882							•
PF503125	12.5	-	.4921	•						
PF503126	12.6	-	.4961	•						
PF503127	12.7	-	.5000	•						
PF503128	12.8	-	.5039	•						
PF503129	12.9	-	.5079	•						
PF503130	13.0	-	.5118	•						
PF50313096	13.096	33/64	.5156	•						
PF503131	13.1	-	.5157	•						
PF503132	13.2	-	.5197	60	107	14				•
PF503133	13.3	-	.5236							•

Data, P379

EDP. No.	Dia.			L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
	mm	fraction	inch				
PF503134	13.4	-	.2188	60	107	14	•
PF50313494	13.494	17/32	.2205				•
PF503135	13.5	-	.2244				•
PF503136	13.6	-	.2283				•
PF503137	13.7	-	.2323				•
PF503138	13.8	-	.2344				•
PF50313891	13.891	35/64	.2362				•
PF503139	13.9	-	.2402				•
PF503140	14.0	-					•
PF503141	14.1	-					•
PF503142	14.2	-	.2441	62	111	15	•
PF50314288	14.288	9/16	.24				•
PF503143	14.3	-	.80				•
PF503144	14.4	-	.2500				•
PF503145	14.5	-	.2520				•
PF503146	14.6	-	.2559				•
PF503147	14.7	-	.2598				•
PF503148	14.8	-	.2638				•
PF503149	14.9	-	.2656				•
PF503150	15.0	-	.2677				•
PF50315081	15.081	19/32	.2717	•			
PF503151	15.1	-	.2756	64	115	16	•
PF503152	15.2	-	.2795				•
PF503153	15.3	-	.2813				•
PF503154	15.4	-	.2835				•
PF503155	15.5	-	.2874				•
PF503156	15.6	-	.2913				•
PF503157	15.7	-	.2953				•
PF503158	15.8	-	.2969				•
PF50315875	15.875	5/8	.2992				•
PF503160	16.0	-	.3031				•
PF503161	16.1	-	.3071	•			
PF503163	16.3	-		66	119	17	•
PF503165	16.5	-					•
PF50316667	16.667	21/32	.3110				•
PF503170	17.0	-	.3125				•
PF503171	17.1	-	.3150	66	123	18	•
PF503172	17.2	-					•
PF503173	17.3	-					•
PF50317463	17.463	11/16					•
PF503175	17.5	-					•
PF503177	17.7	-					•
PF503178	17.8	-					•
PF503180	18.0	-					•
PF503181	18.1	-					•
PF503182	18.2	-	.3189				70
PF503185	18.5	-	.3228	•			
PF503190	19.0	-	.3268	•			
PF503191	19.1	-	.3281	•			
PF503193	19.3	-	.3307	70	131	20	•
PF503195	19.5	-	.3346				•
PF503197	19.7	-	.3425				•
PF503200	20.0	-	.3438				•

Data. P379

■ Tolerance

μm = 1/1000<sup>mm</sup>

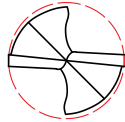
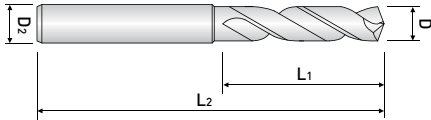
Tolerance \ Dia.	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
Cutting Edge(h8)	0 -14	0 -18	0 -22	0 -27	0 -33
Shank(h6)	0 -6	0 -8	0 -9	0 -11	0 -13

# Power Max Drill



## 5 X D / POWER MAX DRIL-STUB / HIGH SPEED MACHINING

- Suitable for high speed cutting due to newly developed raw-material and new coating.



## PF505 ...series



EDP. No.	Dia.			L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
	mm	fraction	inch				
PF505030	3.0	-	.1193	25	60	3	•
PF505031	3.1	-	.1233	27			•
PF50503175	3.175	1/8	.1250				•
PF505032	3.2	-	.1260				•
PF50503264	3.264	#30	.1285				•
PF505033	3.3	-	.1299				•
PF505034	3.4	-	.1339		30	65	•
PF505035	3.5	-	.1378	•			
PF50503572	3.572	9/64	.1406	•			
PF505036	3.6	-	.1417	•			
PF505037	3.7	-	.1457	•			
PF505038	3.8	-	.1496	33			71
PF505039	3.9	-	.1535		•		
PF50504039	4.039	#21	.1575		•		
PF505040	4.0	-	.1590		•		
PF505041	4.1	-	.1614		•		
PF505042	4.2	-	.1654		36	71	
PF505043	4.3	-	.1693	•			
PF505044	4.4	-	.1732	•			
PF505045	4.5	-	.1772	•			
PF505046	4.6	-	.1811	•			
PF505047	4.7	-	.1850	39			83
PF50504763	4.763	3/16	.1875		•		
PF505048	4.8	-	.1890		•		
PF505049	4.9	-	.1929		•		
PF505050	5.0	-	.1969		•		
PF505051	5.1	-	.2008		43	83	
PF50505159	5.159	13/64	.2031	•			
PF505052	5.2	-	.2047	•			
PF505053	5.3	-	.2087	•			
PF505054	5.4	-	.2126	•			
PF505055	5.5	-	.2165	47			87
PF50505558	5.558	7/32	.2188		•		
PF505056	5.6	-	.2205		•		
PF505057	5.7	-	.2244		•		
PF505058	5.8	-	.2283		•		
PF505059	5.9	-	.2323		•		
PF50505953	5.953	15/64	.2344	47	87	•	
PF505060	6.0	-	.2362			•	
PF505061	6.1	-	.2402			•	
PF505062	6.2	-	.2441			•	
PF505063	6.3	-	.2480			•	

Data. P379

EDP. No.	Dia.			L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
	mm	fraction	inch				
PF5050635	6.350	1/4	.2500	47	87	7	•
PF505064	6.4	-	.2520				•
PF505065	6.5	-	.2559				•
PF505066	6.6	-	.2598				•
PF505067	6.7	-	.2638				•
PF50506747	6.747	17/64	.2656				•
PF505068	6.8	-	.2677				•
PF505069	6.9	-	.2717				•
PF505070	7.0	-	.2756				•
PF505071	7.1	-	.2795				•
PF50507145	7.145	9/32	.2813	52	92	8	•
PF505072	7.2	-	.2835				•
PF505073	7.3	-	.2874				•
PF505074	7.4	-	.2913				•
PF505075	7.5	-	.2953				•
PF50507541	7.541	19/64	.2969				•
PF505076	7.6	-	.2992				•
PF505077	7.7	-	.3031				•
PF505078	7.8	-	.3071				•
PF505079	7.9	-	.3110				•
PF50507938	7.938	5/16	.3125	•			
PF505080	8.0	-	.3150	•			
PF505081	8.1	-	.3189	56	96	9	•
PF505082	8.2	-	.3228				•
PF505083	8.3	-	.3268				•
PF50508334	8.334	21/64	.3281				•
PF505084	8.4	-	.3307				•
PF505085	8.5	-	.3346				•
PF505086	8.6	-	.3386				•
PF505087	8.7	-	.3325				•
PF50508733	8.733	11/32	.3338				•
PF505088	8.8	-	.3465				•
PF505089	8.9	-	.3504	•			
PF505090	9.0	-	.3543	•			
PF505091	9.1	-	.3583	62	105	10	•
PF50509129	9.129	23/64	.3594				•
PF505092	9.2	-	.3622				•
PF505093	9.3	-	.3661				•
PF505094	9.4	-	.3701				•
PF505095	9.5	-	.3740				•
PF50509525	9.525	3/8	.3750				•
PF505096	9.6	-	.3780	•			

Data, P379

EDP. No.	Dia.			L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
	mm	fraction	inch				
PF505097	9.7	-	.3819	62	105	10	•
PF505098	9.8	-	.3858				•
PF505099	9.9	-	.3898				•
PF50509921	9.921	25/64	.3906				•
PF505100	10.0	-	.3937				•
PF505101	10.1	-	.3976	68	115	11	•
PF505102	10.2	-	.4016				•
PF505103	10.3	-	.4055				•
PF50501032	10.32	13/32	.4063				•
PF505104	10.4	-	.4094				•
PF505105	10.5	-	.4134				•
PF505106	10.6	-	.4173				•
PF505107	10.7	-	.4213				•
PF50510716	10.716	27/64	.4219				•
PF505108	10.8	-	.4252				•
PF505109	10.9	-	.4291				•
PF505110	11.0	-	.4331	•			
PF505111	11.1	-	.4370	71	121	12	•
PF50511113	11.113	7/16	.4375				•
PF505112	11.2	-	.4409				•
PF505113	11.3	-	.4449				•
PF505114	11.4	-	.4488				•
PF505115	11.5	-	.4528				•
PF505116	11.6	-	.4567				•
PF505117	11.7	-	.4606				•
PF505118	11.8	-	.4646				•
PF505119	11.9	-	.4685				•
PF50511908	11.908	15/32	.4688				•
PF505120	12.0	-	.4724	•			
PF505121	12.1	-	.4764	75	125	13	•
PF505122	12.2	-	.4803				•
PF505123	12.3	-	.4843				•
PF50512304	12.304	31/64	.4844				•
PF505124	12.4	-	.4882				•
PF505125	12.5	-	.4921				•
PF505126	12.6	-	.4961				•
PF505127	12.7	-	.5000				•
PF505128	12.8	-	.5039				•
PF505129	12.9	-	.5079				•
PF505130	13.0	-	.5118				•
PF50513096	13.096	33/64	.5156	80	134	14	•
PF505131	13.1	-	.5157				•
PF505132	13.2	-	.5197				•
PF505133	13.3	-	.5236				•
PF505134	13.4	-	.5276				•
PF50513494	13.494	17/32	.5313				•
PF505135	13.5	-	.5315				•

Data. P379

EDP. No.	Dia.			L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK			
	mm	fraction	inch							
PF505136	13.6	-	.5354	80	134	14	•			
PF505137	13.7	-	.5394				•			
PF505138	13.8	-	.5433				•			
PF50513891	13.891	35/64	.5469				•			
PF505139	13.9	-	.5472				•			
PF505140	14.0	-	.5512				•			
PF505141	14.1	-	.5551	83	143	15	•			
PF505142	14.2	-	.5591				•			
PF50514288	14.288	-	.5625				•			
PF505143	14.3	-	.5630				•			
PF505144	14.4	-	.5669				•			
PF505145	14.5	-	.5709				•			
PF505146	14.6	-	.5748				•			
PF505147	14.7	-	.5787				•			
PF505148	14.8	-	.5827				•			
PF505149	14.9	-	.5866				•			
PF505150	15.0	-	.5906				•			
PF50515081	15.081	19/32	.5937				90	152	16	•
PF505151	15.1	-	.5945							•
PF505152	15.2	-	.5984							•
PF505154	15.4	-	.6063	•						
PF505155	15.5	-	.6102	•						
PF505156	15.6	-	.6142	•						
PF505157	15.7	-	.6181	•						
PF505158	15.8	-	.6220	•						
PF50515875	15.875	5/8	.6250	•						
PF505160	16.0	-	.6299	•						
PF505161	16.1	-	.6339	95	155	17	•			
PF505163	16.3	-	.6417				•			
PF505165	16.5	-	.6496				•			
PF50516667	16.667	21/32	.6562				•			
PF505170	17.0	-	.6693				•			
PF505171	17.1	-	.6732	100	157	18	•			
PF505172	17.2	-	.6772				•			
PF50517463	17.463	11/16	.6875				•			
PF505175	17.5	-	.6890				•			
PF505177	17.7	-	.6969				•			
PF505178	17.8	-	.7008				•			
PF505180	18.0	-	.7087				•			
PF505181	18.1	-	.7126				105	160	19	•
PF505182	18.2	-	.7165	•						
PF505185	18.5	-	.7283	•						
PF505190	19.0	-	.7480	•						
PF505191	19.1	-	.7520	110	163	20	•			
PF505195	19.5	-	.7677				•			
PF505197	19.7	-	.7756				•			
PF505200	20.0	-	.7874				•			

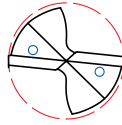
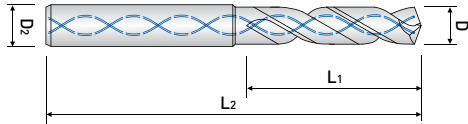
Data, P379

■ Tolerance

μm = 1/1000mm

Tolerance \ Dia.	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
Cutting Edge(h8)	0 -14	0 -18	0 -22	0 -27	0 -33
Shank(h6)	0 -6	0 -8	0 -9	0 -11	0 -13

# Power Max Drill



## 3 X D / POWER MAX DRILL - STUB / INTERNAL COOLANT

- Suitable for high speed cutting with newly developed raw-material and new coating.

## SF503 ...series



EDP. No.	Dia.			L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK	
	mm	fraction	inch					
SF503030	3.0	-	.1193	18	60	3	•	
SF503031	3.1	-	.1233	20		4	•	
SF50303175	3.175	-	.1250				•	
SF503032	3.2	-	.1260				•	
SF50303246	3.264	-	.1285				•	
SF503033	3.3	-	.1299				•	
SF503034	3.4	-	.1339				•	
SF503035	3.5	-	.1378				•	
SF50303572	3.572	-	.1406				•	
SF503036	3.6	-	.1417				•	
SF503037	3.7	-	.1457	•				
SF503038	3.8	-	.1496	•				
SF503039	3.9	-	.1535	•				
SF503040	4.0	-	.1575	•				
SF50304039	4.039	-	.1590	24	62	•		
SF503041	4.1	-	.1614	26		5	•	
SF503042	4.2	-	.1654				•	
SF503043	4.3	-	.1693				•	
SF503044	4.4	-	.1732				•	
SF503045	4.5	-	.1772				•	
SF503046	4.6	-	.1811				•	
SF503047	4.7	-	.1850				•	
SF50304763	4.763	-	.1875				•	
SF503048	4.8	-	.1890				•	
SF503049	4.9	-	.1929	•				
SF503050	5.0	-	.1969	•				
SF503051	5.1	-	.2008	28	6	•		
SF50305159	5.159	-	.2031			•		
SF503052	5.2	-	.2047			•		
SF503053	5.3	-	.2087			•		
SF503054	5.4	-	.2126			•		
SF503055	5.5	-	.2165			•		
SF50305558	5.558	-	.2188			•		
SF503056	5.6	-	.2205			•		
SF503057	5.7	-	.2244			•		
SF503058	5.8	-	.2283	30	7	•		
SF503059	5.9	-	.2323			•		
SF50305953	5.953	-	.2344			•		
SF503060	6.0	-	.2362			•		
SF503061	6.1	-	.2402			34	74	•
SF503062	6.2	-	.2441					•
SF503063	6.3	-	.2480					•

Data, P379



EDP. No.	Dia.			L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK			
	mm	fraction	inch							
SF5030635	6.350	-	.2500	34	74	7	•			
SF503064	6.4	-	.2520				•			
SF503065	6.5	-	.2559				•			
SF503066	6.6	-	.2598				•			
SF503067	6.7	-	.2638				•			
SF50306747	6.747	-	.2656				•			
SF503068	6.8	-	.2677	37			•			
SF503069	6.9	-	.2717				•			
SF503070	7.0	-	.2756				•			
SF503071	7.1	-	.2795				•			
SF50307145	7.145	-	.2813				•			
SF503072	7.2	-	.2835				•			
SF503073	7.3	-	.2874	•						
SF503074	7.4	-	.2913	•						
SF503075	7.5	-	.2953	40	79	8	•			
SF50307541	7.541	-	.2969				•			
SF503076	7.6	-	.2992				•			
SF503077	7.7	-	.3031				•			
SF503078	7.8	-	.3071				•			
SF503079	7.9	-	.3110				•			
SF50307938	7.938	-	.3125				•			
SF503080	8.0	-	.3150				•			
SF503081	8.1	-	.3189				43	84	9	•
SF503082	8.2	-	.3228							•
SF503083	8.3	-	.3268							•
SF50308334	8.334	-	.3281							•
SF503084	8.4	-	.3307	•						
SF503085	8.5	-	.3346	•						
SF503086	8.6	-	.3386	•						
SF503087	8.7	-	.3325	•						
SF50308733	8.733	-	.3338	•						
SF503088	8.8	-	.3465	•						
SF503089	8.9	-	.3504	•						
SF503090	9.0	-	.3543	•						
SF503091	9.1	-	.3583	47	89	10	•			
SF50309129	9.129	-	.3594				•			
SF503092	9.2	-	.3622				•			
SF503093	9.3	-	.3661				•			
SF503094	9.4	-	.3701				•			
SF503095	9.5	-	.3740				•			
SF50309525	9.525	-	.3750				•			
SF503096	9.6	-	.3780				•			

Data. P379

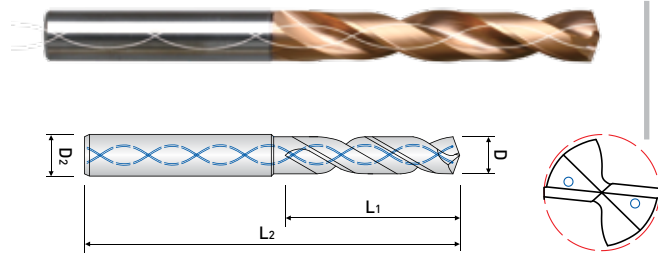
EDP. No.	Dia.			L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK			
	mm	fraction	inch							
SF503136	13.6	-	.5354	60	107	14	•			
SF503137	13.7	-	.5394				•			
SF503138	13.8	-	.5433				•			
SF50313891	13.891	35/64	.5469				•			
SF503139	13.9	-	.5472				•			
SF503140	14.0	-	.5512				•			
SF503141	14.1	-	.5551	62	111	15	•			
SF503142	14.2	-	.5591				•			
SF50314288	14.288	9/16	.5625				•			
SF503143	14.3	-	.5630				•			
SF503144	14.4	-	.5669				•			
SF503145	14.5	-	.5709				•			
SF503146	14.6	-	.5748				•			
SF503147	14.7	-	.5787				•			
SF503148	14.8	-	.5827				•			
SF503149	14.9	-	.5866				•			
SF503150	15.0	-	.5906				•			
SF50315081	15.081	19/32	.5937				64	115	16	•
SF503151	15.1	-	.5945							•
SF503152	15.2	-	.5984							•
SF503154	15.4	-	.6063	•						
SF503155	15.5	-	.6102	•						
SF503156	15.6	-	.6142	•						
SF503157	15.7	-	.6181	•						
SF503158	15.8	-	.6220	•						
SF50315875	15.875	5/8	.6250	•						
SF503160	16.0	-	.6299	•						
SF503161	16.1	-	.6339	66	119	17	•			
SF503163	16.3	-	.6417				•			
SF503165	16.5	-	.6496				•			
SF50316667	16.667	21/32	.6562				•			
SF503170	17.0	-	.6693				•			
SF503171	17.1	-	.6732				66	123	18	•
SF503172	17.2	-	.6772	•						
SF50317463	17.463	11/16	.6875	•						
SF503175	17.5	-	.6890	•						
SF503177	17.7	-	.6969	•						
SF503178	17.8	-	.7008	•						
SF503180	18.0	-	.7087	•						
SF503181	18.1	-	.7126	70	127	19				•
SF503182	18.2	-	.7165							•
SF503185	18.5	-	.7283							•
SF503190	19.0	-	.7480				•			
SF503191	19.1	-	.7520				70	131	20	•
SF503195	19.5	-	.7677							•
SF503197	19.7	-	.7756	•						
SF503200	20.0	-	.7874	•						

Data, P379

■ Tolerance μm=1/1000mm

Tolerance \ Dia.	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
Cutting Edge(h8)	0 -14	0 -18	0 -22	0 -27	0 -33
Shank(h6)	0 -6	0 -8	0 -9	0 -11	0 -13

# Power Max Drill



## 5 X D / POWER MAX DRILL - MEDIUM / INTERNAL COOLANT

- Suitable for high speed cutting with newly developed raw-material and new coating.

