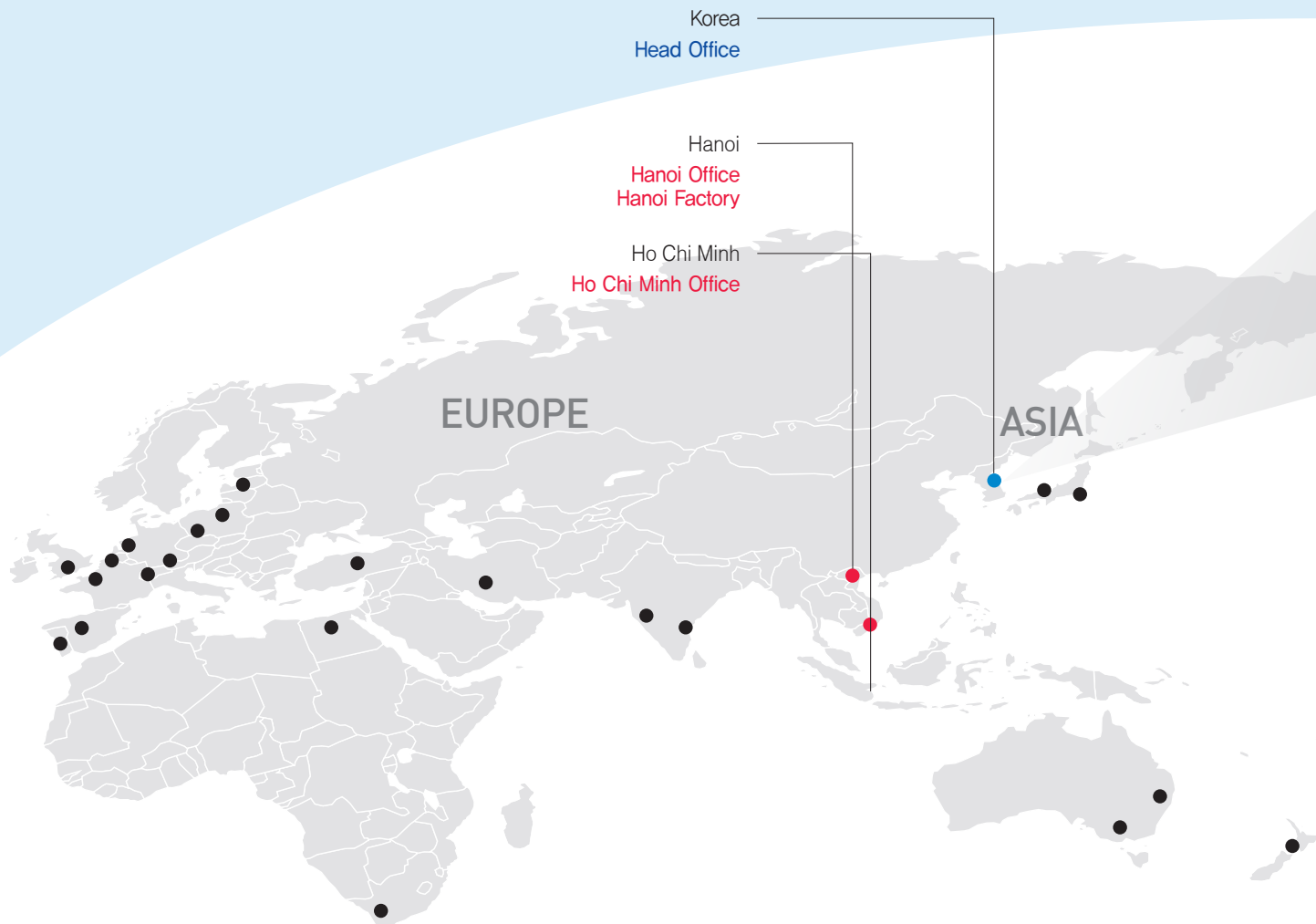






Global Network



**WIDIN will continuously try
its utmost to fulfill customer's
needs with satisfaction.**

Our export started in the late of 90's is growing fast by ceaseless
activities to find a new market with our high quality products.



AMERICA

Chicago
Chicago Office

50 Countries

3 Overseas Branch Offices

4 Domestic Branch Offices

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



WJ DIN
(주)

History

1988	07	Established Hana Cutting Tools Co.,Ltd.
2001	07	Certified in ISO9001 quality management system
2002	03	Establishment of Hana Tools R&D center permitted by MSIT
2005	11	Certified in INNO-BIZ(Innovative company)
2007	07	Changing name of company from HANA TOOLS CO.,LTD. to WIDIN CO.,LTD.
2008	03	Establishment of Chicago, USA sales office
	07	Observed the 20th anniversary of the foundation with opening new SungJu premises in Changwon city
2010	05	Awarded Global standard management awards
2012	01	Appointed as global hidden champions by Small & medium business Corporation
	06	Moved to a larger facility located in Sahaw-ro, Changwon City
2017	08	Establishment of Vietnam manufacturing factory
	11	Awarded Ten Million Dollars export achievement prize from Government
2018	09	Taken over by DINE precision



Guide Line to Icons

Raw-Material



Ultra fine grade is used in the tool



Micro grain grade is used in the tool



K10~K20 grade is used in the tool

Number of Teeth



Helix Angle



Coating



ALTiN HH



TiAlN SH



ALTiN SH



CRN Coating



ALTiN H



TiAlN HH



ALTiN W



W Coating



ALTiN



TiAlN



D.L.C. Coating



Diamond Coating



TiAlN+



TiAlN SH+



TiAlN HH+



W+ Coating



TiN Coating



TiCN Coating



HOMO Coating



Un Coating

The Type of End Teeth



Ball Nose



Corner Radius



Chamfer



Sharp edge

The Type of Periphery



Fine Pitch Type



Flat Shallow Pitch Type

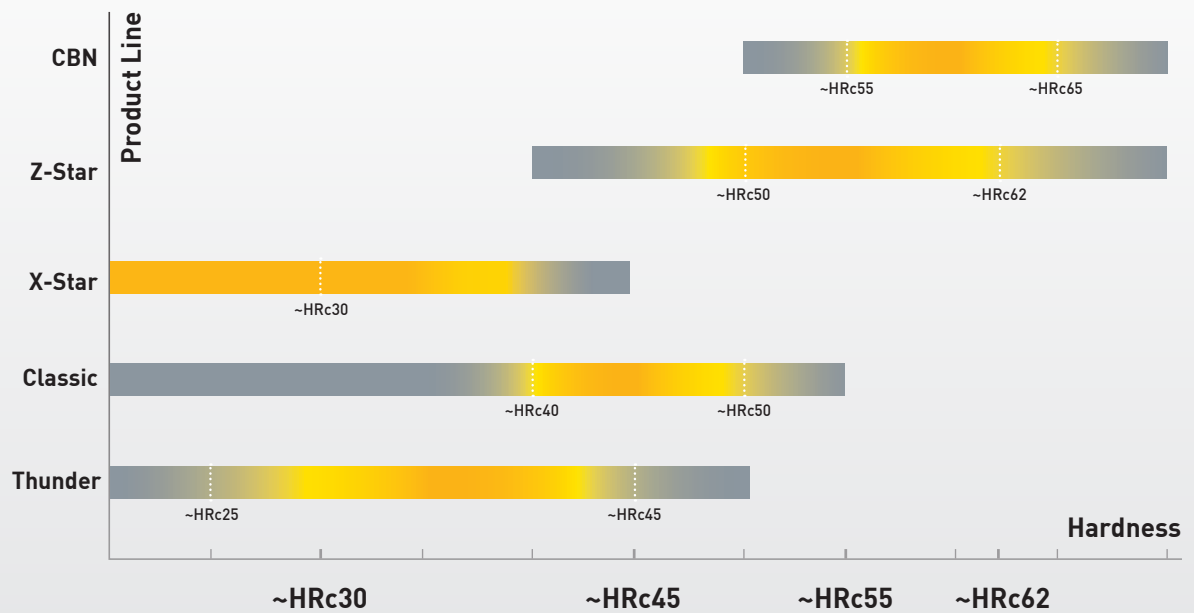


Chamfered Pitch Type

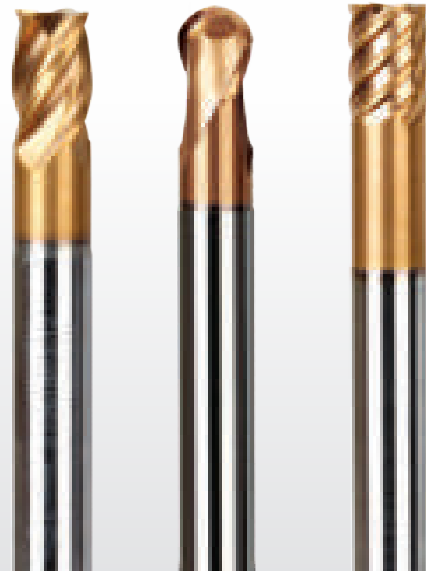


Coarse Pitch Type

Cutting Tools Category Table



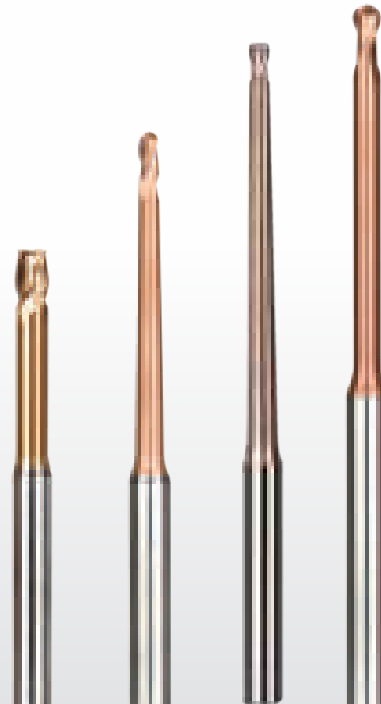
Endmills for high hard- ened steel



Better performance and quality than Japan Producers
Best for High Speed Machining!

- Endmill for high speed cutting of high hardened steel up to HRC70
- Made of new special raw material and applied new coating technology

RIB Processing

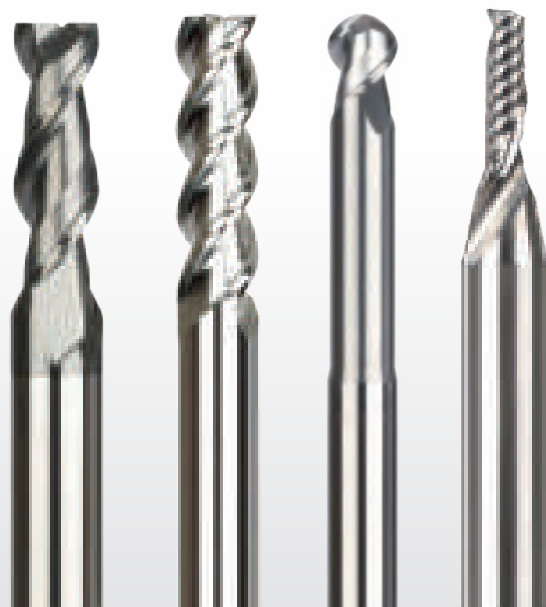


Thes best raw material for longer tool life

- Deep hole mahchining with high speed
- Micro size produced from 0.03mm
- Supereminent wear resistance

Aluminum Endmills

- Endmill for Aircraft and Aluminum Machining
- High precision, excellent surface and maximum tool life





Endmills for difficult to cut materials

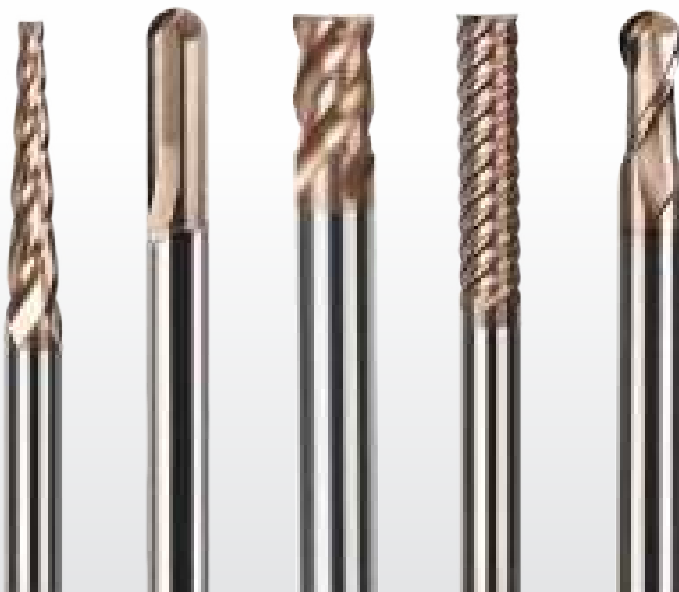
Excellent Performance for
Stainless Steel, Titanium, Inconel

- Superb Chip ejection
- Suitable for machine tool steel, alloy steel, stainless steel and low hardness materials



Diamond coating Endmills

- Less Heating
- Excellent tool life
- High quality machining surface



Endmills for Mold & Die

Premium Quality of Precise
Machining tool
made from the finest raw material

H S S E T A P

Equipped with the world best precision machines and raw materials

Top of the best in high hardness, high speed machining

- STRAIGHT TAP
- SPIRAL TAP
- SPIRAL ROLL TAP
- POINT TAP
- ROLL TAP



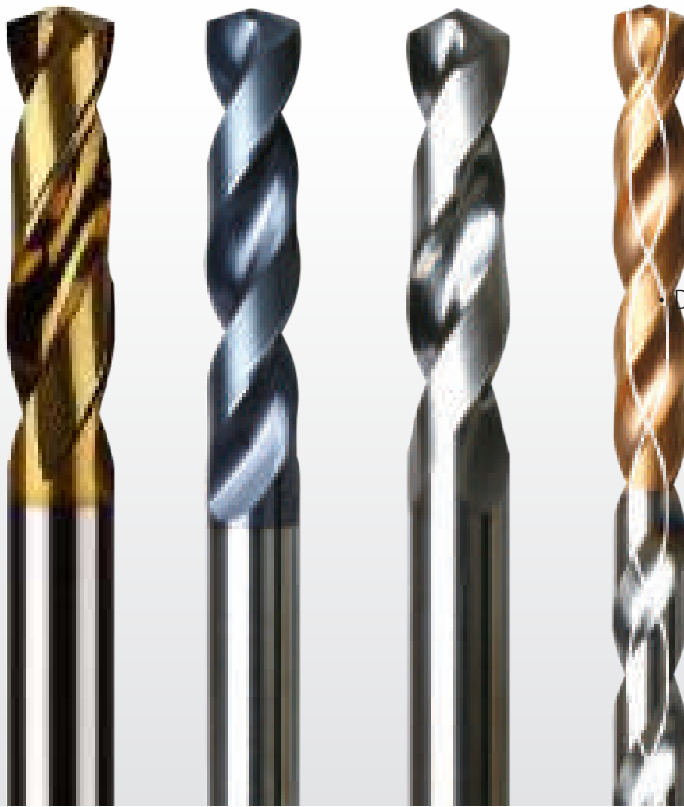
Carbide T A P

Supereminent wear resistance

- STRAIGHT TAP
- SPIRAL TAP
- SPIRAL ROLL TAP
- POINT TAP
- ROLL TAP



Drills for high hard- ened steel



For Heat Treated Steel, General Steel,
Cast Iron, Stainless Steel

- Various types of products based on each material type
- Differentiated cutting force along with WIDIN's unique design

Tungsten Carbide Rods & Blanks

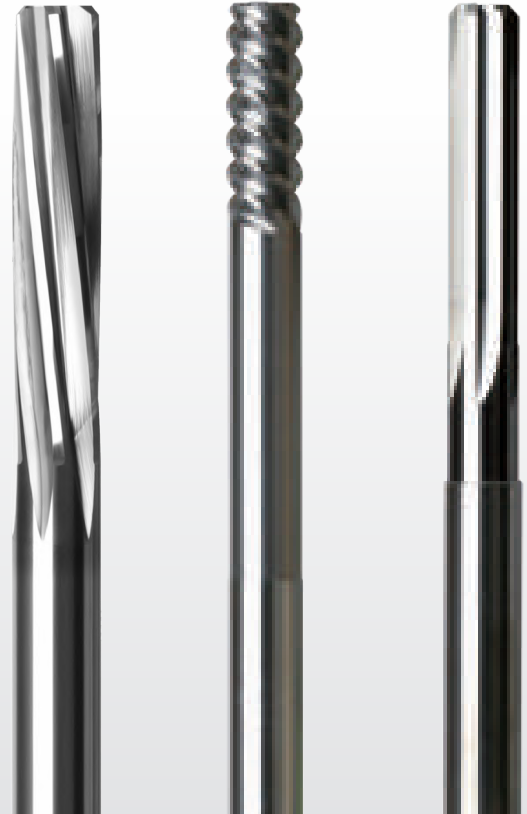


Multi- purpose Reamer

Used ultra fine cemented Carbide

Excellent performance for high speed machining

- For prehardened, hardened and machine tool steels and cast iron up to HRc52



Live & Special Center

Live Center for CNC lathe

Live Center for Heavy Duty

Live Center for High Speed Rotation

- Long life
- Run Out 0.003
- Prevent the inflow of cutting oil and foreign substance
- High degree of accuracy of rotation and high durability by using the triplexed bearing structure as high degree of precision



TAP SERIES ······ 52~



1

ENDMILL SERIES ······ 113~



2

DRILL SERIES ······ 558~



3

CENTERING TOOLS & REAMERS ··· 634~



4

TUNGSTEN CARBIDE RODS ··· 651~



5

LIVE CENTER SERIES ····· 598~



6

TECHNICAL DATA ······ 684~

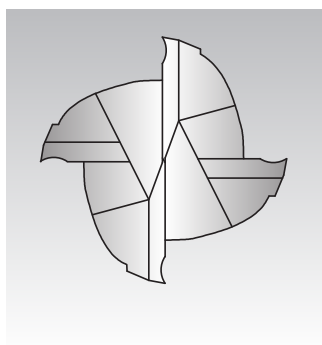


7

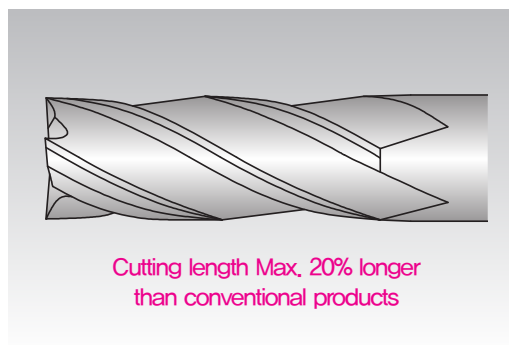
Thunder Plus

Features

- Optimal performance up to HRc 40 for general purpose machining
- Improved tool performance reliability with new coating
- Optimize flute shape to make sure of superb surface roughness



End face shape

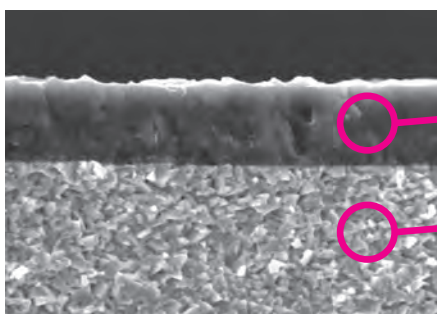


Cutting length Max. 20% longer than conventional products

Side cutting edge

Improvement points

- Enhanced wear resistance and increased tool life with new coating



New Coating

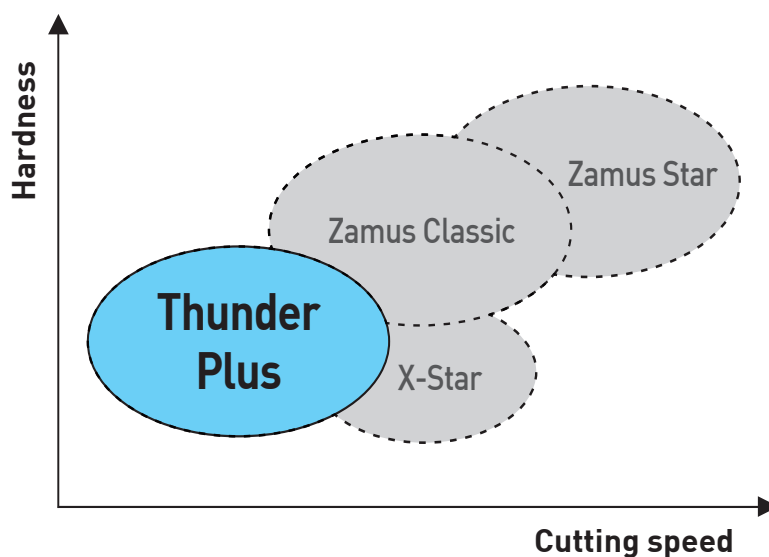
ALTiN

Improved wear resistance, chipping resistance applying PVD technology with excellent adhesion

Applying wear resistance substrate

Improved hardness and wear resistance by applying a stable base of fine grain

Applications



Thunder Plus

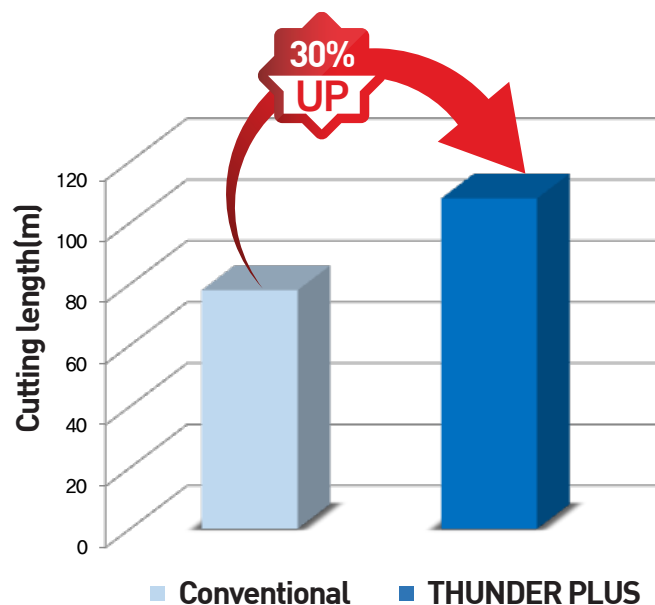
Cutting condition

- TEST TOOL : conventional / THUNDER PLUS
- WORK PIECE : S45C (HB180)
- Cutting type : Side cutting
- Cutting condition : RPM 3,820 / Feed 917 / Ap 10.0, Ae 1.0

Test result

Case study		
	conventional	THUNDER PLUS
Wear Appearance		
Chipping Appearance		

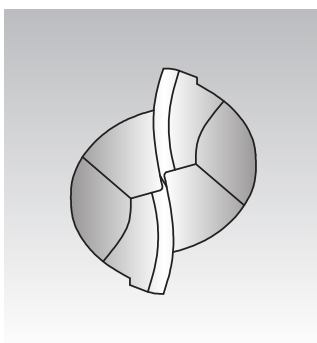
TEST EDP NO.
: ZE304100



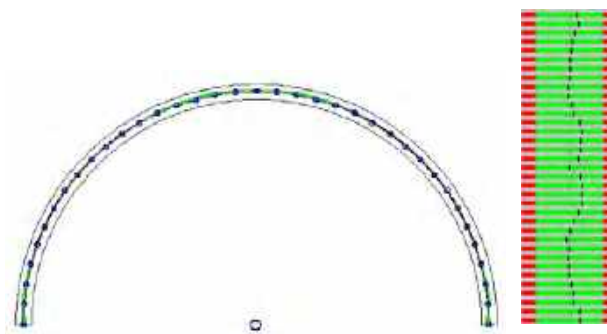
WINNER 7 PLUS+

Features

- Most optimal performance when machining high hardened workpieces below HRc 60
- Various shape cutting machining with wide selection of neck length
- Precision machining by applying precision tolerance



End face shape

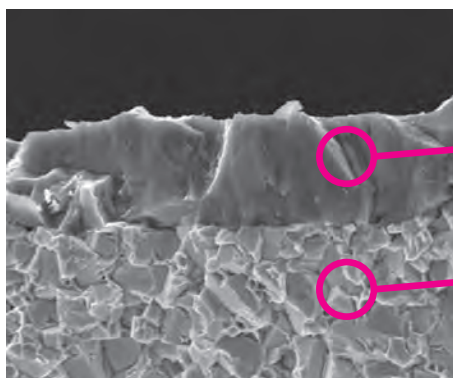


Precise ball shape

±0.005mm

Improvement points

- Improved tool performance with application of Nano-coating which has toughness and heat resistance
- High precision machining with precision tolerance in the shape of flute part



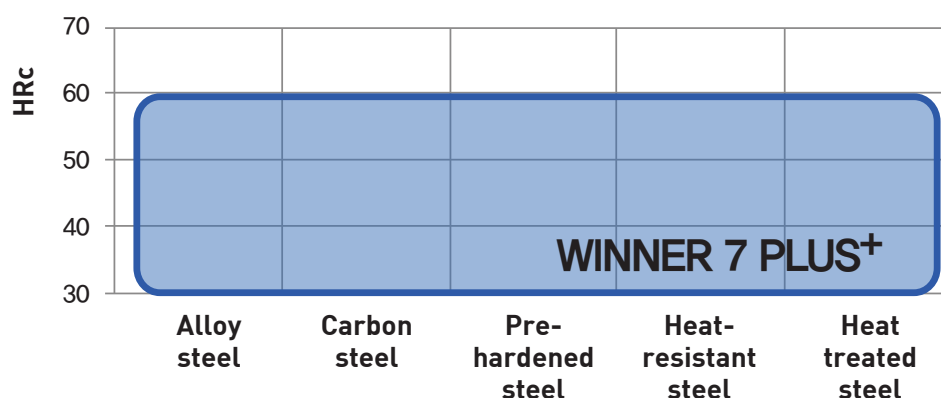
AlTiN

Improved wear resistance, chipping resistance applying PVD technology with excellent adhesion

Applying wear resistance substrate

Improved hardness and wear resistance by applying a stable base of fine grain

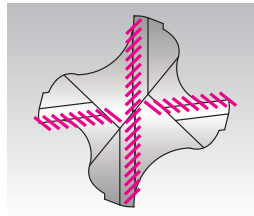
Applications



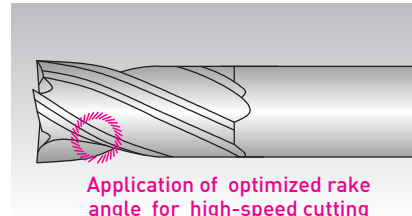
S-STAR

Features

- Stable high-speed process with application of variable helix and optimized rake angle during work
- High quality cutting surface with minimization of the vibration
- Excellent chip emission with minimization of the attrition



End face

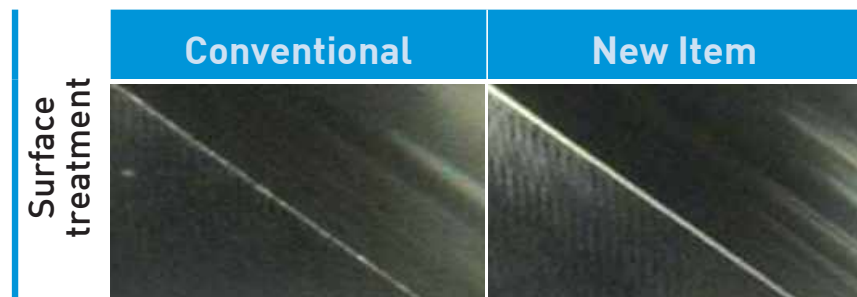


Application of optimized rake angle for high-speed cutting

Side cutting edge

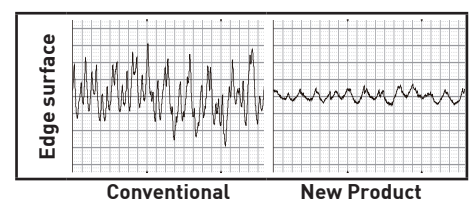
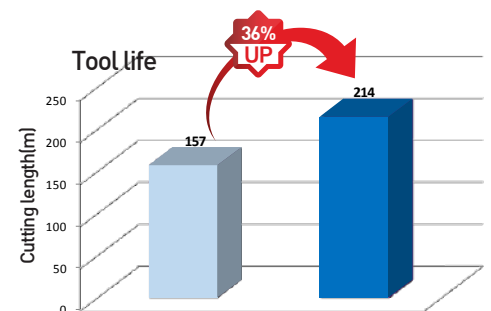
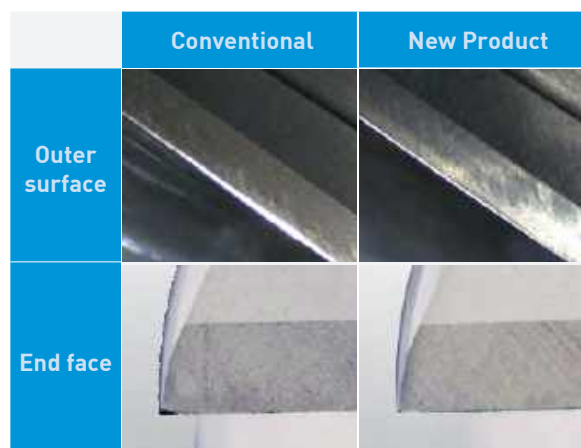
Improvement points

- Minimize micro chipping on flute part with new surface treatment



Case study

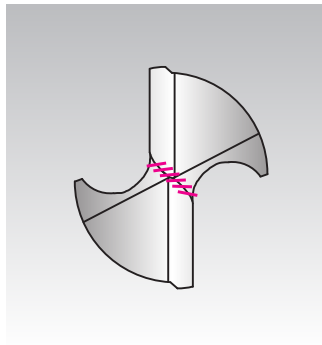
TEST EDP NO.
: STE504100



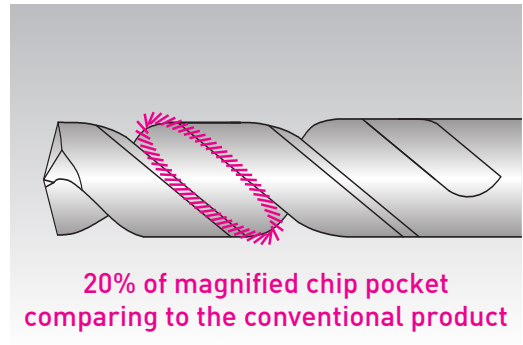
NDP...

Features

- Improvement of chips emission with wider chip pockets comparing to the conventional products
- Decrease of frictional resistance and heat with optimum margin and back taper
- Multipurpose use with various items



Improvement of chip curling by applying new γ -Flute concept

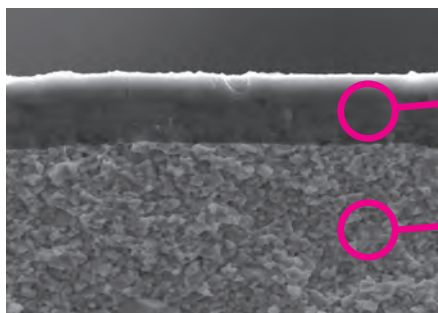


Improvement of minimum friction and chip emission with the optimum margin, back taper and bigger chip pockets

Improvement points

- Applying to various work pieces with improvement of wear resistance chip resistance with optimum material and coating
- Improvement of chip emission and tool life with developed surface treatment

Application of optimum material and new PVD coating for general purpose machining



New coating

Application of multi-layered PVD technology which improves wear resistance, chip resistance and lubrication

Stable machining by applying material which has optimum wear resistance and hardness

NDP...

Case study

TEST EDP NO.
: NDPR060

Case study

	Conventional	Competitor	NDPR060
Wear Appearance			
Tool Life	1,350	1,550	2,000

SM45C / Wet, External / Blind Hole / Vc:80m/min, f:0.14mm/rev / Ap:20mm

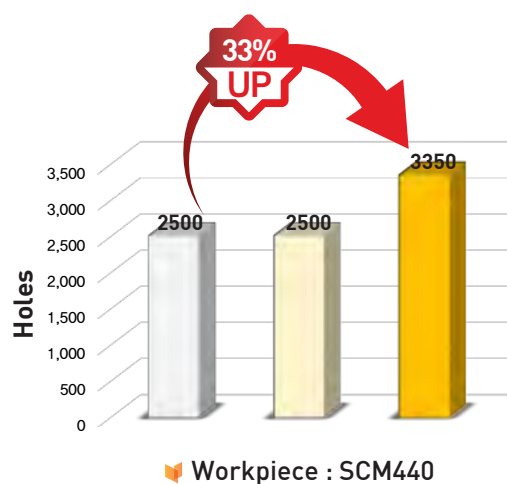
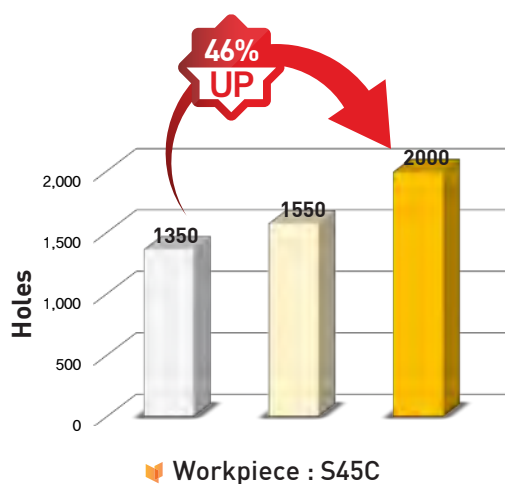
Case study

	Conventional	Competitor	NDPR060
Wear Appearance			
Tool Life	2,500	2,500	3,350

SCM440 / Wet, External / Blind Hole / Vc:80m/min, f:0.14mm/rev / Ap:14.5mm

Case result

Conventional
Competitor
New product



※ If the following items are not in stock, they will be ordered and produced

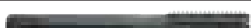
Series		EDP. NO	Appearance	Type	Coating	Standard range Min~Max	Page	Stock
CARBIDE TAP SERIES	JIS	WSOM		STRAIGHT TAPS	uncoated	M3~M12	50	●
		WSCM		STRAIGHT TAPS	TiCN	M3~M12	51	●
		WPOM		SPIRAL TAPS	uncoated	M3~M12	52	●
		WPCM		SPIRAL TAPS	TiCN	M3~M12	53	●
		WROM		ROLL TAPS	uncoated	M3~M12	54	●
		WRCM		ROLL TAPS	TiCN	M3~M12	55	●
		WFOM		SPIRAL ROLL TAPS	uncoated	M3~M6	56	●
		WFCM		SPIRAL ROLL TAPS	TiCN	M3~M6	57	●
	DIN	WGOM		STRAIGHT TAPS	uncoated	M3~M24	58	●
		WGCM		STRAIGHT TAPS	TiCN	M3~M24	59	●
		WQOM		SPIRAL TAPS	uncoated	M3~M24	60	●
		WQCM		SPIRAL TAPS	TiCN	M3~M24	61	●
		WMOM		ROLL TAPS	uncoated	M3~M12	62	●
		WMCM		ROLL TAPS	TiCN	M3~M12	63	●
HSS-E TAP SERIES	JIS	VSOM		STRAIGHT TAPS	uncoated	M3~M24	64	●
		VSTM		STRAIGHT TAPS	TiN	M3~M24	65	●
		VSCM		STRAIGHT TAPS	TiCN	M3~M24	66	●
		VSHM		STRAIGHT TAPS	HOMO	M3~M24	67	●
		VNOM		POINT TAPS	uncoated	M3~M24	68	●
		VNTM		POINT TAPS	TiN	M3~M24	69	●
		VNCM		POINT TAPS	TiCN	M3~M24	70	●
		VNHM		POINT TAPS	HOMO	M3~M24	71	●
		VPOM		SPIRAL TAPS	uncoated	M3~M24	72	●
		VPTM		SPIRAL TAPS	TiN	M3~M24	73	●
		VPCM		SPIRAL TAPS	TiCN	M3~M24	74	●
		VPHM		SPIRAL TAPS	HOMO	M3~M24	75	●
		VROM		ROLL TAPS	uncoated	M3~M12	76	●
		VRTM		ROLL TAPS	TiN	M3~M12	77	●
		VRCM		ROLL TAPS	TiCN	M3~M12	78	●
		VFOM		SPIRAL ROLL TAPS	uncoated	M3~M6	79	●
		VFTM		SPIRAL ROLL TAPS	TiN	M3~M6	80	●
		VFCM		SPIRAL ROLL TAPS	TiCN	M3~M6	81	●

NEXT >>>

[Applicable Working Material] ○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C -0.25%	C0.25%~0.45%	C 0.45%~	SCM	25~45 HRC	45~55 HRC	50~60 HRC	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC, ADC	MC	ZDC				
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※ If the following items are not in stock, they will be ordered and produced

Series		EDP. NO	Appearance	Type	Coating	Standard range Min~Max	Page	Stock
H S S E T T A P S E R I E S	DIN	VGOM		STRAIGHT TAPS	uncoated	M3~M24	82	●
		VGTM		STRAIGHT TAPS	TiN	M3~M24	83	●
		VGCM		STRAIGHT TAPS	TiCN	M3~M24	84	●
		VGHM		STRAIGHT TAPS	HOMO	M3~M24	85	●
		VQOM		SPIRAL TAPS	uncoated	M3~M24	86	●
		VQTM		SPIRAL TAPS	TiN	M3~M24	87	●
		VQCM		SPIRAL TAPS	TiCN	M3~M24	88	●
		VQHM		SPIRAL TAPS	HOMO	M3~M24	89	●
		VDOM		POINT TAPS	uncoated	M3~M24	90	●
		VDTM		POINT TAPS	TiN	M3~M24	91	●
		VDCM		POINT TAPS	TiCN	M3~M24	92	●
		VDHM		POINT TAPS	HOMO	M3~M24	93	●
		VMOM		ROLL TAPS	uncoated	M3~M12	94	●
		VMTM		ROLL TAPS	TiN	M3~M12	95	●
		VMCM		ROLL TAPS	TiCN	M3~M12	96	●
P I P E T A P S E R I E S		VSOPT		STRAIGHT TAPS	uncoated	1/16-28~ 1-11	97	●
		VPOPT		SPIRAL TAPS	uncoated	1/16-28~ 1-11	98	●
		VSONPT		STRAIGHT TAPS	uncoated	1/16-28~1-11	99	●
		VPONPT		SPIRAL TAPS	uncoated	1/16-27~1-11½	100	●
		VSOPS		STRAIGHT TAPS	uncoated	1/8-28~ 1-11	101	●
		VPOPS		SPIRAL TAPS	uncoated	1/8-28~ 1-11	102	●
		VSOPF		STRAIGHT TAPS	uncoated	1/8-28~ 1-11	103	●
		VPOPF		SPIRAL TAPS	uncoated	1/8-28~ 1-11	104	●

[Applicable Working Material] ○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermosclerosis Plastic	Thermo Plastic
C ~0.25%	C 0.25% ~0.45%	C 0.45%~	SCM	25~45 HRC	45~55 HRC	50~60 HRC	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC, ADC	MC	ZDC				
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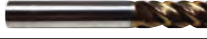
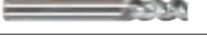
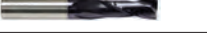
※ If the following items are not in stock, they will be ordered and produced

Series	Feature	EDP. NO	Appearance	Flutes	Type	INCH METRIC	Standard range Min~Max	Page	Stock
1 High Hardened Material ~HRC70 ZAMUS STAR SERIES		ZS124		4F	LONG LENGTH CUT, VARIABLE FLUTE	METRIC	2~12	110	•
		ZS1(2)04		4F	CORNER RADIUS, VARIABLE HELIX	METRIC	1~12	111	•
		ZS204		4F	CORNER RADIUS, VARIABLE HELIX	METRIC	2~12	112	•
		ZSLNS20		2F	LONG NECK	METRIC	0.1~5	114	•
		ZSLNS40		4F	LONG NECK	METRIC	1~5	119	•
		ZSLNB		2F	LONG NECK	METRIC	0.05~5	121	•
		ZSLNR		2F	LONG NECK & BACK DRAFT TYPE	METRIC	0.2~3	125	•
		ZSTNB20		2F	TAPER NECK & BACK DRAFT TYPE	METRIC	0.2~10	129	•
		ZSTNB30		3F	TAPER NECK & BACK DRAFT TYPE	METRIC	1~2.5	133	•
		ZSTNR		2F	TAPER NECK & BACK DRAFT TYPE	METRIC	0.2~3	134	•
		WB712+	 NEW!	2F	for RIB PROCESSING	METRIC	0.1 ~ 12	136	•
		WE712+	 NEW!	2F	for RIB PROCESSING	METRIC	0.1 ~ 12	147	•
	* High speed & High feed rates	ZSPM4		4F	STUB CUT LENGTH, with EXTENDED NECK	METRIC	3~10	155	•
		DB702		2F	STUB CUT LENGTH, BALL NOSE with EXTENDED NECK	METRIC	0.1~12	156	•
		DB712		2F	REGULAR LENGTH, BALL NOSE	METRIC	1~12	157	•
		DB703		3F	BALL NOSE for FINISHING MOLD & DIE	METRIC	2~12	158	•
		DB734		4F	TAPER NECK for FINISHING MOLD & DIE	METRIC	2~10	159	•
		ZE702		2F	STUB CUT LENGTH, with EXTENDED NECK	METRIC	0.1~20	160	•
		ZE704		4F	STUB CUT LENGTH, with EXTENDED NECK	METRIC	1~20	161	•
		ZE724(6)		4&6F	FINISHING for MOLD & DIE	METRIC	1~12	162	•
		ZR702		2F	STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK	METRIC	1~12	163	•
		ZR732		2F	CORNER RADIUS with LONG SHANK	METRIC	1~12	164	•
		ZR704		4F	STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK	METRIC	1~12	170	•
	* Hardened Steels (~ HRC 70)	ZR714		4F	45° HELIX FINISHING MOLD & DIE	METRIC	3~12	173	•
		ZR724		4F	STUB CUT LENGTH, CORNER RADIUS with LONG SHANK	METRIC	6~12	174	•
		ZR734		4F	CORNER RADIUS with LONG SHANK	METRIC	1~12	175	•
		ZR706		6F	45° HELIX STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK	METRIC	6~12	177	•
		ZR736		6F	45° HELIX, LONG SHANK, CORNER RADIUS	METRIC	6~12	178	•
	* High Speed Cutting	ZE712		2F	35° HELIX REGULAR LENGTH	METRIC	1~12	179	•
		ZE714		4F	45° HELIX REGULAR LENGTH	METRIC	1~12	180	•
		ZE716		6F	50° HELIX REGULAR LENGTH	METRIC	6~20	181	•

[Applicable Working Material] ○:General Application ◎:The most suitable Application

Carbon Steel (S45C,S55C...) ~ HB225	Alloy steel (SCM,SK...) HB225~325	Prehardened Steel (NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400. 500~	Aluminium	Stainless Steel
			~HRc55 SKD61	~HRc55 SKD11					
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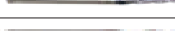
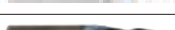
※ If the following items are not in stock, they will be ordered and produced

Series	Feature	EDP. NO	Appearance	Flutes	Type	INCH METRIC	Standard range Min~Max	Page	Stock
2 for stainless ~HRc45 NEO CLASSIC X-STAR	* High performance & Hig efficiency (~ HRc 45)	XE505		5F	REGULAR CUT LENGTH, VARIABLE HELIX	METRIC	6~25	184	•
		XE515		5F	LONG CUT LENGTH	METRIC	6~20	185	•
		XR505		5F	REGULAR CUT LENGTH CORNER RADIUS, VARIABLE HELIX	METRIC	6~25	186	•
		XXB504		4F	REGULAR CUT LENGTH, VARIABLE HELIX	METRIC	4~12	187	•
		XCE504		4F	REGULAR CUT LENGTH, VARIABLE HELIX	METRIC	6~25	188	•
		XE304		4F	REGULAR LENGTH	METRIC	3~20	189	•
		XM304		4F	ENDMILL FOR COMPLEX AUTOMATIC	METRIC	3~10	190	•
		XCC504		4F	REGULAR CUT LENGTH, CORNER CHAMFER, VARIABLE HELIX	METRIC	6~25	191	•
		XCR504		4F	REGULAR CUT LENGTH, CORNER RADIUS, VARIABLE HELIX	METRIC	6~25	192	•
		XCE503		3F	REGULAR CUT LENGTH	METRIC	2~25	193	•
		XCC503		3F	REGULAR CUT LENGTH, CORNER CHAMFER	METRIC	2~25	194	•
		XCR503		3F	REGULAR CUT LENGTH, CORNER RADIUS	METRIC	5~25	195	•
		XE504		4F	REGULAR CUT LENGTH, VARIABLE HELIX	METRIC	1~25	196	•
		XR504		4F	REGULAR CUT LENGTH, CORNER RADIUS, VARIABLE HELIX	METRIC	2~25	197	•
		XE514		4F	STUB CUT LENGTH with EXTENDED NECK, VARIABLE HELIX	METRIC	1~20	198	•
		XE524		4F	STUB CUT LENGTH with EXTENDED LONG NECK	METRIC	6~16	199	•
		XR514		4F	REGULAR CUT LENGTH, VARIABLE HELIX	METRIC	2~20	200	•
3 Endmills for high speed & general cutting ~HRc55 ZAMUS CLASSIC	* Hardened Steels (~ HRc 55) * High Speed Cutting * General Speed Cutting	DB402		2F	SHORT LENGTH, BALL NOSE	METRIC	1~20	205	•
		DB412		2F	LONG LENGTH, BALL NOSE	METRIC	1~10	206	•
		DB512		2F	LONG LENGTH, BALL NOSE	METRIC	1~25	207	•
		DB514		4F	LONG LENGTH, BALL NOSE	METRIC	3~25	208	•
		DB502		2F	STUB CUT LENGTH, BALL NOSE with EXTENDED NECK	METRIC	1~12	209	•
		DB522		2F	NECK & LONG SHANK TYPE	METRIC	3~16	210	•
		DB532		2F	MMC - SPHERE TYPE	METRIC	3~16	211	•
		DB534		4F	MMC - SPHERE TYPE	METRIC	5~16	212	•
		DB54(5)2		2F	BALL NOSE with TAPER NECK	METRIC	2~12	213	•
		ZE502		2F	REGULAR LENGTH	METRIC	1~25	214	•
		ZE504		4F	REGULAR LENGTH	METRIC	1~25	215	•
		ZE503		3F	REGULAR LENGTH	METRIC	6~32	216	•
		ZE506		6F	REGULAR & LONG LENGTH	METRIC	6~32	217	•
		ZM502		2F	MEDIUM LENGTH	METRIC	2~25	218	•
		ZM504		4F	MEDIUM LENGTH	METRIC	2~25	219	•

[Applicable Working Material] ○:General Application ◎:The most suitable Application

Carbon Steel [S45C,S55C...] ~ HB225	Alloy steel [SCM,SK...] HB225~325	Prehardened Steel [NAK...] HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400. 500~	Aluminium	Stainless Steel
			~HRc55 SKD61	~HRc55 SKD11					
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※ If the following items are not in stock, they will be ordered and produced

Series	Feature	EDP. NO	Appearance	Flutes	Type	INCH METRIC	Standard range Min~Max	Page	Stock
Endmills for high speed & general cutting ~HRc55 ZAMUS CLASSIC	* Hardened Steels [~ HRc 55] * High Speed Cutting * General Speed Cutting	ZM522		2F	MEDIUM CUT, LONG SHANK TYPE	METRIC	3~20	220	•
		ZM524		4F	MEDIUM CUT, LONG SHANK TYPE	METRIC	3~20	221	•
		ZE522		2F	LONG TYPE	METRIC	3~20	222	•
		ZE524		4F	LONG TYPE	METRIC	3~20	223	•
		ZE534		4F	EXTRA LONG TYPE	METRIC	4~25	224	•
		ZE512		2F	35° HELIX REGULAR LENGTH	METRIC	1~12	225	•
		ZE514		4F	45° HELIX REGULAR LENGTH	METRIC	2~12	226	•
		ZE516		6F	for RIB PROCESSING	METRIC	6~20	227	•
		ZR502		2F	STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK	METRIC	4~12	228	•
		ZR504		4F	STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK	METRIC	4~12	229	•
		ZR512		2F	REGULAR LENGTH, CORNER RADIUS	METRIC	6~20	230	•
		ZR514		4F	REGULAR LENGTH, CORNER RADIUS	METRIC	6~20	231	•
		ZR522		2F	LONG LENGTH, CORNER RADIUS	METRIC	3~12	232	•
		ZR524		4F	LONG LENGTH, CORNER RADIUS	METRIC	3~12	233	•
		TPRB4-050		4F	30' TAPER BALL, RIB PROCESSING	METRIC	0.6~2.5	234	•
		TPRB4-075		4F	45' TAPER BALL, RIB PROCESSING	METRIC	0.6~2.5	235	•
		TPRB4-100		4F	1° TAPER BALL, RIB PROCESSING	METRIC	0.6~2.5	236	•
		TPRB4-150		4F	1° 30' TAPER BALL, RIB PROCESSING	METRIC	0.6~2.5	238	•
		TPRB4-200		4F	2° TAPER BALL, RIB PROCESSING	METRIC	0.6~2.5	240	•
		TPRE4-050		4F	30' TAPER BALL, RIB PROCESSING	METRIC	0.4~2.5	242	•
		TPRE4-075		4F	45' TAPER, RIB PROCESSING	METRIC	0.4~3	244	•
		TPRE4-100		4F	1° TAPER, RIB PROCESSING	METRIC	0.4~3	246	•
		TPRE4-150		4F	1° TAPER, RIB PROCESSING	METRIC	0.4~3	248	•
		TPRE4-200		4F	2° TAPER, RIB PROCESSING	METRIC	0.4~3	250	•
		TPRE4-300		4F	3° TAPER BALL, RIB PROCESSING	METRIC	0.5~3	252	•
		TE503		3F	TAPER END MILL	METRIC	3~10	253	•
		TB503		3F	TAPER BALL END MILL	METRIC	3~12	254	•
		TB504		4F	TAPER BALL END MILL	METRIC	5~12	255	•
		ZF60		3~6F	ROUGHING END MILL	METRIC	4~32	256	•
		ZF61		3~5F	ROUGHING END MILL - FINE PITCH	METRIC	4~25	257	•
		PK503		3F	Z - AXIS ROUGHING END MILL	METRIC	6~20	258	•

[Applicable Working Material] ○:General Application ◎:The most suitable Application

Carbon Steel [S45C,S55C...] ~ HB225	Alloy steel [SCM,SK...] HB225~325	Prehardened Steel [NAK...] HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400. 500~	Aluminium	Stainless Steel
			~HRc55 SKD61	~HRc55 SKD11					
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Series	Feature	EDP. NO	Appearance	Flutes	Type	INCH METRIC	Standard range Min~Max	Page	Stock
4 Endmills for high speed & general cutting ~HRC45 ZAMUS THUNDER	* Hardened Steels (~ HRC 45) * High Speed Cutting * General Speed Cutting	DB312		2F	LONG LENGTH, BALL NOSE	METRIC	1~20	263	•
		DB342		2F	BALL NOSE with TAPER NECK	METRIC	1~12	264	•
		ZE302		2F	REGULAR LENGTH	METRIC	1~20	265	•
		ZE304		4F	REGULAR LENGTH	METRIC	2~20	266	•
		ZE302+		2F	REGULAR LENGTH	METRIC	1~20	267	•
		ZE304+		4F	REGULAR LENGTH	METRIC	2~20	268	•
		ZE322		2F	LONG & EXTRA LONG LENGTH	METRIC	3~20	269	•
		ZE324		4F	LONG and X-LONG LENGTHS	METRIC	3~20	270	•
		ZR322		2F	CORNER RADIUS LONG LENGTH	METRIC	3~12	271	•
		ZR324		4F	CORNER RADIUS LONG LENGTH	METRIC	3~12	272	•
		ZR304H		4F	45° HELIX STUB CUT LENGTH, CORNER RADIUS, EXTENDED NECK	METRIC	3~12	273	•
		ZR324H		4F	45° HELIX STUB CUT LENGTH, CORNER RADIUS, LONG SHANK	METRIC	6~12	274	•
	* Hardened Steels (~ HRC 45) * High Speed Cutting * General Speed Cutting * Economic Type	TX302		2F	REGULAR LENGTH	METRIC	1~20	275	•
		TS302		2F	REGULAR LENGTH	METRIC	1~20	276	•
		TX304		4F	REGULAR LENGTH	METRIC	1~20	277	•
		TS304		4F	REGULAR LENGTH	METRIC	2~20	278	•
		TX304H		4F	45° HELIX, REGULAR LENGTH	METRIC	3~20	279	•
		TXB302		2F	REGULAR LENGTH, BALL NOSE	METRIC	1~20	280	•
		TXB304		4F	REGULAR LENGTH, BALL NOSE	METRIC	1~20	281	•
		TX202		2F	SHORT LENGTH	METRIC	1~20	282	•
		TX222		2F	LONG LENGTH	METRIC	3~20	283	•
		TX204		4F	SHORT LENGTH	METRIC	1~20	284	•
		TX224		4F	LONG LENGTH	METRIC	3~20	285	•
		TXB202		2F	REGULAR LENGTH, BALL NOSE	METRIC	1~20	286	•
		TXB222		2F	LONG LENGTH, BALL NOSE	METRIC	3~22	287	•
		TXB232		2F	LONG REACH, BALL NOSE	METRIC	3~20	288	•
		TXB204		4F	REGULAR LENGTH, BALL NOSE	METRIC	2~20	289	•
5 Endmills for difficult to cut materials ZAMUS SUS-MATE	* Stainless Steel * Titanium Inconell	DS502		2F	BALL NOSE REGULAR & LONG LENGTH	METRIC	1~12	292	•
		SM503		3F	REGULAR LENGTH	METRIC	2~20	293	•
		SM504		4F	REGULAR LENGTH, CORNER RADIUS	METRIC	2~20	294	•
		ZF62		4~6F	ROUGHING END MILL	METRIC	6~20	295	•

[Applicable Working Material] ○:General Application ◎:The most suitable Application

Carbon Steel (S45C,S55C...) ~ HB225	Alloy steel (SCM,SK...) HB225~325	Prehardened Steel (NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400. 500~	Aluminium	Stainless Steel
			~HRc55 SKD61	~HRc55 SKD11					
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Series	Feature	EDP. NO	Appearance	Flutes	Type	INCH METRIC	Standard range Min~Max	Page	Stock
6 Endmills for difficult to cut materials ZAMUS S-STAR	* Stainless Steel * Titanium * Inconell	STE504		4F	Variable Helx	METRIC	1.0~20	298	•
		STR504		4F	Variable Helx Coner Radius	METRIC	1.0~20	299	•
7 Endmill for non-ferrous metal machining ZAMUS COPPER-MATE	* Copper & non-ferrous material	BC502		2F	STUB CUT with EXTENDED NECK	METRIC	1~12	304	•
		RC502		2F	STUB CUT with EXTENDED NECK	METRIC	2~12	305	•
8 Endmill for Graphite and Non-ferrous ZAMUS GRA-MATE	* Graphite & non-ferrous material	G		2F	DIAMOND COATING BALL NOSE	METRIC	0.5~12	308	•
		GE		2F	DIAMOND COATING END MILL	METRIC	0.5~12	311	•
		WGR502		4F	DIAMOND COATING RADIUS	METRIC	0.2~6	312	•
		WGR504		4F	DIAMOND COATING RADIUS	METRIC	3~20	313	•
		WGB504		4F	DIAMOND COATING, BALL NOSE	METRIC	8~20	314	•
		WGE504		4F	DIAMOND COATING SQUARE	METRIC	2~20	315	•
9 Endmill for Graphite and Non-ferrous ALU-WAVE	* Aluminum * Non-Ferrous Material * Graphite * Plastics	WAB312		2F	50° HELIX BALL ENDMILL - FOR ALUMINUM	METRIC	6~20	320	•
		WAE301		1F	1 FLUTE-FOR PLASTIC AND NON-FERROUS	METRIC	0.2~2.5	321	•
		WAE302		2F	45° HELIX - FOR ALUMINUM	METRIC	1~25	323	•
		WAE30(2)3		3F	45° HELIX LONG & EXTRA LONG LENGTH	METRIC	1~25	324	•
		WAR302		2F	45° HELIX CORNER RADIUS - FOR ALUMINUM	METRIC	6~20	328	•
		WAR303		3F	45° HELIX CORNER RADIUS - FOR ALUMINUM	METRIC	6~20	329	•
		WAR502		2F	CORNER RADIUS WITH D.L.C COATED - FOR ALUMINUM & NONFERROUS	METRIC	1~12	330	•
		WAR503		3F	CORNER RADIUS WITH D.L.C COATED - FOR ALUMINUM & NONFERROUS	METRIC	4~20	331	•
		WAF303		3F	38° HELIX ROUGHING ENDMILL - FOR ALUMINUM	METRIC	4~20	332	•

[Applicable Working Material] ○:General Application ◎:The most suitable Application

Carbon Steel (S45C,S55C...) ~ HB225	Alloy steel (SCM,SK...) HB225~325	Prehardened Steel (NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400. 500~	Aluminium	Stainless Steel
			~HRc55 SKD61	~HRc55 SKD11					
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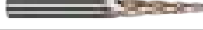
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Series	Feature	EDP. NO	Appearance	Flutes	Type	INCH METRIC	Standard range Min~Max	Page	Stock
10 Endmills for General & Multi- purpose STANDARD END MILL	* General & Multi-purpose	E302		2F	REGULAR LENGTH	METRIC	1~25	336	•
		E304		4F	REGULAR LENGTH	METRIC	2~25	338	•
		B302		2F	BALL NOSE LONG LENGTH	METRIC	1~25	339	•
		BL422		2F	BALL NOSE EXTRA LONG LENGTH	METRIC	3~20	340	•
		B304		4F	BALL NOSE LONG LENGTH	METRIC	3~25	341	•
		E322		2F	LONG LENGTH	METRIC	3~20	342	•
		E324		4F	LONG LENGTH	METRIC	3~20	343	•
		EB302		2F	REGULAR LENGTH - BRAZED TYPE	METRIC	14~50	344	•
		EB304		4F	REGULAR LENGTH - BRAZED TYPE	METRIC	14~50	345	•
		EB322		2F	LONG LENGTH - BRAZED TYPE	METRIC	14~45	346	•
		EB324		4F	LONG LENGTH - BRAZED TYPE	METRIC	14~50	347	•
11 Endmills for Mold & Die WINNER SERIES	BALL	WHPB902		2F	APPLIED ULTRA-HIGH PRECISION R TOLERANCE	METRIC	0.1~12	348	•
		WB502---		2F	SHORT LENGTH + REGULAR LENGTH + LONG LENGTH	METRIC	0.1~25	349	•
		WB502---P		2F	HIGH PRECISION	METRIC	0.1~12	353	•
		WB512---		2F	for RIB PROCESSING	METRIC	0.1~12	354	•
		WB512---S6		2F	for RIB PROCESSING(Shank-6)	METRIC	0.5~2	361	•
		WB542---		2F	TAPER NECK	METRIC	0.1~12	364	•
		WB532---		2F	MILLING MACHINE COPY	METRIC	3~12	375	•
		WSB502---		2F	STRAIGHT FLUTE	METRIC	3~20	376	•
		WB503---		3F	HIGH FEED & CENTER MATCH	METRIC	1~12	377	•
		WB504---		4F	HIGH FEED	METRIC	1~12	378	•

[Applicable Working Material] ○:General Application ◎:The most suitable Application

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

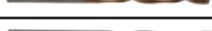
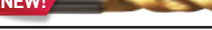
※ If the following items are not in stock, they will be ordered and produced

Series	Feature	EDP. NO	Appearance	Flutes	Type	INCH METRIC	Standard range Min~Max	Page	Stock
Endmills for Mold & Die WINNER SERIES	CORNER RADIUS	WR502---		2F	SHORT LENGTH + REGULAR LENGTH + LONG LENGTH	METRIC	0.2~20	379	●
		WR512---		2F	LONG NECK	METRIC	0.2~20	384	●
		WR542---		2F	TAPER NECK	METRIC	0.2~4	396	●
		WDR503---		3F	DOUBLE CORNER RADIUS	METRIC	6~20	406	●
		WXR504---		4F	SHORT LENGTH+REGULAR LENGTH+LONG SHANK+VARIABLE INDEX GEOMETRY	METRIC	1~20	407	●
		WXR514---		4F	LONG NECK+VARIABLE INDEX GEOM- ETRY	METRIC	1~20	411	●
		WR544---		4F	TAPER NECK	METRIC	1~4	421	●
		WSPM4---		4F	HIGH FEED	METRIC	1~20	428	●
		WR504---		4F	SHORT LENGTH+REGULAR LENGTH+END TEETH VARIABLE INDEX GEOMETRY	METRIC	3~20	430	●
		WR514---		4F	LONG NECK CORNER RADIUS	METRIC	6~12	432	●
		WR506---		6F	45° HELIX CORNER RADIUS	METRIC	6~20	433	●
	SQUARE	WME502---		2F	Ø0.03~	METRIC	0.03~25	434	●
		WE502---S4		2F	Ø0.1 + SHANK 4	METRIC	1~4	436	●
		WE502---S3		2F	SHANK 3	METRIC	0.1~3	437	●
		WE502---		2F	SHORT + REGULAR + LONG LENGTH	METRIC	0.1~20	442	●
		WE522---		2F	LONG	METRIC	1~25	445	●
		WE512---		2F	LONG NECK	METRIC	0.1~12	450	●
		WME504---		4F	VARIABLE INDEX GEOMETRY	METRIC	0.8~25	456	●
		WXE504---		4F	SHORT + REGULAR + LONG LENGTH + VARIABLE INDEX GEOMETRY	METRIC	1~20	458	●
		WE524---		4F	LONG	METRIC	1~25	460	●
		WE514---		4F	LONG NECK	METRIC	1~12	464	●
		WE504---H		4F	45°HELIX + REGULAR + LONG	METRIC	1~20	468	●
		WE506---		6F	45°HELIX + REGULAR + LONG	METRIC	6~20	470	●
	ROUGHING	WF61---		3~5F	ROUGHING ENDMILL	METRIC	3~25	471	●
		WF60---		3~5F	ROUGHING ENDMILL-CORNER R	METRIC	3~25	472	●
	SQUARE TAPER	WTE502---		2F	TAPER	METRIC	0.3~10	473	●
		WTE504---		4F	TAPER	METRIC	3~10	477	●
	SQUARE TAPER RIB	WTE514---		4F	RIB	METRIC	0.8~2.5	478	●
	BALL TAPER	WTB502---		2F	TAPER BALL	METRIC	0.3~2	484	●
	CORNER RADIUS TAPER	WTR504---		4F	TAPER CORNER RADIUS	METRIC	0.8~2.5	486	●

[Applicable Working Material] ○:General Application ◎:The most suitable Application

Carbon Steel [S45C,S55C...] ~ HB225	Alloy steel [SCM,SK...] HB225~325	Prehardened Steel [NAK...] HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400. 500~	Aluminium	Stainless Steel
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○ ◎ ○ ◎ ○
○	○	◎	○				○		○
○	○	◎	○				○		○

※ If the following items are not in stock, they will be ordered and produced

	Feature	EDP. NO	Appearance	Flutes	Type	INCH METRIC	Standard range Min~Max	Page	Stock
1 Drills for high hardened steel POWER MAX DRILL	* High Speed & General Speed Cutting	PF503		2F	3XD	INCH & METRIC	2~20	498	•
		PF505		2F	5XD	INCH & METRIC	3~20	502	•
		SF503		2F	3XD / INTERNAL COOLANT	INCH & METRIC	3~20	506	•
		SF505		2F	5 X D / INTERNAL COOLANT	INCH & METRIC	3.1~20	510	•
		SF510		2F	10 X D / INTERNAL COOLANT, DOUBLE MARGIN	METRIC	3~11.5	514	•
		SF520		2F	20 X D / INTERNAL COOLANT, DOUBLE MARGIN	METRIC	4.1~10	516	•
		HP503		2F	HIGH PRECISION 3 X D, DOUBLE MARGIN	INCH & METRIC	3~16	517	•
		HPI 503		2F	HIGH PRECISION 3 X D INTERNAL COOLANT, DOUBLE MARGIN	INCH & METRIC	3.175~20	518	•
		HPI 505		2F	HIGH PRECISION 5 X D INTERNAL COOLANT, DOUBLE MARGIN	INCH & METRIC	3.175~20	520	•
		HPI 508		2F	HIGH PRECISION 8 X D INTERNAL COOLANT, DOUBLE MARGIN	INCH & METRIC	3~20	523	•
		P503A(F)		2F	STUB / DIN 6537K	METRIC	3~20	530	•
		PI503A(F)		2F	STUB INTERNAL COOLANT / DIN 6537K	METRIC	3~20	536	•
		PI505A(F)		2F	MEDIUM INTERNAL COOLANT / DIN 6537L	METRIC	4~20	538	•
2 Drills for General Speed Cutting POWER DRILL	* General Speed Cutting	PDS		2F	STUB TYPE - 3 X D	METRIC	1~24	544	•
		PDM		2F	MEDIUM TYPE - 5 X D	METRIC	3~14	546	•
		PDSI		2F	STUB TYPE - 3 x D	METRIC	3~14	548	•
		PDMI		2F	MEDIUM TYPE - 5 x D	METRIC	3.1~14	550	•
		PX503G		2F	POWER DRILL(X-treme)	METRIC	1~20	552	•
		CTS		2F	COUNTER BORE SOLID-BOTTOM DRILL	METRIC	3~12	554	•
		NDP		2F	NEW DYNAMIC POWER DRILL - LONG	METRIC	3~12	556	•
3 Drills for Multi-purpose SOLID SPIRAL DRILL	* Non Ferrous & Aluminum	SSD		2F	REGULAR LENGTH	METRIC	1~13	562	•
		SSDL		2F	LONG LENGTH	METRIC	3~10	564	•
		SSTD		2F	REGULAR LENGTH	METRIC	0.5~13	566	•
		APF		3F	MEDIUM TYPE - 5xD	INCH & METRIC	3~16	568	•

[Applicable Working Material] ○:General Application ◎:The most suitable Application

Carbon Steel [S45C,S55C...] ~ HB225	Alloy steel [SCM,SK...] HB225~325	Prehardened Steel [NAK...] HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~ ○:General Application	Aluminium ◎:The most suitable Application	Stainless Steel
			~HRc55 SKD61	~HRc55 SKD11					
○	◎	◎	○	○			◎		◎
○	◎	○	○				◎		○
○	◎	○	○				○		○
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○	◎	◎	○	○			◎		◎
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					○			◎	
○					○		○	◎	○
○					○			◎	

※ If the following items are not in stock, they will be ordered and produced

Series	Feature	EDP. NO	Appearance	Flutes	Item	Type	Page	Stock	
CENTERING TOOLS	Multi-Purpose	CDS		2F	SOLID CENTER DRILL		576	•	
		LDS		2F	NC SPOTTING DRILL		577	•	
		LDF		2F	NC SPOTTING DRILL MULTY TYPE		578	•	
		LDA		2F	NC SPOTTING DRILL		579	•	
		CES302		2F	CENTERING END MILL - SOLID		580	•	
		CEM		2F	CENTERING END MILL - BRAZED TYPE		581	•	
		CRC		2F	CORNER ROUNDING CUTTER		582	•	
		CFT		3F	CHAMFER TOOL		583	•	
		CCT		2F	CHAMFER CUTTER		584	•	
		CCF		2F	CHAMFER CUTTER FACE		585	•	

※ If the following items are not in stock, they will be ordered and produced

Series	Feature	EDP. NO	Appearance	Flutes	Item	Type	Page	Stock	
REAMERS	Multi-Purpose	SSR		4&6F	STRAIGHT FLUTE REAMERS	Straight	586	•	
		SHR		4&6F	HELICAL FLUTE REAMERS	7° Left Helix	587	•	
		SBR		4&6F	BROACH REAMERS	60° Left Helix	588	•	
		HRS		4&6F	MACHINE CHUCKING REAMER		589	•	

[Applicable Working Material] ○:General Application ◎:The most suitable Application

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

[Applicable Working Material] ○:General Application ◎:The most suitable Application

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

※ If the following items are not in stock, they will be ordered and produced

Grades	Series	Feature	Page
WF08	Reaming	Suitable for Grey Cast Iron, Chilled Cast Iron, Hardened Steel, Aluminum Alloy, Plastic	593
MF10	Drilling/Milling	Suitable for Titanium Alloys, Inconel, Heat resisting Steel, Stainless Steel, Grey Cast Iron	593
WF12	Drilling/Milling/Machine tapping	Suitable for Titanium Alloys, Inconel, Stainless Steel, Hardening Steel, Grey Cast Iron, Composite Material, Drill	593
WK10	Drilling/Milling	Suitable for material Hrc45 or more, Stainless Steel, Titanium-Nickel Alloy, Low speed cutting machine, Continuous cutting and Intermitten Cutting	593
WN09	Drilling/Milling/Planing	Suitable for high speed cutting and dry machining to high wear resistance material like Graphite and composite material like CFRP and Industrial Fiber	593
WU08	Drilling/Milling/Planing	Suitable for High Hardened Steel for high speed cutting and dry cutting and high wear resistance for composite material like Aluminum Alloy	593

※If the following items are not in stock, they will be ordered and produced

Type	Appearance	Page
NC TYPE		598
NCB TYPE		598
NCC TYPE		598
NCBC TYPE		599
NCN TYPE		599
NCBN TYPE		599
NCCN TYPE		600
NCBCN TYPE		600
NCP TYPE		601
NCPB TYPE		601
NCPC TYPE		601
NCPBC TYPE		602
NCPN TYPE		602
NCPBN TYPE		602
NCPCN TYPE		603
NCPBCN TYPE		603
NK TYPE		604
NKB TYPE		604
NKC TYPE		604
NKBC TYPE		605
NKN TYPE		605
NKBN TYPE		605
NKCN TYPE		606
NKBCN TYPE		606
NKD TYPE		607
GR TYPE		607
SM TYPE		608
SMB TYPE		608
SMC TYPE		608
SMBC TYPE		609
SMN TYPE		609
SMBN TYPE		609
SMCN TYPE		610
SMBCN TYPE		610

Type	Appearance	Page
SMP TYPE		611
SMPB TYPE		611
SMPC TYPE		611
SMPBC TYPE		612
SMPN TYPE		612
SMPBN TYPE		612
SMPCN TYPE		613
SMPBCN TYPE		613
D50 TYPE		614
D50B TYPE		614
D50C TYPE		614
D50BC TYPE		615
HD TYPE		616
HDC TYPE		616
HDS TYPE		616
HDSC TYPE		617
HDSTH TYPE		617
PT-60 TYPE		618
PT-80 TYPE		618
LM-A TYPE		619
LM-C TYPE		619
LM-AN TYPE		620
LM-CN TYPE		620
LM-H TYPE		621
LM-HC TYPE		621
LM-HN TYPE		622
LM-HCN TYPE		622
LM-FN TYPE		623
LM-#80 TYPE		623

1

TAP SERIES >



Carbide Tap(JIS) Series

50

Carbide Tap(DIN) Series

58

HSSE Tap(JIS) Series

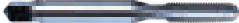
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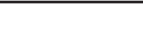
HSSE Tap(DIN) Series

82

Pipe Tap Series

97

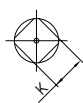
Series		EDP. NO	Appearance	Type	Stock	Page
CARBIDE TAP SERIES	JIS	WSOM ...series		STRAIGHT TAPS(uncoated)	•	50
		WSCM ...series		STRAIGHT TAPS(TiCN)	•	51
		WPOM ...series		SPIRAL TAPS(uncoated)	•	52
		WPCM ...series		SPIRAL TAPS(TiCN)	•	53
		WROM ...series		ROLL TAPS(uncoated)	•	54
		WRCM ...series		ROLL TAPS(TiCN)	•	55
		WFOM ...series		SPIRAL ROLL TAPS(uncoated)	•	56
		WFCM ...series		SPIRAL ROLL TAPS(TiCN)	•	57
	DIN	WGOM ...series		STRAIGHT TAPS(uncoated)	•	58
		WGCM ...series		STRAIGHT TAPS(TiCN)	•	59
		WQOM ...series		SPIRAL TAPS(uncoated)	•	60
		WQCM ...series		SPIRAL TAPS(TiCN)	•	61
		WMOM ...series		ROLL TAPS(uncoated)	•	62
		WMCM ...series		ROLL TAPS(TiCN)	•	63
HSS TAP SERIES	JIS	VSOM ...series		STRAIGHT TAPS(uncoated)	•	64
		VSTM ...series		STRAIGHT TAPS(TiN)	•	65
		VSCM ...series		STRAIGHT TAPS(TiCN)	•	66
		VSHM ...series		STRAIGHT TAPS(HOMO)	•	67
		VNOM ...series		POINT TAPS(uncoated)	•	68
		VNTM ...series		POINT TAPS(TiN)	•	69
		VNCM ...series		POINT TAPS(TiCN)	•	70
		VNHM ...series		POINT TAPS(HOMO)	•	71
		VPOM ...series		SPIRAL TAPS(uncoated)	•	72
		VPTM ...series		SPIRAL TAPS(TiN)	•	73
		VPCM ...series		SPIRAL TAPS(TiCN)	•	74
		VPHM ...series		SPIRAL TAPS(HOMO)	•	75
		VROM ...series		ROLL TAPS(uncoated)	•	76
		VRTM ...series		ROLL TAPS(TiN)	•	77
		VRCM ...series		ROLL TAPS(TiCN)	•	78
		VFOM ...series		SPIRAL ROLL TAPS(uncoated)	•	79
		VFTM ...series		SPIRAL ROLL TAPS(TiN)	•	80
		VFCM ...series		SPIRAL ROLL TAPS(TiCN)	•	81

Series	EDP. NO	Appearance	Type	Stock	Page
H S S E T A P S E R I E S	DIN	VGOM ...series		STRAIGHT TAPS(uncoated)	• 82
		VGTM ...series		STRAIGHT TAPS(TiN)	• 83
		VGCM ...series		STRAIGHT TAPS(TiCN)	• 84
		VGHM ...series		STRAIGHT TAPS(HOMO)	• 85
		VQOM ...series		SPIRAL TAPS(uncoated)	• 86
		VQTM ...series		SPIRAL TAPS(TiN)	• 87
		VQCM ...series		SPIRAL TAPS(TiCN)	• 88
		VQHM ...series		SPIRAL TAPS(HOMO)	• 89
		VDOM ...series		POINT TAPS(uncoated)	• 90
		VDTM ...series		POINT TAPS(TiN)	• 91
		VDCM ...series		POINT TAPS(TiCN)	• 92
		VDHM ...series		POINT TAPS(HOMO)	• 93
		VMOM ...series		ROLL TAPS(uncoated)	• 94
		VMTM ...series		ROLL TAPS(TiN)	• 95
		VMCM ...series		ROLL TAPS(TiCN)	• 96
P I P E T A P S E R I E S		VSOPT ...series		STRAIGHT TAPS(uncoated)	• 97
		VPOPT ...series		SPIRAL TAPS(uncoated)	• 98
		VSONPT ...series		STRAIGHT TAPS(uncoated)	• 99
		VPONPT ...series		SPIRAL TAPS(uncoated)	• 100
		VSOPS ...series		STRAIGHT TAPS(uncoated)	• 101
		VPOPS ...series		SPIRAL TAPS(uncoated)	• 102
		VSOPF ...series		STRAIGHT TAPS(uncoated)	• 103
		VPOPF ...series		SPIRAL TAPS(uncoated)	• 104

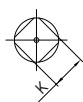
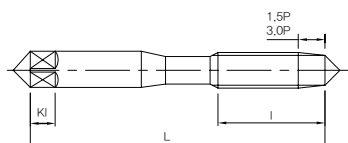
CODE SYSTEM

V	R	O	M	06	100	40	S
Material	Shape	Coating	Thread Dimension	Nominal Diameter	Pitch	Chamfered Thread Number	Oil Groove
V : HSSE	S(JIS) : Straight	O : NON	M : Meter Thread	M3	0.5	1.5	S : 1 Groove
W : CARBIDE	G(DIN) : Straight	T : TiN	PT : Pipe Tapered	M24	3.0	2.0	M : 4 Groove
	P(JIS) : Spiral	C : TiCN	NPT : National Pipe			2.5	
	Q(DIN) : Spiral	H : HOMO	PS : Pipe Straight			4.0	
	N(JIS) : Point		PF : Pipe Fasten-			5.0	
	D(DIN) : Point						
	R(JIS) : Roll						
	F(JIS) : Spiral						
	M(DIN) : Roll						

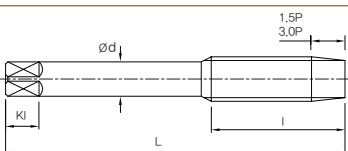
CARBIDE TAP(JIS TYPE)



M3-M6



M8-M24



STRAIGHT TAPS

- Designed for high mass production for general workpieces such as Cast Iron, C.Br, Plastics and so on



WSOM...series

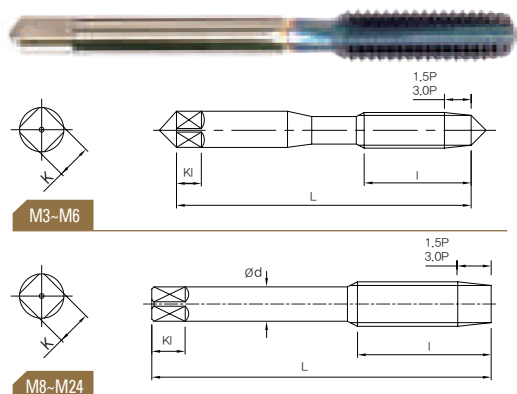
EDP. No.		Thread Size	Limits	L	I	d	K	KI	Flutes
1.5P	3P								
WSOM0305015	WSOM0305030	M3 X 0.5	WH3	46	11	4	3.2	6	3
WSOM0407015	WSOM0407030	M4 X 0.7	WH3	52	13	5	4	7	3
WSOM0508015	WSOM0508030	M5 X 0.8	WH3	60	16	5.5	4.5	7	3
WSOM0610015	WSOM0610030	M6 X 1.0	WH3	62	19	6	4.5	7	3
WSOM0810015	WSOM0810030	M8 X 1.0	WH3	70	22	6.2	5	8	4
WSOM0812515	WSOM0812530	M8 X 1.25	WH4	70	22	6.2	5	8	4
WSOM1010015	WSOM1010030	M10 X 1.0	WH3	75	24	7	5.5	8	4
WSOM1012515	WSOM1012530	M10 X 1.25	WH4	75	24	7	5.5	8	4
WSOM1015015	WSOM1015030	M10 X 1.5	WH4	75	24	7	5.5	8	4
WSOM1210015	WSOM1210030	M12 X 1.0	WH3	82	29	8.5	6.5	9	4
WSOM1212515	WSOM1212530	M12 X 1.25	WH4	82	29	8.5	6.5	9	4
WSOM1215015	WSOM1215030	M12 X 1.5	WH4	82	29	8.5	6.5	9	4
WSOM1217515	WSOM1217530	M12 X 1.75	WH5	82	29	8.5	6.5	9	4

■ Applicable Working Material

○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25-45 HRC	45-55 HRC	50-60 HRC	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
										◎	○		○	○	◎		○	○	○			◎	

CARBIDE TAP(JIS TYPE)



STRAIGHT TAPS

- Designed for high mass production for general workpieces such as Cast Iron, C.Br, Plastics, and so on
- By applying TiCN coating, it provides stable and highly efficient operation due to enhanced durability

WSCM...series



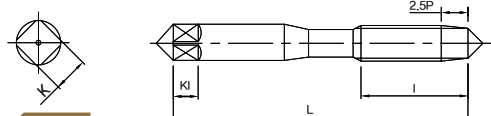
EDP. No.		Thread Size	Limits	L	I	d	K	KI	Flutes
1.5P	3P								
WSCM0305015	WSCM0305030	M3 X 0.5	WH3	46	11	4	3.2	6	3
WSCM0407015	WSCM0407030	M4 X 0.7	WH3	52	13	5	4	7	3
WSCM0508015	WSCM0508030	M5 X 0.8	WH3	60	16	5.5	4.5	7	3
WSCM0610015	WSCM0610030	M6 X 1.0	WH3	62	19	6	4.5	7	3
WSCM0810015	WSCM0810030	M8 X 1.0	WH3	70	22	6.2	5	8	4
WSCM0812515	WSCM0812530	M8 X 1.25	WH4	70	22	6.2	5	8	4
WSCM1010015	WSCM1010030	M10 X 1.0	WH3	75	24	7	5.5	8	4
WSCM1012515	WSCM1012530	M10 X 1.25	WH4	75	24	7	5.5	8	4
WSCM1015015	WSCM1015030	M10 X 1.5	WH4	75	24	7	5.5	8	4
WSCM1210015	WSCM1210030	M12 X 1.0	WH3	82	29	8.5	6.5	9	4
WSCM1212515	WSCM1212530	M12 X 1.25	WH4	82	29	8.5	6.5	9	4
WSCM1215015	WSCM1215030	M12 X 1.5	WH4	82	29	8.5	6.5	9	4
WSCM1217515	WSCM1217530	M12 X 1.75	WH5	82	29	8.5	6.5	9	4

■ Applicable Working Material

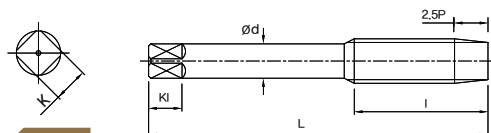
○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25~45 HRC	45~55 HRC	50~60 HRC	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
										◎	○		○	○	◎		○	○	○			◎	

CARBIDE TAP(JIS TYPE)



M3-M6



M8-M24

SPIRAL TAPS

- Designed for high mass production for general workpieces such as Cast Iron, C.Br, Plastics and so on
- Suitable for tapping of through and blind holes

WPOM...series



EDP. No. 2.5P	Thread Size	Limits	L	I	d	K	KI
WPOM0305025	M3 X 0.5	WH3	46	11	4	3.2	6
WPOM0407025	M4 X 0.7	WH3	52	13	5	4	7
WPOM0508025	M5 X 0.8	WH3	60	16	5.5	4.5	7
WPOM0610025	M6 X 1.0	WH3	62	19	6	4.5	7
WPOM0810025	M8 X 1.0	WH3	70	22	6.2	5	8
WPOM0812525	M8 X 1.25	WH4	70	22	6.2	5	8
WPOM1010025	M10 X 1.0	WH3	75	24	7	5.5	8
WPOM1012525	M10 X 1.25	WH4	75	24	7	5.5	8
WPOM1015025	M10 X 1.5	WH4	75	24	7	5.5	8
WPOM1210025	M12 X 1.0	WH3	82	29	8.5	6.5	9
WPOM1212525	M12 X 1.25	WH4	82	29	8.5	6.5	9
WPOM1215025	M12 X 1.5	WH4	82	29	8.5	6.5	9
WPOM1217525	M12 X 1.75	WH5	82	29	8.5	6.5	9

■ Applicable Working Material

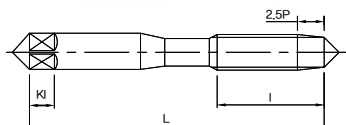
○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25%~0.45%	C 0.45%~	SCM	25-45 HRc	45-55 HRc	50-60 HRc	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
										○	◎	◎	◎	◎	○	○	○	○	○				◎

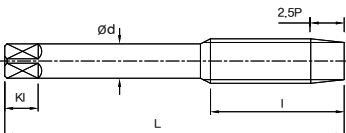
CARBIDE TAP(JIS TYPE)



M3-M6



M8-M24



SPIRAL TAPS

- Designed for high mass production for general work pieces such as Cast Iron, C.Br, Plastics and so on
- Suitable for tapping of through and blind holes
- By applying TiCN coating, it provides stable and highly efficient operation due to enhanced durability



WPCM...series

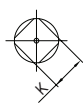
EDP. No. 2.5P	Thread Size	Limits	L	I	d	K	KI
WPCM0305025	M3 X 0.5	WH3	46	11	4	3.2	6
WPCM0407025	M4 X 0.7	WH3	52	13	5	4	7
WPCM0508025	M5 X 0.8	WH3	60	16	5.5	4.5	7
WPCM0610025	M6 X 1.0	WH3	62	19	6	4.5	7
WPCM0810025	M8 X 1.0	WH3	70	22	6.2	5	8
WPCM0812525	M8 X 1.25	WH4	70	22	6.2	5	8
WPCM1010025	M10 X 1.0	WH3	75	24	7	5.5	8
WPCM1012525	M10 X 1.25	WH4	75	24	7	5.5	8
WPCM1015025	M10 X 1.5	WH4	75	24	7	5.5	8
WPCM1210025	M12 X 1.0	WH3	82	29	8.5	6.5	9
WPCM1212525	M12 X 1.25	WH4	82	29	8.5	6.5	9
WPCM1215025	M12 X 1.5	WH4	82	29	8.5	6.5	9
WPCM1217525	M12 X 1.75	WH5	82	29	8.5	6.5	9

■ Applicable Working Material

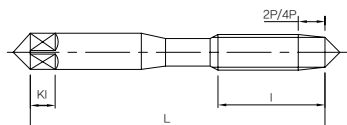
○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25-45 HRc	45-55 HRc	50-60 HRc	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
										○	◎	◎	◎	◎	○	○	◎	◎	◎			○	◎

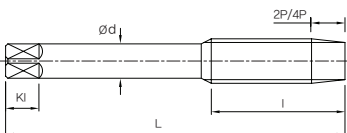
CARBIDE TAP(JIS TYPE)



M3-M6



M8-M24



ROLL TAPS

- Designed for high performance of threading Nonferrous metals
- Suitable for tapping of through and blind holes



WROM...series

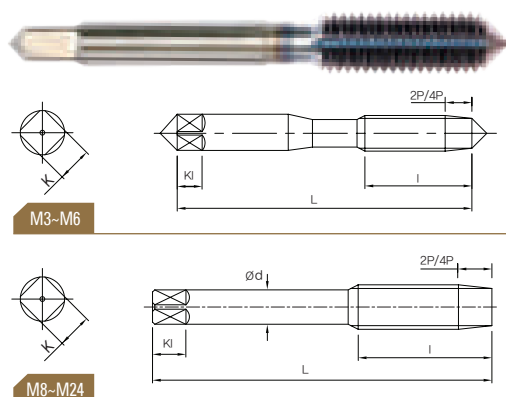
EDP. No.		Thread Size	Limits	L	I	d	K	KI	Oil Groove
2P	4P								
WROM0305020S	-	M3 X 0.5	GH5	46	11	4	3.2	6	1
WROM0305020M	WROM0305040M								4
WROM0407020S	-	M4 X 0.7	GH6	52	13	5	4	7	1
WROM0407020M	WROM0407040M								4
WROM0508020S	-	M5 X 0.8	GH6	60	16	5.5	4.5	7	1
WROM0508020M	WROM0508040M								4
WROM0610020S	-	M6 X 1.0	GH7	62	19	6	4.5	7	1
WROM0610020M	WROM0610040M								4
WROM0812520S	-	M8 X 1.25	GH7	70	22	6.2	5	8	1
WROM0812520M	WROM0812540M								4
WROM1012520S	-	M10 X 1.25	GH7	75	24	7	5.5	8	1
WROM1012520M	WROM1012540M								4
WROM1015020S	-	M10 X 1.50	GH7	75	24	7	5.5	8	1
WROM1015020M	WROM1015040M								4
WROM1210020S	-	M12 X 1.0	GH7	82	29	8.5	6.5	9	1
WROM1210020M	WROM1210040M								4
WROM1212520S	-	M12 X 1.25	GH7	82	29	8.5	6.5	9	1
WROM1212520M	WROM1212540M								4
WROM1215020S	-	M12 X 1.5	GH7	82	29	8.5	6.5	9	1
WROM1215020M	WROM1215040M								4
WROM1217520S	-	M12 X 1.75	GH8	82	29	8.5	6.5	9	1
WROM1217520M	WROM1217540M								4

■ Applicable Working Material

○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25%~0.45%	C 0.45%~	SCM	25~45 HRC	45~55 HRC	50~60 HRC	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
												◎	◎	◎		◎	◎		◎				

CARBIDE TAP(JIS TYPE)



ROLL TAPS

- It is applicable regardless of steel or Nonferrous alloys
- By applying TiCN coating, it provides stable and highly efficient operation due to enhanced durability



WRCM...series

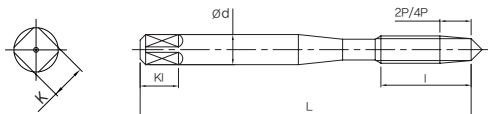
EDP. No.		Thread Size	Limits	L	I	d	K	KI	Oil Groove
2P	4P								
WRCM0305020S	-	M3 X 0.5	GH5	46	11	4	3.2	6	1
WRCM0305020M	WRCM0305040M								4
WRCM0407020S	-	M4 X 0.7	GH6	52	13	5	4	7	1
WRCM0407020M	WRCM0407040M								4
WRCM0508020S	-	M5 X 0.8	GH6	60	16	5.5	4.5	7	1
WRCM0508020M	WRCM0508040M								4
WRCM0610020S	-	M6 X 1.0	GH7	62	19	6	4.5	7	1
WRCM0610020M	WRCM0610040M								4
WRCM0812520S	-	M8 X 1.25	GH7	70	22	6.2	5	8	1
WRCM0812520M	WRCM0812540M								4
WRCM1012520S	-	M10 X 1.25	GH7	75	24	7	5.5	8	1
WRCM1012520M	WRCM1025040M								4
WRCM1015020S	-	M10 X 1.50	GH7	75	24	7	5.5	8	1
WRCM1015020M	WRCM1015040M								4
WRCM1210020S	-	M12 X 1.0	GH7	82	29	8.5	6.5	9	1
WRCM1210020M	WRCM1210040M								4
WRCM1212520S	-	M12 X 1.25	GH7	82	29	8.5	6.5	9	1
WRCM1212520M	WRCM1212540M								4
WRCM1215020S	-	M12 X 1.5	GH7	82	29	8.5	6.5	9	1
WRCM1215020M	WRCM1215040M								4
WRCM1217520S	-	M12 X 1.75	GH8	82	29	8.5	6.5	9	1
WRCM1217520M	WRCM1217540M								4

■ Applicable Working Material

○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25~45 HRc	45~55 HRc	50~60 HRc	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
◎	◎	○	○				◎					◎	◎	◎		◎	◎		◎				

CARBIDE TAP(JIS TYPE)



M3-M6

SPIRAL ROLL TAPS

- Designed for high performance of threading
Nonferrous alloys, Aluminum, Magnesium,
Zinc and Copper

WFOM...series



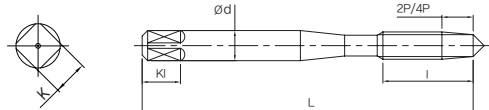
EDP. No.		Thread Size	Limits	L	I	d	K	KI
2P	4P							
WFOM0305020	WFOM0305040	M3 X 0.5	GH6	46	18	4	3.2	6
WFOM03506020	WFOM03506040	M3.5 X 0.6	GH6	46	18	4	3.2	6
WFOM0407020	WFOM0407040	M4 X 0.7	GH7	52	20	5	4	7
WFOM0508020	WFOM0508040	M5 X 0.8	GH7	60	22	5.5	4.5	7
WFOM0610020	WFOM0610040	M6 X 1.0	GH7	62	24	6	4.5	7

■ Applicable Working Material

○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25-45 HRc	45-55 HRc	50-60 HRc	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
												◎	◎	◎		◎	◎		◎				

CARBIDE TAP(JIS TYPE)



M3-M6

SPIRAL ROLL TAPS

- Designed for high performance of threading Steel, Nonferrous alloys and Stainless steel
- By applying TiCN coating, it provides stable and highly efficient operation due to enhanced durability

WFCM...series



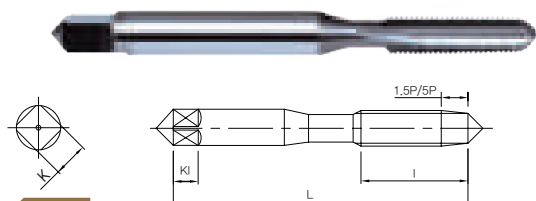
EDP. No.		Thread Size	Limits	L	I	d	K	KI
2P	4P							
WFCM0305020	WFCM0305040	M3 X 0.5	GH6	46	18	4	3.2	6
WFCM03506020	WFCM03506040	M3.5 X 0.6	GH6	46	18	4	3.2	6
WFCM0407020	WFCM0407040	M4 X 0.7	GH7	52	20	5	4	7
WFCM0508020	WFCM0508040	M5 X 0.8	GH7	60	22	5.5	4.5	7
WFCM0610020	WFCM0610040	M6 X 1.0	GH7	62	24	6	4.5	7

■ Applicable Working Material

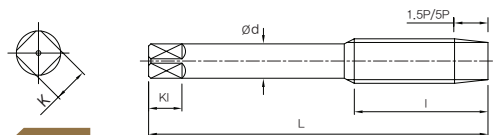
○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25%~0.45%	C 0.45%~	SCM	25-45 HRc	45-55 HRc	50-60 HRc	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
◎	◎	○	○				◎					◎	◎	◎		◎	◎		◎				

CARBIDE TAP(DIN TYPE)



M3-M6



M8-M24

STRAIGHT TAPS

- Designed for high mass production for general workpieces such as Cast Iron, C.Br, Plastics and so on

WGOM...series



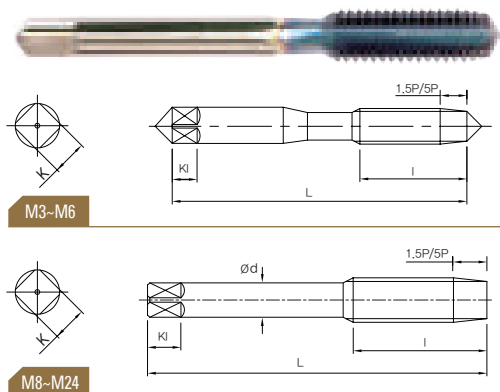
EDP. No.		Thread Size	Limits	L	I	d	K	KI	Flutes	DiN Type
1.5P	5P									
WGOM0305015	WGOM0305050	M3X0.5	6H	56	11.0	3.5	2.7	6	3	371
WGOM0407015	WGOM0407050	M4X0.7	6H	63	13.0	4.5	3.4	6	3	371
WGOM0508015	WGOM0508050	M5X0.8	6H	70	15.0	6.0	4.9	8	3	371
WGOM0610015	WGOM0610050	M6X1.0	6H	80	17.0	6.0	4.9	8	3	371
WGOM0810015	WGOM0810050	M8X1.0	6H	90	17.0	6.0	4.9	8	4	374
WGOM0812515	WGOM0812550	M8X1.25	6H	90	20.0	8.0	6.2	9	4	371
WGOM1010015	WGOM1010050	M10X1.0	6H	90	18.0	7.0	5.5	8	4	374
WGOM1012515	WGOM1012550	M10X1.25	6H	100	22.0	7.0	5.5	8	4	374
WGOM1015015	WGOM1015050	M10X1.5	6H	100	22.0	10.0	8.0	11	4	371
WGOM1210015	WGOM1210050	M12X1.0	6H	100	18.0	9.0	7.0	10	4	374
WGOM1212515	WGOM1212550	M12X1.25	6H	100	22.0	9.0	7.0	10	4	374
WGOM1215015	WGOM1215050	M12X1.5	6H	100	22.0	9.0	7.0	10	4	374
WGOM1217515	WGOM1217550	M12X1.75	6H	110	24.0	9.0	7.0	10	4	376

■ Applicable Working Material

○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25-45 HRc	45-55 HRc	50-60 HRc	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
										◎	○		○	○	◎		○	○	○			○	

CARBIDE TAP(DIN TYPE)



STRAIGHT TAPS

- Designed for high mass production for general workpieces such as Cast Iron, C.Br, Plastics , and so on
- By applying TiCN coating, it provides stable and highly efficient operation due to enhanced durability

WGCM...series



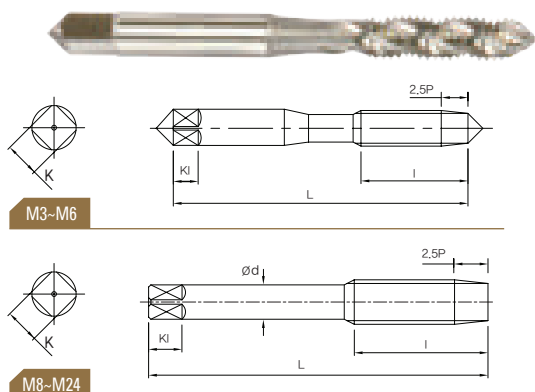
EDP. No.		Thread Size	Limits	L	I	d	K	KI	Flutes	DiN Type
1.5P	5P									
WGCM0305015	WGCM0305050	M3X0.5	6H	56	11.0	3.5	2.7	6	3	371
WGCM0407015	WGCM0407050	M4X0.7	6H	63	13.0	4.5	3.4	6	3	371
WGCM0508015	WGCM0508050	M5X0.8	6H	70	15.0	6.0	4.9	8	3	371
WGCM0610015	WGCM0610050	M6X1.0	6H	80	17.0	6.0	4.9	8	3	371
WGCM0810015	WGCM0810050	M8X1.0	6H	90	17.0	6.0	4.9	8	4	374
WGCM0812515	WGCM0812550	M8X1.25	6H	90	20.0	8.0	6.2	9	4	371
WGCM1010015	WGCM1010050	M10X1.0	6H	90	18.0	7.0	5.5	8	4	374
WGCM1012515	WGCM1012550	M10X1.25	6H	100	22.0	7.0	5.5	8	4	374
WGCM1015015	WGCM1015050	M10X1.5	6H	100	22.0	10.0	8.0	11	4	371
WGCM1210015	WGCM1210050	M12X1.0	6H	100	18.0	9.0	7.0	10	4	374
WGCM1212515	WGCM1212550	M12X1.25	6H	100	22.0	9.0	7.0	10	4	374
WGCM1215015	WGCM1215050	M12X1.5	6H	100	22.0	9.0	7.0	10	4	374
WGCM1217515	WGCM1217550	M12X1.75	6H	110	24.0	9.0	7.0	10	4	376

■ Applicable Working Material

○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25%~0.45%	C 0.45%~	SCM	25-45 HRc	45-55 HRc	50-60 HRc	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
										◎	○		○	○	◎		○	○	○			◎	

CARBIDE TAP(DIN TYPE)



SPIRAL TAPS

- Designed for high mass production for general workpieces such as Cast Iron, C.Br, Plastics and so on
- Suitable for tapping of through and blind holes

WQOM...series



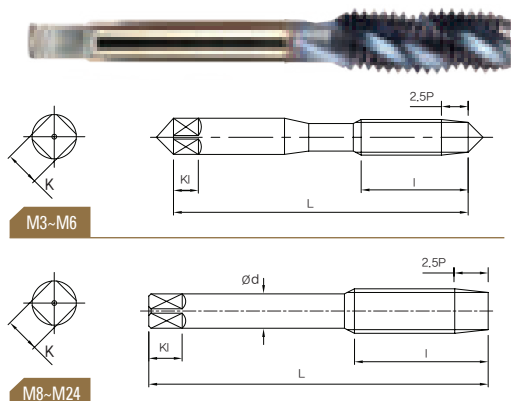
EDP. No.	Thread Size	Limits	L	I	d	K	KI	Flutes	DiN Type
WQOM0305025	M3X0.5	6H	56	11.0	3.5	2.7	6	3	371
WQOM0407025	M4X0.7	6H	63	13.0	4.5	3.4	6	3	371
WQOM0508025	M5X0.8	6H	70	15.0	6.0	4.9	8	3	371
WQOM0610025	M6X1.0	6H	80	17.0	6.0	4.9	8	3	371
WQOM0810025	M8X1.0	6H	90	17.0	6.0	4.9	8	3	374
WQOM0812525	M8X1.25	6H	90	20.0	8.0	6.2	9	3	371
WQOM1010025	M10X1.0	6H	90	18.0	7.0	5.5	8	3	374
WQOM1012525	M10X1.25	6H	100	22.0	7.0	5.5	8	3	374
WQOM1015025	M10X1.5	6H	100	22.0	10.0	8.0	11	3	371
WQOM1210025	M12X1.0	6H	100	18.0	9.0	7.0	10	3	374
WQOM1212525	M12X1.25	6H	100	22.0	9.0	7.0	10	3	374
WQOM1215025	M12X1.5	6H	100	22.0	9.0	7.0	10	3	374
WQOM1217525	M12X1.75	6H	110	24.0	9.0	7.0	10	3	376

■ Applicable Working Material

○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25-45 HRc	45-55 HRc	50-60 HRc	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
○			◎								○	○	○	○	○	○	○	○	○				○

CARBIDE TAP(DIN TYPE)



SPIRAL TAPS

- Designed for high mass production for general work pieces such as Cast Iron, C.Br, Plastics and so on
- Suitable for tapping of through and blind holes
- By applying TiCN coating, it provides stable and highly efficient operation due to enhanced durability



WQCM...series

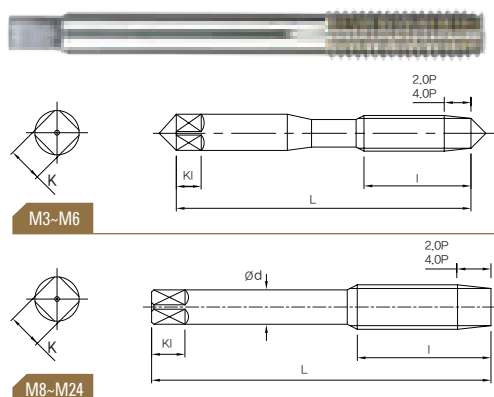
EDP. No.	Thread Size	Limits	L	I	d	K	KI	Flutes	DiN Type
WQCM0305025	M3X0.5	6H	56	11.0	3.5	2.7	6	3	371
WQCM0407025	M4X0.7	6H	63	13.0	4.5	3.4	6	3	371
WQCM0508025	M5X0.8	6H	70	15.0	6.0	4.9	8	3	371
WQCM0610025	M6X1.0	6H	80	17.0	6.0	4.9	8	3	371
WQCM0810025	M8X1.0	6H	90	17.0	6.0	4.9	8	3	374
WQCM0812525	M8X1.25	6H	90	20.0	8.0	6.2	9	3	371
WQCM1010025	M10X1.0	6H	90	18.0	7.0	5.5	8	3	374
WQCM1012525	M10X1.25	6H	100	22.0	7.0	5.5	8	3	374
WQCM1015025	M10X1.5	6H	100	22.0	10.0	8.0	11	3	371
WQCM1210025	M12X1.0	6H	100	18.0	9.0	7.0	10	3	374
WQCM1212525	M12X1.25	6H	100	22.0	9.0	7.0	10	3	374
WQCM1215025	M12X1.5	6H	100	22.0	9.0	7.0	10	3	374
WQCM1217525	M12X1.75	6H	110	24.0	9.0	7.0	10	3	376

■ Applicable Working Material

○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25-45 HRc	45-55 HRc	50-60 HRc	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
○	○	○	○				○	○	○		○	○	○	○	○	○	○	○	○	○			○

CARBIDE TAP(DIN TYPE)



ROLL TAPS

- Suitable for tapping of through and blind holes

WMOM...series



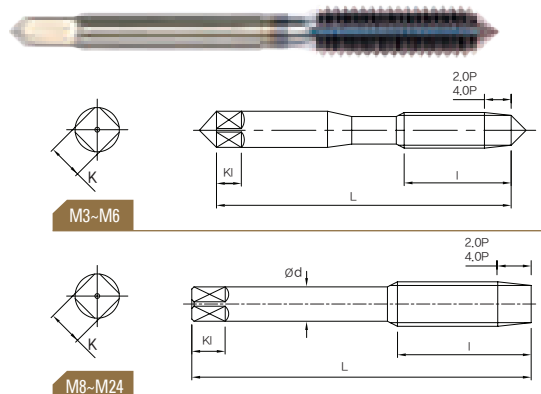
EDP. No.		Thread Size	Limits	L	I	d	K	KI	Oil Groove
2P	4P								
WMOM0305020S	-	M3x0.5	6HX	56	11.0	3.5	2.7	6	1
WMOM0305020M	WMOM0305040M	M3x0.5	6HX	56	11.0	3.5	2.7	6	4
WMOM0407020S	-	M4x0.7	6HX	63	13.0	4.5	3.4	6	1
WMOM0407020M	WMOM0407040M	M4x0.7	6HX	63	13.0	4.5	3.4	6	4
WMOM0508020S	-	M5x0.8	6HX	70	15.0	6.0	4.9	8	1
WMOM0508020M	WMOM0508040M	M5x0.8	6HX	70	15.0	6.0	4.9	8	4
WMOM0610020S	-	M6x1.0	6HX	80	17.0	6.0	4.9	8	1
WMOM0610020M	WMOM0610040M	M6x1.0	6HX	80	17.0	6.0	4.9	8	4
WMOM0810020S	-	M8x1.0	6HX	90	17.0	6.0	4.9	8	1
WMOM0810020M	WMOM0810040M	M8x1.0	6HX	90	17.0	6.0	4.9	8	4
WMOM0812520S	-	M8x1.25	6HX	90	20.0	8.0	6.2	9	1
WMOM0812520M	WMOM0812540M	M8x1.25	6HX	90	20.0	8.0	6.2	9	4
WMOM1010020S	-	M10x1.0	6HX	90	18.0	7.0	5.5	8	1
WMOM1010020M	WMOM1010040M	M10x1.0	6HX	90	18.0	7.0	5.5	8	4
WMOM1012520S	-	M10x1.25	6HX	100	22.0	7.0	5.5	8	1
WMOM1012520M	WMOM1012540M	M10x1.25	6HX	100	22.0	7.0	5.5	8	4
WMOM1015020S	-	M10x1.5	6HX	100	22.0	10.0	8.0	11	1
WMOM1015020M	WMOM1015040M	M10x1.5	6HX	100	22.0	10.0	8.0	11	4
WMOM1210020S	-	M12x1.0	6HX	100	18.0	9.0	7.0	10	1
WMOM1210020M	WMOM1210040M	M12x1.0	6HX	100	18.0	9.0	7.0	10	4
WMOM1212520S	-	M12x1.25	6HX	100	22.0	9.0	7.0	10	1
WMOM1212520M	WMOM1212540M	M12x1.25	6HX	100	22.0	9.0	7.0	10	4
WMOM1215020S	-	M12x1.5	6HX	100	22.0	9.0	7.0	10	1
WMOM1215020M	WMOM1215040M	M12x1.5	6HX	100	22.0	9.0	7.0	10	4
WMOM1217520S	-	M12x1.75	6HX	110	24.0	9.0	7.0	10	1
WMOM1217520M	WMOM1217540M	M12x1.75	6HX	100	24.0	9.0	7.0	10	4

■ Applicable Working Material

○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25~45 HRC	45~55 HRC	50~60 HRC	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
												◎	◎	◎		◎	◎		◎				

CARBIDE TAP(DIN TYPE)



ROLL TAPS

- Designed for high mass production for general work pieces such as Cast Iron, C.Br, Plastics and so on
- Suitable for tapping of through and blind holes
- By applying TiCN coating, it provides stable and highly efficient operation due to enhanced durability



WMCM...series

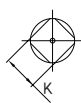
EDP. No.		Thread Size	Limits	L	I	d	K	KI	Oil Groove
2P	4P								
WMCM0305020S	-	M3x0.5	6HX	56	11	3.5	2.7	6	1
WMCM0305020M	VMCM0305040M	M3x0.5	6HX	56	11	3.5	2.7	6	4
WMCM0407020S	-	M4x0.7	6HX	63	13	4.5	3.4	6	1
WMCM0407020M	VMCM0407040M	M4x0.7	6HX	63	13	4.5	3.4	6	4
WMCM0508020S	-	M5x0.8	6HX	70	15	6.0	4.9	8	1
WMCM0508020M	VMCM0508040M	M5x0.8	6HX	70	15	6.0	4.9	8	4
WMCM0610020S	-	M6x1.0	6HX	80	17	6.0	4.9	8	1
WMCM0610020M	VMCM0610040M	M6x1.0	6HX	80	17	6.0	4.9	8	4
WMCM0810020S	-	M8x1.0	6HX	90	17	8.0	6.2	9	1
WMCM0810020M	VMCM0810040M	M8x1.0	6HX	90	17	8.0	6.2	9	4
WMCM0812520S	-	M8x1.25	6HX	90	20	8.0	6.2	9	1
WMCM0812520M	VMCM0812540M	M8x1.25	6HX	90	20	8.0	6.2	9	4
WMCM1010020S	-	M10x1.0	6HX	90	18	10.0	8.0	11	1
WMCM1010020M	VMCM1010040M	M10x1.0	6HX	90	18	10.0	8.0	11	4
WMCM1012520S	-	M10x1.25	6HX	100	22	10.0	8.0	11	1
WMCM1012520M	VMCM1012540M	M10x1.25	6HX	100	22	10.0	8.0	11	4
WMCM1015020S	-	M10x1.5	6HX	100	22	10.0	8.0	11	1
WMCM1015020M	VMCM1015040M	M10x1.5	6HX	100	22	10.0	8.0	11	4
WMCM1210020S	-	M12x1.0	6HX	100	18	9.0	7.0	10	1
WMCM1210020M	VMCM1210040M	M12x1.0	6HX	100	18	9.0	7.0	10	4
WMCM1212520S	-	M12x1.25	6HX	100	22	9.0	7.0	10	1
WMCM1212520M	VMCM1212540M	M12x1.25	6HX	100	22	9.0	7.0	10	4
WMCM1215020S	-	M12x1.5	6HX	100	22	9.0	7.0	10	1
WMCM1215020M	VMCM1215040M	M12x1.5	6HX	100	22	9.0	7.0	10	4
WMCM1217520S	-	M12x1.75	6HX	110	24	9.0	7.0	10	1
WMCM1217520M	VMCM1217540M	M12x1.75	6HX	110	24	9.0	7.0	10	4

■ Applicable Working Material

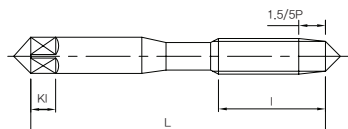
○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25%~0.45%	C 0.45%~	SCM	25-45 HRC	45-55 HRC	50-60 HRC	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
										○	◎	◎	◎	◎	○	○	◎	◎	◎			○	◎

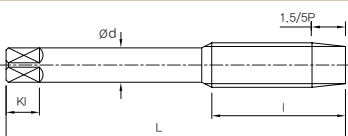
HSSE TAP(JIS TYPE)



M3-M6



M8-M24



STRAIGHT TAPS

- Designed for high performance of threading Cast Iron, Medium Carbon steel, Nonferrous metals and so on

VSOM...series



HELIUS

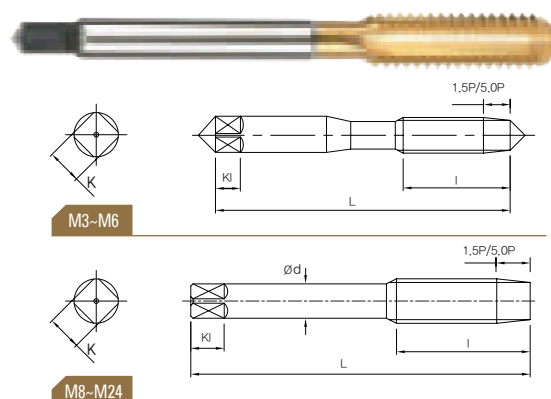
EDP. No.		Thread Size	Limits	L	I	d	K	KI	Flutes
1.5P	5P								
VSOM0305015	VSOM0305050	M3 X 0.5	WH2	46	11	4	3.2	6	3
VSOM0407015	VSOM0407050	M4 X 0.7	WH2	52	13	5	4	7	3
VSOM04507515	VSOM04507550	M4.5 X 0.75	WH2	55	13	5	4	7	3
VSOM0508015	VSOM0508050	M5 X 0.8	WH2	60	16	5.5	4.5	7	3
VSOM0610015	VSOM0610050	M6 X 1.0	WH2	62	19	6	4.5	7	3
VSOM0810015	VSOM0810050	M8 X 1.0	WH2	70	22	6.2	5	8	4
VSOM0812515	VSOM0812550	M8 X 1.25	WH2	70	22	6.2	5	8	4
VSOM1012515	VSOM1012550	M10 X 1.25	WH2	75	24	7	5.5	8	4
VSOM1015015	VSOM1015050	M10 X 1.5	WH3	75	24	7	5.5	8	4
VSOM1210015	VSOM1210050	M12 X 1.0	WH2	82	29	8.5	6.5	9	4
VSOM1212515	VSOM1212550	M12 X 1.25	WH2	82	29	8.5	6.5	9	4
VSOM1215015	VSOM1215050	M12 X 1.5	WH3	82	29	8.5	6.5	9	4
VSOM1217515	VSOM1217550	M12 X 1.75	WH3	82	29	8.5	6.5	9	4
VSOM1415015	VSOM1415050	M14 X 1.5	WH3	88	30	10.5	8	11	4
VSOM1420015	VSOM1420050	M14 X 2.0	WH3	88	30	10.5	8	11	4
VSOM1615015	VSOM1615050	M16 X 1.5	WH3	95	32	12.5	10	13	4
VSOM1620015	VSOM1620050	M16 X 2.0	WH3	95	32	12.5	10	13	4
VSOM1815015	VSOM1815050	M18 X 1.5	WH3	100	37	14	11	14	4
VSOM1825015	VSOM1825050	M18 X 2.5	WH3	100	37	14	11	14	4
VSOM2015015	VSOM2015050	M20 X 1.5	WH3	105	37	15	12	15	4
VSOM2025015	VSOM2025050	M20 X 2.5	WH3	105	37	15	12	15	4
VSOM2215015	VSOM2215050	M22 X 1.5	WH3	115	38	17	13	16	4
VSOM2225015	VSOM2225050	M22 X 2.5	WH3	115	38	17	13	16	4
VSOM2415015	VSOM2415050	M24 X 1.5	WH3	120	45	19	15	18	4
VSOM2420015	VSOM2420050	M24 X 2.0	WH3	120	45	19	15	18	4
VSOM2430015	VSOM2430050	M24 X 3.0	WH3	120	45	19	15	18	4

■ Applicable Working Material

○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermosclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25%~0.45%	C 0.45%~	SCM	25-45 HRC	45-55 HRC	50-60 HRC	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
○											○		○	○	○	○	○	○	○				

HSSE TAP(JIS TYPE)



STRAIGHT TAPS

- Designed for high mass production for general work pieces such as Cast Iron, C.Br, Plastics and so on
- Suitable for tapping of through and blind holes
- By applying TiN coating, it provides stable and highly efficient operation due to enhanced durability

VSTM...series



HSSE TAP(JIS TYPE)SERIES

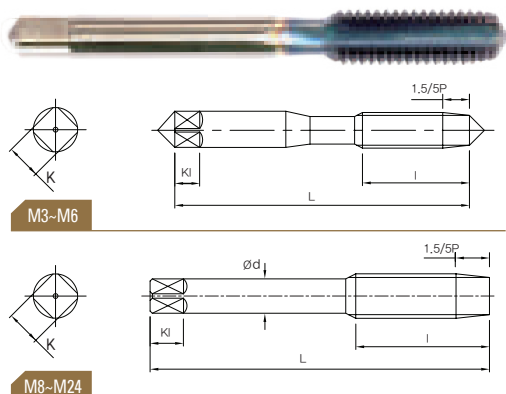
EDP. No.		Thread Size	Limits	L	I	d	K	KI	Flutes
1.5P	5P								
VSTM0305015	VSTM0305050	M3 X 0.5	WH2	46	11	4	3.2	6	3
VSTM0407015	VSTM0407050	M4 X 0.7	WH2	52	13	5	4	7	3
VSTM04507515	VSTM04507550	M4.5 X 0.75	WH2	55	13	5	4	7	3
VSTM0508015	VSTM0508050	M5 X 0.8	WH2	60	16	5.5	4.5	7	3
VSTM0610015	VSTM0610050	M6 X 1.0	WH2	62	19	6	4.5	7	3
VSTM0810015	VSTM0810050	M8 X 1.0	WH2	70	22	6.2	5	8	4
VSTM0812515	VSTM0812550	M8 X 1.25	WH2	70	22	6.2	5	8	4
VSTM1012515	VSTM1012550	M10 X 1.25	WH2	75	24	7	5.5	8	4
VSTM1015015	VSTM1015050	M10 X 1.5	WH3	75	24	7	5.5	8	4
VSTM1210015	VSTM1210050	M12 X 1.0	WH2	82	29	8.5	6.5	9	4
VSTM1212515	VSTM1212550	M12 X 1.25	WH2	82	29	8.5	6.5	9	4
VSTM1215015	VSTM1215050	M12 X 1.5	WH3	82	29	8.5	6.5	9	4
VSTM1217515	VSTM1217550	M12 X 1.75	WH3	82	29	8.5	6.5	9	4
VSTM1415015	VSTM1415050	M14 X 1.5	WH3	88	30	10.5	8	11	4
VSTM1420015	VSTM1420050	M14 X 2.0	WH3	88	30	10.5	8	11	4
VSTM1615015	VSTM1615050	M16 X 1.5	WH3	95	32	12.5	10	13	4
VSTM1620015	VSTM1620050	M16 X 2.0	WH3	95	32	12.5	10	13	4
VSTM1815015	VSTM1815050	M18 X 1.5	WH3	100	37	14	11	14	4
VSTM1825015	VSTM1825050	M18 X 2.5	WH3	100	37	14	11	14	4
VSTM2015015	VSTM2015050	M20 X 1.5	WH3	105	37	15	12	15	4
VSTM2025015	VSTM2025050	M20 X 2.5	WH3	105	37	15	12	15	4
VSTM2215015	VSTM2215050	M22 X 1.5	WH3	115	38	17	13	16	4
VSTM2225015	VSTM2225050	M22 X 2.5	WH3	115	38	17	13	16	4
VSTM2415015	VSTM2415050	M24 X 1.5	WH3	120	45	19	15	18	4
VSTM2420015	VSTM2420050	M24 X 2.0	WH3	120	45	19	15	18	4
VSTM2430015	VSTM2430050	M24 X 3.0	WH3	120	45	19	15	18	4

■ Applicable Working Material

○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermosclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25-45 HRc	45-55 HRc	50-60 HRc	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
○	○	○	○	○									○	○	○	○	○	○	○				

HSSE TAP(JIS TYPE)



STRAIGHT TAPS

- Designed for high performance of threading Carbon steel, Alloy steel and Nonferrous metals
- Suitable for tapping of through and blind holes
- By applying TiCN coating, it provides stable and highly efficient operation due to enhanced durability

VSCM...series



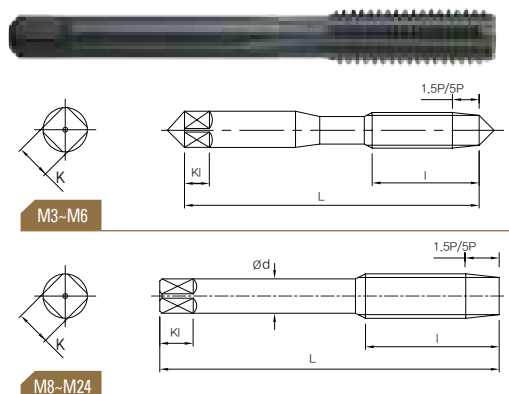
EDP. No.		Thread Size	Limits	L	I	d	K	KI	Flutes
1.5P	5P								
VSCM0305015	VSCM0305050	M3 X 0.5	WH2	46	11	4	3.2	6	3
VSCM0407015	VSCM0407050	M4 X 0.7	WH2	52	13	5	4	7	3
VSCM04507515	VSCM04507550	M4.5 X 0.75	WH2	55	13	5	4	7	3
VSCM0508015	VSCM0508050	M5 X 0.8	WH2	60	16	5.5	4.5	7	3
VSCM0610015	VSCM0610050	M6 X 1.0	WH2	62	19	6	4.5	7	3
VSCM0810015	VSCM0810050	M8 X 1.0	WH2	70	22	6.2	5	8	4
VSCM0812515	VSCM0812550	M8 X 1.25	WH2	70	22	6.2	5	8	4
VSCM1012515	VSCM1012550	M10 X 1.25	WH2	75	24	7	5.5	8	4
VSCM1015015	VSCM1015050	M10 X 1.5	WH3	75	24	7	5.5	8	4
VSCM1210015	VSCM1210050	M12 X 1.0	WH2	82	29	8.5	6.5	9	4
VSCM1212515	VSCM1212550	M12 X 1.25	WH2	82	29	8.5	6.5	9	4
VSCM1215015	VSCM1215050	M12 X 1.5	WH3	82	29	8.5	6.5	9	4
VSCM1217515	VSCM1217550	M12 X 1.75	WH3	82	29	8.5	6.5	9	4
VSCM1415015	VSCM1415050	M14 X 1.5	WH3	88	30	10.5	8	11	4
VSCM1420015	VSCM1420050	M14 X 2.0	WH3	88	30	10.5	8	11	4
VSCM1615015	VSCM1615050	M16 X 1.5	WH3	95	32	12.5	10	13	4
VSCM1620015	VSCM1620050	M16 X 2.0	WH3	95	32	12.5	10	13	4
VSCM1815015	VSCM1815050	M18 X 1.5	WH3	100	37	14	11	14	4
VSCM1825015	VSCM1825050	M18 X 2.5	WH3	100	37	14	11	14	4
VSCM2015015	VSCM2015050	M20 X 1.5	WH3	105	37	15	12	15	4
VSCM2025015	VSCM2025050	M20 X 2.5	WH3	105	37	15	12	15	4
VSCM2215015	VSCM2215050	M22 X 1.5	WH3	115	38	17	13	16	4
VSCM2225015	VSCM2225050	M22 X 2.5	WH3	115	38	17	13	16	4
VSCM2415015	VSCM2415050	M24 X 1.5	WH3	120	45	19	15	18	4
VSCM2420015	VSCM2420050	M24 X 2.0	WH3	120	45	19	15	18	4
VSCM2430015	VSCM2430050	M24 X 3.0	WH3	120	45	19	15	18	4

■ Applicable Working Material

○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25~45 HRc	45~55 HRc	50~60 HRc	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
○	○	○	○	○									○	○	○	○	○	○	○				

HSSE TAP(JIS TYPE)



STRAIGHT TAPS

- Designed for high performance of threading Carbon steel, Alloy steel and Nonferrous metals
- Suitable for tapping of through and blind holes
- By applying HOMO coating, it provides stable and highly efficient operation due to enhanced durability

VSHM...series



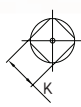
EDP. No.		Thread Size	Limits	L	I	d	K	KI	Flutes
1.5P	5P								
VSHM0305015	VSHM0305050	M3 X 0.5	WH2	46	11	4	3.2	6	3
VSHM0407015	VSHM0407050	M4 X 0.7	WH2	52	13	5	4	7	3
VSHM04507515	VSHM04507550	M4.5 X 0.75	WH2	55	13	5	4	7	3
VSHM0508015	VSHM0508050	M5 X 0.8	WH2	60	16	5.5	4.5	7	3
VSHM0610015	VSHM0610050	M6 X 1.0	WH2	62	19	6	4.5	7	3
VSHM0810015	VSHM0810050	M8 X 1.0	WH2	70	22	6.2	5	8	4
VSHM0812515	VSHM0812550	M8 X 1.25	WH2	70	22	6.2	5	8	4
VSHM1012515	VSHM1012550	M10 X 1.25	WH2	75	24	7	5.5	8	4
VSHM1015015	VSHM1015050	M10 X 1.5	WH3	75	24	7	5.5	8	4
VSHM1210015	VSHM1210050	M12 X 1.0	WH2	82	29	8.5	6.5	9	4
VSHM1212515	VSHM1212550	M12 X 1.25	WH2	82	29	8.5	6.5	9	4
VSHM1215015	VSHM1215050	M12 X 1.5	WH3	82	29	8.5	6.5	9	4
VSHM1217515	VSHM1217550	M12 X 1.75	WH3	82	29	8.5	6.5	9	4
VSHM1415015	VSHM1415050	M14 X 1.5	WH3	88	30	10.5	8	11	4
VSHM1420015	VSHM1420050	M14 X 2.0	WH3	88	30	10.5	8	11	4
VSHM1615015	VSHM1615050	M16 X 1.5	WH3	95	32	12.5	10	13	4
VSHM1620015	VSHM1620050	M16 X 2.0	WH3	95	32	12.5	10	13	4
VSHM1815015	VSHM1815050	M18 X 1.5	WH3	100	37	14	11	14	4
VSHM1825015	VSHM1825050	M18 X 2.5	WH3	100	37	14	11	14	4
VSHM2015015	VSHM2015050	M20 X 1.5	WH3	105	37	15	12	15	4
VSHM2025015	VSHM2025050	M20 X 2.5	WH3	105	37	15	12	15	4
VSHM2215015	VSHM2215050	M22 X 1.5	WH3	115	38	17	13	16	4
VSHM2225015	VSHM2225050	M22 X 2.5	WH3	115	38	17	13	16	4
VSHM2415015	VSHM2415050	M24 X 1.5	WH3	120	45	19	15	18	4
VSHM2420015	VSHM2420050	M24 X 2.0	WH3	120	45	19	15	18	4
VSHM2430015	VSHM2430050	M24 X 3.0	WH3	120	45	19	15	18	4

■ Applicable Working Material

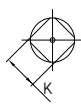
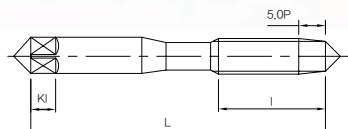
○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25~45 HRC	45~55 HRC	50~60 HRC	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
○			○						○														

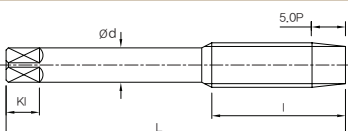
HSSE TAP(JIS TYPE)



M3~M6



M8~M24



POINT TAPS

- Designed for high performance of threading Carbon steel, Alloy steel and Nonferrous metals
- Suitable for tapping of through holes



HELIX

VNOM...series

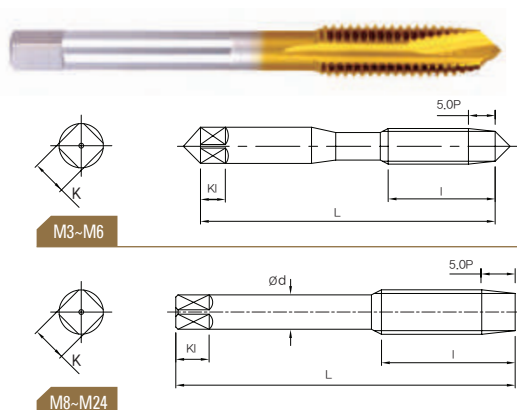
EDP. No. 5P	Thread Size	Limits	L	I	d	K	KI	Flutes
VNOM0305050	M3 X 0.5	WH2	46	11	4	3.2	6	3
VNOM0407050	M4 X 0.7	WH2	52	13	5	4	7	3
VNOM04507550	M4.5 X 0.75	WH2	55	13	5	4	7	3
VNOM0508050	M5 X 0.8	WH2	60	16	5.5	4.5	7	3
VNOM0610050	M6 X 1.0	WH2	62	19	6	4.5	7	3
VNOM0810050	M8 X 1.0	WH3	70	22	6.2	5	8	3
VNOM0812550	M8 X 1.25	WH3	70	22	6.2	5	8	3
VNOM1012550	M10 X 1.25	WH3	75	24	7	5.5	8	3
VNOM1015050	M10 X 1.5	WH3	75	24	7	5.5	8	3
VNOM1210050	M12 X 1.0	WH3	82	29	8.5	6.5	9	3
VNOM1212550	M12 X 1.25	WH3	82	29	8.5	6.5	9	3
VNOM1215050	M12 X 1.5	WH3	82	29	8.5	6.5	9	3
VNOM1217550	M12 X 1.75	WH4	82	29	8.5	6.5	9	3
VNOM1415050	M14 X 1.5	WH3	88	30	10.5	8	11	3
VNOM1420050	M14 X 2.0	WH4	88	30	10.5	8	11	3
VNOM1615050	M16 X 1.5	WH3	95	32	12.5	10	13	3
VNOM1620050	M16 X 2.0	WH4	95	32	12.5	10	13	3
VNOM1815050	M18 X 1.5	WH4	100	37	14	11	14	3
VNOM1825050	M18 X 2.5	WH4	100	37	14	11	14	3
VNOM2015050	M20 X 1.5	WH4	105	37	15	12	15	3
VNOM2025050	M20 X 2.5	WH4	105	37	15	12	15	3
VNOM2215050	M22 X 1.5	WH4	115	38	17	13	16	3
VNOM2225050	M22 X 2.5	WH4	115	38	17	13	16	3
VNOM2415050	M24 X 1.5	WH4	120	45	19	15	18	3
VNOM2420050	M24 X 2.0	WH4	120	45	19	15	18	3
VNOM2430050	M24 X 3.0	WH4	120	45	19	15	18	3

■ Applicable Working Material

○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25%~0.45%	C 0.45%~	SCM	25~45 HRc	45~55 HRc	50~60 HRc	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
○	○	○	◎							○	○	○	○	○	○	◎	○	○	○				○

HSSE TAP(JIS TYPE)



POINT TAPS

- Designed for high performance of threading Carbon steel, Alloy steel and Nonferrous metals
- Suitable for tapping of through holes
- By applying TiN coating, it provides stable and highly efficient operation due to enhanced durability

VNTM...series



HSSE TAP(JIS TYPE)SERIES

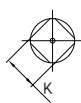
EDP. No. 5P	Thread Size	Limits	L	I	d	K	KI	Flutes
VNTM0305050	M3 X 0.5	WH2	46	11	4	3.2	6	3
VNTM0407050	M4 X 0.7	WH2	52	13	5	4	7	3
VNTM04507550	M4.5 X 0.75	WH2	55	13	5	4	7	3
VNTM0508050	M5 X 0.8	WH2	60	16	5.5	4.5	7	3
VNTM0610050	M6 X 1.0	WH2	62	19	6	4.5	7	3
VNTM0810050	M8 X 1.0	WH3	70	22	6.2	5	8	3
VNTM0812550	M8 X 1.25	WH3	70	22	6.2	5	8	3
VNTM1012550	M10 X 1.25	WH3	75	24	7	5.5	8	3
VNTM1015050	M10 X 1.5	WH3	75	24	7	5.5	8	3
VNTM1210050	M12 X 1.0	WH3	82	29	8.5	6.5	9	3
VNTM1212550	M12 X 1.25	WH3	82	29	8.5	6.5	9	3
VNTM1215050	M12 X 1.5	WH3	82	29	8.5	6.5	9	3
VNTM1217550	M12 X 1.75	WH4	82	29	8.5	6.5	9	3
VNTM1415050	M14 X 1.5	WH3	88	30	10.5	8	11	3
VNTM1420050	M14 X 2.0	WH4	88	30	10.5	8	11	3
VNTM1615050	M16 X 1.5	WH3	95	32	12.5	10	13	3
VNTM1620050	M16 X 2.0	WH4	95	32	12.5	10	13	3
VNTM1815050	M18 X 1.5	WH4	100	37	14	11	14	3
VNTM1825050	M18 X 2.5	WH4	100	37	14	11	14	3
VNTM2015050	M20 X 1.5	WH4	105	37	15	12	15	3
VNTM2025050	M20 X 2.5	WH4	105	37	15	12	15	3
VNTM2215050	M22 X 1.5	WH4	115	38	17	13	16	3
VNTM2225050	M22 X 2.5	WH4	115	38	17	13	16	3
VNTM2415050	M24 X 1.5	WH4	120	45	19	15	18	3
VNTM2420050	M24 X 2.0	WH4	120	45	19	15	18	3
VNTM2430050	M24 X 3.0	WH4	120	45	19	15	18	3

■ Applicable Working Material

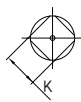
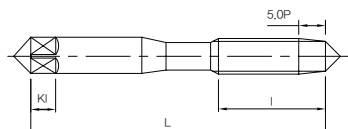
○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25~45 HRc	45~55 HRc	50~60 HRc	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
○	○	○	○				◎	○	○	○	○	○	○	○	○	○	○	○	○	○	○		○

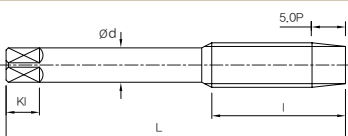
HSSE TAP(JIS TYPE)



M3-M6



M8-M24



POINT TAPS

- Designed for high performance of threading Carbon steel, Alloy steel and Nonferrous metals
- Suitable for tapping of through holes
- By applying TiCN coating, it provides stable and highly efficient operation due to enhanced durability



HELIX

VNCM...series

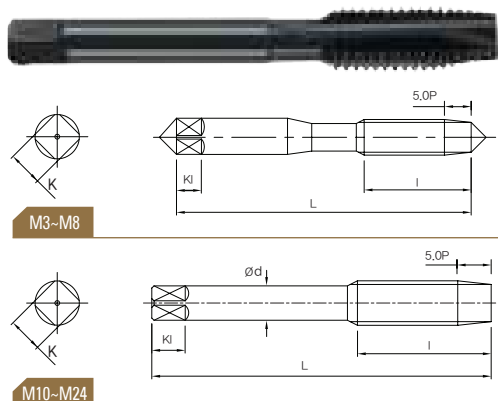
EDP. No. 5P	Thread Size	Limits	L	I	d	K	KI	Flutes
VNCM0305050	M3 X 0.5	WH2	46	11	4	3.2	6	3
VNCM0407050	M4 X 0.7	WH2	52	13	5	4	7	3
VNCM04507550	M4.5 X 0.75	WH2	55	13	5	4	7	3
VNCM0508050	M5 X 0.8	WH2	60	16	5.5	4.5	7	3
VNCM0610050	M6 X 1.0	WH2	62	19	6	4.5	7	3
VNCM0810050	M8 X 1.0	WH3	70	22	6.2	5	8	3
VNCM0812550	M8 X 1.25	WH3	70	22	6.2	5	8	3
VNCM1012550	M10 X 1.25	WH3	75	24	7	5.5	8	3
VNCM1015050	M10 X 1.5	WH3	75	24	7	5.5	8	3
VNCM1210050	M12 X 1.0	WH3	82	29	8.5	6.5	9	3
VNCM1212550	M12 X 1.25	WH3	82	29	8.5	6.5	9	3
VNCM1215050	M12 X 1.5	WH3	82	29	8.5	6.5	9	3
VNCM1217550	M12 X 1.75	WH4	82	29	8.5	6.5	9	3
VNCM1415050	M14 X 1.5	WH3	88	30	10.5	8	11	3
VNCM1420050	M14 X 2.0	WH4	88	30	10.5	8	11	3
VNCM1615050	M16 X 1.5	WH3	95	32	12.5	10	13	3
VNCM1620050	M16 X 2.0	WH4	95	32	12.5	10	13	3
VNCM1815050	M18 X 1.5	WH4	100	37	14	11	14	3
VNCM1825050	M18 X 2.5	WH4	100	37	14	11	14	3
VNCM2015050	M20 X 1.5	WH4	105	37	15	12	15	3
VNCM2025050	M20 X 2.5	WH4	105	37	15	12	15	3
VNCM2215050	M22 X 1.5	WH4	115	38	17	13	16	3
VNCM2225050	M22 X 2.5	WH4	115	38	17	13	16	3
VNCM2415050	M24 X 1.5	WH4	120	45	19	15	18	3
VNCM2420050	M24 X 2.0	WH4	120	45	19	15	18	3
VNCM2430050	M24 X 3.0	WH4	120	45	19	15	18	3

■ Applicable Working Material

○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25%~0.45%	C 0.45%~	SCM	25-45 HRC	45-55 HRC	50-60 HRC	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
○	○	○	○				○	○	○	○	○	○	○	○	○	○	○	○	○	○	○		○

HSSE TAP(JIS TYPE)



POINT TAPS

- Designed for high performance of threading Carbon steel, Alloy steel and Nonferrous metals
- Suitable for tapping of through holes
- By applying HOMO coating, it provides stable and highly efficient operation due to enhanced durability

VNHM...series



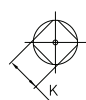
EDP. No. 5P	Thread Size	Limits	L	I	d	K	KI	Flutes
VNHM0305050	M3 X 0.5	WH2	46	11	4	3.2	6	3
VNHM0407050	M4 X 0.7	WH2	52	13	5	4	7	3
VNHM04507550	M4.5 X 0.75	WH2	55	13	5	4	7	3
VNHM0508050	M5 X 0.8	WH2	60	16	5.5	4.5	7	3
VNHM0610050	M6 X 1.0	WH2	62	19	6	4.5	7	3
VNHM0810050	M8 X 1.0	WH3	70	22	6.2	5	8	3
VNHM0812550	M8 X 1.25	WH3	70	22	6.2	5	8	3
VNHM1012550	M10 X 1.25	WH3	75	24	7	5.5	8	3
VNHM1015050	M10 X 1.5	WH3	75	24	7	5.5	8	3
VNHM1210050	M12 X 1.0	WH3	82	29	8.5	6.5	9	3
VNHM1212550	M12 X 1.25	WH3	82	29	8.5	6.5	9	3
VNHM1215050	M12 X 1.5	WH3	82	29	8.5	6.5	9	3
VNHM1217550	M12 X 1.75	WH4	82	29	8.5	6.5	9	3
VNHM1415050	M14 X 1.5	WH3	88	30	10.5	8	11	3
VNHM1420050	M14 X 2.0	WH4	88	30	10.5	8	11	3
VNHM1615050	M16 X 1.5	WH3	95	32	12.5	10	13	3
VNHM1620050	M16 X 2.0	WH4	95	32	12.5	10	13	3
VNHM1815050	M18 X 1.5	WH4	100	37	14	11	14	3
VNHM1825050	M18 X 2.5	WH4	100	37	14	11	14	3
VNHM2015050	M20 X 1.5	WH4	105	37	15	12	15	3
VNHM2025050	M20 X 2.5	WH4	105	37	15	12	15	3
VNHM2215050	M22 X 1.5	WH4	115	38	17	13	16	3
VNHM2225050	M22 X 2.5	WH4	115	38	17	13	16	3
VNHM2415050	M24 X 1.5	WH4	120	45	19	15	18	3
VNHM2420050	M24 X 2.0	WH4	120	45	19	15	18	3
VNHM2430050	M24 X 3.0	WH4	120	45	19	15	18	3

■ Applicable Working Material

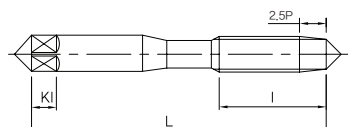
○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Therm Plastic
C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25-45 HRc	45-55 HRc	50-60 HRc	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
◎	○		○						○														○

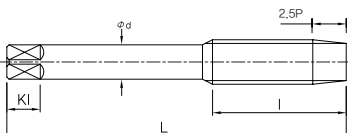
HSSE TAP(JIS TYPE)



M3~M6



M8~M24



SPIRAL TAPS

- Suitable for Carbon steel, Alloy steel and Nonferrous metals and the unique shape of the groove is designed for high release of chips
- Suitable for tapping of blind holes



VPOM...series

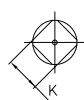
EDP. No. 2.5P	Thread Size	Limits	L	l	d	K	Kl	Flutes
VPOM0305025	M3 X 0.5	WH2	46	11	4	3.2	6	3
VPOM0407025	M4 X 0.7	WH2	52	13	5	4	7	3
VPOM04507525	M4.5 X 0.75	WH2	55	13	5	4	7	3
VPOM0508025	M5 X 0.8	WH2	60	16	5.5	4.5	7	3
VPOM0610025	M6 X 1.0	WH2	62	19	6	4.5	7	3
VPOM0810025	M8 X 1.0	WH2	70	22	6.2	5	8	3
VPOM0812525	M8 X 1.25	WH2	70	22	6.2	5	8	3
VPOM1012525	M10 X 1.25	WH2	75	24	7	5.5	8	3
VPOM1015025	M10 X 1.5	WH2	75	24	7	5.5	8	3
VPOM1210025	M12 X 1.0	WH2	82	29	8.5	6.5	9	3
VPOM1212525	M12 X 1.25	WH2	82	29	8.5	6.5	9	3
VPOM1215025	M12 X 1.5	WH2	82	29	8.5	6.5	9	3
VPOM1217525	M12 X 1.75	WH2	82	29	8.5	6.5	9	3
VPOM1415025	M14 X 1.5	WH2	88	30	10.5	8	11	3
VPOM1420025	M14 X 2.0	WH2	88	30	10.5	8	11	3
VPOM1615025	M16 X 1.5	WH2	95	32	12.5	10	13	3
VPOM1620025	M16 X 2.0	WH2	95	32	12.5	10	13	3
VPOM1815025	M18 X 1.5	WH2	100	37	14	11	14	4
VPOM1825025	M18 X 2.5	WH3	100	37	14	11	14	4
VPOM2015025	M20 X 1.5	WH3	105	37	15	12	15	4
VPOM2025025	M20 X 2.5	WH3	105	37	15	12	15	4
VPOM2215025	M22 X 1.5	WH3	115	38	17	13	16	4
VPOM2225025	M22 X 2.5	WH3	115	38	17	13	16	4
VPOM2415025	M24 X 1.5	WH3	120	45	19	15	18	4
VPOM2420025	M24 X 2.0	WH3	120	45	19	15	18	4
VPOM2430025	M24 X 3.0	WH4	120	45	19	15	18	4

■ Applicable Working Material

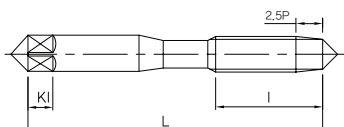
○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25%~0.45%	C 0.45%~	SCM	25~45 HRc	45~55 HRc	50~60 HRc	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
○	○	○	◎								○	○	○	○	○	○	○	○	○				○

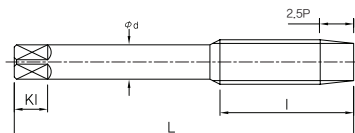
HSSE TAP(JIS TYPE)



M3~M6



M8~M24



SPIRAL TAPS

- Suitable for Carbon steel, Alloy steel and Nonferrous metals and the unique shape of the groove is designed for high release of chips
- Suitable for tapping of blind holes
- By applying TiN coating, it provides stable and highly efficient operation due to enhanced durability

VPTM...series



HSSE TAP(JIS TYPE)SERIES

EDP. No. 2.5P	Thread Size	Limits	L	l	d	K	Kl	Flutes
VPTM0305025	M3 X 0.5	WH2	46	11	4	3.2	6	3
VPTM0407025	M4 X 0.7	WH2	52	13	5	4	7	3
VPTM04507525	M4.5 X 0.75	WH2	55	13	5	4	7	3
VPTM0508025	M5 X 0.8	WH2	60	16	5.5	4.5	7	3
VPTM0610025	M6 X 1.0	WH2	62	19	6	4.5	7	3
VPTM0810025	M8 X 1.0	WH2	70	22	6.2	5	8	3
VPTM0812525	M8 X 1.25	WH2	70	22	6.2	5	8	3
VPTM1012525	M10 X 1.25	WH2	75	24	7	5.5	8	3
VPTM1015025	M10 X 1.5	WH2	75	24	7	5.5	8	3
VPTM1210025	M12 X 1.0	WH2	82	29	8.5	6.5	9	3
VPTM1212525	M12 X 1.25	WH2	82	29	8.5	6.5	9	3
VPTM1215025	M12 X 1.5	WH2	82	29	8.5	6.5	9	3
VPTM1217525	M12 X 1.75	WH2	82	29	8.5	6.5	9	3
VPTM1415025	M14 X 1.5	WH2	88	30	10.5	8	11	3
VPTM1420025	M14 X 2.0	WH2	88	30	10.5	8	11	3
VPTM1615025	M16 X 1.5	WH2	95	32	12.5	10	13	3
VPTM1620025	M16 X 2.0	WH2	95	32	12.5	10	13	3
VPTM1815025	M18 X 1.5	WH2	100	37	14	11	14	4
VPTM1825025	M18 X 2.5	WH3	100	37	14	11	14	4
VPTM2015025	M20 X 1.5	WH3	105	37	15	12	15	4
VPTM2025025	M20 X 2.5	WH3	105	37	15	12	15	4
VPTM2215025	M22 X 1.5	WH3	115	38	17	13	16	4
VPTM2225025	M22 X 2.5	WH3	115	38	17	13	16	4
VPTM2415025	M24 X 1.5	WH3	120	45	19	15	18	4
VPTM2420025	M24 X 2.0	WH3	120	45	19	15	18	4
VPTM2430025	M24 X 3.0	WH4	120	45	19	15	18	4

■ Applicable Working Material

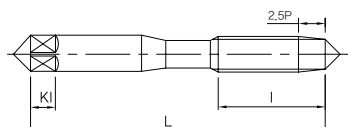
○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25%~0.45%	C 0.45%~	SCM	25~45 HRC	45~55 HRC	50~60 HRC	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
○	○	○	○				○	○	○		○	○	○	○	○	○	○	○	○	○			○

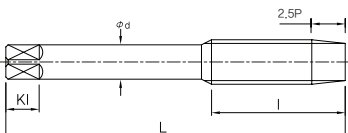
HSSE TAP(JIS TYPE)



M3-M6



M8-M24



SPIRAL TAPS

- Suitable for Carbon steel, Alloy steel and Nonferrous metals and the unique shape of the groove is designed for high release of chips
- Suitable for tapping of blind holes
- By applying TiCN coating, it provides stable and highly efficient operation due to enhanced durability



VPCM...series

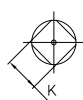
EDP. No. 2.5P	Thread Size	Limits	L	I	d	K	KI	Flutes
VPCM0305025	M3 X 0.5	WH2	46	11	4	3.2	6	3
VPCM0407025	M4 X 0.7	WH2	52	13	5	4	7	3
VPCM04507525	M4.5 X 0.75	WH2	55	13	5	4	7	3
VPCM0508025	M5 X 0.8	WH2	60	16	5.5	4.5	7	3
VPCM0610025	M6 X 1.0	WH2	62	19	6	4.5	7	3
VPCM0810025	M8 X 1.0	WH2	70	22	6.2	5	8	3
VPCM0812525	M8 X 1.25	WH2	70	22	6.2	5	8	3
VPCM1012525	M10 X 1.25	WH2	75	24	7	5.5	8	3
VPCM1015025	M10 X 1.5	WH2	75	24	7	5.5	8	3
VPCM1210025	M12 X 1.0	WH2	82	29	8.5	6.5	9	3
VPCM1212525	M12 X 1.25	WH2	82	29	8.5	6.5	9	3
VPCM1215025	M12 X 1.5	WH2	82	29	8.5	6.5	9	3
VPCM1217525	M12 X 1.75	WH2	82	29	8.5	6.5	9	3
VPCM1415025	M14 X 1.5	WH2	88	30	10.5	8	11	3
VPCM1420025	M14 X 2.0	WH2	88	30	10.5	8	11	3
VPCM1615025	M16 X 1.5	WH2	95	32	12.5	10	13	3
VPCM1620025	M16 X 2.0	WH2	95	32	12.5	10	13	3
VPCM1815025	M18 X 1.5	WH2	100	37	14	11	14	4
VPCM1825025	M18 X 2.5	WH3	100	37	14	11	14	4
VPCM2015025	M20 X 1.5	WH3	105	37	15	12	15	4
VPCM2025025	M20 X 2.5	WH3	105	37	15	12	15	4
VPCM2215025	M22 X 1.5	WH3	115	38	17	13	16	4
VPCM2225025	M22 X 2.5	WH3	115	38	17	13	16	4
VPCM2415025	M24 X 1.5	WH3	120	45	19	15	18	4
VPCM2420025	M24 X 2.0	WH3	120	45	19	15	18	4
VPCM2430025	M24 X 3.0	WH4	120	45	19	15	18	4

■ Applicable Working Material

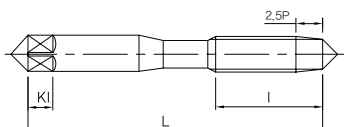
○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25%~0.45%	C 0.45%~	SCM	25-45 HRC	45-55 HRC	50-60 HRC	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
○	◎	◎	○				○	○	○		○	○	○	○	○	○	◎	○	○	○	○		○

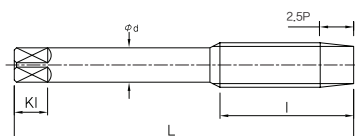
HSSE TAP(JIS TYPE)



M3-M6



M8-M24



SPIRAL TAPS

- Suitable for Carbon steel, Alloy steel and Nonferrous metals and the unique shape of the groove is designed for high release of chips

VPHM...series



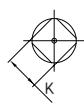
EDP. No. 2.5P	Thread Size	Limits	L	l	d	K	Kl	Oil Groove
VPHM0305025	M3 X 0.5	WH2	46	11	4	3.2	6	3
VPHM0407025	M4 X 0.7	WH2	52	13	5	4	7	3
VPHM04507525	M4.5 X 0.75	WH2	55	13	5	4	7	3
VPHM0508025	M5 X 0.8	WH2	60	16	5.5	4.5	7	3
VPHM0610025	M6 X 1.0	WH2	62	19	6	4.5	7	3
VPHM0810025	M8 X 1.0	WH2	70	22	6.2	5	8	3
VPHM0812525	M8 X 1.25	WH2	70	22	6.2	5	8	3
VPHM1012525	M10 X 1.25	WH2	75	24	7	5.5	8	3
VPHM1015025	M10 X 1.5	WH2	75	24	7	5.5	8	3
VPHM1210025	M12 X 1.0	WH2	82	29	8.5	6.5	9	3
VPHM1212525	M12 X 1.25	WH2	82	29	8.5	6.5	9	3
VPHM1215025	M12 X 1.5	WH2	82	29	8.5	6.5	9	3
VPHM1217525	M12 X 1.75	WH2	82	29	8.5	6.5	9	3
VPHM1415025	M14 X 1.5	WH2	88	30	10.5	8	11	3
VPHM1420025	M14 X 2.0	WH2	88	30	10.5	8	11	3
VPHM1615025	M16 X 1.5	WH2	95	32	12.5	10	13	3
VPHM1620025	M16 X 2.0	WH2	95	32	12.5	10	13	3
VPHM1815025	M18 X 1.5	WH2	100	37	14	11	14	4
VPHM1825025	M18 X 2.5	WH3	100	37	14	11	14	4
VPHM2015025	M20 X 1.5	WH3	105	37	15	12	15	4
VPHM2025025	M20 X 2.5	WH3	105	37	15	12	15	4
VPHM2215025	M22 X 1.5	WH3	115	38	17	13	16	4
VPHM2225025	M22 X 2.5	WH3	115	38	17	13	16	4
VPHM2415025	M24 X 1.5	WH3	120	45	19	15	18	4
VPHM2420025	M24 X 2.0	WH3	120	45	19	15	18	4
VPHM2430025	M24 X 3.0	WH4	120	45	19	15	18	4

■ Applicable Working Material

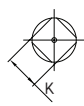
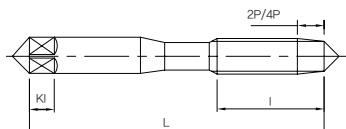
○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C -0.25%	C0.25%~0.45%	C 0.45%~	SCM	25-45 HRC	45-55 HRC	50-60 HRC	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
○	○								○														○

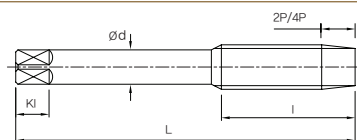
HSSE TAP(JIS TYPE)



M3-M6



M8-M24



ROLL TAPS

- Designed for high performance of threading
- Aluminum, Zinc, Copper and other Nonferrous alloys



VROM...series

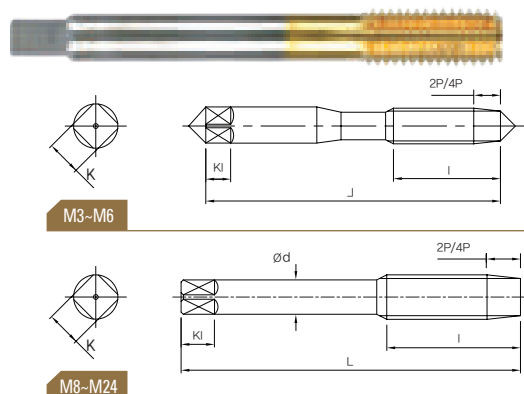
EDP. No.		Thread Size	Limits	L	I	d	K	KI	Oil Groove
2P	4P								
VROM0305020S	-	M3 X 0.5	GH5	46	11	4	3.2	6	1
VROM0305020M	VROM0305040M								4
VROM0407020S	-	M4 X 0.7	GH6	52	13	5	4	7	1
VROM0407020M	VROM0407040M								4
VROM0508020S	-	M5 X 0.8	GH6	60	16	5.5	4.5	7	1
VROM0508020M	VROM0508040M								4
VROM0610020S	-	M6 X 1.0	GH7	62	19	6	4.5	7	1
VROM0610020M	VROM0610040M								4
VROM0810020S	-	M8 X 1.0	GH7	70	22	6.2	5	8	1
VROM0810040S	VROM0810040M								4
VROM0812520S	-	M8 X 1.25	GH7	70	22	6.2	5	8	1
VROM0812520M	VROM0812540M								4
VROM1012520S	-	M10 X 1.25	GH7	75	24	7	5.5	8	1
VROM1012520M	VROM1012540M								4
VROM1015020S	-	M10 X 1.50	GH7	75	24	7	5.5	8	1
VROM1015020M	VROM1015040M								4
VROM1210020S	-	M12 X 1.0	GH7	82	29	8.5	6.5	9	1
VROM1210020M	VROM1210040M								4
VROM1212520S	-	M12 X 1.25	GH7	82	29	8.5	6.5	9	1
VROM1212520M	VROM1212540M								4
VROM1215020S	-	M12 X 1.5	GH7	82	29	8.5	6.5	9	1
VROM1215020M	VROM1215040M								4
VROM1217520S	-	M12 X 1.75	GH8	82	29	8.5	6.5	9	1
VROM1217520M	VROM1217540M								4

■ Applicable Working Material

○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25-45 HRC	45-55 HRC	50-60 HRC	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
												○	○	○	○	○	○		◎				

HSSE TAP(JIS TYPE)



ROLL TAPS

- It is applicable regardless of steel or Nonferrous alloys
- By applying TiN coating, it provides stable and highly efficient operation due to enhanced durability



VRTM...series

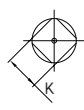
EDP. No.		Thread Size	Limits	L	I	d	K	KI	Oil Groove
2P	4P								
VRTM0305020S	-	M3 X 0.5	GH5	46	11	4	3.2	6	1
VRTM0305020M	VRTM0305040M								4
VRTM0407020S	-	M4 X 0.7	GH6	52	13	5	4	7	1
VRTM0407020M	VRTM0407040M								4
VRTM0508020S	-	M5 X 0.8	GH6	60	16	5.5	4.5	7	1
VRTM0508020M	VRTM0508040M								4
VRTM0610020S	-	M6 X 1.0	GH7	62	19	6	4.5	7	1
VRTM0610020M	VRTM0610040M								4
VRTM0810020S	-	M8 X 1.0	GH7	70	22	6.2	5	8	1
VRTM0810020S	VRTM0810040M								4
VRTM0812520S	-	M8 X 1.25	GH7	70	22	6.2	5	8	1
VRTM0812520M	VRTM0812540M								4
VRTM1012520S	-	M10 X 1.25	GH7	75	24	7	5.5	8	1
VRTM1012520M	VRTM1012540M								4
VRTM1015020S	-	M10 X 1.50	GH7	75	24	7	5.5	8	1
VRTM1015020M	VRTM1015040M								4
VRTM1210020S	-	M12 X 1.0	GH7	82	29	8.5	6.5	9	1
VRTM1210020M	VRTM1210040M								4
VRTM1212520S	-	M12 X 1.25	GH7	82	29	8.5	6.5	9	1
VRTM1212520M	VRTM1212540M								4
VRTM1215020S	-	M12 X 1.5	GH7	82	29	8.5	6.5	9	1
VRTM1215020M	VRTM1215040M								4
VRTM1217520S	-	M12 X 1.75	GH8	82	29	8.5	6.5	9	1
VRTM1217520M	VRTM1217540M								4

■ Applicable Working Material

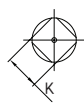
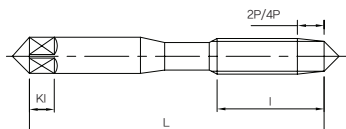
○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25~45 HRC	45~55 HRC	50~60 HRC	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
○	○	○	○				◎	○	○		○	○	○	○									

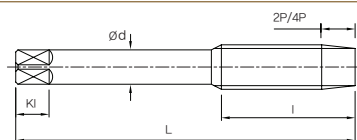
HSSE TAP(JIS TYPE)



M3-M6



M8-M24



ROLL TAPS

- It is applicable regardless of steel or Nonferrous alloys
- By applying TiCN coating, it provides stable and highly efficient operation due to enhanced durability



VRCM...series

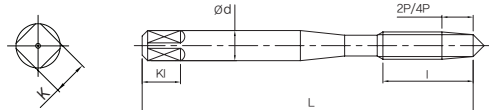
EDP. No.		Thread Size	Limits	L	I	d	K	KI	Oil Groove
2P	4P								
VRCM0305020S	-	M3 X 0.5	GH5	46	11	4	3.2	6	1
VRCM0305020M	VRCM0305040M								4
VRCM0407020S	-	M4 X 0.7	GH6	52	13	5	4	7	1
VRCM0407020M	VRCM0407040M								4
VRCM0508020S	-	M5 X 0.8	GH6	60	16	5.5	4.5	7	1
VRCM0508020M	VRCM0508040M								4
VRCM0610020S	-	M6 X 1.0	GH7	62	19	6	4.5	7	1
VRCM0610020M	VRCM0610040M								4
VRCM0810020S	-	M8 X 1.0	GH7	70	22	6.2	5	8	1
VRCM0810040S	VRCM0810040M								4
VRCM0812520S	-	M8 X 1.25	GH7	70	22	6.2	5	8	1
VRCM0812520M	VRCM0812540M								4
VRCM1012520S	-	M10 X 1.25	GH7	75	24	7	5.5	8	1
VRCM1012520M	VRCM1012540M								4
VRCM1015020S	-	M10 X 1.50	GH7	75	24	7	5.5	8	1
VRCM1015020M	VRCM1015040M								4
VRCM1210020S	-	M12 X 1.0	GH7	82	29	8.5	6.5	9	1
VRCM1210020M	VRCM1210040M								4
VRCM1212520S	-	M12 X 1.25	GH7	82	29	8.5	6.5	9	1
VRCM1212520M	VRCM1212540M								4
VRCM1215020S	-	M12 X 1.5	GH7	82	29	8.5	6.5	9	1
VRCM1215020M	VRCM1215040M								4
VRCM1217520S	-	M12 X 1.75	GH8	82	29	8.5	6.5	9	1
VRCM1217520M	VRCM1217540M								4

■ Applicable Working Material

○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25%~0.45%	C 0.45%~	SCM	25-45 HRc	45-55 HRc	50-60 HRc	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
◎	◎	○	○				◎					◎	◎	◎		◎	◎		◎				

HSSE TAP(JIS TYPE)



M3-M6

SPIRAL ROLL TAPS

- Designed for high performance of threading
Aluminum, Zinc, Magnesium, Copper and other
Nonferrous alloys

VFOM...series



HSSE TAP(JIS TYPE)SERIES

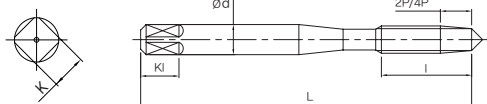
EDP. No.		Thread Size	Limits	L	I	d	K	KI
2P	4P							
VFOM0305020	VFOM0305040	M3 X 0.5	GH6	46	18	4	3.2	6
VFOM03506020	VFOM03506040	M3.5 X 0.6	GH6	46	18	4	3.2	6
VFOM0407020	VFOM0407040	M4 X 0.7	GH7	52	20	5	4	7
VFOM0508020	VFOM0508040	M5 X 0.8	GH7	60	22	5.5	4.5	7
VFOM0610020	VFOM0610040	M6 X 1.0	GH7	62	24	6	4.5	7

■ Applicable Working Material

○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25-45 HRc	45-55 HRc	50-60 HRc	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
												○	○	○	○	○	○		◎				

HSSE TAP(JIS TYPE)



M3-M6

SPIRAL ROLL TAPS

- Designed for high performance of threading Nonferrous alloys, Steel, and Stainless steel
- By applying TiN coating, it provides stable and highly efficient operation due to enhanced durability

VFTM...series



EDP. No.		Thread Size	Limits	L	I	d	K	KI
2P	4P							
VFTM0305020	VFTM0305040	M3 X 0.5	GH6	46	18	4	3.2	6
VFTM03506020	VFTM03506040	M3.5 X 0.6	GH6	46	18	4	3.2	6
VFTM0407020	VFTM0407040	M4 X 0.7	GH7	52	20	5	4	7
VFTM0508020	VFTM0508040	M5 X 0.8	GH7	60	22	5.5	4.5	7
VFTM0610020	VFTM0610040	M6 X 1.0	GH7	62	24	6	4.5	7

■ Applicable Working Material

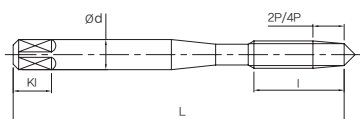
○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C 0.25% ~0.45%	C 0.45%~	SCM	25-45 HRc	45-55 HRc	50-60 HRc	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
○	○	○	○				◎	○	○		○	○	○	○									

HSSE TAP(JIS TYPE)



M3-M6



SPIRAL ROLL TAPS

- Designed for high performance of threading Nonferrous alloys, Steel, and Stainless steel
- By applying TiCN coating, it provides stable and highly efficient operation due to enhanced durability

VFCM...series



HSSE TAP(JIS TYPE)SERIES

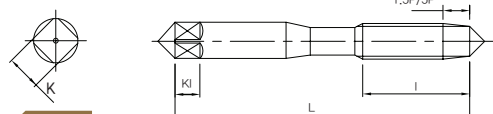
EDP. No.		Thread Size	Limits	L	I	d	K	KI
2P	4P							
VFCM0305020	VFCM0305040	M3 X 0.5	GH6	46	18	4	3.2	6
VFCM03506020	VFCM03506040	M3.5 X 0.6	GH6	46	18	4	3.2	6
VFCM0407020	VFCM0407040	M4 X 0.7	GH7	52	20	5	4	7
VFCM0508020	VFCM0508040	M5 X 0.8	GH7	60	22	5.5	4.5	7
VFCM0610020	VFCM0610040	M6 X 1.0	GH7	62	24	6	4.5	7

■ Applicable Working Material

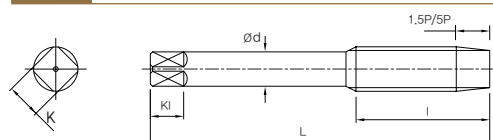
○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25~45 HRc	45~55 HRc	50~60 HRc	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
◎	◎	○	○				◎					◎	◎	◎		◎	◎		◎				

HSSE TAP(DIN TYPE)



M3-M6



M8-M24

STRAIGHT TAPS

- Designed for high mass production for general workpieces such as Cast Iron, C.Br, Plastics and so on



HELIX

VGOM...series

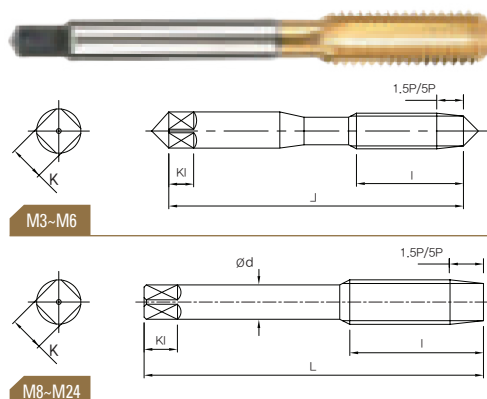
EDP. No.		Thread Size	Limits	L	I	d	K	KI	Flutes	DiN Type
1.5P	5P									
VGOM0305015	VGOM0305050	M3X0.5	6H	56	11.0	3.5	2.7	6	3	371
VGOM0407015	VGOM0407050	M4X0.7	6H	63	13.0	4.5	3.4	6	3	371
VGOM0508015	VGOM0508050	M5X0.8	6H	70	15.0	6.0	4.9	8	3	371
VGOM0610015	VGOM0610050	M6X1.0	6H	80	17.0	6.0	4.9	8	3	371
VGOM0810015	VGOM0810050	M8X1.0	6H	90	17.0	6.0	4.9	8	4	374
VGOM0812515	VGOM0812550	M8X1.25	6H	90	20.0	8.0	6.2	9	4	371
VGOM1010015	VGOM1010050	M10X1.0	6H	90	18.0	7.0	5.5	8	4	374
VGOM1012515	VGOM1012550	M10X1.25	6H	100	22.0	7.0	5.5	8	4	374
VGOM1015015	VGOM1015050	M10X1.5	6H	100	22.0	10.0	8.0	11	4	371
VGOM1210015	VGOM1210050	M12X1.0	6H	100	18.0	9.0	7.0	10	4	374
VGOM1212515	VGOM1212550	M12X1.25	6H	100	22.0	9.0	7.0	10	4	374
VGOM1215015	VGOM1215050	M12X1.5	6H	100	22.0	9.0	7.0	10	4	374
VGOM1217515	VGOM1217550	M12X1.75	6H	110	24.0	9.0	7.0	10	4	376
VGOM1415015	VGOM1415050	M14X1.5	6H	100	22.0	11.0	9.0	12	4	374
VGOM1420015	VGOM1420050	M14X2.0	6H	110	26.0	11.0	9.0	12	4	376
VGOM1615015	VGOM1615050	M16X1.5	6H	100	22.0	12.0	9.0	12	4	374
VGOM1620015	VGOM1620050	M16X2.0	6H	110	27.0	12.0	9.0	12	4	376
VGOM1815015	VGOM1815050	M18X1.5	6H	110	25.0	14.0	11.0	14	4	374
VGOM1825015	VGOM1825050	M18X2.5	6H	125	30.0	14.0	11.0	14	4	376
VGOM2015015	VGOM2015050	M20X1.5	6H	125	25.0	16.0	12.0	15	4	374
VGOM2025015	VGOM2025050	M20X2.5	6H	140	32.0	16.0	12.0	15	4	376
VGOM2215015	VGOM2215050	M22X1.5	6H	125	25.0	18.0	14.5	17	4	374
VGOM2225015	VGOM2225050	M22X2.5	6H	140	32.0	18.0	14.5	17	4	376
VGOM2415015	VGOM2415050	M24X1.5	6H	140	27.0	18.0	14.5	17	4	374
VGOM2420015	VGOM2420050	M24X2.0	6H	140	27.0	18.0	14.5	17	4	374
VGOM2430015	VGOM2430050	M24X3.0	6H	160	34.0	18.0	14.5	17	4	376

■ Applicable Working Material

○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25-45 HRC	45-55 HRC	50-60 HRC	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
										◎	○		○	○	◎		○	○	○			○	

HSSE TAP(DIN TYPE)



STRAIGHT TAPS

- Suitable for Carbon steel, Alloy steel and Nonferrous metals and the unique shape of the groove is designed for high release of chips
- Suitable for tapping of blind holes
- By applying TiN coating, it provides stable and highly efficient operation due to enhanced durability