## SF505 ...series



EDP. No.	Dia.			L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK				
	mm	fraction	inch								
SF505031	3.1	-	.1233	27	74	4	•				
SF50503175	3.175	1/8	.1250				•				
SF505032	3.2	-	.1260				•				
SF50503264	3.264	#30	.1285				•				
SF505033	3.3	-	.1299	•							
SF505034	3.4	-	.1339	•							
SF505035	3.5	-	.1378	•							
SF50503572	3.572	9/64	.1406	•							
SF505036	3.6	-	.1417	•							
SF505037	3.7	-	.1457	•							
SF505038	3.8	-	.1496	33	80	5	•				
SF505039	3.9	-	.1535				•				
SF505040	4.0	-	.1575				•				
SF50504039	4.039	#21	.1590				•				
SF505041	4.1	-	.1614	•							
SF505042	4.2	-	.1654	•							
SF505043	4.3	-	.1693	36			87	6	•		
SF505044	4.4	-	.1732						•		
SF505045	4.5	-	.1772						•		
SF505046	4.6	-	.1811						•		
SF505047	4.7	-	.1850	•							
SF50504763	4.763	3/16	.1875	39	95	7			•		
SF505048	4.8	-	.1890						•		
SF505049	4.9	-	.1929						•		
SF505050	5.0	-	.1969						•		
SF505051	5.1	-	.2008	39					95	7	•
SF50505159	5.159	13/64	.2031				•				
SF505052	5.2	-	.2047				•				
SF505053	5.3	-	.2087				•				
SF505054	5.4	-	.2126	43			95	7			•
SF505055	5.5	-	.2165								•
SF50505558	5.558	7/32	.2188		•						
SF505056	5.6	-	.2205		•						
SF505057	5.7	-	.2244	•							
SF505058	5.8	-	.2283	•							
SF505059	5.9	-	.2323	•							
SF50505953	5.953	15/64	.2344	47	95	7			•		
SF505060	6.0	-	.2362						•		
SF505061	6.1	-	.2402						•		
SF505062	6.2	-	.2441				•				
SF505063	6.3	-	.2480	•							
SF5050635	6.350	1/4	.2500	•							

Data. P379

EDP. No.	Dia.			L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK			
	mm	fraction	inch							
SF505064	6.4	-	.2520	47	95	7	•			
SF505065	6.5	-	.2559				•			
SF505066	6.6	-	.2598				•			
SF505067	6.7	-	.2638				•			
SF50506747	6.747	17/64	.2656				•			
SF505068	6.8	-	.2677				•			
SF505069	6.9	-	.2717				•			
SF505070	7.0	-	.2756				•			
SF505071	7.1	-	.2795				•			
SF50507145	7.145	9/32	.2813				52	103	8	•
SF505072	7.2	-	.2835	•						
SF505073	7.3	-	.2874	•						
SF505074	7.4	-	.2913	•						
SF505075	7.5	-	.2953	•						
SF50507541	7.541	19/64	.2969	•						
SF505076	7.6	-	.2992	•						
SF505077	7.7	-	.3031	•						
SF505078	7.8	-	.3071	•						
SF505079	7.9	-	.3110	•						
SF50507938	7.938	5/16	.3125	•						
SF505080	8.0	-	.3150	•						
SF505081	8.1	-	.3189	56	105	9				•
SF505082	8.2	-	.3228							•
SF505083	8.3	-	.3268				•			
SF50508334	8.334	21/64	.3281				•			
SF505084	8.4	-	.3307				•			
SF505085	8.5	-	.3346				•			
SF505086	8.6	-	.3386				•			
SF505087	8.7	-	.3325				•			
SF50508733	8.733	11/32	.3338				•			
SF505088	8.8	-	.3465				•			
SF505089	8.9	-	.3504				•			
SF505090	9.0	-	.3543				•			
SF505091	9.1	-	.3583				62	108	10	•
SF50509129	9.129	23/64	.3594							•
SF505092	9.2	-	.3622	•						
SF505093	9.3	-	.3661	•						
SF505094	9.4	-	.3701	•						
SF505095	9.5	-	.3740	•						
SF50509525	9.525	3/8	.3750	•						
SF505096	9.6	-	.3780	•						
SF505097	9.7	-	.3819	•						

Data, P379

EDP. No.	Dia.			L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
	mm	fraction	inch				
SF505098	9.8	-	.3858	62	108	10	•
SF505099	9.9	-	.3898				•
SF50509921	9.921	25/64	.3906				•
SF505100	10.0	-	.3937				•
SF505101	10.1	-	.3976	68	125	11	•
SF505102	10.2	-	.4016				•
SF505103	10.3	-	.4055				•
SF5051032	10.32	13/32	.4063				•
SF505104	10.4	-	.4094				•
SF505105	10.5	-	.4134				•
SF505106	10.6	-	.4173				•
SF505107	10.7	-	.4213				•
SF50510716	10.716	27/64	.4219				•
SF505108	10.8	-	.4252				•
SF505109	10.9	-	.4291				•
SF505110	11.0	-	.4331				•
SF505111	11.1	-	.4370	71	133	12	•
SF50511113	11.113	7/16	.4375				•
SF505112	11.2	-	.4409				•
SF505113	11.3	-	.4449				•
SF505114	11.4	-	.4488				•
SF505115	11.5	-	.4528				•
SF505116	11.6	-	.4567				•
SF505117	11.7	-	.4606				•
SF505118	11.8	-	.4646				•
SF505119	11.9	-	.4685				•
SF50511908	11.908	15/32	.4688				•
SF505120	12.0	-	.4724				•
SF505121	12.1	-	.4764	75	137	13	•
SF505122	12.2	-	.4803				•
SF505123	12.3	-	.4843				•
SF50512304	12.304	31/64	.4844				•
SF505124	12.4	-	.4882				•
SF505125	12.5	-	.4921				•
SF505126	12.6	-	.4961				•
SF505127	12.7	-	.5000				•
SF505128	12.8	-	.5039				•
SF505129	12.9	-	.5079				•
SF505130	13.0	-	.5118				•
SF50513096	13.096	33/64	.5156				80
SF505131	13.1	-	.5157	•			
SF505132	13.2	-	.5197	•			
SF505133	13.3	-	.5236	•			
SF505134	13.4	-	.5276	•			
SF50513494	13.494	-	.5313	•			
SF505135	13.5	17/32	.5315	•			
SF505136	13.6	-	.5354	•			

Data. P379

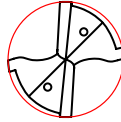
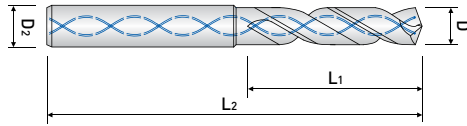
EDP. No.	Dia.			L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
	mm	fraction	inch				
SF505137	13.7	-	.5354	80	142	14	•
SF505138	13.8	-	.5394				•
SF50513891	13.891	35/64	.5469				•
SF505139	13.9	-	.5472				•
SF505140	14.0	-	.5512				•
SF505141	14.1	-	.5551	83	148	15	•
SF505142	14.2	-	.5591				•
SF50514288	14.288	9/16	.5625				•
SF505143	14.3	-	.5630				•
SF505144	14.4	-	.5669				•
SF505145	14.5	-	.5709				•
SF505146	14.6	-	.5748				•
SF505147	14.7	-	.5787				•
SF505148	14.8	-	.5827				•
SF505149	14.9	-	.5866				•
SF505150	15.0	-	.5906	•			
SF50515081	15.081	19/32	.5937	90	152	16	•
SF505151	15.1	-	.5945				•
SF505152	15.2	-	.5984				•
SF505154	15.4	-	.6063				•
SF505155	15.5	-	.6102				•
SF505156	15.6	-	.6142				•
SF505157	15.7	-	.6181				•
SF505158	15.8	-	.6220				•
SF50515875	15.875	5/8	.6250				•
SF505160	16.0	-	.6299				•
SF505161	16.1	-	.6339	95	155	17	•
SF505163	16.3	-	.6417				•
SF505165	16.5	-	.6496				•
SF50516667	16.667	21/32	.6562				•
SF505170	17.0	-	.6693				•
SF505171	17.1	-	.6732	100	157	18	•
SF505172	17.2	-	.6772				•
SF50517463	17.463	11/16	.6875				•
SF505175	17.5	-	.6890				•
SF505177	17.7	-	.6969				•
SF505178	17.8	-	.7008	•			
SF505180	18.0	-	.7087	•			
SF505181	18.1	-	.7126	105	160	19	•
SF505182	18.2	-	.7165				•
SF505185	18.5	-	.7283				•
SF505190	19.0	-	.7480				•
SF505191	19.1	-	.7520				•
SF505195	19.5	-	.7677	110	163	20	•
SF505197	19.7	-	.7756				•
SF505200	20.0	-	.7874				•

Data, P379

■ Tolerance μm=1/1000mm

Tolerance \ Dia.	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
Cutting Edge(h8)	0 -14	0 -18	0 -22	0 -27	0 -33
Shank(h6)	0 -6	0 -8	0 -9	0 -11	0 -13

# Power Max Drill



## 10 X D / POWER MAX DRILL - LONG / INTERNAL COOLANT

- Double margin

## SF510 ...series

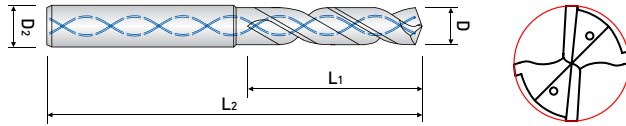


EDP. No.	Dia.	L1	L2	D2	STOCK
SF510 030	3.0	39	87	3	•
SF510 031	3.1	46	94	4	•
SF510 032	3.2				•
SF510 033	3.3				•
SF510 034	3.4				•
SF510 035	3.5				•
SF510 036	3.6	52	101	4	•
SF510 037	3.7				•
SF510 038	3.8				•
SF510 039	3.9				•
SF510 040	4.0				•
SF510 041	4.1	59	108	5	•
SF510 042	4.2				•
SF510 043	4.3				•
SF510 044	4.4				•
SF510 045	4.5				•
SF510 046	4.6	66	117	5	•
SF510 047	4.7				•
SF510 048	4.8				•
SF510 049	4.9				•
SF510 050	5.0				•
SF510 051	5.1	72	123	6	•
SF510 052	5.2				•
SF510 053	5.3				•
SF510 054	5.4				•
SF510 055	5.5				•
SF510 056	5.6	79	130	6	•
SF510 057	5.7				•
SF510 058	5.8				•
SF510 059	5.9				•
SF510 060	6.0				•
SF510 061	6.1	85	138	7	•
SF510 062	6.2				•
SF510 063	6.3				•
SF510 064	6.4				•
SF510 065	6.5				•
SF510 066	6.6	92	145		•

EDP. No.	Dia.	L1	L2	D2	STOCK
SF510 067	6.7	92	145	7	•
SF510 068	6.8				•
SF510 069	6.9				•
SF510 070	7.0				•
SF510 071	7.1				98
SF510 072	7.2	•			
SF510 073	7.3	•			
SF510 074	7.4	•			
SF510 075	7.5	•			
SF510 076	7.6	105	160	8	•
SF510 077	7.7				•
SF510 078	7.8				•
SF510 079	7.9				•
SF510 080	8.0				•
SF510 081	8.1	111	166	9	•
SF510 082	8.2				•
SF510 083	8.3				•
SF510 084	8.4				•
SF510 085	8.5				•
SF510 086	8.6	118	173	9	•
SF510 087	8.7				•
SF510 088	8.8				•
SF510 089	8.9				•
SF510 090	9.0				•
SF510 091	9.1	124	179	10	•
SF510 092	9.2				•
SF510 093	9.3				•
SF510 094	9.4				•
SF510 095	9.5				•
SF510 096	9.6	131	186	10	•
SF510 097	9.7				•
SF510 098	9.8				•
SF510 099	9.9				•
SF510 100	10.0				•
SF510 101	10.1	138	193	11	•
SF510 102	10.2				•
SF510 103	10.3				•

Data. P381

# Power Max Drill



## 10 X D / POWER MAX DRILL - LONG / INTERNAL COOLANT

- Double margin

## SF510 ...series



EDP. No.	Dia.	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK	EDP. No.	Dia.	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
SF510 104	10.4	138	193	11	•	SF510 116	11.6	157	218	12	•
SF510 105	10.5				•	SF510 117	11.7				•
SF510 106	10.6				•	SF510 118	11.8				•
SF510 107	10.7	•	SF510 119		11.9	•					
SF510 108	10.8	144	205		•	SF510 120	12.0				164
SF510 109	10.9				•	SF510 121	12.1	•			
SF510 110	11.0			•	SF510 122	12.2	•				
SF510 111	11.1	151	212	12	•	SF510 123	12.3	170	236	13	
SF510 112	11.2				•	SF510 124	12.4				•
SF510 113	11.3				•	SF510 125	12.5				•
SF510 114	11.4			•	SF510 126	12.6	•				
SF510 115	11.5			•	SF510 127	12.7	•				
							•	SF510 128	12.8		
					•	SF510 129	12.9			•	
					•	SF510 130	13.0			•	

Data, P381

■ Tolerance µm=1/1000mm

Tolerance \ Dia.	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
Cutting Edge(h8)	0 -14	0 -18	0 -22	0 -27	0 -33
Shank(h6)	0 -6	0 -8	0 -9	0 -11	0 -13

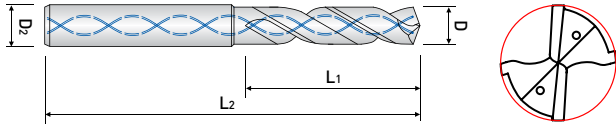


# Power Max Drill



## 20 X D / POWER MAX DRILL - EXTRA LONG / INTERNAL COOLANT

- Double margin



## SF520 ...series



EDP. No.	Dia.	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
SF520 041	4.1	104	155	5	•
SF520 042	4.2				•
SF520 043	4.3				•
SF520 044	4.4				•
SF520 045	4.5				•
SF520 046	4.6	116	167	5	•
SF520 047	4.7				•
SF520 048	4.8				•
SF520 049	4.9				•
SF520 050	5.0				•
SF520 051	5.1	127	178	6	•
SF520 052	5.2				•
SF520 053	5.3				•
SF520 054	5.4				•
SF520 055	5.5				•
SF520 056	5.6	139	190	6	•
SF520 057	5.7				•
SF520 058	5.8				•
SF520 059	5.9				•
SF520 060	6.0				•
SF520 061	6.1	150	203	7	•
SF520 062	6.2				•
SF520 063	6.3				•
SF520 064	6.4				•
SF520 065	6.5				•
SF520 066	6.6	162	215	7	•
SF520 067	6.7				•
SF520 068	6.8				•
SF520 069	6.9				•
SF520 070	7.0				•

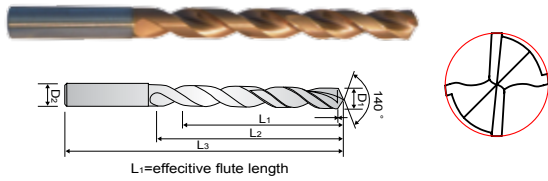
EDP. No.	Dia.	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
SF520 071	7.1	173	228	8	•
SF520 072	7.2				•
SF520 073	7.3				•
SF520 074	7.4				•
SF520 075	7.5				•
SF520 076	7.6	185	240	8	•
SF520 077	7.7				•
SF520 078	7.8				•
SF520 079	7.9				•
SF520 080	8.0				•
SF520 081	8.1	196	251	9	•
SF520 082	8.2				•
SF520 083	8.3				•
SF520 084	8.4				•
SF520 085	8.5				•
SF520 086	8.6	208	263	9	•
SF520 087	8.7				•
SF520 088	8.8				•
SF520 089	8.9				•
SF520 090	9.0				•
SF520 091	9.1	219	274	10	•
SF520 092	9.2				•
SF520 093	9.3				•
SF520 094	9.4				•
SF520 095	9.5				•
SF520 096	9.6	231	286	10	•
SF520 097	9.7				•
SF520 098	9.8				•
SF520 099	9.9				•
SF520 100	10.0				•