VGTM...series



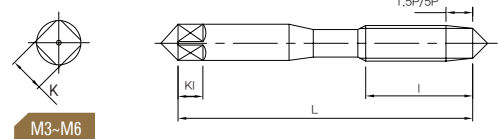
EDP. No.		Thread Size	Limits	L	I	d	K	KI	Flutes	DiN Type
1.5P	5P									
VGTM0305015	VGTM0305050	M3X0.5	6H	56	11.0	3.5	2.7	6	3	371
VGTM0407015	VGTM0407050	M4X0.7	6H	63	13.0	4.5	3.4	6	3	371
VGTM0508015	VGTM0508050	M5X0.8	6H	70	15.0	6.0	4.9	8	3	371
VGTM0610015	VGTM0610050	M6X1.0	6H	80	17.0	6.0	4.9	8	3	371
VGTM0810015	VGTM0810050	M8X1.0	6H	90	17.0	6.0	4.9	8	4	374
VGTM0812515	VGTM0812550	M8X1.25	6H	90	20.0	8.0	6.2	9	4	371
VGTM1010015	VGTM1010050	M10X1.0	6H	90	18.0	7.0	5.5	8	4	374
VGTM1012515	VGTM1012550	M10X1.25	6H	100	22.0	7.0	5.5	8	4	374
VGTM1015015	VGTM1015050	M10X1.5	6H	100	22.0	10.0	8.0	11	4	371
VGTM1210015	VGTM1210050	M12X1.0	6H	100	18.0	9.0	7.0	10	4	374
VGTM1212515	VGTM1212550	M12X1.25	6H	100	22.0	9.0	7.0	10	4	374
VGTM1215015	VGTM1215050	M12X1.5	6H	100	22.0	9.0	7.0	10	4	374
VGTM1217515	VGTM1217550	M12X1.75	6H	110	24.0	9.0	7.0	10	4	376
VGTM1415015	VGTM1415050	M14X1.5	6H	100	22.0	11.0	9.0	12	4	374
VGTM1420015	VGTM1420050	M14X2.0	6H	110	26.0	11.0	9.0	12	4	376
VGTM1615015	VGTM1615050	M16X1.5	6H	100	22.0	12.0	9.0	12	4	374
VGTM1620015	VGTM1620050	M16X2.0	6H	110	27.0	12.0	9.0	12	4	376
VGTM1815015	VGTM1815050	M18X1.5	6H	110	25.0	14.0	11.0	14	4	374
VGTM1825015	VGTM1825050	M18X2.5	6H	125	30.0	14.0	11.0	14	4	376
VGTM2015015	VGTM2015050	M20X1.5	6H	125	25.0	16.0	12.0	15	4	374
VGTM2025015	VGTM2025050	M20X2.5	6H	140	32.0	16.0	12.0	15	4	376
VGTM2215015	VGTM2215050	M22X1.5	6H	125	25.0	18.0	14.5	17	4	374
VGTM2225015	VGTM2225050	M22X2.5	6H	140	32.0	18.0	14.5	17	4	376
VGTM2415015	VGTM2415050	M24X1.5	6H	140	27.0	18.0	14.5	17	4	374
VGTM2420015	VGTM2420050	M24X2.0	6H	140	27.0	18.0	14.5	17	4	374
VGTM2430015	VGTM2430050	M24X3.0	6H	160	34.0	18.0	14.5	17	4	376

■ Applicable Working Material

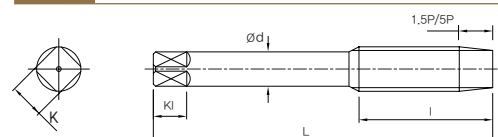
○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25-45 HRC	45-55 HRC	50-60 HRC	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
○	○																						

HSSE TAP(DIN TYPE)



M3-M6



M8-M24

STRAIGHT TAPS

- Designed for high mass production for general workpieces such as Cast Iron, C.Br, Plastics, and so on
- By applying TiCN coating, it provides stable and highly efficient operation due to enhanced durability



VGCM...series

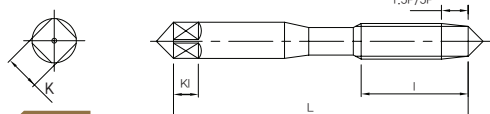
EDP. No.		Thread Size	Limits	L	I	d	K	KI	Flutes	DiN Type
1.5P	5P									
VGCM0305015	VGCM0305050	M3X0.5	6H	56	11.0	3.5	2.7	6	3	371
VGCM0407015	VGCM0407050	M4X0.7	6H	63	13.0	4.5	3.4	6	3	371
VGCM0508015	VGCM0508050	M5X0.8	6H	70	15.0	6.0	4.9	8	3	371
VGCM0610015	VGCM0610050	M6X1.0	6H	80	17.0	6.0	4.9	8	3	371
VGCM0810015	VGCM0810050	M8X1.0	6H	90	17.0	6.0	4.9	8	4	374
VGCM0812515	VGCM0812550	M8X1.25	6H	90	20.0	8.0	6.2	9	4	371
VGCM1010015	VGCM1010050	M10X1.0	6H	90	18.0	7.0	5.5	8	4	374
VGCM1012515	VGCM1012550	M10X1.25	6H	100	22.0	7.0	5.5	8	4	374
VGCM1015015	VGCM1015050	M10X1.5	6H	100	22.0	10.0	8.0	11	4	371
VGCM1210015	VGCM1210050	M12X1.0	6H	100	18.0	9.0	7.0	10	4	374
VGCM1212515	VGCM1212550	M12X1.25	6H	100	22.0	9.0	7.0	10	4	374
VGCM1215015	VGCM1215050	M12X1.5	6H	100	22.0	9.0	7.0	10	4	374
VGCM1217515	VGCM1217550	M12X1.75	6H	110	24.0	9.0	7.0	10	4	376
VGCM1415015	VGCM1415050	M14X1.5	6H	100	22.0	11.0	9.0	12	4	374
VGCM1420015	VGCM1420050	M14X2.0	6H	110	26.0	11.0	9.0	12	4	376
VGCM1615015	VGCM1615050	M16X1.5	6H	100	22.0	12.0	9.0	12	4	374
VGCM1620015	VGCM1620050	M16X2.0	6H	110	27.0	12.0	9.0	12	4	376
VGCM1815015	VGCM1815050	M18X1.5	6H	110	25.0	14.0	11.0	14	4	374
VGCM1825015	VGCM1825050	M18X2.5	6H	125	30.0	14.0	11.0	14	4	376
VGCM2015015	VGCM2015050	M20X1.5	6H	125	25.0	16.0	12.0	15	4	374
VGCM2025015	VGCM2025050	M20X2.5	6H	140	32.0	16.0	12.0	15	4	376
VGCM2215015	VGCM2215050	M22X1.5	6H	125	25.0	18.0	14.5	17	4	374
VGCM2225015	VGCM2225050	M22X2.5	6H	140	32.0	18.0	14.5	17	4	376
VGCM2415015	VGCM2415050	M24X1.5	6H	140	27.0	18.0	14.5	17	4	374
VGCM2420015	VGCM2420050	M24X2.0	6H	140	27.0	18.0	14.5	17	4	374
VGCM2430015	VGCM2430050	M24X3.0	6H	160	34.0	18.0	14.5	17	4	376

■ Applicable Working Material

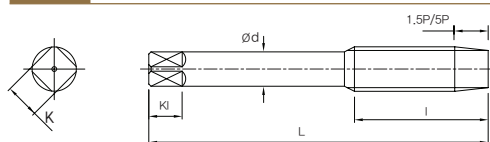
○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermosclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25-45 HRC	45-55 HRC	50-60 HRC	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
										◎	○		○	○	◎		○	○	○			◎	

HSSE TAP(DIN TYPE)



M3-M6



M8-M24

STRAIGHT TAPS

- Suitable for Carbon steel, Alloy steel and Nonferrous metals and the unique shape of the groove is designed for high release of chips
- Suitable for tapping of blind holes
- By applying HOMO coating, it provides stable and highly efficient operation due to enhanced durability



VGHM...series

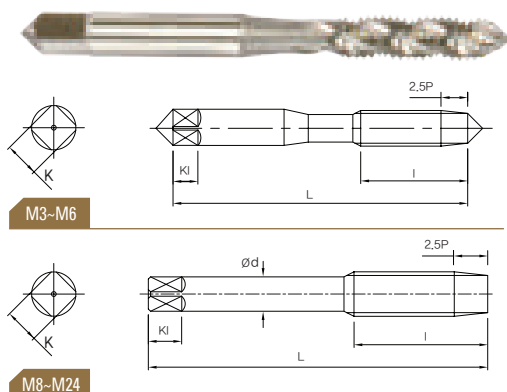
EDP. No.		Thread Size	Limits	L	I	d	K	KI	Flutes	DiN Type
1.5P	5P									
VGHM0305015	VGHM0305050	M3X0.5	6H	56	11.0	3.5	2.7	6	3	371
VGHM0407015	VGHM0407050	M4X0.7	6H	63	13.0	4.5	3.4	6	3	371
VGHM0508015	VGHM0508050	M5X0.8	6H	70	15.0	6.0	4.9	8	3	371
VGHM0610015	VGHM0610050	M6X1.0	6H	80	17.0	6.0	4.9	8	3	371
VGHM0810015	VGHM0810050	M8X1.0	6H	90	17.0	6.0	4.9	8	4	374
VGHM0812515	VGHM0812550	M8X1.25	6H	90	20.0	8.0	6.2	9	4	371
VGHM1010015	VGHM1010050	M10X1.0	6H	90	18.0	7.0	5.5	8	4	374
VGHM1012515	VGHM1012550	M10X1.25	6H	100	22.0	7.0	5.5	8	4	374
VGHM1015015	VGHM1015050	M10X1.5	6H	100	22.0	10.0	8.0	11	4	371
VGHM1210015	VGHM1210050	M12X1.0	6H	100	18.0	9.0	7.0	10	4	374
VGHM1212515	VGHM1212550	M12X1.25	6H	100	22.0	9.0	7.0	10	4	374
VGHM1215015	VGHM1215050	M12X1.5	6H	100	22.0	9.0	7.0	10	4	374
VGHM1217515	VGHM1217550	M12X1.75	6H	110	24.0	9.0	7.0	10	4	376
VGHM1415015	VGHM1415050	M14X1.5	6H	100	22.0	11.0	9.0	12	4	374
VGHM1420015	VGHM1420050	M14X2.0	6H	110	26.0	11.0	9.0	12	4	376
VGHM1615015	VGHM1615050	M16X1.5	6H	100	22.0	12.0	9.0	12	4	374
VGHM1620015	VGHM1620050	M16X2.0	6H	110	27.0	12.0	9.0	12	4	376
VGHM1815015	VGHM1815050	M18X1.5	6H	110	25.0	14.0	11.0	14	4	374
VGHM1825015	VGHM1825050	M18X2.5	6H	125	30.0	14.0	11.0	14	4	376
VGHM2015015	VGHM2015050	M20X1.5	6H	125	25.0	16.0	12.0	15	4	374
VGHM2025015	VGHM2025050	M20X2.5	6H	140	32.0	16.0	12.0	15	4	376
VGHM2215015	VGHM2215050	M22X1.5	6H	125	25.0	18.0	14.5	17	4	374
VGHM2225015	VGHM2225050	M22X2.5	6H	140	32.0	18.0	14.5	17	4	376
VGHM2415015	VGHM2415050	M24X1.5	6H	140	27.0	18.0	14.5	17	4	374
VGHM2420015	VGHM2420050	M24X2.0	6H	140	27.0	18.0	14.5	17	4	374
VGHM2430015	VGHM2430050	M24X3.0	6H	160	34.0	18.0	14.5	17	4	376

■ Applicable Working Material

○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25-45 HRC	45-55 HRC	50-60 HRC	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
○			○						○														

HSSE TAP(DIN TYPE)



SPIRAL TAPS

- Designed for high mass production for general work pieces such as Cast Iron, C.Br, Plastics and so on

VQOM...series



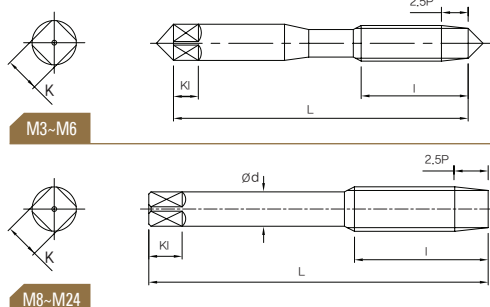
EDP. No.	Thread Size	Limits	L	I	d	K	KI	Flutes	DiN Type
VQOM0305025	M3X0.5	6H	56	11.0	3.5	2.7	6	3	371
VQOM0407025	M4X0.7	6H	63	13.0	4.5	3.4	6	3	371
VQOM0508025	M5X0.8	6H	70	15.0	6.0	4.9	8	3	371
VQOM0610025	M6X1.0	6H	80	17.0	6.0	4.9	8	3	371
VQOM0810025	M8X1.0	6H	90	17.0	6.0	4.9	8	3	374
VQOM0812525	M8X1.25	6H	90	20.0	8.0	6.2	9	3	371
VQOM1010025	M10X1.0	6H	90	18.0	7.0	5.5	8	3	374
VQOM1012525	M10X1.25	6H	100	22.0	7.0	5.5	8	3	374
VQOM1015025	M10X1.5	6H	100	22.0	10.0	8.0	11	3	371
VQOM1210025	M12X1.0	6H	100	18.0	9.0	7.0	10	3	374
VQOM1212525	M12X1.25	6H	100	22.0	9.0	7.0	10	3	374
VQOM1215025	M12X1.5	6H	100	22.0	9.0	7.0	10	3	374
VQOM1217525	M12X1.75	6H	110	24.0	9.0	7.0	10	3	376
VQOM1415025	M14X1.5	6H	100	22.0	11.0	9.0	12	4	374
VQOM1420025	M14X2.0	6H	110	26.0	11.0	9.0	12	4	376
VQOM1615025	M16X1.5	6H	100	22.0	12.0	9.0	12	4	374
VQOM1620025	M16X2.0	6H	110	27.0	12.0	9.0	12	4	376
VQOM1815025	M18X1.5	6H	110	25.0	14.0	11.0	14	4	374
VQOM1825025	M18X2.5	6H	125	30.0	14.0	11.0	14	4	376
VQOM2015025	M20X1.5	6H	125	25.0	16.0	12.0	15	4	374
VQOM2025025	M20X2.5	6H	140	32.0	16.0	12.0	15	4	376
VQOM2215025	M22X1.5	6H	125	25.0	18.0	14.5	17	4	374
VQOM2225025	M22X2.5	6H	140	32.0	18.0	14.5	17	4	376
VQOM2415025	M24X1.5	6H	140	27.0	18.0	14.5	17	4	374
VQOM2420025	M24X2.0	6H	140	27.0	18.0	14.5	17	4	374
VQOM2430025	M24X3.0	6H	160	34.0	18.0	14.5	17	4	376

■ Applicable Working Material

○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25%~0.45%	C 0.45%~	SCM	25~45 HRc	45~55 HRc	50~60 HRc	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
○	○	◎	◎								○	○	○	○	○	○	○	○	○				○

HSSE TAP(DIN TYPE)



SPIRAL TAPS

- Suitable for Carbon steel, Alloy steel and Nonferrous metals and the unique shape of the groove is designed for high release of chips
- Suitable for tapping of blind holes
- By applying TiN coating, it provides stable and highly efficient operation due to enhanced durability



VQTM...series

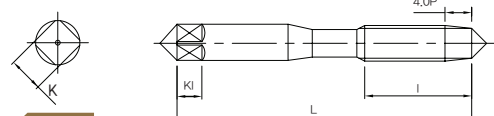
EDP. No.	Thread Size	Limits	L	I	d	K	KI	Flutes	DiN Type
VQTM0305025	M3X0.5	6H	56	11.0	3.5	2.7	6	3	371
VQTM0407025	M4X0.7	6H	63	13.0	4.5	3.4	6	3	371
VQTM0508025	M5X0.8	6H	70	15.0	6.0	4.9	8	3	371
VQTM0610025	M6X1.0	6H	80	17.0	6.0	4.9	8	3	371
VQTM0810025	M8X1.0	6H	90	17.0	6.0	4.9	8	3	374
VQTM0812525	M8X1.25	6H	90	20.0	8.0	6.2	9	3	371
VQTM1010025	M10X1.0	6H	90	18.0	7.0	5.5	8	3	374
VQTM1012525	M10X1.25	6H	100	22.0	7.0	5.5	8	3	374
VQTM1015025	M10X1.5	6H	100	22.0	10.0	8.0	11	3	371
VQTM1210025	M12X1.0	6H	100	18.0	9.0	7.0	10	3	374
VQTM1212525	M12X1.25	6H	100	22.0	9.0	7.0	10	3	374
VQTM1215025	M12X1.5	6H	100	22.0	9.0	7.0	10	3	374
VQTM1217525	M12X1.75	6H	110	24.0	9.0	7.0	10	3	376
VQTM1415025	M14X1.5	6H	100	22.0	11.0	9.0	12	3	374
VQTM1420025	M14X2.0	6H	110	26.0	11.0	9.0	12	3	376
VQTM1615025	M16X1.5	6H	100	22.0	12.0	9.0	12	3	374
VQTM1620025	M16X2.0	6H	110	27.0	12.0	9.0	12	3	376
VQTM1815025	M18X1.5	6H	110	25.0	14.0	11.0	14	4	374
VQTM1825025	M18X2.5	6H	125	30.0	14.0	11.0	14	4	376
VQTM2015025	M20X1.5	6H	125	25.0	16.0	12.0	15	4	374
VQTM2025025	M20X2.5	6H	140	32.0	16.0	12.0	15	4	376
VQTM2215025	M22X1.5	6H	125	25.0	18.0	14.5	17	4	374
VQTM2225025	M22X2.5	6H	140	32.0	18.0	14.5	17	4	376
VQTM2415025	M24X1.5	6H	140	27.0	18.0	14.5	17	4	374
VQTM2420025	M24X2.0	6H	140	27.0	18.0	14.5	17	4	374
VQTM2430025	M24X3.0	6H	160	34.0	18.0	14.5	17	4	376

■ Applicable Working Material

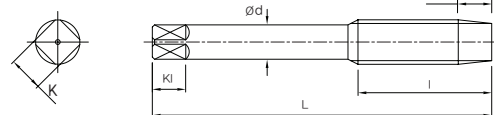
○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25~45 HRC	45~55 HRC	50~60 HRC	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
○	○	○	○				○	○	○		○	○	○	○	○	○	○	○	○				○

HSSE TAP(DIN TYPE)



M3-M6



M8-M24

SPIRAL TAPS

- Designed for high mass production for general work pieces such as Cast Iron, C.Br, Plastics and so on
- Suitable for tapping of through and blind holes
- By applying TiCN coating, it provides stable and highly efficient operation due to enhanced durability



HELIX

VQCM...series

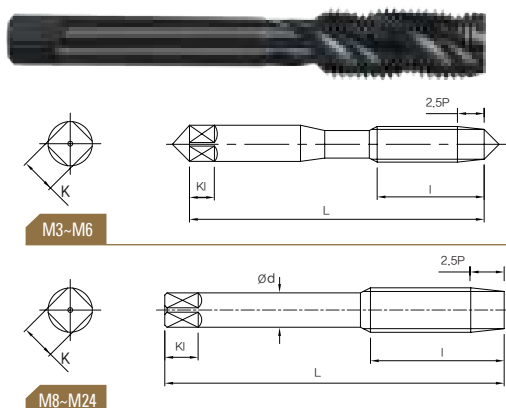
EDP. No.	Thread Size	Limits	L	I	d	K	KI	Flutes	DiN Type
VQCM0305025	M3X0.5	6H	56	11.0	3.5	2.7	6	3	371
VQCM0407025	M4X0.7	6H	63	13.0	4.5	3.4	6	3	371
VQCM0508025	M5X0.8	6H	70	15.0	6.0	4.9	8	3	371
VQCM0610025	M6X1.0	6H	80	17.0	6.0	4.9	8	3	371
VQCM0810025	M8X1.0	6H	90	17.0	6.0	4.9	8	3	374
VQCM0812525	M8X1.25	6H	90	20.0	8.0	6.2	9	3	371
VQCM1010025	M10X1.0	6H	90	18.0	7.0	5.5	8	3	374
VQCM1012525	M10X1.25	6H	100	22.0	7.0	5.5	8	3	374
VQCM1015025	M10X1.5	6H	100	22.0	10.0	8.0	11	3	371
VQCM1210025	M12X1.0	6H	100	18.0	9.0	7.0	10	3	374
VQCM1212525	M12X1.25	6H	100	22.0	9.0	7.0	10	3	374
VQCM1215025	M12X1.5	6H	100	22.0	9.0	7.0	10	3	374
VQCM1217525	M12X1.75	6H	110	24.0	9.0	7.0	10	3	376
VQCM1415025	M14X1.5	6H	100	22.0	11.0	9.0	12	4	374
VQCM1420025	M14X2.0	6H	110	26.0	11.0	9.0	12	4	376
VQCM1615025	M16X1.5	6H	100	22.0	12.0	9.0	12	4	374
VQCM1620025	M16X2.0	6H	110	27.0	12.0	9.0	12	4	376
VQCM1815025	M18X1.5	6H	110	25.0	14.0	11.0	14	4	374
VQCM1825025	M18X2.5	6H	125	30.0	14.0	11.0	14	4	376
VQCM2015025	M20X1.5	6H	125	25.0	16.0	12.0	15	4	374
VQCM2025025	M20X2.5	6H	140	32.0	16.0	12.0	15	4	376
VQCM2215025	M22X1.5	6H	125	25.0	18.0	14.5	17	4	374
VQCM2225025	M22X2.5	6H	140	32.0	18.0	14.5	17	4	376
VQCM2415025	M24X1.5	6H	140	27.0	18.0	14.5	17	4	374
VQCM2420025	M24X2.0	6H	140	27.0	18.0	14.5	17	4	374
VQCM2430025	M24X3.0	6H	160	34.0	18.0	14.5	17	4	376

■ Applicable Working Material

○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25%~0.45%	C 0.45%~	SCM	25-45 HRC	45-55 HRC	50-60 HRC	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
○	○	○	○				○	○	○		○	○	○	○	○	○	○	○	○	○			○

HSSE TAP(DIN TYPE)



SPIRAL TAPS

- Suitable for Carbon steel, Alloy steel and Nonferrous metals and the unique shape of the groove is designed for high release of chips

VQHM...series



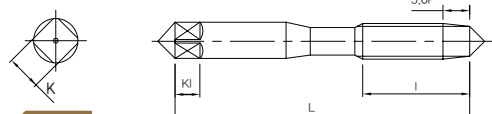
EDP. No.	Thread Size	Limits	L	I	d	K	KI	Flutes	DiN Type
VQHM0305025	M3X0.5	6H	56	11.0	3.5	2.7	6	3	371
VQHM0407025	M4X0.7	6H	63	13.0	4.5	3.4	6	3	371
VQHM0508025	M5X0.8	6H	70	15.0	6.0	4.9	8	3	371
VQHM0610025	M6X1.0	6H	80	17.0	6.0	4.9	8	3	371
VQHM0810025	M8X1.0	6H	90	17.0	6.0	4.9	8	3	374
VQHM0812525	M8X1.25	6H	90	20.0	8.0	6.2	9	3	371
VQHM1010025	M10X1.0	6H	90	18.0	7.0	5.5	8	3	374
VQHM1012525	M10X1.25	6H	100	22.0	7.0	5.5	8	3	374
VQHM1015025	M10X1.5	6H	100	22.0	10.0	8.0	11	3	371
VQHM1210025	M12X1.0	6H	100	18.0	9.0	7.0	10	3	374
VQHM1212525	M12X1.25	6H	100	22.0	9.0	7.0	10	3	374
VQHM1215025	M12X1.5	6H	100	22.0	9.0	7.0	10	3	374
VQHM1217525	M12X1.75	6H	110	24.0	9.0	7.0	10	3	376
VQHM1415025	M14X1.5	6H	100	22.0	11.0	9.0	12	3	374
VQHM1420025	M14X2.0	6H	110	26.0	11.0	9.0	12	3	376
VQHM1615025	M16X1.5	6H	100	22.0	12.0	9.0	12	3	374
VQHM1620025	M16X2.0	6H	110	27.0	12.0	9.0	12	3	376
VQHM1815025	M18X1.5	6H	110	25.0	14.0	11.0	14	4	374
VQHM1825025	M18X2.5	6H	125	30.0	14.0	11.0	14	4	376
VQHM2015025	M20X1.5	6H	125	25.0	16.0	12.0	15	4	374
VQHM2025025	M20X2.5	6H	140	32.0	16.0	12.0	15	4	376
VQHM2215025	M22X1.5	6H	125	25.0	18.0	14.5	17	4	374
VQHM2225025	M22X2.5	6H	140	32.0	18.0	14.5	17	4	376
VQHM2415025	M24X1.5	6H	140	27.0	18.0	14.5	17	4	374
VQHM2420025	M24X2.0	6H	140	27.0	18.0	14.5	17	4	374
VQHM2430025	M24X3.0	6H	160	34.0	18.0	14.5	17	4	376

■ Applicable Working Material

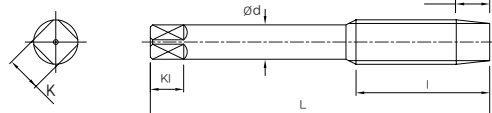
○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25-45 HRc	45-55 HRc	50-60 HRc	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
○	○								○														○

HSSE TAP(DIN TYPE)



M3-M8



M10-M24

POINT TAPS

- Designed for high performance of threading Carbon steel, Alloy steel and Nonferrous metals



HELIX

VDOM...series

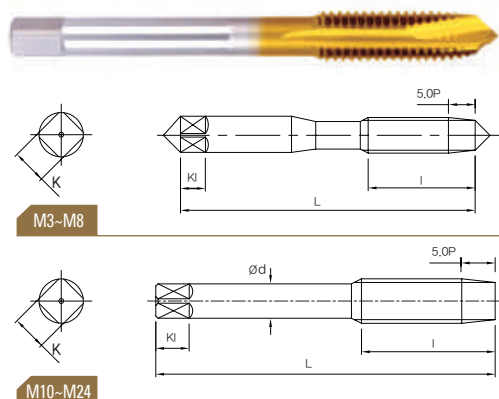
EDP. No.	Thread Size	Limits	L	I	d	K	KI	Flutes	DiN Type
VDOM0305050	M3X0.5	6H	56	11.0	3.5	2.7	6	3	371
VDOM0407050	M4X0.7	6H	63	13.0	4.5	3.4	6	3	371
VDOM0508050	M5X0.8	6H	70	15.0	6.0	4.9	8	3	371
VDOM0610050	M6X1.0	6H	80	17.0	6.0	4.9	8	3	371
VDOM0810050	M8X1.0	6H	90	17.0	6.0	4.9	8	3	374
VDOM0812550	M8X1.25	6H	90	20.0	8.0	6.2	9	3	371
VDOM1010050	M10X1.0	6H	90	18.0	7.0	5.5	8	3	374
VDOM1012550	M10X1.25	6H	100	22.0	7.0	5.5	8	3	374
VDOM1015050	M10X1.5	6H	100	22.0	10.0	8.0	11	3	371
VDOM1210050	M12X1.0	6H	100	18.0	9.0	7.0	10	3	374
VDOM1212550	M12X1.25	6H	100	22.0	9.0	7.0	10	3	374
VDOM1215050	M12X1.5	6H	100	22.0	9.0	7.0	10	3	374
VDOM1217550	M12X1.75	6H	110	24.0	9.0	7.0	10	3	376
VDOM1415050	M14X1.5	6H	100	22.0	11.0	9.0	12	3	374
VDOM1420050	M14X2.0	6H	110	26.0	11.0	9.0	12	3	376
VDOM1615050	M16X1.5	6H	100	22.0	12.0	9.0	12	3	374
VDOM1620050	M16X2.0	6H	110	27.0	12.0	9.0	12	3	376
VDOM1815050	M18X1.5	6H	110	25.0	14.0	11.0	14	3	374
VDOM1825050	M18X2.5	6H	125	30.0	14.0	11.0	14	3	376
VDOM2015050	M20X1.5	6H	125	25.0	16.0	12.0	15	3	374
VDOM2025050	M20X2.5	6H	140	32.0	16.0	12.0	15	3	376
VDOM2215050	M22X1.5	6H	125	25.0	18.0	14.5	17	3	374
VDOM2225050	M22X2.5	6H	140	32.0	18.0	14.5	17	3	376
VDOM2415050	M24X1.5	6H	140	27.0	18.0	14.5	17	3	374
VDOM2420050	M24X2.0	6H	140	27.0	18.0	14.5	17	3	374
VDOM2430050	M24X3.0	6H	160	34.0	18.0	14.5	17	3	376

■ Applicable Working Material

○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25-45 HRc	45-55 HRc	50-60 HRc	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
○	○	◎								○	○	○	○	○	○	◎	○	○	○				○

HSSE TAP(DIN TYPE)



POINT TAPS

- Designed for high performance of threading Carbon steel, Alloy steel and Nonferrous metals
- Suitable for tapping of through holes
- By applying TiN coating, it provides stable and highly efficient operation due to enhanced durability

VDTM...series



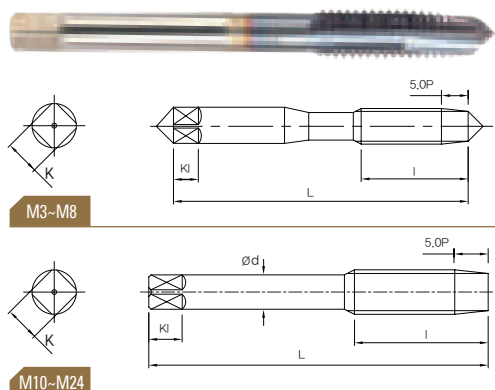
EDP. No.	Thread Size	Limits	L	I	d	K	KI	Flutes	DiN Type
VDTM0305050	M3X0.5	6H	56	11.0	3.5	2.7	6	3	371
VDTM0407050	M4X0.7	6H	63	13.0	4.5	3.4	6	3	371
VDTM0508050	M5X0.8	6H	70	15.0	6.0	4.9	8	3	371
VDTM0610050	M6X1.0	6H	80	17.0	6.0	4.9	8	3	371
VDTM0810050	M8X1.0	6H	90	17.0	6.0	4.9	8	3	374
VDTM0812550	M8X1.25	6H	90	20.0	8.0	6.2	9	3	371
VDTM1010050	M10X1.0	6H	90	18.0	7.0	5.5	8	3	374
VDTM1012550	M10X1.25	6H	100	22.0	7.0	5.5	8	3	374
VDTM1015050	M10X1.5	6H	100	22.0	10.0	8.0	11	3	371
VDTM1210050	M12X1.0	6H	100	18.0	9.0	7.0	10	3	374
VDTM1212550	M12X1.25	6H	100	22.0	9.0	7.0	10	3	374
VDTM1215050	M12X1.5	6H	100	22.0	9.0	7.0	10	3	374
VDTM1217550	M12X1.75	6H	110	24.0	9.0	7.0	10	3	376
VDTM1415050	M14X1.5	6H	100	22.0	11.0	9.0	12	3	374
VDTM1420050	M14X2.0	6H	110	26.0	11.0	9.0	12	3	376
VDTM1615050	M16X1.5	6H	100	22.0	12.0	9.0	12	3	374
VDTM1620050	M16X2.0	6H	110	27.0	12.0	9.0	12	3	376
VDTM1815050	M18X1.5	6H	110	25.0	14.0	11.0	14	3	374
VDTM1825050	M18X2.5	6H	125	30.0	14.0	11.0	14	3	376
VDTM2015050	M20X1.5	6H	125	25.0	16.0	12.0	15	3	374
VDTM2025050	M20X2.5	6H	140	32.0	16.0	12.0	15	3	376
VDTM2215050	M22X1.5	6H	125	25.0	18.0	14.5	17	3	374
VDTM2225050	M22X2.5	6H	140	32.0	18.0	14.5	17	3	376
VDTM2415050	M24X1.5	6H	140	27.0	18.0	14.5	17	3	374
VDTM2420050	M24X2.0	6H	140	27.0	18.0	14.5	17	3	374
VDTM2430050	M24X3.0	6H	160	34.0	18.0	14.5	17	3	376

■ Applicable Working Material

○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25-45 HRc	45-55 HRc	50-60 HRc	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
○	○	○	○				◎	○	○	○	○	○	○	○	○	○	○	○	○	○	○		○

HSSE TAP(DIN TYPE)



POINT TAPS

- Designed for high performance of threading Carbon steel, Alloy steel and Nonferrous metals
- Suitable for tapping of through holes
- By applying TiCN coating, it provides stable and highly efficient operation due to enhanced durability



VDCM...series

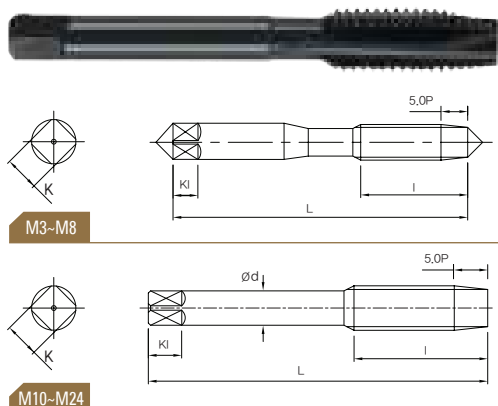
EDP. No.	Thread Size	Limits	L	I	d	K	KI	Flutes	DiN Type
VDCM0305050	M3X0.5	6H	56	11.0	3.5	2.7	6	3	371
VDCM0407050	M4X0.7	6H	63	13.0	4.5	3.4	6	3	371
VDCM0508050	M5X0.8	6H	70	15.0	6.0	4.9	8	3	371
VDCM0610050	M6X1.0	6H	80	17.0	6.0	4.9	8	3	371
VDCM0810050	M8X1.0	6H	90	17.0	6.0	4.9	8	3	374
VDCM0812550	M8X1.25	6H	90	20.0	8.0	6.2	9	3	371
VDCM1010050	M10X1.0	6H	90	18.0	7.0	5.5	8	3	374
VDCM1012550	M10X1.25	6H	100	22.0	7.0	5.5	8	3	374
VDCM1015050	M10X1.5	6H	100	22.0	10.0	8.0	11	3	371
VDCM1210050	M12X1.0	6H	100	18.0	9.0	7.0	10	3	374
VDCM1212550	M12X1.25	6H	100	22.0	9.0	7.0	10	3	374
VDCM1215050	M12X1.5	6H	100	22.0	9.0	7.0	10	3	374
VDCM1217550	M12X1.75	6H	110	24.0	9.0	7.0	10	3	376
VDCM1415050	M14X1.5	6H	100	22.0	11.0	9.0	12	3	374
VDCM1420050	M14X2.0	6H	110	26.0	11.0	9.0	12	3	376
VDCM1615050	M16X1.5	6H	100	22.0	12.0	9.0	12	3	374
VDCM1620050	M16X2.0	6H	110	27.0	12.0	9.0	12	3	376
VDCM1815050	M18X1.5	6H	110	25.0	14.0	11.0	14	3	374
VDCM1825050	M18X2.5	6H	125	30.0	14.0	11.0	14	3	376
VDCM2015050	M20X1.5	6H	125	25.0	16.0	12.0	15	3	374
VDCM2025050	M20X2.5	6H	140	32.0	16.0	12.0	15	3	376
VDCM2215050	M22X1.5	6H	125	25.0	18.0	14.5	17	3	374
VDCM2225050	M22X2.5	6H	140	32.0	18.0	14.5	17	3	376
VDCM2415050	M24X1.5	6H	140	27.0	18.0	14.5	17	3	374
VDCM2420050	M24X2.0	6H	140	27.0	18.0	14.5	17	3	374
VDCM2430050	M24X3.0	6H	160	34.0	18.0	14.5	17	3	376

■ Applicable Working Material

○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25~45 HRC	45~55 HRC	50~60 HRC	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
◎	◎	◎	○				○	○	○	○	○	○	○	○	○	○	○	○	○	○	○		○

HSSE TAP(DIN TYPE)



POINT TAPS

- Designed for high performance of threading Carbon steel, Alloy steel and Nonferrous metals
- Suitable for tapping of through holes
- By applying HOMO coating, it provides stable and highly efficient operation due to enhanced durability

VDHM...series



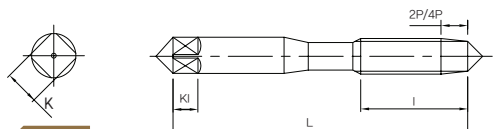
EDP. No.	Thread Size	Limits	L	I	d	K	KI	Flutes	DiN Type
VDHM0305050	M3X0.5	6H	56	11.0	3.5	2.7	6	3	371
VDHM0407050	M4X0.7	6H	63	13.0	4.5	3.4	6	3	371
VDHM0508050	M5X0.8	6H	70	15.0	6.0	4.9	8	3	371
VDHM0610050	M6X1.0	6H	80	17.0	6.0	4.9	8	3	371
VDHM0810050	M8X1.0	6H	90	17.0	6.0	4.9	8	3	374
VDHM0812550	M8X1.25	6H	90	20.0	8.0	6.2	9	3	371
VDHM1010050	M10X1.0	6H	90	18.0	7.0	5.5	8	3	374
VDHM1012550	M10X1.25	6H	100	22.0	7.0	5.5	8	3	374
VDHM1015050	M10X1.5	6H	100	22.0	10.0	8.0	11	3	371
VDHM1210050	M12X1.0	6H	100	18.0	9.0	7.0	10	3	374
VDHM1212550	M12X1.25	6H	100	22.0	9.0	7.0	10	3	374
VDHM1215050	M12X1.5	6H	100	22.0	9.0	7.0	10	3	374
VDHM1217550	M12X1.75	6H	110	24.0	9.0	7.0	10	3	376
VDHM1415050	M14X1.5	6H	100	22.0	11.0	9.0	12	3	374
VDHM1420050	M14X2.0	6H	110	26.0	11.0	9.0	12	3	376
VDHM1615050	M16X1.5	6H	100	22.0	12.0	9.0	12	3	374
VDHM1620050	M16X2.0	6H	110	27.0	12.0	9.0	12	3	376
VDHM1815050	M18X1.5	6H	110	25.0	14.0	11.0	14	3	374
VDHM1825050	M18X2.5	6H	125	30.0	14.0	11.0	14	3	376
VDHM2015050	M20X1.5	6H	125	25.0	16.0	12.0	15	3	374
VDHM2025050	M20X2.5	6H	140	32.0	16.0	12.0	15	3	376
VDHM2215050	M22X1.5	6H	125	25.0	18.0	14.5	17	3	374
VDHM2225050	M22X2.5	6H	140	32.0	18.0	14.5	17	3	376
VDHM2415050	M24X1.5	6H	140	27.0	18.0	14.5	17	3	374
VDHM2420050	M24X2.0	6H	140	27.0	18.0	14.5	17	3	374
VDHM2430050	M24X3.0	6H	160	34.0	18.0	14.5	17	3	376

■ Applicable Working Material

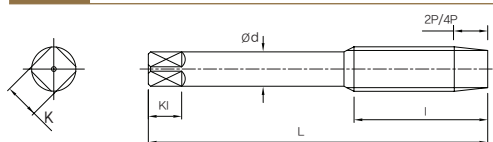
○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25%~0.45%	C 0.45%~	SCM	25~45 HRc	45~55 HRc	50~60 HRc	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
◎	◎		○						○														○

HSSE TAP(DIN TYPE)



M3-M6



M10-M24

ROLL TAPS

- Designed for high performance of threading Carbon steel, Alloy steel and Nonferrous metals



VMOM...series

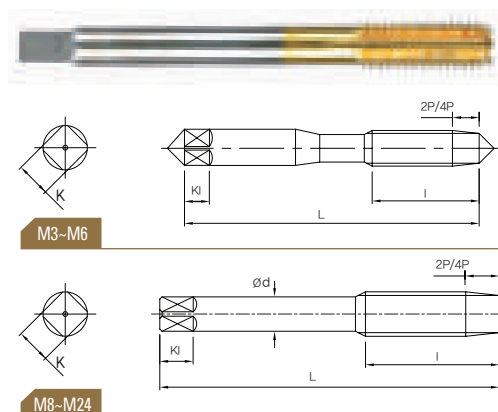
EDP. No.		Thread Size	Limits	L	I	d	K	KI	Oil Groove
2P	4P								
VMOM0305020S	-	M3x0.5	6HX	56	11.0	3.5	2.7	6	1
VMOM0305020M	VMOM0305040M	M3x0.5	6HX	56	11.0	3.5	2.7	6	4
VMOM0407020S	-	M4x0.7	6HX	63	13.0	4.5	3.4	6	1
VMOM0407020M	VMOM0407040M	M4x0.7	6HX	63	13.0	4.5	3.4	6	4
VMOM0508020S	-	M5x0.8	6HX	70	15.0	6.0	4.9	8	1
VMOM0508020M	VMOM0508040M	M5x0.8	6HX	70	15.0	6.0	4.9	8	4
VMOM0610020S	-	M6x1.0	6HX	80	17.0	6.0	4.9	8	1
VMOM0610020M	VMOM0610040M	M6x1.0	6HX	80	17.0	6.0	4.9	8	4
VMOM0810020S	-	M8x1.0	6HX	90	17.0	6.0	4.9	8	1
VMOM0810020M	VMOM0810040M	M8x1.0	6HX	90	17.0	6.0	4.9	8	4
VMOM0812520S	-	M8x1.25	6HX	90	20.0	8.0	6.2	9	1
VMOM0812520M	VMOM0812540M	M8x1.25	6HX	90	20.0	8.0	6.2	9	4
VMOM1010020S	-	M10x1.0	6HX	90	18.0	7.0	5.5	8	1
VMOM1010020M	VMOM1010040M	M10x1.0	6HX	90	18.0	7.0	5.5	8	4
VMOM1012520S	-	M10x1.25	6HX	100	22.0	7.0	5.5	8	1
VMOM1012520M	VMOM1012540M	M10x1.25	6HX	100	22.0	7.0	5.5	8	4
VMOM1015020S	-	M10x1.5	6HX	100	22.0	10.0	8.0	11	1
VMOM1015020M	VMOM1015040M	M10x1.5	6HX	100	22.0	10.0	8.0	11	4
VMOM1210020S	-	M12x1.0	6HX	100	18.0	9.0	7.0	10	1
VMOM1210020M	VMOM1210040M	M12x1.0	6HX	100	18.0	9.0	7.0	10	4
VMOM1212520S	-	M12x1.25	6HX	100	22.0	9.0	7.0	10	1
VMOM1212520M	VMOM1212540M	M12x1.25	6HX	100	22.0	9.0	7.0	10	4
VMOM1215020S	-	M12x1.5	6HX	100	22.0	9.0	7.0	10	1
VMOM1215020M	VMOM1215040M	M12x1.5	6HX	100	22.0	9.0	7.0	10	4
VMOM1217520S	-	M12x1.75	6HX	110	24.0	9.0	7.0	10	1
VMOM1217520M	VMOM1217540M	M12x1.75	6HX	100	24.0	9.0	7.0	10	4

■ Applicable Working Material

○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25%~0.45%	C 0.45%~	SCM	25-45 HRC	45-55 HRC	50-60 HRC	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
												◎	◎	◎		◎	◎		◎				

HSSE TAP(DIN TYPE)



ROLL TAPS

- It is applicable regardless of steel or Nonferrous alloys
- By applying TiN coating, it provides stable and highly efficient operation due to enhanced durability



VMTM...series

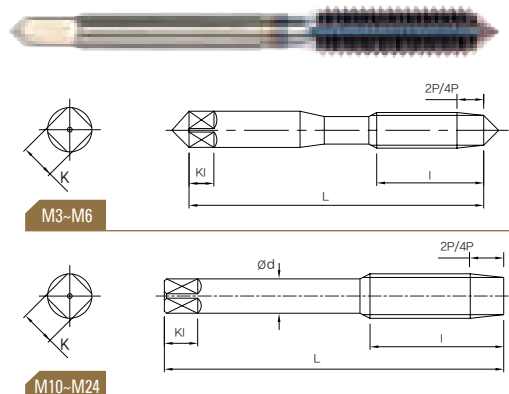
EDP. No.		Thread Size	Limits	L	I	d	K	KI	Oil Groove
2P	4P								
VMTM0305020S	-	M3x0.5	6HX	56	11	3.5	2.7	6	1
VMTM0305020M	VMTM0305040M	M3x0.5	6HX	56	11	3.5	2.7	6	4
VMTM0407020S	-	M4x0.7	6HX	63	13	4.5	3.4	6	1
VMTM0407020M	VMTM0407040M	M4x0.7	6HX	63	13	4.5	3.4	6	4
VMTM0508020S	-	M5x0.8	6HX	70	15	6.0	4.9	8	1
VMTM0508020M	VMTM0508040M	M5x0.8	6HX	70	15	6.0	4.9	8	4
VMTM0610020S	-	M6x1.0	6HX	80	17	6.0	4.9	8	1
VMTM0610020M	VMTM0610040M	M6x1.0	6HX	80	17	6.0	4.9	8	4
VMTM0810020S	-	M8x1.0	6HX	90	17	8.0	6.2	9	1
VMTM0810020M	VMTM0810040M	M8x1.0	6HX	90	17	8.0	6.2	9	4
VMTM0812520S	-	M8x1.25	6HX	90	20	8.0	6.2	9	1
VMTM0812520M	VMTM0812540M	M8x1.25	6HX	90	20	8.0	6.2	9	4
VMTM1010020S	-	M10x1.0	6HX	90	18	10.0	8.0	11	1
VMTM1010020M	VMTM1010040M	M10x1.0	6HX	90	18	10.0	8.0	11	4
VMTM1012520S	-	M10x1.25	6HX	100	22	10.0	8.0	11	1
VMTM1012520M	VMTM1012540M	M10x1.25	6HX	100	22	10.0	8.0	11	4
VMTM1015020S	-	M10x1.5	6HX	100	22	10.0	8.0	11	1
VMTM1015020M	VMTM1015040M	M10x1.5	6HX	100	22	10.0	8.0	11	4
VMTM1210020S	-	M12x1.0	6HX	100	18	9.0	7.0	10	1
VMTM1210020M	VMTM1210040M	M12x1.0	6HX	100	18	9.0	7.0	10	4
VMTM1212520S	-	M12x1.25	6HX	100	22	9.0	7.0	10	1
VMTM1212520M	VMTM1212540M	M12x1.25	6HX	100	22	9.0	7.0	10	4
VMTM1215020S	-	M12x1.5	6HX	100	22	9.0	7.0	10	1
VMTM1215020M	VMTM1215040M	M12x1.5	6HX	100	22	9.0	7.0	10	4
VMTM1217520S	-	M12x1.75	6HX	110	24	9.0	7.0	10	1
VMTM1217520M	VMTM1217540M	M12x1.75	6HX	110	24	9.0	7.0	10	4

■ Applicable Working Material

○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermosclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25-45 HRC	45-55 HRC	50-60 HRC	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
○	○	○	○				◎	○	○		○	○	○	○									

HSSE TAP(DIN TYPE)



ROLL TAPS

- Designed for high mass production for general work pieces such as Cast Iron, C.Br, Plastics and so on
- Suitable for tapping of through and blind holes
- By applying TiCN coating, it provides stable and highly efficient operation due to enhanced durability

HSSE

TiCN

VMCM...series

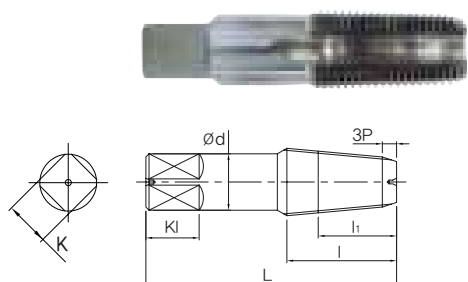
EDP. No.		Thread Size	Limits	L	I	d	K	KI	Oil Groove
2P	4P								
VMCM0305020S	-	M3x0.5	6HX	56	11	3.5	2.7	6	1
VMCM0305020M	VMCM0305040M	M3x0.5	6HX	56	11	3.5	2.7	6	4
VMCM0407020S	-	M4x0.7	6HX	63	13	4.5	3.4	6	1
VMCM0407020M	VMCM0407040M	M4x0.7	6HX	63	13	4.5	3.4	6	4
VMCM0508020S	-	M5x0.8	6HX	70	15	6.0	4.9	8	1
VMCM0508020M	VMCM0508040M	M5x0.8	6HX	70	15	6.0	4.9	8	4
VMCM0610020S	-	M6x1.0	6HX	80	17	6.0	4.9	8	1
VMCM0610020M	VMCM0610040M	M6x1.0	6HX	80	17	6.0	4.9	8	4
VMCM0810020S	-	M8x1.0	6HX	90	17	8.0	6.2	9	1
VMCM0810020M	VMCM0810040M	M8x1.0	6HX	90	17	8.0	6.2	9	4
VMCM0812520S	-	M8x1.25	6HX	90	20	8.0	6.2	9	1
VMCM0812520M	VMCM0812540M	M8x1.25	6HX	90	20	8.0	6.2	9	4
VMCM1010020S	-	M10x1.0	6HX	90	18	10.0	8.0	11	1
VMCM1010020M	VMCM1010040M	M10x1.0	6HX	90	18	10.0	8.0	11	4
VMCM1012520S	-	M10x1.25	6HX	100	22	10.0	8.0	11	1
VMCM1012520M	VMCM1012540M	M10x1.25	6HX	100	22	10.0	8.0	11	4
VMCM1015020S	-	M10x1.5	6HX	100	22	10.0	8.0	11	1
VMCM1015020M	VMCM1015040M	M10x1.5	6HX	100	22	10.0	8.0	11	4
VMCM1210020S	-	M12x1.0	6HX	100	18	9.0	7.0	10	1
VMCM1210020M	VMCM1210040M	M12x1.0	6HX	100	18	9.0	7.0	10	4
VMCM1212520S	-	M12x1.25	6HX	100	22	9.0	7.0	10	1
VMCM1212520M	VMCM1212540M	M12x1.25	6HX	100	22	9.0	7.0	10	4
VMCM1215020S	-	M12x1.5	6HX	100	22	9.0	7.0	10	1
VMCM1215020M	VMCM1215040M	M12x1.5	6HX	100	22	9.0	7.0	10	4
VMCM1217520S	-	M12x1.75	6HX	110	24	9.0	7.0	10	1
VMCM1217520M	VMCM1217540M	M12x1.75	6HX	110	24	9.0	7.0	10	4

■ Applicable Working Material

○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25-45 HRc	45-55 HRc	50-60 HRc	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC			○	◎
										○	◎	◎	◎	◎	○	○	◎	◎	◎			○	◎

PIPE TAP(PT TYPE)



PT PIPE TAPS

VSOPT...series



EDP. No.	Thread Size	Tap Limit	Basic Major Dia(mm)	L	I	I ₁	d	K	KI	Flutes
VSOPT1/16	1/16-28	JIS II	7.723	55	19	13.00	8	6	9	4
VSOPT1/8	1/8-28	JIS II	9.728	55	19	13.00	8	6	9	4
VSOPT1/4	1/4-19	JIS II	13.157	62	28	21.00	11	9	12	4
VSOPT3/8	3/8-19	JIS II	16.604	65	28	21.00	14	11	14	4
VSOPT1/2	1/2-14	JIS II	20.955	80	35	25.00	18	14	17	4
VSOPT3/4	3/4-14	JIS II	26.441	85	35	25.00	23	17	20	4
VSOPT1	1-11	JIS II	33.249	95	45	32.00	26	21	24	4

PIPE TAP SERIES

■ Applicable Working Material

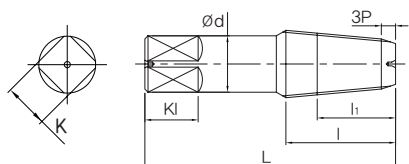
○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C 0.25% ~0.45%	C 0.45%~	SCM	25-45 HRc	45-55 HRc	50-60 HRc	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
○	○	○							○	○	○	○	○	○		○	○	○	○				○

PIPE TAP(PT TYPE)



PT SPIRAL PIPE TAPS



VPOPT...series



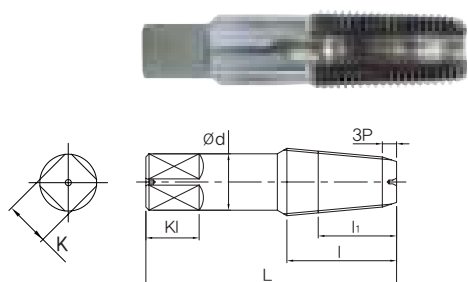
EDP. No.	Thread Size	Tap Limit	Basic Major Dia(mm)	L	I	L ₁	d	K	KI	Flutes
VPOPT1/16	1/16-28	JIS II	7.723	55	19	13.00	8	6	9	3
VPOPT1/8	1/8-28	JIS II	9.728	55	19	13.00	8	6	9	3
VPOPT1/4	1/4-19	JIS II	13.157	62	28	21.00	11	9	12	3
VPOPT3/8	3/8-19	JIS II	16.604	65	28	21.00	14	11	14	3
VPOPT1/2	1/2-14	JIS II	20.955	80	35	25.00	18	14	17	4
VPOPT3/4	3/4-14	JIS II	26.441	85	35	25.00	23	17	20	4
VPOPT1	1-11	JIS II	33.249	95	45	32.00	26	21	24	4

■ Applicable Working Material

○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C 0.25% ~0.45%	C 0.45%~	SCM	25-45 HRC	45-55 HRC	50-60 HRC	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
○			○						○									○					

PIPE TAP(NPT TYPE)



NPT PIPE TAPS

VSONPT...series



EDP. No.	Thread Size	Tap Limit	Basic Major Dia(mm)	L	I	I ₁	d	K	KI	Flutes
VSONPT1/16	1/16-27	ANSI G	7.770	55	19	12.00	8	6	9	4
VSONPT1/8	1/8-27	ANSI G	10.117	55	19	12.05	8	6	9	4
VSONPT1/4	1/4-18	ANSI G	13.426	62	28	17.45	11	9	12	4
VSONPT3/8	3/8-18	ANSI G	16.866	65	28	17.65	14	11	14	4
VSONPT1/2	1/2-14	ANSI G	20.980	80	35	22.85	18	14	17	4
VSONPT3/4	3/4-14	ANSI G	26.325	85	35	22.95	23	17	20	4
VSONPT1	1-11½	ANSI G	32.934	95	45	27.40	26	21	24	4

PIPE TAP SERIES

■ Applicable Working Material

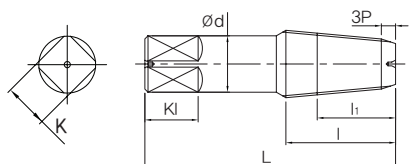
○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C 0.25% ~0.45%	C 0.45%~	SCM	25~45 HRc	45~55 HRc	50~60 HRc	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
○	○	○							○	○	○	○	○	○		○	○	○	○				○

PIPE TAP(NPT TYPE)



NPT SPIRAL PIPE TAPS



VPONPT...series



EDP. No.	Thread Size	Tap Limit	Basic Major Dia(mm)	L	I	L ₁	d	K	KI	Flutes
VPONPT1/16	1/16-27	ANSI G	7.770	55	19	12.00	8	6	9	3
VPONPT1/8	1/8-27	ANSI G	10.117	55	19	12.05	8	6	9	3
VPONPT1/4	1/4-18	ANSI G	13.426	62	28	17.45	11	9	12	3
VPONPT3/8	3/8-18	ANSI G	16.866	65	28	17.65	14	11	14	3
VPONPT1/2	1/2-14	ANSI G	20.980	80	35	22.85	18	14	17	4
VPONPT3/4	3/4-14	ANSI G	26.325	85	35	22.95	23	17	20	4
VPONPT1	1-11½	ANSI G	32.934	95	45	27.40	26	21	24	4

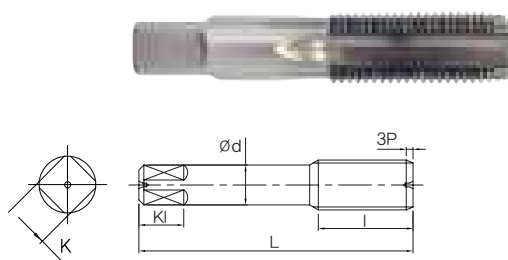
※Production other than the above requirement is possible when requested separately

■ Applicable Working Material

○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C 0.25% ~0.45%	C 0.45%~	SCM	25~45 HRc	45~55 HRc	50~60 HRc	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
○			○						○									○					

PIPE TAP(PS TYPE)



PS PIPE TAPS

VSOPS...series



EDP. No.	Thread Size	Tap Limit	Basic Major Dia(mm)	L	I	d	K	KI	Flutes
VSOPS1/8	1/8-28	JIS II	9.728	55	19	8	6	9	4
VSOPS1/4	1/4-19	JIS II	13.157	62	28	11	9	12	4
VSOPS3/8	3/8-19	JIS II	16.604	65	28	14	11	14	4
VSOPS1/2	1/2-14	JIS II	20.955	80	35	18	14	17	4
VSOPS3/4	3/4-14	JIS II	26.441	85	35	23	17	20	4
VSOPS1	1-11	JIS II	33.249	95	45	26	21	24	4

※Production other than the above requirement is possible when requested separately

PIPE TAP SERIES

■ Applicable Working Material

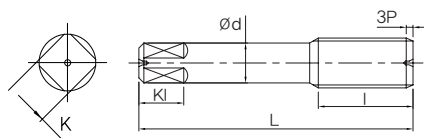
○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25-45 HRc	45-55 HRc	50-60 HRc	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
○									○	○	○		○	○	○	○	○	○	○				

PIPE TAP(PS TYPE)



PS SPIRAL PIPE TAPS



VPOPS...series



EDP. No.	Thread Size	Tap Limit	Basic Major Dia(mm)	L	I	d	K	KI	Flutes
VPOPS1/8	1/8-28	JIS II	9.728	55	19	8	6	9	3
VPOPS1/4	1/4-19	JIS II	13.157	62	28	11	9	12	3
VPOPS3/8	3/8-19	JIS II	16.604	65	28	14	11	14	3
VPOPS1/2	1/2-14	JIS II	20.955	80	35	18	14	17	4
VPOPS3/4	3/4-14	JIS II	26.441	85	35	23	17	20	4
VPOPS1	1-11	JIS II	33.249	95	45	26	21	24	4

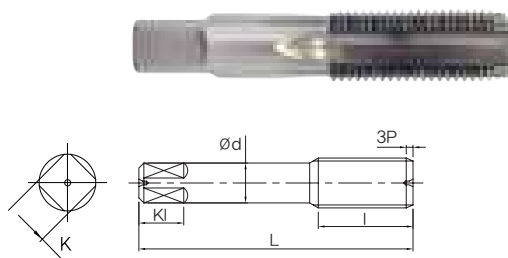
※Production other than the above requirement is possible when requested separately

■ Applicable Working Material

○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C 0.25% ~0.45%	C 0.45%~	SCM	25~45 HRc	45~55 HRc	50~60 HRc	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
○			○						○		○		○	○	○	○	○	○	○				○

PIPE TAP(PF TYPE)



PF PIPE TAPS

VSOPF...series



EDP. No.	Thread Size	Tap Limit	Basic Major Dia(mm)	L	I	d	K	KI	Flutes
VSOPF1/8	1/8-28	JIS II	9.728	55	19	8	6	9	4
VSOPF1/4	1/4-19	JIS II	13.157	62	28	11	9	12	4
VSOPF3/8	3/8-19	JIS II	16.604	65	28	14	11	14	4
VSOPF1/2	1/2-14	JIS II	20.955	80	35	18	14	17	4
VSOPF3/4	3/4-14	JIS II	26.441	85	35	23	17	20	4
VSOPF1	1-11	JIS II	33.249	95	45	26	21	24	4

※Production other than the above requirement is possible when requested separately

PIPE TAP SERIES

■ Applicable Working Material

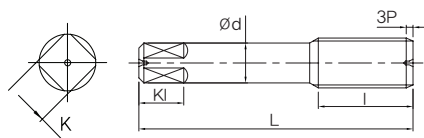
○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C 0.25% ~0.45%	C 0.45%~	SCM	25-45 HRc	45-55 HRc	50-60 HRc	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
○									○	○	○		○	○	○	○	○	○	○				

PIPE TAP(PF TYPE)



PF SPIRAL PIPE TAPS



VPOPF...series



EDP. No.	Thread Size	Tap Limit	Basic Major Dia(mm)	L	I	d	K	KI	Flutes
VPOPF1/8	1/8-28	JIS II	9.728	55	19	8	6	9	3
VPOPF1/4	1/4-19	JIS II	13.157	62	28	11	9	12	3
VPOPF3/8	3/8-19	JIS II	16.604	65	28	14	11	14	3
VPOPF1/2	1/2-14	JIS II	20.955	80	35	18	14	17	4
VPOPF3/4	3/4-14	JIS II	26.441	85	35	23	17	20	4
VPOPF1	1-11	JIS II	33.249	95	45	26	21	24	4

※Production other than the above requirement is possible when requested separately

■ Applicable Working Material

○:General Application ◎:The most suitable Application

Low Carbon Steels	Medium Carbon Steels	High Carbon Steels	Alloy Steels	Hardened Steels			Stainless Steels	Tool Steels	Cast Steels	Cast Iron	Ductile Cast Iron	Copper	Brass	Brass Casting	Bronze	Aluminum Pressed Material	Aluminum Alloy Casting	Magnesium Alloy Casting	Zinc Alloy Casting	Titanium Alloys	Ni based Alloy	Thermo-sclerosis Plastic	Thermo Plastic
C ~0.25%	C 0.25% ~0.45%	C 0.45%~	SCM	25~45 HRc	45~55 HRc	50~60 HRc	SUS	SKD	SC	FC	FCD	Cu	Bs	BsC	PB	AL	AC,ADC	MC	ZDC				
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2

ENDMILL SERIES >



2

Endmills for high hardened steel (Zamus Star Series)	110
Endmills for Stainless Steel (Neo Classic X-STAR Series)	184
Endmills for hardened steel (Zamus Classic Series)	205
Endmills for general steel (Zamus Thunder Series)	263
Endmills for difficult to cut materials (Sus-wave Series)	292
Endmills for copper (Zamus S-STAR Series)	298
Endmills for copper (Zamus Copper-Mate Series)	304
Endmills for Diamond and Composite Material (Zamus Gra-Mate Series)	308
Endmills for Aluminum (Alu-Wave Series)	320
Standard EndMills (Standard EndMill Series)	336
Endmills for Mold & Die (Winner Series)	348



Endmills for high hardened steel

ZAMUS STAR SERIES

ENDMILL
SERIES

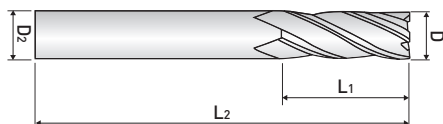


EDP. No.	APPEARANCE	FEATURE	INCH & METRIC	STOCK	PAGE
ZS124 ...series		LONG LENGTH CUT, VARIABLE FLUTE	METRIC	•	110
ZS1(2)04 ...series		CORNER RADIUS, VARIABLE HELIX	METRIC	•	111
ZS204 ...series		CORNER RADIUS, VARIABLE HELIX	METRIC	•	112
ZSLNS20 ...series		LONG NECK	METRIC	•	114
ZSLNS40 ...series		LONG NECK	METRIC	•	119
ZSLNB ...series		LONG NECK	METRIC	•	121
ZSLNR ...series		LONG NECK & BACK DRAFT TYPE	METRIC	•	125
ZSTNB20 ...series		TAPER NECK & BACK DRAFT TYPE	METRIC	•	129
ZSTNB30 ...series		TAPER NECK & BACK DRAFT TYPE	METRIC	•	133
ZSTNR ...series		TAPER NECK & BACK DRAFT TYPE	METRIC	•	134
WB712 ⁺ ...series	NEW! 	FOR RIB PROCESSING	METRIC	•	136
WE712 ⁺ ...series	NEW! 	FOR RIB PROCESSING	METRIC	•	147
ZSPM4 ...series		STUB CUT LENGTH, with EXTENDED NECK	METRIC	•	155
DB702 ...series		STUB CUT LENGTH, BALL NOSE with EXTENDED NECK	METRIC	•	156
DB712 ...series		REGULAR LENGTH, BALL NOSE	METRIC	•	157
DB703 ...series		BALL NOSE for FINISHING MOLD & DIE	METRIC	•	158
DB734 ...series		TAPER NECK for FINISHING MOLD & DIE	METRIC	•	159
ZE702 ...series		STUB CUT LENGTH, with EXTENDED NECK	METRIC	•	160
ZE704 ...series		STUB CUT LENGTH, with EXTENDED NECK	METRIC	•	161
ZE724(6) ...series		FINISHING for MOLD & DIE	METRIC	•	162
ZR702 ...series		STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK	METRIC	•	163
ZR732 ...series		CORNER RADIUS with LONG SHANK	METRIC	•	164
ZR704 ...series		STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK	METRIC	•	170
ZR714 ...series		45° HELIX FINISHING MOLD & DIE	METRIC	•	173
ZR724 ...series		STUB CUT LENGTH, CORNER RADIUS with LONG SHANK	METRIC	•	174
ZR734 ...series		CORNER RADIUS with LONG SHANK	METRIC	•	175
ZR706 ...series		45° HELIX STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK	METRIC	•	177
ZR736 ...series		45° HELIX, LONG SHANK, CORNER RADIUS	METRIC	•	178
ZE712 ...series		35° HELIX REGULAR LENGTH	METRIC	•	179
ZE714 ...series		45° HELIX REGULAR LENGTH	METRIC	•	180
ZE716 ...series		50° HELIX REGULAR LENGTH	METRIC	•	181

CODE SYSTEM

Z	R	7	0	4	020	03	06	S04
Classification	Shape	Grade	Length, Shank type	No. of Flute	Diameter	Corner radius	Neck length	S.H Diameter
Z : Zamus Endmill	A : Inch Size	7 : Grade	0 - Neck	2 : 2 Flute	0.05	0.05	Detail Lenth reference to Catalog	4
D : Dynamic	B : Ball		1 - Straight type, NECK	3 : 3 Flute	20	3		20
ZS : Zamus Star	E : Square		2 - Long neck	4 : 4 Flute				
W : WINNER 7 PLUS	R : Radius		3 - long Shank	6 : 6 Flute				
	LNS : Long Neck Square							
	LNB : Long Neck Ball							
	LNR : Long Neck Radius							
	PM : Power Mill							

Endmills for high hardened steel *Zamus Star Series*



4 FLUTE, LONG CUT LENGTH BROKEN INDEX

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

ZS124 ...series



ULTRA FINE



ULTRA FINE



HELIX



p.661



p.661

EDP. No.	D	L ₁	L ₂	D ₂
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

Endmills for high hardened steel – Zamus Star Series

■ Applicable Working Material

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					
	○	○	◎	◎	○				

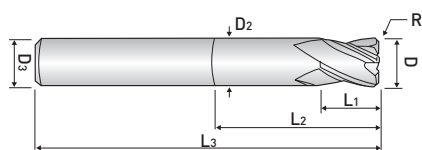
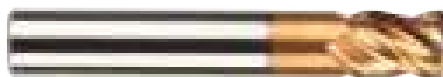
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ Items can be changed for quality improvement without notice.

Endmills for high hardened steel *Zamus Star Series*



4 FLUTE, CORNER RADIUS BROKEN INDEX

- 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 unequal index geometry
- Longer tool life over 50% as reducing chatter and resonance

ZS1(2)04 ...series



EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂	D ₃
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					

Endmills for high hardened steel – Zamus Star Series

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○	○	◎	◎	○				

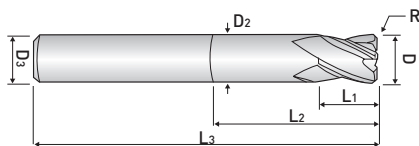
○:General Application ◎:The most suitable Application

■ Tolerance

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

※Items can be changed for quality improvement without notice.

Endmills for high hardened steel *Zamus Star Series*



4 FLUTE, CORNER RADIUS BROKEN INDEX

- 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 unequal index geometry
- Longer tool life over 50% as reducing chatter and resonance

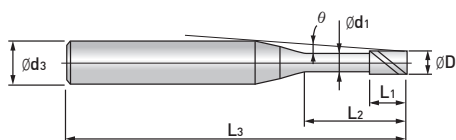
ZS204 series



EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂	D ₃
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					
ZS2040300312				12			
ZS2040300316				16			
ZS2040400212	4	0.2	5	12	55	3.8	6
ZS2040400312		0.3		16			
ZS2040400316				20			
ZS2040400320				12			
ZS2040400512		0.5		16			
ZS2040400516				20			
ZS2040400520				12			
ZS2040401012							
ZS2040500116	5	0.1	6	16	60	4.8	6
ZS2040500216		0.2					
ZS2040500316		0.3					
ZS2040500516		0.5					
ZS2040501016		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					

NEXT >>

Endmills for high hardened steel *Zamus Star 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

ZSLNS20....-.. series

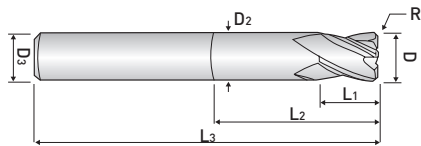


EDP. No.	Dimension(mm)							Effective Neck Length				
	D	L ₂	L ₁	d ₁	L ₃	d ₃	θ	0.5°	1°	1.5°	2°	3°
ZSLNS2001-0.3	0.1	0.3	0.15	0.08	45	4	11.6	0.4	0.4	0.5	0.5	0.5
ZSLNS2001-0.5		0.5					11.4	0.6	0.7	0.7	0.7	0.8
ZSLNS2001-1		1					10.9	1.2	1.2	1.2	1.3	1.4
ZSLNS2002-0.5	0.2	0.5	0.3	0.17	50	4	11.3	1.2	1.3	1.5	1.7	2.0
ZSLNS2002-1		1					10.8	1.7	1.9	2.2	2.4	2.7
ZSLNS2002-1.5		1.5					10.3	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					10.3	2.3	2.5	2.8	3.0	3.4
ZSLNS2003-2		2					9.8	2.8	3.1	3.4	3.6	4.1
ZSLNS2003-2.5		2.5					9.4	3.4	3.7	4.0	4.3	4.7
ZSLNS2003-3		3					9.0	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					10.2	2.3	2.5	2.8	3.0	3.4
ZSLNS2004-2		2					9.7	2.8	3.1	3.4	3.6	4.1
ZSLNS2004-2.5		2.5					9.3	3.4	3.7	4.0	4.3	4.7
ZSLNS2004-3		3					8.9	3.9	4.3	4.6	4.9	5.4
ZSLNS2004-3.5		3.5					8.6	4.5	4.9	5.2	5.5	6.0
ZSLNS2004-4		4					8.2	5.0	5.4	5.8	6.1	6.6
ZSLNS2004-5		5					7.6	6.1	6.6	6.9	7.3	7.8
ZSLNS2004-6		6					7.1	7.2	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					10.2	2.3	2.5	2.8	3.0	3.4
ZSLNS2005-2		2					9.7	2.8	3.1	3.4	3.6	4.1
ZSLNS2005-2.5		2.5					9.3	3.4	3.7	4.0	4.3	4.7
ZSLNS2005-3		3					8.9	3.9	4.3	4.6	4.9	5.4
ZSLNS2005-4		4					8.1	5.0	5.4	5.8	6.1	6.6
ZSLNS2005-5		5					7.5	6.1	6.6	6.9	7.3	7.8
ZSLNS2005-6		6					7.0	7.2	7.7	8.1	8.4	9.0
ZSLNS2005-8		8					6.2	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					8.1	5.0	5.4	5.8	6.1	6.6
ZSLNS2006-6		6					6.9	7.2	7.7	8.1	8.4	9.0
ZSLNS2006-8		8					6.1	9.3	9.9	10.3	10.7	11.4
ZSLNS2006-10		10					5.4	11.5	12.1	12.6	13.0	13.7

NEXT >>>

Endmills for high hardened steel – Zamus Star Series

Endmills for high hardened steel *Zamus Star Series*



4 FLUTE, CORNER RADIUS BROKEN INDEX

- 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 unequal index geometry
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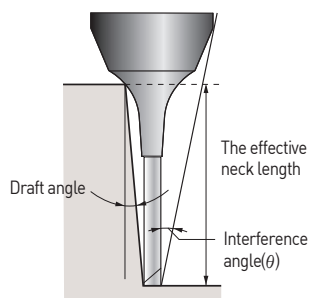
ZS204 series



EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂	D ₃
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				16			
ZS2040300316							
ZS2040400212	4	0.2	5	12	55	3.8	6
ZS2040400312		0.3		16			
ZS2040400316				20			
ZS2040400320				12			
ZS2040400512		0.5		16			
ZS2040400516				20			
ZS2040400520				12			
ZS2040401012							
ZS2040500116	5	0.1	6	16	60	4.8	6
ZS2040500216		0.2					
ZS2040500316		0.3					
ZS2040500516		0.5					
ZS2040501016		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					

NEXT >>>

Endmills for high hardened steel *Zamus Star Series*



2 FLUTE, LONG NECK

- If the workpiece has draft angle, the interference length will be longer than the L₂.
- 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 θ₂" 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

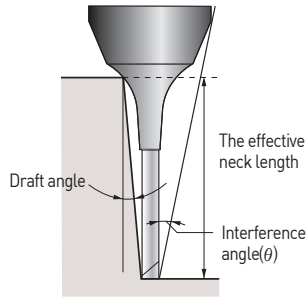
EDP. No.	Dimension(mm)							Effective Neck Length					
	D	L ₂	L ₁	d ₁	L ₃	d ₃	θ	0.5°	1°	1.5°	2°	3°	
ZSLNS2007-2	0.7	2	1.05	0.67	50	4	9.6	2.8	3.1	3.4	3.6	4.1	
ZSLNS2007-4		4					8.0	5.0	5.4	5.8	6.1	6.6	
ZSLNS2007-6		6					6.9	7.2	7.7	8.1	8.4	9.0	
ZSLNS2007-8		8					6.0	9.3	9.9	10.3	10.7	11.4	
ZSLNS2007-10		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			55		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			55		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			55		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			60		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	8.1	8.5	9.1	
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			55		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			55		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	

X No application
— No interference

※ These tools are manufactured based on order received

NEXT >>

Endmills for high hardened steel *Zamus Star Series*



2 FLUTE, LONG NECK

- If the workpiece has draft angle, the interference length will be longer than the L₂
- 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 θ₂" 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

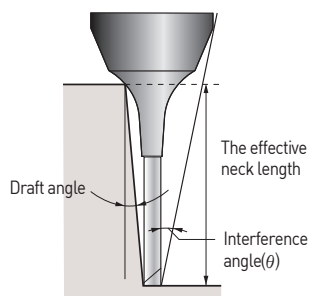
EDP. No.	Dimension(mm)							Effective Neck Length				
	D	L ₂	L ₁	d ₁	L ₃	d ₃	θ	0.5°	1°	1.5°	2°	3°
ZSLNS2015-4	1.5	4	2.25	1.44	50	4	7.2	5.2	5.5	5.9	6.2	6.7
ZSLNS2015-6		6					6.0	7.3	7.8	8.1	8.5	9.1
ZSLNS2015-8		8					5.1	9.4	10.0	10.4	10.8	11.5
ZSLNS2015-10		10					4.5	11.6	12.1	12.6	13.0	13.8
ZSLNS2015-12		12					4.0	13.7	14.3	14.8	15.3	16.1
ZSLNS2015-14		14			55		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			60		2.8	22.0	22.9	23.5	24.1	-
ZSLNS2015-25		25					65	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			55		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			60		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			55		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			60		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			55		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

X No application
- No interference

※ These tools are manufactured based on order received

NEXT >>

Endmills for high hardened steel *Zamus Star Series*



2 FLUTE, LONG NECK

- If the workpiece has draft angle, the interference length will be longer than the L2
- 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 θ_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				
	D	L ₂	L ₁	d ₁	L ₃	d ₃	θ	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			70		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			75		2.0	20.1	20.8	21.4	-	-
ZSLNS2025-20		20			80		1.8	22.1	22.9	23.5	-	-
ZSLNS2025-25		25			85		1.5	27.3	28.2	-	-	-
ZSLNS2025-30		30			90		1.3	32.6	33.5	-	-	-
ZSLNS2030-8	3	8	4.5	2.88	55	6	5.6	9.6	10.1	10.5	10.9	11.5
ZSLNS2030-10		10			60		5.0	11.7	12.3	12.7	13.1	13.8
ZSLNS2030-12		12			65		4.5	13.8	14.4	14.9	15.4	16.3
ZSLNS2030-14		14			70		4.1	15.9	16.6	17.1	17.6	18.9
ZSLNS2030-16		16			75		3.7	18.0	18.7	19.3	19.8	21.6
ZSLNS2030-18		18			80		3.4	20.1	20.8	21.4	21.9	24.2
ZSLNS2030-20		20			85		3.2	22.2	23.0	23.6	24.2	26.9
ZSLNS2030-25		25			90		2.7	27.4	28.2	28.9	30.2	-
ZSLNS2030-30		30			95		2.4	32.6	33.5	34.5	36.2	-
ZSLNS2030-35		35			100		2.1	37.7	38.7	40.2	42.2	-
ZSLNS2030-40		40			105		1.9	42.9	43.9	45.9	-	-

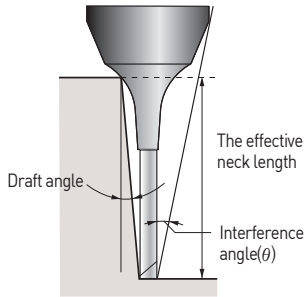
X No application
- No interference

※ These tools are manufactured based on order received

Endmills for high hardened steel – Zamus Star Series

NEXT >>>

Endmills for high hardened steel *Zamus Star Series*



2 FLUTE, LONG NECK

- If the workpiece has draft angle, the interference length will be longer than the L2
- 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 θ_2 ," and should also be referred to



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ZSLNS20....-.. series

EDP. No.	Dimension(mm)							Effective Neck Length					
	D	L ₂	L ₁	d ₁	L ₃	d ₃	θ	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			70		2.0	27.4	28.3	28.9	-	-	
ZSLNS2040-30		30					80	1.7	32.6	33.5	34.6	-	-
ZSLNS2040-35		35						90	1.5	37.8	38.8	-	-
ZSLNS2040-40		40			100				1.3	42.9	44.0	-	-
ZSLNS2040-45		45					6		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			70		1.1	27.4	28.3	-	-	-	-
ZSLNS2050-30		30					80	0.9	32.6	-	-	-	-
ZSLNS2050-35		35			90			0.8	37.8	-	-	-	-
ZSLNS2050-40		40					100	0.7	42.9	-	-	-	-
ZSLNS2050-50		50			0.6			53.2	-	-	-	-	-

X No application
- No interference

※ These tools are manufactured based on order received

■ Applicable Working Material

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					
	○	○	◎	◎	○				

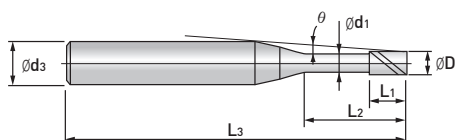
○:General Application ◎:The most suitable Application

■ 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.

Endmills for high hardened steel *Zamus Star Series*



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ZSLNS40....-.. series



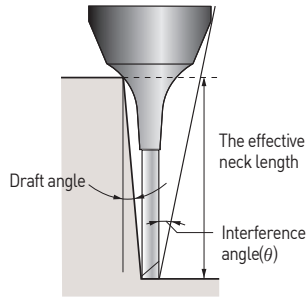
EDP. No.	Dimension(mm)							Effective Neck Length				
	D	L ₂	L ₁	d ₁	L ₃	d ₃	θ	0.5°	1°	1.5°	2°	3°
ZSLNS4010-4	1	4	1.5	0.96	50	4	7.7	5.1	5.5	5.8	6.1	6.6
ZSLNS4010-6		6					6.6	7.2	7.7	8.1	8.4	9.1
ZSLNS4010-8		8					5.7	9.4	9.9	10.4	10.7	11.4
ZSLNS4010-10		10					5.0	11.5	12.1	12.6	13.0	13.7
ZSLNS4015-4	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	-	-	-	

X No application
- No interference

※ These tools are manufactured based on order received

NEXT >>

Endmills for high hardened steel *Zamus Star Series*



4 FLUTE, LONG NECK

- If the workpiece has draft angle, the interference length will be longer than the L2.
- 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 θ_2 ," and should also be referred to



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ZSLNS40....-.. series

EDP. No.	Dimension(mm)							Effective Neck Length				
	D	L ₂	L ₁	d ₁	L ₃	d ₃	θ	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			60		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			70		2.7	27.4	28.2	28.9	30.2	-
ZSLNS4030-30		30			75		2.4	32.6	33.5	34.5	36.2	-
ZSLNS4030-35		35			80		2.1	37.7	38.7	40.2	42.2	-
ZSLNS4030-40		40			90		1.9	42.9	43.9	45.9	-	-
ZSLNS4040-12		4			12		6	3.85	60	6	3.4	13.9
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		100	1.1	53.2	54.8			-		-	-
ZSLNS4050-16	5		16	7.5	4.85	60			6		1.5	18.1
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	-	-		-	-	
ZSLNS4050-50		50	100			0.6	53.2	-		-	-	-

X No application
- No interference

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■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○	○	◎	◎	○				

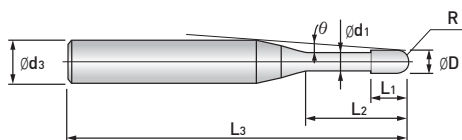
○: General Application ◎: The most suitable Application

■ Tolerance

Diameter	Mill Dia.(mm)	Shank Dia.
0.1 ~ 0.5	0 ~ -0.012	h5
0.6 ~ 4	0 ~ -0.015	

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Endmills for high hardened steel *Zamus Star 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

ZSLNB..... series

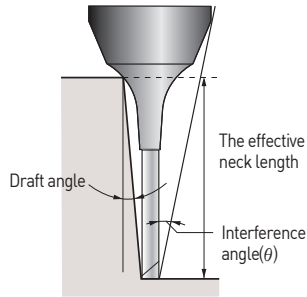


EDP. No.	Dimension(mm)							Effective Neck Length					
	R	D	L ₂	L ₁	d ₁	L ₃	d ₃	θ	0.5°	1°	1.5°	2°	3°
ZSLNB2001-0.2	0.05	0.1	0.2	0.08	0.08	45	4	11.8	0.3	0.3	0.3	0.4	0.4
ZSLNB2001-0.3			0.3					11.7	0.4	0.4	0.5	0.5	0.5
ZSLNB2001-0.5			0.5					11.4	0.6	0.7	0.7	0.7	0.8
ZSLNB2002-0.5	0.1	0.2	0.5	0.15	0.17	50	4	11.5	1.2	1.3	1.5	1.6	2.0
ZSLNB2002-1			1					10.9	1.7	1.9	2.1	2.3	2.7
ZSLNB2002-1.5			1.5					10.4	2.3	2.5	2.8	3.0	3.4
ZSLNB2002-2			2					9.9	2.8	3.1	3.4	3.6	4.1
ZSLNB2002-2.5			2.5					9.5	3.4	3.7	4.0	4.2	4.7
ZSLNB2002-3.0			3					9.1	3.9	4.3	4.6	4.9	5.4
ZSLNB2003-1	0.15	0.3	1	0.25	0.27	50	4	10.9	1.7	1.9	2.1	2.3	2.7
ZSLNB2003-1.5			1.5					10.4	2.3	2.5	2.7	3.0	3.4
ZSLNB2003-2			2					9.9	2.8	3.1	3.4	3.6	4.0
ZSLNB2003-2.5			2.5					9.5	3.4	3.7	4.0	4.2	4.7
ZSLNB2003-3			3					9.1	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					10.4	2.3	2.5	2.7	2.9	3.4
ZSLNB2004-2			2					9.9	2.8	3.1	3.4	3.6	4.0
ZSLNB2004-2.5			2.5					9.5	3.4	3.7	4.0	4.2	4.7
ZSLNB2004-3			3					9.1	3.9	4.3	4.6	4.8	5.3
ZSLNB2004-3.5			3.5					8.7	4.5	4.8	5.2	5.4	6.0
ZSLNB2004-4			4					8.3	5.0	5.4	5.7	6.0	6.6
ZSLNB2004-4.5			4.5					8.0	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					9.9	2.8	3.1	3.3	3.6	4.0
ZSLNB2005-3			3					9.0	3.9	4.3	4.6	4.8	5.3
ZSLNB2005-4			4					8.3	5.0	5.4	5.7	6.0	6.6
ZSLNB2005-5			5					7.7	6.1	6.5	6.9	7.2	7.8
ZSLNB2005-6			6					7.1	7.2	7.6	8.0	8.4	9.0
ZSLNB2005-8			8					6.3	9.3	9.9	10.3	10.7	11.4

NEXT >>>

Endmills for high hardened steel – Zamus Star Series

Endmills for high hardened steel *Zamus Star Series*



2 FLUTE, LONG NECK

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ULTRA FINE



HELIX



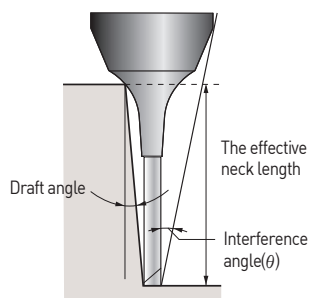
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ZSLNB..... series

EDP. No.	Dimension(mm)								Effective Neck Length				
	R	D	L ₂	L ₁	d ₁	L ₃	d ₃	θ	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
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			55		4.5	13.6	14.2	14.7	15.2	15.9

NEXT >>>

Endmills for high hardened steel *Zamus Star Series*



2 FLUTE, LONG NECK

- If the workpiece has draft angle, the interference length will be longer than the L2
- 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 θ_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



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ZSLNB..... series

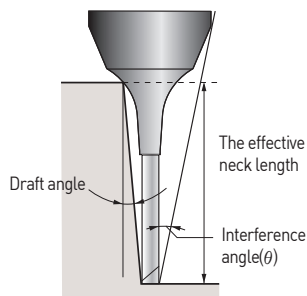
EDP. No.	Dimension(mm)								Effective Neck Length					
	R	D	L ₂	L ₁	d ₁	L ₃	d ₃	θ	0.5°	1°	1.5°	2°	3°	
ZSLNB2014-8	0.7	1.4	8	1.3	1.34	50	4	5.5	9.4	9.9	10.3	10.7	11.3	
ZSLNB2014-12			12			55		4.3	13.6	14.2	14.7	15.2	15.9	
ZSLNB2014-16			16					3.5	17.8	18.5	19.1	19.6	21.2	
ZSLNB2015-4	0.75	1.5	4	1.35	1.44	50	4	7.7	5.1	5.4	5.7	6.0	6.5	
ZSLNB2015-6			6					6.4	7.3	7.7	8.0	8.4	9.0	
ZSLNB2015-8			8					5.4	9.4	9.9	10.3	10.7	11.3	
ZSLNB2015-10			10					4.7	11.5	12.1	12.5	12.9	13.7	
ZSLNB2015-12			12			55		4.2	13.6	14.2	14.7	15.2	15.9	
ZSLNB2015-14			14					3.8	15.7	16.4	16.9	17.4	18.5	
ZSLNB2015-16			16					3.4	17.8	18.5	19.1	19.6	21.1	
ZSLNB2015-20			20					2.9	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			55		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					60	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			55		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					60	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					3	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	55		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	60		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	65		2.3		24.1	24.9	25.6	26.3	-		
ZSLNB2020-25			25			2.0		27.3	28.1	28.8	-	-		
ZSLNB2020-30			30	70		1.7		32.4	33.4	34.2	-	-		

X No application
- No interference

NEXT >>>

Endmills for high hardened steel – Zamus Star Series

Endmills for high hardened steel *Zamus Star Series*



2 FLUTE, LONG NECK

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- 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 θ_2 " and should also be referred to



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ZSLNB..... series

EDP. No.	Dimension(mm)								Effective Neck Length				
	R	D	L ₂	L ₁	d ₁	L ₃	d ₃	θ	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			60		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			65		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			70		2.8	27.3	28.2	28.8	29.9	-
ZSLNB2030-30			30			75		2.5	32.5	33.4	34.3	35.9	-
ZSLNB2030-35			35			80		2.2	37.7	38.7	40.0	41.9	-
ZSLNB2040-10	2	4	10	5	3.9	55	6	4.5	11.6	12.1	12.5	12.9	13.5
ZSLNB2040-13			13			60		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			65		2.5	22.1	22.8	23.4	23.9	-
ZSLNB2040-25			25			70		2.1	27.3	28.1	28.8	29.8	-
ZSLNB2040-30			30			75		1.8	32.4	33.4	34.2	-	-
ZSLNB2040-35			35			80		1.6	37.6	38.6	39.9	-	-
ZSLNB2040-40			40					1.4	42.8	43.8	-	-	-
ZSLNB2040-45			45			90		1.2	47.9	49.1	-	-	-
ZSLNB2040-50			50			100		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

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○	○	◎	◎	○				

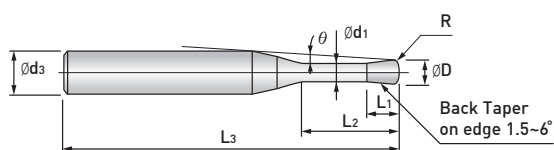
○:General Application ◎:The most suitable Application

■ Tolerance

Radius (mm)	Shank Dia.
±0.005	h5

※Items can be changed for quality improvement without notice.

Endmills for high hardened steel *Zamus Star Series*



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ZSLNR..... series



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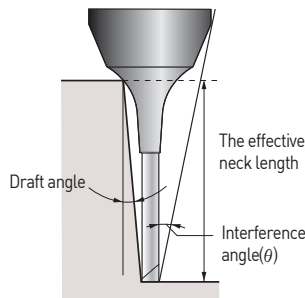
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EDP. No.	Dimension(mm)								Effective Neck Length				
	D	R	L ₂	L ₁	d ₁	L ₃	d ₃	θ	0.5°	1°	1.5°	2°	3°
ZSLNR2002-0.5-005	0.2	0.05	0.5	0.15	0.17	50	4	11.4	0.9	1.0	1.0	1.1	1.2
ZSLNR2002-1-005			1					10.9	1.6	1.7	1.9	2.0	2.3
ZSLNR2002-1.5-005			1.5					10.3	2.1	2.3	2.5	2.7	3.0
ZSLNR2002-2-005			2					9.9	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					10.3	2.1	2.3	2.5	2.7	3.0
ZSLNR2003-2-005			2					9.8	2.7	2.9	3.1	3.3	3.6
ZSLNR2003-2.5-005			2.5					9.4	3.2	3.5	3.7	3.9	4.3
ZSLNR2003-3-005			3					9.0	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					10.3	2.0	2.1	2.2	2.3	2.5
ZSLNR2004-2-005			2					9.8	2.7	2.9	3.1	3.3	3.6
ZSLNR2004-2.5-005			2.5					9.4	3.2	3.5	3.7	3.9	4.3
ZSLNR2004-3-005			3					9.0	3.8	4.0	4.3	4.5	4.9
ZSLNR2004-3.5-005			3.5					8.6	4.3	4.6	4.9	5.1	5.5
ZSLNR2004-4-005			4					8.3	5.0	5.4	5.8	6.1	6.6
ZSLNR2004-2-01		0.1	2					9.8	2.7	2.9	3.1	3.3	3.6
ZSLNR2004-3-01			3					9.0	3.8	4.0	4.3	4.5	4.9
ZSLNR2004-4-01			4					8.3	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					9.7	2.5	2.6	2.8	2.9	3.1
ZSLNR2005-3-005			3					8.9	3.8	4.0	4.3	4.5	4.9
ZSLNR2005-4-005			4					8.2	4.8	5.2	5.4	5.7	6.1
ZSLNR2005-5-005			5					7.6	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					10.8	1.4	1.5	1.6	1.7	1.9
ZSLNR2005-2-01			2					9.8	2.5	2.6	2.8	2.9	3.1
ZSLNR2005-3-01			3					8.9	3.8	4.0	4.3	4.5	4.9

NEXT >>

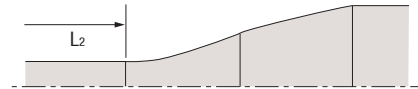
Endmills for high hardened steel – Zamus Star Series

Endmills for high hardened steel *Zamus Star Series*



2 FLUTE, LONG NECK

- If the workpiece has draft angle, the interference length will be longer than the L2.
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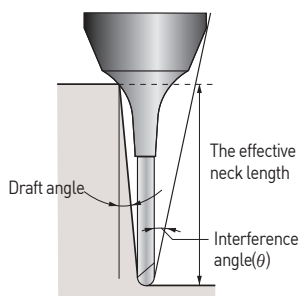
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ZSLNR..... series

EDP. No.	Dimension(mm)								Effective Neck Length					
	D	R	L ₂	L ₁	d ₁	L ₃	d ₃	θ	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			55		4.5	13.7	14.3	14.8	15.3	16.0	
ZSLNR2010-16-01			16			60		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					55	4.6	13.7	14.3	14.8	15.2	16.0
ZSLNR2010-16-02			16					60	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	

NEXT >>

Endmills for high hardened steel *Zamus Star Series*



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ZSLNR..... series

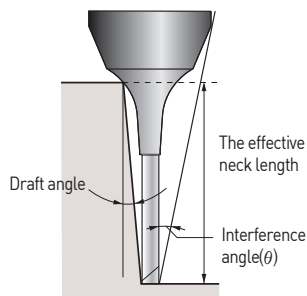
EDP. No.	Dimension(mm)								Effective Neck Length								
	D	R	L ₂	L ₁	d ₁	L ₃	d ₃	θ	0.5°	1°	1.5°	2°	3°				
ZSLNR2010-6-03	1	0.3	6	0.8	0.94	50	4	6.7	7.1	7.4	7.7	8.0	8.4				
ZSLNR2010-10-03			10					5.1	11.5	12.1	12.6	13.0	13.7				
ZSLNR2010-16-03			16			60		3.8	17.9	18.6	19.1	19.6	21.3				
ZSLNR2010-20-03			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			55		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			60		2.8	22.1	22.9	23.5	24.1	-				
ZSLNR2015-4-02		0.2	4			50		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			55		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			60		2.8	22.1	22.9	23.5	24.1	-				
ZSLNR2015-8-03		0.3	8			50		5.2	9.2	9.6	10.0	10.3	10.8				
ZSLNR2015-15-03			15			55		3.5	16.9	17.5	18.1	18.6	20.0				
ZSLNR2015-20-03			20			60		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	7.5	8.1
ZSLNR2020-8-02						8						4.6	8.9	9.2	9.4	9.7	10.8
ZSLNR2020-12-02						12				55		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			60	2.4	22.1	22.9			23.5		24.1	-				
ZSLNR2020-25-02	25			65	2.0	27.3	28.2			28.8		-	-				
ZSLNR2020-30-02	30			70	1.7	32.5	33.4			34.4		-	-				
ZSLNR2020-8-03	0.3		8	50	4.6	8.9	9.2			9.4		9.7	10.7				
ZSLNR2020-16-03			16	55	2.8	17.6	18.1			18.6		19.3	-				
ZSLNR2020-20-03			20	60	2.4	22.1	22.9			23.5		24.0	-				
ZSLNR2020-6-05	0.5		6	50	5.5	6.8	7.1			7.3		7.4	8.0				
ZSLNR2020-8-05			8		4.7	8.9	9.2			9.4		9.6	10.7				

— No interference

NEXT >>

Endmills for high hardened steel – Zamus Star Series

Endmills for high hardened steel *Zamus Star Series*



2 FLUTE, LONG NECK

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ZSLNR..... series

Endmills for high hardened steel – Zamus Star Series

EDP. No.	Dimension(mm)								Effective Neck Length				
	D	R	L ₂	L ₁	d ₁	L ₃	d ₃	θ	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			60		2.9	17.6	18.1	18.6	19.2	-
ZSLNR2020-20-05			20			65		2.4	22.1	22.9	23.5	24.0	-
ZSLNR2020-25-05			25			70		2.0	27.3	28.1	28.8	-	-
ZSLNR2020-30-05		0.8	30			50		1.7	32.5	33.4	34.3	-	-
ZSLNR2020-8-08			8			55		4.8	8.9	9.2	9.4	9.6	10.6
ZSLNR2020-16-08			16			60		2.9	17.6	18.1	18.6	19.2	-
ZSLNR2020-20-08			20			65		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			85		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		0.5	30			75		2.4	32.6	33.5	34.5	36.2	-
ZSLNR2030-8-05			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			85		2.1	37.7	38.7	40.2	42.1	-

— No interference

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○	○	◎	◎	○				

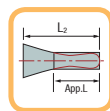
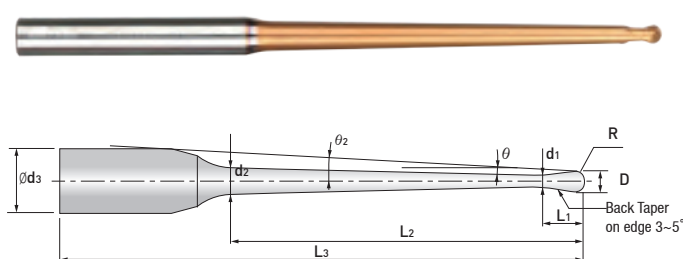
○:General Application ◎:The most suitable Application

■ Tolerance

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

※Items can be changed for quality improvement without notice.

Endmills for high hardened steel *Zamus Star 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

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

ZSTNB20... series



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EDP. No.	Dimension(mm)										Effective Neck Length					
	R	D	L ₂	θ	L ₁	d ₁	d ₂	L ₃	d ₃	App.L	θ ₂	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	0.9			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	0.4			0.77	55		2.54	4.4	15.9	17.0	17.6	18.2	19.2
ZSTNB2006-15-09			15	0.9			1.03			1.35	4.5	x	16.1	17.1	17.7	18.8

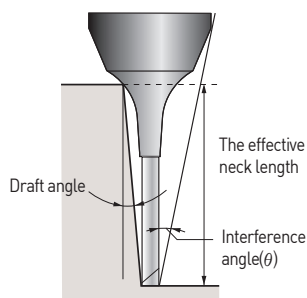
X No application
- No interference

NEXT >>>

※ These tools are manufactured based on order received.

Endmills for high hardened steel – Zamus Star Series

Endmills for high hardened steel *Zamus Star Series*



2 FLUTE, TAPER NECK BACK DRAFT TYPE

- If the workpiece has draft angle, the interference length will be longer than the L2.
- 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 θ_2 " and should also be referred to



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ZSTNB20... series



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Endmills for high hardened steel – Zamus Star Series

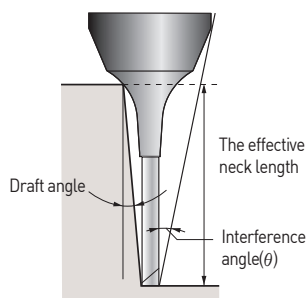
EDP. No.	Dimension(mm)										Effective Neck Length					
	R	D	L ₂	θ	L ₁	d ₁	d ₂	L ₃	d ₃	App. L	θ ₂	0.5°	1°	1.5°	2°	3°
ZSTNB2008-4-04	0.4	0.8	4	0.4	0.5	0.77	0.82	50	4	2.64	8.3	4.6	4.9	5.2	5.5	5.9
ZSTNB2008-6-04			6				0.85			2.64	7.1	6.6	7.1	7.5	7.7	8.3
ZSTNB2008-8-09			8	0.9			1.01	55		1.45	6.3	x	8.9	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	50	4	3.46	8.2	4.5	4.7	4.9	5.1	5.4
ZSTNB2009-8-04			8				0.96	55		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	60		3.46	4.0	17.0	18.0	18.7	19.3	20.5
ZSTNB2009-18-04			18				1.10	65		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	70		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	50	6	5.09	8.3	6.8	7.2	7.5	7.8	8.3
ZSTNB2010-8-04			8				1.04	55		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	0.9			1.23	2.70		6.9	x	11.2	11.9	12.4	13.2	
ZSTNB2010-15-09			15				1.39	60		2.70	5.7	x	16.2	17.1	17.8	18.8
ZSTNB2010-20-04			20	0.4			1.21	65		5.09	4.7	21.2	22.3	23.0	23.6	25.7
ZSTNB2010-20-09			20	0.9			1.54			2.70	4.8	x	21.3	22.4	23.1	24.6
ZSTNB2010-25-09			25				1.70	70		2.70	4.2	x	26.4	27.6	28.4	30.8
ZSTNB2010-30-04			30	0.4			1.35	75		5.09	3.6	31.3	32.7	33.6	34.8	38.5
ZSTNB2010-30-09			30	0.9			1.86			2.70	3.7	x	31.4	32.8	33.7	36.9
ZSTNB2010-35-09			35				2.02	80		2.70	3.3	x	36.5	38.0	39.0	43.1
ZSTNB2010-40-09			40				2.17	85		2.70	3.0	x	41.6	43.2	44.4	-
ZSTNB2010-50-09			50				2.49	95		2.70	2.5	x	51.7	53.5	55.5	-
ZSTNB2010-60-09			60				2.80	105		2.70	2.2	x	61.8	63.8	66.6	-
ZSTNB2010-70-09			70				3.11	115		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
ZSTNB2015-10-04			10	1.54				7.07			6.6	10.9	11.5	11.9	12.2	12.9

X No application
- No interference

NEXT >>

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Endmills for high hardened steel *Zamus Star Series*



2 FLUTE, TAPER NECK BACK DRAFT TYPE

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ZSTNB20... series



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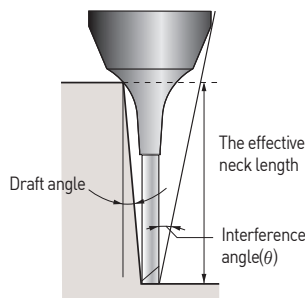
EDP. No.	Dimension(mm)										Effective Neck Length					
	R	D	L ₂	θ	L ₁	d ₁	d ₂	L ₃	d ₃	App.L	θ ₂	0.5°	1°	1.5°	2°	3°
ZSTNB2015-12-04	0.75	1.5	12	0.4	1.35	1.42	1.57	55	6	7.07	6.0	13.0	13.6	14.0	14.4	15.4
ZSTNB2015-15-09			15	0.9			1.85	60		3.89	5.4	x	16.4	17.2	17.8	18.8
ZSTNB2015-20-09			20				2.01	65		3.89	4.5	x	21.4	22.4	23.2	24.7
ZSTNB2015-30-09			30				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			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	8.7	9.0	9.2	9.5	10.2
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	0.9			2.50			4.24	4.2	x	21.4	22.4	23.2	24.6
ZSTNB2020-25-09			25				2.65			4.24	3.6	x	26.5	27.7	28.5	30.8
ZSTNB2020-30-04			30	0.4			70	7.42		3.1	31.4	32.7	33.6	34.8	38.5	
ZSTNB2020-30-09			30	0.9				2.81		4.24	3.2	x	31.6	32.9	33.7	36.9
ZSTNB2020-35-09			35				2.97	75		4.24	2.8	x	36.6	38.0	39.0	-
ZSTNB2020-40-04			40	0.4			80	7.42		2.5	41.5	43.1	44.2	46.3	-	
ZSTNB2020-40-09			40	0.9				3.12		4.24	2.6	x	41.7	43.2	44.5	-
ZSTNB2020-50-09			50				3.44	90		4.24	2.1	x	51.8	53.5	55.5	-
ZSTNB2020-60-09			60				3.75	100		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

NEXT >>>

X No application
- No interference

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Endmills for high hardened steel *Zamus Star Series*



2 FLUTE, TAPER NECK BACK DRAFT TYPE

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ZSTNB20... series

Endmills for high hardened steel – Zamus Star Series

EDP. No.	Dimension(mm)										Effective Neck Length					
	R	D	L ₂	θ	L ₁	d ₁	d ₂	L ₃	d ₃	App. L	θ 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	0.9			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	0.9			4.04	80		6.95	2.0	x	41.9	43.3	-	-
ZSTNB2030-50-09			50				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	34.16
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	-	-	-	-

X No application
- No interference

※ These tools are manufactured based on order received.

■ Applicable Working Material

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					
	○	○	◎	◎	○				

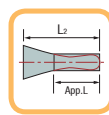
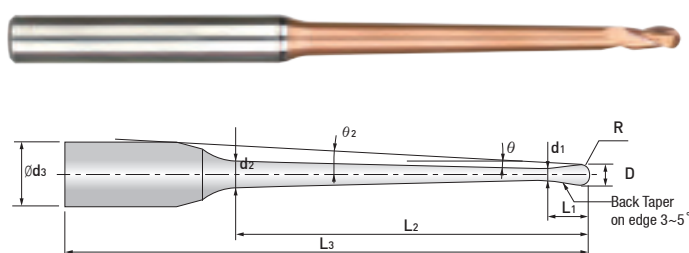
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ Items can be changed for quality improvement without notice.

Endmills for high hardened steel *Zamus Star 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

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

ZSTNB30... series



p.652~655

EDP. No.	Dimension(mm)										Effective Neck Length					
	R	D	L ₂	θ	L ₁	d ₁	d ₂	L ₃	d ₃	App.L	θ ₂	0.5°	1°	1.5°	2°	3°
ZSTNB3020-8-04	1	2	8	0.4	1.7	1.92	2.01	50	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			4.24			4.2	x	21.4	22.4	23.2	24.6	
ZSTNB3020-25-09			25	2.65			70	4.24		3.6	x	26.5	27.7	28.5	30.8	
ZSTNB3020-30-04			30	0.4				2.32		7.42	3.1	31.4	32.7	33.6	34.8	38.5
ZSTNB3020-30-09			30	0.9				2.81		4.24	3.2	x	31.6	32.9	33.7	36.9
ZSTNB3020-35-09			35				2.97	75		4.24	2.8	x	36.6	38.0	39.0	-
ZSTNB3020-40-04			40	0.4			2.46	80		7.42	2.5	41.5	43.1	44.2	46.3	-
ZSTNB3020-40-09			40	0.9			3.12	80		4.24	2.6	x	41.7	43.2	44.5	-
ZSTNB3020-50-09			50				3.44	90		4.24	2.1	x	51.8	53.5	55.5	-
ZSTNB3020-60-09			60				3.75	100		4.24	1.8	x	61.9	63.8	-	-
ZSTNB3020-70-09			70				4.07	110		4.24	1.6	x	72.0	74.1	-	-
ZSTNB3030-8-04	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
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	0.9			3.72			6.95	2.6	x	31.8	33.0	33.8	-
ZSTNB3030-40-04			40	0.4			3.38	80		12.52	2.0	41.7	43.2	44.3	-	-
ZSTNB3030-40-09			40	0.9			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	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	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	-	-	-

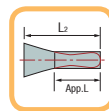
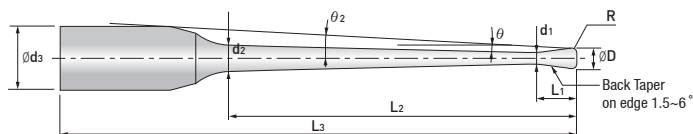
X No application
- No interference

NEXT >>

※ These tools are manufactured based on order received.

Endmills for high hardened steel – Zamus Star Series

Endmills for high hardened steel *Zamus Star 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

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

ZSTNR..... series



ULTRA FINE



HELIX

p.656~657

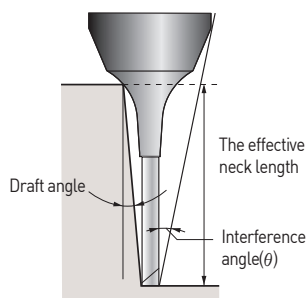
EDP. No.	Dimension(mm)										Effective Neck Length					
	D	R	L ₂	θ	L ₁	d ₁	d ₂	L ₃	d ₃	App.L	θ ₂	0.5°	1°	1.5°	2°	3°
ZSTNR2002-2-09005	0.2	0.05	2	0.9	0.15	0.17	0.23	50	4	1.10	10.0	x	2.8	3.1	3.4	3.9
ZSTNR2004-4-09005	0.4	0.05	4	0.9	0.3	0.37	0.49	50	4	1.25	8.4	x	4.9	5.3	5.7	6.3
ZSTNR2004-5-09005			5	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			55	1.30	5.8	x	11.0	11.8	12.4
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			1.04	55		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	11.9	12.3	13.0
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

X No application
- No interference

NEXT >>>

※ These tools are manufactured based on order received.

Endmills for high hardened steel *Zamus Star Series*



2 FLUTE, TAPER NECK BACK DRAFT TYPE

- If the workpiece has draft angle, the interference length will be longer than the L2.
- 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 θ_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



ULTRA FINE



HELIX



p.656~657

EDP. No.	Dimension(mm)										Effective Neck Length					
	D	R	L ₂	θ	L ₁	d ₁	d ₂	L ₃	d ₃	App. L	θ 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				0.9	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	0.4			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	0.9			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			40				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	-	-	-

X No application
- No interference

※ These tools are manufactured based on order received.

■ Applicable Working Material

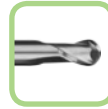
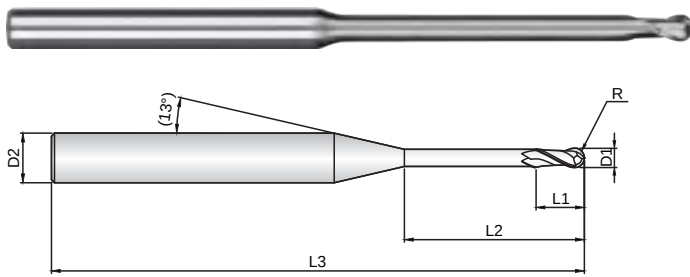
Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○	○	◎	◎	○				

○:General Application ◎:The most suitable Application

■ Tolerance

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

※Items can be changed for quality improvement without notice.

NEW!**Endmills for high hardened steel** *Zamus Star Series***2 Flute, Long Neck Ball Endmill**

- Most optimal performance when machining high hardened workpieces below HRc 60
- Various shape cutting machining with wide selection of neck length
- Precision machining by applying precision tolerance

WB712+... series

EDP. No.	Dimension(mm)					
	D1	R	L1	L2	L3	D2
WB712001002P	0.1	0.05	0.1	0.2	40	4
WB712001003P	0.1	0.05	0.1	0.3	40	4
WB712001005P	0.1	0.05	0.1	0.5	40	4
WB71200101P	0.1	0.05	0.1	1	40	4
WB712002005P	0.2	0.1	0.2	0.5	40	4
WB71200201P	0.2	0.1	0.2	1	40	4
WB712002015P	0.2	0.1	0.2	1.5	40	4
WB71200202P	0.2	0.1	0.2	2	40	4
WB71200203P	0.2	0.1	0.2	3	40	4
WB71200301P	0.3	0.15	0.3	1	40	4
WB712003015P	0.3	0.15	0.3	1.5	40	4
WB71200302P	0.3	0.15	0.3	2	40	4
WB712003025P	0.3	0.15	0.3	2.5	40	4
WB71200303P	0.3	0.15	0.3	3	40	4
WB71200304P	0.3	0.15	0.3	4	40	4
WB71200305P	0.3	0.15	0.3	5	40	4
WB71200401P	0.4	0.2	0.4	1	40	4
WB712004015P	0.4	0.2	0.4	1.5	40	4
WB71200402P	0.4	0.2	0.4	2	40	4
WB712004025P	0.4	0.2	0.4	2.5	40	4
WB71200403P	0.4	0.2	0.4	3	40	4
WB71200404P	0.4	0.2	0.4	4	40	4
WB71200405P	0.4	0.2	0.4	5	40	4
WB71200406P	0.4	0.2	0.4	6	40	4
WB71200408P	0.4	0.2	0.4	8	40	4
WB71200410P	0.4	0.2	0.4	10	40	4
WB71200501P	0.5	0.25	0.5	1	45	4
WB712005015P	0.5	0.25	0.5	1.5	45	4
WB71200501S6P	0.5	0.25	0.5	1	45	6

NEXT >>>

■ Applicable Working Material

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					
○	○	◎	◎	◎					○

○:General Application ◎:The most suitable Application

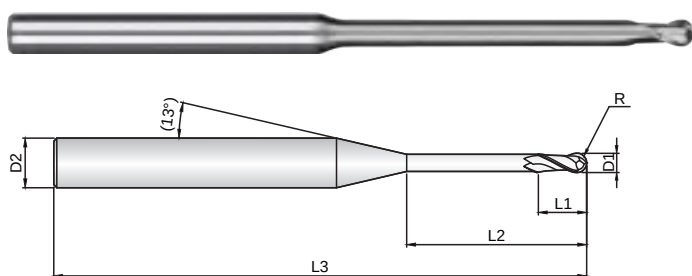
■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.015	h5
over 6	0 ~ -0.02	

※Items can be changed for quality improvement without notice.

NEW!

Endmills for high hardened steel *Zamus Star Series*



2 Flute, Long Neck Ball Endmill

- Most optimal performance when machining high hardened workpieces below HRC 60
- Various shape cutting machining with wide selection of neck length
- Precision machining by applying precision tolerance

WB712+... series



EDP. No.	Dimension(mm)					
	D1	R	L1	L2	L3	D2
WB71200502P	0.5	0.25	0.5	2	45	4
WB712005025P	0.5	0.25	0.5	2.5	45	4
WB71200502S6P	0.5	0.25	0.5	2	45	6
WB71200503P	0.5	0.25	0.5	3	45	4
WB71200504P	0.5	0.25	0.5	4	45	4
WB71200504S6P	0.5	0.25	0.5	4	45	6
WB71200505P	0.5	0.25	0.5	5	45	4
WB71200506P	0.5	0.25	0.5	6	45	4
WB71200508P	0.5	0.25	0.5	8	45	4
WB71200510P	0.5	0.25	0.5	10	45	4
WB71200712P	0.5	0.25	0.5	12	45	4
WB71200514P	0.5	0.25	0.5	14	45	4
WB71200516P	0.5	0.25	0.5	16	45	4
WB71200601P	0.6	0.3	0.6	1	45	4
WB71200601S6P	0.6	0.3	0.6	1	45	6
WB71200602P	0.6	0.3	0.6	2	45	4
WB71200602S6P	0.6	0.3	0.6	2	45	6
WB71200603P	0.6	0.3	0.6	3	45	4
WB71200603S6P	0.6	0.3	0.6	3	45	6
WB71200604P	0.6	0.3	0.6	4	45	4
WB71200604S6P	0.6	0.3	0.6	4	45	6
WB71200605P	0.6	0.3	0.6	5	45	4
WB71200605S6P	0.6	0.3	0.6	5	45	6
WB71200606P	0.6	0.3	0.6	6	45	4
WB71200606S6P	0.6	0.3	0.6	6	45	6
WB71200608P	0.6	0.3	0.6	8	45	4
WB71200608S6P	0.6	0.3	0.6	8	45	6
WB71200610P	0.6	0.3	0.6	10	45	4
WB71200610S6P	0.6	0.3	0.6	10	45	6

NEXT >>>

■ Applicable Working Material

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					
○	○	◎	◎	◎					○

○:General Application ◎:The most suitable Application

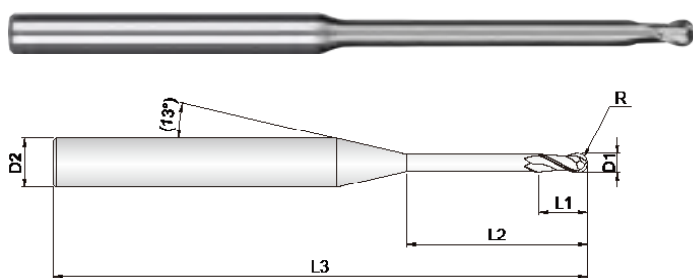
■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.015	h5
over 6	0 ~ -0.02	

※Items can be changed for quality improvement without notice.

NEW!

Endmills for high hardened steel *Zamus Star Series*



2 Flute, Long Neck Ball Endmill

- Most optimal performance when machining high hardened workpieces below HRc 60
- Various shape cutting machining with wide selection of neck length
- Precision machining by applying precision tolerance

WB712+... series



ULTRA FINE

HELIX

EDP. No.	Dimension(mm)					
	D1	R	L1	L2	L3	D2
WB71200612P	0.6	0.3	0.6	12	45	4
WB71200612S6P	0.6	0.3	0.6	12	45	6
WB71200614P	0.6	0.3	0.6	14	45	4
WB71200614S6P	0.6	0.3	0.6	14	45	6
WB71200616P	0.6	0.3	0.6	16	45	4
WB71200616S6P	0.6	0.3	0.6	16	45	6
WB71200702P	0.7	0.35	0.7	2	45	4
WB71200704P	0.7	0.35	0.7	4	45	4
WB71200706P	0.7	0.35	0.7	6	45	4
WB71200708P	0.7	0.35	0.7	8	45	4
WB71200710P	0.7	0.35	0.7	10	45	4
WB71200712P	0.7	0.35	0.7	12	45	4
WB71200801P	0.8	0.4	0.8	1	45	4
WB71200801S6P	0.8	0.4	0.8	1	45	6
WB71200802P	0.8	0.4	0.8	2	45	4
WB71200802S6P	0.8	0.4	0.8	2	45	6
WB71200803P	0.8	0.4	0.8	3	45	4
WB71200803S6P	0.8	0.4	0.8	3	45	6
WB71200804P	0.8	0.4	0.8	4	45	4
WB71200804S6P	0.8	0.4	0.8	4	45	6
WB71200805P	0.8	0.4	0.8	5	45	4
WB71200805S6P	0.8	0.4	0.8	5	45	6
WB71200806P	0.8	0.4	0.8	6	45	4
WB71200806S6P	0.8	0.4	0.8	6	45	6
WB71200808P	0.8	0.4	0.8	8	45	4
WB71200808S6P	0.8	0.4	0.8	8	45	6
WB71200810P	0.8	0.4	0.8	10	45	4
WB71200810S6P	0.8	0.4	0.8	10	45	6
WB71200812P	0.8	0.4	0.8	12	45	4

NEXT >>>

■ Applicable Working Material

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					
○	○	◎	◎	◎					○

○:General Application ◎:The most suitable Application

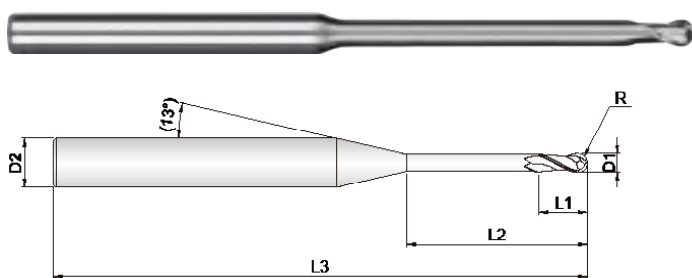
■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.015	h5
over 6	0 ~ -0.02	

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NEW!

Endmills for high hardened steel *Zamus Star Series*



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WB712+... series



EDP. No.	Dimension(mm)					
	D ₁	R	L ₁	L ₂	L ₃	D ₂
WB71200812S6P	0.8	0.4	0.8	12	45	6
WB71200814P	0.8	0.4	0.8	14	45	4
WB71200814S6P	0.8	0.4	0.8	14	45	6
WB71200816P	0.8	0.4	0.8	16	45	4
WB71200816S6P	0.8	0.4	0.8	16	45	6
WB71200820P	0.8	0.4	0.8	20	45	4
WB71200820S6P	0.8	0.4	0.8	20	55	6
WB71200904P	0.9	0.45	0.9	4	45	4
WB71200906P	0.9	0.45	0.9	6	45	4
WB71200908P	0.9	0.45	0.9	8	45	4
WB71200910P	0.9	0.45	0.9	10	45	4
WB71201002P	1	0.5	1	2	50	4
WB71201002S6P	1	0.5	1	2	50	6
WB71201003P	1	0.5	1	3	50	4
WB71201003S6P	1	0.5	1	3	50	6
WB71201004P	1	0.5	1	4	50	4
WB71201004S6P	1	0.5	1	4	50	6
WB71201005P	1	0.5	1	5	50	4
WB71201005S6P	1	0.5	1	5	50	6
WB71201006P	1	0.5	1	6	50	4
WB71201006S6P	1	0.5	1	6	50	6
WB71201007P	1	0.5	1	7	50	4
WB71201007S6P	1	0.5	1	7	50	6
WB71201008P	1	0.5	1	8	50	4
WB71201008S6P	1	0.5	1	8	50	6
WB71201009P	1	0.5	1	9	50	4
WB71201009S6P	1	0.5	1	9	50	6
WB71201010P	1	0.5	1	10	50	4
WB71201010S6P	1	0.5	1	10	50	6

NEXT >>>

■ Applicable Working Material

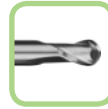
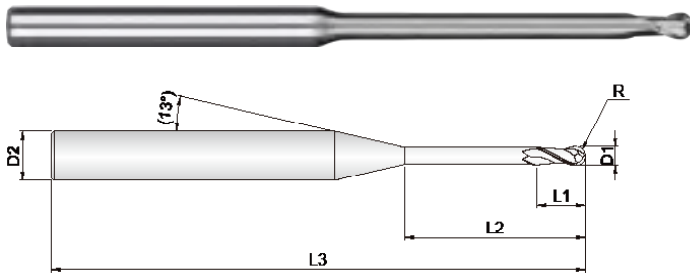
Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	◎	◎					○

○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.015	h5
over 6	0 ~ -0.02	

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NEW!**Endmills for high hardened steel** *Zamus Star Series***2 Flute, Long Neck Ball Endmill**

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WB712+... series

EDP. No.	Dimension(mm)					
	D ₁	R	L ₁	L ₂	L ₃	D ₂
WB71201012P	1	0.5	1	12	50	4
WB71201012S6P	1	0.5	1	12	50	6
WB71201014P	1	0.5	1	14	50	4
WB71201014S6P	1	0.5	1	14	50	6
WB71201016P	1	0.5	1	16	50	4
WB71201016S6P	1	0.5	1	16	50	6
WB71201018P	1	0.5	1	18	50	4
WB71201018S6P	1	0.5	1	18	50	6
WB71201020P	1	0.5	1	20	55	4
WB71201020S6P	1	0.5	1	20	55	6
WB71201022P	1	0.5	1	22	60	4
WB71201022S6P	1	0.5	1	22	60	6
WB71201026P	1	0.5	1	26	60	4
WB71201026S6P	1	0.5	1	26	60	6
WB71201030P	1	0.5	1	30	70	4
WB71201030S6P	1	0.5	1	30	70	6
WB71201040P	1	0.5	1	40	80	4
WB71201050P	1	0.5	1	50	100	4
WB71201204P	1.2	0.6	1.2	4	50	4
WB71201206P	1.2	0.6	1.2	6	50	4
WB71201208P	1.2	0.6	1.2	8	50	4
WB71201210P	1.2	0.6	1.2	10	50	4
WB71201212P	1.2	0.6	1.2	12	50	4
WB71201216P	1.2	0.6	1.2	16	50	4
WB71201220P	1.2	0.6	1.2	20	50	4
WB71201226P	1.2	0.6	1.2	26	60	4
WB71201406P	1.4	0.7	1.4	6	50	4
WB71201408P	1.4	0.7	1.4	8	50	4
WB71201410P	1.4	0.7	1.4	10	50	4

NEXT >>

■ Applicable Working Material

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					
○	○	◎	◎	◎					○

○:General Application ◎:The most suitable Application

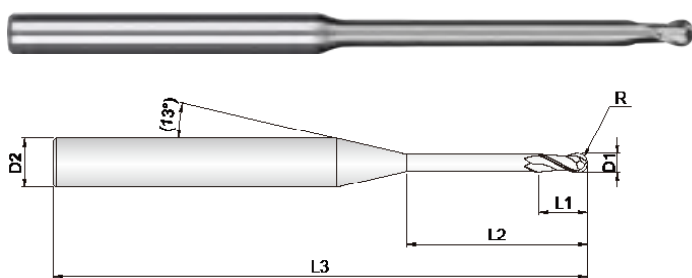
■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.015	h5
over 6	0 ~ -0.02	

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NEW!

Endmills for high hardened steel *Zamus Star Series*



2 Flute, Long Neck Ball Endmill

- Most optimal performance when machining high hardened workpieces below HRC 60
- Various shape cutting machining with wide selection of neck length
- Precision machining by applying precision tolerance

WB712+... series



EDP. No.	Dimension(mm)					
	D ₁	R	L ₁	L ₂	L ₃	D ₂
WB71201412P	1.4	0.7	1.4	12	50	4
WB71201416P	1.4	0.7	1.4	16	50	4
WB71201503P	1.5	0.75	1.5	3	50	4
WB71201503S6P	1.5	0.75	1.5	3	50	6
WB71201504P	1.5	0.75	1.5	4	50	4
WB71201504S6P	1.5	0.75	1.5	4	50	6
WB71201505P	1.5	0.75	1.5	5	50	4
WB71201506P	1.5	0.75	1.5	6	50	4
WB71201506S6P	1.5	0.75	1.5	6	50	6
WB71201507P	1.5	0.75	1.5	7	50	4
WB71201508P	1.5	0.75	1.5	8	50	4
WB71201508S6P	1.5	0.75	1.5	8	50	6
WB71201510P	1.5	0.75	1.5	10	50	4
WB71201510S6P	1.5	0.75	1.5	10	50	6
WB71201712P	1.5	0.75	1.5	12	50	4
WB71201712S6P	1.5	0.75	1.5	12	50	6
WB71201514P	1.5	0.75	1.5	14	50	4
WB71201514S6P	1.5	0.75	1.5	14	50	6
WB71201516P	1.5	0.75	1.5	16	50	4
WB71201516S6P	1.5	0.75	1.5	16	50	6
WB71201518P	1.5	0.75	1.5	18	50	4
WB71201518S6P	1.5	0.75	1.5	18	50	6
WB71201520P	1.5	0.75	1.5	20	55	4
WB71201520S6P	1.5	0.75	1.5	20	50	6
WB71201522P	1.5	0.75	1.5	22	60	4
WB71201522S6P	1.5	0.75	1.5	22	60	6
WB71201526P	1.5	0.75	1.5	26	60	4
WB71201526S6P	1.5	0.75	1.5	26	60	6
WB71201530P	1.5	0.75	1.5	30	70	4

NEXT >>>

■ Applicable Working Material

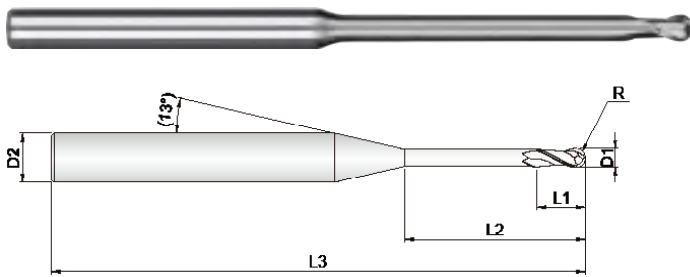
Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	◎	◎					○

○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.015	h5
over 6	0 ~ -0.02	

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WB712+... series

EDP. No.	Dimension(mm)					
	D1	R	L1	L2	L3	D2
WB71201530S6P	1.5	0.75	1.5	30	70	6
WB71201535P	1.5	0.75	1.5	35	70	4
WB71201535S6P	1.5	0.75	1.5	35	70	6
WB71201540P	1.5	0.75	1.5	40	80	4
WB71201540S6P	1.5	0.75	1.5	40	80	6
WB71201604P	1.6	0.8	1.6	4	50	4
WB71201606P	1.6	0.8	1.6	6	50	4
WB71201608P	1.6	0.8	1.6	8	50	4
WB71201610P	1.6	0.8	1.6	10	50	4
WB71201612P	1.6	0.8	1.6	12	50	4
WB71201616P	1.6	0.8	1.6	16	50	4
WB71201620P	1.6	0.8	1.6	20	50	4
WB71201804P	1.8	0.9	1.8	4	50	4
WB71201806P	1.8	0.9	1.8	6	50	4
WB71201808P	1.8	0.9	1.8	8	50	4
WB71201810P	1.8	0.9	1.8	10	50	4
WB71201812P	1.8	0.9	1.8	12	50	4
WB71201816P	1.8	0.9	1.8	16	50	4
WB71201820P	1.8	0.9	1.8	20	50	4
WB71202004P	2	1	2	4	50	4
WB71202004S6P	2	1	2	4	50	6
WB71202006P	2	1	2	6	50	4
WB71202006S6P	2	1	2	6	50	6
WB71202008P	2	1	2	8	50	4
WB71202008S6P	2	1	2	8	50	6
WB71202010P	2	1	2	10	50	4
WB71202010S6P	2	1	2	10	50	6
WB71202012P	2	1	2	12	50	4
WB71202012S6P	2	1	2	12	50	6

NEXT >>>

■ Applicable Working Material

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					
○	○	◎	◎	◎					○

○:General Application ◎:The most suitable Application

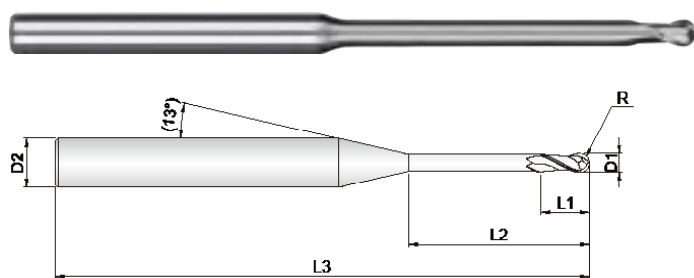
■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.015	h5
over 6	0 ~ -0.02	

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WB712+... series



EDP. No.	Dimension(mm)					
	D ₁	R	L ₁	L ₂	L ₃	D ₂
WB71202014P	2	1	2	14	50	4
WB71202014S6P	2	1	2	14	50	6
WB71202016P	2	1	2	16	50	4
WB71202016S6P	2	1	2	16	50	6
WB71202018P	2	1	2	18	55	4
WB71202018S6P	2	1	2	18	50	6
WB71202020P	2	1	2	20	55	4
WB71202020S6P	2	1	2	20	50	6
WB71202022P	2	1	2	22	60	4
WB71202022S6P	2	1	2	22	60	6
WB71202026P	2	1	2	26	60	4
WB71202026S6P	2	1	2	26	60	6
WB71202030P	2	1	2	30	70	4
WB71202030S6P	2	1	2	30	70	6
WB71202035P	2	1	2	35	70	4
WB71202035S6P	2	1	2	35	70	6
WB71202040P	2	1	2	40	80	4
WB71202040S6P	2	1	2	40	80	6
WB71202045P	2	1	2	45	90	4
WB71202045S6P	2	1	2	45	90	6
WB71202050P	2	1	2	50	100	4
WB71202050S6P	2	1	2	50	100	6
WB71202060P	2	1	2	60	110	4
WB71202508P	2.5	1.25	2.5	8	50	4
WB71202510P	2.5	1.25	2.5	10	50	4
WB71202712P	2.5	1.25	2.5	12	50	4
WB71202516P	2.5	1.25	2.5	16	50	4
WB71202520P	2.5	1.25	2.5	20	50	4
WB71202522P	2.5	1.25	2.5	22	60	4

NEXT >>>

■ Applicable Working Material

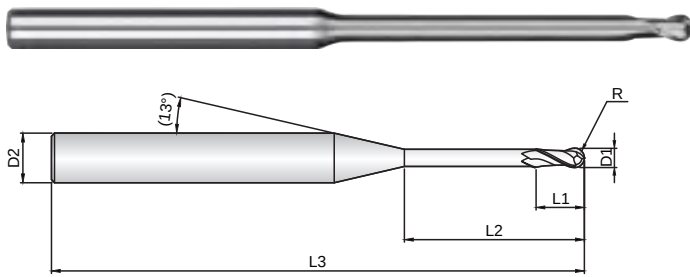
Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	◎	◎					○

○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.015	h5
over 6	0 ~ -0.02	

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WB712+... series

EDP. No.	Dimension(mm)					
	D1	R	L1	L2	L3	D2
WB71202526P	2.5	1.25	2.5	26	60	4
WB71202530P	2.5	1.25	2.5	30	70	4
WB71202535P	2.5	1.25	2.5	35	70	4
WB71202540P	2.5	1.25	2.5	40	80	4
WB71202545P	2.5	1.25	2.5	45	90	4
WB71202550P	2.5	1.25	2.5	50	100	4
WB71203006P	3	1.5	3	6	50	6
WB71203008P	3	1.5	3	8	50	6
WB71203010P	3	1.5	3	10	50	6
WB71203012P	3	1.5	3	12	50	6
WB71203014P	3	1.5	3	14	60	6
WB71203016P	3	1.5	3	16	60	6
WB71203018P	3	1.5	3	18	60	6
WB71203020P	3	1.5	3	20	60	6
WB71203022P	3	1.5	3	22	65	6
WB71203026P	3	1.5	3	26	65	6
WB71203030P	3	1.5	3	30	70	6
WB71203035P	3	1.5	3	35	70	6
WB71203040P	3	1.5	3	40	80	6
WB71203045P	3	1.5	3	45	90	6
WB71203050P	3	1.5	3	50	100	6
WB71203060P	3	1.5	3	60	100	6
WB71203510P	3.5	1.75	3	10	50	6
WB71203516P	3.5	1.75	3	16	60	6
WB71203520P	3.5	1.75	3	20	60	6
WB71203526P	3.5	1.75	3	26	65	6
WB71203530P	3.5	1.75	3	30	70	6
WB71204008P	4	2	4	8	50	6
WB71204010P	4	2	4	10	50	6

NEXT >>>

■ Applicable Working Material

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					
○	○	◎	◎	◎					○

○:General Application ◎:The most suitable Application

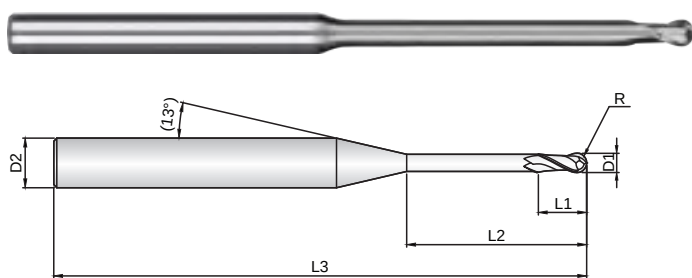
■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.015	h5
over 6	0 ~ -0.02	

※Items can be changed for quality improvement without notice.

NEW!

Endmills for high hardened steel *Zamus Star Series*



2 Flute, Long Neck Ball Endmill

- Most optimal performance when machining high hardened workpieces below HRC 60
- Various shape cutting machining with wide selection of neck length
- Precision machining by applying precision tolerance

WB712+... series



EDP. No.	Dimension(mm)					
	D ₁	R	L ₁	L ₂	L ₃	D ₂
WB71204012P	4	2	4	12	50	6
WB71204014P	4	2	4	14	60	6
WB71204016P	4	2	4	16	60	6
WB71204018P	4	2	4	18	60	6
WB71204020P	4	2	4	20	60	6
WB71204022P	4	2	4	22	65	6
WB71204026P	4	2	4	26	65	6
WB71204030P	4	2	4	30	70	6
WB71204035P	4	2	4	35	70	6
WB71204040P	4	2	4	40	80	6
WB71204045P	4	2	4	45	90	6
WB71204050P	4	2	4	50	100	6
WB71204055P	4	2	4	55	100	6
WB71204060P	4	2	4	60	100	6
WB71205015P	5	2.5	6	15	60	6
WB71205020P	5	2.5	6	20	60	6
WB71205026P	5	2.5	6	26	65	6
WB71205030P	5	2.5	6	30	70	6
WB71205035P	5	2.5	6	35	70	6
WB71205040P	5	2.5	6	40	80	6
WB71205045P	5	2.5	6	45	90	6
WB71205050P	5	2.5	6	50	100	6
WB71205055P	5	2.5	6	55	100	6
WB71205060P	5	2.5	6	60	100	6
WB71206020P	6	3	8	20	60	6
WB7120602090P	6	3	12	20	90	6
WB71206030P	6	3	8	30	60	6
WB7120603090P	6	3	12	30	90	6
WB71208025P	8	4	10	25	70	8

NEXT >>>

■ Applicable Working Material

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					
○	○	◎	◎	◎					○

○:General Application ◎:The most suitable Application

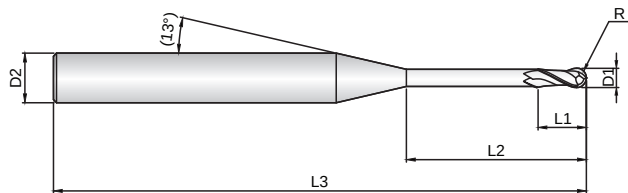
■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.015	h5
over 6	0 ~ -0.02	

※Items can be changed for quality improvement without notice.

NEW!

Endmills for high hardened steel *Zamus Star Series*



2 Flute, Long Neck Ball Endmill

- Most optimal performance when machining high hardened workpieces below HRc 60
- Various shape cutting machining with wide selection of neck length
- Precision machining by applying precision tolerance

WB712+... series



EDP. No.	Dimension(mm)					
	D ₁	R	L ₁	L ₂	L ₃	D ₂
WB71208025100P	8	4	14	25	100	8
WB71208035P	8	4	10	35	70	8
WB71208035100P	8	4	14	35	100	8
WB71210030P	10	5	12	30	75	10
WB71210030100P	10	5	18	30	100	10
WB71210040P	10	5	12	40	75	10
WB71210040100P	10	5	18	40	100	10
WB71212032P	12	6	14	32	80	12
WB71212032110P	12	6	22	32	110	12
WB71212045P	12	6	14	45	80	12
WB71212045110P	12	6	22	45	110	12

Endmills for high hardened steel – Zamus Star Series

■ Applicable Working Material

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					
○	○	◎	◎	◎					○

○:General Application ◎:The most suitable Application

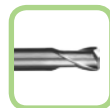
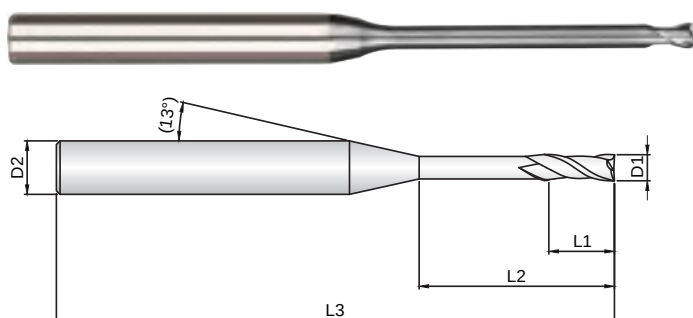
■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.015	h5
over 6	0 ~ -0.02	

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WE712+... series



EDP. No.	Dimension(mm)				
	D ₁	L ₁	L ₂	L ₃	D ₂
WE712001003P	0.1	0.15	0.3	40	4
WE712001005P	0.1	0.15	0.5	40	4
WE71200101P	0.1	0.15	1	40	4
WE712002005P	0.2	0.3	0.5	40	4
WE71200201P	0.2	0.3	1	40	4
WE712002015P	0.2	0.3	1.5	40	4
WE71200202P	0.2	0.3	2	40	4
WE71200301P	0.3	0.5	1	40	4
WE712003015P	0.3	0.5	1.5	40	4
WE71200302P	0.3	0.5	2	40	4
WE712003025P	0.3	0.5	2.5	40	4
WE71200303P	0.3	0.5	3	40	4
WE71200304P	0.3	0.5	4	40	4
WE71200305P	0.3	0.5	5	40	4
WE71200401P	0.4	0.6	1	40	4
WE712004015P	0.4	0.6	1.5	40	4
WE71200402P	0.4	0.6	2	40	4
WE712004025P	0.4	0.6	2.5	40	4
WE71200403P	0.4	0.6	3	40	4
WE71200404P	0.4	0.6	4	40	4
WE71200405P	0.4	0.6	5	40	4
WE71200406P	0.4	0.6	6	40	4
WE71200408P	0.4	0.6	8	40	4
WE71200410P	0.4	0.6	10	40	4
WE71200501P	0.5	0.7	1	45	4
WE712005015P	0.5	0.7	1.5	45	4
WE71200502P	0.5	0.7	2	45	4
WE712005025P	0.5	0.7	2.5	45	4
WE71200503P	0.5	0.7	3	45	4

NEXT >>>

■ Applicable Working Material

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					
○	○	◎	◎	◎					○

○:General Application ◎:The most suitable Application

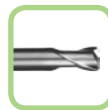
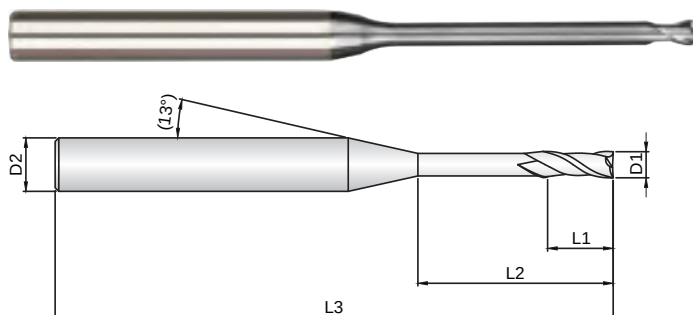
■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.015	h5
over 6	0 ~ -0.02	

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WE712+... series



EDP. No.	Dimension(mm)				
	D ₁	L ₁	L ₂	L ₃	D ₂
WE71200504P	0.5	0.7	4	45	4
WE71200505P	0.5	0.7	5	45	4
WE71200506P	0.5	0.7	6	45	4
WE71200508P	0.5	0.7	8	45	4
WE71200510P	0.5	0.7	10	45	4
WE71200512P	0.5	0.7	12	45	4
WE71200514P	0.5	0.7	14	45	4
WE71200516P	0.5	0.7	16	45	4
WE71200602P	0.6	0.9	2	45	4
WE71200603P	0.6	0.9	3	45	4
WE71200604P	0.6	0.9	4	45	4
WE71200605P	0.6	0.9	5	45	4
WE71200606P	0.6	0.9	6	45	4
WE71200608P	0.6	0.9	8	45	4
WE71200610P	0.6	0.9	10	45	4
WE71200612P	0.6	0.9	12	45	4
WE71200614P	0.6	0.9	14	45	4
WE71200616P	0.6	0.9	16	45	4
WE71200702P	0.7	1.2	2	45	4
WE71200704P	0.7	1.2	4	45	4
WE71200706P	0.7	1.2	6	45	4
WE71200708P	0.7	1.2	8	45	4
WE71200710P	0.7	1.2	10	45	4
WE71200712P	0.7	1.2	12	45	4
WE71200802P	0.8	1.2	2	45	4
WE71200803P	0.8	1.2	3	45	4
WE71200804P	0.8	1.2	4	45	4
WE71200805P	0.8	1.2	5	45	4
WE71200806P	0.8	1.2	6	45	4

NEXT >>>

■ Applicable Working Material

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					
○	○	◎	◎	◎					○

○:General Application ◎:The most suitable Application

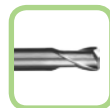
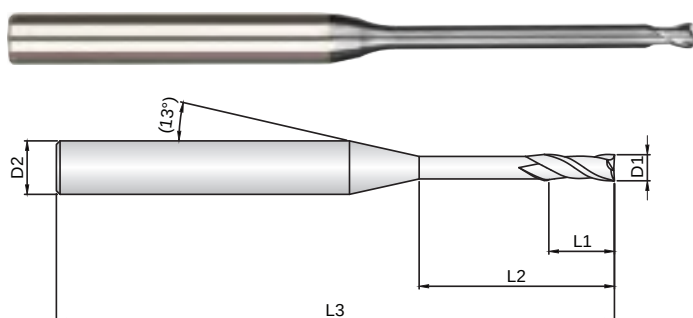
■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.015	h5
over 6	0 ~ -0.02	

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WE712+... series



EDP. No.	Dimension(mm)				
	D ₁	L ₁	L ₂	L ₃	D ₂
WE71200808P	0.8	1.2	8	45	4
WE71200810P	0.8	1.2	10	45	4
WE71200812P	0.8	1.2	12	45	4
WE71200814P	0.8	1.2	14	45	4
WE71200816P	0.8	1.2	16	45	4
WE71200820P	0.8	1.2	20	45	4
WE71200906P	0.9	1.3	6	45	4
WE71200908P	0.9	1.3	8	45	4
WE71200910P	0.9	1.3	10	45	4
WE71201002P	1	1.5	2	50	4
WE71201003P	1	1.5	3	50	4
WE71201004P	1	1.5	4	50	4
WE71201005P	1	1.5	5	50	4
WE71201006P	1	1.5	6	50	4
WE71201007P	1	1.5	7	50	4
WE71201008P	1	1.5	8	50	4
WE71201010P	1	1.5	10	50	4
WE71201012P	1	1.5	12	50	4
WE71201014P	1	1.5	14	50	4
WE71201016P	1	1.5	16	50	4
WE71201018P	1	1.5	18	50	4
WE71201020P	1	1.5	20	50	4
WE71201022P	1	1.5	22	60	4
WE71201026P	1	1.5	26	60	4
WE71201030P	1	1.5	30	70	4
WE71201040P	1	1.5	40	80	4
WE71201050P	1	1.5	50	100	4
WE71201204P	1.2	1.8	4	50	4
WE71201206P	1.2	1.8	6	50	4

NEXT >>>

■ Applicable Working Material

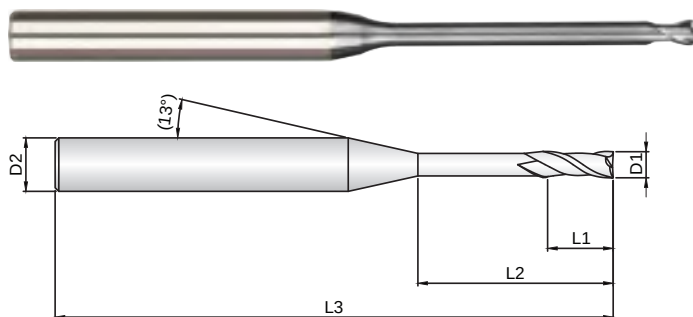
Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	◎	◎					○

○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.015	h5
over 6	0 ~ -0.02	

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NEW!**Endmills for high hardened steel** *Zamus Star Series***2 Flute, Long Neck Endmill**

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WE712+... series

EDP. No.	Dimension(mm)				
	D ₁	L ₁	L ₂	L ₃	D ₂
WE71201208P	1.2	1.8	8	50	4
WE71201210P	1.2	1.8	10	50	4
WE71201212P	1.2	1.8	12	50	4
WE71201214P	1.2	1.8	14	50	4
WE71201216P	1.2	1.8	16	50	4
WE71201220P	1.2	1.8	20	50	4
WE71201226P	1.2	1.8	26	60	4
WE71201230P	1.2	1.8	30	70	4
WE71201406P	1.4	2.1	6	50	4
WE71201408P	1.4	2.1	8	50	4
WE71201410P	1.4	2.1	10	50	4
WE71201414P	1.4	2.1	14	50	4
WE71201416P	1.4	2.1	16	50	4
WE71201420P	1.4	2.1	20	50	4
WE71201504P	1.5	2.3	4	50	4
WE71201505P	1.5	2.3	5	50	4
WE71201506P	1.5	2.3	6	50	4
WE71201507P	1.5	2.3	7	50	4
WE71201508P	1.5	2.3	8	50	4
WE71201510P	1.5	2.3	10	50	4
WE71201512P	1.5	2.3	12	50	4
WE71201514P	1.5	2.3	14	50	4
WE71201516P	1.5	2.3	16	50	4
WE71201518P	1.5	2.3	18	50	4
WE71201520P	1.5	2.3	20	50	4
WE71201522P	1.5	2.3	22	60	4
WE71201526P	1.5	2.3	26	60	4
WE71201530P	1.5	2.3	30	70	4
WE71201608P	1.6	2.3	8	50	4

NEXT >>>

■ Applicable Working Material

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					
○	○	◎	◎	◎					○

○:General Application ◎:The most suitable Application

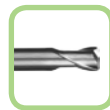
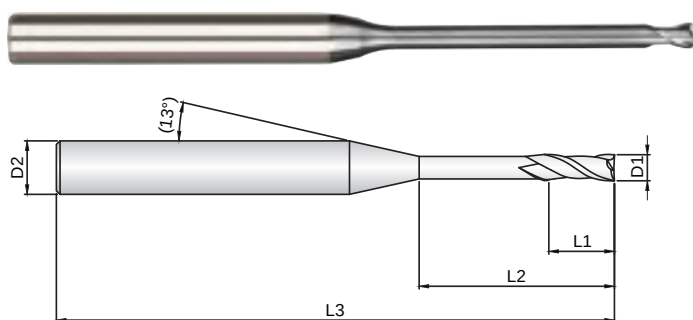
■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.015	h5
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WE712+... series



EDP. No.	Dimension(mm)				
	D ₁	L ₁	L ₂	L ₃	D ₂
WE71201610P	1.6	2.3	10	50	4
WE71201612P	1.6	2.3	12	50	4
WE71201616P	1.6	2.3	16	50	4
WE71201620P	1.6	2.3	20	50	4
WE71201808P	1.8	2.7	8	50	4
WE71201810P	1.8	2.7	10	50	4
WE71201812P	1.8	2.7	12	50	4
WE71201816P	1.8	2.7	16	50	4
WE71201820P	1.8	2.7	20	50	4
WE71202006P	2	3	6	50	4
WE71202008P	2	3	8	50	4
WE71202010P	2	3	10	50	4
WE71202012P	2	3	12	50	4
WE71202014P	2	3	14	50	4
WE71202016P	2	3	16	50	4
WE71202018P	2	3	18	50	4
WE71202020P	2	3	20	50	4
WE71202022P	2	3	22	60	4
WE71202026P	2	3	26	60	4
WE71202030P	2	3	30	70	4
WE71202035P	2	3	35	70	4
WE71202040P	2	3	40	80	4
WE71202045P	2	3	45	90	4
WE71202050P	2	3	50	100	4
WE71202060P	2	3	60	110	4
WE71202508P	2.5	4	8	50	4
WE71202510P	2.5	4	10	50	4
WE71202512P	2.5	4	12	50	4
WE71202514P	2.5	4	14	50	4

NEXT >>>

■ Applicable Working Material

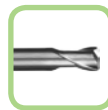
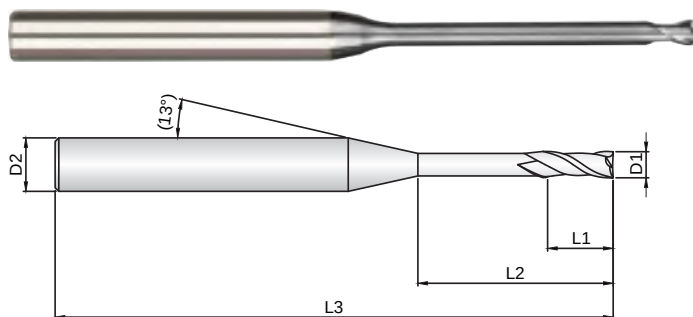
Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	◎	◎					○

○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.015	h5
over 6	0 ~ -0.02	

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WE712+... series

EDP. No.	Dimension(mm)				
	D ₁	L ₁	L ₂	L ₃	D ₂
WE71202516P	2.5	4	16	50	4
WE71202518P	2.5	4	18	50	4
WE71202520P	2.5	4	20	50	4
WE71202522P	2.5	4	22	60	4
WE71202526P	2.5	4	26	60	4
WE71202530P	2.5	4	30	70	4
WE71202535P	2.5	4	35	70	4
WE71202540P	2.5	4	40	80	4
WE71202545P	2.5	4	45	90	4
WE71202550P	2.5	4	50	100	4
WE71203006P	3	4.5	6	50	6
WE71203008P	3	4.5	8	50	6
WE71203010P	3	4.5	10	50	6
WE71203012P	3	4.5	12	50	6
WE71203014P	3	4.5	14	60	6
WE71203016P	3	4.5	16	60	6
WE71203018P	3	4.5	18	60	6
WE71203020P	3	4.5	20	60	6
WE71203022P	3	4.5	22	65	6
WE71203026P	3	4.5	26	65	6
WE71203030P	3	4.5	30	70	6
WE71203035P	3	4.5	35	70	6
WE71203040P	3	4.5	40	80	6
WE71203045P	3	4.5	45	90	6
WE71203050P	3	4.5	50	100	6
WE71203060P	3	4.5	60	100	6
WE71204008P	4	6	8	50	6
WE71204010P	4	6	10	50	6
WE71204012P	4	6	12	50	6

NEXT >>>

■ Applicable Working Material

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					
○	○	◎	◎	◎					○

○:General Application ◎:The most suitable Application

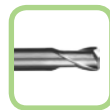
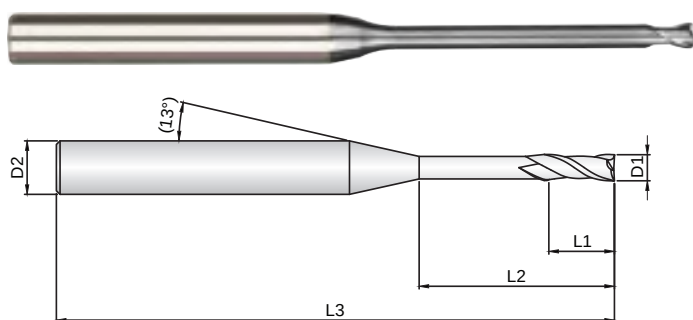
■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.015	h5
over 6	0 ~ -0.02	

※Items can be changed for quality improvement without notice.

NEW!

Endmills for high hardened steel *Zamus Star Series*



2 Flute, Long Neck Endmill

- Most optimal performance when machining high hardened workpieces below HRC 60
- Various shape cutting machining with wide selection of neck length
- Precision machining by applying precision tolerance

WE712+... series



EDP. No.	Dimension(mm)				
	D ₁	L ₁	L ₂	L ₃	D ₂
WE71204014P	4	6	14	60	6
WE71204016P	4	6	16	60	6
WE71204018P	4	6	18	60	6
WE71204020P	4	6	20	60	6
WE71204022P	4	6	22	65	6
WE71204026P	4	6	26	65	6
WE71204030P	4	6	30	70	6
WE71204035P	4	6	35	70	6
WE71204040P	4	6	40	80	6
WE71204045P	4	6	45	90	6
WE71204050P	4	6	50	100	6
WE71204060P	4	6	60	100	6
WE71205016P	5	8	16	60	6
WE71205020P	5	8	20	60	6
WE71205026P	5	8	26	65	6
WE71205030P	5	8	30	70	6
WE71205035P	5	8	35	75	6
WE71205040P	5	8	40	80	6
WE71205050P	5	8	50	90	6
WE71205060P	5	8	60	100	6
WE71206015P	6	9	15	60	6
WE71206020P	6	9	20	60	6
WE71206030P	6	9	30	70	6
WE71206032P	6	9	32	90	6
WE71208025P	8	12	25	70	8
WE71208030P	8	12	30	80	8
WE71208042P	8	12	42	100	8
WE71210030P	10	15	30	75	10
WE71210035P	10	15	35	80	10

NEXT >>>

■ Applicable Working Material

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					
○	○	◎	◎	◎					○

○:General Application ◎:The most suitable Application

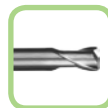
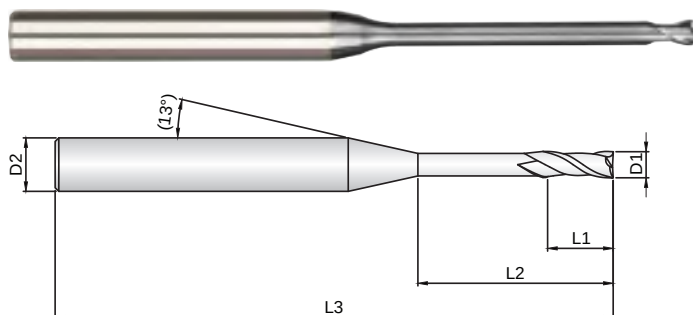
■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.015	
over 6	0 ~ -0.02	h5

※Items can be changed for quality improvement without notice.

NEW!

Endmills for high hardened steel *Zamus Star Series*



2 Flute, Long Neck Endmill

- Most optimal performance when machining high hardened workpieces below HRc 60
- Various shape cutting machining with wide selection of neck length
- Precision machining by applying precision tolerance

WE712+... series



EDP. No.	Dimension(mm)				
	D ₁	L ₁	L ₂	L ₃	D ₂
WE71210045P	10	15	45	100	10
WE71212035P	12	20	35	80	12
WE71212040P	12	20	40	90	12
WE71212050P	12	20	50	110	12

Endmills for high hardened steel – Zamus Star Series

■ Applicable Working Material

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					
○	○	◎	◎	◎					○

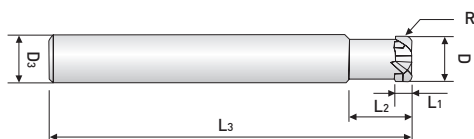
○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.015	
over 6	0 ~ -0.02	h5

※Items can be changed for quality improvement without notice.

Endmills for high hardened steel *Zamus Star 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 back draft type on the tool to maximize the reducing chatter and preventing deflection

ZSPM4...-.. series



ULTRA FINE



HELIIX



R ±0.015



ACTIN



p.661~662

EDP. No.	D	R	L ₁	L ₂	L ₃	D ₃
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			90	
ZSPM4060-15		1.5			100	
ZSPM4060-15L	8	1	3.5	16	60	8
ZSPM4080-10		2			100	
ZSPM4080-20		2			100	
ZSPM4080-20L	10	1	4	20	70	10
ZSPM4100-10		2			100	
ZSPM4100-20		2			100	
ZSPM4100-20L	12	2	5	25	80	12
ZSPM4120-20		3			110	
ZSPM4120-30		3			110	
ZSPM4120-30L						

Endmills for high hardened steel – Zamus Star Series

■ Applicable Working Material

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					
	○	○	◎	◎	○				

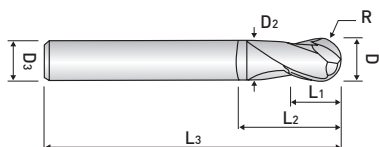
○:General Application ◎:The most suitable Application

■ Tolerance

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

※Items can be changed for quality improvement without notice.

Endmills for high hardened steel *Zamus Star Series*



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



ULTRA FINE



HELIX



up to R3



over R3



p.662

EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂	D ₃
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	1.5	0.75	2	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	3.9	6
DB702040					60		
DB702041					70		
DB702050	5	2.5	6	12	60	4.9	6
DB702060	6	3	7	12	60	5.9	6
DB702061					90		
DB702080	8	4	9	15	70	7.9	8
DB702081					100		
DB702100	10	5	11	25	75	9.9	10
DB702101					100		
DB702120	12	6	12	25	80	11.9	12
DB702121					110		

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○	○	◎	◎	○				

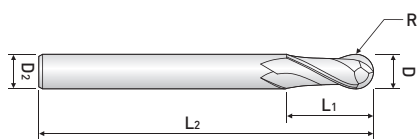
○: General Application ◎: The most suitable Application

■ Tolerance

Radius (mm)		Shank Dia.
up to R3	± 0.005	
over R3	± 0.01	

※ Items can be changed for quality improvement without notice.

Endmills for high hardened steel *Zamus Star Series*



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.	D	R	L ₁	L ₂	D ₂
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	

Endmills for high hardened steel – Zamus Star Series

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○	○	◎	◎	○				

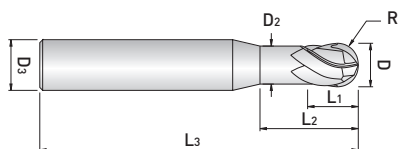
○:General Application ◎:The most suitable Application

■ Tolerance

Radius (mm)		Shank Dia.
up to R3	± 0.005	h6
over R3	± 0.01	

※Items can be changed for quality improvement without notice.

Endmills for high hardened steel *Zamus Star Series*



3 FLUTE, BALL NOSE for FINISHING 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
- Excellent workpiece finishes

DB703 ...series



ULTRA FINE



HELIX



up to R3



over R3



p.663

EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂	D ₃
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	5.9	
DB703080	8	4	9	15	70	7.4	8
DB703081					100	7.9	
DB703100	10	5	11	25	75	9.4	10
DB703101					100	9.9	
DB703120	12	6	12	25	80	11.4	12
DB703121					110	11.9	

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
	○	○	◎	◎	○				

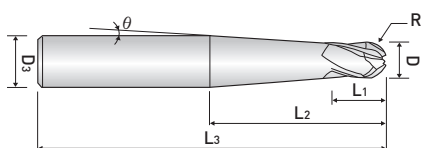
○:General Application ◎:The most suitable Application

■ Tolerance

Radius (mm)		Shank Dia.
up to R3	± 0.005	
over R3	± 0.01	

※Items can be changed for quality improvement without notice.

Endmills for high hardened steel *Zamus Star Series*



4 FLUTE, 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 ₁	L ₂	L ₃	θ	D ₃
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	

Endmills for high hardened steel – Zamus Star Series

■ Applicable Working Material

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					
	○	○	◎	◎	○				

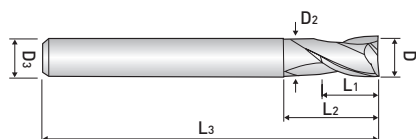
○:General Application ◎:The most suitable Application

■ Tolerance

Radius (mm)	Shank Dia.
±0.01	h6

※Items can be changed for quality improvement without notice.

Endmills for high hardened steel *Zamus Star Series*



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 ₁	L ₂	L ₃	D ₂	D ₃
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
ZE702020						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

■ Applicable Working Material

Carbon Steels (S45C, S55C,...) ~ HB225	Alloy Steels (SCM, SK,...) HB225~325	Prehardened Steels(NAK,...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○	○	◎	◎	○				

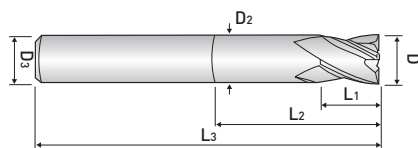
○: General Application ◎: The most suitable Application

■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.012	
over 6	0 ~ -0.015	h6

※ These tools are manufactured based on order received.

Endmills for high hardened steel *Zamus Star Series*



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 ₁	L ₂	L ₃	D ₂	D ₃
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

Endmills for high hardened steel – Zamus Star Series

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○	○	◎	◎	○				

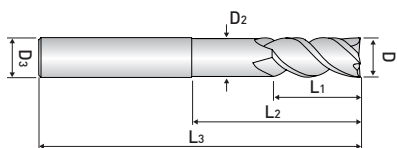
○: General Application ◎: The most suitable Application

■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.012	
over 6	0 ~ -0.015	h6

※ These tools are manufactured based on order received.

Endmills for high hardened steel *Zamus Star Series*



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.

ZE724(6) ...series



ULTRA FINE

HELIX

HELIX

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EDP. No.	D	L ₁	L ₂	L ₃	D ₂	D ₃	Z
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

Endmills for high hardened steel – Zamus Star Series

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○	○	◎	◎	○				

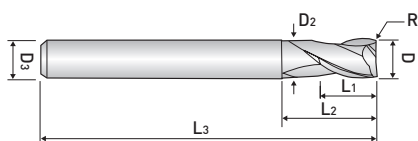
○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.015	
over 6	0 ~ -0.002	h6

※ These tools are manufactured based on order received.

Endmills for high hardened steel *Zamus Star Series*



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



ULTRA FINE



HELIX

up to $\phi 6$ over $\phi 6$ 

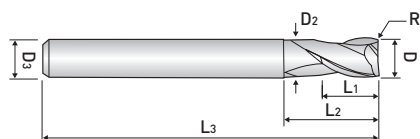
p.665~666

EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂	D ₃
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		0.1		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			

NEXT >>>

Endmills for high hardened steel – Zamus Star Series

Endmills for high hardened steel *Zamus Star Series*



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



ULTRA FINE



HELIX

up to $\phi 6$ over $\phi 6$ 

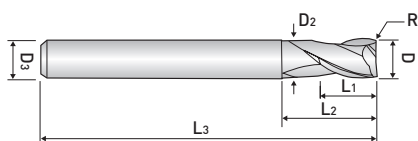
p.665~666

Endmills for high hardened steel – Zamus Star Series

EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂	D ₃
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	20						

NEXT >>>

Endmills for high hardened steel *Zamus Star Series*



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



ULTRA FINE



HELIX

up to $\phi 6$ over $\phi 6$ 

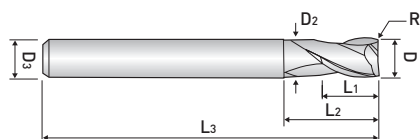
p.665~666

EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂	D ₃
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		16					
ZR702 020 03 06		0.3		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	60		
ZR702 030 02 08		0.2		8	55		
ZR702 030 02 09				9			
ZR702 030 02 10				10			

NEXT >>>

Endmills for high hardened steel – Zamus Star Series

Endmills for high hardened steel *Zamus Star Series*



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



ULTRA FINE



HELIX

up to $\phi 6$ over $\phi 6$ 

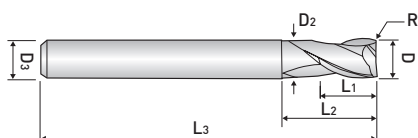
p.665~666

Endmills for high hardened steel – Zamus Star Series

EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂	D ₃	
ZR702 030 02 12	3	0.2	4.5	12	55	2.9	6	
ZR702 030 02 16				16				
ZR702 030 02 20				20				60
ZR702 030 03 08		0.3		8	55			
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		0.5		8	55			
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				1.0				8
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						
ZR702 040 01 10	4	0.1	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				
ZR702 040 02 10		0.2		10	55			
ZR702 040 02 12				12				
ZR702 040 02 16				16				
ZR702 040 02 20				20	60			
ZR702 040 02 25				25				
ZR702 040 03 10		0.3		10	55			
ZR702 040 03 12				12				
ZR702 040 03 16				16				
ZR702 040 03 20				20	60			
ZR702 040 03 25				25				

NEXT >>>

Endmills for high hardened steel *Zamus Star Series*



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



ULTRA FINE



HELIX

up to $\phi 6$ over $\phi 6$ 

p.665~666

EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂	D ₃
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	60		
ZR702 040 05 25				25			
ZR702 040 05 30				30			
ZR702 040 10 10		1.0		10	55		
ZR702 040 10 12				12			
ZR702 040 10 16				16			
ZR702 040 10 20				20	60		
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	32	70	9.7	10
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					

■ Applicable Working Material

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					
	○	○	◎	◎	○				

○:General Application ◎:The most suitable Application

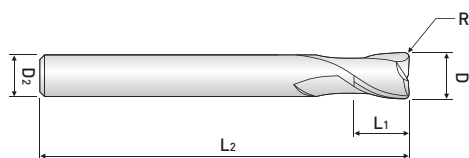
■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.012	
over 6	0 ~ -0.015	h6

※Items can be changed for quality improvement without notice.

Endmills for high hardened steel – Zamus Star Series

Endmills for high hardened steel *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

ZR732 series



ULTRA FINE



HELIX

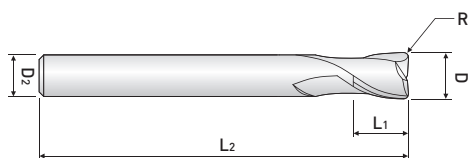
up to $\varnothing 6$ over $\varnothing 6$ 

p.665~666

EDP. No.	D	R	L ₁	L ₂	D ₂
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			

NEXT >>

Endmills for high hardened steel *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

ZR732 series



ULTRA FINE



HELIX

up to $\phi 6$ over $\phi 6$ 

p.665~666

EDP. No.	D	R	L ₁	L ₂	D ₂
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			

Endmills for high hardened steel – Zamus Star Series

■ Applicable Working Material

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					
	○	○	◎	◎	○				

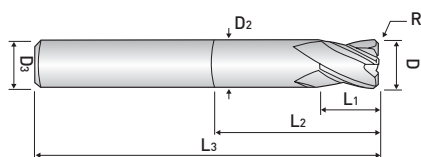
○: General Application ◎: The most suitable Application

■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.012	
over 6	0 ~ -0.015	h6

※Items can be changed for quality improvement without notice.

Endmills for high hardened steel *Zamus Star Series*



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



ULTRA FINE



HELIX

up to $\varnothing 6$ over $\varnothing 6$ 

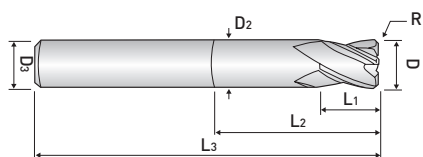
p.666

Endmills for high hardened steel – Zamus Star Series

EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂	D ₃
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		0.3		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		0.3		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	60		
ZR704 030 01 20				20			
ZR704 030 02 08		0.2		8	55		
ZR704 030 02 10				10			
ZR704 030 02 12				12			
ZR704 030 02 16				16			
ZR704 030 02 20				20	60		

NEXT >>>

Endmills for high hardened steel *Zamus Star Series*



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



ULTRA FINE



HELIX

up to $\varnothing 6$ over $\varnothing 6$ 

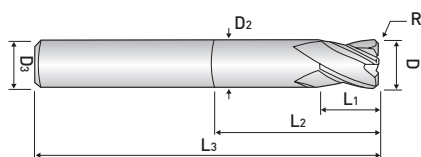
p.666

EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂	D ₃
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	55		
ZR704 030 05 09				9			
ZR704 030 05 10				10			
ZR704 030 05 12				12			
ZR704 030 05 16				16			
ZR704 030 05 20				20	60		
ZR704 030 10 08		1.0		8	55		
ZR704 030 10 10				10			
ZR704 030 10 12				12			
ZR704 030 10 16				16			
ZR704 030 10 20				20			
ZR704 040 01 10				4	0.1		
ZR704 040 01 12	12						
ZR704 040 01 16	16						
ZR704 040 01 20	20	60					
ZR704 040 01 25	25						
ZR704 040 02 10	0.2	10	55				
ZR704 040 02 12		12					
ZR704 040 02 16		16					
ZR704 040 02 20		20	60				
ZR704 040 02 25		25					
ZR704 040 03 10	0.3	10	55				
ZR704 040 03 12		12					
ZR704 040 03 16		16					
ZR704 040 03 20		20	60				
ZR704 040 03 25		25					
ZR704 040 05 10	0.5	10	55				
ZR704 040 05 12		12					
ZR704 040 05 16		16					
ZR704 040 05 20		20	60				
ZR704 040 05 25		25					

NEXT >>

Endmills for high hardened steel – Zamus Star Series

Endmills for high hardened steel *Zamus Star Series*



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



ULTRA FINE



HELIX

up to $\phi 6$ over $\phi 6$ 

p.666

EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂	D ₃
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	60		
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					

■ Applicable Working Material

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					
	○	○	◎	◎	○				

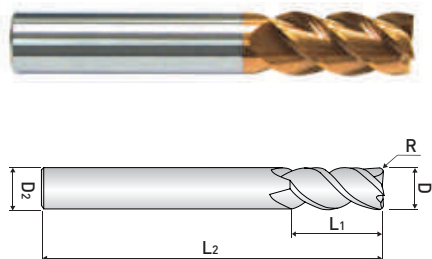
○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to $\phi 6$	0 ~ -0.012	
over 6	0 ~ -0.015	h6

※ These tools are manufactured based on order received.

Endmills for high hardened steel *Zamus Star Series*



4 FLUTE, 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 ₁	L ₂	D ₂
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			

Endmills for high hardened steel – Zamus Star Series

■ Applicable Working Material

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					
	○	○	◎	◎	○				

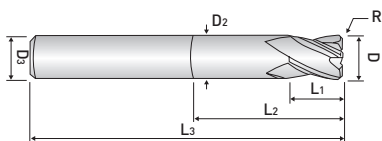
○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.012	
over 6	0 ~ -0.015	h6

※ These tools are manufactured based on order received.

Endmills for high hardened steel *Zamus Star Series*



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

ZR724 series



ULTRA FINE



HELIX

up to $\phi 6$ over $\phi 6$ 

p.666

EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂	D ₃
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					

Endmills for high hardened steel – Zamus Star Series

■ Applicable Working Material

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					
	○	○	◎	◎	○				

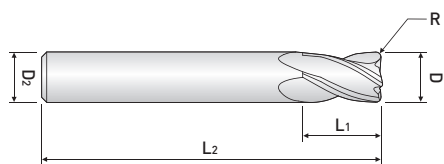
○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.012	
over 6	0 ~ -0.015	h6

※ These tools are manufactured based on order received.

Endmills for high hardened steel *Zamus Star Series*



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 $\varnothing 6$ over $\varnothing 6$ 

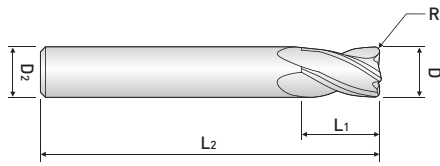
p.666

EDP. No.	D	R	L ₁	L ₂	D ₂
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			

NEXT >>>

Endmills for high hardened steel – Zamus Star Series

Endmills for high hardened steel *Zamus Star Series*



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 ₁	L ₂	D ₂
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			

■ Applicable Working Material

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					
	○	○	◎	◎	○				

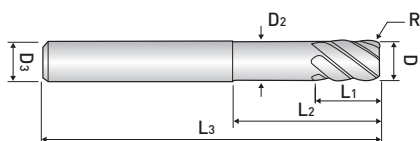
○: General Application ◎: The most suitable Application

■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.012	
over 6	0 ~ -0.015	h6

※ These tools are manufactured based on order received.

Endmills for high hardened steel *Zamus Star Series*



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



ULTRA FINE



HELIX

up to $\phi 6$ over $\phi 6$ 

p.667

EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂	D ₃
ZR7060600314	6	0.3	6	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					

Endmills for high hardened steel – Zamus Star Series

■ Applicable Working Material

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					
	○	○	◎	◎	○				

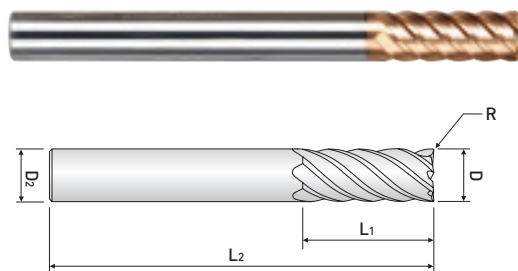
○:General Application ◎:The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for high hardened steel *Zamus Star Series*



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



ULTRA FINE



HELIX

up to $\phi 6$ over $\phi 6$ 

p.667

EDP. No.	D	R	L ₁	L ₂	D ₂
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			

Endmills for high hardened steel – Zamus Star Series

■ Applicable Working Material

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					
	○	○	◎	◎	○				

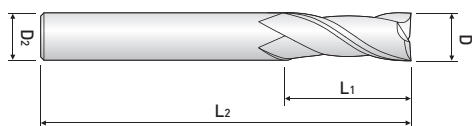
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for high hardened steel *Zamus Star Series*



2 FLUTE, 35°HELIX REGULAR LENGTH

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

ZE712 ...series



EDP. No.	D	L ₁	L ₂	D ₂
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	

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○	○	◎	◎	○				

○:General Application ◎:The most suitable Application

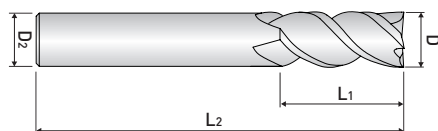
■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for high hardened steel – Zamus Star Series

Endmills for high hardened steel *Zamus Star Series*



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



ULTRA FINE



HELIX



p.665

EDP. No.	D	L ₁	L ₂	D ₂
ZE714010	1.0	2.5	40	6
ZE714012	1.2	3	40	6
ZE714015	1.5	4	40	6
ZE714020	2.0	5	40	6
ZE714025	2.5	6	40	6
ZE714030	3.0	8	45	6
ZE714035	3.5	9	45	6
ZE714040	4.0	10	45	6
ZE714050	5.0	13	50	6
ZE714060	6.0	13	50	6
ZE714060-15		15	60	
ZE714080	8.0	19	60	8
ZE714100	10.0	22	70	10
ZE714100-25		25		
ZE714120	12.0	26	75	12
ZE714120-30		30	80	

■ Applicable Working Material

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					
	○	○	◎	◎	○				

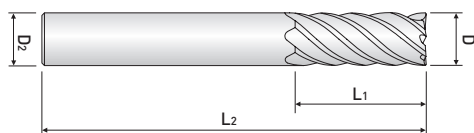
○:General Application ◎:The most suitable Application

■ Tolerance

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

※Items can be changed for quality improvement without notice.

Endmills for high hardened steel *Zamus Star Series*



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 ₁	L ₂	D ₂
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

Endmills for high hardened steel – Zamus Star Series

■ Applicable Working Material

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					
	○	○	◎	◎	○				

○:General Application ◎:The most suitable Application

■ Tolerance

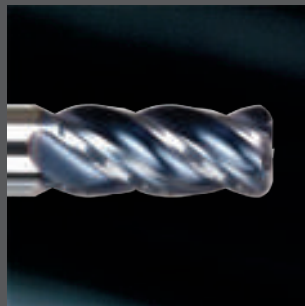
Mill Dia. (mm)	Shank Dia.
0 ~ -0.02	h6

※Items can be changed for quality improvement without notice.

Endmills for Stainless Steel

NEO CLASSIC X-STAR SERIES(~HRc45)

ENDMILL
SERIES



Endmills for stainless steel_ Neo Classic X-STAR Series

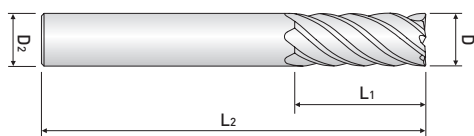
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EDP. No.	APPEARANCE	FEATURE	INCH & METRIC	STOCK	PAGE
XE505 ... series		REGULAR CUT LENGTH, VARIABLE HELIX	METRIC	•	184
XE515 ... series		LONG CUT LENGTH	METRIC	•	185
XR505 ... series		REGULAR CUT LENGTH CORNER RADIUS, VARIABLE HELIX	METRIC	•	186
XXB504 ... series		REGULAR CUT LENGTH, VARIABLE HELIX	METRIC	•	187
XCE504 ... series		REGULAR CUT LENGTH, VARIABLE HELIX	METRIC	•	188
XE304 ... series		REGULAR LENGTH	METRIC	•	189
XCC504 ... series		REGULAR CUT LENGTH, CORNER CHAMFER, VARIABLE HELIX	METRIC	•	190
XCR504 ... series		REGULAR CUT LENGTH, CORNER RADIUS, VARIABLE HELIX	METRIC	•	191
XCE503 ... series		REGULAR LENGTH	METRIC	•	192
XCC503 ... series		REGULAR LENGTH	METRIC	•	193
XCR503 ... series		REGULAR LENGTH	METRIC	•	194
XE504 ... series		REGULAR LENGTH	METRIC	•	195
XR504 ... series		REGULAR LENGTH	METRIC	•	196
XE514 ... series		STUB CUT LENGTH with EXTENDED NECK	METRIC	•	197
XE524 ... series		STUB CUT LENGTH with EXTENDED LONG NECK	METRIC	•	198

■ CODE SYSTEM

X	CR	5	0	4	12	10
Classification	Shape	Grade	Length, Shank type	No. of Flute	Diameter	Corner radius
X : X-Star (Unequal Division)	E : Square type	3 : Grade	0 - Straight type	3 : 3 Flute	1	0.1
	R : Radius type	5 : Grade	1 - Neck	4 : 4 Flute	25.4	5
	XE : Square type (Edge protection)		2 - Long neck	5 : 5 Flute		
	XB : Ball type					
	XR : Radius type (Edge protection)					
	CE : Square type (Double Core)					
	CC : Chamfer type (Double Core)					
	CR : Radius type (Double Core)					

Endmills for stainless steel *Neo Classic X-STAR Series*



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



p.647~649

EDP. No.	D	L ₁	L ₂	D ₂
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

■ Applicable Working Material

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					
◎	◎	○			○				◎

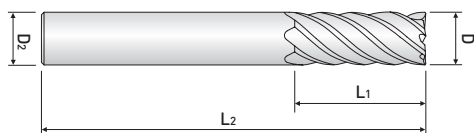
○:General Application ◎:The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for stainless steel *Neo Classic X-STAR Series*



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



ULTRA FINE



HELIX



p.647~649

EDP. No.	D	L ₁	L ₂	D ₂
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

Endmills for stainless steel – Neo Classic X-STAR Series

■ Applicable Working Material

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					
◎	◎	○			○				◎

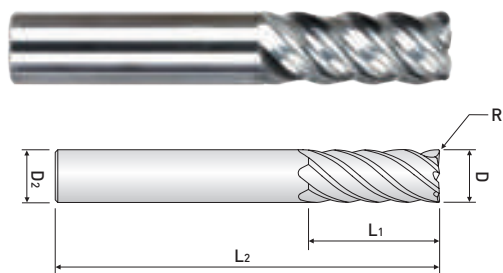
○:General Application ◎:The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for stainless steel *Neo Classic X-STAR Series*



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



ULTRA FINE



HELIX



HELIX



HELIX



p.647~649

EDP. No.	D	R	L ₁	L ₂	D ₂
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

■ Applicable Working Material

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					
◎	◎	○			○				◎

○:General Application ◎:The most suitable Application

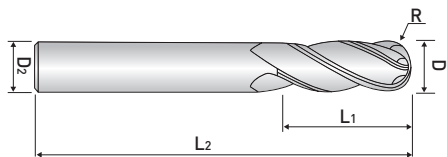
■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for stainless steel

Neo Classic X-STAR Series



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

XXB504 ...series



ULTRA FINE



HELIX



HELIX

R
±0.01

p.647~649

EDP. No.	D	R	L ₁	L ₂	D ₂
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

※ Flat shank is available upon request

ex) XXB504100F : Flat shank

Endmills for stainless steel – Neo Classic X-STAR Series

■ Applicable Working Material

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					
◎	◎	○			○				◎

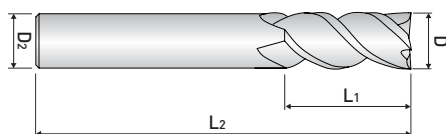
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for stainless steel *Neo Classic X-STAR Series*



4 FLUTE, REGULAR LENGTH, VARIABLE HELIX - DOUBLE CORE

- 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



p.647~649

EDP. No.	D	L ₁	L ₂	D ₂
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

※ Flat shank is available upon request

ex) XCE504100F : Flat shank

■ Applicable Working Material

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					
◎	◎	○	◎	◎	○				◎

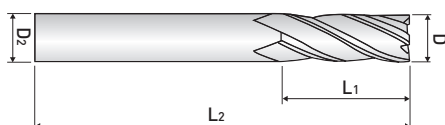
○:General Application ◎:The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for stainless steel *Neo Classic X-STAR Series*



4 FLUTE, REGULAR LENGTH

- 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

XE304 ...series



FINE GRAIN



HELIX



HELIX



p.647~649

EDP. No.	D	C.L	OAL	SH. Dia.
XE304 030	3	10	50	6
XE304 040	4	12	50	6
XE304 050	5	15	50	6
XE304 060	6	15	57	6
XE304 070	7	20	63	8
XE304 080	8	20	63	8
XE304 090	9	25	72	10
XE304 100	10	25	72	10
XE304 110	11	30	80	12
XE304 120	12	30	80	12
XE304 130	13	35	80	12
XE304 140	14	35	80	12
XE304 160	16	42	100	16
XE304 180	18	45	100	16
XE304 200	20	48	105	20

Endmills for stainless steel – Neo Classic X-STAR Series

■ Applicable Working Material

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					
◎	◎	○	◎	◎	○				◎

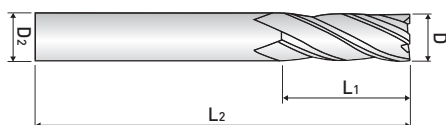
○:General Application ◎:The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for stainless steel *Neo Classic X-STAR Series*



4 FLUTES, VARIABLE HELIX ENDMILL FOR A COMPLEX AUTOMATIC LATHE (X-STAR MINI)

- Minimize resonance phenomenon with Variable helix
- Suitable for a low hardness machine (automatic lathe) with unique design

XM304 ...series



FINE GRAIN



HELIX



HELIX



p.647~649

EDP. No.	D	C.L	OAL	SH. Dia.
XM304 030	3	5	35	3
XM304 040	4	6	40	4
XM304 050	5	8	40	5
XM304 060	6	10	45	6
XM304 070	7	12	45	7
XM304 080	8	12	45	8
XM304 090	9	15	50	9
XM304 100	10	15	50	10

■ Applicable Working Material

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					
◎	◎	○	◎	◎	○				◎

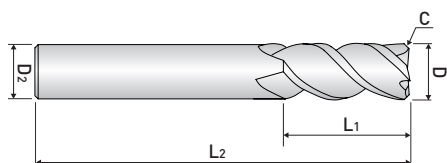
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for stainless steel *Neo Classic X-STAR Series*



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



ULTRA FINE



HELIX



HELIX



p.647~649

EDP. No.	D	C	L ₁	L ₂	D ₂
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

※ Flat shank is available upon request

ex) XCC504100F : Flat shank

Endmills for stainless steel – Neo Classic X-STAR Series

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○	◎	◎	○				◎

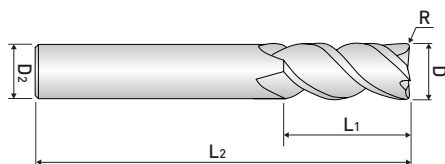
○:General Application ◎:The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for stainless steel *Neo Classic X-STAR Series*



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
- Reinforced bending moment because of double core geometry

XCR504 ...series



p.647~649

EDP. No.	D	R	L ₁	L ₂	D ₂
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			

※ Flat shank is available upon request

ex) XCR5041005F : Flat shank

■ Applicable Working Material

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					
◎	◎	○	◎	◎	○				◎

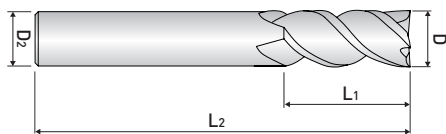
○:General Application ◎:The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for stainless steel *Neo Classic X-STAR Series*



3 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

XCE503 ...series



ULTRA FINE



HELIX



p.647~649

EDP. No.	D	L ₁	L ₂	D ₂
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

※ Flat shank is available upon request

ex) XCE503100F : Flat shank

Endmills for stainless steel – Neo Classic X-STAR Series

■ Applicable Working Material

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					
◎	◎	○	◎	◎	○				◎

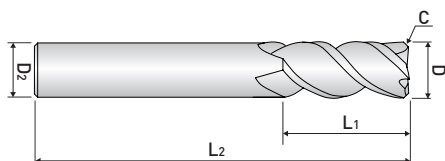
○:General Application ◎:The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for stainless steel *Neo Classic X-STAR Series*



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



p.647~649

EDP. No.	D	C	L ₁	L ₂	D ₂
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

※ Flat shank is available upon request

ex) XCC503100F : Flat shank

■ Applicable Working Material

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					
◎	◎	○	◎	◎	○				◎

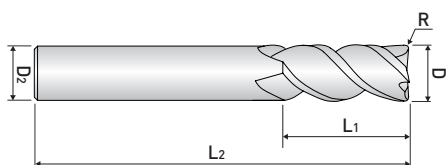
○:General Application ◎:The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for stainless steel *Neo Classic X-STAR Series*



3 FLUTE, REGULAR LENGTH CORNER RADIUS, DOUBLE CORE

- 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



ULTRA FINE



HELIX



p.647~649

EDP. No.	D	R	L ₁	L ₂	D ₂
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			

※ Flat shank is available upon request

ex) XCR5031010F : Flat shank

Endmills for stainless steel – Neo Classic X-STAR Series

■ Applicable Working Material

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					
◎	◎	○	◎	◎	○				◎

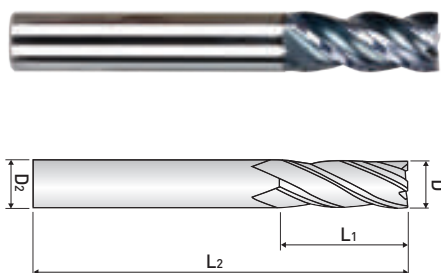
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for stainless steel *Neo Classic X-STAR Series*



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



ULTRA FINE



HELIX



HELIX



p.647~649

EDP. No.	D	L ₁	L ₂	D ₂
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

※ Flat shank is available upon request

ex) XE504100F : Flat shank

■ Applicable Working Material

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					
◎	◎	○	◎	◎	○				◎

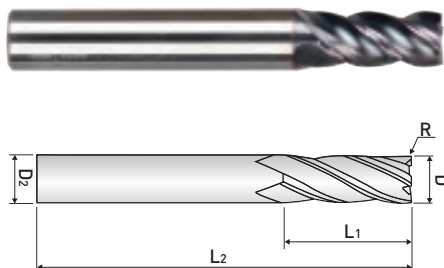
○:General Application ◎:The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for stainless steel *Neo Classic X-STAR Series*



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

XR504 ...series



p.647~649

EDP. No.	D	R	L ₁	L ₂	D ₂
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

※ Flat shank is available upon request

ex) XR504100F : Flat shank

■ Applicable Working Material

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					
◎	◎	○	◎	◎	○				◎

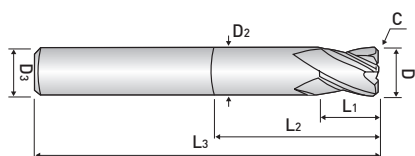
○:General Application ◎:The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for stainless steel *Neo Classic X-STAR Series*



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



p.647~649

EDP. No.	D	L ₁	L ₂	L ₃	D ₂	D ₃
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

※ Flat shank is available upon request

ex) XE514100F : Flat shank

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○	◎	◎	○				◎

○:General Application ◎:The most suitable Application

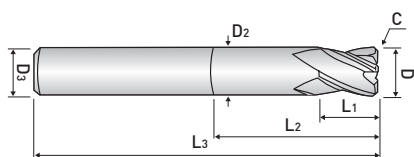
■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for stainless steel

Neo Classic X-STAR Series



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



ULTRA FINE



HELIX



HELIX



p.647~649

EDP. No.	D	L ₁	L ₂	L ₃	D ₂	D ₃
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

※ Flat shank is available upon request

ex) XE524100F : Flat shank

Endmills for stainless steel – Neo Classic X-STAR Series

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○	◎	◎	○				◎

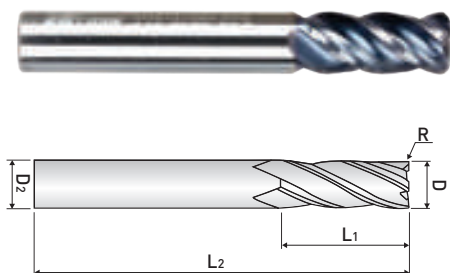
○:General Application ◎:The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for stainless steel *Neo Classic X-STAR Series*



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
- Applied various corner radius.
- Sharp cutting edge geometry designed for excellent performance on mild mold steel and stainless steel

XR514 ...series



p.647~649

EDP. No.	D	R	L ₁	L ₂	D ₂
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			

※ Flat shank is available upon request

ex) XR5141010 : Flat shank

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○	◎	◎	○				◎

○: General Application ◎: The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.



Endmills for high speed & general cutting

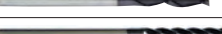
ZAMUS CLASSIC SERIES(~HRc55)

ENDMILL
SERIES



Endmills for high speed & general cutting _ ZAMUS CLASSIC SERIES

WIDIN

EDP. No.	APPEARANCE	FEATURE	INCH & METRIC	STOCK	PAGE
DB402 ...series		SHORT LENGTH, BALL NOSE	METRIC	•	205
DB412 ...series		15° HELIX STUB CUT LENGTH, BALL NOSE with EXTENDED NECK	METRIC	•	206
DB512 ...series		LONG LENGTH, BALL NOSE	METRIC	•	207
DB514 ...series		LONG LENGTH, BALL NOSE	METRIC	•	208
DB502 ...series		STUB CUT LENGTH, BALL NOSE with EXTENDED NECK	METRIC	•	209
DB522 ...series		EXTENDED NECK-LONG SHANK	METRIC	•	210
DB532 ...series		MMC-SPHERE TYPE	METRIC	•	211
DB534 ...series		MMC-SPHERE TYPE	METRIC	•	212
DB54(5)2 ...series		BALL NOSE with TAPER NECK	METRIC	•	213
ZE502 ...series		REGULAR LENGTH	METRIC	•	214
ZE504 ...series		REGULAR LENGTH	METRIC	•	215
ZE503 ...series		REGULAR LENGTH	METRIC	•	216
ZE506 ...series		REGULAR & LONG LENGTH	METRIC	•	217
ZM502 ...series		MEDIUM LENGTH	METRIC	•	218
ZM504 ...series		MEDIUM LENGTH	METRIC	•	219
ZM522 ...series		MEDIUM CUT, LONG SHANK TYPE	METRIC	•	220
ZM524 ...series		MEDIUM CUT, LONG SHANK TYPE	METRIC	•	221
ZE522 ...series		LONG LENGTH	METRIC	•	222
ZE524 ...series		LONG LENGTH	METRIC	•	223
ZE534 ...series		EXTRA LONG LENGTH	METRIC	•	224
ZE512 ...series		35° HELIX REGULAR LENGTH	METRIC	•	225
ZE514 ...series		45° HELIX REGULAR LENGTH	METRIC	•	226
ZE516 ...series		50° HELIX REGULAR LENGTH	METRIC	•	227
ZR502 ...series		STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK	METRIC	•	228
ZR504 ...series		STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK	METRIC	•	229
ZR512 ...series		REGULAR LENGTH, CORNER RADIUS	METRIC	•	230
ZR514 ...series		REGULAR LENGTH, CORNER RADIUS	METRIC	•	231
ZR522 ...series		LONG LENGTH, CORNER RADIUS	METRIC	•	232
ZR524 ...series		LONG LENGTH, CORNER RADIUS	METRIC	•	233
TPRB4 ...-...-050 series		30° TAPER BALL, RIB PROCESSING	METRIC	•	234
TPRB4 ...-...-075 series		45° TAPER BALL, RIB PROCESSING	METRIC	•	235
TPRB4 ...-...-100 series		1° TAPER BALL, RIB PROCESSING	METRIC	•	236

NEXT >>

Endmills for high speed & general cutting _ ZAMUS CLASSIC SERIES

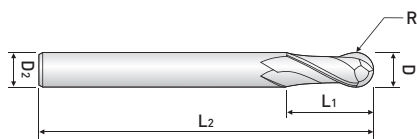
WIDIN

EDP. No.	APPEARANCE	FEATURE	INCH & METRIC	STOCK	PAGE
TPRB4 ...-...-150 series		1°30' TAPER BALL, RIB PROCESSING	METRIC	•	238
TPRB4 ...-...-200 series		2° TAPER BALL, RIB PROCESSING	METRIC	•	240
TPRE4 ...-...-050 series		30° TAPER BALL, RIB PROCESSING	METRIC	•	242
TPRE4 ...-...-075 series		45° TAPER, RIB PROCESSING	METRIC	•	244
TPRE4 ...-...-100 series		1° TAPER, RIB PROCESSING	METRIC	•	246
TPRE4 ...-...-150 series		1°30' TAPER, RIB PROCESSING	METRIC	•	248
TPRE4 ...-...-200 series		2° TAPER, RIB PROCESSING	METRIC	•	250
TPRE4 ...-...-300 series		3° TAPER BALL, RIB PROCESSING	METRIC	•	252
TE503 series		TAPER END MILL	METRIC	•	253
TB503 ...series		TAPER BALL END MILL	METRIC	•	254
TB504 ...series		TAPER BALL END MILL	METRIC	•	255
ZF60 series		ROUGHING END MILL	METRIC	•	256
ZF61 ...series		ROUGHING END MILL - FINE PITCH	METRIC	•	257
PK503 ...series		Z - AXIS ROUGHING END MILL	METRIC	•	258

■ CODE SYSTEM

Z	R	5	0	4	12	10	S4
Classification	Shape	Grade	Length, Shank type	No. of Flute	Diameter	Corner radius	Shank Diameter
D : Dynamic	A : Inch Size	4 : Grade	0 : Straight	2 : 2 Flute	0.4	0.2	4
M : Miniature	D : Dinamic Ball	5 : Grade	1 : Neck	3 : 3 Flute	32	3	32
Z : Zamus Endmill	Z : Square		2 : Long Cutting Length, Long	4 : 4 Flute			
F : Inch Size	B : Ball type		3 : Extra Long Cutting Length	6 : 6 Flute			
T : Tapered	E : Square			8 : 8 Flute			
PK : Plunge Roughing	M : Medium Cutting Length						
TREB604 : Tapered Rib(Ball)	R : Radius						
TPRE604 : Tapered Rib(Square)	F : Roughing						

Endmills for high speed & general cutting ZAMUS CLASSIC Series



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



ULTRA FINE



HELIX



±0.01



p.672

EDP. No.	D	R	L ₁	L ₂	D ₂
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

Endmills for high speed & general cutting – ZAMUS CLASSIC Series

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

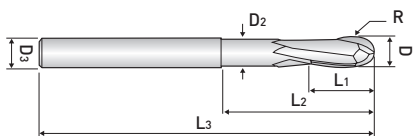
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



2 FLUTE, 15° HELIX 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.

DB412 ...series



ULTRA FINE



HELIX

R
±0.01

ALTiN



p.668

EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂	D ₃
DB412010	1	0.5	1	3	50	0.95	4
DB412015	1.5	0.75	2	5	50	1.4	4
DB412020	2	1	3	6	50	1.9	6
DB412030S	3	1.5	4	8	50	2.9	4
DB412030L					75		6
DB412040S	4	2	5	10	50	3.9	4
DB412040L					75		6
DB412050	5	2.5	5	10	50	4.9	6
DB412060S	6	3	6	12	50	5.9	6
DB412060L				16	100		
DB412080	8	4	8	16	60	7.9	8
DB412080L				25	100		
DB412100	10	5	10	20	70	9.9	10
DB412100L				30	100		

※ These tools are manufactured based on order received.

■ Applicable Working Material

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					
○	○	◎	○				○		○

○: General Application ◎: The most suitable Application

■ Tolerance

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

※ Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



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 ₁	L ₂	D ₂
DB512010S4	1	0.5	3	50	4
DB512010					6
DB512015	1.5	0.75	4	50	6
DB512020S4	2	1	5	60	4
DB512020					6
DB512025	2.5	1.25	6	60	6
DB512030S4	3	1.5	8	70	4
DB512030					6
DB512035	3.5	1.75	8	70	6
DB512040S4	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

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

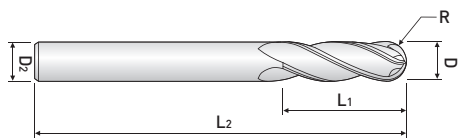
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



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



ULTRA FINE



HELIX



p.673

EDP. No.	D	R	L ₁	L ₂	D ₂
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

■ Applicable Working Material

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					
○	○	◎	○				○		○

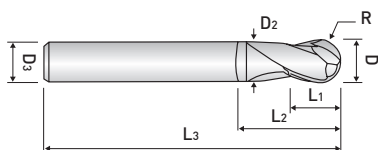
○: General Application ◎: The most suitable Application

■ Tolerance

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

※Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



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



ULTRA FINE



HELIX



p.672

EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂	D ₃
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

Endmills for high speed & general cutting – ZAMUS CLASSIC Series

■ Applicable Working Material

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					
○	○	◎	○				○		○

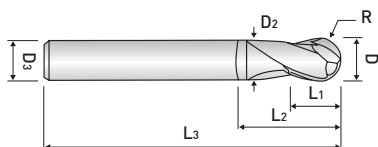
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



2 FLUTE, EXTENDED NECK-LONG SHANK

- 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

DB522 ...series



ULTRA FINE



HELIX



p.672

EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂	D ₃
DB522030	3	1.5	4	35	100	2.9	6
DB522040	4	2	6	35	100	3.9	6
DB522050	5	2.5	7	40	115	4.9	6
DB522060	6	3	8	45	115	5.9	6
DB522061							8
DB522070	7	3.5	10	45	125	6.9	8
DB522080	8	4	12	55	125	7.9	8
DB522081							10
DB522090	9	4.5	15	65	140	8.9	10
DB522100	10	5	15	65	140	9.9	10
DB522120	12	6	18	75	150	11.9	12
DB522140	14	7	23	75	155	13.9	14
DB522160	16	8	30	75	155	15.9	16

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

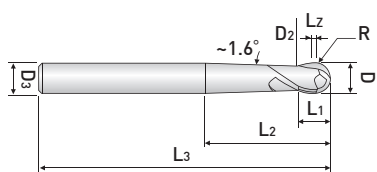
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



2 FLUTE, MMC-SPHERE TYPE

- For copy milling & steep sloped machining in mold & die
- AlTiN coated for high wear resistance

DB532 ...series



EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂	D ₃	L _z
DB532030	3	1.5	4	30	80	2.5	6	1.5
DB532031			2.3					-
DB532040	4	2	5	30	80	3.3	6	1.5
DB532041			3.1					-
DB532050	5	2.5	6	43	80	4.1	6	2
DB532051			3.9	38				-
DB532060	6	3	7	30	100	4.7	6	2
DB532061			4.9	28				-
DB532080	8	4	9	36	100	6.5	8	3
DB532081			6.3	33				-
DB532100	10	5	11	43	100	8.2	10	3
DB532101			7.9	40				-
DB532120	12	6	13	52	100	9.8	12	3
DB532121			9.5	49				-
DB532160	16	8	15	61	150	13.4	16	3
DB532161			12.4	59				-

Endmills for high speed & general cutting – ZAMUS CLASSIC Series

■ Applicable Working Material

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					
○	○	◎	○				○		○

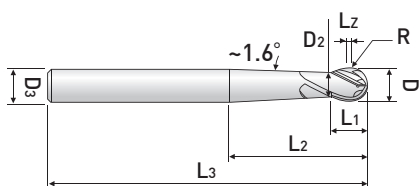
○: General Application ◎: The most suitable Application

■ Tolerance

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

※Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



4 FLUTE, MMC-SPHERE TYPE

- For copy milling & Steep sloped machining in Mold & Die
- AlTiN coated for high wear resistance

DB534 ...series



ULTRA FINE



HELIX



±0.01



AlTiN



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EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂	D ₃	L _z
DB534050	5	2.5	6	43	80	4.1	6	2
DB534051			3.9	38				-
DB534060	6	3	7	30	100	4.7	6	2
DB534061			4.9	28				-
DB534080	8	4	9	36	100	6.5	8	3
DB534081			6.3	33				-
DB534100	10	5	11	43	100	8.2	10	3
DB534101			7.9	40				-
DB534120	12	6	13	52	100	9.8	12	3
DB534121			9.5	49				-
DB534160	16	8	15	61	150	13.4	16	3
DB534161			12.4	59				-

■ Applicable Working Material

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					
○	○	◎	○				○		○

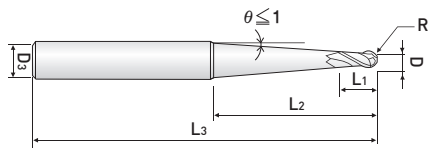
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



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



ULTRA FINE



HELIX

R
±0.01

A/TiN

DATA
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EDP. No.	D	R	L ₁	L ₂	L ₃	D ₃
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	

Endmills for high speed & general cutting – ZAMUS CLASSIC Series

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

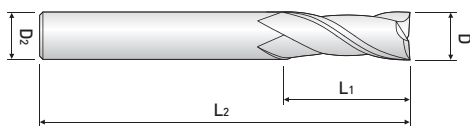
○: General Application ◎: The most suitable Application

■ Tolerance

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

※Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



2 FLUTE, REGULAR LENGTH

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

ZE502 ...series



EDP. No.	D	L ₁	L ₂	D ₂
ZE502010S4	1	3	42	4
ZE502010				6
ZE502015	1.5	4	42	6
ZE502020S4				4
ZE502020	2	6	42	6
ZE502025				6
ZE502030S4	2.5	8	42	6
ZE502030				4
ZE502035	3	10	50	6
ZE502040S4				4
ZE502040	3.5	10	50	6
ZE502045				4
ZE502050	4	12	50	6
ZE502055				6
ZE502060	4.5	14	50	6
ZE502065				6
ZE502070	5	15	50	6
ZE502075				6
ZE502080	5.5	15	50	6
ZE502085				6
ZE502090	6	15	50	6
ZE502095				6
ZE502100	6.5	18	60	8
ZE502105				8
ZE502110	7	20	60	8
ZE502115				8
ZE502120	7.5	20	60	8
ZE502125S12				10
ZE502130S12	8	20	60	10
ZE502130				10
ZE502130S16	8.5	23	70	12
ZE502140				12
ZE502140S16	9	25	70	12
ZE502150				12
ZE502160	9.5	25	70	12
ZE502170				12
ZE502180	10	25	70	12
ZE502190				12
ZE502200	10.5	28	75	12
ZE502210				12
ZE502220	11	30	75	12
ZE502230				12
ZE502240	11.5	30	75	12
ZE502250				12
ZE502260	12	30	75	12
ZE502270				12
ZE502280	12.5	30	80	12
ZE502290				12
ZE502300	13	30	80	12
ZE502310				12
ZE502320	13	35	85	14
ZE502330				14
ZE502340	14	35	85	16
ZE502350				16
ZE502360	14	35	90	16
ZE502370				16
ZE502380	15	40	90	16
ZE502390				16
ZE502400	16	40	90	16
ZE502410				16
ZE502420	17	40	100	16
ZE502430				16
ZE502440	18	45	100	18
ZE502450				18
ZE502460	19	45	100	20
ZE502470				20
ZE502480	20	45	100	20
ZE502490				20
ZE502500	22	45	100	20
ZE502510				20
ZE502520	24	50	120	25
ZE502530				25
ZE502540	25	50	120	25
ZE502550				25

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

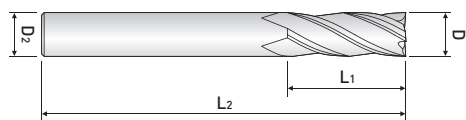
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



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 ₁	L ₂	D ₂
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

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

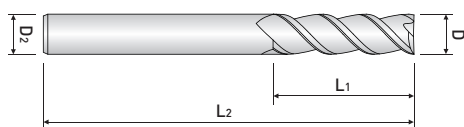
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



3 FLUTE, REGULAR LENGTH

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

ZE503 ...series



EDP. No.	D	L ₁	L ₂	D ₂
ZE503060	6	15	50	6
ZE503070	7	18	60	8
ZE503080	8	18	60	8
ZE503090	9	22	70	10
ZE503100	10	22	70	10
ZE503110	11	26	75	12
ZE503120	12	26	75	12
ZE503130	13	32	85	14
ZE503140	14	32	85	14
ZE503150	15	35	90	16
ZE503160	16	35	90	16
ZE503180	18	40	100	18
ZE503200	20	40	100	20
ZE503250	25	50	120	25
ZE503320	32	70	150	32

■ Applicable Working Material

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					
○	○	◎	○				○		○

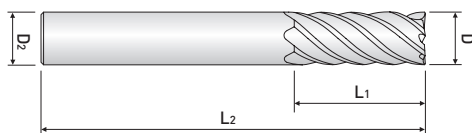
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



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 ₁	L ₂	D ₂
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

Endmills for high speed & general cutting – ZAMUS CLASSIC Series

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

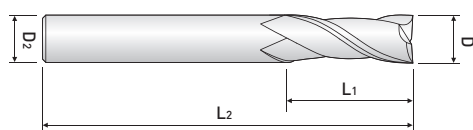
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



2 FLUTE, MEDIUM LENGTH

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

ZM502 ...series



ULTRA FINE



HELIX



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EDP. No.	D	L ₁	L ₂	D ₂
ZM502020	2	8	40	4
ZM502030	3	12	50	6
ZM502040	4	15	50	6
ZM502050	5	20	60	6
ZM502060	6	20	60	6
ZM502080	8	25	70	8
ZM502100	10	30	90	10
ZM502120	12	30	90	12
ZM502140	14	40	110	16
ZM502160	16	50	110	16
ZM502180	18	50	110	20
ZM502200	20	55	110	20
ZM502250	25	75	140	25

Endmills for high speed & general cutting – ZAMUS CLASSIC Series

■ Applicable Working Material

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					
○	○	◎	○				○		○

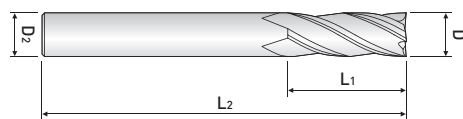
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



4 FLUTE, MEDIUM LENGTH

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

ZM504 ...series



ULTRA FINE



HELIX



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EDP. No.	D	L ₁	L ₂	D ₂
ZM504020	2	8	40	4
ZM504030	3	12	50	6
ZM504040	4	15	50	6
ZM504050	5	20	60	6
ZM504060	6	20	60	6
ZM504080	8	25	70	8
ZM504100	10	30	90	10
ZM504120	12	30	90	12
ZM504140	14	40	110	16
ZM504160	16	50	110	16
ZM504180	18	50	110	20
ZM504200	20	55	110	20
ZM504250	25	75	140	25

Endmills for high speed & general cutting – ZAMUS CLASSIC Series

■ Applicable Working Material

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					
○	○	◎	○				○		○

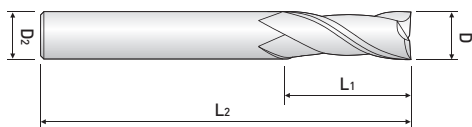
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



2 FLUTE, MEDIUM CUT LONG SHANK TYPE

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

ZM522 ...series



ULTRA FINE



HELIX



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EDP. No.	D	L ₁	L ₂	D ₂
ZM522030	3	10	70	6
ZM522040	4	12	70	6
ZM522050	5	15	80	6
ZM522060	6	15	80	6
ZM522080	8	20	100	8
ZM522100	10	25	100	10
ZM522120	12	30	110	12
ZM522160	16	40	125	16
ZM522200	20	45	150	20

Endmills for high speed & general cutting – ZAMUS CLASSIC Series

■ Applicable Working Material

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					
○	○	◎	○				○		○

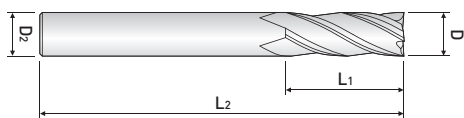
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



4 FLUTE, MEDIUM CUT LONG SHANK TYPE

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

ZM524 ...series



EDP. No.	D	L ₁	L ₂	D ₂
ZM524030	3	10	70	6
ZM524040	4	12	70	6
ZM524050	5	15	80	6
ZM524060	6	15	80	6
ZM524080	8	20	100	8
ZM524100	10	25	100	10
ZM524120	12	30	110	12
ZM524160	16	40	125	16
ZM524200	20	45	150	20

Endmills for high speed & general cutting – ZAMUS CLASSIC Series

■ Applicable Working Material

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					
○	○	◎	○				○		○

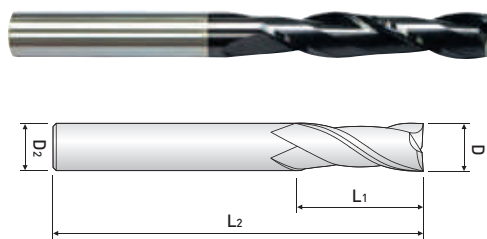
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



2 FLUTE, LONG LENGTH

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

ZE522 ...series



EDP. No.	D	L ₁	L ₂	D ₂
ZE522030	3	25	75	6
ZE522040	4	25	75	6
ZE522050	5	30	80	6
ZE522060	6	30	80	6
ZE522070	7	35	85	8
ZE522080	8	35	85	8
ZE522090	9	45	100	10
ZE522100	10	45	100	10
ZE522101		60	155	
ZE522110	11	50	110	12
ZE522120	12	55	120	12
ZE522121		65	155	
ZE522140	14	60	120	14
ZE522160	16	60	120	16
ZE522161		75	165	
ZE522180	18	60	120	18
ZE522200	20	60	120	20
ZE522201		75	165	

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

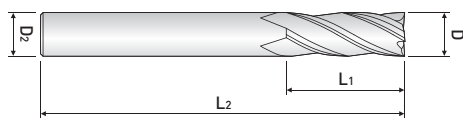
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



4 FLUTE, LONG LENGTH

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

ZE524 ...series



ULTRA FINE



HELIX



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EDP. No.	D	L ₁	L ₂	D ₂
ZE524030	3	25	75	6
ZE524040	4	25	75	6
ZE524050	5	30	80	6
ZE524060	6	30	80	6
ZE524070	7	35	85	8
ZE524080	8	35	85	8
ZE524090	9	45	100	10
ZE524100	10	45	100	10
ZE524110	11	50	110	12
ZE524120	12	55	120	12
ZE524140	14	60	120	14
ZE524160	16	60	120	16
ZE524180	18	60	120	18
ZE524200	20	60	120	20

Endmills for high speed & general cutting – ZAMUS CLASSIC Series

■ Applicable Working Material

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					
○	○	◎	○				○		○

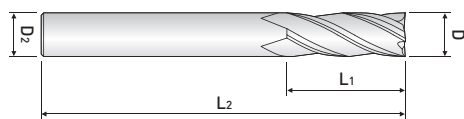
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



4 FLUTE, EXTRA LONG LENGTH

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

ZE534 ...series



EDP. No.	D	L ₁	L ₂	D ₂
ZE534040	4	30	130	6
ZE534050	5	35	130	6
ZE534060	6	40	130	6
ZE534061		50	155	
ZE534081	8	60	155	8
ZE534082		80	200	
ZE534101	10	60	155	10
ZE534102		80	200	
ZE534121	12	60	155	12
ZE534122		80	200	
ZE534161	16	80	155	16
ZE534162		100	200	
ZE534163		120	250	
ZE534201	20	80	165	20
ZE534202		100	200	
ZE534203		130	250	
ZE534252	25	100	200	25
ZE534253		150	250	

※ Please reduce cutting speed around 20~30% from the above table for ZE534 series.

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

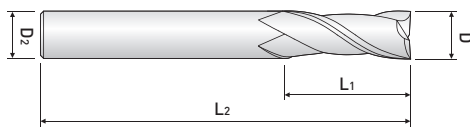
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



2 FLUTE, 35° HELIX REGULAR LENGTH

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

ZE512 ...series



EDP. No.	D	L ₁	L ₂	D ₂
ZE512010	1	3	40	6
ZE512015	1.5	4	40	6
ZE512020	2	5	40	6
ZE512025	2.5	6	40	6
ZE512030	3	8	45	6
ZE512035	3.5	10	45	6
ZE512040	4	10	45	6
ZE512045	4.5	11	45	6
ZE512050	5	13	50	6
ZE512055	5.5	13	50	6
ZE512060	6	13	50	6
ZE512065	6.5	16	60	8
ZE512070	7	18	60	8
ZE512080	8	19	60	8
ZE512100	10	22	70	10
ZE512120	12	26	75	12

※ These tools are manufactured based on order received.

Endmills for high speed & general cutting – ZAMUS CLASSIC Series

■ Applicable Working Material

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					
○	○	◎	○				○		○

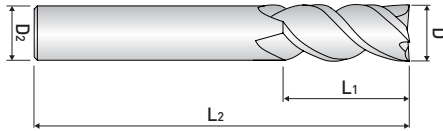
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



4 FLUTE, 45° HELIX REGULAR LENGTH

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

ZE514 ...series



EDP. No.	D	L ₁	L ₂	D ₂
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

※ These tools are manufactured based on order received.

Endmills for high speed & general cutting – ZAMUS CLASSIC Series

■ Applicable Working Material

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					
○	○	◎	○				○		○

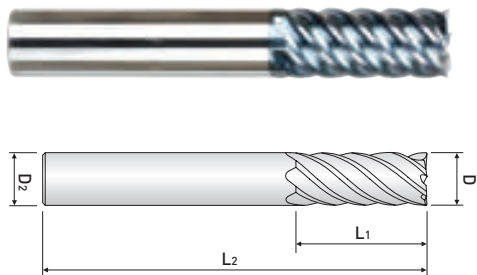
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



6 FLUTE, 50° HELIX REGULAR LENGTH

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

ZE516 ...series



EDP. No.	D	L ₁	L ₂	D ₂
ZE516060	6	13	50	6
ZE516080	8	18	60	8
ZE516100	10	22	70	10
ZE516120	12	26	75	12
ZE516160	16	35	90	16
ZE516200	20	44	100	20

※ These tools are manufactured based on order received.

Endmills for high speed & general cutting – ZAMUS CLASSIC Series

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

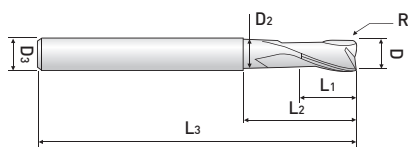
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



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



ULTRA FINE



HELIX

R
±0.02

A/TiN



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EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂	D ₃
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					

■ Applicable Working Material

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					
○	○	◎	○				○		○

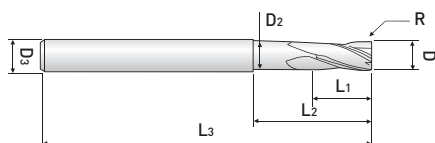
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



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 ₁	L ₂	L ₃	D ₂	D ₃
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	9.7	10
ZR5041010		1					
ZR5041015		1.5					
ZR5041020		2					
ZR5041205	12	0.5	15	30	82	11.7	12
ZR5041210		1					
ZR5041215		1.5					
ZR5041220		2					

Endmills for high speed & general cutting – ZAMUS CLASSIC Series

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

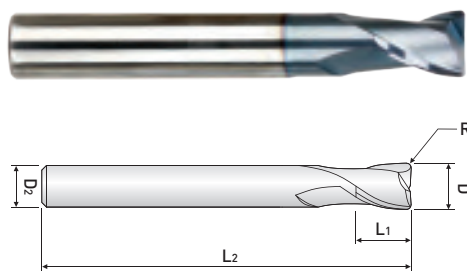
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



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



ULTRA FINE



HELIX



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EDP. No.	D	R	L ₁	L ₂	D ₂
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			

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

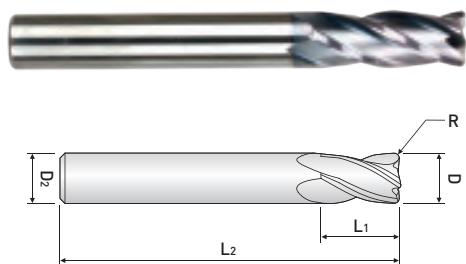
○: General Application ◎: The most suitable Application

■ Tolerance

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

※Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



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



ULTRA FINE



HELIX



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EDP. No.	D	R	L ₁	L ₂	D ₂
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	12	3	30	82	12
ZR5141205		0.5			
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	20	3	45	110	20
ZR5142005		0.5			
ZR5142010		1			
ZR5142015		1.5			
ZR5142020		2			
ZR5142030		3			

■ Applicable Working Material

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					
○	○	◎	○				○		○

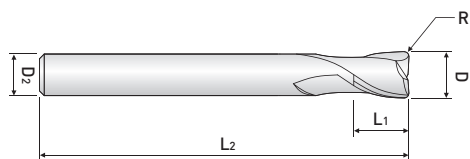
○: General Application ◎: The most suitable Application

■ Tolerance

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

※Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



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



ULTRA FINE



HELIX



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EDP. No.	D	R	L ₁	L ₂	D ₂
ZR5220302S4	3	0.2	8	60	4
ZR5220302					6
ZR5220305S4		0.5			4
ZR5220305					6
ZR5220402S4	4	0.2	11	70	4
ZR5220402		0.2			6
ZR5220405S4		0.5			4
ZR5220405		0.5			6
ZR5220410S4		1			4
ZR5220410		1			6
ZR5220502	5	0.2	13	80	6
ZR5220505		0.5			
ZR5220510		1			
ZR5220602	6	0.2	13	90	6
ZR5220605		0.5			
ZR5220610		1			
ZR5220805	8	0.5	19	100	8
ZR5220810		1			
ZR5220815		1.5			
ZR5220820		2			
ZR5221005	10	0.5	22	100	10
ZR5221010		1			
ZR5221015		1.5			
ZR5221020		2			
ZR5221025		2.5			
ZR5221205	12	0.5	26	110	12
ZR5221210		1			
ZR5221215		1.5			
ZR5221220		2			
ZR5221225		2.5			
ZR5221230		3			

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

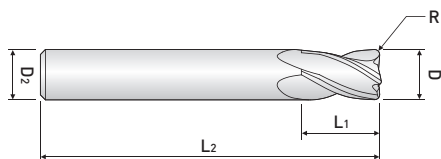
○: General Application ◎: The most suitable Application

■ Tolerance

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

※Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



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



ULTRA FINE



HELIX



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EDP. No.	D	R	L ₁	L ₂	D ₂
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			
ZR5240510		1			
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			

■ Applicable Working Material

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					
○	○	◎	○				○		○

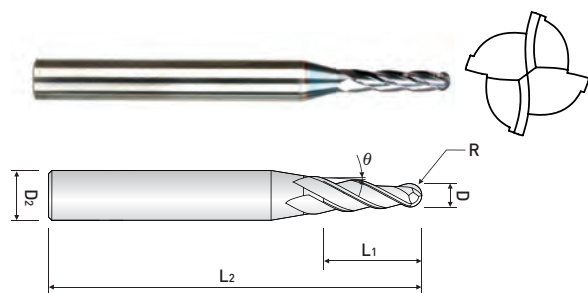
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



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	θ	L ₁	L ₂	D ₂
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		
TPRB4010-16-050	0.6	30'	16	50	4
TPRB4012-06-050			6	45	
TPRB4012-08-050			8		
TPRB4012-10-050			10		
TPRB4012-12-050			12		
TPRB4012-16-050			16	50	
TPRB4015-08-050	0.75	30'	8	45	4
TPRB4015-10-050			10		
TPRB4015-12-050			12		
TPRB4015-16-050			16		
TPRB4015-20-050	0.8	30'	20	55	4
TPRB4016-08-050			8	45	
TPRB4016-10-050			10		
TPRB4016-12-050			12		
TPRB4016-16-050			16	50	
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	1.0	30'	20	55	4
TPRB4020-10-050			10	45	
TPRB4020-12-050			12	50	
TPRB4020-16-050			16	55	
TPRB4020-20-050			20		
TPRB4020-25-050	1.25	30'	25	55	4
TPRB4025-10-050			10		
TPRB4025-12-050			12		
TPRB4025-16-050			16		
TPRB4025-20-050			20		
TPRB4025-25-050			25		

※ These tools are manufactured based on order received.

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

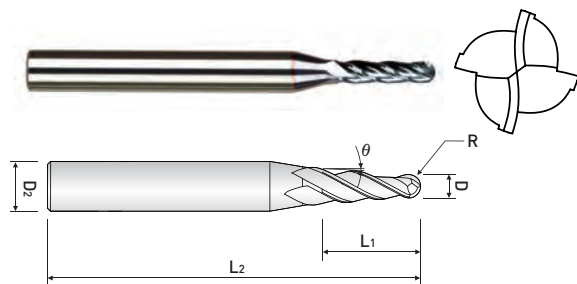
○: General Application ◎: The most suitable Application

■ Tolerance

Radius (mm)	Shank Dia.
± 0.01	h6

※ Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



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	θ	L ₁	L ₂	D ₂
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	50	
TPRB4015-08-075	0.75	45'	8	45	4
TPRB4015-10-075			10		
TPRB4015-12-075			12		
TPRB4015-16-075			16	50	
TPRB4015-20-075			20	55	
TPRB4016-08-075	0.8	45'	8	45	4
TPRB4016-10-075			10		
TPRB4016-12-075			12		
TPRB4016-16-075			16	50	
TPRB4016-20-075			20	55	
TPRB4018-08-075	0.9	45'	8	45	4
TPRB4018-10-075			10		
TPRB4018-12-075			12		
TPRB4018-16-075			16	50	
TPRB4018-20-075			20	55	
TPRB4020-10-075	1.0	45'	10	45	4
TPRB4020-12-075			12		
TPRB4020-16-075			16	50	
TPRB4020-20-075			20	55	
TPRB4020-25-075			25		
TPRB4025-10-075	1.25	45'	10	45	4
TPRB4025-12-075			12		
TPRB4025-16-075			16	50	
TPRB4025-20-075			20	55	
TPRB4025-25-075			25		

※ These tools are manufactured based on order received.

■ Applicable Working Material

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					
○	○	◎	○				○		○

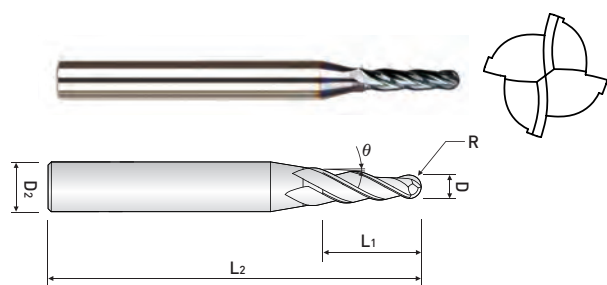
○: General Application ◎: The most suitable Application

■ Tolerance

Radius (mm)	Shank Dia.
± 0.01	h6

※ Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



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

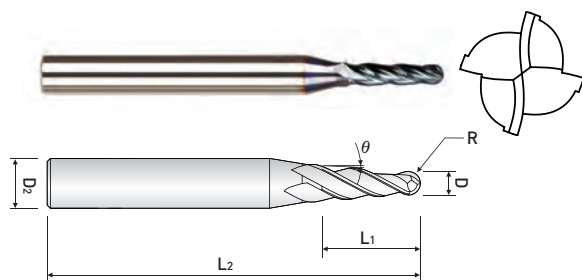


EDP. No.	R	θ	L ₁	L ₂	D ₂
TPRB4006-04-100	0.3	1°00′	4	40	4
TPRB4006-06-100			6		
TPRB4008-06-100	0.4	1°00′	6	45	4
TPRB4008-08-100			8		
TPRB4008-10-100			10		
TPRB4010-06-100	0.5	1°00′	6	45	4
TPRB4010-08-100			8		
TPRB4010-10-100			10		
TPRB4010-12-100			12		
TPRB4010-16-100			16	50	
TPRB4012-06-100	0.6	1°00′	6	45	4
TPRB4012-08-100			8		
TPRB4012-10-100			10		
TPRB4012-12-100			12		
TPRB4012-16-100			16	50	
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.

NEXT >>

Endmills for high speed & general cutting ZAMUS CLASSIC Series



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	θ	L ₁	L ₂	D ₂
TPRB4020-10-100	1.0	1°00'	10	45	4
TPRB4020-12-100			12		
TPRB4020-16-100			16	50	
TPRB4020-20-100			20	55	
TPRB4020-25-100			25		
TPRB4025-10-100	1.25	1°00'	10	45	4
TPRB4025-12-100			12		
TPRB4025-16-100			16	50	
TPRB4025-20-100			20	55	
TPRB4025-25-100			25		

※ These tools are manufactured based on order received.

Endmills for high speed & general cutting – ZAMUS CLASSIC Series

■ Applicable Working Material

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					
○	○	◎	○				○		○

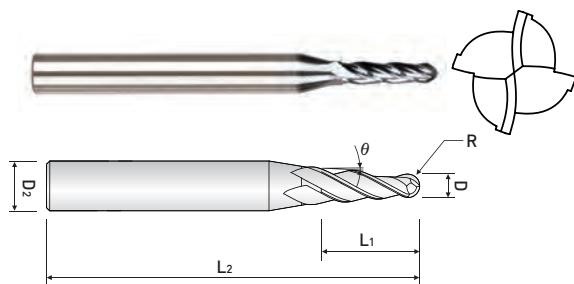
○:General Application ◎:The most suitable Application

■ Tolerance

Radius (mm)	Shank Dia.
± 0.01	h6

※ Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



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 : $\pm 10'$

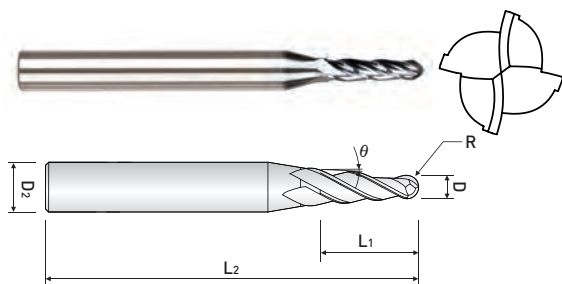
TPRB4....-150 series



EDP. No.	R	θ	L ₁	L ₂	D ₂
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	50	
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.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



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



ULTRA FINE



HELIX



± 0.01



ALTiN



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EDP. No.	R	θ	L ₁	L ₂	D ₂
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	6

※ These tools are manufactured based on order received.

Endmills for high speed & general cutting – ZAMUS CLASSIC Series

■ Applicable Working Material

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					
○	○	◎	○				○		○

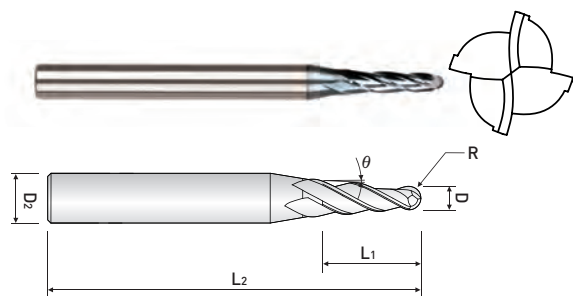
○: General Application ◎: The most suitable Application

■ Tolerance

Radius (mm)	Shank Dia.
± 0.01	h6

※ Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



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 : $\pm 10'$

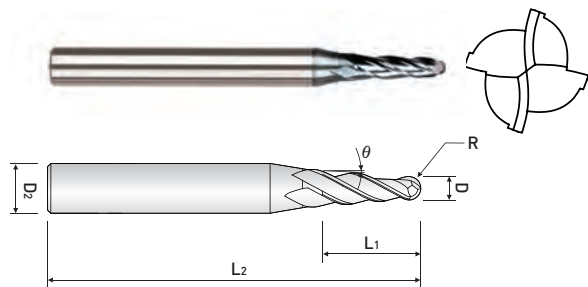
TPRB4....-200 series



EDP. No.	R	θ	L ₁	L ₂	D ₂
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	50	
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	50	
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.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



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



ULTRA FINE



HELIX



± 0.01



A/T/N



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EDP. No.	R	θ	L ₁	L ₂	D ₂
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	6
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	6

※ These tools are manufactured based on order received.

Endmills for high speed & general cutting – ZAMUS CLASSIC Series

■ Applicable Working Material

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					
○	○	◎	○				○		○

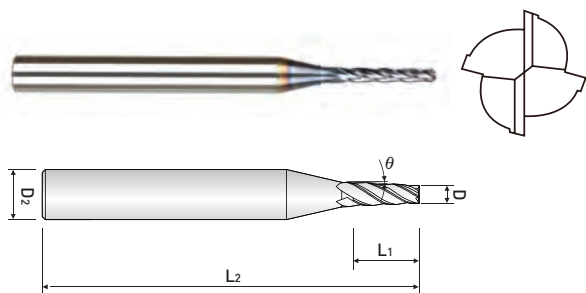
○: General Application ◎: The most suitable Application

■ Tolerance

Radius (mm)	Shank Dia.
± 0.01	h6

※ Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



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 : $\pm 10'$

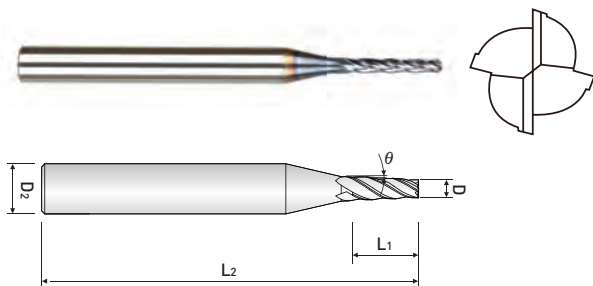
TPRE4...-050 series



EDP. No.	D	θ	L ₁	L ₂	D ₂
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.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



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 : $\pm 10'$

TPRE4...-050 series



EDP. No.	D	θ	L ₁	L ₂	D ₂
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		
TPRE4025-10-050	2.5	30'	10	45	4
TPRE4025-12-050			12		
TPRE4025-16-050			16	50	
TPRE4025-20-050			20	55	
TPRE4025-25-050			25		
TPRE4025-30-050			30	60	

※ These tools are manufactured based on order received.

■ Applicable Working Material

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					
○	○	◎	○				○		○

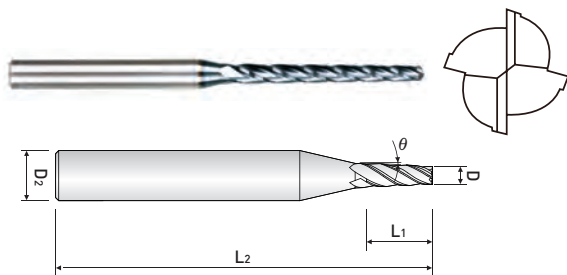
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting *ZAMUS CLASSIC Series*



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 : $\pm 10'$

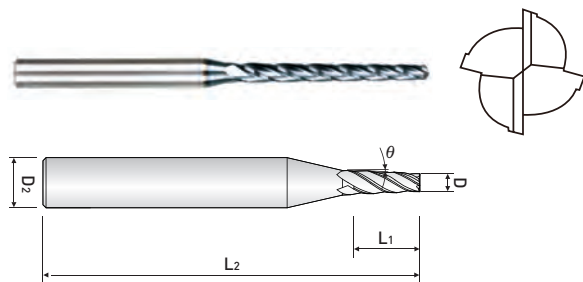
TPRE4...-075 series



EDP. No.	D	θ	L ₁	L ₂	D ₂
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.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



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 : $\pm 10'$

TPRE4...-075 series



EDP. No.	D	θ	L ₁	L ₂	D ₂
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.

Endmills for high speed & general cutting – ZAMUS CLASSIC Series

■ Applicable Working Material

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					
○	○	◎	○				○		○

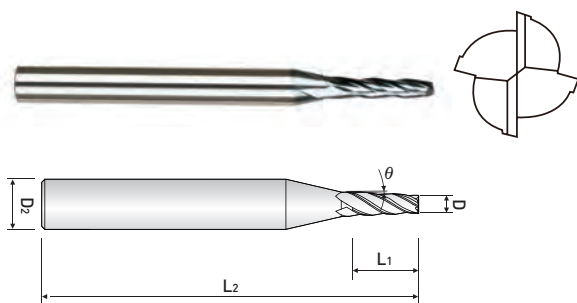
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



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 : $\pm 10'$

TPRE4...-100 series

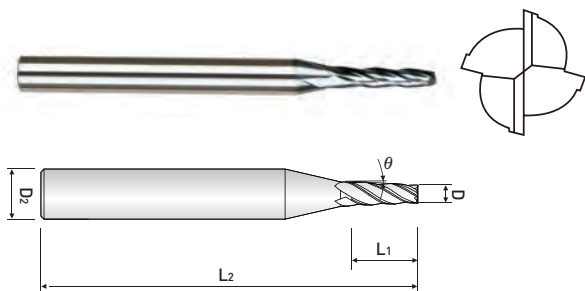


EDP. No.	D	θ	L ₁	L ₂	D ₂
TPRE4004-02-100	0.4	1°00′	2	40	4
TPRE4004-03-100			3		
TPRE4004-04-100			4		
TPRE4005-02-100	0.5	1°00′	2	40	4
TPRE4005-04-100			4		
TPRE4005-06-100			6		
TPRE4006-04-100	0.6	1°00′	4	40	4
TPRE4006-06-100			6		
TPRE4007-06-100	0.7	1°00′	6	40	4
TPRE4007-08-100			8		
TPRE4008-06-100	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.

NEXT >>

Endmills for high speed & general cutting ZAMUS CLASSIC Series



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 : $\pm 10'$

TPRE4...-100 series



EDP. No.	D	θ	L ₁	L ₂	D ₂
TPRE4015-08-100	1.5	1°00′	8	45	4
TPRE4015-10-100			10		
TPRE4015-12-100			12		
TPRE4015-16-100			16	50	
TPRE4015-20-100			20	55	
TPRE4016-08-100	1.6	1°00′	8	45	4
TPRE4016-10-100			10		
TPRE4016-12-100			12		
TPRE4016-16-100			16	50	
TPRE4016-20-100			20	55	
TPRE4018-08-100	1.8	1°00′	8	45	4
TPRE4018-10-100			10		
TPRE4018-12-100			12		
TPRE4018-16-100			16	50	
TPRE4018-20-100			20	55	
TPRE4020-10-100	2.0	1°00′	10	45	4
TPRE4020-12-100			12		
TPRE4020-16-100			16	50	
TPRE4020-20-100			20	55	
TPRE4020-25-100			25		
TPRE4025-10-100	2.5	1°00′	10	45	4
TPRE4025-12-100			12		
TPRE4025-16-100			16	50	
TPRE4025-20-100			20	55	
TPRE4025-25-100			25		
TPRE4025-30-100			30	60	
TPRE4030-25-100	3.0	1°00′	25	55	4
TPRE4030-40-100			40	80	6

※ These tools are manufactured based on order received.

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

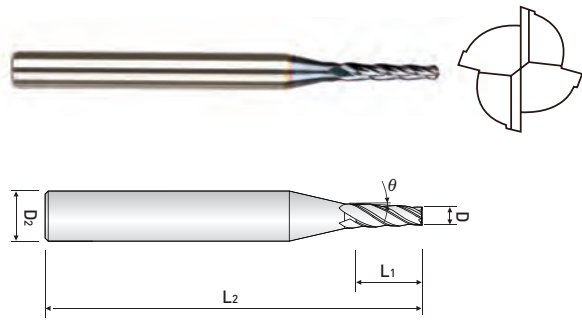
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



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 : $\pm 10'$

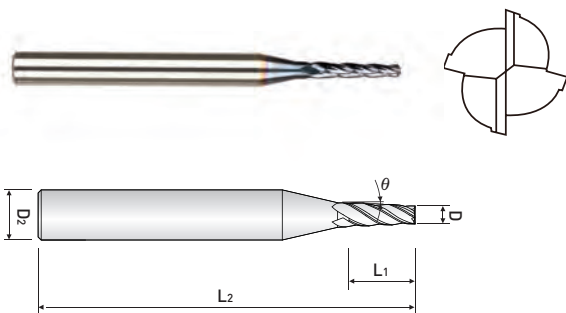
TPRE4...-150 series



EDP. No.	D	θ	L ₁	L ₂	D ₂
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.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



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 : $\pm 10'$

TPRE4...-150 series



EDP. No.	D	θ	L ₁	L ₂	D ₂
TPRE4015-08-150	1.5	1°30′	8	45	4
TPRE4015-10-150			10		
TPRE4015-12-150			12		
TPRE4015-16-150			16	50	
TPRE4015-20-150			20	55	
TPRE4016-08-150	1.6	1°30′	8	45	4
TPRE4016-10-150			10		
TPRE4016-12-150			12		
TPRE4016-16-150			16	50	
TPRE4016-20-150			20	55	
TPRE4018-08-150	1.8	1°30′	8	45	4
TPRE4018-10-150			10		
TPRE4018-12-150			12		
TPRE4018-16-150			16	50	
TPRE4018-20-150			20	55	
TPRE4020-10-150	2.0	1°30′	10	45	4
TPRE4020-12-150			12		
TPRE4020-16-150			16	50	
TPRE4020-20-150			20	55	
TPRE4020-25-150			25		
TPRE4025-10-150	2.5	1°30′	10	45	4
TPRE4025-12-150			12		
TPRE4025-16-150			16	50	
TPRE4025-20-150			20	55	
TPRE4025-25-150			25		
TPRE4025-30-150			30	65	6
TPRE4030-25-150	3.0	1°30′	25	60	6
TPRE4030-40-150					

※ These tools are manufactured based on order received.

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

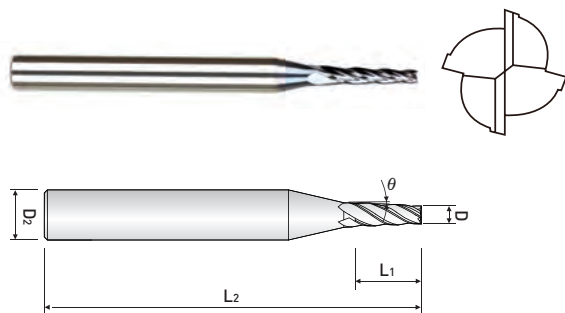
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



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 : $\pm 10'$

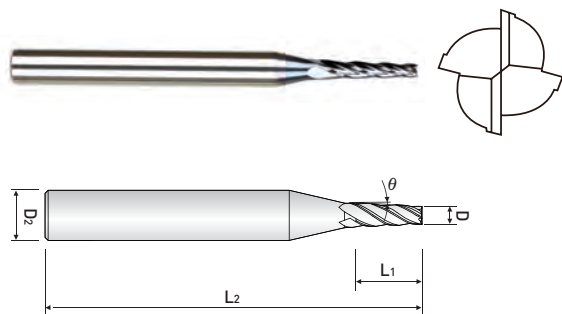
TPRE4...-200 series



EDP. No.	D	θ	L ₁	L ₂	D ₂
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	50	
TPRE4014-08-200	1.4	2°00'	8	45	4
TPRE4014-12-200			12		
TPRE4014-16-200			16	50	

※ These tools are manufactured based on order received.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



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 : $\pm 10'$

TPRE4...-200 series



EDP. No.	D	θ	L ₁	L ₂	D ₂
TPRE4015-08-200	1.5	2°00′	8	45	4
TPRE4015-10-200			10		
TPRE4015-12-200			12		
TPRE4015-16-200			16	50	
TPRE4015-20-200			20	55	
TPRE4016-08-200	1.6	2°00′	8	45	4
TPRE4016-10-200			10		
TPRE4016-12-200			12		
TPRE4016-16-200			16	50	
TPRE4016-20-200			20	55	
TPRE4018-08-200	1.8	2°00′	8	45	4
TPRE4018-10-200			10		
TPRE4018-12-200			12		
TPRE4018-16-200			16	50	
TPRE4018-20-200			20	55	
TPRE4020-10-200	2.0	2°00′	10	45	4
TPRE4020-12-200			12		
TPRE4020-16-200			16	50	
TPRE4020-20-200			20	55	
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	
TPRE4025-25-200			25	60	6
TPRE4025-30-200			30	65	
TPRE4030-25-200	3.0	2°00′	25	60	6
TPRE4030-40-200			40	80	

※ These tools are manufactured based on order received.

■ Applicable Working Material

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					
○	○	◎	○				○		○

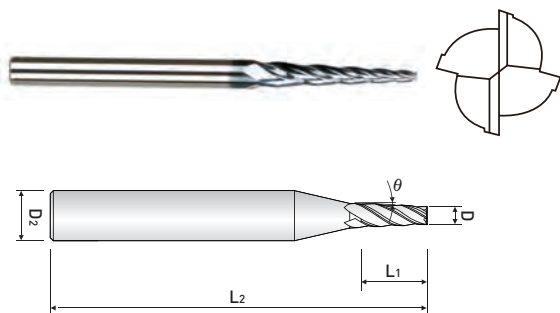
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



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 : $\pm 10'$

TPRE4...-300 series



EDP. No.	D	θ	L ₁	L ₂	D ₂
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.

■ Applicable Working Material

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					
○	○	◎	○				○		○

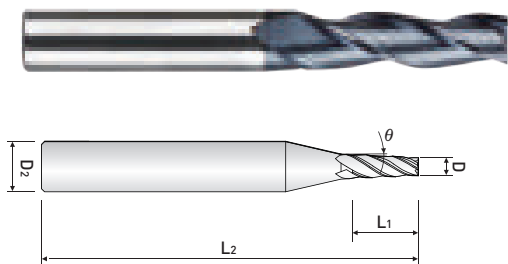
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



3 FLUTE, TAPER END MILL

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

TE503 series



EDP. No.	D	θ	L ₁	N.D	L ₂	D ₂
TE50303106	3	1°	10	3.4	50	6
TE50303206		2°		3.7		
TE50303306		3°		4		
TE50303506		5°		4.8		
TE50304106	4	1°	15	4.5	50	6
TE50304206		2°		5		
TE50304306		3°		5.6		
TE50304508		5°		6.6		8
TE50305106	5	1°	20	5.7	60	6
TE50305208		2°		6.4		8
TE50305308		3°		7.1		
TE50305508		5°	(17.1)	8.5		
TE50306108	6	1°	20	6.7	60	8
TE50306208		2°		7.4		
TE50306308		3°		8.1		
TE50306510		5°		9.5	70	10
TE50308110	8	1°	25	8.9	70	10
TE50308210		2°		9.8		
TE50308312		3°		10.6		
TE50308512		5°	(22.8)	12.4	75	12
TE50310112	10	1°	35	11.2	90	12
TE50310212		2°	28	12.4		14
TE50310314		3°	35	13.7		
TE50310516		5°	(34.3)	16.1		16

※ These tools are manufactured based on order received.

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

○:General Application ◎:The most suitable Application

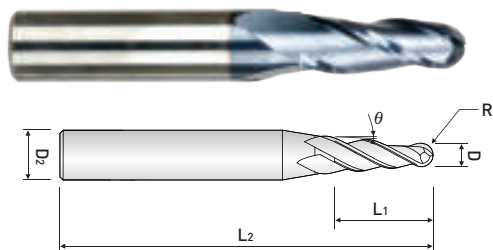
■ Tolerance

Mill Dia. (mm)	Shank Dia.
±0.02	h6

※Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting – ZAMUS CLASSIC Series

Endmills for high speed & general cutting ZAMUS CLASSIC Series



3 FLUTE, TAPER BALL END MILL

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

TB503 ...series



EDP. No.	D	R	θ	L ₁	L ₂	D ₂
TB50315306	3	1.5	3°	12	60	6
TB50320306	4	2		15	60	6
TB50325308	5	2.5		18	60	8
TB50330310	6	3		22	70	10
TB50340312	8	4		26	75	12
TB50350312	10	5		19	75	12
TB50360316	12	6		36	90	16
TB50315506	3	1.5	5°	12	60	6
TB50320508	4	2		15	60	8
TB50325510	5	2.5		18	70	10
TB50330510	6	3		22	70	10
TB50340512	8	4		26	75	12
TB50350516	10	5		30	90	16
TB50360520	12	6		36	100	20
TB50315706	3	1.5	7°	12	60	6
TB50320708	4	2		15	60	8
TB50325710	5	2.5		18	70	10
TB50330712	6	3		22	75	12
TB50340716	8	4		26	90	16
TB50350716	10	5		30	90	16
TB50360720	12	6		36	100	20

※ These tools are manufactured based on order received.

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

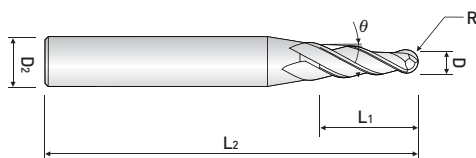
○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (mm)	Shank Dia.
±0.05	h6

※Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



4 FLUTE, TAPER BALL END MILL

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

TB504 ...series



ULTRA FINE



HELIX



p.680

EDP. No.	D	R	θ	L ₁	L ₂	D ₂
TB50425308	5	2.5	3°	18	60	8
TB50430310	6	3		22	70	10
TB50440312	8	4		26	75	12
TB50450312	10	5		19	75	12
TB50460316	12	6		36	90	16
TB50425510	5	2.5	5°	18	70	10
TB50430510	6	3		22	70	10
TB50440512	8	4		26	75	12
TB50450516	10	5		30	90	16
TB50460520	12	6		36	100	20
TB50425710	5	2.5	7°	18	70	10
TB50430712	6	3		22	75	12
TB50440716	8	4		26	90	16
TB50450716	10	5		30	90	16
TB50460720	12	6		36	100	20

※ These tools are manufactured based on order received.

Endmills for high speed & general cutting – ZAMUS CLASSIC Series

■ Applicable Working Material

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					
○	○	◎	○				○		○

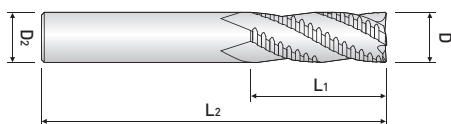
○: General Application ◎: The most suitable Application

■ Tolerance

Mill Dia. (mm)	Shank Dia.
±0.05	h6

※ Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting ZAMUS CLASSIC Series



3~6 FLUTE, ROUGHING & FINISHING END MILL

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

ZF60 series



EDP. No.	D	L ₁	L ₂	D ₂
ZF603040	4	10	50	6
ZF603050	5	13	50	6
ZF603060	6	15	50	6
ZF603070	7	18	60	8
ZF603080	8	18	60	8
ZF604090	9	22	70	10
ZF604100	10	22	70	10
ZF604110	11	26	75	12
ZF604120	12	26	75	12
ZF604130	13	32	85	14
ZF604140	14	32	85	14
ZF604150	15	35	90	16
ZF604160	16	35	90	16
ZF604180	18	44	100	18
ZF604200	20	44	100	20
ZF605250	25	50	120	25
ZF606320	32	70	150	32

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
○	○	◎	~HRC55 SKD61	~HRC55 SKD11			○		○

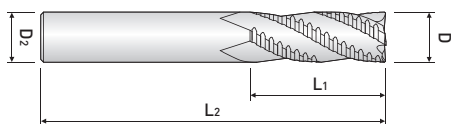
○:General Application ◎:The most suitable Application

■ Tolerance

μm = 1/1000mm

Tolerance Dia.	φ 1~φ 3	φ 3~φ 6	φ 6~φ 10	φ 10~φ 18	φ 18~φ 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

Endmills for high speed & general cutting ZAMUS CLASSIC Series



3~5 FLUTE, ROUGHING END MILL - FINE Pitch DIN6527L / DIN6535-HA, DIN6535-HB

- 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

ZF61 series



p.685

EDP. No.		D	L ₁	L ₂	D ₂
PLAIN SHANK	FLAT SHANK				
ZF613040	ZF613040F	4	10	50	6
ZF613050	ZF613050F	5	13	50	6
ZF613060	ZF613060F	6	16	57	6
ZF613070	ZF613070F	7	16	63	8
ZF613080	ZF613080F	8	16	63	8
ZF614090	ZF614090F	9	19	72	10
ZF614100	ZF614100F	10	22	72	10
ZF614120	ZF614120F	12	26	83	12
ZF614140	ZF614140F	14	32	83	14
ZF614160	ZF614160F	16	35	92	16
ZF614180	ZF614180F	18	40	100	18
ZF614200	ZF614200F	20	44	104	20
ZF615250	ZF615250F	25	50	120	25

Endmills for high speed & general cutting – ZAMUS CLASSIC Series

■ Applicable Working Material

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
○	○	◎	○	○			○		○

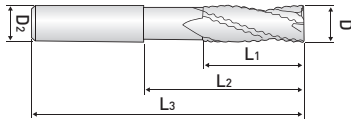
○:General Application ◎:The most suitable Application

■ Tolerance

μm = 1/1000mm

Tolerance	Dia.	φ 1~φ 3	φ 3~φ 6	φ 6~φ 10	φ 10~φ 18	φ 18~φ 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

Endmills for high speed & general cutting ZAMUS CLASSIC Series



3 FLUTE, Z - AXIS ROUGHING END MILL

- Reducing cycle time by 1 pass operating from Z-axis to slotting
- Preventing the working interruption as Neck type

PK503 ...series



ULTRA FINE



HELIX

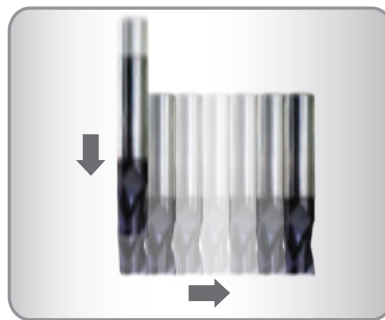


Conventional Pitch



p.689

EDP. No.	D	L ₁	L ₂	L ₃	D ₂	Z
PK503060	6	9	15	57	6	3
PK503080	8	12	20	63	8	
PK503100	10	15	25	72	10	
PK503120	12	18	30	83	12	
PK503140	14	21	35	83	14	
PK503160	16	24	40	92	16	
PK503200	20	30	50	104	20	



■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
○	○	◎	~HRC55 SKD61	~HRC55 SKD11			○		○

○:General Application ◎:The most suitable Application

■ Tolerance

μm = 1/1000mm

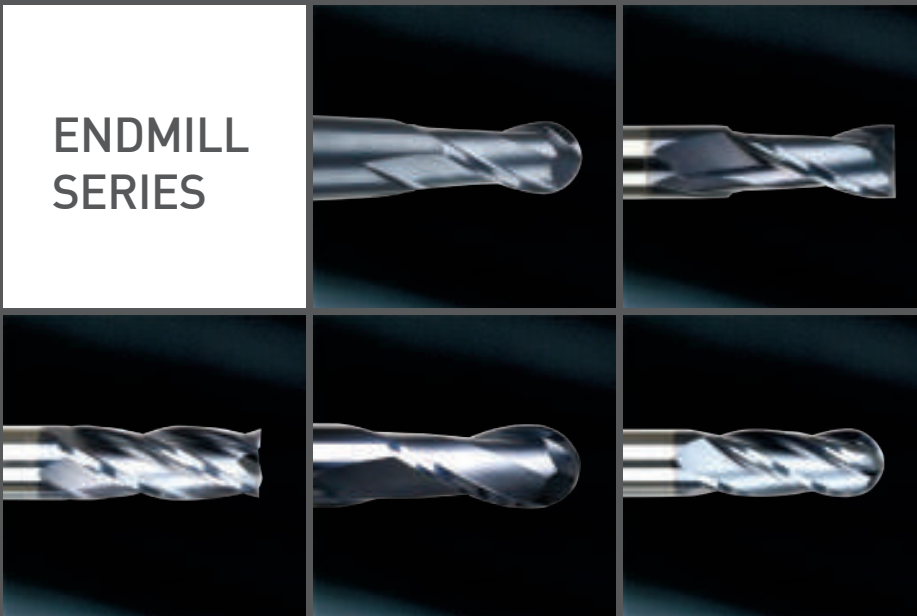
Tolerance Dia.	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
Cutting Edge(d11)	-20 -85	-30 -105	-40 -150	-50 -180	-65 -225
Shank(h6)	0 -6	0 -8	0 -9	0 -11	0 -13



Endmills for high speed & general cutting

ZAMUS THUNDER SERIES

ENDMILL
SERIES



Endmills for high speed & general cutting _ ZAMUS THUNDER Series

WIDIN

EDP. No.	APPEARANCE	FEATURE	INCH & METRIC	STOCK	PAGE
DB312 series		LONG LENGTH, BALL NOSE	METRIC	•	263
DB342 series		BALL NOSE with TAPER NECK	METRIC	•	264
ZE302 series		REGULAR LENGTH	METRIC	•	265
ZE304 series		REGULAR LENGTH	METRIC	•	266
ZE302...P series	NEW! 	REGULAR LENGTH	METRIC	•	267
ZE304...P series	NEW! 	REGULAR LENGTH	METRIC	•	268
ZE322 series		LONG & EXTRA LONG LENGTH	METRIC	•	269
ZE324 series		LONG and EXTRA LONG LENGTH	METRIC	•	270
ZR322 series		CORNER RADIUS LONG LENGTH	METRIC	•	271
ZR324 series		CORNER RADIUS with LONG SHANK	METRIC	•	272
ZR304H series		45° HELIX STUB CUT LENGTH, CORNER RADIUS, EXTENDED NECK	METRIC	•	273
ZR324H series		45° HELIX STUB CUT LENGTH, CORNER RADIUS, LONG SHANK	METRIC	•	274
TX302 series		REGULAR LENGTH	METRIC	•	275
TS302 series		REGULAR LENGTH	METRIC	•	276
TX304 series		REGULAR LENGTH	METRIC	•	277

NEXT >>

Endmills for high speed & general cutting _ ZAMUS THUNDER Series

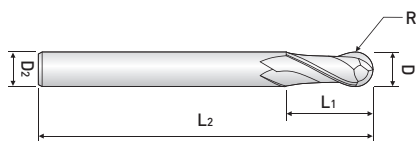
WIDIN

EDP. No.	APPEARANCE	FEATURE	INCH & METRIC	STOCK	PAGE
TS304 series		REGULAR LENGTH	METRIC	•	278
TX304H series		45° HELIX REGULAR LENGTH	METRIC	•	279
TXB302 series		REGULAR LENGTH, BALL NOSE	METRIC	•	280
TXB304 series		REGULAR LENGTH, BALL NOSE	METRIC	•	281
TX202 series		SHORT LENGTH	METRIC	•	282
TX222 series		LONG LENGTH	METRIC	•	283
TX204 series		SHORT LENGTH	METRIC	•	284
TX224 series		LONG LENGTH	METRIC	•	285
TXB202 series		REGULAR LENGTH, BALL NOSE	METRIC	•	286
TXB222 series		LONG LENGTH, BALL NOSE	METRIC	•	287
TXB232 series		LONG REACH, BALL NOSE	METRIC	•	288
TXB204 series		REGULAR LENGTH, BALL NOSE	METRIC	•	289

■ CODE SYSTEM

Z	R	3	0	4H	10	10	S4
Classification	Shape	Grade	Length, Shank type	No. of Flute	Diameter	Corner radius	Shank Diameter
D : Dynamic	B : Ball	3 : Grade	0 : Straight	2 : 2 Flute	1	0.2	4
Z : Zamus Endmill	E : Square	2 : Grade	1 : Long Cutting Length	4 : 4 Flute	20	3	20
T : Thunder	R : Radius		2 : Long Cutting Length	4H : 4 Flute (Helix 45°)			
	X : Square		3 : Long Shank				
	S : Square		4 : Tapered Neck				
	XB : Ball						

Endmills for high speed & general cutting ZAMUS THUNDER Series



2 FLUTE, LONG LENGTH, BALL NOSE

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

DB312 ...series



EDP. No.	D	R	L ₁	L ₂	D ₂
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

■ Applicable Working Material

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					
◎	◎	○							

○: General Application ◎: The most suitable Application

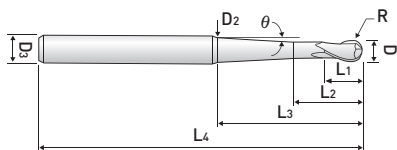
■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for high speed & general cutting – ZAMUS THUNDER Series

Endmills for high speed & general cutting ZAMUS THUNDER Series



2 FLUTE, BALL NOSE with TAPER NECK

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

DB342 ...series



FINE GRAIN



HELIX



p.672

EDP. No.	D	R	L ₁	L ₂	L ₃	L ₄	D ₂	D ₃	θ
DB34201015	1	0.5	2	4	23	60	2	6	1°30′
DB34201050							4.3		5°
DB34201030							5		3°
DB34202015	2	1	4	6	23	60	2.9	6	1°30′
DB34202050							5		5°
DB34202030							5.7		3°
DB34203030	3	1.5	6	8	32	70	5.6	6	3°
DB34203015					52	90	5.3		1°30′
DB34204030	4	2	8	10	28	70	6	6	3°
DB34204015					49	90			1°30′
DB34205030	5	2.5	10	12	41	90	8	8	3°
DB34205015					61	110	7.6		1°30′
DB34206030	6	3	12	15	34	90	8	8	3°
DB34206015					53	110			1°30′
DB34208030	8	4	14	17	36	100	10	10	3°
DB34208015					55	120			1°30′
DB34210030	10	5	18	21	40	110	12	12	3°
DB34210015					59	130			1°30′
DB34212030	12	6	22	25	63	140	16	16	3°
DB34212015					83	160	15		1°30′

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○							

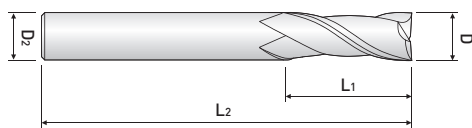
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for high speed & general cutting 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 ₁	L ₂	D ₂
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

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○							

○:General Application ◎:The most suitable Application

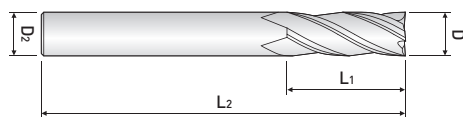
■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for high speed & general cutting – ZAMUS THUNDER Series

Endmills for high speed & general cutting ZAMUS THUNDER Series



4 FLUTE, REGULAR LENGTH

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

ZE304 ...series



EDP. No.	D	L ₁	L ₂	D ₂
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

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○							

○: General Application ◎: The most suitable Application

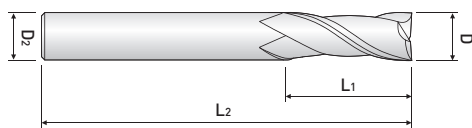
■ Tolerance

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

※ These tools are manufactured based on order received.

NEW!

Endmills for high speed & general cutting ZAMUS THUNDER Series

**2 FLUTE, REGULAR LENGTH**

- Designed for machine tool steel, alloy steel, mold steel and other hardened materials
- New coating application improves wear resistance and chipping resistance
- Tool life has improved

ZE302+ ... series



EDP. No.	Dia	C.L	O.A.L	S.H Dia
ZE302010P	1	2.5	50	6
ZE302015P	1.5	4	50	6
ZE302020P	2	6	50	6
ZE302025P	2.5	8	50	6
ZE302030P	3	10	50	6
ZE302035P	3.5	10	50	6
ZE302040P	4	12	50	6
ZE302045P	4.5	14	50	6
ZE302050P	5	15	60	6
ZE302055P	5.5	15	60	6
ZE302060P	6	15	60	6
ZE302065P	6.5	18	60	8
ZE302070P	7	20	65	8
ZE302075P	7.5	20	65	8
ZE302080P	8	20	65	8
ZE302085P	8.5	22	70	10
ZE302090P	9	22	70	10
ZE302095P	9.5	24	70	10
ZE302100P	10	25	70	10
ZE302105P	10.5	26	80	12
ZE302110P	11	30	80	12
ZE302115P	11.5	30	80	12
ZE302120P	12	30	80	12
ZE302130P	13	35	90	12
ZE302140P	14	35	100	14
ZE302150P	15	40	100	16
ZE302160P	16	40	100	16
ZE302180P	18	45	100	18
ZE302200P	20	45	100	20

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○							

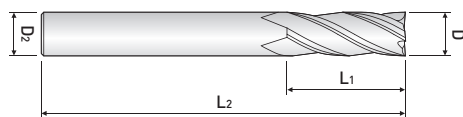
○:General Application ◎:The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for high speed & general cutting – ZAMUS THUNDER Series

NEW!**Endmills for high speed & general cutting** ZAMUS THUNDER Series**4 FLUTE, REGULAR LENGTH**

- Designed for machine tool steel, alloy steel, mold steel and other hardened materials
- New coating application improves wear resistance and chipping resistance
- Tool life has improved

ZE304+ ... series

EDP. No.	Dia	C.L	O.A.L	S.H Dia
ZE304010P	1	2.5	50	6
ZE304015P	1.5	4	50	6
ZE304020P	2	6	50	6
ZE304025P	2.5	8	50	6
ZE304030P	3	10	50	6
ZE304035P	3.5	10	50	6
ZE304040P	4	12	50	6
ZE304045P	4.5	14	50	6
ZE304050P	5	15	60	6
ZE304055P	5.5	15	60	6
ZE304060P	6	15	60	6
ZE304065P	6.5	18	60	8
ZE304070P	7	20	65	8
ZE304075P	7.5	20	65	8
ZE304080P	8	20	65	8
ZE304085P	8.5	22	70	10
ZE304090P	9	22	70	10
ZE304095P	9.5	24	70	10
ZE304100P	10	25	70	10
ZE304105P	10.5	26	80	12
ZE304110P	11	30	80	12
ZE304115P	11.5	30	80	12
ZE304120P	12	30	80	12
ZE304130P	13	35	90	12
ZE304140P	14	35	100	14
ZE304150P	15	40	100	16
ZE304160P	16	40	100	16
ZE304180P	18	45	100	18
ZE304200P	20	45	100	20

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○							

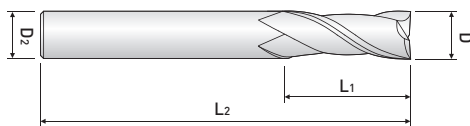
○:General Application ◎:The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for high speed & general cutting ZAMUS THUNDER Series



2 FLUTE, LONG & EXTRA LONG LENGTH

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

ZE322 ...series



EDP. No.	D	L ₁	L ₂	D ₂
ZE322030	3	15	60	6
ZE322031		20	70	3
ZE322030S			100	
ZE322040	4	15	60	6
ZE322041		20	70	4
ZE322040S			100	
ZE322050	5	20	60	6
ZE322051			80	
ZE322052		25	100	
ZE322060	6	20	80	6
ZE322061		30	100	
ZE322062		40	150	
ZE322080	8	30	90	8
ZE322081		35	100	
ZE322082		40	150	
ZE322100	10	30	90	10
ZE322101		35	100	
ZE322102		45	150	
ZE322103		55	180	
ZE322120	12	30	90	12
ZE322121		40	110	
ZE322122		50	150	
ZE322123		60	200	
ZE322140	14	40	120	14
ZE322141		60	150	
ZE322160	16	50	140	16
ZE322161		70	160	
ZE322162		80	200	
ZE322180	18	50	140	18
ZE322200	20	60	150	20
ZE322201		100	200	
ZE322202		130	250	

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○							

○: General Application ◎: The most suitable Application

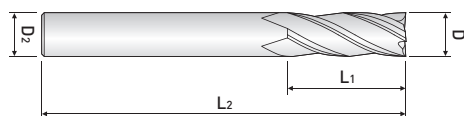
■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for high speed & general cutting – ZAMUS THUNDER Series

Endmills for high speed & general cutting ZAMUS THUNDER Series



4 FLUTE, LONG & EXTRA LONG LENGTH

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

ZE324 ... series



FINE GRAIN



HELIX



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EDP. No.	D	L ₁	L ₂	D ₂
ZE324030	3	15	60	6
ZE324031		20	70	
ZE324030S			100	
ZE324040	4	15	60	6
ZE324041		20	70	
ZE324040S			100	
ZE324050	5	20	60	6
ZE324051			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	

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○							

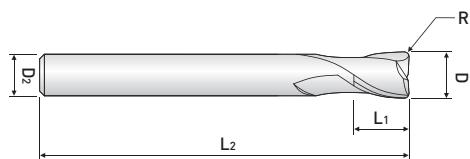
○:General Application ◎:The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for high speed & general cutting ZAMUS THUNDER Series



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 ₁	L ₂	D ₂
ZR3220302S4	3	0.2	8	60	4
ZR3220302					6
ZR3220303		6			
ZR3220305S4		4			
ZR3220305		6			
ZR3220402S4	4	0.2	11	70	4
ZR3220402					6
ZR3220403		6			
ZR3220405S4		4			
ZR3220405		6			
ZR3220410S4		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			

Endmills for high speed & general cutting – ZAMUS THUNDER Series

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○							

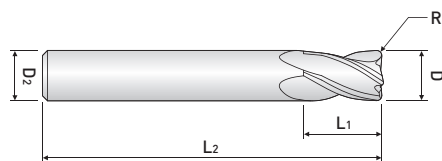
○:General Application ◎:The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for high speed & general cutting ZAMUS THUNDER Series



4 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

ZR324 ... series



FINE GRAIN



HELIX



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EDP. No.	D	R	L ₁	L ₂	D ₂
ZR3240302S4	3	0.2	8	60	4
ZR3240302					6
ZR3240303		0.3			6
ZR3240305S4		0.5			4
ZR3240305					6
ZR3240402S4	4	0.2	11	70	4
ZR3240402					6
ZR3240403		0.3			6
ZR3240405S4		0.5			4
ZR3240405					6
ZR3240410S4	4	1.0	11	70	4
ZR3240410					6
ZR3240502	5	0.2	13	80	6
ZR3240503		0.3			
ZR3240505		0.5			
ZR3240510		1.0			
ZR3240602	6	0.2	13	90	6
ZR3240603		0.3			
ZR3240605		0.5			
ZR3240610		1.0			
ZR3240803	8	0.3	19	100	8
ZR3240805		0.5			
ZR3240810		1.0			
ZR3240815		1.5			
ZR3240820		2.0			
ZR3241003	10	0.3	22	100	10
ZR3241005		0.5			
ZR3241010		1.0			
ZR3241015		1.5			
ZR3241020		2.0			
ZR3241025	12	2.5	26	110	12
ZR3241205		0.5			
ZR3241210		1.0			
ZR3241215		1.5			
ZR3241220		2.0			
ZR3241225		2.5			
ZR3241230		3.0			

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○							

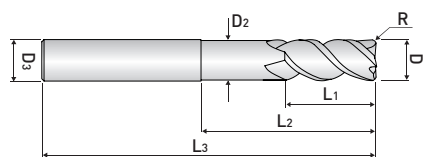
○:General Application ◎:The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for high speed & general cutting ZAMUS THUNDER Series



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 ₁	L ₂	L ₃	D ₂	D ₃
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					

※ These tools are manufactured based on order received.

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○							

○:General Application ◎:The most suitable Application

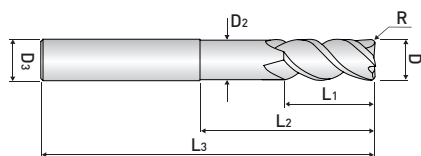
■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for high speed & general cutting – ZAMUS THUNDER Series

Endmills for high speed & general cutting ZAMUS THUNDER Series



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



FINE GRAIN



HELIX



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EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂	D ₃
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					

※ These tools are manufactured based on order received.

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○							

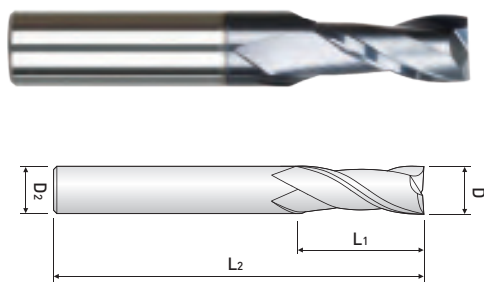
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for high speed & general cutting ZAMUS THUNDER Series



2 FLUTE, REGULAR LENGTH

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

TX302 ... series



EDP. No.	D	L ₁	L ₂	D ₂
TX302010	1	3	50	4
TX302015	1.5	4	50	4
TX302020	2	6	50	4
TX302025	2.5	8	50	4
TX302030	3	9	50	4
TX302040	4	11	50	4
TX302050	5	13	50	6
TX302060	6	16	50	6
TX302070	7	16	60	8
TX302080	8	19	60	8
TX302090	9	19	60	10
TX302100	10	25	75	10
TX302120	12	30	75	12
TX302140	14	32	75	14
TX302160	16	32	100	16
TX302180	18	32	100	18
TX302200	20	38	100	20

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
◎	◎	○	~HRC55 SKD61	~HRC55 SKD11					

○:General Application ◎:The most suitable Application

■ Tolerance

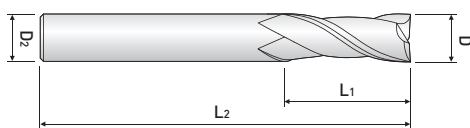
μm = 1/1000mm

Tolerance	Dia.	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
Cutting Edge(e8)		-14 -28	-20 -38	-25 -47	-32 -59	-40 -73
Shank(h6)		0 -6	0 -8	0 -9	0 -11	0 -13

Endmills for high speed & general cutting ZAMUS THUNDER Series



2 FLUTE, REGULAR LENGTH



TS302 ... series



EDP. No.	D	C.L	OAL	SH.Dia.
TS302 010	1	3	45	6
TS302 015	1.5	4	45	6
TS302 020	2	6	45	6
TS302 025	2.5	8	45	6
TS302 030	3	10	50	6
TS302 035	3.5	10	50	6
TS302 040	4	12	50	6
TS302 045	4.5	14	50	6
TS302 050	5	15	50	6
TS302 055	5.5	15	50	6
TS302 060	6	15	57	6
TS302 065	6.5	18	63	8
TS302 070	7	20	63	8
TS302 075	7.5	20	63	8
TS302 080	8	20	63	8
TS302 085	8.5	23	72	10
TS302 090	9	25	72	10
TS302 095	9.5	25	72	10
TS302 100	10	25	72	10
TS302 105	10.5	28	80	12
TS302 110	11	30	80	12
TS302 115	11.5	30	80	12
TS302 120	12	30	80	12
TS302 125	12.5	35	80	12
TS302 130	13	35	80	12
TS302 140	14	35	80	12
TS302 150	15	42	100	16
TS302 160	16	42	100	16
TS302 170	17	42	100	16
TS302 180	18	45	100	16
TS302 190	19	48	105	20
TS302 200	20	48	105	20

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○							

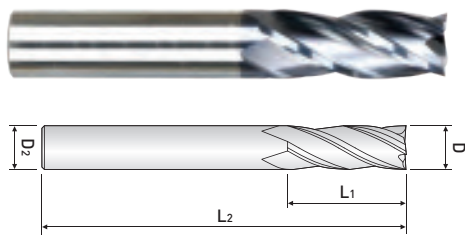
○:General Application ◎:The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for high speed & general cutting ZAMUS THUNDER Series



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 ₁	L ₂	D ₂
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

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
◎	◎	○	~HRC55 SKD61	~HRC55 SKD11					

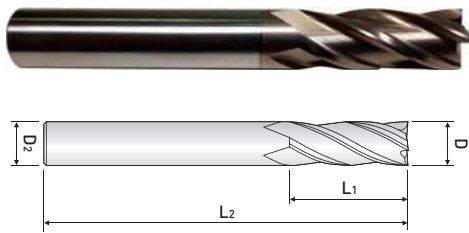
○:General Application ◎:The most suitable Application

■ 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(e8)		-14 -28	-20 -38	-25 -47	-32 -59	-40 -73
Shank(h6)		0 -6	0 -8	0 -9	0 -11	0 -13

Endmills for high speed & general cutting ZAMUS THUNDER Series



4 FLUTE, REGULAR LENGTH

TS304 ... series



EDP. No.	D	C.L	OAL	SH.Dia
TS304 020	2	6	45	6
TS304 025	2.5	8	45	6
TS304 030	3	10	50	6
TS304 035	3.5	10	50	6
TS304 040	4	12	50	6
TS304 045	4.5	14	50	6
TS304 050	5	15	50	6
TS304 055	5.5	15	50	6
TS304 060	6	15	57	6
TS304 065	6.5	18	63	8
TS304 070	7	20	63	8
TS304 075	7.5	20	63	8
TS304 080	8	20	63	8
TS304 085	8.5	23	72	10
TS304 090	9	25	72	10
TS304 095	9.5	25	72	10
TS304 100	10	25	72	10
TS304 105	10.5	28	80	12
TS304 110	11	30	80	12
TS304 115	11.5	30	80	12
TS304 120	12	30	80	12
TS304 125	12.5	35	80	12
TS304 130	13	35	80	12
TS304 140	14	35	80	12
TS304 150	15	42	100	16
TS304 160	16	42	100	16
TS304 170	17	42	100	16
TS304 180	18	45	100	16
TS304 190	19	48	105	20
TS304 200	20	48	105	20

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○							

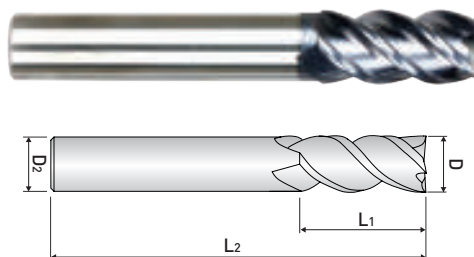
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for high speed & general cutting ZAMUS THUNDER Series



4 FLUTE, 45° HELIX, REGULAR LENGTH

TX304H ... series



EDP. No.	D	L ₁	L ₂	D ₂
TX304H030	3	8	50	6
TX304H040	4	11	50	6
TX304H050	5	13	50	6
TX304H060	6	13	50	6
TX304H080	8	19	60	8
TX304H100	10	22	70	10
TX304H120	12	26	75	12
TX304H130	13	26	80	12
TX304H140	14	26	80	14
TX304H160	16	32	90	16
TX304H180	18	32	100	18
TX304H200	20	38	100	20

※ These tools are manufactured based on order received.

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○							

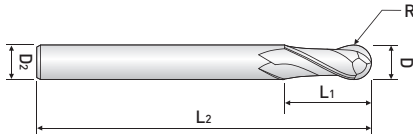
○:General Application ◎:The most suitable Application

■ 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(e8)		-14 -28	-20 -38	-25 -47	-32 -59	-40 -73
Shank(h6)		0 -6	0 -8	0 -9	0 -11	0 -13

Endmills for high speed & general cutting ZAMUS THUNDER Series



2 FLUTE, REGULAR LENGTH, BALL NOSE

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

TXB302 ... series



FINE GRAIN



HELIX



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EDP. No.	D	R	L ₁	L ₂	D ₂
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

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○							

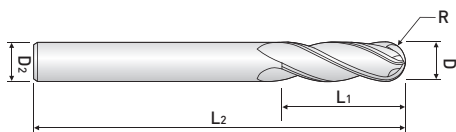
○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.04	h6

※ These tools are manufactured based on order received.

Endmills for high speed & general cutting 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



FINE GRAIN



HELIX



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EDP. No.	D	R	L ₁	L ₂	D ₂
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

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels (NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○							

○: General Application ◎: The most suitable Application

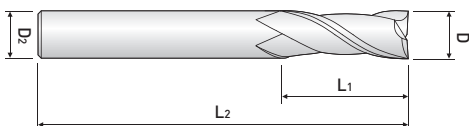
■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.04	h6

※ These tools are manufactured based on order received.

Endmills for high speed & general cutting – ZAMUS THUNDER Series

Endmills for high speed & general cutting ZAMUS THUNDER Series



2 FLUTE, SHORT LENGTH

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

TX202 ... series



EDP. No.	D	L ₁	L ₂	D ₂
TX202010	1	3	39	3
TX202015	1.5	5	39	3
TX202020	2	7	39	3
TX202025	2.5	8	39	3
TX202030	3	10	39	3
TX202040	4	14	51	4
TX202050	5	16	51	5
TX202060	6	19	64	6
TX202080	8	21	64	8
TX202100	10	25	70	10
TX202120	12	25	76	12
TX202160	16	32	89	16
TX202200	20	38	102	20

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
◎	◎	○	~HRC55 SKD61	~HRC55 SKD11					

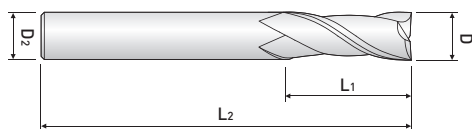
○:General Application ◎:The most suitable Application

■ 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(e8)		-14 -28	-20 -38	-25 -47	-32 -59	-40 -73
Shank(h6)		0 -6	0 -8	0 -9	0 -11	0 -13

Endmills for high speed & general cutting ZAMUS THUNDER Series



2 FLUTE, LONG LENGTH

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

TX222 ... series



FINE GRAIN



HELIX



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EDP. No.	D	L ₁	L ₂	D ₂
TX222030	3	20	60	3
TX222040	4	20	60	4
TX222050	5	25	75	5
TX222060	6	30	75	6
TX222080	8	30	75	8
TX222100	10	40	100	10
TX222120	12	45	100	12
TX222140	14	45	100	14
TX222160	16	45	100	16
TX222180	18	45	100	18
TX222200	20	45	100	20

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
◎	◎	○	~HRc55 SKD61	~HRc55 SKD11					

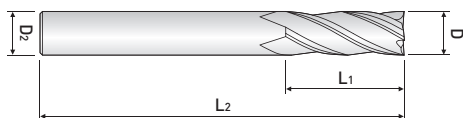
○:General Application ◎:The most suitable Application

■ 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(e8)		-14 -28	-20 -38	-25 -47	-32 -59	-40 -73
Shank(h6)		0 -6	0 -8	0 -9	0 -11	0 -13

Endmills for high speed & general cutting ZAMUS THUNDER Series



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 ₁	L ₂	D ₂
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

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
◎	◎	○	~HRC55 SKD61	~HRC55 SKD11					

○:General Application ◎:The most suitable Application

■ Tolerance

μm = 1/1000mm

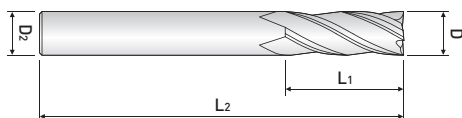
Tolerance Dia.	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
Cutting Edge(e8)	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73
Shank(h6)	0 -6	0 -8	0 -9	0 -11	0 -13

Endmills for high speed & general cutting ZAMUS THUNDER Series



4 FLUTE, LONG LENGTH

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



TX224 ... series



EDP. No.	D	L ₁	L ₂	D ₂
TX224030	3	20	60	3
TX224040	4	20	60	4
TX224050	5	25	75	5
TX224060	6	30	75	6
TX224080	8	30	75	8
TX224100	10	40	100	10
TX224120	12	45	100	12
TX224140	14	45	100	14
TX224160	16	45	100	16
TX224180	18	45	100	18
TX224200	20	45	100	20

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
◎	◎	○	~HRC55 SKD61	~HRC55 SKD11					

○:General Application ◎:The most suitable Application

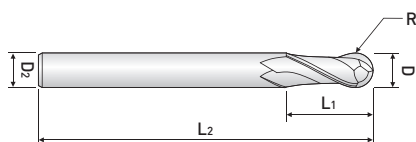
■ Tolerance

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(e8)		-14 -28	-20 -38	-25 -47	-32 -59	-40 -73
Shank(h6)		0 -6	0 -8	0 -9	0 -11	0 -13

Endmills for high speed & general cutting – ZAMUS THUNDER Series

Endmills for high speed & general cutting ZAMUS THUNDER Series



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



FINE GRAIN



HELIX



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EDP. No.	D	R	L ₁	L ₂	D ₂
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

■ Applicable Working Material

Carbon Steels (S45C, S55C,...) ~ HB225	Alloy Steels (SCM, SK,...) HB22 ~ 325	Prehardened Steels(NAK,...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○							

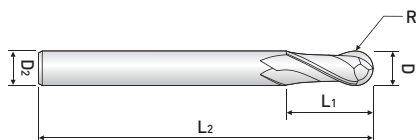
○: General Application ◎: The most suitable Application

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.04	h6

※ These tools are manufactured based on order received.

Endmills for high speed & general cutting ZAMUS THUNDER Series



2 FLUTE, LONG LENGTH, BALL NOSE

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

TXB222 ... series



FINE GRAIN



HELIX



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EDP. No.	D	R	L ₁	L ₂	D ₂
TXB222030	3	1.5	20	60	3
TXB222040	4	2	20	60	4
TXB222050	5	2.5	25	75	5
TXB222060	6	3	30	75	6
TXB222080	8	4	30	100	8
TXB222100	10	5	40	100	10
TXB222120	12	6	45	100	12
TXB222140	14	7	45	100	14
TXB222160	16	8	45	100	16
TXB222180	18	9	45	100	18
TXB222200	20	10	45	100	20

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○							

○:General Application ◎:The most suitable Application

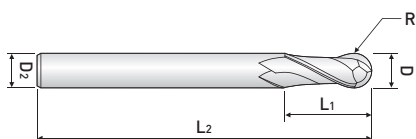
■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.04	h6

※ These tools are manufactured based on order received.

Endmills for high speed & general cutting – ZAMUS THUNDER Series

Endmills for high speed & general cutting *ZAMUS THUNDER Series*



2 FLUTE, LONG REACH, BALL NOSE

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

TXB232 ... series



FINE GRAIN



HELIX



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EDP. No.	D	R	L ₁	L ₂	D ₂
TXB232030	3	1.5	5	75	3
TXB232040	4	2	8	75	4
TXB232050	5	2.5	9	75	5
TXB232060	6	3	10	100	6
TXB232080	8	4	12	100	8
TXB232100	10	5	14	100	10
TXB232120	12	6	16	100	12
TXB232140	14	7	18	100	14
TXB232160	16	8	22	150	16
TXB232200	20	10	26	150	20

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○							

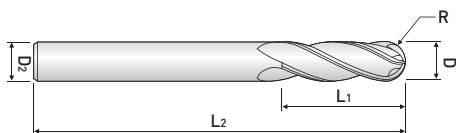
○: General Application ◎: The most suitable Application

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.04	h6

※ These tools are manufactured based on order received.

Endmills for high speed & general cutting 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

TXB204 ... series



FINE GRAIN



HELIX



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EDP. No.	D	R	L ₁	L ₂	D ₂
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

Endmills for high speed & general cutting – ZAMUS THUNDER Series

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
☉	☉	○							

○:General Application ☉:The most suitable Application

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.04	h6

※ These tools are manufactured based on order received.

Endmills for difficult to cut Materials

SUS WAVE SERIES

ENDMILL
SERIES



Endmills for difficult to cut materials _ SUS WAVE SERIES

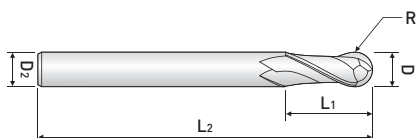
WIDIN

EDP. No.	APPEARANCE	FEATURE	INCH & METRIC	STOCK	PAGE
DS502 ...series		BALL NOSE REGULAR & LONG LENGTH	METRIC	•	292
SM503 ...series		REGULAR LENGTH	METRIC	•	293
SM504 ...series		REGULAR LENGTH, CORNER RADIUS	METRIC	•	294
ZF62 ...series		ROUGHING END MILL	METRIC	•	295

■ CODE SYSTEM

S	M	5	0	3	100
Classification	Shape	Grade	Length, Shank type	No. of Flute	Diameter
D : Dynamic	S : Ball type	6 : Grade	0 : Straight	2 : 2 Flute	1
S : Stainless	M : Square type Radius type	5 : Grade	2 : Straight / Neck	3 : 3 Flute	20
Z : ZAMUS	F : Roughing			4 : 4 Flute	
				5 : 5 Flute	
				6 : 6 Flute	

Endmills for difficult to cut materials SUS WAVE Series



2 FLUTE, BALL NOSE REGULAR & LONG LENGTH

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

DS502 ...series



ULTRA FINE



HELIX



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EDP. No.	D	R	L ₁	L ₂	D ₂
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	

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○			○				◎

○:General Application ◎:The most suitable Application

■ Tolerance

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

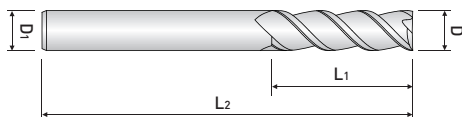
※ These tools are manufactured based on order received.

Endmills for difficult to cut materials SUS WAVE Series



3 FLUTE, REGULAR LENGTH

- Suitable for Stainless steel, Titanium, Inconel



SM503 ...series



EDP. No.	D	L ₁	L ₂	D ₂
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

Endmills for difficult to cut materials – SUS WAVE Series

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○			○				◎

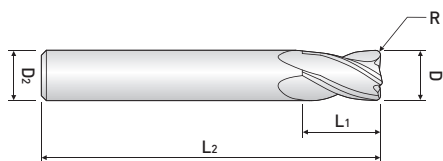
○:General Application ◎:The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for difficult to cut materials *SUS WAVE Series*



4 FLUTE, REGULAR LENGTH

- Suitable for Stainless steel, Titanium, Inconel
- Variable helix Type
- High performance by applying corner radius to prevent chipping
(Not suitable for a work which requires R shape)

SM504 ...series



EDP. No.	D	R	L ₁	L ₂	D ₂
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

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○			○				◎

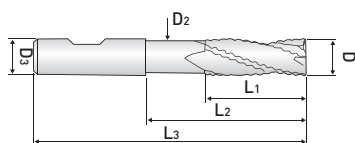
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for difficult to cut materials SUS WAVE Series



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 ₁	L ₂	D ₂	L ₃	D ₃	Z
PLAIN SHANK	FLAT SHANK							
ZF624060	ZF624060F	6	7	-	-	54	6	4
ZF624061	ZF624061F		16	-	-	57		
ZF624062	ZF624062F			20	5.5			
ZF624080	ZF624080F	8	9	-	-	58	8	4
ZF624081	ZF624081F		16	-	-	63		
ZF624082	ZF624082F			26	7.5			
ZF624100	ZF624100F	10	14	-	-	66	10	4
ZF624101	ZF624101F		22	-	-	72		
ZF624102	ZF624102F			31	9.5			
ZF624120	ZF624120F	12	16	-	-	73	12	4
ZF624121	ZF624121F		26	-	-	83		
ZF624122	ZF624122F			37	11.5			
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		

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○			○				◎

○:General Application ◎:The most suitable Application

■ Tolerance

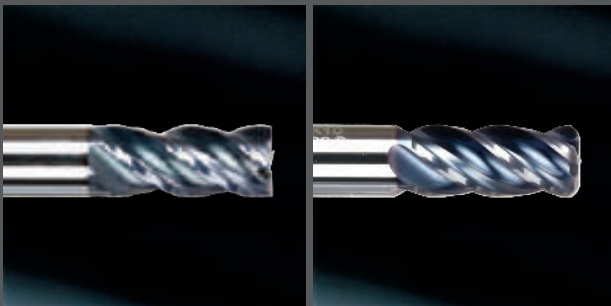
mm = 1/1000mm

Tolerance	Ø1~Ø3	Ø3~Ø6	Ø6~Ø10	Ø10~Ø18	Ø18~Ø30
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

Endmills for difficult to cut materials

ZAMUS S-STAR SERIES

ENDMILL
SERIES



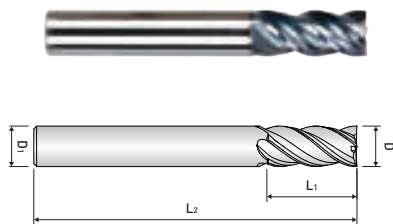
Endmills for difficult to cut materials _ ZAMUS S-STAR SERIES

WIDIN

EDP. No.	APPEARANCE	FEATURE	INCH & METRIC	STOCK	PAGE
STE504 series	NEW! 	Variable Helx	METRIC	•	298
STR504.....series	NEW! 	Variable Helx Coner Radius	METRIC	•	299

■ CODE SYSTEM

ST	R	5	0	4	100	20
Classification	Shape	Grade	Length, Shank type	No. of Flute	Diameter	RADIUS
ST : Sus Star	E : Square type	5 : Grade	0 : Straight	4 : 4 Flute	1	0.1
	R : Raidus type				2	2
					20	3

NEW!**Endmills for difficult to cut materials** ZAMUS S-STAR Series**4 FLUTE, Variable Helix**

- Excellent performance for difficult to cut Stainless steel, Titanium, Inconel
- Improved work surface and tool life with applying on variable helix and newest flute shape
- Stable high-speed process with application of variable helix and optimized rake angle during work

STE504 ...series

EDP No.	D	L ₁	L ₂	D ₂
STE504 050	5	15	55	6
STE504 055	5.5	15	60	6
STE504 060	6	15	60	6
STE504 060 20	6	20	65	6
STE504 065	6.5	15	60	8
STE504 070	7	20	80	8
STE504 080	8	20	70	8
STE504 080 25	8	25	70	8
STE504 080 30	8	30	80	8
STE504 085	8.5	20	70	10
STE504 090	9	25	80	10
STE504 100	10	25	75	10
STE504 100 35	10	35	85	10
STE504 120	12	30	80	12
STE504 120 40	12	40	90	12
STE504 140	14	35	90	16
STE504 160	16	42	100	16
STE504 180	18	45	100	16
STE504 200	20	48	100	20

※ These tools are manufactured based on order received.

■ Applicable Working Material

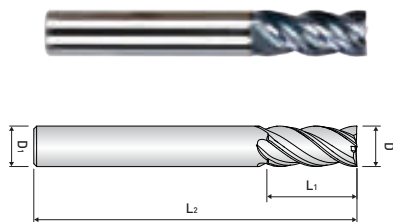
Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○			○				◎

○:General Application ◎:The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

NEW!**Endmills for difficult to cut materials** ZAMUS S-STAR Series**4 FLUTE, Variable Helix**

- Excellent performance for difficult to cut Stainless steel, Titanium, Inconel
- Improved work surface and tool life with applying on variable helix and newest flute shape
- Stable high-speed process with application of variable helix and optimized rake angle during work

STR504 ...series

EDP. No.	D	R	L ₁	L ₂	D ₂
STR504 010	1	0.1	2.5	50	-
STR504 010 02	1	0.2	2.5	50	6
STR504 012	1.2	0.1	3	-	6
STR504 015	1.5	0.1	4	50	6
STR504 015 02	1.5	0.2	4	50	6
STR504 020	2	0.1	6	50	6
STR504 020 02	2	0.2	6	50	6
STR504 025	2.5	0.2	7	50	6
STR504 030	3	0.2	8	55	6
STR504 030 03	3	0.3	8	55	6
STR504 030 05	3	0.5	8	55	6
STR504 040	4	0.2	10	55	6
STR504 040 03	4	0.3	10	55	6
STR504 040 05	4	0.5	10	55	6
STR504 050	5	0.2	15	55	6
STR504 050 03	5	0.3	15	55	6
STR504 050 05	5	0.5	15	55	6
STR504 060	6	0.3	15	60	6
STR504 060 05	6	0.5	15	60	6
STR504 060 10	6	1	15	60	6
STR504 080	8	0.3	20	70	8
STR504 080 05	8	0.5	20	70	8
STR504 080 10	8	1	20	70	8
STR504 100	10	0.3	25	75	10
STR504 100 05	10	0.5	25	75	10
STR504 100 10	10	1	25	75	10
STR504 100 15	10	1.5	25	75	10
STR504 100 20	10	2	25	75	10
STR504 100 30	10	3	25	75	10

※ These tools are manufactured based on order received.

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○			○				◎

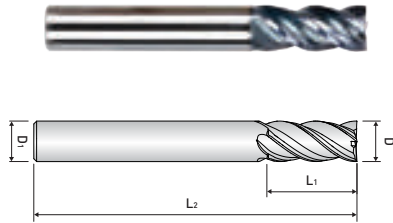
○:General Application ◎:The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for difficult to cut materials – ZAMUS S-STAR Series

NEW!**Endmills for difficult to cut materials** ZAMUS S-STAR Series**4 FLUTE, Variable Helix**

- Excellent performance for difficult to cut Stainless steel, Titanium, Inconel
- Improved work surface and tool life with applying on variable helix and newest flute shape
- Stable high-speed process with application of variable helix and optimized rake angle during work

STR504 ...series

EDP. No.	D	R	L ₁	L ₂	D ₂
STR504 120	12	0.5	30	80	12
STR504 120 10	12	1	30	80	12
STR504 120 15	12	1.5	30	80	12
STR504 120 20	12	2	30	80	12
STR504 120 30	12	3	30	80	12
STR504 120 40	12	4	30	80	12
STR504 140	14	0.5	35	90	16
STR504 140 10	14	1	35	90	16
STR504 160	16	0.5	42	100	16
STR504 160 10	16	1	42	100	16
STR504 180	18	0.5	45	100	16
STR504 200	20	0.5	48	100	20
STR504 200 10	20	1	48	100	20

※ These tools are manufactured based on order received.

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○			○				◎

○:General Application ◎:The most suitable Application

■ Tolerance

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

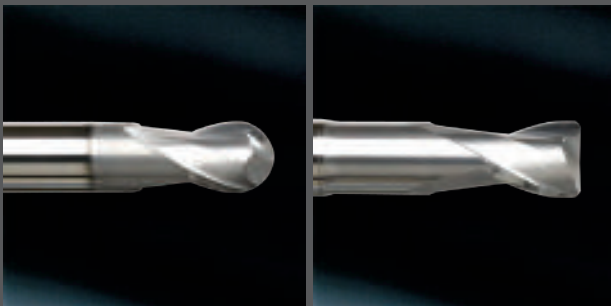
※ These tools are manufactured based on order received.



Endmill for non-ferrous metal machining

ZAMUS COPPER MATE SERIES

ENDMILL
SERIES



Endmill for non-ferrous metal machining _ ZAMUS COPPER MATE SERIES

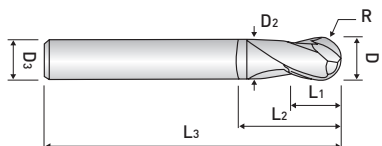
WIDIN

EDP. No.	APPEARANCE	FEATURE	INCH & METRIC	STOCK	PAGE
BC502 series		STUB CUT with EXTENDED NECK	METRIC	•	304
RC502.....series		STUB CUT with EXTENDED NECK	METRIC	•	305

■ CODE SYSTEM

R	C	5	0	2	020	05	09
Classification	Shape	Grade	Length, Shank type	No. of Flute	Diameter	Corner radius	Neck length
B : Ball Endmill	C : Copper	5 : Grade	0 : Neck	2 : 2 Flute	1	0.5	3
R : Radius Endmill					12	1	38

Endmill for non-ferrous metal machining ZAMUS COPPER MATE Series



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

- Suitable for copper & non-ferrous material

BC502 ...series



ULTRA FINE



HELIX



p.692

EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂	D ₃
BC502010	1	0.5	1.5	3	50	0.8	6
BC502015	1.5	0.75	2	4	50	1.3	6
BC502020	2	1	2.5	5	50	1.8	6
BC502025	2.5	1.25	3	7	50	2.3	6
BC502030	3	1.5	4	10	60	2.8	6
BC502040	4	2	5	10	60	3.8	6
BC502050	5	2.5	6	12	60	4.8	6
BC502060	6	3	7	12	60	5.8	6
BC502061					90		
BC502080	8	4	9	15	70	7.8	8
BC502081				16	100		
BC502100	10	5	11	25	75	9.8	10
BC502101					100		
BC502120	12	6	12	25	80	11.8	12
BC502121					110		

※ These tools are manufactured based on order received.

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○				◎			○	

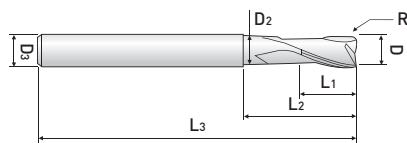
○:General Application ◎:The most suitable Application

■ Tolerance

Radius (mm)	Shank Dia.
±0.01	h6

※ These tools are manufactured based on order received.

Endmill for non-ferrous metal machining ZAMUS COPPER MATE Series



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

- Suitable for copper & non-ferrous material

RC502 series



ULTRA FINE



HELIX



up to $\phi 6$



over 6



CRN



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EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂	D ₃
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					

※ These tools are manufactured based on order received.

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○				◎			○	

○: General Application ◎: The most suitable Application

■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.012	
over 6	0 ~ -0.015	h6

※ These tools are manufactured based on order received.

Endmill for Graphite and Non-ferrous

ZAMUS GRA MATE SERIES

ENDMILL
SERIES



Endmill for Graphite and Non-ferrous _ ZAMUS GRA MATE SERIES

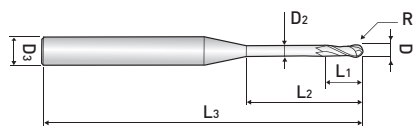
WIDIN

EDP. No.	APPEARANCE	FEATURE	INCH & METRIC	STOCK	PAGE
G series		DIAMOND COATING BALL NOSE	METRIC	•	308
GE series		DIAMOND COATING END MILL	METRIC	•	311
WGR502 series		2 FLUTE, DIAMOND COATING RADIUS	METRIC	•	312
WGR504 series		4 FLUTE, DIAMOND COATING RADIUS	METRIC	•	313
WGB504 series		4 FLUTE, DIAMOND COATING, BALL NOSE	METRIC	•	314
WGE504 series		4 FLUTE, DIAMOND COATING SQUARE	METRIC	•	315

■ CODE SYSTEM

WG	R	5	0	4	080	10	130
Classification	Shape	Grade	Length, Shank type	No. of Flute	Diameter	Corner radius	Whole length
G : Graphite	E : Square type	5 : Grade	0 : Straight, Neck	2 : 2 Flute	0.2	0.05	3
WG : Winner Graphite	R : Radius type			4 : 4 Flute	20	1	80

Endmill for Graphite and Non-ferrous 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

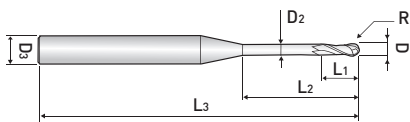


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EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂	D ₃
G00501003	0.5	0.25	1	3	50	0.45	4
G00501006				6			
G00501010				10			
G00601203	0.6	0.3	1.2	3	50	0.55	4
G00601206				6			
G00601208				8			
G00601210				10			
G00601212				12			
G0080164	0.8	0.4	1.6	4	50	0.75	4
G0080166				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			

NEXT >>

Endmill for Graphite and Non-ferrous 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

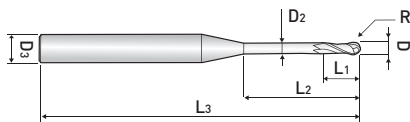
p.694

EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂	D ₃
G0200812	2	1	8	12	60	1.95	4
G0200816				16			
G0200820				20			
G0200825				25	70		
G0200830				30			
G0200835				35	80		
G0200840				40			
G0201020			10	20	80		
G0201020L					100		
G0251020	2.5	1.25	10	20	80	2.43	4
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

NEXT >>>

Endmill for Graphite and Non-ferrous – ZAMUS GRA MATE Series

Endmill for Graphite and Non-ferrous 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

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EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂	D ₃
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		

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
						◎		○	

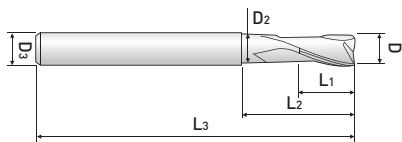
○:General Application ◎:The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmill for Graphite and Non-ferrous ZAMUS GRA MATE Series



2 FLUTE, DIAMOND COATING BALL NOSE

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

GE series



HELIX



DIAMOND



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EDP. No.	D	L ₁	L ₂	L ₃	D ₂	D ₃
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		

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
						◎		○	

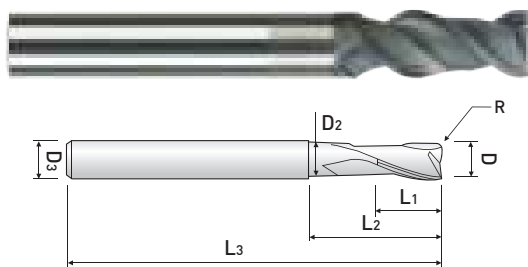
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmill for Graphite and Non-ferrous ZAMUS GRA MATE Series



2 FLUTE, DIAMOND COATING RADIUS ENDMILLS

- High performance on Graphite and Non-ferrous material
- Applicable various Shape machining by applying Variable Corner Radius

WGR502 series



HELIX

AGAINST
CHIPPING

DIAMOND

p.695

EDP No.	D	R	L ₁	L ₂	L ₃	D ₂	D ₃
WGR502 002	0.2	-	0.3	-	40	-	3
WGR502 003	0.3	-	0.5	-	40	-	3
WGR502 004	0.4	-	0.6	-	40	-	3
WGR502 005 025	0.5	0.05	0.7	2.5	40	0.45	3
WGR502 005 040				4			
WGR502 006 030	0.6	0.05	0.9	3	40	0.55	3
WGR502 006 050				5			
WGR502 008 040	0.8	0.05	1.2	4	40	0.75	3
WGR502 008 070				7			
WGR502 010 050	1	0.1	1.5	5	40	0.95	3
WGR502 010 085				8.5			
WGR502 010 120				12			
WGR502 012 060	1.2	0.1	1.8	6	50	1.15	3
WGR502 012 100				10			
WGR502 015 075	1.5	0.15	2.2	7.5	50	1.4	3
WGR502 015 120				12			
WGR502 015 180				18			
WGR502 020 100	2	0.15	2.2	10	60	1.9	3
WGR502 020 160				16			
WGR502 020 250				25			
WGR502 030 100	3	0.2	3	10	65	2.9	4
WGR502 030 150				15			
WGR502 030 200				20			
WGR502 030 250				25	75		
WGR502 030 300				30			
WGR502 040 200	4	0.2	4	20	65	3.9	6
WGR502 040 300				30	75		
WGR502 040 400				40	90		
WGR502 050 200	5	0.3	5	20	75	4.9	6
WGR502 050 300				30			
WGR502 050 400				40	90		
WGR502 050 500				50			
WGR502 060 300	6	0.3	6	30	75	5.9	6
WGR502 060 400				40	90		
WGR502 060 500				50			
WGR502 060 600				60			

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
						◎		○	

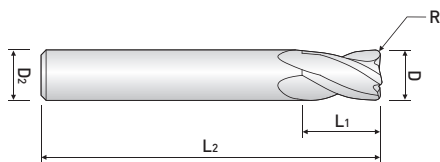
○: General Application ◎: The most suitable Application

■ Tolerance

Mill Dia. (mm)		Shank Dia.
Dia.	Tolerance	
All size	0 ~ -0.020	h6

※ These tools are manufactured based on order received.

Endmill for Graphite and Non-ferrous ZAMUS GRA MATE Series



4 FLUTE, DIAMOND COATING RADIUS ENDMILLS

- Improve coating stability by applying high-end Diamond Coating
- Applicable non-ferrous material such as Graphite and CFRP

WGR504 series



HELIX

D≤12

D>12

DIAMOND

p.696

EDP No.	D	R	L ₁	L ₂	D ₂
WGR504 030 02 080	3.0	0.2	8	80	4
WGR504 030 03 080		0.3			
WGR504 030 05 080		0.5			
WGR504 040 03 100	4.0	0.3	10	100	4
WGR504 040 05 100		0.5			
WGR504 040 10 100		1.0			
WGR504 060 03 110	6.0	0.3	15	110	6
WGR504 060 05 110		0.5			
WGR504 060 10 110		1.0			
WGR504 080 05 110	8.0	0.5	20	110	8
WGR504 080 10 110		1.0		130	
WGR504 080 05 130		0.5			
WGR504 080 10 130		1.0			
WGR504 100 05 130	10.0	0.5	25	130	10
WGR504 100 10 130		1.0		150	
WGR504 100 05 150		0.5			
WGR504 100 10 150		1.0			
WGR504 120 05 130	12.0	0.5	30	130	12
WGR504 120 10 130		1.0		150	
WGR504 120 05 150		0.5			
WGR504 120 10 150		1.0			
WGR504 160 05 200	16.0	0.5	32	200	16
WGR504 160 10 200		1.0			
WGR504 200 05 200	20.0	0.5	40	200	20
WGR504 200 10 200		1.0			

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
						◎		○	

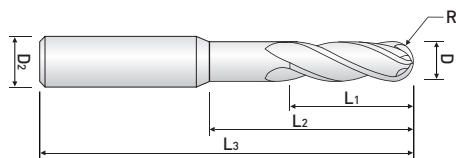
○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (mm)		Shank Dia.
Dia.	Tolerance	
up to 12	0 ~ -0.020	
over 12	0 ~ -0.030	h6

※ These tools are manufactured based on order received.

Endmill for Graphite and Non-ferrous ZAMUS GRA MATE Series



4 FLUTE, DIAMOND COATING, BALL NOSE ENDMILLS

- High performance on Graphite and Non-ferrous material

WGB504 series



HELIX

ALL SIZE

DIAMOND

p.696

EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂
WGB504 010	1.0	0.5	3	-	60	4
WGB504 010 10				10		
WGB504 010 15				15		
WGB504 010 20				20	80	
WGB504 010 25				25		
WGB504 010 30				30		
WGB504 015	1.5	0.75	4	-	60	4
WGB504 015 10				10	80	
WGB504 015 15				15		
WGB504 015 20				20		
WGB504 015 25				25		
WGB504 015 30				30		
WGB504 020	2.0	1.0	6	-	60	4
WGB504 020 10				10	80	
WGB504 020 15				15		
WGB504 020 20				20		
WGB504 020 25				25		
WGB504 020 30				30		
WGB504 020 40				40		
WGB504 030	3.0	1.5	9	-	60	4
WGB504 030 15				15	100	
WGB504 030 20				20		
WGB504 030 25				25		
WGB504 030 30				30		
WGB504 030 40				40		
WGB504 030 50				50		
WGB504 040 060	4.0	2.0	12	-	60	4
WGB504 040 080					80	
WGB504 040 110					110	
WGB504 040 130					130	
WGB504 040 150					150	
WGB504 050 080	5.0	2.5	15	25	80	6
WGB504 050 110					110	
WGB504 060 090	6.0	3.0	20	-	90	6
WGB504 060 110					110	
WGB504 060 130					130	
WGB504 060 150					150	
WGB504 060 180					180	

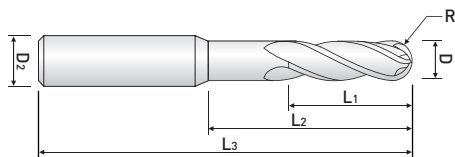
NEXT >>>

Endmill for Graphite and Non-ferrous ZAMUS GRA MATE Series



4 FLUTE, DIAMOND COATING, BALL NOSE ENDMILLS

- High performance on Graphite and Non-ferrous material



WGB504 series



HELIX

ALL SIZE

DIAMOND

p.696

EDP No.	D	R	L ₁	L ₂	L ₃	D ₂
WGB504 080 110	8.0	4.0	25	-	110	8
WGB504 080 130					130	
WGB504 080 150					150	
WGB504 080 200					200	
WGB504 100 110	10.0	5.0	30	-	110	10
WGB504 100 130					130	
WGB504 100 150					150	
WGB504 100 180					180	
WGB504 100 200					200	
WGB504 120 110	12.0	6.0	35	-	110	12
WGB504 120 130					130	
WGB504 120 150					150	
WGB504 120 180					180	
WGB504 120 200					200	
WGB504 160 150	16.0	8.0	50	-	150	16
WGB504 160 200					200	
WGB504 200 150	20.0	10.0	60	-	150	20
WGB504 200 200					200	

■ Applicable Working Material

Carbon Steels (S45C, S55C,...) ~ HB225	Alloy Steels (SCM, SK,...) HB22 ~ 325	Prehardened Steels(NAK,...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
						◎		○	

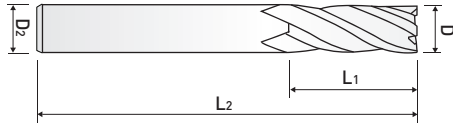
○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (mm)		Shank Dia.
Dia.	Tolerance	
up to 12	0 ~ -0.020	
over 12	0 ~ -0.030	h6

※ These tools are manufactured based on order received.

Endmill for Graphite and Non-ferrous ZAMUS GRA MATE Series



4 FLUTE, DIAMOND COATING, BALL NOSE ENDMILLS

- High performance on Graphite, Reinforced plastic and Non-ferrous material

WGE504 series



HELIX

DIAMOND

p.698

EDP No.	D	L ₁	L ₂	D ₂
WGE504 020	2.0	6	50	4
WGE504 020 08		8		
WGE504 020 10		10		
WGE504 025	2.5	8	50	4
WGE504 030	3.0	8	50	6
WGE504 030 10		10		
WGE504 030 12		12		
WGE504 030 16		16	60	
WGE504 030 20	20			
WGE504 040	4.0	10	50	6
WGE504 040 12		12	60	
WGE504 040 16		16		
WGE504 040 20		20		
WGE504 040 25		25		
WGE504 050	5.0	15	60	6
WGE504 060	6.0	15	60	6
WGE504 060 20		20	110	
WGE504 060 30		30	150	
WGE504 080	8.0	20	70	8
WGE504 080 30		30	110	
WGE504 080 40		40	150	
WGE504 100	10.0	25	75	10
WGE504 100 40		40	110	
WGE504 100 50		50	150	
WGE504 120	12.0	30	80	12
WGE504 120 50		50	120	
WGE504 120 60		60	160	
WGE504 160	16.0	50	110	16
WGE504 160 70		70	160	
WGE504 160 90		90	160	
WGE504 160 100		100	200	
WGE504 200	20.0	70	160	20
WGE504 200 90		90	160	
WGE504 200 100		100	200	

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels (NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
						◎		○	

○: General Application ◎: The most suitable Application

■ 허용공차

인선부(mm)		자루부
외경	공차	
50 이하	0.015	h6
50 이상	0.02	h6

※ These tools are manufactured based on order received.



Aluminum Endmills

ALU WAVE SERIES

ENDMILL
SERIES



Aluminum Endmills _ ALU WAVE SERIES

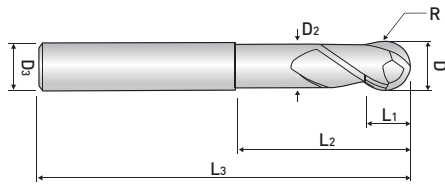
WIDIN

EDP. No.	APPEARANCE	FEATURE	INCH & METRIC	STOCK	PAGE
WAB312 ...series		2 FLUTE, 50 HELIX BALL ENDMILL FOR ALUMINUM	METRIC	•	320
WAE301 ...series		1 FLUTE, SQUARE ENDMILL, REGULAR LENGTH	METRIC	•	321
WAE302 ...series		2 FLUTE, SQUARE ENDMILL, REGULAR LENGTH	METRIC	•	323
WAE30(2)3 ...series		3 FLUTE, SQUARE ENDMILL, REGULAR & LONG LENGTH	METRIC	•	324
WAR302 ...series		2 FLUTE, CORNER RADIUS ENDMILL, REGULAR LENGTH	METRIC	•	328
WAR303 ...series		3 FLUTE, CORNER RADIUS ENDMILL, REGULAR LENGTH	METRIC	•	329
WAR502 ...series		2 FLUTE, CORNER RADIUS ENDMILL, DLC COATED, REGULAR LENGTH	METRIC	•	330
WAR503 ...series		3 FLUTE, CORNER RADIUS ENDMILL, DLC COATED, REGULAR LENGTH	METRIC	•	331
WAF303 ...series		3 FLUTE, ROUGHER ENDMILL, REGULAR & LONG LENGTH	METRIC	•	332

■ CODE SYSTEM

WA	R	3	0	3	14	10
Classification	Shape	Grade	Length, Shank type	No. of Flute	Diameter	Corner radius
WA : WINNER ALUMINIUM	B : Ball type	3 : NON Coating	0 : Stub Length	1 : 1 Flute	0.2	0.05
	E : Square type	5 : D.L.C Coating	1 : Regular Length	2 : 2 Flute	25	5
	R : Radius type		2 : Long Length	3 : 3 Flute		
	F : Roughing					

Aluminum Endmills ALU WAVE Series



2 FLUTE, STUB CUT BALL NOSE

- for Aluminum

- Excellent cutting quality on aluminum & copper
- high polished flute face improving chip evacuation and Lubricity

WAB312 ...series



EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂	D ₃
WAB312 060	6	3	5.5	25	55	5.4	6
WAB312 061	6	3	5.5	40	90	5.4	6
WAB312 080	8	4	7	30	65	7.2	8
WAB312 081	8	4	7	50	100	7.2	8
WAB312 100	10	5	8.5	35	75	9	10
WAB312 101	10	5	10	50	100	9	10
WAB312 102	10	5	10	60	150	9	10
WAB312 120	12	6	10.5	40	75	11	12
WAB312 121	12	6	12	50	110	11	12
WAB312 122	12	6	12	60	150	11	12
WAB312 160	16	8	14	50	90	14.5	16
WAB312 161	16	8	16	70	150	14.5	16
WAB312 162	16	8	16	90	200	14.5	16
WAB312 200	20	10	17	50	100	18	20

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
					○			◎	

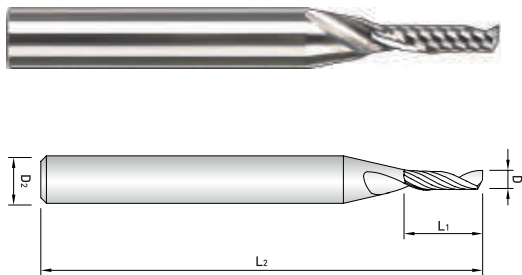
○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (mm)	Shank Dia.
±0.02	h6

※ These tools are manufactured based on order received.

Aluminum Endmills ALU WAVE Series



1 FLUTE, SQUARE ENDMILL, REGULAR LENGTH - for Aluminum

- Excellent cutting quality on aluminum & copper
- high polished flute face improving chip evacuation and Lubricity

WAE301 ...series



FINE GRAIN



HELIX

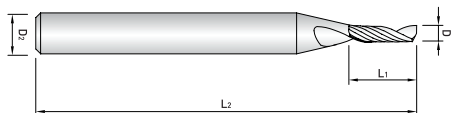


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EDP. No.	D	L ₁	L ₂	D ₂
WAE301 002	0.2	0.3	40	4
WAE301 003	0.3	0.9	40	4
WAE301 004	0.4	1.2	40	4
WAE301 005	0.5	1.5	40	4
WAE301 006	0.6	1.8	40	4
WAE301 007	0.7	2.1	40	4
WAE301 008	0.8	2.4	40	4
WAE301 009	0.9	2.7	40	4
WAE301 010	1	3	45	6
WAE301 010-4.5	1	4.5	45	6
WAE301 010-6	1	6	50	6
WAE301 012	1.2	3	45	6
WAE301 012-5	1.2	5	45	6
WAE301 012-6	1.2	6	50	6
WAE301 015	1.5	4	45	6
WAE301 015-6	1.5	6	50	6
WAE301 015-8	1.5	8	50	6
WAE301 020	2	6	50	6
WAE301 020-8	2	8	50	6
WAE301 020-10	2	10	50	6
WAE301 025	2.5	7	50	6

NEXT >>

Aluminum Endmills ALU WAVE Series



1 FLUTE, SQUARE ENDMILL, REGULAR LENGTH - for Aluminum

- Excellent cutting quality on aluminum & copper
- high polished flute face improving chip evacuation and Lubricity

WAE301 ...series



FINE GRAIN



HELIX



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EDP. No.	D	L ₁	L ₂	D ₂
WAE301 025-8	2.5	8	50	6
WAE301 025-10	2.5	10	50	6
WAE301 025-12	2.5	12	50	6
WAE301 030	3	8	50	6
WAE301 030-12	3	12	50	6
WAE301 030-15	3	15	50	6
WAE301 040	4	10	50	6
WAE301 040-15	4	15	50	6
WAE301 040-20	4	20	60	6
WAE301 050	5	13	60	6
WAE301 050-20	5	20	60	6
WAE301 050-25	5	25	60	6
WAE301 060	6	15	60	6
WAE301 060-20	6	20	60	6
WAE301 060-25	6	25	60	6
WAE301 080	8	20	70	8
WAE301 080-25	8	25	75	8
WAE301 100	10	22	75	10
WAE301 100-30	10	30	80	10
WAE301 120	12	26	75	12
WAE301 120-35	12	35	90	12

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
					○			◎	

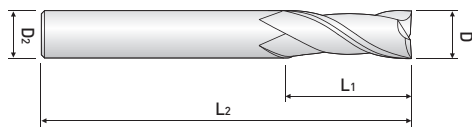
○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 5	0 ~ -0.02	
over 5	0 ~ -0.03	h6

※ These tools are manufactured based on order received.

Aluminum Endmills ALU WAVE Series



2 FLUTE, SQUARE ENDMILL, REGULAR LENGTH - for Aluminum

- Suitable for Aluminum, Aluminum Alloy, Copper & Non-ferrous material
- high polished flute face improving chip evacuation and Lubricity

WAE302 ...series



FINE GRAIN



HELIX



SHARP EDGE



UNCOATED



p.699

EDP. No.	D	L ₁	L ₂	D ₂
WAE302 010	1	3	50	4
WAE302 010-6	1	6	60	6
WAE302 012	1.2	4	50	6
WAE302 015	1.5	6	50	6
WAE302 015-8	1.5	8	60	6
WAE302 020 S4	2	6	50	4
WAE302 020	2	6	50	6
WAE302 020-10	2	10	60	6
WAE302 025	2.5	12	55	6
WAE302 030	3	12	55	6
WAE302 030-15	3	15	65	6
WAE302 035	3.5	14	57	6
WAE302 040	4	14	55	6
WAE302 040-16	4	16	65	6
WAE302 050	5	17	55	6
WAE302 050-22	5	22	60	6
WAE302 060	6	17	60	6
WAE302 060-22	6	22	60	6
WAE302 070	7	20	63	8
WAE302 080	8	23	70	8
WAE302 080-31	8	31	80	8
WAE302 090	9	25	72	10
WAE302 100	10	28	75	10
WAE302 100-36	10	36	90	10
WAE302 110	11	30	80	12
WAE302 120	12	33	80	12
WAE302 120-41	12	41	95	12
WAE302 122	12	45	100	12
WAE302 130	13	35	85	14
WAE302 140	14	38	90	14
WAE302 150	15	40	90	16
WAE302 160	16	45	100	16
WAE302 160-53	16	53	110	16
WAE302 180	18	49	100	18
WAE302 200	20	50	100	20
WAE302 200-55	20	55	110	20
WAE302 250	25	50	120	25

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○				○			◎	

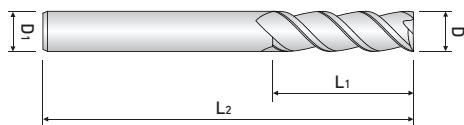
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Aluminum Endmills *ALU WAVE Series*



3 FLUTE, SQUARE ENDMILL, REGULAR & LONG LENGTH

- for Aluminum

- Suitable for Aluminum, Aluminum Alloy, Copper & Non-ferrous material
- Suitable for high speed cutting
- Optimized design for reducing cutting load and maximizing chip evacuation

WAE30(2)3 ...series



FINE GRAIN



3



45°



SHARP EDGE



UNCOATED

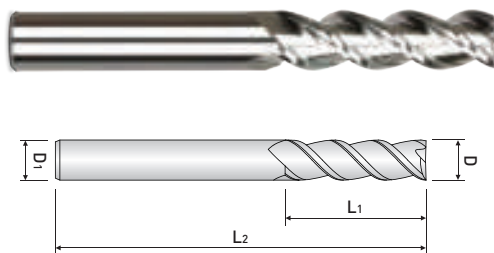


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EDP. No.	D	L ₁	L ₂	D ₂
WAE303 010-02	1	2	40	6
WAE303 010-025	1	2.5	40	6
WAE303 010	1	3	50	6
WAE303 010-04	1	4	60	6
WAE303 010-06	1	6	60	6
WAE303 012	1.2	4	50	6
WAE303 015-03	1.5	3	40	6
WAE303 015	1.5	5	50	6
WAE303 015-06	1.5	6	60	6
WAE303 015-08	1.5	8	60	6
WAE303 015-10	1.5	10	60	6
WAE303 020-03	2	3	40	6
WAE303 020	2	6	50	6
WAE303 020-08	2	8	60	6
WAE303 020-10	2	10	60	6
WAE303 020-12	2	12	60	6
WAE303 025	2.5	8	40	6
WAE303 025-10	2.5	10	55	6
WAE303 025-12	2.5	12	60	6
WAE303 030-04	3	4	45	6
WAE303 030-08	3	8	45	6
WAE303 030	3	12	55	6
WAE303 031	3	15	65	6
WAE323 030	3	20	70	6
WAE323 031	3	25	75	6
WAE323 032	3	30	80	6
WAE303 035	3.5	12	55	6
WAE303 040-05	4	5	45	6
WAE303 040-08	4	8	45	6
WAE303 040-11	4	11	45	6
WAE303 040	4	14	55	6
WAE303 040-16	4	16	65	6
WAE303 041	4	20	70	6
WAE323 040	4	26	75	6
WAE323 041	4	30	80	6
WAE303 045	4.5	15	55	6

NEXT >>

Aluminum Endmills ALU WAVE Series



3 FLUTE, SQUARE ENDMILL, REGULAR & LONG LENGTH - for Aluminum

- Suitable for Aluminum, Aluminum Alloy, Copper & Non-ferrous material
- Suitable for high speed cutting
- Optimized design for reducing cutting load and maximizing chip evacuation

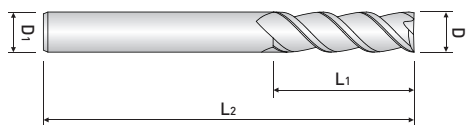
WAE30(2)3 ...series



EDP. No.	D	L ₁	L ₂	D ₂
WAE303 050-06	5	6	45	6
WAE303 050	5	17	55	6
WAE303 051	5	22	60	6
WAE303 052	5	26	70	6
WAE323 050	5	31	75	6
WAE323 051	5	36	80	6
WAE323 052	5	41	85	6
WAE323 053	5	46	90	6
WAE303 055	5.5	17	55	6
WAE303 060-07	6	7	50	6
WAE303 060-13	6	13	50	6
WAE303 060	6	17	60	6
WAE303 061	6	22	60	6
WAE303 062	6	26	70	6
WAE303 063	6	31	75	6
WAE323 060	6	36	80	6
WAE323 061	6	43	90	6
WAE323 062	6	51	100	6
WAE303 070	7	23	65	8
WAE303 080-10	8	10	60	8
WAE303 080-20	8	20	60	8
WAE303 080	8	23	70	8
WAE303 080-29	8	29	80	8
WAE303 081	8	31	80	8
WAE303 082	8	36	85	8
WAE323 080	8	41	90	8
WAE323 081	8	46	95	8
WAE323 082	8	51	100	8
WAE323 083	8	56	105	8
WAE323 084	8	66	110	8
WAE303 090	9	28	70	10
WAE303 100-12	10	12	65	10
WAE303 100-23	10	23	65	10
WAE303 100	10	28	75	10

NEXT >>

Aluminum Endmills ALU WAVE Series



3 FLUTE, SQUARE ENDMILL, REGULAR & LONG LENGTH

- for Aluminum

- Suitable for Aluminum, Aluminum Alloy, Copper & Non-ferrous material
- Suitable for high speed cutting
- Optimized design for reducing cutting load and maximizing chip evacuation

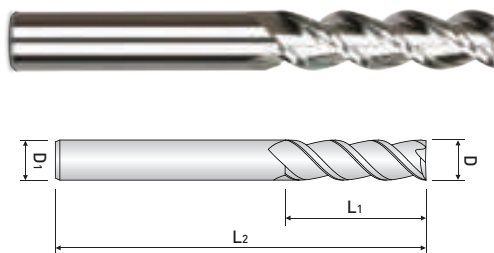
WAE30(2)3 ...series



EDP. No.	D	L ₁	L ₂	D ₂
WAE303 100-33	10	33	90	10
WAE303 101	10	36	90	10
WAE303 100-41	10	41	90	10
WAE303 102	10	46	100	10
WAE303 103	10	51	100	10
WAE323 100	10	56	110	10
WAE323 100-61	10	61	110	10
WAE323 101	10	66	120	10
WAE303 110	11	30	80	12
WAE303 120-14	12	14	70	12
WAE303 120-27	12	27	70	12
WAE303 120	12	33	80	12
WAE303 121	12	41	95	12
WAE303 122	12	46	100	12
WAE303 122-51	12	51	100	12
WAE303 123	12	56	110	12
WAE303 124-61	12	61	110	12
WAE323 120	12	66	120	12
WAE323 120-71	12	71	120	12
WAE323 121	12	76	135	12
WAE303 130	13	35	85	14
WAE303 140	14	38	90	14
WAE303 150	15	40	90	16
WAE303 160-19	16	19	90	16
WAE303 160-33	16	33	90	16
WAE303 160	16	45	100	16
WAE303 160-53	16	53	105	16
WAE303 161	16	56	110	16
WAE303 162	16	66	130	16
WAE303 163	16	76	150	16
WAE323 160	16	86	160	16
WAE323 161	16	96	180	16
WAE323 162	16	106	190	16
WAE323 163	16	116	200	16

NEXT >>

Aluminum Endmills ALU WAVE Series



3 FLUTE, SQUARE ENDMILL, REGULAR & LONG LENGTH - for Aluminum

- Suitable for Aluminum, Aluminum Alloy, Copper & Non-ferrous material
- Suitable for high speed cutting
- Optimized design for reducing cutting load and maximizing chip evacuation

WAE30(2)3 ...series



EDP. No.	D	L ₁	L ₂	D ₂
WAE303 180	18	49	100	18
WAE303 200-23	20	23	90	20
WAE303 200-39	20	39	90	20
WAE303 200	20	50	100	20
WAE303 201	20	60	110	20
WAE303 202	20	70	130	20
WAE303 203	20	76	150	20
WAE323 200	20	86	160	20
WAE323 201	20	96	180	20
WAE323 202	20	106	190	20
WAE323 203	20	116	200	20
WAE323 204	20	126	220	20
WAE303 250	25	50	120	25

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○				○			◎	

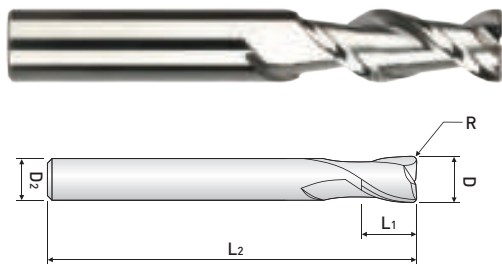
○:General Application ◎:The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Aluminum Endmills ALU WAVE Series



2 FLUTE, CORNER RADIUS ENDMILL, REGULAR LENGTH

- for Aluminum

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

WAR302 ...series



FINE GRAIN



HELIX



p.701

EDP. No.	D	R	L ₁	L ₂	D ₂
WAR302 06 05	6	0.5	15	50	6
WAR302 06 10		1			
WAR302 06 15		1.5			
WAR302 06 20		2			
WAR302 08 05	8	0.5	20	60	8
WAR302 08 10		1			
WAR302 08 15		1.5			
WAR302 08 20		2			
WAR302 08 30		3			
WAR302 10 05	10	0.5	25	70	10
WAR302 10 10		1			
WAR302 10 15		1.5			
WAR302 10 20		2			
WAR302 10 30		3			
WAR302 10 40	12	4	30	75	12
WAR302 12 10		1			
WAR302 12 20		2			
WAR302 12 30		3			
WAR302 12 40		4			
WAR302 14 10	14	1	35	80	14
WAR302 14 20		2			
WAR302 14 30		3			
WAR302 14 40		4			
WAR302 14 50		5			
WAR302 16 10	16	1	40	90	16
WAR302 16 20		2			
WAR302 16 30		3			
WAR302 16 40		4			
WAR302 16 50		5			
WAR302 20 10	20	1	45	100	20
WAR302 20 20		2			
WAR302 20 30		3			
WAR302 20 40		4			
WAR302 20 50		5			

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
					○			◎	

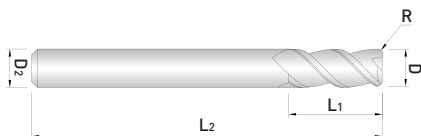
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Aluminum Endmills ALU WAVE Series



3 FLUTE, REGULAR 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

WAR303 ...series



EDP. No.	D	R	L ₁	L ₂	D ₂
WAR303 06 05	6	0.5	15	50	6
WAR303 06 10		1			
WAR303 06 15		1.5			
WAR303 06 20		2			
WAR303 08 05	8	0.5	20	60	8
WAR303 08 10		1			
WAR303 08 15		1.5			
WAR303 08 20		2			
WAR303 10 05	10	0.5	25	70	10
WAR303 10 10		1			
WAR303 10 15		1.5			
WAR303 10 20		2			
WAR303 10 30		3			
WAR303 10 40		4			
WAR303 12 10	12	1	30	75	12
WAR303 12 20		2			
WAR303 12 30		3			
WAR303 12 40		4			
WAR303 14 10	14	1	35	80	14
WAR303 14 20		2			
WAR303 14 30		3			
WAR303 14 40		4			
WAR303 14 50		5			
WAR303 16 10	16	1	40	90	16
WAR303 16 20		2			
WAR303 16 30		3			
WAR303 16 40		4			
WAR303 16 50		5			
WAR303 20 10	20	1	45	100	20
WAR303 20 20		2			
WAR303 20 30		3			
WAR303 20 40		4			
WAR303 20 50		5			

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○				○			◎	

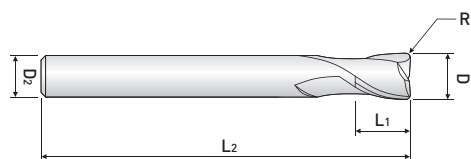
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Aluminum Endmills ALU WAVE Series



2 FLUTE, CORNER RADIUS ENDMILL with DLC COATING, REGULAR LENGTH

- for Aluminum

- Suitable for Aluminum, Aluminum Alloy, Copper & Non-Ferrous Material
- Adjust Corner Radius to prevent chipping (Not applicable for R Shape machining)
- Diamond Film Coating maximizes the tool life
- DLC Coated to improve chip evacuation and prolong tool life

WAR502 ...series



FINE GRAIN



HELIX



D.L.C.



p.702

EDP. No.	D	R	L ₁	L ₂	D ₂
WAR502 010	1	0.05	3	40	6
WAR502 015	1.5	0.05	5	40	6
WAR502 020	2	0.1	6	40	6
WAR502 021		0.1	12	50	
WAR502 030	3	0.1	10	50	6
WAR502 031		0.1	20	60	
WAR502 040	4	0.1	12	50	6
WAR502 041		0.1	20	60	
WAR502 050	5	0.1	15	57	6
WAR502 060	6	0.1	15	57	6
WAR502 061		0.1	22	65	
WAR502 070	7	0.1	20	63	8
WAR502 080	8	0.1	20	63	8
WAR502 081		0.1	28	70	
WAR502 090	9	0.1	25	72	10
WAR502 100	10	0.2	28	72	10
WAR502 101		0.2	32	80	
WAR502 110	11	0.2	30	80	12
WAR502 120	12	0.2	32	80	12
WAR502 121		0.2	40	100	

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
					○			◎	

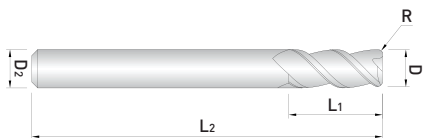
○: General Application ◎: The most suitable Application

■ Tolerance

Mill Dia. (mm)	Shank Dia.
±0.02	h6

※ These tools are manufactured based on order received.