Data. P381

■ Tolerance μm = 1/1000mm

Tolerance \ Dia.	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
Cutting Edge(h8)	0 -14	0 -18	0 -22	0 -27	0 -33
Shank(h6)	0 -6	0 -8	0 -9	0 -11	0 -13

# Power Max Drill



## POWER MAX DRILL-HIGH PRECISION

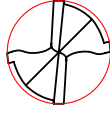
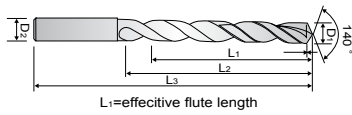
- Applied highly precise hole tolerance on the tool.
- Increased tool life by minimizing chatter and resonance on the (through hole) penetrated hole or (blind hole) one-side open hole area.
- Double margin

## HP503 ...series



EDP. No.	D <sub>1</sub>		D <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	STOCK
	mm	inch					
HP503030	3.0	.1181	6	14	20	62	•
HP503031	3.1	.1220					
HP503032	3.2	.1260					
HP503033	3.3	.1299					
HP503034	3.4	.1339					
HP503035	3.5	.1378					
HP503036	3.6	.1417					
HP503037	3.7	.1457					
HP503038	3.8	.1496	6	17	24	66	•
HP503039	3.9	.1535					
HP503040	4	.1575					
HP503041	4.1	.1614					
HP503042	4.2	.1654					
HP503043	4.3	.1693					
HP503044	4.4	.1732					
HP503045	4.5	.1772					
HP503046	4.6	.1811					
HP503047	4.7	.1850					
HP503048	4.8	.1890	6	20	28	66	•
HP503049	4.9	.1929					
HP503050	5	.1969					
HP503051	5.1	.2008					
HP503052	5.2	.2047					
HP503053	5.3	.2087					
HP503054	5.4	.2126					
HP503055	5.5	.2165					
HP503056	5.6	.2205					
HP503057	5.7	.2244					
HP503058	5.8	.2283					
HP503059	5.9	.2322					
HP503060	6	.2362					

# Power Max Drill



## POWER MAX DRILL-HIGH PRECISION

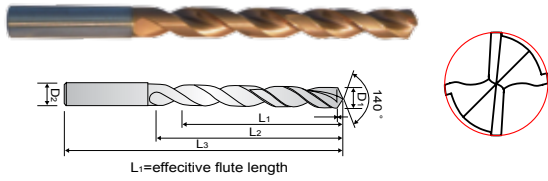
- Applied highly precise hole tolerance on the tool.
- Increased tool life by minimizing chatter and resonance on the (through hole) penetrated hole or (blind hole) one-side open hole area.
- Double margin

## HP503 ...series



EDP. No.	D <sub>1</sub>		D <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	STOCK
	mm	inch					
HP503061	6.1	.2402	8	24	34	79	•
HP503062	6.2	.2441					
HP503063	6.3	.2480					
HP503064	6.4	.2520					
HP503065	6.5	.2559					
HP503066	6.6	.2598					
HP503067	6.7	.2638					
HP503068	6.8	.2677					
HP503069	6.9	.2717					
HP503070	7	.2756					
HP503071	7.1	.2795	8	29	41	79	•
HP503072	7.2	.2835					
HP503073	7.3	.2874					
HP503074	7.4	.2913					
HP503075	7.5	.2953					
HP503076	7.6	.2992					
HP503077	7.7	.3031					
HP503078	7.8	.3071					
HP503079	7.9	.3110					
HP503080	8	.3150					
HP503081	8.1	.3189	10	35	47	89	•
HP503082	8.2	.3228					
HP503083	8.3	.3268					
HP503084	8.4	.3307					
HP503085	8.5	.3346					
HP503086	8.6	.3386					
HP503087	8.7	.3425					
HP503088	8.8	.3465					
HP503089	8.9	.3504					
HP503090	9	.3543					
HP503091	9.1	.3583					

# Power Max Drill



## POWER MAX DRILL-HIGH PRECISION

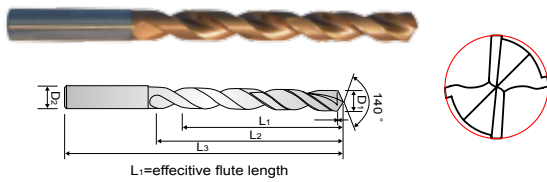
- Applied highly precise hole tolerance on the tool.
- Increased tool life by minimizing chatter and resonance on the (through hole) penetrated hole or (blind hole) one-side open hole area.
- Double margin

## HP503 ...series



EDP. No.	D <sub>1</sub>		D <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	STOCK
	mm	inch					
HP503092	9.2	.3622	10	35	47	89	•
HP503093	9.3	.3661					
HP503094	9.4	.3701					
HP503095	9.5	.3740					
HP503096	9.6	.3780					
HP503097	9.7	.3819					
HP503098	9.8	.3858					
HP503099	9.9	.3898					
HP503100	10	.3937					
HP503101	10.1	.3976					
HP503102	10.2	.4016					
HP503103	10.3	.4055					
HP503104	10.4	.4094					
HP503105	10.5	.4134					
HP503106	10.6	.4173					
HP503107	10.7	.4213					
HP503108	10.8	.4252					
HP503109	10.9	.4291					
HP503110	11	.4331					
HP503111	11.1	.4370					
HP503112	11.2	.4409					
HP503113	11.3	.4449					
HP503114	11.4	.4488					
HP503115	11.5	.4528					
HP503116	11.6	.4567					
HP503117	11.7	.4606					
HP503118	11.8	.4646					
HP503119	11.9	.4685					
HP503120	12	.4724					

# Power Max Drill



## POWER MAX DRILL-HIGH PRECISION

- Applied highly precise hole tolerance on the tool.
- Increased tool life by minimizing chatter and resonance on the (through hole) penetrated hole or (blind hole) one-side open hole area.
- Double margin

## HP503 ...series

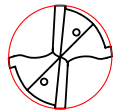
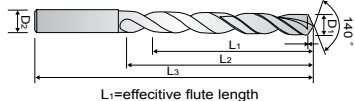


EDP. No.	D <sub>1</sub>		D <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	STOCK
	mm	inch					
HP503121	12.1	.4764	14	43	60	107	•
HP503122	12.2	.4803					
HP503123	12.3	.4843					
HP503124	12.4	.4882					
HP503125	12.5	.4921					
HP503126	12.6	.4961					
HP503127	12.7	.5000					
HP503128	12.8	.5039					
HP503129	12.9	.5079					
HP503130	13	.5118					
HP503131	13.1	.5157					
HP503132	13.2	.5157					
HP503133	13.3	.5236					
HP503135	13.5	.5315					
HP503137	13.7	.5394					
HP503140	14	.5512	16	45	65	115	•
HP503142	14.2	.5591					
HP503143	14.3	.5630					
HP503145	14.5	.5709					
HP503146	14.6	.5787					
HP503148	14.8	.5827					
HP503150	15	.5906					
HP503155	15.5	.6102					
HP503157	15.7	.6181					
HP503160	16	.6299					

■ Tolerance μm = 1/1000mm

Tolerance \ Dia.	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
Cutting Edge(m7)	+12 +2	+16 +4	+21 +6	+25 +7	+29 +8
Shank(h6)	0 -6	0 -8	0 -9	0 -11	0 -13

# Power Max Drill



## 3 X D / POWER MAX DRILL -HIGH PRECISION

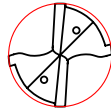
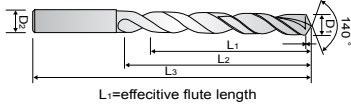
- Applied highly precise hole tolerance on the tool.
- Increased tool life by minimizing chatter and resonance on the (through hole) penetrated hole or (blind hole) one-side open hole area.
- Double margin

## HPI 503 ...series



EDP. No.	D <sub>1</sub>			D <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	STOCK					
	inch	fraction	mm										
HPI 50303175	.1250	1/8	3.175	6	14	20	62	•					
HPI 50303264	.1285	#30	3.264										
HPI 50303572	.1406	9/64	3.572										
HPI 5030397	.1563	5/32	3.97	6	17	24	66	•					
HPI 503040	.1590	#21	4										
HPI 50304039	.1575	-	4.039										
HPI 503042	.1654	-	4.2										
HPI 503043	.1693	-	4.3										
HPI 503045	.1772	-	4.5										
HPI 503046	.1811	-	4.6										
HPI 50304763	.1875	3/16	4.763										
HPI 503048	.1890	-	4.8	6	20	28	66	•					
HPI 503049	.1929	-	4.9										
HPI 503050	.1969	-	5										
HPI 503051	.2008	-	5.1										
HPI 50305159	.2031	13/64	5.159										
HPI 503052	.2047	-	5.2										
HPI 503053	.2087	-	5.3										
HPI 503054	.2126	-	5.4										
HPI 503055	.2165	-	5.5										
HPI 50305558	.2188	7/32	5.558										
HPI 503056	.2205	-	5.6										
HPI 503057	.2244	-	5.7										
HPI 503058	.2283	-	5.8										
HPI 50305953	.2344	15/64	5.953										
HPI 503060	.2362	-	6										
HPI 503062	.2441	-	6.2						8	24	34	79	•
HPI 5030635	.2500	1/4	6.35										
HPI 503065	.2559	-	6.5										
HPI 503066	.2598	-	6.6										
HPI 50306747	.2656	17/64	6.747										
HPI 503068	.2677	-	6.8										
HPI 503070	.2756	-	7										
HPI 50307145	.2813	9/32	7.145										
HPI 503072	.2835	-	7.2	8	29	41	79	•					
HPI 503074	.2913	-	7.4										
HPI 503075	.2953	-	7.5										
HPI 50307541	.2969	19/64	7.541										

# Power Max Drill



## 3 X D / POWER MAX DRILL -HIGH PRECISION

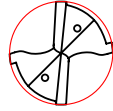
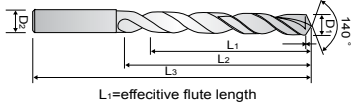
- Applied highly precise hole tolerance on the tool.
- Increased tool life by minimizing chatter and resonance on the (through hole) penetrated hole or (blind hole) one-side open hole area.
- Double margin

## HPI 503 ...series



EDP. No.	D <sub>1</sub>			D <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	STOCK
	inch	fraction	mm					
HPI 503078	.3071	-	7.8	8	29	41	79	•
HPI 503079	.3110	-	7.9					
HPI 50307938	.3125	5/16	7.938					
HPI 503080	.3150	-	8					
HPI 503081	.3189	-	8.1	10	35	47	89	•
HPI 503082	.3228	-	8.2					
HPI 503083	.3268	-	8.3					
HPI 50308334	.3281	21/64	8.334					
HPI 503085	.3346	-	8.5					
HPI 503086	.3386	-	8.6					
HPI 503087	.3425	-	8.7					
HPI 50308733	.3438	11/32	8.733					
HPI 503088	.3465	-	8.8					
HPI 503090	.3543	-	9					
HPI 503091	.3583	-	9.1					
HPI 50309129	.3594	23/64	9.129					
HPI 503092	.3622	-	9.2					
HPI 503093	.3661	-	9.3					
HPI 503095	.3740	-	9.5					
HPI 50309525	.3750	3/8	9.525					
HPI 503096	.3780	-	9.6					
HPI 503097	.3819	-	9.7					
HPI 503098	.3858	-	9.8					
HPI 50309921	.3906	25/64	9.921					
HPI 503100	.3937	-	10	12	40	55	105	•
HPI 503102	.4016	-	10.2					
HPI 5031032	.4063	13/32	10.32					
HPI 503105	.4134	-	10.5					
HPI 503107	.4213	-	10.7					
HPI 50310716	.4219	27/64	10.716					
HPI 503108	.4252	-	10.8					
HPI 503110	.4331	-	11					
HPI 50311113	.4375	7/16	11.113					
HPI 503112	.4409	-	11.2					
HPI 503115	.4528	-	11.5					
HPI 50311509	.4531	29/64	11.509					
HPI 503117	11.7	-	11.7					
HPI 50311908	11.908	15/32	11.908					

# Power Max Drill



## 3 X D / POWER MAX DRILL -HIGH PRECISION

- Applied highly precise hole tolerance on the tool.
- Increased tool life by minimizing chatter and resonance on the (through hole) penetrated hole or (blind hole) one-side open hole area.
- Double margin

## HPI 503 ...series



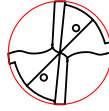
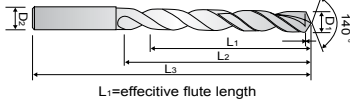
EDP. No.	D <sub>1</sub>			D <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	STOCK
	inch	fraction	mm					
HPI 503120	.4724	-	12	12	40	55	105	•
HPI 503123	.4843	-	12.3					
HPI 50312304	.4844	31/64	12.304					
HPI 503125	.4921	-	12.5					
HPI 503127	.5000	1/2	12.7					
HPI 503128	.5039	-	12.8					
HPI 503130	.5118	-	13					
HPI 503133	.5236	-	13.3					
HPI 50313494	.5313	17/32	13.494					
HPI 503135	.5315	-	13.5					
HPI 503137	.5394	-	13.7					
HPI 50313891	.5469	35/64	13.891	14	43	60	107	•
HPI 503140	.5512	-	14					
HPI 503141	.5551	-	14.1					
HPI 503142	.5591	-	14.2					
HPI 50314288	.5625	9/16	14.288					
HPI 503145	.5709	-	14.5					
HPI 503147	.5787	-	14.7					
HPI 503150	.5906	-	15					
HPI 50315081	.5937	19/32	15.081					
HPI 503155	.6102	-	15.5					
HPI 50315875	.6250	5/8	15.875	16	45	65	115	•
HPI 503160	.6299	-	16					
HPI 503165	.6496	-	16.5					
HPI 503168	.6614	-	16.8					
HPI 503170	.6693	-	17					
HPI 503171	.6732	-	17.1					
HPI 50317463	.6875	11/16	17.463					
HPI 503175	.6890	-	17.5					
HPI 503180	.7087	-	18					
HPI 503190	.7480	-	19					
HPI 5031905	.7500	3/4	19.05	18	51	73	123	•
HPI 503197	.7756	-	19.7					
HPI 503200	.7874	-	20					
HPI 503197	.7756	-	19.7					
HPI 503200	.7874	-	20	20	55	79	131	•
HPI 503197	.7756	-	19.7					
HPI 503200	.7874	-	20					
HPI 503197	.7756	-	19.7					

■ Tolerance µm=1/1000mm

Tolerance	Dia.	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
Cutting Edge(m7)		+12	+16	+21	+25	+29
		+2	+4	+6	+7	+8
Shank(h6)		0	0	0	0	0
		-6	-8	-9	-11	-13



# Power Max Drill



## 5 X D / POWER MAX DRILL -HIGH PRECISION

- Applied highly precise hole tolerance on the tool.
- Increased tool life by minimizing chatter and resonance on the (through hole) penetrated hole or (blind hole) one-side open hole area.
- Double margin

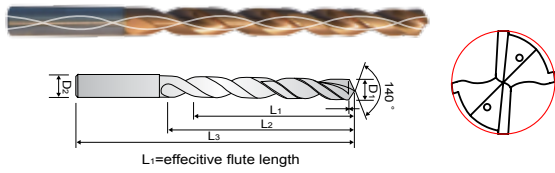
## HPI 505 ...series



EDP. No.	D <sub>1</sub>			D <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	STOCK
	inch	fraction	mm					
HPI50503175**	.1250	1/8	3.175	4	23	29	61	•
HPI50503264**	.1285	#30	3.264					
HPI50503572**	.1406	9/64	3.572					
HPI50503175	.1250	1/8	3.175	6	24	30	66	•
HPI50503264	.1285	#30	3.264					
HPI50503572	.1406	9/64	3.572					
HPI 5050397	.1563	5/32	3.97	6	29	36	74	•
HPI 505040	.1575	-	4					
HPI 50504039	.1590	#21	4.039					
HPI 505041	.1614	-	4.1					
HPI 505042	.1654	-	4.2					
HPI 505043	.1693	-	4.3					
HPI 50504366	.1719	11/64	4.366					
HPI 505044	.1732	-	4.4					
HPI 505045	.1772	-	4.5					
HPI 5050458	.1803	-	4.58					
HPI 505046	.1811	-	4.6					
HPI 50504623	.1820	-	4.623					
HPI 505047	.1850	-	4.7					
HPI 50504763	.1875	3/16	4.763	6	35	44	82	•
HPI 505048	.1890	-	4.8					
HPI 505049	.1929	-	4.9					
HPI 505050	.1969	-	5					
HPI 505051	.2008	-	5.1					
HPI 50505159	.2031	13/64	5.159					
HPI 505052	.2047	-	5.2					
HPI 505053	.2087	-	5.3					
HPI 505054	.2126	-	5.4					
HPI 5050541	.2130	-	5.41					
HPI 505055	.2165	-	5.5					
HPI 50505558	.2188	7/32	5.558					
HPI 505056	.2205	-	5.6					
HPI 505057	.2244	-	5.7					
HPI 505058	.2283	-	5.8					
HPI 505059	.2323	-	5.9					
HPI 50505953	.2344	15/64	5.953					
HPI 505060	.2362	-	6					

\*\* : Available while supplies last

# Power Max Drill



## 5 X D / POWER MAX DRILL -HIGH PRECISION

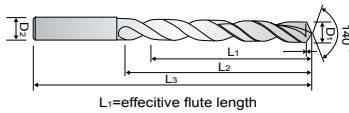
- Applied highly precise hole tolerance on the tool.
- Increased tool life by minimizing chatter and resonance on the (through hole) penetrated hole or (blind hole) one-side open hole area.
- Double margin