Aluminum Endmills ALU WAVE Series



3 FLUTE, CORNER RADIUS ENDMILL with DLC COATING, REGULAR LENGTH - for Aluminum

- Suitable for Aluminum, Aluminum Alloy, Copper & Non-Ferrous Material
- Diamond Film Coating maximizes the tool life
- DLC Coated to improve chip evacuation and prolong tool life

WAR503 ...series



FINE GRAIN



HELIX



D.L.C.



p.703

EDP. No.	D	R	L ₁	L ₂	D ₂
WAR503 040	4	0.5	14	57	6
WAR503 041		1	25	62	
WAR503 060	6	0.5	16	57	6
WAR503 061		1	25	62	
WAR503 080	8	0.5	22	63	8
WAR503 081		1	35	80	
WAR503 100	10	0.5	28	72	10
WAR503 101		1	45	100	
WAR503 120	12	0.5	32	80	12
WAR503 121		1	45	100	
WAR503 160	16	0.5	45	90	16
WAR503 161		1	65	125	
WAR503 200	20	0.5	50	100	20
WAR503 201		1	70	130	

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○				○			◎	

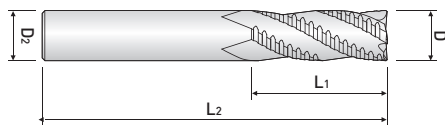
○:General Application ◎:The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Aluminum Endmills ALU WAVE Series



3 FLUTE, ROUGHER ENDMILL, REGULAR & LONG LENGTH

- for Aluminum

- Suitable for Aluminum, Aluminum Alloy, Copper & Non-Ferrous Material
- High performance geometry and coarse pitch combined for excellent tool life
- Regular and Long lengths
- Uncoated only
- Excellent for Aluminum, Aluminum Alloys, Non-Ferrous Metals, Graphite and Plastics

WAF303 ...series



FINE GRAIN



HELIX



Conventional Pitch



p.705

EDP. No.	D	L ₁	L ₂	D ₂
WAF303 040	4	10	55	6
WAF303 050	5	15	55	6
WAF303 060	6	16	60	6
WAF303 061	6	25	80	6
WAF303 070	7	16	63	8
WAF303 080	8	20	65	8
WAF303 081	8	30	90	8
WAF303 090	9	19	72	10
WAF303 100	10	25	75	10
WAF303 101	10	40	100	10
WAF303 120	12	30	80	12
WAF303 121	12	50	110	12
WAF303 140	14	35	90	14
WAF303 160	16	42	100	16
WAF303 161	16	52	150	16
WAF303 162	16	65	125	16
WAF303 180	18	32	92	18
WAF303 200	20	38	104	20
WAF303 201	20	55	160	20

※ Flat Shank is available upon request

ex) WAF303100F : Flat shank

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(VAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○				○			◎	

○:General Application ◎:The most suitable Application

■ Tolerance

μm = 1/1000mm

Tolerance	Di.	φ 1~φ 3	φ 3~φ 6	φ 6~φ 10	φ 10~φ 18	φ 18~φ 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



Endmills for General & Multi-purpose

STANDARD ENDMILL SERIES

ENDMILL
SERIES

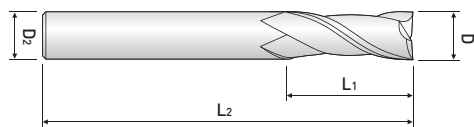


EDP. No.	APPEARANCE	FEATURE	INCH & METRIC	STOCK	PAGE
E302 ...series		REGULAR LENGTH	METRIC	•	336
E304 ...series		REGULAR LENGTH	METRIC	•	338
B302 ...series		BALL NOSE LONG LENGTH	METRIC	•	339
BL422 ...series		BALL NOSE EXTRA LONG LENGTH	METRIC	•	340
B304 ...series		BALL NOSE LONG LENGTH	METRIC	•	341
E322 ...series		LONG LENGTH	METRIC	•	342
E324 ...series		LONG LENGTH	METRIC	•	343
EB302 ...series		REGULAR LENGTH - BRAZED TYPE	METRIC	•	344
EB304 ...series		REGULAR LENGTH - BRAZED TYPE	METRIC	•	345
EB322 ...series		LONG LENGTH - BRAZED TYPE	METRIC	•	346
EB324 ...series		LONG LENGTH - BRAZED TYPE	METRIC	•	347
BB302 ...series		BALL NOSE REGULAR LENGTH - BRAZED TYPE	METRIC	•	348

CODE SYSTEM

BL	4	2	2	100	S42
Shape	Grade	Length, Shank type	No. of Flute	Diameter	Shank Diameter
B : Ball Endmill	3 : Standard	0 : Regular Length	2 : 2 Flute	1	3
E : Square Endmill	4 : Long Length	2 : Long Length	4 : 4 Flute	50	42
BL : Long Length Ball					
EB : Brazed Square					
BB : Brazed Ball					

Endmills for General & Multi-purpose STANDARD END MILL Series



2 FLUTE, REGULAR LENGTH

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

E302 ...series

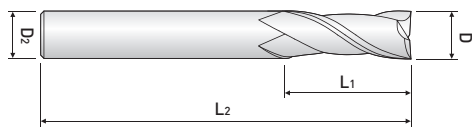


EDP. No.	D	L ₁	L ₂	D ₂
E302010S4	1	3	42	4
E302010				6
E302015S4	1.5	4	42	4
E302015				6
E302020S4	2	6	42	4
E302020				6
E302025S4	2.5	8	42	4
E302025				6
E302030	3	10	50	6
E302035	3.5	10	50	6
E302040	4	12	50	6
E302045	4.5	14	50	6
E302050	5	15	50	6
E302055	5.5	15	50	6
E302060	6	15	50	6
E302065	6.5	18	60	8
E302070	7	20	60	8
E302075	7.5	20	60	8
E302080	8	20	60	8
E302085	8.5	23	70	10
E302090	9	25	70	10
E302095	9.5	25	70	10
E302100	10	25	70	10
E302105	10.5	28	75	12
E302110	11	30	75	12

※ Please reduce cutting speed around 20~30%

NEXT >>

Endmills for General & Multi-purpose STANDARD END MILL Series



2 FLUTE, REGULAR LENGTH

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

E302 ...series



FINE GRAIN



p.706

EDP. No.	D	L ₁	L ₂	D ₂
E302115	11.5	30	75	12
E302120	12	30	75	12
E302130	13	35	85	14
E302130S16			90	16
E302140	14	35	85	14
E302140S16			90	16
E302150	15	40	90	16
E302160	16	40	90	16
E302180	18	45	100	18
E302200	20	45	100	20
E302250	25	50	120	25

※ Please reduce cutting speed around 20~30%

■ Applicable Working Material

Carbon Steels (S45C, S55C,...) ~ HB225	Alloy Steels (SCM, SK,...) HB22 ~ 325	Prehardened Steels (NAK,...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○								

○: General Application ◎: The most suitable Application

■ Tolerance

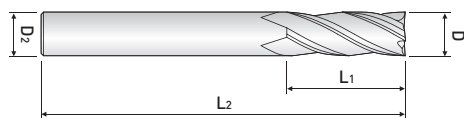
mm = 1/1000mm

Tolerance	Dia.	φ 1~φ 3	φ 3~φ 6	φ 6~φ 10	φ 10~φ 18	φ 18~φ 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

Endmills for General & Multi-purpose STANDARD END MILL Series



4 FLUTE, REGULAR LENGTH



E304 ...series



EDP. No.	D	L ₁	L ₂	D ₂
E304020S4	2	6	42	4
E304020				6
E304025	2.5	8	42	6
E304030	3	10	50	6
E304035	3.5	10	50	6
E304040	4	12	50	6
E304045	4.5	14	50	6
E304050	5	15	50	6
E304055	5.5	15	50	6
E304060	6	15	50	6
E304065	6.5	18	60	8
E304070	7	20	60	8
E304075	7.5	20	60	8
E304080	8	20	60	8
E304085	8.5	23	70	10
E304090	9	25	70	10
E304095	9.5	25	70	10
E304100	10	25	70	10
E304105	10.5	28	75	12
E304110	11	30	75	12
E304115	11.5	30	75	12
E304120	12	30	75	12
E304130	13	35	85	14
E304130S16			90	16
E304140	14	35	85	14
E304140S16			90	16
E304150	15	40	90	16
E304160	16	40	90	16
E304180	18	45	100	18
E304200	20	45	100	20
E304250	25	50	120	25

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (S50M, SK...) HB22 ~ 325	Prehardened Steels (NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○								

○: General Application ◎: The most suitable Application

■ Tolerance

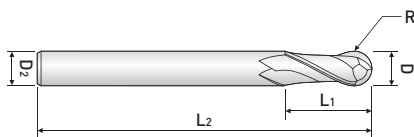
μm = 1/1000mm

Tolerance	Dia.	φ 1~φ 3	φ 3~φ 6	φ 6~φ 10	φ 10~φ 18	φ 18~φ 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

Endmills for General & Multi-purpose STANDARD END MILL Series



2 FLUTE, BALL NOSE LONG LENGTH



B302 ...series



EDP. No.	D	R	L ₁	L ₂	D ₂
B302010	1	0.5	3	50	6
B302015	1.5	0.75	4	50	6
B302020	2	1	6	60	6
B302025	2.5	1.25	6	60	6
B302030	3	1.5	8	70	6
B302035	3.5	1.75	8	70	6
B302040	4	2	8	70	6
B302045	4.5	2.25	10	70	6
B302050	5	2.5	12	80	6
B302055	5.5	2.75	12	80	6
B302060	6	3	12	90	6
B302065	6.5	3.25	12	90	8
B302070	7	3.5	20	90	8
B302080	8	4	20	100	8
B302090	9	4.5	25	100	10
B302100	10	5	25	100	10
B302110	11	5.5	30	110	12
B302120	12	6	30	110	12
B302130	13	6.5	35	120	14
B302140	14	7	35	120	14
B302150	15	7.5	40	140	16
B302160	16	8	40	140	16
B302180	18	9	45	150	18
B302200	20	10	45	160	20
B302250	25	12.5	50	180	25

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB229	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					

○:General Application ◎:The most suitable Application

■ Tolerance

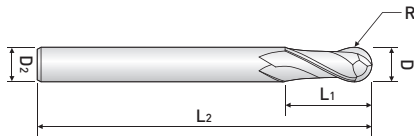
μm = 1/1000mm

Tolerance	Dia.	φ 1~φ 3	φ 3~φ 6	φ 6~φ 10	φ 10~φ 18	φ 18~φ 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

Endmills for General & Multi-purpose STANDARD END MILL Series



2 FLUTE, BALL NOSE EXTRA LONG LENGTH



BL422 ...series



FINE GRAIN



HELIX



p.707

EDP. No.	D	R	L ₁	L ₂	D ₂
BL422030	3	1.5	30	75	3
BL422040	4	2	30	75	4
BL422050	5	2.5	40	100	5
BL422060	6	3	50	150	6
BL422080	8	4	50	150	8
BL422100	10	5	60	150	10
BL422120	12	6	75	150	12
BL422140	14	7	75	150	14
BL422160	16	8	75	150	16
BL422180	18	9	75	150	18
BL422200	20	10	75	150	20

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB229	Alloy Steels (S50M, SK...) HB22 ~ 325	Prehardened Steels (NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					

○: General Application ◎: The most suitable Application

■ Tolerance

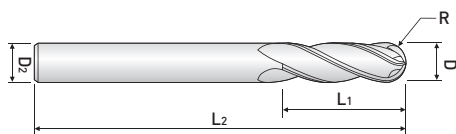
Tolerance	Dia.	ø 1~ø 3	ø 3~ø 6	ø 6~ø 10	ø 10~ø 18	ø 18~ø 30
Cutting Edge(h10)		0 -40	0 -48	0 -58	0 -70	0 -84
Shank(h6)		0 -6	0 -8	0 -9	0 -11	0 -13

μm = 1/1000mm

Endmills for General & Multi-purpose STANDARD END MILL Series



4 FLUTE, BALL NOSE LONG LENGTH



B304 ...series



EDP. No.	D	R	L ₁	L ₂	D ₂
B304030	3	1.5	8	70	6
B304040	4	2	8	70	6
B304050	5	2.5	12	80	6
B304060	6	3	12	90	6
B304070	7	3.5	20	90	8
B304080	8	4	20	100	8
B304090	9	4.5	25	100	10
B304100	10	5	25	100	10
B304110	11	5.5	30	110	12
B304120	12	6	30	110	12
B304130	13	6.5	35	120	14
B304140	14	7	35	120	14
B304150	15	7.5	40	140	16
B304160	16	8	40	140	16
B304180	18	9	45	150	18
B304200	20	10	45	160	20
B304250	25	12.5	50	180	25

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB229	Alloy Steels (S50M, SK...) HB22 ~ 325	Prehardened Steels (NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					

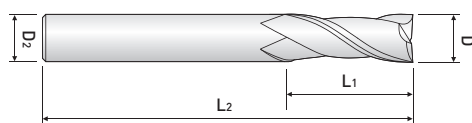
○: General Application ◎: The most suitable Application

■ Tolerance

μm = 1/1000mm

Tolerance	Dia.	φ 1~φ 3	φ 3~φ 6	φ 6~φ 10	φ 10~φ 18	φ 18~φ 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

Endmills for General & Multi-purpose STANDARD END MILL Series



2 FLUTE, LONG LENGTH

E322 ...series



FINE GRAIN



HELIX



p.706

EDP. No.	D	L ₁	L ₂	D ₂
E322030	3	25	75	6
E322040	4	25	75	6
E322050	5	30	85	6
E322060	6	30	85	6
E322070	7	35	85	8
E322080	8	35	85	8
E322090	9	45	100	10
E322100	10	45	100	10
E322101		60	155	
E322120	12	55	120	12
E322121		65	155	
E322140	14	60	120	14
E322160	16	60	120	16
E322161		75	165	
E322180	18	60	120	18
E322200	20	60	120	20
E322201		75	165	

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB229	Alloy Steels (S50M, SK...) HB22 ~ 325	Prehardened Steels (NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					

○: General Application ◎: The most suitable Application

■ Tolerance

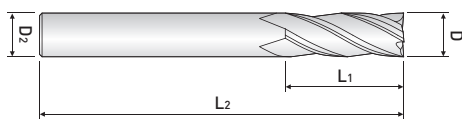
μm = 1/1000mm

Tolerance Dia.	φ 1~φ 3	φ 3~φ 6	φ 6~φ 10	φ 10~φ 18	φ 18~φ 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

Endmills for General & Multi-purpose STANDARD END MILL Series



4 FLUTE, LONG LENGTH



E324 ...series



EDP. No.	D	L ₁	L ₂	D ₂
E324030	3	25	75	6
E324040	4	25	75	6
E324050	5	30	85	6
E324060	6	30	85	6
E324070	7	35	85	8
E324080	8	35	85	8
E324090	9	45	100	10
E324100	10	45	100	10
E324101		60	155	
E324120	12	55	120	12
E324121		65	155	
E324140	14	60	120	14
E324160	16	60	120	16
E324161		75	165	
E324180	18	60	120	18
E324200	20	60	120	20
E324201		75	165	

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB229	Alloy Steels (S50M, SK...) HB22 ~ 325	Prehardened Steels (NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○								

○: General Application ◎: The most suitable Application

■ Tolerance

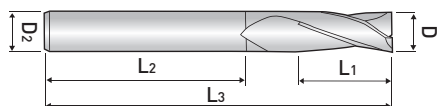
μm = 1/1000mm

Tolerance \ Dia.	ø 1~ø 3	ø 3~ø 6	ø 6~ø 10	ø 10~ø 18	ø 18~ø 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

Endmills for General & Multi-purpose STANDARD END MILL Series



**2 FLUTE, REGULAR LENGTH
- BRAZED TYPE**



EB302 ...series



EDP. No.	D	L ₁	L ₂	L ₃	D ₂
EB302140	14	28	60	98	16
EB302150	15	28	60	98	16
EB302160	16	28	60	98	16
EB302170	17	32	70	115	20
EB302180	18	32	70	115	20
EB302190	19	32	70	115	20
EB302200	20	32	70	115	20
EB302210	21	32	70	115	20
EB302220	22	32	70	115	20
EB302230	23	40	85	140	25
EB302240	24	40	85	140	25
EB302250	25	40	85	140	25
EB302260	26	40	85	140	25
EB302270	27	40	85	140	25
EB302280	28	40	85	140	25
EB302290	29	50	85	150	32
EB302300	30	50	85	150	32
EB302310	31	50	85	150	32
EB302320	32	50	85	150	32
EB302350	35	50	85	150	32
EB302360	36	50	85	150	32
EB302380	38	55	85	155	32
EB302400	40	55	85	155	32
EB302420	42	55	85	155	32
EB302450	45	63	85	160	32
EB302500	50	63	85	160	32

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○								

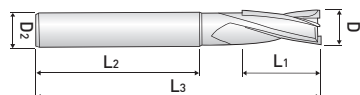
○: General Application ◎: The most suitable Application

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.05	h7

※ Items can be changed for quality improvement without notice.

Endmills for General & Multi-purpose STANDARD END MILL Series



4 FLUTE, REGULAR LENGTH
- BRAZED TYPE

EB304 ...series



EDP. No.	D	L ₁	L ₂	L ₃	D ₂
EB304140	14	28	60	98	16
EB304150	15	28	60	98	16
EB304160	16	28	60	98	16
EB304170	17	32	70	115	20
EB304180	18	32	70	115	20
EB304190	19	32	70	115	20
EB304200	20	32	70	115	20
EB304210	21	32	70	115	20
EB304220	22	32	70	115	20
EB304230	23	40	85	140	25
EB304240	24	40	85	140	25
EB304250	25	40	85	140	25
EB304260	26	40	85	140	25
EB304270	27	40	85	140	25
EB304280	28	40	85	140	25
EB304290	29	50	85	150	32
EB304300	30	50	85	150	32
EB304310	31	50	85	150	32
EB304320	32	50	85	150	32
EB304350	35	50	85	150	32
EB304360	36	50	85	150	32
EB304380	38	55	85	155	32
EB304400	40	55	85	155	32
EB304420	42	55	85	155	32
EB304450	45	63	85	160	32
EB304500	50	63	85	160	32

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○								

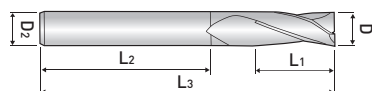
○: General Application ◎: The most suitable Application

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.05	h7

※ Items can be changed for quality improvement without notice.

Endmills for General & Multi-purpose STANDARD END MILL Series



**2 FLUTE, LONG LENGTH
- BRAZED TYPE**

EB322 ...series



EDP. No.	D	L ₁	L ₂	L ₃	D ₂
EB322140	14	50	60	130	16
EB322150	15	50	60	130	16
EB322160	16	50	60	130	16
EB322180	18	60	60	140	20
EB322200	20	60	60	140	20
EB322220	22	60	60	140	20
EB322240	24	70	60	150	25
EB322250	25	70	60	150	25
EB322260	26	70	60	150	25
EB322280	28	70	60	150	25
EB322300	30	80	70	180	32
EB322320	32	90	70	190	32
EB322350	35	100	70	200	32
EB322380	38	100	70	220	32
EB322400	40	100	70	220	32
EB322450	45	120	80	230	32

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○								

○: General Application ◎: The most suitable Application

■ Tolerance

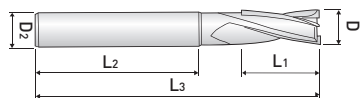
Mill Dia. (mm)	Shank Dia.
0 ~ -0.05	h7

※ Items can be changed for quality improvement without notice.

Endmills for General & Multi-purpose STANDARD END MILL Series



4 FLUTE, LONG LENGTH
- BRAZED TYPE



EB324 ...series



EDP. No.	D	L ₁	L ₂	L ₃	D ₂
EB324140	14	50	60	130	16
EB324150	15	50	60	130	16
EB324160	16	50	60	130	16
EB324180	18	60	60	140	20
EB324200	20	60	60	140	20
EB324220	22	60	60	140	20
EB324240	24	70	60	150	25
EB324250	25	70	60	150	25
EB324260	26	70	60	150	25
EB324280	28	70	60	150	25
EB324300	30	80	70	180	32
EB324320	32	90	70	190	32
EB324350	35	100	70	200	32
EB324380	38	100	70	220	32
EB324400	40	100	70	220	32
EB324450	45	120	80	230	32
EB324500	50	140	80	240	32

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○								

○: General Application ◎: The most suitable Application

■ Tolerance

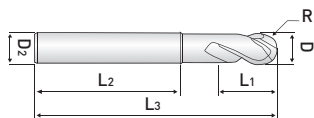
Mill Dia. (mm)	Shank Dia.
0 ~ -0.05	h7

※ Items can be changed for quality improvement without notice.

Endmills for General & Multi-purpose STANDARD END MILL Series



**2 FLUTE, BALL NOSE REGULAR LENGTH
- BRAZED TYPE**



BB302 ...series



EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂
BB302150	15	7.5	28	55	100	16
BB302160	16	8	28	55	100	16
BB302180	18	9	29	55	110	20
BB302200	20	10	29	55	110	20
BB302220	22	11	36	60	110	25
BB302240	24	12	37	60	110	25
BB302250	25	12.5	38	60	120	25
BB302280	28	14	40	65	120	32
BB302300	30	15	46	65	130	32
BB302320	32	16	47	65	140	32

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○								

○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.05	h7

※Items can be changed for quality improvement without notice.

Endmills for Mold & Die

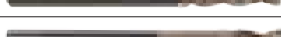
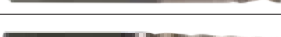
WINNER SERIES

ENDMILL
SERIES



Endmills for Mold & Die _ WINNER SERIES

WIDIN

EDP. No.	APPEARANCE	FEATURE	INCH & METRIC	STOCK	PAGE
WHPB902 ... series		APPLIED ULTRA-HIGH PRECISION R TOLERANCE	METRIC	•	348
WB502 ... series		SHORT LENGTH + REGULAR LENGTH + LONG LENGTH	METRIC	•	349
WB502---P ... series		HIGH PRECISION	METRIC	•	353
WB512 ... series		for RIB PROCESSING	METRIC	•	354
WB512---S6 ... series		for RIB PROCESSING (Shank-6)	METRIC	•	361
WB542... series		TAPER NECK	METRIC	•	364
WB532... series		MILLING MACHINE COPY	METRIC	•	375
WSB502... series		STRAIGHT FLUTE	METRIC	•	376
WB503... series		HIGH FEED & CENTER MATCH	METRIC	•	377
WB504... series		HIGH FEED	METRIC	•	378
WR502 ... series		SHORT LENGTH + REGULAR LENGTH + LONG LENGTH	METRIC	•	379
WR512 ... series		LONG NECK	METRIC	•	384
WR542 ... series		TAPER NECK	METRIC	•	396
WDR503 ... series		DOUBLE CORNER RADIUS	METRIC	•	406
WXR504 ... series		SHORT LENGTH+REGULAR LENGTH +LONG SHANK+VARIABLE INDEX GEOMETRY	METRIC	•	407
WXR514 ... series		LONG NECK +VARIABLE INDEX GEOMETRY	METRIC	•	411
WR544 ... series		TAPER NECK	METRIC	•	421
WSPM4 ... series		HIGH FEED	METRIC	•	428
WR504 ... series		SHORT LENGTH+REGULAR LENGTH +END TEETH VARIABLE INDEX GEOMETRY	METRIC	•	430
WR514 ... series		LONG NECK CORNER RADIUS	METRIC	•	432
WR506 ... series		45° CORNER RADIUS	METRIC	•	433
WME502 ... series		Ø0.03~	METRIC	•	434
WE502---S4 ... series		Ø0.1 + SHANK 4	METRIC	•	436
WE502---S3 ... series		SHANK 3	METRIC	•	437
WE502 ... series		SHORT + REGULAR + LONG LENGTH	METRIC	•	442
WE522 ... series		LONG	METRIC	•	445
WE512 ... series		LONG NECK	METRIC	•	450

Endmills for Mold & Die _ WINNER SERIES

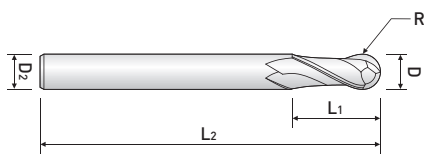
WIDIN

EDP. No.	APPEARANCE	FEATURE	INCH & METRIC	STOCK	PAGE
WME504 ... series		VARIABLE INDEX GEOMETRY	METRIC	•	456
WXE504... series		SHORT + REGULAR + LONG LENGTH + VARIABLE INDEX GEOMETRY	METRIC	•	458
WE524 ... series		LONG	METRIC	•	460
WE514 ... series		LONG NECK	METRIC	•	464
WE504---H ... series		45°HELIX + REGULAR + LONG	METRIC	•	468
WE506 ... series		45°HELIX + REGULAR + LONG	METRIC	•	470
WF61 ... series		ROUGHING ENDMILL	METRIC	•	471
WF60 ... series		ROUGHING ENDMILL-CORNER R	METRIC	•	472
WTE502 ... series		TAPER	METRIC	•	473
WTE504 ... series		TAPER	METRIC	•	477
WTE514 ... series		RIB	METRIC	•	478
WTB502 ... series		TAPER BALL	METRIC	•	484
WTR504 ... series		TAPER CORNER RADIUS	METRIC	•	486

■ CODE SYSTEM

W	R	5	1	2	010	005	03
Classification	Shape	Grade	Length, Shank type	No. of Flute	Diameter	Corner radius	Neck length
W : Winner	B : Ball type	5 : Grade	0 : Straight	2 : 2 Flute	0.03	0.05	0.2
WHP : Winner High Precision	SB : Straight Ball type	9 : High Precision Grade	1 : Neck	3 : 3 Flute	5	5	5
	R : Radius type		4 : Tapered Neck	4 : 4 Flute	25	2	100
	DR : Double Radius type			4H : 4 Flute (Helix 45°)			
	XR : Radius type (Unequal Division)						
	SPM : Speed Power Mill						
	ME : Miniature type						
	F : Roughing						
	TE : Tapered type						
	TB : Tapered Ball type						
	TR : Tapered Radius type						
	XE : Square type (Unequal Division)						

Endmills for Mold & Die(Ball) WINNER Series



ULTRA HIGH PRECISION BALL ENDMILLS

- Longer tool life and improvement on stable machining by the newest W Coating
- Actualization of high precision by applying the world's first Ultra precision Tolerance

WHPB902 series



EDP. No.	D	R	L ₁	L ₂	D ₂
WHPB902 001	0.1	0.05	0.2	40	4
WHPB902 0015	0.15	0.075	0.3	40	4
WHPB902 002	0.2	0.1	0.4	40	4
WHPB902 003	0.3	0.15	0.6	40	4
WHPB902 004	0.4	0.2	0.8	40	4
WHPB902 005	0.5	0.25	1.0	40	4
WHPB902 006	0.6	0.3	1.2	40	4
WHPB902 007	0.7	0.35	1.4	40	4
WHPB902 008	0.8	0.4	1.6	40	4
WHPB902 009	0.9	0.45	1.8	40	4
WHPB902 010	1.0	0.5	2.5	50	6
WHPB902 012	1.2	0.6	3.0	50	6
WHPB902 015	1.5	0.75	4.0	50	6
WHPB902 020	2.0	1	5.0	50	6
WHPB902 025	2.5	1.25	6.0	60	6
WHPB902 030	3.0	1.5	6.0	60	6
WHPB902 040	4.0	2	8.0	70	6
WHPB902 050	5.0	2.5	10.0	80	6
WHPB902 060	6.0	3	12.0	90	6
WHPB902 080	8.0	4	14.0	100	8
WHPB902 100	10.0	5	18.0	100	10
WHPB902 120	12.0	6	24.0	110	12

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
						◎		○	

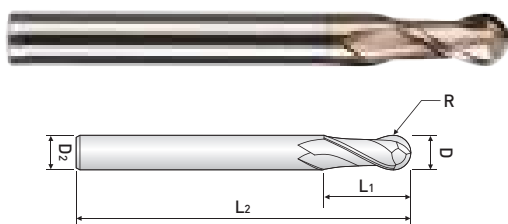
○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.012	
over 6	0 ~ -0.015	h6

※ These tools are manufactured based on order received.

Endmills for Mold & Die(Ball) WINNER Series



2 FLUTE BALL, SHORT LENGTH + REGULAR LENGTH + LONG LENGTH

- Better wear resistance and machining with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
Pre-hardened Steel Alloy Steel, Carbon Steel

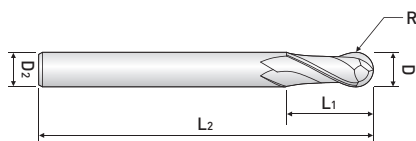
WB502 ...series



EDP. No.	D	R	L ₁	L ₂	D ₂
WB502 001S	0.1	0.05	0.1	40	4
WB502 001			0.2	40	4
WB502 001 S3			0.2	40	3
WB502 0015S	0.15	0.075	0.15	40	4
WB502 0015			0.3	40	4
WB502 0015 S3			0.3	40	3
WB502 002S	0.2	0.1	0.2	40	4
WB502 002			0.4	40	4
WB502 002 S3			0.4	40	3
WB502 003S	0.3	0.15	0.3	40	4
WB502 003			0.6	40	4
WB502 003 S3			0.6	40	3
WB502 004S	0.4	0.2	0.4	40	4
WB502 004			0.8	40	4
WB502 004 S3			0.8	40	3
WB502 005S	0.5	0.25	0.5	40	4
WB502 005			1.0	40	4
WB502 005 S3			1.0	40	3
WB502 006S	0.6	0.3	0.6	40	4
WB502 006			1.2	40	4
WB502 006 S3			1.2	40	3
WB502 007S	0.7	0.35	0.7	40	4
WB502 007			1.4	40	4
WB502 007 S3			1.4	40	3
WB502 008S	0.8	0.4	0.8	40	4
WB502 008			1.6	40	4
WB502 008 S3			1.6	40	3
WB502 009S	0.9	0.45	0.9	40	4
WB502 009			1.8	40	4
WB502 009 S3			1.8	40	3
WB502 010S	1.0	0.5	1.5	40	6
WB502 010 S3			2.5	50	3
WB502 010 S4			2.5	50	4
WB502 010			2.5	50	6
WB502 010 070			2.5	70	6
WB502 010 100			2.5	100	6

NEXT >>>

Endmills for Mold & Die(Ball) WINNER Series



2 FLUTE BALL, SHORT LENGTH + REGULAR LENGTH + LONG LENGTH

- Better wear resistance and machining with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
Pre-hardened Steel Alloy Steel, Carbon Steel

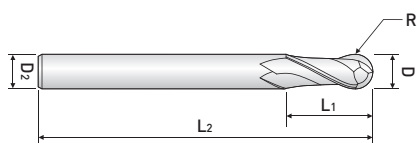
WB502 ...series



EDP. No.	D	R	L ₁	L ₂	D ₂
WB502 0120S	1.2	0.6	2.0	40	6
WB502 012 S3			3.0	50	3
WB502 012 S4			3.0	50	4
WB502 012			3.0	50	6
WB502 012 070			3.0	70	6
WB502 012 100			3.0	100	6
WB502 015S	1.5	0.75	2.5	40	6
WB502 015 S3			4.0	50	3
WB502 015 S4			4.0	50	4
WB502 015			4.0	50	6
WB502 015 070			4.0	70	6
WB502 015 100			4.0	100	6
WB502 020S	2.0	1	3.0	40	6
WB502 020 S3			5.0	50	3
WB502 020 S4			5.0	50	4
WB502 020			5.0	50	6
WB502 020 080			5.0	80	6
WB502 020 100			5.0	100	6
WB502 025S	2.5	1.25	4.0	40	6
WB502 025 S3			6.0	60	3
WB502 025 S4			6.0	60	4
WB502 025			6.0	60	6
WB502 025 080			6.0	80	6
WB502 025 100			6.0	100	6
WB502 030S	3.0	1.5	4.5	40	6
WB502 030 S3			6.0	60	3
WB502 030 S4			6.0	60	4
WB502 030			6.0	60	6
WB502 030 080			6.0	80	6
WB502 030 100			6.0	100	6
WB502 035	3.5	1.75	8.0	70	6
WB502 040S	4.0	2	6.0	50	6
WB502 040 S4			8.0	70	4
WB502 040			8.0	70	6
WB502 040 100 S4			8.0	100	4
WB502 040 120 S4			8.0	120	4
WB502 040 100			8.0	100	6
WB502 040 120			8.0	120	6

NEXT >>

Endmills for Mold & Die(Ball) WINNER Series



2 FLUTE BALL, SHORT LENGTH + REGULAR LENGTH + LONG LENGTH

- Better wear resistance and machining with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
Pre-hardened Steel Alloy Steel, Carbon Steel

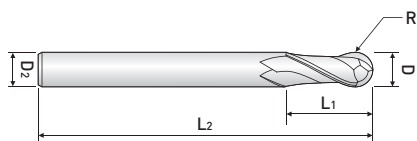
WB502 ...series



EDP. No.	D	R	L ₁	L ₂	D ₂
WB502 045	4.5	2.25	9.0	80	6
WB502 050S	5.0	2.5	7.5	60	6
WB502 050			10.0	80	6
WB502 050 S5			10.0	80	5
WB502 055	5.5	2.75	11.0	90	6
WB502 060S	6.0	3	9.0	50	6
WB502 060 060			9.0	60	6
WB502 060 080			9.0	80	6
WB502 060			12.0	90	6
WB502 060 110			12.0	110	6
WB502 060 130			12.0	130	6
WB502 060 150			12.0	150	6
WB502 065	6.5	3.25	13.0	90	8
WB502 070	7.0	3.5	14.0	90	8
WB502 080S	8.0	4	12.0	50	8
WB502 080 060			12.0	60	8
WB502 080 080			12.0	80	8
WB502 080 090			12.0	90	8
WB502 080			14.0	100	8
WB502 080 130			14.0	130	8
WB502 080 150			14.0	150	8
WB502 085	8.5	4.25	16.0	100	10
WB502 090	9.0	4.5	18.0	100	10
WB502 100S	10.0	5	15.0	50	10
WB502 100 060			15.0	60	10
WB502 100 080			15.0	80	10
WB502 100 090			15.0	90	10
WB502 100			18.0	100	10
WB502 100 130			18.0	130	10
WB502 100 150			18.0	150	10
WB502 100 180			18.0	180	10
WB502 100 200			18.0	200	10
WB502 110	11.0	5.5	20.0	100	12
WB502 120S	12.0	6	18.0	60	12
WB502 120 080			18.0	80	12
WB502 120 090			18.0	90	12
WB502 120 100			18.0	100	12
WB502 120			24.0	110	12

NEXT >>

Endmills for Mold & Die(Ball) WINNER Series



2 FLUTE BALL, SHORT LENGTH + REGULAR LENGTH + LONG LENGTH

- Better wear resistance and machining with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
Pre-hardened Steel Alloy Steel, Carbon Steel

WB502 ...series



EDP. No.	D	R	L ₁	L ₂	D ₂
WB502 120 130	12.0	6	24.0	130	12
WB502 120 150			24.0	150	12
WB502 120 180			24.0	180	12
WB502 120 200			24.0	200	12
WB502 130	13.0	6.5	24.0	100	12
WB502 140 S12	14.0	7	26.0	100	12
WB502 140			26.0	100	14
WB502 140 S16			26.0	100	16
WB502 150	15.0	7.5	28.0	140	16
WB502 160 100	16.0	8	24.0	100	16
WB502 160 130			24.0	130	16
WB502 160			30.0	150	16
WB502 160 180			30.0	180	16
WB502 160 200			30.0	200	16
WB502 180 S16	18.0	9	34.0	150	16
WB502 180			34.0	150	18
WB502 200 100	20.0	10	30.0	100	20
WB502 200 130			30.0	130	20
WB502 200			38.0	150	20
WB502 200 200			38.0	200	20
WB502 250 120	25.0	12.5	50.0	120	25
WB502 250			50.0	180	25

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

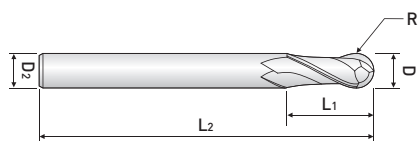
○: General Application ◎: The most suitable Application

■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.012	
over 6	0 ~ -0.015	h6

※ These tools are manufactured based on order received.

Endmills for Mold & Die(Ball) WINNER Series



High PRECISION BALL

- High precise performance with R tolerance below 3 micron
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55

Pre-hardened Steel, Alloy Steel, Carbon Steel

WB502...P ...series



ULTRA FINE

HELIX

up to R3

over R3

W Coating

EDP. No.	D	R	L ₁	L ₂	D ₂
WB502 001P	0.1	0.05	0.2	40	4
WB502 0015P	0.15	0.075	0.3	40	4
WB502 002P	0.2	0.1	0.4	40	4
WB502 003P	0.3	0.15	0.6	40	4
WB502 004P	0.4	0.2	0.8	40	4
WB502 005P	0.5	0.25	1.0	40	4
WB502 006P	0.6	0.3	1.2	40	4
WB502 007P	0.7	0.35	1.4	40	4
WB502 008P	0.8	0.4	1.6	40	4
WB502 009P	0.9	0.45	1.8	40	4
WB502 010P	1.0	0.5	2.5	50	6
WB502 012P	1.2	0.6	3.0	50	6
WB502 015P	1.5	0.75	4.0	50	6
WB502 020P	2.0	1	5.0	50	6
WB502 025P	2.5	1.25	6.0	60	6
WB502 030P	3.0	1.5	6.0	60	6
WB502 040P	4.0	2	8.0	70	6
WB502 050P	5.0	2.5	10.0	80	6
WB502 060P	6.0	3	12.0	90	6
WB502 080P	8.0	4	14.0	100	8
WB502 100P	10.0	5	18.0	100	10
WB502 120P	12.0	6	24.0	110	12

Endmills for Mold & Die(Ball) – WINNER Series

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

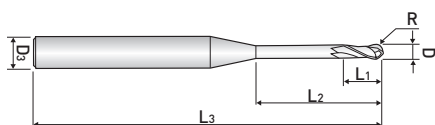
○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.012	h6
over 6	0 ~ -0.015	

※ These tools are manufactured based on order received.

Endmills for Mold & Die(Ball) WINNER Series



2 FLUTE, for RIB PROCESSING

- Excellent effect in preventing breakage with a shape of neck without notch
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
Pre-hardened Steel Alloy Steel, Carbon Steel

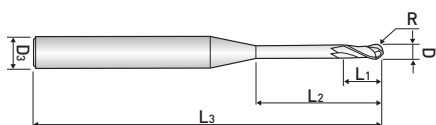
WB512 ...series



EDP. No.	D	R	L ₁	L ₂	L ₃	D ₃
WB512 001 002	0.1	0.05	0.1	0.2	40	4
WB512 001 003				0.3		
WB512 001 005				0.5		
WB512 001 01				1.0		
WB512 002 005	0.2	0.1	0.2	0.5	40	4
WB512 002 01				1.0		
WB512 002 015				1.5		
WB512 002 02				2.0		
WB512 002 03				3.0		
WB512 003 01	0.3	0.15	0.3	1.0	40	4
WB512 003 015				1.5		
WB512 003 02				2.0		
WB512 003 025				2.5		
WB512 003 03				3.0		
WB512 003 04	0.4	0.2	0.4	4.0	40	4
WB512 003 05				5.0		
WB512 004 01				1.0		
WB512 004 015				1.5		
WB512 004 02				2.0		
WB512 004 025				2.5		
WB512 004 03				3.0		
WB512 004 04				4.0		
WB512 004 05				5.0		
WB512 004 06				6.0		
WB512 004 08				8.0		
WB512 004 10				10.0		
WB512 005 01	0.5	0.25	0.5	1.0	45	4
WB512 005 015				1.5		
WB512 005 02				2.0		
WB512 005 025				2.5		
WB512 005 03				3.0		
WB512 005 04				4.0		
WB512 005 05				5.0		
WB512 005 06				6.0		
WB512 005 08				8.0		
WB512 005 10				10.0		

NEXT >>

Endmills for Mold & Die(Ball) WINNER Series



2 FLUTE, for RIB PROCESSING

- Excellent effect in preventing breakage with a shape of neck without notch
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
Pre-hardened Steel Alloy Steel, Carbon Steel

WB512 ...series



ULTRA FINE



HELIX



up to R3



over R3



W Coating

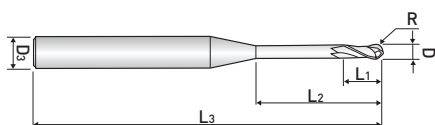


p.709~712

EDP. No.	D	R	L ₁	L ₂	L ₃	D ₃
WB512 005 12	0.5	0.25	0.5	12.0	45	4
WB512 005 14				14.0		
WB512 005 16				16.0		
WB512 006 01	0.6	0.3	0.6	1.0	45	4
WB512 006 02				2.0		
WB512 006 03				3.0		
WB512 006 04				4.0		
WB512 006 05				5.0		
WB512 006 06				6.0		
WB512 006 08				8.0		
WB512 006 10				10.0		
WB512 006 12				12.0		
WB512 006 14				14.0	50	
WB512 006 16				16.0		
WB512 007 02	0.7	0.35	0.7	2.0	45	4
WB512 007 04				4.0		
WB512 007 06				6.0		
WB512 007 08				8.0		
WB512 007 10				10.0		
WB512 007 12				12.0		
WB512 008 01	0.8	0.4	0.8	1.0	45	4
WB512 008 02				2.0		
WB512 008 03				3.0		
WB512 008 04				4.0		
WB512 008 05				5.0		
WB512 008 06				6.0		
WB512 008 08				8.0		
WB512 008 10				10.0		
WB512 008 12				12.0		
WB512 008 14				14.0	50	
WB512 008 16				16.0		
WB512 008 20	20.0	55				
WB512 009 04	0.9	0.45	0.9	4.0	45	4
WB512 009 06				6.0		
WB512 009 08				8.0		
WB512 009 10				10.0		

NEXT >>>

Endmills for Mold & Die(Ball) *WINNER Series*



2 FLUTE, for RIB PROCESSING

- Excellent effect in preventing breakage with a shape of neck without notch
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55
Pre-hardened Steel Alloy Steel, Carbon Steel

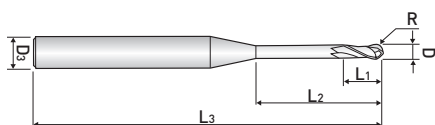
WB512 ...series



EDP. No.	D	R	L ₁	L ₂	L ₃	D ₃
WB512 010 02	1.0	0.5	1.0	2.0	50	4
WB512 010 03				3.0		
WB512 010 04				4.0		
WB512 010 05				5.0		
WB512 010 06				6.0		
WB512 010 07				7.0		
WB512 010 08				8.0		
WB512 010 09				9.0		
WB512 010 10				10.0		
WB512 010 12				12.0		
WB512 010 14				14.0		
WB512 010 16				16.0		
WB512 010 18				18.0		
WB512 010 20				20.0	55	
WB512 010 22				22.0	60	
WB512 010 26				26.0		
WB512 010 30	30.0	70				
WB512 010 40	40.0	80				
WB512 010 50	50.0	100				
WB512 012 04	1.2	0.6	1.2	4.0	50	4
WB512 012 06				6.0		
WB512 012 08				8.0		
WB512 012 10				10.0		
WB512 012 12				12.0		
WB512 012 16				16.0		
WB512 012 20				20.0		
WB512 012 26				26.0	60	
WB512 014 06	1.4	0.7	1.4	6.0	50	4
WB512 014 08				8.0		
WB512 014 10				10.0		
WB512 014 12				12.0		
WB512 014 16				16.0		

NEXT >>

Endmills for Mold & Die(Ball) WINNER Series



2 FLUTE, for RIB PROCESSING

- Excellent effect in preventing breakage with a shape of neck without notch
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
Pre-hardened Steel Alloy Steel, Carbon Steel

WB512 ...series



ULTRA FINE

HELIX

up to R3

over R3

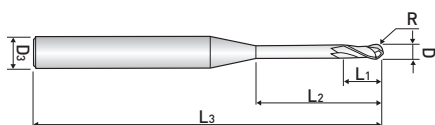
W Coating

p.709~712

EDP. No.	D	R	L ₁	L ₂	L ₃	D ₃
WB512 015 03	1.5	0.75	1.5	3.0	50	4
WB512 015 04				4.0		
WB512 015 05				5.0		
WB512 015 06				6.0		
WB512 015 07				7.0		
WB512 015 08				8.0		
WB512 015 10				10.0		
WB512 015 12				12.0		
WB512 015 14				14.0		
WB512 015 16				16.0		
WB512 015 18				18.0		
WB512 015 20				20.0	55	
WB512 015 22				22.0	60	
WB512 015 26				26.0	70	
WB512 015 30	30.0					
WB512 015 35	35.0					
WB512 015 40	40.0	80				
WB512 016 04	1.6	0.8	1.6	4.0	50	4
WB512 016 06				6.0		
WB512 016 08				8.0		
WB512 016 10				10.0		
WB512 016 12				12.0		
WB512 016 16				16.0		
WB512 016 20				20.0	55	
WB512 018 04	1.8	0.9	1.8	4.0	50	4
WB512 018 06				6.0		
WB512 018 08				8.0		
WB512 018 10				10.0		
WB512 018 12				12.0		
WB512 018 16				16.0		
WB512 018 20				20.0	55	
WB512 020 04	2.0	1	2.0	4.0	50	4
WB512 020 06				6.0		
WB512 020 08				8.0		
WB512 020 10				10.0		
WB512 020 12				12.0		

NEXT >>>

Endmills for Mold & Die(Ball) WINNER Series



2 FLUTE, for RIB PROCESSING

- Excellent effect in preventing breakage with a shape of neck without notch
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55
Pre-hardened Steel Alloy Steel, Carbon Steel

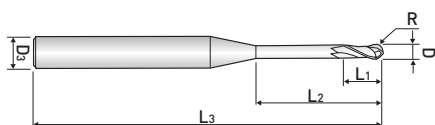
WB512 ...series



EDP. No.	D	R	L ₁	L ₂	L ₃	D ₃
WB512 020 14	2.0	1	2.0	14.0	50	4
WB512 020 16				16.0		
WB512 020 18				18.0	55	
WB512 020 20				20.0		
WB512 020 22				22.0	60	
WB512 020 26				26.0		
WB512 020 30				30.0	70	
WB512 020 35				35.0		
WB512 020 40				40.0	80	
WB512 020 45				45.0	90	
WB512 020 50				50.0	100	
WB512 020 60				60.0	110	
WB512 025 08	2.5	1.25	2.5	8.0	50	4
WB512 025 10				10.0		
WB512 025 12				12.0		
WB512 025 16				16.0		
WB512 025 20				20.0	60	
WB512 025 22				22.0		
WB512 025 26				26.0	70	
WB512 025 30				30.0		
WB512 025 35				35.0	80	
WB512 025 40				40.0	90	
WB512 025 45				45.0	100	
WB512 025 50				50.0		
WB512 030 06	3.0	1.5	3.0	6.0	50	6
WB512 030 08				8.0		
WB512 030 10				10.0		
WB512 030 12				12.0	60	
WB512 030 14				14.0		
WB512 030 16				16.0		
WB512 030 18				18.0		
WB512 030 20				20.0	65	
WB512 030 22				22.0		
WB512 030 26				26.0	70	
WB512 030 30				30.0		
WB512 030 35				35.0	80	
WB512 030 40				40.0	90	
WB512 030 45				45.0		

NEXT >>

Endmills for Mold & Die(Ball) WINNER Series



2 FLUTE, for RIB PROCESSING

- Excellent effect in preventing breakage with a shape of neck without notch
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
Pre-hardened Steel Alloy Steel, Carbon Steel

WB512 ...series



ULTRA FINE



HELIX



up to R3



over R3



W Coating

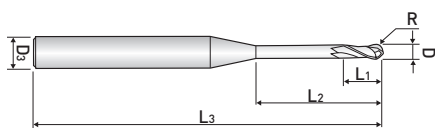


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EDP. No.	D	R	L ₁	L ₂	L ₃	D ₃
WB512 030 50	3.0	1.5	3.0	50.0	100	6
WB512 030 60				60.0		
WB512 040 08	4.0	2	4.0	8.0	50	6
WB512 040 10				10.0		
WB512 040 12				12.0		
WB512 040 14				14.0	60	
WB512 040 16				16.0		
WB512 040 18				18.0		
WB512 040 20				20.0		
WB512 040 22				22.0	65	
WB512 040 26				26.0		
WB512 040 30				30.0	70	
WB512 040 35				35.0		
WB512 040 40				40.0	80	
WB512 040 45				45.0	90	
WB512 040 50				50.0	100	
WB512 040 55				55.0		
WB512 040 60				60.0		
WB512 050 15	5.0	2.5	6.0	15.0	60	6
WB512 050 20				20.0		
WB512 050 26				26.0		
WB512 050 30				30.0	70	
WB512 050 35				35.0		
WB512 050 40				40.0		
WB512 050 45				45.0	90	
WB512 050 50				50.0	100	
WB512 050 55				55.0		
WB512 050 60				60.0		
WB512 060 20	6.0	3	8.0	20.0	60	6
WB512 060 30				30.0		
WB512 060 20 90			12.0	20.0	90	
WB512 060 30 90				30.0		

NEXT >>>

Endmills for Mold & Die(Ball) WINNER Series



2 FLUTE, for RIB PROCESSING

- Excellent effect in preventing breakage with a shape of neck without notch
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55
Pre-hardened Steel Alloy Steel, Carbon Steel

WB512 ...series



EDP. No.	D	R	L ₁	L ₂	L ₃	D ₃
WB512 080 25	8.0	4	10.0	25.0	70	8
WB512 080 35				35.0		
WB512 080 25 100			14.0	25.0	100	
WB512 080 35 100				35.0		
WB512 100 30	10.0	5	12.0	30.0	75	10
WB512 100 40				40.0		
WB512 100 30 100			18.0	30.0	100	
WB512 100 40 100				40.0		
WB512 120 32	12.0	6	14.0	32.0	80	12
WB512 120 45				45.0		
WB512 120 32 110			22.0	32.0	110	
WB512 120 45 110				45.0		

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

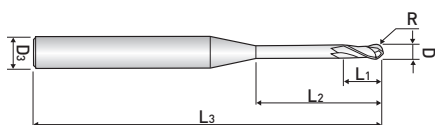
○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0~-0.012	
over 6	0~-0.015	h6

※ These tools are manufactured based on order received.

Endmills for Mold & Die(Ball) WINNER Series



2 FLUTE, for RIB PROCESSING(Shank-6)

- High precise performance through increasing chucking power from 6mm Shank
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55
Pre-hardened Steel, Alloy Steel, Carbon Steel

WB512...S6 ...series



ULTRA FINE

HELIX

up to R3

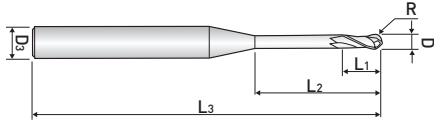
over R3

W Coating

EDP. No.	D	R	L ₁	L ₂	L ₃	D ₃
WB512 005 01 S6	0.5	0.25	0.5	1.0	45	6
WB512 005 02 S6				2.0		
WB512 005 04 S6				4.0		
WB512 006 01 S6	0.6	0.3	0.6	1.0	45	6
WB512 006 02 S6				2.0		
WB512 006 03 S6				3.0		
WB512 006 04 S6				4.0		
WB512 006 05 S6				5.0		
WB512 006 06 S6				6.0		
WB512 006 08 S6				8.0		
WB512 006 10 S6				10.0		
WB512 006 12 S6				12.0		
WB512 006 14 S6				14.0	50	
WB512 006 16 S6				16.0		
WB512 008 01 S6	0.8	0.4	0.8	1.0	45	6
WB512 008 02 S6				2.0		
WB512 008 03 S6				3.0		
WB512 008 04 S6				4.0		
WB512 008 05 S6				5.0		
WB512 008 06 S6				6.0		
WB512 008 08 S6				8.0		
WB512 008 10 S6				10.0		
WB512 008 12 S6				12.0		
WB512 008 14 S6				14.0	50	
WB512 008 16 S6				16.0		
WB512 008 20 S6						
WB512 010 02 S6	1.0	0.5	1.0	2.0	50	6
WB512 010 03 S6				3.0		
WB512 010 04 S6				4.0		
WB512 010 05 S6				5.0		
WB512 010 06 S6				6.0		
WB512 010 07 S6				7.0		
WB512 010 08 S6				8.0		
WB512 010 09 S6				9.0		
WB512 010 10 S6				10.0		
WB512 010 12 S6				12.0		
WB512 010 14 S6				14.0		
WB512 010 16 S6				16.0		

NEXT >>>

Endmills for Mold & Die(Ball) WINNER Series



2 FLUTE, for RIB PROCESSING(Shank-6)

- High precise performance through increasing chucking power from 6mm Shank
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55
Pre-hardened Steel, Alloy Steel, Carbon Steel

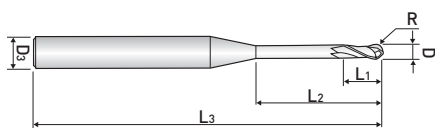
WB512...S6 ...series



EDP. No.	D	R	L ₁	L ₂	L ₃	D ₃
WB512 010 18 S6	1.0	0.5	1.0	18.0	50	6
WB512 010 20 S6				20.0	55	
WB512 010 22 S6				22.0	60	
WB512 010 26 S6				26.0		
WB512 010 30 S6				30.0	70	
WB512 015 03 S6	1.5	0.75	1.5	3.0	50	6
WB512 015 04 S6				4.0		
WB512 015 06 S6				6.0		
WB512 015 08 S6				8.0		
WB512 015 10 S6				10.0		
WB512 015 12 S6				12.0		
WB512 015 14 S6				14.0		
WB512 015 16 S6				16.0		
WB512 015 18 S6				18.0		
WB512 015 20 S6				20.0	55	
WB512 015 22 S6				22.0	60	
WB512 015 26 S6				26.0		
WB512 015 30 S6				30.0	70	
WB512 015 35 S6				35.0		
WB512 015 40 S6				40.0	80	
WB512 020 04 S6	2.0	1	2.0	4.0	50	6
WB512 020 06 S6				6.0		
WB512 020 08 S6				8.0		
WB512 020 10 S6				10.0		
WB512 020 12 S6				12.0		
WB512 020 14 S6				14.0		
WB512 020 16 S6				16.0	55	
WB512 020 18 S6				18.0		
WB512 020 20 S6				20.0		
WB512 020 22 S6				22.0	60	
WB512 020 26 S6				26.0		

NEXT >>>

Endmills for Mold & Die(Ball) WINNER Series



2 FLUTE, for RIB PROCESSING(Shank-6)

- High precise performance through increasing chucking power from 6mm Shank
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55
Pre-hardened Steel, Alloy Steel, Carbon Steel

WB512...S6 ...series



ULTRA FINE

HELIX

up to R3

over R3

W Coating

EDP. No.	D	R	L ₁	L ₂	L ₃	D ₃
WB512 020 30 S6	2.0	1	2.0	30.0	70	6
WB512 020 35 S6				35.0		
WB512 020 40 S6				40.0	80	
WB512 020 45 S6				45.0	90	
WB512 020 50 S6				50.0	100	

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

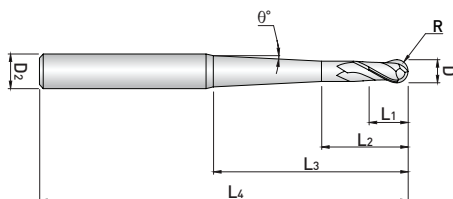
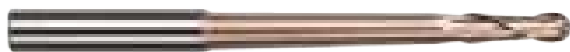
○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0~-0.012	
over 6	0~-0.015	h6

※ These tools are manufactured based on order received.

Endmills for Mold & Die(Ball) WINNER Series



2 FLUTE, TAPER NECK

- Strengthen the hardness of neck by applying Taper neck
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
- Pre-hardened Steel, Alloy Steel, Carbon Steel

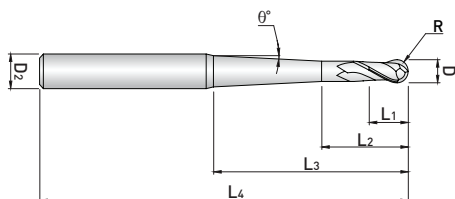
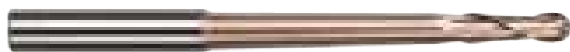
WB542 ...series



EDP. No.	D	R	θ	L ₁	L ₂	L ₃	L ₄	D ₂
WB542 001 05 005	0.1	0.05	30`	0.1	-	0.5	40	4
WB542 001 05 01						1.0		
WB542 001 10 005			1°			0.5		
WB542 001 10 01						1.0		
WB542 001 15 005			1°30`			0.5		
WB542 001 15 01						1.0		
WB542 001 20 005			2°			0.5		
WB542 001 20 01						1.0		
WB542 001 30 005			3°			0.5		
WB542 001 30 01						1.0		
WB542 002 05 01	0.2	0.1	30`	0.2	0.4	1.0	40	4
WB542 002 05 02						2.0		
WB542 002 05 03						3.0		
WB542 002 10 01			1°			1.0		
WB542 002 10 02						2.0		
WB542 002 10 03						3.0		
WB542 002 15 01			1°30`			1.0		
WB542 002 15 02						2.0		
WB542 002 15 03						3.0		
WB542 002 20 01			2°			1.0		
WB542 002 20 02						2.0		
WB542 002 20 03						3.0		
WB542 002 30 01			3°			1.0		
WB542 002 30 02						2.0		
WB542 002 30 03						3.0		
WB542 002 50 02			5°			2.0		
WB542 002 50 03						3.0		
WB542 003 05 02	0.3	0.15	30`	0.3	0.6	2.0	40	4
WB542 003 05 03						3.0		
WB542 003 05 04						4.0		
WB542 003 05 05						5.0		
WB542 003 10 02			1°			2.0		
WB542 003 10 03						3.0		
WB542 003 10 04						4.0		
WB542 003 10 05						5.0		
WB542 003 15 02			1°30′			2.0		
WB542 003 15 03						3.0		
WB542 003 15 04						4.0		

NEXT >>>

Endmills for Mold & Die(Ball) WINNER Series



2 FLUTE, TAPER NECK

- Strengthen the hardness of neck by applying Taper neck
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
- Pre-hardened Steel, Alloy Steel, Carbon Steel

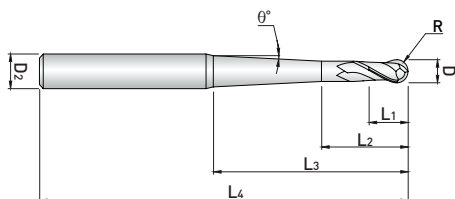
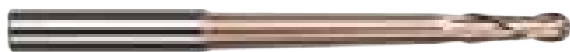
WB542 ...series



EDP. No.	D	R	θ	L ₁	L ₂	L ₃	L ₄	D ₂
WB542 003 15 05	0.3	0.15	1°30′	0.3	0.6	5.0	40	4
WB542 003 20 02			2°			2.0		
WB542 003 20 03						3.0		
WB542 003 20 04						4.0		
WB542 003 20 05						5.0		
WB542 003 30 02			3°			2.0		
WB542 003 30 03						3.0		
WB542 003 30 04						4.0		
WB542 003 30 05						5.0		
WB542 003 50 05			5°			5.0		
WB542 004 05 02	0.4	0.2	30`	0.4	0.8	2.0	50	4
WB542 004 05 03						3.0		
WB542 004 05 04						4.0		
WB542 004 05 05						5.0		
WB542 004 05 06						6.0		
WB542 004 10 02						1°		
WB542 004 10 03			3.0					
WB542 004 10 04			4.0					
WB542 004 10 05			5.0					
WB542 004 10 06			6.0					
WB542 004 15 02			1°30`					
WB542 004 15 03						3.0		
WB542 004 15 04						4.0		
WB542 004 15 05						5.0		
WB542 004 15 06						6.0		
WB542 004 20 02						2°		
WB542 004 20 03			3.0					
WB542 004 20 04			4.0					
WB542 004 20 05			5.0					
WB542 004 20 06			6.0					
WB542 004 30 02			3°					
WB542 004 30 03						3.0		
WB542 004 30 04						4.0		
WB542 004 30 05						5.0		
WB542 004 30 06						6.0		
WB542 004 50 04						5°		
WB542 004 50 06			6.0					

NEXT >>>

Endmills for Mold & Die(Ball) WINNER Series



2 FLUTE, TAPER NECK

- Strengthen the hardness of neck by applying Taper neck
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- Suitable for Mold & Die machining below HRC 55
- Pre-hardened Steel, Alloy Steel, Carbon Steel

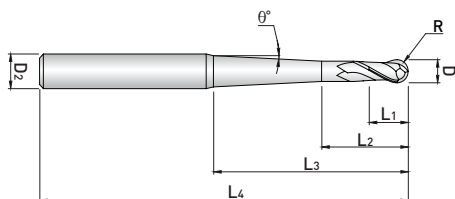
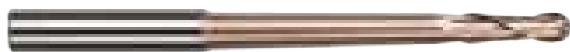
WB542 ...series



EDP. No.	D	R	θ	L ₁	L ₂	L ₃	L ₄	D ₂
WB542 005 05 04	0.5	0.25	30`	0.5	1.0	4.0	50	4
WB542 005 05 06						6.0		
WB542 005 05 08						8.0		
WB542 005 05 10						10.0		
WB542 005 10 04			1°			4.0		
WB542 005 10 06						6.0		
WB542 005 10 08						8.0		
WB542 005 10 10						10.0		
WB542 005 15 04			1°30`			4.0		
WB542 005 15 06						6.0		
WB542 005 15 08						8.0		
WB542 005 15 10						10.0		
WB542 005 20 04			2°			4.0		
WB542 005 20 06						6.0		
WB542 005 20 08						8.0		
WB542 005 20 10						10.0		
WB542 005 30 04			3°			4.0		
WB542 005 30 06						6.0		
WB542 005 30 08						8.0		
WB542 005 30 10						10.0		
WB542 006 05 04	0.6	0.3	30`	0.6	1.2	4.0	50	4.0
WB542 006 05 06						6.0		
WB542 006 05 08						8.0		
WB542 006 05 10						10.0		
WB542 006 05 12			1°			12.0		
WB542 006 10 04						4.0		
WB542 006 10 06						6.0		
WB542 006 10 08						8.0		
WB542 006 10 10			1°30`			10.0		
WB542 006 10 12						12.0		
WB542 006 15 04						4.0		
WB542 006 15 06						6.0		
WB542 006 15 08			2°			8.0		
WB542 006 15 10						10.0		
WB542 006 15 12						12.0		
WB542 006 20 04						4.0		
WB542 006 20 06			2°			6.0		
WB542 006 20 08						8.0		

NEXT >>>

Endmills for Mold & Die(Ball) WINNER Series



2 FLUTE, TAPER NECK

- Strengthen the hardness of neck by applying Taper neck
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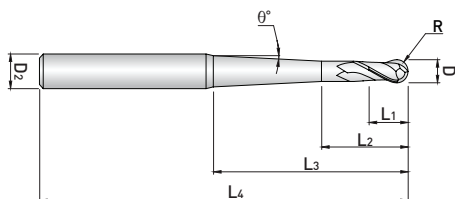
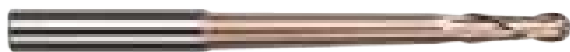
WB542 ...series



EDP. No.	D	R	θ	L ₁	L ₂	L ₃	L ₄	D ₂
WB542 006 20 10	0.6	0.3	2°	0.6	1.2	10.0	50	4.0
WB542 006 20 12			12.0					
WB542 006 30 04			4.0					
WB542 006 30 06			6.0					
WB542 006 30 08			8.0					
WB542 006 30 10			10.0					
WB542 006 30 12			12.0					
WB542 008 05 04	0.8	0.4	30`	0.8	1.6	4.0	50	4
WB542 008 05 06						6.0		
WB542 008 05 08						8.0		
WB542 008 05 10						10.0		
WB542 008 05 12						12.0		
WB542 008 05 16						16.0		
WB542 008 10 04			1°			4.0		
WB542 008 10 06						6.0		
WB542 008 10 08						8.0		
WB542 008 10 10						10.0		
WB542 008 10 12						12.0		
WB542 008 10 16						16.0		
WB542 008 15 04			1°30`			4.0		
WB542 008 15 06						6.0		
WB542 008 15 08						8.0		
WB542 008 15 10						10.0		
WB542 008 15 12						12.0		
WB542 008 15 16						16.0		
WB542 008 20 04			2°			4.0		
WB542 008 20 06						6.0		
WB542 008 20 08						8.0		
WB542 008 20 10						10.0		
WB542 008 20 12						12.0		
WB542 008 20 16						16.0		
WB542 008 30 04			3°			4.0		
WB542 008 30 06						6.0		
WB542 008 30 08						8.0		
WB542 008 30 10						10.0		
WB542 008 30 12						12.0		
WB542 008 30 16						16.0		

NEXT >>

Endmills for Mold & Die(Ball) WINNER Series



2 FLUTE, TAPER NECK

- Strengthen the hardness of neck by applying Taper neck
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- Suitable for Mold & Die machining below HRC 55
- Pre-hardened Steel, Alloy Steel, Carbon Steel

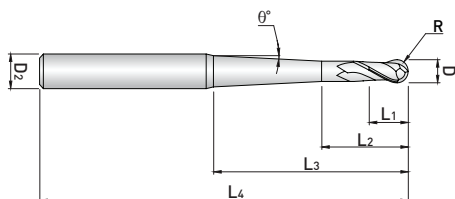
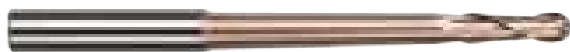
WB542 ...series



EDP. No.	D	R	θ	L ₁	L ₂	L ₃	L ₄	D ₂	
WB542 010 05 06	1.0	0.5	30`	1.0	2.5	6.0	50	4	
WB542 010 05 08						8.0			
WB542 010 05 10						10.0			
WB542 010 05 12						12.0			
WB542 010 05 16						16.0			
WB542 010 05 20						20.0			
WB542 010 05 25						25.0			60
WB542 010 05 30						30.0			70
WB542 010 05 40						40.0			80
WB542 010 05 50						50.0			90
WB542 010 10 06			1°			6.0	50		
WB542 010 10 08						8.0			
WB542 010 10 10						10.0			
WB542 010 10 12						12.0			
WB542 010 10 16						16.0			
WB542 010 10 20						20.0			
WB542 010 10 25						25.0			60
WB542 010 10 30						30.0			70
WB542 010 10 40						40.0			80
WB542 010 10 50						50.0			90
WB542 010 15 06			1°30`			6.0	50		
WB542 010 15 08						8.0			
WB542 010 15 10						10.0			
WB542 010 15 12						12.0			
WB542 010 15 16						16.0			
WB542 010 15 20						20.0			
WB542 010 15 25						25.0			60
WB542 010 15 30						30.0			70
WB542 010 15 40						40.0			80
WB542 010 15 50						50.0			90
WB542 010 20 06			2°			6.0	50		
WB542 010 20 08						8.0			
WB542 010 20 10						10.0			
WB542 010 20 12						12.0			
WB542 010 20 16						16.0			
WB542 010 20 20						20.0			
WB542 010 20 25						25.0			60
WB542 010 20 30						30.0			70

NEXT >>

Endmills for Mold & Die(Ball) WINNER Series



2 FLUTE, TAPER NECK

- Strengthen the hardness of neck by applying Taper neck
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
- Pre-hardened Steel, Alloy Steel, Carbon Steel

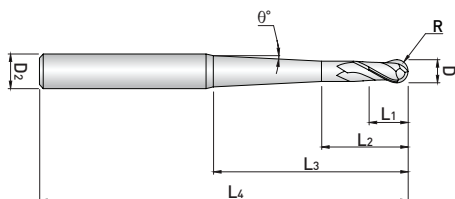
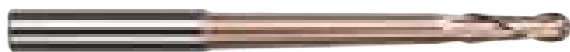
WB542 ...series



EDP. No.	D	R	θ	L ₁	L ₂	L ₃	L ₄	D ₂	
WB542 010 20 40	1.0	0.5	2°	1.0	2.5	40.0	80	4	
WB542 010 20 50						50.0	90	6	
WB542 010 30 06			50			4	6.0		
WB542 010 30 08							8.0		
WB542 010 30 10							10.0		
WB542 010 30 12							12.0		
WB542 010 30 16							16.0		
WB542 010 30 20							20.0		
WB542 010 30 25			25.0			60	6		
WB542 010 30 30			30.0			70			
WB542 010 30 40			40.0			80			
WB542 010 30 50			50.0			90			
WB542 010 50 30			30.0			70			
WB542 012 05 08	1.2	0.6	30`	1.2	3.0	8.0		50	4
WB542 012 05 12						12.0			
WB542 012 05 16						16.0			
WB542 012 05 20						20.0			
WB542 012 05 25						25.0	60		
WB542 012 05 30						30.0	70		
WB542 012 10 08			1°			50	8.0		
WB542 012 10 12							12.0		
WB542 012 10 16							16.0		
WB542 012 10 20							20.0		
WB542 012 10 25							25.0	60	
WB542 012 10 30							30.0	70	
WB542 012 15 08			1°30`			50	8.0		
WB542 012 15 12							12.0		
WB542 012 15 16							16.0		
WB542 012 15 20							20.0		
WB542 012 15 25							25.0	60	
WB542 012 15 30							30.0	70	
WB542 012 20 08			2°			50	8.0		
WB542 012 20 12							12.0		
WB542 012 20 16							16.0		
WB542 012 20 20							20.0		
WB542 012 20 25							25.0	60	
WB542 012 20 30							30.0	70	
WB542 012 30 08			3°			50	8.0		
WB542 012 30 12							12.0		

NEXT >>

Endmills for Mold & Die(Ball) WINNER Series



2 FLUTE, TAPER NECK

- Strengthen the hardness of neck by applying Taper neck
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
- Pre-hardened Steel, Alloy Steel, Carbon Steel

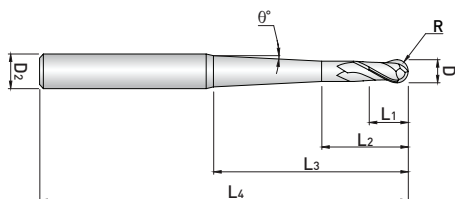
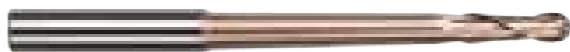
WB542 ...series



EDP. No.	D	R	θ	L ₁	L ₂	L ₃	L ₄	D ₂		
WB542 012 30 16	1.2	0.6	3°	1.2	3.0	16.0	50	4		
WB542 012 30 20						20.0				
WB542 012 30 25						25.0	60			
WB542 012 30 30						30.0	70	6		
WB542 015 05 08	1.5	0.75	30°	1.5	4.0	8.0	50	4		
WB542 015 05 10						10.0				
WB542 015 05 12						12.0				
WB542 015 05 16						16.0				
WB542 015 05 20						20.0				
WB542 015 05 25						25.0	60			
WB542 015 05 30						30.0	70			
WB542 015 05 40						40.0	80			
WB542 015 05 50						50.0	90			
WB542 015 10 08			1°			8.0	50		8.0	
WB542 015 10 10									10.0	
WB542 015 10 12									12.0	
WB542 015 10 16									16.0	
WB542 015 10 20									20.0	
WB542 015 10 25									25.0	60
WB542 015 10 30									30.0	70
WB542 015 10 40									40.0	80
WB542 015 10 50									50.0	90
WB542 015 15 08			1°30`			8.0	50		8.0	
WB542 015 15 10									10.0	
WB542 015 15 12									12.0	
WB542 015 15 16									16.0	
WB542 015 15 20									20.0	
WB542 015 15 25									25.0	60
WB542 015 15 30									30.0	70
WB542 015 15 40									40.0	80
WB542 015 15 50									50.0	90
WB542 015 20 08			2°			8.0	50		8.0	
WB542 015 20 10									10.0	
WB542 015 20 12									12.0	
WB542 015 20 16									16.0	
WB542 015 20 20									20.0	
WB542 015 20 25									25.0	60
WB542 015 20 30									30.0	70
WB542 015 20 40								40.0	80	6

NEXT >>

Endmills for Mold & Die(Ball) WINNER Series



2 FLUTE, TAPER NECK

- Strengthen the hardness of neck by applying Taper neck
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
- Pre-hardened Steel, Alloy Steel, Carbon Steel

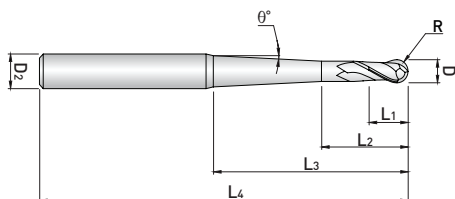
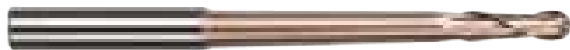
WB542 ...series



EDP. No.	D	R	θ	L ₁	L ₂	L ₃	L ₄	D ₂			
WB542 015 20 50	1.5	0.75	2°	1.5	4.0	50.0	90	6			
WB542 015 30 20			20.0			50					
WB542 015 30 30			30.0			70					
WB542 015 30 40			40.0			80					
WB542 015 30 50			50.0			90	8				
WB542 015 50 30			30.0			70					
WB542 020 05 10	2.0	1	30°	2.0	5.0	10.0	50	4			
WB542 020 05 12						12.0					
WB542 020 05 16						16.0					
WB542 020 05 20						20.0					
WB542 020 05 25						25.0	60				
WB542 020 05 30						30.0	70				
WB542 020 05 40						40.0	80				
WB542 020 05 50						50.0	100	6			
WB542 020 05 60						60.0					
WB542 020 05 80						80.0	140				
WB542 020 10 10			1°			10.0	50	4			
WB542 020 10 12						12.0					
WB542 020 10 16						16.0					
WB542 020 10 20						20.0					
WB542 020 10 25						25.0	60				
WB542 020 10 30						30.0	70				
WB542 020 10 40						40.0	80	6			
WB542 020 10 50						50.0	100				
WB542 020 10 60						60.0					
WB542 020 10 80						80.0	140				
WB542 020 15 10			1°30`			10.0	50	4			
WB542 020 15 12						12.0					
WB542 020 15 16						16.0					
WB542 020 15 20						20.0					
WB542 020 15 25						25.0	60				
WB542 020 15 30						30.0	70	6			
WB542 020 15 40						40.0	80				
WB542 020 15 50						50.0	100				
WB542 020 15 60						60.0					
WB542 020 15 80						80.0	140				
WB542 020 20 10			2°			10.0	50	4			
WB542 020 20 12						12.0					
WB542 020 20 16						16.0					

NEXT >>>

Endmills for Mold & Die(Ball) WINNER Series



2 FLUTE, TAPER NECK

- Strengthen the hardness of neck by applying Taper neck
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
- Pre-hardened Steel, Alloy Steel, Carbon Steel

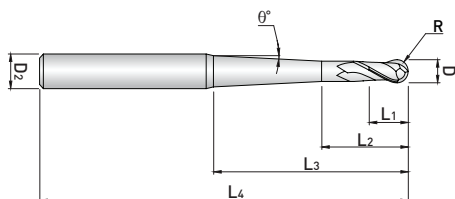
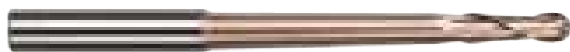
WB542 ...series



EDP. No.	D	R	θ	L ₁	L ₂	L ₃	L ₄	D ₂				
WB542 020 20 20	2.0	1	2°	2.0	5.0	20.0	55	4				
WB542 020 20 25						25.0	60					
WB542 020 20 30						30.0	70					
WB542 020 20 40						40.0	80	6				
WB542 020 20 50						50.0	90					
WB542 020 20 60						60.0	100					
WB542 020 20 80			80.0			140	8					
WB542 020 30 30			30.0			70	6					
WB542 020 30 40			40.0			80						
WB542 020 30 50			50.0			90	8					
WB542 020 30 60			60.0			100						
WB542 020 30 80			80.0			140	10					
WB542 020 50 30			5°			30.0	70	8				
WB542 020 50 40						40.0	90	10				
WB542 030 05 16			3.0			1.5	30°	4.5	6.0	16.0	60	6
WB542 030 05 20										20.0	65	
WB542 030 05 30	30.0	70										
WB542 030 05 40	40.0	80										
WB542 030 05 50	50.0	90										
WB542 030 05 60	60.0	100										
WB542 030 10 16	1°	16.0		60								
WB542 030 10 20		20.0		65								
WB542 030 10 30		30.0		70								
WB542 030 10 40		40.0		80								
WB542 030 10 50		50.0		90								
WB542 030 10 60		60.0		100								
WB542 030 10 70	1°30'	70.0		120								
WB542 030 15 16		16.0		60								
WB542 030 15 20		20.0		65								
WB542 030 15 30		30.0		70								
WB542 030 15 40		40.0		80								
WB542 030 15 50		50.0		90								
WB542 030 15 60	2°	60.0		100								
WB542 030 20 16		16.0		60								
WB542 030 20 20		20.0		65								
WB542 030 20 30		30.0		70								
WB542 030 20 40		40.0		80								
WB542 030 20 50		50.0		90	8							
WB542 030 30 30	3°	30.0		70	6							

NEXT >>>

Endmills for Mold & Die(Ball) WINNER Series



2 FLUTE, TAPER NECK

- Strengthen the hardness of neck by applying Taper neck
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
- Pre-hardened Steel, Alloy Steel, Carbon Steel

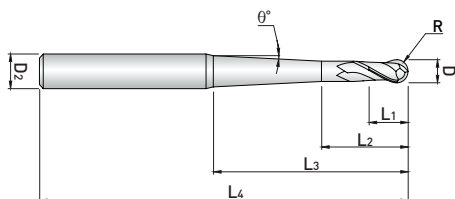
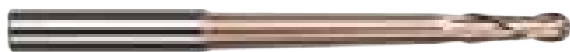
WB542 ...series



EDP. No.	D	R	θ	L ₁	L ₂	L ₃	L ₄	D ₂		
WB542 030 30 40	3.0	1.5	3°	4.5	6.0	40.0	90	8		
WB542 030 50 30			5°			30.0	70	8		
WB542 030 50 40						40.0	90	10		
WB542 040 05 40	4.0	2	30`	6.0	8.0	40.0	90	6		
WB542 040 05 50						50.0	100			
WB542 040 05 60						60.0	110			
WB542 040 05 70						70.0	120			
WB542 040 10 40			1°			40.0	90	8		
WB542 040 10 50						50.0	100			
WB542 040 10 60						60.0	110			
WB542 040 10 70			1°30`			70.0	120	8		
WB542 040 15 40						40.0	90			
WB542 040 15 50						50.0	100			
WB542 040 15 60						60.0	110			
WB542 040 15 70						70.0	120			
WB542 040 30 50			3°			50.0	100	10		
WB542 040 50 50						5°	50.0	100	12	
WB542 050 10 60	5.0	2.5	1°	10.0	13.0	60.0	120	8		
WB542 050 15 60			1°30`			60.0				
WB542 050 30 40			3°			40.0				
WB542 060 10 60	6.0	3	1°	12.0	15.0	60.0	120	8		
WB542 060 10 90						90.0	150	10		
WB542 060 15 60			1°30`			60.0	120			
WB542 060 15 90						90.0	150			
WB542 060 20 60			2°			60.0	120	12		
WB542 060 20 90						90.0	150			
WB542 060 30 60			3°			60.0	120			
WB542 060 30 90						90.0	150	14		
WB542 080 10 70	8.0	4	1°	14.0	18.0	70.0	130	10		
WB542 080 10 100						100.0	150	12		
WB542 080 15 70			1°30`			70.0	130			
WB542 080 15 100						100.0	150			
WB542 080 20 70			2°			70.0	130	12		
WB542 080 20 100						100.0	150	14		
WB542 080 30 70			3°			70.0	130			
WB542 080 30 100						100.0	150			

NEXT >>

Endmills for Mold & Die(Ball) WINNER Series



2 FLUTE, TAPER NECK

- Strengthen the hardness of neck by applying Taper neck
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
- Pre-hardened Steel, Alloy Steel, Carbon Steel

WB542 ...series



EDP. No.	D	R	θ	L ₁	L ₂	L ₃	L ₄	D ₂
WB542 100 10 70	10.0	5	1°	18.0	22.0	70.0	130	12
WB542 100 10 80						80.0	150	14
WB542 100 10 100						100.0	200	
WB542 100 15 70			1°30`			70.0	130	
WB542 100 15 80						80.0	150	
WB542 100 15 100						100.0	200	
WB542 100 20 70			2°			70.0	130	14
WB542 100 20 80						80.0	150	16
WB542 100 20 100						100.0	200	
WB542 100 30 70			3°			70.0	130	18
WB542 100 30 80						80.0	150	
WB542 100 30 100						100.0	200	
WB542 120 10 60	12.0	6	1°	22.0	25.0	60.0	130	14
WB542 120 10 80						80.0	150	
WB542 120 10 90						1°30`	90.0	180
WB542 120 10 100			100.0				200	
WB542 120 15 60			60.0				130	14
WB542 120 15 80			1°30`			80.0	150	
WB542 120 15 90						90.0	180	
WB542 120 15 100						100.0	200	
WB542 120 20 60			2°			60.0	130	18
WB542 120 20 80						80.0	150	
WB542 120 20 90						90.0	180	
WB542 120 20 100			100.0			200	16	
WB542 120 30 60			3°			60.0		130
WB542 120 30 80						80.0	150	
WB542 120 30 90						90.0	180	20
WB542 120 30 100						100.0	200	

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

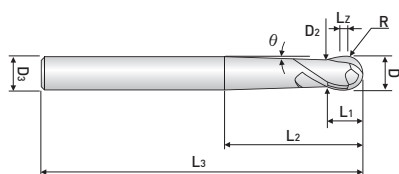
○: General Application ◎: The most suitable Application

■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0~-0.012	
over 6	0~-0.015	h6

※ These tools are manufactured based on order received.

Endmills for Mold & Die(Ball) WINNER Series



MILLING MACHINE COPY

- A rounded cutting line enable to machining a various curved shape
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55

Pre-hardened Steel, Alloy Steel, Carbon Steel

WB532 ...series



ULTRA FINE



HELIX



All Sizes



W Coating



p.715

EDP. No.	D	R	θ	L ₁	L ₂	L ₃	D ₂	D ₃
WB532 030	3.0	1.5	1°30'	2.3	16.0	80	2.5	6
WB532 040	4.0	2	1°30'	3.1	20.0	80	3.3	6
WB532 050	5.0	2.5	1°30'	3.9	25.0	80	4.1	6
WB532 060	6.0	3	1°30'	4.9	30.0	100	4.7	6
WB532 080	8.0	4	1°30'	6.3	35.0	100	6.5	8
WB532 100	10.0	5	1°30'	7.9	40.0	100	8.2	10
WB532 120	12.0	6	1°30'	9.5	50.0	100	9.8	12

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

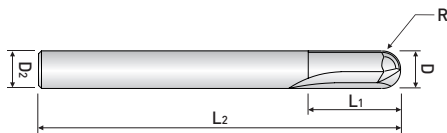
○:General Application ◎:The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for Mold & Die(Ball) WINNER Series



2 FLUTE STRAIGHT BALL

- Strengthen the hardness of neck by applying Taper neck
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
- Pre-hardened Steel, Alloy Steel, Carbon Steel

WSB502 ...series



EDP. No.	D	R	L ₁	L ₂	D ₂
WSB502 030	3.0	1.5	10.0	70	6
WSB502 040	4.0	2	12.0	70	6
WSB502 050	5.0	2.5	18.0	90	6
WSB502 060	6.0	3	20.0	90	6
WSB502 080	8.0	4	25.0	100	8
WSB502 100	10.0	5	30.0	100	10
WSB502 120	12.0	6	32.0	110	12
WSB502 160	16.0	8	35.0	150	16
WSB502 200	20.0	10	40.0	150	20

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

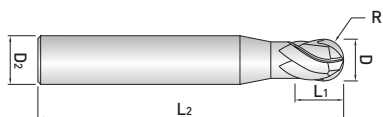
○: General Application ◎: The most suitable Application

■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0~-0.012	
over 6	0~-0.015	h6

※ These tools are manufactured based on order received.

Endmills for Mold & Die(Ball) WINNER Series



3 FLUTE BALL

- Increased tool life and excellent surface roughness with a ball type in the shape of 3 flute center match
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
- Pre-hardened Steel, Alloy Steel, Carbon Steel

WB503 ...series



EDP. No.	D	R	L ₁	L ₂	D ₂
WB503 010	1.0	0.5	1.0	50	6
WB503 015	1.5	0.75	1.5	50	6
WB503 020	2.0	1	2.0	50	6
WB503 030	3.0	1.5	3.0	60	6
WB503 040	4.0	2	4.0	70	6
WB503 050	5.0	2.5	5.0	80	6
WB503 060	6.0	3	6.0	90	6
WB503 080	8.0	4	8.0	100	8
WB503 100	10.0	5	10.0	100	10
WB503 120	12.0	6	12.0	110	12

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

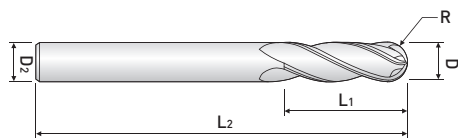
○:General Application ◎:The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for Mold & Die(Ball) WINNER Series



4 FLUTE BALL

- Increased tool life and excellent surface roughness with a ball type in the shape of 4 flute center match
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55
Pre-hardened Steel, Alloy Steel, Carbon Steel

WB504 ...series



EDP. No.	D	R	L ₁	L ₂	D ₂
WB504 010	1.0	0.5	1.0	50	6
WB504 015	1.5	0.75	1.5	50	6
WB504 020	2.0	1	2.0	50	6
WB504 030	3.0	1.5	3.0	60	6
WB504 040	4.0	2	4.0	70	6
WB504 050	5.0	2.5	5.0	80	6
WB504 060	6.0	3	6.0	90	6
WB504 080	8.0	4	8.0	100	8
WB504 100	10.0	5	10.0	100	10
WB504 120	12.0	6	12.0	110	12

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

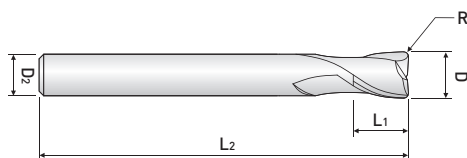
○:General Application ◎:The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for Mold & Die(Corner Radius) WINNER Series



2 FLUTE CORNER RADIUS

SHORT LENGTH + REGULAR LENGTH + LONG LENGTH

- A variety of sizes on 2 flute corner R radius
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
- Pre-hardened Steel, Alloy Steel, Carbon Steel

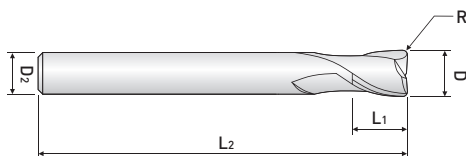
WR502 ...series



EDP. No.	D	R	L ₁	L ₂	D ₂
WR502 002 002	0.2	0.02	0.4	40	4
WR502 002 005		0.05			
WR502 003 002	0.3	0.02	0.6	40	4
WR502 003 005		0.05			
WR502 004 005	0.4	0.05	0.8	40	4
WR502 004 01		0.10			
WR502 005 005	0.5	0.05	1.0	40	4
WR502 005 01		0.10			
WR502 006 005	0.6	0.05	1.2	40	4
WR502 006 01		0.10			
WR502 006 02		0.20			
WR502 007 005	0.7	0.05	1.4	40	4
WR502 007 01		0.10			
WR502 007 02		0.20			
WR502 008 005	0.8	0.05	1.6	40	4
WR502 008 01		0.10			
WR502 008 02		0.20			
WR502 009 005	0.9	0.05	1.8	40	4
WR502 009 01		0.10			
WR502 010 005	1.0	0.05	2.5	50	6
WR502 010 01		0.10			
WR502 010 02		0.20			
WR502 010 03		0.30			
WR502 012 005	1.2	0.05	3.0	50	6
WR502 012 01		0.10			
WR502 012 02		0.20			
WR502 012 03		0.30			
WR502 015 005	1.5	0.05	4.0	50	6
WR502 015 01		0.10			
WR502 015 02		0.20			
WR502 015 03		0.30			
WR502 015 05		0.50			
WR502 020 01	2.0	0.10	6.0	50	6
WR502 020 02		0.20			
WR502 020 03		0.30			
WR502 020 05		0.50			

NEXT >>>

Endmills for Mold & Die(Corner Radius) *WINNER Series*



2 FLUTE CORNER RADIUS

SHORT LENGTH + REGULAR LENGTH + LONG LENGTH

- A variety of sizes on 2 flute corner R radius
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
- Pre-hardened Steel, Alloy Steel, Carbon Steel

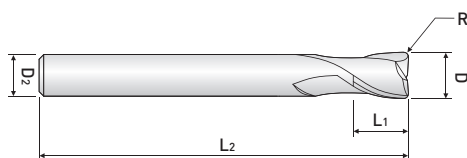
WR502 ...series



EDP. No.	D	R	L ₁	L ₂	D ₂
WR502 025 01	2.5	0.10	7.0	60	6
WR502 025 02		0.20			
WR502 025 03		0.30			
WR502 025 05		0.50			
WR502 030 01	3.0	0.10	8.0	60	6
WR502 030 02		0.20			
WR502 030 03		0.30			
WR502 030 05		0.50			
WR502 030 10		1.00			
WR502 035 01	3.5	0.10	10.0	70	6
WR502 035 02		0.20			
WR502 035 03		0.30			
WR502 035 05		0.50			
WR502 040 01 S4	4.0	0.10	10.0	70	4
WR502 040 02 S4		0.20			
WR502 040 03 S4		0.30			
WR502 040 05 S4		0.50			
WR502 040 10 S4		1.00			
WR502 040 01 100 S4		0.10	10.0	100	4
WR502 040 02 100 S4		0.20			
WR502 040 03 100 S4		0.30			
WR502 040 05 100 S4		0.50			
WR502 040 10 100 S4		1.00			
WR502 040 01	4.0	0.10	10.0	70	6
WR502 040 02		0.20			
WR502 040 03		0.30			
WR502 040 05		0.50			
WR502 040 10		1.00			
WR502 045 01	4.5	0.10	11.0	80	6
WR502 045 02		0.20			
WR502 045 03		0.30			
WR502 045 05		0.50			
WR502 050 01	5.0	0.10	13.0	90	6
WR502 050 02		0.20			
WR502 050 03		0.30			
WR502 050 05		0.50			
WR502 050 10		1.00			

NEXT >>

Endmills for Mold & Die(Corner Radius) WINNER Series



2 FLUTE CORNER RADIUS

SHORT LENGTH + REGULAR LENGTH + LONG LENGTH

- A variety of sizes on 2 flute corner R radius
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
- Pre-hardened Steel, Alloy Steel, Carbon Steel

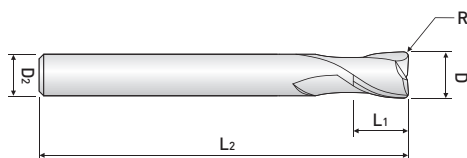
WR502 ...series



EDP. No.	D	R	L ₁	L ₂	D ₂
WR502 055 01	5.5	0.10	13.0	90	6
WR502 055 02		0.20			
WR502 055 03		0.30			
WR502 055 05		0.50			
WR502 055 10		1.00			
WR502 060 03 60	6.0	0.30	15.0	60	6
WR502 060 05 60		0.50		90	
WR502 060 10 60		1.00			
WR502 060 01		0.10			
WR502 060 02		0.20			
WR502 060 03		0.30			
WR502 060 05		0.50			
WR502 060 10		1.00			
WR502 060 15		1.50			
WR502 060 20		2.00			
WR502 060 05 110		0.50		110	
WR502 060 10 110		1.00		130	
WR502 060 05 130		0.50			
WR502 060 10 130		1.00			
WR502 070 01	7.0	0.10	16.0	90	8
WR502 070 02		0.20			
WR502 070 03		0.30			
WR502 070 05		0.50			
WR502 070 10		1.00			
WR502 070 20		2.00			
WR502 080 03 70	8.0	0.30	20.0	70	8
WR502 080 05 70		0.50		100	
WR502 080 10 70		1.00			
WR502 080 01		0.10			
WR502 080 02		0.20			
WR502 080 03		0.30			
WR502 080 05		0.50			
WR502 080 10		1.00			
WR502 080 15		1.50			
WR502 080 20		2.00			
WR502 080 25		2.50			
WR502 080 30		3.00			

NEXT >>>

Endmills for Mold & Die(Corner Radius) WINNER Series



2 FLUTE CORNER RADIUS

SHORT LENGTH + REGULAR LENGTH + LONG LENGTH

- A variety of sizes on 2 flute corner R radius
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
- Pre-hardened Steel, Alloy Steel, Carbon Steel

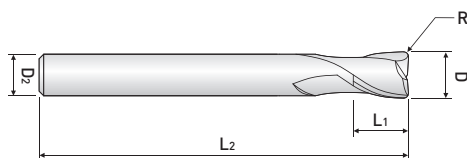
WR502 ...series



EDP. No.	D	R	L ₁	L ₂	D ₂
WR502 080 05 120	8.0	0.50	20.0	120	8
WR502 080 10 120		1.00			
WR502 080 05 150		0.50		150	
WR502 080 10 150		1.00			
WR502 100 03 75	10.0	0.30	25.0	75	10
WR502 100 05 75		0.50			
WR502 100 10 75		1.00			
WR502 100 01		0.10			
WR502 100 02		0.20			
WR502 100 03		0.30			
WR502 100 05		0.50			
WR502 100 10		1.00			
WR502 100 15		1.50			
WR502 100 20		2.00			
WR502 100 25		2.50			
WR502 100 30		3.00			
WR502 100 40		4.00			
WR502 100 05 130		0.50		130	
WR502 100 10 130		1.00			
WR502 100 05 150		0.50		150	
WR502 100 10 150		1.00			
WR502 110 02	11.0	0.20	25.0		12
WR502 110 03		0.30			
WR502 110 05		0.50		110	
WR502 110 10		1.00			
WR502 110 20		2.00			
WR502 120 03 80	12.0	0.30	30.0	80	12
WR502 120 05 80		0.50			
WR502 120 10 80		1.00			
WR502 120 01		0.10			
WR502 120 02		0.20			
WR502 120 03		0.30			
WR502 120 05		0.50		110	
WR502 120 10		1.00			
WR502 120 15		1.50			
WR502 120 20		2.00			

NEXT >>>

Endmills for Mold & Die(Corner Radius) WINNER Series



2 FLUTE CORNER RADIUS

SHORT LENGTH + REGULAR LENGTH + LONG LENGTH

- A variety of sizes on 2 flute corner R radius
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
- Pre-hardened Steel, Alloy Steel, Carbon Steel

WR502 ...series



EDP. No.	D	R	L ₁	L ₂	D ₂
WR502 120 25	12.0	2.50	30.0	110	12
WR502 120 30		3.00			
WR502 120 40		4.00			
WR502 120 50		5.00			
WR502 120 05 130		0.50	30.0	130	
WR502 120 10 130		1.00			
WR502 120 05 150		0.50	30.0	150	
WR502 120 10 150		1.00			
WR502 140 05	14.0	0.50	30.0	150	16
WR502 140 10		1.00			
WR502 140 20		2.00			
WR502 160 05	16.0	0.50	32.0	150	16
WR502 160 10		1.00			
WR502 160 15		1.50			
WR502 160 20		2.00			
WR502 200 05	20.0	0.50	38.0	150	20
WR502 200 10		1.00			
WR502 200 15		1.50			
WR502 200 20		2.00			

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

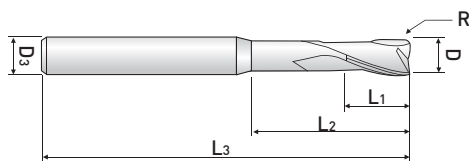
○: General Application ◎: The most suitable Application

■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0~-0.012	
over 6	0~-0.015	h6

※ These tools are manufactured based on order received.

Endmills for Mold & Die(Corner Radius) WINNER Series



2 FLUTE LONG NECK CORNER RADIUS

- Excellent effect in preventing breakage with a shape on neck without notch
- A variety of sizes on 2 flute long neck corner R radius
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

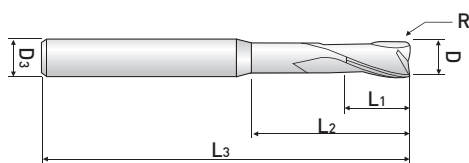
WR512 ...series



EDP. No.	D	R	L ₁	L ₂	L ₃	D ₃
WR512 002 002 005	0.2	0.02	0.3	0.5	40.0	4.0
WR512 002 002 01				1.0		
WR512 002 002 015				1.5		
WR512 002 002 02				2.0		
WR512 002 005 005		0.05		0.5		
WR512 002 005 01				1.0		
WR512 002 005 015				1.5		
WR512 002 005 02				2.0		
WR512 003 002 01				0.3		
WR512 003 002 02	2.0					
WR512 003 002 03	3.0					
WR512 003 005 01	0.05	1.0				
WR512 003 005 02		2.0				
WR512 003 005 03		3.0				
WR512 004 005 01	0.4	0.05	0.6	1.0	40.0	4.0
WR512 004 005 015				1.5		
WR512 004 005 02				2.0		
WR512 004 005 025				2.5		
WR512 004 005 03				3.0		
WR512 004 005 04				4.0		
WR512 004 01 01		0.1		1.0		
WR512 004 01 015				1.5		
WR512 004 01 02				2.0		
WR512 004 01 025				2.5		
WR512 004 01 03				3.0		
WR512 004 01 04				4.0		
WR512 005 005 01	0.5	0.05	0.7	1.0	45.0	4.0
WR512 005 005 015				1.5		
WR512 005 005 02				2.0		
WR512 005 005 025				2.5		
WR512 005 005 03				3.0		
WR512 005 005 04				4.0		
WR512 005 005 05				5.0		
WR512 005 005 06				6.0		
WR512 005 01 01		0.10		1.0		
WR512 005 01 015				1.5		
WR512 005 01 02				2.0		

NEXT >>

Endmills for Mold & Die(Corner Radius) WINNER Series



2 FLUTE LONG NECK CORNER RADIUS

- Excellent effect in preventing breakage with a shape on neck without notch
- A variety of sizes on 2 flute long neck corner R radius
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

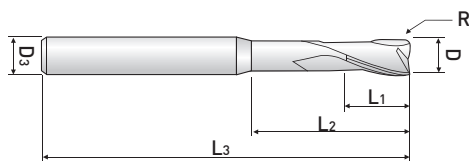
WR512 ...series



EDP. No.	D	R	L ₁	L ₂	L ₃	D ₃
WR512 005 01 025	0.5	0.10	0.7	2.5	45.0	4.0
WR512 005 01 03				3.0		
WR512 005 01 04				4.0		
WR512 005 01 05				5.0		
WR512 005 01 06				6.0		
WR512 006 005 02	0.6	0.05	0.9	2.0	45.0	4.0
WR512 006 005 03				3.0		
WR512 006 005 04				4.0		
WR512 006 005 06				6.0		
WR512 006 005 08				8.0		
WR512 006 005 10				10.0		
WR512 006 01 02		0.10		2.0		
WR512 006 01 03				3.0		
WR512 006 01 04				4.0		
WR512 006 01 06				6.0		
WR512 006 01 08				8.0		
WR512 006 01 10				10.0		
WR512 006 02 02		0.20		2.0		
WR512 006 02 03				3.0		
WR512 006 02 04				4.0		
WR512 006 02 06				6.0		
WR512 006 02 08				8.0		
WR512 006 02 10				10.0		
WR512 007 005 02	0.7	0.05	1.2	2.0	45.0	4.0
WR512 007 005 04				4.0		
WR512 007 005 06				6.0		
WR512 007 005 08				8.0		
WR512 007 005 10				10.0		
WR512 007 01 02		0.10		2.0		
WR512 007 01 04				4.0		
WR512 007 01 06				6.0		
WR512 007 01 08				8.0		
WR512 007 01 10				10.0		
WR512 007 02 02		0.20		2.0		
WR512 007 02 04				4.0		
WR512 007 02 06				6.0		
WR512 007 02 08				8.0		
WR512 007 02 10				10.0		

NEXT >>

Endmills for Mold & Die(Corner Radius) WINNER Series



2 FLUTE LONG NECK CORNER RADIUS

- Excellent effect in preventing breakage with a shape on neck without notch
- A variety of sizes on 2 flute long neck corner R radius
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

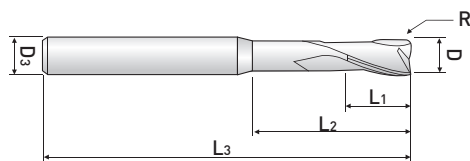
WR512 ...series



EDP. No.	D	R	L ₁	L ₂	L ₃	D ₃		
WR512 008 005 02	0.8	0.05	1.2	2.0	45.0	4.0		
WR512 008 005 03				3.0				
WR512 008 005 04				4.0				
WR512 008 005 06				6.0				
WR512 008 005 08				8.0				
WR512 008 005 10				10.0				
WR512 008 01 02		0.10		2.0				
WR512 008 01 03				3.0				
WR512 008 01 04				4.0				
WR512 008 01 06				6.0				
WR512 008 01 08				8.0				
WR512 008 01 10				10.0				
WR512 008 02 02		0.20		2.0				
WR512 008 02 03				3.0				
WR512 008 02 04				4.0				
WR512 008 02 06				6.0				
WR512 008 02 08				8.0				
WR512 008 02 10				10.0				
WR512 010 005 03				1.0			0.05	3.0
WR512 010 005 04								4.0
WR512 010 005 06	6.0							
WR512 010 005 08	8.0							
WR512 010 005 10	10.0							
WR512 010 005 12	12.0							
WR512 010 005 14	14.0							
WR512 010 005 16	16.0							
WR512 010 005 20	20.0							
WR512 010 01 03	0.10	3.0						
WR512 010 01 04		4.0						
WR512 010 01 06		6.0						
WR512 010 01 08		8.0						
WR512 010 01 10		10.0						
WR512 010 01 12		12.0						
WR512 010 01 14		14.0						
WR512 010 01 16		16.0						
WR512 010 01 20		20.0						

NEXT >>>

Endmills for Mold & Die(Corner Radius) WINNER Series



2 FLUTE LONG NECK CORNER RADIUS

- Excellent effect in preventing breakage with a shape on neck without notch
- A variety of sizes on 2 flute long neck corner R radius
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

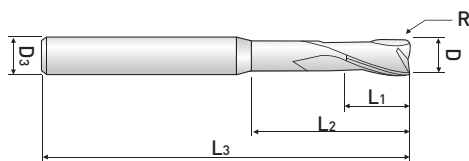
WR512 ...series



EDP. No.	D	R	L ₁	L ₂	L ₃	D ₃					
WR512 010 02 03	1.0	0.20	1.5	3.0	50.0	4.0					
WR512 010 02 04				4.0							
WR512 010 02 06				6.0							
WR512 010 02 08				8.0							
WR512 010 02 10				10.0							
WR512 010 02 12				12.0							
WR512 010 02 14				14.0							
WR512 010 02 16				16.0							
WR512 010 02 20				20.0							
WR512 010 03 03		0.30		3.0							
WR512 010 03 04				4.0							
WR512 010 03 06				6.0							
WR512 010 03 08				8.0							
WR512 010 03 10				10.0							
WR512 010 03 12				12.0							
WR512 010 03 14				14.0							
WR512 010 03 16				16.0							
WR512 010 03 20				20.0							
WR512 012 005 03				1.2			0.05	1.8	3.0	50.0	4.0
WR512 012 005 04									4.0		
WR512 012 005 06	6.0										
WR512 012 005 08	8.0										
WR512 012 005 10	10.0										
WR512 012 005 12	12.0										
WR512 012 005 16	16.0										
WR512 012 005 20	20.0										
WR512 012 01 03	0.10	3.0									
WR512 012 01 04		4.0									
WR512 012 01 06		6.0									
WR512 012 01 08		8.0									
WR512 012 01 10		10.0									
WR512 012 01 12		12.0									
WR512 012 01 16		16.0									
WR512 012 01 20		20.0									
WR512 012 02 03	0.20	3.0									
WR512 012 02 04		4.0									
WR512 012 02 06		6.0									
WR512 012 02 08		8.0									
WR512 012 02 10		10.0									

NEXT >>

Endmills for Mold & Die(Corner Radius) WINNER Series



2 FLUTE LONG NECK CORNER RADIUS

- Excellent effect in preventing breakage with a shape on neck without notch
- A variety of sizes on 2 flute long neck corner R radius
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

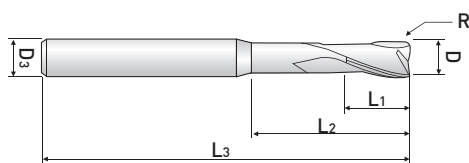
WR512 ...series



EDP. No.	D	R	L ₁	L ₂	L ₃	D ₃	
WR512 012 02 12	1.2	0.20	1.8	12.0	50.0	4.0	
WR512 012 02 16				16.0			
WR512 012 02 20				20.0			
WR512 012 03 03		0.30		3.0			
WR512 012 03 04				4.0			
WR512 012 03 06				6.0			
WR512 012 03 08				8.0			
WR512 012 03 10				10.0			
WR512 012 03 12				12.0			
WR512 012 03 16				16.0			
WR512 012 03 20				20.0			
WR512 015 005 04				1.5			0.05
WR512 015 005 06	6.0						
WR512 015 005 08	8.0						
WR512 015 005 10	10.0						
WR512 015 005 12	12.0						
WR512 015 005 14	14.0						
WR512 015 005 16	16.0						
WR512 015 005 20	20.0						
WR512 015 005 22	22.0	60					
WR512 015 005 26	26.0						
WR512 015 01 04	0.10	4.0	50				
WR512 015 01 06		6.0					
WR512 015 01 08		8.0					
WR512 015 01 10		10.0					
WR512 015 01 12		12.0					
WR512 015 01 14		14.0					
WR512 015 01 16		16.0					
WR512 015 01 20		20.0					
WR512 015 01 22		22.0			60		
WR512 015 01 26		26.0					
WR512 015 02 04	0.20	4.0	50				
WR512 015 02 06		6.0					
WR512 015 02 08		8.0					
WR512 015 02 10		10.0					
WR512 015 02 12		12.0					
WR512 015 02 14		14.0					
WR512 015 02 16		16.0					
WR512 015 02 20		20.0					

NEXT >>

Endmills for Mold & Die(Corner Radius) WINNER Series



2 FLUTE LONG NECK CORNER RADIUS

- Excellent effect in preventing breakage with a shape on neck without notch
- A variety of sizes on 2 flute long neck corner R radius
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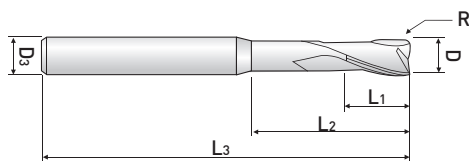
WR512 ...series



EDP. No.	D	R	L ₁	L ₂	L ₃	D ₃
WR512 015 02 22	1.5	0.20	2.3	22.0	60	4.0
WR512 015 02 26				26.0		
WR512 015 03 04		0.30		4.0	50	
WR512 015 03 06				6.0		
WR512 015 03 08				8.0		
WR512 015 03 10				10.0		
WR512 015 03 12				12.0		
WR512 015 03 14				14.0		
WR512 015 03 16				16.0		
WR512 015 03 20				20.0		
WR512 015 03 22				22.0	60	
WR512 015 03 26				26.0		
WR512 015 05 04		0.50		4.0	50	
WR512 015 05 06				6.0		
WR512 015 05 08				8.0		
WR512 015 05 10				10.0		
WR512 015 05 12				12.0		
WR512 015 05 14				14.0		
WR512 015 05 16				16.0		
WR512 015 05 20				20.0		
WR512 015 05 22				22.0	60	
WR512 015 05 26				26.0		
WR512 020 01 06	2.0	0.10	3.0	6.0	50	4.0
WR512 020 01 08				8.0		
WR512 020 01 10				10.0		
WR512 020 01 12				12.0		
WR512 020 01 14				14.0		
WR512 020 01 16				16.0		
WR512 020 01 20				20.0		
WR512 020 01 22				22.0	60	
WR512 020 01 26				26.0		
WR512 020 01 30				30.0	70	
WR512 020 02 06		0.20		6.0	50	
WR512 020 02 08				8.0		
WR512 020 02 10				10.0		
WR512 020 02 12				12.0		
WR512 020 02 14				14.0		
WR512 020 02 16				16.0		
WR512 020 02 20				20.0		

NEXT >>>

Endmills for Mold & Die(Corner Radius) WINNER Series



2 FLUTE LONG NECK CORNER RADIUS

- Excellent effect in preventing breakage with a shape on neck without notch
- A variety of sizes on 2 flute long neck corner R radius
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

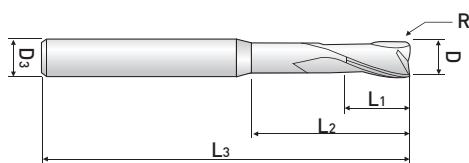
WR512 ...series



EDP. No.	D	R	L ₁	L ₂	L ₃	D ₃
WR512 020 02 22	2.0	0.20	3.0	22.0	60	4.0
WR512 020 02 26				26.0		
WR512 020 02 30				30.0	70	
WR512 020 03 06		0.30		6.0	50	
WR512 020 03 08				8.0		
WR512 020 03 10				10.0		
WR512 020 03 12				12.0		
WR512 020 03 14				14.0		
WR512 020 03 16				16.0		
WR512 020 03 20				20.0		
WR512 020 03 22				22.0	60	
WR512 020 03 26				26.0		
WR512 020 03 30				30.0	70	
WR512 020 05 06		0.50		6.0	50	
WR512 020 05 08				8.0		
WR512 020 05 10				10.0		
WR512 020 05 12				12.0		
WR512 020 05 14				14.0		
WR512 020 05 16				16.0		
WR512 020 05 20				20.0		
WR512 020 05 22				22.0	60	
WR512 020 05 26				26.0		
WR512 020 05 30				30.0	70	
WR512 025 01 08	2.5	0.10	4.0	8.0	50	4.0
WR512 025 01 10				10.0		
WR512 025 01 12				12.0		
WR512 025 01 14				14.0		
WR512 025 01 16				16.0		
WR512 025 01 20				20.0		
WR512 025 01 26				26.0	60	
WR512 025 01 30				30.0	70	
WR512 025 02 08		0.20		8.0	50	
WR512 025 02 10				10.0		
WR512 025 02 12				12.0		
WR512 025 02 14				14.0		
WR512 025 02 16				16.0		
WR512 025 02 20				20.0		
WR512 025 02 26				26.0	60	
WR512 025 02 30				30.0	70	

NEXT >>

Endmills for Mold & Die(Corner Radius) WINNER Series



2 FLUTE LONG NECK CORNER RADIUS

- Excellent effect in preventing breakage with a shape on neck without notch
- A variety of sizes on 2 flute long neck corner R radius
- Enhanced cutting effect and better wear resistance made from the finest raw material
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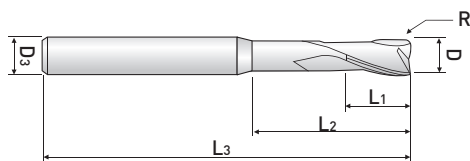
WR512 ...series



EDP. No.	D	R	L ₁	L ₂	L ₃	D ₃	
WR512 025 03 08	2.5	0.30	4.0	8.0	50	4.0	
WR512 025 03 10				10.0			
WR512 025 03 12				12.0			
WR512 025 03 14				14.0			
WR512 025 03 16				16.0			
WR512 025 03 20				20.0			
WR512 025 03 26				26.0	60		
WR512 025 03 30				30.0	70		
WR512 025 05 08		0.50		8.0	50		
WR512 025 05 10				10.0			
WR512 025 05 12				12.0			
WR512 025 05 14				14.0			
WR512 025 05 16				16.0			
WR512 025 05 20				20.0			
WR512 025 05 26				26.0	60		
WR512 025 05 30				30.0	70		
WR512 030 01 08	3.0		0.10	4.5	8.0	50	6.0
WR512 030 01 10					10.0		
WR512 030 01 12		12.0					
WR512 030 01 14		14.0			60		
WR512 030 01 16		16.0					
WR512 030 01 20		20.0					
WR512 030 01 26		26.0			65		
WR512 030 01 30		30.0			70		
WR512 030 01 35		35.0					
WR512 030 01 40		40.0			80		
WR512 030 02 08		0.20	8.0		50		
WR512 030 02 10			10.0				
WR512 030 02 12			12.0				
WR512 030 02 14			14.0		60		
WR512 030 02 16			16.0				
WR512 030 02 20			20.0				
WR512 030 02 26			26.0		65		
WR512 030 02 30			30.0		70		
WR512 030 02 35			35.0				
WR512 030 02 40			40.0		80		

NEXT >>

Endmills for Mold & Die(Corner Radius) WINNER Series



2 FLUTE LONG NECK CORNER RADIUS

- Excellent effect in preventing breakage with a shape on neck without notch
- A variety of sizes on 2 flute long neck corner R radius
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

WR512 ...series



ULTRA FINE

HELIX

up to $\phi 6$ over $\phi 6$

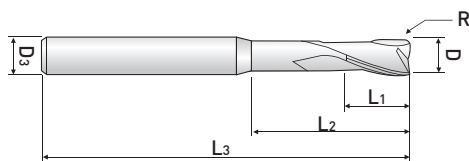
W Coating

p.721

EDP. No.	D	R	L ₁	L ₂	L ₃	D ₃
WR512 030 03 08	3.0	0.30	4.5	8.0	50	6.0
WR512 030 03 10				10.0		
WR512 030 03 12				12.0		
WR512 030 03 14				14.0	60	
WR512 030 03 16				16.0		
WR512 030 03 20				20.0		
WR512 030 03 26				26.0	65	
WR512 030 03 30				30.0	70	
WR512 030 03 35				35.0		
WR512 030 03 40				40.0	80	
WR512 030 05 08		0.50		8.0	50	
WR512 030 05 10				10.0		
WR512 030 05 12				12.0		
WR512 030 05 14				14.0	60	
WR512 030 05 16				16.0		
WR512 030 05 20				20.0		
WR512 030 05 26				26.0	65	
WR512 030 05 30				30.0	70	
WR512 030 05 35				35.0		
WR512 030 05 40				40.0	80	
WR512 030 10 08		1.00		8.0	50	
WR512 030 10 10				10.0		
WR512 030 10 12				12.0		
WR512 030 10 14				14.0	60	
WR512 030 10 16				16.0		
WR512 030 10 20				20.0		
WR512 030 10 26				26.0	65	
WR512 030 10 30				30.0	70	
WR512 030 10 35				35.0		
WR512 030 10 40				40.0	80	
WR512 040 01 10	4.0	0.10	6.0	10.0	50	6.0
WR512 040 01 12				12.0		
WR512 040 01 14				14.0	60	
WR512 040 01 16				16.0		
WR512 040 01 20				20.0		
WR512 040 01 26				26.0	65	
WR512 040 01 30				30.0		

NEXT >>

Endmills for Mold & Die(Corner Radius) WINNER Series



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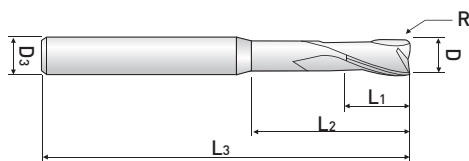
WR512 ...series



EDP. No.	D	R	L ₁	L ₂	L ₃	D ₃	
WR512 040 01 35	4.0	0.10	6.0	35.0	70	6.0	
WR512 040 01 40				40.0	80		
WR512 040 01 45				45.0	90		
WR512 040 01 50				50.0	100		
WR512 040 02 10		0.20		10.0	50		
WR512 040 02 12				12.0			
WR512 040 02 14				14.0	60		
WR512 040 02 16				16.0			
WR512 040 02 20				20.0			
WR512 040 02 26				26.0	65		
WR512 040 02 30				30.0			
WR512 040 02 35				35.0	70		
WR512 040 02 40				40.0	80		
WR512 040 02 45				45.0	90		
WR512 040 02 50				50.0	100		
WR512 040 03 10				0.30	10.0		50
WR512 040 03 12					12.0		
WR512 040 03 14					14.0		60
WR512 040 03 16					16.0		
WR512 040 03 20					20.0		
WR512 040 03 26		26.0			65		
WR512 040 03 30		30.0					
WR512 040 03 35		35.0			70		
WR512 040 03 40		40.0			80		
WR512 040 03 45		45.0			90		
WR512 040 03 50		50.0			100		
WR512 040 05 10		0.50			10.0		50
WR512 040 05 12					12.0		
WR512 040 05 14					14.0		60
WR512 040 05 16					16.0		
WR512 040 05 20					20.0		
WR512 040 05 26				26.0	65		
WR512 040 05 30				30.0			
WR512 040 05 35				35.0	70		
WR512 040 05 40				40.0	80		
WR512 040 05 45				45.0	90		
WR512 040 05 50				50.0	100		

NEXT >>

Endmills for Mold & Die(Corner Radius) WINNER Series



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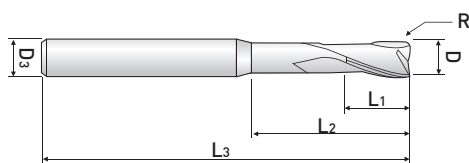
WR512 ...series



EDP. No.	D	R	L ₁	L ₂	L ₃	D ₃
WR512 040 10 10	4.0	1.00	6.0	10.0	50	6.0
WR512 040 10 12				12.0		
WR512 040 10 14				14.0		
WR512 040 10 16				16.0	60	
WR512 040 10 20				20.0		
WR512 040 10 26				26.0	65	
WR512 040 10 30				30.0		
WR512 040 10 35				35.0	70	
WR512 040 10 40				40.0	80	
WR512 040 10 45				45.0	90	
WR512 040 10 50				50.0	100	
WR512 050 01	5.0	0.10	8.0	15.0	60.0	6.0
WR512 050 02		0.20				
WR512 050 03		0.30				
WR512 050 05		0.50				
WR512 050 10		1.00				
WR512 050 15		1.50				
WR512 050 20		2.00				
WR512 060 01	6.0	0.10	9.0	20.0	60.0	6.0
WR512 060 02		0.20				
WR512 060 03		0.30				
WR512 060 05		0.50				
WR512 060 10		1.00				
WR512 060 15		1.50				
WR512 060 20		2.00				
WR512 060 03 90		0.30	15.0	30.0	90.0	6.0
WR512 060 05 90		0.50				
WR512 060 10 90		1.00				
WR512 080 01	8.0	0.10	12.0	25.0	70.0	8.0
WR512 080 02		0.20				
WR512 080 03		0.30				
WR512 080 05		0.50				
WR512 080 10		1.00				
WR512 080 15		1.50				
WR512 080 20		2.00				
WR512 080 03 100		0.30	20.0	35.0	100.0	8.0
WR512 080 05 100		0.50				
WR512 080 10 100		1.00				

NEXT >>>

Endmills for Mold & Die(Corner Radius) WINNER Series



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WR512 ...series



EDP. No.	D	R	L ₁	L ₂	L ₃	D ₃
WR512 100 01	10.0	0.10	15.0	30.0	75.0	10.0
WR512 100 02		0.20				
WR512 100 03		0.30				
WR512 100 05		0.50				
WR512 100 10		1.00				
WR512 100 15		1.50				
WR512 100 20		2.00				
WR512 100 03 100		0.30				
WR512 100 05 100		0.50				
WR512 100 10 100		1.00				
WR512 120 02	12.0	0.20	18.0	32.0	80.0	12.0
WR512 120 03		0.30				
WR512 120 05		0.50				
WR512 120 10		1.00				
WR512 120 15		1.50				
WR512 120 20		2.00				
WR512 120 03 110		0.30				
WR512 120 05 110		0.50				
WR512 120 10 110		1.00				
WR512 160 05	16.0	0.50	20.0	35.0	100.0	16.0
WR512 160 10		1.00				
WR512 160 05 150		0.50				
WR512 160 10 150		1.00				
WR512 200 05	20.0	0.50	25.0	40.0	100.0	20.0
WR512 200 10		1.00				
WR512 200 05 150		0.50				
WR512 200 10 150		1.00				

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

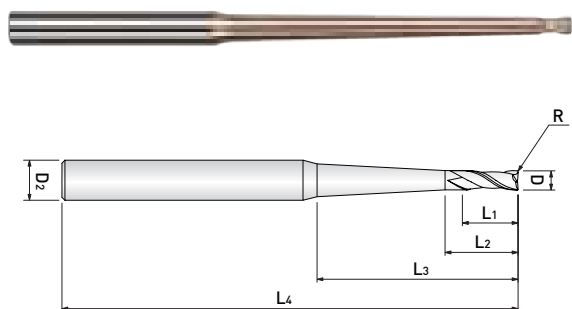
○: General Application ◎: The most suitable Application

■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0~-0.012	
over 6	0~-0.015	h6

※ These tools are manufactured based on order received.

Endmills for Mold & Die(Corner Radius) WINNER Series



2 FLUTE TAPER LONG LECK CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Strengthen the hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

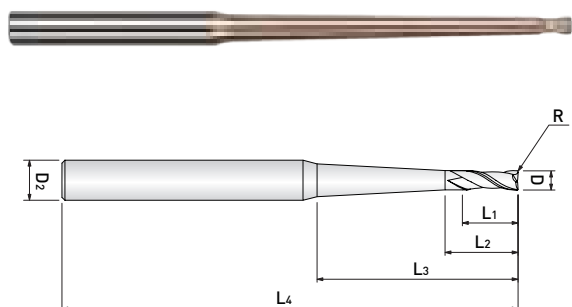
WR542 ...series



EDP. No.	D	R	θ	L ₁	L ₂	L ₃	L ₄	D ₂
WR542 002 005 01 01	0.2	0.05	1°	0.3	0.4	1.0	40	4
WR542 002 005 01 02						2.0		
WR542 002 005 01 03						3.0		
WR542 002 005 02 01			1.0					
WR542 002 005 02 02			2.0					
WR542 002 005 02 03			3.0					
WR542 003 005 01 02	0.3	0.05	1°	0.5	0.6	2.0	40	4
WR542 003 005 01 03						3.0		
WR542 003 005 01 04						4.0		
WR542 003 005 01 05						5.0		
WR542 003 005 02 02			2.0					
WR542 003 005 02 03			3.0					
WR542 003 005 02 04			4.0					
WR542 003 005 02 05			5.0					
WR542 004 005 01 02	0.4	0.05	1°	0.6	0.8	2.0	50	4
WR542 004 005 01 03						3.0		
WR542 004 005 01 04						4.0		
WR542 004 005 01 05						5.0		
WR542 004 005 01 06			6.0					
WR542 004 005 02 02			2.0					
WR542 004 005 02 03			3.0					
WR542 004 005 02 04			4.0					
WR542 004 005 02 05			5.0					
WR542 004 005 02 06			6.0					
WR542 004 01 01 02		0.10	1°			2.0		
WR542 004 01 01 03						3.0		
WR542 004 01 01 04						4.0		
WR542 004 01 01 05						5.0		
WR542 004 01 01 06			6.0					
WR542 004 01 02 02			2.0					
WR542 004 01 02 03			3.0					
WR542 004 01 02 04			4.0					
WR542 004 01 02 05			5.0					
WR542 004 01 02 06			6.0					
WR542 005 005 01 04	0.50	0.05	1°	0.70	1.0	4.0	50	4
WR542 005 005 01 06						6.0		
WR542 005 005 01 08						8.0		

NEXT >>>

Endmills for Mold & Die(Corner Radius) WINNER Series



2 FLUTE TAPER LONG LECK CORNER RADIUS

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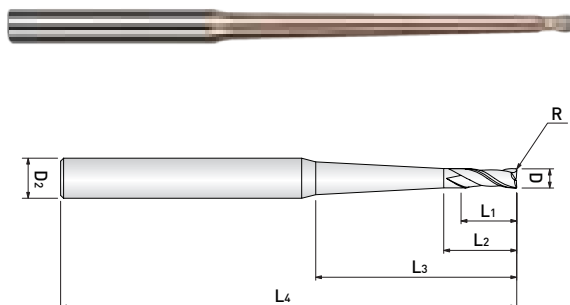
WR542 ...series



EDP. No.	D	R	θ	L ₁	L ₂	L ₃	L ₄	D ₂
WR542 005 005 01 10	0.50	0.05	1°	0.70	1.0	10.0	50	4
WR542 005 005 02 04			4.0					
WR542 005 005 02 06			6.0					
WR542 005 005 02 08			8.0					
WR542 005 005 02 10			10.0					
WR542 005 01 01 04		0.10	1°			4.0		
WR542 005 01 01 06						6.0		
WR542 005 01 01 08						8.0		
WR542 005 01 01 10						10.0		
WR542 005 01 02 04						4.0		
WR542 005 01 02 06			6.0					
WR542 005 01 02 08			8.0					
WR542 005 01 02 10			10.0					
WR542 006 01 01 04			0.6			0.10		
WR542 006 01 01 06	6.0							
WR542 006 01 01 08	8.0							
WR542 006 01 01 10	10.0							
WR542 006 01 01 12	12.0							
WR542 006 01 02 04	4.0							
WR542 006 01 02 06	6.0							
WR542 006 01 02 08	8.0							
WR542 006 01 02 10	10.0							
WR542 006 01 02 12	12.0							
WR542 006 02 01 04	0.20	1°		4.0				
WR542 006 02 01 06				6.0				
WR542 006 02 01 08				8.0				
WR542 006 02 01 10				10.0				
WR542 006 02 01 12				12.0				
WR542 006 02 02 04		4.0						
WR542 006 02 02 06		6.0						
WR542 006 02 02 08		8.0						
WR542 006 02 02 10		10.0						
WR542 006 02 02 12		12.0						
WR542 008 01 01 04	0.8	0.10	1°	1.2	1.6	4.0	50.0	4.0
WR542 008 01 01 06						6.0		
WR542 008 01 01 08						8.0		
WR542 008 01 01 10						10.0		

NEXT >>>

Endmills for Mold & Die(Corner Radius) WINNER Series



2 FLUTE TAPER LONG LECK CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Strengthen the hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

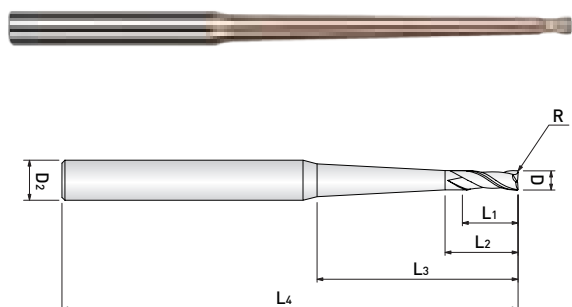
WR542 ...series



EDP. No.	D	R	θ	L ₁	L ₂	L ₃	L ₄	D ₂		
WR542 008 01 01 12	0.8	0.10	1°	1.2	1.6	12.0	50.0	4.0		
WR542 008 01 01 16						16.0				
WR542 008 01 02 04			2°			4.0				
WR542 008 01 02 06						6.0				
WR542 008 01 02 08						8.0				
WR542 008 01 02 10						10.0				
WR542 008 01 02 12						12.0				
WR542 008 01 02 16						16.0				
WR542 008 02 01 04		0.20	1°			4.0				
WR542 008 02 01 06						6.0				
WR542 008 02 01 08						8.0				
WR542 008 02 01 10						10.0				
WR542 008 02 01 12			2°			12.0				
WR542 008 02 01 16						16.0				
WR542 008 02 02 04						4.0				
WR542 008 02 02 06						6.0				
WR542 008 02 02 08						8.0				
WR542 008 02 02 10						10.0				
WR542 008 02 02 12						12.0				
WR542 008 02 02 16						16.0				
WR542 010 01 01 06	1.0	0.10	1°	1.5	2.5	6.0	50	4		
WR542 010 01 01 08						8.0				
WR542 010 01 01 10						10.0				
WR542 010 01 01 12						12.0				
WR542 010 01 01 16						16.0				
WR542 010 01 01 20						20.0				
WR542 010 01 01 25						25.0	60			
WR542 010 01 01 30						30.0	70			
WR542 010 01 01 40						40.0	80			
WR542 010 01 01 50						50.0	90	6		
WR542 010 01 02 06			2°			6.0	50	4		
WR542 010 01 02 08						8.0				
WR542 010 01 02 10						10.0				
WR542 010 01 02 12						12.0				
WR542 010 01 02 16						16.0				
WR542 010 01 02 20						20.0				
WR542 010 01 02 25						25.0	60			
WR542 010 01 02 30						30.0	70			

NEXT >>>

Endmills for Mold & Die(Corner Radius) WINNER Series



2 FLUTE TAPER LONG LECK CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Strengthen the hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

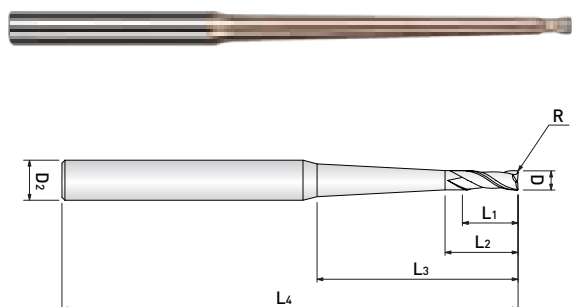
WR542 ...series



EDP. No.	D	R	θ	L ₁	L ₂	L ₃	L ₄	D ₂	
WR542 010 01 02 40	1.0	0.10	2°	1.5	2.5	40.0	80	4	
WR542 010 01 02 50			50.0			90	6		
WR542 010 02 01 06		0.20	1°				6.0	50	4
WR542 010 02 01 08							8.0		
WR542 010 02 01 10							10.0		
WR542 010 02 01 12							12.0		
WR542 010 02 01 16							16.0		
WR542 010 02 01 20							20.0		
WR542 010 02 01 25							25.0	60	
WR542 010 02 01 30							30.0	70	
WR542 010 02 01 40							40.0	80	
WR542 010 02 01 50							50.0	90	6
WR542 010 02 02 06		0.20	2°				6.0	50	4
WR542 010 02 02 08							8.0		
WR542 010 02 02 10							10.0		
WR542 010 02 02 12							12.0		
WR542 010 02 02 16							16.0		
WR542 010 02 02 20							20.0		
WR542 010 02 02 25							25.0	60	
WR542 010 02 02 30							30.0	70	
WR542 010 02 02 40							40.0	80	
WR542 010 02 02 50							50.0	90	6
WR542 012 01 01 08	1.2	0.10	1°	1.8	3.0	8.0	50	4	
WR542 012 01 01 12						12.0			
WR542 012 01 01 16						16.0			
WR542 012 01 01 20						20.0			
WR542 012 01 01 25						25.0	60		
WR542 012 01 01 30						30.0	70		
WR542 012 01 02 08		0.20	2°				8.0		50
WR542 012 01 02 12							12.0		
WR542 012 01 02 16							16.0		
WR542 012 01 02 20							20.0		
WR542 012 01 02 25							25.0	60	
WR542 012 01 02 30							30.0	70	
WR542 012 02 01 08		0.20	1°				8.0	50	
WR542 012 02 01 12							12.0		
WR542 012 02 01 16							16.0		
WR542 012 02 01 20							20.0		

NEXT >>

Endmills for Mold & Die(Corner Radius) WINNER Series



2 FLUTE TAPER LONG LECK CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Strengthen the hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

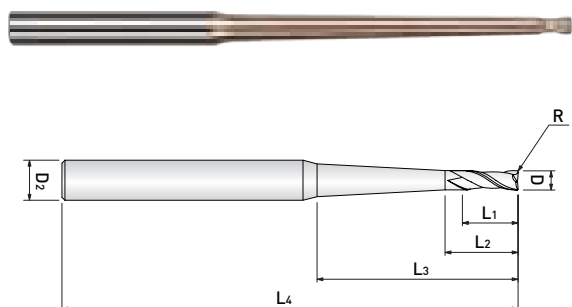
WR542 ...series



EDP. No.	D	R	θ	L ₁	L ₂	L ₃	L ₄	D ₂
WR542 012 02 01 25	1.2	0.20	1°	1.8	3.0	25.0	60	4
WR542 012 02 01 30			30.0			70		
WR542 012 02 02 08			8.0			50		
WR542 012 02 02 12			12.0					
WR542 012 02 02 16			16.0					
WR542 012 02 02 20			20.0					
WR542 012 02 02 25			25.0			60		
WR542 012 02 02 30			30.0			70		
WR542 015 01 01 08	1.5	0.10	1°	2.3	3.0	8.0	50	4
WR542 015 01 01 10						10.0		
WR542 015 01 01 12						12.0		
WR542 015 01 01 16						16.0		
WR542 015 01 01 20						20.0		
WR542 015 01 01 25						25.0	60	
WR542 015 01 01 30			30.0			70		
WR542 015 01 01 40			40.0			80		
WR542 015 01 01 50			50.0			90		
WR542 015 01 02 08			2°			8.0	50	
WR542 015 01 02 10		10.0						
WR542 015 01 02 12		12.0						
WR542 015 01 02 16		16.0						
WR542 015 01 02 20		20.0						
WR542 015 01 02 25		25.0				60		
WR542 015 01 02 30		30.0				70		
WR542 015 01 02 40		40.0				80		
WR542 015 01 02 50		50.0				90		
WR542 015 02 01 08		0.20				1°	8.0	50
WR542 015 02 01 10			10.0					
WR542 015 02 01 12			12.0					
WR542 015 02 01 16			16.0					
WR542 015 02 01 20			20.0					
WR542 015 02 01 25			25.0				60	
WR542 015 02 01 30			30.0				70	
WR542 015 02 01 40			40.0				80	
WR542 015 02 01 50			50.0				90	
WR542 015 02 02 08			2°				8.0	50
WR542 015 02 02 10						10.0		
WR542 015 02 02 12						12.0		
WR542 015 02 02 14						14.0		
WR542 015 02 02 16	16.0							

NEXT >>>

Endmills for Mold & Die(Corner Radius) WINNER Series



2 FLUTE TAPER LONG LECK CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Strengthen the hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

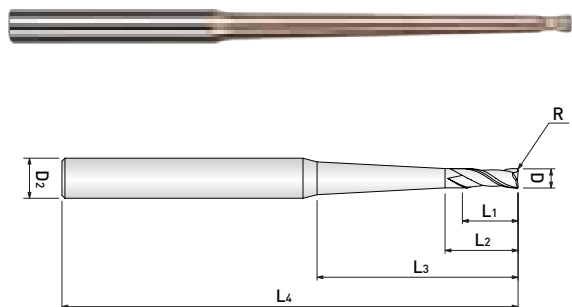
WR542 ...series



EDP. No.	D	R	θ	L ₁	L ₂	L ₃	L ₄	D ₂			
WR542 015 02 02 16	1.5	0.20	2°	2.3	3.0	16.0	50	4			
WR542 015 02 02 20						20.0					
WR542 015 02 02 25						25.0			60		
WR542 015 02 02 30						30.0	70				
WR542 015 02 02 40						40.0	80				
WR542 015 02 02 50						50.0	90				
WR542 015 03 01 08		0.30	1°			2°	8.0	50	4		
WR542 015 03 01 10							10.0				
WR542 015 03 01 12							12.0				
WR542 015 03 01 16							16.0				
WR542 015 03 01 20							20.0				
WR542 015 03 01 25							25.0	60			
WR542 015 03 01 30			30.0			70					
WR542 015 03 01 40			40.0			80					
WR542 015 03 01 50			50.0			90					
WR542 015 03 02 08			2°			2°	8.0	50		6	
WR542 015 03 02 10							10.0				
WR542 015 03 02 12							12.0				
WR542 015 03 02 16							16.0				
WR542 015 03 02 20							20.0				
WR542 015 03 02 25							25.0	60			
WR542 015 03 02 30							30.0	70			
WR542 015 03 02 40							40.0	80			
WR542 015 03 02 50							50.0	90			
WR542 020 01 01 10	2.0	0.10		1°	2.0		5.0	10.0	50		4
WR542 020 01 01 12								12.0			
WR542 020 01 01 16								16.0			
WR542 020 01 01 20			20.0								
WR542 020 01 01 25			25.0			60					
WR542 020 01 01 30			30.0			70					
WR542 020 01 01 40			40.0			80					
WR542 020 01 01 50			50.0			100					
WR542 020 01 01 60			60.0								
WR542 020 01 01 80			80.0			140					
WR542 020 01 02 10			2°	2°		10.0		50	4		
WR542 020 01 02 12						12.0					
WR542 020 01 02 16						16.0					

NEXT >>

Endmills for Mold & Die(Corner Radius) WINNER Series



2 FLUTE TAPER LONG LECK CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Strengthen the hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

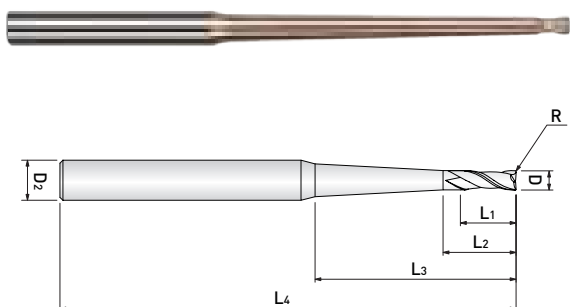
WR542 ...series



EDP. No.	D	R	θ	L ₁	L ₂	L ₃	L ₄	D ₂	
WR542 020 01 02 20	2.0	0.10	2°	2.0	5.0	20.0	50	4	
WR542 020 01 02 25						25.0	60		
WR542 020 01 02 30						30.0	70		
WR542 020 01 02 40						40.0	80	6	
WR542 020 01 02 50						50.0	100		
WR542 020 01 02 60						60.0			
WR542 020 01 02 80						80.0	140	8	
WR542 020 02 01 10		0.20	1°			2°	10.0	50	4
WR542 020 02 01 12							12.0		
WR542 020 02 01 16							16.0		
WR542 020 02 01 20							20.0		
WR542 020 02 01 25							25.0	60	6
WR542 020 02 01 30							30.0	70	
WR542 020 02 01 40							40.0	80	
WR542 020 02 01 50							50.0	100	6
WR542 020 02 01 60							60.0		
WR542 020 02 01 80							80.0	140	4
WR542 020 02 02 10							10.0	50	
WR542 020 02 02 12							12.0		
WR542 020 02 02 16							16.0		
WR542 020 02 02 20							20.0		
WR542 020 02 02 25							25.0	60	6
WR542 020 02 02 30							30.0	70	
WR542 020 02 02 40							40.0	80	
WR542 020 02 02 50							50.0	100	6
WR542 020 02 02 60							60.0		
WR542 020 02 02 80							80.0	140	8
WR542 020 03 01 10		0.30	1°			2°	10.0	50	4
WR542 020 03 01 12							12.0		
WR542 020 03 01 16							16.0		
WR542 020 03 01 20							20.0		
WR542 020 03 01 25							25.0	60	6
WR542 020 03 01 30							30.0	70	
WR542 020 03 01 40							40.0	80	
WR542 020 03 01 50							50.0	100	6
WR542 020 03 01 60							60.0		
WR542 020 03 01 80							80.0	140	6

NEXT >>>

Endmills for Mold & Die(Corner Radius) WINNER Series



2 FLUTE TAPER LONG LECK CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
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- Enhanced cutting effect and better wear resistance made from the finest raw material
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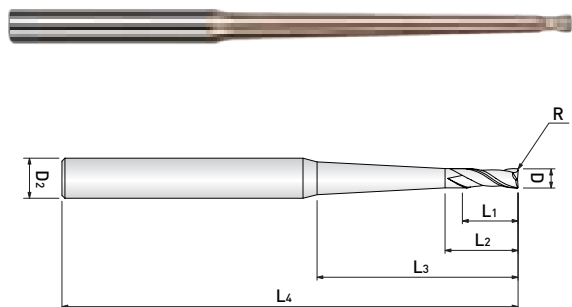
WR542 ...series



EDP. No.	D	R	θ	L ₁	L ₂	L ₃	L ₄	D ₂			
WR542 020 03 02 10	2.0	0.30	2°	2.0	5.0	10.0	50	4			
WR542 020 03 02 12						12.0					
WR542 020 03 02 16						16.0					
WR542 020 03 02 20						20.0					
WR542 020 03 02 25						25.0	60				
WR542 020 03 02 30						30.0	70				
WR542 020 03 02 40						40.0	80				
WR542 020 03 02 50						50.0	100		6		
WR542 020 03 02 60		60.0									
WR542 020 03 02 80		80.0	140			8					
WR542 020 05 01 10		0.50	1°			2°	10.0	50	4		
WR542 020 05 01 12							12.0				
WR542 020 05 01 16							16.0				
WR542 020 05 01 20							20.0				
WR542 020 05 01 25							25.0	60			
WR542 020 05 01 30							30.0	70			
WR542 020 05 01 40							40.0	80			
WR542 020 05 01 50							50.0	100		6	
WR542 020 05 01 60							60.0				
WR542 020 05 01 80							80.0	140			
WR542 020 05 02 10							2°	2°	10.0	50	4
WR542 020 05 02 12									12.0		
WR542 020 05 02 16									16.0		
WR542 020 05 02 20									20.0		
WR542 020 05 02 25									25.0	60	
WR542 020 05 02 30			30.0			70					
WR542 020 05 02 40			40.0			80					
WR542 020 05 02 50			50.0			100			6		
WR542 020 05 02 60			60.0								
WR542 020 05 02 80			80.0			140			8		
WR542 030 02 01 16	3.0		0.20	1°	4.5	6.0	16.0	60	6		
WR542 030 02 01 20							20.0	65			
WR542 030 02 01 30							30.0	70			
WR542 030 02 01 40		40.0					80				
WR542 030 02 01 50		50.0					90				
WR542 030 02 01 60		60.0					100				
WR542 030 02 02 16		2°		16.0			60				

NEXT >>>

Endmills for Mold & Die(Corner Radius) WINNER Series



2 FLUTE TAPER LONG LECK CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
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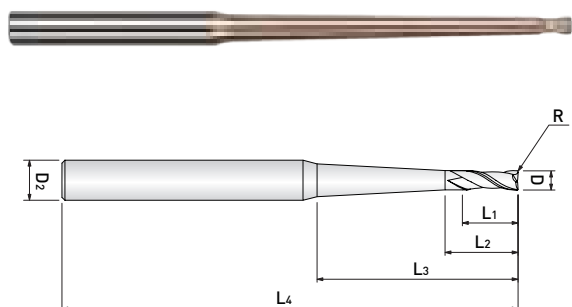
WR542 ...series



EDP. No.	D	R	θ	L ₁	L ₂	L ₃	L ₄	D ₂
WR542 030 02 02 20	3.0	0.20	2°	4.5	6.0	20.0	65	6
WR542 030 02 02 30						30.0	70	
WR542 030 02 02 40						40.0	80	
WR542 030 02 02 50						50.0	90	8
WR542 030 02 02 60						60.0	100	
WR542 030 02 02 70						70.0	120	
WR542 030 03 01 16		0.30	1°			16.0	60	6
WR542 030 03 01 20						20.0	65	
WR542 030 03 01 30						30.0	70	
WR542 030 03 01 40						40.0	80	
WR542 030 03 01 50						50.0	90	
WR542 030 03 01 60						60.0	100	
WR542 030 03 02 16			2°			16.0	60	8
WR542 030 03 02 20						20.0	65	
WR542 030 03 02 30						30.0	70	
WR542 030 03 02 40						40.0	80	
WR542 030 03 02 50						50.0	90	
WR542 030 03 02 60						60.0	100	
WR542 030 03 02 70						70.0	120	
WR542 030 05 01 16		0.50	1°			16.0	60	6
WR542 030 05 01 20						20.0	65	
WR542 030 05 01 30						30.0	70	
WR542 030 05 01 40						40.0	80	
WR542 030 05 01 50						50.0	90	
WR542 030 05 01 60						60.0	100	
WR542 030 05 02 16			2°			16.0	60	8
WR542 030 05 02 20						20.0	65	
WR542 030 05 02 30						30.0	70	
WR542 030 05 02 40						40.0	80	
WR542 030 05 02 50						50.0	90	
WR542 030 05 02 60						60.0	100	
WR542 030 05 02 70						70.0	120	

NEXT >>

Endmills for Mold & Die(Corner Radius) WINNER Series



2 FLUTE TAPER LONG LECK CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Strengthen the hardness of flute by applying the minute corner R to prevent chipping
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- Longer tool life and improvement on stable machining with W coating

WR542 ...series



EDP. No.	D	R	θ	L ₁	L ₂	L ₃	L ₄	D ₂
WR542 040 02 01 40	4.0	0.20	1°	6.0	8.0	40.0	90	6
WR542 040 02 01 50						50.0	100	
WR542 040 02 01 60						60.0	110	
WR542 040 02 01 70						70.0	120	
WR542 040 02 02 40			2°			40.0	90	8
WR542 040 02 02 50						50.0	100	
WR542 040 02 02 60						60.0	110	
WR542 040 02 02 70						70.0	120	
WR542 040 03 01 40		0.30	1°			40.0	90	6
WR542 040 03 01 50						50.0	100	
WR542 040 03 01 60						60.0	110	
WR542 040 03 01 70						70.0	120	
WR542 040 03 02 40			2°			40.0	90	8
WR542 040 03 02 50						50.0	100	
WR542 040 03 02 60						60.0	110	
WR542 040 03 02 70						70.0	120	
WR542 040 05 01 40		0.50	1°			40.0	90	6
WR542 040 05 01 50						50.0	100	
WR542 040 05 01 60						60.0	110	
WR542 040 05 01 70						70.0	120	
WR542 040 05 02 40			2°			40.0	90	8
WR542 040 05 02 50						50.0	100	
WR542 040 05 02 60						60.0	110	
WR542 040 05 02 70						70.0	120	

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

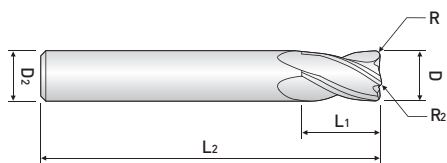
○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0~0.012	h6

※ These tools are manufactured based on order received.

Endmills for Mold & Die(Corner Radius) *WINNER Series*



3 FLUTE DOUBLE CORNER RADIUS

- High speed and feed rate lead to an improved productivity due to the choice of unique double corner radius
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
Pre-hardened Steel, Alloy Steel, Carbon Steel

WDR503 ...series



EDP. No.	D	R	R ₂	L ₁	L ₂	D ₂
WDR503 060 05	6.0	0.50	6.0	10.0	90.0	6.0
WDR503 060 10		1.00				
WDR503 060 20		2.00				
WDR503 080 05	8.0	0.50	8.0	16.0	100.0	8.0
WDR503 080 10		1.00				
WDR503 080 20		2.00				
WDR503 100 05	10.0	0.50	10.0	20.0	100.0	10.0
WDR503 100 10		1.00				
WDR503 100 20		2.00				
WDR503 120 05	12.0	0.50	12.0	24.0	110.0	12.0
WDR503 120 10		1.00				
WDR503 120 20		2.00				
WDR503 160 05	16.0	0.50	16.0	32.0	150.0	16.0
WDR503 160 10		1.00				
WDR503 200 05	20.0	0.50	20.0	40.0	150.0	20.0
WDR503 200 10		1.00				

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

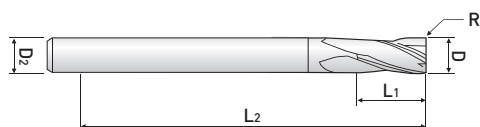
○:General Application ◎:The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for Mold & Die(Corner Radius) WINNER Series



VARIABLE INDEX 4 FLUTE CORNER RADIUS

- Excellent surface roughness with a variable index geometry for more than 30°
- Increased tool life with a reduced chatter vibration and resonance by irregular exciting force
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

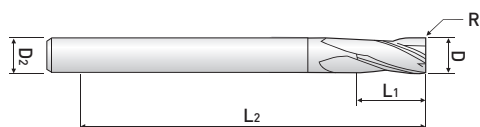
WXR504 ...series



EDP. No.	D	R	L ₁	L ₂	D ₂
WXR504 010 005	1.0	0.05	2.5	50	6
WXR504 010 01		0.10			
WXR504 010 02		0.20			
WXR504 010 03		0.30			
WXR504 012 005	1.2	0.05	3.0	50	6
WXR504 012 01		0.10			
WXR504 012 02		0.20			
WXR504 012 03		0.30			
WXR504 015 005	1.5	0.05	4.0	50	6
WXR504 015 01		0.10			
WXR504 015 02		0.20			
WXR504 015 03		0.30			
WXR504 015 05	2.0	0.50	6.0	50	6
WXR504 020 01		0.10			
WXR504 020 02		0.20			
WXR504 020 03		0.30			
WXR504 020 05	2.5	0.50	7.0	60	6
WXR504 025 01		0.10			
WXR504 025 02		0.20			
WXR504 025 03		0.30			
WXR504 025 05	3.0	0.50	8.0	60	6
WXR504 030 01		0.10			
WXR504 030 02		0.20			
WXR504 030 03		0.30			
WXR504 030 05	3.5	0.50	10.0	70	6
WXR504 030 10		1.00			
WXR504 035 01		0.10			
WXR504 035 02		0.20			
WXR504 035 03	4.0	0.30	10.0	70	4
WXR504 035 05		0.50			
WXR504 040 01 S4		0.10			
WXR504 040 02 S4		0.20			
WXR504 040 03 S4	4.0	0.30	10.0	100	4
WXR504 040 05 S4		0.50			
WXR504 040 10 S4		1.00			
WXR504 040 01 100 S4		0.10			
WXR504 040 02 100 S4	4.0	0.20	10.0	100	4
WXR504 040 03 100 S4		0.30			

NEXT >>

Endmills for Mold & Die(Corner Radius) *WINNER Series*



VARIABLE INDEX 4 FLUTE CORNER RADIUS

- Excellent surface roughness with a variable index geometry for more than 30°
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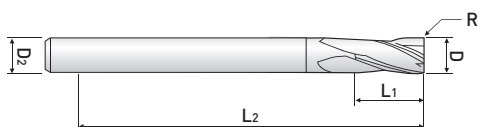
WXR504 ...series



EDP. No.	D	R	L ₁	L ₂	D ₂
WXR504 040 05 100 S4	4.0	0.50	10.0	100	4
WXR504 040 10 100 S4		1.00			
WXR504 040 01		0.10		70	6
WXR504 040 02		0.20			
WXR504 040 03		0.30			
WXR504 040 05		0.50			
WXR504 040 10		1.00			
WXR504 045 01	4.5	0.10	11.0	80	6
WXR504 045 02		0.20			
WXR504 045 03		0.30			
WXR504 045 05		0.50			
WXR504 050 01	5.0	0.10	13.0	90	6
WXR504 050 02		0.20			
WXR504 050 03		0.30			
WXR504 050 05		0.50			
WXR504 050 10		1.00			
WXR504 055 01	5.5	0.10	13.0	90	6
WXR504 055 02		0.20			
WXR504 055 03		0.30			
WXR504 055 05		0.50			
WXR504 055 10		1.00			
WXR504 060 01 060	6.0	0.10	15.0	60	6
WXR504 060 02 060		0.20			
WXR504 060 01		0.10		90	
WXR504 060 02		0.20			
WXR504 060 03		0.30			
WXR504 060 05		0.50			
WXR504 060 10		1.00			
WXR504 060 15		1.50			
WXR504 060 20		2.00			
WXR504 060 05 110		0.50		110	
WXR504 060 10 110		1.00			
WXR504 060 05 130		0.50		130	
WXR504 060 10 130		1.00			
WXR504 070 01	7.0	0.10	16.0	90	8
WXR504 070 02		0.20			
WXR504 070 03		0.30			
WXR504 070 05		0.50			

NEXT >>

Endmills for Mold & Die(Corner Radius) WINNER Series



VARIABLE INDEX 4 FLUTE CORNER RADIUS

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WXR504 ...series



ULTRA FINE

HELIX

HELIX

All sizes

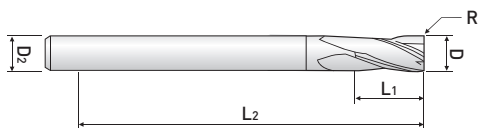
W Coating

p.718

EDP. No.	D	R	L ₁	L ₂	D ₂
WXR504 070 10	7.0	1.00	16.0	90	8
WXR504 070 20		2.00			
WXR504 080 03 070	8.0	0.30	20.0	70	8
WXR504 080 05 070		0.50			
WXR504 080 10 070		1.00			
WXR504 080 01		0.10			
WXR504 080 02		0.20			
WXR504 080 03		0.30			
WXR504 080 05		0.50			
WXR504 080 10		1.00			
WXR504 080 15		1.50			
WXR504 080 20		2.00			
WXR504 080 25		2.50			
WXR504 080 30		3.00			
WXR504 080 05 120		0.50			
WXR504 080 10 120		1.00			
WXR504 080 05 150		0.50			
WXR504 080 10 150		1.00			
WXR504 100 03 075	10.0	0.30	25.0	75	10
WXR504 100 05 075		0.50			
WXR504 100 10 075		1.00			
WXR504 100 01		0.10			
WXR504 100 02		0.20			
WXR504 100 03		0.30			
WXR504 100 05		0.50			
WXR504 100 10		1.00			
WXR504 100 15		1.50			
WXR504 100 20		2.00			
WXR504 100 25		2.50			
WXR504 100 30		3.00			
WXR504 100 40		4.00			
WXR504 100 05 130		0.50			
WXR504 100 10 130		1.00			
WXR504 100 05 150		0.50			
WXR504 100 10 150	1.00				
WXR504 110 02	11.0	0.20	25	110	12
WXR504 110 03		0.30			

NEXT >>

Endmills for Mold & Die(Corner Radius) WINNER Series



VARIABLE INDEX 4 FLUTE CORNER RADIUS

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WXR504 ...series



EDP. No.	D	R	L ₁	L ₂	D ₂
WXR504 110 05	11.0	0.50	25	110	12
WXR504 110 10		1.00			
WXR504 110 20		2.00			
WXR504 120 03 080	12.0	0.30	30	80	12
WXR504 120 05 080		0.50			
WXR504 120 10 080		1.00			
WXR504 120 01		0.10		110	
WXR504 120 02		0.20			
WXR504 120 03		0.30			
WXR504 120 05		0.50			
WXR504 120 10		1.00			
WXR504 120 15		1.50			
WXR504 120 20		2.00			
WXR504 120 25		2.50			
WXR504 120 30		3.00			
WXR504 120 40		4.00			
WXR504 120 50		5.00			
WXR504 120 05 130		0.50		130	
WXR504 120 10 130		1.00			
WXR504 120 05 150		0.50		150	
WXR504 120 10 150		1.00			
WXR504 140 05	14.0	0.50	35	150	16
WXR504 140 10		1.00			
WXR504 140 20		2.00			
WXR504 160 05	16.0	0.50	32	150	16
WXR504 160 10		1.00			
WXR504 160 15		1.50			
WXR504 160 20		2.00			
WXR504 200 05	20.0	0.50	38	150	20
WXR504 200 10		1.00			
WXR504 200 15		1.50			
WXR504 200 20		2.00			

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		◎

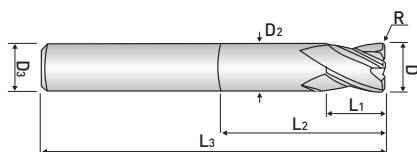
○:General Application ◎:The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for Mold & Die(Corner Radius) WINNER Series



VARIABLE INDEX 4 FLUTE CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
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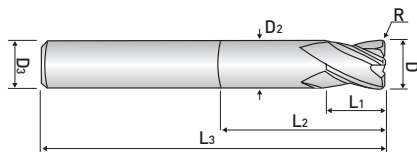
WXR514 ...series



EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂
WXR514 010 005 03	1.0	0.05	1.5	3	50.0	4.0
WXR514 010 005 04				4		
WXR514 010 005 06				6		
WXR514 010 005 08				8		
WXR514 010 005 10				10		
WXR514 010 005 12				12		
WXR514 010 005 14				14		
WXR514 010 005 16				16		
WXR514 010 005 20				20		
WXR514 010 01 03		0.10		3		
WXR514 010 01 04				4		
WXR514 010 01 06				6		
WXR514 010 01 08				8		
WXR514 010 01 10				10		
WXR514 010 01 12				12		
WXR514 010 01 14				14		
WXR514 010 01 16				16		
WXR514 010 01 20				20		
WXR514 010 02 03		0.20		3		
WXR514 010 02 04				4		
WXR514 010 02 06				6		
WXR514 010 02 08				8		
WXR514 010 02 10				10		
WXR514 010 02 12				12		
WXR514 010 02 14				14		
WXR514 010 02 16				16		
WXR514 010 02 20				20		
WXR514 010 03 03		0.30		3		
WXR514 010 03 04				4		
WXR514 010 03 06				6		
WXR514 010 03 08				8		
WXR514 010 03 10				10		
WXR514 010 03 12				12		
WXR514 010 03 14				14		
WXR514 010 03 16				16		
WXR514 010 03 20				20		
WXR514 012 005 03	1.2	0.05	1.8	3	50.0	4.0
WXR514 012 005 04				4		

NEXT >>>

Endmills for Mold & Die(Corner Radius) *WINNER Series*



VARIABLE INDEX 4 FLUTE CORNER RADIUS

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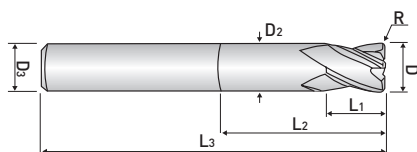
WXR514 ...series



EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂
WXR514 012 005 06	1.2	0.05	1.8	6	50.0	4.0
WXR514 012 005 08				8		
WXR514 012 005 10				10		
WXR514 012 005 12				12		
WXR514 012 005 16				16		
WXR514 012 005 20				20		
WXR514 012 01 03		0.10		3		
WXR514 012 01 04				4		
WXR514 012 01 06				6		
WXR514 012 01 08				8		
WXR514 012 01 10				10		
WXR514 012 01 12				12		
WXR514 012 01 16				16		
WXR514 012 01 20				20		
WXR514 012 02 03		0.20		3		
WXR514 012 02 04				4		
WXR514 012 02 06				6		
WXR514 012 02 08				8		
WXR514 012 02 10				10		
WXR514 012 02 12				12		
WXR514 012 02 16				16		
WXR514 012 02 20				20		
WXR514 012 03 03		0.30		3		
WXR514 012 03 04				4		
WXR514 012 03 06				6		
WXR514 012 03 08				8		
WXR514 012 03 10				10		
WXR514 012 03 12				12		
WXR514 012 03 16				16		
WXR514 012 03 20				20		
WXR514 015 005 04	1.5	0.05	2.3	4	50.0	4.0
WXR514 015 005 06				6		
WXR514 015 005 08				8		
WXR514 015 005 10				10		
WXR514 015 005 12				12		
WXR514 015 005 14				14		
WXR514 015 005 16				16		
WXR514 015 005 20				20		

NEXT >>>

Endmills for Mold & Die(Corner Radius) WINNER Series



VARIABLE INDEX 4 FLUTE CORNER RADIUS

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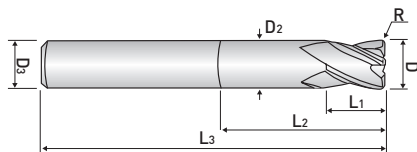
WXR514 ...series



EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂	
WXR514 015 005 22	1.5	0.05	2.3	22	60	4.0	
WXR514 015 005 26				26			
WXR514 015 01 04		0.10		4	50		
WXR514 015 01 06				6			
WXR514 015 01 08				8			
WXR514 015 01 10				10			
WXR514 015 01 12				12			
WXR514 015 01 14				14			
WXR514 015 01 16				16			
WXR514 015 01 20				20			
WXR514 015 01 22				22			60
WXR514 015 01 26				26			
WXR514 015 02 04				0.20	4		50
WXR514 015 02 06					6		
WXR514 015 02 08		8					
WXR514 015 02 10		10					
WXR514 015 02 12		12					
WXR514 015 02 14		14					
WXR514 015 02 16		16					
WXR514 015 02 20		20					
WXR514 015 02 22		22			60		
WXR514 015 02 26		26					
WXR514 015 03 04		0.30			4		50
WXR514 015 03 06					6		
WXR514 015 03 08				8			
WXR514 015 03 10				10			
WXR514 015 03 12				12			
WXR514 015 03 14				14			
WXR514 015 03 16				16			
WXR514 015 03 20				20			
WXR514 015 03 22				22	60		
WXR514 015 03 26				26			
WXR514 015 05 04				0.50	4		50
WXR514 015 05 06					6		

NEXT >>>

Endmills for Mold & Die(Corner Radius) *WINNER Series*



VARIABLE INDEX 4 FLUTE CORNER RADIUS

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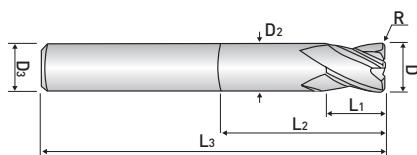
WXR514 ...series



EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂	
WXR514 015 05 08	1.5	0.50	2.3	8	50	4.0	
WXR514 015 05 10				10			
WXR514 015 05 12				12			
WXR514 015 05 14				14			
WXR514 015 05 16				16	60		
WXR514 015 05 20				20			
WXR514 015 05 22				22			
WXR514 015 05 26				26			
WXR514 020 01 06	2.0	0.10	3.0	6	50	4.0	
WXR514 020 01 08				8			
WXR514 020 01 10				10			
WXR514 020 01 12				12			
WXR514 020 01 14				14			
WXR514 020 01 16				16			
WXR514 020 01 20				20			
WXR514 020 01 22				22			
WXR514 020 01 26				26	60		
WXR514 020 01 30				30			
WXR514 020 02 06		0.20		6	6		50
WXR514 020 02 08					8		
WXR514 020 02 10					10		
WXR514 020 02 12					12		
WXR514 020 02 14					14		
WXR514 020 02 16					16		
WXR514 020 02 20					20		
WXR514 020 02 22					22		
WXR514 020 02 26					26		60
WXR514 020 02 30					30		
WXR514 020 03 06		0.30		6	6		70
WXR514 020 03 08					8		
WXR514 020 03 10					10		
WXR514 020 03 12					12		
WXR514 020 03 14					14		50
WXR514 020 03 16					16		
WXR514 020 03 20					20		
WXR514 020 03 22					22		
WXR514 020 03 26					26		60
WXR514 020 03 30					30		

NEXT >>

Endmills for Mold & Die(Corner Radius) WINNER Series



VARIABLE INDEX 4 FLUTE CORNER RADIUS

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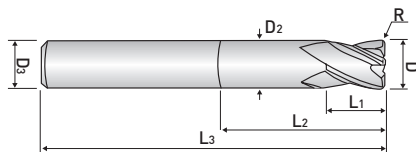
WXR514 ...series



EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂
WXR514 020 05 06	2.0	0.50	3.0	6	50	4.0
WXR514 020 05 08				8		
WXR514 020 05 10				10		
WXR514 020 05 12				12		
WXR514 020 05 14				14		
WXR514 020 05 16				16		
WXR514 020 05 20				20		
WXR514 020 05 22				22	60	
WXR514 020 05 26				26		
WXR514 020 05 30				30	70	
WXR514 025 01 08	2.5	0.10	4.0	8	50	4.0
WXR514 025 01 10				10		
WXR514 025 01 12				12		
WXR514 025 01 14				14		
WXR514 025 01 16				16		
WXR514 025 01 20				20		
WXR514 025 01 26				26		
WXR514 025 01 30				30	70	
WXR514 025 02 08		0.20		8	50	
WXR514 025 02 10				10		
WXR514 025 02 12				12		
WXR514 025 02 14				14		
WXR514 025 02 16				16		
WXR514 025 02 20				20		
WXR514 025 02 26				26		
WXR514 025 02 30				30	70	
WXR514 025 03 08		0.30		8	50	
WXR514 025 03 10				10		
WXR514 025 03 12				12		
WXR514 025 03 14				14		
WXR514 025 03 16				16		
WXR514 025 03 20				20		
WXR514 025 03 26				26		
WXR514 025 03 30				30	70	
WXR514 025 05 08		0.50		8	50	
WXR514 025 05 10				10		
WXR514 025 05 12				12		
WXR514 025 05 14				14		

NEXT >>

Endmills for Mold & Die(Corner Radius) *WINNER Series*



VARIABLE INDEX 4 FLUTE CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
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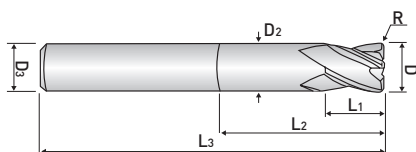
WXR514 ...series



EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂			
WXR514 025 05 16	2.5	0.50	4.0	16	50	4.0			
WXR514 025 05 20				20					
WXR514 025 05 26				26					
WXR514 025 05 30				30					
WXR514 030 01 08	3.0	0.10	4.5	8	50	6.0			
WXR514 030 01 10				10					
WXR514 030 01 12				12					
WXR514 030 01 14				14	60				
WXR514 030 01 16				16					
WXR514 030 01 20				20					
WXR514 030 01 26				26	65				
WXR514 030 01 30				30	70				
WXR514 030 01 35				35					
WXR514 030 01 40				40	80				
WXR514 030 02 08				0.20	4.5		8	50	
WXR514 030 02 10							10		
WXR514 030 02 12		12							
WXR514 030 02 14		14					60		
WXR514 030 02 16		16							
WXR514 030 02 20		20							
WXR514 030 02 26		26					65		
WXR514 030 02 30		30					70		
WXR514 030 02 35		35							
WXR514 030 02 40		40					80		
WXR514 030 03 08		0.30					4.5	8	50
WXR514 030 03 10								10	
WXR514 030 03 12								12	
WXR514 030 03 14								14	60
WXR514 030 03 16								16	
WXR514 030 03 20								20	
WXR514 030 03 26								26	65
WXR514 030 03 30								30	70
WXR514 030 03 35				35					
WXR514 030 03 40				40	80				

NEXT >>

Endmills for Mold & Die(Corner Radius) WINNER Series



VARIABLE INDEX 4 FLUTE CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Excellent surface roughness with a variable index geometry for more than 30
- Increased tool life with a reduced chatter vibration and resonance by irregular exciting force
- Excellent effect in preventing breakage with a shape on neck without notch
- Enhanced cutting effect and better wear resistance made from the finest raw material

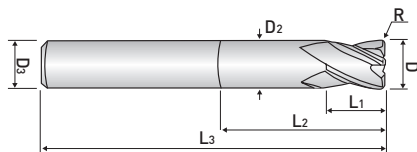
WXR514 ...series



EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂	
WXR514 030 05 08	3.0	0.50	4.5	8	50	6.0	
WXR514 030 05 10				10			
WXR514 030 05 12				12			
WXR514 030 05 14				14	60		
WXR514 030 05 16				16			
WXR514 030 05 20				20			
WXR514 030 05 26				26	65		
WXR514 030 05 30				30	70		
WXR514 030 05 35		35		80			
WXR514 030 05 40		40		80			
WXR514 030 10 08		1.00		8	50		
WXR514 030 10 10				10			
WXR514 030 10 12				12			
WXR514 030 10 14				14	60		
WXR514 030 10 16				16			
WXR514 030 10 20				20			
WXR514 030 10 26				26	65		
WXR514 030 10 30				30	70		
WXR514 030 10 35				35	70		
WXR514 030 10 40				40	80		
WXR514 040 01 10	4.0		0.10	6.0	10	50	6.0
WXR514 040 01 12					12		
WXR514 040 01 14		14			60		
WXR514 040 01 16		16					
WXR514 040 01 20		20					
WXR514 040 01 26		26			65		
WXR514 040 01 30		30			70		
WXR514 040 01 35		35			70		
WXR514 040 01 40		40	80				
WXR514 040 01 45		45	90				
WXR514 040 01 50		50	100				
WXR514 040 02 10		0.20	10		50		
WXR514 040 02 12			12				
WXR514 040 02 14			14		60		
WXR514 040 02 16			16				
WXR514 040 02 20			20				
WXR514 040 02 26			26			65	
WXR514 040 02 30			30		70		

NEXT >>

Endmills for Mold & Die(Corner Radius) *WINNER Series*



VARIABLE INDEX 4 FLUTE CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Excellent surface roughness with a variable index geometry for more than 30°
- Increased tool life with a reduced chatter vibration and resonance by irregular exciting force
- Excellent effect in preventing breakage with a shape on neck without notch
- Enhanced cutting effect and better wear resistance made from the finest raw material

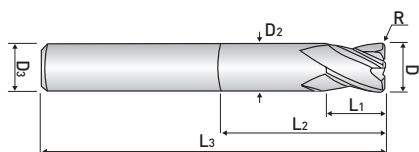
WXR514 ...series



EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂	
WXR514 040 02 35	4.0	0.20	6.0	35	70	6.0	
WXR514 040 02 40				40	80		
WXR514 040 02 45				45	90		
WXR514 040 02 50				50	100		
WXR514 040 03 10		0.30		10	50		
WXR514 040 03 12				12			
WXR514 040 03 14				14	60		
WXR514 040 03 16				16			
WXR514 040 03 20				20			
WXR514 040 03 26				26	65		
WXR514 040 03 30				30	70		
WXR514 040 03 35				35			
WXR514 040 03 40				40	80		
WXR514 040 03 45				45	90		
WXR514 040 03 50				50	100		
WXR514 040 05 10				0.50	10		50
WXR514 040 05 12					12		
WXR514 040 05 14					14		60
WXR514 040 05 16					16		
WXR514 040 05 20					20		
WXR514 040 05 26		26			65		
WXR514 040 05 30		30			70		
WXR514 040 05 35		35					
WXR514 040 05 40		40			80		
WXR514 040 05 45		45			90		
WXR514 040 05 50		50			100		
WXR514 040 10 10		1.00			10		50
WXR514 040 10 12					12		
WXR514 040 10 14					14		60
WXR514 040 10 16					16		
WXR514 040 10 20					20		
WXR514 040 10 26				26	65		
WXR514 040 10 30				30	70		
WXR514 040 10 35				35			
WXR514 040 10 40				40			80
WXR514 040 10 45				45	90		
WXR514 040 10 50				50	100		

NEXT >>

Endmills for Mold & Die(Corner Radius) WINNER Series



VARIABLE INDEX 4 FLUTE CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Excellent surface roughness with a variable index geometry for more than 30
- Increased tool life with a reduced chatter vibration and resonance by irregular exciting force
- Excellent effect in preventing breakage with a shape on neck without notch
- Enhanced cutting effect and better wear resistance made from the finest raw material

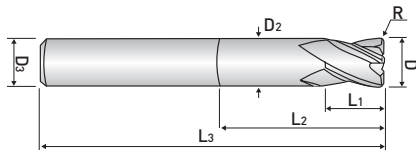
WXR514 ...series



EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂
WXR514 050 01	5.0	0.10	8.0	15.0	60.0	6.0
WXR514 050 02		0.20				
WXR514 050 03		0.30				
WXR514 050 05		0.50				
WXR514 050 10		1.00				
WXR514 050 15		1.50				
WXR514 050 20		2.00				
WXR514 060 01	6.0	0.10	9	20	60	6
WXR514 060 02		0.20				
WXR514 060 03		0.30				
WXR514 060 05		0.50				
WXR514 060 10		1.00				
WXR514 060 15		1.50				
WXR514 060 20		2.00				
WXR514 060 03 090		0.30	15	30	90	
WXR514 060 05 090		0.50				
WXR514 060 10 090		1.00				
WXR514 080 01	8.0	0.10	12	25	70	8
WXR514 080 02		0.20				
WXR514 080 03		0.30				
WXR514 080 05		0.50				
WXR514 080 10		1.00				
WXR514 080 15		1.50				
WXR514 080 20		2.00				
WXR514 080 03 100		0.30	20	35	100	
WXR514 080 05 100		0.50				
WXR514 080 10 100		1.00				
WXR514 100 01	10.0	0.10	15	30	75	10
WXR514 100 02		0.20				
WXR514 100 03		0.30				
WXR514 100 05		0.50				
WXR514 100 10		1.00				
WXR514 100 15		1.50				
WXR514 100 20		2.00				
WXR514 100 03 100		0.30	25	40	100	
WXR514 100 05 100		0.50				
WXR514 100 10 100		1.00				

NEXT >>>

Endmills for Mold & Die(Corner Radius) *WINNER Series*



VARIABLE INDEX 4 FLUTE CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Excellent surface roughness with a variable index geometry for more than 30°
- Increased tool life with a reduced chatter vibration and resonance by irregular exciting force
- Excellent effect in preventing breakage with a shape on neck without notch
- Enhanced cutting effect and better wear resistance made from the finest raw material

WXR514 ...series



EDP. No.	D	R	L ₁	L ₂	L ₃	D ₂
WXR514 120 02	12.0	0.20	18	32	80	12
WXR514 120 03		0.30				
WXR514 120 05		0.50				
WXR514 120 10		1.00				
WXR514 120 15		1.50				
WXR514 120 20		2.00				
WXR514 120 03 110		0.30	30	45	110	
WXR514 120 05 110		0.50				
WXR514 120 10 110		1.00				
WXR514 160 05		0.50				
WXR514 160 10	1.00					
WXR514 160 05 150	16.0	0.50	35	50	150	20
WXR514 160 10 150		1.00				
WXR514 200 05	20.0	0.50	25	40	100	20
WXR514 200 10		1.00				
WXR514 200 05 150		0.50	40	55	150	
WXR514 200 10 150		1.00				

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		◎

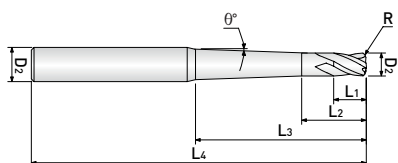
○:General Application ◎:The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for Mold & Die(Corner Radius) WINNER Series



4 FLUTE TAPER NECK CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Strengthen the hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

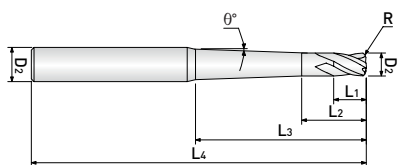
WR544 ...series



EDP. No.	D	R	θ	L ₁	L ₂	L ₃	L ₄	D ₂		
WR544 010 01 01 06	1.0	0.10	1°	1.5	2.5	6.0	50	4		
WR544 010 01 01 08						8.0				
WR544 010 01 01 10						10.0				
WR544 010 01 01 12						12.0				
WR544 010 01 01 16						16.0				
WR544 010 01 01 20						20.0				
WR544 010 01 01 25			25.0			60				
WR544 010 01 01 30			30.0			70				
WR544 010 01 01 40			40.0			80				
WR544 010 01 01 50			50.0			90				
WR544 010 01 02 06			0.20			2°	6.0		50	
WR544 010 01 02 08							8.0			
WR544 010 01 02 10		10.0								
WR544 010 01 02 12		12.0								
WR544 010 01 02 16		16.0								
WR544 010 01 02 20		20.0								
WR544 010 01 02 25		25.0				60				
WR544 010 01 02 30		30.0				70				
WR544 010 01 02 40		40.0				80				
WR544 010 01 02 50		50.0				90	6			
WR544 010 02 01 06		0.20				1°	6.0		50	4
WR544 010 02 01 08							8.0			
WR544 010 02 01 10			10.0							
WR544 010 02 01 12			12.0							
WR544 010 02 01 16	16.0									
WR544 010 02 01 20	20.0									
WR544 010 02 01 25	25.0		60							
WR544 010 02 01 30	30.0		70							
WR544 010 02 01 40	40.0		80							
WR544 010 02 01 50	50.0		90							
WR544 010 02 02 06	2°		6.0	50						
WR544 010 02 02 08			8.0							
WR544 010 02 02 10			10.0							
WR544 010 02 02 12			12.0							
WR544 010 02 02 16			16.0							
WR544 010 02 02 20			20.0							
WR544 010 02 02 25	25.0		60							
WR544 010 02 02 30	30.0		70							

NEXT >>>

Endmills for Mold & Die(Corner Radius) WINNER Series



4 FLUTE TAPER NECK CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Strengthen the hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

WR544 ...series



ULTRA FINE



HELIX



All sizes



W Coating

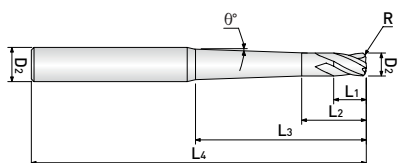


p.720

EDP. No.	D	R	θ	L ₁	L ₂	L ₃	L ₄	D ₂	
WR544 010 02 02 40	1.0	0.20	2°	1.5	2.5	40.0	80	4	
WR544 010 02 02 50						50.0	90	6	
WR544 012 01 01 08	1.2	0.10	1°	1.8	3.0	8.0	50	4	
WR544 012 01 01 12						12.0			
WR544 012 01 01 16						16.0			
WR544 012 01 01 20						20.0			
WR544 012 01 01 25						25.0			60
WR544 012 01 01 30						30.0			70
WR544 012 01 02 08			2°			8.0	50		
WR544 012 01 02 12						12.0			
WR544 012 01 02 16						16.0			
WR544 012 01 02 20						20.0			
WR544 012 01 02 25						25.0			60
WR544 012 01 02 30						30.0			70
WR544 012 02 01 08		0.20	1°			8.0	50		
WR544 012 02 01 12						12.0			
WR544 012 02 01 16						16.0			
WR544 012 02 01 20						20.0			
WR544 012 02 01 25						25.0			60
WR544 012 02 01 30						30.0			70
WR544 012 02 02 08			2°			8.0	50		
WR544 012 02 02 12						12.0			
WR544 012 02 02 16						16.0			
WR544 012 02 02 20						20.0			
WR544 012 02 02 25						25.0			60
WR544 012 02 02 30						30.0			70
WR544 015 01 01 08	1.5	0.10	1°	2.3	3.0	8.0	50	4	
WR544 015 01 01 10						10.0			
WR544 015 01 01 12						12.0			
WR544 015 01 01 16						16.0			
WR544 015 01 01 20						20.0			
WR544 015 01 01 25						25.0			60
WR544 015 01 01 30			30.0			70			
WR544 015 01 01 40			40.0			80			
WR544 015 01 01 50			50.0			90			
WR544 015 01 02 08			2°			8.0	50		
WR544 015 01 02 10						10.0			
WR544 015 01 02 12						12.0			

NEXT >>

Endmills for Mold & Die(Corner Radius) WINNER Series



4 FLUTE TAPER NECK CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Strengthen the hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

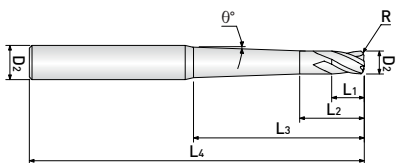
WR544 ...series



EDP. No.	D	R	θ	L ₁	L ₂	L ₃	L ₄	D ₂	
WR544 015 01 02 16	1.5	0.10	2°	2.3	3.0	16.0	50	4	
WR544 015 01 02 20						20.0			
WR544 015 01 02 25						25.0	60		
WR544 015 01 02 30						30.0	70		
WR544 015 01 02 40						40.0	80		
WR544 015 01 02 50						50.0	90		
WR544 015 02 01 08		0.20	1°			2°	8.0	50	4
WR544 015 02 01 10							10.0		
WR544 015 02 01 12							12.0		
WR544 015 02 01 16							16.0		
WR544 015 02 01 20							20.0		
WR544 015 02 01 25							25.0	60	
WR544 015 02 01 30							30.0	70	
WR544 015 02 01 40							40.0	80	
WR544 015 02 01 50							50.0	90	
WR544 015 02 02 08			2°			2°	8.0	50	
WR544 015 02 02 10							10.0		
WR544 015 02 02 12							12.0		
WR544 015 02 02 16							16.0		
WR544 015 02 02 20							20.0		
WR544 015 02 02 25							25.0	60	
WR544 015 02 02 30							30.0	70	
WR544 015 02 02 40							40.0	80	
WR544 015 02 02 50							50.0	90	
WR544 015 03 01 08		0.30	1°			2°	8.0	50	4
WR544 015 03 01 10							10.0		
WR544 015 03 01 12							12.0		
WR544 015 03 01 16							16.0		
WR544 015 03 01 20							20.0		
WR544 015 03 01 25							25.0	60	
WR544 015 03 01 30							30.0	70	
WR544 015 03 01 40							40.0	80	
WR544 015 03 01 50							50.0	90	
WR544 015 03 02 08			2°			2°	8.0	50	
WR544 015 03 02 10							10.0		
WR544 015 03 02 12							12.0		
WR544 015 03 02 16							16.0		
WR544 015 03 02 20							20.0		

NEXT >>>

Endmills for Mold & Die(Corner Radius) WINNER Series



4 FLUTE TAPER NECK CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Strengthen the hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

WR544 ...series



ULTRA FINE



HELIX



All sizes



W Coating

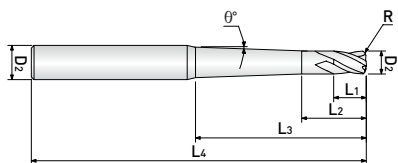


p.720

EDP. No.	D	R	θ	L ₁	L ₂	L ₃	L ₄	D ₂	
WR544 015 03 02 25	1.5	0.30	2°	2.3	3.0	25.0	60	4	
WR544 015 03 02 30						30.0	70		
WR544 015 03 02 40						40.0	80	6	
WR544 015 03 02 50						50.0	90		
WR544 020 01 01 10	2.0	0.10	1°	2.0	5.0	10.0	50	4	
WR544 020 01 01 12						12.0			
WR544 020 01 01 16						16.0			
WR544 020 01 01 20						20.0			
WR544 020 01 01 25						25.0	60		
WR544 020 01 01 30						30.0	70		
WR544 020 01 01 40						40.0	80		
WR544 020 01 01 50			50.0			100	6		
WR544 020 01 01 60			60.0						
WR544 020 01 01 80			80.0			140			
WR544 020 01 02 10		0.20	2°			10.0	50	4	
WR544 020 01 02 12									12.0
WR544 020 01 02 16									16.0
WR544 020 01 02 20									20.0
WR544 020 01 02 25							25.0	60	
WR544 020 01 02 30							30.0	70	
WR544 020 01 02 40							40.0	80	
WR544 020 01 02 50			50.0				100	6	
WR544 020 01 02 60			60.0						
WR544 020 01 02 80			80.0				140	8	
WR544 020 02 01 10		0.20	1°			10.0	50	4	
WR544 020 02 01 12									12.0
WR544 020 02 01 16									16.0
WR544 020 02 01 20									20.0
WR544 020 02 01 25							25.0	60	
WR544 020 02 01 30							30.0	70	
WR544 020 02 01 40							40.0	80	
WR544 020 02 01 50			50.0				100	6	
WR544 020 02 01 60			60.0						
WR544 020 02 01 80			80.0				140	6	
WR544 020 02 02 10			2°			10.0	50	4	
WR544 020 02 02 12									12.0
WR544 020 02 02 16									16.0
WR544 020 02 02 20									20.0
WR544 020 02 02 25							25.0	60	

NEXT >>>

Endmills for Mold & Die(Corner Radius) WINNER Series



4 FLUTE TAPER NECK CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Strengthen the hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

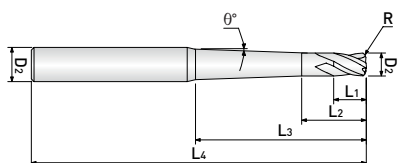
WR544 ...series



EDP. No.	D	R	θ	L ₁	L ₂	L ₃	L ₄	D ₂	
WR544 020 02 02 30	2.0	0.20	2°	2.0	5.0	30.0	70	4	
WR544 020 02 02 40						40.0	80	6	
WR544 020 02 02 50						50.0	100		
WR544 020 02 02 60						60.0			
WR544 020 02 02 80						80.0	140	8	
WR544 020 03 01 10		0.30	1°			10.0	50	4	
WR544 020 03 01 12						12.0			
WR544 020 03 01 16						16.0			
WR544 020 03 01 20						20.0			
WR544 020 03 01 25						25.0	60		
WR544 020 03 01 30						30.0	70		
WR544 020 03 01 40						40.0	80		
WR544 020 03 01 50						50.0	100	6	
WR544 020 03 01 60						60.0			
WR544 020 03 01 80						80.0	140		
WR544 020 03 02 10			2°			2°	10.0	50	4
WR544 020 03 02 12							12.0		
WR544 020 03 02 16							16.0		
WR544 020 03 02 20							20.0		
WR544 020 03 02 25							25.0	60	
WR544 020 03 02 30							30.0	70	
WR544 020 03 02 40							40.0	80	
WR544 020 03 02 50							50.0	100	6
WR544 020 03 02 60							60.0		
WR544 020 03 02 80							80.0	140	8
WR544 020 05 01 10		0.50	1°			1°	10.0	50	4
WR544 020 05 01 12							12.0		
WR544 020 05 01 16							16.0		
WR544 020 05 01 20							20.0		
WR544 020 05 01 25							25.0	60	
WR544 020 05 01 30							30.0	70	
WR544 020 05 01 40							40.0	80	
WR544 020 05 01 50							50.0	100	6
WR544 020 05 01 60							60.0		
WR544 020 05 01 80							80.0	140	
WR544 020 05 02 10			2°			2°	10.0	50	4
WR544 020 05 02 12							12.0		
WR544 020 05 02 16							16.0		

NEXT >>>

Endmills for Mold & Die(Corner Radius) WINNER Series



4 FLUTE TAPER NECK CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
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- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

WR544 ...series



ULTRA FINE



HELIX



All sizes



W Coating

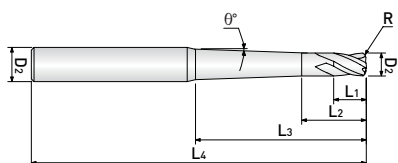


p.720

EDP. No.	D	R	θ	L ₁	L ₂	L ₃	L ₄	D ₂	
WR544 020 05 02 20	2.0	0.50	2°	2.0	5.0	20.0	50	4	
WR544 020 05 02 25						25.0	60		
WR544 020 05 02 30						30.0	70		
WR544 020 05 02 40						40.0	80	6	
WR544 020 05 02 50						50.0	100		
WR544 020 05 02 60						60.0			
WR544 020 05 02 80						80.0	140	8	
WR544 030 02 01 16	3.0	0.20	1°	4.5	6.0	16.0	60	6	
WR544 030 02 01 20						20.0	65		
WR544 030 02 01 30						30.0	70		
WR544 030 02 01 40						40.0	80		
WR544 030 02 01 50						50.0	90		
WR544 030 02 01 60						60.0	100		
WR544 030 02 02 16			2°			16.0	60		8
WR544 030 02 02 20						20.0	65		
WR544 030 02 02 30						30.0	70		
WR544 030 02 02 40						40.0	80		
WR544 030 02 02 50						50.0	90		
WR544 030 02 02 60						60.0	100		
WR544 030 02 02 70						70.0	120		
WR544 030 03 01 16		0.30	1°			16.0	60	6	
WR544 030 03 01 20						20.0	65		
WR544 030 03 01 30						30.0	70		
WR544 030 03 01 40						40.0	80		
WR544 030 03 01 50						50.0	90		
WR544 030 03 01 60						60.0	100		
WR544 030 03 02 16			2°			16.0	60	6	
WR544 030 03 02 20						20.0	65		
WR544 030 03 02 30						30.0	70		
WR544 030 03 02 40						40.0	80		
WR544 030 03 02 50						50.0	90		
WR544 030 03 02 60						60.0	100		
WR544 030 03 02 70						70.0	120		
WR544 030 05 01 16		0.50	1°			16.0	60	6	
WR544 030 05 01 20						20.0	65		
WR544 030 05 01 30						30.0	70		
WR544 030 05 01 40						40.0	80		
WR544 030 05 01 50						50.0	90		

NEXT >>>

Endmills for Mold & Die(Corner Radius) WINNER Series



4 FLUTE TAPER NECK CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Strengthen the hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

WR544 ...series



EDP. No.	D	R	θ	L ₁	L ₂	L ₃	L ₄	D ₂
WR544 030 05 01 60	3.0	0.50	1°	4.5	6.0	60.0	100	6
WR544 030 05 02 16			2°			16.0	60	
WR544 030 05 02 20						20.0	65	
WR544 030 05 02 30						30.0	70	
WR544 030 05 02 40						40.0	80	
WR544 030 05 02 50						50.0	90	8
WR544 030 05 02 60						60.0	100	
WR544 030 05 02 70						70.0	120	
WR544 040 02 01 40	4.0	0.20	1°	6.0	8.0	40.0	90	6
WR544 040 02 01 50						50.0	100	
WR544 040 02 01 60						60.0	110	
WR544 040 02 01 70						70.0	120	8
WR544 040 02 02 40			2°			40.0	90	
WR544 040 02 02 50						50.0	100	
WR544 040 02 02 60						60.0	110	
WR544 040 02 02 70						70.0	120	10
WR544 040 03 01 40		0.30	1°			40.0	90	6
WR544 040 03 01 50						50.0	100	
WR544 040 03 01 60						60.0	110	
WR544 040 03 01 70						70.0	120	8
WR544 040 03 02 40			2°			40.0	90	
WR544 040 03 02 50						50.0	100	
WR544 040 03 02 60						60.0	110	
WR544 040 03 02 70						70.0	120	10
WR544 040 05 01 40		0.50	1°			40.0	90	6
WR544 040 05 01 50						50.0	100	
WR544 040 05 01 60						60.0	110	
WR544 040 05 01 70						70.0	120	8
WR544 040 05 02 40			2°			40.0	90	
WR544 040 05 02 50						50.0	100	
WR544 040 05 02 60						60.0	110	
WR544 040 05 02 70						70.0	120	10

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

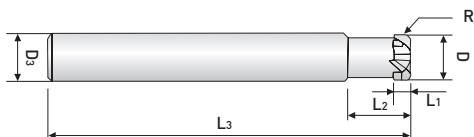
○: General Application ◎: The most suitable Application

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0~0.012	h6

※ These tools are manufactured based on order received.

Endmills for Mold & Die(Corner Radius) *WINNER Series*



4 FLUTE HIGH FEED RATE CORNER RADIUS

- High speed and feed rate lead to enhanced cutting with Low Helix
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

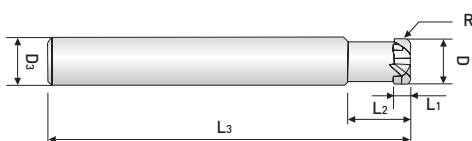
WSPM4 ...series



EDP. No.	D	R	L ₁	L ₂	L ₃	D ₃
WSPM4010-01	1.0	0.10	1.0	2.5	50.0	6.0
WSPM4010-02		0.20				
WSPM4010-03		0.30				
WSPM4015-02	1.5	0.20	1.5	4.0	50.0	6.0
WSPM4015-03		0.30				
WSPM4015-05		0.50				
WSPM4020-02	2.0	0.20	2.0	6.0	50.0	6.0
WSPM4020-03		0.30				
WSPM4020-05		0.50				
WSPM4030-02	3.0	0.20	3.0	8.0	50.0	6.0
WSPM4030-03		0.30				
WSPM4030-05		0.50				
WSPM4040-02	4.0	0.20	4	10.0	50	6.0
WSPM4040-03		0.30				
WSPM4040-05		0.50				
WSPM4040-10		1.00				
WSPM4060-02	6.0	0.20	6.0	15.0	60.0	6.0
WSPM4060-03		0.30				
WSPM4060-05		0.50				
WSPM4060-10		1.00				
WSPM4060-20		2.00				
WSPM4060-02L		0.20				
WSPM4060-03L		0.30				
WSPM4060-05L		0.50				
WSPM4060-10L		1.00				
WSPM4060-20L		2.00				
WSPM4080-02	8.0	0.20	8.0	20.0	70.0	8.0
WSPM4080-03		0.30				
WSPM4080-05		0.50				
WSPM4080-10		1.00				
WSPM4080-20		2.00				
WSPM4080-02L		0.20				
WSPM4080-03L		0.30				
WSPM4080-05L		0.50				
WSPM4080-10L		1.00				
WSPM4080-20L		2.00				
WSPM4100-02	10.0	0.20	10.0	25.0	75	10.0
WSPM4100-03		0.30				
WSPM4100-05		0.50				

NEXT >>

Endmills for Mold & Die(Corner Radius) WINNER Series



4 FLUTE HIGH FEED RATE CORNER RADIUS

- High speed and feed rate lead to enhanced cutting with Low Helix
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

WSPM4 ...series



EDP. No.	D	R	L ₁	L ₂	L ₃	D ₃
WSPM4100-10	10.0	1.00	10.0	25.0	75	10.0
WSPM4100-15		1.50				
WSPM4100-20		2.00				
WSPM4100-02L		0.20			100	
WSPM4100-03L		0.30				
WSPM4100-05L		0.50				
WSPM4100-10L		1.00				
WSPM4100-15L		1.50				
WSPM4100-20L		2.00				
WSPM4120-03	12.0	0.30	12.0	30.0	80	12.0
WSPM4120-05		0.50				
WSPM4120-10		1.00				
WSPM4120-15		1.50				
WSPM4120-20		2.00				
WSPM4120-30		3.00				
WSPM4120-03L		0.30			110	
WSPM4120-05L		0.50				
WSPM4120-10L		1.00				
WSPM4120-15L		1.50				
WSPM4120-20L		2.00				
WSPM4120-30L		3.00				
WSPM4160-05	16.0	0.50	16.0	35.0	100	16.0
WSPM4160-10		1.00				
WSPM4160-20		2.00				
WSPM4160-05L		0.50			150	
WSPM4160-10L		1.00				
WSPM4160-20L		2.00				
WSPM4200-05	20.0	0.50	20.0	40.0	100	20.0
WSPM4200-10		1.00				
WSPM4200-20		2.00				
WSPM4200-05L		0.50			150	
WSPM4200-10L		1.00				
WSPM4200-20L		2.00				

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

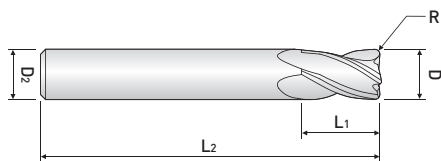
○: General Application ◎: The most suitable Application

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0~0.030	h6

※ These tools are manufactured based on order received.

Endmills for Mold & Die(Corner Radius) *WINNER Series*



4 FLUTE MULTI PURPOSE CORNER RADIUS

- Excellent surface roughness with a variable index geometry
- Increased tool life with a reduced chatter vibration and resonance by irregular exciting force
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

WR504 ...series



ULTRA FINE

HELIX

All sizes

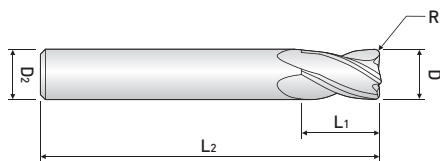
W Coating

p.721

EDP. No.	D	R	L ₁	L ₂	D ₂
WR504 030 02	3.0	0.20	8.0	60.0	6.0
WR504 030 03		0.30			
WR504 030 05		0.50			
WR504 040 02	4.0	0.20	10.0	70.0	6.0
WR504 040 03		0.30			
WR504 040 05		0.50			
WR504 040 10		1.00			
WR504 050 03 060	5.0	0.30	13.0	60.0	6.0
WR504 050 05 060		0.50		90.0	
WR504 050 03		0.30			
WR504 050 05		0.50			
WR504 060 03 060	6.0	0.30	15	60	6
WR504 060 05 060		0.50		90	
WR504 060 10 060		1.00			
WR504 060 03		0.30			
WR504 060 05		0.50			
WR504 060 10		1.00			
WR504 080 03 070	8.0	0.30	20	70	8
WR504 080 05 070		0.50		100	
WR504 080 10 070		1.00			
WR504 080 03		0.30			
WR504 080 05		0.50			
WR504 080 10		1.00			
WR504 100 03 075	10.0	0.30	25	75	10
WR504 100 05 075		0.50		100	
WR504 100 10 075		1.00			
WR504 100 03		0.30			
WR504 100 05		0.50			
WR504 100 10		1.00			
WR504 120 03 080	12.0	0.30	30	80	12
WR504 120 05 080		0.50		110	
WR504 120 10 080		1.00			
WR504 120 03		0.30			
WR504 120 05		0.50			
WR504 120 10		1.00			

NEXT >>>

Endmills for Mold & Die(Corner Radius) WINNER Series



4 FLUTE MULTI PURPOSE CORNER RADIUS

- Excellent surface roughness with a variable index geometry
- Increased tool life with a reduced chatter vibration and resonance by irregular exciting force
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

WR504 ...series



EDP. No.	D	R	L ₁	L ₂	D ₂
WR504 160 05 100	16.0	0.50	32.0	100	16.0
WR504 160 10 100		1.00			
WR504 160 15 100		1.50			
WR504 160 20 100		2.00			
WR504 160 05		0.50		150	
WR504 160 10		1.00			
WR504 160 15		1.50			
WR504 160 20		2.00			
WR504 200 05 100	20.0	0.50	38.0	100	20.0
WR504 200 10 100		1.00			
WR504 200 15 100		1.50			
WR504 200 20 100		2.00			
WR504 200 05		0.50		150	
WR504 200 10		1.00			
WR504 200 15		1.50			
WR504 200 20		2.00			

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		◎

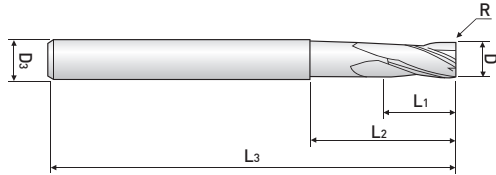
○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0~0.030	h6

※ These tools are manufactured based on order received.

Endmills for Mold & Die(Corner Radius) *WINNER Series*



4 FLUTE MULTI PURPOSE LONG NECK CORNER RADIUS

- Excellent surface roughness with a variable index geometry
- Increased tool life with a reduced chatter vibration and resonance by irregular exciting force
- Excellent effect in preventing breakage with a shape of neck without notch
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

WR514 ...series



ULTRA FINE



HELIX



All sizes



W Coating



p.718

EDP. No.	D	R	L ₁	L ₂	L ₃	D ₃
WR514 060 05	6.0	0.50	10.0	30.0	90.0	6.0
WR514 060 10		1.00				
WR514 080 05	8.0	0.50	12.0	35.0	100.0	8.0
WR514 080 10		1.00				
WR514 100 05	10.0	0.50	15.0	40.0	100.0	10.0
WR514 100 10		1.00				
WR514 120 05	12.0	0.50	20.0	45.0	110.0	12.0
WR514 120 10		1.00				

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		◎

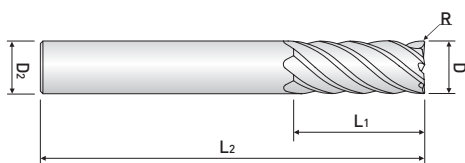
○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0~0.030	h6

※ These tools are manufactured based on order received.

Endmills for Mold & Die(Corner Radius) WINNER Series



6 FLUTE 45° CORNER RADIUS

- Dramatically reduce cutting load by 6 flute with high helix
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

WR506 ...series



EDP. No.	D	R	L ₁	L ₂	D ₂
WR506 060 03	6.0	0.30	15.0	90.0	6.0
WR506 060 05		0.50			
WR506 060 10		1.00			
WR506 080 03	8.0	0.30	20.0	100.0	8.0
WR506 080 05		0.50			
WR506 080 10		1.00			
WR506 100 03	10.0	0.30	25.0	100.0	10.0
WR506 100 05		0.50			
WR506 100 10		1.00			
WR506 120 03	12.0	0.30	30.0	110.0	12.0
WR506 120 05		0.50			
WR506 120 10		1.00			
WR506 160 05	16.0	0.50	32.0	150.0	16.0
WR506 160 10		1.00			
WR506 160 15		1.50			
WR506 160 20		2.00			
WR506 200 05	20.0	0.50	38.0	150.0	20.0
WR506 200 10		1.00			
WR506 200 15		1.50			
WR506 200 20		2.00			

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

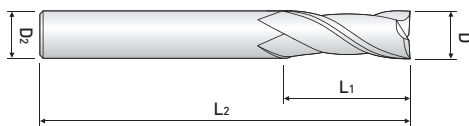
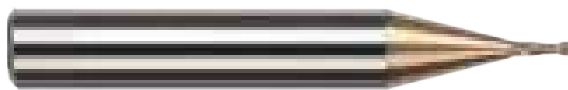
○:General Application ◎:The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for Mold & Die(square) WINNER Series



2 FLUTE MINIATURE & SQUARE

- From 0.03mm size made by a state of the art machine
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

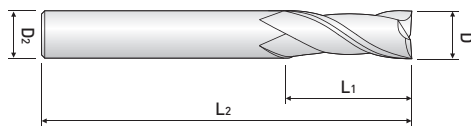
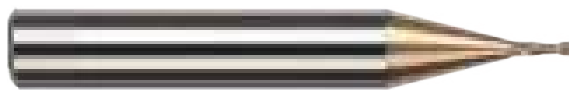
WME502 ...series



EDP. No.	D	L ₁	L ₂	D ₂
WME502 0003	0.03	0.04	40	4
WME502 0004	0.04	0.06	40	4
WME502 0005	0.05	0.07	40	4
WME502 0006	0.06	0.09	40	4
WME502 0007	0.07	0.10	40	4
WME502 0008	0.08	0.12	40	4
WME502 0009	0.09	0.13	40	4
WME502 001	0.10	0.20	40	4
WME502 0015	0.15	0.30	40	4
WME502 002	0.20	0.40	40	4
WME502 0025	0.25	0.50	40	4
WME502 003	0.30	0.60	40	4
WME502 0035	0.35	0.70	40	4
WME502 004	0.40	0.80	40	4
WME502 0045	0.45	0.90	40	4
WME502 005	0.50	1.00	40	4
WME502 0055	0.55	1.10	40	4
WME502 006	0.60	1.20	40	4
WME502 0065	0.65	1.30	40	4
WME502 007	0.70	1.40	40	4
WME502 0075	0.75	1.50	40	4
WME502 008	0.80	1.60	40	4
WME502 0085	0.85	1.70	40	4
WME502 009	0.90	1.80	40	4
WME502 0095	0.95	2.00	40	4
WME502 010	1.00	2.50	50	6
WME502 012	1.20	3.00	50	6
WME502 015	1.50	4.00	50	6
WME502 020	2.00	6.00	50	6
WME502 025	2.50	7.00	50	6
WME502 030	3.00	8.00	50	6
WME502 035	3.50	10.00	50	6
WME502 040	4.00	10.00	50	6
WME502 045	4.50	14.00	50	6
WME502 050	5.00	15.00	60	6
WME502 055	5.50	15.00	60	6
WME502 060	6.00	15.00	60	6

NEXT >>

Endmills for Mold & Die(square) WINNER Series



2 FLUTE MINIATURE & SQUARE

- From 0.03mm size made by a state of the art machine
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

WME502 ...series



EDP. No.	D	L ₁	L ₂	D ₂
WME502 065	6.50	18.00	60	8
WME502 070	7.00	20.00	60	8
WME502 075	7.50	20.00	60	8
WME502 080	8.00	20.00	70	8
WME502 085	8.50	22.00	70	10
WME502 090	9.00	22.00	70	10
WME502 095	9.50	24.00	70	10
WME502 100	10.00	25.00	75	10
WME502 105	10.50	26.00	75	12
WME502 110	11.00	30.00	75	12
WME502 115	11.50	30.00	80	12
WME502 120	12.00	30.00	80	12
WME502 130	13.00	35.00	100	12
WME502 140 S12	14.00	35.00	100	12
WME502 140				14
WME502 140 S16				16
WME502 150	15.00	38.00	100	16
WME502 160	16.00	40.00	100	16
WME502 170	17.00	42.00	100	16
WME502 180 S16	18.00	45.00	100	16
WME502 180				18
WME502 190	19.00	45.00	100	20
WME502 200	20.00	45.00	100	20
WME502 210	21.00	45.00	100	20
WME502 220	22.00	45.00	100	20
WME502 230	23.00	50.00	120	25
WME502 240	24.00	50.00	120	25
WME502 250	25.00	50.00	120	25

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

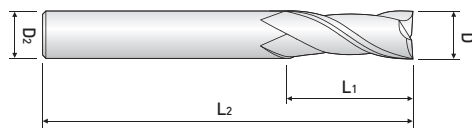
○: General Application ◎: The most suitable Application

■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0~-0.012	
over 6	0~-0.015	h6

※ These tools are manufactured based on order received.

Endmills for Mold & Die(square) WINNER Series



2 FLUTE WITH SHANK 4 BY 0.1 mm

- A variety of diameter sizes by every 0.1mm with shank 4
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

WE502...S4 ...series



EDP. No.	D	L ₁	L ₂	D ₂
WE502 010 S4	1.0	2.5	50	4
WE502 011 S4	1.1	3.0	50	4
WE502 012 S4	1.2	3.0	50	4
WE502 013 S4	1.3	3.0	50	4
WE502 014 S4	1.4	4.0	50	4
WE502 015 S4	1.5	4.0	50	4
WE502 016 S4	1.6	4.0	50	4
WE502 017 S4	1.7	4.0	50	4
WE502 018 S4	1.8	5.0	50	4
WE502 019 S4	1.9	5.0	50	4
WE502 020 S4	2.0	6.0	50	4
WE502 021 S4	2.1	6.0	50	4
WE502 022 S4	2.2	6.0	50	4
WE502 023 S4	2.3	6.0	50	4
WE502 024 S4	2.4	6.0	50	4
WE502 025 S4	2.5	8.0	50	4
WE502 026 S4	2.6	8.0	50	4
WE502 027 S4	2.7	8.0	50	4
WE502 028 S4	2.8	8.0	50	4
WE502 029 S4	2.9	8.0	50	4
WE502 030 S4	3.0	8.0	50	4
WE502 035 S4	3.5	10.0	50	4
WE502 040 S4	4.0	10.0	50	4
WE502 040 080 S4			80	

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

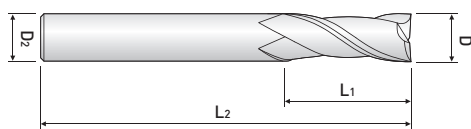
○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0~0.012	h6

※ These tools are manufactured based on order received.

Endmills for Mold & Die(square) WINNER Series



2 FLUTE ENDMILL WITH SHANK 3

- Excellent effect in preventing breakage with a shape of neck without notch
- A variety of diameter sizes with Shank 3
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

WE502...S3 ...series



EDP. No.	D	L ₁	L ₂	D ₂
WE502 001 S3	0.1	0.2	40	3
WE502 002 S3	0.2	0.4	40	3
WE502 003 S3	0.3	0.6	40	3
WE502 004 S3	0.4	0.8	40	3
WE502 005 S3	0.5	1.0	40	3
WE502 006 S3	0.6	1.2	40	3
WE502 007 S3	0.7	1.4	40	3
WE502 008 S3	0.8	1.6	40	3
WE502 009 S3	0.9	1.8	40	3
WE502 010 S3	1.0	2.5	50	3
WE502 012 S3	1.2	3.0	50	3
WE502 015 S3	1.5	4.0	50	3
WE502 020 S3	2.0	6.0	50	3
WE502 025 S3	2.5	7.0	50	3
WE502 030 S3	3.0	8.0	50	3

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

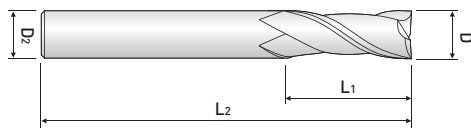
○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0~0.012	h6

※ These tools are manufactured based on order received.

Endmills for Mold & Die(square) WINNER Series



2 FLUTE FOR POWERFUL CUTTING

- Designed Gash touch shape to prevent flute chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

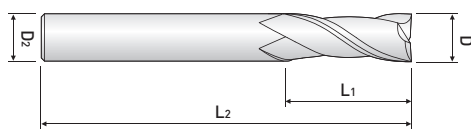
WE502 ...series



EDP. No.	D	L ₁	L ₂	D ₂
WE502 001 001	0.1	0.1	40	4
WE502 001		0.2		
WE502 001 003		0.3		
WE502 002 002	0.2	0.2	40	4
WE502 002		0.4		
WE502 002 006		0.6		
WE502 003 003	0.3	0.3	40	4
WE502 003		0.6		
WE502 003 009		0.9		
WE502 004 004	0.4	0.4	40	4
WE502 004		0.8		
WE502 004 012		1.2		
WE502 005 005	0.5	0.5	40	4
WE502 005		1.0		
WE502 005 015		1.5		
WE502 006 006	0.6	0.6	40	4
WE502 006		1.2		
WE502 006 018		1.8		
WE502 007 007	0.7	0.7	40	4
WE502 007		1.4		
WE502 007 021		2.1		
WE502 008 008	0.8	0.8	40	4
WE502 008		1.6		
WE502 008 024		2.4		
WE502 009 009	0.9	0.9	40	4
WE502 009		1.8		
WE502 009 027		2.7		
WE502 010 01	1.0	1.0	40	6
WE502 010 02		2.0		
WE502 010		2.5	50	
WE502 010 03		3.0		
WE502 010 04		4.0		
WE502 010 06		6.0		
WE502 012 02	1.2	2.0	40	6
WE502 012		3.0		
WE502 012 04		4.0	50	
WE502 012 06		6.0		

NEXT >>

Endmills for Mold & Die(square) WINNER Series



2 FLUTE FOR POWERFUL CUTTING

- Designed Gash touch shape to prevent flute chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

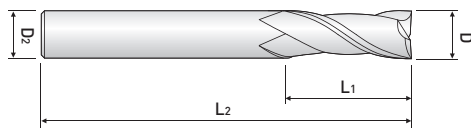
WE502 ...series



EDP. No.	D	L ₁	L ₂	D ₂
WE502 015 015	1.5	1.5	40	6
WE502 015 03		3.0		
WE502 015		4.0	50	
WE502 015 06		6.0		
WE502 015 08		8.0		
WE502 015 10		10.0		
WE502 020 02	2.0	2.0	40	6
WE502 020 04		4.0		
WE502 020		6.0	50	
WE502 020 08		8.0		
WE502 020 10		10.0		
WE502 020 12		12.0		
WE502 025 025	2.5	2.5	40	6
WE502 025 05		5.0		
WE502 025		7.0	50	
WE502 025 10		10.0		
WE502 025 12		12.0		
WE502 030 03	3.0	3.0	40	6
WE502 030 06		6.0		
WE502 030		8.0	50	
WE502 030 10		10.0		
WE502 030 12		12.0		
WE502 030 14		14.0		
WE502 040 04	4.0	4.0	40	6
WE502 040 08		8.0		
WE502 040		10.0	50	
WE502 040 12		12.0		
WE502 040 14		14.0		
WE502 040 16		16.0		
WE502 050 05	5.0	5.0	50	6
WE502 050 10		10.0		
WE502 050		15.0	60	
WE502 050 20		20.0		
WE502 050 25		25.0		

NEXT >>

Endmills for Mold & Die(square) WINNER Series



2 FLUTE FOR POWERFUL CUTTING

- Designed Gash touch shape to prevent flute chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

WE502 ...series



EDP. No.	D	L ₁	L ₂	D ₂
WE502 060 06	6.0	6.0	50	6
WE502 060 12		12.0		
WE502 060		15.0	60	
WE502 060 20		20.0		
WE502 060 25		25.0		
WE502 080 16	8.0	16.0	60	8
WE502 080		20.0	70	
WE502 080 25		25.0		
WE502 080 30		30.0		
WE502 100 22	10.0	22.0	65	10
WE502 100		25.0	75	
WE502 100 30		30.0		
WE502 100 35		35.0		
WE502 120 26	12.0	26.0	70	12
WE502 120		30.0	80	
WE502 120 35		35.0		
WE502 120 40		40.0		
WE502 140	14.0	35.0	100	16
WE502 160	16.0	32.0	100	16
WE502 160 40		40.0		
WE502 180	18.0	45.0	100	20
WE502 200	20.0	45.0	100	20

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

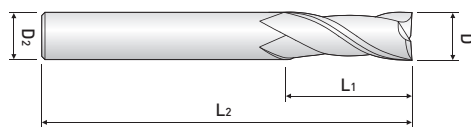
○: General Application ◎: The most suitable Application

■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0~-0.012	
over 6	0~-0.015	h6

※ These tools are manufactured based on order received.

Endmills for Mold & Die(square) WINNER Series



2 FLUTE LONG

- 2 Flute long type with a variety of flute length sizes
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

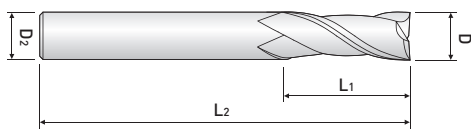
WE522 ...series



EDP. No.	D	L ₁	L ₂	D ₂
WE522 010 03	1.0	3.0	60	6
WE522 010 04		4.0		
WE522 010 05		5.0		
WE522 010 06		6.0		
WE522 010 07		7.0		
WE522 010 08		8.0		
WE522 010 10		10.0		
WE522 010 12		12.0		
WE522 012 04	1.2	4.0	60	6
WE522 012 06		6.0		
WE522 012 08		8.0		
WE522 012 10		10.0		
WE522 012 12		12.0		
WE522 015 06	1.5	6.0	60	6
WE522 015 08		8.0		
WE522 015 10		10.0		
WE522 015 12		12.0		
WE522 015 14		14.0		
WE522 015 16		16.0		
WE522 020 08	2.0	8.0	60	6
WE522 020 10		10.0		
WE522 020 12		12.0		
WE522 020 14		14.0		
WE522 020 16		16.0		
WE522 025 10	2.5	10.0	60	6
WE522 025 12		12.0		
WE522 025 16		16.0		
WE522 025 20		20.0		
WE522 025 26		26.0		
WE522 030 16 S3	3.0	16.0	100	3
WE522 030 10		10.0	70	6
WE522 030 12		12.0		
WE522 030 14		14.0		
WE522 030 16		16.0		
WE522 030 20		20.0		
WE522 030 26		26.0		
WE522 030 30		30.0		

NEXT >>

Endmills for Mold & Die(square) WINNER Series



2 FLUTE LONG

- 2 Flute long type with a variety of flute length sizes
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

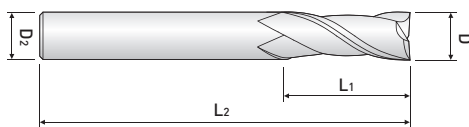
WE522 ...series



EDP. No.	D	L ₁	L ₂	D ₂
WE522 040 20 S4	4.0	20.0	100	4
WE522 040 12		12.0	70	6
WE522 040 16		16.0		
WE522 040 20		20.0		
WE522 040 26		26.0		
WE522 040 30		30.0		
WE522 050 20	5.0	20.0	70	6
WE522 050 25		25.0	70	
WE522 050 25 100			100	
WE522 050 30		30.0	80	
WE522 050 35		35.0	90	
WE522 050 40		40.0	100	
WE522 060 15	6.0	15.0	60	6
WE522 060 15 080			80	
WE522 060 20		20.0	70	
WE522 060 20 090			90	
WE522 060 25		25.0	75	
WE522 060 30			80	
WE522 060 30 100		30.0	100	
WE522 060 30 150			150	
WE522 060 35		35.0	90	
WE522 060 40		40.0	90	
WE522 060 40 120			120	
WE522 060 45		45.0	150	
WE522 080 25	8.0	25.0	80	8
WE522 080 30		30.0	80	
WE522 080 30 100			100	
WE522 080 35		35.0	90	
WE522 080 40			90	
WE522 080 40 120		40.0	120	
WE522 080 40 150			150	
WE522 080 45		45.0	100	
WE522 080 50		50.0	100	
WE522 080 50 150			150	
WE522 100 30	10.0	30.0	80	10
WE522 100 30 100			100	
WE522 100 35		35.0	90	

NEXT >>

Endmills for Mold & Die(square) WINNER Series



2 FLUTE LONG

- 2 Flute long type with a variety of flute length sizes
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

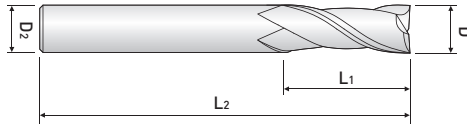
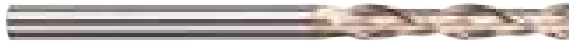
WE522 ...series



EDP. No.	D	L ₁	L ₂	D ₂
WE522 100 40	10.0	40.0	90	10
WE522 100 40 120			120	
WE522 100 45		45.0	100	
WE522 100 50			100	
WE522 100 50 150		50.0	150	
WE522 100 50 200			200	
WE522 100 55		55.0	150	
WE522 100 60			110	
WE522 100 60 200		60.0	200	
WE522 120 35	12.0	35.0	90	12
WE522 120 40		40.0	100	
WE522 120 40 120			120	
WE522 120 45		45.0	130	
WE522 120 50			100	
WE522 120 50 150		50.0	150	
WE522 120 55			110	
WE522 120 60		60.0	110	
WE522 120 60 150			150	
WE522 120 60 200		65.0	200	
WE522 120 65			150	
WE522 120 70		70.0	120	
WE522 120 70 200			200	
WE522 140 50	14.0	50.0	110	16
WE522 140 60		60.0	150	
WE522 160 40	16.0	40.0	150	16
WE522 160 50		50.0	110	
WE522 160 50 150			150	
WE522 160 60		60.0	120	
WE522 160 70			130	
WE522 160 70 150		70.0	150	
WE522 160 70 200			200	
WE522 160 80		80.0	150	
WE522 160 90			150	
WE522 160 110		110.0	200	
WE522 160 120		120.0	250	

NEXT >>

Endmills for Mold & Die(square) WINNER Series



2 FLUTE LONG

- 2 Flute long type with a variety of flute length sizes
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

WE522 ...series



EDP. No.	D	L ₁	L ₂	D ₂
WE522 180 50	18.0	50.0	120	20
WE522 180 70		70.0	130	
WE522 180 100		100.0	200	
WE522 200 50	20.0	50.0	110	20
WE522 200 50 150			150	
WE522 200 60		60.0	130	
WE522 200 70		70.0	130	
WE522 200 80		80.0	150	
WE522 200 90		90.0	150	
WE522 200 90 200			200	
WE522 200 110		110.0	200	
WE522 200 120		120.0	250	
WE522 220 75	22.0	75.0	150	20
WE522 220 110		110.0	200	
WE522 250 70	25.0	70.0	150	25
WE522 250 90		90.0	150	
WE522 250 110		110.0	200	
WE522 250 120		120.0	250	

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

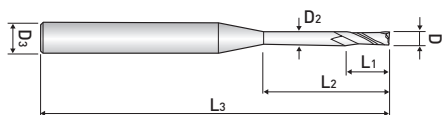
○:General Application ◎:The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for Mold & Die(square) WINNER Series



2 FLUTE LONG NECK

- Double neck below 10° lead to strengthened hardness and machining RIB with a various effective length
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

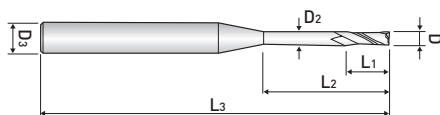
WE512 ...series



EDP. No.	D	L ₁	L ₂	L ₃	D ₃
WE512 001 003	0.1	0.15	0.3	40	4
WE512 001 005			0.5		
WE512 001 01			1.0		
WE512 002 005	0.2	0.3	0.5	40	4
WE512 002 01			1.0		
WE512 002 015			1.5		
WE512 002 02			2.0		
WE512 003 01	0.3	0.5	1.0	40	4
WE512 003 015			1.5		
WE512 003 02			2.0		
WE512 003 025			2.5		
WE512 003 03			3.0		
WE512 003 04			4.0		
WE512 003 05			5.0		
WE512 004 01	0.4	0.6	1.0	40	4
WE512 004 015			1.5		
WE512 004 02			2.0		
WE512 004 025			2.5		
WE512 004 03			3.0		
WE512 004 04			4.0		
WE512 004 05			5.0		
WE512 004 06			6.0		
WE512 004 08			8.0		
WE512 004 10			10.0		
WE512 005 01	0.5	0.7	1.0	45	4
WE512 005 015			1.5		
WE512 005 02			2.0		
WE512 005 025			2.5		
WE512 005 03			3.0		
WE512 005 04			4.0		
WE512 005 05			5.0		
WE512 005 06			6.0		
WE512 005 08			8.0		
WE512 005 10			10.0		

NEXT >>

Endmills for Mold & Die(square) *WINNER Series*



2 FLUTE LONG NECK

- Double neck below 10° lead to strengthened hardness and machining RIB with a various effective length
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

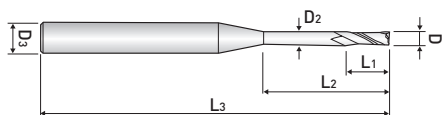
WE512 ...series



EDP. No.	D	L ₁	L ₂	L ₃	D ₃
WE512 005 12	0.5	0.7	12.0	45	4
WE512 005 14			14.0		
WE512 005 16			16.0		
WE512 006 02	0.6	0.9	2.0	45	4
WE512 006 03			3.0		
WE512 006 04			4.0		
WE512 006 05			5.0		
WE512 006 06			6.0		
WE512 006 08			8.0		
WE512 006 10			10.0		
WE512 006 12			12.0		
WE512 006 14			14.0		
WE512 006 16			16.0		
WE512 007 02	0.7	1.2	2.0	45	4
WE512 007 04			4.0		
WE512 007 06			6.0		
WE512 007 08			8.0		
WE512 007 10			10.0		
WE512 007 12			12.0		
WE512 008 02	0.8	1.2	2.0	45	4
WE512 008 03			3.0		
WE512 008 04			4.0		
WE512 008 05			5.0		
WE512 008 06			6.0		
WE512 008 08			8.0		
WE512 008 10			10.0		
WE512 008 12			12.0		
WE512 008 14			14.0		
WE512 008 16			16.0		
WE512 008 20			20.0		
WE512 009 06	0.9	1.3	6.0	45	4
WE512 009 08			8.0		
WE512 009 10			10.0		

NEXT >>>

Endmills for Mold & Die(square) WINNER Series



2 FLUTE LONG NECK

- Double neck below 10° lead to strengthened hardness and machining RIB with a various effective length
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

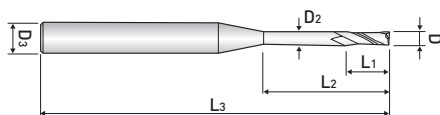
WE512 ...series



EDP. No.	D	L ₁	L ₂	L ₃	D ₃
WE512 010 02	1.0	1.5	2.0	50	4
WE512 010 03			3.0		
WE512 010 04			4.0		
WE512 010 05			5.0		
WE512 010 06			6.0		
WE512 010 07			7.0		
WE512 010 08			8.0		
WE512 010 10			10.0		
WE512 010 12			12.0		
WE512 010 14			14.0		
WE512 010 16			16.0		
WE512 010 18			18.0		
WE512 010 20			20.0		
WE512 010 22			22.0	60	
WE512 010 26			26.0		
WE512 010 30			30.0	70	
WE512 010 40			40.0	80	
WE512 010 50			50.0	100	
WE512 012 04	1.2	1.8	4.0	50	4
WE512 012 06			6.0		
WE512 012 08			8.0		
WE512 012 10			10.0		
WE512 012 12			12.0		
WE512 012 14			14.0		
WE512 012 16			16.0		
WE512 012 20			20.0		
WE512 012 26			26.0	60	
WE512 012 30			30.0	70	
WE512 014 06	1.4	2.1	6.0	50	4
WE512 014 08			8.0		
WE512 014 10			10.0		
WE512 014 14			14.0		
WE512 014 16			16.0		
WE512 014 20			20.0		

NEXT >>

Endmills for Mold & Die(square) *WINNER Series*



2 FLUTE LONG NECK

- Double neck below 10° lead to strengthened hardness and machining RIB with a various effective length
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

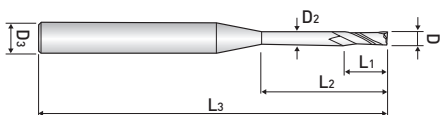
WE512 ...series



EDP. No.	D	L ₁	L ₂	L ₃	D ₃
WE512 015 04	1.5	2.3	4.0	50	4
WE512 015 05			5.0		
WE512 015 06			6.0		
WE512 015 07			7.0		
WE512 015 08			8.0		
WE512 015 10			10.0		
WE512 015 12			12.0		
WE512 015 14			14.0		
WE512 015 16			16.0		
WE512 015 18			18.0		
WE512 015 20			20.0		
WE512 015 22			22.0	60	
WE512 015 26			26.0		
WE512 015 30			30.0	70	
WE512 016 08	1.6	2.3	8.0	50	4
WE512 016 10			10.0		
WE512 016 12			12.0		
WE512 016 16			16.0		
WE512 016 20			20.0		
WE512 018 08	1.8	2.7	8.0	50	4
WE512 018 10			10.0		
WE512 018 12			12.0		
WE512 018 16			16.0		
WE512 018 20			20.0		
WE512 020 06	2.0	3.0	6.0	50	4
WE512 020 08			8.0		
WE512 020 10			10.0		
WE512 020 12			12.0		
WE512 020 14			14.0		
WE512 020 16			16.0		
WE512 020 18			18.0		
WE512 020 20			20.0		

NEXT >>

Endmills for Mold & Die(square) WINNER Series



2 FLUTE LONG NECK

- Double neck below 10° lead to strengthened hardness and machining RIB with a various effective length
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

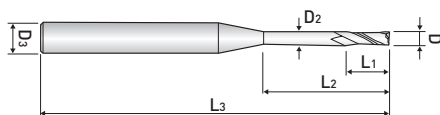
WE512 ...series



EDP. No.	D	L ₁	L ₂	L ₃	D ₃
WE512 020 22	2.0	3.0	22.0	60	4
WE512 020 26			26.0		
WE512 020 30			30.0	70	
WE512 020 35			35.0		
WE512 020 40			40.0	80	
WE512 020 45			45.0	90	
WE512 020 50			50.0	100	
WE512 020 60			60.0	110	
WE512 025 08	2.5	4.0	8.0	50	4
WE512 025 10			10.0		
WE512 025 12			12.0		
WE512 025 14			14.0		
WE512 025 16			16.0		
WE512 025 18			18.0		
WE512 025 20			20.0		
WE512 025 22			22.0	60	
WE512 025 26			26.0		
WE512 025 30			30.0	70	
WE512 025 35			35.0		
WE512 025 40			40.0	80	
WE512 025 45			45.0	90	
WE512 025 50			50.0	100	
WE512 030 06	3.0	4.5	6.0	50	6
WE512 030 08			8.0		
WE512 030 10			10.0		
WE512 030 12			12.0		
WE512 030 14			14.0	60	
WE512 030 16			16.0		
WE512 030 18			18.0		
WE512 030 20			20.0		

NEXT >>

Endmills for Mold & Die(square) *WINNER Series*



2 FLUTE LONG NECK

- Double neck below 10° lead to strengthened hardness and machining RIB with a various effective length
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

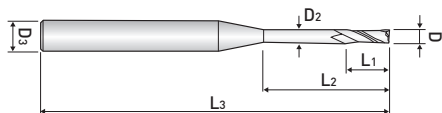
WE512 ...series



EDP. No.	D	L ₁	L ₂	L ₃	D ₃
WE512 030 22	3.0	4.5	22.0	65	6
WE512 030 26			26.0		
WE512 030 30			30.0	70	
WE512 030 35			35.0		
WE512 030 40			40.0	80	
WE512 030 45			45.0	90	
WE512 030 50			50.0	100	
WE512 030 60			60.0		
WE512 040 08	4.0	6.0	8.0	50	6
WE512 040 10			10.0		
WE512 040 12			12.0		
WE512 040 14			14.0	60	
WE512 040 16			16.0		
WE512 040 18			18.0		
WE512 040 20			20.0		
WE512 040 22			22.0	65	
WE512 040 26			26.0		
WE512 040 30			30.0	70	
WE512 040 35			35.0		
WE512 040 40			40.0	80	
WE512 040 45			45.0	90	
WE512 040 50			50.0	100	
WE512 040 60			60.0		
WE512 050 16	5.0	8.0	16.0	60	6
WE512 050 20			20.0		
WE512 050 26			26.0	65	
WE512 050 30			30.0	70	
WE512 050 35			35.0	75	
WE512 050 40			40.0	80	
WE512 050 50			50.0	90	
WE512 050 60			60.0	100	

NEXT >>>

Endmills for Mold & Die(square) WINNER Series



2 FLUTE LONG NECK

- Double neck below 1Ø lead to strengthened hardness and machining RIB with a various effective length
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55 Prehardened Steel, Alloy Steel, Carbon Steel

WE512 ...series



EDP. No.	D	L ₁	L ₂	L ₃	D ₃
WE512 060 15	6.0	9.0	15.0	60	6
WE512 060 20			20.0		
WE512 060 30			30.0		
WE512 060 32			32.0		
WE512 080 25	8.0	12.0	25.0	70	8
WE512 080 30			30.0	80	
WE512 080 42			42.0	100	
WE512 100 30	10.0	15.0	30.0	75	10
WE512 100 35			35.0	80	
WE512 100 45			45.0	100	
WE512 120 35	12.0	20.0	35.0	80	12
WE512 120 40			40.0	90	
WE512 120 50			50.0	110	

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

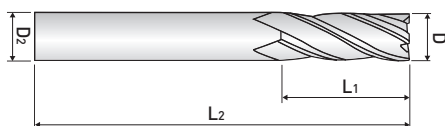
○: General Application ◎: The most suitable Application

■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0~-0.012	
over 6	0~-0.015	h6

※ These tools are manufactured based on order received.

Endmills for Mold & Die(square) *WINNER Series*



VARIABLE INDEX 4 FLUTE SQUARE

- Excellent surface roughness with a variable index geometry for more than 30°
- Increased tool life with a reduced chatter vibration and resonance by irregular exciting force
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

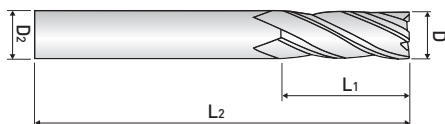
WME504 ...series



EDP. No.	D	L ₁	L ₂	D ₂
WME504 008	0.8	1.6	40	4
WME504 009	0.9	1.8	40	4
WME504 010	1.0	2.5	50	6
WME504 012	1.2	3.0	50	6
WME504 015	1.5	4.0	50	6
WME504 020	2.0	6.0	50	6
WME504 025	2.5	7.0	50	6
WME504 030	3.0	8.0	50	6
WME504 035	3.5	10.0	50	6
WME504 040	4.0	10.0	50	6
WME504 045	4.5	14.0	50	6
WME504 050	5.0	15.0	60	6
WME504 055	5.5	15.0	60	6
WME504 060	6.0	15.0	60	6
WME504 065	6.5	18.0	60	8
WME504 070	7.0	20.0	60	8
WME504 075	7.5	20.0	60	8
WME504 080	8.0	20.0	70	8
WME504 085	8.5	22.0	70	10
WME504 090	9.0	22.0	70	10
WME504 095	9.5	24.0	70	10
WME504 100	10.0	25.0	75	10
WME504 105	10.5	26.0	75	12
WME504 110	11.0	30.0	75	12
WME504 115	11.5	30.0	80	12
WME504 120	12.0	30.0	80	12
WME504 130	13.0	35.0	100	12
WME504 140 S12	14.0	35.0	100	12
WME504 140 S14				14
WME504 140				16
WME504 150	15.0	38.0	100	16
WME504 160	16.0	40.0	100	16
WME504 170	17.0	42.0	100	16
WME504 180 S16	18.0	45.0	100	16
WME504 180				18
WME504 190	19.0	45.0	100	20
WME504 200	20.0	45.0	100	20
WME504 210	21.0	45.0	100	20

NEXT >>

Endmills for Mold & Die(square) WINNER Series



VARIABLE INDEX 4 FLUTE SQUARE

- Excellent surface roughness with a variable index geometry for more than 30°
- Increased tool life with a reduced chatter vibration and resonance by irregular exciting force
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

WME504 ...series



EDP. No.	D	L ₁	L ₂	D ₂
WME504 220	22.0	45.0	100	20
WME504 230	23.0	50.0	120	25
WME504 240	24.0	50.0	120	25
WME504 250	25.0	50.0	120	25

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

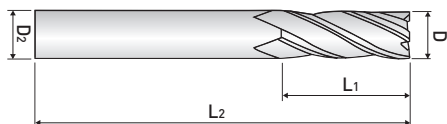
○:General Application ◎:The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for Mold & Die(square) WINNER Series



VARIABLE INDEX 4 FLUTE FOR POWERFUL CUTTING

- Excellent surface roughness with a variable index geometry for more than 30°
- Increased tool life with a reduced chatter vibration and resonance by irregular exciting force
- Gash touch shape applied to prevent flute chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

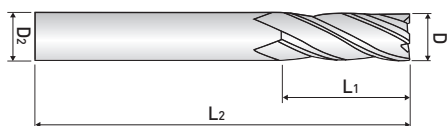
WXE504 ...series



EDP. No.	D	L ₁	L ₂	D ₂
WXE504 010 01	1.0	1.0	40	6
WXE504 010 02		2.0		
WXE504 010		2.5	50	
WXE504 010 03		3.0		
WXE504 010 04		4.0		
WXE504 010 06		6.0		
WXE504 012 02	1.2	2.0	40	6
WXE504 012		3.0	50	
WXE504 012 04		4.0		
WXE504 012 06		6.0		
WXE504 015 015	1.5	1.5	40	6
WXE504 015 03		3.0		
WXE504 015		4.0	50	
WXE504 015 06		6.0		
WXE504 015 08		8.0		
WXE504 015 10		10.0		
WXE504 020 02	2.0	2.0	40	6
WXE504 020 04		4.0		
WXE504 020		6.0	50	
WXE504 020 08		8.0		
WXE504 020 10		10.0		
WXE504 020 12		12.0		
WXE504 025 025	2.5	2.5	40	6
WXE504 025 05		5.0		
WXE504 025		7.0	50	
WXE504 025 10		10.0		
WXE504 025 12		12.0		
WXE504 030 03	3.0	3.0	40	6
WXE504 030 06		6.0		
WXE504 030		8.0	50	
WXE504 030 10		10.0		
WXE504 030 12		12.0		
WXE504 030 14		14.0		
WXE504 040 04	4.0	4.0	40	6
WXE504 040 08		8.0		
WXE504 040		10.0	50	
WXE504 040 12		12.0		

NEXT >>

Endmills for Mold & Die(square) WINNER Series



VARIABLE INDEX 4 FLUTE FOR POWERFUL CUTTING

- Excellent surface roughness with a variable index geometry for more than 30°
- Increased tool life with a reduced chatter vibration and resonance by irregular exciting force
- Gash touch shape applied to prevent flute chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

WXE504 ...series



EDP. No.	D	L ₁	L ₂	D ₂
WXE504 040 14	4.0	14.0	50	6
WXE504 040 16		16.0		
WXE504 050 05	5.0	5.0	50	6
WXE504 050 10		10.0		
WXE504 050		15.0	60	
WXE504 050 20		20.0		
WXE504 050 25		25.0		
WXE504 060 06	6.0	6.0	50	6
WXE504 060 12		12.0		
WXE504 060		15.0	60	
WXE504 060 20		20.0		
WXE504 060 25		25.0		
WXE504 080 16	8.0	16.0	60	8
WXE504 080		20.0	70	
WXE504 080 25		25.0		
WXE504 080 30		30.0		
WXE504 100 22	10.0	22.0	65	10
WXE504 100		25.0	75	
WXE504 100 30		30.0		
WXE504 100 35		35.0		
WXE504 120 26	12.0	26.0	70	12
WXE504 120		30.0	80	
WXE504 120 35		35.0		
WXE504 120 40		40.0		
WXE504 140	14.0	35.0	100	16
WXE504 160 32	16.0	32.0	100	16
WXE504 160		40.0		
WXE504 180	18.0	45.0	100	20
WXE504 200	20.0	45.0	100	20

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

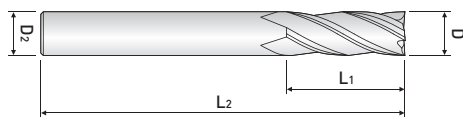
○: General Application ◎: The most suitable Application

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0~0.030	h6

※ These tools are manufactured based on order received.

Endmills for Mold & Die(square) WINNER Series



4 FLUTE LONG

- A wide range of choices due to a variety of sizes of cutting length and overall length
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

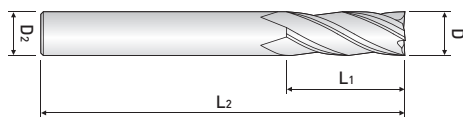
WE524 ...series



EDP. No.	D	L ₁	L ₂	D ₂
WE524 010 03	1.0	3.0	60	6
WE524 010 04		4.0		
WE524 010 05		5.0		
WE524 010 06		6.0		
WE524 010 07		7.0		
WE524 010 08		8.0		
WE524 010 10		10.0		
WE524 010 12		12.0		
WE524 012 04	1.2	4.0	60	6
WE524 012 06		6.0		
WE524 012 08		8.0		
WE524 012 10		10.0		
WE524 012 12		12.0		
WE524 015 06	1.5	6.0	60	6
WE524 015 08		8.0		
WE524 015 10		10.0		
WE524 015 12		12.0		
WE524 015 14		14.0		
WE524 015 16		16.0		
WE524 020 08	2.0	8.0	60	6
WE524 020 10		10.0		
WE524 020 12		12.0		
WE524 020 14		14.0		
WE524 020 16		16.0		
WE524 025 10	2.5	10.0	60	6
WE524 025 12		12.0		
WE524 025 16		16.0		
WE524 025 20		20.0		
WE524 025 26		26.0		
WE524 030 16 S3	3.0	16.0	100	3
WE524 030 10		10.0	70	6
WE524 030 12		12.0		
WE524 030 14		14.0		
WE524 030 16		16.0		
WE524 030 20		20.0		
WE524 030 26		26.0		
WE524 030 30		30.0		

NEXT >>

Endmills for Mold & Die(square) WINNER Series



4 FLUTE LONG

- A wide range of choices due to a variety of sizes of cutting length and overall length
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

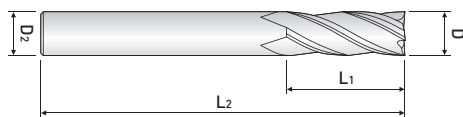
WE524 ...series



EDP. No.	D	L1	L2	D2
WE524 040 20 S4	4.0	20.0	100	4
WE524 040 12		12.0	70	6
WE524 040 16		16.0		
WE524 040 20		20.0		
WE524 040 26		26.0		
WE524 040 30		30.0		
WE524 050 20	5.0	20.0	70	6
WE524 050 25		25.0	70	
WE524 050 25 100			100	
WE524 050 30		30.0	80	
WE524 050 35		35.0	90	
WE524 050 40		40.0	100	
WE524 060 15	6.0	15.0	60	6
WE524 060 15 080			80	
WE524 060 20		20.0	70	
WE524 060 20 090			90	
WE524 060 25		25.0	75	
WE524 060 30			80	
WE524 060 30 100		30.0	100	
WE524 060 30 150			150	
WE524 060 35		35.0	90	
WE524 060 40		40.0	90	
WE524 060 40 120			120	
WE524 060 45		45.0	150	
WE524 080 25	8.0	25.0	80	8
WE524 080 30			80	
WE524 080 30 100		30.0	100	
WE524 080 35		35.0	90	
WE524 080 40			90	
WE524 080 40 120		40.0	120	
WE524 080 40 150			150	
WE524 080 45		45.0	100	
WE524 080 50		50.0	100	
WE524 080 50 150			150	

NEXT >>>

Endmills for Mold & Die(square) WINNER Series



4 FLUTE LONG

- A wide range of choices due to a variety of sizes of cutting length and overall length
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

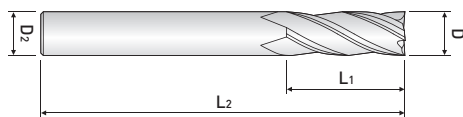
WE524 ...series



EDP. No.	D	L1	L2	D2
WE524 100 30	10.0	30.0	80	10
WE524 100 30 100			100	
WE524 100 35		35.0	90	
WE524 100 40		40.0	90	
WE524 100 40 120			120	
WE524 100 45		45.0	100	
WE524 100 50		50.0	100	
WE524 100 50 150			150	
WE524 100 50 200		55.0	200	
WE524 100 55			150	
WE524 100 60		60.0	110	
WE524 100 60 200			200	
WE524 120 35	12.0	35.0	90	12
WE524 120 40		40.0	100	
WE524 120 40 120			120	
WE524 120 45		45.0	130	
WE524 120 50		50.0	100	
WE524 120 50 150			150	
WE524 120 55		55.0	110	
WE524 120 60			110	
WE524 120 60 150		60.0	150	
WE524 120 60 200			200	
WE524 120 65		65.0	150	
WE524 120 70		70.0	120	
WE524 120 70 200			200	
WE524 140 50	14.0	50.0	110	16
WE524 140 60		60.0	150	
WE524 160 40	16.0	40.0	150	16
WE524 160 50		50.0	110	
WE524 160 50 150			150	
WE524 160 60		60.0	120	
WE524 160 70			130	
WE524 160 70 150		70.0	150	
WE524 160 70 200			200	
WE524 160 80		80.0	150	
WE524 160 90		90.0	150	
WE524 160 110		110.0	200	
WE524 160 120		120.0	250	

NEXT >>

Endmills for Mold & Die(square) WINNER Series



4 FLUTE LONG

- A wide range of choices due to a variety of sizes of cutting length and overall length
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

WE524 ...series



EDP. No.	D	L ₁	L ₂	D ₂
WE524 180 50	18.0	50.0	120	20
WE524 180 70		70.0	130	
WE524 180 100		100.0	200	
WE524 200 50	20.0	50.0	110	20
WE524 200 50 150			150	
WE524 200 60		60.0	130	
WE524 200 70		70.0	130	
WE524 200 80		80.0	150	
WE524 200 90		90.0	150	
WE524 200 90 200			200	
WE524 200 110		110.0	200	
WE524 200 120		120.0	250	
WE524 220 75	22.0	75.0	150	20
WE524 220 110		110.0	200	
WE524 250 70	25.0	70.0	150	25
WE524 250 90		90.0	150	
WE524 250 110		110.0	200	
WE524 250 120		120.0	250	

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

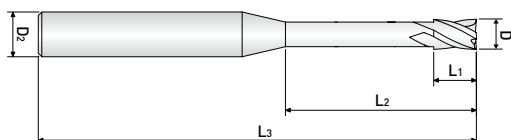
○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0~0.030	h6

※ These tools are manufactured based on order received.

Endmills for Mold & Die(square) WINNER Series



4 FLUTE LONG NECK

- Excellent effect in preventing breakage with a shape of neck without notch
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55 Pre- hardened Steel, Alloy Steel, Carbon Steel

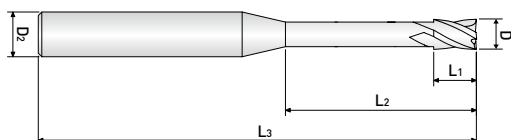
WE514 ...series



EDP. No.	D	L ₁	L ₂	L ₃	D ₂			
WE514 010 02	1.0	1.5	2.0	50	4			
WE514 010 03			3.0					
WE514 010 04			4.0					
WE514 010 05			5.0					
WE514 010 06			6.0					
WE514 010 07			7.0					
WE514 010 08			8.0					
WE514 010 10			10.0					
WE514 010 12			12.0					
WE514 010 14			14.0					
WE514 010 16			16.0					
WE514 010 18			18.0					
WE514 010 20			20.0					
WE514 010 22			22.0	60				
WE514 010 26			26.0					
WE514 010 30			30.0			70		
WE514 010 40			40.0			80		
WE514 010 50			50.0	100				
WE514 012 04			1.2	1.8		4.0	50	4
WE514 012 06						6.0		
WE514 012 08	8.0							
WE514 012 10	10.0							
WE514 012 12	12.0							
WE514 012 14	14.0							
WE514 012 16	16.0							
WE514 012 20	20.0							
WE514 012 26	26.0	60						
WE514 012 30	30.0	70						
WE514 015 04	1.5	2.3	4.0	50	4			
WE514 015 05			5.0					
WE514 015 06			6.0					
WE514 015 07			7.0					
WE514 015 08			8.0					
WE514 015 10			10.0					
WE514 015 12			12.0					
WE514 015 14			14.0					
WE514 015 16			16.0					

NEXT >>

Endmills for Mold & Die(square) WINNER Series



4 FLUTE LONG NECK

- Excellent effect in preventing breakage with a shape of neck without notch
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

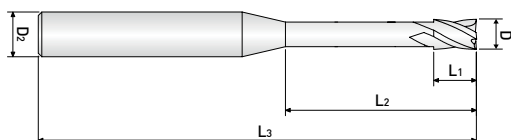
WE514 ...series



EDP. No.	D	L ₁	L ₂	L ₃	D ₂
WE514 015 18	1.5	2.3	18.0	50	4
WE514 015 20			20.0		
WE514 015 22			22.0	60	
WE514 015 26			26.0		
WE514 015 30			30.0	70	
WE514 020 06	2.0	3.0	6.0	50	4
WE514 020 08			8.0		
WE514 020 10			10.0		
WE514 020 12			12.0		
WE514 020 14			14.0		
WE514 020 16			16.0		
WE514 020 18			18.0		
WE514 020 20			20.0		
WE514 020 22			22.0	60	
WE514 020 26			26.0		
WE514 020 30			30.0	70	
WE514 020 35			35.0		
WE514 020 40			40.0	80	
WE514 020 45			45.0	90	
WE514 020 50			50.0	100	
WE514 020 60			60.0	110	
WE514 025 08	2.5	4.0	8.0	50	4
WE514 025 10			10.0		
WE514 025 12			12.0		
WE514 025 14			14.0		
WE514 025 16			16.0		
WE514 025 18			18.0		
WE514 025 20			20.0	60	
WE514 025 22			22.0		
WE514 025 26			26.0		
WE514 025 30			30.0		
WE514 025 35			35.0		
WE514 025 40			40.0	80	
WE514 025 45			45.0	90	
WE514 025 50			50.0	100	

NEXT >>>

Endmills for Mold & Die(square) WINNER Series



4 FLUTE LONG NECK

- Excellent effect in preventing breakage with a shape of neck without notch
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55 Pre- hardened Steel, Alloy Steel, Carbon Steel

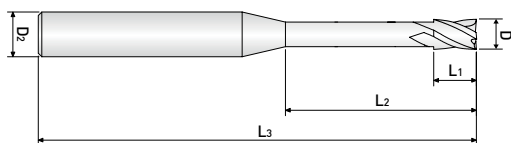
WE514 ...series



EDP. No.	D	L ₁	L ₂	L ₃	D ₂
WE514 030 06	3.0	4.5	6.0	50	6
WE514 030 08			8.0		
WE514 030 10			10.0		
WE514 030 12			12.0		
WE514 030 14			14.0	60	
WE514 030 16			16.0		
WE514 030 18			18.0		
WE514 030 20			20.0		
WE514 030 22			22.0	65	
WE514 030 26			26.0		
WE514 030 30			30.0	70	
WE514 030 35			35.0		
WE514 030 40			40.0	80	
WE514 030 45			45.0	90	
WE514 030 50			50.0	100	
WE514 030 60			60.0	100	
WE514 040 08	4.0	4.5	8.0	50	6
WE514 040 10			10.0		
WE514 040 12			12.0		
WE514 040 14			14.0	60	
WE514 040 16			16.0		
WE514 040 18			18.0		
WE514 040 20			20.0		
WE514 040 22			22.0	65	
WE514 040 26			26.0		
WE514 040 30			30.0	70	
WE514 040 35			35.0		
WE514 040 40			40.0	80	
WE514 040 45			45.0	90	
WE514 040 50			50.0	100	
WE514 040 60			60.0		
WE514 050 16			5.0	8.0	
WE514 050 20	20.0				
WE514 050 26	26.0	65			
WE514 050 30	30.0	70			
WE514 050 35	35.0	75			
WE514 050 40	40.0	80			

NEXT >>>

Endmills for Mold & Die(square) WINNER Series



4 FLUTE LONG NECK

- Excellent effect in preventing breakage with a shape of neck without notch
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55 Pre- hardened Steel, Alloy Steel, Carbon Steel

WE514 ...series



EDP. No.	D	L ₁	L ₂	L ₃	D ₂
WE514 050 50	5.0	8.0	50.0	90	6
WE514 050 60			60.0	100	
WE514 060 15	6.0	9.0	15.0	60	6
WE514 060 20			20.0		
WE514 060 30			30.0	70	
WE514 060 32			32.0	90	
WE514 080 25	8.0	12.0	25.0	70	8
WE514 080 30			30.0	80	
WE514 080 42			42.0	100	
WE514 100 30	10.0	15.0	30.0	75	10
WE514 100 35			35.0	80	
WE514 100 45			45.0	100	
WE514 120 35	12.0	20.0	35.0	80	12
WE514 120 40			40.0	90	
WE514 120 50			50.0	110	

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

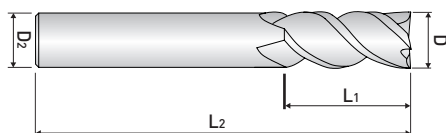
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for Mold & Die(square) WINNER Series



4 FLUTE HIGH HELIX (45°)

- Reduce cutting load with 45° High Helix
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

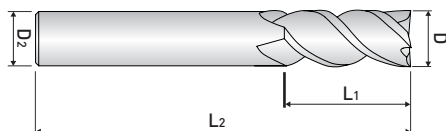
WE504...H ...series



EDP. No.	D	L ₁	L ₂	D ₂
WE504H 010	1.0	2.5	50	6
WE504H 010 04		4.0	60	
WE504H 010 06		6.0		
WE504H 015	1.5	4.0	50	6
WE504H 015 06		6.0	60	
WE504H 015 08		8.0		
WE504H 020	2.0	6.0	50	6
WE504H 020 08		8.0	60	
WE504H 020 10		10.0		
WE504H 030	3.0	8.0	50	6
WE504H 030 10		10.0	70	
WE504H 030 12		12.0		
WE504H 030 16		16.0		
WE504H 040	4.0	10.0	50	6
WE504H 040 12		12.0	70	
WE504H 040 16		16.0		
WE504H 040 20		20.0		
WE504H 050	5.0	15.0	50	6
WE504H 050 30		30.0	80	
WE504H 060	6.0	15.0	60	6
WE504H 060 20		20.0	70	
WE504H 060 30		30.0	80	
WE504H 080	8.0	20.0	70	8
WE504H 080 30		30.0	80	
WE504H 080 35		35.0	90	
WE504H 080 40		40.0	90	
WE504H 100	10.0	25.0	75	10
WE504H 100 30		30.0	80	
WE504H 100 40		40.0	90	
WE504H 100 50		50.0	100	
WE504H 120	12.0	30.0	80	12
WE504H 120 40		40.0	90	
WE504H 120 50		50.0	100	
WE504H 120 60		60.0	110	

NEXT >>

Endmills for Mold & Die(square) WINNER Series



4 FLUTE HIGH HELIX (45°)

- Reduce cutting load with 45° High Helix
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

WE504...H ...series



EDP. No.	D	L ₁	L ₂	D ₂
WE504H 160	16.0	40.0	100	16
WE504H 160 50		50.0	110	
WE504H 160 60		60.0	120	
WE504H 160 110		110.0	200	
WE504H 200	20.0	45.0	100	20
WE504H 200 60		60.0	120	
WE504H 200 70		70.0	130	
WE504H 200 110		110.0	200	

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

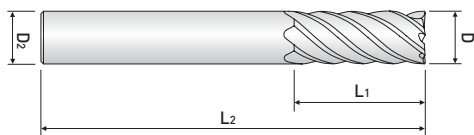
○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0~-0,030	h6

※ These tools are manufactured based on order received.

Endmills for Mold & Die(square) WINNER Series



6 FLUTE HIGH HELIX (45°)

- Dramatically reduced cutting load using 6 flute with high helix
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

WE506 ...series



EDP. No.	D	L ₁	L ₂	D ₂
WE506 060	6.0	15.0	60	6
WE506 060 20		20.0	70	
WE506 060 30		30.0	80	
WE506 060 30 110		30.0	110	
WE506 080	8.0	20.0	70	8
WE506 080 30		30.0	80	
WE506 080 35		35.0	90	
WE506 080 40		40.0	90	
WE506 080 40 130		40.0	130	
WE506 100	10.0	25.0	75	10
WE506 100 30		30.0	80	
WE506 100 40		40.0	90	
WE506 100 50		50.0	100	
WE506 100 50 150		50.0	150	
WE506 120	12.0	30.0	80	12
WE506 120 40		40.0	90	
WE506 120 50		50.0	100	
WE506 120 60		60.0	110	
WE506 120 60 150		60.0	150	
WE506 160	16.0	40.0	100	16
WE506 160 50		50.0	110	
WE506 160 60		60.0	120	
WE506 160 90		90.0	150	
WE506 160 110		110.0	200	
WE506 160 110 250		110.0	250	
WE506 200	20.0	45.0	100	20
WE506 200 60		60.0	120	
WE506 200 70		70.0	130	
WE506 200 110		110.0	200	
WE506 200 110 250			250	
WE506 200 110 300			300	

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

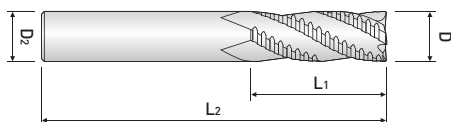
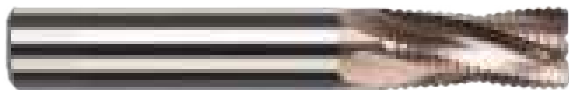
○: General Application ◎: The most suitable Application

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0~0.030	h6

※ These tools are manufactured based on order received.

Endmills for Mold & Die(square) WINNER Series



3, 4, 5 FLUTE 20° ROUGHING

- Strengthen the hardness with Low Helix
- Effective cutting by reduction of chipping due to the shape of chamfer at the end of teeth
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

WF61 ...series



EDP. No.	D	L ₁	L ₂	D ₂	FLUTE
WF613 030	3.0	8.0	50	6	3
WF613 040	4.0	10.0	50	6	3
WF613 050	5.0	13.0	50	6	3
WF613 060	6.0	15.0	60	6	3
WF613 060 20		20.0			3
WF613 070	7.0	18.0	70	8	3
WF613 080	8.0	20.0	70	8	3
WF613 080 25		25.0			3
WF614 090	9.0	22.0	75	10	4
WF614 100	10.0	25.0	75	10	4
WF614 100 30		30.0			4
WF614 110	11.0	27.0	80	12	4
WF614 120	12.0	30.0	80	12	4
WF614 120 35		35.0			4
WF614 130	13.0	35.0	100	12	4
WF614 140	14.0	35.0	100	16	4
WF614 160	16.0	40.0	100	16	4
WF614 180	18.0	40.0	100	18	4
WF614 200	20.0	50.0	100	20	4
WF615 250	25.0	50.0	100	25	5

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

○:General Application ◎:The most suitable Application

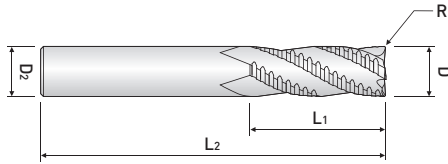
■ Tolerance

μm = 1/1000mm

Tolerance	Diameter	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
Mill Dia(mm)(h10)		0 -40	0 -48	0 -58	0 -70	0 -84
Shank(h6)		0 -6	0 -8	0 -9	0 -11	0 -13

※ These tools are manufactured based on order received.

Endmills for Mold & Die(roughing) *WINNER Series*



VARIABLE INDEX 3, 4, 5 FLUTE ROUGHING

- Powerful cutting with variable index + Corner R
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

WF60 ...series



EDP. No.	D	R	L ₁	L ₂	D ₂	FLUTE
WF603 030	3.0	0.2	8.0	50	6	3
WF603 040	4.0	0.2	10.0	50	6	3
WF604 050	5.0	0.2	13.0	50	6	4
WF604 060	6.0	0.2	10.0	50	6	4
WF604 060 15			15.0	60		4
WF604 070	7.0	0.2	18.0	70	8	4
WF604 080	8.0	0.2	12.0	60	8	4
WF604 080 20			20.0	70		4
WF604 090	9.0	0.3	22.0	75	10	4
WF604 100	10.0	0.3	15.0	65	10	4
WF604 100 25			25.0	75		4
WF604 110	11.0	0.3	27.0	80	12	4
WF604 120	12.0	0.3	20.0	70	12	4
WF604 120 30			30.0	80		4
WF605 130	13.0	0.5	35.0	100	12	5
WF605 140	14.0	0.5	35.0	100	14	5
WF605 140 S16					16	5
WF605 160	16.0	1.0	25.0	80	16	5
WF605 160 40			40.0	100		5
WF605 180	18.0	1.0	40.0	100	18	5
WF605 180 S20					20	5
WF605 200	20.0	1.0	25.0	80	20	5
WF605 200 45			45.0	100		5
WF605 250	25.0	1.0	45.0	100	25	5

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

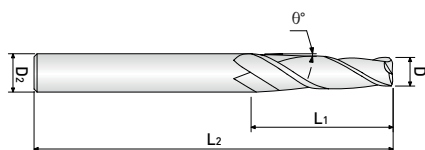
○: General Application ◎: The most suitable Application

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0~0.05	h6

※ These tools are manufactured based on order received.

Endmills for Mold & Die(taper) WINNER Series



2 FLUTE TAPER

- A wide range of choices due to a variety of taper angles
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

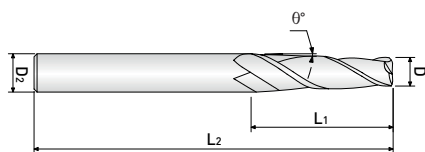
WTE502 ...series



EDP. No.	D	θ	L ₁	L ₂	D ₂
WTE502 003 005	0.3	30°	1.2	40	4
WTE502 003 01		1°	1.2		
WTE502 003 015		1°30'	1.2		
WTE502 003 02		2°	1.2		
WTE502 003 03		3°	1.5		
WTE502 003 05		5°	1.5		
WTE502 003 07		7°	1.5		
WTE502 003 10		10°	1.5		
WTE502 004 005	0.4	30°	1.6	40	4
WTE502 004 01		1°	1.6		
WTE502 004 015		1°30'	1.6		
WTE502 004 02		2°	1.6		
WTE502 004 03		3°	1.6		
WTE502 004 05		5°	2.0		
WTE502 004 07		7°	2.0		
WTE502 004 10		10°	2.0		
WTE502 005 005	0.5	30°	2.0	45	4
WTE502 005 01		1°	2.0		
WTE502 005 015		1°30'	2.0		
WTE502 005 02		2°	2.0		
WTE502 005 03		3°	2.0		
WTE502 005 05		5°	2.5		
WTE502 005 07		7°	2.5		
WTE502 005 10		10°	2.5		
WTE502 006 005	0.6	30°	2.4	45	4
WTE502 006 01		1°	2.4		
WTE502 006 015		1°30'	2.4		
WTE502 006 02		2°	2.4		
WTE502 006 03		3°	2.4		
WTE502 006 05		5°	3.0		
WTE502 006 07		7°	3.0		
WTE502 006 10		10°	3.0		
WTE502 007 005	0.7	30°	2.8	45	4
WTE502 007 01		1°	2.8		
WTE502 007 015		1°30'	2.8		
WTE502 007 02		2°	2.8		
WTE502 007 03		3°	2.8		
WTE502 007 05		5°	3.5		

NEXT >>

Endmills for Mold & Die(taper) WINNER Series



2 FLUTE TAPER

- A wide range of choices due to a variety of taper angles
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

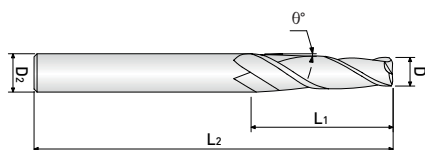
WTE502 ...series



EDP. No.	D	θ	L ₁	L ₂	D ₂
WTE502 007 07	0.7	7°	3.5	45	4
WTE502 007 10		10°	3.5		
WTE502 008 005	0.8	30°	3.2	45	4
WTE502 008 01		1°	3.2		
WTE502 008 015		1°30'	3.2		
WTE502 008 02		2°	3.2		
WTE502 008 03		3°	3.2		
WTE502 008 05		5°	4.0		
WTE502 008 07		7°	4.0		
WTE502 008 10		10°	4.0		
WTE502 010 005	1.0	30°	4.0	50	4
WTE502 010 01		1°	4.0		
WTE502 010 015		1°30'	4.0		
WTE502 010 02		2°	6.0		
WTE502 010 03		3°	6.0		
WTE502 010 05		5°	8.0		
WTE502 010 07		7°	8.0		
WTE502 010 10		10°	8.0		
WTE502 015 005	1.5	30°	6.0	50	4
WTE502 015 01		1°	6.0		
WTE502 015 015		1°30'	6.0		
WTE502 015 02		2°	8.0		
WTE502 015 03		3°	8.0		
WTE502 015 05		5°	10.0		
WTE502 015 07		7°	10.0		
WTE502 015 10		10°	10.0		6
WTE502 020 005	2.0	30°	8.0	50	4
WTE502 020 01		1°	8.0		
WTE502 020 015		1°30'	8.0		
WTE502 020 02		2°	10.0		
WTE502 020 03		3°	10.0		6
WTE502 020 05		5°	12.0		
WTE502 020 07		7°	12.0		
WTE502 020 10		10°	12.0		8

NEXT >>>

Endmills for Mold & Die(taper) WINNER Series



2 FLUTE TAPER

- A wide range of choices due to a variety of taper angles
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- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

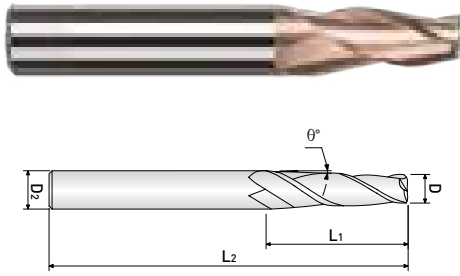
WTE502 ...series



EDP. No.	D	θ	L ₁	L ₂	D ₂
WTE502 025 005	2.5	30°	10.0	50	6
WTE502 025 01		1°	10.0		
WTE502 025 015		1°30'	10.0		
WTE502 025 02		2°	12.0		
WTE502 025 03		3°	12.0		
WTE502 025 05		5°	14.0		
WTE502 025 07		7°	14.0		
WTE502 025 10		10°	14.0		8
WTE502 030 005	3.0	30°	12.0	50	6
WTE502 030 01		1°	12.0		
WTE502 030 015		1°30'	12.0		
WTE502 030 02		2°	14.0		
WTE502 030 03		3°	14.0		
WTE502 030 05		5°	16.0		
WTE502 030 07		7°	16.0		8
WTE502 030 10		10°	16.0		10
WTE502 040 005	4.0	30°	16.0	60	6
WTE502 040 01		1°	16.0		
WTE502 040 015		1°30'	16.0		
WTE502 040 02		2°	16.0		
WTE502 040 03		3°	19.0	65	8
WTE502 040 05		5°	22.0		
WTE502 040 07		7°	16.0		
WTE502 040 10		10°	17.0		10
WTE502 060 005	6.0	30°	20.0	65	8
WTE502 060 01		1°	20.0		
WTE502 060 015		1°30'	20.0		
WTE502 060 02		2°	20.0		
WTE502 060 03		3°	19.0	75	10
WTE502 060 05		5°	22.0		
WTE502 060 07		7°	24.0		
WTE502 060 10		10°	17.0		12

NEXT >>>

Endmills for Mold & Die(taper) WINNER Series



2 FLUTE TAPER

- A wide range of choices due to a variety of taper angles
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

WTE502 ...series



EDP. No.	D	θ	L ₁	L ₂	D ₂	
WTE502 070 005	7.0	30`	28.0	70	8	
WTE502 070 01		1°	28.0			
WTE502 070 015		1°30`	28.0			
WTE502 070 02		2°	28.0	80	10	
WTE502 070 03		3°	28.0			
WTE502 070 05		5°	28.0			
WTE502 080 005		8.0	30`	35.0	90	10
WTE502 080 01	1°		35.0			
WTE502 080 015	1°30`		35.0			
WTE502 080 02	2°		28.0			
WTE502 080 03	3°		38.0			
WTE502 080 05	5°		45.0	100	16	
WTE502 080 07	7°		32.0	90	16	
WTE502 080 10	10°		34.0	100	20	
WTE502 080 10 S25	10°		48.0	150	25	
WTE502 100 005	10.0	30`	40.0	90	12	
WTE502 100 01		1°	40.0			
WTE502 100 015		1°30`	38.0			
WTE502 100 02		2°	40.0	75	16	
WTE502 100 03		3°	40.0	100		
WTE502 100 05		5°	34.0			
WTE502 100 07		7°	40.0	90		20
WTE502 100 10		10°	42.0	100		25

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

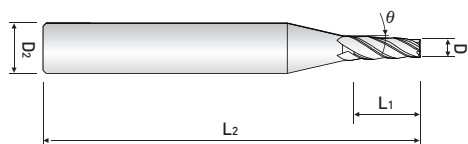
○: General Application ◎: The most suitable Application

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0~0.030	h6

※ These tools are manufactured based on order received.

Endmills for Mold & Die(taper) WINNER Series



4 FLUTE TAPER

- A wide range of choices due to a variety of taper angles
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

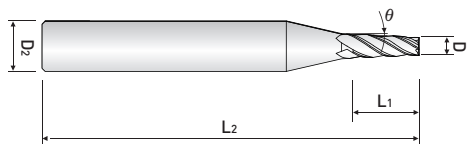
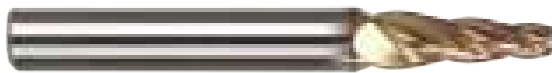
WTE504 ...series



EDP. No.	D	θ	L ₁	L ₂	D ₂
WTE504 030 005	3.0	30°	12.0	50	6
WTE504 030 01		1°	12.0		
WTE504 030 015		1°30'	12.0		
WTE504 030 02		2°	14.0		
WTE504 030 03		3°	14.0		
WTE504 030 05		5°	16.0		
WTE504 030 07		7°	16.0		8
WTE504 030 10		10°	16.0		10
WTE504 040 005	4.0	30°	16.0	60	6
WTE504 040 01		1°	16.0		
WTE504 040 015		1°30'	16.0		
WTE504 040 02		2°	16.0		
WTE504 040 03		3°	19.0		
WTE504 040 05		5°	22.0		
WTE504 040 07		7°	16.0	65	8
WTE504 040 10		10°	17.0		10
WTE504 060 005	6.0	30°	20.0	65	8
WTE504 060 01		1°	20.0		
WTE504 060 015		1°30'	20.0		
WTE504 060 02		2°	20.0		
WTE504 060 03		3°	19.0		
WTE504 060 05		5°	22.0		
WTE504 060 07		7°	24.0	75	10
WTE504 060 10		10°	17.0		12
WTE504 070 005	7.0	30°	28.0	70	8
WTE504 070 01		1°	28.0		
WTE504 070 015		1°30'	28.0		
WTE504 070 02		2°	28.0		
WTE504 070 03		3°	28.0	80	10
WTE504 070 05		5°	28.0		12
WTE504 080 005	8.0	30°	35.0	90	10
WTE504 080 01		1°	35.0		
WTE504 080 015		1°30'	35.0		
WTE504 080 02		2°	28.0		
WTE504 080 03		3°	38.0		
WTE504 080 05		5°	45.0	100	
WTE504 080 07		7°	32.0	90	16
WTE504 080 10		10°	34.0	100	20

NEXT >>>

Endmills for Mold & Die(taper) WINNER Series



4 FLUTE TAPER

- A wide range of choices due to a variety of taper angles
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

WTE504 ...series



EDP. No.	D	θ	L ₁	L ₂	D ₂
WTE504 100 005	10.0	30°	40.0	90	12
WTE504 100 01		1°	40.0		
WTE504 100 015		1°30'	38.0		
WTE504 100 02		2°	40.0		
WTE504 100 03		3°	40.0	100	16
WTE504 100 05		5°	34.0		
WTE504 100 07		7°	40.0		
WTE504 100 10		10°	42.0		

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

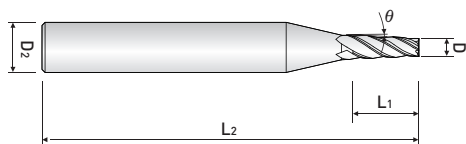
○:General Application ◎:The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for Mold & Die(taper) WINNER Series



4 FLUTE TAPER LONG RIB

- A wide range of choices due to a variety of taper angles & flute length
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

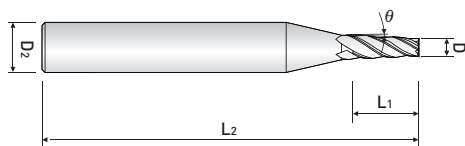
WTE514 ...series



EDP. No.	D	θ	L ₁	L ₂	D ₂
WTE514 008 005 04	0.8	30°	4.0	45	4
WTE514 008 005 06			6.0		
WTE514 008 005 08			8.0		
WTE514 008 005 10			10.0		
WTE514 008 005 12			12.0		
WTE514 008 010 04		1°	4.0		
WTE514 008 010 06			6.0		
WTE514 008 010 08			8.0		
WTE514 008 010 10			10.0		
WTE514 008 010 12			12.0		
WTE514 008 015 04		1°30'	4.0		
WTE514 008 015 06			6.0		
WTE514 008 015 08			8.0		
WTE514 008 015 10			10.0		
WTE514 008 015 12			12.0		
WTE514 008 020 04		2°	4.0		
WTE514 008 020 06			6.0		
WTE514 008 020 08			8.0		
WTE514 008 020 10			10.0		
WTE514 008 020 12			12.0		
WTE514 010 005 04	1.0	30°	4.0	50	4
WTE514 010 005 06			6.0		
WTE514 010 005 08			8.0		
WTE514 010 005 10			10.0		
WTE514 010 005 12			12.0		
WTE514 010 005 16			16.0		
WTE514 010 010 04		1°	4.0		
WTE514 010 010 06			6.0		
WTE514 010 010 08			8.0		
WTE514 010 010 10			10.0		
WTE514 010 010 12			12.0		
WTE514 010 010 16			16.0		
WTE514 010 015 04		1°30'	4.0		
WTE514 010 015 06			6.0		
WTE514 010 015 08			8.0		
WTE514 010 015 10			10.0		
WTE514 010 015 12			12.0		
WTE514 010 015 16			16.0		

NEXT >>

Endmills for Mold & Die(taper) *WINNER Series*



4 FLUTE TAPER LONG RIB

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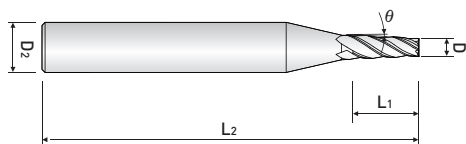
WTE514 ...series



EDP. No.	D	θ	L ₁	L ₂	D ₂
WTE514 010 020 04	1.0	2°	4.0	50	4
WTE514 010 020 06			6.0		
WTE514 010 020 08			8.0		
WTE514 010 020 10			10.0		
WTE514 010 020 12			12.0		
WTE514 010 020 16			16.0		
WTE514 010 030 04		3°	4.0		
WTE514 010 030 06			6.0		
WTE514 010 030 08			8.0		
WTE514 010 030 10			10.0		
WTE514 010 030 12			12.0		
WTE514 010 030 16			16.0		
WTE514 012 005 06	1.2	30°	6.0	50	4
WTE514 012 005 08			8.0		
WTE514 012 005 10			10.0		
WTE514 012 005 12			12.0		
WTE514 012 005 16			16.0		
WTE514 012 010 06		1°	6.0		
WTE514 012 010 08			8.0		
WTE514 012 010 10			10.0		
WTE514 012 010 12			12.0		
WTE514 012 010 16			16.0		
WTE514 012 015 06		1°30'	6.0		
WTE514 012 015 08			8.0		
WTE514 012 015 10			10.0		
WTE514 012 015 12			12.0		
WTE514 012 015 16			16.0		
WTE514 012 020 06		2°	6.0		
WTE514 012 020 08			8.0		
WTE514 012 020 10			10.0		
WTE514 012 020 12			12.0		
WTE514 012 020 16			16.0		
WTE514 012 030 06		3°	6.0		
WTE514 012 030 08			8.0		
WTE514 012 030 10			10.0		
WTE514 012 030 12			12.0		
WTE514 012 030 16			16.0		

NEXT >>>

Endmills for Mold & Die(taper) WINNER Series



4 FLUTE TAPER LONG RIB

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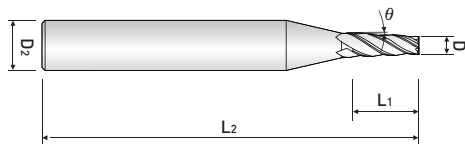
WTE514 ...series



EDP. No.	D	θ	L ₁	L ₂	D ₂
WTE514 015 005 06	1.5	30°	6.0	50	4
WTE514 015 005 08			8.0		
WTE514 015 005 10			10.0		
WTE514 015 005 12			12.0		
WTE514 015 005 16			16.0		
WTE514 015 005 20			20.0		
WTE514 015 010 06		1°	6.0	50	
WTE514 015 010 08			8.0		
WTE514 015 010 10			10.0		
WTE514 015 010 12			12.0		
WTE514 015 010 16			16.0		
WTE514 015 010 20			20.0		
WTE514 015 015 06		1°30`	6.0	50	
WTE514 015 015 08			8.0		
WTE514 015 015 10			10.0		
WTE514 015 015 12			12.0		
WTE514 015 015 16			16.0		
WTE514 015 015 20			20.0		
WTE514 015 020 06		2°	6.0	50	
WTE514 015 020 08			8.0		
WTE514 015 020 10			10.0		
WTE514 015 020 12			12.0		
WTE514 015 020 16			16.0		
WTE514 015 020 20			20.0		
WTE514 015 030 06		3°	6.0	50	
WTE514 015 030 08			8.0		
WTE514 015 030 10			10.0		
WTE514 015 030 12			12.0		
WTE514 015 030 16			16.0		
WTE514 015 030 20			20.0		

NEXT >>

Endmills for Mold & Die(taper) *WINNER Series*



4 FLUTE TAPER LONG RIB

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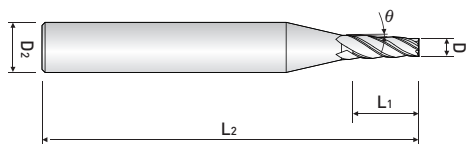
WTE514 ...series



EDP. No.	D	θ	L ₁	L ₂	D ₂
WTE514 020 005 08	2.0	30°	8.0	50	4
WTE514 020 005 10			10.0		
WTE514 020 005 12			12.0		
WTE514 020 005 16			16.0		
WTE514 020 005 20			20.0		
WTE514 020 005 25			25.0		
WTE514 020 010 08		1°	8.0	50	
WTE514 020 010 10			10.0		
WTE514 020 010 12			12.0		
WTE514 020 010 16			16.0		
WTE514 020 010 20			20.0		
WTE514 020 010 25			25.0		
WTE514 020 015 08		1°30`	8.0	50	
WTE514 020 015 10			10.0		
WTE514 020 015 12			12.0		
WTE514 020 015 16			16.0		
WTE514 020 015 20			20.0		
WTE514 020 015 25			25.0		
WTE514 020 020 08		2°	8.0	50	
WTE514 020 020 10			10.0		
WTE514 020 020 12			12.0		
WTE514 020 020 16			16.0		
WTE514 020 020 20			20.0		
WTE514 020 020 25			25.0		
WTE514 020 030 08		3°	8.0	50	
WTE514 020 030 10			10.0		
WTE514 020 030 12			12.0		
WTE514 020 030 16			16.0		
WTE514 020 030 20			20.0		
WTE514 020 030 25			25.0		
				60	6

NEXT >>

Endmills for Mold & Die(taper) WINNER Series



4 FLUTE TAPER LONG RIB

- A wide range of choices due to a variety of taper angles & flute length
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

WTE514 ...series



EDP. No.	D	θ	L ₁	L ₂	D ₂
WTE514 025 005 10	2.5	30`	10.0	50	4
WTE514 025 005 12			12.0		
WTE514 025 005 16			16.0		
WTE514 025 005 20			20.0	60	
WTE514 025 005 25			25.0		
WTE514 025 005 30			30.0		
WTE514 025 010 10		1°	10.0	50	
WTE514 025 010 12			12.0		
WTE514 025 010 16			16.0		
WTE514 025 010 20			20.0	60	
WTE514 025 010 25			25.0		
WTE514 025 010 30			30.0		
WTE514 025 015 10		1°30`	10.0	50	
WTE514 025 015 12			12.0		
WTE514 025 015 16			16.0		
WTE514 025 015 20			20.0	60	
WTE514 025 015 25			25.0		
WTE514 025 015 30			30.0		6
WTE514 025 020 10		2°	10.0	50	4
WTE514 025 020 12			12.0		
WTE514 025 020 16			16.0		
WTE514 025 020 20			20.0	60	
WTE514 025 020 25			25.0		6
WTE514 025 020 30			30.0		
WTE514 025 030 10		3°	10.0	50	4
WTE514 025 030 12			12.0		
WTE514 025 030 16			16.0		
WTE514 025 030 20			20.0	60	6
WTE514 025 030 25			25.0		
WTE514 025 030 30			30.0		

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

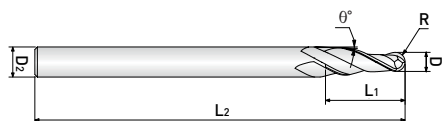
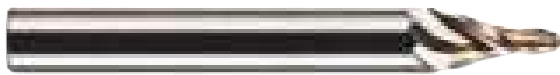
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for Mold & Die(taper) *WINNER Series*



2 FLUTE TAPER BALL

- A wide range of choices due to a variety of taper angles
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

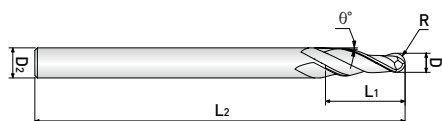
WTB502 ...series



EDP. No.	D	R	θ	L ₁	L ₂	D ₂
WTB502 003 005	0.3	0.15	30`	1.2	40	4
WTB502 003 01			1°			
WTB502 003 015			1°30`			
WTB502 003 02			2°			
WTB502 003 03			3°	1.5		
WTB502 003 05			5°			
WTB502 003 07			7°			
WTB502 003 10			10°			
WTB502 004 005	0.4	0.2	30`	1.6	40	4
WTB502 004 01			1°			
WTB502 004 015			1°30`			
WTB502 004 02			2°			
WTB502 004 03			3°	2		
WTB502 004 05			5°			
WTB502 004 07			7°			
WTB502 004 10			10°			
WTB502 005 005	0.5	0.25	30`	2	45	4
WTB502 005 01			1°			
WTB502 005 015			1°30`			
WTB502 005 02			2°			
WTB502 005 03			3°	2.5		
WTB502 005 05			5°			
WTB502 005 07			7°			
WTB502 005 10			10°			
WTB502 006 005	0.6	0.3	30`	2	45	4
WTB502 006 01			1°			
WTB502 006 015			1°30`			
WTB502 006 02			2°			
WTB502 006 03			3°	2.5		
WTB502 006 05			5°			
WTB502 006 07			7°			
WTB502 006 10			10°			
WTB502 007 005	0.7	0.35	30`	2.5	45	4
WTB502 007 01			1°			
WTB502 007 015			1°30`			
WTB502 007 02			2°			
WTB502 007 03			3°			
WTB502 007 05			5°			

NEXT >>>

Endmills for Mold & Die(taper) WINNER Series



2 FLUTE TAPER BALL

- A wide range of choices due to a variety of taper angles
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

WTB502 ...series



EDP. No.	D	R	θ	L ₁	L ₂	D ₂
WTB502 007 07	0.7	0.35	7°	3	45	4
WTB502 007 10			10°			
WTB502 008 005	0.8	0.4	30`	3.2	45	4
WTB502 008 01			1°			
WTB502 008 015			1°30`			
WTB502 008 02			2°			
WTB502 008 03			3°			
WTB502 008 05			5°			
WTB502 008 07			7°			
WTB502 008 10			10°			
WTB502 010 005	1.0	0.5	30`	4.0	50	4
WTB502 010 01			1°			
WTB502 010 015			1°30`			
WTB502 010 02			2°			
WTB502 010 03			3°			
WTB502 010 05			5°			
WTB502 010 07			7°			
WTB502 010 10			10°			
WTB502 015 005	1.5	0.75	30`	6.0	50	4
WTB502 015 01			1°			
WTB502 015 015			1°30`			
WTB502 015 02			2°	7.0		
WTB502 015 03			3°	8.0		
WTB502 015 05			5°	10.0		
WTB502 015 07			7°			
WTB502 015 10			10°			6
WTB502 020 005	2.0	1	30`	6.0	50	4
WTB502 020 01			1°			
WTB502 020 015			1°30`			
WTB502 020 02			2°	10.0		
WTB502 020 03			3°			
WTB502 020 05			5°			
WTB502 020 07			7°			
WTB502 020 10			10°			11.0

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

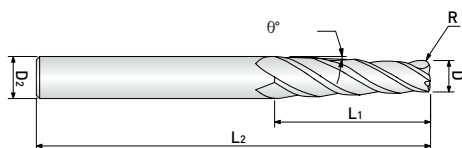
○: General Application ◎: The most suitable Application

■ Tolerance

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

※ These tools are manufactured based on order received.

Endmills for Mold & Die(taper) *WINNER Series*



4 FLUTE TAPER CORNER RADIUS

- Strengthened hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

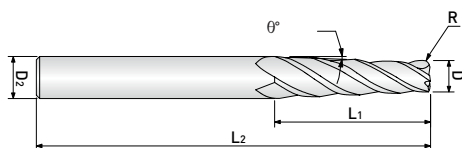
WTR504 ...series



EDP. No.	D	R	θ	L ₁	L ₂	D ₂
WTR504 008 01 01 04	0.8	0.1	1°	4.0	45	4
WTR504 008 01 01 06				6.0		
WTR504 008 01 01 08				8.0		
WTR504 008 01 015 04			1°30'	4.0		
WTR504 008 01 015 06				6.0		
WTR504 008 01 015 08				8.0		
WTR504 008 02 01 04		0.2	1°	4.0		
WTR504 008 02 01 06				6.0		
WTR504 008 02 01 08				8.0		
WTR504 008 02 015 04			1°30'	4.0		
WTR504 008 02 015 06				6.0		
WTR504 008 02 015 08				8.0		
WTR504 010 01 01 04	1.0	0.1	1°	4.0	50	4
WTR504 010 01 01 06				6.0		
WTR504 010 01 01 08				8.0		
WTR504 010 01 01 10				10.0		
WTR504 010 01 01 12				12.0		
WTR504 010 01 015 04			1°30'	4.0		
WTR504 010 01 015 06				6.0		
WTR504 010 01 015 08				8.0		
WTR504 010 01 015 10				10.0		
WTR504 010 01 015 12				12.0		
WTR504 010 01 02 04			2°	4.0		
WTR504 010 01 02 06				6.0		
WTR504 010 01 02 08				8.0		
WTR504 010 01 02 10				10.0		
WTR504 010 01 02 12				12.0		
WTR504 010 01 03 04			3°	4.0		
WTR504 010 01 03 06				6.0		
WTR504 010 01 03 08				8.0		
WTR504 010 01 03 10				10.0		
WTR504 010 01 03 12				12.0		
WTR504 010 02 01 04		0.2	1°	4.0		
WTR504 010 02 01 06				6.0		
WTR504 010 02 01 08				8.0		
WTR504 010 02 01 10				10.0		
WTR504 010 02 01 12				12.0		
WTR504 010 02 015 04			1°30'	4.0		

NEXT >>

Endmills for Mold & Die(taper) *WINNER Series*



4 FLUTE TAPER CORNER RADIUS

- Strengthened hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
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- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

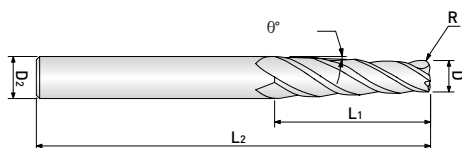
WTR504 ...series



EDP. No.	D	R	θ	L ₁	L ₂	D ₂
WTR504 010 02 015 06	1.0	0.2	1°30'	6.0	50	4
WTR504 010 02 015 08				8.0		
WTR504 010 02 015 10				10.0		
WTR504 010 02 015 12				12.0		
WTR504 010 02 02 04			2°	4.0		
WTR504 010 02 02 06				6.0		
WTR504 010 02 02 08				8.0		
WTR504 010 02 02 10				10.0		
WTR504 010 02 02 12				12.0		
WTR504 010 02 03 04			3°	4.0		
WTR504 010 02 03 06				6.0		
WTR504 010 02 03 08				8.0		
WTR504 010 02 03 10				10.0		
WTR504 010 02 03 12				12.0		
WTR504 010 03 01 04		0.3	1°	4.0		
WTR504 010 03 01 06				6.0		
WTR504 010 03 01 08				8.0		
WTR504 010 03 01 10				10.0		
WTR504 010 03 01 12				12.0		
WTR504 010 03 015 04			1°30'	4.0		
WTR504 010 03 015 06				6.0		
WTR504 010 03 015 08				8.0		
WTR504 010 03 015 10				10.0		
WTR504 010 03 015 12				12.0		
WTR504 010 03 02 04			2°	4.0		
WTR504 010 03 02 06				6.0		
WTR504 010 03 02 08				8.0		
WTR504 010 03 02 10				10.0		
WTR504 010 03 02 12				12.0		
WTR504 010 03 03 04			3°	4.0		
WTR504 010 03 03 06				6.0		
WTR504 010 03 03 08				8.0		
WTR504 010 03 03 10				10.0		
WTR504 010 03 03 12				12.0		
WTR504 012 01 01 06	1.2	0.1	1°	6.0	50	4
WTR504 012 01 01 08				8.0		
WTR504 012 01 01 10				10.0		
WTR504 012 01 01 12				12.0		

NEXT >>

Endmills for Mold & Die(taper) *WINNER Series*



4 FLUTE TAPER CORNER RADIUS

- Strengthened hardness of flute by applying the minute corner R to prevent chipping
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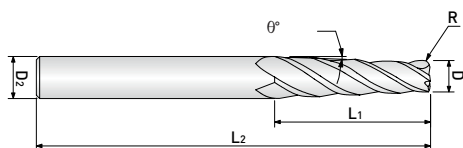
WTR504 ...series



EDP. No.	D	R	θ	L ₁	L ₂	D ₂
WTR504 012 01 02 06	1.2	0.1	2°	6.0	50	4
WTR504 012 01 02 08				8.0		
WTR504 012 01 02 10				10.0		
WTR504 012 01 02 12				12.0		
WTR504 012 01 03 06			3°	6.0		
WTR504 012 01 03 08				8.0		
WTR504 012 01 03 10				10.0		
WTR504 012 01 03 12				12.0		
WTR504 012 02 01 06		0.2	1°	6.0		
WTR504 012 02 01 08				8.0		
WTR504 012 02 01 10				10.0		
WTR504 012 02 01 12				12.0		
WTR504 012 02 02 06			2°	6.0		
WTR504 012 02 02 08				8.0		
WTR504 012 02 02 10				10.0		
WTR504 012 02 02 12				12.0		
WTR504 012 02 03 06			3°	6.0		
WTR504 012 02 03 08				8.0		
WTR504 012 02 03 10				10.0		
WTR504 012 02 03 12				12.0		
WTR504 012 03 01 06		0.3	1°	6.0		
WTR504 012 03 01 08				8.0		
WTR504 012 03 01 10				10.0		
WTR504 012 03 01 12				12.0		
WTR504 012 03 02 06			2°	6.0		
WTR504 012 03 02 08				8.0		
WTR504 012 03 02 10				10.0		
WTR504 012 03 02 12				12.0		
WTR504 012 03 03 06			3°	6.0		
WTR504 012 03 03 08				8.0		
WTR504 012 03 03 10				10.0		
WTR504 012 03 03 12				12.0		

NEXT >>

Endmills for Mold & Die(taper) *WINNER Series*



4 FLUTE TAPER CORNER RADIUS

- Strengthened hardness of flute by applying the minute corner R to prevent chipping
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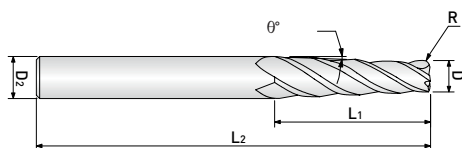
WTR504 ...series



EDP. No.	D	R	θ	L ₁	L ₂	D ₂			
WTR504 015 01 01 06	1.5	0.1	1°	6.0	50	4			
WTR504 015 01 01 08				8.0					
WTR504 015 01 01 10				10.0					
WTR504 015 01 01 12				12.0					
WTR504 015 01 01 16				16.0					
WTR504 015 01 01 20				20.0					
WTR504 015 01 02 06			2°	6.0	50				
WTR504 015 01 02 08				8.0					
WTR504 015 01 02 10				10.0					
WTR504 015 01 02 12				12.0					
WTR504 015 01 02 16				16.0					
WTR504 015 01 02 20				20.0					
WTR504 015 01 03 06			3°	6.0	50				
WTR504 015 01 03 08				8.0					
WTR504 015 01 03 10				10.0					
WTR504 015 01 03 12				12.0					
WTR504 015 01 03 16				16.0					
WTR504 015 01 03 20				20.0					
WTR504 015 02 01 06			1.5	0.2	1°		6.0	50	4
WTR504 015 02 01 08							8.0		
WTR504 015 02 01 10	10.0								
WTR504 015 02 01 12	12.0								
WTR504 015 02 01 16	16.0								
WTR504 015 02 01 20	20.0								
WTR504 015 02 02 06	2°	6.0			50				
WTR504 015 02 02 08		8.0							
WTR504 015 02 02 10		10.0							
WTR504 015 02 02 12		12.0							
WTR504 015 02 02 16		16.0							
WTR504 015 02 02 20		20.0							
WTR504 015 02 03 06	3°	6		50					
WTR504 015 02 03 08		8							
WTR504 015 02 03 10		10							
WTR504 015 02 03 12		12							
WTR504 015 02 03 16		16							
WTR504 015 02 03 20		20							
WTR504 015 03 01 06	0.3	1°		6	50				
WTR504 015 03 01 08				8					
WTR504 015 03 01 10			10						

NEXT >>>

Endmills for Mold & Die(taper) *WINNER Series*



4 FLUTE TAPER CORNER RADIUS

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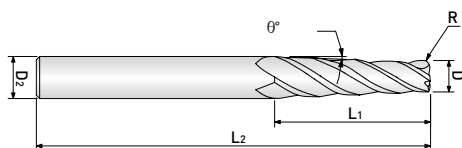
WTR504 ...series



EDP. No.	D	R	θ	L ₁	L ₂	D ₂	
WTR504 015 03 01 12	1.5	0.3	1°	12	50	4	
WTR504 015 03 01 16				16			
WTR504 015 03 01 20				20			
WTR504 015 03 02 06			2°	6	50		
WTR504 015 03 02 08				8			
WTR504 015 03 02 10				10			
WTR504 015 03 02 12				12			
WTR504 015 03 02 16				16			
WTR504 015 03 02 20				20			60
WTR504 015 03 03 06			3°	6	50		
WTR504 015 03 03 08				8			
WTR504 015 03 03 10				10			
WTR504 015 03 03 12				12			
WTR504 015 03 03 16				16			
WTR504 015 03 03 20				20			60
WTR504 020 01 01 08	2.0	0.1	1°	8.0	50	4	
WTR504 020 01 01 10				10.0			
WTR504 020 01 01 12				12.0			
WTR504 020 01 01 16				16.0			
WTR504 020 01 01 20				20.0	60		
WTR504 020 01 01 25				25.0			
WTR504 020 01 02 08			2°	8.0	50		
WTR504 020 01 02 10				10.0			
WTR504 020 01 02 12				12.0			
WTR504 020 01 02 16				16.0			
WTR504 020 01 02 20				20.0			60
WTR504 020 01 02 25				25.0			
WTR504 020 01 03 08		3°	8.0	50	4		
WTR504 020 01 03 10			10.0				
WTR504 020 01 03 12			12.0				
WTR504 020 01 03 16			16.0				
WTR504 020 01 03 20			20.0			60	
WTR504 020 01 03 25			25.0				
WTR504 020 02 01 08		0.2	1°	8.0	50	4	
WTR504 020 02 01 10				10.0			
WTR504 020 02 01 12				12.0			
WTR504 020 02 01 16				16.0			
WTR504 020 02 01 20				20.0			60
WTR504 020 02 01 25				25.0			

NEXT >>

Endmills for Mold & Die(taper) *WINNER Series*



4 FLUTE TAPER CORNER RADIUS

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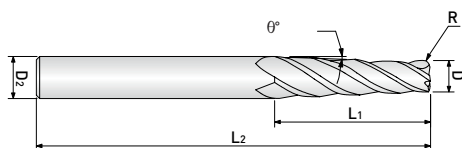
WTR504 ...series



EDP. No.	D	R	θ	L ₁	L ₂	D ₂
WTR504 020 02 02 08	2.0	0.2	2°	8.0	50	4
WTR504 020 02 02 10				10.0		
WTR504 020 02 02 12				12.0		
WTR504 020 02 02 16				16.0		
WTR504 020 02 02 20			20.0	60		
WTR504 020 02 02 25			25.0			
WTR504 020 02 03 08			3°	8.0	50	
WTR504 020 02 03 10				10.0		
WTR504 020 02 03 12				12.0		
WTR504 020 02 03 16				16.0		
WTR504 020 02 03 20		20.0		60		
WTR504 020 02 03 25		25.0				
WTR504 020 03 01 08		0.3	1°	8.0	50	4
WTR504 020 03 01 10				10.0		
WTR504 020 03 01 12				12.0		
WTR504 020 03 01 16				16.0		
WTR504 020 03 01 20				20.0	60	
WTR504 020 03 01 25				25.0		
WTR504 020 03 02 08			2°	8.0	50	
WTR504 020 03 02 10				10.0		
WTR504 020 03 02 12				12.0		
WTR504 020 03 02 16				16.0		
WTR504 020 03 02 20				20.0	60	
WTR504 020 03 02 25				25.0		
WTR504 020 03 03 08			3°	8.0	50	6
WTR504 020 03 03 10				10.0		
WTR504 020 03 03 12				12.0		
WTR504 020 03 03 16				16.0		
WTR504 020 03 03 20				20.0		
WTR504 020 03 03 25				25.0		

NEXT >>

Endmills for Mold & Die(taper) *WINNER Series*



4 FLUTE TAPER CORNER RADIUS

- Strengthened hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

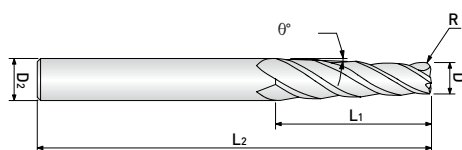
WTR504 ...series



EDP. No.	D	R	θ	L ₁	L ₂	D ₂
WTR504 025 01 01 10	2.5	0.1	1°	10.0	50	4
WTR504 025 01 01 12				12.0		
WTR504 025 01 01 16				16.0		
WTR504 025 01 01 20				20.0		
WTR504 025 01 01 25				25.0		
WTR504 025 01 01 30				30.0		
WTR504 025 01 02 10			2°	10.0	50	
WTR504 025 01 02 12				12.0		
WTR504 025 01 02 16				16.0		
WTR504 025 01 02 20				20.0	60	
WTR504 025 01 02 25				25.0		
WTR504 025 01 02 30				30.0		
WTR504 025 01 03 10			3°	10.0	50	4
WTR504 025 01 03 12				12.0		
WTR504 025 01 03 16				16.0		
WTR504 025 01 03 20				20.0	60	6
WTR504 025 01 03 25				25.0		
WTR504 025 01 03 30				30.0		
WTR504 025 02 01 10		0.2	1°	10.0	50	4
WTR504 025 02 01 12				12.0		
WTR504 025 02 01 16				16.0		
WTR504 025 02 01 20				20.0		
WTR504 025 02 01 25				25.0		
WTR504 025 02 01 30				30.0		
WTR504 025 02 02 10			2°	10.0	50	
WTR504 025 02 02 12				12.0		
WTR504 025 02 02 16				16.0		
WTR504 025 02 02 20				20.0	60	
WTR504 025 02 02 25				25.0		
WTR504 025 02 02 30				30.0		

NEXT >>

Endmills for Mold & Die(taper) WINNER Series



4 FLUTE TAPER CORNER RADIUS

- Strengthened hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

WTR504 ...series



EDP. No.	D	R	θ	L ₁	L ₂	D ₂
WTR504 025 02 03 10	2.5	0.2	3°	10.0	50	4
WTR504 025 02 03 12				12.0		
WTR504 025 02 03 16				16.0		
WTR504 025 02 03 20				20.0	60	6
WTR504 025 02 03 25				25.0		
WTR504 025 02 03 30				30.0		
WTR504 025 03 01 10		0.3	1°	10.0	50	4
WTR504 025 03 01 12				12.0		
WTR504 025 03 01 16				16.0		
WTR504 025 03 01 20				20.0	60	
WTR504 025 03 01 25				25.0		
WTR504 025 03 01 30				30.0		
WTR504 025 03 02 10			2°	10.0	50	4
WTR504 025 03 02 12				12.0		
WTR504 025 03 02 16				16.0		
WTR504 025 03 02 20				20.0	60	
WTR504 025 03 02 25				25.0		
WTR504 025 03 02 30				30.0		
WTR504 025 03 03 10			3°	10.0	50	4
WTR504 025 03 03 12				12.0		
WTR504 025 03 03 16				16.0		
WTR504 025 03 03 20				20.0		
WTR504 025 03 03 25				25.0		
WTR504 025 03 03 30				30.0		

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

○:General Application ◎:The most suitable Application

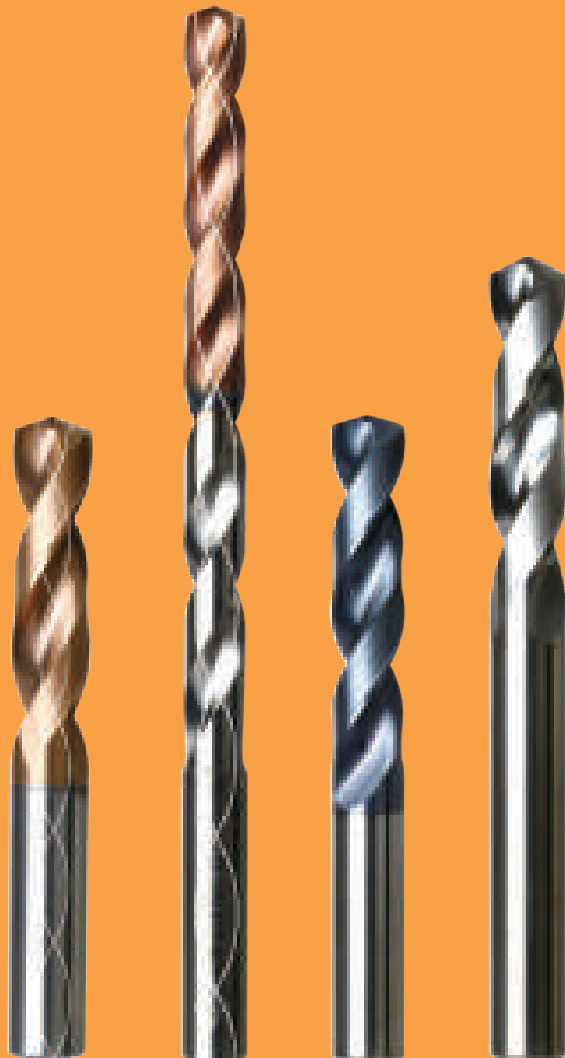
■ Tolerance

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

※ These tools are manufactured based on order received.

3

DRILL SERIES >



Drills for high hardened steel
(Power Max Drill Series)

498

Drills for General Speed Cutting
(Power Drill Series)

544

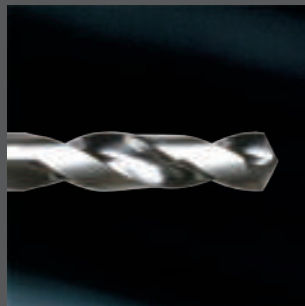
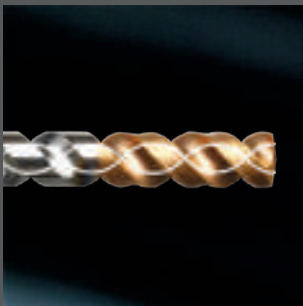
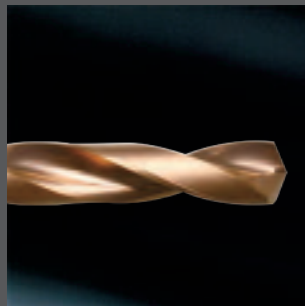
Drills for Multi-purpose
(Solid Spiral Drill Series)

562

Drills for high hardened steel

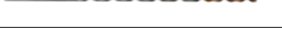
POWER MAX DRILL SERIES

DRILL
SERIES



Drills for high hardened steel _ Power Max Drill Series

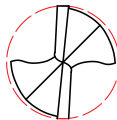
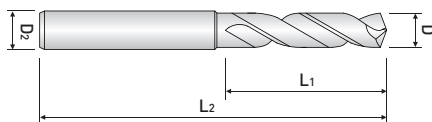
WIDIN

EDP. No.	APPEARANCE	FEATURE	INCH & METRIC	STOCK	PAGE
PF503 ...series		3XD	METRIC	•	498
PF505 ...series		5XD	METRIC	•	502
SF503 ...series		3XD / INTERNAL COOLANT	METRIC	•	506
SF505 ...series		5XD / INTERNAL COOLANT	METRIC	•	510
SF510 ...series		10 X D / INTERNAL COOLANT / DOUBLE MARGIN	METRIC	•	514
SF520 ...series		20 X D / INTERNAL COOLANT / DOUBLE MARGIN	METRIC	•	516
HP503 ...series		HIGH PRECISION 3XD / DOUBLE MARGIN	METRIC	•	517
HPI 503 ...series		HIGH PRECISION 3 X D / INTERNAL COOLANT / DOUBLE MARGIN	METRIC	•	518
HPI 505 ...series		HIGH PRECISION 5 X D / INTERNAL COOLANT/ Double margin	METRIC	•	520
HPI 508 ...series		HIGH PRECISION / 8 X D / INTERNAL COOLANT / Double margin	METRIC	•	523
P503A(F) ...series		STUB / DIN 6537K	METRIC	•	530
PI503A(F) ...series		STUB INTERNAL COOLANT / DIN 6537K	METRIC	•	536
PI505A(F) ...series		MEDIUM INTERNAL COOLANT / DIN 6537L	METRIC	•	538

■ CODE SYSTEM

P	I	5	05	A	040
Classification	Shape	Grade	Drilling Depth	Shank type	Diameter
P : Power Max	F : Facet Point	5 : Grade	03 : 3xD	A : Plane	2
S : Spairal Coolant	I : Internal Coolant		05 : 5xD	F : DIN 6535 HE	20
HP : High Precision			08 : 8xD		
			10 : 10xD		
			20 : 20xD		

Drills for high hardened steel *Power Max Drill Series*



POWER MAX DRILL - STUB HIGH SPEED MACHINING, 3 X D

- Suitable for high speed cutting with newly developed raw-material and new coating

PF503 ...series



EDP. No.	D			L ₁	L ₂	D ₂
	mm	fraction	inch			
PF503020	2.0	-	.0787	14	50	3
PF503021	2.1	-	.0827			
PF503022	2.2	-	.0866			
PF503023	2.3	-	.0906			
PF503024	2.4	-	.0945			
PF503025	2.5	-	.0984			
PF503026	2.6	-	.1024			
PF503027	2.7	-	.1063			
PF503028	2.8	-	.1102			
PF503029	2.9	-	.1142			
PF503030	3.0	-	.1181	18	60	
PF503031	3.1	-	.1220	20	60	4
PF50303175	3.175	1/8	.1250			
PF503032	3.2	-	.1260			
PF50303264	3.264	-	.1285			
PF503033	3.3	-	.1299			
PF503034	3.4	-	.1339	22		
PF503035	3.5	-	.1378			
PF50303572	3.572	9/64	.1406			
PF503036	3.6	-	.1417			
PF503037	3.7	-	.1457			
PF503038	3.8	-	.1496	24		
PF503039	3.9	-	.1535			
PF503040	4.0	-	.1575			
PF50304039	4.039	-	.1590			
PF503041	4.1	-	.1614			
PF503042	4.2	-	.1654	26	62	5
PF503043	4.3	-	.1693			
PF503044	4.4	-	.1732			
PF503045	4.5	-	.1772			
PF503046	4.6	-	.1811			
PF503047	4.7	-	.1850			
PF50304763	4.763	3/16	.1875			
PF503048	4.8	-	.1890			
PF503049	4.9	-	.1920			
PF503050	5.0	-	.1969			
PF503051	5.1	-	.2008	28	66	6
PF50305159	5.159	13/64	.2031			
PF503052	5.2	-	.2047			
PF503053	5.3	-	.2087			
PF503054	5.4	-	.2126			
PF503055	5.5	-	.2165			

NEXT >>>

PF503 ...series

EDP. No.	D			L ₁	L ₂	D ₂		
	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			74	7
PF503069	6.9	-	.2717					
PF503070	7.0	-	.2756					
PF503071	7.1	-	.2795					
PF50307145	7.145	9/32	.2813					
PF503072	7.2	-	.2835					
PF503073	7.3	-	.2874					
PF503074	7.4	-	.2913					
PF503075	7.5	-	.2953	40	79	8		
PF50307541	7.541	19/64	.2969					
PF503076	7.6	-	.2992					
PF503077	7.7	-	.3031					
PF503078	7.8	-	.3071					
PF503079	7.9	-	.3110					
PF50307938	7.938	5/16	.3125					
PF503080	8.0	-	.3150					
PF503081	8.1	-	.3189					
PF503082	8.2	-	.3228					
PF503083	8.3	-	.3268					
PF50308334	8.334	21/64	.3281					
PF503084	8.4	-	.3307					
PF503085	8.5	-	.3320					
PF503086	8.6	-	.3346					
PF503087	8.7	-	.3386					
PF50308733	8.733	-	.3425					
PF503088	8.8	-	.3438					
PF503089	8.9	-	.3465					
PF503090	9.0	-	.3504					
PF503091	9.1	-	.3543					
PF50309129	9.129	23/64	.3594	47	89	10		
PF503092	9.2	-	.3622					
PF503093	9.3	-	.3661					
PF50309347	9.347	-	.3680					
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					

NEXT >>>



PF503 ...series

EDP. No.	D			L ₁	L ₂	D ₂
	mm	fraction	inch			
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	54	102	12
PF50311113	11.113	7/16	.4375			
PF503112	11.2	-	.4409			
PF503113	11.3	-	.4449			
PF503114	11.4	-	.4488			
PF503115	11.5	-	.4528			
PF503116	11.6	-	.4531			
PF503117	11.7	-	.4567			
PF503118	11.8	-	.4606			
PF503119	11.9	15/32	.4646			
PF50311908	11.908	-	.4685			
PF503120	12.0	-	.4688	57	102	13
PF503121	12.1	-	.4724			
PF503122	12.2	-	.4803			
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	60	107	14
PF50313096	13.096	33/64	.5156			
PF503131	13.1	-	.5157			
PF503132	13.2	-	.5197			
PF503133	13.3	-	.5236			
PF503134	13.4	-	.5276			
PF50313494	13.494	17/32	.5313			
PF503135	13.5	-	.5315			
PF503136	13.6	-	.5354			
PF503137	13.7	-	.5394			
PF503138	13.8	-	.5433			
PF50313891	13.891	35/64	.5469	62	111	15
PF503139	13.9	-	.5472			
PF503140	14.0	-	.5512			
PF503141	14.1	-	.5551			
PF503142	14.2	-	.5591			
PF50314288	14.288	9/16	.5625			
PF503143	14.3	-	.5630			
PF503144	14.4	-	.5669			
PF503145	14.5	-	.5709			
PF503146	14.6	-	.5748			
PF503147	14.7	-	.5787			
PF503148	14.8	-	.5827	62	111	15
PF503149	14.9	-	.5866			
PF503150	15.0	-	.5906			
PF50315081	15.081	19/32	.5937			
PF503151	15.1	-	.5945			

NEXT >>>

PF503 ...series

EDP. No.	D			L ₁	L ₂	D ₂
	mm	fraction	inch			
PF503152	15.2	-	.5984	64	115	16
PF503153	15.3	-	.6063			
PF503154	15.4	-	.6102			
PF503155	15.5	-	.6142			
PF503156	15.6	-	.6181			
PF503157	15.7	-	.6220			
PF503158	15.8	-	.6250			
PF50315875	15.875	5/8	.6299			
PF503160	16.0	-	.6339	66	119	17
PF503161	16.1	-	.3071			
PF503163	16.3	-	.6417			
PF503165	16.5	-	.6496			
PF50316667	16.667	21/32	.6562			
PF503170	17.0	-	.6693			
PF503171	17.1	-	.6732	66	123	18
PF503172	17.2	-	.6772			
PF50317463	17.463	11/16	.6772			
PF503175	17.5	-	.6875			
PF503177	17.7	-	.6890			
PF503178	17.8	-	.6969			
PF503180	18.0	-	.7008			
PF503181	18.1	-	.7087	70	127	19
PF503182	18.2	-	.7165			
PF503185	18.5	-	.7283			
PF503190	19.0	-	.7480			
PF503191	19.1	-	.7520	70	131	20
PF503195	19.5	-	.7677			
PF503197	19.7	-	.7756			
PF503200	20.0	-	.7874			

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	◎	◎	○	○			◎		◎

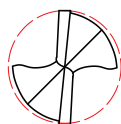
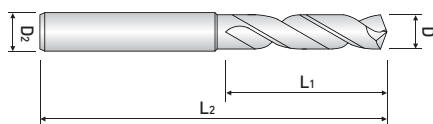
○:General Application ◎:The most suitable Application

■ Tolerance

μm = 1/1000mm

Tolerance \ Diameter	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

Drills for high hardened steel *Power Max Drill Series*



POWER MAX DRILL- MEDIUM HIGH SPEED MACHINING, 5 X D

- Suitable for high speed cutting due to newly developed raw-material and new coating.

PF505 ...series



ULTRA FINE



HELIX



p.735

EDP. No.	D			L ₁	L ₂	D ₂
	mm	fraction	inch			
PF505030	3.0	-	.1181	25	60	3
PF505031	3.1	-	.1220	27		4
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	4
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			
PF505040	4.0	-	.1575			
PF50504039	4.039	#21	.1575			
PF505041	4.1	-	.1590	33	71	5
PF505042	4.2	-	.1614			
PF505043	4.3	-	.1654			
PF505044	4.4	-	.1693			
PF505045	4.5	-	.1732			
PF505046	4.6	-	.1772			
PF505047	4.7	-	.1811			
PF50504763	4.763	3/16	.1850			
PF505048	4.8	-	.1875			
PF505049	4.9	-	.1890			
PF505050	5.0	-	.1920	39	83	6
PF505051	5.1	-	.2008			
PF50505159	5.159	13/64	.2031			
PF505052	5.2	-	.2047			
PF505053	5.3	-	.2087			
PF505054	5.4	-	.2126	43		
PF505055	5.5	-	.2165			
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			
PF505060	6.0	-	.2362			

NEXT >>>

PF505 ...series

EDP. No.	D			L ₁	L ₂	D ₂
	mm	fraction	inch			
PF505061	6.1	-	.2402	47	87	7
PF505062	6.2	-	.2441			
PF505063	6.3	-	.2480			
PF5050635	6.350	1/4	.2500			
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	52	92	8
PF505070	7.0	-	.2756			
PF505071	7.1	-	.2795			
PF50507145	7.145	9/32	.2813			
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	56	96	9
PF505078	7.8	-	.3071			
PF505079	7.9	-	.3110			
PF50507938	7.938	5/16	.3125			
PF505080	8.0	-	.3150			
PF505081	8.1	-	.3189			
PF505082	8.2	-	.3228			
PF505083	8.3	-	.3268			
PF50508334	8.334	21/64	.3281			
PF505084	8.4	-	.3307			
PF505085	8.5	-	.3346	62	105	10
PF505086	8.6	-	.3386			
PF505087	8.7	-	.3425			
PF50508733	8.733	11/32	.3438			
PF505088	8.8	-	.3465			
PF505089	8.9	-	.3504			
PF505090	9.0	-	.3543			
PF505091	9.1	-	.3583			
PF50509129	9.129	23/64	.3594			
PF505092	9.2	-	.3622			
PF505093	9.3	-	.3661	68	115	11
PF505094	9.4	-	.3701			
PF505095	9.5	-	.3740			
PF50509525	9.525	3/8	.3750			
PF505096	9.6	-	.3780			
PF505097	9.7	-	.3819			
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			

NEXT >>



PF505 ...series

EDP. No.	D			L ₁	L ₂	D ₂
	mm	fraction	inch			
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	75	125	13
PF505120	12.0	-	.4724			
PF505121	12.1	-	.4764			
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	80	134	14
PF505129	12.9	-	.5079			
PF505130	13.0	-	.5118			
PF50513096	13.096	33/64	.5156			
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			
PF505136	13.6	-	.5354	83	143	15
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			
PF505142	14.2	-	.5591			
PF50514288	14.288	-	.5625			
PF505143	14.3	-	.5630			
PF505144	14.4	-	.5669	90	152	16
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			
PF505151	15.1	-	.5945			
PF505152	15.2	-	.5984			
PF505154	15.4	-	.6063	90	152	16
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			

NEXT >>>

PF505 ...series

EDP. No.	D			L ₁	L ₂	D ₂
	mm	fraction	inch			
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			

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	◎	◎	○	○			◎		◎

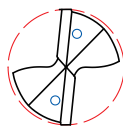
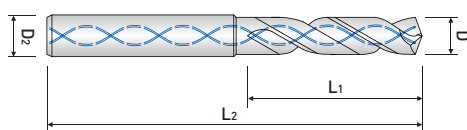
○:General Application ◎:The most suitable Application

■ Tolerance

μm = 1/1000mm

Tolerance \ Diameter	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

Drills for high hardened steel *Power Max Drill Series*



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.	D			L ₁	L ₂	D ₂	
	mm	fraction	inch				
SF503030	3.0	-	.1181	18	60	3	
SF503031	3.1	-	.1220	20		4	
SF50303175	3.175	1/8	.1250				
SF503032	3.2	-	.1260				
SF50303264	3.264	-	.1285				
SF503033	3.3	-	.1299				
SF503034	3.4	-	.1339	22			
SF503035	3.5	-	.1378				
SF50303572	3.572	9/64	.1406				
SF503036	3.6	-	.1417				
SF503037	3.7	-	.1457				
SF503038	3.8	-	.1496	24			
SF503039	3.9	-	.1535				
SF503040	4.0	-	.1575				
SF50304039	4.039	-	.1590				
SF503041	4.1	-	.1614	24	62	5	
SF503042	4.2	-	.1654	26			
SF503043	4.3	-	.1693				
SF503044	4.4	-	.1732				
SF503045	4.5	-	.1772				
SF503046	4.6	-	.1811				
SF503047	4.7	-	.1850				
SF50304763	4.763	3/16	.1875				
SF503048	4.8	-	.1890				
SF503049	4.9	-	.1920				
SF503050	5.0	-	.1969				
SF503051	5.1	-	.2008				28
SF50305159	5.159	13/64	.2031				
SF503052	5.2	-	.2047				
SF503053	5.3	-	.2087				
SF503054	5.4	-	.2126				
SF503055	5.5	-	.2165				
SF50305558	5.558	7/32	.2188	30			
SF503056	5.6	-	.2205				
SF503057	5.7	-	.2244				
SF503058	5.8	-	.2283				
SF503059	5.9	-	.2323				
SF50305953	5.953	15/64	.2344				
SF503060	6.0	-	.2362	34	74	7	
SF503061	6.1	-	.2402				
SF503062	6.2	-	.2441				
SF503063	6.3	-	.2480				

NEXT >>>

SF503 ...series



EDP. No.	D			L ₁	L ₂	D ₂			
	mm	fraction	inch						
SF5030635	6.350	1/4	.2500	34	74	7			
SF503064	6.4	-	.2520						
SF503065	6.5	-	.2559						
SF503066	6.6	-	.2598						
SF503067	6.7	-	.2638	37					
SF50306747	6.747	17/64	.2656						
SF503068	6.8	-	.2677						
SF503069	6.9	-	.2717						
SF503070	7.0	-	.2756						
SF503071	7.1	-	.2795	40	79	8			
SF50307145	7.145	9/32	.2813						
SF503072	7.2	-	.2835						
SF503073	7.3	-	.2874						
SF503074	7.4	-	.2913						
SF503075	7.5	-	.2953						
SF50307541	7.541	19/64	.2969						
SF503076	7.6	-	.2992						
SF503077	7.7	-	.3031						
SF503078	7.8	-	.3071						
SF503079	7.9	-	.3110						
SF50307938	7.938	5/16	.3125						
SF503080	8.0	-	.3150						
SF503081	8.1	-	.3189				43	84	9
SF503082	8.2	-	.3228						
SF503083	8.3	-	.3268						
SF50308334	8.334	21/64	.3281						
SF503084	8.4	-	.3307						
SF503085	8.5	-	.3346						
SF503086	8.6	-	.3386						
SF503087	8.7	-	.3425						
SF50308733	8.733	11/32	.3438						
SF503088	8.8	-	.3465						
SF503089	8.9	-	.3504						
SF503090	9.0	-	.3543						
SF503091	9.1	-	.3583	47	89	10			
SF50309129	9.129	23/64	.3594						
SF503092	9.2	-	.3622						
SF503093	9.3	-	.3661						
SF503094	9.4	-	.3701						
SF503095	9.5	-	.3740						
SF50309525	9.525	3/8	.3750						
SF503096	9.6	-	.3780						
SF503097	9.7	-	.3819						
SF503098	9.8	-	.3858						
SF503099	9.9	-	.3898						
SF50309921	9.921	25/64	.3906						
SF503100	10.0	-	.3937				51	95	11
SF503101	10.1	-	.3976						
SF503102	10.2	-	.4016						
SF503103	10.3	-	.4055						
SF5031032	10.32	13/32	.4063						
SF503104	10.4	-	.4094						
SF503105	10.5	-	.4134						
SF503106	10.6	-	.4173						
SF503107	10.7	-	.4213						
SF50310716	10.716	27/64	.4219						
SF503108	10.8	-	.4252						
SF503109	10.9	-	.4291						
SF503110	11.0	-	.4331						

NEXT >>

SF503 ...series

EDP. No.	D			L ₁	L ₂	D ₂
	mm	fraction	inch			
SF503111	11.1	-	.4370	54	102	12
SF50311113	11.113	7/16	.4375			
SF503112	11.2	-	.4409			
SF503113	11.3	-	.4449			
SF503114	11.4	-	.4488			
SF503115	11.5	-	.4528			
SF50311509	11.509	29/64	.4531			
SF503116	11.6	-	.4567			
SF503117	11.7	-	.4606			
SF503118	11.8	-	.4646			
SF503119	11.9	-	.4685			
SF50311908	11.908	15/32	.4688			
SF503120	12.0	-	.4724	57	102	13
SF503121	12.1	-	.4764			
SF503122	12.2	-	.4803			
SF503123	12.3	-	.4843			
SF50312304	12.304	31/64	.4844			
SF503124	12.4	-	.4882			
SF503125	12.5	-	.4921			
SF503126	12.6	-	.4961			
SF503127	12.7	1/2	.5000			
SF503128	12.8	-	.5039			
SF503129	12.9	-	.5079			
SF503130	13.0	-	.5118	60	107	14
SF50313096	13.096	33/64	.5156			
SF503131	13.1	-	.5157			
SF503132	13.2	-	.5197			
SF503133	13.3	-	.5236			
SF503134	13.4	-	.5276			
SF50313494	13.494	17/32	.5313			
SF503135	13.5	-	.5315			
SF503136	13.6	-	.5354			
SF503137	13.7	-	.5394			
SF503138	13.8	-	.5433			
SF50313891	13.891	35/64	.5469			
SF503139	13.9	-	.5472	62	111	15
SF503140	14.0	-	.5512			
SF503141	14.1	-	.5551			
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	64	115	16
SF50315081	15.081	19/32	.5937			
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			

NEXT >>

SF503 ...series



EDP. No.	D			L ₁	L ₂	D ₂
	mm	fraction	inch			
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			

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	◎	◎	○	○			◎		◎

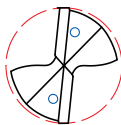
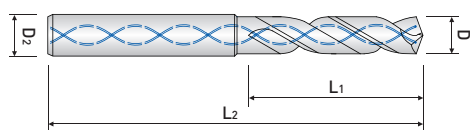
○:General Application ◎:The most suitable Application

■ Tolerance

μm = 1/1000mm

Tolerance \ Diameter	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

Drills for high hardened steel *Power Max Drill Series*



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.	D			L ₁	L ₂	D ₂				
	mm	fraction	inch							
SF505031	3.1	-	.1220	27	74	4				
SF50503175	3.175	1/8	.1250							
SF505032	3.2	-	.1260							
SF50503264	3.264	-	.1285							
SF505033	3.3	-	.1299	30			74	4		
SF505034	3.4	-	.1339							
SF505035	3.5	-	.1378							
SF50503572	3.572	9/64	.1406							
SF505036	3.6	-	.1417	33					74	4
SF505037	3.7	-	.1457							
SF505038	3.8	-	.1496							
SF505039	3.9	-	.1535							
SF505040	4.0	-	.1575	33	80	5				
SF50504039	4.039	-	.1590							
SF505041	4.1	-	.1614							
SF505042	4.2	-	.1654							
SF505043	4.3	-	.1693	36			80	5		
SF505044	4.4	-	.1732							
SF505045	4.5	-	.1772							
SF505046	4.6	-	.1811							
SF505047	4.7	-	.1850	39					80	5
SF50504763	4.763	3/16	.1875							
SF505048	4.8	-	.1890							
SF505049	4.9	-	.1920							
SF505050	5.0	-	.1969	39	87	6				
SF505051	5.1	-	.2008							
SF50505159	5.159	13/64	.2031							
SF505052	5.2	-	.2047							
SF505053	5.3	-	.2087	43			87	6		
SF505054	5.4	-	.2126							
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							
SF505060	6.0	-	.2362	47	95	7				
SF505061	6.1	-	.2402							
SF505062	6.2	-	.2441							
SF505063	6.3	-	.2480							
SF5050635	6.350	1/4	.2500							

NEXT >>>

SF505 ...series

EDP. No.	D			L ₁	L ₂	D ₂
	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	52	103	8
SF505071	7.1	-	.2795			
SF50507145	7.145	9/32	.2813			
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	-	.3425			
SF50508733	8.733	11/32	.3438			
SF505088	8.8	-	.3465			
SF505089	8.9	-	.3504			
SF505090	9.0	-	.3543	62	108	10
SF505091	9.1	-	.3583			
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			
SF505098	9.8	-	.3858			
SF505099	9.9	-	.3898			
SF50509921	9.921	25/64	.3906	68	125	11
SF505100	10.0	-	.3937			
SF505101	10.1	-	.3976			
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	68	125	11
SF505109	10.9	-	.4291			
SF505110	11.0	-	.4331			

NEXT >>

SF505 ...series

EDP. No.	D			L ₁	L ₂	D ₂
	mm	fraction	inch			
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	142	14
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			
SF505137	13.7	-	.5394			
SF505138	13.8	-	.5433			
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			

NEXT >>>

SF505 ...series



EDP. No.	D			L ₁	L ₂	D ₂
	mm	fraction	inch			
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	110	163	20
SF505195	19.5	-	.7677			
SF505197	19.7	-	.7756			
SF505200	20.0	-	.7874			

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	◎	◎	○	○			◎		◎

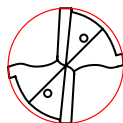
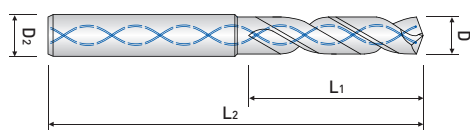
○:General Application ◎:The most suitable Application

■ Tolerance

μm = 1/1000mm

Tolerance \ Diameter	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

Drills for high hardened steel *Power Max Drill Series*



**10 X D / POWER MAX DRILL
- LONG / INTERNAL COOLANT**

- Double margin

SF510 ...series



ULTRA FINE



HELIX



TIAN



10xD



140°



DATA

p.736

EDP. No.	D	L ₁	L ₂	D ₂
SF510030	3.0	39	87	3
SF510031	3.1	46	94	4
SF510032	3.2			
SF510033	3.3			
SF510034	3.4			
SF510035	3.5			
SF510036	3.6	52	101	4
SF510037	3.7			
SF510038	3.8			
SF510039	3.9			
SF510040	4.0			
SF510041	4.1	59	108	5
SF510042	4.2			
SF510043	4.3			
SF510044	4.4			
SF510045	4.5			
SF510046	4.6	66	117	5
SF510047	4.7			
SF510048	4.8			
SF510049	4.9			
SF510050	5.0			
SF510051	5.1	72	123	6
SF510052	5.2			
SF510053	5.3			
SF510054	5.4			
SF510055	5.5			
SF510056	5.6	79	130	6
SF510057	5.7			
SF510058	5.8			
SF510059	5.9			
SF510060	6.0			
SF510061	6.1	85	138	7
SF510062	6.2			
SF510063	6.3			
SF510064	6.4			
SF510065	6.5			
SF510066	6.6	92	145	7

EDP. No.	D	L ₁	L ₂	D ₂
SF510 067	6.7	92	145	7
SF510 068	6.8			
SF510 069	6.9			
SF510 070	7.0	98	153	8
SF510 071	7.1			
SF510 072	7.2			
SF510 073	7.3			
SF510 074	7.4			
SF510 075	7.5	105	160	8
SF510 076	7.6			
SF510 077	7.7			
SF510 078	7.8			
SF510 079	7.9			
SF510 080	8.0	111	166	9
SF510 081	8.1			
SF510 082	8.2			
SF510 083	8.3			
SF510 084	8.4			
SF510 085	8.5	118	173	9
SF510 086	8.6			
SF510 087	8.7			
SF510 088	8.8			
SF510 089	8.9			
SF510 090	9.0	124	179	10
SF510 091	9.1			
SF510 092	9.2			
SF510 093	9.3			
SF510 094	9.4			
SF510 095	9.5	131	186	10
SF510 096	9.6			
SF510 097	9.7			
SF510 098	9.8			
SF510 099	9.9			
SF510 100	10.0	138	193	11
SF510 101	10.1			
SF510 102	10.2			
SF510 103	10.3			

NEXT >>>

SF510 ...series

ULTRA FINE



HELIX



TIAN



10x0



140°



DATA

p.736

EDP. No.	D	L ₁	L ₂	D ₂
SF510104	10.4	138	193	11
SF510105	10.5			
SF510106	10.6	144	205	
SF510107	10.7			
SF510108	10.8			
SF510109	10.9			
SF510110	11.0	151	212	12
SF510111	11.1			
SF510112	11.2			
SF510113	11.3			
SF510114	11.4			
SF510115	11.5			

EDP. No.	D	L ₁	L ₂	D ₂
SF510116	11.6	157	218	12
SF510117	11.7			
SF510118	11.8			
SF510119	11.9			
SF510120	12.0			
SF510121	12.1	164	225	13
SF510122	12.2			
SF510123	12.3			
SF510124	12.4			
SF510125	12.5			
SF510126	12.6	170	236	
SF510127	12.7			
SF510128	12.8			
SF510129	12.9			
SF510130	13.0			

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels (NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	◎	◎	○	○			◎		◎

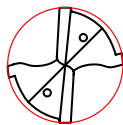
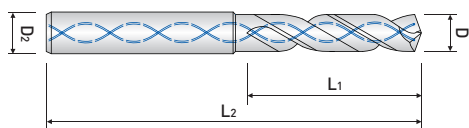
○: General Application ◎: The most suitable Application

■ Tolerance

mm = 1/1000mm

Tolerance \ Diameter	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

Drills for high hardened steel *Power Max Drill Series*



20 X D / POWER MAX DRILL
- EXTRA LONG / INTERNAL COOLANT

- Double margin

SF520 ...series



ULTRA FINE



HELIX



TiAlN 404



20xD



140°



DATA

p.736

EDP. No.	D	L ₁	L ₂	D ₂
SF520041	4.1	104	155	5
SF520042	4.2			
SF520043	4.3			
SF520044	4.4			
SF520045	4.5			
SF520046	4.6	116	167	5
SF520047	4.7			
SF520048	4.8			
SF520049	4.9			
SF520050	5.0			
SF520051	5.1	127	178	6
SF520052	5.2			
SF520053	5.3			
SF520054	5.4			
SF520055	5.5			
SF520056	5.6	139	190	6
SF520057	5.7			
SF520058	5.8			
SF520059	5.9			
SF520060	6.0			
SF520061	6.1	150	203	7
SF520062	6.2			
SF520063	6.3			
SF520064	6.4			
SF520065	6.5			
SF520066	6.6	162	215	7
SF520067	6.7			
SF520068	6.8			
SF520069	6.9			
SF520070	7.0			

EDP. No.	D	L ₁	L ₂	D ₂
SF520071	7.1	173	228	8
SF520072	7.2			
SF520073	7.3			
SF520074	7.4			
SF520075	7.5			
SF520076	7.6	185	240	8
SF520077	7.7			
SF520078	7.8			
SF520079	7.9			
SF520080	8.0			
SF520081	8.1	196	251	9
SF520082	8.2			
SF520083	8.3			
SF520084	8.4			
SF520085	8.5			
SF520086	8.6	208	263	9
SF520087	8.7			
SF520088	8.8			
SF520089	8.9			
SF520090	9.0			
SF520091	9.1	219	274	10
SF520092	9.2			
SF520093	9.3			
SF520094	9.4			
SF520095	9.5			
SF520096	9.6	231	286	10
SF520097	9.7			
SF520098	9.8			
SF520099	9.9			
SF520100	10.0			

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
○	◎	◎	~HRC55 SKD61	~HRC55 SKD11			◎		◎

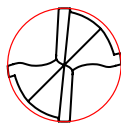
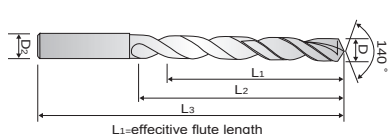
○:General Application ◎:The most suitable Application

■ Tolerance

μm = 1/1000mm

Tolerance	Diameter	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

Drills for high hardened steel *Power Max Drill Series*



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



ULTRA FINE



HELIX



EDP. No.	D		D ₂	L ₁	L ₂	L ₃
	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	6	17	24	66
HP503038	3.8	.1496				
HP503039	3.9	.1535				
HP503040	4.0	.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	6	20	28	66
HP503048	4.8	.1890				
HP503049	4.9	.1929				
HP503050	5.0	.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	6.0	.2362				

NEXT >>>

HP503 ...series



EDP. No.	D		D ₂	L ₁	L ₂	L ₃
	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	7.0	.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	8.0	.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	9.0	.3543				
HP503091	9.1	.3583	12	40	55	102
HP503092	9.2	.3622				
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	10.0	.3937				
HP503101	10.1	.3976	12	40	55	102
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	11.0	.4331				
HP503111	11.1	.4370				
HP503112	11.2	.4409				
HP503113	11.3	.4449				

NEXT >>

HP503 ...series



ULTRA FINE



HELIX



TiAlN



3xD



140°

EDP. No.	D		D ₂	L ₁	L ₂	L ₃
	mm	inch				
HP503114	11.4	.4488	12	40	55	102
HP503115	11.5	.4528				
HP503116	11.6	.4567				
HP503117	11.7	.4606				
HP503118	11.8	.4646				
HP503119	11.9	.4685				
HP503120	12.0	.4724				
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	13.0	.5118				
HP503131	13.1	.5157				
HP503132	13.2	.5157				
HP503133	13.3	.5236				
HP503135	13.5	.5315				
HP503137	13.7	.5394				
HP503140	14.0	.5512				
HP503142	14.2	.5591	16	45	65	115
HP503143	14.3	.5630				
HP503145	14.5	.5709				
HP503146	14.6	.5787				
HP503148	14.8	.5827				
HP503150	15.0	.5906				
HP503155	15.5	.6102				
HP503157	15.7	.6181				
HP503160	16.0	.6299				

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	◎	◎	○	○			◎		◎

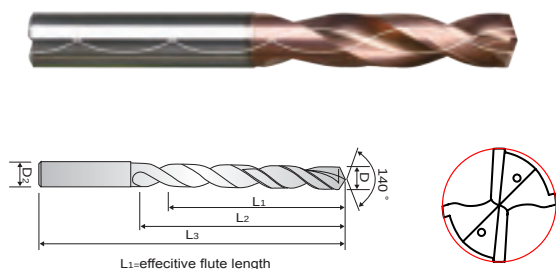
○:General Application ◎:The most suitable Application

■ Tolerance

mm = 1/1000mm

Tolerance	Diameter	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

Drills for high hardened steel *Power Max Drill Series*



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



ULTRA FINE



HELIX



p.734

EDP. No.	D			D ₂	L ₁	L ₂	L ₃
	mm	fraction	inch				
HPI50303175	3.175	1/8	.1250	6	14	20	62
HPI50303264	3.264	-	.1285				
HPI50303572	3.572	9/64	.1406				
HPI5030397	3.97	5/32	.1563	6	17	24	66
HPI503040	4	-	.1590				
HPI50304039	4.039	-	.1575				
HPI503042	4.2	-	.1654				
HPI503043	4.3	-	.1693				
HPI503045	4.5	-	.1772				
HPI503046	4.6	-	.1811				
HPI50304763	4.763	3/16	.1875	6	20	28	66
HPI503048	4.8	-	.1890				
HPI503049	4.9	-	.1929				
HPI503050	5	-	.1969				
HPI503051	5.1	-	.2008				
HPI50305159	5.159	13/64	.2031				
HPI503052	5.2	-	.2047				
HPI503053	5.3	-	.2087				
HPI503054	5.4	-	.2126				
HPI503055	5.5	-	.2165				
HPI50305558	5.558	7/32	.2188				
HPI503056	5.6	-	.2205				
HPI503057	5.7	-	.2244				
HPI503058	5.8	-	.2283				
HPI50305953	5.953	15/64	.2344	8	24	34	79
HPI503060	6	-	.2362				
HPI503061	6.1	-	.2402				
HPI503062	6.2	-	.2441				
HPI5030635	6.35	1/4	.2500				
HPI503065	6.5	-	.2559				
HPI503066	6.6	-	.2598				
HPI50306747	6.747	17/64	.2656				
HPI503068	6.8	-	.2677	8	29	41	79
HPI503070	7	-	.2756				
HPI50307145	7.145	9/32	.2813				
HPI503072	7.2	-	.2835				
HPI503074	7.4	-	.2913				
HPI503075	7.5	-	.2953				
HPI50307541	7.541	19/64	.2969				

NEXT >>>

HPI 503 ...series

ULTRA FINE



HELIX



TIAN



3xD



140°



DATA

p.734

EDP. No.	D			D ₂	L ₁	L ₂	L ₃
	mm	fraction	inch				
HPI503078	7.8	-	.3071	8	29	41	79
HPI503079	7.9	-	.3110				
HPI50307938	7.938	5/16	.3125				
HPI503080	8	-	.3150	10	35	47	89
HPI503081	8.1	-	.3189				
HPI503082	8.2	-	.3228				
HPI503083	8.3	-	.3268				
HPI50308334	8.334	21/64	.3281				
HPI503085	8.5	-	.3346				
HPI503086	8.6	-	.3386				
HPI503087	8.7	-	.3425				
HPI50308733	8.733	11/32	.3438				
HPI503088	8.8	-	.3465				
HPI503090	9	-	.3543				
HPI503091	9.1	-	.3583				
HPI50309129	9.129	23/64	.3594				
HPI503092	9.2	-	.3622				
HPI503093	9.3	-	.3661				
HPI503095	9.5	-	.3740				
HPI50309525	9.525	3/8	.3750				
HPI503096	9.6	-	.3780				
HPI503097	9.7	-	.3819				
HPI503098	9.8	-	.3858				
HPI50309921	9.921	25/64	.3906				
HPI503100	10	-	.3937	12	40	55	105
HPI503102	10.2	-	.4016				
HPI5031032	10.32	13/32	.4063				
HPI503105	10.5	-	.4134				
HPI503107	10.7	-	.4213				
HPI50310716	10.716	27/64	.4219				
HPI503108	10.8	-	.4252				
HPI503110	11	-	.4331				
HPI50311113	11.113	7/16	.4375				
HPI503112	11.2	-	.4409				
HPI503115	11.5	-	.4528				
HPI50311509	11.509	29/64	.4531				
HPI503117	11.7	-	.4606				
HPI50311908	11.908	15/32	.4688				
HPI503120	12	-	.4724				
HPI503123	12.3	-	.4843	14	43	60	107
HPI50312304	12.304	31/64	.4844				
HPI503125	12.5	-	.4921				
HPI503127	12.7	1/2	.5000				
HPI503128	12.8	-	.5039				
HPI503130	13	-	.5118				
HPI503133	13.3	-	.5236				
HPI50313494	13.494	17/32	.5313				
HPI503135	13.5	-	.5315				
HPI503137	13.7	-	.5394				
HPI50313891	13.891	35/64	.5469				
HPI503140	14	-	.5512	16	45	65	115
HPI503141	14.1	-	.5551				
HPI503142	14.2	-	.5591				
HPI50314288	14.288	9/16	.5625				
HPI503145	14.5	-	.5709				
HPI503147	14.7	-	.5787				
HPI503150	15	-	.5906				
HPI50315081	15.081	19/32	.5937				
HPI503155	15.5	-	.6102				
HPI50315875	15.875	5/8	.6250				
HPI503160	16	-	.6299				

NEXT >>

HPI 503 ...series



EDP. No.	D			D ₂	L ₁	L ₂	L ₃
	mm	fraction	inch				
HPI503165	16.5	-	.6496	18	51	73	123
HPI503168	16.8	-	.6614				
HPI503170	17	-	.6693				
HPI503171	17.1	-	.6732				
HPI50317463	17.463	11/16	.6875				
HPI503175	17.5	-	.6890				
HPI503180	18	-	.7087	20	55	79	131
HPI503190	19	-	.7480				
HPI5031905	19.05	3/4	.7500				
HPI503197	19.7	-	.7756				
HPI503200	20	-	.7874				

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(MAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	◎	◎	○	○			◎		◎

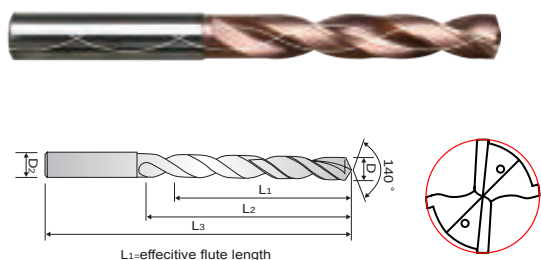
○: General Application ◎: The most suitable Application

■ Tolerance

μm = 1/1000mm

Tolerance \ Diameter	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

Drills for high hardened steel *Power Max Drill Series*



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			D ₂	L ₁	L ₂	L ₃
	mm	fraction	inch				
HPI50503175	3.175	1/8	.1250	6	24	30	66
HPI50503264	3.264	-	.1285				
HPI50503572	3.572	9/64	.1406				
HPI5050397	3.97	5/32	.1563	6	29	36	74
HPI505040	4	-	.1575				
HPI50504039	4.039	-	.1590				
HPI505041	4.1	-	.1614				
HPI505042	4.2	-	.1654				
HPI505043	4.3	-	.1693				
HPI505044	4.4	-	.1732				
HPI505045	4.5	-	.1772				
HPI5050458	4.58	-	.1803				
HPI505046	4.6	-	.1811				
HPI50504623	4.623	-	.1820				
HPI505047	4.7	-	.1850				
HPI50504763	4.763	3/16	.1875	6	35	44	82
HPI505048	4.8	-	.1890				
HPI505049	4.9	-	.1920				
HPI505050	5	-	.1969				
HPI505051	5.1	-	.2008				
HPI50505159	5.159	13/64	.2031				
HPI505052	5.2	-	.2047				
HPI505053	5.3	-	.2087				
HPI505054	5.4	-	.2126				
HPI5050541	5.41	-	.2130				
HPI505055	5.5	-	.2165				
HPI50505558	5.558	7/32	.2188				
HPI505056	5.6	-	.2205				
HPI505057	5.7	-	.2244				
HPI505058	5.8	-	.2283				
HPI505059	5.9	-	.2323				
HPI50505953	5.953	15/64	.2344				
HPI505060	6	-	.2362				

NEXT >>>

HPI 505 ...series



ULTRA FINE



HELIX



TiAlN



5xD



140°



p.734

EDP. No.	D			D ₂	L ₁	L ₂	L ₃
	mm	fraction	inch				
HPI505061	6.1	-	.2402	8	43	53	91
HPI505062	6.2	-	.2441				
HPI505063	6.3	-	.2480				
HPI5050635	6.35	1/4	.2500				
HPI505064	6.4	-	.2520				
HPI505065	6.5	-	.2559				
HPI50506528	6.528	-	.2570				
HPI505066	6.6	-	.2598				
HPI505067	6.7	-	.2638				
HPI50506747	6.747	17/64	.2656				
HPI505068	6.8	-	.2677				
HPI505069	6.9	-	.2717				
HPI50506909	6.909	-	.2720				
HPI505070	7	-	.2756				
HPI505071	7.1	-	.2795				
HPI50507145	7.145	9/32	.2813				
HPI505072	7.2	-	.2835				
HPI505073	7.3	-	.2874				
HPI505074	7.4	-	.2913				
HPI505075	7.5	-	.2953				
HPI50507541	7.541	19/64	.2969				
HPI505076	7.6	-	.2992				
HPI505077	7.7	-	.3031				
HPI505078	7.8	-	.3071				
HPI505079	7.9	-	.3110				
HPI50507938	7.938	5/16	.3125				
HPI505080	8	-	.3150	10	49	61	103
HPI505081	8.1	-	.3189				
HPI505082	8.2	-	.3228				
HPI505083	8.3	-	.3268				
HPI50508334	8.334	21/64	.3281				
HPI505084	8.4	-	.3307				
HPI50508433	8.433	-	.3320				
HPI505085	8.5	-	.3346				
HPI505086	8.6	-	.3386				
HPI505087	8.7	-	.3425				
HPI50508733	8.733	11/32	.3438				
HPI505088	8.8	-	.3465				
HPI505089	8.9	-	.3504				
HPI505090	9	-	.3543				
HPI505091	9.1	-	.3583				
HPI50509129	9.129	23/64	.3594				
HPI505092	9.2	-	.3622				
HPI505093	9.3	-	.3661				
HPI50509347	9.347	-	.3680				
HPI505094	9.4	-	.3701				
HPI505095	9.5	-	.3740				
HPI50509525	9.525	3/8	.3750				
HPI505096	9.6	-	.3780				
HPI505097	9.7	-	.3819				
HPI50509703	9.703	-	.3858				
HPI50509746	9.746	-	.3898				
HPI505098	9.8	-	.3906				
HPI505099	9.9	-	.3937				
HPI50509921	9.921	25/64	.3976				
HPI505100	10	-	.4016				

NEXT >>

HPI 505 ...series

ULTRA FINE



HELIX



p.734

EDP. No.	D			D ₂	L ₁	L ₂	L ₃
	mm	fraction	inch				
HPI505101	10.1	-	.4055	12	56	71	118
HPI505102	10.2	-	.4063				
HPI505103	10.3	-	.4094				
HPI5051032	10.32	13/32	.4134				
HPI505104	10.4	-	.4173				
HPI505105	10.5	-	.4213				
HPI505106	10.6	-	.4219				
HPI505107	10.7	-	.4252				
HPI50510716	10.716	27/64	.4291				
HPI505108	10.8	-	.4331				
HPI505109	10.9	-	.4370				
HPI505110	11	-	.4375				
HPI505111	11.1	-	.4409				
HPI50511113	11.113	7/16	.4449				
HPI505112	11.2	-	.4488				
HPI505113	11.3	-	.4528				
HPI505114	11.4	-	.4488				
HPI505115	11.5	-	.4528				
HPI50511509	11.509	29/64	.4531				
HPI505116	11.6	-	.4567				
HPI505117	11.7	-	.4606				
HPI505118	11.8	-	.4646				
HPI505119	11.9	-	.4685				
HPI50511908	11.908	15/32	.4688				
HPI505120	12	-	.4724	14	60	77	124
HPI505121	12.1	-	.4764				
HPI505122	12.2	-	.4803				
HPI505123	12.3	-	.4843				
HPI50512304	12.304	31/64	.4844				
HPI505124	12.4	-	.4882				
HPI505125	12.5	-	.4921				
HPI505126	12.6	-	.4961				
HPI505127	12.7	1/2	.5000				
HPI505128	12.8	-	.5039				
HPI505129	12.9	-	.5079				
HPI50512903	12.903	-	.5118				
HPI505130	13	-	.5156				
HPI50513096	13.096	33/64	.5157				
HPI505131	13.1	-	.5236				
HPI505133	13.3	-	.5313				
HPI50513494	13.494	17/32	.5315				
HPI505135	13.5	-	.5394				
HPI505137	13.7	-	.5433				
HPI505138	13.8	-	.5469				
HPI50513891	13.891	35/64	.5512				
HPI505140	14	-	.5591	16	63	83	133
HPI505142	14.2	-	.5625				
HPI50514288	14.288	9/16	.5709				
HPI505145	14.5	-	.5748				
HPI505146	14.6	-	.5787				
HPI505147	14.7	-	.5866				
HPI505149	14.9	-	.5906				
HPI505150	15	-	.5937				
HPI50515081	15.081	19/32	.5945				
HPI505151	15.1	-	.5945				
HPI505155	15.5	-	.6102				
HPI505157	15.7	-	.6181				
HPI505158	15.8	-	.6220				
HPI50515875	15.875	5/8	.6250				
HPI505159	15.9	-	.6260				
HPI505160	16	-	.6299				

NEXT >>

HPI 505 ...series



EDP. No.	D			D ₂	L ₁	L ₂	L ₃
	mm	fraction	inch				
HPI50516078	16.078	-	.6330	18	71	93	143
HPI505162	16.2	-	.6378				
HPI505164	16.4	-	.6457				
HPI505165	16.5	-	.6496				
HPI505166	16.6	-	.6535				
HPI50516667	16.667	21/32	.6562				
HPI505167	16.7	-	.6575				
HPI505170	17	-	.6693				
HPI50517463	17.463	11/16	.6875				
HPI505175	17.5	-	.6890				
HPI505177	17.7	-	.6969	20	77	101	153
HPI505180	18	-	.7087				
HPI505184	18.4	-	.7244				
HPI505185	18.5	-	.7283				
HPI505186	18.6	-	.7323				
HPI505188	18.8	-	.7402				
HPI505190	19	-	.7480				
HPI5051905	19.05	3/4	.7500				
HPI505192	19.2	-	.7559				
HPI50519253	19.253	-	.7580				
HPI50519446	19.446	49/64	.7656	20	77	101	153
HPI505195	19.5	-	.7677				
HPI505197	19.7	-	.7756				
HPI50519844	19.844	25/32	.7813				
HPI505200	20	-	.7874				

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	◎	◎	○	○			◎		◎

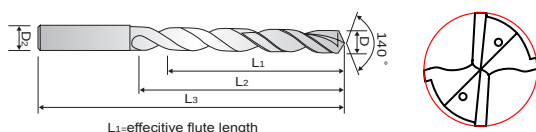
○: General Application ◎: The most suitable Application

■ Tolerance

μm = 1/1000mm

Tolerance \ Diameter	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

Drills for high hardened steel *Power Max Drill Series*



L1-effective flute length

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



ULTRA FINE



HELIX



TiAlN



8XD



140°



p.734

EDP. No.	D			D ₂	L ₁	L ₂	L ₃
	mm	fraction	inch				
HPI508030N	3	-	.1181	6	37	43	80
HPI50803175N	3.175	1/8	.1250				
HPI50803264N	3.264	-	.1285				
HPI50803572N	3.572	9/64	.1406				
HPI5080397N	3.97	5/32	.1563	6	41	49	87
HPI50804039N	4.039	-	.1590				
HPI50804763N	4.763	3/16	.1875				
HPI508050N	5	-	.1969				
HPI508051N	5.1	-	.2008	6	48	56	94
HPI50805159N	5.159	13/64	.2031				
HPI508052N	5.2	-	.2047				
HPI508053N	5.3	-	.2087				
HPI508055N	5.5	-	.2165				
HPI50805558N	5.558	7/32	.2188				
HPI508057N	5.7	-	.2244				
HPI50805953N	5.953	15/64	.2344				
HPI508060N	6	-	.2362				
HPI508061N	6.1	-	.2402				
HPI508062N	6.2	-	.2441				
HPI508063N	6.3	-	.2480				
HPI5080635N	6.35	1/4	.2500	8	57	67	105
HPI508064N	6.4	-	.2520				
HPI508065N	6.5	-	.2559				
HPI508066N	6.6	-	.2598				
HPI508067N	6.7	-	.2638				
HPI50806746N	6.746	17/64	.2656				
HPI508068N	6.8	-	.2677				
HPI508070N	7	-	.2756				
HPI50807145N	7.145	9/32	.2813				
HPI508075N	7.5	-	.2953				
HPI50807541N	7.541	19/64	.2969				
HPI508077N	7.7	-	.3031	8	65	76	116
HPI508078N	7.8	-	.3071				
HPI50807938N	7.938	5/16	.3125				
HPI508080N	8	-	.3150				

NEXT >>

HPI 508 ...series

EDP. No.	D			D ₂	L ₁	L ₂	L ₃
	mm	fraction	inch				
HPI508081N	8.1	-	.3189	10	74	87	131
HPI50808334N	8.334	-	.3281				
HPI508085N	8.5	11/32	.3346				
HPI508086N	8.6	-	.3386				
HPI508087N	8.7	-	.3425				
HPI50808733N	8.733	-	.3438				
HPI508088N	8.8	23/64	.3465				
HPI508090N	9	-	.3543				
HPI508091N	9.1	3/8	.3583	10	81	95	139
HPI50809129N	9.129	-	.3594				
HPI508095N	9.5	-	.3740				
HPI50809525N	9.525	-	.3750				
HPI508097N	9.7	25/64	.3819				
HPI508098N	9.8	-	.3858				
HPI508099N	9.9	-	.3898				
HPI50809921N	9.921	-	.3906				
HPI508100N	10	-	.3937	12	90	106	155
HPI508101N	10.1	13/32	.3979				
HPI508102N	10.2	-	.4016				
HPI508103N	10.3	27/64	.4055				
HPI5081032N	10.32	-	.4063				
HPI508105N	10.5	-	.4134				
HPI50810716N	10.716	7/16	.4219				
HPI508108N	10.8	-	.4252				
HPI508110N	11	-	.4331	12	97	114	163
HPI50811113N	11.113	-	.4375				
HPI508112N	11.2	-	.4409				
HPI508113N	11.3	29/64	.4449				
HPI508114N	11.4	-	.4488				
HPI508115N	11.5	-	.4528				
HPI50811509N	11.509	15/32	.4531				
HPI508117N	11.7	-	.4606				
HPI508118N	11.8	31/64	.4646	14	113	133	182
HPI50811908N	11.908	-	.4688				
HPI508120N	12	1/2	.4724				
HPI50812304N	12.304	-	.4844				
HPI508125N	12.5	-	.4921				
HPI508127N	12.7	-	.5000				
HPI508128N	12.8	-	.5039				
HPI508130N	13	9/16	.5118				
HPI508135N	13.5	-	.5315	16	129	152	204
HPI508140N	14	-	.5512				
HPI50814288N	14.288	-	.5625				
HPI508145N	14.5	-	.5709				
HPI508150N	15	-	.5906				
HPI508151N	15.1	-	.5945				
HPI508152N	15.2	-	.5984				
HPI508153N	15.3	5/8	.6024				
HPI508155N	15.5	-	.6102	16	129	152	204
HPI508158N	15.8	5/8	.6220				
HPI50815875N	15.875	-	.6250				
HPI508160N	16	-	.6299				

NEXT >>>

HPI 508 ...series

EDP. No.	D			D ₂	L ₁	L ₂	L ₃
	mm	fraction	inch				
HPI50816078N	16.078	-	.6330	18	145	171	223
HPI508162N	16.2	-	.6378				
HPI508165N	16.5	-	.6496				
HPI508170N	17	-	.6693				
HPI50817463N	17.463	11/16	.6875				
HPI508175N	17.5	-	0.689				
HPI508180N	18	-	.7087	20	162	191	244
HPI508185N	18.5	-	.7283				
HPI508190N	19	-	.7480				
HPI5081905N	19.05	3/4	.7500				
HPI50819253N	19.253	-	.7580				
HPI508198N	19.8	-	.7795				
HPI508200N	20	-	.7874				

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels (NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	◎	◎	○	○			◎		◎

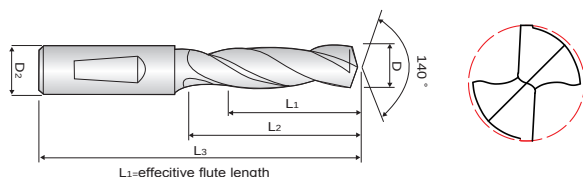
○: General Application ◎: The most suitable Application

■ Tolerance

μm = 1/1000mm

Tolerance \ Diameter	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

Drills for high hardened steel *Power Max Drill Series*



POWER MAX DRILL - STUB / DIN 6537K

■ Shank Type

- P503A : DIN 6535 HA - straight A type
- P503F : DIN 6535 HE - 2°Whistle Flat F type

P503A / P503F ...series



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EDP. No.	EDP. No.	D	D ₂	L ₁	L ₂	L ₃
P503A030	P503F030	3.0	6	14	20	62
P503A031	P503F031	3.1				
P503A032	P503F032	3.2				
P503A033	P503F033	3.3				
P503A034	P503F034	3.4				
P503A035	P503F035	3.5				
P503A036	P503F036	3.6				
P503A037	P503F037	3.7	6	17	24	66
P503A038	P503F038	3.8				
P503A039	P503F039	3.9				
P503A040	P503F040	4.0				
P503A041	P503F041	4.1				
P503A042	P503F042	4.2				
P503A043	P503F043	4.3				
P503A044	P503F044	4.4				
P503A045	P503F045	4.5				
P503A046	P503F046	4.6				
P503A047	P503F047	4.7				
P503A048	P503F048	4.8	6	20	28	66
P503A049	P503F049	4.9				
P503A050	P503F050	5.0				
P503A051	P503F051	5.1				
P503A052	P503F052	5.2				
P503A053	P503F053	5.3				
P503A054	P503F054	5.4				
P503A055	P503F055	5.5				
P503A056	P503F056	5.6				
P503A057	P503F057	5.7				
P503A058	P503F058	5.8				
P503A059	P503F059	5.9				
P503A060	P503F060	6.0				
P503A061	P503F061	6.1	8	24	34	79
P503A062	P503F062	6.2				
P503A063	P503F063	6.3				
P503A064	P503F064	6.4				
P503A065	P503F065	6.5				
P503A066	P503F066	6.6				

※ These tools are manufactured based on order received.