## HPI 505 ...series

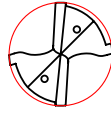


EDP. No.	D <sub>1</sub>			D <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	STOCK
	inch	fraction	mm					
HPI 505061	.2402	-	6.1	8	43	53	91	•
HPI 505062	.2441	-	6.2					
HPI 505063	.2480	-	6.3					
HPI 5050635	.2500	1/4	6.35					
HPI 505064	.2520	-	6.4					
HPI 505065	.2559	-	6.5					
HPI 50506528	.2570	-	6.528					
HPI 505066	.2598	-	6.6					
HPI 505067	.2638	-	6.7					
HPI 50506747	.2656	17/64	6.747					
HPI 505068	.2677	-	6.8					
HPI 505069	.2717	-	6.9					
HPI 50506909	.2720	-	6.909					
HPI 505070	.2756	-	7					
HPI 505071	.2795	-	7.1					
HPI 50507145	.2813	9/32	7.145					
HPI 505072	.2835	-	7.2					
HPI 505073	.2874	-	7.3					
HPI 505074	.2913	-	7.4					
HPI 505075	.2953	-	7.5					
HPI 50507541	.2969	19/64	7.541					
HPI 505076	.2992	-	7.6					
HPI 505077	.3031	-	7.7					
HPI 505078	.3071	-	7.8					
HPI 505079	.3110	-	7.9					
HPI 50507938	.3125	5/16	7.938					
HPI 505080	.3150	-	8					
HPI 505081	.3189	-	8.1					
HPI 505082	.3228	-	8.2					
HPI 505083	.3268	-	8.3					
HPI 50508334	.3281	21/64	8.334					
HPI 505084	.3307	-	8.4					
HPI 50508433	.3320	-	8.433					
HPI 505085	.3346	-	8.5					
HPI 505086	.3386	-	8.6					
HPI 505087	.3425	-	8.7					
HPI 50508733	.3438	11/32	8.733					
				10	49	61	103	•

# Power Max Drill



L<sub>1</sub>=effective flute length



## 5 X D / POWER MAX DRILL -HIGH PRECISION

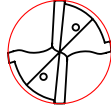
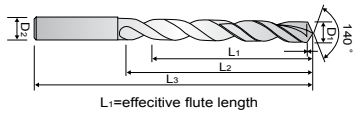
- Applied highly precise hole tolerance on the tool.
- Increased tool life by minimizing chatter and resonance on the (through hole) penetrated hole or (blind hole) one-side open hole area.
- Double margin



## HPI 505 ...series

EDP. No.	D <sub>1</sub>			D <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	STOCK
	inch	fraction	mm					
HPI 505088	.3465	-	8.8	10	49	61	103	•
HPI 505089	.3504	-	8.9					
HPI 505090	.3543	-	9					
HPI 505091	.3583	-	9.1					
HPI 50509129	.3594	23/64	9.129					
HPI 505092	.3622	-	9.2					
HPI 505093	.3661	-	9.3					
HPI 50509347	.3680	-	9.347					
HPI 505094	.3701	-	9.4					
HPI 505095	.3740	-	9.5					
HPI 50509525	.3750	3/8	9.525					
HPI 505096	.3780	-	9.6					
HPI 505097	.3819	-	9.7					
HPI 50509703	.3820	-	9.703					
HPI 50509746	.3837	-	9.746					
HPI 505098	.3858	-	9.8					
HPI 505099	.3898	-	9.9					
HPI 50509921	.3906	25/64	9.921					
HPI 505100	.3937	-	10					
HPI 505101	.3976	-	10.1					
HPI 505102	.4016	-	10.2					
HPI 505103	.4055	-	10.3					
HPI 5051032	.4063	13/32	10.32					
HPI 505104	.4094	-	10.4					
HPI 505105	.4134	-	10.5					
HPI 505106	.4173	-	10.6					
HPI 505107	.4213	-	10.7					
HPI 50510716	.4219	27/64	10.716					
HPI 505108	.4252	-	10.8					
HPI 505109	.4291	-	10.9					
HPI 505110	.4331	-	11					
HPI 505111	.4370	-	11.1					
HPI 50511113	.4375	7/16	11.113					
HPI 505112	.4409	-	11.2					
HPI 505113	.4449	-	11.3					
HPI 505114	.4488	-	11.4					
HPI 505115	.4528	-	11.5					

# Power Max Drill



## 5 X D / POWER MAX DRILL -HIGH PRECISION

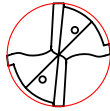
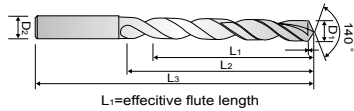
- Applied highly precise hole tolerance on the tool.
- Increased tool life by minimizing chatter and resonance on the (through hole) penetrated hole or (blind hole) one-side open hole area.
- Double margin

## HPI 505 ...series



EDP. No.	D <sub>1</sub>			D <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	STOCK
	inch	fraction	mm					
HPI 50511509	.4531	29/64	11.509	12	56	71	118	•
HPI 505116	.4567	-	11.6					
HPI 505117	.4606	-	11.7					
HPI 505118	.4646	-	11.8					
HPI 505119	.4685	-	11.9					
HPI 50511908	.4688	15/32	11.908					
HPI 505120	.4724	-	12	14	60	77	124	•
HPI 505121	.4764	-	12.1					
HPI 505122	.4803	-	12.2					
HPI 505123	.4843	-	12.3					
HPI 50512304	.4844	31/64	12.304					
HPI 505124	.4882	-	12.4					
HPI 505125	.4921	-	12.5					
HPI 505126	.4961	-	12.6					
HPI 505127	.5000	1/2	12.7					
HPI 505128	.5039	-	12.8					
HPI 505129	.5079	-	12.9					
HPI 50512903	.5080	-	12.903					
HPI 505130	.5118	-	13					
HPI 50513096	.5156	33/64	13.096					
HPI 505131	.5157	-	13.1					
HPI 505133	.5236	-	13.3					
HPI 50513494	.5313	17/32	13.494					
HPI 505135	.5315	-	13.5					
HPI 505137	.5394	-	13.7					
HPI 505138	.5433	-	13.8					
HPI 50513891	.5469	35/64	13.891					
HPI 505140	.5512	-	14	16	63	83	133	•
HPI 505142	.5591	-	14.2					
HPI 50514288	.5625	9/16	14.288					
HPI 505145	.5709	-	14.5					
HPI 505146	.5748	-	14.6					
HPI 505147	.5787	-	14.7					
HPI 505149	.5866	-	14.9					
HPI 505150	.5906	-	15					
HPI 50515081	.5937	19/32	15.081					
HPI 505151	.5945	-	15.1					

# Power Max Drill



## 5 X D / POWER MAX DRILL -HIGH PRECISION

- Applied highly precise hole tolerance on the tool.
- Increased tool life by minimizing chatter and resonance on the (through hole) penetrated hole or (blind hole) one-side open hole area.
- Double margin



## HPI 505 ...series

EDP. No.	D <sub>1</sub>			D <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	STOCK					
	inch	fraction	mm										
HPI 505155	.6102	-	.6102	18	63	83	133	•					
HPI 505157	.6181	-	.6181										
HPI 505158	.6220	-	.6220										
HPI 50515875	.6250	5/8	.6250										
HPI 505159	.6260	-	.6260										
HPI 505160	.6299	-	.6299										
HPI 50516078	.6330	-	.6330	18	71	93	143	•					
HPI 505162	.6378	-	.6378										
HPI 505164	.6457	-	.6457										
HPI 505165	.6496	-	.6496										
HPI 505166	.6535	-	.6535										
HPI 50516667	.6562	21/32	.6562										
HPI 505167	.6575	-	.6575										
HPI 505170	.6693	-	.6693										
HPI 50517463	.6875	11/16	.6875										
HPI 505175	.6890	-	.6890										
HPI 505177	.6969	-	.6969										
HPI 505180	.7087	-	.7087										
HPI 505184	.7244	-	.7244						20	77	101	153	•
HPI 505185	.7283	-	.7283										
HPI 505186	.7323	-	.7323										
HPI 505188	.7402	-	.7402										
HPI 505190	.7480	-	.7480										
HPI 5051905	.7500	3/4	.7500										
HPI 505192	.7559	-	.7559										
HPI 50519253	.7580	-	.7580										
HPI 50519446	.7656	49/64	.7656										
HPI 505195	.7677	-	.7677										
HPI 505197	.7756	-	.7756										
HPI 50519844	.7813	25/32	.7813										
HPI 505200	.7874	-	.7874										

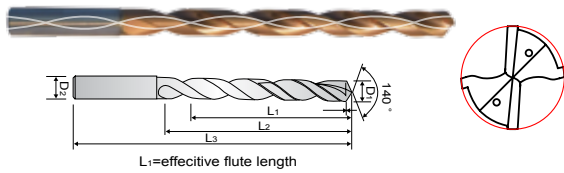
\*\* : Available while supplies last

### ■ Tolerance

μm = 1/1000mm

Tolerance	Dia.	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
Cutting Edge(m7)		+12	+16	+21	+25	+29
		+2	+4	+6	+7	+8
Shank(h6)		0	0	0	0	0
		-6	-8	-9	-11	-13

# Power Max Drill



## 8 X D / POWER MAX DRILL -HIGH PRECISION

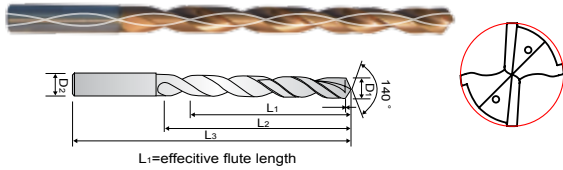
- Applied highly precise hole tolerance on the tool.
- Increased tool life by minimizing chatter and resonance on the (through hole) penetrated hole or (blind hole) one-side open hole area.
- Double margin

## HPI 508 ...series



EDP. No.	D <sub>1</sub>			D <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	STOCK
	inch	fraction	mm					
HPI 50803175	.1250	1/8	3.175	6	37	43	80	•
HPI 50803264	.1285	#30	3.264					
HPI 50803572	.1406	9/64	3.572					
HPI 5080397	.1563	5/32	3.97	6	41	49	87	•
HPI 50804039	.1590	#21	4.039					
HPI 50804763	.1875	3/16	4.763	6	48	56	94	•
HPI 508050	.1969	-	5					
HPI 508051	.2008	-	5.1					
HPI 50805159	.2031	13/64	5.159					
HPI 508052	.2047	-	5.2					
HPI 508053	.2087	-	5.3					
HPI 508055	.2165	-	5.5					
HPI 50805558	.2188	7/32	5.558					
HPI 508057	.2244	-	5.7					
HPI 50805953	.2344	15/64	5.953					
HPI 508060	.2362	-	6	8	57	67	105	•
HPI 508061	.2402	-	6.1					
HPI 508062	.2441	-	6.2					
HPI 508063	.2480	-	6.3					
HPI 5080635	.2500	1/4	6.35					
HPI 508064	.2520	-	6.4					
HPI 508065	.2559	-	6.5					
HPI 508066	.2598	-	6.6					
HPI 508067	.2638	-	6.7					
HPI 50806746	.2656	17/64	6.746					
HPI 508068	.2677	-	6.8					
HPI 508070	.2756	-	7	8	61	72	110	•
HPI 50807145	.2813	9/32	7.145					
HPI 508075	.2953	-	7.5					
HPI 50807541	.2969	19/64	7.541					
HPI 508077	.3031	-	7.7					
HPI 508078	.3071	-	7.8					
HPI 50807938	.3125	5/16	7.938					
HPI 508080	.3150	-	8					
HPI 508081	.3189	-	8.1					
HPI 50808334	.3281	21/64	8.334					
				10	68	80	122	•

# Power Max Drill



## 8 X D / POWER MAX DRILL -HIGH PRECISION

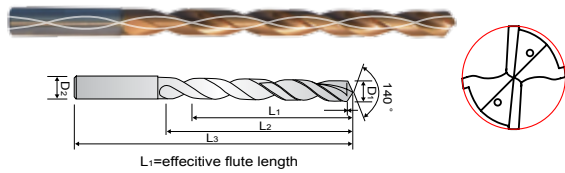
- Applied highly precise hole tolerance on the tool.
- Increased tool life by minimizing chatter and resonance on the (through hole) penetrated hole or (blind hole) one-side open hole area.
- Double margin



## HPI 508 ...series

EDP. No.	D <sub>1</sub>			D <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	STOCK
	inch	fraction	mm					
HPI 508085	.3346	-	8.5	10	68	80	122	•
HPI 508086	.3386	-	8.6					
HPI 508087	.3425	-	8.7					
HPI 50808733	.3438	11/32	8.733					
HPI 508088	.3465	-	8.8					
HPI 508090	.3543	-	9					
HPI 508091	.3583	-	9.1					
HPI 50809129	.3594	23/64	9.129					
HPI 508095	.3740	-	9.5					
HPI 50809525	.3750	3/8	9.525					
HPI 508097	.3819	-	9.7					
HPI 508098	.3858	-	9.8					
HPI 508099	.3898	-	9.9					
HPI 50809921	.3906	25/64	9.921					
HPI 508100	.3937	-	10	12	79	94	141	•
HPI 508101	.3976	-	10.1					
HPI 508102	.4016	-	10.2					
HPI 508103	.4055	-	10.3					
HPI 5081032	.4063	13/32	10.32					
HPI 508105	.4134	-	10.5					
HPI 50810716	.4219	27/64	10.716					
HPI 508108	.4252	-	10.8					
HPI 508110	.4331	-	11					
HPI 50811113	.4375	7/16	11.113					
HPI 508112	.4409	-	11.2					
HPI 508113	.4449	-	11.3					
HPI 508114	.4488	-	11.4					
HPI 508115	.4528	-	11.5					
HPI 50811509	.4531	29/64	11.509					
HPI 508117	.4606	-	11.7					
HPI 508118	.4646	-	11.8					
HPI 50811908	.4688	15/32	11.908					
HPI 508120	.4724	-	12					
HPI 50812304	.4844	31/64	12.304	14	91	108	155	•
HPI 508125	.4921	-	12.5					
HPI 508127	.5000	1/2	12.7					

# Power Max Drill



## 8 X D / POWER MAX DRILL -HIGH PRECISION

- Applied highly precise hole tolerance on the tool.
- Increased tool life by minimizing chatter and resonance on the (through hole) penetrated hole or (blind hole) one-side open hole area.
- Double margin

## HPI 508 ...series



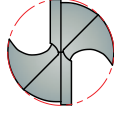
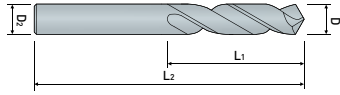
EDP. No.	D <sub>1</sub>			D <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	STOCK
	inch	fraction	mm					
HPI 508128	.5039	-	12.8	14	91	108	155	•
HPI 508130	.5118	-	13					
HPI 508135	.5315	-	13.5					
HPI 508140	.5512	-	14					
HPI 50814288	.5625	9/16	14.288	16	101	121	171	•
HPI 508145	.5709	-	14.5					
HPI 508150	.5906	-	15					
HPI 508151	.5945	-	15.1					
HPI 508152	.5984	-	15.2					
HPI 508153	.6024	-	15.3					
HPI 508155	.6102	-	15.5					
HPI 508158	.6220	-	15.8					
HPI 50815875	.6250	5/8	15.875					
HPI 508160	.6299	-	16					
HPI 50816078	.6330	-	16.078					
HPI 508162	.6378	-	16.2					
HPI 508165	.6496	-	16.5					
HPI 508170	.6693	-	17					
HPI 50817463	.6875	11/16	17.463					
HPI 508175	.6890	-	17.5	20	124	148	200	•
HPI 508180	.7087	-	18					
HPI 508185	.7283	-	18.5					
HPI 508190	.7480	-	19					
HPI 5081905	.7500	3/4	19.05					
HPI 50819253	.7580	-	19.253					
HPI 508198	.7795	-	19.8					
HPI 508200	.7874	-	20					

■ Tolerance μm=1/1000mm

Tolerance \ Dia.	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
Cutting Edge(m7)	+12 +2	+16 +4	+21 +6	+25 +7	+29 +8
Shank(h6)	0 -6	0 -8	0 -9	0 -11	0 -13



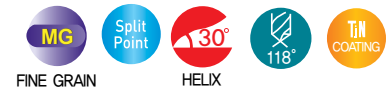
# Power Max Drill



## SSTD -REGULAR LENGTH(3XD)

- Improved surface roughness
- Suitable for non-ferrous and aluminum machining
- Suitable for High Speed Machining

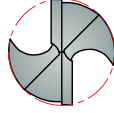
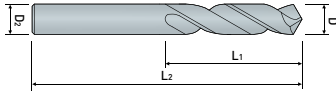
## SSTD ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
SSTD005	0.5	6	22	0.5
SSTD0055	0.55	7	24	0.55
SSTD006	0.6			0.6
SSTD0065	0.65	8	26	0.65
SSTD007	0.7	9	28	0.7
SSTD0075	0.75			0.75
SSTD008	0.8	10	30	0.8
SSTD0085	0.85			0.85
SSTD009	0.9	11	32	0.9
SSTD0095	0.95			0.95
SSTD010	1.0	10	38	1.0
SSTD011	1.1			1.1
SSTD012	1.2			1.2
SSTD013	1.3			1.3
SSTD014	1.4			1.4
SSTD015	1.5	13	38	1.5
SSTD016	1.6			1.6
SSTD017	1.7			1.7
SSTD018	1.8			1.8
SSTD019	1.9			1.9
SSTD020	2.0	16	45	2.0
SSTD021	2.1			2.1
SSTD022	2.2			2.2
SSTD023	2.3			2.3
SSTD024	2.4	18	50	2.4
SSTD025	2.5	20	50	2.5
SSTD026	2.6			2.6
SSTD027	2.7	22	50	2.7
SSTD028	2.8			2.8
SSTD029	2.9			2.9
SSTD030	3.0			3.0
SSTD031	3.1	25	50	3.1
SSTD032	3.2			3.2
SSTD033	3.3			3.3
SSTD034	3.4			3.4
SSTD035	3.5			3.5

Data. P380

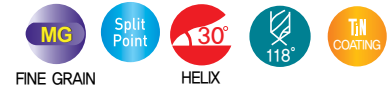
# Power Max Drill



## SSTD -REGULAR LENGTH(3XD)

- Improved surface roughness
- Suitable for non-ferrous and aluminum machining
- Suitable for High Speed Machining