NEXT >>>

P503A / P503F ...series

ULTRA FINE



HELIX



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EDP. No.	EDP. No.	D	D ₂	L ₁	L ₂	L ₃
P503A067	P503F067	6.7	8	24	34	79
P503A068	P503F068	6.8				
P503A069	P503F069	6.9				
P503A070	P503F070	7.0				
P503A071	P503F071	7.1	8	29	41	79
P503A072	P503F072	7.2				
P503A073	P503F073	7.3				
P503A074	P503F074	7.4				
P503A075	P503F075	7.5				
P503A076	P503F076	7.6				
P503A077	P503F077	7.7				
P503A078	P503F078	7.8				
P503A079	P503F079	7.9				
P503A080	P503F080	8.0				
P503A081	P503F081	8.1	10	35	47	89
P503A082	P503F082	8.2				
P503A083	P503F083	8.3				
P503A084	P503F084	8.4				
P503A085	P503F085	8.5				
P503A086	P503F086	8.6				
P503A087	P503F087	8.7				
P503A088	P503F088	8.8				
P503A089	P503F089	8.9				
P503A090	P503F090	9.0				
P503A091	P503F091	9.1				
P503A092	P503F092	9.2				
P503A093	P503F093	9.3				
P503A094	P503F094	9.4				
P503A095	P503F095	9.5				
P503A096	P503F096	9.6				
P503A097	P503F097	9.7				
P503A098	P503F098	9.8				
P503A099	P503F099	9.9				
P503A100	P503F100	10.0				
P503A101	P503F101	10.1	12	40	55	102
P503A102	P503F102	10.2				
P503A103	P503F103	10.3				
P503A104	P503F104	10.4				
P503A105	P503F105	10.5				
P503A106	P503F106	10.6				
P503A107	P503F107	10.7				
P503A108	P503F108	10.8				
P503A109	P503F109	10.9				
P503A110	P503F110	11.0				
P503A111	P503F111	11.1				
P503A112	P503F112	11.2				
P503A113	P503F113	11.3				
P503A114	P503F114	11.4				
P503A115	P503F115	11.5				
P503A116	P503F116	11.6				
P503A117	P503F117	11.7				
P503A118	P503F118	11.8				
P503A119	P503F119	11.9				
P503A120	P503F120	12.0				

※ These tools are manufactured based on order received.

NEXT >>>

P503A / P503F ...series

ULTRA FINE



HELIX



p.735

EDP. No.	EDP. No.	D	D ₂	L ₁	L ₂	L ₃
P503A104	P503F104	10.4	12	40	55	102
P503A105	P503F105	10.5				
P503A106	P503F106	10.6				
P503A107	P503F107	10.7				
P503A108	P503F108	10.8				
P503A109	P503F109	10.9				
P503A110	P503F110	11.0				
P503A111	P503F111	11.1				
P503A112	P503F112	11.2				
P503A113	P503F113	11.3				
P503A114	P503F114	11.4				
P503A115	P503F115	11.5				
P503A116	P503F116	11.6	14	43	60	107
P503A117	P503F117	11.7				
P503A118	P503F118	11.8				
P503A119	P503F119	11.9				
P503A120	P503F120	12.0				
P503A121	P503F121	12.1				
P503A122	P503F122	12.2				
P503A123	P503F123	12.3				
P503A124	P503F124	12.4				
P503A125	P503F125	12.5				
P503A126	P503F126	12.6				
P503A127	P503F127	12.7				
P503A128	P503F128	12.8				
P503A129	P503F129	12.9				
P503A130	P503F130	13.0				
P503A131	P503F131	13.1				
P503A132	P503F132	13.2				
P503A133	P503F133	13.3				
P503A134	P503F134	13.4				
P503A135	P503F135	13.5				
P503A136	P503F136	13.6				
P503A137	P503F137	13.7				
P503A138	P503F138	13.8				
P503A139	P503F139	13.9				
P503A140	P503F140	14.0	16	45	65	115
P503A141	P503F141	14.1				
P503A142	P503F142	14.2				
P503A143	P503F143	14.3				
P503A144	P503F144	14.4				
P503A145	P503F145	14.5				
P503A146	P503F146	14.6				
P503A147	P503F147	14.7				
P503A148	P503F148	14.8				
P503A149	P503F149	14.9				
P503A150	P503F150	15.0				
P503A151	P503F151	15.1				
P503A152	P503F152	15.2				
P503A153	P503F153	15.3				
P503A154	P503F154	15.4				
P503A155	P503F155	15.5				
P503A156	P503F156	15.6				
P503A157	P503F157	15.7				
P503A158	P503F158	15.8				
P503A159	P503F159	15.9				
P503A160	P503F160	16.0				

※ These tools are manufactured based on order received.

NEXT >>

P503A / P503F ...series

ULTRA FINE



HELIX



p.735

EDP. No.	EDP. No.	D	D ₂	L ₁	L ₂	L ₃
P503A161	P503F161	16.1	18	51	73	123
P503A163	P503F163	16.3				
P503A165	P503F165	16.5				
P503A170	P503F170	17.0				
P503A171	P503F171	17.1				
P503A172	P503F172	17.2				
P503A175	P503F175	17.5				
P503A177	P503F177	17.7				
P503A178	P503F178	17.8				
P503A180	P503F180	18.0				
P503A181	P503F181	18.1	20	55	79	131
P503A182	P503F182	18.2				
P503A185	P503F185	18.5				
P503A190	P503F190	19.0				
P503A191	P503F191	19.1				
P503A195	P503F195	19.5				
P503A197	P503F197	19.7				
P503A200	P503F200	20.0				

※ These tools are manufactured based on order received.

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	◎	◎	○	○			◎		◎

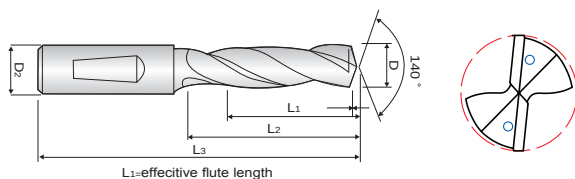
○:General Application ◎:The most suitable Application

■ Tolerance

mm = 1/1000mm

Tolerance \ Diameter	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

Drills for high hardened steel *Power Max Drill Series*



POWER MAX DRILL STUB INTERNAL COOLANT / DIN 6537K

■ Shank Type

- PI503A : DIN 6535 HA - straight A type
- PI503F : DIN 6535 HE - 2°Whistle Flat F type

PI503A / PI503F ...series



ULTRA FINE

HELIX

m7

p.735

EDP. No.	EDP. No.	D	D ₂	L ₁	L ₂	L ₃
PI503A030	PI503F030	3.0	6	14	20	62
PI503A031	PI503F031	3.1				
PI503A032	PI503F032	3.2				
PI503A033	PI503F033	3.3				
PI503A034	PI503F034	3.4				
PI503A035	PI503F035	3.5				
PI503A036	PI503F036	3.6				
PI503A037	PI503F037	3.7	6	17	24	66
PI503A038	PI503F038	3.8				
PI503A039	PI503F039	3.9				
PI503A040	PI503F040	4.0				
PI503A041	PI503F041	4.1				
PI503A042	PI503F042	4.2				
PI503A043	PI503F043	4.3				
PI503A044	PI503F044	4.4				
PI503A045	PI503F045	4.5				
PI503A046	PI503F046	4.6				
PI503A047	PI503F047	4.7				
PI503A048	PI503F048	4.8	6	20	28	66
PI503A049	PI503F049	4.9				
PI503A050	PI503F050	5.0				
PI503A051	PI503F051	5.1				
PI503A052	PI503F052	5.2				
PI503A053	PI503F053	5.3				
PI503A054	PI503F054	5.4				
PI503A055	PI503F055	5.5				
PI503A056	PI503F056	5.6				
PI503A057	PI503F057	5.7				
PI503A058	PI503F058	5.8				
PI503A059	PI503F059	5.9				
PI503A060	PI503F060	6.0				
PI503A061	PI503F061	6.1	8	24	34	79
PI503A062	PI503F062	6.2				
PI503A063	PI503F063	6.3				
PI503A064	PI503F064	6.4				
PI503A065	PI503F065	6.5				
PI503A066	PI503F066	6.6				

※ These tools are manufactured based on order received.

NEXT >>>

PI503A / PI503F ...series

ULTRA FINE



HELIX



m7



p.735

EDP. No.	EDP. No.	D	D ₂	L ₁	L ₂	L ₃
PI503A067	PI503F067	6.7	8	24	34	79
PI503A068	PI503F068	6.8				
PI503A069	PI503F069	6.9				
PI503A070	PI503F070	7.0				
PI503A071	PI503F071	7.1	8	29	41	79
PI503A072	PI503F072	7.2				
PI503A073	PI503F073	7.3				
PI503A074	PI503F074	7.4				
PI503A075	PI503F075	7.5				
PI503A076	PI503F076	7.6				
PI503A077	PI503F077	7.7				
PI503A078	PI503F078	7.8				
PI503A079	PI503F079	7.9				
PI503A080	PI503F080	8.0				
PI503A081	PI503F081	8.1	10	35	47	89
PI503A082	PI503F082	8.2				
PI503A083	PI503F083	8.3				
PI503A084	PI503F084	8.4				
PI503A085	PI503F085	8.5				
PI503A086	PI503F086	8.6				
PI503A087	PI503F087	8.7				
PI503A088	PI503F088	8.8				
PI503A089	PI503F089	8.9				
PI503A090	PI503F090	9.0				
PI503A091	PI503F091	9.1				
PI503A092	PI503F092	9.2				
PI503A093	PI503F093	9.3				
PI503A094	PI503F094	9.4				
PI503A095	PI503F095	9.5				
PI503A096	PI503F096	9.6				
PI503A097	PI503F097	9.7				
PI503A098	PI503F098	9.8				
PI503A099	PI503F099	9.9				
PI503A100	PI503F100	10.0				
PI503A101	PI503F101	10.1	12	40	55	102
PI503A102	PI503F102	10.2				
PI503A103	PI503F103	10.3				
PI503A104	PI503F104	10.4				
PI503A105	PI503F105	10.5				
PI503A106	PI503F106	10.6				
PI503A107	PI503F107	10.7				
PI503A108	PI503F108	10.8				
PI503A109	PI503F109	10.9				
PI503A110	PI503F110	11.0				
PI503A111	PI503F111	11.1				
PI503A112	PI503F112	11.2				
PI503A113	PI503F113	11.3				
PI503A114	PI503F114	11.4				
PI503A115	PI503F115	11.5				
PI503A116	PI503F116	11.6				
PI503A117	PI503F117	11.7				
PI503A118	PI503F118	11.8				
PI503A119	PI503F119	11.9				
PI503A120	PI503F120	12.0				

※ These tools are manufactured based on order received.

NEXT >>>

PI503A / PI503F ...series

ULTRA FINE



HELIX



m7



p.735

EDP. No.	EDP. No.	D ₁	D ₂	L ₁	L ₂	L ₃
PI503A121	PI503F121	12.1	14	43	60	107
PI503A122	PI503F122	12.2				
PI503A123	PI503F123	12.3				
PI503A124	PI503F124	12.4				
PI503A125	PI503F125	12.5				
PI503A126	PI503F126	12.6				
PI503A127	PI503F127	12.7				
PI503A128	PI503F128	12.8				
PI503A129	PI503F129	12.9				
PI503A130	PI503F130	13.0				
PI503A131	PI503F131	13.1				
PI503A132	PI503F132	13.2				
PI503A133	PI503F133	13.3				
PI503A134	PI503F134	13.4				
PI503A135	PI503F135	13.5				
PI503A136	PI503F136	13.6	16	45	65	115
PI503A137	PI503F137	13.7				
PI503A138	PI503F138	13.8				
PI503A139	PI503F139	13.9				
PI503A140	PI503F140	14.0				
PI503A141	PI503F141	14.1				
PI503A142	PI503F142	14.2				
PI503A143	PI503F143	14.3				
PI503A144	PI503F144	14.4				
PI503A145	PI503F145	14.5				
PI503A146	PI503F146	14.6				
PI503A147	PI503F147	14.7				
PI503A148	PI503F148	14.8				
PI503A149	PI503F149	14.9				
PI503A150	PI503F150	15.0				
PI503A151	PI503F151	15.1	18	51	73	123
PI503A152	PI503F152	15.2				
PI503A153	PI503F153	15.3				
PI503A154	PI503F154	15.4				
PI503A155	PI503F155	15.5				
PI503A156	PI503F156	15.6				
PI503A157	PI503F157	15.7				
PI503A158	PI503F158	15.8				
PI503A159	PI503F159	15.9				
PI503A160	PI503F160	16.0				
PI503A161	PI503F161	16.1	18	51	73	123
PI503A163	PI503F163	16.3				
PI503A165	PI503F165	16.5				
PI503A170	PI503F170	17.0				
PI503A171	PI503F171	17.1				
PI503A172	PI503F172	17.2				
PI503A175	PI503F175	17.5				
PI503A177	PI503F177	17.7				
PI503A178	PI503F178	17.8				
PI503A180	PI503F180	18.0				

※ These tools are manufactured based on order received.

NEXT >>>

PI503A / PI503F ...series

ULTRA FINE



HELIX



m7



p.735

EDP. No.	EDP. No.	D	D ₂	L ₁	L ₂	L ₃
PI503A181	PI503F181	18.1	20	55	79	131
PI503A182	PI503F182	18.2				
PI503A185	PI503F185	18.5				
PI503A190	PI503F190	19.0				
PI503A191	PI503F191	19.1				
PI503A195	PI503F195	19.5				
PI503A197	PI503F197	19.7				
PI503A200	PI503F200	20.0				

※ These tools are manufactured based on order received.

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	◎	◎	○	○			◎		◎

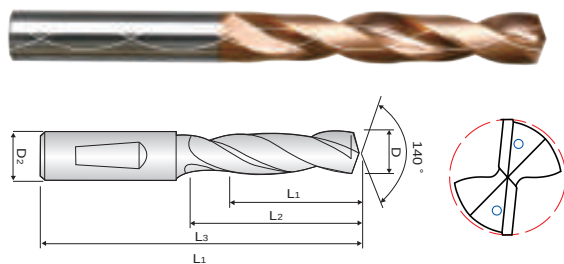
○:General Application ◎:The most suitable Application

■ Tolerance

mm = 1/1000mm

Tolerance \ Diameter	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

Drills for high hardened steel *Power Max Drill Series*



POWER MX DRILL MEDIUM INTERNAL COOLANT

■ Shank Type

- PI505A : DIN 6535 HA - straight A type
- PI505F : DIN 6535 HE - 2°Whistle Flat F type

PI505A / PI505F ...series



EDP. No.	EDP. No.	D	D ₂	L ₁	L ₂	L ₃
PI505A040	PI505F040	4.0	6	29	36	74
PI505A041	PI505F041	4.1				
PI505A042	PI505F042	4.2				
PI505A043	PI505F043	4.3				
PI505A044	PI505F044	4.4				
PI505A045	PI505F045	4.5				
PI505A046	PI505F046	4.6				
PI505A047	PI505F047	4.7	6	35	44	82
PI505A048	PI505F048	4.8				
PI505A049	PI505F049	4.9				
PI505A050	PI505F050	5.0				
PI505A051	PI505F051	5.1				
PI505A052	PI505F052	5.2				
PI505A053	PI505F053	5.3				
PI505A054	PI505F054	5.4				
PI505A055	PI505F055	5.5				
PI505A056	PI505F056	5.6				
PI505A057	PI505F057	5.7				
PI505A058	PI505F058	5.8				
PI505A059	PI505F059	5.9				
PI505A060	PI505F060	6.0	8	43	53	91
PI505A061	PI505F061	6.1				
PI505A062	PI505F062	6.2				
PI505A063	PI505F063	6.3				
PI505A064	PI505F064	6.4				
PI505A065	PI505F065	6.5				
PI505A066	PI505F066	6.6				
PI505A067	PI505F067	6.7				
PI505A068	PI505F068	6.8				
PI505A069	PI505F069	6.9				
PI505A070	PI505F070	7.0				
PI505A071	PI505F071	7.1				
PI505A072	PI505F072	7.2				
PI505A073	PI505F073	7.3				
PI505A074	PI505F074	7.4				
PI505A075	PI505F075	7.5				
PI505A076	PI505F076	7.6				

※ These tools are manufactured based on order received.

NEXT >>>

PI505A / PI505F ...series

EDP. No.	EDP. No.	D	D ₂	L ₁	L ₂	L ₃
PI505A077	PI505F077	7.7	8	43	53	91
PI505A078	PI505F078	7.8				
PI505A079	PI505F079	7.9				
PI505A080	PI505F080	8.0				
PI505A081	PI505F081	8.1	10	49	61	103
PI505A082	PI505F082	8.2				
PI505A083	PI505F083	8.3				
PI505A084	PI505F084	8.4				
PI505A085	PI505F085	8.5				
PI505A086	PI505F086	8.6				
PI505A087	PI505F087	8.7				
PI505A088	PI505F088	8.8				
PI505A089	PI505F089	8.9				
PI505A090	PI505F090	9.0				
PI505A091	PI505F091	9.1				
PI505A092	PI505F092	9.2				
PI505A093	PI505F093	9.3				
PI505A094	PI505F094	9.4				
PI505A095	PI505F095	9.5				
PI505A096	PI505F096	9.6				
PI505A097	PI505F097	9.7				
PI505A098	PI505F098	9.8				
PI505A099	PI505F099	9.9				
PI505A100	PI505F100	10.0				
PI505A101	PI505F101	10.1	12	56	71	118
PI505A102	PI505F102	10.2				
PI505A103	PI505F103	10.3				
PI505A104	PI505F104	10.4				
PI505A105	PI505F105	10.5				
PI505A106	PI505F106	10.6				
PI505A107	PI505F107	10.7				
PI505A108	PI505F108	10.8				
PI505A109	PI505F109	10.9				
PI505A110	PI505F110	11.0				
PI505A111	PI505F111	11.1				
PI505A112	PI505F112	11.2				
PI505A113	PI505F113	11.3				
PI505A114	PI505F114	11.4				
PI505A115	PI505F115	11.5				
PI505A116	PI505F116	11.6				
PI505A117	PI505F117	11.7				
PI505A118	PI505F118	11.8				
PI505A119	PI505F119	11.9				
PI505A120	PI505F120	12.0				
PI505A121	PI505F121	12.1	14	60	77	124
PI505A122	PI505F122	12.2				
PI505A123	PI505F123	12.3				
PI505A124	PI505F124	12.4				
PI505A125	PI505F125	12.5				
PI505A126	PI505F126	12.6				
PI505A127	PI505F127	12.7				
PI505A128	PI505F128	12.8				
PI505A129	PI505F129	12.9				
PI505A130	PI505F130	13.0				
PI505A131	PI505F131	13.1				
PI505A132	PI505F132	13.2				
PI505A133	PI505F133	13.3				
PI505A134	PI505F134	13.4				
PI505A135	PI505F135	13.5				
PI505A136	PI505F136	13.6				
PI505A137	PI505F137	13.7				
PI505A138	PI505F138	13.8				
PI505A139	PI505F139	13.9				
PI505A140	PI505F140	14.0				

※ These tools are manufactured based on order received.

NEXT >>>

PI505A / PI505F ...series

EDP. No.	EDP. No.	D	D ₂	L ₁	L ₂	L ₃
PI505A141	PI505F141	14.1	16	63	83	133
PI505A142	PI505F142	14.2				
PI505A143	PI505F143	14.3				
PI505A144	PI505F144	14.4				
PI505A145	PI505F145	14.5				
PI505A146	PI505F146	14.6				
PI505A147	PI505F147	14.7				
PI505A148	PI505F148	14.8				
PI505A149	PI505F149	14.9				
PI505A150	PI505F150	15.0				
PI505A151	PI505F151	15.1				
PI505A152	PI505F152	15.2				
PI505A153	PI505F153	15.3				
PI505A154	PI505F154	15.4				
PI505A155	PI505F155	15.5				
PI505A156	PI505F156	15.6				
PI505A157	PI505F157	15.7				
PI505A158	PI505F158	15.8				
PI505A159	PI505F159	15.9				
PI505A160	PI505F160	16.0				
PI505A161	PI505F161	16.1	18	71	93	143
PI505A163	PI505F163	16.3				
PI505A165	PI505F165	16.5				
PI505A170	PI505F170	17.0				
PI505A171	PI505F171	17.1				
PI505A172	PI505F172	17.2				
PI505A175	PI505F175	17.5				
PI505A177	PI505F177	17.7				
PI505A178	PI505F178	17.8				
PI505A180	PI505F180	18.0				
PI505A181	PI505F181	18.1	20	77	101	153
PI505A182	PI505F182	18.2				
PI505A185	PI505F185	18.5				
PI505A190	PI505F190	19.0				
PI505A191	PI505F191	19.1				
PI505A195	PI505F195	19.5				
PI505A197	PI505F197	19.7				
PI505A200	PI505F200	20.0				

※ These tools are manufactured based on order received.

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	◎	◎	○	○			◎		◎

○:General Application ◎:The most suitable Application

■ Tolerance

mm = 1/1000mm

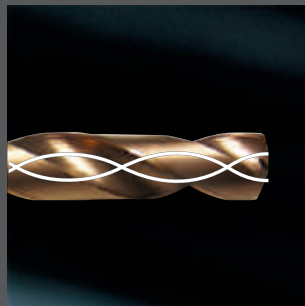
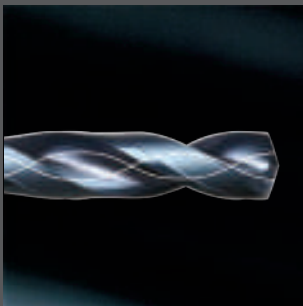
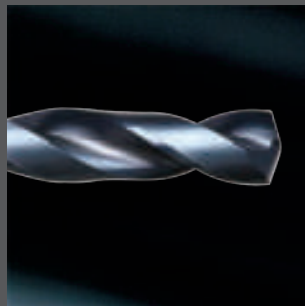
Tolerance \ Diameter	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
Cutting edge(m7)	+12 +2	+16 +4	+21 +6	+25 +7	+29 +8
Shank(h6)	0 -6	0 -8	0 -9	0 -11	0 -13



Drills for General Speed Cutting

POWER DRILL SERIES

DRILL
SERIES



Drills for General Speed Cutting _ Power Drill Series

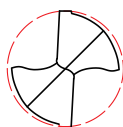
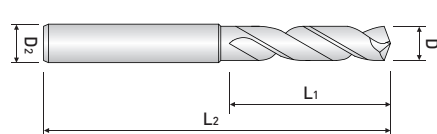
WIDIN

EDP. No.	APPEARANCE	FEATURE	INCH & METRIC	STOCK	PAGE
PDS ...series		STUB TYPE - 3 X D	METRIC	•	544
PDM ...series		MEDIUM TYPE - 5 X D	METRIC	•	546
PDSI ...series		STUB TYPE - 3 x D	METRIC	•	548
PDMI ...series		MEDIUM TYPE - 5 x D	METRIC	•	550
PX503G ...series		POWER DRILL (X-treme)	METRIC	•	552
CTS ...series		COUNTER BORE SOLID-BOTTOM DRILL	METRIC	•	554
NDP ...series		NEW DYNAMIC POWER DRILL	METRIC	•	556

■ CODE SYSTEM

PD	MI	MI	MI	100
Classification	Shape	Grade	Drilling Depth	Diameter
PD : Power Drill	S : Stub Length	5 : standard	03 : 3xD	1
PX : Power Drill X-Treme	M : Medium		05 : 5xD	24
CTS : Counter Boring Solid Drill	SI : Stub, Internal Coolant		R : Regular	
NDP : New Dynamic Power Drill	MI : Medium, Internal Coolant		L : Long	

Drills for General Speed Cutting *Power Drill Series*



POWER DRILL - STUB / 3 x D

PDS ...series



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EDP. No.	D	L ₁	L ₂	D ₂
PDS010	1	8	38	3
PDS011	1.1	10	42	
PDS012	1.2			
PDS013	1.3			
PDS014	1.4			
PDS015	1.5	11		
PDS016	1.6			
PDS017	1.7	12		
PDS018	1.8			
PDS019	1.9	13		
PDS020	2.0			
PDS021	2.1	14	50	3
PDS022	2.2			
PDS023	2.3			
PDS024	2.4			
PDS025	2.5			
PDS026	2.6			
PDS027	2.7			
PDS028	2.8			
PDS029	2.9			
PDS030	3.0			
PDS031	3.1	20	60	4
PDS032	3.2			
PDS033	3.3			
PDS034	3.4			
PDS035	3.5	22		
PDS036	3.6			
PDS037	3.7			
PDS038	3.8			
PDS039	3.9	24		
PDS040	4.0			
PDS041	4.1	24	62	5
PDS042	4.2			
PDS043	4.3			
PDS044	4.4			
PDS045	4.5			
PDS046	4.6			
PDS047	4.7			
PDS048	4.8			
PDS049	4.9			
PDS050	5.0			
PDS051	5.1	28	66	6

EDP. No.	D	L ₁	L ₂	D ₂
PDS052	5.2	28	66	6
PDS053	5.3			
PDS054	5.4			
PDS055	5.5			
PDS056	5.6	30		
PDS057	5.7			
PDS058	5.8			
PDS059	5.9			
PDS060	6.0			
PDS061	6.1	34	74	7
PDS062	6.2			
PDS063	6.3			
PDS064	6.4			
PDS065	6.5			
PDS066	6.6			
PDS067	6.7	37		
PDS068	6.8			
PDS069	6.9			
PDS070	7.0			
PDS071	7.1	40	79	8
PDS072	7.2			
PDS073	7.3			
PDS074	7.4			
PDS075	7.5			
PDS076	7.6			
PDS077	7.7			
PDS078	7.8			
PDS079	7.9			
PDS080	8.0			
PDS081	8.1	43	84	9
PDS082	8.2			
PDS083	8.3			
PDS084	8.4			
PDS085	8.5			
PDS086	8.6			
PDS087	8.7			
PDS088	8.8			
PDS089	8.9			
PDS090	9.0			
PDS091	9.1	47	89	10
PDS092	9.2			
PDS093	9.3			

NEXT >>>

PDS ...series



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EDP. No.	D	L ₁	L ₂	D ₂
PDS094	9.4	47	89	10
PDS095	9.5			
PDS096	9.6			
PDS097	9.7			
PDS098	9.8			
PDS099	9.9			
PDS100	10.0	51	95	11
PDS101	10.1			
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	54	102	12
PDS111	11.1			
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	57	102	13
PDS121	12.1			
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	60	107	14
PDS131	13.1			
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.	D	L ₁	L ₂	D ₂
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			
PDS182	18.2			
PDS185	18.5			
PDS190	19.0	70	127	19
PDS191	19.1			
PDS192	19.2			
PDS195	19.5			
PDS197	19.7			
PDS200	20.0	70	131	20
PDS220	22.0			
PDS225	22.5			
PDS230	23.0			
PDS235	23.5			
PDS240	24.0	86	140	24

■ Applicable Working Material

Carbon Steels (S45C, S55C,...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
○	◎	○	~HRC55 SKD61	~HRC55 SKD11			◎		○

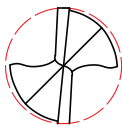
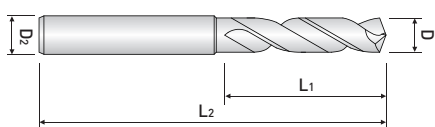
○:General Application ◎:The most suitable Application

■ Tolerance

mm = 1/1000mm

Tolerance \ Diameter	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

Drills for General Speed Cutting *Power Drill Series*



POWER DRILL - MEDIUM / 5 x D

PDM ...series



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EDP. No.	D	L ₁	L ₂	D ₂
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			
PDM042	4.2	33	71	5
PDM043	4.3	36		
PDM044	4.4			
PDM045	4.5			
PDM046	4.6			
PDM047	4.7	39		
PDM048	4.8			
PDM049	4.9			
PDM050	5.0			
PDM051	5.1	39	83	6
PDM052	5.2			
PDM053	5.3			
PDM054	5.4			
PDM055	5.5	43		
PDM056	5.6			
PDM057	5.7			
PDM058	5.8			
PDM059	5.9			
PDM060	6.0			
PDM061	6.1	47	87	7
PDM062	6.2			
PDM063	6.3			
PDM064	6.4			
PDM065	6.5			
PDM066	6.6			

EDP. No.	D	L ₁	L ₂	D ₂
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			
PDM076	7.6			
PDM077	7.7			
PDM078	7.8			
PDM079	7.9			
PDM080	8.0			
PDM081	8.1	56	96	9
PDM082	8.2			
PDM083	8.3			
PDM084	8.4			
PDM085	8.5			
PDM086	8.6			
PDM087	8.7			
PDM088	8.8			
PDM089	8.9			
PDM090	9.0			
PDM091	9.1	62	105	10
PDM092	9.2			
PDM093	9.3			
PDM094	9.4			
PDM095	9.5			
PDM096	9.6			
PDM097	9.7			
PDM098	9.8			
PDM099	9.9			
PDM100	10.0			
PDM101	10.1	68	115	11
PDM102	10.2			
PDM103	10.3			

NEXT >>>

PDM ...series



ULTRA FINE



HELIIX



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EDP. No.	D	L ₁	L ₂	D ₂
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.	D	L ₁	L ₂	D ₂
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			
PDM163	16.3			
PDM165	16.5	95	155	17
PDM170	17.0			
PDM171	17.1			
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			
PDM197	19.7			
PDM200	20.0			

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	◎	○	○				◎		○

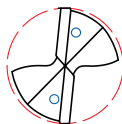
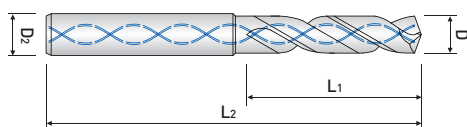
○:General Application ◎:The most suitable Application

■ Tolerance

μm = 1/1000mm

Tolerance \ Diameter	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

Drills for General Speed Cutting *Power Drill Series*



**POWER DRILL - STUB
INTERNAL COOLANT / 3 x D**

PDSI ...series



ULTRA FINE



HELIX



TiAlN



3xD



h8



140°



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EDP. No.	D	L ₁	L ₂	D ₂
PDSI030	3.0	18	60	3
PDSI031	3.1	20		4
PDSI032	3.2			
PDSI033	3.3			
PDSI034	3.4	22		
PDSI035	3.5			
PDSI036	3.6			
PDSI037	3.7			
PDSI038	3.8	24		
PDSI039	3.9			
PDSI040	4.0			
PDSI041	4.1	24	62	5
PDSI042	4.2	26		
PDSI043	4.3			
PDSI044	4.4			
PDSI045	4.5			
PDSI046	4.6			
PDSI047	4.7			
PDSI048	4.8			
PDSI049	4.9			
PDSI050	5.0			
PDSI051	5.1	28	66	6
PDSI052	5.2			
PDSI053	5.3			
PDSI054	5.4			
PDSI055	5.5	30		
PDSI056	5.6			
PDSI057	5.7			
PDSI058	5.8			
PDSI059	5.9			
PDSI060	6.0			
PDSI061	6.1	34	74	7
PDSI062	6.2			
PDSI063	6.3			
PDSI064	6.4			
PDSI065	6.5			
PDSI066	6.6			

EDP. No.	D	L ₁	L ₂	D ₂
PDSI067	6.7	37	74	7
PDSI068	6.8			
PDSI069	6.9			
PDSI070	7.0			
PDSI071	7.1	40	79	8
PDSI072	7.2			
PDSI073	7.3			
PDSI074	7.4			
PDSI075	7.5			
PDSI076	7.6			
PDSI077	7.7			
PDSI078	7.8			
PDSI079	7.9			
PDSI080	8.0	43	84	9
PDSI081	8.1			
PDSI082	8.2			
PDSI083	8.3			
PDSI084	8.4			
PDSI085	8.5			
PDSI086	8.6			
PDSI087	8.7			
PDSI088	8.8			
PDSI089	8.9			
PDSI090	9.0	47	89	10
PDSI091	9.1			
PDSI092	9.2			
PDSI093	9.3			
PDSI094	9.4			
PDSI095	9.5			
PDSI096	9.6			
PDSI097	9.7			
PDSI098	9.8			
PDSI099	9.9	51	95	11
PDSI100	10.0			
PDSI101	10.1			
PDSI102	10.2			
PDSI103	10.3	51	95	11

NEXT >>

PDSI ...series



ULTRA FINE



HELIX



p.734

EDP. No.	D	L ₁	L ₂	D ₂
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.	D	L ₁	L ₂	D ₂
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			
PDSI163	16.3			
PDSI165	16.5	66	119	17
PDSI170	17.0			
PDSI171	17.1			
PDSI172	17.2			
PDSI175	17.5	66	123	18
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			

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	◎	○	○				◎		○

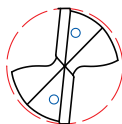
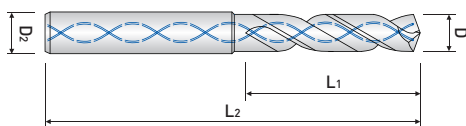
○:General Application ◎:The most suitable Application

■ Tolerance

μm = 1/1000mm

Tolerance \ Diameter	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

Drills for General Speed Cutting *Power Drill Series*



**POWER DRILL - MEDIUM
INTERNAL COOLANT / 5 x D**

PDMI ...series



ULTRA FINE



HELIX



TiAlN



5xD



h8



140°



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EDP. No.	D	L ₁	L ₂	D ₂
PDMI031	3.1	27	74	4
PDMI032	3.2			
PDMI033	3.3			
PDMI034	3.4	30		
PDMI035	3.5			
PDMI036	3.6			
PDMI037	3.7			
PDMI038	3.8	33		
PDMI039	3.9			
PDMI040	4.0			
PDMI041	4.1	33	80	5
PDMI042	4.2			
PDMI043	4.3	36		
PDMI044	4.4			
PDMI045	4.5			
PDMI046	4.6			
PDMI047	4.7			
PDMI048	4.8	39		
PDMI049	4.9			
PDMI050	5.0			
PDMI051	5.1	39	87	6
PDMI052	5.2			
PDMI053	5.3			
PDMI054	5.4	43		
PDMI055	5.5			
PDMI056	5.6			
PDMI057	5.7			
PDMI058	5.8			
PDMI059	5.9			
PDMI060	6.0			
PDMI061	6.1	47	95	7
PDMI062	6.2			
PDMI063	6.3			
PDMI064	6.4			
PDMI065	6.5			
PDMI066	6.6			
PDMI067	6.7			

EDP. No.	D	L ₁	L ₂	D ₂
PDMI068	6.8	47	95	7
PDMI069	6.9			
PDMI070	7.0			
PDMI071	7.1	52	103	8
PDMI072	7.2			
PDMI073	7.3			
PDMI074	7.4			
PDMI075	7.5			
PDMI076	7.6			
PDMI077	7.7			
PDMI078	7.8			
PDMI079	7.9			
PDMI080	8.0	56	105	9
PDMI081	8.1			
PDMI082	8.2			
PDMI083	8.3			
PDMI084	8.4			
PDMI085	8.5			
PDMI086	8.6			
PDMI087	8.7			
PDMI088	8.8			
PDMI089	8.9			
PDMI090	9.0	62	108	10
PDMI091	9.1			
PDMI092	9.2			
PDMI093	9.3			
PDMI094	9.4			
PDMI095	9.5			
PDMI096	9.6			
PDMI097	9.7			
PDMI098	9.8			
PDMI099	9.9			
PDMI100	10.0	68	125	11
PDMI101	10.1			
PDMI102	10.2			
PDMI103	10.3			
PDMI104	10.4			

NEXT >>>

PDMI ...series



ULTRA FINE



HELIX



h8



p.734

EDP. No.	D	L ₁	L ₂	D ₂
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.	D	L ₁	L ₂	D ₂
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			
PDMI163	16.3			
PDMI165	16.5	95	155	17
PDMI170	17.0			
PDMI171	17.1			
PDMI172	17.2			
PDMI175	17.5	100	157	18
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			

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
○	◎	○	~HRC55 SKD61	~HRC55 SKD11			○		○

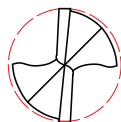
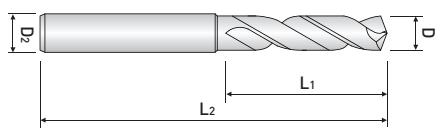
○:General Application ◎:The most suitable Application

■ Tolerance

μm = 1/1000mm

Tolerance \ Diameter	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

Drills for General Speed Cutting *Power Drill Series*



POWER DRILL X-treme

- Superior chip evacuation with unique flute design
- Outstanding performance for high ductility materials or soft steels like stainless steel
- Longer tool life and improvement on stable machining with W coating

PX503G ...series



ULTRA FINE



HELIX



W Coating



3xD



h8



140°



p.737

EDP. No.	D	L ₁	L ₂	D ₂
PX503G010	1	8	38	3
PX503G011	1.1	10	42	3
PX503G012	1.2	10	42	3
PX503G013	1.3	10	42	3
PX503G014	1.4	11	42	3
PX503G015	1.5	11	42	3
PX503G016	1.6	12	42	3
PX503G017	1.7	12	42	3
PX503G018	1.8	13	42	3
PX503G019	1.9	13	42	3
PX503G020	2	15	50	3
PX503G021	2.1	15	50	3
PX503G022	2.2	15	50	3
PX503G023	2.3	15	50	3
PX503G024	2.4	15	50	3
PX503G025	2.5	15	50	3
PX503G026	2.6	15	50	3
PX503G027	2.7	15	50	3
PX503G028	2.8	15	50	3
PX503G029	2.9	15	50	3
PX503G030	3	18	60	4
PX503G031	3.1	18	60	4
PX503G032	3.2	18	60	4
PX503G033	3.3	18	60	4
PX503G034	3.4	18	60	4
PX503G035	3.5	18	60	4
PX503G036	3.6	23	60	4
PX503G037	3.7	23	60	4
PX503G038	3.8	23	60	4
PX503G039	3.9	23	60	4
PX503G040	4	23	60	4
PX503G041	4.1	23	60	4
PX503G042	4.2	30	62	5
PX503G043	4.3	30	62	5
PX503G044	4.4	30	62	5
PX503G045	4.5	30	62	5

EDP. No.	D	L ₁	L ₂	D ₂
PX503G046	4.6	30	62	5
PX503G047	4.7	30	62	5
PX503G048	4.8	30	62	5
PX503G049	4.9	30	62	5
PX503G050	5	30	62	5
PX503G051	5.1	30	62	5
PX503G052	5.2	34	66	6
PX503G053	5.3	34	66	6
PX503G054	5.4	34	66	6
PX503G055	5.5	34	66	6
PX503G056	5.6	34	66	6
PX503G057	5.7	34	66	6
PX503G058	5.8	34	66	6
PX503G059	5.9	34	66	6
PX503G060	6	34	66	6
PX503G061	6.1	34	66	6
PX503G062	6.2	40	74	7
PX503G063	6.3	40	74	7
PX503G064	6.4	40	74	7
PX503G065	6.5	40	74	7
PX503G066	6.6	40	74	7
PX503G067	6.7	40	74	7
PX503G068	6.8	40	74	7
PX503G069	6.9	40	74	7
PX503G070	7	40	74	7
PX503G071	7.1	40	74	7
PX503G072	7.2	44	79	8
PX503G073	7.3	44	79	8
PX503G074	7.4	44	79	8
PX503G075	7.5	44	79	8
PX503G076	7.6	44	79	8
PX503G077	7.7	44	79	8
PX503G078	7.8	44	79	8
PX503G079	7.9	44	79	8
PX503G080	8	44	79	8
PX503G081	8.1	44	79	8

NEXT >>>

PX503G ...series



ULTRA FINE



HELIX



W Coating



h8



p.737

EDP. No.	D	L ₁	L ₂	D ₂
PX503G082	8.2	48	84	9
PX503G083	8.3	48	84	9
PX503G084	8.4	48	84	9
PX503G085	8.5	48	84	9
PX503G086	8.6	48	84	9
PX503G087	8.7	48	84	9
PX503G088	8.8	48	84	9
PX503G089	8.9	48	84	9
PX503G090	9	48	84	9
PX503G091	9.1	48	84	9
PX503G092	9.2	51	89	10
PX503G093	9.3	51	89	10
PX503G094	9.4	51	89	10
PX503G095	9.5	51	89	10
PX503G096	9.6	51	89	10
PX503G097	9.7	51	89	10
PX503G098	9.8	51	89	10
PX503G099	9.9	51	89	10
PX503G100	10	51	89	10
PX503G101	10.1	51	89	10
PX503G102	10.2	53	95	11
PX503G103	10.3	53	95	11
PX503G104	10.4	53	95	11
PX503G105	10.5	53	95	11
PX503G106	10.6	53	95	11
PX503G107	10.7	53	95	11
PX503G108	10.8	53	95	11
PX503G109	10.9	53	95	11
PX503G110	11	53	95	11
PX503G111	11.1	53	95	11
PX503G112	11.2	60	102	12
PX503G113	11.3	60	102	12
PX503G114	11.4	60	102	12
PX503G115	11.5	60	102	12
PX503G116	11.6	60	102	12
PX503G117	11.7	60	102	12
PX503G118	11.8	60	102	12
PX503G119	11.9	60	102	12
PX503G120	12	60	102	12
PX503G121	12.1	60	102	12
PX503G122	12.2	60	102	13
PX503G123	12.3	60	102	13
PX503G124	12.4	60	102	13
PX503G125	12.5	60	102	13
PX503G126	12.6	60	102	13
PX503G127	12.7	60	120	13
PX503G128	12.8	60	102	13
PX503G129	12.9	60	102	13
PX503G130	13	60	102	13
PX503G131	13.1	60	102	13
PX503G132	13.2	62	107	14

EDP. No.	D	L ₁	L ₂	D ₂
PX503G133	13.3	62	107	14
PX503G134	13.4	62	107	14
PX503G135	13.5	62	107	14
PX503G136	13.6	62	107	14
PX503G137	13.7	62	107	14
PX503G138	13.8	62	107	14
PX503G139	13.9	62	107	14
PX503G140	14	62	107	14
PX503G141	14.1	62	107	14
PX503G142	14.2	65	111	15
PX503G143	14.3	65	111	15
PX503G144	14.4	65	111	15
PX503G145	14.5	65	111	15
PX503G146	14.6	65	111	15
PX503G147	14.7	65	111	15
PX503G148	14.8	65	111	15
PX503G149	14.9	65	111	15
PX503G150	15	65	111	15
PX503G151	15.1	65	111	15
PX503G152	15.2	67	115	16
PX503G153	15.3	67	115	16
PX503G154	15.4	67	115	16
PX503G155	15.5	67	115	16
PX503G156	15.6	67	115	16
PX503G157	15.7	67	115	16
PX503G158	15.8	67	115	16
PX503G159	15.9	67	115	16
PX503G160	16	67	115	16
PX503G161	16.1	67	115	16
PX503G163	16.3	69	119	17
PX503G165	16.5	69	119	17
PX503G170	17	69	119	17
PX503G171	17.1	69	119	17
PX503G172	17.2	72	123	18
PX503G173	17.3	72	123	18
PX503G175	17.5	72	123	18
PX503G177	17.7	72	123	18
PX503G180	18	72	123	18
PX503G181	18.1	72	123	18
PX503G182	18.2	74	127	19
PX503G185	18.5	74	127	19
PX503G190	19	74	127	19
PX503G191	19.1	74	127	19
PX503G193	19.3	78	131	20
PX503G195	19.5	78	131	20
PX503G197	19.7	78	131	20
PX503G200	20	78	131	20

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
◎	◎	○	~HRC55 SKD61	~HRC55 SKD11			○		◎

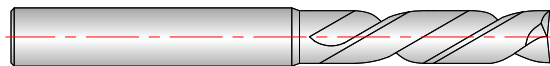
○: General Application ◎: The most suitable Application

■ Tolerance

μm = 1/1000mm

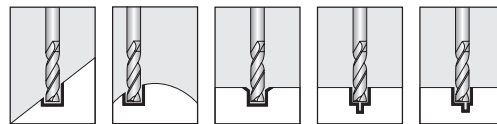
Tolerance	Diameter	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	over 30 to 50
Cutting edge(h8)		0 -14	0 -18	0 -22	0 -27	0 -33	0 -39
Shank(h6)		0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

Drills for General Speed Cutting *Power Drill Series*



Counter Bore Solid

- Bottom Drill



Machining for
slant face

Machining for
round face

Z axis cutting
for chamfer

Hole spot
facing

Hole
correction

(impossible to cut in direction of outside of periphery)

CTS ...series



EDP. No.	Dimension(mm)			SH.Dia
	D	F.L	OAL	
CTS030	3	18	60	4
CTS033	3.3	20	60	4
CTS035	3.5	22	60	4
CTS040	4	24	60	4
CTS042	4.2	26	62	5
CTS045	4.5	26	62	5
CTS050	5	26	62	5
CTS053	5.3	28	66	6
CTS055	5.5	28	66	6
CTS060	6	30	66	6
CTS065	6.5	34	74	7
CTS068	6.8	37	74	7
CTS070	7	37	74	7
CTS075	7.5	40	79	8
CTS080	8	40	79	8
CTS085	8.5	43	84	9
CTS088	8.8	43	84	9
CTS090	9	43	84	9
CTS095	9.5	47	89	10
CTS100	10	47	89	10
CTS103	10.3	51	95	11
CTS105	10.5	51	95	11
CTS108	10.8	51	95	11
CTS110	11	51	95	11
CTS115	11.5	54	102	12
CTS120	12	54	102	12

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
○	◎	◎	~HRC55 SKD61	~HRC55 SKD11			◎		◎

○:General Application ◎:The most suitable Application

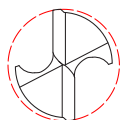
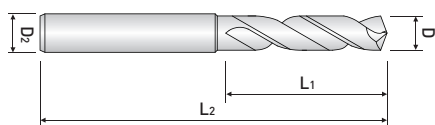
■ Tolerance

μm = 1/1000mm

Tolerance Diameter	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

NEW!

Drills for General Speed Cutting *Power Drill Series*



NEW DYNAMIC POWER DRILL - LONG

- The most economical drill supplying and optimum tooling in the wide range work piece
- Applying various work pieces with improvement of wear resistance, wear resistance with optimum material and coating
- improvement of chip emission and tool life with developed surface treatment
- improvement of chip curling by applying new Gamma-Flute concept
- High precision work is possible without the need for separate centering and reamer operation

NDPR ...series



ULTRA FINE



HELIX



W Coating



4xD



h7



140°

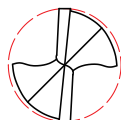
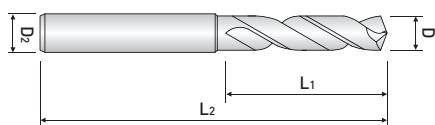


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EDP. No.	D	F.L	OAL	SH.Dia
NDPR010	1	8	38	3
NDPR011	1.1	9	42	3
NDPR012	1.2	10	42	3
NDPR013	1.3	10	42	3
NDPR014	1.4	11	42	3
NDPR015	1.5	11	42	3
NDPR016	1.6	12	42	3
NDPR017	1.7	12	42	3
NDPR018	1.8	13	42	3
NDPR019	1.9	13	42	3
NDPR020	2	17	50	3
NDPR021	2.1	17	50	3
NDPR022	2.2	17	50	3
NDPR023	2.3	17	50	3
NDPR024	2.4	17	50	3
NDPR025	2.5	17	50	3
NDPR026	2.6	17	50	3
NDPR027	2.7	17	50	3
NDPR028	2.8	17	50	3
NDPR029	2.9	17	50	3
NDPR030	3	20	55	4
NDPR031	3.1	20	55	4
NDPR032	3.2	20	55	4
NDPR033	3.3	20	55	4
NDPR034	3.4	20	55	4
NDPR035	3.5	20	55	4
NDPR036	3.6	20	55	4
NDPR037	3.7	20	55	4
NDPR038	3.8	20	55	4
NDPR039	3.9	20	55	4
NDPR040	4	20	55	4
NDPR041	4.1	20	55	4
NDPR042	4.2	32	62	5
NDPR043	4.3	32	62	5
NDPR044	4.4	32	62	5
NDPR045	4.5	32	62	5

EDP. No.	D	F.L	OAL	SH.Dia
NDPR046	4.6	32	62	5
NDPR047	4.7	32	62	5
NDPR048	4.8	32	62	5
NDPR049	4.9	32	62	5
NDPR050	5	32	62	5
NDPR051	5.1	32	62	5
NDPR052	5.2	36	66	6
NDPR053	5.3	36	66	6
NDPR054	5.4	36	66	6
NDPR055	5.5	36	66	6
NDPR056	5.6	36	66	6
NDPR057	5.7	36	66	6
NDPR058	5.8	36	66	6
NDPR059	5.9	36	66	6
NDPR060	6	36	66	6
NDPR061	6.1	36	66	6
NDPR062	6.2	42	74	7
NDPR063	6.3	42	74	7
NDPR064	6.4	42	74	7
NDPR065	6.5	42	74	7
NDPR066	6.6	42	74	7
NDPR067	6.7	42	74	7
NDPR068	6.8	42	74	7
NDPR069	6.9	42	74	7
NDPR070	7	42	74	7
NDPR071	7.1	42	74	7
NDPR072	7.2	46	79	8
NDPR073	7.3	46	79	8
NDPR074	7.4	46	79	8
NDPR075	7.5	46	79	8
NDPR076	7.6	46	79	8
NDPR077	7.7	46	79	8
NDPR078	7.8	46	79	8
NDPR079	7.9	46	79	8
NDPR080	8	46	79	8
NDPR081	8.1	46	79	8

Drills for General Speed Cutting *Power Drill Series*



NEW DYNAMIC POWER DRILL - LONG

- The most economical drill supplying and optimum tooling in the wide range work piece
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- improvement of chip emission and tool life with developed surface treatment
- improvement of chip curling by applying new Gamma-Flute concept
- High precision work is possible without the need for separate centering and reamer operation

NDPR ...series



ULTRA FINE



HELIX



W Coating



h8



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EDP. No.	D	L ₁	L ₂	D ₂
NDPR010	1	8	38	3
NDPR011	1.1	10	42	3
NDPR012	1.2	10	42	3
NDPR013	1.3	10	42	3
NDPR014	1.4	11	42	3
NDPR015	1.5	11	42	3
NDPR016	1.6	12	42	3
NDPR017	1.7	12	42	3
NDPR018	1.8	13	42	3
NDPR019	1.9	13	42	3
NDPR020	2	15	50	3
NDPR021	2.1	15	50	3
NDPR022	2.2	15	50	3
NDPR023	2.3	15	50	3
NDPR024	2.4	15	50	3
NDPR025	2.5	15	50	3
NDPR026	2.6	15	50	3
NDPR027	2.7	15	50	3
NDPR028	2.8	15	50	3
NDPR029	2.9	15	50	3
NDPR030	3	18	60	4
NDPR031	3.1	18	60	4
NDPR032	3.2	18	60	4
NDPR033	3.3	18	60	4
NDPR034	3.4	18	60	4
NDPR035	3.5	18	60	4
NDPR036	3.6	23	60	4
NDPR037	3.7	23	60	4
NDPR038	3.8	23	60	4
NDPR039	3.9	23	60	4
NDPR040	4	23	60	4
NDPR041	4.1	23	60	4
NDPR042	4.2	30	62	5
NDPR043	4.3	30	62	5
NDPR044	4.4	30	62	5
NDPR045	4.5	30	62	5

EDP. No.	D	L ₁	L ₂	D ₂
NDPR046	4.6	30	62	5
NDPR047	4.7	30	62	5
NDPR048	4.8	30	62	5
NDPR049	4.9	30	62	5
NDPR050	5	30	62	5
NDPR051	5.1	30	62	5
NDPR052	5.2	34	66	6
NDPR053	5.3	34	66	6
NDPR054	5.4	34	66	6
NDPR055	5.5	34	66	6
NDPR056	5.6	34	66	6
NDPR057	5.7	34	66	6
NDPR058	5.8	34	66	6
NDPR059	5.9	34	66	6
NDPR060	6	34	66	6
NDPR061	6.1	34	66	6
NDPR062	6.2	40	74	7
NDPR063	6.3	40	74	7
NDPR064	6.4	40	74	7
NDPR065	6.5	40	74	7
NDPR066	6.6	40	74	7
NDPR067	6.7	40	74	7
NDPR068	6.8	40	74	7
NDPR069	6.9	40	74	7
NDPR070	7	40	74	7
NDPR071	7.1	40	74	7
NDPR072	7.2	44	79	8
NDPR073	7.3	44	79	8
NDPR074	7.4	44	79	8
NDPR075	7.5	44	79	8
NDPR076	7.6	44	79	8
NDPR077	7.7	44	79	8
NDPR078	7.8	44	79	8
NDPR079	7.9	44	79	8
NDPR080	8	44	79	8
NDPR081	8.1	44	79	8

NEXT >>

NDPR ...series



ULTRA FINE



HELIX



W Coating



h8



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EDP. No.	D	L ₁	L ₂	D ₂
NDPR082	8.2	48	84	9
NDPR083	8.3	48	84	9
NDPR084	8.4	48	84	9
NDPR085	8.5	48	84	9
NDPR086	8.6	48	84	9
NDPR087	8.7	48	84	9
NDPR088	8.8	48	84	9
NDPR089	8.9	48	84	9
NDPR090	9	48	84	9
NDPR091	9.1	48	84	9
NDPR092	9.2	51	89	10
NDPR093	9.3	51	89	10
NDPR094	9.4	51	89	10
NDPR095	9.5	51	89	10
NDPR096	9.6	51	89	10
NDPR097	9.7	51	89	10
NDPR098	9.8	51	89	10
NDPR099	9.9	51	89	10
NDPR100	10	51	89	10
NDPR101	10.1	51	89	10
NDPR102	10.2	53	95	11
NDPR103	10.3	53	95	11
NDPR104	10.4	53	95	11
NDPR105	10.5	53	95	11
NDPR106	10.6	53	95	11
NDPR107	10.7	53	95	11
NDPR108	10.8	53	95	11
NDPR109	10.9	53	95	11
NDPR110	11	53	95	11
NDPR111	11.1	53	95	11
NDPR112	11.2	60	102	12
NDPR113	11.3	60	102	12
NDPR114	11.4	60	102	12
NDPR115	11.5	60	102	12
NDPR116	11.6	60	102	12
NDPR117	11.7	60	102	12
NDPR118	11.8	60	102	12
NDPR119	11.9	60	102	12
NDPR120	12	60	102	12
NDPR121	12.1	60	102	12
NDPR122	12.2	60	102	13
NDPR123	12.3	60	102	13
NDPR124	12.4	60	102	13
NDPR125	12.5	60	102	13
NDPR126	12.6	60	102	13
NDPR127	12.7	60	120	13
NDPR128	12.8	60	102	13
NDPR129	12.9	60	102	13
NDPR130	13	60	102	13
NDPR131	13.1	60	102	13
NDPR132	13.2	62	107	14

EDP. No.	D	L ₁	L ₂	D ₂
NDPR133	13.3	62	107	14
NDPR134	13.4	62	107	14
NDPR135	13.5	62	107	14
NDPR136	13.6	62	107	14
NDPR137	13.7	62	107	14
NDPR138	13.8	62	107	14
NDPR139	13.9	62	107	14
NDPR140	14	62	107	14
NDPR141	14.1	62	107	14
NDPR142	14.2	65	111	15
NDPR143	14.3	65	111	15
NDPR144	14.4	65	111	15
NDPR145	14.5	65	111	15
NDPR146	14.6	65	111	15
NDPR147	14.7	65	111	15
NDPR148	14.8	65	111	15
NDPR149	14.9	65	111	15
NDPR150	15	65	111	15
NDPR151	15.1	65	111	15
NDPR152	15.2	67	115	16
NDPR153	15.3	67	115	16
NDPR154	15.4	67	115	16
NDPR155	15.5	67	115	16
NDPR156	15.6	67	115	16
NDPR157	15.7	67	115	16
NDPR158	15.8	67	115	16
NDPR159	15.9	67	115	16
NDPR160	16	67	115	16
NDPR161	16.1	67	115	16
NDPR163	16.3	69	119	17
NDPR165	16.5	69	119	17
NDPR170	17	69	119	17
NDPR171	17.1	69	119	17
NDPR172	17.2	72	123	18
NDPR173	17.3	72	123	18
NDPR175	17.5	72	123	18
NDPR177	17.7	72	123	18
NDPR180	18	72	123	18
NDPR181	18.1	72	123	18
NDPR182	18.2	74	127	19
NDPR185	18.5	74	127	19
NDPR190	19	74	127	19
NDPR191	19.1	74	127	19
NDPR193	19.3	78	131	20
NDPR195	19.5	78	131	20
NDPR197	19.7	78	131	20
NDPR200	20	78	131	20

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
◎	◎	◎	~HRC55 SKD61	~HRC55 SKD11			◎		◎

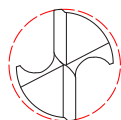
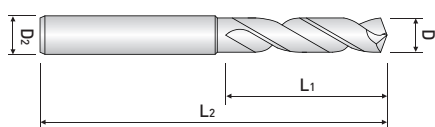
○: General Application ◎: The most suitable Application

■ Tolerance

mm = 1/1000mm

Tolerance	Diameter	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	over 30 to 50
Cutting edge(h8)		0 -10	0 -12	0 -15	0 -18	0 -21	0 -25
Shank(h6)		0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

Drills for General Speed Cutting *Power Drill Series*



NEW DYNAMIC POWER DRILL - LONG

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NDPL ...series



ULTRA FINE



HELIX



W Coating



h7



140°



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EDP. No.	D	F.L	OAL	SH.Dia
NDPL030	3	45	80	4
NDPL031	3.1	45	80	4
NDPL032	3.2	45	80	4
NDPL033	3.3	45	80	4
NDPL034	3.4	45	80	4
NDPL035	3.5	45	80	4
NDPL036	3.6	45	80	4
NDPL037	3.7	45	80	4
NDPL038	3.8	45	80	4
NDPL039	3.9	45	80	4
NDPL040	4	45	80	4
NDPL041	4.1	45	80	4
NDPL042	4.2	45	80	5
NDPL043	4.3	45	80	5
NDPL044	4.4	45	80	5
NDPL046	4.6	45	80	5
NDPL047	4.7	45	80	5
NDPL048	4.8	45	80	5
NDPL049	4.9	45	80	5
NDPL050	5	45	80	5
NDPL051	5.1	45	80	5
NDPL052	5.2	50	83	6
NDPL053	5.3	50	83	6
NDPL054	5.4	50	83	6
NDPL055	5.5	50	83	6
NDPL056	5.6	50	83	6
NDPL057	5.7	50	83	6
NDPL058	5.8	50	83	6
NDPL059	5.9	50	83	6
NDPL060	6	50	83	6
NDPL061	6.1	50	83	6
NDPL062	6.2	53	85	7
NDPL063	6.3	53	85	7
NDPL064	6.4	53	85	7
NDPL065	6.5	53	85	7
NDPL066	6.6	53	85	7

EDP. No.	D	F.L	OAL	SH.Dia
NDPL067	6.7	53	85	7
NDPL068	6.8	53	85	7
NDPL069	6.9	53	85	7
NDPL070	7	53	85	7
NDPL071	7.1	53	85	7
NDPL072	7.2	58	90	8
NDPL073	7.3	58	90	8
NDPL074	7.4	58	90	8
NDPL075	7.5	58	90	8
NDPL076	7.6	58	90	8
NDPL077	7.7	58	90	8
NDPL078	7.8	58	90	8
NDPL079	7.9	58	90	8
NDPL080	8	58	90	8
NDPL081	8.1	58	90	8
NDPL082	8.2	64	98	9
NDPL083	8.3	64	98	9
NDPL084	8.4	64	98	9
NDPL085	8.5	64	98	9
NDPL086	8.6	64	98	9
NDPL087	8.7	64	98	9
NDPL088	8.8	64	98	9
NDPL089	8.9	64	98	9
NDPL090	9	64	98	9
NDPL091	9.1	64	98	9
NDPL092	9.2	68	105	10
NDPL093	9.3	68	105	10
ND PR094	9.4	68	105	10
NDPL095	9.5	68	105	10
NDPL096	9.6	68	105	10
NDPL097	9.7	68	105	10
NDPL098	9.8	68	105	10
NDPL099	9.9	68	105	10
NDPL100	10	68	105	10
NDPL101	10.1	68	105	10
NDPL102	10.2	73	110	11

NDPL ...series



ULTRA FINE



HELIX



W Coating



h7



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EDP. No.	D	F.L	OAL	SH.Dia
NDPL103	10.3	73	110	11
NDPL104	10.4	73	110	11
NDPL105	10.5	73	110	11
NDPL106	10.6	73	110	11
NDPL107	10.7	73	110	11
NDPL108	10.8	73	110	11
NDPL109	10.9	73	110	11
NDPL110	11	73	110	11
NDPL111	11.1	73	110	11
NDPL112	11.2	80	120	12
NDPL113	11.3	80	120	12
NDPL114	11.4	80	120	12
NDPL115	11.5	80	120	12
NDPL116	11.6	80	120	12
NDPL117	11.7	80	120	12
NDPL118	11.8	80	120	12
NDPL119	11.9	80	120	12
NDPL120	12	80	120	12
NDPL121	12.1	80	120	12
NDPL122	12.2	90	137	13
NDPL123	12.3	90	137	13
NDPL124	12.4	90	137	13
NDPL125	12.5	90	137	13
NDPL126	12.6	90	137	13
NDPL127	12.7	90	137	13
NDPL128	12.8	90	137	13
NDPL129	12.9	90	137	13
NDPL130	13	90	137	13
NDPL131	13.1	90	137	13
NDPL132	13.2	96	147	14
NDPL133	13.3	96	147	14
NDPL134	13.4	96	147	14
NDPL135	13.5	96	147	14
NDPL136	13.6	96	147	14
NDPL137	13.7	96	147	14
NDPL138	13.8	96	147	14
NDPL139	13.9	96	147	14
NDPL140	14	96	147	14
NDPL141	14.1	96	147	14
NDPL142	14.2	100	153	15
NDPL143	14.3	100	153	15
NDPL144	14.4	100	153	15
NDPL145	14.5	100	153	15
NDPL146	14.6	100	153	15
NDPL147	14.7	100	153	15
NDPL148	14.8	100	153	15
NDPL149	14.9	100	153	15
NDPL150	15	100	153	15
NDPL151	15.1	100	153	15
NDPL152	15.2	112	160	16
NDPL153	15.3	112	160	16

EDP. No.	D	F.L	OAL	SH.Dia
NDPL154	15.4	112	160	16
NDPL155	15.5	112	160	16
NDPL156	15.6	112	160	16
NDPL157	15.7	112	160	16
NDPL158	15.8	112	160	16
NDPL159	15.9	112	160	16
NDPL160	16	112	160	16
NDPL165	16.5	112	160	17
NDPL170	17	112	160	17
NDPL175	17.5	112	160	18
NDPL176	17.6	112	160	18
NDPL177	17.7	112	160	18
NDPL178	17.8	112	160	18
NDPL180	18	112	160	18
NDPL185	18.5	112	160	19
NDPL190	19	112	160	19
NDPL195	19.5	112	160	20
NDPL200	20	112	160	20

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	◎	○				◎		◎

○:General Application ◎:The most suitable Application

■ Tolerance

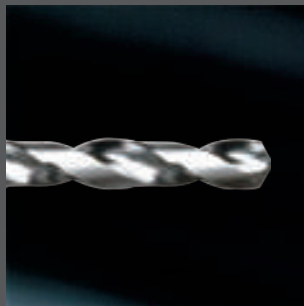
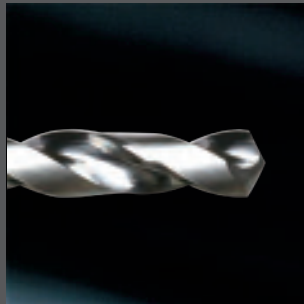
mm = 1/1000mm

Tolerance	Diameter	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	over 30 to 50
Cutting edge(h7)		0 -10	0 -12	0 -15	0 -18	0 -21	0 -25
Shank(h6)		0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

Drills for Multi-purpose

SOLID SPIRAL DRILL SERIES

DRILL
SERIES



Drills for Multi-purpose _ Solid Spiral Drill Series

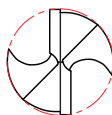
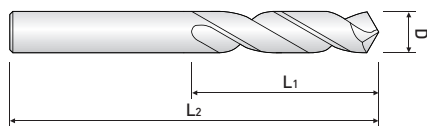
WIDIN

EDP. No.	APPEARANCE	FEATURE	INCH & METRIC	STOCK	PAGE
SSD ...series		REGULAR LENGTH	METRIC	•	562
SSDL ...series		LONG LENGTH	METRIC	•	564
SSTD ...series		REGULAR LENGTH(3xD)	METRIC	•	566
APF ...series		3 FLUTE, 5XD SOLID CARBIDE DRILL, DLC COATED	INCH & METRIC	•	568

■ CODE SYSTEM

SS	D	L	060
Classification	Shape	Drilling Depth	Diameter
SS : Solid Spiral	D : Drill	L : Long	0.5
AP : Aluminium Power	TD : TIN Coated Drill	505 : 5xD	16
	F : Facet Point		

Drills for Multi-purpose *Solid Spiral Drill Series*



REGULAR LENGTH

- Suitable for nonferrous metal and Aluminum

SSD ...series



FINE GRAIN



HELIX



118°



p.735

EDP. No.	D	L ₁	L ₂
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	18	50
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	50
SSD032	3.2		
SSD033	3.3		
SSD034	3.4		
SSD035	3.5		
SSD036	3.6	28	55
SSD037	3.7		
SSD038	3.8		
SSD039	3.9		
SSD040	4.0		

EDP. No.	D	L ₁	L ₂
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	38	75
SSD054	5.4		
SSD055	5.5		
SSD056	5.6		
SSD057	5.7		
SSD058	5.8		
SSD059	5.9		
SSD060	6.0		
SSD061	6.1		
SSD062	6.2		
SSD063	6.3		
SSD064	6.4		
SSD065	6.5		

NEXT >>

SSD ...series



EDP. No.	D	L ₁	L ₂
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		
SSD091	9.1		
SSD092	9.2		
SSD093	9.3		

EDP. No.	D	L ₁	L ₂
SSD094	9.4	50	95
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	70	125
SSD120	12.0		
SSD124	12.4		
SSD125	12.5	75	130
SSD130	13.0		

■ Applicable Working Material

Carbon Steels (S45C, S55C,...) ~HB225	Alloy Steels (SCM, SK,...) HB22 ~325	Prehardened Steels(NAK,...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11	○			◎	

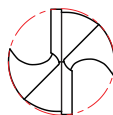
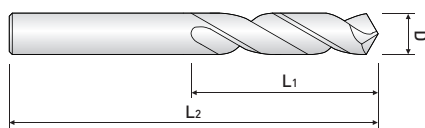
○:General Application ◎:The most suitable Application

■ Tolerance

mm = 1/1000mm

Tolerance \ Diameter	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	0 -27
Shank(h6)	0 -6	0 -8	0 -9	0 -11

Drills for Multi-purpose Solid Spiral Drill Series



SOLID SPIRAL DRILL - LONG

- Suitable for nonferrous metal and Aluminum

SSDL ...series



p.735

EDP. No.	D	L ₁	L ₂
SSDL030	3.0	42	73
SSDL031	3.1		
SSDL032	3.2		
SSDL033	3.3		
SSDL034	3.4		
SSDL035	3.5	45	80
SSDL036	3.6		
SSDL037	3.7		
SSDL038	3.8	48	80
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	59	90
SSDL046	4.6		
SSDL047	4.7		
SSDL048	4.8		
SSDL049	4.9		
SSDL050	5.0	63	95
SSDL051	5.1		
SSDL052	5.2		
SSDL053	5.3		
SSDL054	5.4		
SSDL055	5.5	66	100
SSDL056	5.6		
SSDL057	5.7		
SSDL058	5.8		
SSDL059	5.9		
SSDL060	6.0	70	105
SSDL061	6.1		
SSDL062	6.2		
SSDL063	6.3		
SSDL064	6.4		
SSDL065	6.5		

EDP. No.	D	L ₁	L ₂
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		

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11	○			◎	

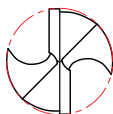
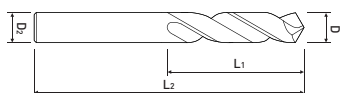
○: General Application ◎: The most suitable Application

■ Tolerance

mm = 1/1000mm

Tolerance \ Diameter	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	0 -27
Shank(h6)	0 -6	0 -8	0 -9	0 -11

Drills for Multi-purpose Solid Spiral Drill Series



REGULAR LENGTH

- Improved surface roughness
- Suitable for non-ferrous and aluminum machining
- Suitable for High Speed Machining

SSTD ...series



FINE GRAIN



SPLIT POINT



30°



118°



TiN



p.735

EDP. No.	D	L ₁	L ₂	D ₂
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

NEXT >>>

SSTD ...series



p.737

EDP. No.	D	L ¹	L ²	D ₂
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	45	80	6.4
SSTD066	6.6			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

NEXT >>

SSTD ...series



EDP. No.	D	L ¹	L ²	D ₂
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

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels (NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○					○		○	◎	○

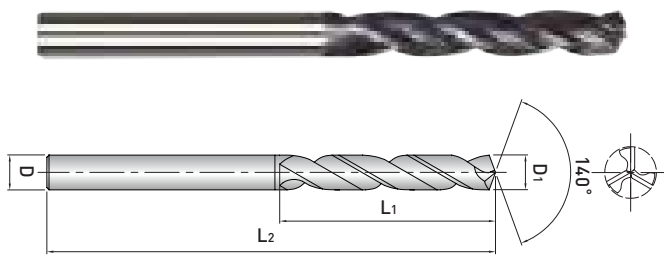
○: General Application ◎: The most suitable Application

■ Tolerance

mm = 1/1000mm

Tolerance \ Diameter	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	0 -27
Shank(h6)	0 -6	0 -8	0 -9	0 -11

Drills for Multi-purpose Solid Spiral Drill Series



3 FLUTE, 5XD SOLID CARBIDE DRILL - for Aluminum

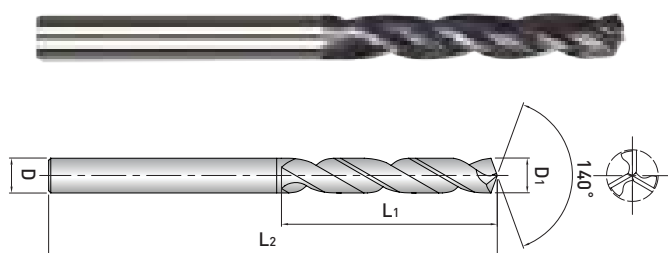
- DLC coated for longer tool life and maintain edge sharpness
- High performance geometry to optimize performance and finish
- High performance, micro grain solid carbide drill
- High performance drill point
- No spot drilling required

APF505 ...series



EDP NO.	Diameter			Flute Length	OAL	shank
	inch	fraction	mm			
APF505030	.1181		3	20	60	3
APF50503175	.1250	1/8"	3.175	27/32	2-3/8	4
APF50503263	.1285	#30	3.263	27/32	2-3/8	4
APF505035	.1378		3.5	22	63	4
APF50503572	.1406	9/64"	3.571	15/16	2-1/2	4
APF50503967	.1562	5/32"	3.967	15/16	2-1/2	4
APF505040	.1575	-	4	24	65	4
APF505045	.1772	-	4.5	24	65	5
APF50504762	.1875	3/16 "	4.762	1-1/4	2-3/4	5
APF50504800	.1890	#12	4.800	1-1/4	2-3/4	5
APF50504851	.1910	#11	4.851	1-1/4	2-3/4	5
APF50504914	.1935	#10	4.914	1-1/4	2-3/4	5
APF505050	.1969	-	5	32	75	5
APF50505054	.1990	#8	5.054	1-5/16	3"	6
APF50505105	.2010	#7	5.105	1-5/16	3"	6
APF50505158	.2031	13/64"	5.158	1-5/16	3"	6
APF50505181	.2040	#6	5.181	1-3/8	3"	6
APF50505219	.2055	#5	5.219	1-3/8	3"	6
APF50505308	.2090	#4	5.308	1-3/8	3"	6
APF50505410	.2130	#3	5.410	1-3/8	3"	6
APF505055	.2165	-	5.5	35	75	6
APF50505556	.2188	7/32 "	5.556	1-3/8	3"	6
APF50505613	.2210	#2	5.613	1-3/8	3"	6
APF50505791	.2280	#1	5.791	1-3/8	3"	6
APF50505953	.2344	15/64 "	5.953	1-1/2	3-1/4	6
APF505060	.2362	-	6	38	82	6
APF50506045	.2380	B	6.045	1-5/8	3-1/4	7
APF50506146	.2420	C	6.146	1-5/8	3-1/4	7
APF50506248	.2460	D	6.248	1-5/8	3-1/4	7
APF50506350	.2500	1/4 / E"	6.350	1-5/8	3-1/4	7
APF505065	.2559	-	6.5	41	82	7
APF50506527	.2570	F	6.527	1-11/16	3-1/4	7
APF50506629	.2610	G	6.629	1-11/16	3-1/2	7

Drills for Multi-purpose Solid Spiral Drill Series



3 FLUTE, 5XD SOLID CARBIDE DRILL - for Aluminum

- DLC coated for longer tool life and maintain edge sharpness
- High performance geometry to optimize performance and finish
- High performance, micro grain solid carbide drill
- High performance drill point
- No spot drilling required

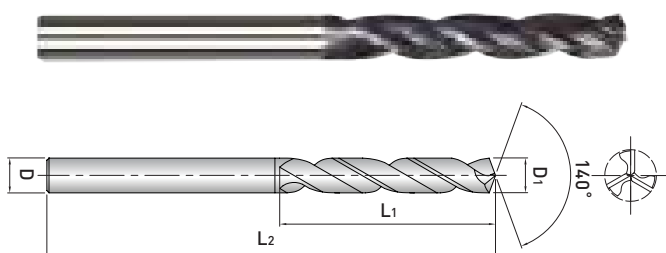
APF505 ...series



p.738

EDP NO.	Diameter			Flute Length	OAL	shank
	inch	fraction	mm			
APF50506746	.2656	17/64 "	6.746	1-11/16	3-1/2	7
APF50506756	.2660	H	6.756	1-11/16	3-1/2	7
APF50506908	.2720	I	6.908	1-11/16	3-1/2	7
APF505070	.2756	-	7	43	88	7
APF50507035	.2770	J	7.035	1-11/16	3-1/2	8
APF50507142	.2812	9/32 "	7.142	1-3/4	3-1/2	8
APF50507366	.2900	L	7.366	1-3/4	3-1/2	8
APF505075	.2953	-	7.5	44	95	8
APF50507541	.2969	19/64 "	7.541	1-7/8	3-3/4	8
APF50507670	.3020	N	7.670	1-7/8	3-3/4	8
APF50507937	.3125	5/16 "	7.937	1-7/8	3-3/4	8
APF505080	.3150	-	8	48	95	8
APF50508026	.3160	O	8.026	1-7/8	3-3/4	9
APF50508204	.3230	P	8.204	2-3/32	3-3/4	9
APF50508333	.3281	21/64 "	8.333	2-3/32	4"	9
APF50508432	.3320	Q	8.432	2-3/32	4"	9
APF505085	.3346	-	8.5	53	100	9
APF50508610	.3390	R	8.610	2-3/32	4"	9
APF50508732	.3438	11/32 "	8.732	2-3/16	4"	9
APF50508839	.3480	S	8.839	2-3/16	4"	9
APF505090	.3543	-	9	55	100	9
APF50509093	.3580	T	9.093	2-9/32	4-1/4	10
APF50509128	.3594	23/64 "	9.128	2-9/32	4-1/4	10
APF50509347	.3680	U	9.347	2-9/32	4-1/4	10
APF505095	.3740	-	9.5	58	108	10
APF50509525	.3750	3/8 "	9.525	2-3/8	4-1/4	10
APF50509575	.3770	V	9.575	2-3/8	4-1/4	10
APF50509804	.3860	W	9.804	2-3/8	4-1/2	10
APF50509921	.3906	25/64 "	9.921	2-3/8	4-1/2	10
APF505100	.3937	-	10	60	114	10
APF50510083	.3970	X	10.083	2-1/2	4-1/2	11
APF50510261	.4040	Y	10.261	2-9/16	4-1/2	11
APF50510317	.4062	13/32 "	10.317	2-9/16	4-1/2	11

Drills for Multi-purpose Solid Spiral Drill Series



3 FLUTE, 5XD SOLID CARBIDE DRILL - for Aluminum

- DLC coated for longer tool life and maintain edge sharpness
- High performance geometry to optimize performance and finish
- High performance, micro grain solid carbide drill
- High performance drill point
- No spot drilling required

APF505 ...series



EDP NO.	Diameter			Flute Length	OAL	shank
	inch	fraction	mm			
APF505105	.4134		10.5	67	114	11
APF50510716	.4219	27/64 "	10.716	2-11/16	4-1/2	11
APF505110	.4331	-	11	68	114	11
APF50511112	.4375	7/16 "	11.112	2-13/16	4-3/4	12
APF505115	.4528		11.5	70	120	12
APF50511508	.4531	29/64 "	11.508	2-7/8	4-3/4	12
APF50511907	.4688	15/32 "	11.907	2-7/8	4-3/4	12
APF505120	.4724	-	12	73	120	12
APF50512303	.4844	31/64 "	12.303	3"	5-5/16	13
APF505125	.4921	-	12.5	75	135	13
APF505127	.5000	1/2 "	12.7	3-1/16	5-3/8	13
APF505130	.5118	-	13	78	136	13
APF50513096	.5156	33/64 "	13.096	3-1/8	5-3/8	14
APF50513492	.5312	17/32 "	13.492	3-5/16	5-11/16	14
APF50513891	.5469	35/64 "	13.891	3-3/8	5-13/16	14
APF505140	.5512	-	14	86	148	14
APF50514287	.5625	9/16 "	14.287	3-1/2	5-15/16	15
APF50514683	.5781	37/64 "	14.683	3-1/2	6"	15
APF505150	.5906	-	15	90	152	15
APF50515082	.5938	19/32 "	15.082	3-9/16	6"	16
APF50515478	.6094	39/64 "	15.478	3-11/16	6-3/16	16
APF50515875	.6250	5/8 "	15.875	3-3/4	6-5/16	16
APF505160	.6299	-	16	95	160	16

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○					○			◎	

○: General Application ◎: The most suitable Application

■ Tolerance

mm = 1/1000mm

Tolerance \ Diameter	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18
Cutting edge			0 -12	
Shank(h6)	0 -6	0 -8	0 -9	0 -11

4

CENTERING TOOLS & REAMERS >



4

Centering Tools (General Purpose)

576

Reamers (General Purpose)

586

CENTERING TOOLS & REAMERS



Centering Tools

WIDIN

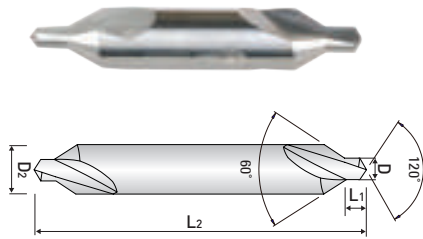
EDP. No.	APPEARANCE	FEATURE	STOCK	PAGE
CDS ...series		SOLID CENTER DRILL	•	576
LDS ...series		NC SPOTTING DRILL	•	577
LDF ...series		NC SPOTTING DRILL MULTY TYPE	•	578
LDA ...series		NC SPOTTING DRILL	•	579
CES302 ...series		CENTERING END MILL - SOLID	•	580
CEM ...series		CENTERING END MILL - BRAZED TYPE	•	581
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Reamers

WIDIN

EDP. No.	APPEARANCE	FEATURE	STOCK	PAGE
SSR ...series		STRAIGHT FLUTE REAMERS	•	586
SHR ...series		HELICAL FLUTE REAMERS	•	587
SBR ...series		BROACH REAMERS	•	588
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Centering Tools Series



SOLID CENTER DRILL

CDS ...series



FINE GRAIN



HELIX



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EDP. No.	D	L ₁	L ₂	D ₂
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

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○			○			○	○	○

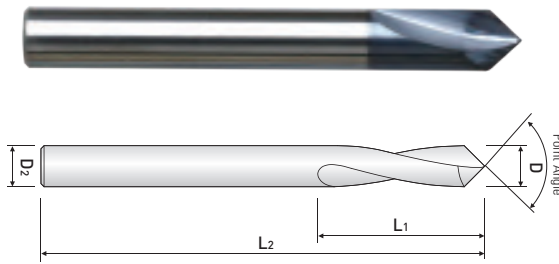
○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (mm)	Shank Dia.
All sizes 0~+0.1	h6

※ These tools are manufactured based on order received.

Centering Tools



NC SPOTTING DRILL

LDS ...series



EDP. No.	D	L ₁	L ₂	D ₂	Point Angle
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°

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○			○		○		○

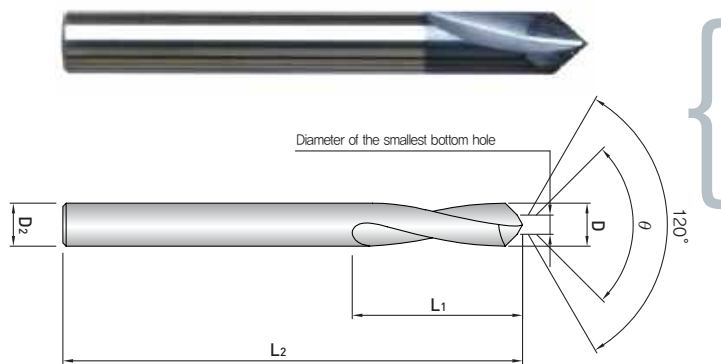
○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (mm)	Shank Dia.
±0.01	h6

※ These tools are manufactured based on order received.

Centering Tools Series



NC SPOTTING DRILL MULTY TYPE

- Minimize breakage of chisel edge by adjusting 120° point angle in the smallest bottom hole



LDF ...series

EDP. No.	D	L ₁	L ₂	D ₂	θ	The smallest bottom hole
LDF0360	3	9	50	3	60°	1.5
LDF0390					90°	1.2
LDF0460	4	10	50	4	60°	1.7
LDF0490					90°	1.3
LDF0560	5	12	50	5	60°	1.9
LDF0590					90°	1.5
LDF0660	6	13	60	6	60°	1.9
LDF0690					90°	1.5
LDF0860	8	23	70	8	60°	1.9
LDF0890					90°	1.6
LDF1060	10	24	80	10	60°	2.1
LDF1090					90°	2.1
LDF1260	12	28	80	12	60°	2.1
LDF1290					90°	2.1

※ The smallest bottom hole means the smallest size of bottom hole on the use of chamfer

■ Applicable Working Material

Carbon Steels (S45C, S55C,...) ~ HB225	Alloy Steels (SCM, SK,...) HB22 ~ 325	Prehardened Steels(NAK,...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○			○		○		○

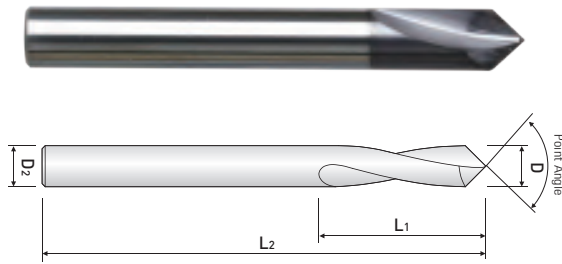
○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (mm)	Shank Dia.
±0.01	h6

※ These tools are manufactured based on order received.

Centering Tools



NC SPOTTING DRILL

LDA ...series



EDP. No.	D			L ₁	L ₂	D ₂	Point Angle
	INCH (DECIMAL)	INCH (FRACTION)	mm	INCH (FRACTION)			
LDA006A	.0938	3/32	2.383	2"	3/8"	3/32"	90°
LDA006B							120°
LDA006C							142°
LDA008A	.1250	1/8	3.175	2"	3/8"	1/8"	90°
LDA008B							120°
LDA008C							142°
LDA012A	.1875	3/16	4.763	3"	3/4"	3/16"	90°
LDA012B							120°
LDA012C							142°
LDA016A	.2500	1/4	6.350	3"	3/4"	1/4"	90°
LDA016B							120°
LDA016C							142°
LDA020A	.3125	5/16	7.938	3"	1"	5/16"	90°
LDA020B							120°
LDA020C							142°
LDA024A	.3750	3/8	9.525	3"	1"	3/8"	90°
LDA024B							120°
LDA024C							142°
LDA028A	.4375	7/16	11.113	4"	1"	7/16"	90°
LDA028B							120°
LDA028C							142°
LDA032A	.5000	1/2	12.700	4"	1"	1/2"	90°
LDA032B							120°
LDA032C							142°

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○			○		○	○	○

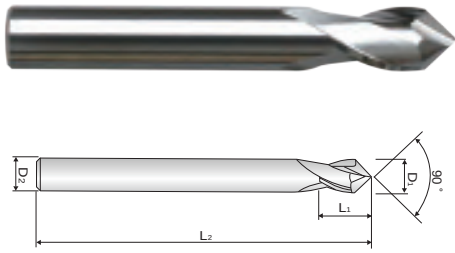
○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (mm)	Shank Dia.
±0.01	h6

※ These tools are manufactured based on order received.

Centering Tools Series

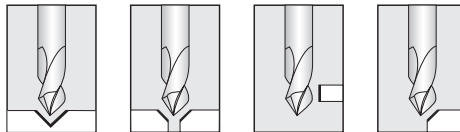


CENTERING END MILL - SOLID

CES302 ...series



EDP. No.		D ₁	L ₁	L ₂	D ₂
비코팅	코팅				
CES302030	CES302030-C	3	6	50	6
CES302040	CES302040-C	4	8	50	6
CES302050	CES302050-C	5	10	50	6
CES302060	CES302060-C	6	12	60	6
CES302080	CES302080-C	8	16	70	8
CES302100	CES302100-C	10	18	70	10
CES302120	CES302120-C	12	20	75	12
CES302140	CES302140-C	14	24	80	14
CES302160	CES302160-C	16	26	80	16
CES302200	CES302200-C	20	32	100	20



■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels (NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○			○			○	○

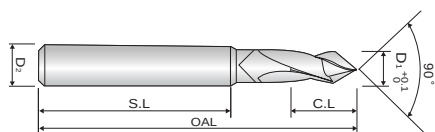
○: General Application ◎: The most suitable Application

■ Tolerance

Mill Dia. (mm)	Shank Dia.
-0.05~0	h6

※ These tools are manufactured based on order received.

Centering Tools



**CENTERING END MILL
- BRAZED TYPE**

CEM ...series

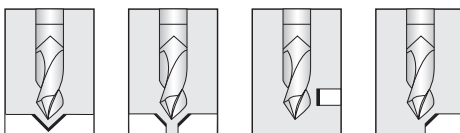


HELIX



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EDP. No.	D ₁	C.L	S.L	OAL	D ₂
CEM1016	10	15	80	115	16
CEM1216	12	20	100	145	16
CEM1620	16	23	100	150	20
CEM2025	20	25	100	155	25



■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○			○		○	○	○

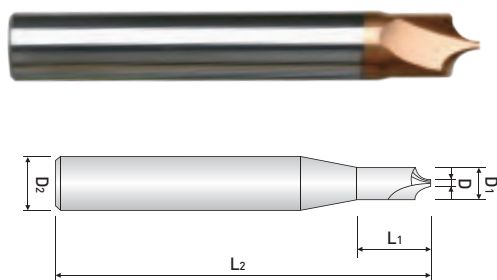
○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ +0.1	h7

※ These tools are manufactured based on order received.

Centering Tools Series



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



ULTRA FINE



HELIX



p.742

EDP. No.	D	R	D ₁	L ₁	L ₂	D ₂
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

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	◎	◎	○		○	○	○

○:General Application ◎:The most suitable Application

Centering Tools

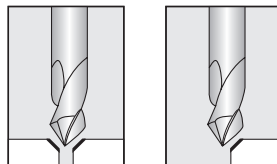


3F, 4F CHAMFER TOOL

CFT ...series



EDP. No.	D	θ	L ₁	L ₂	D ₂	Z
CFT0660	6	60°	5.1	50	6	3
CFT0690	6	90°	3	50	6	3
CFT0860	8	60°	6.9	60	8	3
CFT0890	8	90°	4	60	8	3
CFT1060	10	60°	8.6	70	10	4
CFT1090	10	90°	5	70	10	4
CFT1260	12	60°	10.3	75	12	4
CFT1290	12	90°	6	75	12	4



■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○			○		○		○

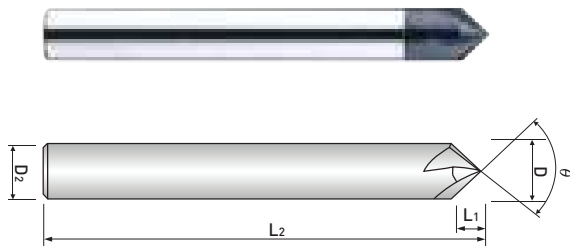
○: General Application ◎: The most suitable Application

■ Tolerance

Mill Dia. (mm)	Shank Dia.
±0.01	h6

※ These tools are manufactured based on order received.

Centering Tools Series



CHAMFER CUTTER

- Superior workpiece surface and excellent cutting performance on edge chamfer machining
- Use micro grain cemented carbide material which has high deflection strength

CCT ...series



EDP. No.	D	θ	L ₁	L ₂	D ₂
CCT502 030 S3	3	90°	1.5	60	3
CCT502 040 S4	4	90°	2	60	4
CCT502 060	6	90°	3	60	6
CCT502 080	8	90°	4	65	8
CCT502 100	10	90°	5	70	10
CCT502 120	12	90°	6	75	12

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels (NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○			○		○		○

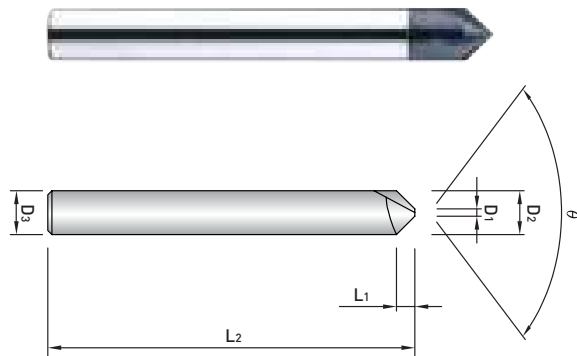
○: General Application ◎: The most suitable Application

■ Tolerance

Mill Dia. (mm)	Shank Dia.
±0.01	h6

※ These tools are manufactured based on order received.

Centering Tools



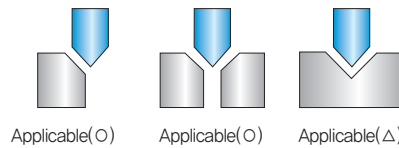
CHAMFER CUTTER FACE

- Superior workpiece surface and excellent cutting performance on edge chamfer machining with 2 Flutes Helix type
- Use micro grain cemented carbide material which has high deflective strength

CCF ...series



EDP. No.	D ₁	θ	D ₂	L ₁	L ₂	D ₃
CCF502 020 S4	0.3	90°	2	0.85	50	4
CCF502 020	0.3	90°	2	0.85	50	6
CCF502 040 S4	0.3	90°	4	1.85	50	4
CCF502 040	0.3	90°	4	1.85	50	6
CCF502 060	0.3	90°	6	2.85	50	6
CCF502 080	0.4	90°	8	3.8	60	8
CCF502 100	0.5	90°	10	4.75	70	10
CCF502 120	0.5	90°	12	5.75	75	12



Applicable(O)

Applicable(O)

Applicable(Δ)

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○			○		○	○	○

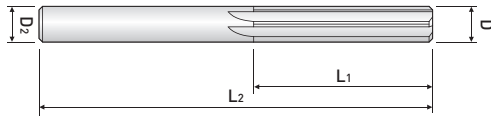
○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (mm)	Shank Dia.
±0.01	h6

※ These tools are manufactured based on order received.

Reamers



STRAIGHT FLUTE REAMERS

SSR ...series



EDP. No.	D	L ₁	L ₂	D ₂	Z
SSR020	2	25	60	4	4
SSR025	2.5	25	60	4	4
SSR030	3	28	70	4	6
SSR035	3.5	30	75	4	6
SSR040	4	30	75	4	6
SSR045	4.5	35	80	6	6
SSR050	5	35	80	6	6
SSR055	5.5	35	80	6	6
SSR060	6	35	80	6	6
SSR065	6.5	45	100	8	6
SSR070	7	45	100	8	6
SSR080	8	45	100	8	6
SSR090	9	50	110	10	6
SSR100	10	50	110	10	6
SSR110	11	50	120	12	6
SSR120	12	50	120	12	6

■ Applicable Working Material

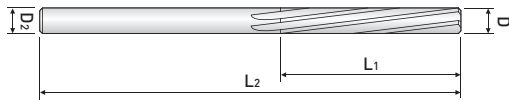
Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○			○		○	○	○

○:General Application ◎:The most suitable Application

■ Tolerance

Tolerance	Diameter	μm = 1/1000mm				
		from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
Cutting edge(m5)		+6 +2	+9 +4	+12 +6	+15 +7	+17 +8
Shank(h6)		0 -6	0 -8	0 -9	0 -11	0 -13

Reamers



HELICAL FLUTE REAMERS

SHR ...series



EDP. No.	D	L ₁	L ₂	D ₂	Z
SHR020	2	25	60	4	4
SHR025	2.5	25	60	4	4
SHR030	3	28	70	4	6
SHR035	3.5	30	75	4	6
SHR040	4	30	75	4	6
SHR045	4.5	35	80	6	6
SHR050	5	35	80	6	6
SHR055	5.5	35	80	6	6
SHR060	6	35	80	6	6
SHR065	6.5	45	100	8	6
SHR070	7	45	100	8	6
SHR080	8	45	100	8	6
SHR090	9	50	110	10	6
SHR100	10	50	110	10	6
SHR110	11	50	120	12	6
SHR120	12	50	120	12	6

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○			○		○	○	○

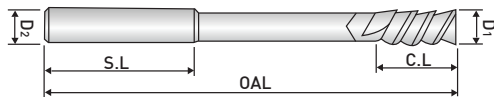
○:General Application ◎:The most suitable Application

■ Tolerance

Tolerance	Diameter	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
Cutting edge(m5)		+6 +2	+9 +4	+12 +6	+15 +7	+17 +8
Shank(h6)		0 -6	0 -8	0 -9	0 -11	0 -13

μm = 1/1000mm

Reamers


BROACH REAMERS


SBR ...series



EDP. No.	D ₁	C.L	S.L	OAL	D ₂	Z
SBR030	3	12	30	70	4	4
SBR040	4	12	30	75	4	4
SBR050	5	16	35	80	6	4
SBR060	6	16	35	80	6	4
SBR080	8	20	40	100	8	4
SBR100	10	25	45	110	10	4
SBR120	12	28	50	120	12	4
SBR140	14	30	55	145	14	4
SBR160	16	35	55	155	16	6
SBR180	18	38	60	170	18	6
SBR200	20	40	60	180	20	6

* Above ϕ 14 will be manufactured with brazed type.

* ϕ 14~20 are manufactured based on order received.

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○			○		○	○	○

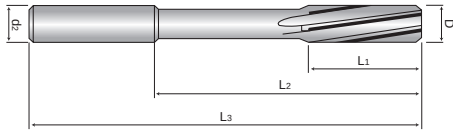
○:General Application ◎:The most suitable Application

■ Tolerance

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

Tolerance Diameter	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
Cutting edge(m5)	+6 +2	+9 +4	+12 +6	+15 +7	+17 +8
Shank(h6)	0 -6	0 -8	0 -9	0 -11	0 -13

Reamers



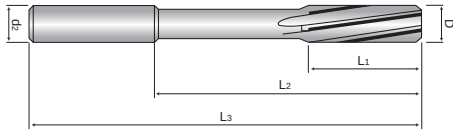
**MACHINE CHUCKING REAMER
- Solid Type**

HRS ...series



EDP. No.	D	L ₁	L ₂	L ₃	d ₂	Z
HRS0198	1.98	12	22	50	4	4
HRS0199	1.99	12	22	50	4	4
HRS0200	2	12	22	50	4	4
HRS0201	2.01	12	22	50	4	4
HRS0202	2.02	12	22	50	4	4
HRS0203	2.03	12	22	50	4	4
HRS0248	2.48	16	26	60	4	4
HRS0249	2.49	16	26	60	4	4
HRS0250	2.5	16	26	60	4	4
HRS0251	2.51	16	26	60	4	4
HRS0252	2.52	16	26	60	4	4
HRS0253	2.53	16	26	60	4	4
HRS0297	2.97	18	30	65	4	6
HRS0298	2.98	18	30	65	4	6
HRS0299	2.99	18	30	65	4	6
HRS0300	3	18	30	65	4	6
HRS0301	3.01	18	30	65	4	6
HRS0302	3.02	18	30	65	4	6
HRS0303	3.03	18	30	65	4	6
HRS0350	3.5	20	35	75	4	6
HRS0397	3.97	20	35	75	4	6
HRS0398	3.98	20	35	75	4	6
HRS0399	3.99	20	35	75	4	6
HRS0400	4	20	35	75	4	6
HRS0401	4.01	20	35	75	4	6
HRS0402	4.02	20	35	75	4	6
HRS0403	4.03	20	35	75	4	6
HRS0450	4.5	25	40	80	6	6
HRS0497	4.97	25	40	80	6	6
HRS0498	4.98	25	40	80	6	6
HRS0499	4.99	25	40	80	6	6
HRS0500	5	25	40	80	6	6
HRS0501	5.01	25	40	80	6	6
HRS0502	5.02	25	40	80	6	6
HRS0503	5.03	25	40	80	6	6
HRS0550	5.5	25	45	80	6	6
HRS0597	5.97	25	45	80	6	6
HRS0598	5.98	25	45	80	6	6
HRS0599	5.99	25	45	80	6	6

Reamers



MACHINE CHUCKING REAMER - Solid Type

HRS ...series



EDP. No.	D	L ₁	L ₂	L ₃	d ₂	Z
HRS0600	6	25	45	80	6	6
HRS0601	6.01	25	45	80	6	6
HRS0602	6.02	25	45	80	6	6
HRS0603	6.03	25	45	80	6	6
HRS0650	6.5	30	60	100	8	6
HRS0700	7	30	60	100	8	6
HRS0750	7.5	33	65	100	8	6
HRS0797	7.97	33	65	100	8	6
HRS0798	7.98	33	65	100	8	6
HRS0799	7.99	33	65	100	8	6
HRS0800	8	33	65	100	8	6
HRS0801	8.01	33	65	100	8	6
HRS0802	8.02	33	65	100	8	6
HRS0803	8.03	33	65	100	8	6
HRS0850	8.5	35	70	110	10	6
HRS0900	9	35	70	110	10	6
HRS0997	9.97	35	70	110	10	6
HRS0998	9.98	35	70	110	10	6
HRS0999	9.99	35	70	110	10	6
HRS1000	10	35	70	110	10	6
HRS1001	10.01	35	70	110	10	6
HRS1002	10.02	35	70	110	10	6
HRS1003	10.03	35	70	110	10	6
HRS1004	10.04	35	70	110	10	6
HRS1005	10.05	35	70	110	10	6
HRS1100	11	40	80	120	12	6
HRS1197	11.97	40	80	120	12	6
HRS1198	11.98	40	80	120	12	6
HRS1199	11.99	40	80	120	12	6
HRS1200	12	40	80	120	12	6
HRS1201	12.01	40	80	120	12	6
HRS1202	12.02	40	80	120	12	6
HRS1203	12.03	40	80	120	12	6
HRS1204	12.04	40	80	120	12	6
HRS1205	12.05	40	80	120	12	6

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○			○		○		○

○: General Application ◎: The most suitable Application

■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
~ ø 5.03	0~+0.004	h6
ø 5.5 ~ ø 12.05	0~+0.005	

※ These tools are manufactured based on order received.

5

CARBIDE RODS & BLANKS >

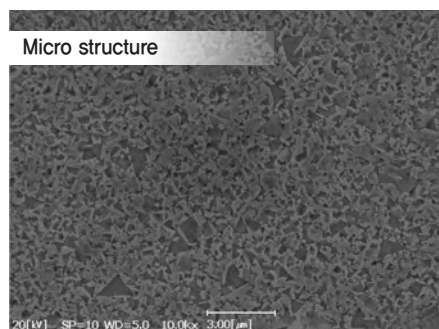
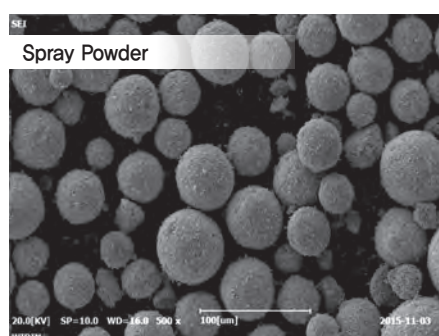


CARBIDE RODS & BLANKS

► Thugsten Carbide Rods & Blanks

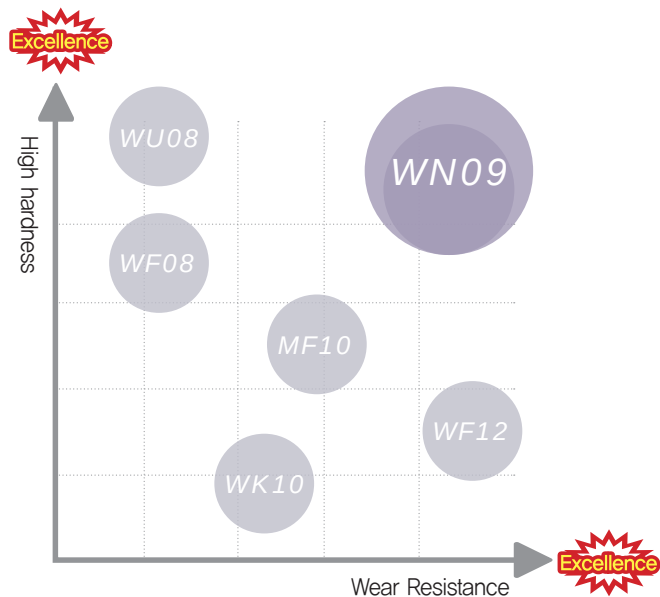
GRADE	SERIES	FEATURE
WF08	Reaming	Suitable for Grey Cast Iron, Chilled Cast Iron, Hardened Steel, Aluminum Alloy, Plastic
WF10	Drilling/Milling	Suitable for Titanium Alloys, Inconel, Heat resisting Steel, Stainless Steel, Grey Cast Iron
WF12	Drilling/Milling/Machine tapping	Suitable for Titanium Alloys, Inconel, Stainless Steel, Hardening Steel, Grey Cast Iron, Composite Material, Drill
WK10	Drilling/Milling	Suitable for material Hrc45 or more, Stainless Steel, Titanium-Nickel Alloy, Low speed cutting machine, Continuous cutting and Intermitten Cutting
WN09	Drilling/Milling/Planing	Suitable for high speed cutting and dry machining to high wear resistance material like Graphite and composite material like CFRP and Industrial Fiber
WU08	Drilling/Milling/Planing	Suitable for High Hardened Steel for high speed cutting and dry cutting and high wear resistance for composite material like Aluminum Alloy

► Carbide Grades

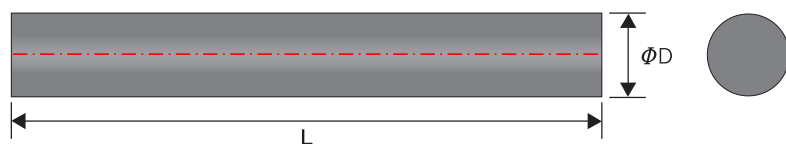


GRADE		WN09	WU08	WF08	MF10	WF12	WK10
ISO-RANGE		K01-K05	K05-K10	K10	K15	K20	K30
Diameter	mm	3.0 ~ 25.0					
Length	mm	330					
Co	wt%	9	8	8	10	12	10
Density	g/cm ³	14.25	14.30	14.40	14.20	14.10	14.10
Hv10	kg/mm ²	2130 ↑	2080	2000	1850	1730	1650
HRA	ISO3738	94.5 ↑	94.2	93.5	92.5	92.0	91.0
TRS	N/mm ²	4200 ↑	3,800 ≥	3,800 ≥	4,000 ≥	4,100 ≥	3,900 ≥
A <10μm		≤ 02	≤ 02	≤ 02	≤ 02	≤ 02	≤ 02
B >10μm		00	00	00	00	00	00
C (F.C)		00	00	00	00	00	00
WC grain size (μm)		≤ 0.2	0.3	0.5	0.5	0.5	0.8

CARBIDE RODS & BLANKS



Product	Unground & Cutting	Ground & Polished Rods
Shape		
Grinding		
Size		
Tolerance		h6
Grade		



φD (mm)	φD Tolerance	L(mm)	L Tolerance	Grade
3.0 ~ 10.0	0.2 ~ 0.4	330	0.1 ~ 6.0	K10 : WK10 K10, K15, K20 : WF08, MF10, WF12 K05~K10 : WU08
11.0 ~ 15.0	0.3 ~ 0.6			
16.0 ~ 25.0	0.3 ~ 0.8			



6

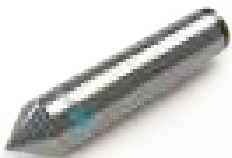
LIVE CENTER SERIES >



LIVE CENTER SERIES

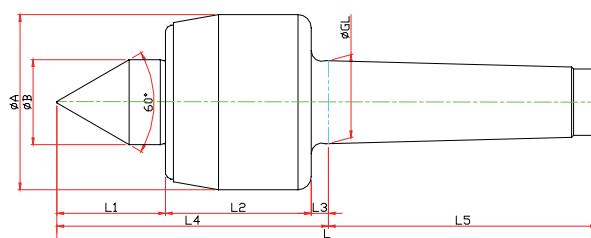
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	NCC TYPE	598
	NCBC TYPE	599
	NCN TYPE	599
	NCBN TYPE	599
	NCCN TYPE	600
	NCBCN TYPE	600
	NCP TYPE	601
	NCPB TYPE	601
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	NCPBC TYPE	602
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	NKC TYPE	604
	NKBC TYPE	605
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	SMBCN TYPE	610

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	LM-A TYPE	619
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	LM-AN TYPE	620
	LM-CN TYPE	620
	LM-H TYPE	621
	LM-HC TYPE	621
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	LM-HCN TYPE	622
	LM-FN TYPE	623
	LM-#80 TYPE	623

NC TYPE

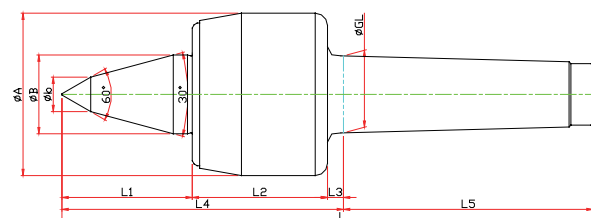
► NC-TYPE



Model	Order Number	Morse Taper	Dimension									Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	L1	L2	L3	L4	L5	L			
LC-3NC	010003	NQ.3	23.825	50	22	27	45	5	77	81	158	630	4800	0.003
LC-4NC	010004	NQ.4	31.267	66	32	41	55	6.5	102.5	101.5	204	1100	3800	0.003
LC-5NC	010005	NQ.5	44.399	82	40	50	65	6.5	121.5	129.5	251	1600	3400	0.005
LC-6NC	010006	NQ.6	63.384	105	45	54	80	8	142	182	324	2100	3000	0.005

► NCB-TYPE

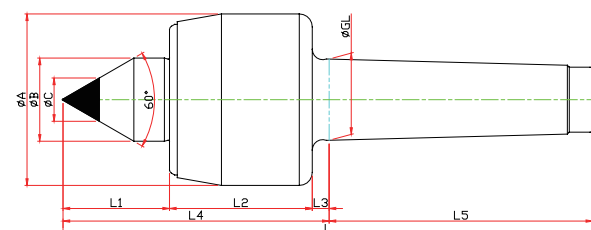
※ SHAFT EXTENTION(Minimize the bite-interference)



Model	Order Number	Morse Taper	Dimension										Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	b	L1	L2	L3	L4	L5	L			
LC-3NCB	011003	NQ.3	23.825	50	22	10	47	45	5	97	81	178	630	4800	0.003
LC-4NCB	011004	NQ.4	31.267	66	32	14	53	55	6.5	114.5	101.5	216	1100	3800	0.003
LC-5NCB	011005	NQ.5	44.399	82	40	16	65	65	6.5	129.5	129.5	266	1600	3400	0.005
LC-6NCB	011006	NQ.6	63.384	105	45	18	78	80	8	182	182	348	2100	3000	0.005

► NCC-TYPE

※ Carbide Type

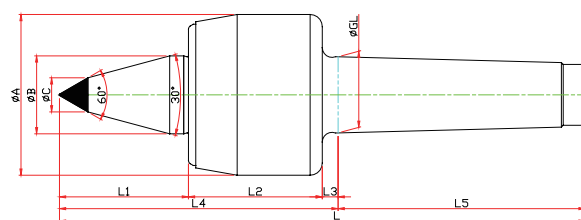


Model	Order Number	Morse Taper	Dimension										Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	L1	L2	L3	L4	L5	C	L			
LC-3NCC	010103	NQ.3	23.825	50	22	27	45	5	77	81	10	158	630	4800	0.003
LC-4NCC	010104	NQ.4	31.267	66	32	41	55	6.5	102.5	101.5	14	204	1100	3800	0.003
LC-5NCC	010105	NQ.5	44.399	82	40	50	65	6.5	121.5	129.5	18	251	1600	3400	0.005
LC-6NCC	010106	NQ.6	63.384	105	45	54	80	8	142	182	25	324	2100	3000	0.005

NC TYPE

► NCBC-TYPE

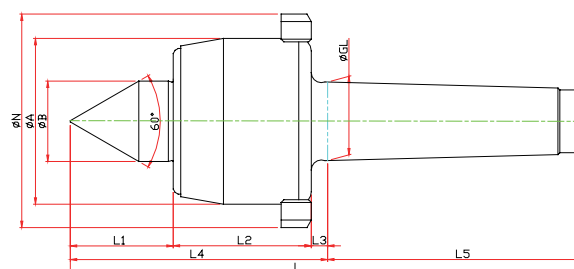
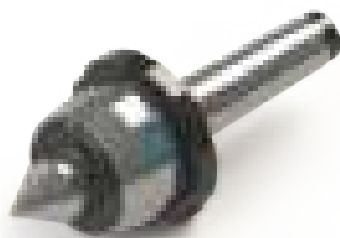
- ※ SHAFT EXTENTION(Minimize the bite-interference)
- ※ Carbide Type



Model	Order Number	Morse Taper	Dimension											Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	L1	L2	L3	L4	L5	C	L				
LC-3NCBC	011102	NO.3	23.825	50	22	47	45	5	97	81	10	178	630	4800	0.003	
LC-4NCBC	011103	NO.4	31.267	66	32	53	55	6.5	114.5	101.5	14	216	1100	3800	0.003	
LC-5NCBC	011104	NO.5	44.399	82	40	65	65	6.5	136.5	129.5	16	266	1600	3400	0.005	
LC-6NCBC	011105	NO.6	63.384	105	45	78	80	8	166	182	18	348	2100	3000	0.005	

► NCN-TYPE

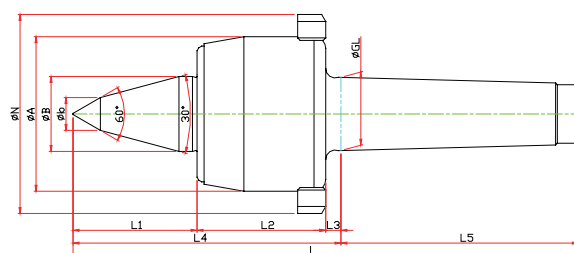
- ※ Nut Type



Model	Order Number	Morse Taper	Dimension										Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	L1	L2	L3	L4	L5	N	L			
LC-3NCN	010013	NO.3	23.825	50	22	27	45	5	77	81	70	158	630	4800	0.003
LC-4NCN	010014	NO.4	31.267	66	32	41	55	6.5	102.5	101.5	85	204	1100	3800	0.003
LC-5NCN	010015	NO.5	44.399	82	40	50	65	6.5	121.5	129.5	105	251	1600	3400	0.005
LC-6NCN	010016	NO.6	63.384	105	45	54	80	8	142	182	130	324	2100	3000	0.005

► NCBN-TYPE

- ※ SHAFT EXTENTION(Minimize the bite-interference)
- ※ Nut Type

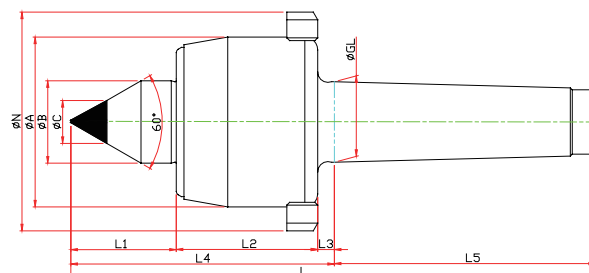


Model	Order Number	Morse Taper	Dimension											Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	b	L1	L2	L3	L4	L5	N	L			
LC-3NCBN	011013	NO.3	23.825	50	22	10	47	45	5	97	81	70	178	630	4800	0.003
LC-4NCBN	011014	NO.4	31.267	66	32	14	53	55	6.5	114.5	101.5	85	216	1100	3800	0.003
LC-5NCBN	011015	NO.5	44.399	82	40	16	65	65	6.5	136.5	129.5	105	266	1600	3400	0.005
LC-6NCBN	011016	NO.6	63.384	105	45	18	78	80	8	166	182	130	348	2100	3000	0.005

NC TYPE

► NCCN-TYPE

※ Nut, Carbide Type Type

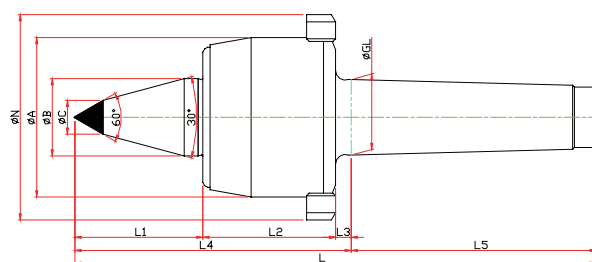


Model	Order Number	Morse Taper	Dimension											Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	L1	L2	L3	L4	L5	C	N	L			
LC-3NCCN	010113	NO.3	23.825	50	22	27	45	5	77	81	10	70	158	630	4800	0.003
LC-4NCCN	010114	NO.4	31.267	66	32	41	55	6.5	102.5	101.5	14	85	204	1100	3800	0.003
LC-5NCCN	010115	NO.5	44.399	82	40	50	65	6.5	121.5	129.5	18	105	251	1600	3400	0.005
LC-6NCCN	010116	NO.6	63.384	105	45	54	80	8	142	182	25	130	324	2100	3000	0.005

► NCBCN-TYPE

※ SHAFT EXTENTION(Minimize the bite-interference)

※ Nut, Carbide Type Type



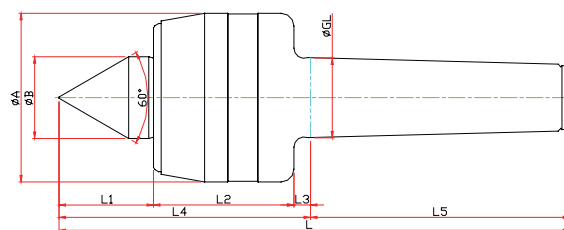
Model	Order Number	Morse Taper	Dimension											Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	L1	L2	L3	L4	L5	C	N	L			
LC-3NCBCN	011113	NO.3	23.825	50	22	47	45	5	97	81	10	70	178	630	4800	0.003
LC-4NCBCN	011114	NO.4	31.267	66	32	53	55	6.5	114.5	101.5	14	85	216	1100	3800	0.003
LC-5NCBCN	011115	NO.5	44.399	82	40	65	65	6.5	136.5	129.5	16	105	266	1600	3400	0.005
LC-6NCBCN	011116	NO.6	63.384	105	45	78	80	8	166	182	18	130	348	2100	3000	0.005

► NC-SPECIAL



NCP TYPE

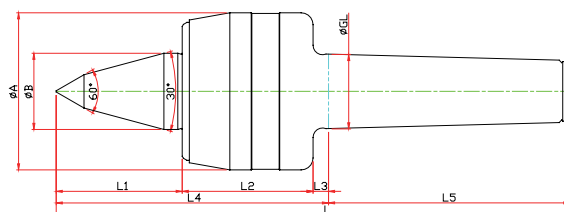
► NCP-TYPE



Model	Order Number	Morse Taper	Dimension									Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	L1	L2	L3	L4	L5	L			
LC-3NCP	030003	NO.3	23.825	50	22	27	45	5	77	81	158	800	4800	0.003
LC-4NCP	030004	NO.4	31.267	66	32	37	55	6.5	98.5	101.5	200	1300	3800	0.003
LC-5NCP	030005	NO.5	44.399	82	40	45	65	6.5	116.5	129.5	246	1900	3400	0.005
LC-6NCP	030006	NO.6	63.384	100	45	65	80	8	153	182	335	2500	3000	0.005

► NCPB-TYPE

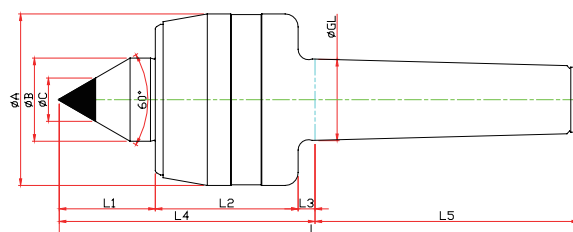
※ SHAFT EXTENTION(Minimize the bite-interference)



Model	Order Number	Morse Taper	Dimension										Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	b	L1	L2	L3	L4	L5	L			
LC-3NCPB	031003	NO.3	23.825	50	22	10	27	45	5	97	81	178	800	4800	0.003
LC-4NCPB	031004	NO.4	31.267	66	32	14	37	55	6.5	114.5	101.5	216	1300	3800	0.003
LC-5NCPB	031005	NO.5	44.399	82	40	16	45	65	6.5	136.5	129.5	266	1900	3400	0.005
LC-6NCPB	031006	NO.6	63.384	100	45	18	65	80	8	166	182	348	2500	3000	0.005

► NCPB-TYPE

※ Carbide Type

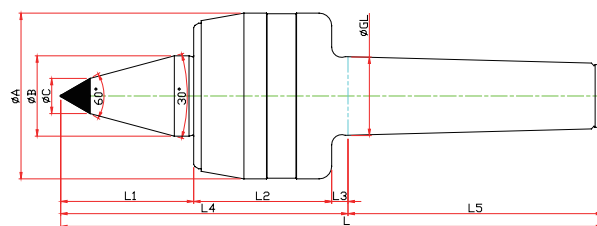


Model	Order Number	Morse Taper	Dimension										Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	L1	L2	L3	L4	L5	C	L			
LC-3NCPC	030103	NO.3	23.825	50	22	27	45	5	77	81	10	158	800	4800	0.003
LC-4NCPC	030104	NO.4	31.267	66	32	37	55	6.5	98.5	101.5	14	200	1300	3800	0.003
LC-5NCPC	030105	NO.5	44.399	82	40	45	65	6.5	116.5	129.5	18	246	1900	3400	0.005
LC-6NCPC	030106	NO.6	63.384	100	45	65	80	8	153	182	25	335	2500	3000	0.005

NCP TYPE

► NCPBC-TYPE

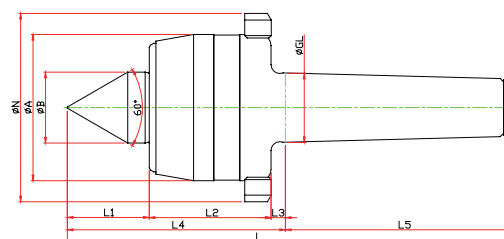
- ※ SHAFT EXTENSION(Minimize the bite-interference)
- ※ Carbide Type



Model	Order Number	Morse Taper	Dimension										Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	L1	L2	L3	L4	L5	C	L			
LC-3NCPBC	031103	NO.3	23,825	50	22	27	45	5	97	81	10	178	800	4800	0,003
LC-4NCPBC	031104	NO.4	31,267	66	32	37	55	6,5	114,5	101,5	14	216	1300	3800	0,003
LC-5NCPBC	031105	NO.5	44,399	82	40	45	65	6,5	136,5	129,5	16	266	1900	3400	0,005
LC-6NCPBC	031106	NO.6	63,384	100	45	65	80	8	166	182	18	348	2500	3000	0,005

► NCPN-TYPE

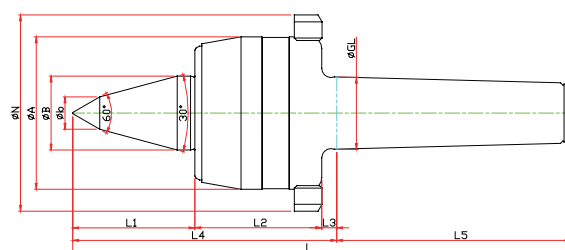
- ※ Nut Type



Model	Order Number	Morse Taper	Dimension										Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	L1	L2	L3	L4	L5	N	L			
LC-3NCPN	030013	NO.3	23,825	50	22	27	45	5	77	81	70	158	800	4800	0,003
LC-4NCPN	030014	NO.4	31,267	66	32	37	55	6,5	98,5	101,5	85	200	1300	3800	0,003
LC-5NCPN	030015	NO.5	44,399	82	40	45	65	6,5	116,5	129,5	105	246	1900	3400	0,005
LC-6NCPN	030016	NO.6	63,384	100	45	65	80	8	153	182	130	335	2500	3000	0,005

► NCPBN-TYPE

- ※ SHAFT EXTENSION(Minimize the bite-interference)
- ※ Nut Type

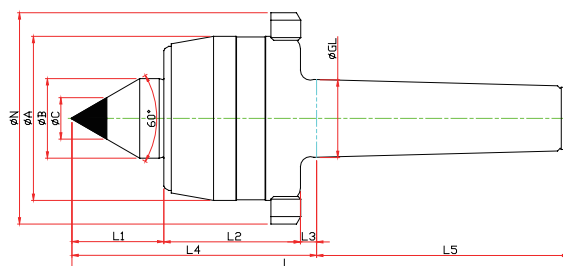


Model	Order Number	Morse Taper	Dimension											Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	b	L1	L2	L3	L4	L5	N	L			
LC-3NCPBN	031013	NO.3	23,825	50	22	10	47	45	5	97	81	70	178	800	4800	0,003
LC-4NCPBN	031014	NO.4	31,267	66	32	14	53	55	6,5	114,5	101,5	85	216	1300	3800	0,003
LC-5NCPBN	031015	NO.5	44,399	82	40	16	65	65	6,5	136,5	129,5	105	266	1900	3400	0,005
LC-6NCPBN	031016	NO.6	63,384	100	45	18	78	80	8	166	182	130	348	2500	3000	0,005

NCP TYPE

► NCPCN-TYPE

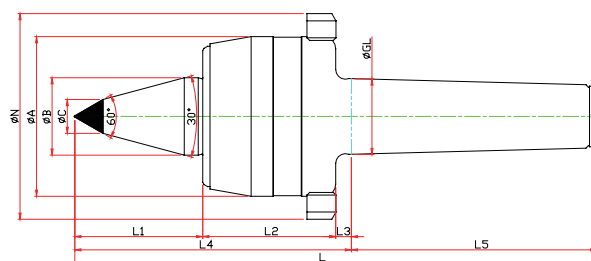
※ Nut, Carbide Type Type



Model	Order Number	Morse Taper	Dimension											Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	L1	L2	L3	L4	L5	C	N	L			
LC-3NCPCN	030113	NO.3	23.825	50	22	27	45	5	77	81	10	70	158	800	4800	0.003
LC-4NCPCN	030114	NO.4	31.267	66	32	37	55	6.5	98.5	101.5	14	85	200	1300	3800	0.003
LC-5NCPCN	030115	NO.5	44.399	82	40	45	65	6.5	116.5	129.5	18	105	246	1900	3400	0.005
LC-6NCPCN	030116	NO.6	63.384	100	45	65	80	8	153	182	25	130	335	2500	3000	0.005

► NCPBCN-TYPE

※ SHAFT EXTENTION(Minimize the bite-interference)
 ※ Nut, Carbide Type Type



Model	Order Number	Morse Taper	Dimension											Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	L1	L2	L3	L4	L5	C	N	L			
LC-3NCPBCN	031113	NO.3	23.825	50	22	47	45	5	97	81	10	70	178	800	4800	0.003
LC-4NCPBCN	031114	NO.4	31.267	66	32	53	55	6.5	114.5	101.5	14	85	216	1300	3800	0.003
LC-5NCPBCN	031115	NO.5	44.399	82	40	65	65	6.5	136.5	129.5	16	105	266	1900	3400	0.005
LC-6NCPBCN	031116	NO.6	63.384	100	45	78	80	8	166	182	25	130	348	2500	3000	0.005

► NCP SPECIAL

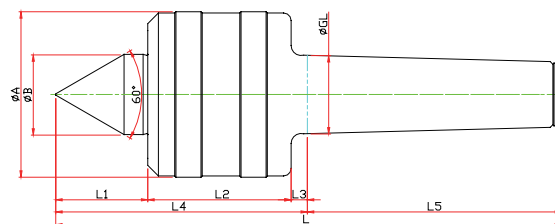
※ Customized-special production for user's condition



LC-NK · NKD TYPE

► NK-TYPE

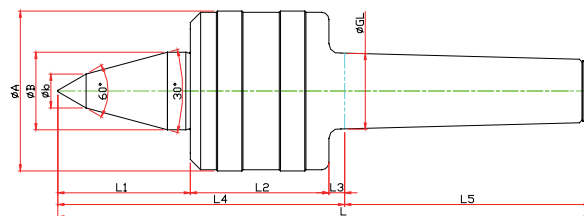
※ Center for heavy duty and Semi High Speed



Model	Order Number	Morse Taper	Dimension									Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	L1	L2	L3	L4	L5	L			
LC-3NK	020003	NO.3	23,825	52	22	29	42	5	76	80	156	1900	5000	0.003
LC-4NK	020004	NO.4	31,267	66	32	37	57	6.5	100.5	101.5	202	2700	3800	0.003
LC-5NK	020005	NO.5	44,399	80	40	45.5	57	6.5	109	129.5	238.5	3200	3400	0.005
LC-6NK	020006	NO.6	63,348	132	65	65	100	8	173	182	355	10000	1800	0.005
LC-7NK	020007	NO.7	83,058	168	72	84	128	10	222	250	427	17200	1200	0.005

► NKB-TYPE

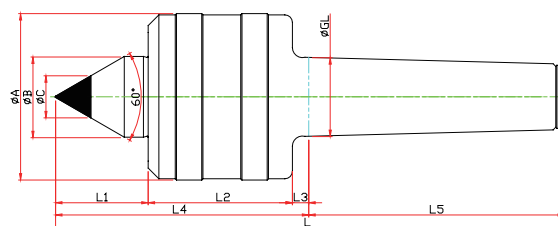
※ SHAFT EXTENTION(Minimize the bite-interference)



Model	Order Number	Morse Taper	Dimension										Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	b	L1	L2	L3	L4	L5	L			
LC-3NKB	021003	NO.3	23.825	52	22	10	48	42	5	95	80	175	1900	5000	0.003
LC-4NKB	021004	NO.4	31.267	66	32	14	53	57	6.5	116.5	101.5	218	2700	3800	0.003
LC-5NKB	021005	NO.5	44.399	80	40	18	65.5	57	6.5	129	129.5	258.5	3200	3400	0.005
LC-6NKB	021006	NO.6	63.348	132	65	25	78	100	8	186	182	368	10000	1800	0.005

► NKC-TYPE

※ Carbide Type

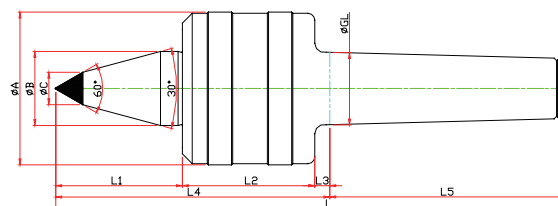


Model	Order Number	Morse Taper	Dimension										Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	L1	L2	L3	L4	L5	C	L			
LC-3NKC	020103	NO.3	23.825	52	22	29	42	5	76	80	10	156	1900	5000	0.003
LC-4NKC	020104	NO.4	31.267	66	32	37	57	6.5	100.5	101.5	14	202	2700	3800	0.003
LC-5NKC	020105	NO.5	44.399	80	40	45.5	57	6.5	109	129.5	18	238.5	3200	3400	0.005
LC-6NKC	020106	NO.6	63.348	132	65	65	100	8	173	182	25	355	10000	1800	0.005

LC-NK · NKD TYPE

► NKBC-TYPE

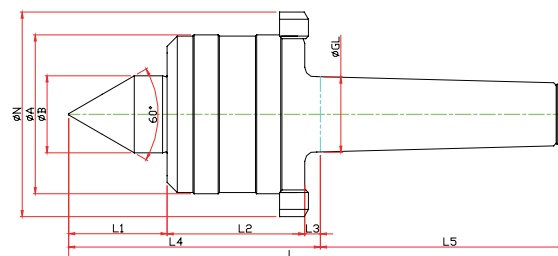
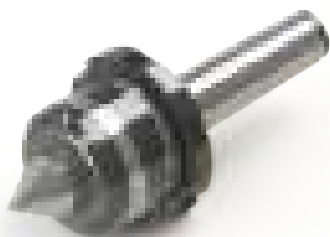
- ※ SHAFT EXTENTION(Minimize the bite-interference)
- ※ Carbide Type



Model	Order Number	Morse Taper	Dimension										Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	L1	L2	L3	L4	L5	C	L			
LC-3NKBC	021103	NO.3	23.825	52	22	48	42	5	95	80	10	175	1900	5000	0.003
LC-4NKBC	021104	NO.4	31.267	66	32	53	57	6.5	116.5	101.5	14	218	2700	3800	0.003
LC-5NKBC	021105	NO.5	44.399	80	40	65.5	57	6.5	129	129.5	18	258.5	3200	3400	0.005
LC-6NKBC	021106	NO.6	63.348	132	65	78	100	8	186	182	25	368	10000	1800	0.005

► NKN-TYPE

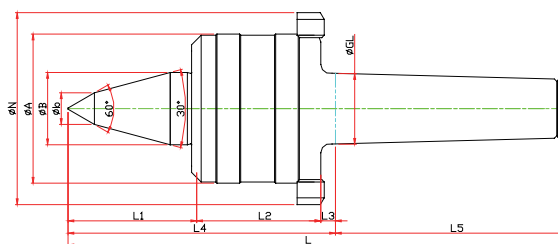
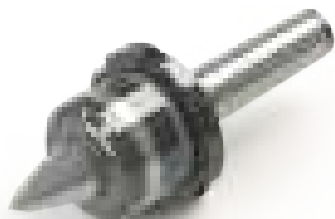
- ※ Nut Type



Model	Order Number	Morse Taper	Dimension										Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	L1	L2	L3	L4	L5	N	L			
LC-3NKN	020013	NO.3	23.825	52	22	29	42	5	76	80	70	156	1900	5000	0.003
LC-4NKN	020014	NO.4	31.267	66	32	37	57	6.5	100.5	101.5	85	202	2700	3800	0.003
LC-5NKN	020015	NO.5	44.399	80	40	45.5	57	6.5	109	129.5	98	238.5	3200	3400	0.005
LC-6NKN	020016	NO.6	63.348	132	65	65	100	8	173	182	165	355	10000	1800	0.005
LC-7NKN	020017	NO.7	83.058	168	72	84	128	10	222	250	210	427	17200	1200	0.005

► NKBN-TYPE

- ※ SHAFT EXTENTION(Minimize the bite-interference)
- ※ Nut Type

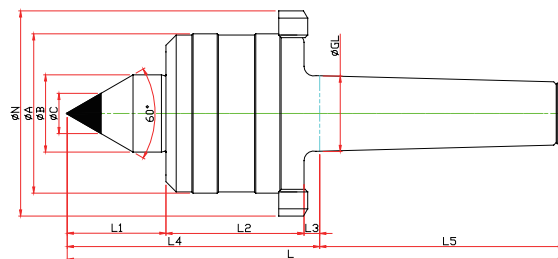


Model	Order Number	Morse Taper	Dimension											Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	b	L1	L2	L3	L4	L5	N	L			
LC-3NKBN	021013	NO.3	23.825	52	22	10	48	42	5	95	80	70	175	1900	5000	0.003
LC-4NKBN	021014	NO.4	31.267	66	32	14	53	57	6.5	116.5	101.5	85	218	2700	3800	0.003
LC-5NKBN	021015	NO.5	44.399	80	40	18	65.5	57	6.5	129	129.5	98	258.5	3200	3400	0.005
LC-6NKBN	021016	NO.6	63.348	132	65	25	78	100	8	186	182	165	368	10000	1800	0.005

LC-NK · NKD TYPE

► NKCN-TYPE

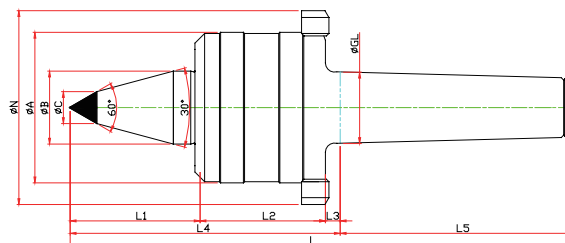
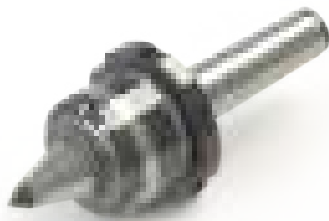
※ Carbide, Nut Type



Model	Order Number	Morse Taper	Dimension											Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	L1	L2	L3	L4	L5	C	N	L			
LC-3NKCNC	020113	NO.3	23.825	52	22	29	42	5	76	80	10	70	156	1900	5000	0.003
LC-4NKCNC	020114	NO.4	31.267	66	32	37	57	6.5	100.5	101.5	14	85	202	2700	3800	0.003
LC-5NKCNC	020115	NO.5	44.399	80	40	45.5	57	6.5	109	129.5	18	98	238.5	3200	3400	0.005
LC-6NKCNC	020116	NO.6	63.348	132	65	65	100	8	173	182	25	165	355	10000	1800	0.005

► NKBCN-TYPE

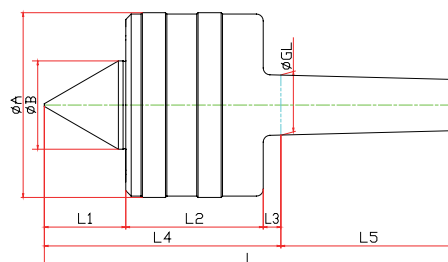
※ SHAFT EXTENTION(Minimize the bite-interference)
 ※ Carbide, Nut Type



Model	Order Number	Morse Taper	Dimension											Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	L1	L2	L3	L4	L5	C	N	L			
LC-3NKBCNC	021113	NO.3	23.825	52	22	48	42	5	95	80	10	70	175	1900	5000	0.003
LC-4NKBCNC	021114	NO.4	31.267	66	32	53	57	6.5	116.5	101.5	14	85	218	2700	3800	0.003
LC-5NKBCNC	021115	NO.5	44.399	80	40	65.5	57	6.5	129	129.5	18	98	258.5	3200	3400	0.005
LC-6NKBCNC	021116	NO.6	63.348	132	65	78	100	8	186	182	25	165	368	10000	1800	0.005

LC-NK · NKD TYPE

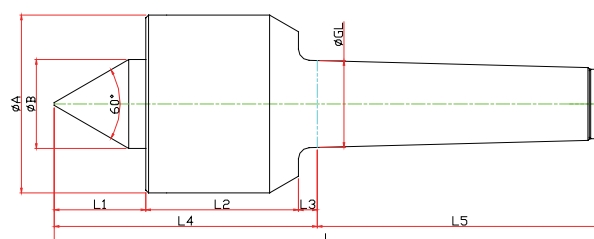
► NKD-TYPE



Model	Order Number	Morse Taper	Dimension									Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	L1	L2	L3	L4	L5	L			
LC-5NKD	090005	NO.5	44,399	136	65	60	101	13	174	129,5	303,5	13000	3400	0,005
LC-6NKD	090006	NO.6	63,348	148	70	80	110,5	15	205,5	181	387,5	16000	1800	0,005
LC-7NKD	090007	NO.7	83,058	200	95	90	141	20	251	250	501	22000	1200	0,005

GR · SM TYPE

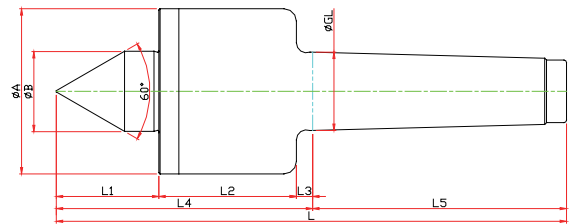
► GR-TYPE



Model	Order Number	Morse Taper	Dimension									Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	L1	L2	L3	L4	L5	L			
LC-4GR	080004	NO.4	31,267	71	40	45	59,5	6,5	111	101,5	212,5	1300	7000	0,002
LC-5GR	080005	NO.5	44,399	88	50	45	66	6,5	117,5	129,5	247	3500	4500	0,002
LC-6GR	080006	NO.6	63,348	114	52	55	92	8	155	182	337	5000	3400	0,002
LC-7GR	080007	NO.7	83,058	200	98	78	132	10	200	250	470	20000	1900	0,002

GR · SM TYPE

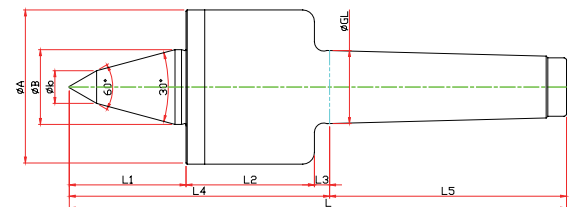
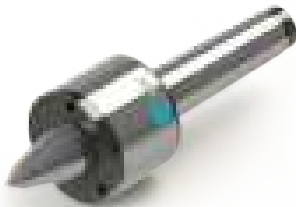
► SM-TYPE



Model	Order Number	Morse Taper	Dimension									Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	L1	L2	L3	L4	L5	L			
LC-3SM	040003	NO.3	23,825	52	22	30	51	5	86	81	167	330	12000	0,003
LC-4SM	040004	NO.4	31,267	66	32	41	55	6,5	102,5	101,5	204	1100	10000	0,003
LC-5SM	040005	NO.5	44,399	82	40	51	75	6,5	132,5	129,5	262	2200	8000	0,005

► SMB-TYPE

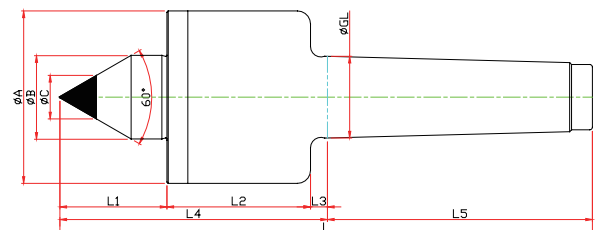
※ SHAFT EXTENTION(Minimize the bite-interference)



Model	Order Number	Morse Taper	Dimension										Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	b	L1	L2	L3	L4	L5	L			
LC-3SMB	041003	NO.3	23,825	52	22	10	40	51	5	96	81	177	330	12000	0,003
LC-4SMB	041004	NO.4	31,267	66	32	14	50	55	6,5	111,5	101,5	213	1100	10000	0,003
LC-5SMB	041005	NO.5	44,399	82	40	16	65	75	6,5	146,5	129,5	276	2200	8000	0,005

► SMC-TYPE

※ Carbide Type

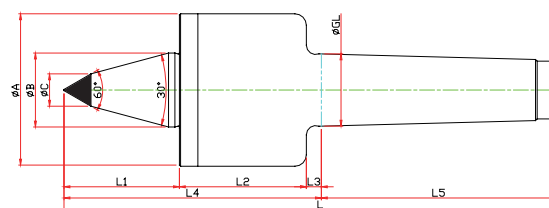


Model	Order Number	Morse Taper	Dimension										Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	L1	L2	L3	L4	L5	C	L			
LC-3SMC	040103	NO.3	23,825	52	22	30	51	5	86	81	10	167	330	12000	0,003
LC-4SMC	040104	NO.4	31,267	66	32	41	55	6,5	102,5	101,5	14	204	1100	10000	0,003
LC-5SMC	040105	NO.5	44,399	82	40	51	75	6,5	132,5	129,5	18	262	2200	8000	0,005

LC-NK · NKD TYPE

► SMBC-TYPE

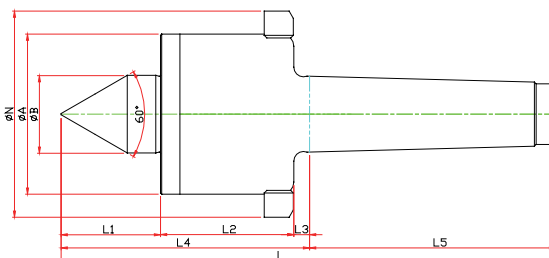
- ※ SHAFT EXTENTION(Minimize the bite-interference)
- ※ Carbide, Nut Type



Model	Order Number	Morse Taper	Dimension											Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	b	L1	L2	L3	L4	L5	C	L			
LC-3SMBC	041103	NO.3	23.825	52	22	10	40	51	5	96	81	10	177	330	12000	0.003
LC-4SMBC	041104	NO.4	31.267	66	32	14	50	55	6.5	111.5	101.5	14	213	1100	10000	0.003
LC-5SMBC	041105	NO.5	44.399	82	40	16	65	75	6.5	146.55	129.5	16	276	2200	8000	0.005

► SMN-TYPE

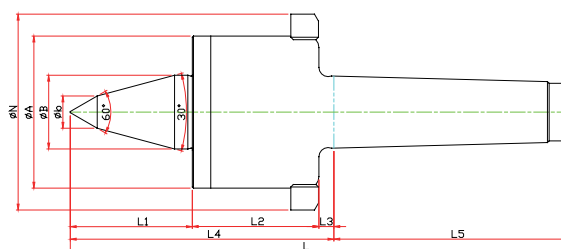
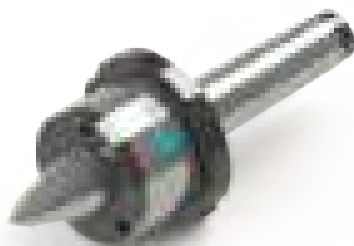
- ※ Nut Type



Model	Order Number	Morse Taper	Dimension										Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	L1	L2	L3	L4	L5	N	L			
LC-3SMN	040013	NO.3	23.825	52	22	30	51	5	86	81	70	167	330	12000	0.003
LC-4SMN	040014	NO.4	31.267	66	32	41	55	6.5	102.5	101.5	85	204	1100	10000	0.003
LC-5SMN	040015	NO.5	44.399	82	40	51	75	6.5	132.5	129.5	105	262	2200	8000	0.005

► SMBN-TYPE

- ※ SHAFT EXTENTION(Minimize the bite-interference)
- ※ Nut Type

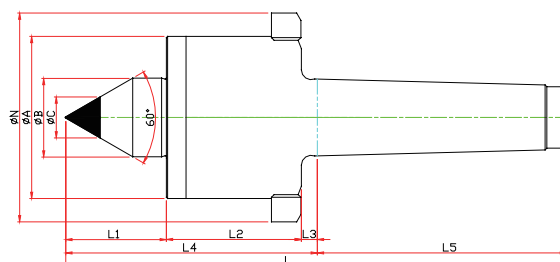
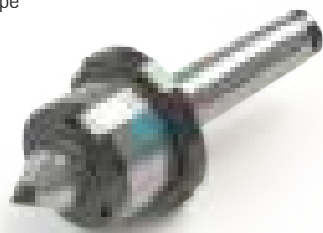


Model	Order Number	Morse Taper	Dimension											Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	b	L1	L2	L3	L4	L5	N	L			
LC-3SMBN	041013	NO.3	23.825	52	22	10	40	51	5	96	81	70	177	330	12000	0.003
LC-4SMBN	041014	NO.4	31.267	66	32	14	50	55	6.5	111.5	101.5	85	213	1100	10000	0.003
LC-5SMBN	041015	NO.5	44.399	82	40	16	65	75	6.5	146.5	129.5	105	276	2200	8000	0.005

GR · SM TYPE

► SMCN-TYPE

※ Carbide, Nut Type

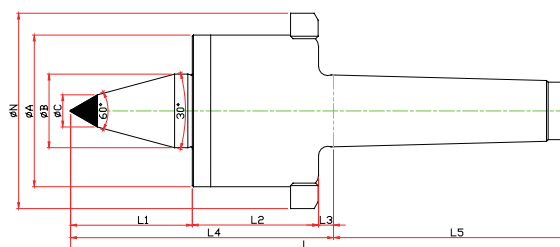


Model	Order Number	Morse Taper	Dimension											Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	C	D	E	F	G	N	T	L			
LC-3SMCN	040113	NO.3	23,825	52	22	30	51	5	86	81	70	10	167	300	12000	0.003
LC-4SMCN	040114	NO.4	31,267	66	32	41	55	6.5	102.5	101.5	85	14	204	1100	10000	0.003
LC-5SMCN	040115	NO.5	44,399	82	40	51	75	6.5	132.5	129.5	105	16	262	2200	8000	0.005

► SMBCN-TYPE

※ SHAFT EXTENTION(Minimize the bite-interference)

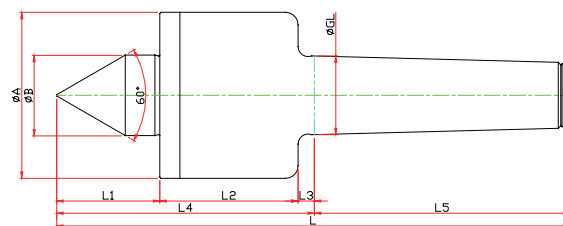
※ Carbide, Nut Type



Model	Order Number	Morse Taper	Dimension											Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	b	L1	L2	L3	L4	L5	C	N	L		
LC-3SMBCN	041113	NO.3	23,825	52	22	10	40	51	5	96	81	10	70	177	330	12000
LC-4SMBCN	041114	NO.4	31,267	66	32	14	50	55	6.5	111.5	101.5	14	85	213	1100	10000
LC-5SMBCN	041115	NO.5	44,399	82	40	16	65	75	6.5	146.5	129.5	16	105	276	2200	8000

SMP TYPE

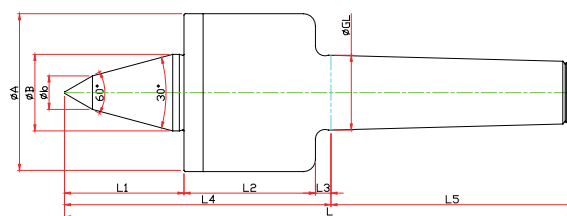
► SMP-TYPE



Model	Order Number	Morse Taper	Dimension									Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	L1	L2	L3	L4	L5	L			
LC-3SMP	050003	NO.3	23,825	52	22	30	51	5	86	81	167	330	12000	0.003
LC-4SMP	050004	NO.4	31.267	66	32	41	55	6.5	102.5	101.5	204	1100	10000	0.003
LC-5SMP	050005	NO.5	44,399	82	40	51	75	6.5	132.5	129.5	262	2200	8000	0.005

► SMPB-TYPE

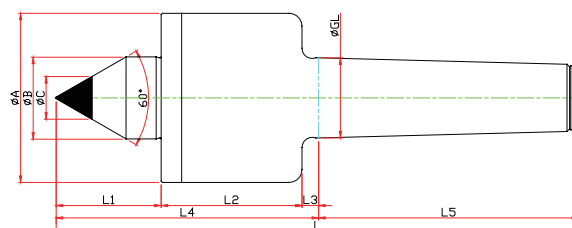
※ SHAFT EXTENTION(Minimize the bite-interference)



Model	Order Number	Morse Taper	Dimension										Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	b	L1	L2	L3	L4	L5	L			
LC-3SMPB	051003	NO.3	23,825	52	22	10	40	51	5	96	81	177	330	12000	0.003
LC-4SMPB	051004	NO.4	31.267	66	32	14	50	55	6.5	111.5	101.5	213	1100	10000	0.003
LC-5SMPB	051005	NO.5	44,399	82	40	16	65	75	6.5	146.5	129.5	276	2200	8000	0.005

► SMPC-TYPE

※ Carbide Type

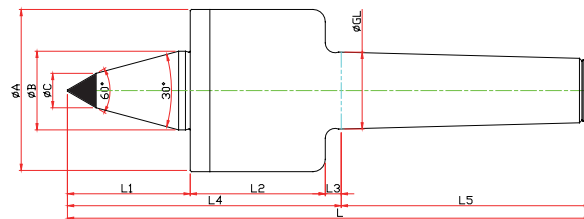


Model	Order Number	Morse Taper	Dimension										Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	L1	L2	L3	L4	L5	C	L			
LC-3SMPC	050103	NO.3	23,825	52	22	30	51	5	86	81	10	167	330	12000	0.003
LC-4SMPC	050104	NO.4	31.267	66	32	41	55	6.5	102.5	101.5	14	204	1100	10000	0.003
LC-5SMPC	050105	NO.5	44,399	82	40	51	75	6.5	132.5	129.5	18	262	2200	8000	0.005

SMP TYPE

► SMPBC-TYPE

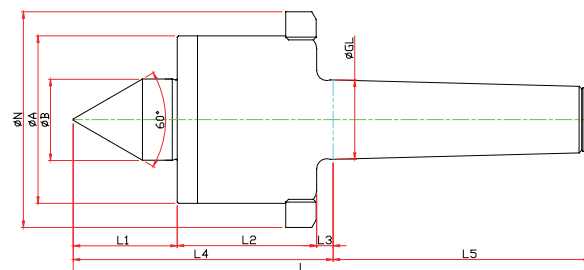
- ※ SHAFT EXTENSION(Minimize the bite-interference)
- ※ Carbide Type



Model	Order Number	Morse Taper	Dimension											Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	b	L1	L2	L3	L4	L5	C	L			
LC-3SMPBC	051103	NO.3	23.825	52	22	10	40	51	5	96	81	10	177	330	12000	0.003
LC-4SMPBC	051104	NO.4	31.267	66	32	14	50	55	6.5	111.5	101.5	14	213	1100	10000	0.003
LC-5SMPBC	051105	NO.5	44.399	82	40	16	65	75	6.5	146.5	129.5	18	276	2200	8000	0.005

► SMPN-TYPE

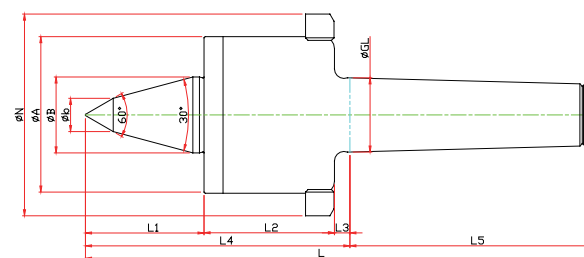
- ※ Nut Type



Model	Order Number	Morse Taper	Dimension										Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	L1	L2	L3	L4	L5	N	L			
LC-3SMPN	050013	NO.3	23.825	52	22	30	51	5	86	81	70	167	330	12000	0.003
LC-4SMPN	050014	NO.4	31.267	66	32	41	55	6.5	102.5	101.5	85	204	1100	10000	0.003
LC-5SMPN	050015	NO.5	44.399	82	40	51	75	6.5	132.5	129.5	105	262	2200	8000	0.005

► SMPBN-TYPE

- ※ SHAFT EXTENSION(Minimize the bite-interference)
- ※ Nut Type

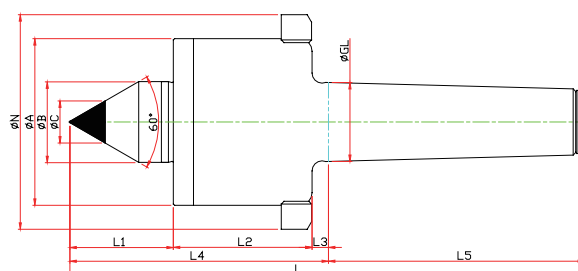


Model	Order Number	Morse Taper	Dimension											Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	b	L1	L2	L3	L4	L5	N	L			
LC-3SMPBN	051013	NO.3	23.825	52	22	10	40	51	5	96	81	70	177	330	12000	0.003
LC-4SMPBN	051014	NO.4	31.267	66	32	14	50	55	6.5	111.5	101.5	85	213	1100	10000	0.003
LC-5SMPBN	051015	NO.5	44.399	82	40	16	65	75	6.5	146.5	129.5	105	276	2200	8000	0.005

SMP TYPE

► SMPCN-TYPE

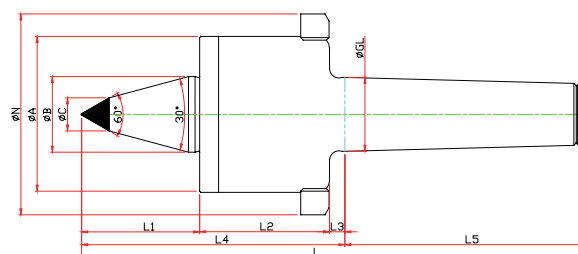
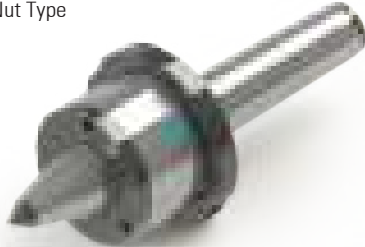
※ Carbide, Nut Type



Model	Order Number	Morse Taper	Dimension											Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	L1	L2	L3	L4	L5	C	N	L			
LC-3SMPCN	050113	NO.3	23.825	52	22	30	51	5	86	81	10	70	167	330	12000	0.003
LC-4SMPCN	050114	NO.4	31.267	66	32	41	55	6.5	102.5	101.5	14	85	204	1100	10000	0.003
LC-5SMPCN	050115	NO.5	44.399	82	40	51	75	6.5	132.5	129.5	18	105	262	2200	8000	0.005

► SMPBCN-TYPE

※ SHAFT EXTENTION(Minimize the bite-interference)
 ※ Carbide, Nut Type



Model	Order Number	Morse Taper	Dimension												Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	b	L1	L2	L3	L4	L5	C	N	L			
LC-3SMPBCN	051113	NO.3	23.825	52	22	10	40	51	5	96	81	10	70	177	330	12000	0.003
LC-4SMPBCN	051114	NO.4	31.267	66	32	14	50	55	6.5	111.5	101.5	14	85	213	1100	10000	0.003
LC-5SMPBCN	051115	NO.5	44.399	82	40	16	65	75	6.5	146.5	129.5	16	105	276	2200	8000	0.005

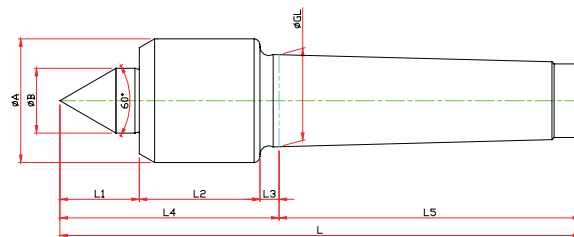
► SMP SPECIAL

※ Customized-special production for user's condition



D50 TYPE

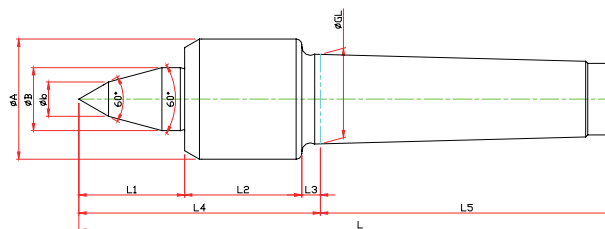
► D50-TYPE



Model	Order Number	Morse Taper	Dimension									Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	L1	L2	L3	L4	L5	L			
LC-3D50	080350	NO.3	23.825	34	22	21	38	5	64	81	145	400	4800	0.003
LC-4D50	080450	NO.4	31.267	42	22	27	41	6.5	74.5	102.5	177	800	3800	0.003
LC-5D50	080550	NO.5	44.399	58	32	35	60	6.5	101.5	129.5	231	1600	3400	0.005

► D50B-TYPE

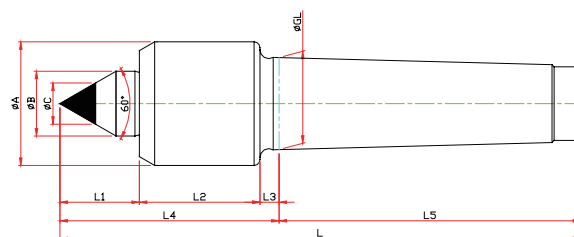
※ SHAFT EXTENTION(Minimize the bite-interference)



Model	Order Number	Morse Taper	Dimension										Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	b	L1	L2	L3	L4	L5	L			
LC-3D50B	082350	NO.3	23.825	34	22	10	25	38	5	72	81	153	400	4800	0.003
LC-4D50B	082450	NO.4	31.267	42	22	12	36	41	6.5	83.5	102.5	186.5	800	3800	0.003
LC-5D50B	082550	NO.5	44.399	58	32	16	53	60	6.5	119.5	129.5	249	1600	3400	0.005

► D50C-TYPE

※ Carbide Type

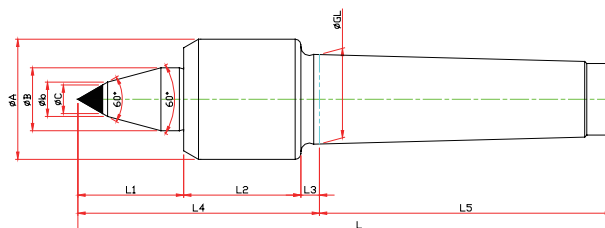


Model	Order Number	Morse Taper	Dimension										Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	L1	L2	L3	L4	L5	C	L			
LC-3D50C	081350	NO.3	23.825	34	22	21	38	5	64	81	10	145	400	4800	0.003
LC-4D50C	081450	NO.4	31.267	42	22	27	41	6.5	74.5	102.5	14	177	800	3800	0.003
LC-5D50C	081550	NO.5	44.399	58	32	60	60	6.5	101.5	129.5	18	231	1600	3400	0.005

D50 TYPE

► D50BC-TYPE

- ※ SHAFT EXTENSION(Minimize the bite-interference)
- ※ Carbide Type



Model	Order Number	Morse Taper	Dimension											Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	b	L1	L2	L3	L4	L5	C	L			
LC-3D50BC	083350	NO.3	23,825	34	22	10	25	38	5	72	81	8	153	400	4800	0,003
LC-4D50BC	083450	NO.4	31,267	42	22	12	36	41	6,5	83,5	102,5	10	186,5	800	3800	0,003
LC-5D50BC	083550	NO.5	44,399	58	32	16	53	60	6,5	119,5	129,5	14	249	1600	3400	0,005

► D50 SPECIAL

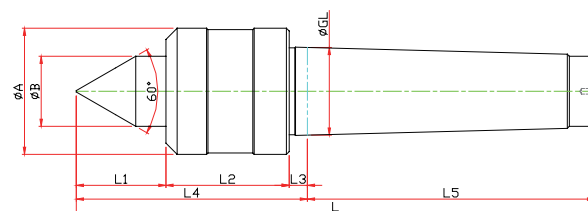
- ※ Customized-special production for user's condition



HD TYPE

► HD-TYPE

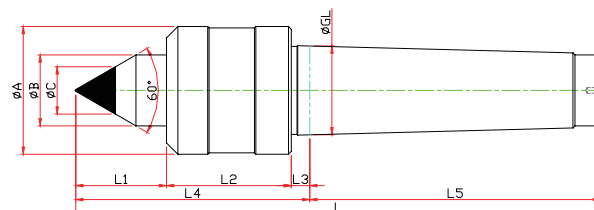
※ Economical live center



Model	Order Number	Morse Taper	Dimension									Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	L1	L2	L3	L4	L5	L			
LC-1HD	070001	NO.1	12.065	34	15	21	37	3.5	61.5	53.5	115	120	5000	0.003
LC-2HD	070002	NO.2	17.780	40	18	24	37	5	66	64	130	140	4000	0.003
LC-3HD	070003	NO.3	23.825	45	25	32	44	5	81	81	162	190	3800	0.003
LC-4HD	070004	NO.4	31.267	45	25	32	44	6.5	82.5	102.5	185	190	3800	0.003
LC-5HD	070005	NO.5	44.399	78	38	47	66	6.5	119.5	129.5	249	350	2000	0.005
LC-6HD	070006	NO.6	63.384	102	55	62	82	8	152	182	334	1200	2000	0.005

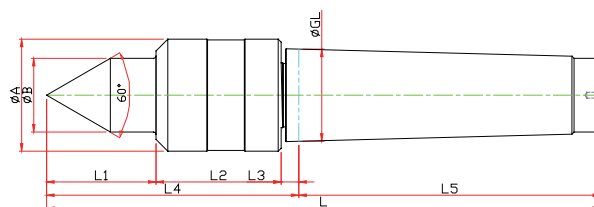
► HDC-TYPE

※ Carbide Type



Model	Order Number	Morse Taper	Dimension										Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	L1	L2	L3	L4	L5	C	L			
LC-3HDC	071003	NO.3	23.825	25	45	32	44	5	81	81	10	162	190	3800	0.003
LC-4HDC	071004	NO.4	31.267	25	45	32	44	6.5	82.5	102.5	14	185	190	3800	0.003
LC-5HDC	071005	NO.5	44.399	38	78	47	66	6.5	119.5	129.5	18	249	350	2000	0.005
LC-6HDC	071006	NO.6	63.384	55	102	62	82	8	152	182	25	334	1200	2000	0.005

► HDS-TYPE

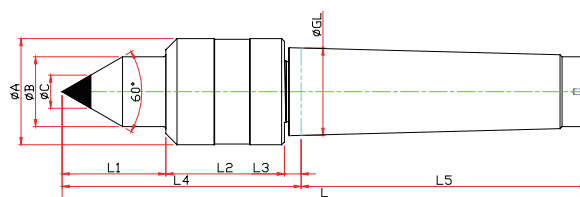


Model	Order Number	Morse Taper	Dimension									Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	L1	L2	L3	L4	L5	L			
LC-2HDS	070012	NO.2	17.780	34	15	25	40	5	70	64	134	70	4500	0.003
LC-3HDS	070013	NO.3	23.825	36	18	27.5	40.5	5	73	81	154	80	4500	0.003
LC-4HDS	070014	NO.4	31.267	38	22	32	42.5	6	80.5	102.5	183	80	4500	0.003
LC-5HDS	070015	NO.5	44.399	64	30	47	56.5	10	113.5	129.5	243	230	2000	0.005
LC-6HDS	070016	NO.6	63.384	86	42	60	66.5	10	136.5	182	318.5	600	1500	0.005

HD TYPE

► HDSC-TYPE

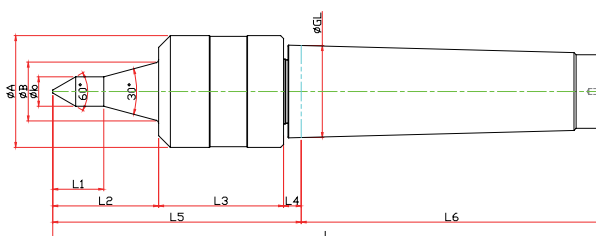
- ※ Economical live center
- ※ Suitable for lathe
- ※ Optimal RPM(below 3,800)



Model	Order Number	Morse Taper	Dimension										Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	L1	L2	L3	L4	L5	C	L			
LC-3HDSC	071012	NO.3	23.825	36	18	27.5	40.5	5	73	81	10	154	80	4500	0.003
LC-4HDSC	071013	NO.4	31.267	38	22	32	42.5	6	80.5	102.5	14	183	80	4500	0.003
LC-5HDSC	071014	NO.5	44.399	64	30	47	56.5	10	113.5	129.5	18	243	230	2000	0.005
LC-6HDSC	071015	NO.6	63.384	86	42	60	66.5	10	136.5	182	30	318.5	600	1500	0.005

► HDSTH-TYPE

- ※ The type of thread milling
- ※ triplexed bearing fit
- ※ Structure resistant to coolant
- ※ Optimal RPM(below 3,800)



Model	Order Number	Morse Taper	Dimension											Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	b	L1	L2	L3	L4	L5	L6	L			
LC-3HDSTH-06	073011	NO.3	23.825	36	18	6	12.6	35	40.5	5	80.5	81	161.5	55	3800	0.003
LC-3HDSTH-08	073012					8	16.3									
LC-3HDSTH-10	073013					10	20.1									
LC-3HDSTH-12	073014					12	23.8									
LC-4HDSTH-06	074011	NO.4	31.267	38	20	6	10.1	36.2	40.5	6	84.5	102.5	187	65	3800	0.003
LC-4HDSTH-08	074012					8	13.9									
LC-4HDSTH-10	074013					10	17.6									
LC-4HDSTH-12	074014					12	21.3									
LC-5HDSTH-06	075011	NO.5	44.399	64	24	6	13.4	47	56.5	10	113.5	129.5	243	150	3800	0.003
LC-5HDSTH-08	075012					8	17.1									
LC-5HDSTH-10	075013					10	20.8									
LC-4HDSTH-12	075014					12	24.6									

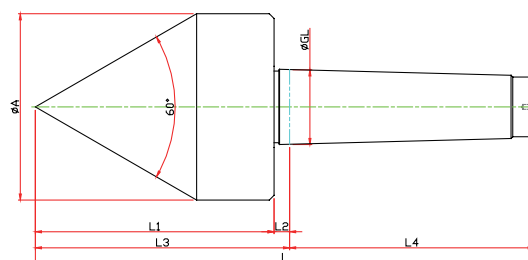
► HD SPECIAL



PT TYPE

▶ PT-60 TYPE

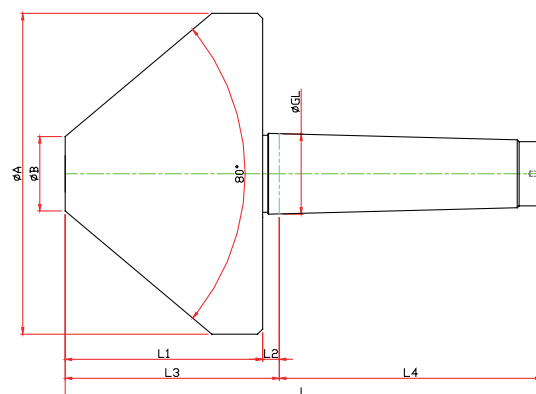
- ※ For PIPE machining
- ※ Optimal RPM(below 3,800)



Model	Order Number	Morse Taper	Dimension							Weight MAX.	R.P.M MAX.	Run Out
			GL	A	L1	L2	L3	L4	L			
LC-2PT-60	066002	NO.2	17,780	44	66	5	71	64	135	70	4500	0.003
LC-3PT-60	066003	NO.3	23,825	56	78.5	5	83.5	81	164.5	80	4500	0.003
LC-4PT-60	066004	NO.4	31,267	78	100	6.5	106.5	101.5	208	80	4500	0.003
LC-5PT-60	066005	NO.5	44,399	98	125	6.5	131.5	129.5	261	230	2000	0.005
LC-6PT-60	066006	NO.6	63,384	118	154	8	162	182	344	600	1500	0.005

▶ PT-80 TYPE

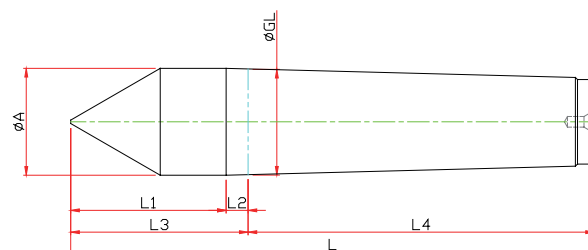
- ※ For PIPE machining
- ※ Optimal RPM(below 3,800)



Model	Order Number	Morse Taper	Dimension								Weight MAX.	R.P.M MAX.	Run Out
			GL	A	B	L1	L2	L3	L4	L			
LC-3PT-80	066803	NO.3	23,825	95	20	66	5	65	81	146	190	3800	0.003
LC-4PT-80	066804	NO.4	31,267	125	29	77	6.5	83.5	102.5	185	190	3800	0.003
LC-5PT-80	066805	NO.5	44,399	150	32	90	6.5	96.5	129.5	226	350	2000	0.005
LC-6PT-80	066806	NO.6	63,384	200	38	120	8	128	182	310	1200	1500	0.005

LM CENTER

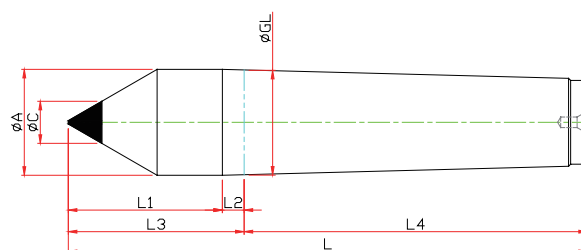
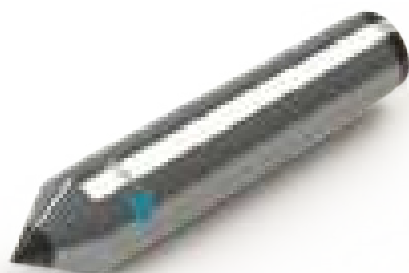
► LM-A TYPE



Model	Order Number	Morse Taper	Dimension							Run Out
			GL	A	L1	L2	L3	L4	L	
LM-1A	110001	NO.1	12.065	12.2	25	3.5	28.5	53.5	82	0.003
LM-2A	110002	NO.2	17.780	18	31	5	36	64	100	0.003
LM-3A	110003	NO.3	23.825	24	39	5	44	81	125	0.003
LM-4A	110004	NO.4	31.267	31.6	46	6.5	52.5	102.5	155	0.003
LM-5A	110005	NO.5	44.399	44.7	64	6.5	70.5	129.5	200	0.003
LM-6A	110006	NO.6	63.348	63.8	80	8	88	182	270	0.005
LM-7A	110007	NO.7	83.058	83.6	105	10	115	250	365	0.005

► LM-C TYPE

※ Carbide Type

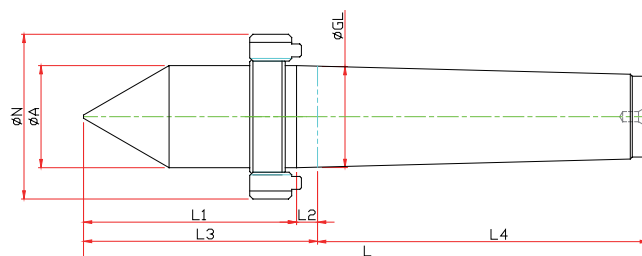


Model	Order Number	Morse Taper	Dimension								Run Out
			GL	A	L1	L2	L3	L4	C	L	
LM-1C	110101	NO.1	12.065	12.2	25	3.5	28.5	53.5	7	82	0.003
LM-2C	110102	NO.2	17.780	18	31	5	36	64	7	100	0.003
LM-3C	110103	NO.3	23.825	24	39	5	44	81	10	125	0.003
LM-4C	110104	NO.4	31.267	31.6	46	6.5	52.5	102.5	14	155	0.003
LM-5C	110105	NO.5	44.399	44.7	64	6.5	70.5	129.5	18	200	0.003
LM-6C	110106	NO.6	63.348	63.8	80	8	88	182	25	270	0.005
LM-7C	110107	NO.7	83.058	83.6	105	10	115	250	30	365	0.005

LM CENTER

► LM-AN TYPE

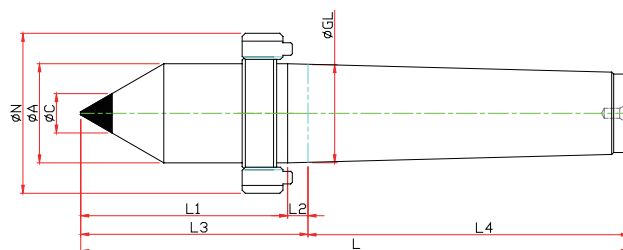
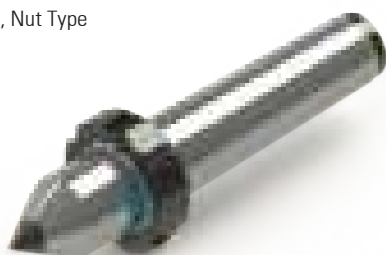
※ Nut Type



Model	Order Number	Morse Taper	Dimension								Run Out
			GL	A	L1	L2	L3	L4	N	L	
LM-1AN	110011	NO.1	12.065	12.2	31.5	5	36.5	53.5	M16	90	0.003
LM-2AN	110012	NO.2	17.780	18	41.5	6.5	48	64	M22	112	0.003
LM-3AN	110013	NO.3	23.825	24	49.5	7.5	57	81	M27	138	0.003
LM-4AN	110014	NO.4	31.267	31.6	62.5	10	72.5	102.5	M36	175	0.003
LM-5AN	110015	NO.5	44.399	44.7	77	11	88	129.6	M48	217.5	0.003
LM-6AN	110016	NO.6	63.348	63.8	96.5	11.5	108	182	M68	290	0.005
LM-7AN	110017	NO.7	83.058	83.6	108.5	11.5	120	250	M90	370	0.005

► LM-CN TYPE

※ Carbide, Nut Type



Model	Order Number	Morse Taper	Dimension									Run Out
			GL	A	L1	L2	L3	L4	C	N	L	
LM-1CN	110111	NO.1	12.065	12	31.5	5	36.5	53.5	7	M16	90	0.003
LM-2CN	110112	NO.2	17.780	18	41.5	6.5	48	64	7	M22	112	0.003
LM-3CN	110113	NO.3	23.825	24	49.5	7.5	57	81	10	M27	138	0.003
LM-4CN	110114	NO.4	31.267	32	62.5	10	72.5	102.5	14	M36	175	0.003
LM-5CN	110115	NO.5	44.399	45	77	11	88	129.5	18	M48	217.5	0.003
LM-6CN	110116	NO.6	63.348	64	96.5	11.5	108	182	18	M68	290	0.005

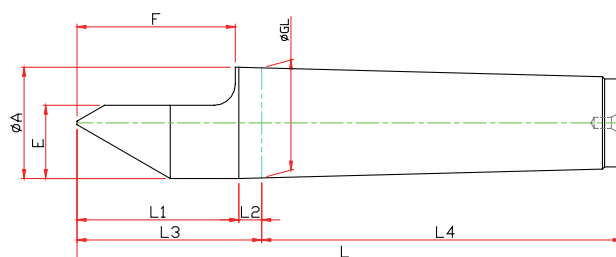
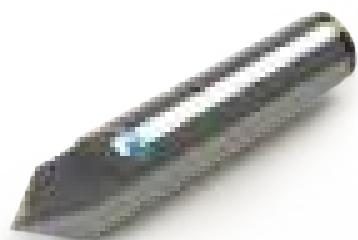
► LM SPECIAL

※ Customized-special production for user's condition



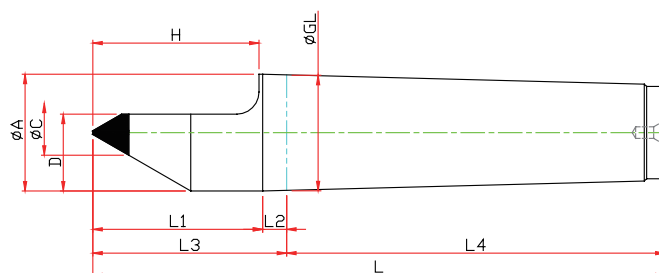
LM-H CENTER

► LM-H TYPE



Model	Order Number	Morse Taper	Dimension									Run Out
			GL	A	L1	L2	L3	L4	E	F	L	
LM-1H	110001	NO.1	12,065	12.2	25	3.5	28.5	53.5	7.6	22	82	0.003
LM-2H	110002	NO.2	17,780	18	31	5	36	64	11	30	100	0.003
LM-3H	110003	NO.3	23,825	24	39	5	44	81	15	38	125	0.003
LM-4H	110004	NO.4	31,267	31.6	46	6.5	52.5	102.5	21	45	155	0.003
LM-5H	110005	NO.5	44,399	44.7	64	6.5	70.5	129.5	27.4	63	200	0.003
LM-6H	110006	NO.6	63,348	63.8	80	8	88	182	38.9	79	270	0.005

► LM-HC TYPE

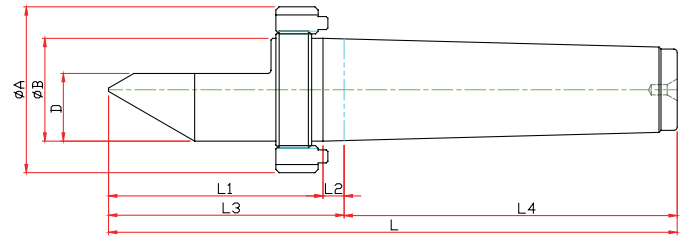


Model	Order Number	Morse Taper	Dimension										Run Out
			GL	A	L1	L2	L3	L4	C	D	H	L	
LM-1HC	210101	NO.1	12,065	12.2	25	3.5	28.5	53.5	7	7.6	22	82	0.003
LM-2HC	210102	NO.2	17,780	18	31	5	36	64	7	11	30	100	0.003
LM-3HC	210103	NO.3	23,825	24	39	5	44	81	10	15	38	125	0.003
LM-4HC	210104	NO.4	31,267	31.6	46	6.5	52.5	102.5	14	21	45	125	0.003
LM-5HC	210105	NO.5	44,399	44.7	64	6.5	70.5	129.5	18	27.4	63	200	0.003
LM-6HC	210106	NO.6	63,348	63.8	80	8	88	182	25	38.9	79	270	0.005

LM-H CENTER

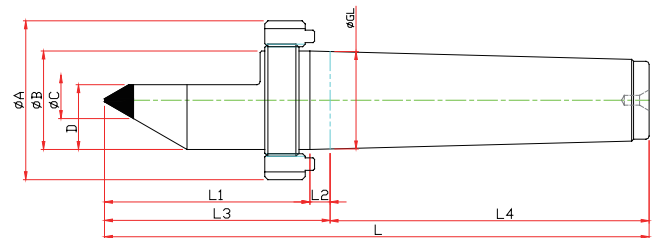
► LM-HN TYPE

※ Nut Type



Model	Order Number	Morse Taper	Dimension										Run Out
			GL	A	L1	L2	L3	L4	D	E	N	L	
LM-1HN	210011	NO.1	12,065	12	31.5	5	36.5	53.5	7.6	22	M16	90	0.003
LM-2HN	210012	NO.2	17,780	18	41.5	6.5	48	64	11	30	M22	112	0.003
LM-3HN	210013	NO.3	23,825	24	49.5	7.5	57	81	15	38	M27	138	0.003
LM-4HN	210014	NO.4	31,267	32	62.5	10	72.5	102.5	21	50	M36	175	0.003
LM-5HN	210015	NO.5	44,399	45	77	11	88	129.5	29.4	63	M48	217.5	0.003
LM-6HN	210016	NO.6	63,348	64	96.5	11.5	108	182	42	79	M68	290	0.005

► LM-HCN TYPE



Model	Order Number	Morse Taper	Dimension											Run Out
			GL	A	L1	L2	L3	L4	C	D	E	N	L	
LM-1HCN	210111	NO.1	12,065	12	31.5	5	36.5	53.5	7	7.6	22	M16	90	0.003
LM-2HCN	210112	NO.2	17,780	18	41.5	6.5	48	64	7	11	30	M22	112	0.003
LM-3HCN	210113	NO.3	23,825	24	49.5	7.5	57	81	10	15	38	M27	138	0.003
LM-4HCN	210114	NO.4	31,267	32	62.5	10	72.5	102.5	14	21	50	M36	175	0.003
LM-5HCN	210115	NO.5	44,399	45	77	11	88	129.5	18	29.4	63	M48	217.5	0.003
LM-6HCN	210116	NO.6	63,348	64	96.5	11.5	108	182	18	42	79	M68	290	0.005

► LM-H SPECIAL

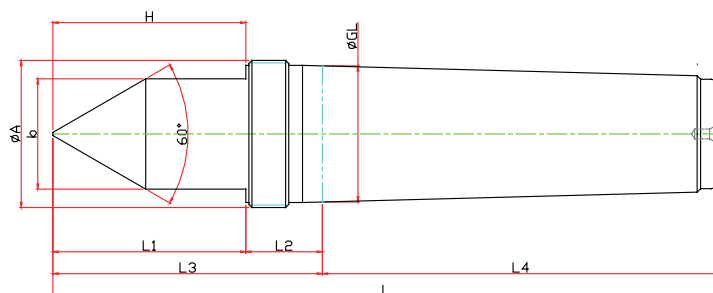
※ Customized-special production for user's condition



LM-FN TYPE

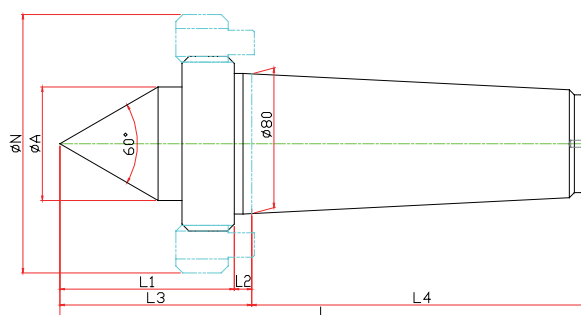
► LM-FN TYPE

※ Spanner Type



Model	Order Number	Morse Taper	Dimension									Run Out
			GL	A	b	L1	L2	L3	L4	E	L	
LM-1FN	120011	NO.1	12.065	12.2	10	25	3.5	28.5	53.5	22	82	0.003
LM-2FN	120012	NO.2	17.780	18	14	31	5	36	64	30	100	0.003
LM-3FN	120013	NO.3	23.825	24	19	39	5	44	81	38	125	0.003
LM-4FN	120014	NO.4	31.267	31.6	27	46	6.5	52.5	102.5	50	155	0.003
LM-5FN	120015	NO.5	44.399	44.7	36	64	6.5	70.5	129.5	53	200	0.003

► LM-#80 TYPE



Model	Order Number	Morse Taper	Dimension									Run Out
			GL	A	b	L1	L2	L3	L4	E	L	
#80-60	260010	1/10 TAPER	80	65	148	70	30	10	110	193	303	0.005
#80-75	275010	1/10 TAPER	80	65	148	70	30	10	110	193	303	0.005

7

TECHNICAL DATA >

TAP's Technical Data

626

Endmill's Technical Data

630

Drill's Technical Data

733

Centering Tools & Reamers Technical Data

740

Tool Holder Technical Data

745

WH Limits

WH Limits

WIDIN applies an unique WH limits system in order to fulfill the degree of an internal screw and provides users the best tools for suitable working and operating conditions.