## SSTD ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
SSTD036	3.6	28	55	3.6
SSTD037	3.7			3.7
SSTD038	3.8			3.8
SSTD039	3.9			3.9
SSTD040	4.0			4.0
SSTD041	4.1	30	60	4.1
SSTD042	4.2			4.2
SSTD043	4.3			4.3
SSTD044	4.4			4.4
SSTD045	4.5			4.5
SSTD046	4.6	33	65	4.6
SSTD047	4.7			4.7
SSTD048	4.8	35	65	4.8
SSTD049	4.9			4.9
SSTD050	5.0			5.0
SSTD051	5.1			5.1
SSTD052	5.2			5.2
SSTD053	5.3			5.3
SSTD054	5.4			5.4
SSTD055	5.5			5.5
SSTD056	5.6	38	75	5.6
SSTD057	5.7			5.7
SSTD058	5.8			5.8
SSTD059	5.9			5.9
SSTD060	6.0			6.0
SSTD061	6.1			6.1
SSTD062	6.2			6.2
SSTD063	6.3			6.3
SSTD064	6.4	6.4		

Data, P380

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

Tolerance	Dia.	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18
Cutting Edge(h8)		0	0	0	0
		-14	-18	-22	-27
Shank(h6)		0	0	0	0
		-10	-12	-15	-18

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
SSTD066	6.6	45	80	6.6
SSTD067	6.7			6.7
SSTD068	6.8			6.8
SSTD069	6.9			6.9
SSTD070	7.0			7.0
SSTD071	7.1			7.1
SSTD072	7.2			7.2
SSTD073	7.3			7.3
SSTD074	7.4			7.4
SSTD075	7.5			7.5
SSTD076	7.6	50	85	7.6
SSTD077	7.7			7.7
SSTD078	7.8			7.8
SSTD079	7.9			7.9
SSTD080	8.0			8.0
SSTD081	8.1			8.1
SSTD082	8.2			8.2
SSTD083	8.3			8.3
SSTD084	8.4			8.4
SSTD085	8.5			8.5
SSTD086	8.6	50	95	8.6
SSTD087	8.7			8.7
SSTD088	8.8			8.8
SSTD089	8.9			8.9
SSTD090	9.0			9.0
SSTD091	9.1			9.1
SSTD092	9.2			9.2
SSTD093	9.3			9.3
SSTD094	9.4			9.4
SSTD095	9.5			9.5
SSTD096	9.6	9.6		
SSTD097	9.7	9.7		
SSTD098	9.8	9.8		
SSTD099	9.9	55	100	9.9
SSTD100	10.0			10.0
SSTD101	10.1	55	115	10.1
SSTD102	10.2			10.2
SSTD103	10.3			10.3
SSTD104	10.4			10.4
SSTD105	10.5			10.5
SSTD106	10.6	60	115	10.6
SSTD107	10.7			10.7
SSTD108	10.8			10.8
SSTD109	10.9			10.9
SSTD110	11.0			11.0
SSTD111	11.1	65	120	11.1
SSTD112	11.2			11.2
SSTD113	11.3			11.3
SSTD115	11.5			11.5
SSTD118	11.8			11.8
SSTD119	11.9			11.9
SSTD120	12.0			12.0
SSTD124	12.4	70	125	12.4
SSTD125	12.5			12.5
SSTD130	13.0	75	130	13.0

Data. P380

# Power Drill Series







**DRILL  
SERIES**



## Power Drill



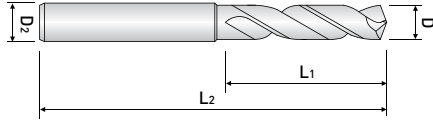
ITEM SERIES	APPEARANCE	FEATURE	INCH & METRIC	PAGE
<b>PDS ...series</b>		STUB / 3 x D	METRIC	364
<b>PDM ...series</b>		MEDIUM / 5 x D	METRIC	366
<b>PDSI ...series</b>		STUB / INTERNAL COOLANT / 3 x D	METRIC	368
<b>PDMI...series</b>		INTERNAL COOLANT / 5 x D	METRIC	370

# Power Drill

DRILLS  
> Fractional



POWER DRILL - STUB / 3 x D



## PDS ...series



EDP. No.	Dia.	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK	EDP. No.	Dia.	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK		
PDS010	1	8	38	3	•	PDS052	5.2	28	66	6	•		
PDS011	1.1	10	42		•	PDS053	5.3				•		
PDS012	1.2				•	PDS054	5.4				•		
PDS013	1.3				•	PDS055	5.5				•		
PDS014	1.4				•	PDS056	5.6				•		
PDS015	1.5	11			•	PDS057	5.7				•		
PDS016	1.6	12			•	PDS058	5.8				•		
PDS017	1.7				•	PDS059	5.9				•		
PDS018	1.8				•	PDS060	6.0				•		
PDS019	1.9	13			•	PDS061	6.1				34	74	7
PDS020	2.0	14		50	•	PDS062	6.2	•					
PDS021	2.1		•		PDS063	6.3	•						
PDS022	2.2		•		PDS064	6.4	•						
PDS023	2.3		•		PDS065	6.5	•						
PDS024	2.4		•		PDS066	6.6	•						
PDS025	2.5		37		3	•	PDS067	6.7	•				
PDS026	2.6					•	PDS068	6.8	•				
PDS027	2.7					•	PDS069	6.9	•				
PDS028	2.8					•	PDS070	7.0	•				
PDS029	2.9		18			60	•	PDS071	7.1	40	79	8	•
PDS030	3.0	•		PDS072			7.2	•					
PDS031	3.1	20		4			•	PDS073	7.3				•
PDS032	3.2						•	PDS074	7.4				•
PDS033	3.3						•	PDS075	7.5				•
PDS034	3.4						•	PDS076	7.6				•
PDS035	3.5	22			60		•	PDS077	7.7				•
PDS036	3.6						•	PDS078	7.8				•
PDS037	3.7						•	PDS079	7.9				•
PDS038	3.8						•	PDS080	8.0				•
PDS039	3.9	24	5			•	PDS081	7.1	43	84	9	•	
PDS040	4.0					•	PDS082	7.2				•	
PDS041	4.1			24		•	PDS083	7.3				•	
PDS042	4.2			26		62	•	PDS084				7.4	•
PDS043	4.3	•					PDS085	7.5				•	
PDS044	4.4	•					PDS086	7.6				•	
PDS045	4.5	•			PDS087		7.7	•					
PDS046	4.6	•			PDS088		7.8	•					
PDS047	4.7	•			PDS089		7.9	•					
PDS048	4.8	•			PDS090		8.0	•					
PDS049	4.9	•	PDS091		9.1		47	89	10	•			
PDS050	5.0	•	PDS092		9.2					•			
PDS051	5.1	28	66		6					•	PDS093	9.3	•

Data. P378

EDP. No.	Dia.	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
PDS094	9.4	47	89	10	•
PDS095	9.5				•
PDS096	9.6				•
PDS097	9.7				•
PDS098	9.8				•
PDS099	9.9				•
PDS100	10.0				•
PDS101	10.1	51	95	11	•
PDS102	10.2				•
PDS103	10.3				•
PDS104	10.4				•
PDS105	10.5				•
PDS106	10.6				•
PDS107	10.7				•
PDS108	10.8				•
PDS109	10.9				•
PDS110	11.0				•
PDS111	11.1	54	102	12	•
PDS112	11.2				•
PDS113	11.3				•
PDS114	11.4				•
PDS115	11.5				•
PDS116	11.6				•
PDS117	11.7				•
PDS118	11.8				•
PDS119	11.9				•
PDS120	12.0				•
PDS121	12.1	57	102	13	•
PDS122	12.2				•
PDS123	12.3				•
PDS124	12.4				•
PDS125	12.5				•
PDS126	12.6				•
PDS127	12.7				•
PDS128	12.8				•
PDS129	12.9				•
PDS130	13.0				•
PDS131	13.1	60	107	14	•
PDS132	13.2				•
PDS133	13.3				•
PDS132	13.4				•
PDS135	13.5				•
PDS136	13.6				•
PDS137	13.7				•
PDS138	13.8				•
PDS139	13.9				•
PDS140	14.0				•

EDP. No.	Dia.	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK			
PDS141	14.1	62	111	15	•			
PDS142	14.2				•			
PDS143	14.3				•			
PDS144	14.4				•			
PDS145	14.5				•			
PDS146	14.6				•			
PDS147	14.7				•			
PDS148	14.8				•			
PDS149	14.9				•			
PDS150	15.0				•			
PDS151	15.1	64	115	16	•			
PDS152	15.2				•			
PDS154	15.4				•			
PDS155	15.5				•			
PDS156	15.6				•			
PDS157	15.7				•			
PDS158	15.8				•			
PDS159	15.9				•			
PDS160	16.0				•			
PDS161	16.1				66	119	17	•
PDS163	16.3	•						
PDS164	16.4	•						
PDS165	16.5	•						
PDS170	17.0	•						
PDS171	17.1	66	123	18				•
PDS172	17.2							•
PDS173	17.3							•
PDS175	17.5							•
PDS177	17.7							•
PDS178	17.8				•			
PDS180	18.0				•			
PDS181	18.1				70	127	19	•
PDS182	18.2							•
PDS185	18.5							•
PDS190	19.0	•						
PDS191	19.1	70	131	20				•
PDS192	19.2							•
PDS195	19.5							•
PDS197	19.7							•
PDS200	20.0							•
PDS220	22.0							75
PDS225	22.5				80	131	23	•
PDS230	23.0				86	140	23	•
PDS235	23.5				86	140	24	•
PDS240	24.0							•

Data. P378

■ Tolerance

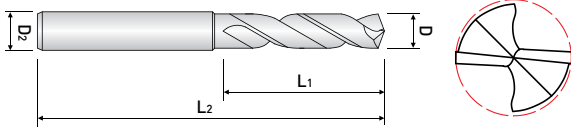
μm = 1/1000mm

Tolerance \ Dia.	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
Cutting Edge(h8)	0 -14	0 -18	0 -22	0 -27	0 -33
Shank(h6)	0 -6	0 -8	0 -9	0 -11	0 -13

# Power Drill



## POWER DRILL - MEDIUM / 5 x D



## PDM ...series



EDP. No.	Dia.	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK	
PDM030	3.0	25	60	3	•	
PDM031	3.1	27		4	•	
PDM032	3.2				•	
PDM033	3.3				•	
PDM034	3.4	30	65		•	
PDM035	3.5			•		
PDM036	3.6			•		
PDM037	3.7			•		
PDM038	3.8	33	71	•		
PDM039	3.9			•		
PDM040	4.0			•		
PDM041	4.1			33	71	•
PDM042	4.2	•				
PDM043	4.3	36	71			•
PDM044	4.4					•
PDM045	4.5			•		
PDM046	4.6			39	71	•
PDM047	4.7	•				
PDM048	4.8	•				
PDM049	4.9	•				
PDM050	5.0	39	83	5	•	
PDM051	5.1				•	
PDM052	5.2				•	
PDM053	5.3				43	83
PDM054	5.4	•				
PDM055	5.5	•				
PDM056	5.6	47	87	7		
PDM057	5.7				•	
PDM058	5.8				•	
PDM059	5.9				•	
PDM060	6.0	47	87	7	•	
PDM061	6.1				•	
PDM062	6.2				•	
PDM063	6.3				•	
PDM064	6.4	47	87	7	•	
PDM065	6.5				•	
PDM066	6.6				•	

EDP. No.	Dia.	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
PDM067	6.7	47	87	7	•
PDM068	6.8				•
PDM069	6.9				•
PDM070	7.0				•
PDM071	7.1	52	92	8	•
PDM072	7.2				•
PDM073	7.3				•
PDM074	7.4				•
PDM075	7.5	52	92	8	•
PDM076	7.6				•
PDM077	7.7				•
PDM078	7.8				•
PDM079	7.9	56	96	9	•
PDM080	8.0				•
PDM081	8.1				•
PDM082	8.2				56
PDM083	8.3	•			
PDM084	8.4	•			
PDM085	8.5	•			
PDM086	8.6	56	96	9	•
PDM087	8.7				•
PDM088	8.8				•
PDM089	8.9				62
PDM090	9.0	•			
PDM091	9.1	•			
PDM092	9.2	62	105	10	
PDM093	9.3				•
PDM094	9.4				•
PDM095	9.5				68
PDM096	9.6	•			
PDM097	9.7	•			
PDM098	9.8	68	115	11	
PDM099	9.9				•
PDM100	10.0				•
PDM101	10.1				68
PDM102	10.2	•			
PDM103	10.3	•			

Data. P378



EDP. No.	Dia.	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
PDM104	10.4	68	115	11	•
PDM105	10.5				•
PDM106	10.6				•
PDM107	10.7				•
PDM108	10.8				•
PDM109	10.9				•
PDM110	11.0				•
PDM111	11.1	71	121	12	•
PDM112	11.2				•
PDM113	11.3				•
PDM114	11.4				•
PDM115	11.5				•
PDM116	11.6				•
PDM117	11.7				•
PDM118	11.8				•
PDM119	11.9				•
PDM120	12.0				•
PDM121	12.1	75	125	13	•
PDM122	12.2				•
PDM123	12.3				•
PDM124	12.4				•
PDM125	12.5				•
PDM126	12.6				•
PDM127	12.7				•
PDM128	12.8				•
PDM129	12.9				•
PDM130	13.0				•
PDM131	13.1	80	134	14	•
PDM132	13.2				•
PDM133	13.3				•
PDM134	13.4				•
PDM135	13.5				•
PDM136	13.6				•
PDM137	13.7				•
PDM138	13.8				•
PDM139	13.9				•
PDM140	14.0				•

EDP. No.	Dia.	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
PDM141	14.1	83	143	15	•
PDM142	14.2				•
PDM143	14.3				•
PDM144	14.4				•
PDM145	14.5				•
PDM146	14.6				•
PDM147	14.7				•
PDM148	14.8				•
PDM149	14.9				•
PDM150	15.0				•
PDM151	15.1	90	152	16	•
PDM152	15.2				•
PDM154	15.4				•
PDM155	15.5				•
PDM156	15.6				•
PDM157	15.7				•
PDM158	15.8				•
PDM160	16.0				•
PDM161	16.1	95	155	17	•
PDM163	16.3				•
PDM165	16.5				•
PDM170	17.0				•
PDM171	17.1	100	157	18	•
PDM172	17.2				•
PDM175	17.5				•
PDM177	17.7				•
PDM178	17.8				•
PDM180	18.0				•
PDM181	18.1				•
PDM182	18.2				•
PDM185	18.5	105	160	19	•
PDM190	19.0				•
PDM191	19.1				•
PDM195	19.5	110	163	20	•
PDM197	19.7				•
PDM199	19.9				•
PDM200	20.0				•

Data, P378

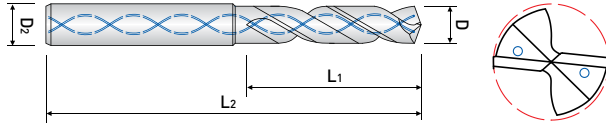
■ Tolerance μm = 1/1000mm

Tolerance \ Dia.	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
Cutting Edge(h8)	0 -14	0 -18	0 -22	0 -27	0 -33
Shank(h6)	0 -6	0 -8	0 -9	0 -11	0 -13

# Power Drill



**POWER DRILL - STUB  
/ INTERNAL COOLANT / 3 x D**



## PDSI ...series



EDP. No.	Dia.	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK	EDP. No.	Dia.	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK		
PDSI030	3.0	25	60	3	•	PDSI067	6.7	37	74	7	•		
PDSI031	3.1	20		4	•	PDSI068	6.8				•		
PDSI032	3.2				•	PDSI069	6.9				•		
PDSI033	3.3				•	PDSI070	7.0				•		
PDSI034	3.4				22	•	PDSI071				7.1	•	
PDSI035	3.5					•	PDSI072	7.2	•				
PDSI036	3.6	•				PDSI073	7.3	•					
PDSI037	3.7	•				PDSI074	7.4	•					
PDSI038	3.8	24				•	PDSI075	7.5	•				
PDSI039	3.9				•	PDSI076	7.6	•					
PDSI040	4.0		•		PDSI077	7.7	•						
PDSI041	4.1		26	62	5	•	PDSI078	7.8	•				
PDSI042	4.2					•	PDSI079	7.9	•				
PDSI043	4.3	•				PDSI080	8.0	•					
PDSI044	4.4	•				PDSI081	8.1	•					
PDSI045	4.5	•				PDSI082	8.2	•					
PDSI046	4.6	28				66	6	•	PDSI083	8.3	•		
PDSI047	4.7							•	PDSI084	8.4	•		
PDSI048	4.8							•	PDSI085	8.5	•		
PDSI049	4.9							•	PDSI086	8.6	•		
PDSI050	5.0							•	PDSI087	8.7	•		
PDSI051	5.1		30	74	7			•	PDSI088	8.8	•		
PDSI052	5.2							•	PDSI089	8.9	•		
PDSI053	5.3							•	PDSI090	9.0	•		
PDSI054	5.4							34	6	•	PDSI091	9.1	•
PDSI055	5.5									•	PDSI092	9.2	•
PDSI056	5.6	28	•			PDSI093	9.3			•			
PDSI057	5.7		66			•	PDSI094			9.4	•		
PDSI058	5.8					30	•			PDSI095	9.5	•	
PDSI059	5.9						74	•		PDSI096	9.6	•	
PDSI060	6.0							6		•	PDSI097	9.7	•
PDSI061	6.1	6		•	PDSI098					9.8	•		
PDSI062	6.2		6	•	PDSI099					9.9	•		
PDSI063	6.3			6	•	PDSI100				10.0	•		
PDSI064	6.4				6	•	PDSI101		10.1	•			
PDSI065	6.5					6	•	PDSI102	10.2	•			
PDSI066	6.6	6					•	PDSI103	10.3	•			
			34				74	7	•	47	89	10	•
				•					•				
				•	•								
				•	•								
		•		•									
		34	74	7	•	51	95	11	•				
					•				•				
					•				•				
					•				•				
					•				•				

Data, P378

EDP. No.	Dia.	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
PDSI104	10.4	51	95	11	•
PDSI105	10.5				•
PDSI106	10.6				•
PDSI107	10.7				•
PDSI108	10.8				•
PDSI109	10.9				•
PDSI110	11.0				•
PDSI111	11.1	54	102	12	•
PDSI112	11.2				•
PDSI113	11.3				•
PDSI114	11.4				•
PDSI115	11.5				•
PDSI116	11.6				•
PDSI117	11.7				•
PDSI118	11.8				•
PDSI119	11.9				•
PDSI120	12.0				•
PDSI121	12.1	57	102	13	•
PDSI122	12.2				•
PDSI123	12.3				•
PDSI124	12.4				•
PDSI125	12.5				•
PDSI126	12.6				•
PDSI127	12.7				•
PDSI128	12.8				•
PDSI129	12.9				•
PDSI130	13.0				•
PDSI131	13.1	60	107	14	•
PDSI132	13.2				•
PDSI133	13.3				•
PDSI134	13.4				•
PDSI135	13.5				•
PDSI136	13.6				•
PDSI137	13.7				•
PDSI138	13.8				•
PDSI139	13.9				•
PDSI140	14.0				•

EDP. No.	Dia.	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK			
PDSI141	14.1	62	111	15	•			
PDSI142	14.2				•			
PDSI143	14.3				•			
PDSI144	14.4				•			
PDSI145	14.5				•			
PDSI146	14.6				•			
PDSI147	14.7				•			
PDSI148	14.8				•			
PDSI149	14.9				•			
PDSI150	15.0				•			
PDSI151	15.1	64	115	16	•			
PDSI152	15.2				•			
PDSI154	15.4				•			
PDSI155	15.5				•			
PDSI156	15.6				•			
PDSI157	15.7				•			
PDSI158	15.8				•			
PDSI160	16.0				•			
PDSI161	16.1	66	119	17	•			
PDSI163	16.3				•			
PDSI165	16.5				•			
PDSI170	17.0				•			
PDSI171	17.1	66	123	18	•			
PDSI172	17.2				•			
PDSI175	17.5				•			
PDSI177	17.7				•			
PDSI178	17.8				•			
PDSI180	18.0				•			
PDSI181	18.1				70	127	19	•
PDSI182	18.2							•
PDSI185	18.5	•						
PDSI190	19.0	•						
PDSI191	19.1	70	131	20	•			
PDSI195	19.5				•			
PDSI197	19.7				•			
PDSI200	20.0				•			

Data. P378

■ Tolerance μm = 1/1000mm

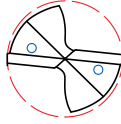
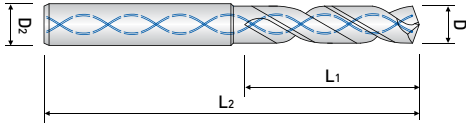
Tolerance \ Dia.	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
Cutting Edge(h8)	0 -14	0 -18	0 -22	0 -27	0 -33
Shank(h6)	0 -6	0 -8	0 -9	0 -11	0 -13

# Power Drill

DRILLS  
> Fractional



**POWER DRILL - MEDIUM**  
**/ INTERNAL COOLANT / 5 x D**



## PDMI ...series



EDP. No.	Dia.	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK	EDP. No.	Dia.	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK						
PDMI031	3.1	27			•	PDMI068	6.8	47	95	7	•						
PDMI032	3.2				•	PDMI069	6.9				•						
PDMI033	3.3				•	PDMI070	7.0				•						
PDMI034	3.4				30	74	4	•	PDMI071	7.1	52	103	8	•			
PDMI035	3.5	•	PDMI072	7.2				•									
PDMI036	3.6	•	PDMI073	7.3				•									
PDMI037	3.7	•	PDMI074	7.4				•									
PDMI038	3.8	33			•	PDMI075	7.5	56	105	9				•			
PDMI039	3.9				•	PDMI076	7.6							•			
PDMI040	4.0	33			•	PDMI077	7.7							62	108	10	•
PDMI041	4.1				•	PDMI078	7.8										•
PDMI042	4.2				•	PDMI079	7.9										•
PDMI043	4.3				•	PDMI080	8.0										•
PDMI044	4.4	36	80	5	•	PDMI081	8.1				68	125	11				•
PDMI045	4.5				•	PDMI082	8.2										•
PDMI046	4.6				•	PDMI083	8.3										•
PDMI047	4.7				•	PDMI084	8.4										•
PDMI048	4.8	39			•	PDMI085	8.5	62	108	10							•
PDMI049	4.9				•	PDMI086	8.6										•
PDMI050	5.0				•	PDMI087	8.7							•			
PDMI051	5.1				•	PDMI088	8.8							•			
PDMI052	5.2	39			•	PDMI089	8.9							62	108	10	•
PDMI053	5.3				•	PDMI090	9.0										•
PDMI054	5.4				•	PDMI091	9.1				•						
PDMI055	5.5				•	PDMI092	9.2				•						
PDMI056	5.6	43	87	6	•	PDMI093	9.3				62	108	10				•
PDMI057	5.7				•	PDMI094	9.4										•
PDMI058	5.8				•	PDMI095	9.5	•									
PDMI059	5.9				•	PDMI096	9.6	•									
PDMI060	6.0	43			•	PDMI097	9.7	62	108	10							•
PDMI061	6.1				•	PDMI098	9.8										•
PDMI062	6.2				•	PDMI099	9.9							•			
PDMI063	6.3				•	PDMI100	10.0							•			
PDMI064	6.4	47	95	7	•	PDMI101	10.1							68	125	11	•
PDMI065	6.5				•	PDMI102	10.2										•
PDMI066	6.6				•	PDMI103	10.3				•						
PDMI067	6.7				•	PDMI104	10.4				•						

Data, P378

EDP. No.	Dia.	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK			
PDMI105	10.5	68	125	11	•			
PDMI106	10.6				•			
PDMI107	10.7				•			
PDMI108	10.8				•			
PDMI109	10.9				•			
PDMI110	11.0				•			
PDMI111	11.1	71	133	12	•			
PDMI112	11.2				•			
PDMI113	11.3				•			
PDMI114	11.4				•			
PDMI115	11.5				•			
PDMI116	11.6				•			
PDMI117	11.7				•			
PDMI118	11.8				•			
PDMI119	11.9				•			
PDMI120	12.0				•			
PDMI121	12.1				75	137	13	•
PDMI122	12.2							•
PDMI123	12.3	•						
PDMI124	12.4	•						
PDMI125	12.5	•						
PDMI126	12.6	•						
PDMI127	12.7	•						
PDMI128	12.8	•						
PDMI129	12.9	•						
PDMI130	13.0	•						
PDMI131	13.1	80	142	14				•
PDMI132	13.2							•
PDMI133	13.3				•			
PDMI134	13.4				•			
PDMI135	13.5				•			
PDMI136	13.6				•			
PDMI137	13.7				•			
PDMI138	13.8				•			
PDMI139	13.9				•			
PDMI140	14.0				•			

EDP. No.	Dia.	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK			
PDMI141	14.1	83	148	15	•			
PDMI142	14.2				•			
PDMI143	14.3				•			
PDMI144	14.4				•			
PDMI145	14.5				•			
PDMI146	14.6				•			
PDMI147	14.7				•			
PDMI148	14.8				•			
PDMI149	14.9				•			
PDMI150	15.0				•			
PDMI151	15.1	90	152	16	•			
PDMI152	15.2				•			
PDMI154	15.4				•			
PDMI155	15.5				•			
PDMI156	15.6				•			
PDMI157	15.7				•			
PDMI158	15.8				•			
PDMI160	16.0				•			
PDMI161	16.1				95	155	17	•
PDMI163	16.3							•
PDMI165	16.5	•						
PDMI170	17.0	•						
PDMI171	17.1	100	157	18				•
PDMI172	17.2							•
PDMI175	17.5							•
PDMI177	17.7							•
PDMI178	17.8							•
PDMI180	18.0							•
PDMI181	18.1				105	160	19	•
PDMI182	18.2							•
PDMI185	18.5							•
PDMI190	19.0							•
PDMI191	19.1	110	163	20				•
PDMI195	19.5							•
PDMI197	19.7							•
PDMI200	20.0							•

Data, P378

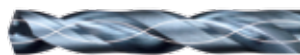
■ Tolerance

μm = 1/1000mm

Tolerance \ Dia.	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
Cutting Edge(h8)	0 -14	0 -18	0 -22	0 -27	0 -33
Shank(h6)	0 -6	0 -8	0 -9	0 -11	0 -13



# Solid Spiral Drill Series

DRILL  
SERIES



## Solid Spiral Drill

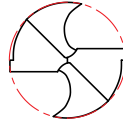
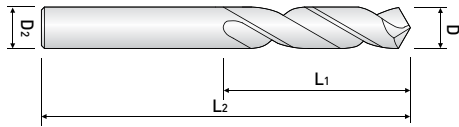


ITEM SERIES	APPEARANCE	FEATURE	INCH & METRIC	PAGE
<b>SSD ...series</b>		REGULAR LENGTH	METRIC	374
<b>SSDL ...series</b>		LONG LENGTH	METRIC	376

# Solid Spiral Drill



SOLID SPIRAL DRILL



## SSD ...series

EDP. No.	Dia.	L <sub>1</sub>	L <sub>2</sub>	STOCK
SSD010	1.0	10	38	•
SSD011	1.1			•
SSD012	1.2			•
SSD013	1.3			•
SSD014	1.4			•
SSD015	1.5	13	38	•
SSD016	1.6			•
SSD017	1.7			•
SSD018	1.8			•
SSD019	1.9			•
SSD020	2.0	16	45	•
SSD021	2.1			•
SSD022	2.2			•
SSD023	2.3			•
SSD024	2.4			•
SSD025	2.5	20	50	•
SSD026	2.6			•
SSD027	2.7	22	50	•
SSD028	2.8			•
SSD029	2.9			•
SSD030	3.0			•
SSD031	3.1			25
SSD032	3.2	•		
SSD033	3.3	•		
SSD034	3.4	•		
SSD035	3.5	•		

EDP. No.	Dia.	L <sub>1</sub>	L <sub>2</sub>	STOCK
SSD036	3.6	28	55	•
SSD037	3.7			•
SSD038	3.8			•
SSD039	3.9			•
SSD040	4.0			•
SSD041	4.1	30	60	•
SSD042	4.2			•
SSD043	4.3			•
SSD044	4.4			•
SSD045	4.5			•
SSD046	4.6	33	65	•
SSD047	4.7			•
SSD048	4.8	35	65	•
SSD049	4.9			•
SSD050	5.0			•
SSD051	5.1			•
SSD052	5.2			•
SSD053	5.3			•
SSD054	5.4			•
SSD055	5.5			•
SSD056	5.6	38	75	•
SSD057	5.7			•
SSD058	5.8			•
SSD059	5.9			•
SSD060	6.0			•

Data, P378



EDP. No.	Dia.	L <sub>1</sub>	L <sub>2</sub>	STOCK
SSD061	6.1	38	75	•
SSD062	6.2			•
SSD063	6.3			•
SSD064	6.4			•
SSD065	6.5			•
SSD066	6.6	45	80	•
SSD067	6.7			•
SSD068	6.8			•
SSD069	6.9			•
SSD070	7.0			•
SSD071	7.1			•
SSD072	7.2			•
SSD073	7.3			•
SSD074	7.4			•
SSD075	7.5			•
SSD076	7.6	50	85	•
SSD077	7.7			•
SSD078	7.8			•
SSD079	7.9			•
SSD080	8.0			•
SSD081	8.1			•
SSD082	8.2			•
SSD083	8.3			•
SSD084	8.4			•
SSD085	8.5			•
SSD086	8.6	50	95	•
SSD087	8.7			•
SSD088	8.8			•
SSD089	8.9			•
SSD090	9.0			•

EDP. No.	Dia.	L <sub>1</sub>	L <sub>2</sub>	STOCK		
SSD091	9.1	50	95	•		
SSD092	9.2			•		
SSD093	9.3			•		
SSD094	9.4			•		
SSD095	9.5			•		
SSD096	9.6			•		
SSD097	9.7			•		
SSD098	9.8			•		
SSD099	9.9			55	100	•
SSD100	10.0					•
SSD101	10.1	55	115	•		
SSD102	10.2			•		
SSD103	10.3			•		
SSD104	10.4			•		
SSD105	10.5			•		
SSD106	10.6			60	115	•
SSD107	10.7	•				
SSD108	10.8	•				
SSD109	10.9	•				
SSD110	11.0	•				
SSD111	11.1	65	120	•		
SSD112	11.2			•		
SSD113	11.3			•		
SSD115	11.5			•		
SSD118	11.8			•		
SSD119	11.9			•		
SSD120	12.0			•		
SSD124	12.4			70	125	•
SSD125	12.5					•
SSD130	13.0			75	130	•

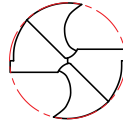
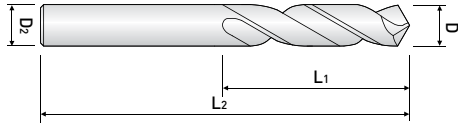
Data, P378

Tolerance	Dia.	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18
		Cutting Edge(h8)	0 -14	0 -18	0 -22
Shank(h6)	0 -10	0 -12	0 -15	0 -18	

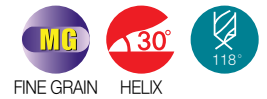
# Solid Spiral Drill



**SOLID SPIRAL DRILL - LONG**



## SSDL ...series



EDP. No.	Dia.	L <sub>1</sub>	L <sub>2</sub>	STOCK
SSDL030	3.0	42	73	•
SSDL031	3.1			•
SSDL032	3.2			•
SSDL033	3.3			•
SSDL034	3.4			•
SSDL035	3.5			•
SSDL036	3.6	45	80	•
SSDL037	3.7			•
SSDL038	3.8			•
SSDL039	3.9	50	80	•
SSDL040	4.0	54	85	•
SSDL041	4.1			•
SSDL042	4.2			•
SSDL043	4.3			•
SSDL044	4.4			•
SSDL045	4.5			•
SSDL046	4.6	59	90	•
SSDL047	4.7			•
SSDL048	4.8			•
SSDL049	4.9			•
SSDL050	5.0			•
SSDL051	5.1			•
SSDL052	5.2	63	95	•
SSDL053	5.3			•
SSDL054	5.4			•
SSDL055	5.5			•
SSDL056	5.6			•
SSDL057	5.7			•
SSDL058	5.8	66	100	•
SSDL059	5.9			•
SSDL060	6.0			•
SSDL061	6.1			•
SSDL062	6.2			•
SSDL063	6.3			70
SSDL064	6.4	•		
SSDL065	6.5	•		

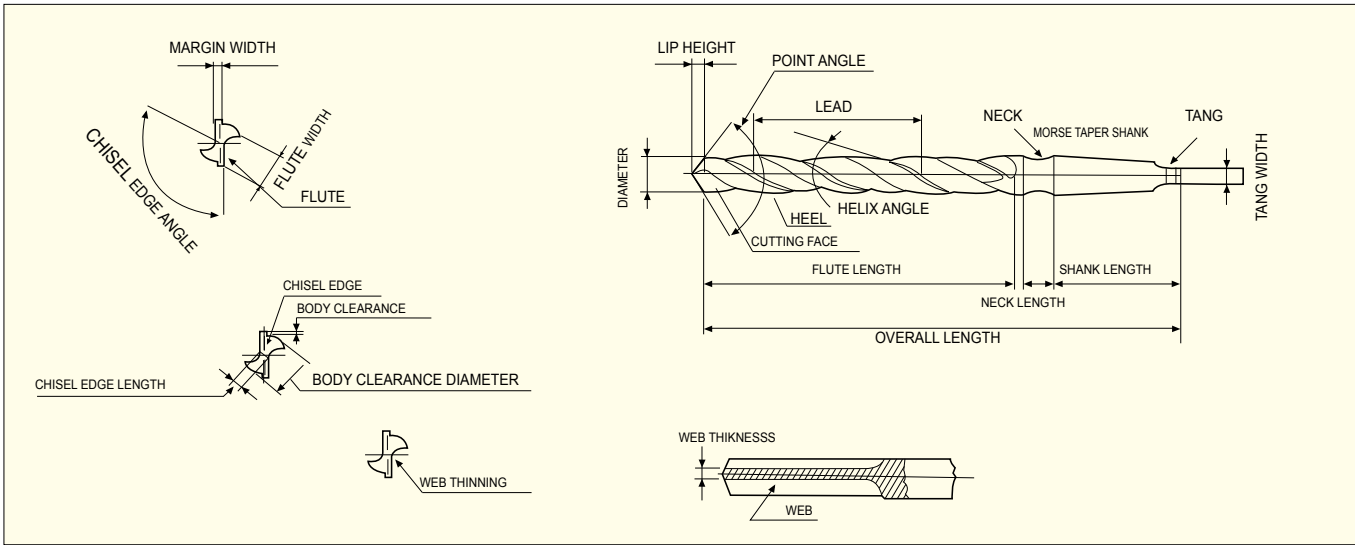
EDP. No.	Dia.	L <sub>1</sub>	L <sub>2</sub>	STOCK		
SSDL066	6.6	73	105	•		
SSDL067	6.7			•		
SSDL068	6.8			•		
SSDL069	6.9			•		
SSDL070	7.0			•		
SSDL071	7.1			76	110	•
SSDL072	7.2	•				
SSDL073	7.3	•				
SSDL074	7.4	•				
SSDL075	7.5	•				
SSDL076	7.6	80	115			•
SSDL077	7.7			•		
SSDL078	7.8			•		
SSDL079	7.9			•		
SSDL080	8.0			•		
SSDL081	8.1			85	125	•
SSDL082	8.2	•				
SSDL083	8.3	•				
SSDL084	8.4	•				
SSDL085	8.5	•				
SSDL086	8.6	•				
SSDL087	8.7	•				
SSDL088	8.8	•				
SSDL089	8.9	•				
SSDL090	9.0	•				
SSDL091	9.1	88	130			•
SSDL092	9.2					•
SSDL093	9.3					•
SSDL094	9.4					•
SSDL095	9.5			•		
SSDL096	9.6			90	130	•
SSDL097	9.7	•				
SSDL098	9.8	•				
SSDL099	9.9	•				
SSDL100	10.0	•				