1. $\{p \leq 0.6 (T.P.I \geq 40)\}$

Upper Limits : $0.010 + 0.015 \times n$

Lower Limits : Upper Limits - 0.015

Unit :mm (n=WH)

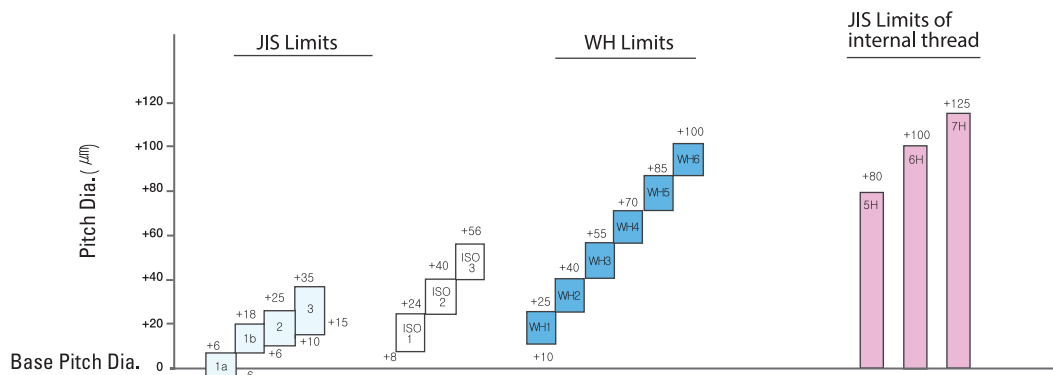
2. $\{p \leq 0.7 (T.P.I \leq 36)\}$

Upper Limits : $0.020 \times n$

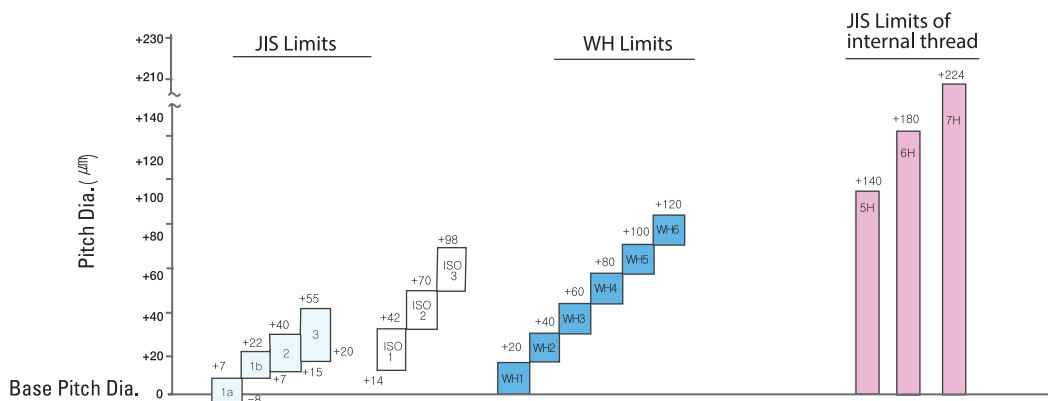
Lower Limits : Upper Limits - 0.020

Unit:mm (n=WH)

Example M3×0.5



Example M10×1.5



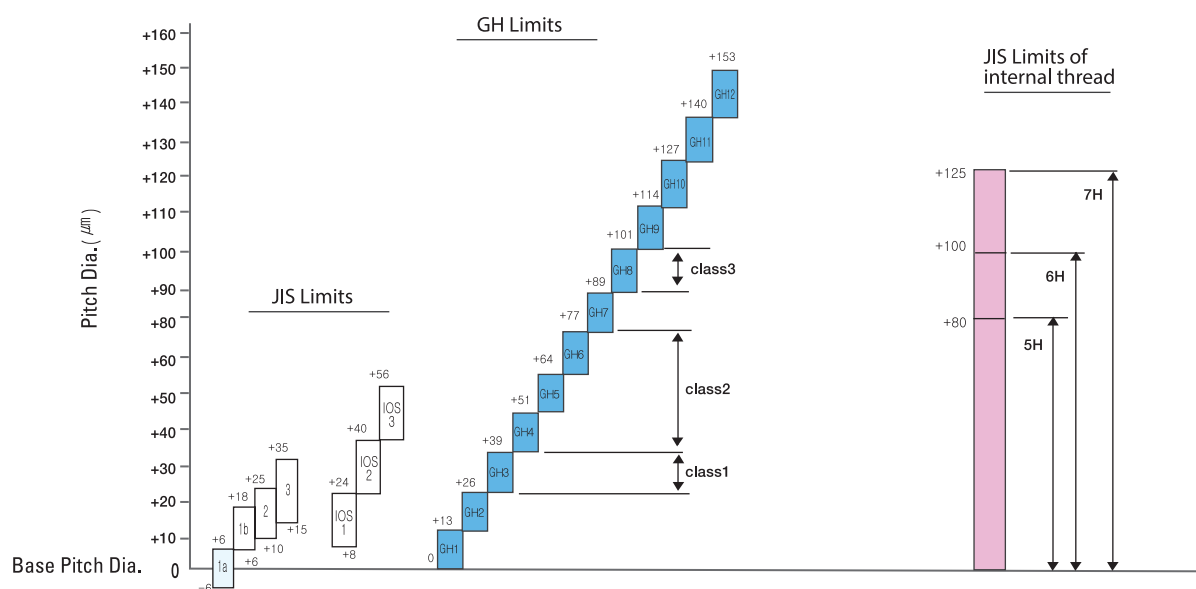
GH Limits

GH Limits

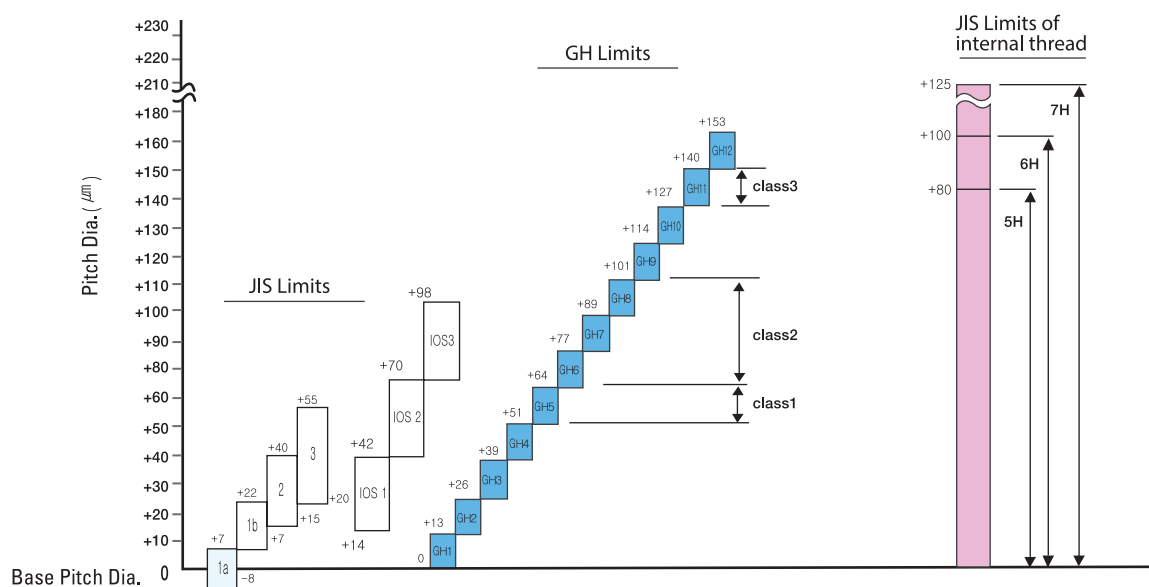
WIDIN applies the strict tap pitch diameter limits because Fluteless taps need to be managed by the rigid diameter of a bottom hole (unlike other normal taps) for it to be able to make precise tapping process of an internal screw by Plastic working.

WIDIN adopts the limits tolerance of $12.7\mu\text{m}$ (0.0005) increments.

Example M3×0.5



Example M10×1.5



Recommended tapping speeds and lubricants

Tapping speeds depend on very important factors such as material and type of tap, chamfer length, dimension of holes, work materials and fluids.

Users need to check every aspect before applying it.

Moreover, lubricant, cooling and abrasion resistance are three important factors affecting cutting fluids.

Therefore, users should provide enough fluids during the tapping process.

Recommended tapping speeds and lubricants

Work Material		Speed(m/min)							Lubricants			
		Straight Fluted Tap	Spiral Fluted Tap	Spiral Pointed Tap	Tungsten Carbide Tap	Fluteless Tap	HighSpeed Synchro Tap	Pipe Thread Tap	Non Water-soluble	Water-soluble	Semi-dry	dry
Low Carbon Steels	C ~0.25%	8~13	8~13	15~25	—	8~13	27~32	3~6	◎	○	△	△
Medium Carbon Steels	CO.25~0.45%	7~12	7~12	10~15	—	7~10	27~32	3~6	◎	○	△	△
High Carbon Steels	C 0.45%~	6~9	6~9	8~13	—	5~8	22~27	2~5	◎	○	△	△
Alloy Steels	SCM	7~12	7~12	10~15	—	5~8	22~27	2~5	◎	△	△	△
Hardened Steels	25~45 HRc	3~5 (4~8)	3~5 (4~8)	4~6 (6~10)	—	—	15~20	2~5	◎	△	—	—
Stainless Steels	SUS	4~7	5~8	8~13	—	5~10	—	3~6	◎	○	—	—
Precipitation Hardened Steels	SUS630 SUS631	3~5	3~5	4~6	—	—	—	2~5	◎	—	—	—
Tool Steels	SKD	6~9	6~9	7~10	—	—	—	2~5	◎	—	—	—
Cast Steels	SC	6~11	6~11	10~15	—	—	17~22	2~5	◎	○	—	—
Cast Iron	FC	10~15	—	—	10~20	—	—	2~5	◎	○	○	○
Ductile Cast Iron	FCD	7~12	7~12	10~20	10~20	—	—	4~8	◎	○	○	—
Copper	Cu	6~9	6~11	7~12	10~20	7~12	27~32	2~5	○	○	—	—
Brass, Brass Casting	Bs, Bsc	10~15	10~20	15~25	15~25	7~12	27~32	5~10	○	○	○	○
Bronze, Bronze Casting	PB, PBC	6~11	6~11	10~20	10~20	7~12	—	6~11	○	○	—	—
Aluminum	AL	10~20	10~20	15~25	—	10~20	100~300	5~10	◎	○	△	—
Aluminum Alloy Casting	AC, ADC	10~15	10~15	15~20	10~20	10~25	80~300	10~15	◎	○	△	—
Magnesium Alloy Casting	MC	7~12	7~12	10~15	10~20	—	—	10~15	◎	○	○	—
Zinc Alloy Casting	ZDC	1~12	7~12	10~15	10~20	7~12	27~100	10~15	◎	○	△	—
Thermo Setting Plastic	Bakelite, Phenol Epoxy	10~20	—	—	15~25	—	—	5~10	—	○	○	○
Thermo Plastic	Vinyl Chloride Nylon	10~20	10~15	10~20	10~20	—	27~32	5~10	—	○	○	○

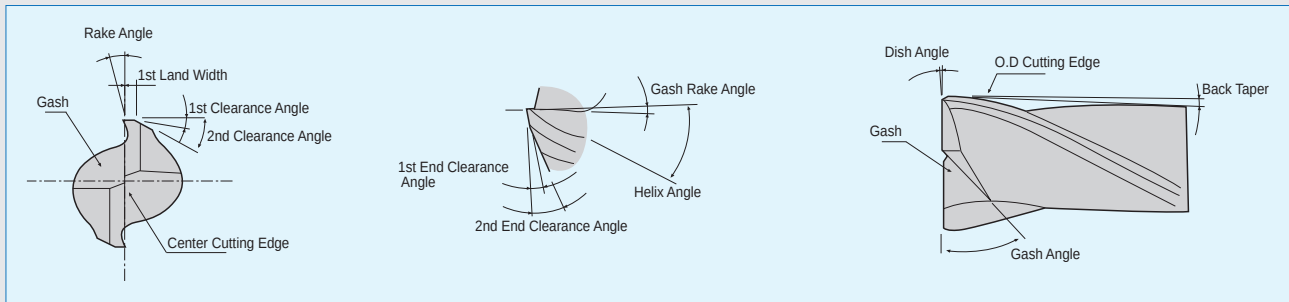
◎: Ideal / ○: Good / △: Applicable / - : Not Applicable

Drill hole Size for Metric Screw Threads in Accordance with 2nd Class of Limits

Straight Tap, Spiral Tap

Thread Size	Drill Size(mm)	mm	
		Min	Max
M3 X 0.5	2.50	2.459	2.599
M4 X 0.7	3.30	3.242	3.422
M5 X 0.8	4.20	4.134	4.334
M6 X 1.0	5.00	4.917	5.153
M8 X 1.25	6.80	6.647	6.912
M10 X 1.25	8.80	8.647	8.912
M10 X 1.5	8.50	8.376	8.676
M12 X 1.0	11.00	10.917	11.153
M12 X 1.25	10.80	10.647	10.912
M12 X 1.5	10.50	10.376	10.676
M12 X 1.75	10.30	10.106	10.441
M14 X 1.5	12.50	12.376	12.676
M14 X 2.0	12.00	11.835	12.21
M16 X 1.5	14.50	14.376	14.676
M16 X 2.0	14.00	13.835	14.21
M18 X 1.5	16.50	16.376	16.676
M18 X 2.5	15.50	15.294	15.744
M20 X 1.5	18.50	18.376	18.676
M20 X 2.5	17.50	17.294	17.744

[Nomenclature of EndMill]



[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~K20
Heat Treatment Steel(HRc 40-60)	• Ultrafinest Carbide
Aluminium, Nonferrous Material	• Micro Grain Carbide • K10

[Formula of End Milling]

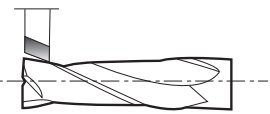
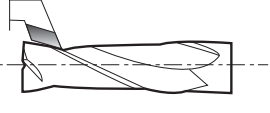
1) Cutting Speed $V = \frac{\pi \times D \times N}{1000}$ (m/min)	V : Cutting Speed (m/min) D : Diameter of End Mill (mm) N : End Mill revolution (RPM)
2) Feed per tooth $fz = \frac{F}{Z \times N}$ (mm/tooth)	fz : Feed per tooth (mm/tooth) Z : No. of teeth N : End Mill revolution (RPM)
3) Table Feed 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+ α)

[For Regrinding]

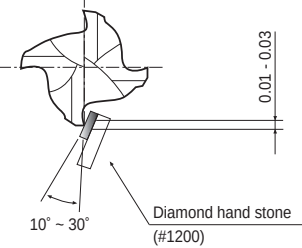
1. Regrinding range

APPLICATION RANGE	CUTTER Dia.	AMOUNT OF FLANK WEAR
Finish Machining	~ $\phi 10$	0.05 ~ 0.1
	$\phi 11 \sim \phi 30$	0.1 ~ 0.25
	$\phi 31 \sim \phi 50$	0.2 ~ 0.35
Rough Machining	~ $\phi 10$	0.08 ~ 0.15
	$\phi 11 \sim \phi 30$	0.15 ~ 0.35
	$\phi 31 \sim \phi 50$	0.3 ~ 0.45

2. Regrinding Method of Relief

		(1) Concave method • In case when precise outer diameter dimension is required. • In case of aluminium machining.
		(2) Flat method • Excellent machinability - Applicable to ball end mill and taper end mill. • Secondary clearance angle work is required. - When Diameter is large.
		(3) Eccentric method • Excellent toughness and surface roughness. • Secondary clearance angle work is not required.

3. Honing

 10° ~ 30° Diamond hand stone (#1200) 0.01 - 0.03	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 End Milling]

■ Trouble Shooting for End Milling

		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	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]

WORKPIECE	HARDENED STEELS HEAT RESISTANT STEELS		HARDENED STEELS									
HARDNESS	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	50,000	188.98	50,000	165.35	45,000	149.61	40,000	118.11	35,000	102.36	35,000	90.55
R1/32 X 1/16	49,700	224.41	47,800	188.98	40,000	157.48	35,000	124.02	32,000	110.24	28,500	90.55
R3/64 X 3/32	49,700	224.41	47,800	188.98	40,000	157.48	35,000	124.02	32,000	110.24	28,500	90.55
R1/16 X 1/8	33,100	236.22	31,800	208.66	26,500	157.48	23,500	124.02	21,000	110.24	19,000	90.55
R3/32 X 3/16	18,600	228.35	17,800	192.91	15,000	147.64	13,500	120.08	11,500	100.39	10,500	82.68
R1/8 X 1/4	13,900	190.94	13,400	161.42	11,000	122.05	10,000	98.43	8,800	84.65	8,000	68.90
R5/32 X 5/16	11,100	165.35	10,700	137.80	9,000	106.30	8,000	84.65	7,000	72.83	6,500	61.02
R3/16 X 3/8	9,300	145.67	8,900	122.05	7,500	94.49	6,600	74.80	5,800	64.96	5,300	54.33
R1/4 X 1/2	6,950	116.14	6,680	98.43	5,600	74.80	5,000	61.02	4,400	49.21	4,000	41.34

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

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

[DA412 series] ▶ High Speed Cutting

WORKPIECE	HARDENED STEELS							
HARDNESS	HRc45 ~ HRc50		HRc50 ~ HRc55		HRc55 ~ HRc60		HRc60 ~ HRc65	
STRENGTH	1500 ~ 1750N/mm ²		1750 ~ 2000N/mm ²		2000 ~ 2080N/mm ²		2080N/mm ²	
DIAMETER(inch)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
R1/16 X 1/8	12,700	43.30	12,300	41.30	11,800	39.40	8,400	26.00
R3/32 X 3/16	9,400	43.30	9,050	41.30	8,600	37.40	5,600	26.80
R1/8 X 1/4	8,600	45.30	8,250	43.30	7,850	37.40	4,850	27.60
R5/32 X 5/16	7,000	41.30	6,700	39.40	6,350	37.40	3,800	25.60
R3/16 X 3/8	6,050	39.40	5,800	37.80	5,450	35.40	3,200	24.40
R1/4 X 1/2	5,450	39.40	5,200	37.80	4,900	35.40	2,750	24.40
R5/16 X 5/8	4,350	34.30	4,150	32.70	3,900	32.30	2,150	10.40
R3/8 X 3/4	3,500	27.20	3,300	25.60	3,150	24.80	1,700	8.70
R1/2 X 1	2,800	27.20	2,650	25.60	2,520	24.80	1,360	8.70

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

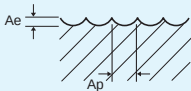
Ae: D1/8=0.06
D3/16~D5/16=0.10
D3/8~D1=0.12
Ap: 0.1 X D

[DA412 series] ▶ High Speed Cutting

WORKPIECE	HARDENED STEELS					
HARDNESS	HRc45 ~ HRc50		HRc50 ~ HRc55		HRc55 ~ HRc60	
STRENGTH	1500 ~ 1750N/mm ²		1750 ~ 2000N/mm ²		2000 ~ 2080N/mm ²	
DIAMETER(inch)	RPM	FEED	RPM	FEED	RPM	FEED
R1/16 X 1/8	12,700	68.90	12,300	65.70	11,800	39.90
R3/32 X 3/16	9,400	65.00	9,050	61.80	8,600	29.50
R1/8 X 1/4	8,600	68.90	8,250	65.70	7,850	27.60
R5/32 X 5/16	7,000	61.00	6,700	57.50	6,350	25.60
R3/16 X 3/8	6,050	57.10	5,800	53.50	5,450	24.40
R1/4 X 1/2	5,450	55.90	5,200	52.40	4,900	24.00
R5/16 X 5/8	4,350	48.40	4,150	44.50	3,900	10.40
R3/8 X 3/4	3,500	39.40	3,300	35.40	3,150	8.70
R1/2 X 1	2,800	39.40	2,640	35.40	2,520	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

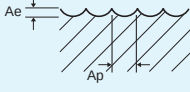


[DA512, DA302 series] ▶ General Cutting

WORKPIECE	NON-ALLOYED STEELS ALLOY STEELS · CAST IRON		ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS	
HARDNESS	~ HRc30		HRc30 ~ HRc40		HRc45 ~ HRc65	
STRENGTH	~ 1000N/mm ²		1000 ~ 1250N/mm ²		1500N/mm ²	
DIAMETER(inch)	RPM	FEED	RPM	FEED	RPM	FEED
R1/64 X 1/32	15,760	9.80	12,720	7.80	5,800	3.80
R1/32 X 1/16	15,760	13.80	12,140	1.60	5,320	4.70
R3/64 X 3/32	14,400	29.50	10,700	19.30	4,680	5.90
R1/16 X 1/8	13,100	26.70	10,000	18.10	4,520	5.90
R3/32 X 3/16	9,140	32.30	7,300	22.80	3,680	7.10
R1/8 X 1/4	7,780	33.00	6,300	24.80	3,160	7.50
R5/32 X 5/16	5,260	37.50	4,420	26.00	2,100	7.50
R3/16 X 3/8	4,620	40.10	3,780	28.00	1,780	7.50
R1/4 X 1/2	3,780	35.40	2,940	26.00	1,360	7.50
R5/16 X 5/8	2,740	36.20	2,320	26.00	1,160	7.50
R3/8 X 3/4	2,100	33.00	1,900	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



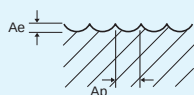
Ae: D1/32~D1/4=.008inch
 D5/16~D3/4=.012inch
 Ap: 0.1 X D

[DA512, DA302 series] ▶ High Speed Cutting

WORKPIECE	NON-ALLOYED STEELS ALLOY STEELS · CAST IRON		HARDENED STEELS	
HARDNESS	~ HRc45		HRc45 ~ HRc65	
STRENGTH	~ 1500N/mm ²		1500N/mm ²	
DIAMETER(inch)	RPM	FEED	RPM	FEED
R1/64 X 1/32	25,000	25.60	12,720	15.70
R1/32 X 1/16	23,000	27.50	12,140	16.90
R3/64 X 3/32	21,000	34.60	10,700	19.30
R1/16 X 1/8	21,000	39.40	10,000	20.50
R3/32 X 3/16	21,000	70.90	7,300	23.60
R1/8 X 1/4	21,000	90.90	6,300	24.80
R5/32 X 5/16	15,760	111.80	4,420	29.10
R3/16 X 3/8	13,660	120.00	3,780	33.00
R1/4 X 1/2	10,500	103.50	2,940	33.00
R5/16 X 5/8	8,200	103.50	2,320	28.00
R3/8 X 3/4	6,300	99.00	1,900	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

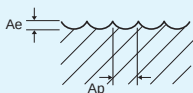


[DA514 series] ▶ General Cutting

WORKPIECE	NON-ALLOYED STEELS ALLOY STEELS · CAST IRON		ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS	
HARDNESS	~ HRc30		HRc30 ~ HRc40		HRc45 ~ HRc65	
STRENGTH	~ 1000N/mm ²		1000 ~ 1250N/mm ²		1500N/mm ²	
DIAMETER(inch)	RPM	FEED	RPM	FEED	RPM	FEED
R1/16 X 1/8	13,100	40.10	10,000	27.00	4,520	8.85
R3/32 X 3/16	9,140	48.50	7,300	34.00	3,680	10.50
R1/8 X 1/4	7,780	49.50	6,300	37.00	3,160	11.25
R5/32 X 5/16	5,260	56.00	4,420	39.00	2,100	11.25
R3/16 X 3/8	4,620	60.00	3,780	42.00	1,780	11.25
R1/4 X 1/2	3,780	53.00	2,940	39.00	1,360	11.25
R5/16 X 5/8	2,740	54.50	2,320	38.50	1,160	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



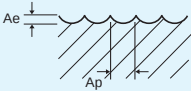
Ae: D1/8~D1/4=.008 inch
D5/16~D5/8=.012 inch
Ap: 0.1 X D

[DA514 series] ▶ High Speed Cutting

WORKPIECE	NON-ALLOYED STEELS ALLOY STEELS · CAST IRON		ALLOY STEELS HEAT RESISTANT STEELS	
HARDNESS	~ HRc45		HRc45 ~ HRc65	
STRENGTH	~ 1500N/mm ²		~ 1500N/mm ²	
DIAMETER(inch)	RPM	FEED	RPM	FEED
R1/16 X 1/8	21,000	59.00	17,000	30.50
R3/32 X 3/16	21,000	106.25	12,000	35.50
R1/8 X 1/4	21,000	136.50	10,500	37.00
R5/32 X 5/16	15,760	167.50	7,800	43.50
R3/16 X 3/8	13,660	180.00	6,300	49.50
R1/4 X 1/2	10,500	155.50	5,260	49.50
R5/16 X 5/8	8,200	155.50	3,780	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

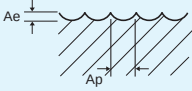


[DA522 series] ▶ General Cutting

WORKPIECE	ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS			
HARDNESS	HRc30 ~ HRc40		HRc45 ~ HRc50		HRc50 ~ HRc55	
STRENGTH	1000 ~ 1250N/mm ²		1500 ~ 1750N/mm ²		1750N/mm ² ~ 2000N/mm ²	
DIAMETER(inch)	RPM	FEED	RPM	FEED	RPM	FEED
R1/16 X 1/8	10,000	18.10	12,700	43.30	12,300	41.30
R3/32 X 3/16	7,300	22.80	9,400	43.30	9,050	41.30
R1/8 X 1/4	6,300	24.80	8,600	45.30	8,250	43.30
R5/32 X 5/16	4,420	26.00	7,000	41.30	6,700	39.40
R3/16 X 3/8	3,780	28.00	6,050	39.40	5,800	37.80
R1/4 X 1/2	2,940	26.00	5,450	39.40	5,200	37.80
R5/16 X 5/8	2,320	26.00	4,350	34.30	4,150	32.70
R3/8 X 3/4	1,900	25.00	3,500	27.20	3,300	25.60
R1/2 X 1	1,520	25.00	2,800	27.20	2,650	25.60

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

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



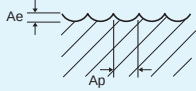
Ae: D1/8=.006
D3/16~D5/16=.010
D3/8~D1=.012
Ap: 0.1 X D

[DA522 series] ▶ High Speed Cutting

WORKPIECE	ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS			
HARDNESS	HRc30 ~ HRc40		HRc45 ~ HRc50		HRc50 ~ HRc55	
STRENGTH	1000 ~ 1250N/mm ²		1500 ~ 1750N/mm ²		1750N/mm ² ~ 2000N/mm ²	
DIAMETER(inch)	RPM	FEED	RPM	FEED	RPM	FEED
R1/16 X 1/8	21,000	39.40	12,700	68.90	12,300	65.70
R3/32 X 3/16	21,000	70.90	9,400	65.00	9,050	61.80
R1/8 X 1/4	21,000	90.90	8,600	69.00	8,250	65.70
R5/32 X 5/16	15,760	111.80	7,000	61.00	6,700	57.50
R3/16 X 3/8	13,660	120.10	6,050	57.10	5,800	53.50
R1/4 X 1/2	10,500	103.50	5,450	55.90	5,200	52.40
R5/16 X 5/8	8,200	103.50	4,350	48.40	4,150	44.50
R3/8 X 3/4	6,300	99.20	3,500	39.40	3,300	35.40
R1/2 X 1	5,040	99.20	2,800	39.40	2,650	35.40

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

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



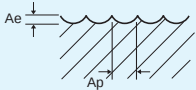
Ae: D1/8=.006
D3/16~D5/16=.010
D3/8~D1=.012
Ap: 0.05 X D

[MD502 series] ▶ High Speed Cutting

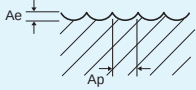
WORKPIECE	NON-ALLOYED STEELS ALLOY STEELS · CAST IRON		ALLOY STEELS HEAT RESISTANT STEELS	
HARDNESS	HRc30 ~ HRc45		HRc45 ~ HRc55	
STRENGTH	1000 ~ 1500N/mm ²		1500 ~ 2000N/mm ²	
DIAMETER(inch)	RPM	FEED	RPM	FEED
R.012X.024	30,000	23.60	30,000	11.80
R.0155X.031	27,000	25.60	27,000	15.00
R.020X.040	25,000	25.60	25,000	15.70
R.0235X.047	24,000	26.40	24,000	16.50
R.031X.062	23,000	27.60	23,000	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

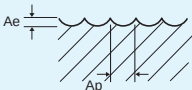


[DA542 series] ▶ General Cutting

WORKPIECE	ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS			
HARDNESS	HRc30 ~ HRc40		HRc45 ~ HRc50		HRc50 ~ HRc55	
STRENGTH	1000 ~ 1250N/mm ²		1250 ~ 1750N/mm ²		1750N/mm ² ~ 2000N/mm ²	
DIAMETER(inch)	RPM	FEED	RPM	FEED	RPM	FEED
R1/32 X 1/16	97,000	8.30	13,800	19.90	13,600	17.90
R1/16 X 1/8	8,000	14.60	10,200	34.60	9,800	33.50
R3/32 X 3/16	5,840	18.10	7,500	34.60	7,200	33.50
R1/8 X 1/4	5,040	19.70	6,900	36.20	6,500	34.60
R5/32 X 5/16	3,540	20.90	5,600	33.10	5,300	31.50
R3/16 X 3/8	3,020	22.40	4,850	31.50	4,650	30.30
R1/4 X 1/2	2,350	20.90	4,350	31.50	4,150	30.30

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

Ae: D1/16~D1/4=0.008
D5/16~D1/2=0.012
Ap: 0.2 X D



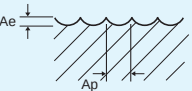
Ae: D1/16~D1/8=0.05 X D
D3/16~D5/16=0.010
D3/8~D1/2=0.012
Ap: 0.1 X D

[DA542 series] ▶ High Speed Cutting

WORKPIECE	ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS			
HARDNESS	HRc45		HRc45 ~ HRc50		HRc50 ~ HRc55	
STRENGTH	1500N/mm ²		1250 ~ 1750N/mm ²		1750N/mm ² ~ 2000N/mm ²	
DIAMETER(inch)	RPM	FEED	RPM	FEED	RPM	FEED
R1/32 X 1/16	18,400	21.90	13,800	28.90	13,600	30.10
R1/16 X 1/8	16,800	31.50	10,200	55.10	9,800	51.20
R3/32 X 3/16	16,800	56.70	7,500	52.00	7,200	49.20
R1/8 X 1/4	16,800	72.80	6,900	55.10	6,500	53.10
R5/32 X 5/16	12,600	89.40	5,600	49.20	5,300	45.30
R3/16 X 3/8	10,930	96.10	4,850	45.30	4,650	43.30
R1/4 X 1/2	8,400	82.70	4,350	44.50	4,150	41.30

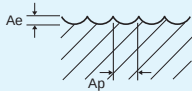
RPM = rev. / min.
FEED = inch / min.

Ae: D1/16~D1/4=0.008
D5/16~D1/2=0.012
Ap: 0.05 X D

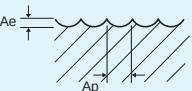


Ae: D1/16~D1/8=0.05 X D
D3/16~D5/16=0.010
D3/8~D1/2=0.012
Ap: 0.05 X D

[DA552 series] ▶ General Cutting

WORKPIECE	ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS			
HARDNESS	HRc30 ~ HRc40		HRc45 ~ HRc50		HRc50 ~ HRc55	
STRENGTH	1000 ~ 1250N/mm ²		1250 ~ 1750N/mm ²		1750N/mm ² ~ 2000N/mm ²	
DIAMETER(inch)	RPM	FEED	RPM	FEED	RPM	FEED
R3/32 X 3/16	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
RPM = rev. / min. FEED = inch / min. Ae: D3/16~D1/4=.008 D5/16~D1/2=.012 Ap: 0.2 X D			 Ae: D3/16~D5/16=.010 D3/8~D1/2=.012 Ap: 0.1 X D			

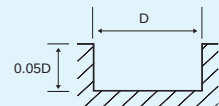
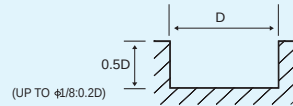
[DA552 series] ▶ High Speed Cutting

WORKPIECE	ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS			
HARDNESS	~ HRc45		HRc45 ~ HRc50		HRc50 ~ HRc55	
STRENGTH	~ 1500N/mm ²		1250 ~ 1750N/mm ²		1750N/mm ² ~ 2000N/mm ²	
DIAMETER(inch)	RPM	FEED	RPM	FEED	RPM	FEED
R3/32 X 3/16	13,440	45.40	6,000	41.60	5,760	39.40
R1/8 X 1/4	13,440	58.20	5,520	44.10	5,200	42.50
R5/32 X 5/16	10,080	71.50	4,480	39.40	4,240	36.20
R3/16 X 3/8	8,740	76.90	3,880	36.30	3,720	34.60
R1/4 X 1/2	6,720	66.20	3,480	35.60	3,320	33.00
RPM = rev. / min. FEED = inch / min. Ae: D3/16~D1/4=.008 D5/16~D1/2=.012 Ap: 0.5 X D			 Ae: D3/16~D5/16=.010 D3/8~D1/2=.012 Ap: 0.05 X D			

[ZA302, ZA502 series]

WORKPIECE	CARBON STEELS ALLOY STEELS-CAST IRON		ALLOY STEELS TOOL STEELS		STAINLESS STEELS		HARDENED STEELS			
HARDNESS	~ HRc30		HRc30 ~ HRc45				HRc45 ~ HRc55		HRc55 ~ HRc65	
STRENGTH	~ 1000N/mm ²		1000 ~ 1500N/mm ²				1500 ~ 2000N/mm ²		2000N/mm ²	
DIAMETER(inch)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1/16	11,560	11,560	7,560	4.70	6,300	3.55	5,040	1.40		
1/8	8,920	8,920	5,560	5.50	4,620	4.70	3,360	1.55	1,900	1.55
3/16	6,300	6,300	3,780	7.50	3,160	6.30	2,320	1.95	1,260	1.55
1/4	5,560	5,560	3,360	8.65	2,840	7.10	2,000	2.15	1,100	1.55
5/16	4,200	4,200	2,520	7.85	2,100	7.10	1,680	2.95	840	1.55
3/8	3,260	3,260	2,000	6.30	1,680	6.30	1,360	2.35	680	1.40
1/2	2,740	2,740	1,680	5.10	1,360	5.10	1,160	2.15	560	1.40
5/8	2,200	2,200	1,360	4.30	1,060	4.30	900	1.55	440	0.80
3/4	1,680	1,680	1,060	3.15	840	3.15	680	1.20	320	0.80
1	1,360	1,360	840	2.75	680	2.35	540	0.80	260	0.60

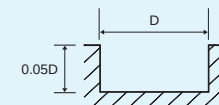
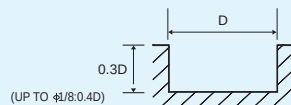
RPM = rev. / min.
FEED = inch / min.



[ZA522 series] ▶ General Cutting

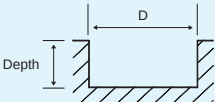
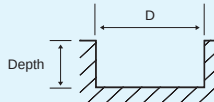
WORKPIECE	CARBON STEELS ALLOY STEELS-CAST IRON		ALLOY STEELS TOOL STEEL		HARDENED STEELS	
HARDNESS	~ HRc30		HRc30 ~ HRc45		HRc45 ~ HRc55	
STRENGTH	~ 1000N/mm ²		1000 ~ 1500N/mm ²		1500 ~ 2000N/mm ²	
DIAMETER(inch)	RPM	FEED	RPM	FEED	RPM	FEED
1/8	4,410	7.8	3,570	2.4	2,200	1.2
3/16	3,050	4.1	2,420	3.3	1,580	1.6
1/4	2,630	4.9	2,100	4.1	1,370	2.0
5/16	2,000	5.3	1,580	4.1	1,050	2.0
3/8	1,680	5.3	1,370	4.1	840	2.0
1/2	1,370	4.1	1,160	3.7	700	1.6
5/8	1,160	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.



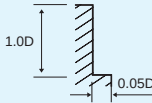
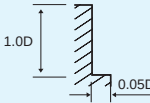
[MZ502 series] ▶ High Speed Cutting

WORKPIECE	ALLOY STEELS TOOL STEELS		HARDENED STEELS	
HARDNESS	HRc30 ~ HRc45		HRc45 ~ HRc55	
STRENGTH	1000 ~ 1500N/mm ²		1500 ~ 2000N/mm ²	
DIAMETER(inch)	RPM	FEED	RPM	FEED
.016	30,000	23.60	23,000	3.90
.031	27,000	25.60	18,000	5.10
.040	25,000	25.60	15,000	5.90
.047	24,000	26.40	12,000	5.90
.062	23,000	27.60	9,000	5.50

RPM = rev. / min. FEED = inch / min.	$D < .040$ Depth = $0.15 \times D$ $D \geq .040$ Depth = $0.25 \times D$		$D < .040$ Depth = $0.02 \times D$ $D \geq .040$ Depth = $0.05 \times D$	

[ZA304, ZA504 series]

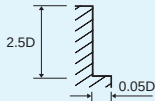
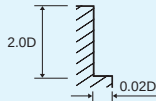
WORKPIECE	CARBON STEELS ALLOY STEELS-CAST IRON		ALLOY STEELS TOOL STEELS		STAINLESS STEELS		HARDENED STEELS			
HARDNESS	~ HRc30		HRc30 ~ HRc45				HRc45 ~ HRc55		HRc55 ~ HRc65	
STRENGTH	~ 1000N/mm ²		1000 ~ 1500N/mm ²				1500 ~ 2000N/mm ²		2000N/mm ²	
DIAMETER(inch)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1/16	11,560	11.00	7,560	6.70	6,300	5.50	5,040	1.95		
1/8	8,920	12.60	5,560	7.85	4,620	6.70	3,360	2.35	1,900	2.35
3/16	6,300	23.60	3,780	14.15	3,160	11.80	2,320	2.75	1,260	2.35
1/4	5,560	26.00	3,360	16.15	2,840	13.00	2,000	3.15	1,100	2.35
5/16	4,200	27.95	2,520	14.95	2,100	13.80	1,680	4.30	840	2.35
3/8	3,260	24.00	2,000	11.80	1,680	11.80	1,360	3.55	680	1.95
1/2	2,740	20.50	1,680	9.85	1,360	9.45	1,160	3.15	560	1.95
5/8	2,200	16.15	1,360	7.85	1,060	7.85	900	2.35	440	1.20
3/4	1,680	12.60	1,060	6.30	840	5.90	680	1.55	320	1.20
1	1,360	9.85	840	5.10	680	4.70	540	1.20	260	0.80

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

[ZA524 series] ▶ General Cutting

WORKPIECE	CARBON STEELS ALLOY STEELS-CAST IRON		ALLOY STEELS TOOL STEELS		HARDENED STEELS			
HARDNESS	~ HRc30		HRc30 ~ HRc45		HRc45 ~ HRc55		HRc55 ~ HRc65	
STRENGTH	~ 1000N/mm ²		1000 ~ 1500N/mm ²		1500 ~ 2000N/mm ²		2000N/mm ²	
DIAMETER(inch)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1/8	4,410	4.5	3,570	3.9	2,200	2.2	1,890	1.2
3/16	3,050	7.1	2,420	5.5	1,580	2.8	1,260	1.6
1/4	2,630	8.5	2,100	7.1	1,370	3.5	1,160	2.0
5/16	2,000	9.1	1,580	7.1	1,050	3.5	840	2.0
3/8	1,680	9.1	1,370	7.1	840	3.5	670	2.0
1/2	1,370	7.1	1,160	6.3	700	2.8	560	1.6
5/8	1,160	6.3	890	4.9	560	2.4	440	1.4
3/4	840	4.5	680	3.5	420	1.8	340	1.0
1	670	4.5	540	3.5	340	1.8	270	1.0

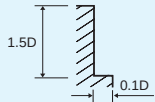
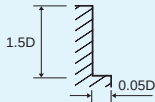
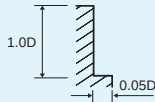
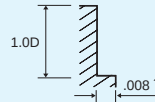
RPM = rev. / min.
FEED = inch / min.

[ZA506 & 8 series] ▶ General Cutting

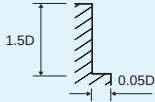
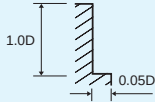
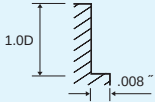
WORKPIECE	CARBON STEELS ALLOY STEELS-CAST IRON		ALLOY STEELS TOOL STEELS		HARDENED STEELS			
HARDNESS	~ HRc30		HRc30 ~ HRc50		HRc50 ~ HRc55		HRc60 ~ HRc65	
STRENGTH	~ 1000N/mm ²		1000 ~ 1750N/mm ²		1750 ~ 2080N/mm ²		2080N/mm ²	
DIAMETER(inch)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1/4	5,560	79.00	3,880	54.00	1,580	8.25	1,100	5.10
5/16	4,200	79.00	2,940	54.00	1,160	8.25	840	5.10
3/8	3,360	79.00	2,320	54.00	1,000	8.25	680	5.10
1/2	2,840	66.00	2,000	46.00	840	7.10	560	4.35
5/8	2,100	50.00	1,480	35.00	640	5.10	420	2.75
3/4	1,680	40.00	1,160	27.00	500	4.35	320	2.35
1	1,260	25.00	870	17.50	375	3.00	240	1.54

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

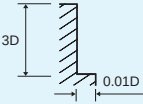
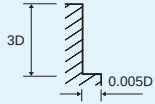
[ZA506 & 8 series] ▶ High Speed Cutting

WORKPIECE	CARBON STEELS TOOL STEELS		HARDENED STEELS			
HARDNESS	~ HRc50		HRc50 ~ HRc60		HRc60 ~	
STRENGTH	1750N/mm ²		1750~ 2080N/mm ²		2080N/mm ²	
DIAMETER(inch)	RPM	FEED	RPM	FEED	RPM	FEED
1/8	16,800	240.00	8,400	120.00	4,200	58.00
3/16	12,600	240.00	6,300	120.00	3,160	58.00
1/4	9,980	235.00	5,040	120.00	2,520	58.00
5/16	8,400	199.00	4,200	100.00	2,100	50.00
3/8	6,300	149.00	3,160	75.00	1,580	37.00
1/2	5,040	120.00	2,520	58.00	1,260	30.00
5/8	3,790	75.00	1,890	38.00	950	19.00

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

[ZA526 & 8 series] ▶ High Speed Cutting

WORKPIECE	NON-ALLOYED STEELS ALLOY STEELS-CAST IRON		ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS			
HARDNESS	~ HRc40		HRc40 ~ HRc50		HRc50 ~ HRc60		HRc60 ~ HRc65	
STRENGTH	~ 1250N/mm ²		1250 ~ 1750N/mm ²		1750 ~ 2080N/mm ²		2080N/mm ²	
DIAMETER(inch)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1/4	2,230	19.00	1,670	14.00	1,390	10.00	1,110	8.00
5/16	1,670	18.00	1,250	13.00	1,050	9.50	840	7.00
3/8	1,330	17.00	1,000	12.00	840	9.00	680	6.30
1/2	1,110	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

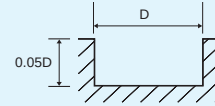
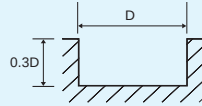
RPM = rev. / min. FEED = inch / min.		

[ZR502A, ZR522A, ZR532A series]

► General Cutting

WORKPIECE	CARBON STEELS ALLOY STEELS · CAST IRON		ALLOY STEELS TOOL STEELS		HARDENED STEELS			
HARDNESS	~ HRc30		HRc30 ~ HRc38		HRc45 ~ HRc55		HRc55 ~ HRc65	
STRENGTH	~ 1000N/mm ²		1000 ~ 1200N/mm ²		1400 ~ 2000N/mm ²		2000N/mm ²	
DIAMETER(inch)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1/4	2,630	4.90	2,100	4.20	1,370	2.00	1,160	1.40
5/16	2,000	5.30	1,580	4.20	1,050	2.00	840	1.40
3/8	1,680	5.30	1,370	4.20	840	2.00	670	1.40
1/2	1,370	4.20	1,160	3.80	700	1.50	550	1.00

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

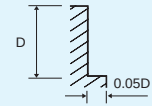
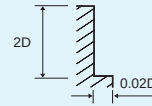
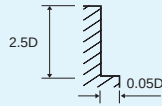


[ZR504A, ZR524A, ZR534A series]

► General Cutting

WORKPIECE	CARBON STEELS ALLOY STEELS · CAST IRON		ALLOY STEELS TOOL STEELS		HARDENED STEELS			
HARDNESS	~ HRc30		HRc30 ~ HRc50		HRc50 ~ HRc55		HRc55 ~ HRc65	
STRENGTH	~ 1000N/mm ²		1000 ~ 1750N/mm ²		1750 ~ 2000N/mm ²		2000N/mm ²	
DIAMETER(inch)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1/4	2,630	8.50	2,100	7.10	1,370	3.30	1,160	2.00
5/16	2,000	9.00	1,580	7.10	1,050	3.30	840	2.00
3/8	1,680	9.00	1,370	7.10	840	3.30	670	2.00
1/2	1,370	7.10	1,160	6.30	700	2.80	550	1.50

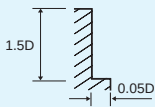
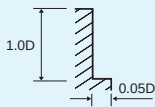
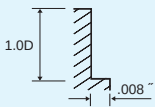
RPM = rev. / min.
FEED = inch / min.



[ZR506(8)A series] ▶ High Speed Cutting

WORKPIECE	CARBON STEELS ALLOY STEELS · CAST IRON		ALLOY STEELS TOOL STEELS		HARDENED STEELS	
HARDNESS	~ HRc50		HRc50 ~ HRc60		HRc60 ~ HRc65	
STRENGTH	1750N/mm ²		1750N/mm ²		2080N/mm ²	
DIAMETER(inch)	RPM	FEED	RPM	FEED	RPM	FEED
1/4	16,800	240.00	8,400	120.00	4,200	58.00
5/16	12,600	240.00	6,300	120.00	3,200	58.00
3/8	10,000	235.00	5,000	120.00	2,500	58.00
1/2	8,400	200.00	4,200	100.00	2,100	50.00
5/8	6,300	150.00	3,150	75.00	1,600	37.00
3/4	5,000	120.00	2,500	58.00	1,260	30.00

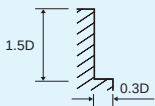
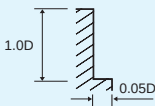
RPM = rev. / min.
FEED = inch / min.

[FA50 series] ▶ General Cutting

WORKPIECE	NON-ALLOYED STEELS ALLOY STEELS · CAST IRON		ALLOY STEELS HEAT RESISTANT STEELS				HARDENED STEELS			
HARDNESS	~ HRc30		HRc30 ~ HRc38		HRc38 ~ HRc45		HRc45 ~ HRc55		HRc55 ~ HRc65	
STRENGTH	~ 1000N/mm ²		1000 ~ 1200N/mm ²		1200 ~ 1400N/mm ²		1400 ~ 2000N/mm ²		2000N/mm ²	
DIAMETER(inch)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1/4	15,600	91.35	12,400	33.10	8,400	22.45	3,400	10.25	2,400	7.50
5/16	11,600	91.35	9,200	33.10	6,300	22.45	2,400	9.50	1,800	7.10
3/8	9,200	91.35	7,600	33.10	5,100	22.45	2,000	11.40	1,300	7.50
1/2	8,000	94.50	6,000	31.50	4,200	22.45	1,680	10.25	1,200	7.50
5/8	6,000	94.50	4,800	29.90	3,300	20.05	1,200	6.30	800	4.35
3/4	5,200	91.35	4,400	28.35	2,700	16.55	1,100	5.90	700	3.95
1	4,800	85.05	3,600	22.05	2,400	14.15	1,000	5.90	660	3.95

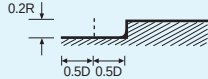
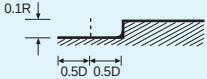
RPM = rev. / min.
FEED = inch / min.

[ZSPM ...-.. series, Fractional] ▶ GENERAL SPEED M/C

WORKPIECE	HARDENED STEELS									
HARDNESS	~ HRc40		HRc40 ~ HRc50		HRc50 ~ HRc55		HRc55 ~ HRc60		HRc60 ~ HRc65	
D X R(Fractional)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
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

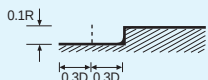
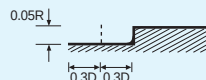
RPM = rev. / min.
FEED = inch / min.

[ZSPM ...-.. series, Fractional] ▶ HIGH SPEED M/C

WORKPIECE	HARDENED STEELS									
HARDNESS	~ HRc40		HRc40 ~ HRc50		HRc50 ~ HRc55		HRc55 ~ HRc60		HRc60 ~ HRc65	
D X R(Fractional)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
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

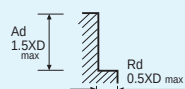
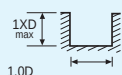
RPM = rev. / min.
FEED = inch / min.

[X-STAR series, Fractional]

WORKPIECE	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	15,585	12	12,835	10	10,695	8	5,500	4	14,515	11	7,335	5
3/16	10,360	20	8,560	17	7,150	14	3,670	8	9,690	19	4,880	9
1/4	7,795	24	6,420	20	5,350	17	2,750	8	7,260	23	3,665	11
5/16	6,235	29	5,135	24	4,280	20	2,200	10	5,805	27	2,935	14
3/8	5,195	39	4,280	32	3,565	27	1,835	13	4,840	36	2,445	18
7/16	4,455	38	3,665	31	3,055	26	1,570	13	4,145	35	2,095	18
1/2	3,895	37	3,210	30	2,675	25	1,375	13	3,630	34	1,835	17
9/16	3,465	35	2,850	29	2,375	24	1,220	12	3,225	32	1,630	16
5/8	3,115	33	2,565	27	2,140	23	1,100	11	2,905	31	1,465	15
3/4	2,600	31	2,140	25	1,785	21	915	11	2,420	29	1,220	14
1	1,950	25	1,605	21	1,335	17	690	9	1,815	24	915	12

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

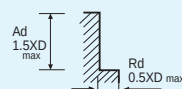
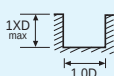


- ※ Use a rigid and precise machines and holders.
- ※ Use a suitable cutting oil.

[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	4,585	4	9,170	7	12,835	10	7,640	5	9,170	9	2,445	2
3/16	3,070	6	6,080	12	8,550	17	5,080	10	6,080	14	1,600	3
1/4	2,290	7	4,585	14	6,420	22	3,820	12	4,585	16	1,220	3
5/16	1,835	8	3,665	16	5,135	25	3,055	14	3,665	18	980	4
3/8	1,530	11	3,055	16	4,280	25	2,545	14	3,055	18	815	4
7/16	1,310	11	2,620	16	3,665	25	2,185	14	2,620	18	700	4
1/2	1,145	11	2,290	16	3,210	25	1,910	14	2,290	18	610	4
9/16	1,020	10	2,035	20	2,850	29	1,700	17	2,035	20	545	6
5/8	915	9	1,835	16	2,565	25	1,530	14	1,835	18	490	4
3/4	765	9	1,520	15	2,410	22	1,275	12	1,520	16	400	4
1	575	7	1,145	15	1,605	22	955	12	1,145	16	305	3

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

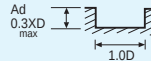


- ※ Use a rigid and precise machines and holders.
- ※ Use a suitable cutting oil.

[X-STAR series, Fractional] ▶ Slotting

WORKPIECE	HARDENED STEELS	
HARDNESS	HRc30~45	
D(Fractional)	RPM	FEED
1/8	6,573	16
3/16	4,382	16
1/4	3,287	17
5/16	2,629	17
3/8	2,191	17
7/16	1,878	17
1/2	1,643	16
9/16	1,461	16
5/8	1,315	16
3/4	1,096	17
1	822	16

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

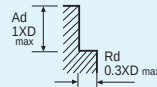


- ※ Use a rigid and precise machines and holders.
- ※ Use a suitable cutting oil.

[X-STAR series, Fractional] ▶ Side Cutting

WORKPIECE	HARDENED STEELS	
HARDNESS	HRc30~45	
D(Fractional)	RPM	FEED
1/8	6,573	16
3/16	4,382	16
1/4	3,287	17
5/16	2,629	17
3/8	2,191	17
7/16	1,878	17
1/2	1,643	16
9/16	1,461	16
5/8	1,315	16
3/4	1,096	17
1	822	16

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

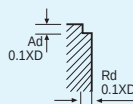


- ※ Use a rigid and precise machines and holders.
- ※ Use a suitable cutting oil.

[X-STAR series, Fractional] ▶ High Speed Cutting

WORKPIECE	HARDENED STEELS	
HARDNESS	HRc30~45	
D(Fractional)	RPM	FEED
1/8	17,121	75
3/16	11,414	78
1/4	8,561	75
5/16	6,848	77
3/8	5,707	75
7/16	4,892	76
1/2	4,280	75
9/16	3,805	75
5/8	3,424	75
3/4	2,854	75
1	2,140	73

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

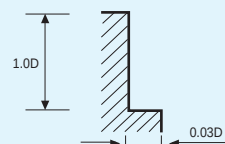
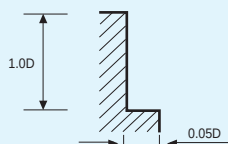


- ※ Use a rigid and precise machines and holders.
- ※ Use a suitable cutting oil.

[ZE716A, ZR706A series]

WORKPIECE	HARDENED STEELS HEAT RESISTANT STEELS		HARDENED STEELS									
HARDNESS	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
6(1/4)	24,800	5,350	23,500	4,900	16,000	4,900	13,500	3,300	10,500	2,100	8,000	1,450
8(5/16)	20,000	5,500	19,000	5,000	12,000	4,600	10,000	3,100	8,000	2,000	6,000	1,400
10(3/8)	16,000	4,900	15,500	4,500	9,500	4,100	8,000	2,900	6,400	1,800	4,800	1,300
12(1/2)	13,000	4,500	12,500	4,100	8,000	3,800	6,600	2,500	5,300	1,600	4,000	1,150
16(5/8)	10,000	4,000	9,700	3,700	6,000	3,400	5,000	2,300	4,000	1,250	3,000	870
20(3/4)	8,000	3,350	7,800	3,400	4,800	3,200	4,000	2,100	3,200	1,020	2,400	690

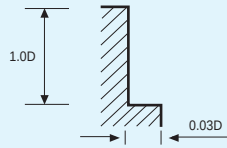
RPM = rev. / min.
FEED = inch / min.



[ZE712A series] ▶ Side Cutting

WORKPIECE	HARDENED STEELS HEAT RESISTANT STEELS		HARDENED STEELS									
HARDNESS	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
1	48,000	1,050	38,000	820	25,500	510	20,500	310	16,000	190	12,500	125
2(1/16)	33,300	1,200	26,000	970	17,500	600	14,500	370	11,000	230	9,500	165
3(1/8)	21,800	1,200	17,300	970	11,500	600	9,500	370	7,500	230	6,400	165
4	16,700	1,250	13,200	1000	8,800	625	7,200	385	5,600	240	4,750	170
5(3/16)	15,700	1,450	12,500	1,150	8,300	710	6,400	410	5,100	260	4,450	190
6(1/4)	13,100	1,350	10,350	1,100	6,900	690	5,300	400	4,200	255	3,700	185
8(5/16)	9,880	1,320	7,800	1,030	5,200	635	4,000	365	3,200	235	2,800	170
10(3/8)	7,800	1,200	6,150	970	4,100	590	3,200	340	2,550	220	2,200	160
12(1/2)	6,650	1,200	5,250	970	3,500	590	2,650	340	2,100	220	1,860	160
16	4,900	1,050	3,900	840	2,600	520	2,000	300	1,600	190	1,400	140
20	3,900	950	3,100	750	2,050	475	1,600	275	1,300	175	1,100	125

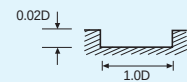
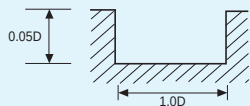
RPM = rev. / min.
FEED = inch / min.



[ZE712A series] ▶ Slotting

WORKPIECE	HARDENED STEELS HEAT RESISTANT STEELS		HARDENED STEELS									
HARDNESS	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
0.2	50,000	130	45,000	115	40,000	95	33,000	310	16,000	190	12,500	125
0.3	50,000	190	45,000	140	40,000	115	33,000	370	11,000	230	9,500	165
0.4	50,000	235	45,000	180	40,000	140	33,000	370	7,500	230	6,400	165
0.5	50,000	370	45,000	280	40,000	220	33,000	385	5,600	240	4,750	170
0.6	50,000	470	45,000	360	40,000	285	30,000	410	5,100	260	4,450	190
0.8	50,000	600	40,000	440	30,000	295	25,000	400	4,200	255	3,700	185
0.9	49,000	655	39,000	520	27,800	330	22,700	365	3,200	235	2,800	170
1	48,000	750	38,000	570	25,500	360	20,500	340	2,550	220	2,200	160
2(1/16)	33,300	850	26,000	680	17,500	420	14,500	340	2,100	220	1,860	160
3(1/8)	21,800	850	17,300	680	11,500	420	9,500	300	1,600	190	1,400	140
4	16,700	880	13,200	700	8,800	440	7,200	275	1,300	175	1,100	125
5(3/16)	15,700	1,000	12,500	805	8,300	500	6,400	0	0	0	0	0
6(1/4)	13,100	950	10,350	770	6,900	480	5,300	0	0	0	0	0
8(5/16)	9,880	930	7,800	720	5,200	445	4,000	0	0	0	0	0
10(3/8)	7,800	850	6,150	680	4,100	415	3,200	0	0	0	0	0
12(1/2)	6,650	850	5,250	680	3,500	415	2,650	0	0	0	0	0
16	4,900	730	3,900	580	2,600	365	2,000	0	0	0	0	0
20	3,900	660	3,100	525	2,050	335	1,600	0	0	0	0	0

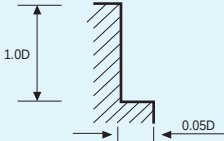
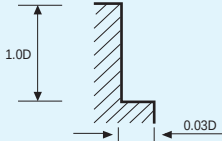
RPM = rev. / min.
FEED = inch / min.



[ZE714A series] ▶ Side Cutting

WORKPIECE	HARDENED STEELS											
	HARDENED STEELS HEAT RESISTANT STEELS		HARDENED STEELS									
HARDNESS	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
1	48,000	1,480	38,000	1,050	25,500	710	20,500	430	16,000	270	12,500	175
2(1/16)	33,300	1,750	26,000	1,250	17,500	840	14,500	520	11,000	320	9,500	230
3(1/8)	21,800	1,750	17,300	1,250	11,500	840	9,500	520	7,500	320	6,400	230
4	16,700	1,800	13,200	1,300	8,800	880	7,200	540	5,600	335	4,750	240
5(3/16)	15,700	2,000	12,500	1,500	8,300	1,000	6,400	580	5,100	370	4,450	270
6(1/4)	13,100	1,950	10,350	1,400	6,900	950	5,300	560	4,200	350	3,700	260
8(5/16)	9,880	1,880	7,800	1,350	5,200	900	4,000	520	3,200	330	2,800	240
10(3/8)	7,800	1,750	6,150	1,260	4,100	840	3,200	480	2,550	310	2,200	220
12(1/2)	6,650	1,750	5,250	1,260	3,500	840	2,650	480	2,100	300	1,860	220
16	4,900	1,500	3,900	1,100	2,600	730	2,000	420	1,600	270	1,400	200
20	3,900	1,300	3,100	970	2,050	650	1,600	380	1,300	250	1,100	180

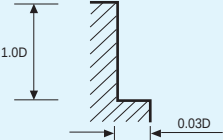
RPM = rev. / min.
FEED = inch / min.

[ZS204A series] ▶ Side Cutting

WORKPIECE	HARDENED STEELS									
	HRc40~ HRc50		HRc50~ HRc55		HRc55~ HRc60		HRc60~ HRc65		HRc65~ HRc70	
HARDNESS	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
4(3/16)	17,200	1,690	11,440	1,140	9,360	700	7,280	430	6,170	310
6(1/4)	13,450	1,820	8,970	1,230	6,890	720	5,460	450	4,810	330
8(5/16)	9,100	1,750	6,760	1,170	5,200	670	4,160	420	3,640	310
10(3/8)	8,000	1,630	5,330	1,090	4,160	620	3,320	400	2,860	280
12(1/2)	6,830	1,630	4,550	1,010	3,450	580	2,730	370	2,420	260

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



[ZSTNB series]

WORKPIECE					Carbon Steels, Alloy Steels (180~250HB)		Pre-harden Steels (HRC35~45)		Hardened Steels (HRC45~55)		Hardened Steels (HRC55~65)	
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 ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	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]

WORKPIECE					Carbon Steels, Alloy Steels (180~250HB)		Pre-harden Steels (HRc35~45)		Hardened Steels (HRc45~55)		Hardened Steels (HRc55~65)	
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 ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	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

[ZSTNB series]

WORKPIECE					Carbon Steels, Alloy Steels (180~250HB)		Pre-harden Steels (HRc35~45)		Hardened Steels (HRc45~55)		Hardened Steels (HRc55~65)	
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 ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	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]

WORKPIECE					Carbon Steels, Alloy Steels (180~250HB)		Pre-hardened Steels (HRC35~45)		Hardened Steels (HRC45~55)		Hardened Steels (HRC55~65)	
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 ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	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 : $0.32(\text{standard cutting depth}) \times 0.65 \times 0.8 = 0.17\text{mm}$

※ 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]

WORKPIECE				Carbon Steels, Alloy Steels (180~250HB)		Pre-hardened Steels (HRc35~45)		Hardened Steels (HRc45~55)		Hardened Steels (HRc55~65)	
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 ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	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
		30	0.028	12,320	536	10,472	423	9,240	345	8,624	268
	0.3	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]

WORKPIECE				Carbon Steels, Alloy Steels (180~250HB)		Pre-hardened Steels (HRc35~45)		Hardened Steels (HRc45~55)		Hardened Steels (HRc55~65)	
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 ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	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]

WORKPIECE				Carbon Steels, Alloy Steels (180~250HB)		Pre-hardened Steels (HRc35~45)		Hardened Steels (HRc45~55)		Hardened Steels (HRc55~65)	
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 ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	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	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	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]

WORKPIECE				Carbon Steels, Alloy Steels (180~250HB)		Pre-harden Steels (HRc35~45)		Hardened Steels (HRc45~55)		Hardened Steels (HRc55~65)	
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 ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	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

[ZSLNR series]

WORKPIECE				Carbon Steels, Alloy Steels (180~250HB)		Pre-hardened Steels (HRc35~45)		Hardened Steels (HRc45~55)		Hardened Steels (HRc55~65)	
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 ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	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
		30	0.030	11,312	889	9,615	756	8,484	593	7,918	484
	0.8	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
		20	0.060	11,907	936	10,121	796	8,930	624	8,335	510
3	0.2	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
		35	0.035	9,072	1,146	7,711	974	6,804	764	6,350	624
	0.3	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
		30	0.060	9,072	1,274	7,711	1,083	6,804	849	6,350	693
	0.5	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.

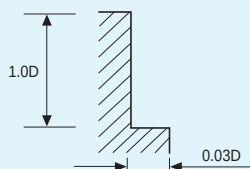
※ In actual machining, the condition should be adjusted according to the machining shape, purpose and machine type.

※ 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

WORKPIECE	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	17,200	1,690	11,440	1,140	9,360	700	7,280	430	6,170	310
6	13,450	1,820	8,970	1,230	6,890	720	5,460	450	4,810	330
8	9,100	1,750	6,760	1,170	5,200	670	4,160	420	3,640	310
10	8,000	1,630	5,330	1,090	4,160	620	3,320	400	2,860	280
12	6,830	1,630	4,550	1,010	3,450	580	2,730	370	2,420	260

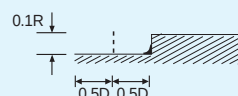
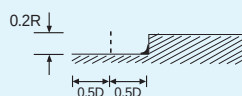
RPM = rev. / min.
FEED = mm / min.



[ZSPM4...-.. series]

WORKPIECE	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	9,550	6,500	6,900	4,150	4,550	2,750	2,850	1,150	1,900	610
4 X R0.5	7,950	7,000	5,750	4,600	4,000	3,200	2,550	1,350	1,750	700
6 X R0.5	5,800	7,650	4,100	4,900	2,900	3,500	1,850	1,850	1,350	795
6 X R1.0	5,800	7,650	4,100	4,900	2,900	3,500	1,850	1,850	1,350	795
8 X R1.0	4,350	7,650	3,050	4,900	2,200	3,500	1,400	1,850	995	795
8 X R2.0	4,350	7,650	3,050	4,900	2,200	3,500	1,400	1,850	995	795
10 X R1.0	3,500	7,650	2,450	4,900	1,750	3,500	1,100	1,850	795	795
10 X R2.0	3,500	7,650	2,450	4,900	1,750	3,500	1,100	1,850	795	795
12 X R2.0	2,900	7,650	2,050	4,900	1,450	3,500	925	1,850	665	795
12 X R3.0	2,900	7,650	2,050	4,900	1,450	3,500	925	1,850	665	795

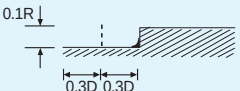
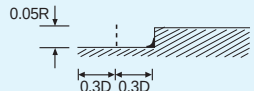
RPM = rev. / min.
FEED = mm / min.



[ZSPM4...-.. series] ▶ High Speed Cutting

WORKPIECE	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	22,000	16,000	17,000	10,000	12,500	8,000	9,500	4,600	6,900	2,500
4 X R0.5	17,000	17,500	13,000	12,000	11,000	9,200	8,000	5,500	5,600	2,900
6 X R0.5	13,500	18,500	10,500	13,800	9,000	11,000	6,400	6,400	4,500	3,600
6 X R1.0	13,500	18,500	10,500	13,800	9,000	11,000	6,400	6,400	4,500	3,600
8 X R1.0	10,000	18,500	8,000	14,000	6,800	11,000	4,800	6,700	3,400	4,100
8 X R2.0	10,000	18,500	8,000	14,000	6,800	11,000	4,800	6,700	3,400	4,100
10 X R1.0	8,000	18,500	6,400	14,000	5,400	11,000	3,800	6,800	2,700	3,800
10 X R2.0	8,000	18,500	6,400	14,000	5,400	11,000	3,800	6,800	2,700	3,800
12 X R2.0	6,600	18,500	5,300	14,000	4,500	11,000	3,200	7,000	2,250	3,600
12 X R3.0	6,600	18,500	5,300	14,000	4,500	11,000	3,200	7,000	2,250	3,600

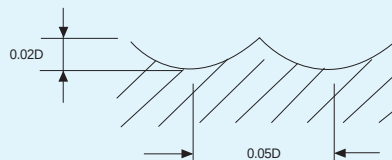
RPM = rev. / min.
FEED = mm / min.

[DB702, DB712 series]

WORKPIECE	HARDENED STEELS HEAT RESISTANT STEELS		HARDENED STEELS									
HARDNESS	HRc30 ~ HRc40		HRc40 ~ HRc50		HRc50 ~ HRc55		HRc55 ~ HRc60		HRc60 ~ HRc65		HRc 65 ~ HRc70	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
0.2	50,000	1,200	50,000	1,050	45,000	960	40,000	770	35,000	674	31,500	570
0.3	50,000	1,500	50,000	1,350	45,000	1,200	40,000	965	35,000	840	31,500	700
0.4	50,000	1,900	50,000	1,700	45,000	1,500	40,000	1,200	35,000	1,050	31,500	890
0.5	50,000	2,400	50,000	2,100	45,000	1,900	40,000	1,500	35,000	1,300	31,500	1,100
0.6	50,000	2,900	50,000	2,500	45,000	2,200	40,000	1,800	35,000	1,600	31,500	1,400
0.8	50,000	3,900	50,000	3,300	45,000	3,000	40,000	2,400	35,000	2,100	31,500	1,800
1	50,000	4,800	50,000	4,200	45,000	3,800	40,000	3,000	35,000	2,600	35,000	2,300
1.5	50,000	5,400	48,000	4,500	43,000	4,000	37,000	3,100	33,000	2,700	29,700	2,300
2	49,700	5,700	47,800	4,800	40,000	4,000	35,000	3,150	32,000	2,800	28,500	2,300
3	33,100	6,000	31,800	5,300	26,500	4,000	23,500	3,150	21,000	2,800	19,000	2,300
4	24,900	6,000	23,900	5,300	20,000	4,000	17,500	3,150	16,000	2,800	14,500	2,300
5	18,600	5,800	17,800	4,900	15,000	3,750	13,500	3,050	11,500	2,550	10,500	2,100
6	13,900	4,850	13,400	4,100	11,000	3,100	10,000	2,500	8,800	2,150	8,000	1,750
8	11,100	4,200	10,700	3,500	9,000	2,700	8,000	2,150	7,000	1,850	6,500	1,550
10	9,300	3,700	8,900	3,100	7,500	2,400	6,600	1,900	5,800	1,650	5,300	1,380
12	6,950	2,950	6,680	2,500	5,600	1,900	5,000	1,550	4,400	1,250	4,000	1,050

RPM = rev. / min.
FEED = mm / min.



[DB703 series]

WORKPIECE	HARDENED STEELS											
HARDNESS	HRc30~ HRc40		HRc40~ HRc50		HRc50~ HRc55		HRc55~ HRc60		HRc60~ HRc65		HRc65~ HRc70	
D X R(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	57,000	7,100	55,000	6,000	46,000	5,000	40,300	3,900	36,800	3,500	32,800	2,900
2.5	57,000	7,100	55,000	6,000	46,000	5,000	40,300	3,900	36,800	3,500	32,800	2,900
3	38,000	7,500	36,600	6,600	30,500	5,000	27,000	3,900	24,200	3,500	21,900	2,900
4	28,500	7,500	27,500	6,600	23,000	5,000	20,100	3,900	18,400	3,500	16,700	2,900
5	21,500	7,300	20,500	6,100	17,300	4,700	15,500	3,800	13,200	3,200	12,100	2,600
6	16,000	6,100	15,400	5,100	12,700	3,900	11,500	3,100	10,100	2,700	9,200	2,200
8	12,700	5,300	12,300	4,400	10,400	3,400	9,200	2,700	8,100	2,300	7,500	1,900
10	10,700	4,600	10,200	3,900	8,600	3,000	7,600	2,400	6,700	2,100	6,100	1,700
1	8,000	3,700	7,700	3,100	6,400	2,400	5,800	1,900	5,100	1,600	4,600	1,300

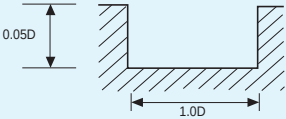
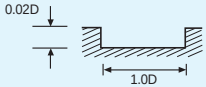
[DB734 series]

WORKPIECE	HARDENED STEELS											
HARDNESS	HRc30~ HRc40		HRc40~ HRc50		HRc50~ HRc55		HRc55~ HRc60		HRc60~ HRc65		HRc65~ HRc70	
D X R(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	62,100	8,600	59,800	7,200	50,000	6,000	43,800	4,700	40,000	4,200	35,600	3,500
2.5	62,100	8,600	59,800	7,200	50,000	6,000	43,800	4,700	40,000	4,200	35,600	3,500
3	41,400	9,000	39,800	8,000	33,100	6,000	29,400	4,700	26,300	4,200	23,800	3,500
4	31,100	9,000	29,900	8,000	25,000	6,000	21,900	4,700	20,000	4,200	18,100	3,500
5	23,300	8,700	22,300	7,400	18,800	5,600	16,900	4,600	14,400	3,800	13,100	3,200
6	17,400	7,300	16,800	6,200	13,800	4,700	12,500	3,800	11,000	3,200	10,000	2,600
8	13,900	6,300	13,400	5,300	11,300	4,100	10,000	3,200	8,800	2,800	8,100	2,300
10	11,600	5,600	11,100	4,700	9,400	3,600	8,300	2,900	7,300	2,500	6,600	2,100

[ZE702, ZE712 series] ▶ Slotting

WORKPIECE	HARDENED STEELS HEAT RESISTANT 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	50,000	130	45,000	115	40,000	95	33,000	60	33,000	45	26,400	30
0.3	50,000	190	45,000	140	40,000	115	33,000	70	25,000	50	20,000	35
0.4	50,000	235	45,000	180	40,000	140	33,000	90	25,000	55	20,000	40
0.5	50,000	370	45,000	280	40,000	220	33,000	140	25,000	85	20,000	60
0.6	50,000	470	45,000	360	40,000	285	30,000	160	25,000	105	20,000	75
0.8	50,000	600	40,000	440	30,000	295	25,000	185	19,000	110	15,200	80
0.9	49,000	655	39,000	520	27,800	330	22,700	205	17,500	125	14,000	90
1	48,000	750	38,000	570	25,500	360	20,500	215	16,000	135	12,500	85
2	33,300	850	26,000	680	17,500	420	14,500	260	11,000	160	9,500	115
3	21,800	850	17,300	680	11,500	420	9,500	260	7,500	160	6,400	115
4	16,700	880	13,200	700	8,800	440	7,200	270	5,600	170	4,750	118
5	15,700	1,000	12,500	805	8,300	500	6,400	285	5,100	180	4,450	132
6	13,100	950	10,350	770	6,900	480	5,300	280	4,200	180	3,700	130
8	9,880	930	7,800	720	5,200	445	4,000	255	3,200	165	2,800	120
10	7,800	850	6,150	680	4,100	415	3,200	240	2,550	155	2,200	112
12	6,650	850	5,250	680	3,500	415	2,650	240	2,100	155	1,860	112
16	4,900	730	3,900	580	2,600	365	2,000	210	1,600	135	1,400	95
20	3,900	660	3,100	525	2,050	335	1,600	195	1,300	125	1,100	85

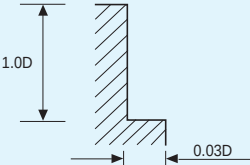
RPM = rev. / min.
FEED = mm / min.

[ZE702, ZE712 series] ▶ Side Cutting

WORKPIECE	HARDENED STEELS HEAT RESISTANT 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	48,000	1,050	38,000	820	25,500	510	20,500	310	16,000	190	12,500	125
2	33,300	1,200	26,000	970	17,500	600	14,500	370	11,000	230	9,500	165
3	21,800	1,200	17,300	970	11,500	600	9,500	370	7,500	230	6,400	165
4	16,700	1,250	13,200	1,000	8,800	625	7,200	385	5,600	240	4,750	170
5	15,700	1,450	12,500	1,150	8,300	710	6,400	410	5,100	260	4,450	190
6	13,100	1,350	10,350	1,100	6,900	690	5,300	400	4,200	255	3,700	185
8	9,880	1,320	7,800	1,030	5,200	635	4,000	365	3,200	235	2,800	170
10	7,800	1,200	6,150	970	4,100	590	3,200	340	2,550	220	2,200	160
12	6,650	1,200	5,250	970	3,500	590	2,650	340	2,100	220	1,860	160
16	4,900	1,050	3,900	840	2,600	520	2,000	300	1,600	190	1,400	140
20	3,900	950	3,100	750	2,050	475	1,600	275	1,300	175	1,100	125

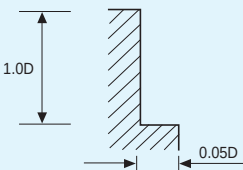
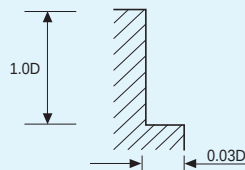
RPM = rev. / min.
FEED = mm / min.



[ZE704, ZE714, ZE724 series] ▶ Side Cutting

WORKPIECE	HARDENED STEELS HEAT RESISTANT STEELS		HARDENED STEELS									
	HRC30 ~ HRC40		HRC40 ~ HRC50		HRC50 ~ HRC55		HRC55 ~ HRC60		HRC60 ~ HRC65		HRC65 ~ HRC70	
HARDNESS												
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1	48,000	1,480	38,000	1,050	25,500	710	20,500	430	16,000	270	12,500	175
2	33,300	1,750	26,000	1,250	17,500	840	14,500	520	11,000	320	9,500	230
3	21,800	1,750	17,300	1,250	11,500	840	9,500	520	7,500	320	6,400	230
4	16,700	1,800	13,200	1,300	8,800	880	7,200	540	5,600	335	4,750	240
5	15,700	2,000	12,500	1,500	8,300	1,000	6,400	580	5,100	370	4,450	270
6	13,100	1,950	10,350	1,400	6,900	950	5,300	560	4,200	350	3,700	260
8	9,880	1,880	7,800	1,350	5,200	900	4,000	520	3,200	330	2,800	240
10	7,800	1,750	6,150	1,260	4,100	840	3,200	480	2,550	310	2,200	220
12	6,650	1,750	5,250	1,260	3,500	840	2,650	480	2,100	300	1,860	220
16	4,900	1,500	3,900	1,100	2,600	730	2,000	420	1,600	270	1,400	200
20	3,900	1,300	3,100	970	2,050	650	1,600	380	1,300	250	1,100	180

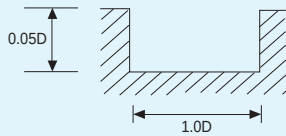
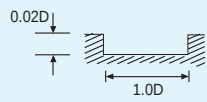
RPM = rev. / min.
FEED = mm / min.

[ZR702, ZR732 series] ▶ Slotting

WORKPIECE	HARDENED STEELS HEAT RESISTANT STEELS		HARDENED STEELS									
	HRC30 ~ HRC40		HRC40 ~ HRC50		HRC50 ~ HRC55		HRC55 ~ HRC60		HRC60 ~ HRC65		HRC65 ~ HRC70	
HARDNESS												
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	33,300	680	26,000	544	17,500	336	14,500	208	11,000	128	9,500	92
3	21,800	680	17,300	544	11,500	336	9,500	208	7,500	128	6,400	92
4	16,700	704	13,200	560	8,800	352	7,200	216	5,600	136	4,750	94
5	15,700	800	12,500	644	8,300	400	6,400	228	5,100	144	4,450	106
6	13,100	760	10,350	616	6,900	384	5,300	224	4,200	144	3,700	104
8	9,880	744	7,800	576	5,200	356	4,000	204	3,200	132	2,800	96
10	7,800	680	6,150	544	4,100	332	3,200	192	2,550	124	2,200	90
12	6,650	680	5,250	544	3,500	332	2,650	192	2,100	124	1,860	90
16	4,900	584	3,900	464	2,600	292	2,000	168	1,600	108	1,400	78
20	3,900	528	3,100	420	2,050	268	1,600	168	1,300	100	1,100	70

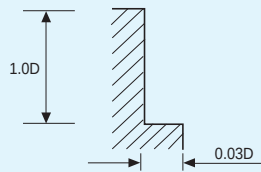
RPM = rev. / min.
FEED = mm / min.

[ZR702, ZR732 series] ▶ Side Cutting

WORKPIECE	HARDENED STEELS HEAT RESISTANT 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
2	33,300	960	26,000	776	17,500	480	14,500	296	11,000	184	9,500	132
3	21,800	960	17,300	776	11,500	480	9,500	296	7,500	184	6,400	132
4	16,700	1,000	13,200	800	8,800	500	7,200	308	5,600	192	4,750	136
5	15,700	1,160	12,500	920	8,300	568	6,400	328	5,100	208	4,450	152
6	13,100	1,080	10,350	880	6,900	552	5,300	320	4,200	204	3,700	148
8	9,880	1,056	7,800	824	5,200	508	4,000	292	3,200	188	2,800	136
10	7,800	960	6,150	776	4,100	472	3,200	272	2,550	176	2,200	128
12	6,650	960	5,250	776	3,500	472	2,650	272	2,100	176	1,860	128
16	4,900	840	3,900	672	2,600	416	2,000	240	1,600	152	1,400	112
20	3,900	760	3,100	600	2,050	380	1,600	220	1,300	140	1,100	100

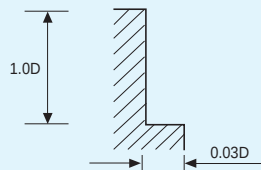
RPM = rev. / min.
FEED = mm / min.



[ZR704, ZR714, ZR724, ZR734 series]

WORKPIECE	HARDENED STEELS HEAT RESISTANT 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
3	21,800	1,400	17,300	1,000	11,500	672	9,500	416	7,500	256	6,400	184
4	16,700	1,440	13,200	1,040	8,800	704	7,200	432	5,600	268	4,750	192
5	15,700	1,600	12,500	1,200	8,300	800	6,400	464	5,100	296	4,450	216
6	13,100	1,560	10,350	1,120	6,900	760	5,300	448	4,200	280	3,700	208
8	9,880	1,504	7,800	1,080	5,200	720	4,000	416	3,200	264	2,800	192
10	7,800	1,400	6,150	1,008	4,100	672	3,200	384	2,550	248	2,200	176
12	6,650	1,400	5,250	1,008	3,500	672	2,650	384	2,100	240	1,860	176
16	4,900	1,200	3,900	880	2,600	584	2,000	336	1,600	216	1,400	160
20	3,900	1,040	3,100	776	2,050	520	1,600	304	1,300	200	1,100	144

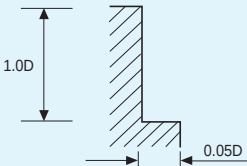
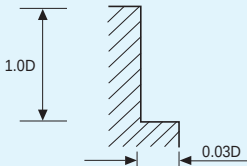
RPM = rev. / min.
FEED = mm / min.



[ZR706, ZR736, ZE716, ZE726 series]

WORKPIECE	HARDENED STEELS HEAT RESISTANT STEELS		HARDENED STEELS									
HARDNESS	HRc30 ~ HRc40		HRc40 ~ HRc50		HRc50 ~ HRc 55		HRc55 ~ HRc60		HRc60 ~ HRc65		HRc65 ~ HRc70	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
6	24,800	5,350	23,500	4,900	16,000	4,900	13,500	3,300	10,500	2,100	8,000	1,450
8	20,000	5,500	19,000	5,000	12,000	4,600	10,000	3,100	8,000	2,000	6,000	1,400
10	16,000	4,900	15,500	4,500	9,500	4,100	8,000	2,900	6,400	1,800	4,800	1,300
12	13,000	4,500	12,500	4,100	8,000	3,800	6,600	2,500	5,300	1,600	4,000	1,150
16	10,000	4,000	9,700	3,700	6,000	3,400	5,000	2,300	4,000	1,250	3,000	870
20	8,000	3,350	7,800	3,400	4,800	3,200	4,000	2,100	3,200	1,020	2,400	690

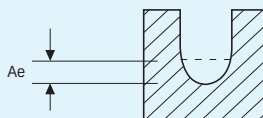
RPM = rev. / min.
FEED = mm / min.

[ZSLNB series]

WORKPIECE	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	34,100-49,500	600-870	0.007-0.028	31,900-35,200	490-540	0.005-0.023	31,900-35,200	440-480	0.005-0.021	49,000-50,000	1,100-1,400	0.010-0.042
0.6	28,600-40,700	590-850	0.007-0.034	26,400-29,700	480-540	0.006-0.028	26,400-29,700	400-480	0.006-0.025	42,000-50,000	1,100-1,700	0.011-0.050
0.8	22,000-30,800	640-890	0.016-0.064	19,800-22,000	490-550	0.013-0.052	19,800-22,000	440-500	0.012-0.048	31,000-50,000	1,100-2,250	0.024-0.096
1.0	17,600-24,200	600-850	0.008-0.080	15,400-17,600	470-540	0.007-0.065	15,400-17,600	440-500	0.006-0.060	24,000-49,500	1,100-2,200	0.012-0.120
1.2	14,300-18,700	590-780	0.024-0.032	12,000-14,000	480-540	0.020-0.026	12,000-14,000	420-480	0.018-0.024	28,500-38,500	1,480-1,950	0.036-0.048
1.5	11,000-14,300	580-760	0.031-0.048	10,000-11,500	480-540	0.025-0.039	10,000-11,500	420-480	0.023-0.036	17,000-28,500	1,100-1,950	0.046-0.072
2.0	8,500-11,000	590-800	0.024-0.160	7,900-8,800	470-530	0.020-0.130	7,900-8,800	440-480	0.018-0.120	12,600-24,000	1,100-2,150	0.036-0.240
3.0	5,700-8,200	730-1,000	0.064-0.24	5,300-5,800	590-650	0.052-0.195	5,300-5,800	550-620	0.048-0.120	11,900-17,000	1,850-2,700	0.096-0.360
4.0	4,300-6,200	680-990	0.080-0.320	3,950-4,400	550-620	0.065-0.260	3,850-4,400	530-570	0.060-0.240	6,600-12,500	1,260-2,500	0.120-0.480

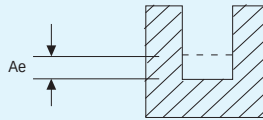
RPM = rev. / min.
FEED = mm / min.



[ZSLNS20, ZSLNS40 series]

WORKPIECE	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)
0.4	34,100-50,000	350-590	0.005-0.028	30,500-35,200	295-340	0.003-0.020	18,300-24,600	120-200	0.002-0.012	48,000-50,000	790-920	0.008-0.048
0.5	25,650-33,000	370-470	0.006-0.035	23,750-26,000	285-315	0.004-0.025	14,200-18,000	115-130	0.003-0.015	44,000-50,000	800-1,150	0.010-0.060
0.6	20,900-35,200	330-560	0.007-0.030	19,900-22,000	260-290	0.005-0.021	11,900-15,500	100-120	0.003-0.013	37,500-50,000	770-1,250	0.011-0.051
0.8	16,150-26,400	360-590	0.009-0.040	15,200-16,700	280-310	0.006-0.028	9,000-11,700	110-125	0.004-0.017	28,500-47,000	770-1,300	0.015-0.068
1.0	12,300-18,700	350-540	0.011-0.028	10,500-11,500	250-280	0.008-0.020	6,300-8,050	100-115	0.005-0.012	22,500-34,000	810-1,300	0.018-0.048
1.2	10,450-17,600	350-590	0.025-0.070	9,100-10,000	250-280	0.015-0.042	5,400-7,000	100-115	0.009-0.026	22,500-31,500	950-1,350	0.036-0.101
1.5	9,100-17,600	430-830	0.017-0.077	7,000-8,000	250-280	0.012-0.055	4,300-5,500	100-115	0.007-0.033	14,500-25,000	770-1,320	0.028-0.132
2.0	6,350-10,550	340-570	0.021-0.140	6,100-6,700	270-300	0.015-0.100	3,600-4,700	100-120	0.009-0.060	11,500-18,500	770-1,250	0.036-0.240
3.0	4,300-7,050	550-900	0.056-0.210	3,990-4,600	445-515	0.040-0.150	2,400-3,200	105-310	0.024-0.090	9,000-13,000	1,400-2,110	0.096-0.360
4.0	3,200-5,300	400-675	0.074-0.280	3,000-3,400	335-380	0.053-0.200	1,800-2,400	75-230	0.032-0.120	6,750-9,750	1,050-1,575	0.128-0.480

RPM = rev. / min.
FEED = mm / min.

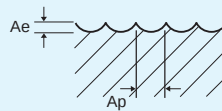


[DB412 series]

WORKPIECE	HARDENED STEELS							
HARDNESS	HRC45 ~ HRC50		HRC50 ~ HRC55		HRC55 ~ HRC60		HRC60 ~ HRC70	
STRENGTH	1500 ~ 1750N/mm ²		1750 ~ 2000N/mm ²		2000 ~ 2080N/mm ²		2080N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1	20,000	460	20,000	400	20,000	350	20,000	240
1.5	16,300	640	16,100	580	16,000	570	14,200	360
2	14,500	800	14,200	740	13,850	760	11,300	465
2.5	13,400	950	13,000	890	12,600	920	9,600	560
3	12,700	1,100	12,300	1,050	11,800	1,000	8,400	660
4	10,600	1,100	10,300	1,050	9,800	1,000	6,650	650
5	9,400	1,100	9,050	1,050	8,600	950	5,600	680
6	8,600	1,150	8,250	1,100	7,850	950	4,850	700
8	7,000	1,050	6,700	1,000	6,350	950	3,800	650
10	6,050	1,000	5,800	960	5,450	900	3,200	620
12	5,450	1,000	5,200	960	4,900	900	2,750	610

RPM = rev. / min.
FEED = mm / min.

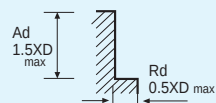
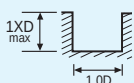
Ae: D1-D4=0.05XD
D5-D8=0.025mm
D10-D20=0.30mm
Ap: D1-D20=0.1 X D



[X-STAR series]

WORKPIECE	LOW CARBON STEELS				MED ALLOY STEELS		MOLD&DIE STEELS		CAST IRON-GRAY		CAST IRON-DUCTILE	
HARDNESS	~HB175		~HB275		~HB275		~HB275		~HB200		~HB300	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
3	16,500	335	13,585	276	11,320	230	5,820	118	15,360	300	7,765	158
4	12,340	326	10,190	326	8,520	340	4,380	175	11,550	462	5,810	232
5	9,895	502	8,150	413	6,790	345	3,490	177	9,215	468	4,655	236
6	8,250	586	6,795	483	5,660	403	2,910	207	7,680	546	3,880	276
8	6,185	754	5,095	620	4,245	517	2,185	266	5,760	702	2,910	354
10	4,950	955	4,075	786	3,395	656	1,745	337	4,610	889	2,330	449
12	4,125	963	3,395	793	2,830	661	1,455	340	3,840	897	1,940	453
14	3,535	890	2,910	733	2,425	592	1,250	314	3,290	829	1,665	419
16	3,095	817	2,545	672	2,125	561	1,090	288	2,880	761	1,455	384
18	2,750	809	2,265	667	1,885	556	970	285	2,560	754	1,295	381
20	2,475	804	2,040	662	1,700	552	875	283	2,305	749	1,165	378
25	1,975	631	1,630	521	1,360	435	700	230	1,850	600	930	300

RPM = rev. / min.
FEED = mm / min.



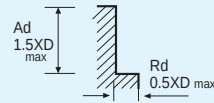
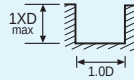
※ Use a rigid and precise machines and holders.

※ Use a suitable cutting oil.

[X-STAR series]

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	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
3	4,850	95	9,705	175	13,585	250	8,085	125	9,705	225	2,590	50
4	3,660	146	7,245	290	10,190	407	6,050	242	7,245	290	1,910	76
5	2,910	147	5,820	300	8,150	430	4,850	250	5,820	355	1,550	75
6	2,425	173	4,850	355	6,795	560	4,045	300	4,850	405	1,295	75
8	1,820	221	3,640	405	5,095	635	3,030	355	3,640	455	970	100
10	1,455	280	2,910	405	4,075	635	2,425	355	2,910	455	775	100
12	1,215	283	2,425	405	3,395	635	2,020	355	2,425	455	645	100
14	1,040	262	2,080	405	2,910	635	1,735	355	2,080	455	555	100
16	910	240	1,820	405	2,545	635	1,515	355	1,820	455	485	100
18	810	238	1,615	380	2,265	560	1,350	300	1,615	405	430	100
20	730	236	1,455	380	2,040	560	1,215	300	1,455	405	390	100
25	585	187	1,160	370	1,630	560	970	300	1,160	405	305	73

RPM = rev. / min.
FEED = mm / min.



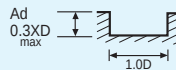
※ Use a rigid and precise machines and holders.

※ Use a suitable cutting oil.

[X-STAR series] ▶ High Speed Cutting

WORKPIECE	HARDENED STEELS	
HARDNESS	HRc30~45	
DIAMETER(mm)	RPM	FEED
3	6,900	552
4	5,175	414
5	4,140	331
6	3,450	414
8	2,588	414
10	2,070	414
12	1,725	414
14	1,479	414
16	1,294	414
18	1,150	368
20	1,035	414
25	828	397

RPM = rev. / min.
FEED = mm / min.



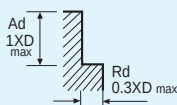
※ Use a rigid and precise machines and holders.

※ Use a suitable cutting oil.

[X-STAR series] ▶ Side Cutting

WORKPIECE	HARDENED STEELS	
HARDNESS	HRc30~45	
DIAMETER(mm)	RPM	FEED
3	8,493	679
4	6,369	510
5	5,096	611
6	4,246	849
8	3,185	764
10	2,548	713
12	2,123	764
14	1,820	728
16	1,592	701
18	1,415	679
20	1,274	662
25	1,019	611

RPM = rev. / min.
FEED = mm / min.



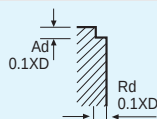
※ Use a rigid and precise machines and holders.

※ Use a suitable cutting oil.

[X-STAR series] ▶ High Speed Cutting

WORKPIECE	HARDENED STEELS	
HARDNESS	HRc30~45	
DIAMETER(mm)	RPM	FEED
3	18,047	2,166
4	13,535	1,624
5	10,828	1,732
6	9,023	2,166
8	6,768	1,895
10	5,414	1,732
12	4,512	1,985
14	3,867	1,856
16	3,384	1,895
18	3,008	1,805
20	2,707	1,841
25	2,166	1,646

RPM = rev. / min.
FEED = mm / min.



※ Use a rigid and precise machines and holders.

※ Use a suitable cutting oil.

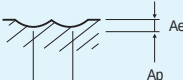
[DB312, 342, 402, 502, 512, 522, 54(5)2 series]

► General Cutting

WORKPIECE	NON-ALLOYED STEELS ALLOY STEELS · CAST IRON		ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS	
HARDNESS	~ HRc30		HRc30 ~ HRc40		HRc40 ~ HRc55	
STRENGTH	~ 1000N/mm ²		1000 ~ 1250N/mm ²		1500N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
1	16,500	290	13,300	230	6,100	105
1.5	16,500	405	12,700	310	5,590	140
2	15,100	865	11,200	565	4,900	175
2.5	15,100	865	11,200	565	4,900	175
3	13,800	780	10,500	530	4,750	175
4	11,000	850	8,800	610	4,410	205
5	9,600	945	7,600	665	3,860	205
6	8,900	1,150	7,200	955	3,340	220
8	7,500	1,500	6,050	1,060	2,590	255
10	6,700	1,750	5,300	1,170	2,140	260
12	6,150	2,000	4,900	1,280	1,840	280
16	5,000	1,950	3,900	1,220	1,420	280
20	4,350	1,900	3,400	1,200	1,170	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, 342, 402, 502, 512, 522, 54(5)2 series]

► High Speed Cutting

WORKPIECE	NON-ALLOYED STEELS · ALLOY STEELS · CAST IRON		ALLOY STEELS · HEAT RESISTANT STEELS	
HARDNESS	~ HRc45		HRc30 ~ HRc40	
STRENGTH	~ 1500N/mm ²		1500 ~ 2000N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED
1	26,000	1,500	26,000	920
1.5	24,000	1,600	24,000	990
2	22,000	1,700	22,000	1,080
2.5	22,000	2,000	20,000	1,130
3	22,000	2,300	17,800	1,200
4	22,000	3,350	14,300	1,300
5	22,000	4,150	12,600	1,380
6	22,000	4,600	11,000	1,440
8	17,500	4,600	8,800	1,440
10	14,700	4,450	7,350	1,380
12	12,800	4,450	6,400	1,330
16	10,000	4,000	5,000	1,150
20	8,350	3,650	4,150	1,060

RPM = rev. / min.
FEED = mm / min.

Ae : D1~D6=0.2mm
D8~D20=0.3mm
Ap : 0.2XD



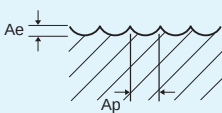
※ Please reduce cutting speed around 20~30% from the above table or DB522 series.

[DB514 series] ▶ General Cutting

WORKPIECE	NON-ALLOYED STEELS ALLOY STEELS · CAST IRON		ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS	
HARDNESS	~ HRc30		HRc30 ~ HRc40		HRc45 ~ HRc65	
STRENGTH	~ 1000N/mm ²		1000 ~ 1250N/mm ²		1500N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
3	13,100	1,020	10,000	690	4,520	220
4	10,500	1,110	8,400	800	4,200	270
5	9,140	1,230	7,300	870	3,680	270
6	7,780	1,260	6,300	950	3,160	280
8	5,260	1,430	4,420	990	2,100	280
10	4,620	1,530	3,780	1,070	1,780	280
12	3,780	1,350	2,940	990	1,360	280
16	2,740	1,380	2,320	980	1,160	280
20	2,100	1,260	1,900	950	840	280

RPM = rev. / min.
FEED = mm / min.

Ae: D1~D6=0.2mm
D8~D20=0.3mm
Ap: 0.2 X D



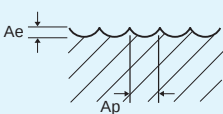
Ae: D1~D6=0.2mm
D8~D20=0.3mm
Ap: 0.1 X D

[DB514 series] ▶ High Speed Cutting

WORKPIECE	NON-ALLOYED STEELS ALLOY STEELS · CAST IRON		HARDENED STEELS	
HARDNESS	~ HRc45		HRc45 ~ HRc65	
STRENGTH	~ 1500N/mm ²		~ 1500N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED
3	21,000	1,500	17,000	780
4	21,000	2,210	13,660	870
5	21,000	2,700	12,000	900
6	21,000	3,470	10,500	940
8	15,760	4,260	7,880	1,110
10	13,660	4,580	6,300	1,260
12	10,500	3,950	5,260	1,260
16	8,200	3,950	3,780	1,060
20	6,300	3,780	2,940	790

RPM = rev. / min.
FEED = mm / min.

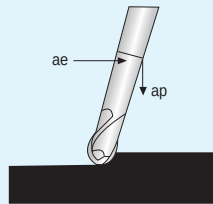
Ae: D1~D6=0.2mm
D8~D20=0.3mm
Ap: 0.05 X D



[DB532 series] ▶ General Cutting

WORKPIECE	NON-ALLOYED STEELS ALLOY STEELS · CAST IRON		ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS	
HARDNESS	~ HRc30		HRc30 ~ HRc40		HRc45 ~ HRc65	
STRENGTH	~ 1000N/mm ²		1000 ~ 1250N/mm ²		1500N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
3	35,000	2,800	33,000	2,600	12,000	900
4	26,000	2,300	25,000	2,200	9,000	800
5	21,000	2,100	20,000	2,000	7,000	700
6	17,000	1,900	16,000	1,800	6,000	650
8	13,000	1,700	12,000	1,600	4,500	550
10	10,500	1,450	10,000	1,400	3,500	500
12	9,000	1,400	8,000	1,300	3,000	450
16	6,000	1,200	5,500	1,100	2,000	400

RPM = rev. / min.
FEED = mm / min.



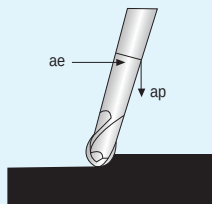
$$ae = 0.05 \times d1$$

$$ap = 0.02 \times d1$$

[DB532 series] ▶ High Speed Cutting

WORKPIECE	NON-ALLOYED STEELS ALLOY STEELS · CAST IRON		ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS	
HARDNESS	~ HRc30		HRc30 ~ HRc40		HRc45 ~ HRc65	
STRENGTH	~ 1000N/mm ²		1000 ~ 1250N/mm ²		1500N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
3	47,000	3,700	44,000	3,500	17,000	1,400
4	35,000	3,200	33,000	3,000	13,000	1,200
5	28,000	2,800	27,000	2,600	10,000	1,100
6	23,000	2,600	22,000	2,400	8,000	950
8	18,000	2,300	17,000	2,100	6,000	850
10	14,000	2,000	13,000	1,900	5,000	750
12	12,000	1,800	11,000	1,800	4,000	700
16	9,000	1,600	8,000	1,500	3,300	600

RPM = rev. / min.
FEED = mm / min.



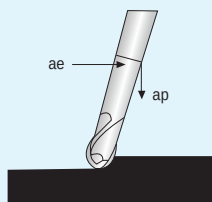
$$ae = 0.05 \times d1$$

$$ap = 0.02 \times d1$$

[DB534 series] ▶ General Cutting

WORKPIECE	NON-ALLOYED STEELS ALLOY STEELS · CAST IRON		ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS	
HARDNESS	~ HRc30		HRc30 ~ HRc40		HRc45 ~ HRc65	
STRENGTH	~ 1000N/mm ²		1000 ~ 1250N/mm ²		1500N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
5	21,000	4,000	20,000	4,000	7,000	1,400
6	17,000	4,000	16,000	3,500	6,000	1,300
8	13,000	3,500	12,000	3,000	4,500	1,100
10	10,500	3,000	10,000	2,500	3,500	1,000
12	9,000	2,800	8,000	2,500	3,000	950
16	6,000	2,800	5,500	2,200	2,000	800

RPM = rev. / min.
FEED = mm / min.



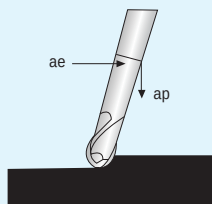
$$ae = 0.05 \times d1$$

$$ap = 0.02 \times d1$$

[DB534 series] ▶ High Speed Cutting

WORKPIECE	NON-ALLOYED STEELS ALLOY STEELS · CAST IRON		ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS	
HARDNESS	~ HRc30		HRc30 ~ HRc40		HRc45 ~ HRc65	
STRENGTH	~ 1000N/mm ²		1000 ~ 1250N/mm ²		1500N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
5	28,000	5,600	27,000	5,300	11,000	2,100
6	23,000	5,100	22,000	4,900	9,000	1,900
8	18,000	4,600	17,000	4,300	7,000	1,700
10	14,000	3,900	13,000	3,700	5,000	1,400
12	12,000	3,700	11,000	3,500	4,500	1,300
16	9,000	3,100	8,000	3,000	3,300	1,100

RPM = rev. / min.
FEED = mm / min.



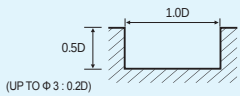
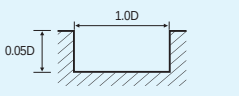
$$ae = 0.05 \times d1$$

$$ap = 0.02 \times d1$$

[ZE302, ZE322, ZE402, ZE502, ZE522, ZE512 series] ▶ General Cutting

WORKPIECE	ALLOY STEELS-HEAT RESISTANT STEELS		HARDENED STEELS		STAINLESS STEELS	
HARDNESS	HRc30 ~ HRc40		HRc40 ~ HRc50			
STRENGTH	1000 ~ 1250N/mm ²		1250 ~ 1750N/mm ²			
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
2	9,700	220	6,350	135	5,300	105
3	7,500	240	4,670	160	3,880	135
4	6,350	345	3,880	205	3,250	175
5	5,300	370	3,170	220	2,650	185
6	4,670	405	2,830	255	2,380	205
8	3,530	435	2,120	230	1,760	205
10	2,730	380	1,680	185	1,420	185
12	2,310	320	1,420	150	1,140	150
16	1,850	255	1,140	125	890	125
20	1,420	195	890	90	705	90
25	1,150	150	705	80	580	70

RPM = rev. / min.
FEED = mm / min.

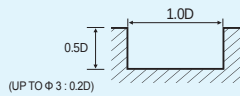
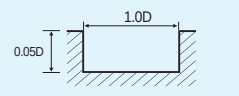



※ Please reduce cutting speed around 20~30% from the above table or ZE522, ZE322 series.

[ZE302, ZE322, ZE402, ZE502, ZE522, ZE512 series] ▶ High Speed Cutting

WORKPIECE	ALLOY STEELS-HEAT RESISTANT STEELS		HARDENED STEELS				STAINLESS STEELS	
HARDNESS	HRc30 ~ HRc40		HRc40 ~ HRc50		HRc40 ~ HRc55			
STRENGTH	1000 ~ 1250N/mm ²		1250 ~ 1750N/mm ²		1750 ~ 2000N/mm ²			
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	18,000	665	11,800	415	8,700	175	9,800	345
3	11,000	655	6,800	435	5,600	185	6,200	370
4	10,300	725	6,300	430	4,300	185	5,300	370
5	9,350	715	5,570	420	3,700	185	4,620	355
6	8,200	750	4,930	470	3,250	185	4,100	390
8	6,300	770	3,780	410	2,470	185	3,120	355
10	4,830	750	2,940	360	2,000	160	2,470	310
12	4,100	750	2,520	345	1,680	160	2,100	300
16	3,260	715	2,000	355	1,890	150	1,940	290
20	2,520	665	1,580	310	1,680	150	1,630	275
25	2,000	635	1,260	340	1,570	150	1,420	290

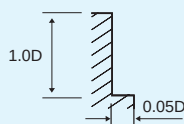
RPM = rev. / min.
FEED = mm / min.

[ZE503 series] ▶ Side Cutting

WORKPIECE	NON-ALLOY STEELS ALLOY STEELS-CAST IRON		ALLOY STEELS HEAT RESISTANT STEELS		STAINLESS STEELS		HARDENED STEELS			
HARDNESS	~ HRc30		HRc30 ~ HRc45				HRc45 ~ HRc55		HRc55 ~ HRc65	
STRENGTH	~ 1000N/mm ²		1000 ~ 1500N/mm ²				1500 ~ 2000N/mm ²		2000N/mm ² ~	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
6	5,560	500	3,360	310	2,840	250	2,000	60	1,100	45
8	4,200	530	2,520	290	2,100	265	1,680	80	840	45
10	3,260	460	2,000	230	1,680	230	1,360	70	680	35
12	2,740	390	1,680	190	1,360	180	1,160	60	560	35
16	2,200	310	1,360	150	1,060	150	900	45	440	20
18	1,940	280	1,210	135	950	130	790	35	380	20
20	1,680	240	1,060	120	840	115	680	30	320	20

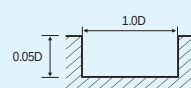
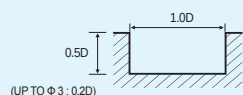
RPM = rev. / min.
FEED = mm / min.



[ZE503 series] ▶ Slotting

WORKPIECE	NON-ALLOY STEELS ALLOY STEELS-CAST IRON		ALLOY STEELS HEAT RESISTANT STEELS		STAINLESS STEELS		HARDENED STEELS			
HARDNESS	~ HRc30		HRc30 ~ HRc45				HRc45 ~ HRc55		HRc55 ~ HRc65	
STRENGTH	~ 1000N/mm ²		1000 ~ 1500N/mm ²				1500 ~ 2000N/mm ²		2000N/mm ² ~	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
6	5,560	310	3,360	200	2,840	160	2,000	50	1,100	35
8	4,200	340	2,520	180	2,100	160	1,680	65	840	35
10	3,260	300	2,000	140	1,680	145	1,360	55	680	30
12	2,740	250	1,680	120	1,360	120	1160	50	560	30
16	2,200	200	1,360	100	1,060	100	900	35	440	20
18	1,940	175	1,210	85	950	85	790	30	380	20
20	1,680	150	1,060	70	840	70	680	25	320	20

RPM = rev. / min.
FEED = mm / min.

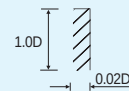
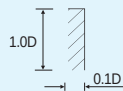


[ZE304, ZE324, ZE404, ZE504, ZE524, ZE534, ZE514 series]

► General Cutting

WORKPIECE	NON-ALLOY STEELS ALLOY STEELS · CAST IRON		HARDENED STEELS				STAINLESS STEELS	
HARDNESS	~HRc30		HRc30 ~ HRc45		HRc45 ~ HRc55			
STRENGTH	~1000N/mm ²		1000 ~ 1500N/mm ²		1500 ~ 2000N/mm ²			
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	12,100	320	7,900	195	2,700	47	6,600	160
3	9,400	370	5,840	230	2,000	58	4,850	195
4	7,900	655	4,850	405	1,500	58	4,070	320
5	6,600	690	3,970	415	1,300	58	3,320	345
6	5,830	760	3,530	470	1,150	58	2,980	380
8	4,410	815	2,650	435	880	58	2,200	405
10	3,420	700	2,100	345	720	46	1,760	345
12	2,880	600	1,760	290	590	46	1,430	275
16	2,310	470	1,430	230	460	29	1,150	230
20	1,760	370	1,110	185	340	29	880	175
25	1,430	290	880	150	270	23	715	140

RPM = rev. / min.
FEED = mm / min.



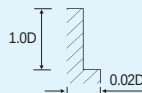
※ Please reduce cutting speed around 20~30% from the above table or ZE524 & ZE324 series.

[ZE304, ZE324, ZE404, ZE504, ZE524, ZE534, ZE514 series]

► High Speed Cutting

WORKPIECE	NON-ALLOY STEELS ALLOY STEELS · CAST IRON		HARDENED STEELS				STAINLESS STEELS	
HARDNESS	~HRc30		HRc30 ~ HRc45		HRc45 ~ HRc55			
STRENGTH	~1000N/mm ²		1000 ~ 1500N/mm ²		1500 ~ 2000N/mm ²			
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	31,400	1,230	23,500	520	12,600	275	21,600	465
3	19,300	1,210	13,600	735	8,900	390	13,500	660
4	18,100	1,330	12,600	865	7,090	465	11,800	775
5	16,400	1,310	11,100	1,010	6,040	530	10,300	910
6	14,400	1,380	9,900	1,100	5,300	580	9,100	990
8	11,000	1,430	7,600	1,090	3,990	575	6,900	980
10	8,500	1,380	5,880	1,110	3,150	580	5,420	1,000
12	7,200	1,380	5,040	1,090	2,620	575	4,600	985
16	5,700	1,320	3,990	1,010	2,000	535	3,590	910
20	4,400	1,270	3,150	930	1,580	490	2,840	840
25	3,500	1,170	2,520	755	1,260	390	2,270	680

RPM = rev. / min.
FEED = mm / min.



[TPRB4, TPRE4 series]

WORKPIECE	MILD STEEL, CARBON STEEL, CAST IRON SS400, S55C, FC250 (~750N/mm ²)			CARBON STEEL, TOOL STEELS SCM,SKT,SKS,SKD (~30HRc)			HIGH HARDENED STEELS, PREHARDENED STEELS(FREE-MACHINING) SKT, SKD, NAK55, HPM1 (30~38HRc)		
DIAMETER(mm)	SPEED (min ⁻¹)	FEED (mm/min)	ap	SPEED (min ⁻¹)	FEED (mm/min)	ap	SPEED (min ⁻¹)	FEED (mm/min)	ap
0.5	31,500	630	0.01~0.025	31,500	565	0.01~0.025	31,500	475	0.01~0.025
0.6	31,500	755	0.012~0.03	31,500	680	0.012~0.03	29,500	530	0.012~0.03
0.7	29,000	940	0.014~0.035	27,000	680	0.014~0.035	25,000	530	0.014~0.035
0.8	25,000	935	0.016~0.04	23,500	680	0.016~0.04	22,000	530	0.016~0.04
0.9	22,500	935	0.018~0.045	21,000	680	0.018~0.045	19,500	530	0.018~0.045
1.0	20,000	930	0.02~0.05	19,000	680	0.02~0.05	17,500	530	0.02~0.05
1.2	16,500	930	0.024~0.06	15,500	680	0.024~0.06	14,500	530	0.024~0.06
1.5	13,500	930	0.03~0.075	12,500	680	0.03~0.075	11,500	530	0.03~0.075
1.6	12,500	930	0.032~0.08	11,500	680	0.032~0.08	11,000	530	0.032~0.08
1.8	11,000	930	0.036~0.09	10,500	680	0.036~0.09	9,900	530	0.036~0.09
2.0	10,000	930	0.04~0.1	9,500	680	0.04~0.1	8,900	530	0.04~0.1
2.5	8,100	930	0.05~0.125	7,600	680	0.05~0.125	7,100	530	0.05~0.125
3.0	6,750	930	0.06~0.15	6,350	680	0.06~0.15	5,900	530	0.06~0.15

WORKPIECE	MILD STEEL, CARBON STEELS, CAST IRON SS400, S55C, FC250 (~750N/mm ²)			ALLOY STEELS, TOOL STEELS SCM,SKT,SKS,SKD (~30HRc)		
DIAMETER(mm)	SPEED (min ⁻¹)	FEED (mm/min)	ap	SPEED (min ⁻¹)	FEED (mm/min)	ap
0.5	31,500	440	0.01~0.025	19,000	250	0.005~0.01
0.6	26,500	445	0.012~0.03	15,500	260	0.006~0.012
0.7	22,500	445	0.014~0.035	13,500	260	0.007~0.014
0.8	19,500	445	0.016~0.04	11,500	260	0.008~0.016
0.9	17,500	445	0.018~0.045	10,500	260	0.009~0.018
1.0	15,500	445	0.02~0.05	9,500	260	0.01~0.02
1.2	13,000	445	0.024~0.06	7,950	260	0.012~0.024
1.5	10,500	445	0.03~0.075	6,350	260	0.015~0.03
1.6	9,900	445	0.032~0.08	5,950	260	0.016~0.032
1.8	8,800	445	0.036~0.09	5,300	260	0.018~0.036
2.0	7,950	445	0.04~0.1	4,750	260	0.02~0.04
2.5	6,350	445	0.05~0.125	3,800	260	0.025~0.05
3.0	5,300	445	0.06~0.15	3,150	260	0.03~0.06

[TE503, TB503, TB504 series]

WORK PIECE	CAST IRON FC, FCD		MILD STEEL - CARBON STEEL SS400, S55C (~750N/mm ²)		ALLOY STEEL, TOOL STEELS SCM, SKT, SKS, SKD (~30HRc)		PREHARDENED STEELS (FREE-MACHINING) SKT, SKD, NAK55, HPM1 (30~38HRc)		STAINLESS STEELS, HARDENED STEELS SUS304, SKD (38~45HRc)		HARDENED STEELS (45~55HRc)	
DIAMETER (mm)	SPEED (min ⁻¹)	FEED (mm/min)	SPEED (min ⁻¹)	FEED (mm/min)	SPEED (min ⁻¹)	FEED (mm/min)	SPEED (min ⁻¹)	FEED (mm/min)	SPEED (min ⁻¹)	FEED (mm/min)	SPEED (min ⁻¹)	FEED (mm/min)
1.0	20,125	231.25	17,825	193.75	17,825	162.5	14,950	112.5	13,800	112.5	12,075	50
1.5	13,225	231.25	12,075	193.75	12,075	162.5	10,235	112.5	9,487.5	112.5	8,050	50
2.0	10,235	237.5	9,142.5	193.75	9,142.5	162.5	7,647.5	112.5	7,130	112.5	6,037.5	50
2.5	8,165	237.5	7,130	181.25	7,130	156.25	6,095	112.5	5,692.5	112.5	4,830	50
3.0	6,785	237.5	5,922.5	181.25	5,922.5	156.25	5,117.5	112.5	4,715	112.5	4,025	50
4.0	5,562.5	237.5	4,457.5	181.25	4,457.5	156.25	3,795	112.5	3,565	106.25	2,990	50
5.0	4,437.5	237.5	3,565	181.25	3,565	156.25	3,047.5	112.5	2,817.5	106.25	2,415	50
6.0	3,392.5	237.5	2,990	181.25	2,990	156.25	2,530	112.5	2,357.5	106.25	2,012.5	50
8.0	2,530	231.25	2,242.5	181.25	2,242.5	156.25	1,897.5	112.5	1,782.5	106.25	1,495	50
10	2,012.5	218.75	1,782.5	181.25	1,782.5	150	1,495	112.5	1,380	106.25	1,207.5	50

[ZE506, ZE516 series] ▶ General Cutting

WORKPIECE	NON-ALLOYED STEELS ALLOY STEELS · CAST IRON		ALLOY STEELS, HEAT RESISTANT STEELS		HARDENED STEELS			
HARDNESS	~ HRC30		HRC30 ~ HRC50		HRC50 ~ HRC60		HRC60 ~ HRC65	
STRENGTH	~ 1000N/mm ²		1000 ~ 1750N/mm ²		1750 ~ 2080N/mm ²		2080N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
6	5,560	2,000	3,880	1,370	1,580	210	1,100	130
8	4,200	2,000	2,940	1,370	1,160	210	840	130
10	3,360	2,000	2,320	1,370	1,000	210	680	130
12	2,840	1,680	2,000	1,160	840	180	560	110
16	2,100	1,260	1,480	880	640	130	420	70
20	1,680	1,010	1,160	690	500	110	320	60
25	1,500	900	1,100	600	430	90	260	50

RPM = rev. / min.
FEED = mm / min.

[ZE506, ZE516 series] ▶ High Speed Cutting

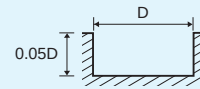
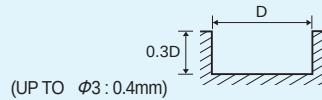
WORKPIECE	HIGH TEMP ALLOYS HARDENED STEELS		HARDENED STEELS			
HARDNESS	~ HRC50		HRC50 ~ HRC60		HRC60 ~ HRC65	
STRENGTH	1750N/mm ²		1750~2080N/mm ²		2080N/mm ² ~	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
6	16,800	6,090	8,400	3,050	4,200	1,470
8	12,600	6,090	6,300	3,050	3,160	1,470
10	9,980	5,990	5,040	3,050	2,520	1,470
12	8,400	5,040	4,200	2,520	2,100	1,260
16	6,300	3,780	3,160	1,890	1,580	950
20	5,040	3,050	2,520	1,470	1,260	760
25	4,500	2,750	2,200	1,300	1,120	670

RPM = rev. / min.
FEED = mm / min.

[ZM502, ZM522 series]

WORKPIECE	NON-ALLOY STEELS ALLOY STEELS · CAST IRON		ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS	
HARDNESS	~ HRc30		HRc30 ~ HRc45		HRc45 ~ HRc55	
STRENGTH	~ 1000N/mm ²		1000 ~ 1500N/mm ²		1500 ~ 2000N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
2	6,300	60	5,040	50	3,150	25
3	4,410	70	3,570	60	2,200	30
4	3,570	85	2,840	70	1,790	35
5	3,050	105	2,420	85	1,580	40
6	2,630	125	2,100	105	1,370	50
8	2,000	135	1,580	105	1,050	50
10	1,680	135	1,370	105	840	50
12	1,370	105	1,160	95	700	40
16	1,160	95	890	75	560	35
20	840	70	680	50	420	25

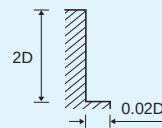
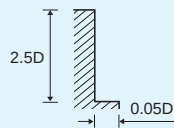
RPM = rev. / min.
FEED = mm / min.



[ZM504, ZM524 series]

WORKPIECE	NON-ALLOY STEELS ALLOY STEELS · CAST IRON		ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS			
HARDNESS	~ HRc30		HRc30 ~ HRc45		HRc45 ~ HRc55		HRc55 ~ HRc65	
STRENGTH	~ 1000N/mm ²		1000 ~ 1500N/mm ²		1500 ~ 2000N/mm ²		2000N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	6,300	100	5,040	80	3,150	45		
3	4,410	115	3,570	100	2,200	55	1,890	30
4	3,570	140	2,840	115	1,790	60	1,470	35
5	3,050	180	2,420	140	1,580	70	1,260	40
6	2,630	215	2,100	180	1,370	90	1,160	50
8	2,000	230	1,580	180	1,050	90	840	50
10	1,680	230	1,370	180	840	90	670	50
12	1,370	180	1,160	160	700	70	560	40
16	1,160	160	890	125	560	60	440	35
20	840	115	680	90	420	45	340	25

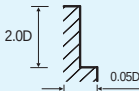
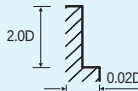
RPM = rev. / min.
FEED = mm / min.



[ZR322, ZR502, ZR512, ZR522 series] ▶ Side Cutting

WORKPIECE	NON-ALLOY STEELS ALLOY STEELS · CAST IRON		ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS	
HARDNESS	~ HRc30		HRc30 ~ HRc45		HRc45 ~ HRc55	
STRENGTH	~ 1000N/mm ²		1000 ~ 1500N/mm ²		1500 ~ 2000N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
3	6,950	195	4,500	150	3,300	100
4	5,600	240	3,600	170	2,700	105
5	4,800	250	3,050	210	2,350	125
6	4,150	250	2,650	210	2,050	125
8	3,150	265	2,000	210	1,600	125
10	2,150	265	1,700	210	1,250	125
12	1,800	210	1,500	185	1,050	105
16	1,800	185	1,100	140	840	90
20	1,300	130	860	105	625	65

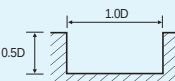
RPM = rev. / min.
FEED = mm / min.

[ZR322, ZR502, ZR512, ZR522 series] ▶ Slotting

WORKPIECE	NON-ALLOY STEELS ALLOY STEELS · CAST IRON		ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS	
HARDNESS	~ HRc30		HRc30 ~ HRc45		HRc45 ~ HRc55	
STRENGTH	~ 1000N/mm ²		1000 ~ 1500N/mm ²		1500 ~ 2000N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
3	6,950	160	4,500	80	3,300	55
4	5,600	195	3,600	100	2,700	60
5	4,800	240	3,050	115	2,350	75
6	4,150	290	2,650	145	2,050	90
8	3,150	210	2,000	145	1,600	90
10	2,150	250	1,700	140	1,250	90
12	1,800	200	1,500	135	1,050	75
16	1,800	215	1,100	100	840	60
20	1,300	160	860	70	625	45

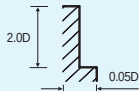
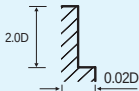
RPM = rev. / min.
FEED = mm / min.



[ZR324, ZR504, ZR514, ZR524 series]

WORKPIECE	NON-ALLOY STEELS ALLOY STEELS · CAST IRON		ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS	
HARDNESS	~ HRc30		HRc30 ~ HRc45		HRc45 ~ HRc55	
STRENGTH	~ 1000N/mm ²		1000 ~ 1500N/mm ²		1500 ~ 2000N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
3	6,950	195	4,500	150	3,300	100
4	5,600	240	3,600	170	2,700	105
5	4,800	250	3,050	210	2,350	125
6	4,150	250	2,650	210	2,050	125
8	3,150	265	2,000	210	1,600	125
10	2,150	265	1,700	210	1,250	125
12	1,800	210	1,500	185	1,050	105
16	1,880	185	1,100	140	840	90
20	1,300	130	860	105	625	65

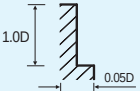
RPM = rev. / min.
FEED = mm / min.

[ZR304H, ZR324H series]

WORKPIECE	NON-ALLOY STEELS ALLOY STEELS · CAST IRON		ALLOY STEELS HEAT RESISTANT STEELS		HARDENED STEELS	
HARDNESS	~ HRc30		HRc30 ~ HRc45		HRc45 ~ HRc55	
STRENGTH	~ 1000N/mm ²		1000 ~ 1500N/mm ²		1500 ~ 2000N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
6	7,000	910	4,200	560	3,000	140
8	5,300	980	3,200	530	2,500	190
10	4,100	840	2,500	410	2,050	165
12	3,500	730	2,100	340	1,700	140

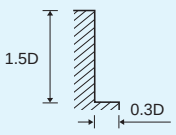
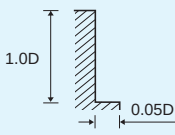
RPM=rev. / min.
FEED=mm / min.



[ZF60, ZF61 series]

WORKPIECE	NON-ALLOY STEELS ALLOY STEELS - CAST IRON		ALLOY STEELS HEAT RESISTANT STEELS		STAINLESS STEELS		HARDENED STEELS			
HARDNESS	~ HRc30		HRc30 ~ HRc38		HRc38 ~ HRc45		HRc45 ~ HRc55		HRc55 ~ HRc65	
STRENGTH	~ 1000N/mm ²		1000 ~ 1200N/mm ²		1200 ~ 1400N/mm ²		1400 ~ 2000N/mm ²		2000N/mm ² ~	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
6	15,600	2,320	12,400	840	8,400	570	3,400	260	2,400	190
8	11,600	2,320	9,200	840	6,300	570	2,400	240	1,800	180
10	9,200	2,320	7,600	840	5,100	570	2,000	290	1,300	190
12	8,000	2,400	6,000	800	4,200	570	1,680	260	1,200	190
14	6,800	2,400	5,200	840	3,600	570	1,400	200	900	130
16	6,000	2,400	4,800	760	3,300	510	1,200	160	800	110
18	5,200	2,320	4,400	720	2,700	420	1,100	150	700	100
20	4,800	2,160	3,600	560	2,400	360	1,000	150	660	100
25	4,300	2,150	3,200	620	2,160	410	900	160	600	100

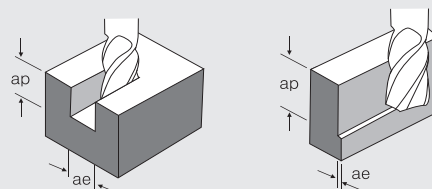
RPM = rev. / min.
FEED = mm / min.

[PK503 series]

WORKPIECE		ALLOY STEELS-HIGH CARBON STEELS			PREHARDENED STEELS-TOOL STEELS HRc30 ~ 40			
(V)m/min		130 ~ 150			100 ~ 120			
DIAMETER(mm)	(r.p.m.)	fz			(r.p.m.)	fz		
		Slot	Side Cutting	Slot		Slot	Side Cutting	Slot
6	7,400	0.030	0.045	0.018	5,800	0.025	0.030	0.012
8	5,600	0.035	0.062	0.025	4,400	0.030	0.045	0.018
10	4,600	0.045	0.075	0.030	3,500	0.040	0.048	0.019
12	3,700	0.050	0.087	0.035	3,000	0.045	0.052	0.020
14	3,200	0.055	0.090	0.036	2,500	0.053	0.056	0.022
16	2,800	0.055	0.090	0.036	2,200	0.060	0.060	0.024
20	2,200	0.080	0.095	0.038	1,800	0.066	0.066	0.026
	ap	1.0D	1.0D	0.5D		1.0D	1.0D	0.5D
	ae	1.0D	0.5D	1.0D		1.0D	0.3D	1.0D

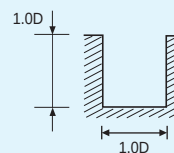
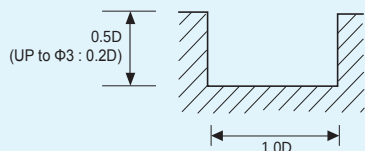
WORKPIECE		SUS304-316-PREHARDENED STEELS HRc40 ~ 45			TITANIUM ALLOY			
(V)m/min		50 ~ 70			30 ~ 50			
DIAMETER(mm)	(r.p.m.)	fz			(r.p.m.)	fz		
		Slot	Side Cutting	Slot		Slot	Side Cutting	Slot
6	3,200	0.020	0.030	0.012	2,100	0.017	0.020	0.008
8	2,400	0.030	0.040	0.016	1,600	0.025	0.025	0.010
10	1,900	0.040	0.055	0.022	1,300	0.035	0.040	0.016
12	1,600	0.045	0.065	0.026	1,100	0.040	0.050	0.020
14	1,360	0.048	0.070	0.028	900	0.043	0.053	0.021
16	1,200	0.050	0.075	0.030	800	0.045	0.055	0.022
20	1,000	0.052	0.083	0.033	600	0.050	0.057	0.023
	ap	0.5D	1.0D	0.5D		0.5D	1.0D	0.5D
	ae	1.0D	0.5D	1.0D		1.0D	0.3D	1.0D



[TX202, 222, 302 ...series]

WORKPIECE	NON - ALLOYED STEELS ALLOY STEELS TOOLS STEELS		ALLOY STEELS HEAT RESISTANT STEELS		STAINLESS STEELS		CAST IRON		ALUMINUM ALLOYS		COPPER, BRASS NON-FERROUS METALS	
HARDNESS	~ HRC30		HRC30 ~ HRC45									
STRENGTH	~ 1000N/mm ²		1000 ~ 1500N/mm ²									
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1	14,300	105	8,500	65	7,150	50	18,700	205	44,000	330	24,700	200
1.5	9,350	150	5,550	85	5,600	80	12,100	205	27,500	385	20,300	300
2	7,850	160	5,150	100	4,300	80	9,350	220	22,000	460	16,500	340
3	6,100	180	3,800	120	3,150	100	6,050	220	15,400	460	11,000	340
4	5,150	255	3,150	155	2,650	130	4,600	220	11,000	460	8,800	340
5	4,300	270	2,550	160	2,150	135	3,650	220	9,150	460	6,800	340
6	3,800	300	2,300	190	1,950	155	2,950	255	7,600	485	5,700	375
8	2,850	325	1,700	170	1,450	155	2,200	275	5,700	485	4,400	375
10	2,200	280	1,350	135	1,150	135	1,850	285	4,600	485	3,400	375
12	1,850	240	1,150	110	950	110	1,450	295	3,750	485	2,850	375
14	1,700	215	1,050	100	850	100	1,300	310	3,300	485	2,400	375
16	1,500	185	950	95	700	95	1,100	320	2,850	485	2,200	375
20	1,150	145	700	70	550	70	900	340	2,200	485	1,700	375

RPM=rev. / min.
FEED=mm / min.

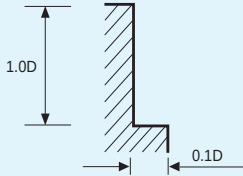
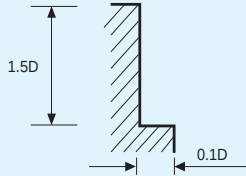


※ The FEED for long & extra long types, should be reduced by around 50%

[TX204, 224, 304 ...series]

WORKPIECE	NON-ALLOYED STEELS ALLOY STEEL CAST IRON		ALLOY STEELS HEAT RESISTANT STEELS		STAINLESS STEELS		CAST IRON		ALUMINUM ALLOYS		COPPER, BRASS NON-FERROUS METALS	
HARDNESS	~ HRc30		HRc 30 ~ HRc45									
STRENGTH	~ 1000N/mm ²		1000 ~ 1500N/mm ²									
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1	17,600	150	10,250	85	8,650	75	18,700	620	44,000	1,050	24,700	605
1.5	11,800	215	7,050	115	7,050	120	12,100	620	27500	1,160	20,300	910
2	9,850	240	6,450	145	5,350	120	9,350	640	22000	1,320	16,500	1,035
3	7,600	270	4,750	170	3,950	145	6,050	640	15400	1,320	11,000	1,035
4	6,450	485	3,950	300	3,300	240	4,600	640	11000	1,320	8,800	1,035
5	5,350	510	3,200	305	2,700	255	3,650	640	9150	1,320	6,800	1,035
6	4,750	560	2,850	350	2,400	280	2,950	770	7600	1,430	5,700	1,100
8	3,550	605	2,150	325	1,800	300	2,200	815	5700	1,430	4,400	1,100
10	2,750	520	1,700	255	1,450	255	1,850	860	4600	1,430	3,400	1,100
12	2,350	440	1,450	215	1,150	205	1,450	900	3750	1,430	2,850	1,100
14	2,100	395	1,300	195	1,050	190	1,300	945	3300	1,430	2,400	1,100
16	1,850	350	1,150	170	950	170	1,100	970	2850	1,430	2,200	1,100
20	1,450	270	900	135	700	130	900	1,035	2200	1,430	1,700	1,100

RPM = rev. / min.
FEED = mm / min.

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

[TXB202, 222, 232, 302 ...series]

WORKPIECE	CARBON STEELS-ALLOY STEELS-TOOLS STEELS				HIGH HARDENED STEELS		CAST IRON		ALUMINUM ALLOYS	
HARDNESS	~ HRc30		HRc30 ~ HRc45		HRc45 ~ HRc50					
STRENGTH	~ 1000N/mm ²		1000 ~ 1500N/mm ²		1500N/mm ²					
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	12,350	640	9,150	415	4,000	125	10,500	220	30,800	395
3	11,400	575	8,550	390	3,800	125	7,050	230	20,500	395
4	8,950	630	7,150	450	3,600	150	5,150	285	15,400	395
5	7,800	700	6,200	490	3,100	150	4,150	330	12,100	470
6	7,250	870	5,900	705	2,700	160	3,400	360	10,300	470
8	6,100	1,090	4,900	785	2,050	190	2,500	460	7,900	540
10	5,450	1,330	4,350	870	1,750	190	2,050	460	6,150	540
12	4,990	1,500	3,950	950	1,500	210	1,750	460	5,150	630
14	4,530	1,495	3,600	925	1,300	210	1,400	460	4,300	630
16	4,085	1,470	3,200	905	1,150	210	1,300	460	3,850	540
18	3,800	1,425	3,000	890	1,050	210	1,100	460	3,400	540
20	3,550	1,425	2,800	885	950	210	1,050	420	2,950	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%

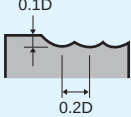
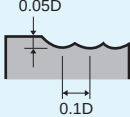
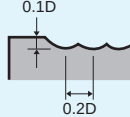
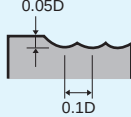
[TXB304, TXB204 ...series]

WORKPIECE	ALLOY STEELS TOOLS STEELS				HARDENED STEELS		CAST IRON		ALUMINUM ALLOYS	
HARDNESS	~ HRc30		HRc30 ~ HRc45		HRc45 ~ HRc50					
STRENGTH	~ 1000N/mm ²		1000 ~ 1500N/mm ²		1500N/mm ²					
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	15,400	1,000	11,400	600	5,000	200	13,100	300	38,500	600
3	14,300	900	10,700	600	4,800	200	8,800	300	25,600	600
4	11,200	900	8,900	700	4,500	200	6,400	400	19,300	600
5	9,800	1,100	7,800	700	3,900	200	5,200	500	15,100	700
6	9,100	1,300	7,400	1,100	3,400	200	4,300	500	12,900	700
8	7,600	1,600	6,100	1,200	2,600	300	3,100	700	9,900	800
10	6,800	2,000	5,400	1,300	2,200	300	2,600	700	7,700	800
12	6,200	2,300	4,900	1,400	1,900	300	2,200	700	6,400	900
14	5,700	2,200	4,500	1,400	1,600	300	1,800	700	5,400	900
16	5,100	2,200	4,000	1,400	1,400	300	1,600	700	4,800	800
18	4,800	2,100	3,800	1,300	1,300	300	1,400	700	4,300	800
20	4,400	2,100	3,500	1,300	1,200	300	1,300	600	3,700	800

[DS502 ...series]

WORKPIECE	CARBON STEELS, CAST IRON		ALLOY STEELS PREHARDENED STEELS		HARDENED STEELS				STAINLESS STEELS		NICKEL ALLOY TITANIUM ALLOY	
HARDNESS	150~250HB		25~35HRC		35~45HRC		45~55HRC		SUS304, 316			
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	19,100	770	12,800	370	10,200	270	8,900	190	8,900	210	6,400	120
4	10,800	1,100	7,200	550	5,700	400	5,000	280	5,000	310	3,600	180
6	7,700	1,300	5,200	660	4,100	480	3,600	330	3,600	380	2,600	210
8	6,000	1,400	4,000	700	3,200	510	2,800	360	2,800	400	2,000	230
10	4,800	1,400	3,200	700	2,600	520	2,300	370	2,300	410	1,600	230
12	4,000	1,400	2,700	710	2,200	530	1,900	370	1,900	410	1,400	240

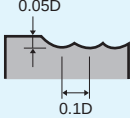
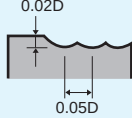
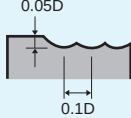
RPM = rev. / min.
FEED = mm / min.

[DS502 ...series]

WORKPIECE	CARBON STEELS, CAST IRON		ALLOY STEELS PREHARDENED STEELS		HARDENED STEELS				STAINLESS STEELS	
HARDNESS	150~250HB		25~35HRc		35~45HRc		45~55HRc		SUS304, 316	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	51,000	2,100	39,800	1,300	35,700	960	23,700	640	35,700	960
4	25,500	2,700	19,900	1,700	17,900	1,300	11,900	830	17,900	1,300
6	17,000	3,000	13,300	1,900	11,900	1,400	7,900	920	11,900	1,400
8	12,800	3,100	10,000	2,000	9,000	1,500	6,000	960	9,000	1,500
10	10,200	3,100	8,000	2,000	7,200	1,500	4,800	960	7,200	1,500
12	8500	3,100	6,700	2,000	6,000	1,500	4,000	960	6,000	1,500

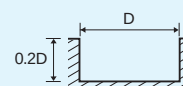
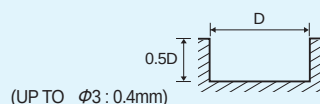
RPM = rev. / min.
FEED = mm / min.

[SM503 series] ▶ Slotting

WORKPIECE	CARBON STEELS-ALLOY STEELS-TOOLS STEELS						CAST IRON		STAINLESS STEELS		COPPER ALLOYS		TITANIUM ALLOYS		INCONEL	
HARDNESS	~HRc20		HRc20 ~ HRc30		HRc30 ~ HRc45											
STRENGTH	1000N/mm ²		800 ~ 1000N/mm ²		1500 ~ 1500N/mm ²											
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
3	10,080	950	7,750	740	5,550	395	6,700	520	5,550	320	8,300	360	5,550	395	2,200	100
4	7,550	1,400	5,850	1,100	4,200	595	5,050	550	4,200	320	6,200	400	4,200	595	1,650	105
6	5,050	1,650	3,850	1,250	2,800	700	3,350	660	2,800	370	4,100	440	2,800	700	1,150	130
8	3,750	1,700	2,950	1,330	2,100	710	2,500	665	2,100	375	3,100	500	2,100	710	850	120
10	3,050	1,650	2,300	1,250	1,650	655	2,000	630	1,650	355	2,500	530	1,650	665	650	120
12	2,500	1,500	2,000	1,200	1,350	605	1,650	570	1,350	320	2,000	550	1,350	605	555	110

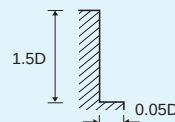
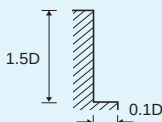
RPM = rev. / min.
FEED = mm / min.



[SM503 series] ▶ Side Cutting

WORKPIECE	CARBON STEELS-ALLOY STEELS-TOOLS STEELS						CAST IRON		STAINLESS STEELS		COPPER ALLOYS		TITANIUM ALLOYS		INCONEL	
HARDNESS	~HRc20		HRc20 ~ HRc30		HRc30 ~ HRc45											
STRENGTH	1000N/mm ²		800 ~ 1000N/mm ²		1500 ~ 1500N/mm ²											
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
3	10,080	1,080	7,750	850	5,550	450	6,700	605	5,550	365	8,300	390	5,550	450	2,200	110
4	7,550	1,630	5,850	1,260	4,200	680	5,050	630	4,200	365	6,200	440	4,200	680	1,650	125
6	5,050	1,910	3,850	1,470	2,800	810	3,350	755	2,800	430	4,100	490	2,800	810	1,150	150
8	3,750	1,950	2,950	1,500	2,100	810	2,500	770	2,100	430	3,100	550	2,100	810	850	140
10	3,050	1,890	2,300	1,400	1,650	775	2,000	720	1,650	415	2,500	570	1,650	775	650	140
12	2,500	1,700	2,000	1,340	1,350	700	1,650	665	1,350	365	2,000	620	1,350	700	555	125

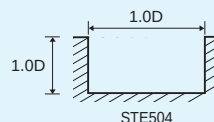
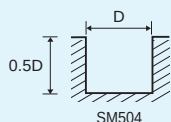
RPM = rev. / min.
FEED = mm / min.



[SM504/STE504/STR504 series]

WORKPIECE	ALLOY STEELS · CAST IRON		STAINLESS STEELS 300 SERIES TITANIUM		STAINLESS STEELS 400 SERIES	
HARDNESS	~HB230					
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
3	13,500	275	6,690	105	9,350	145
4	10,100	370	5,050	135	7,000	185
5	8,090	410	4,050	165	5,600	230
6	6,750	480	3,350	190	4,700	265
8	5,050	620	2,500	250	3,500	340
10	4,050	780	2,050	320	2,800	430
12	3,370	750	1,680	310	2,350	435
14	2,890	670	1,400	280	2,000	405
16	2,500	630	1,250	265	1,750	370
18	2,250	630	1,100	260	1,550	365
20	2,000	620	1,000	260	1,400	365
1.0	40,500	300	20,000	250	28,000	160
1.5	27,000	300	13,000	180	18,500	160
2.0	20,300	300	10,000	150	14,000	160
2.5	16,200	300	8,000	120	11,000	165

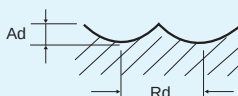
RPM = rev. / min.
FEED = mm / min.



[BC502 series]

WORKPIECE		UNALLOYED COPPER			
R	DIAMETER(mm)	RPM	FEED	Rd	Ad
0.5	1	41,000	1,660	0.040	0.063
0.75	1.5	27,000	1,830	0.068	0.087
1	2	20,000	1,780	0.089	0.112
1.25	2.5	16,000	1,840	0.115	0.090
1.5	3	13,000	2,220	0.171	0.168
2	4	10,000	2,080	0.208	0.200
2.5	5	8,300	1,990	0.240	0.200
3	6	6,900	1,940	0.281	0.250
4	8	5,720	1,000	0.175	0.400
5	10	4,550	700	0.154	0.500
6	12	3,770	600	0.159	0.600

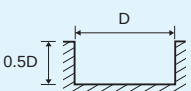
RPM = rev. / min.
FEED = mm / min.

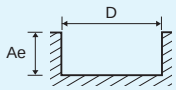


[ZF62 series] ▶ Slotting

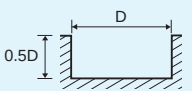
WORKPIECE	NON - ALLOYED STEELS ALLOY STEELS · CAST IRON		ALLOY STEELS HEAT RESISTANT STEELS		STAINLESS STEELS		INCONEL	
HARDNESS	~ HRc30		HRc30 ~ HRc45					
STRENGTH	~ 1000N/mm ²		1000 ~ 1500N/mm ²					
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
6	16,380	2,680	13,020	970	8,820	670	3,000	285
8	12,180	2,680	9,660	970	6,615	670	2,250	270
10	9,660	2,680	7,980	970	5,355	660	1,625	285
12	8,400	2,770	6,300	925	4,410	660	1,500	285
16	6,300	2,770	5,040	880	3,465	590	1,000	165
20	5,040	2,495	3,780	650	2,520	415	825	150

RPM = rev. / min.
FEED = mm / min.





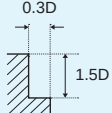
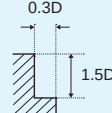
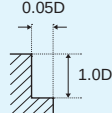
Ae : $\phi 4 \sim \phi 10 = 0.25 \times D$
 $\phi 12 \sim \phi 16 = 0.15 \times D$
 $\phi 18 \sim \phi 20 = 0.10 \times D$



[ZF62 series] ▶ Side Cutting

WORKPIECE	NON - ALLOYED STEELS ALLOY STEELS · CAST IRON		ALLOY STEELS HEAT RESISTANT STEELS		STAINLESS STEELS		INCONEL	
HARDNESS	~ HRc30		HRc30 ~ HRc45					
STRENGTH	~ 1000N/mm ²		1000 ~ 1500N/mm ²					
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
6	16,380	2,680	13,020	970	8,820	670	3,000	285
8	12,180	2,680	9,660	970	6,615	670	2,250	270
10	9,660	2,680	7,980	970	5,355	660	1,625	285
12	8,400	2,770	6,300	925	4,410	660	1,500	285
16	6,300	2,770	5,040	880	3,465	590	1,000	165
20	5,040	2,495	3,780	650	2,520	415	825	150

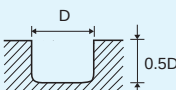
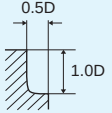
RPM = rev. / min.
FEED = mm / min.

[RC502 series]

WORKPIECE	UNALLOYED COPPER			
DIAMETER(mm)	RPM	FEED	RPM	FEED
3	44,500	2,350	50,000	3,700
4	33,400	2,100	50,000	4,700
6	22,300	2,100	33,400	4,900
8	16,700	2,100	25,000	4,700
10	13,370	2,100	20,000	4,800
12	11,100	2,100	16,700	4,700

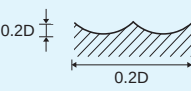
RPM = rev. / min.
FEED = mm / min.