Data, P378

■ Tolerance μm = 1/1000mm

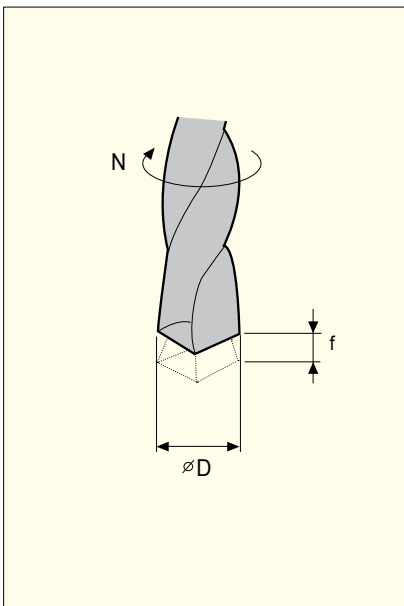
Tolerance	Dia.	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18
Cutting Edge(h8)	0	0	0	0	0
	-14	-18	-22	-27	
Shank(h6)	0	0	0	0	0
	-10	-12	-15	-18	

## ■ Nomenclature of Drill



## ■ Working of Main Angle

POINT ANGLE	HELIX ANGLE	LIP RELIEF ANGLE
70°    118°    140°	10°    38°    40°	7°    10°    12°    15°
<div style="text-align: center;"> </div> <p>Large → Torque → Small Small → Thrust → Large</p>	<div style="text-align: center;"> </div> <p>Bad → Cutting Capacity → Good Good → Chip Ejection → Bad Large → Rigidity of tool → Small</p>	<div style="text-align: center;"> </div> <p>Small → Tool Wear → Large Small → Vibration → Large</p>



### ●Cutting Speed

$$V = \frac{\pi \times D \times N}{1000} \text{ (m/min)}$$

- V : cutting Speed (m/min)
- D : Diameter of drill (mm)
- N : revolution (rpm)
- $\pi$  : (3.14)

### ●Feed

$$f = \frac{S}{N} \text{ (m/rev)}$$

- f : feed (mm/rev)
- S : depth of cut per min (mm/min)
- N : revolution(rpm) (rpm)

### ●Helix Angle

$$\delta^\circ = \tan^{-1} \left( \frac{\pi D}{L} \right)$$

- $\delta$  : helix angle
- D : Diameter of drill (mm)
- L : lead (mm)
- $\pi$  : (3.14)

## ■ SSD, SSDL series

Work Material	Tool Steels, Alloy Steels SKD, SCM		Aluminum Rolled, Aluminum Alloy AL, AC		Brass, Bronze Bs, PB		Epoxy, Resin		
	DIAMETER (mm)	RPM (mm <sup>-1</sup> )	FEED (mm/rev)	RPM (mm <sup>-1</sup> )	FEED (mm/rev)	RPM (mm <sup>-1</sup> )	FEED (mm/rev)	RPM (mm <sup>-1</sup> )	FEED (mm/rev)
	3	4000~7000	0.02	10000~12000	0.03	7000~10000	0.02	9000~12000	0.08
	5	2400~4200	0.03	6000~8000	0.05	4200~6000	0.04	5400~7200	0.08
	8	1500~2600	0.05	3700~5000	0.08	2600~3700	0.08	3400~4500	0.09
	12	1000~1700	0.06	2500~3200	0.12	1700~2500	0.12	2200~3000	0.11

## ■ PDS, PDM series ▶ Power Drill

V : m/min, f : mm/rev

MATERIAL			MILD STEEL-ALLOY STEEL-CARBON STEEL		ALLOY STEEL FORGED STEEL		HIGH HARDENED STEELS		STAINLESS STEEL		DUCTILE CAST IRON		CAST IRON	
			≤HRc25		HRc25~ HRc35		HRc35~ HRc45							
TYPE	Dia.	COD	V	f	V	f	V	f	V	f	V	f	V	f
SOLID TYPE	ø3~5	PDS030-050	40~70	0.15-0.25	35~55	0.10-0.20	15~25	0.05-0.15	15~25	0.05-0.15	35~70	0.15-0.25	45~75	0.15-0.30
	ø5~8	PDS051-080	50~75	0.20-0.30	45~60	0.15-0.25	15~30	0.10-0.20	15~30	0.10-0.20	45~75	0.20-0.35	55~85	0.20-0.40
	ø8~10	PDS081-100	50~75	0.25-0.35	45~60	0.15-0.30	20~35	0.10-0.20	15~30	0.10-0.20	45~75	0.25-0.40	55~85	0.20-0.40
	ø10~12	PDS101-120	50~75	0.25-0.35	45~60	0.15-0.30	20~35	0.10-0.25	15~30	0.10-0.25	45~75	0.25-0.40	55~85	0.20-0.45
	ø12~14	PDS121-140	55~80	0.25-0.40	50~70	0.20-0.35	20~35	0.10-0.25	15~30	0.10-0.25	50~80	0.25-0.45	60~90	0.25-0.50
	ø14~20	PDS141-200	55~80	0.30-0.45	50~70	0.20-0.35	20~35	0.10-0.30	15~30	0.10-0.25	50~80	0.25-0.50	60~100	0.25-0.55

## ■ PDSI, PDMI series ▶ Oil Hole Power Drill

V : m/min, f : mm/rev

MATERIAL		MILD STEEL-ALLOY STEEL-CARBON STEEL		ALLOY STEEL FORGED STEEL		HIGH HARDENED STEELS		STAINLESS STEEL		DUCTILE CAST IRON		CAST IRON	
		≤HRc25		HRc25~ HRc35		HRc35~ HRc45							
Dia.		V	f	V	f	V	f	V	f	V	f	V	f
7~8		80~110	0.15-0.25	70~100	0.15-0.25	50~80	0.10-0.20	30~60	0.10-0.20	50~80	0.15-0.25	80~120	0.15-0.30
8~10		90~120	0.20-0.30	80~110	0.15-0.30	60~90	0.15-0.25	30~70	0.10-0.20	60~90	0.20-0.30	100~130	0.25-0.35
10~12		100~130	0.25-0.35	90~120	0.20-0.30	70~100	0.20-0.30	30~70	0.10-0.20	70~100	0.25-0.35	110~140	0.25-0.35
12~16		110~140	0.25-0.35	100~130	0.25-0.35	80~100	0.20-0.30	40~70	0.15-0.25	80~110	0.30-0.40	120~150	0.30-0.40
16~20		120~150	0.25-0.40	110~140	0.25-0.35	90~110	0.20-0.30	40~70	0.15-0.30	90~120	0.30-0.40	130~160	0.30-0.40

## ■ PF50, P50 series

MATERIAL	CARBON STEEL(C<0.3%) ALLOY STEEL / SS400 SCM ~710N/mm <sup>2</sup>		CARBON STEEL(C≥0.3%) ALLOY STEEL / S50C SCM ~1,060N/mm <sup>2</sup>		SUJ2-SUS440		SKD61 34~43 HRc		43~48 HRc		SKD11 48~53 HRc		CAST IRON FC 250~350		DUCTILE FC 400~500	
	V	80~125m/min		80~125m/min		63~80m/min		40~63m/min		32~45m/min		25~36m/min		80~125m/min		63~90m/min
DIAMETER (mm)	RPM (mm <sup>-1</sup> )	FEED (mm/rev)	RPM (mm <sup>-1</sup> )	FEED (mm/rev)	RPM (mm <sup>-1</sup> )	FEED (mm/rev)	RPM (mm <sup>-1</sup> )	FEED (mm/rev)	RPM (mm <sup>-1</sup> )	FEED (mm/rev)	RPM (mm <sup>-1</sup> )	FEED (mm/rev)	RPM (mm <sup>-1</sup> )	FEED (mm/rev)	RPM (mm <sup>-1</sup> )	FEED (mm/rev)
2	12,000	0.06-0.08	12,000	0.06-0.08	11,000	0.06-0.08	8,000	0.06-0.08	6,000	0.05-0.07	4,500	0.03-0.06	15,000	0.06-0.08	11,000	0.06-0.08
3	9,600	0.09-0.12	9,600	0.09-0.12	7,500	0.09-0.12	5,300	0.09-0.12	4,000	0.07-0.11	3,200	0.05-0.09	10,000	0.09-0.12	7,600	0.09-0.12
4	8,000	0.10-0.15	8,000	0.10-0.15	5,650	0.10-0.15	4,000	0.10-0.15	3,000	0.08-0.13	2,600	0.06-0.10	8,000	0.10-0.15	6,000	0.10-0.15
5	6,400	0.12-0.18	6,400	0.12-0.18	4,550	0.12-0.18	3,300	0.12-0.18	2,400	0.10-0.15	2,000	0.8-0.12	6,400	0.12-0.18	4,800	0.12-0.18
6	5,300	0.14-0.20	5,300	0.14-0.20	3,800	0.14-0.20	2,750	0.14-0.20	2,000	0.12-0.18	1,700	0.09-0.15	5,300	0.14-0.20	4,000	0.14-0.20
8	4,000	0.16-0.24	4,000	0.16-0.24	2,850	0.16-0.24	2,100	0.16-0.24	1,500	0.14-0.22	1,300	0.12-0.20	4,000	0.16-0.24	3,000	0.16-0.24
10	3,200	0.18-0.27	3,200	0.18-0.27	2,250	0.18-0.27	1,700	0.18-0.27	1,200	0.15-0.25	1,000	0.13-0.23	3,200	0.18-0.27	2,400	0.18-0.27
12	2,650	0.20-0.30	2,650	0.20-0.30	1,900	0.20-0.30	1,400	0.20-0.30	1,000	0.17-0.26	850	0.14-0.24	2,700	0.20-0.30	2,000	0.20-0.30
14	2,300	0.22-0.35	2,300	0.22-0.35	1,600	0.22-0.35	1,200	0.22-0.35	860	0.18-0.30	730	0.15-0.26	2,300	0.22-0.35	1,700	0.22-0.35
16	2,000	0.25-0.36	2,000	0.25-0.36	1,400	0.25-0.36	1,050	0.25-0.36	760	0.20-0.32	640	0.16-0.26	2,000	0.25-0.36	1,500	0.25-0.36
18	1,800	0.28-0.38	1,800	0.28-0.38	1,250	0.28-0.38	920	0.28-0.38	670	0.23-0.33	570	0.18-0.28	1,800	0.28-0.38	1,350	0.28-0.38
20	1,600	0.30-0.40	1,600	0.30-0.40	1,150	0.30-0.40	850	0.30-0.40	600	0.25-0.35	500	0.20-0.30	1,600	0.30-0.40	1,200	0.30-0.40

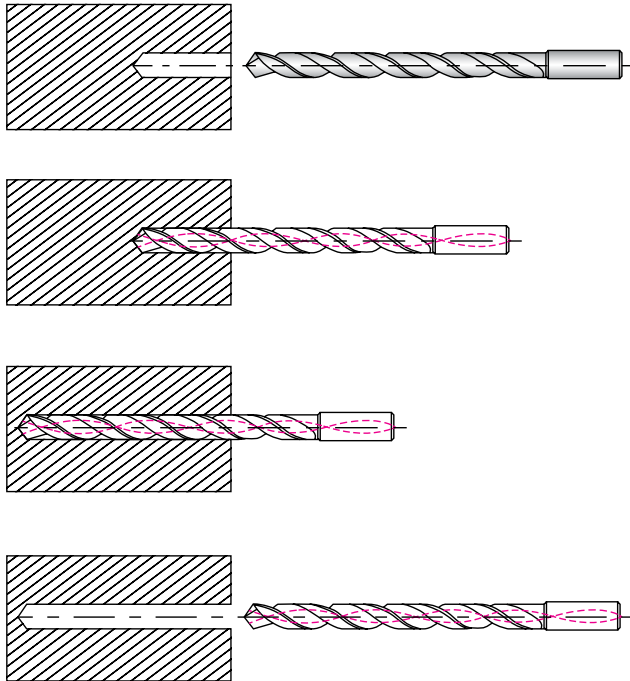
## ■ SF50, PI50 series

MATERIAL	CARBON STEEL(C<0.3%) ALLOY STEEL / SS400 SCM ~710N/mm <sup>2</sup>		CARBON STEEL(C≥0.3%) ALLOY STEEL / S50C SCM ~1,060N/mm <sup>2</sup>		SUJ2-SUS440		SKD61 34~43 HRc		43~48 HRc		SKD11 48~53 HRc		CAST IRON FC 250~350		DUCTILE FC 400~500	
	V	80~150m/min		80~150m/min		63~100m/min		40~70m/min		32~50m/min		25~40m/min		80~150m/min		63~100m/min
DIAMETER (mm)	RPM (mm <sup>-1</sup> )	FEED (mm/rev)	RPM (mm <sup>-1</sup> )	FEED (mm/rev)	RPM (mm <sup>-1</sup> )	FEED (mm/rev)	RPM (mm <sup>-1</sup> )	FEED (mm/rev)	RPM (mm <sup>-1</sup> )	FEED (mm/rev)	RPM (mm <sup>-1</sup> )	FEED (mm/rev)	RPM (mm <sup>-1</sup> )	FEED (mm/rev)	RPM (mm <sup>-1</sup> )	FEED (mm/rev)
3	12,000	0.09-0.12	13,000	0.09-0.12	7,600	0.09-0.12	6,400	0.09-0.12	5,300	0.07-0.11	3,800	0.05-0.09	12,000	0.09-0.12	8,500	0.09-0.12
4	9,500	0.10-0.15	10,000	0.10-0.15	5,700	0.10-0.15	4,800	0.10-0.15	4,000	0.08-0.13	2,950	0.06-0.10	9,000	0.10-0.15	6,350	0.10-0.15
5	7,600	0.12-0.18	8,000	0.12-0.18	4,600	0.12-0.18	3,800	0.12-0.18	3,200	0.10-0.15	2,300	0.8-0.12	7,600	0.12-0.18	5,100	0.12-0.18
6	6,400	0.14-0.20	6,600	0.14-0.20	3,800	0.14-0.20	3,200	0.14-0.20	2,650	0.12-0.18	1,900	0.09-0.15	6,400	0.14-0.20	4,250	0.14-0.20
8	4,800	0.16-0.24	5,000	0.16-0.24	2,900	0.16-0.24	2,400	0.16-0.24	2,000	0.14-0.22	1,450	0.12-0.20	4,800	0.16-0.24	3,200	0.16-0.24
10	3,800	0.18-0.27	4,000	0.18-0.27	2,300	0.18-0.27	1,900	0.18-0.27	1,600	0.15-0.25	1,150	0.13-0.23	3,800	0.18-0.27	2,550	0.18-0.27
12	3,200	0.20-0.30	3,300	0.20-0.30	1,900	0.20-0.30	1,600	0.20-0.30	1,300	0.17-0.26	950	0.14-0.24	3,200	0.20-0.30	2,100	0.20-0.30
14	2,700	0.22-0.35	2,800	0.22-0.35	1,600	0.22-0.35	1,350	0.22-0.35	1,150	0.18-0.30	800	0.15-0.26	2,700	0.22-0.35	1,800	0.22-0.35
16	2,400	0.25-0.36	2,500	0.25-0.36	1,400	0.25-0.36	1,200	0.25-0.36	1,000	0.20-0.32	700	0.16-0.26	2,400	0.25-0.36	1,600	0.25-0.36
18	2,100	0.28-0.38	2,200	0.28-0.38	1,300	0.28-0.38	1,100	0.28-0.38	900	0.23-0.33	650	0.18-0.28	2,100	0.28-0.38	1,400	0.28-0.38
20	1,900	0.30-0.40	2,000	0.30-0.40	1,150	0.30-0.40	1,000	0.30-0.40	800	0.25-0.35	600	0.20-0.30	1,900	0.30-0.40	1,250	0.30-0.40

## ■ SSTD series

Work Material	Tool Steels, Alloy Steels SKD, SCM		Aluminum Rolled, Aluminum Alloy AL, AC		Brass, Bronze Bs, PB		Epoxy, Resin	
	DIAMETER (mm)	RPM (mm <sup>-1</sup> )	FEED (mm/rev)	RPM (mm <sup>-1</sup> )	FEED (mm/rev)	RPM (mm <sup>-1</sup> )	FEED (mm/rev)	RPM (mm <sup>-1</sup> )
3	4000~7000	0.02	10000~12000	0.03	7000~10000	0.02	9000~12000	0.08
5	2400~4200	0.03	6000~8000	0.05	4200~6000	0.04	5400~7200	0.08
8	1500~2600	0.05	3700~5000	0.08	2600~3700	0.08	3400~4500	0.09
12	1000~1700	0.06	2500~3200	0.12	1700~2500	0.12	2200~3000	0.11

## ■ SF51, SF52 series



1. Guide Drilling should be done as Diameter+0.1mm between 3×D and 5×D
2. For Main Drilling, proceed with low RPM at Guide Drilling segment.  
(RPM 300, FEED 400mm/min)
3. Just before the end of Guide Drilling segment, reduce feed to zero and increase the RPM according to Recommended Cutting Condition chart (See Below)
4. After then, proceed main drilling by increasing feed without step drilling.
5. When coming out from Guide Drilling start point after drilling, RPM should be reduced as 300 and feed should be 1000 mm/min.
6. When coming out from Guide Drilling segment to the outside, the feed should be decreased as 50%

WORK MATERIAL	CARBON STEELS ALLOY STEEL ~1060 N/mm <sup>2</sup>		CAST IRON 250~350 N/mm <sup>2</sup>		DUCTILE CAST IRON 400~500 N/mm <sup>2</sup>	
	63~125 m/min		63~125 m/min		60~80 m/min	
Drilling Diameter	Speed (min <sup>-1</sup> )	Feed Rate (mm/rev)	Speed (min <sup>-1</sup> )	Feed Rate (mm/rev)	Speed (min <sup>-1</sup> )	Feed Rate (mm/rev)
3	7500	0.06 ~ 0.12	7500	0.06 ~ 0.12	7500	0.06 ~ 0.12
4	6400	0.08 ~ 0.16	6400	0.08 ~ 0.16	5600	0.08 ~ 0.16
5	5800	0.10 ~ 0.20	5800	0.10 ~ 0.20	4500	0.10 ~ 0.20
6	4800	0.12 ~ 0.24	4800	0.12 ~ 0.24	3800	0.12 ~ 0.24
8	3600	0.16 ~ 0.28	3600	0.16 ~ 0.28	2800	0.16 ~ 0.28
10	2900	0.20 ~ 0.35	2900	0.20 ~ 0.35	2300	0.20 ~ 0.35
12	2900	0.24 ~ 0.42	2400	0.24 ~ 0.42	1900	0.24 ~ 0.42
14	2050	0.28 ~ 0.46	2050	0.28 ~ 0.46	1600	0.28 ~ 0.46

N = R.P.M

S = Feed per Revolution(mm/rev)

## ▣ Trouble Shooting for Drilling

Problems	Cause	Solution					Cutting Conditions					Tool shape					Grade		The Others		
		Cutting Speed	Feed Rate	Step Feed	Initial Feed	Cutting Fluid	Relief Angel	Point Angel	Thinning Angel	Honing	Change the rate of flute and land width	Thinning	Toughness	Hardness	Mechanical rigidity of machine	Drill Rigidity	Guide - Bush	Improvement of setting type			
Chipping	• Improper cutting edge						▼		▼	▲								▲			
	• Improper cutting speed	▼				○															
	• Generation of built - up edge					○	▼		▼	▲								▲			
	• Generation of chattering and vibration	▼																▲	▲		○
Excessive wear on cutting edge	• Cutting speed too high in relation to insert grade	▼				○	▲	▲										▲			
Breakage	In the beginning of operating	• Poor surface conditions of workpiece			○	▼														○	
		• Insufficient rigidity of tool and workpiece																▲			○
	• Deflection of hole	▼	▼																		
Under the operating	• Default of chip ejection		▼	○									○								

▲ : Increase

▼ : Decrease

○ : Application

◎ : Proper application





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# MEMO

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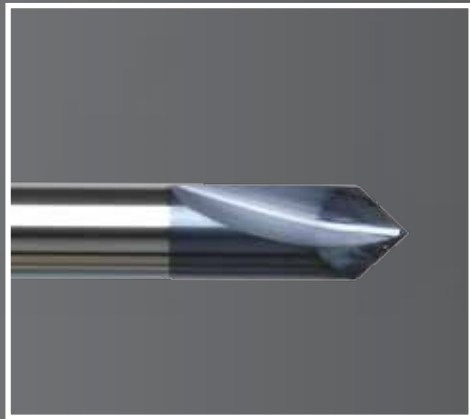
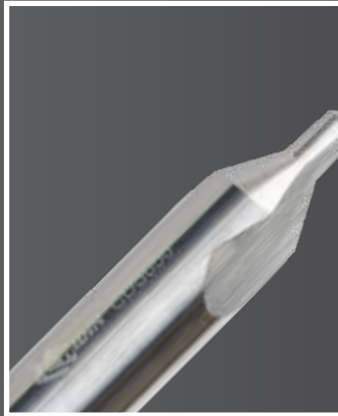
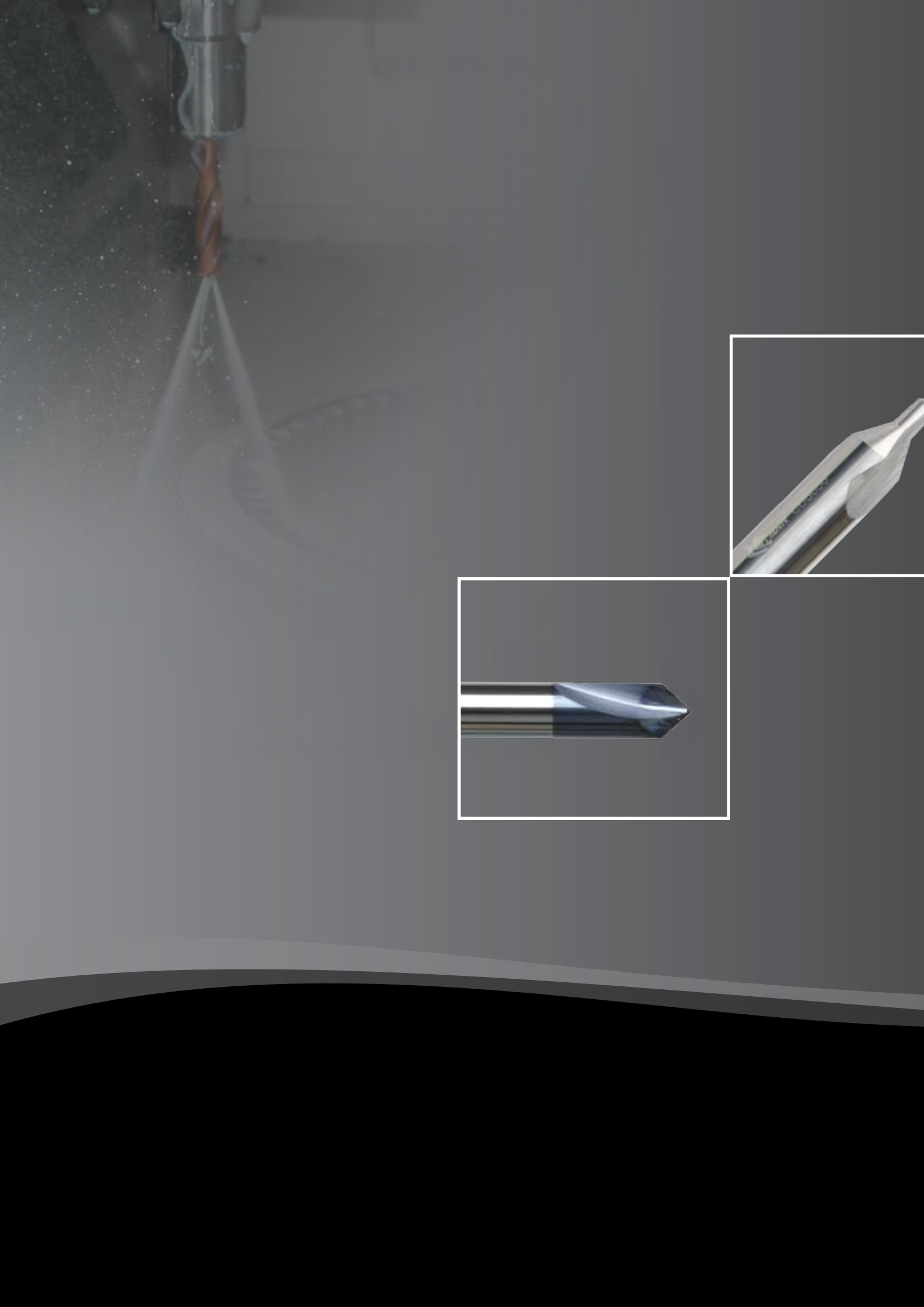
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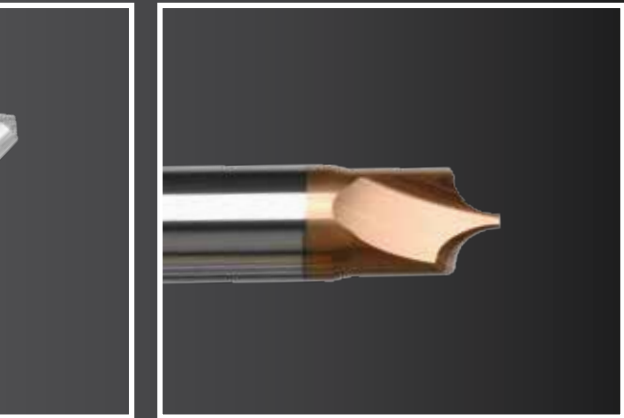
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# CENTERING TOOL SERIES

# Centering Tool Series

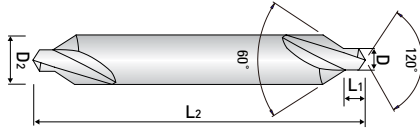


## Centering Tools



Item Series	APPEARANCE	FEATURE	INCH & METRIC	PAGE
CDS ...series		CENTER DRILL SOLID	METRIC	376
LDS ...series		NC SPOTTING DRILL - 90°, 120°	METRIC	377
CES302 ...series		CENTERING EDMILL SOLID TYPE - 90°	METRIC	378
CEM ...series		CENTERING END MILL - BRAZED TYPE - 90°	METRIC	379
CRC ...series		CORNER ROUNDING CUTTER	METRIC	380

# Centering Tools



## SOLID CENTER DRILL

### CDS ...series

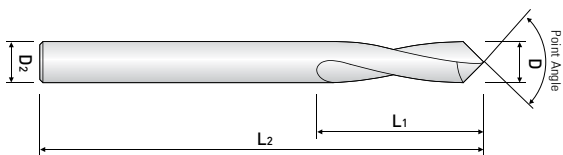


EDP. No.	Dia.	F.L	OAL	SH.Dia.	STOCK
CDS010	1	1	40	3	•
CDS015	1.5	1.5	40	4	•
CDS020	2	2	45	5	•
CDS025	2.5	2.5	45	6	•
CDS030	3	3	55	8	•
CDS040	4	4.5	60	10	•
CDS050	5	5.5	65	12	•

# Centering Tools



**NC SPOTTING DRILL**



## LDS ...series



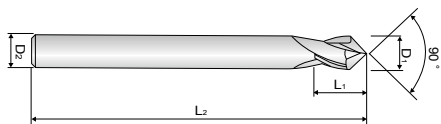
EDP. No.	Dia.	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	Point Angle	STOCK
LDS030	3	9	50	3	90°	•
LDS030A					120°	•
LDS040	4	10	50	4	90°	•
LDS040A					120°	•
LDS050	5	12	50	5	90°	•
LDS050A					120°	•
LDS060	6	13	60	6	90°	•
LDS060A					120°	•
LDS080	8	23	70	8	90°	•
LDS080A					120°	•
LDS100	10	24	80	10	90°	•
LDS100A					120°	•
LDS120	12	28	80	12	90°	•
LDS120A					120°	•
LDS160	16	32	90	16	90°	•
LDS160A					120°	•
LDS200	20	35	100	20	90°	•
LDS200A					120°	•

Data, P381

# Centering Tools



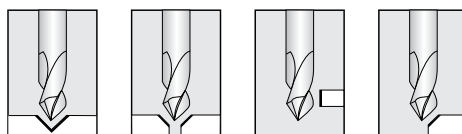
CENTERING END MILL - SOLID



## CES302 ...series



EDP. No.	D <sub>1</sub>	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
CES302030	3	6	50	6	•
CES302040	4	8	50	6	•
CES302050	5	10	50	6	•
CES302060	6	12	60	6	•
CES302080	8	16	70	8	•
CES302100	10	18	70	10	•
CES302120	12	20	75	12	•
CES302140	14	24	80	14	•
CES302160	16	26	80	16	•
CES302200	20	32	100	20	•



■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.05	h6

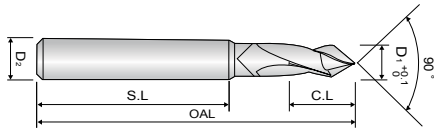
※Items can be changed for quality improvement without notice.



# Centering Tools



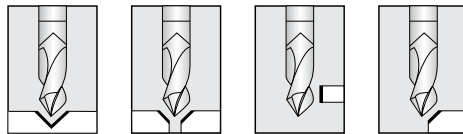
**CENTERING END MILL  
- BRAZED TYPE**



## CEM ...series



EDP. No.	D <sub>1</sub>	C.L	S.L	OAL	D <sub>2</sub>	STOCK
CEM1016	10	15	80	115	16	•
CEM1216	12	20	100	145	16	•
CEM1620	16	23	100	150	20	•
CEM2025	20	25	100	155	25	•

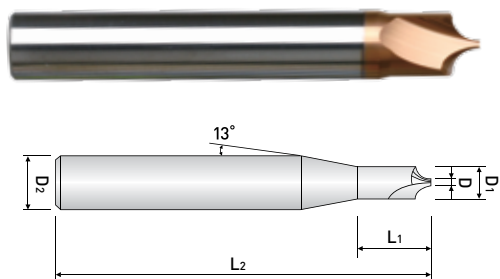


■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ +0,1	h7

※Items can be changed for quality improvement without notice.

# Centering Tools



## CORNER ROUNDING CUTTER

- Designed for prehardened, hardened and stainless steels and cast iron up to HRc 52.
- By using the newly developed raw-material(0.2 um), it provides excellent performance during high speed cutting.

## CRC ...series



EDP. No.	D	R	D <sub>1</sub>	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	STOCK
CRC 209 050	0.9	0.5	2	3	45	4	•
CRC 209 075	0.9	0.75	2.5	4	45	4	•
CRC 209 100	0.9	1.0	3	5	50	6	•
CRC 259 100	5.9	1.0	8	-	60	8	•
CRC 214 150	1.4	1.5	4.5	8	50	6	•
CRC 249 150	4.9	1.5	8	-	60	8	•
CRC 214 200	1.4	2	5.5	10	50	6	•
CRC 239 200	3.9	2	8	-	60	8	•
CRC 219 250	1.9	2.5	7	13	60	8	•
CRC 219 300	1.9	3	8	-	60	8	•
CRC 219 350	1.9	3.5	9	13	70	10	•
CRC 219 400	1.9	4	10	-	70	10	•
CRC 219 450	1.9	4.5	11	13	80	12	•
CRC 219 500	1.9	5	12	-	80	12	•
CRC 239 600	3.9	6	16	-	85	16	•
CRC 259 700	5.9	7	20	-	85	20	•
CRC 239 800	3.9	8	20	-	85	20	•

## ■ LDS series

MATERIAL	S15C ·SS400 ~500N/mm <sup>2</sup>		S45C		SCM440		SKD61 28HRc		SKD61 34HRc		FC250		AC4D	
V	63~80m/min		40~63m/min		32~50m/min		20~28m/min		16~22m/min		63~100m/min		80~160m/min	
DIAMETER (mm)	RPM (mm <sup>-1</sup> )	FEED (mm/rev)	RPM (mm <sup>-1</sup> )	FEED (mm/rev)	RPM (mm <sup>-1</sup> )	FEED (mm/rev)	RPM (mm <sup>-1</sup> )	FEED (mm/rev)	RPM (mm <sup>-1</sup> )	FEED (mm/rev)	RPM (mm <sup>-1</sup> )	FEED (mm/rev)	RPM (mm <sup>-1</sup> )	FEED (mm/rev)
3	7,500	0.04~0.08	5,500	0.04~0.08	4,500	0.04~0.08	2,500	0.04~0.08	1,500	0.04~0.08	8,000	0.05~0.09	12,000	0.10~0.22
4	5,700	0.05~0.10	4,100	0.05~0.10	3,300	0.05~0.10	1,900	0.05~0.10	1,100	0.05~0.1	6,500	0.07~0.12	9,500	0.12~0.25
6	3,800	0.06~0.12	2,700	0.06~0.12	2,300	0.06~0.12	1,250	0.06~0.12	750	0.06~0.12	4,300	0.12~0.18	6,400	0.14~0.28
8	2,800	0.08~0.15	2,000	0.08~0.15	1,700	0.08~0.15	950	0.08~0.15	550	0.08~0.15	3,200	0.13~0.20	4,800	0.18~0.32
10	2,300	0.10~0.18	1,700	0.10~0.18	1,400	0.10~0.18	750	0.10~0.18	450	0.1~0.18	2,600	0.17~0.25	3,800	0.22~0.36
12	1,900	0.12~0.21	1,400	0.12~0.21	1,200	0.12~0.21	650	0.12~0.21	370	0.12~0.21	2,200	0.21~0.30	3,200	0.25~0.40
16	1,400	0.16~0.28	1,000	0.16~0.28	900	0.16~0.28	500	0.16~0.28	280	0.16~0.28	1,600	0.24~0.32	2,400	0.32~0.48
20	1,150	0.20~0.34	820	0.20~0.34	700	0.20~0.34	400	0.20~0.34	220	0.2~0.34	1,300	0.26~0.40	1,900	0.40~0.60
25	900	0.25~0.45	650	0.25~0.45	560	0.25~0.45	300	0.25~0.45	180	0.25~0.45	1,000	0.30~0.50	1,500	0.50~0.75

# Hardness Conversion Table

Rm[N/mm <sup>2</sup> ]	HV 10	HB	HRc
240	75	71	
255	80	76	
270	85	81	
285	90	86	
305	95	90	
320	100	95	
335	105	100	
350	110	105	
370	115	109	
385	120	114	
400	125	119	
415	130	124	
430	135	128	
450	140	133	
465	145	138	
480	150	143	
495	155	147	
510	160	152	
530	165	157	
545	170	162	
560	175	166	
575	180	171	
595	185	176	
610	190	181	
625	195	185	
640	200	190	
660	205	195	
675	210	199	
690	215	204	
705	220	209	
720	225	214	
740	230	219	
755	235	223	
770	240	228	
785	245	233	
800	250	238	22
820	255	242	23
835	260	247	24
860	268	255	25
870	272	258	26
900	280	266	27

Rm[N/mm <sup>2</sup> ]	HV 10	HB	HRc
920	287	273	28
940	293	278	29
970	302	287	30
995	310	295	31
1020	317	301	32
1050	327	311	33
1080	336	319	34
1110	345	328	35
1140	355	337	36
1170	364	346	37
1200	373	354	38
1230	382	363	39
1260	392	372	40
1300	403	383	41
1330	413	393	42
1360	423	402	43
1400	434	413	44
1440	446	424	45
1480	458	435	46
1530	473	449	47
1570	484	460	48
1620	497	472	49
1680	514	488	50
1730	527	501	51
1790	544	517	52
1845	560	532	53
1910	578	549	54
1980	596	567	55
2050	615	584	56
2140	639	607	57
	655	622	58
	675		59
	698		60
	720		61
	745		62
	773		63
	800		64
	829		65
	864		66
	900		67
	940		68

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