[G series]

WORKPIECE	GRAPHITE	
DIAMETER(mm)	RPM	FEED
0.5	16,000	480
0.75	16,000	640
1	16,000	800
1.5	16,000	1,450
2	16,000	2,100
3	15,000	2,950
4	13,000	3,000
5	11,500	3,050
6	10,500	3,150
8	8,555	2,960

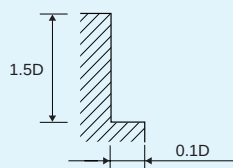
RPM = rev. / min.
FEED = mm / min.



[GE series]

WORKPIECE	GRAPHITE	
DIAMETER(mm)	RPM	FEED
0.4	40,000	200
0.6	40,000	350
0.8	40,000	550
1.0	40,000	700
2.0	25,000	800
3.0	20,000	800
4.0	18,000	950
5.0	14,000	1,200
6.0	11,000	1,400
8.0	8,000	1,300
10.0	6,500	1,200
12.0	5,500	1,200

RPM = rev. / min.
FEED = mm / min.

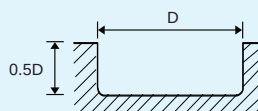


※ Please reduce cutting speed 50% from the above table when using long and extra long type

[WGR502 series]

WORKPIECE	GRAPHITE	
DIAMETER(mm)	RPM	FEED
0.4	40,000	640
0.6	40,000	640
0.8	40,000	800
1.0	40,000	960
1.2	40,000	1,200
1.5	40,000	1,440
2.0	40,000	1,600
3.0	27,000	1,900
4.0	20,000	2,300
5.0	16,000	2,300
6.0	14,000	2,300

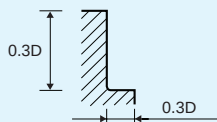
RPM = rev. / min.
FEED = mm / min.



[WGR504 series]

WORKPIECE	GRAPHITE	
DIAMETER(mm)	RPM	FEED
4.0	40,000	3,500
6.0	40,000	5,600
8.0	32,000	5,600
10.0	26,000	5,700
12.0	21,000	5,450
16.0	15,800	5,450
20.0	12,800	5,500

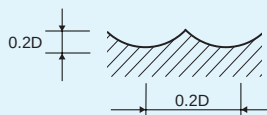
RPM = rev. / min.
FEED = mm / min.



[WGB504 series]

WORKPIECE	GRAPHITE	
DIAMETER(mm)	RPM	FEED
1.0	20,000	700
2.0	16,000	1,200
3.0	16,000	2,000
4.0	16,000	3,100
5.0	15,000	3,800
6.0	15,000	4,400
8.0	13,000	4,500
10.0	12,000	4,600
12.0	10,000	4,700
16.0	7,500	3,800
20.0	6,000	3,500

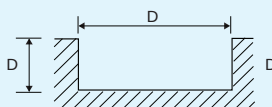
RPM = rev. / min.
FEED = mm / min.



[WROU series] ▶ Slotting

WORKPIECE	CFRP, AFRP	GFRP	CARBON, GRAPHITE	PLASTIC	PROCESSED CERAMIC, PROCESSED GLASS
DIAMETER(mm)	FEED				
1.6	0.030	0.030	0.040	0.040	0.015
3	0.060	0.060	0.075	0.075	0.030
6	0.120	0.120	0.150	0.150	0.060
10	0.230	0.230	0.290	0.290	0.115
12	0.305	0.305	0.380	0.380	0.150
CUTTING SPEED	120	100	145	245	10

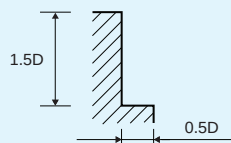
RPM = rev. / min.
FEED = mm / min.



[WROU series] ▶ Side Cutting

WORKPIECE	CFRP, AFRP	GFRP	CARBON, GRAPHITE	PLASTIC	PROCESSED CERAMIC, PROCESSED GLASS
DIAMETER(mm)	FEED				
1.6	0.030	0.030	0.040	0.040	0.015
3	0.060	0.060	0.075	0.075	0.030
6	0.120	0.120	0.150	0.150	0.060
10	0.230	0.230	0.290	0.290	0.115
12	0.305	0.305	0.380	0.380	0.150
CUTTING SPEED	150	120	185	305	15

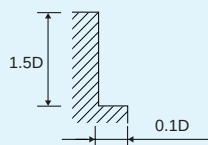
RPM = rev. / min.
FEED = mm / min.



[WGE504 series]

WORKPIECE	GRAPHITE	
DIAMETER(mm)	RPM	FEED
3.0	20,000	1,600
4.0	18,000	1,900
5.0	14,000	2,400
6.0	11,000	2,800
8.0	8,000	2,600
10.0	6,500	2,400
12.0	5,500	2,400
16.0	4,200	2,450
20.0	3,300	2,400

RPM = rev. / min.
FEED = mm / min.

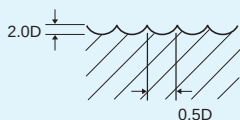


※ Please reduce cutting speed 50% from the above table when using long and extra long type

[WAB312 series]

WORKPIECE	ALUMINUM ALLOY		COPPER ALLOY	
DIAMETER(mm)	RPM	FEED	RPM	FEED
6	18,000	1,750	5,500	440
8	14,000	2,000	4,200	500
10	14,000	2,350	4,200	580
12	14,000	3,000	4,200	750
16	11,000	2,700	3,300	670
20	8,000	2,200	2,200	600

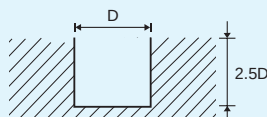
RPM = rev. / min.
FEED = mm / min.



[WAE301 series] ▶ Slotting, General Cutting

WORKPIECE	ACRYLIC		ALLOY STEELS	
DIAMETER(mm)	RPM	FEED	RPM	FEED
1.0	32,000	2,000	23,000	1,300
2.0	32,000	2,200	23,000	1,500
3.0	25,000	2,400	18,000	1,700
4.0	20,000	2,400	15,000	1,800
5.0	15,000	2,200	12,000	1,800
6.0	13,500	2,300	10,000	1,800
8.0	10,000	2,400	7,800	1,900
10.0	8,000	2,400	6,000	2,000
12.0	7,000	2,200	5,000	1,900

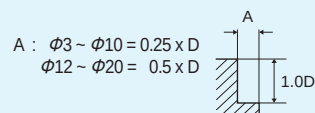
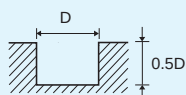
RPM = rev. / min.
FEED = mm / min.



[WAE302 series] ▶ Slotting, Side Cutting

WORKPIECE	ALLOY STEELS · CAST IRON		ALUMINUM ALLOYS	
HARDNESS	~HB230			
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

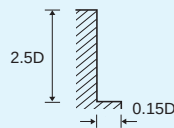
RPM = rev. / min.
FEED = mm / min.



[WAE30(2)3, WAE323, WAR303 series] ▶ Side Cutting, General Cutting

WORKPIECE	ALUMINIUM · 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	1106
16	4,200	1,211
18	2,800	910
20	2,800	956

RPM = rev. / min.
FEED = mm / min.

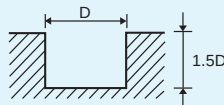


※ Please reduce cutting speed around 20~30% from the above table or AE323 series.

[WAE30(2)3, WAE323, WAR303 series] ▶ Slotting, General Cutting

WORKPIECE	ALUMINIUM · 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.

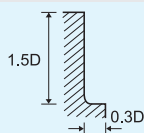


[WAR302 series]

► Side Cutting, General Cutting

WORKPIECE	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.

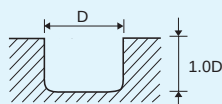


[WAR302 series]

► Slotting, General Cutting

WORKPIECE	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.

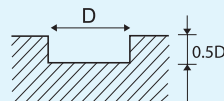
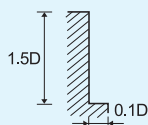


[WAR502 series]

► Side Cutting, Slotting, General Cutting

WORKPIECE	ALUMINUM ALLOY (A7075)		ALUMINUM ALLOY CASTING (Si13%)		MAGNESIUM ALLOY · COPPER ALLOYS	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
1	32,000	220	32,000	220	23,000	220
1.2	32,000	230	32,000	230	19,000	220
1.4	32,000	260	32,000	260	16,500	220
1.5	32,000	280	32,000	280	15,500	220
1.6	32,000	320	32,000	320	14,500	220
1.8	32,000	360	32,000	360	13,000	220
2	32,000	420	32,000	420	11,500	220
2.5	25,000	600	25,000	600	9,500	250
3	21,000	700	21,000	700	7,950	250
4	15,500	725	15,500	725	5,950	280
5	12,500	760	12,500	760	4,750	295
6	10,500	830	10,500	830	3,950	310
8	7,950	890	7,950	890	2,950	300
10	6,350	995	6,350	995	2,350	365
12	5,300	1,050	5,300	1,050	1,950	390

RPM = rev. / min.
FEED = mm / min.

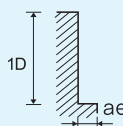


[WAR502 series]

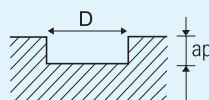
► Side Cutting, Slotting, High Speed Cutting

WORKPIECE	ALUMINUM ALLOY (A7075)		ALUMINUM ALLOY CASTING (Si13%)		MAGNESIUM ALLOY · COPPER ALLOYS	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
1	50,000	1,000	50,000	950	42,000	700
1.2	50,000	1,200	50,000	1,150	36,000	700
1.4	50,000	1,400	50,000	1,250	31,000	700
1.5	50,000	1,600	48,000	1,250	29,500	700
1.6	50,000	1,700	45,000	1,250	28,000	700
1.8	50,000	1,850	41,000	1,250	26,500	750
2	50,000	2,000	38,000	1,250	24,000	750
2.5	48,000	2,100	31,000	1,250	20,000	750
3	40,000	2,100	26,000	1,250	17,000	750
4	33,000	2,250	20,000	1,350	14,000	800
5	31,000	2,800	19,200	1,650	12,500	950
6	26,000	2,800	15,900	1,700	10,500	1,000
8	19,500	2,900	12,000	1,800	7,900	1,000
10	15,500	3,200	9,600	1,900	6,350	1,100
12	13,000	3,200	8,000	1,900	5,300	1,100

RPM = rev. / min.
FEED = mm / min.



	ae
Aluminum Alloy, Aluminum Alloy Casting	0.15D
Magnesium Alloy, Copper Alloy	0.1D



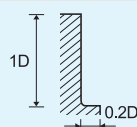
	ap
Aluminum Alloy, Aluminum Alloy Casting	0.15D
Magnesium Alloy, Copper Alloy	0.1D

[WAR503 series]

► Side Cutting, General Cutting

WORKPIECE	ALUMINUM ALLOY (A7075)		ALUMINUM ALLOY CASTING (Si13%)		MAGNESIUM ALLOY · COPPER ALLOYS	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
3	21,000	1,100	21,000	1,100	7,950	325
4	15,500	1,250	15,500	1,250	5,950	365
5	12,500	1,300	12,500	1,275	4,750	385
6	10,500	1,400	10,500	1,400	3,950	400
8	7,950	1,500	7,950	1,500	2,950	460
10	6,350	1,700	6,350	1,700	2,350	475
12	5,300	1,750	5,300	1,750	1,950	510
16	3,950	1,750	3,950	1,750	1,450	510
20	3,150	1,750	3,150	1,750	1,150	510

RPM = rev. / min.
FEED = mm / min.

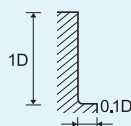


[WAR503 series]

► Side Cutting, High Speed Cutting

WORKPIECE	ALUMINUM ALLOY (A7075)		ALUMINUM ALLOY CASTING (Si13%)		MAGNESIUM ALLOY · COPPER ALLOYS	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
3	40,000	2,100	24,000	1,250	17,000	625
4	32,000	2,250	19,200	1,550	14,300	800
5	32,000	3,250	19,200	1,950	12,700	925
6	26,500	3,500	15,900	2,150	10,600	960
8	20,000	3,750	12,000	2,250	8,000	1,130
10	16,000	4,300	9,600	2,580	6,350	1,150
12	13,300	4,400	8,000	2,650	5,300	1,250
16	10,000	4,400	6,000	2,650	4,000	1,250
20	8,000	4,400	4,800	2,650	3,200	1,250

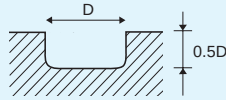
RPM = rev. / min.
FEED = mm / min.



[WAR503 series] ▶ Slotting, General Cutting

WORKPIECE	ALUMUNUM ALLOY (A7075)		ALUMINUM ALLOY CASTING (Si13%)		MAGNESIUM ALLOY, COPPER ALLOY (AZ91·AZ80A·C1100)	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
3	21,000	770	2,100	770	7,950	325
4	15,500	810	15,500	810	5,950	375
5	12,500	860	12,500	860	4,750	385
6	10,500	950	10,500	950	3,950	400
8	8,000	1,000	8,000	1,000	2,950	460
10	6,350	1,150	6,350	1,150	2,350	475
12	5,300	1,200	5,300	1,200	1,950	510
16	3,950	1,200	3,950	1,200	1,450	510
20	3,150	1,200	3,150	1,200	1,150	510

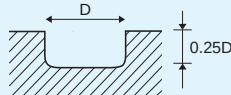
RPM = rev. / min.
FEED = mm / min.



[WAR503 series] ▶ Slotting, High Speed Cutting

WORKPIECE	ALUMUNUM ALLOY (A7075)		ALUMINUM ALLOY CASTING (Si13%)	
DIAMETER(mm)	RPM	FEED	RPM	FEED
3	40,000	1,450	24,000	880
4	32,000	1,700	19,200	1,000
5	32,000	2,200	19,200	1,350
6	26,500	2,400	15,900	1,450
8	20,000	2,500	12,000	1,500
10	16,000	2,800	9,600	1,700
12	13,300	2,950	8,000	1,800
16	10,000	3,000	6,000	1,800
20	8,000	3,000	4,800	1,800

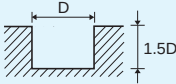
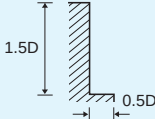
RPM = rev. / min.
FEED = mm / min.



[WAF303 series] ▶ Slotting

WORKPIECE	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.

[E302, E322 series]

	Side Cutting				Slotting			
	DepthofCut : 1.5D		WIDTH : 0.1D		DepthofCut : 0.5D		WIDTH : 1D	
	CARBON STEELS · ALLOY STEELS · TOOLS STEELS		ALLOY STEELS · TOOLS STEELS		CARBON STEELS · ALLOY STEELS · TOOLS STEELS		ALLOY STEELS · TOOLS STEELS	
HARDNESS	~ HB225		HB225~325		~ HB225		HB225~325	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1	5,300	60	4,300	50	4,300	40	3,500	20
2	4,500	80	3,800	60	3,800	50	3,100	30
3	3,700	80	3,200	60	3,200	50	2,650	30
4	2,750	110	2,400	60	2,400	50	2,000	30
6	1,850	110	1,600	60	1,600	50	1,320	30
8	1,400	110	1,200	90	1,200	60	1,000	40
10	1,100	110	950	90	950	60	800	40
12	930	110	800	90	800	60	660	40
16	700	110	600	90	600	60	500	40
20	560	110	480	90	480	60	400	40
25	450	110	380	90	380	60	320	40

※ Please reduce cutting speed around 20~30% from the above table or E322 series.

[E304, E324 series]

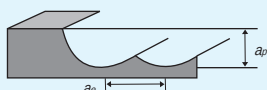
	Side Cutting				Slotting			
	DepthofCut : 1.5D		WIDTH : 0.1D		DepthofCut : 0.5D		WIDTH : 1D	
	CARBON STEELS · ALLOY STEELS · TOOLS STEELS		ALLOY STEELS · TOOLS STEELS		CARBON STEELS · ALLOY STEELS · TOOLS STEELS		ALLOY STEELS · TOOLS STEELS	
HARDNESS	~ HB225		HB225~325		~ HB225		HB225~325	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1	6,630	90	5,380	75	5,380	60	4,380	30
2	5,630	120	4,750	90	4,750	75	3,880	45
3	4,630	120	4,000	90	4,000	75	3,310	45
4	3,440	165	3,000	90	3,000	75	2,500	45
6	2,310	165	2,000	90	2,000	75	1,650	45
8	1,750	165	1,500	135	1,500	90	1,250	60
10	1,380	165	1,190	135	1,190	90	1,000	60
12	1,160	165	1,000	135	1,000	90	830	60
16	880	165	750	135	750	90	630	60
20	700	165	600	135	600	90	500	60
25	560	165	480	135	480	90	400	60

※ Please reduce cutting speed around 20~30% from the above table or E324 series.

[B302, BL422 series]

WORKPIECE	CARBON STEELS · ALLOY STEELS · TOOLS STEELS		ALLOY STEELS · TOOLS STEELS	
HARDNESS	~ HB225		HB225~325	
DIAMETER(mm)	RPM	FEED	RPM	FEED
R0.5	31,800	572	27,900	502
R1	31,800	1,910	27,900	1,670
R2	15,900	1,910	13,900	1,670
R3	10,600	1,910	9,280	1,670
R4	7,960	1,910	6,960	1,670
R5	6,370	1,780	5,570	1,560
R6	5,310	1,590	4,640	1,390
R8	4,000	1,300	3,500	1,050
R10	3,200	1,000	2,800	840
R12.5	2,400	800	2,100	650

RPM = rev. / min.
FEED = mm / min.



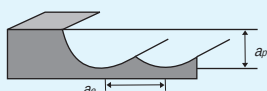
R	ap	ae
$R \leq 1.0$	0.05 x up to R	0.2 x up to R
$1.0 < R$	0.1 x up to R	0.2 x up to R

※ Please reduce cutting speed around 20~30% from the above table or BL422 series.

[B304 series]

WORKPIECE	CARBON STEELS · ALLOY STEELS · TOOLS STEELS		ALLOY STEELS · TOOLS STEELS	
HARDNESS	~ HB225		HB225~325	
DIAMETER(mm)	RPM	FEED	RPM	FEED
R0.5	39,750	718.25	34,875	6,275
R1	39,750	2,387.5	34,875	2,087.5
R2	19,875	2,387.5	17,375	2,087.5
R3	13,250	2,387.5	11,600	2,087.5
R4	9,950	2,387.5	8,700	2,087.5
R5	7,962.5	2,225	6,962.5	1,950
R6	6,637.5	1,987.5	5,800	1,737.5
R8	5,000	1,625	4,375	1,312.5
R10	4,000	1,250	3,500	1050
R12.5	3,000	1,000	2,625	812.5

RPM = rev. / min.
FEED = mm / min.



R	ap	ae
$R \leq 1.0$	0.05 x up to R	0.2 x up to R
$1.0 < R$	0.1 x up to R	0.2 x up to R

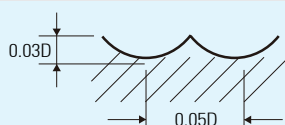
[WHPB902 series]

WORKPIECE	ALLOY STEEL, CARBON STEEL		PREHARDENED STEELS		HARDENED STEELS	
HARDNESS	~HRc35		~HRc35~ HRc45		HRc45~HRc55	
STRENGTH	~1100N/mm ²		1100~1500N/mm ²		1500~2000N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
0.1	40,000	550	40,000	500	33,000	400
0.2	30,000	720	30,000	630	27,000	575
0.3	30,000	900	30,000	810	27,000	720
0.4	30,000	1,140	30,000	1,020	27,000	900
0.5	30,000	1,440	30,000	1,260	27,000	1,140
0.6	30,000	1,740	30,000	1,500	27,000	1,320
0.8	30,000	2,340	30,000	1,980	27,000	1,800
1.0	30,000	2,880	30,000	2,520	27,000	2,280
1.2	30,000	3,060	28,800	2,580	25,800	2,310
1.5	30,000	3,240	28,800	2,700	25,800	2,400
2.0	29,820	3,420	28,680	2,880	24,000	2,400
3.0	19,860	3,600	19,080	3,180	15,900	2,400
4.0	14,940	3,600	14,340	3,180	12,000	2,400
5.0	11,160	3,480	10,680	2,940	9,000	2,250
6.0	8,340	2,910	8,040	2,460	6,600	1,860
8.0	6,660	2,520	6,420	2,100	5,400	1,620
10.0	5,580	2,220	5,340	1,860	4,500	1,440
12.0	4,170	1,770	4,008	1,500	3,360	1,440
16.0	3,340	1,590	3,210	1,320	2,700	1,020
20.0	2,670	1,410	2,580	1,170	2,160	900
25.0	2,130	1,150	2,060	950	1,730	730

[WB502 series]

WORKPIECE	ALLOY STEEL, CARBON STEEL (SCM, SNCM, S45C)		PREHARDENED STEELS (NAK, CENA, KP4)		HARDENED STEELS (SKD, SKT, STAVAX)	
HARDNESS	~HRc35		HRc35~HRc45		HRc45~HRc55	
STRENGTH	~1100N/mm ²		1100~1500N/mm ²		1500~2000N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
0.1	40,000	550	40,000	500	33,000	400
0.2	30,000	720	30,000	630	27,000	575
0.3	30,000	900	30,000	810	27,000	720
0.4	30,000	1,140	30,000	1,020	27,000	900
0.5	30,000	1,440	30,000	1,260	27,000	1,140
0.6	30,000	1,740	30,000	1,500	27,000	1,320
0.8	30,000	2,340	30,000	1,980	27,000	1,800
1.0	30,000	2,880	30,000	2,520	27,000	2,280
1.2	30,000	3,060	28,800	2,580	25,800	2,310
1.5	30,000	3,240	28,800	2,700	25,800	2,400
2.0	29,820	3,420	28,680	2,880	24,000	2,400
3.0	19,860	3,600	19,080	3,180	15,900	2,400
4.0	14,940	3,600	14,340	3,180	12,000	2,400
5.0	11,160	3,480	10,680	2,940	9,000	2,250
6.0	8,340	2,910	8,040	2,460	6,600	1,860
8.0	6,660	2,520	6,420	2,100	5,400	1,620
10.0	5,580	2,220	5,340	1,860	4,500	1,440
12.0	4,170	1,770	4,008	1,500	3,360	1,140
16.0	3,340	1,590	3,210	1,320	2,700	1,020
20.0	2,670	1,410	2,580	1,170	2,160	900
25.0	2,130	1,150	2,060	950	1,730	730

RPM = rev. / min.
FEED = mm / min.



[WB512 series]

WORKPIECE		ALLOY STEELS CARBON STEELS (SCM, SNCM, S45C)			PREHARDENED STEELS (NAK, CENA, KP4)			HARDENED STEELS (SKD, SKT, STAVAX)		
HARDNESS		~HRc35			HRc35~HRc45			HRc45~HRc55		
STRENGTH		~1100N/mm ²			1100~1500N/mm ²			1500~2000N/mm ²		
DIAMETER(mm)	Effective Length	RPM	FEED	Ap(mm)	RPM	FEED	Ap(mm)	RPM	FEED	Ap(mm)
0.1	0.2	50,000	240	0.009	50,000	215	0.007	50,000	190	0.005
0.1	0.3	50,000	240	0.009	50,000	215	0.007	50,000	190	0.005
0.1	0.5	50,000	240	0.006	50,000	215	0.005	50,000	190	0.004
0.1	1	45,000	195	0.002	45,000	175	0.002	45,000	155	0.001
0.2	0.5	50,000	335	0.018	50,000	310	0.014	43,200	260	0.010
0.2	1	50,000	335	0.013	50,000	310	0.010	43,200	260	0.007
0.2	1.5	45,000	270	0.007	45,000	250	0.006	38,880	210	0.004
0.2	2	45,000	270	0.005	45,000	250	0.004	38,880	210	0.003
0.2	3	45,000	270	0.003	45,000	250	0.003	38,880	210	0.002
0.3	1	50,000	475	0.019	50,000	430	0.015	42,800	365	0.011
0.3	1.5	50,000	475	0.019	50,000	430	0.015	42,800	365	0.011
0.3	2	45,000	385	0.011	45,000	350	0.008	38,520	295	0.006
0.3	2.5	45,000	385	0.007	45,000	350	0.005	38,520	295	0.004
0.3	3	45,000	385	0.007	45,000	350	0.005	38,520	295	0.004
0.3	4	40,000	305	0.004	40,000	275	0.003	34,240	235	0.002
0.3	5	30,000	200	0.003	30,000	180	0.002	25,680	155	0.002
0.4	1	41,000	490	0.036	38,800	425	0.028	34,200	340	0.020
0.4	1.5	41,000	490	0.025	38,800	425	0.020	34,200	340	0.014
0.4	2	41,000	490	0.025	38,800	425	0.020	34,200	340	0.014
0.4	2.5	36,900	395	0.014	34,920	345	0.011	30,780	275	0.008
0.4	3	36,900	395	0.014	34,920	345	0.011	30,780	275	0.008
0.4	4	36,900	395	0.009	34,920	345	0.007	30,780	275	0.005
0.4	5	32,800	315	0.009	31,040	270	0.007	27,360	220	0.005
0.4	6	32,800	315	0.005	31,040	270	0.004	27,360	220	0.003
0.4	8	24,600	205	0.004	23,280	180	0.003	20,520	145	0.002
0.4	10	12,300	90	0.004	11,640	75	0.003	10,260	60	0.002
0.5	1	34,200	685	0.045	32,300	580	0.035	28,500	515	0.025
0.5	1.5	34,200	685	0.045	32,300	580	0.035	28,500	515	0.025
0.5	2	34,200	685	0.032	32,300	580	0.025	28,500	515	0.018
0.5	2.5	34,200	685	0.032	32,300	580	0.025	28,500	515	0.018
0.5	3	30,780	555	0.018	29,070	470	0.014	25,650	415	0.010
0.5	4	30,780	555	0.018	29,070	470	0.014	25,650	415	0.010
0.5	5	30,780	555	0.011	29,070	470	0.009	25,650	415	0.006
0.5	6	27,360	440	0.011	25,840	370	0.009	22,800	330	0.006
0.5	8	20,520	290	0.007	19,380	245	0.005	17,100	215	0.004
0.5	10	20,520	290	0.005	19,380	245	0.004	17,100	215	0.003
0.5	12	10,260	125	0.005	9,690	105	0.004	8,550	95	0.003
0.5	14	10,260	125	0.005	9,690	105	0.004	8,550	95	0.003
0.5	16	3,420	35	0.005	3,230	30	0.004	2,850	25	0.003
0.6	1	34,200	1,025	0.038	32,300	840	0.029	28,500	685	0.021
0.6	2	34,200	1,025	0.038	32,300	840	0.029	28,500	685	0.021
0.6	3	34,200	1,025	0.038	32,300	840	0.029	28,500	685	0.021
0.6	4	30,780	830	0.022	29,070	680	0.017	25,650	555	0.012
0.6	5	30,780	830	0.014	29,070	680	0.011	25,650	555	0.008
0.6	6	30,780	830	0.014	29,070	680	0.011	25,650	555	0.008
0.6	8	27,360	655	0.008	25,840	540	0.006	22,800	440	0.005
0.6	10	20,520	430	0.005	19,380	355	0.004	17,100	290	0.003
0.6	12	20,520	430	0.005	19,380	355	0.004	17,100	290	0.003
0.6	14	10,260	185	0.005	9,690	150	0.004	8,550	125	0.003
0.6	16	10,260	185	0.005	9,690	150	0.004	8,550	125	0.003
0.7	2	34,200	1,130	0.063	32,300	930	0.049	28,500	765	0.035
0.7	4	30,780	915	0.025	29,070	755	0.020	25,650	620	0.014
0.7	6	30,780	915	0.016	29,070	755	0.012	25,650	620	0.009

RPM = rev. / min.
FEED = mm / min.

[WB512 series]

WORKPIECE		ALLOY STEELS CARBON STEELS (SCM, SNCM, S45C)			PREHARDENED STEELS (NAK, CENA, KP4)			HARDENED STEELS (SKD, SKT, STAVAX)		
HARDNESS		~HRc35			HRc35~HRc45			HRc45~HRc55		
STRENGTH		~1100N/mm ²			1100~1500N/mm ²			1500~2000N/mm ²		
DIAMETER(mm)	Effective Length	RPM	FEED	Ap(mm)	RPM	FEED	Ap(mm)	RPM	FEED	Ap(mm)
0.7	8	27,360	725	0.016	25,840	595	0.012	22,800	490	0.009
0.7	10	27,360	725	0.009	25,840	595	0.007	22,800	490	0.005
0.7	12	20,520	475	0.006	19,380	390	0.005	17,100	320	0.004
0.8	2	34,200	1,230	0.072	32,300	1,035	0.056	28,500	855	0.040
0.8	3	34,200	1,230	0.050	32,300	1,035	0.039	28,500	855	0.028
0.8	4	34,200	1,230	0.050	32,300	1,035	0.039	28,500	855	0.028
0.8	5	30,780	995	0.029	29,070	840	0.022	25,650	695	0.016
0.8	6	30,780	995	0.029	29,070	840	0.022	25,650	695	0.016
0.8	8	30,780	995	0.018	29,070	840	0.014	25,650	695	0.010
0.8	10	27,360	785	0.018	25,840	660	0.014	22,800	545	0.010
0.8	12	27,360	785	0.011	25,840	660	0.008	22,800	545	0.006
0.8	14	20,520	515	0.007	19,380	435	0.006	17,100	360	0.004
0.8	16	20,520	515	0.007	19,380	435	0.006	17,100	360	0.004
0.8	20	10,260	220	0.007	9,690	185	0.006	8,550	155	0.004
0.9	4	29,250	1,120	0.032	27,630	935	0.025	24,390	775	0.018
0.9	6	29,250	1,120	0.032	27,630	935	0.025	24,390	775	0.018
0.9	8	29,250	1,120	0.020	27,630	935	0.016	24,390	775	0.011
0.9	10	26,000	885	0.020	24,560	740	0.016	21,680	610	0.011
1.0	2	30,800	1,540	0.090	29,100	1,310	0.070	25,700	1,075	0.050
1.0	3	30,800	1,540	0.090	29,100	1,310	0.070	25,700	1,075	0.050
1.0	4	30,800	1,540	0.063	29,100	1,310	0.049	25,700	1,075	0.035
1.0	5	30,800	1,540	0.063	29,100	1,310	0.049	25,700	1,075	0.035
1.0	6	27,720	1,245	0.036	26,190	1,060	0.028	23,130	870	0.020
1.0	7	27,720	1,245	0.036	26,190	1,060	0.028	23,130	870	0.020
1.0	8	27,720	1,245	0.036	26,190	1,060	0.028	23,130	870	0.020
1.0	10	27,720	1,245	0.023	26,190	1,060	0.018	23,130	870	0.013
1.0	12	24,640	985	0.023	23,280	840	0.018	20,560	690	0.013
1.0	14	24,640	985	0.014	23,280	840	0.011	20,560	690	0.008
1.0	16	18,480	645	0.014	17,460	550	0.011	15,420	450	0.008
1.0	18	18,480	645	0.009	17,460	550	0.007	15,420	450	0.005
1.0	20	18,480	645	0.009	17,460	550	0.007	15,420	450	0.005
1.0	22	9,240	275	0.009	8,730	235	0.007	7,710	195	0.005
1.0	26	9,240	275	0.009	8,730	235	0.007	7,710	195	0.005
1.0	30	9,240	275	0.009	8,730	235	0.007	7,710	195	0.005
1.0	40	3,080	75	0.009	2,910	65	0.007	2,570	55	0.005
1.0	50	3,080	75	0.006	2,910	65	0.005	2,570	55	0.003
1.2	4	26,300	1,375	0.076	24,800	1,150	0.059	21,900	950	0.042
1.2	6	26,300	1,375	0.076	24,800	1,150	0.059	21,900	950	0.042
1.2	8	23,670	1,115	0.043	22,320	930	0.034	19,710	770	0.024
1.2	10	23,670	1,115	0.027	22,320	930	0.021	19,710	770	0.015
1.2	12	23,670	1,115	0.027	22,320	930	0.021	19,710	770	0.015
1.2	16	21,040	880	0.016	19,840	735	0.013	17,520	610	0.009
1.2	20	15,780	580	0.011	14,880	485	0.008	13,140	400	0.006
1.2	26	7,890	245	0.011	7,440	205	0.008	6,570	170	0.006
1.4	6	21,500	1,295	0.088	20,300	1,100	0.069	18,000	935	0.049
1.4	8	19,350	1,050	0.050	18,270	890	0.039	16,200	755	0.028
1.4	10	19,350	1,050	0.050	18,270	890	0.039	16,200	755	0.028
1.4	16	17,200	830	0.032	16,240	705	0.025	14,400	600	0.018
1.5	4	23,900	1,580	0.135	22,600	1,355	0.105	20,000	1,075	0.075
1.5	5	23,900	1,580	0.095	22,600	1,355	0.074	20,000	1,075	0.053
1.5	6	23,900	1,580	0.095	22,600	1,355	0.074	20,000	1,075	0.053
1.5	7	23,900	1,580	0.095	22,600	1,355	0.074	20,000	1,075	0.053
1.5	8	21,510	1,280	0.054	20,340	1,100	0.042	18,000	870	0.030

RPM=rev./min.
FEED=mm/min.

[WB512 series]

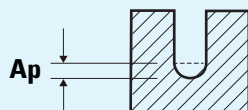
WORKPIECE		ALLOY STEELS CARBON STEELS (SCM, SNCM, S45C)			PREHARDENED STEELS (NAK, CENA, KP4)			HARDENED STEELS (SKD, SKT, STAVAX)		
HARDNESS		~HRc35			HRc35~HRc45			HRc45~HRc55		
STRENGTH		~1100N/mm ²			1100~1500N/mm ²			1500~2000N/mm ²		
DIAMETER(mm)	Effective Length	RPM	FEED	Ap(mm)	RPM	FEED	Ap(mm)	RPM	FEED	Ap(mm)
1.5	10	21,510	1,280	0.054	20,340	1,100	0.042	18,000	870	0.030
1.5	12	21,510	1,280	0.054	20,340	1,100	0.042	18,000	870	0.030
1.5	14	21,510	1,280	0.034	20,340	1,100	0.026	18,000	870	0.019
1.5	16	19,120	1,010	0.034	18,080	865	0.026	16,000	690	0.019
1.5	18	19,120	1,010	0.034	18,080	865	0.026	16,000	690	0.019
1.5	20	19,120	1,010	0.020	18,080	865	0.016	16,000	690	0.011
1.5	22	19,120	1,010	0.020	18,080	865	0.016	16,000	690	0.011
1.5	26	14,340	665	0.014	13,560	570	0.011	12,000	450	0.008
1.5	30	14,340	665	0.014	13,560	570	0.011	12,000	450	0.008
1.5	35	7,170	285	0.010	6,780	245	0.008	6,000	195	0.005
1.5	40	7,170	285	0.010	6,780	245	0.008	6,000	195	0.005
1.6	4	22,200	1,555	0.101	21,000	1,300	0.078	18,500	1,110	0.056
1.6	6	22,200	1,555	0.101	21,000	1,300	0.078	18,500	1,110	0.056
1.6	8	22,200	1,555	0.101	21,000	1,300	0.078	18,500	1,110	0.056
1.6	10	19,980	1,260	0.058	18,900	1,055	0.045	16,650	900	0.032
1.6	12	19,980	1,260	0.058	18,900	1,055	0.045	16,650	900	0.032
1.6	16	19,980	1,260	0.036	18,900	1,055	0.028	16,650	900	0.020
1.6	20	17,760	995	0.036	16,800	830	0.028	14,800	710	0.020
1.8	4	22,200	1,780	0.113	21,000	1,470	0.088	18,500	1,225	0.063
1.8	6	22,200	1,780	0.113	21,000	1,470	0.088	18,500	1,225	0.063
1.8	8	22,200	1,780	0.113	21,000	1,470	0.088	18,500	1,225	0.063
1.8	10	19,980	1,440	0.065	18,900	1,190	0.050	16,650	990	0.036
1.8	12	19,980	1,440	0.065	18,900	1,190	0.050	16,650	990	0.036
1.8	16	19,980	1,440	0.041	18,900	1,190	0.032	16,650	990	0.023
1.8	20	17,760	1,140	0.041	16,800	940	0.032	14,800	785	0.023
2.0	6	18,000	1,795	0.180	17,000	1,525	0.140	15,000	1,285	0.100
2.0	8	18,000	1,795	0.126	17,000	1,525	0.098	15,000	1,285	0.070
2.0	10	18,000	1,795	0.126	17,000	1,525	0.098	15,000	1,285	0.070
2.0	12	16,200	1,455	0.072	15,300	1,235	0.056	13,500	1,040	0.040
2.0	14	16,200	1,455	0.072	15,300	1,235	0.056	13,500	1,040	0.040
2.0	16	16,200	1,455	0.072	15,300	1,235	0.056	13,500	1,040	0.040
2.0	18	16,200	1,455	0.045	15,300	1,235	0.035	13,500	1,040	0.025
2.0	20	16,200	1,455	0.045	15,300	1,235	0.035	13,500	1,040	0.025
2.0	22	14,400	1,150	0.045	13,600	975	0.035	12,000	820	0.025
2.0	26	14,400	1,150	0.045	13,600	975	0.035	12,000	820	0.025
2.0	30	14,400	1,150	0.027	13,600	975	0.021	12,000	820	0.015
2.0	35	10,800	755	0.018	10,200	640	0.014	9,000	540	0.010
2.0	40	10,800	755	0.018	10,200	640	0.014	9,000	540	0.010
2.0	45	5,400	325	0.018	5,100	275	0.014	4,500	230	0.010
2.0	50	5,400	325	0.018	5,100	275	0.014	4,500	230	0.010
2.0	60	5,400	325	0.018	5,100	275	0.014	4,500	230	0.010
2.5	8	15,800	1,925	0.158	14,900	1,605	0.123	13,200	1,305	0.088
2.5	10	15,800	1,925	0.158	14,900	1,605	0.123	13,200	1,305	0.088
2.5	12	15,800	1,925	0.158	14,900	1,605	0.123	13,200	1,305	0.088
2.5	16	14,220	1,560	0.090	13,410	1,300	0.070	11,880	1,055	0.050
2.5	20	14,220	1,560	0.090	13,410	1,300	0.070	11,880	1,055	0.050
2.5	22	14,220	1,560	0.056	13,410	1,300	0.044	11,880	1,055	0.031
2.5	26	12,640	1,230	0.056	11,920	1,025	0.044	10,560	835	0.031
2.5	30	12,640	1,230	0.056	11,920	1,025	0.044	10,560	835	0.031
2.5	35	12,640	1,230	0.034	11,920	1,025	0.026	10,560	835	0.019
2.5	40	9,480	810	0.034	8,940	675	0.026	7,920	550	0.019
2.5	45	9,480	810	0.023	8,940	675	0.018	7,920	550	0.013
2.5	50	9,480	810	0.023	8,940	675	0.018	7,920	550	0.013

RPM=rev./min.
FEED=mm/min.

[WB512 series]

WORKPIECE		ALLOY STEELS CARBON STEELS (SCM, SNCM, S45C)			PREHARDENED STEELS (NAK, CENA, KP4)			HARDENED STEELS (SKD, SKT, STAVAX)		
HARDNESS		~HRc35			HRc35~HRc45			HRc45~HRc55		
STRENGTH		~1100N/mm ²			1100~1500N/mm ²			1500~2000N/mm ²		
DIAMETER(mm)	Effective Length	RPM	FEED	Ap(mm)	RPM	FEED	Ap(mm)	RPM	FEED	Ap(mm)
3.0	6	13,700	2,050	0.270	12,900	1,730	0.210	11,400	1,435	0.150
3.0	8	13,700	2,050	0.270	12,900	1,730	0.210	11,400	1,435	0.150
3.0	10	13,700	2,050	0.189	12,900	1,730	0.147	11,400	1,435	0.105
3.0	12	13,700	2,050	0.189	12,900	1,730	0.147	11,400	1,435	0.105
3.0	14	13,700	2,050	0.189	12,900	1,730	0.147	11,400	1,435	0.105
3.0	16	12,330	1,660	0.108	11,610	1,400	0.084	10,260	1,160	0.060
3.0	18	12,330	1,660	0.108	11,610	1,400	0.084	10,260	1,160	0.060
3.0	20	12,330	1,660	0.108	11,610	1,400	0.084	10,260	1,160	0.060
3.0	22	12,330	1,660	0.108	11,610	1,400	0.084	10,260	1,160	0.060
3.0	26	12,330	1,660	0.068	11,610	1,400	0.053	10,260	1,160	0.038
3.0	30	12,330	1,660	0.068	11,610	1,400	0.053	10,260	1,160	0.038
3.0	35	10,960	1,310	0.068	10,320	1,105	0.053	9,120	920	0.038
3.0	40	10,960	1,310	0.041	10,320	1,105	0.032	9,120	920	0.023
3.0	45	10,960	1,310	0.041	10,320	1,105	0.032	9,120	920	0.023
3.0	50	8,220	860	0.027	7,740	725	0.021	6,840	605	0.015
3.0	60	8,220	860	0.027	7,740	725	0.021	6,840	605	0.015
4.0	8	9,800	1,965	0.360	9,300	1,670	0.280	8,200	1,395	0.200
4.0	10	9,800	1,965	0.360	9,300	1,670	0.280	8,200	1,395	0.200
4.0	12	9,800	1,965	0.360	9,300	1,670	0.280	8,200	1,395	0.200
4.0	14	9,800	1,965	0.252	9,300	1,670	0.196	8,200	1,395	0.140
4.0	16	9,800	1,965	0.252	9,300	1,670	0.196	8,200	1,395	0.140
4.0	18	9,800	1,965	0.252	9,300	1,670	0.196	8,200	1,395	0.140
4.0	20	9,800	1,965	0.252	9,300	1,670	0.196	8,200	1,395	0.140
4.0	22	8,820	1,590	0.144	8,370	1,355	0.112	7,380	1,130	0.080
4.0	26	8,820	1,590	0.144	8,370	1,355	0.112	7,380	1,130	0.080
4.0	30	8,820	1,590	0.144	8,370	1,355	0.112	7,380	1,130	0.080
4.0	35	8,820	1,590	0.090	8,370	1,355	0.070	7,380	1,130	0.050
4.0	40	8,820	1,590	0.090	8,370	1,355	0.070	7,380	1,130	0.050
4.0	45	7,840	1,260	0.090	7,440	1,070	0.070	6,560	895	0.050
4.0	50	7,840	1,260	0.090	7,440	1,070	0.070	6,560	895	0.050
4.0	60	7,840	1,260	0.054	7,440	1,070	0.042	6,560	895	0.030
5.0	15	7,700	1,845	0.315	7,300	1,455	0.245	6,400	1,285	0.175
5.0	20	7,700	1,845	0.315	7,300	1,455	0.245	6,400	1,285	0.175
5.0	26	6,930	1,495	0.180	6,570	1,180	0.140	5,760	1,040	0.100
5.0	30	6,930	1,495	0.180	6,570	1,180	0.140	5,760	1,040	0.100
5.0	35	6,930	1,495	0.180	6,570	1,180	0.140	5,760	1,040	0.100
5.0	40	6,930	1,495	0.180	6,570	1,180	0.140	5,760	1,040	0.100
5.0	50	6,930	1,495	0.113	6,570	1,180	0.088	5,760	1,040	0.063
5.0	60	6,160	1,180	0.113	5,840	930	0.088	5,120	820	0.063
6.0	20	6,500	1,900	0.378	6,200	1,600	0.294	5,500	1,330	0.210
6.0	30	6,500	1,900	0.378	6,200	1,600	0.294	5,500	1,330	0.210
8.0	25	4,850	1,800	0.504	4,600	1,500	0.392	4,000	1,280	0.280
8.0	30	4,850	1,800	0.504	4,600	1,500	0.392	4,000	1,280	0.280
10.0	30	3,850	1,650	0.900	3,680	1,400	0.700	3,200	1,200	0.500
10.0	40	3,850	1,650	0.630	3,680	1,400	0.490	3,200	1,200	0.350
12.0	32	3,200	1,520	1.080	3,050	1,300	0.840	2,650	1,100	0.600
12.0	45	3,200	1,520	0.756	3,050	1,300	0.588	2,650	1,100	0.420

RPM = rev. / min.
FEED = mm / min.

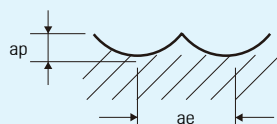


[WB542 series]

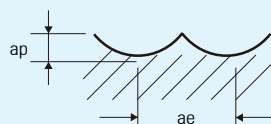
• Normal Speed

WORKPIECE	ALLOY STEELS CARBON STEELS (SCM, SNCM, S45C)		PREHARDENED STEELS (NAK, CENA, KP4)		HARDENED STEELS (SKD, SKT, STAVAX)	
HARDNESS	~HRC35		HRC35~HRC45		HRC45~HRC55	
STRENGTH	~1100N/mm ²		1100~1500N/mm ²		1500~2000N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
0.1	16,500	80	25500	185	25500	160
0.2	16,500	90	25500	220	25500	200
0.3	15,300	112	24000	260	24000	220
0.4	15,300	112	24000	260	24000	220
0.5	13,300	128	20800	300	20800	250
0.6	11,200	144	17600	330	17600	280
0.8	11,200	144	17600	330	17600	280
1.0	10,180	160	16000	370	16000	320
1.5	9,500	220	13000	500	12800	400
2.0	9,250	260	11500	640	11300	590
3.0	8,000	370	10200	880	9800	850
4.0	6,720	420	8500	880	8200	850
5.0	5,840	460	7500	880	7200	850
6.0	5,500	660	6900	920	6500	880
8.0	4,600	740	5600	840	5300	800
10.0	4,070	820	4850	800	4650	770
12.0	3,700	890	4350	800	4150	770

RPM = rev. / min.
FEED = mm / min.



ap : D1~D6=0.2mm
D8~D12=0.3mm
ae : 0.2×D



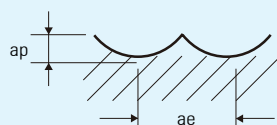
ap : D1~D4=0.05×D
D5~D8=0.25mm
D10~D12=0.3mm
ae : 0.1×D

[WB542 series]

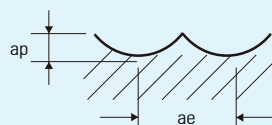
• High Speed

WORKPIECE	ALLOY STEELS CARBON STEELS (SCM, SNCM, S45C)		PREHARDENED STEELS (NAK, CENA, KP4)		HARDENED STEELS (SKD, SKT, STAVAX)	
HARDNESS	~HRc35		HRc35~HRc45		HRc45~HRc55	
STRENGTH	~1100N/mm ²		1100~1500N/mm ²		1500~2000N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
0.1	32,000	520	25,600	310	25,600	275
0.2	32,000	620	25,600	370	25,600	330
0.3	30,000	730	24,000	430	24,000	385
0.4	30,000	730	24,000	430	24,000	385
0.5	26,000	830	20,800	500	20,800	440
0.6	22,000	940	17,600	560	17,600	500
0.8	22,000	940	17,600	560	17,600	500
1.0	20,000	1,040	16,000	620	16,000	550
1.5	18,500	1,100	13,500	720	13,000	700
2.0	16,800	1,200	11,500	850	11,300	980
3.0	16,800	1,600	10,200	1,400	9,800	1,300
4.0	16,800	2,350	8,500	1,350	8,200	1,300
5.0	16,800	2,880	7,500	1,320	7,200	1,250
6.0	16,800	3,200	6,900	1,400	6,500	1,350
8.0	13,400	3,200	5,600	1,250	5,300	1,150
10.0	11,200	3,100	4,850	1,150	4,650	1,100
12.0	9,800	3,100	4,350	1,130	4,150	1,050

RPM = rev. / min.
FEED = mm / min.



ap : D1~D6=0.2mm
D8~D12=0.3mm
ae : 0.05xD

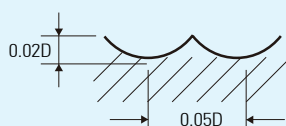


ap : D1~D4=0.05xD
D5~D8=0.25mm
D10~D12=0.3mm
ae : 0.05xD

[WB522 series]

WORKPIECE	NON-FERROUS METALS (ACRYLIC, PLASTIC, ABS)	
DIAMETER(mm)	RPM	FEED
1.0	42,000	280
1.5	28,000	280
2.0	21,000	280
3.0	14,000	280
4.0	10,500	280
5.0	8,400	330
6.0	7,000	330
8.0	5,250	370
10.0	4,200	370
12.0	3,500	430
16.0	2,650	320
20.0	2,100	250

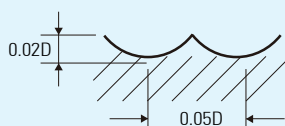
RPM = rev. / min.
FEED = mm / min.



[WB532 series]

WORKPIECE	ALLOY STEELS CARBON STEELS (SCM, SNCM, S45C)		PREHARDENED STEELS (NAK, CENA, KP4)		HARDENED STEELS (SKD, SKT, STAVAX)	
HARDNESS	~HRc35		HRc35~HRc45		HRc45~HRc55	
STRENGTH	~1100N/mm ²		1100~1500N/mm ²		1500~2000N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
3.0	35,000	2,800	33,000	2,600	12,000	900
4.0	26,000	2,300	25,000	2,200	9,000	800
5.0	21,000	2,100	20,000	2,000	7,000	700
6.0	17,000	1,900	16,000	1,800	6,000	650
8.0	13,000	1,700	12,000	1,600	4,500	550
10.0	10,500	1,450	10,000	1,400	3,500	500
12.0	9,000	1,400	8,000	1,300	3,000	450

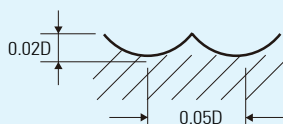
RPM = rev. / min.
FEED = mm / min.



[WSB502 series]

WORKPIECE	ALLOY STEELS CARBON STEELS (SCM, SNCM, S45C)		PREHARDENED STEELS (NAK, CENA, KP4)		HARDENED STEELS (SKD, SKT, STAVAX)	
HARDNESS	~HRc35		HRc35~HRc45		HRc45~HRc55	
STRENGTH	~1100N/mm ²		1100~1500N/mm ²		1500~2000N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
3.0	13,500	1,700	13,200	1,620	12,500	860
4.0	10,600	1,700	10,300	1,620	9,800	860
5.0	9,400	1,650	9,050	1,570	8,600	860
6.0	8,600	1,750	8,250	1,670	7,850	865
8.0	7,000	1,550	6,700	1,460	6,350	890
10.0	6,050	1,450	5,800	1,360	5,450	870
12.0	5,450	1,420	5,200	1,330	4,900	785
16.0	4,300	1,200	4,000	1,100	3,700	650
20.0	3,600	1,050	3,200	900	3,000	550

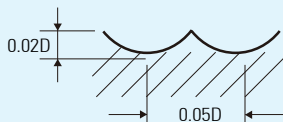
RPM = rev. / min.
FEED = mm / min.



[WB503 series]

WORKPIECE	ALLOY STEELS CARBON STEELS (SCM, SNCM, S45C)		PREHARDENED STEELS (NAK, CENA, KP4)		HARDENED STEELS (SKD, SKT, STAVAX)	
HARDNESS	~HRc35		HRc35~HRc45		HRc45~HRc55	
STRENGTH	~1100N/mm ²		1100~1500N/mm ²		1500~2000N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
1.0	50,000	4,150	44,000	3,000	33,000	2100
1.5	40,000	5,100	35,000	3,660	36,400	2600
2.0	33,000	5,890	29,000	4,150	21,700	3000
3.0	25,000	6,930	22,000	4,880	16,500	3490
4.0	21,670	6,930	18,120	4,880	13,400	3490
5.0	18,000	6,520	15,100	4,880	11,160	3320
6.0	16,200	7,710	13,680	5,590	10,980	4050
8.0	12,150	6,610	10,170	4,720	8,280	3580
10.0	9,720	5,870	8,190	4,130	6,620	3100
12.0	8,150	5,490	4,130	3,830	5,520	2870

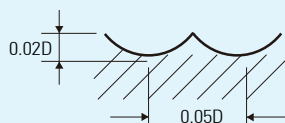
RPM = rev. / min.
FEED = mm / min.



[WB504 series]

WORKPIECE	ALLOY STEELS CARBON STEELS (SCM, SNCM, S45C)		PREHARDENED STEELS (NAK, CENA, KP4)		HARDENED STEELS (SKD, SKT, STAVAX)	
HARDNESS	~HRC35		HRC35~HRC45		HRC45~HRC55	
STRENGTH	~1100N/mm ²		1100~1500N/mm ²		1500~2000N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
1.0	48,000	3,300	35,000	2,350	32,000	2,200
1.5	38,400	4,100	28,000	2,900	25,600	2,700
2.0	31,680	4,600	23,100	3,300	21,000	3,100
3.0	24,000	5,430	17,500	3,880	16,000	3,650
4.0	20,130	5,430	14,880	3,880	14,220	3,650
5.0	16,780	5,430	12,400	3,690	11,670	3,470
6.0	15,200	6,220	12,200	4,500	11,100	3,830
8.0	11,300	5,250	9,200	3,980	8,320	3,350
10.0	9,100	4,590	7,350	3,450	6,660	2,870
12.0	7,590	4,260	6,130	3,190	5,530	2,400

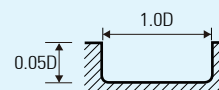
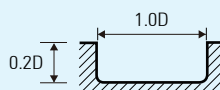
RPM = rev. / min.
FEED = mm / min.



[WR502 series]

WORKPIECE	ALLOY STEELS CARBON STEELS (SCM, SNCM, S45C)		PREHARDENED STEELS (NAK, CENA, KP4)		HARDENED STEELS (SKD, SKT, STAVAX)	
HARDNESS	~HRC35		HRC35~HRC45		HRC45~HRC55	
STRENGTH	~1100N/mm ²		1100~1500N/mm ²		1500~2000N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
0.2	44,000	145	28,800	60	17,600	40
0.3	41,000	170	27,000	70	16,500	45
0.4	41,000	170	27,000	70	16,500	45
0.5	36,000	190	23,400	80	14,300	50
0.6	30,000	210	19,800	90	12,100	55
0.8	30,000	210	19,800	90	12,100	55
1.0	27,600	240	18,000	100	11,000	60
1.5	22,000	250	13,500	110	8,500	60
2.0	18,000	260	11,560	120	7,200	70
2.5	15,000	270	9,500	130	6,100	70
3.0	13,240	280	8,560	140	5,280	70
4.0	10,720	340	6,820	170	4,300	80
5.0	9,160	420	5,800	200	3,800	100
6.0	7,900	500	5,040	250	3,280	120
8.0	6,000	540	3,800	250	2,520	120
10.0	5,040	540	3,280	250	2,020	120
12.0	4,120	420	2,780	230	1,680	100
16.0	3,100	360	2,100	170	1,280	80
20.0	2,520	280	1,640	120	1,000	60

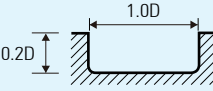
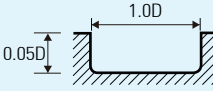
RPM = rev. / min.
FEED = mm / min.



[WR514, WR542 series]

WORKPIECE	ALLOY STEELS CARBON STEELS (SCM, SNCM, S45C)		PREHARDENED STEELS (NAK, CENA, KP4)		HARDENED STEELS (SKD, SKT, STAVAX)	
HARDNESS	~HRc35		HRc35~HRc45		HRc45~HRc55	
STRENGTH	~1100N/mm ²		1100~1500N/mm ²		1500~2000N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
0.2	50,000	170	34,500	75	21,150	45
0.3	50,000	200	32,000	85	20,000	50
0.4	50,000	200	32,000	85	20,000	50
0.5	43,000	220	28,000	95	17,100	60
0.6	36,400	250	24,000	110	14,500	65
0.8	36,400	250	24,000	110	14,500	65
1.0	33,100	280	21,600	120	13,200	70
1.5	26,400	300	16,200	130	10,200	70
2.0	21,600	310	13,800	140	8,640	80
2.5	18,000	320	11,400	150	7,320	80
3.0	15,900	330	10,300	160	6,300	80
4.0	12,800	400	8,200	200	5,150	95
5.0	11,000	500	7,000	240	4,560	120
6.0	9,500	600	6,000	300	3,930	140
8.0	7,200	640	4,550	300	3,020	140
10.0	6,000	640	4,000	300	2,420	140
12.0	5,000	500	3,340	270	2,000	120
16.0	3,720	450	2,520	210	1,540	95
20.0	3,000	330	1,950	140	1,200	70

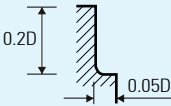
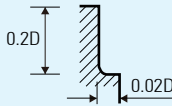
RPM = rev. / min.
FEED = mm / min.

[WXR504 series]

WORKPIECE	ALLOY STEELS CARBON STEELS (SCM, SNCM, S45C)		PREHARDENED STEELS (NAK, CENA, KP4)		HARDENED STEELS (SKD, SKT, STAVAX)	
HARDNESS	~HRc35		HRc35~HRc45		HRc45~HRc55	
STRENGTH	~1100N/mm ²		1100~1500N/mm ²		1500~2000N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
1.0	27,600	300	18,000	220	11,000	120
1.5	22,000	310	13,500	230	8,500	120
2.0	18,000	320	11,560	240	7,200	130
2.5	15,000	330	9,500	250	6,100	130
3.0	13,240	340	8,560	260	5,280	130
4.0	10,720	420	6,820	300	4,300	140
5.0	9,160	430	5,800	360	3,800	170
6.0	7,900	430	5,040	360	3,280	170
8.0	6,000	460	3,800	360	2,520	170
10.0	5,040	460	3,280	360	2,020	170
12.0	4,120	360	2,780	320	1,680	140
16.0	3,100	280	2,100	230	1,280	115
20.0	2,520	230	1,640	180	1,000	90

RPM = rev. / min.
FEED = mm / min.

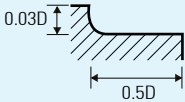
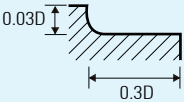



[WDR503 series]

• Normal Speed

WORKPIECE	ALLOY STEELS CARBON STEELS (SCM, SNCM, S45C)		PREHARDENED STEELS (NAK, CENA, KP4)		HARDENED STEELS (SKD, SKT, STAVAX)	
HARDNESS	~HRc35		HRc35~HRc45		HRc45~HRc55	
STRENGTH	~1100N/mm ²		1100~1500N/mm ²		1500~2000N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
6.0	5,100	3,500	5,500	3,750	3,850	2,700
8.0	3,800	3,400	4,150	3,700	2,850	2,550
10.0	3,800	3,750	3,600	3,500	2,700	2,700
12.0	3,200	4,200	3,250	4,250	2,250	2,300
16.0	2,400	3,100	2,250	2,900	1,700	1,750
20.0	1,900	2,500	1,800	2,350	1,350	1,400

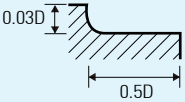
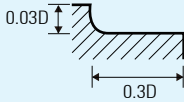
RPM = rev. / min.
FEED = mm / min.

• High Speed

WORKPIECE	ALLOY STEELS CARBON STEELS (SCM, SNCM, S45C)		PREHARDENED STEELS (NAK, CENA, KP4)		HARDENED STEELS (SKD, SKT, STAVAX)	
HARDNESS	~HRc35		HRc35~HRc45		HRc45~HRc55	
STRENGTH	~1100N/mm ²		1100~1500N/mm ²		1500~2000N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
6.0	8,300	5,700	7,650	5,250	6,400	4,550
8.0	6,200	5,550	5,750	5,100	5,250	4,700
10.0	5,750	5,650	5,000	4,900	4,200	4,250
12.0	4,800	6,300	4,150	5,450	3,500	3,650
16.0	3,600	4,700	3,100	4,050	2,650	2,700
20.0	2,900	3,750	2,500	3,250	2,100	2,150

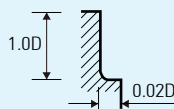
RPM = rev. / min.
FEED = mm / min.

[WXR514, WR544 series]

WORKPIECE	ALLOY STEELS CARBON STEELS (SCM, SNCM, S45C)		PREHARDENED STEELS (NAK, CENA, KP4)		HARDENED STEELS (SKD, SKT, STAVAX)	
HARDNESS	~HRc35		HRc35~HRc45		HRc45~HRc55	
STRENGTH	~1100N/mm ²		1100~1500N/mm ²		1500~2000N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
1.0	33,100	360	21,600	260	13,200	140
1.5	26,400	370	16,200	270	10,200	140
2.0	21,600	380	13,800	280	8,640	150
2.5	18,000	390	11,400	300	7,320	150
3.0	15,900	400	10,300	310	6,300	150
4.0	12,800	500	8,200	360	5,150	160
5.0	11,000	510	7,000	430	4,560	200
6.0	9,500	510	6,000	430	3,930	200
8.0	7,200	550	4,550	430	3,020	200
10.0	6,000	550	4,000	430	2,420	200
12.0	5,000	430	3,340	380	2,000	160
16.0	3,720	330	2,520	280	1,540	135
20.0	3,000	270	1,950	210	1,200	100

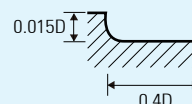
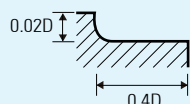
RPM = rev. / min.
FEED = mm / min.



[WSPM4 series]

WORKPIECE	ALLOY STEELS CARBON STEELS (SCM, SNCM, S45C)		PREHARDENED STEELS (NAK, CENA, KP4)		HARDENED STEELS (SKD, SKT, STAVAX)	
HARDNESS	~HRc35		HRc35~HRc45		HRc45~HRc55	
STRENGTH	~1100N/mm ²		1100~1500N/mm ²		1500~2000N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
1.0	49000	7650	40000	6500	35000	5750
1.5	37000	8550	30000	7200	27000	6400
2.0	29700	9000	24300	7560	21600	6750
3.0	19800	9900	16200	8100	14400	7650
4.0	15300	10800	12600	8550	10800	7920
6.0	9900	11700	8100	9900	7200	8640
8.0	7380	11700	6300	9900	5400	8640
10.0	5850	10800	4950	9000	4320	8550
12.0	4950	10800	4140	9000	3690	8100
16.0	3690	9000	3060	7920	2700	7020
20.0	2970	7200	2430	6300	2160	5670

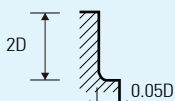
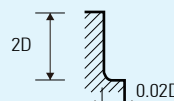
RPM = rev. / min.
FEED = mm / min.



[WR504, WR512 series]

WORKPIECE	ALLOY STEELS CARBON STEELS (SCM, SNCM, S45C)		PREHARDENED STEELS (NAK, CENA, KP4)		HARDENED STEELS (SKD, SKT, STAVAX)	
HARDNESS	~HRC35		HRC35~HRC45		HRC45~HRC55	
STRENGTH	~1100N/mm ²		1100~1500N/mm ²		1500~2000N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
3.0	4,410	115	3,570	100	2,200	55
4.0	3,570	140	2,840	115	1,790	60
5.0	3,050	180	2,420	140	1,580	70
6.0	2,630	215	2,100	180	1,370	85
8.0	2,000	230	1,580	180	1,050	85
10.0	1,680	230	1,370	180	840	85
12.0	1,370	180	1,160	160	700	70
16.0	1,160	160	890	125	560	60
20.0	840	115	680	90	420	45

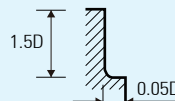
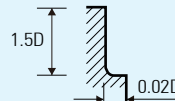
RPM = rev. / min.
FEED = mm / min.

[WR506 series]

WORKPIECE	ALLOY STEELS CARBON STEELS (SCM, SNCM, S45C)		PREHARDENED STEELS (NAK, CENA, KP4)		HARDENED STEELS (SKD, SKT, STAVAX)	
HARDNESS	~HRC35		HRC35~HRC45		HRC45~HRC55	
STRENGTH	~1100N/mm ²		1100~1500N/mm ²		1500~2000N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
6.0	14,880	3,210	14,100	2,940	9,600	2,940
8.0	12,000	3,300	11,400	3,000	7,200	2,760
10.0	9,600	2,940	9,300	2,700	5,700	2,460
12.0	7,800	2,700	7,500	2,460	4,800	2,280
16.0	6,000	2,400	5,820	2,220	3,600	2,040
20.0	4,800	2,010	4,680	2,040	2,880	1,920

RPM = rev. / min.
FEED = mm / min.

[WME502, WE502 S4, WE502 S3, WE502 series]

WORKPIECE	ALLOY STEELS CARBON STEELS (SCM, SNCM, S45C)		PREHARDENED STEELS (NAK, CENA, KP4)		STAINLESS STEELS (SUS)		HARDENED STEELS (SKD, SKT, STAVAX)	
HARDNESS	~HRc35		HRc35~HRc45				HRc45~HRc55	
STRENGTH	~1100N/mm ²		1100~1500N/mm ²				1500~2000N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2.0	11,560	190	7,560	120	6,300	90	5,040	35
3.0	8,920	210	5,560	140	4,620	120	3,360	40
4.0	7,560	300	4,620	180	3,880	150	2,940	40
5.0	6,300	320	3,780	190	3,160	160	2,320	50
6.0	5,560	350	3,360	220	2,840	180	2,000	55
8.0	4,200	380	2,520	200	2,100	180	1,680	75
10.0	3,260	330	2,000	160	1,680	160	1,360	60
12.0	2,740	280	1,680	130	1,360	130	1,160	55
16.0	2,200	220	1,360	110	1,060	110	900	40
20.0	1,680	170	1,060	80	840	80	680	30
25.0	1,360	130	840	70	680	60	540	20

RPM = rev. / min.
FEED = mm / min.

0.05D
(UP TO Ø3:0.2D)

0.05D

[WE522 series]

WORKPIECE	ALLOY STEELS CARBON STEELS (SCM, SNCM, S45C)		PREHARDENED STEELS (NAK, CENA, KP4)		HARDENED STEELS (SKD, SKT, STAVAX)	
HARDNESS	~HRc35		HRc35~HRc45		HRc45~HRc55	
STRENGTH	~1100N/mm ²		1100~1500N/mm ²		1500~2000N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
2.0	6,300	60	5,040	50	3,150	25
3.0	4,410	70	3,570	60	2,200	30
4.0	3,570	85	2,840	70	1,790	35
5.0	3,050	105	2,420	85	1,580	40
6.0	2,630	125	2,100	105	1,370	50
8.0	2,000	135	1,580	105	1,050	50
10.0	1,680	135	1,370	105	840	50
12.0	1,370	105	1,160	95	700	40
16.0	1,160	95	890	75	560	35
20.0	840	70	680	50	420	25

RPM = rev. / min.
FEED = mm / min.

0.3D
(UP TO Ø3:0.4mm)

0.05D

[WE512 series]

WORKPIECE		ALLOY STEELS CARBON STEELS (SCM, SNCM, S45C)			PREHARDENED STEELS (NAK, CENA, KP4)			HARDENED STEELS (SKD, SKT, STAVAX)		
HARDNESS		~HRc35			HRc35~HRc45			HRc45~HRc55		
STRENGTH		~1100N/mm ²			1100~1500N/mm ²			1500~2000N/mm ²		
DIAMETER (mm)	Effective Length	RPM	FEED	Ap(mm)	RPM	FEED	Ap(mm)	RPM	FEED	Ap(mm)
0.1	0.3	50,000	315	0.009	46,200	230	0.007	40,600	170	0.005
0.1	0.5	50,000	315	0.006	46,200	230	0.005	40,600	170	0.004
0.1	1	45,000	255	0.002	41,580	185	0.002	36,540	140	0.001
0.2	0.5	38,500	380	0.018	36,300	270	0.014	32,100	200	0.010
0.2	1	38,500	380	0.013	36,300	270	0.010	32,100	200	0.007
0.2	1.5	34,650	310	0.007	32,670	220	0.006	28,890	160	0.004
0.2	2	34,650	310	0.005	32,670	220	0.004	28,890	160	0.003
0.3	1	34,200	390	0.019	32,300	270	0.015	28,500	230	0.011
0.3	1.5	34,200	390	0.019	32,300	270	0.015	25,800	230	0.011
0.3	2	30,780	315	0.011	29,070	220	0.008	25,650	185	0.006
0.3	2.5	30,780	315	0.007	29,070	220	0.005	25,650	185	0.004
0.3	3	30,780	315	0.007	29,070	220	0.005	25,650	185	0.004
0.3	4	27,360	250	0.004	25,840	175	0.003	22,800	145	0.002
0.3	5	20,520	165	0.003	19,380	115	0.002	17,100	95	0.002
0.4	1	27,400	540	0.036	25,800	380	0.028	22,800	280	0.020
0.4	1.5	27,400	540	0.025	25,800	380	0.020	22,800	280	0.014
0.4	2	27,400	540	0.025	25,800	380	0.020	22,800	280	0.014
0.4	2.5	24,660	435	0.014	23,220	310	0.011	20,520	225	0.008
0.4	3	24,660	435	0.014	23,220	310	0.011	20,520	225	0.008
0.4	4	24,660	435	0.009	23,220	310	0.007	20,520	225	0.005
0.4	5	21,920	345	0.009	20,640	245	0.007	18,240	180	0.005
0.4	6	21,920	345	0.005	20,640	245	0.004	18,240	180	0.003
0.4	8	16,440	225	0.004	15,480	160	0.003	13,680	120	0.002
0.4	10	8,220	95	0.004	7,740	70	0.003	6,840	50	0.002
0.5	1	27,400	540	0.045	25,800	425	0.035	22,800	285	0.025
0.5	1.5	27,400	540	0.045	25,800	425	0.035	22,800	285	0.025
0.5	2	27,400	540	0.032	25,800	425	0.025	22,800	285	0.018
0.5	2.5	27,400	540	0.032	25,800	425	0.025	22,800	285	0.018
0.5	3	24,660	435	0.018	23,220	345	0.014	20,520	230	0.010
0.5	4	24,660	435	0.018	23,220	345	0.014	20,520	230	0.010
0.5	5	24,660	435	0.011	23,220	345	0.009	20,520	230	0.006
0.5	6	21,920	345	0.011	20,640	270	0.009	18,240	180	0.006
0.5	8	16,440	225	0.007	15,480	180	0.005	13,680	120	0.004
0.5	10	16,440	225	0.005	15,480	180	0.004	13,680	120	0.003
0.5	12	8,220	95	0.005	7,740	75	0.004	6,840	50	0.003
0.5	14	8,220	95	0.005	7,740	75	0.004	6,840	50	0.003
0.5	16	2,740	25	0.005	2,580	20	0.004	2,280	15	0.003
0.6	2	27,400	775	0.038	25,800	545	0.029	22,800	405	0.021
0.6	3	27,400	775	0.038	25,800	545	0.029	22,800	405	0.021
0.6	4	24,660	630	0.022	23,220	440	0.017	20,520	330	0.012
0.6	5	24,660	630	0.014	23,220	440	0.011	20,520	330	0.008
0.6	6	24,660	630	0.014	23,220	440	0.011	20,520	330	0.008
0.6	8	21,920	495	0.008	20,640	350	0.006	18,240	260	0.005
0.6	10	16,440	325	0.005	15,480	230	0.004	13,680	170	0.003
0.6	12	16,440	325	0.005	15,480	230	0.004	13,680	170	0.003
0.6	14	8,220	140	0.005	7,740	100	0.004	6,840	75	0.003
0.6	16	8,220	140	0.005	7,740	100	0.004	6,840	75	0.003
0.7	2	27,400	775	0.063	25,800	545	0.049	22,800	405	0.035
0.7	4	24,660	630	0.025	23,220	440	0.020	20,520	330	0.014
0.7	6	24,660	630	0.016	23,220	440	0.012	20,520	330	0.009
0.7	8	21,920	495	0.016	20,640	350	0.012	18,240	260	0.009
0.7	10	21,920	495	0.009	20,640	350	0.007	18,240	260	0.005
0.7	12	16,440	325	0.009	15,480	230	0.005	13,680	170	0.004

RPM = rev. / min.
FEED = mm / min.

[WE512 series]

WORKPIECE		ALLOY STEELS CARBON STEELS (SCM, SNCM, S45C)			PREHARDENED STEELS (NAK, CENA, KP4)			HARDENED STEELS (SKD, SKT, STAVAX)		
HARDNESS		~HRc35			HRc35~HRc45			HRc45~HRc55		
STRENGTH		~1100N/mm ²			1100~1500N/mm ²			1500~2000N/mm ²		
DIAMETER (mm)	Effective Length	RPM	FEED	Ap(mm)	RPM	FEED	Ap(mm)	RPM	FEED	Ap(mm)
0.8	2	27,400	775	0.072	25,800	605	0.056	22,800	450	0.040
0.8	3	27,400	775	0.050	25,800	605	0.039	22,800	450	0.028
0.8	4	27,400	775	0.050	25,800	605	0.039	22,800	450	0.028
0.8	5	24,660	630	0.029	23,220	490	0.022	20,520	365	0.016
0.8	6	24,660	630	0.029	23,220	490	0.022	20,520	365	0.016
0.8	8	24,660	630	0.018	23,220	490	0.014	20,520	365	0.010
0.8	10	21,920	495	0.018	20,640	385	0.014	18,240	290	0.010
0.8	12	21,920	495	0.011	20,640	385	0.008	18,240	290	0.006
0.8	14	16,440	325	0.007	15,480	255	0.006	13,680	190	0.004
0.8	16	16,440	325	0.007	15,480	255	0.006	13,680	190	0.004
0.8	20	8,220	140	0.007	7,740	110	0.006	6,840	80	0.004
0.9	6	22,140	575	0.032	20,970	440	0.025	18,450	330	0.018
0.9	8	22,140	575	0.020	20,970	440	0.016	18,450	330	0.011
0.9	10	19,680	455	0.020	18,640	350	0.016	16,400	260	0.011
1.0	2	24,600	1,045	0.090	23,300	890	0.070	20,500	665	0.050
1.0	3	24,600	1,045	0.090	23,300	890	0.070	20,500	665	0.050
1.0	4	24,600	1,045	0.063	23,300	890	0.049	20,500	665	0.035
1.0	5	24,600	1,045	0.063	23,300	890	0.049	20,500	665	0.035
1.0	6	22,140	845	0.036	20,970	720	0.028	18,450	540	0.020
1.0	7	22,140	845	0.036	20,970	720	0.028	18,450	540	0.020
1.0	8	22,140	845	0.036	20,970	720	0.028	18,450	540	0.020
1.0	10	22,140	845	0.023	20,970	720	0.018	18,450	540	0.013
1.0	12	19,680	670	0.023	18,640	570	0.018	16,400	425	0.013
1.0	14	19,680	670	0.014	18,640	570	0.011	16,400	425	0.008
1.0	16	14,760	440	0.014	13,980	375	0.011	12,300	280	0.008
1.0	18	14,760	440	0.009	13,980	375	0.007	12,300	280	0.005
1.0	20	14,760	440	0.009	13,980	375	0.007	12,300	280	0.005
1.0	22	7,380	190	0.009	6,990	160	0.007	6,150	120	0.005
1.0	26	7,380	190	0.009	6,990	160	0.007	6,150	120	0.005
1.0	30	7,380	190	0.009	6,990	160	0.007	6,150	120	0.005
1.0	40	2,460	50	0.009	2,330	45	0.007	2,050	35	0.005
1.0	50	2,460	50	0.006	2,330	45	0.005	2,050	35	0.003
1.2	4	21,900	930	0.076	20,700	720	0.059	18,200	485	0.042
1.2	6	21,900	930	0.076	20,700	720	0.059	18,200	485	0.042
1.2	8	19,710	755	0.043	18,630	585	0.034	16,380	395	0.024
1.2	10	19,710	755	0.027	18,630	585	0.021	16,380	395	0.015
1.2	12	19,710	755	0.027	18,630	585	0.021	16,380	395	0.015
1.2	14	17,520	595	0.027	16,560	460	0.021	14,560	310	0.015
1.2	16	17,520	595	0.016	16,560	460	0.013	14,560	310	0.009
1.2	20	13,140	390	0.011	12,420	300	0.008	10,920	205	0.006
1.2	26	6,570	165	0.011	6,210	130	0.008	5,460	85	0.006
1.2	30	6,570	165	0.011	6,210	130	0.008	5,460	85	0.006
1.4	6	19,200	815	0.088	18,100	570	0.069	16,000	425	0.049
1.4	8	17,280	660	0.050	16,290	460	0.039	14,400	345	0.028
1.4	10	17,280	660	0.050	16,290	460	0.039	14,400	345	0.028
1.4	14	17,280	660	0.032	16,290	460	0.025	14,400	345	0.018
1.4	16	15,360	520	0.032	14,480	365	0.025	12,800	270	0.018
1.4	20	15,360	520	0.019	14,480	365	0.015	12,800	270	0.011
1.5	4	19,200	905	0.135	18,100	635	0.105	16,000	475	0.075
1.5	5	19,200	905	0.095	18,100	635	0.074	16,000	475	0.053
1.5	6	19,200	905	0.095	18,100	635	0.074	16,000	475	0.053
1.5	7	19,200	905	0.095	18,100	635	0.074	16,000	475	0.053
1.5	8	17,280	735	0.054	16,290	515	0.042	14,400	385	0.030

RPM = rev. / min.
FEED = mm / min.

[WE512 series]

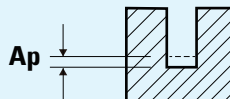
WORKPIECE		ALLOY STEELS CARBON STEELS (SCM, SNCM, S45C)			PREHARDENED STEELS (NAK, CENA, KP4)			HARDENED STEELS (SKD, SKT, STAVAX)		
HARDNESS		~HRc35			HRc35~HRc45			HRc45~HRc55		
STRENGTH		~1100N/mm ²			1100~1500N/mm ²			1500~2000N/mm ²		
DIAMETER (mm)	Effective Length	RPM	FEED	Ap(mm)	RPM	FEED	Ap(mm)	RPM	FEED	Ap(mm)
1.5	10	17,280	735	0.054	16,290	515	0.042	14,400	385	0.030
1.5	12	17,280	735	0.054	16,290	515	0.042	14,400	385	0.030
1.5	14	17,280	735	0.034	16,290	515	0.026	14,400	385	0.019
1.5	16	15,360	580	0.034	14,480	405	0.026	12,800	305	0.019
1.5	18	15,360	580	0.034	14,480	405	0.026	12,800	305	0.019
1.5	20	15,360	580	0.020	14,480	405	0.016	12,800	305	0.011
1.5	22	15,360	580	0.020	14,480	405	0.016	12,800	305	0.011
1.5	26	11,520	380	0.014	10,860	265	0.011	9,600	200	0.008
1.5	30	11,520	380	0.014	10,860	265	0.011	9,600	200	0.008
1.6	8	17,800	840	0.101	16,800	655	0.078	14,800	490	0.056
1.6	10	16,020	680	0.058	15,120	530	0.045	13,320	395	0.032
1.6	12	16,020	680	0.058	15,120	530	0.045	13,320	395	0.032
1.6	16	16,020	680	0.036	15,120	530	0.028	13,320	395	0.020
1.6	20	14,240	540	0.036	13,440	420	0.028	11,840	315	0.020
1.8	8	17,800	840	0.113	16,800	655	0.088	14,800	490	0.063
1.8	10	16,020	680	0.065	15,120	530	0.050	13,320	395	0.036
1.8	12	16,020	680	0.065	15,120	530	0.050	13,320	395	0.036
1.8	16	16,020	680	0.041	15,120	530	0.032	13,320	395	0.023
1.8	20	14,240	540	0.041	13,440	420	0.032	11,840	315	0.023
2.0	6	14,400	820	0.180	13,600	620	0.140	12,000	475	0.100
2.0	8	14,400	820	0.126	13,600	620	0.098	12,000	475	0.070
2.0	10	14,400	820	0.126	13,600	620	0.098	12,000	475	0.070
2.0	12	12,960	665	0.072	12,240	500	0.056	10,800	385	0.040
2.0	14	12,960	665	0.072	12,240	500	0.056	10,800	385	0.040
2.0	16	12,960	665	0.072	12,240	500	0.056	10,800	385	0.040
2.0	18	12,960	665	0.045	12,240	500	0.035	10,800	385	0.025
2.0	20	12,960	665	0.045	12,240	500	0.035	10,800	385	0.025
2.0	22	11,520	525	0.045	10,880	395	0.035	9,600	305	0.025
2.0	26	11,520	525	0.045	10,880	395	0.035	9,600	305	0.025
2.0	30	11,520	525	0.027	10,880	395	0.021	9,600	305	0.015
2.0	35	8,640	345	0.018	8,160	260	0.014	7,200	200	0.010
2.0	40	8,640	345	0.018	8,160	260	0.014	7,200	200	0.010
2.0	45	4,320	150	0.018	4,080	110	0.014	3,600	85	0.010
2.0	50	4,320	150	0.018	4,080	110	0.014	3,600	85	0.010
2.0	60	4,320	150	0.018	4,080	110	0.014	3,600	85	0.010
2.5	8	12,300	970	0.158	11,600	680	0.123	10,300	510	0.088
2.5	10	12,300	970	0.158	11,600	680	0.123	10,300	510	0.088
2.5	12	12,300	970	0.158	11,600	680	0.123	10,300	510	0.088
2.5	14	11,070	785	0.090	10,440	550	0.070	9,270	415	0.050
2.5	16	11,070	785	0.090	10,440	550	0.070	9,270	415	0.050
2.5	18	11,070	785	0.090	10,440	550	0.070	9,270	415	0.050
2.5	20	11,070	785	0.090	10,440	550	0.070	9,270	415	0.050
2.5	22	11,070	785	0.056	10,440	550	0.044	9,270	415	0.031
2.5	26	9,840	620	0.056	9,280	435	0.044	8,240	325	0.031
2.5	30	9,840	620	0.056	9,280	435	0.044	8,240	325	0.031
2.5	35	9,840	620	0.034	9,280	435	0.026	8,240	325	0.019
2.5	40	7,380	405	0.034	6,960	285	0.026	6,180	215	0.019
2.5	45	7,380	405	0.023	6,960	285	0.018	6,180	215	0.013
2.5	50	7,380	405	0.023	6,960	285	0.018	6,180	215	0.013
3.0	6	10,900	860	0.270	10,300	605	0.210	6,600	450	0.150
3.0	8	10,900	860	0.270	10,300	605	0.210	6,600	450	0.150
3.0	10	10,900	860	0.189	10,300	605	0.147	6,600	450	0.105
3.0	12	10,900	860	0.189	10,300	605	0.147	6,600	450	0.105

RPM = rev. / min.
FEED = mm / min.

[WE512 series]

WORKPIECE		ALLOY STEELS CARBON STEELS (SCM, SNCM, S45C)			PREHARDENED STEELS (NAK, CENA, KP4)			HARDENED STEELS (SKD, SKT, STAVAX)		
HARDNESS		~HRc35			HRc35~HRc45			HRc45~HRc55		
STRENGTH		~1100N/mm ²			1100~1500N/mm ²			1500~2000N/mm ²		
DIAMETER (mm)	Effective Length	RPM	FEED	Ap(mm)	RPM	FEED	Ap(mm)	RPM	FEED	Ap(mm)
3.0	14	10,900	860	0.189	10,300	605	0.147	6,600	450	0.105
3.0	16	9,810	695	0.108	9,270	490	0.084	5,940	365	0.060
3.0	18	9,810	695	0.108	9,270	490	0.084	5,940	365	0.060
3.0	20	9,810	695	0.108	9,270	490	0.084	5,940	365	0.060
3.0	22	9,810	695	0.108	9,270	490	0.084	5,940	365	0.060
3.0	26	9,810	695	0.068	9,270	490	0.053	5,940	365	0.038
3.0	30	9,810	695	0.068	9,270	490	0.053	5,940	365	0.038
3.0	35	8,720	550	0.068	8,240	385	0.053	5,280	290	0.038
3.0	40	8,720	550	0.041	8,240	385	0.032	5,280	290	0.023
3.0	45	8,720	550	0.041	8,240	385	0.032	5,280	290	0.023
3.0	50	6,540	360	0.027	6,180	255	0.021	3,960	190	0.015
3.0	60	6,540	360	0.027	6,180	255	0.021	3,960	190	0.015
4.0	8	8,000	1,300	0.360	7,600	1,160	0.280	6,700	770	0.200
4.0	10	8,000	1,300	0.360	7,600	1,160	0.280	6,700	770	0.200
4.0	12	8,000	1,300	0.360	7,600	1,160	0.280	6,700	770	0.200
4.0	14	8,000	1,300	0.252	7,600	1,160	0.196	6,700	770	0.140
4.0	16	8,000	1,300	0.252	7,600	1,160	0.196	6,700	770	0.140
4.0	18	8,000	1,300	0.252	7,600	1,160	0.196	6,700	770	0.140
4.0	20	8,000	1,300	0.252	7,600	1,160	0.196	6,700	770	0.140
4.0	22	7,200	1,055	0.144	6,840	940	0.112	6,030	625	0.080
4.0	26	7,200	1,055	0.144	6,840	940	0.112	6,030	625	0.080
4.0	30	7,200	1,055	0.144	6,840	940	0.112	6,030	625	0.080
4.0	35	7,200	1,055	0.090	6,840	940	0.070	6,030	625	0.050
4.0	40	7,200	1,055	0.090	6,840	940	0.070	6,030	625	0.050
4.0	45	6,400	830	0.090	6,080	740	0.070	5,360	495	0.050
4.0	50	6,400	830	0.090	6,080	740	0.070	5,360	495	0.050
4.0	60	6,400	830	0.054	6,080	740	0.042	5,360	495	0.030
5.0	16	6,400	1,155	0.315	6,100	900	0.245	5,400	605	0.175
5.0	20	6,400	1,155	0.315	6,100	900	0.245	5,400	605	0.175
5.0	26	5,760	935	0.180	5,490	730	0.140	4,860	490	0.100
5.0	30	5,760	935	0.180	5,490	730	0.140	4,860	490	0.100
5.0	35	5,760	935	0.180	5,490	730	0.140	4,860	490	0.100
5.0	40	5,760	935	0.180	5,490	730	0.140	4,860	490	0.100
5.0	50	5,760	935	0.113	5,490	730	0.088	4,860	490	0.063
5.0	60	5,120	740	0.113	4,880	575	0.088	4,320	385	0.063
6.0	15	5,300	1,055	0.540	5,000	820	0.420	4,400	550	0.300
6.0	20	5,300	1,055	0.378	5,000	820	0.294	4,400	550	0.210
6.0	30	5,300	1,055	0.378	5,000	820	0.294	4,400	550	0.210
6.0	32	4,770	855	0.216	4,500	665	0.168	3,960	445	0.120
8.0	25	4,000	950	0.504	3,800	750	0.392	3,300	500	0.280
8.0	30	4,000	950	0.504	3,800	750	0.392	3,300	500	0.280
8.0	42	3,600	770	0.288	3,400	605	0.224	2,950	405	0.160
10.0	30	3,200	900	0.900	3,050	680	0.700	2,630	400	0.500
10.0	35	3,200	900	0.630	3,050	680	0.490	2,630	400	0.350
10.0	45	3,200	900	0.630	3,050	680	0.490	2,630	400	0.350
12.0	35	2,650	800	1.080	2,520	600	0.840	2,180	350	0.600
12.0	40	2,650	800	0.756	2,520	600	0.588	2,180	350	0.420
12.0	50	2,650	800	0.756	2,520	600	0.588	2,180	350	0.420

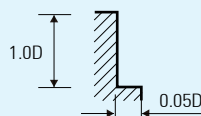
RPM = rev. / min.
FEED = mm / min.



[WME504, WXE504 series]

WORKPIECE	ALLOY STEELS CARBON STEELS (SCM, SNCM, S45C)		PREHARDENED STEELS (NAK, CENA, KP4)		STAINLESS STEELS (SUS)		HARDENED STEELS (SKD, SKT, STAVAX)	
HARDNESS	~HRc35		HRc35~HRc45				HRc45~HRc55	
STRENGTH	~1100N/mm ²		1100~1500N/mm ²				1500~2000N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2.0	11,560	280	7,560	170	6,300	140	5,040	50
3.0	8,920	320	5,560	200	4,620	170	3,360	60
4.0	7,560	570	4,620	350	3,880	280	2,940	60
5.0	6,300	600	3,780	360	3,160	300	2,320	70
6.0	5,560	660	3,360	410	2,840	330	2,000	80
8.0	4,200	710	2,520	380	2,100	350	1,680	110
10.0	3,260	610	2,000	300	1,680	300	1,360	90
12.0	2,740	520	1,680	250	1,360	240	1,160	80
16.0	2,200	410	1,360	200	1,100	300	900	60
20.0	1,680	320	1,060	160	840	150	680	40
25.0	1,360	250	840	130	680	120	540	30

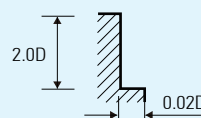
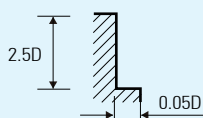
RPM = rev. / min.
FEED = mm / min.



[WE524 series]

WORKPIECE	ALLOY STEELS CARBON STEELS (SCM, SNCM, S45C)		PREHARDENED STEELS (NAK, CENA, KP4)		HARDENED STEELS (SKD, SKT, STAVAX)	
HARDNESS	~HRc35		HRc35~HRc45		HRc45~HRc55	
STRENGTH	~1100N/mm ²		1100~1500N/mm ²		1500~2000N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
2.0	6,300	100	5,040	80	3,150	45
3.0	4,410	115	3,570	100	2,200	55
4.0	3,570	140	2,840	115	1,790	60
5.0	3,050	180	2,420	140	1,580	70
6.0	2,630	215	2,100	180	1,370	90
8.0	2,000	230	1,580	180	1,050	90
10.0	1,680	230	1,370	180	840	90
12.0	1,370	180	1,160	160	700	70
16.0	1,160	160	890	125	560	60
20.0	840	115	680	90	420	45

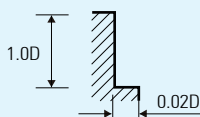
RPM = rev. / min.
FEED = mm / min.



[WE514 series]

WORKPIECE	ALLOY STEELS CARBON STEELS (SCM, SNCM, S45C)		PREHARDENED STEELS (NAK, CENA, KP4)		STAINLESS STEELS (SUS)		HARDENED STEELS (SKD, SKT, STAVAX)	
HARDNESS	~HRc35		HRc35~HRc45				HRc45~HRc55	
STRENGTH	~1100N/mm ²		1100~1500N/mm ²				1500~2000N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1.0	22,000	310	13,500	180	10,750	140	8,500	50
1.5	17,000	320	10,700	190	8,500	150	6,500	50
2.0	13,900	330	9,070	200	7,560	165	6,000	60
2.5	12,000	350	7,600	220	6,000	180	4,500	60
3.0	10,700	380	6,670	240	5,110	200	4,030	70
4.0	9,070	680	5,540	420	4,650	330	3,530	70
5.0	7,560	720	4,530	430	3,800	360	2,780	85
6.0	6,670	790	4,030	490	3,400	390	2,400	95
8.0	5,040	850	3,020	450	2,520	420	2,010	130
10.0	3,910	730	2,400	360	2,010	360	1,630	105
12.0	3,300	620	2,010	300	1,630	280	1,400	95

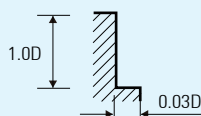
RPM = rev. / min.
FEED = mm / min.



[WE504...H series]

WORKPIECE	ALLOY STEELS CARBON STEELS (SCM, SNCM, S45C)		PREHARDENED STEELS (NAK, CENA, KP4)		HARDENED STEELS (SKD, SKT, STAVAX)	
HARDNESS	~HRc35		HRc35~HRc45		HRc45~HRc55	
STRENGTH	~1100N/mm ²		1100~1500N/mm ²		1500~2000N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
1.0	45,000	750	37,000	560	23,000	300
2.0	23,500	800	18,000	540	12,000	360
3.0	15,750	810	12,600	580	8,280	380
4.0	12,150	830	9,540	600	6,345	400
6.0	9,450	900	7,470	640	4,950	440
8.0	7,110	860	5,625	620	3,780	410
10.0	5,580	800	4,410	570	2,925	380
12.0	4,770	800	3,780	570	2,520	380
16.0	3,600	810	2,900	570	2,000	400
20.0	3,000	810	2,300	570	1,600	400

RPM = rev. / min.
FEED = mm / min.

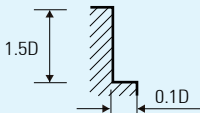
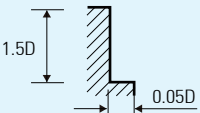
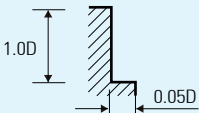


[WE506 series]

• Normal Speed

WORKPIECE	ALLOY STEELS CARBON STEELS (SCM, SNCM, S45C)		PREHARDENED STEELS (NAK, CENA, KP4)		HARDENED STEELS (SKD, SKT, STAVAX)	
HARDNESS	~HRc35		HRc35~HRc45		HRc45~HRc55	
STRENGTH	~1100N/mm ²		1100~1500N/mm ²		1500~2000N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
6.0	5,560	2,000	3,880	1,370	1,580	210
8.0	4,200	2,000	2,940	1,370	1,160	210
10.0	3,360	2,000	2,320	1,370	1,000	210
12.0	2,840	1,680	2,000	1,160	840	180
16.0	2,100	1,260	1,480	880	640	130
20.0	1,680	1,010	1,160	690	500	110
25.0	1,500	90	1,100	600	430	90

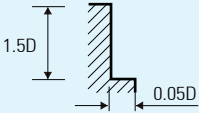
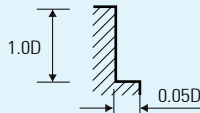
RPM = rev. / min.
FEED = mm / min.

• High Speed

WORKPIECE	PREHARDENED STEELS (NAK, CENA, KP4)		HARDENED STEELS (SKD, SKT, STAVAX)	
HARDNESS	HRc35~HRc45		HRc45~HRc55	
STRENGTH	1100~1500N/mm ²		1500~2000N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED
6.0	16,800	6,090	8,400	3,050
8.0	12,600	6,090	6,300	3,050
10.0	9,980	5,990	5,040	3,050
12.0	8,400	5,040	4,200	2,520
16.0	6,300	3,780	3,160	1,890
20.0	5,040	3,050	2,520	1,470
25.0	4,500	2,700	2,200	1,300

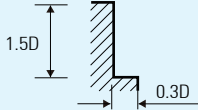
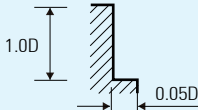
RPM = rev. / min.
FEED = mm / min.

[WF61 series]

WORKPIECE	ALLOY STEELS CARBON STEELS (SCM, SNCM, S45C)		PREHARDENED STEELS (NAK, CENA, KP4)		HARDENED STEELS (SKD, SKT, STAVAX)	
HARDNESS	~HRc35		HRc35~HRc45		HRc45~HRc55	
STRENGTH	~1100N/mm ²		1100~1500N/mm ²		1500~2000N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
6.0	12,400	840	8,400	570	3,400	260
8.0	9,200	840	6,300	570	2,400	240
10.0	7,600	840	5,100	570	2,000	290
12.0	6,000	800	4,200	570	1,680	260
14.0	5,200	840	3,600	570	1,400	200
16.0	4,800	760	3,300	510	1,200	160
18.0	4,400	720	2,700	420	1,100	150
20.0	3,600	560	2,400	360	1,000	150
25.0	3,200	620	2,160	410	900	160

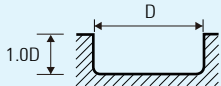
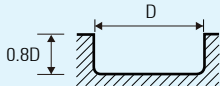
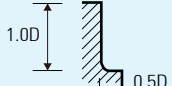
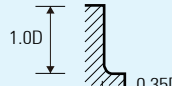
RPM = rev. / min.
FEED = mm / min.

[WF60 series]

WORKPIECE	ALLOY STEELS CARBON STEELS (SCM, S45C, S50C)		ALLOY STEELS CARBON STEELS PREHARDENED STEELS (SCM, SKD, NAK, KP4)		ALLOY STEELS CARBON STEELS (SCM, S45C, S50C)		ALLOY STEELS CARBON STEELS PREHARDENED STEELS (SCM, SKD, NAK, KP4)	
HARDNESS	~HRc25		HRc25~HRc40		~HRc25		HRc25~HRc40	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
6.0	12,000	1,550	10,600	1,100	15,800	2,570	14,300	1,850
8.0	9,000	1,650	8,100	1,180	11,900	2,700	10,700	1,950
10.0	7,200	1,650	6,400	1,180	9,500	2,700	8,500	1,950
12.0	6,000	1,540	5,400	1,140	8,000	2,570	7,100	1,850
16.0	4,500	1,500	4,100	1,050	6,000	2,450	5,400	1,750
20.0	3,600	1,330	3,200	900	4,800	2,140	4,300	1,500

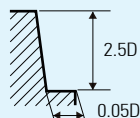
RPM = rev. / min.
FEED = mm / min.

[WTE502 series]

WORKPIECE	ALLOY STEELS CARBON STEELS (SCM, SNCM, S45C)		PREHARDENED STEELS (NAK, CENA, KP4)	
HARDNESS	~ HRc35		HRc35 ~ HRc45	
STRENGTH	~ 1100N/mm ²		1100 ~ 1500N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED
0.3	45,000	135	35,000	105
0.4	36,000	144	27,900	113
0.6	25,200	144	18,900	113
0.8	18,000	144	13,950	108
1.0	14,850	149	11,250	113
2.0	7,560	153	5,670	113
3.0	3,969	108	3,213	90
4.0	3,213	126	2,556	104
6.0	2,367	189	1,890	153
8.0	1,800	225	1,422	162
10.0	1,440	225	1,170	167

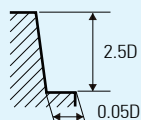
RPM = rev. / min.
FEED = mm / min.



[WTE504, WTE514 series]

WORKPIECE	ALLOY STEELS CARBON STEELS (SCM, SNCM, S45C)		PREHARDENED STEELS (NAK, CENA, KP4)	
HARDNESS	~ HRc35		HRc35 ~ HRc45	
STRENGTH	~ 1100N/mm ²		1100 ~ 1500N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED
3.0	3,969	216	3,213	180
4.0	3,213	252	2,556	207
6.0	2,367	378	1,890	306
8.0	1,800	450	1,422	324
10.0	1,440	450	1,170	333

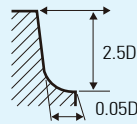
RPM = rev. / min.
FEED = mm / min.



[WTB502 series]

WORKPIECE	ALLOY STEELS CARBON STEELS (SCM, SNCM, S45C)		PREHARDENED STEELS (NAK, CENA, KP4)	
HARDNESS	~ HRc35		HRc35 ~ HRc45	
STRENGTH	~ 1100N/mm ²		1100 ~ 1500N/mm ²	
DIAMETER(mm)	RPM	FEED	RPM	FEED
0.4	36,000	144	27,900	113
0.6	25,200	144	18,900	113
0.8	18,000	144	13,950	108
1.0	14,850	149	11,250	113
2.0	7,560	153	5,670	113
3.0	3,969	108	3,213	90
4.0	3,213	126	2,556	104

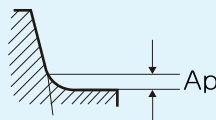
RPM = rev. / min.
FEED = mm / min.



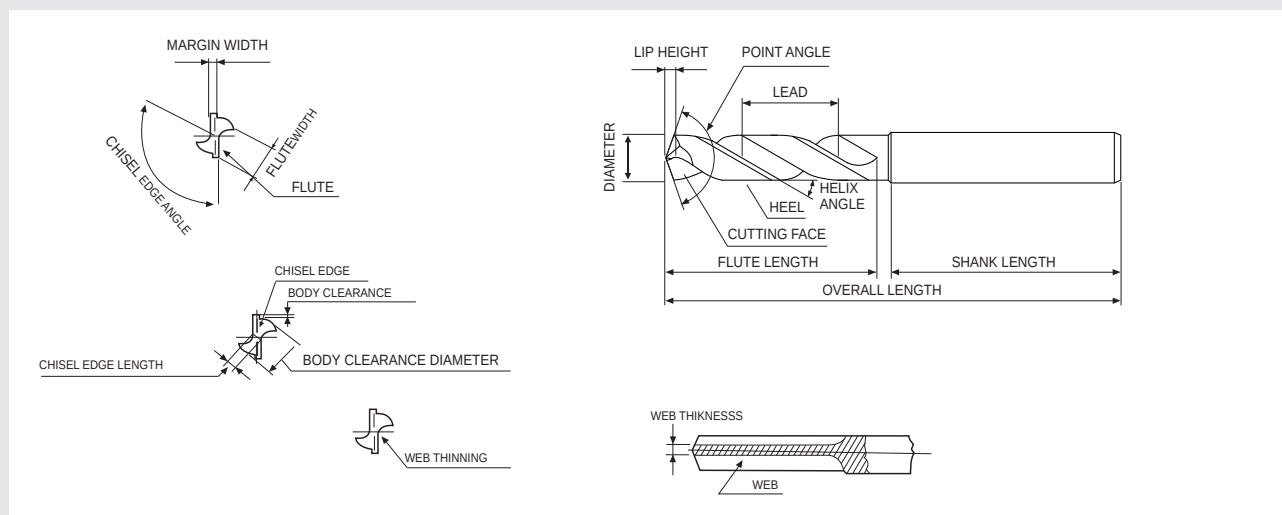
[WTR504 series]

WORKPIECE	ALLOY STEELS CARBON STEELS (SCM, SNCM, S45C)			PREHARDENED STEELS (NAK, CENA, KP4)			HARDENED STEELS (SKD, SKT, STAVAX)		
HARDNESS	~HRc35			HRc35~HRc45			HRc45~HRc55		
STRENGTH	~1100N/mm ²			1100~1500N/mm ²			1500~2000N/mm ²		
DIAMETER(mm)	RPM	FEED	Ap(mm)	RPM	FEED	Ap(mm)	RPM	FEED	Ap(mm)
0.4	40,000	630	0.008~0.016	32,000	450	0.008~0.012	22,000	270	0.004~0.008
0.6	30,000	630	0.012~0.024	23,000	450	0.012~0.018	15,000	270	0.006~0.012
0.8	22,500	630	0.016~0.032	17,000	450	0.016~0.024	11,500	270	0.008~0.016
1.0	18,000	630	0.020~0.040	13,500	450	0.020~0.030	9,000	270	0.010~0.020
1.2	14,400	630	0.025~0.050	11,700	450	0.025~0.040	7,200	270	0.012~0.025
1.5	11,700	630	0.030~0.060	9,000	450	0.030~0.050	5,850	270	0.015~0.030
2.0	9,000	630	0.040~0.080	7,200	450	0.040~0.060	4,500	270	0.020~0.040

RPM = rev. / min.
FEED = mm / min.

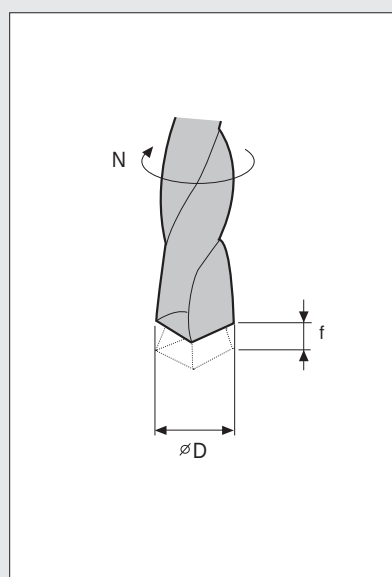


[Nomenclature of Drill]



[Working of Main Angle]

POINT ANGLE	HELIX ANGLE	LIP RELIEF ANGLE
70° 118° 140°	10° 38° 40°	7° 10° 12° 15°
Large → Torque → Small Small → Thrust → Large	Bad → Cutting Capacity → Good Good → Chip Ejection → Bad Large → Rigidity of tool → Small	Small → Tool Wear → Large Small → Vibration → Large



●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)
- π : (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)

●Helix Angle

$$\delta^\circ = \tan^{-1} \left(\frac{\pi D}{L} \right)$$

- δ : Helix angle
- D : Diameter of drill (mm)
- L : lead (mm)
- π : (3.14)

[HPI503, 505, 508 series]

WORKPIECE	NON-ALLOY STEELS		ALLOY STEELS		SOFT CAST IRON		STRONG CAST IRON	
STRENGTH	< 700N/mm ²		< 1000N/mm ²		< HB240, GG25		< HB300, GG40	
DIAMETER(mm)	RPM	FEED (mm/rev)	RPM	FEED (mm/rev)	RPM	FEED (mm/rev)	RPM	FEED (mm/rev)
1.0	16,250	0.05	14,800	0.05	26,600	0.05	17,300	0.05
2.0	16,250	0.07	14,800	0.07	26,600	0.07	17,300	0.07
3.0	16,000	0.16	14,500	0.16	26,000	0.16	17,000	0.16
4.0	12,000	0.17	11,000	0.17	20,000	0.17	13,000	0.17
5.0	9,550	0.18	8,600	0.18	16,000	0.18	10,000	0.18
6.0	8,000	0.20	7,200	0.20	13,000	0.20	8,500	0.20
7.0	6,800	0.22	6,100	0.22	11,500	0.22	7,300	0.22
8.0	6,000	0.24	5,400	0.24	9,900	0.24	6,400	0.24
9.0	5,300	0.27	4,800	0.27	8,800	0.27	5,700	0.27
10.0	4,800	0.30	4,300	0.30	8,000	0.30	5,100	0.30
12.0	4,000	0.33	3,600	0.33	6,600	0.33	4,250	0.33
14.0	3,400	0.36	3,050	0.36	5,700	0.36	3,650	0.36
16.0	3,000	0.39	2,700	0.39	5,000	0.39	3,200	0.39
18.0	2,650	0.42	2,400	0.42	4,400	0.42	2,850	0.42
20.0	2,400	0.45	2,150	0.45	4,000	0.45	2,550	0.45

[PDS, PDM series] ▶ Power Drill

V : m/min, f : mm/rev

WORKPIECE			MILD STEEL-ALLOY STEEL-CARBON STEEL		ALLOY STEEL FORGED STEEL		HIGH HARDENED STEELS		STAINLESS STEEL		DUCTILE CAST IRON		CAST IRON	
HARDNESS			≤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

WORKPIECE	MILD STEEL-ALLOY STEEL-CARBON STEEL		ALLOY STEEL FORGED STEEL		HIGH HARDENED STEELS		STAINLESS STEEL		DUCTILE CAST IRON		CAST IRON	
HARDNESS	≤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

[SSD, SSDL series]

WORKPIECE	TOOLSTEELS, ALLOYSTEELS SKD, SCM		ALUMINUM ROLLED, ALUMINUM ALLOY (AL, AC)		BRASS, BRONZE Bs, PB		EPOXY, RESIN	
DIAMETER (mm)	RPM (mm ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	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

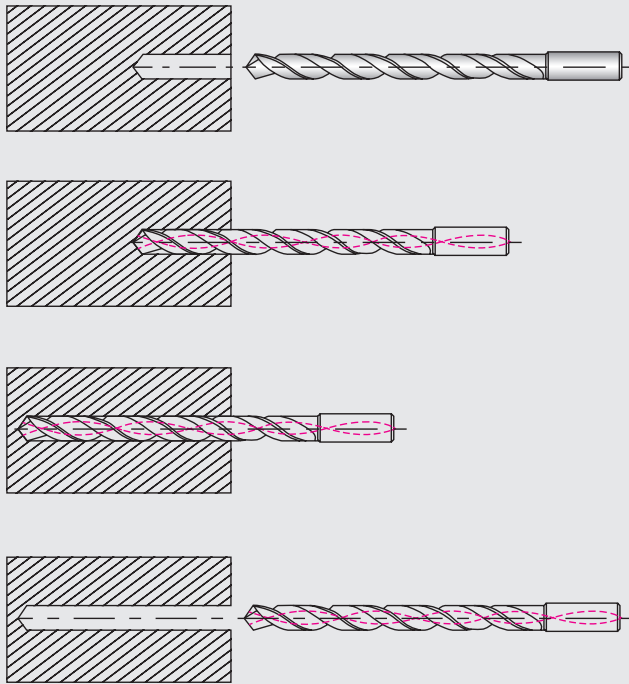
[PF50, P50 series]

WORKPIECE	CARBON STEEL (C<0.3%) ALLOY STEEL / SS400 SCM ~710N/mm ²		CARBON STEEL (C≥0.3%) ALLOY STEEL / S50C SCM ~1.060N/mm ²		SUJ2-SUS440		SKD61 HRc34~43		HRc43~48		SKD11 HRc48~53		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 ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	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]

WORKPIECE	CARBON STEEL (C<0.3%) ALLOY STEEL / SS400 SCM ~710N/mm ²		CARBON STEEL (C≥0.3%) ALLOY STEEL / S50C SCM ~1.060N/mm ²		SUJ2-SUS440		SKD61 HRc34~43		HRc43~48		SKD11 HRc48~53		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 ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	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

[SF510, SF520 series]



1. Guide Drilling should be done as Diameter+0.1mm between 3xD and 5xD
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%

WORKPIECE	CARBON STEELS ALLOY STEEL ~1060 N/mm ²		CAST IRON 250~350 N/mm ²		DUCTILE CAST IRON 400~500 N/mm ²	
Drilling Speed	63~125 m/min		63~125 m/min		60~80 m/min	
Drilling Diameter	Speed (min ⁻¹)	Feed Rate (mm/rev)	Speed (min ⁻¹)	Feed Rate (mm/rev)	Speed (min ⁻¹)	Feed Rate (mm/rev)
3	7,500	0.06 ~ 0.12	7,500	0.06 ~ 0.12	7,500	0.06 ~ 0.12
4	6,400	0.08 ~ 0.16	6,400	0.08 ~ 0.16	5,600	0.08 ~ 0.16
5	5,800	0.10 ~ 0.20	5,800	0.10 ~ 0.20	4,500	0.10 ~ 0.20
6	4,800	0.12 ~ 0.24	4,800	0.12 ~ 0.24	3,800	0.12 ~ 0.24
8	3,600	0.16 ~ 0.28	3,600	0.16 ~ 0.28	2,800	0.16 ~ 0.28
10	2,900	0.20 ~ 0.35	2,900	0.20 ~ 0.35	2,300	0.20 ~ 0.35
12	2,900	0.24 ~ 0.42	2,400	0.24 ~ 0.42	1,900	0.24 ~ 0.42
14	2,050	0.28 ~ 0.46	2,050	0.28 ~ 0.46	1,600	0.28 ~ 0.46

N = R.P.M
S = mm/rev

[SSTD series]

WORKPIECE	TOOLSTEELS, ALLOYSTEELS		ALUMINUM ROLLED, ALUMINUM ALLOY (AL, AC)		BRASS, BRONZE Bs, PB		EPOXY, RESIN	
DIAMETER (mm)	RPM	FEED (mm/rev)	RPM	FEED (mm/rev)	RPM	FEED (mm/rev)	RPM	FEED (mm/rev)
3	4,000~7,000	0.02	10,000~12,000	0.03	7,000~10,000	0.02	9,000~12,000	0.08
5	2,400~4,200	0.03	6,000~8,000	0.05	4,200~6,000	0.04	5,400~7,200	0.08
8	1,500~2,600	0.05	3,700~5,000	0.08	2,600~3,700	0.08	3,400~4,500	0.09
12	1,000~1,700	0.06	2,500~3,200	0.12	1,700~2,500	0.12	2,200~3,000	0.11

[PX50 series]

WORKPIECE	CARBON STEEL (C<0.3%) ALLOY STEEL / S400 SCM ~710N/mm ²		CARBON STEEL (C≥0.3%) ALLOY STEEL / S50C SCM ~1,060N/mm ²		SUJ2-SUS440		SKD61 HRc34~43		HRc43~48		SKD11 HRc48~53		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 ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	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

[PXI50 series]

WORKPIECE	CARBON STEEL (C<0.3%) ALLOY STEEL / S400 SCM ~710N/mm ²		CARBON STEEL (C≥0.3%) ALLOY STEEL / S50C SCM ~1,060N/mm ²		SUJ2-SUS440		SKD61 HRc34~43		HRc43~48		SKD11 HRc48~53		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 ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	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

[NDPR/NDPL series]

DIA	Medium Carbon Steel (C ≤ 0.45%)		High Carbon Steel (C > 0.45%)		Alloy steel (~ HB180)		Alloy steel (~ HB280)		High Alloy steel		Stainless steel				Gray cast iron, ductile cast iron			
	VC	F	VC	F	VC	F	VC	F	VC	F	Ferritic		Martensitic		Ferritic		Perlite	
1	80	0.02~0.04	80	0.02~0.04	80	0.02~0.04	60	0.02~0.04	55	0.02~0.04	45	0.02~0.04	35	0.02~0.04	80	0.03~0.05	60	0.02~0.04
2	80	0.04~0.06	80	0.04~0.06	80	0.04~0.06	60	0.04~0.06	55	0.04~0.06	45	0.02~0.04	35	0.02~0.04	80	0.05~0.07	60	0.04~0.06
3	80	0.04~0.10	80	0.04~0.10	80	0.04~0.10	60	0.04~0.10	55	0.04~0.10	45	0.03~0.05	35	0.03~0.05	80	0.06~0.12	60	0.04~0.10
4	80	0.06~0.12	80	0.06~0.12	80	0.06~0.12	60	0.06~0.12	55	0.06~0.12	45	0.05~0.09	35	0.05~0.09	80	0.08~0.14	60	0.06~0.12
5	80	0.12~0.18	80	0.12~0.18	80	0.12~0.18	60	0.12~0.18	55	0.12~0.18	45	0.07~0.11	35	0.07~0.11	80	0.14~0.20	60	0.12~0.18
6	80	0.14~0.20	80	0.14~0.20	80	0.14~0.20	60	0.14~0.20	55	0.14~0.20	45	0.09~0.13	35	0.09~0.13	80	0.16~0.22	60	0.14~0.20
8	80	0.16~0.22	80	0.16~0.22	80	0.16~0.22	60	0.16~0.22	55	0.16~0.22	45	0.09~0.13	35	0.09~0.13	80	0.18~0.24	60	0.16~0.22
10	80	0.20~0.26	80	0.20~0.26	80	0.20~0.26	60	0.20~0.26	55	0.20~0.26	45	0.10~0.15	35	0.10~0.15	80	0.22~0.28	60	0.20~0.26
12	80	0.18~0.28	80	0.18~0.28	80	0.18~0.28	60	0.18~0.28	55	0.18~0.28	45	0.11~0.16	35	0.11~0.16	80	0.20~0.30	60	0.18~0.28
14	80	0.20~0.30	80	0.20~0.30	80	0.20~0.30	60	0.20~0.30	55	0.20~0.30	45	0.12~0.17	35	0.12~0.17	80	0.22~0.32	60	0.20~0.30
16	80	0.22~0.32	80	0.22~0.32	80	0.22~0.32	60	0.22~0.32	55	0.22~0.32	45	0.13~0.18	35	0.13~0.18	80	0.24~0.34	60	0.22~0.32
18	80	0.26~0.36	80	0.26~0.36	80	0.26~0.36	60	0.26~0.36	55	0.26~0.36	45	0.14~0.19	35	0.14~0.19	80	0.28~0.38	60	0.26~0.36
20	80	0.28~0.38	80	0.28~0.38	80	0.28~0.38	60	0.28~0.38	55	0.28~0.38	45	0.15~0.20	35	0.15~0.20	80	0.30~0.40	60	0.28~0.38

Vc M/min
f mm/rev.

[APF505 series]

► Metric

Work Material	Aluminum Alloy	Cast Aluminum	Magnesium	Copper & Brass	Titanium
Type	6061	380			6Al-4V
SFM	450 ~ 650	300 ~ 500	250 ~ 500	250 ~ 400	100 ~ 300
Cutting Diameter	CHIPLOAD PER FLUTE(Fz)				
4	.050 ~ .100	.038 ~ .075	.038 ~ .075	.025 ~ .060	.025 ~ .050
6	.065 ~ .125	.050 ~ .100	.050 ~ .100	.050 ~ .075	.050 ~ .075
8	.090 ~ .150	.075 ~ .125	.075 ~ .125	.050 ~ .075	.050 ~ .075
10	.115 ~ .175	.075 ~ .150	.075 ~ .150	.050 ~ .100	.050 ~ .100
12	.150 ~ .200	.090 ~ .175	.090 ~ .175	.075 ~ .125	.075 ~ .125
16	.165 ~ .250	.100 ~ .200	.100 ~ .200	.075 ~ .150	.075 ~ .150

[Technical Solutions about general problems to use drill]

Problems and Circumstances	Cause	Technical Countermeasures
Not drill into workpiece	• No enough Lip Relief • Thick Web	Re-grinding of Lip Relief Get the Web thinner
Chipping-off on margin part	large jig-bushing	Use the right sized bushing on drill
Balance of cutting flutes	To overheat on drill during the operation	Reduce feed rate Supply enough cutting oil
Chipped-off on cutting flutes	• Large relief angle • High feed rate	• Adjust Lip Relief • Reduce feed rate
Damage on tang	Incomplete adhesiveness between socket and shaft	Remove foreign substance and replace it to new one when it is worn out
Damage on a drill during a processing of brass	• Wrong choice of shape of drill • Clogged-up with chips in groove	Choose suitable drill for material
crack on center of drill	• Lack of number of flutes • Huge feed rate	• Re-grinding with proper relief angle • Reduce feed rate
Getting hole size larger	• Difference between point angle and cutting flutes • Loose main spindle	• Choose good qualitative drill • Adjust spindle within measure
Damage on edge	• High feed rate • foreign substance on workpiece • Lack of cutting oil supply on drill tip	• Grind tip of drill suitable for workpiece • Reduce feed rate • Regrind it on early stage
Irregular size of chip	inappropriate grind on edge of flute or using only one side of flute	• Need a exact re-grinding • Choose good qualitative drill
Roughness of hole	• blunt edge of flute or inappropriate grinding excessive feed rate • No supply cutting oil on tip of drill	• Regrind flute edge angle • Supply plenty of appropriate cutting oil • Reduce feed rate

[CDS series]

WORKPIECE	DIE STEEL	ALLOYSTEELS		STAINLESS STEELS
HARDNESS	< 700N/mm ²	~HRc23	~HRc32	
V	30~50 m/min	30~50 m/min	20~40 m/min	15~25 m/min
DIAMETER (mm)	FEED (mm/rev)	FEED (mm/rev)	FEED (mm/rev)	FEED (mm/rev)
1.0	0.01~0.03	0.01~0.03	0.01~0.03	0.01~0.03
2.0	0.01~0.035	0.01~0.035	0.01~0.035	0.01~0.035
3.0	0.015~0.05	0.015~0.05	0.015~0.05	0.015~0.05
4.0	0.02~0.06	0.02~0.06	0.02~0.06	0.02~0.06
5.0	0.03~0.07	0.03~0.07	0.03~0.07	0.03~0.07
6.0	0.04~0.07	0.04~0.07	0.04~0.07	0.04~0.07

[LDS series]

WORKPIECE	S15C-SS400 ~500N/mm ²		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 ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	FEED (mm/rev)	RPM (mm ⁻¹)	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

[CES series]

WORKPIECE	CARBON STEELS, ALLOY STEELS						STAINLESS STEEL, TITANIUM STEEL		ALUMINUM	
HARDNESS	~HRc20		HRc20~ HRc30		HRc30~ HRc40					
STRENGTH	500~800N/mm ²		800~1000N/mm ²		1000~1300N/mm ²					
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
3	5,900	60	4,000	30	3,300	25	2,400	20	14,000	220
4	4,800	60	3,300	30	2,800	25	2,000	20	11,800	230
5	3,800	60	2,500	30	2,200	25	1,760	20	9,500	240
6	3,000	60	2,000	30	1,800	30	1,400	20	7,700	250
8	2,300	65	1,540	35	1,300	35	1,100	20	5,800	260
10	2,000	65	1,300	35	1,200	35	1,000	20	5,000	260
12	1,760	65	1,000	40	1,000	35	540	20	4,400	260
16	1,400	65	900	40	770	35	660	25	3,300	270
20	1,100	65	700	40	600	35	440	25	2,600	270

[CEM series]

WORKPIECE	CARBON STEELS, ALLOY STEELS						STAINLESS STEEL, TITANIUM STEEL		ALUMINUM	
HARDNESS	~HRc20		HRc20~ HRc30		HRc30~ HRc40					
STRENGTH	500~800N/mm ²		800~1000N/mm ²		1000~1300N/mm ²					
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
3	5,900	95	3,900	65	3,300	50	2,400	40	14,000	230
4	4,800	95	3,200	65	2,800	50	2,000	40	12,000	240
5	3,800	100	2,500	65	2,200	55	1,760	45	9,500	250
6	3,000	110	2,000	70	1,800	60	1,400	50	7,700	300
8	2,300	115	1,540	75	1,300	65	1,100	55	5,800	350
10	2,000	120	1,300	80	1,200	65	1,000	55	5,100	380
12	1,760	130	1,100	90	1,000	70	840	60	4,400	400
16	1,400	140	900	90	770	70	660	60	3,000	330
20	1,100	140	700	90	600	70	440	60	2,640	340

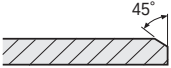
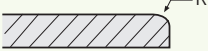
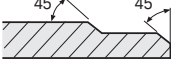
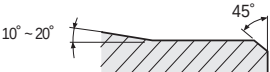
[CRC series]

WORKPIECE	CARBON STEELS S54C ~ S55C		ALLOY STEELS, TOOLS STEELS SKD / SUS / SCM		HARDENED STEELS NAK / HPM	
HARDNESS					HRc35~ HRc45	
DIAMETER(mm)	RPM	FEED	RPM	FEED	RPM	FEED
1.9	3,200	60	2,300	50	2,500	40
2.9	2,500	60	1,800	50	1,800	40
3.9	1,850	60	1,400	50	1,400	40
4.9	1,600	60	1,100	50	1,200	40
5.9	1,400	60	900	50	1,000	40

[Recommendation of Cutting Conditions in Reamer]

WORKPIECE			DIAMETER(mm)	CUTTING CONDITIONS	
MATERIAL	TENSILE STRENGTH(Kg/mm ²)	HARDNESS(HB)		V (m/min)	f (mm/rev)
CARBON STEELS, ALLOY STEELS	~ 100		~10 10~25 25~40	8 ~ 12	0.15 ~ 0.25 0.20 ~ 0.40 0.30 ~ 0.50
	100 ~ 140		~10 10~25 25~40	6 ~ 10	0.12 ~ 0.20 0.15 ~ 0.30 0.20 ~ 0.40
STEEL CASTINGS	40 ~ 50		~10 10~25 25~40	8 ~ 12	0.15 ~ 0.25 0.20 ~ 0.40 0.30 ~ 0.50
	50 ~ 70		~10 10~25 25~40	6 ~ 10	0.12 ~ 0.20 0.15 ~ 0.30 0.20 ~ 0.40
CAST IRON		~ 200	~10 10~25 25~40	8 ~ 15	0.20 ~ 0.30 0.30 ~ 0.50 0.40 ~ 0.70
		200 ~	~10 10~25 25~40	6 ~ 12	0.15 ~ 0.25 0.20 ~ 0.40 0.30 ~ 0.50
ALUMINUM ALLOY			~10	15 ~ 25	0.20 ~ 0.30
			10~25 25~40	20 ~30	0.30 ~ 0.50 0.40 ~ 0.70

[The Effect of Chamfer]

TWIST DIRECTION	CHARACTERISTICS
	If the work piece is caught by sharp blade edge, dent occurs on the machined surface. It is applied to chucking reamer, etc.
	Guide edge was rounded. The ground surface is excellent but round machining is difficult and it may deteriorate the machined surface.
	It is 2 blade-type. Chip is produced in 2 stages and it provides good results. But regrinding is difficult.
	The guide part of second stage of cutting edge is 1~2°. Cutting edge blade is long and life is limited. It provides good results on finish machining
	The guide part of second stage is 10~20. It is very economical as the length of blade is short and utilized length is long
	It is used for finish machining. It is applied to hand reamer.

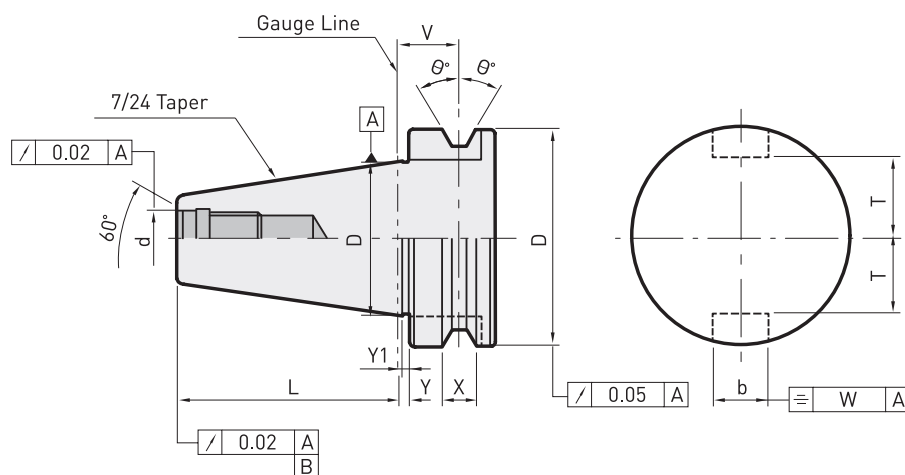
[The Effect of Twist Angle]

TWIST DIRECTION	CHARACTERISTICS
Straight blade (twist angle is 0°)	• Surface is generally poor except cast iron.
Right twist blade	• Excellent machinability and easy to discharge chip • Applicable work piece range is wide. • Excellent for high hardness work piece
Left twist blade	• Excellent surface roughness for work piece of aluminium alloys, copper, and copper alloys • It is good for machining soft materials

[Trouble Shooting of Reaming]

TROUBLE	PLAN	MEASURES
Enlarged Hole	Increase burnishing effects	• Decrease chamfer angle • Decrease back taper • Use S.Cl type cutting oil • Increase margin width • Grind 2 stages chamfer • Check reamer diameter
	Suppress the occurrence of built-up-edge	• Increase margin width • Change heat treatment conditions and microstructure of workpiece • Increase cutting oil supply • Increase cutting speed and reduce feed rate • Grind 2 stages chamfer
	Reduce the unbalance of cutting force	• The cutting edge difference shall be less than 0.005mm • Increase cutting speed • Reduce the deviation of main axis and basic Diameter • Check wear conditions of bush and replace it • Change water soluble cutting oil to non-water soluble oil
Shrunked Hole	Reduce finish effects	• Increase the clearance angle of cutting edge • Decrease margin width • Increase cutting speed • Increase back taper
Poor roundness	Reduce Chattering	• Increase the strength of machine • Change to left helix reamer • Increase back taper • Increase feed rate • Reduce the tolerance of bush • Increase margin width • Decrease cutting speed
Poor surface roughness	Increase burnishing	• Use left helix • Grind with 2 stage chamfer • Decrease chamfer angle
	Remove deposit	• Increase rake angle • Reduce feed rate • Increase cutting speed
	Remove chattering	• The cutting edge difference shall be less than 0.005mm • Increase cutting speed • Align main axis center and basic diameter center • Change water soluble cutting oil to non-water soluble oil
	Remove chip interference	• Change shape of flute type • Increase the depth of flute

[BT-SHANK]

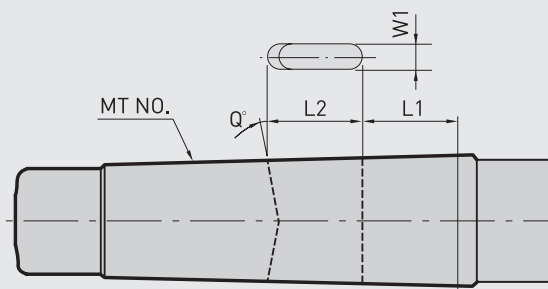


MAS403

N0	Categories of Examination		Allowable Value	Remarks
1	Adhesiveness ratio of Taper		More than 75%	More than 95%[WIDIN]
2	Taper angle allowable difference		AT3	Follow JIS AT3 of B0614
3	RUNOUT of 'D' on Taper		TIR0.05	
4	RUNOUT of 'd' on Taper		TIR0.02	
5	RUNOUT of 'B' on Taper		TIR0.02	
6	Eccentric about center of 'b'		BT30-45:0.06	Allowable value of laterality
			BT50-60:0.1	
7	Tolerance of 'L'		±0.2	
8	Tolerance of 'd'		H8	
9	Tolerance of 'd'		H12	
10	Tolerance of 't'		-0.2	
11	Tolerance of 'D'		h8	
12	Tolerance of 'V'		±0.1	
13	Tolerance of 'x'		+0.1	
14	Tolerance of Ø		-15°	Ø=30°
15	Tolerance of 'y'		±0.4	
16	Tolerance of 'y1'		-0.4	
17	Concentricity on nut of Taper		TIR0.2	Measure from 35mm needle
18	The degree of screw		6H	According to JIS B209
19	Standard intensity of illumination	Taper	1.6S	WIDIN = 0.8S
		Grinder	3.2S	
		Others	▽▽	
20	Flaw, Crack, Rust, Burr			Check by visual confirmation
21	Exterior			Anti-corrosion treatment other than grinding surface
22	carving			
23	Quality of material		SMC415	
24	Heat treatment		Depth : 0.8 ~ 1.0	Prevention of carburizing on screw
			HRC 55-62	Hardness of carburizing surface

[COTTER HOME]

- During the process of Middle-sized cutting, large-sized face mill or endmill, tapping, drill, the tools may have a possibility to fall out from the toolholder
- cotter groove is prevent to fall out of tools
- Due to discrepancy of cotter groove size by each company
Please let us know the manufacturer and L1, L2, W1 of cotter groove



MT

Assumed Taper No.	Manufacturer	Summary notation	L ₁	L ₂	W ₁	Q	Model
MT4	Yoshida	Y	15	15.5	8.2	5°	YR130
			18	15	8.2	5°	YRD1000
			9	21	8.2	5°	YD3-65
	Ooya	O	5	18	8.2	5°	R2000
			9	11	8.2	5°	RA2-1300
			10	10	8.2	5°	RE1250A
	Kurama	K	26.3	29.5	12.2	5°	
MT5	Aoyama	A	44	40	13	5°	ATB-3
	Okuma	B	27	41	12.4	5°	
	Ikegai	I	52	35	13.2	5°	
	Kurashiki	K	53	35	13.2	5°	
	Nomura	N	27	38	12.2	8°	AFB-4
	Shinada	S	37	37	16	0°	
	Toshiba	T	50	35	13	0°	
	Yoshida	Y	25	20	20	5°	YRD700
			9	33.5	8	5°	YDD700
	Ooya	O	15	25	12.2	5°	RE3-2000
			14	20	12.2	5°	RE-2500
MT6	Hyundai WIA	K	54	41.3	16.2	0°	
	Daewoo heavy industries & machinery	D	52	45	16.2	5°	
	Aoyama	A	50	38	19.3	5°	
	Okuma	B	37	48.5	16.4	5°	DRB3000
	Ikegai	I	52	45	16.2	5°	
	Kurashiki	K	54	41	16.3	5°	
	Nomura	N	27	42	16.2	8°	
	Shinada	S	54.5	47.5	19.3	0°	
	Toshiba	T	54	40	16.2	0°	

[Boring's Technical Data]

WORKPIECE	BORING DIAMETER	Finishing A Type			Rough grinding D Type		
		V(m/min)	(mm/rev)	V(m/min)	V(m/min)	(mm/rev)	V(m/min)
CARBON STEELS (S45C, S50C)	24-30	110-140	0.05-0.15	0.05-0.30	100-130	0.15-0.25	4.2
	29-40	115-150	0.05-0.15	0.05-0.30	105-140	0.15-0.30	5.7
	39-50	115-150	0.05-0.15	0.06-0.35	105-150	0.20-0.30	5.7
	49-102	115-150	0.15-0.20	0.06-0.35	105-150	0.25-0.35	6.3
	100-220	115-150	0.15-0.20	0.07-0.50	105-150	0.30-0.40	6.3
	220-500	100-130	0.15-0.20	0.07-0.50	105-150	0.30-0.40	6.3
ALLOY STEELS (SCM, SNCM)	24-30	110-140	0.05-0.15	0.05-0.30	90-120	0.15-0.25	4.2
	29-40	110-150	0.05-0.15	0.05-0.30	100-130	0.15-0.30	5.7
	39-50	110-150	0.05-0.15	0.06-0.35	100-130	0.20-0.30	5.7
	49-102	110-150	0.05-0.20	0.06-0.35	100-130	0.25-0.35	6.3
	100-220	110-150	0.05-0.20	0.07-0.50	100-130	0.30-0.40	6.3
	220-500	110-150	0.05-0.20	0.07-0.50	100-130	0.30-0.40	6.3
STAINLESS STEEL (SUS)	24-30	70-100	0.07-0.15	0.12-0.35	60-90	0.12-0.20	4.2
	29-40	80-110	0.07-0.15	0.12-0.35	70-100	0.15-0.25	5.7
	39-50	80-110	0.07-0.15	0.20-0.50	70-100	0.15-0.25	5.7
	49-102	80-110	0.10-0.20	0.20-0.50	70-100	0.20-0.30	6.3
	100-220	80-110	0.12-0.20	0.25-0.75	70-100	0.25-0.35	6.3
	220-500	80-110	0.12-0.20	0.25-0.75	70-100	0.25-0.35	6.3
CAST STEELS (FC)	24-30	75-100	0.07-0.15	0.12-0.35	60-110	0.20-0.30	4.2
	29-40	80-115	0.07-0.15	0.12-0.35	60-110	0.25-0.35	5.7
	39-50	80-115	0.07-0.15	0.20-0.50	60-110	0.25-0.35	5.7
	49-102	80-115	0.12-0.20	0.20-0.50	60-110	0.30-0.40	6.3
	100-220	80-115	0.12-0.20	0.25-0.75	60-110	0.30-0.45	6.3
	220-500	80-115	0.12-0.20	0.25-0.75	60-110	0.30-0.45	6.3
ALUMINUM ALLOY STEELS (AC)	24-30	150-300	0.05-0.15	0.12-0.35	120-300	0.20-0.30	4.2
	29-40	150-360	0.10-0.20	0.12-0.35	150-370	0.25-0.35	5.7
	39-50	150-360	0.10-0.20	0.20-0.50	150-370	0.25-0.35	5.7
	49-102	150-360	0.10-0.20	0.20-0.50	150-370	0.30-0.40	6.3
	100-220	150-360	0.10-0.25	0.25-0.75	150-370	0.30-0.45	6.3
	220-500	150-360	0.10-0.25	0.25-0.75	150-370	0.30-0.45	6.3
SPECIAL STEEL (SKD61)	24-30	30-40	0.75-0.15	0.12-0.35	25-35	0.12-0.20	4.2
	29-40	40-45	0.07-0.15	0.12-0.35	30-40	0.15-0.25	5.7
	39-50	40-45	0.07-0.15	0.20-0.50	30-40	0.15-0.25	5.7
	49-102	40-45	0.10-0.20	0.20-0.50	30-40	0.20-0.30	6.3
	100-220	40-45	0.10-0.20	0.25-0.75	30-40	0.25-0.35	6.3
	220-500	40-45	0.10-0.20	0.25-0.75	30-40	0.25-0.35	6.3

[Drill's Technical Data]

WORKPIECE	CARBON STEELS (S45C, S50C)		ALLOY STEELS (SCN, SNC, SNCM)		SPECIAL STEEL, QUENCHED AND TEMPERED STEEL(SKD11)		CAST IRON (FC25)		ALUMINUM CASTING (AC4A, ADC)	
CUTTING CONDITIONS	SPEED 22-30mm/min		SPEED 20-25mm/min		SPEED 8-12mm/min		SPEED 32-40mm/min		SPEED 63-100min	
DIAMETER(Ø)	rpm	mm/rev	rpm	mm/rev	rpm	mm/rev	rpm	mm/rev	rpm	mm/rev
1	8,000	0.03-0.05	7,000	0.03-0.05	3,200	0.03-0.05	11,500	0.04-0.06	20,000	0.06-0.09
2	4,000	0.06-0.09	3,500	0.06-0.09	1,600	0.06-0.09	5,700	0.08-0.11	10,000	0.12-0.18
3	2,800	0.10-0.13	2,400	0.10-0.13	1,060	0.10-0.13	3,850	0.11-0.16	10,000	0.20-0.28
4	2,100	0.11-0.15	1,800	0.11-0.15	800	0.11-0.15	2,900	0.13-0.19	7,500	0.24-0.34
5	1,600	0.12-0.18	1,400	0.12-0.18	630	0.12-0.18	2,260	0.16-0.22	6,300	0.28-0.40
6	1,320	0.13-0.19	1,180	0.13-0.19	530	0.13-0.19	1,900	0.19-0.26	5,000	0.34-0.48
8	1,000	0.17-0.24	900	0.17-0.24	400	0.17-0.24	1,400	0.21-0.30	4,000	0.38-0.53
10	800	0.20-0.28	710	0.20-0.28	320	0.20-0.28	1,120	0.25-0.36	3,150	0.45-0.63
12	670	0.24-0.34	600	0.24-0.34	270	0.24-0.34	950	0.30-0.42	2,650	0.53-0.75
13	610	0.26-0.36	540	0.26-0.36	240	0.26-0.36	880	0.33-0.44	2,400	0.56-0.79
14	570	0.28-0.39	500	0.28-0.39	230	0.28-0.39	820	0.31-0.42	2,250	0.57-0.81
16	500	0.30-0.43	440	0.30-0.43	200	0.30-0.43	720	0.34-0.46	1,950	0.61-0.85
18	440	0.34-0.49	390	0.34-0.49	180	0.34-0.49	640	0.36-0.50	1,750	0.63-0.90
20	400	0.36-0.50	350	0.36-0.50	160	0.36-0.50	570	0.40-0.56	1,550	0.68-0.98
22	360	0.40-0.55	320	0.40-0.55	150	0.40-0.55	520	0.42-0.59	1,400	0.73-1.06
24	330	0.41-0.60	290	0.41-0.60	135	0.41-0.60	480	0.46-0.65	1,300	0.77-1.13
26	310	0.42-0.65	270	0.42-0.65	120	0.42-0.65	440	0.47-0.68	1,200	0.81-1.20
28	290	0.45-0.70	250	0.45-0.70	110	0.45-0.70	410	0.50-0.73	1,100	0.84-1.26
30	270	0.48-0.75	230	0.48-0.75	105	0.48-0.75	380	0.54-0.78	1,000	0.87-1.32
32	250	0.51-0.80	220	0.51-0.80	100	0.51-0.80	360	0.58-0.83	950	0.90-1.38

[Endmill Cutting Condition]

Recommended Cutting Condition of General 2 flute endmill(groove processing)

WORKPIECE	CARBON STEELS (Tensile strength up to 50kgf/mm²) COPPER ALLOYS, CAST IRON(soft)		MEDIUM CARBON STEELS (Tensile strength up to 50-75kgf/mm²) COPPER ALLOYS, CAST IRON(soft)		HIGH CARBON STEELS (Tensile strength up to 75-100kgf/mm²) COPPER ALLOYS, CAST IRON(soft)		SPECIAL STEEL QUENCHED AND TEMPERED STEEL		ALUMINUM ALUMINUM ALLOYS PLASTIC	
	DIAMETER(Ø)	rpm	mm/rev	rpm	mm/rev	rpm	mm/rev	rpm	mm/rev	rpm
1	9,000	71	7,500	53	5,600	36	4,000	20	14,000	100
2	5,600	90	4,500	65	2,800	36	2,000	20	12,500	160
3	4,500	100	3,360	75	2,000	36	1,400	20	11,200	250
4	3,150	125	2,360	85	1,400	40	1,000	25	8,000	290
5	2,500	140	1,900	95	1,120	45	800	28	6,300	315
6	2,240	150	1,700	100	1,000	48	710	28	5,600	315
8	1,600	180	1,180	118	710	56	500	34	4,000	387
10	1,250	200	950	132	560	63	400	38	3,150	400
12	1,000	190	750	118	450	60	315	38	2,500	375
14	900	180	670	118	400	60	280	40	2,240	355
16	800	170	600	112	355	60	250	40	2,000	345
18	710	165	530	106	315	56	224	40	1,800	345
20	630	160	475	95	280	56	200	40	1,600	315
22	560	150	425	85	250	50	180	36	1,400	300
24	500	140	375	75	224	45	160	32	1,250	280
25	500	140	375	75	224	45	160	32	1,250	280
26	500	140	375	75	224	45	160	32	1,250	280
28	450	125	335	65	200	40	140	28	1,120	265
30	450	125	335	65	200	40	140	28	1,120	265
32	400	120	300	60	180	36	125	25	1,000	236
35	355	105	265	53	160	32	112	22	900	224
36	355	105	265	53	160	32	112	22	900	224
40	315	100	236	48	140	28	100	20	800	200
45	280	90	212	42	125	25	90	18	710	180
50	280	80	190	38	112	22	80	18	130	160

NOTE

- This table is written with a bases of the information that a cutting value of general 2flute is 1/2D and general 4flute is 1/4D.
- Reduce the feed rate by 20-50 % when the depth of cut exceeds the above.
- Use high hardened machine and chuck
- Select suitable cutting oil on workpiece

[Endmill Cutting Condition]

Recommended working condition of general 2flutes endmill(side cutting)

WORKPIECE CUTTING CONDITIONS DIAMETER (Ø)	CARBON STEELS (Tensile strength up to 50kgf/mm ²) COPPER ALLOYS, CAST IRON(soft)		MEDIUM CARBON STEELS (Tensile strength up to 50-75kgf/mm ²) COPPER ALLOYS, CAST IRON(soft)		HIGH CARBON STEELS (Tensile strength up to 75-100kgf/mm ²) COPPER ALLOYS, CAST IRON(soft)		SPECIAL STEEL QUENCHED AND TEMPERED STEEL		ALUMINUM ALUMINUM ALLOYS PLASTIC	
	rpm	mm/rev	rpm	mm/rev	rpm	mm/rev	rpm	mm/rev	rpm	mm/rev
3	5,300	250	4,000	190	2,650	95	1,600	45	18,000	800
4	3,750	300	2,800	224	1,900	106	1,120	53	12,500	900
5	3,000	335	2,240	250	1,500	118	900	60	10,000	1,000
6	2,650	355	2,000	265	1,320	125	800	63	9,000	1,000
8	1,900	425	1,400	315	950	150	560	75	6,300	1,180
10	1,500	475	1,120	355	750	170	450	85	5,000	1,250
12	1,180	450	900	330	600	160	355	85	4,000	1,180
14	1,060	425	800	315	530	160	315	90	3,550	1,120
16	950	400	710	300	475	160	280	90	3,150	1,060
18	850	400	630	280	425	150	250	90	2,800	1,060
20	750	375	560	250	375	150	200	80	2,500	1,000
22	670	355	500	224	335	132	180	71	2,000	850
24	600	335	450	200	300	118	160	63	1,800	800
25	600	335	450	200	300	118	160	63	1,800	800
26	600	335	450	200	300	118	160	63	1,800	800
28	530	300	400	180	265	106	140	56	1,600	750
30	530	300	400	180	265	106	140	56	1,600	750
32	475	260	355	160	236	95	125	50	1,250	670
35	425	250	315	140	212	85	112	45	1,250	630
36	425	250	415	140	212	85	112	45	1,250	630
40	375	236	280	125	190	75	100	40	1,120	530
45	335	250	250	140	170	85	90	45	1,000	630
50	300	240	224	125	150	75	80	40	900	560

NOTE

- This table is written by a base with the information that general 4 flute cutting depth is 0.1D X Cutting width(1.5D)
Reduce the feed rate by 1/2 of general 2 flute endmill
- Use 1.3 - 1.5 times of rotations using thready cutting
- Use high hardened machine and chuck
- Select suitable cutting oil on workpiece

[Reamer's Technical Data]

WORKPIECE	TENSILE STRENGTH or HARDNESS(kg/mm ²)	SPEED (m/min)	Feed per diameter of Reamer								Angle of inclination (°)	Angle of chamfer (°)
			Ø5	Ø10	Ø15	Ø20	Ø25	Ø30	Ø35	Ø40		
STEEL	<70	12-20	0.07	0.09	0.13	0.16	0.20	0.25	0.30	0.35	0	15-45
	70-100	10-15	0.05	0.08	0.13	0.15	0.21	0.26	0.28	0.30	0	15-45
HARDENED STEELS	100-150	6-12	0.05	0.08	0.13	0.15	0.21	0.26	0.28	0.30	0	15-45
CASTING	<220HB	8-15	0.10	0.12	0.17	0.20	0.30	0.40	0.45	0.50	0(5)	15-45
	>220HB	6-10	0.07	0.10	0.14	0.18	0.26	0.32	0.36	0.40	0(5)	15-45
MALLEABLE CAST IRON	<220HB	6-12	0.07	0.10	0.14	0.18	0.26	0.32	0.36	0.40	0	15-45
COPPER	60-80HB	15-20	0.12	0.15	0.18	0.22	0.30	0.35	0.37	0.40	5	45
BRASS	50-120HB	10-15	0.12	0.15	0.18	0.22	0.30	0.35	0.37	0.40	5	15-45
BRONZE CASTING	60-100HB	8-15	0.12	0.15	0.18	0.22	0.30	0.35	0.37	0.40	5	15-45
ALUMINUM ALLOYS	90-120HB	20-30	0.15	0.18	0.23	0.28	0.35	0.45	0.50	0.50	8	30

mm

Diameter of Reamer	Machining allowance
0.8-1.2	0.05
1.2-1.6	0.10
1.6-3.0	0.15
3.0-6.0	0.20
6.0-18.0	0.30
18.0-30.0	0.40
30.0-100.0	0.50

Note to use Reamer

- Do not reversely pull out
It induce damage on flute and illuminance degradation
- Supply enough cutting oil to drain chips smoothly

※ Get large feed rate with low cutting speed to upgrade illuminance
e.g.) Approximately 0.5mm for 10mm

[Tap's Technical Data]

WORK PIECE	LOW CARBON STEELS (up to S20C)	MEDIUM CARBON STEELS (S20-40C) SCM, FCD	HIGH CARBON STEELS (up to S20C) SKD COPPER	HARDENED STEELS (HRC25-45)	STAINLESS STEELS	CAST STEELS, BRONZE, BRONZE CASTING	CAST IRON BRASS, BRASS CASTING ALUMINUM ALLOYCASTING
CUTTING CONDITIONS	SPEED 8-13m/min	SPEED 7-12m/min	SPEED 6-9m/min	SPEED 3-5m/min	SPEED 4-7m/min	SPEED 6-11m/min	SPEED 10-15m/min
Size of Taps	rpm						
M3	850-1,380	740-1,270	640-960	320-530	420-740	640-1,170	1,060-1,590
M4	640-1,040	560-960	480-720	230-400	320-560	480-880	800-1,190
M5	510-830	450-760	380-570	190-320	260-450	380-700	640-960
M6	420-690	370-640	320-480	160-270	210-370	320-580	530-800
M8	320-520	280-480	240-360	120-200	160-280	240-440	400-600
M10	260-410	230-380	190-290	95-160	130-220	190-350	320-480
M12	210-350	190-320	160-240	80-130	110-190	160-590	270-400
M16	160-260	140-240	120-180	60-99	80-140	120-220	200-300
M20	130-210	110-190	95-140	40-80	64-110	90-180	160-240
M24	110-170	93-160	80-120	40-66	53-93	80-150	130-200
M30	85-140	74-130	64-95	32-53	42-74	64-120	110-160
M33	77-130	68-120	58-87	29-48	39-68	58-110	96-150
M36	71-120	62-110	53-80	27-44	35-62	53-97	88-130
M39	65-110	57-98	49-73	24-41	33-57	49-90	82-120
M48	53-86	46-80	40-60	20-33	27-46	40-73	66-99
M52	50-80	43-73	37-55	18-31	24-43	37-67	61-92

NOTE

- Reference point is SKH hand tap
- Refer to the following details to select cutting speed.
Cutting speed of tap and RPM is largely effected by raw material, pitch, types, diameter of drill, forming depth, workpiece and cutting oil.
Therefore, Please pay due attention to the conditions of use when referring to the table above.

[Trouble Shooting for twist Drill]

TROUBLE	CAUSES	SOLUTIONS
Chipping on cutting flute	- Sharpness of edge - Sharpness of relief angle and Thinning	- Honing(or enhance the amount of honing) - Reduce the relief angle with a change of material of tip having high toughness - Dull a thinning angle
	Too high cutting speed	- Reduce the cutting speed - Use cutting oil
	Occurrence of components of toughness(B,U,E)	- Enhance angle of inclination(30°) - Enhance cutting speed - Use Coating, Cermet material
	Occurrence of vibration and chattering	- Use machine and drill having high hardness - Fix workpiece firmly - Reduce cutting speed
Wear and damage in outside part	Too high cutting speed than the material of tip	- Reduce the cutting speed - Use cutting oil - Change point angle - Use suitable tip material
	Intermittent cutting	Change in shape of material
Damage at the cutting point	Faulty of surface on workpiece	- Use Guide Bush - Reduce the feed rate at the cutting point - Make the surface of workpiece better
	Poor natural condition and abrasiveness	- Grind by machine - Change in Thinning type
	Lack of hardness on machine and workpiece	- Use machine having high hardness - Improve the way to fix the workpiece
	the cutting condition is high	Reduce cutting speed and feed rate
Damage in the processing	twisted drill hole	- Use Guide Bush and Reduce Guide Clearance - Enhance the hardness of drill - Make tip of drill better and change thinning type having centrality
	obstruction of chip	- Step feeding - Reduce feed rate - Use cutting oil
ETC.	- Faulty of drill chucking - No back tapers on diameter of drill	- Make chucking better - Adjust time and amount of re-grinding

[Trouble shooting Reamer]

TROUBLE	CAUSES	SOLUTIONS
Poor illumination of cutting surface and excessive amount of expansion	inappropriate cutting condition excessive cutting speed excessive feed rate	· Reduce cutting speed · Reduce feed rate
· Poor illumination of surface · Excessive · Defective (out of roundness) · Defective cylindricity · Bent Hole	Defective machine Defective Low hardness of raw material's clamp Inappropriate choice of tool holder	· Adjust Vibration of spindle, Bush clearance, Elements of Bush · Enhance the hardness of clamp · Avoid to use quick change holder without Guide Bush
	Defective tool High vibration of cutting edge Defective degree of setting Excessive protrusion of tool Low hardness of tool	· Enhance of the degree of vibration · Remove damages completely (especially outside of tip) after re-grinding · Enhance the degree of Runout after setting (scratch on shank...) · Change the shape of tools enhancing hardness
	Problems on cutting oil Incorrect selection of emulsion Deterioration of emulsion, degradation of performance by decomposition	· Reduce the dilution rate.(thicken 10 to 20 times) · Use High lubricated emulsion · Change to new cutting oil · Enhance amount of supply and reach the effective cutting edge simultaneously
	Problems on workpiece Eccentricity Work on incline	· Enlarge drill angle · Reduce drill angle · Reduce feed rate
Damage	Inappropriate working condition Defective Chisel part due to excessive feed rate Chip blockage due to excessive feed rate Lack of penetration of cutting oil due to excessive the number of rotation	· Reduce feed rate · Reduce the number of rotation · circumstance: blockage of chip and wear out outside of tip
	Problems of re-grinding Degrading hardness of chisel part due to inappropriate Thinning Occurrence of increasing Burnishing Torque or wear-out main part of tip after re-grinding	· Proper grinding · Remove all damages during re-grinding
	Problems on machinery	· Repair of electrical systems · Improve the method of clamp of raw material
	Problem on cutting oil	· Replace cutting oil

[Solutions of Burnishing Drill]

TROUBLE	CAUSES	SOLUTIONS
Expansion of hole	Enhance effect of burning	· Reduce Chamfer angle · Enhance marginal gap · Reduce Back Taper · Grind 2 step chamfer · Check Fitness of Diameter of Reamer
	Control an occurrence of Built-up edge	· Reduce a marginal gap · Grind 2 step Chamfer · Change the heat treatment condition of workpiece · Reduce feed rate and Enhance cutting speed · Enhance the supply of cutting oil amount
	Reduce the unbalance of cutting power	· Make tolerance of cutting edge within 5/1000 · Increase cutting speed · Reduce spindle and Alignment of basic diameter · Check a status of wear-out of Bush and replace if it is needed · Replace water-soluble oil to water insoluble
Reduction of hole	Reduce finish effect	· Enlarge relief angle of cutting edge · Reduce marginal gap · Enlarge Back Taper · Increase cutting speed
Defective roundness	Reduce chattering	· Enhance hardness of machine · Reduce tolerance of Bush · Change to Left Helix Reamer · Enlarge Marginal gap · Enlarge Back Taper · Reduce cutting speed · Increase feed rate
Poor illumination of machined surfaces	Enlarge burnishing	· Change Left Helix Reamer · Reduce Chamfer angle · Grind as 2step chamfer
	Remove deposition	· Enlarge Rake angle · Increase cutting speed · Reduce feed
	Remove chattering	· Make tolerance of cutting edge within 5/1000 · Increase cutting speed · Fit spindle and Alignment of basic diameter
	Remove interference of chips	· Change Flute type · Make depth of flute deeper

[Solution of Endmill Trouble]

TROUBLE	CAUSES	SOLUTIONS
Tool Breakage	When related to work material	• Reduce the feed rate • Reduce the amount of rock out • Minimize the cutting length
	When in normal operation	• Reduce the feed rate • Change the tool on time(control the wear) • Change Chuck and Collet • Reduce the amount of rock out • Put honing on cutting edge • Use less no. of cutting flutes (4F→2F)
	When changing the feed direction	• Reduce the feed rate before change the direction • Change chuck and collet
Breakage on cutting edge	Breakage on Corner	• Put chamfer with hand lapper • Change from 'Down Cut' to 'Up Cut'
	Breakage on end edge on cutting length	• Change from 'Down Cut' to 'Up Cut' • Reduce the cutting speed
	Chipping	• Put honing on cutting edge • Reduce the cutting speed • Increase the feed rate when there is beep sound while machining
	Exaggerated Chipping	• Reduce the feed rate • Use less no. of cutting flutes (4F→2F) • Put honing on cutting edge (solid E/M) • Reduce the cutting speed • change the condition from 'wet working' to 'dry working' (brazed E/M) • Change from 'wet working' to 'dry working' by blowing air • Maintain appropriate cutting speed
Excessive wear generated		• Reduce the cutting speed • Change from 'Down Cut' to 'Up Cut' • Increase the feed speed
Poor illumination of machined surfaces	Constant surface roughness	• Decrease the feed speed • Use more no. of cutting flutes (2F→4F)
	When there is Built-up edge	• Increase the cutting speed • Work in wet condition • Put minute honing on cutting edge • Change from 'Down Cut' to 'Up Cut'
	When there is horizontal stripe on the surface	• Put minute honing on cutting edge • Use insoluble cutting oil • Change from 'Down cut' to 'Up cut'
Chattering Occurred		• Increase the feed speed • Change the cutting speed • Reduce the amount of rock out • Use 2F for roughing, use 4F for finishing • Change from 'Down cut' to 'Up cut'

[Solution of Lathe Turning Trouble]

Types of trouble		Selection of tool material grade	Selection of tool's shape	Selection of cutting condition	Workpiece
A B R A S I O B	Mechanical abrasion	Select high wear-resistant materials which are same material types of workpiece	- Enlarge relief angle - Enlarge sub cutting depth angle - Enlarge cutting nose radius - Less honing	- Lower cutting speed - Use moderate feed rate - Use moderate cutting fluid	Hard material Carbon Cermet Glass
	Thermal abrasion		Moderate relief angle, sub cutting depth angle and cutting nose radius	- Lower cutting speed - Lower feed rate - Use cutting fluid (Check the material)	Hard material
	Deposition spread abrasion		Enlarge rake angle	- Lower cutting speed - Lower feed rate - Use lubricative cutting fluid	Sort of steel material
	Exudate separation abrasion		- Select the best suitable material for rake angle. - Enlarge sub cutting depth angle - Less honing	- Raise cutting speed - Raise feed rate - Use moderate cutting fluid	Ni heat resisting alloy Co hear resisting alloy Stainless High strength steel
	Chemical abrasion	Use ceramic, cermet materials	Enlarge relief angle somewhat	- Lower cutting speed - Lower feed rate - Machine without coolant or use cutting fluid with less extreme-pressure additives	General material
Heat crack		Use ceramic, cermet materials	select less thermo-genesis shape of tool nose radius angle, tool nose radius	- Lower cutting speed - Lower feed rate - Cutting without cutting fluid	Sort of steel material
Plastic deformation		Use high compressive strength material	- Enlarge relief angle, rake angle tool nose radius - Lower main cutting depth angle and less honing	- Lower cutting speed, feed rate and cutting depth. - Use fluid with high cooling effect	Hard material
Chipping		Use high ductile grade	- Lessen tool nose radius angle - Enlarge relief angle, rake angle tool nose radius - Enlarge honing	- Use moderate cutting speed - Lower feed rate	General material
Flaking		Select high wear-resistant materials	- Lessen relief angle - Enlarge corner angle - Enlarge honing	- Lower feed rate - Lessen amount of cutting depth - Use cutting fluid (Check the material)	- General material - Hard material
D E F E C T	Defect due to mechanical repeats	Use high toughness assortment	Lessen tool nose radius angle, tool nose radius and honing	- Use moderate cutting speed - Lower feed rate - Use moderate amount of cutting depth	General material
	Thermal defect	Use high toughness assortment	- Make a shape which has low heat release on tool nose radius angle, tool nose radius - Reduce honing	- Lower cutting speed and feed rate - Lower feed rate - Machine without cutting fluid	General material
	Thermal defect	Use assortment having good wear resistance		- Reduce cutting speed and feed rate - Reduce amount of cutting depth - Use suitable cutting oil	- Hard material - General material
	Pressure Separation defect	Use high toughness assortment	- Reduce angle of inclination - Enlarge main angle of depth of cut - Enlarge honing	- Enhance cutting speed - Enhance feed rate - Use high lubricative cutting oil	- Ni heat resisting alloy - Co hear resisting alloy - Stainless - High strength steel
	Defect of plastic deformation	- Use good assortment with high wear resistance - Cermet assortment is inappropriate	- Adjust relief angle, the angle of inclination properly - Reduce main angle of depth of cut - Reduce toughness radius - Reduce honing	- Reduce cutting speed - Reduce feed rate - Use suitable cutting oil - No use on ceramic	- Hard material - General material
	Defect of cutting flute and illumination	Use high toughness assortment	- Pay attention to grinding tool - Lower grain size of diamond stoneware - Pay attention to the grinding direction of built up edge	- Reduce cutting speed - Reduce feed rate - Reduce insertion volume	General material
	Defect due to change in grinding and brazing	- Use high toughness assortment - Not possible to use Cermet	- Consider the ratio of tip sink and thickness - Grind carefully - Cool down slowly when it braze - Use large shank		General material

[Cutting Speed & Torque]

CUTTING SPEED

$$V = \frac{3.14 \times D \times N}{1000} \quad (\text{mm/rev})$$

- V : cutting speed (mm/min)
- D : drill diameter (mm)
- N : revolutions per minute (r.p.m)

FEED RATE

$$F = \frac{S}{N} \quad (\text{mm/min})$$

- f : feed rate (mm/rev)
- S : cutting depth per minute (mm/min)
- N : revolutions per minute (r.p.m)

CUTTING TORQUE & THRUST

$$Md = Kd2 \times (0.0631 + 1.686 \times f) \quad (\text{kg/cm})$$

$$T = 57.95KDf^{0.85}(\text{kg})$$

- Md : cutting torque (kg/cm)
- K : cutting thrust (kg)
- D : drill diameter (mm)
- f : feed rate (mm/rev)
- T : material modulus

WORKPIECE	STRENGTH kg/mm ²	HARDNESS (HB)	CUTTING THRUST (K)
CAST IRON	21	177	1.00
MEEHANITE CAST IRON	28	198	1.39
CAST IRON-GRAY	35	224	1.88
1020Steel(Carbon steel C 0.2%)	55	160	2.22
1112Steel(Free cutting steel C 0.12, S 0.2%)	62	183	1.42
1335Steel(Mn 1.75%)	63	197	1.45
3115Steel(Ni 1.25, Cr 0.6, Mn 0.5)	53	163	1.56
3120Steel(Ni 1.25, Cr 0.6, Mn 0.7)	69	174	2.02
3140Steel	88	241	2.32
4115Steel(Cr 0.5, Mo 0.11, Mn 0.8)	63	167	1.62
4130Steel(Cr 0.95, Mo 0.2, Mn 0.5)	77	229	2.10
4140Steel(Cr 0.95, Mo 0.2, Mn 0.85)	94	269	2.41
4615Steel(Ni 1.8, Mo 0.25, Mn 0.5)	75	212	2.12
4820Steel(Ni 3.5, Mo 0.25, Mn 0.6)	140	390	3.44
5150Steel(Cr 0.8, Mn 0.8)	95	277	2.46
6115Steel(Cr 0.6, Mo 0.6, V 0.12)	58	174	2.08
6120Steel(Cr 0.8, Mn 0.8, V 0.1)	80	255	2.22
6130Steel	79	260	2.20

[Cutting Speed & Required Power]

CUTTING SPEED

$$V = \frac{3.14 \times D \times N}{1000} \quad (\text{mm/rev})$$

- V : cutting speed (mm/min)
- D : drill diameter (mm)
- N : revolutions per minute (r.p.m)

FEED RATE

$$F = f \times Z \times N \quad (\text{mm/min})$$

$$f = \frac{S}{N} \quad (\text{mm/min})$$

- F : table r.p.m (mm/min)
- S : feed rate per tooth (mm/tooth)
- Z : flute
- N : revolutions per minute (r.p.m)

REQUIRED POWER

$$W = \frac{S}{60 \times 102 \times \eta} \quad (\text{km})$$

$$H_p = \frac{w}{0.75} \quad (\text{km})$$

$$Q = \frac{L \times f \times V \times L \times Z}{1000} = \frac{D \times f \times V \times L \times Z}{3.14 \times D}$$

- W : required power (Kw)
- H_p : horse power
- Q : quantity of emission (cm³/min)
- L : cutting width (mm)
- F : table r.p.m (mm/min)
- d : cutting depth (mm)
- K_s : specific cutting force (kg/mm²)
- η : the modulus of a machine (0.5 - 0.75)

WORKPIECE	STRENGTH (kg/mm ²) HARDNESS	SPECIFIC CUTTING FORCE PER FEED RATE(kg/mm ²)				
		0.1(mm/FLUTE)	0.2(mm/FLUTE)	0.3(mm/FLUTE)	0.4(mm/FLUTE)	0.6(mm/FLUTE)
MILD STEEL	52	220	195	182	170	158
MEDIUM STEEL	62	198	180	173	160	157
HIGH STEEL	72	252	220	204	185	174
TOOL STEELS	67	198	180	173	170	160
TOOL STEELS	77	203	180	175	170	158
CHROME MANGANESE STEEL	77	230	200	188	175	166
CHROME MANGANESE STEEL	63	275	230	206	180	178
CHROME MOLYBDENUM STEEL	73	254	225	214	200	180
CHROME MOLYBDENUM STEEL	60	218	200	186	180	167
NICKEL CHROME MOLYBDENUM STEEL	94	200	180	168	160	150
NICKEL CHROME MOLYBDENUM STEEL	HB 352	210	180	176	170	153
CAST STEELS	52	280	250	232	220	204
CAST IRON	HRC 46	300	270	250	240	220
MEEHANITE CAST IRON	36	218	200	175	160	147
CAST IRON-GRAY	HB 200	175	140	124	105	97
BRASS	50	115	95	80	70	63
Light alloy(Al-Mg)	16	58	48	40	35	32
Light alloy(Al-Si)	20	70	60		45	39

[Cutting Speed & Torque]

CUTTING SPEED

$$V = \frac{3.14 \times D \times N}{1000} \quad (\text{mm/min})$$

calculating cutting speed at r.p.m 1

$$N = \frac{1000 \times V}{3.14 \times D}$$

- N : revolutions per minute (r.p.m)
- V : cutting speed (mm/min)
- D : diameter of work piece (mm)

CUTTING TORQUE & THRUST

$$W = \frac{Q \times K_s}{60 \times 102 \times \eta} = \frac{D \times f \times d \times K_s}{60 \times 102 \times \eta}$$

$$H_p = \frac{W}{0.75}$$

- W : revolutions per minute (Kw)
- Q : volume of Chip (cm)
- V : feed rate (mm/min)
- f : cutting depth (mm/rev)
- d : cutting depth (mm)
- η : the modulus of a machine (0.5 - 0.85)
- H_p : horse power
- K_s : specific cutting force of work piece (kg/cm)

SPECIFIC CUTTING FORCE

WORKPIECE	STRENGTH (kg/mm ²) HARDNESS	SPECIFIC CUTTING FORCE PER FEED RATE(kg/mm ²)				
		0.1(mm/FLUTE)	0.2(mm/FLUTE)	0.3(mm/FLUTE)	0.4(mm/FLUTE)	0.6(mm/FLUTE)
MILD STEEL	52	361	310	272	250	228
MEDIUM STEEL	62	308	270	257	245	230
HIGH STEEL	72	450	360	325	295	264
TOOL STEELS	67	304	280	263	250	240
TOOL STEELS	77	315	285	262	245	234
CHROME MANGANESE STEEL	77	383	325	290	265	240
CHROME MANGANESE STEEL	63	451	390	324	290	263
CHROME MOLYBDENUM STEEL	73	340	390	340	315	285
CHROME MOLYBDENUM STEEL	60	361	320	288	270	250
NICKEL CHROME MOLYBDENUM STEEL	94	307	265	235	220	198
NICKEL CHROME MOLYBDENUM STEEL	HB352	331	290	258	240	220
CAST IRON	HRC46	319	280	260	245	227
MEEHANITE CAST IRON	36	230	193	173	160	145
CAST IRON-GRAY	HB200	211	180	160	140	133

CUTTING FORCE

$$P = A \times K_s$$

- A : cutting dimensions (mm²)
- P : cutting force (kg)
- K_s : specific cutting force (kg/mm²)

$$A = d \times f$$

- A : cutting dimensions (mm²)
- d : cutting depth (kg)
- f : feed rate (kg/mm/rev)

[Drill Diameter for Tapping]

METRIC COARSE SCREW THREAD(mm) mm

THREAD SIZE	GRADE 1	GRADE 2	GRADE 3
M2X0.4	1.65	1.65	
M2.2X0.45	1.81	1.83	
M2.5X0.45	2.11	2.13	
M3X0.5	2.57	2.59	2.62
M3.5X0.5	2.95	3.01	3.05
M4X0.7	3.36	3.39	3.43
M4.5X0.75	3.81	3.85	3.89
M5X0.8	4.25	4.31	4.35
M6X1.0	5.08	5.13	5.19
M7X1.0	6.08	6.13	6.19
M8X1.25	6.85	6.85	6.92
M9X1.25	7.85	7.85	7.92
M10X1.5	8.45	8.62	8.70
M11X1.5	9.54	9.62	9.70
M12X1.75	10.3	10.4	10.5
M14X2.0	12.1	12.2	12.3
M16X2.0	14.1	14.2	14.3
M18X2.5	15.6	15.7	15.8
M20X2.5	17.6	17.7	17.8
M22X2.5	19.6	19.7	19.8
M24X3.0	21.1	21.2	21.2
M27X3.0	24.1	24.2	24.2
M30X3.5	29.6	26.6	26.8
M33X3.5	29.6	29.6	29.8
M36X4.0	32.1	32.1	32.3
M39X4.0	35.1	35.1	35.3
M42X4.5	37.6	37.6	37.9
M45X4.5	40.6	40.6	40.9
M48X5.0	43.1	43.1	43.4
M52X5.0	47.1	47.1	47.4
M56X5.5	50.6	50.6	50.9
M60X5.5	54.6	54.6	54.9
M64X6.0	57.8	57.2	58.5
M68X6.0	61.8	61.2	62.5

PIPE THREAD mm

THREAD SIZE	PF	WITH REAMER	WITHOUT REAMER	PF
1/6-28	6.79	6.11	6.23	6.49
1/8-28	8.80	8.11	8.24	8.50
1/4-19	11.8	10.8	10.9	11.3
1/8-19	15.3	14.2	14.2	14.9
1/2-14	19.1	17.7	18.0	18.5
5/8-14	21.1			
3/4-14	24.6	23.1	23.3	24.0
7/8-14	28.3			
1-11	30.9	29.1	29.4	31.1
1 1/8-1	35.5			
1 1/4-1	39.5	37.5	38.0	38.8
1 1/2-1	45.4	43.4	43.8	44.5
1 3/4-1	51.4			
2-11	57.2	54.9	55.4	56.5
2 1/4-1	63.3			72.0
2 1/2-1	72.8	70.2	70.7	84.7

UNIFIED NATIONAL COARSE(UNC) mm

THREAD SIZE	3B	2B	1B
NO. 1-64 UNC	1.57	1.75	
NO. 2-56 UNC	1.86	1.86	
NO. 3-48 UNC	2.14	2.14	
NO. 4-40 UNC	2.36	2.36	
NO. 5-40 UNC	2.69	2.69	
NO. 6-32 UNC	2.86	2.86	
NO. 8-32 UNC	3.52	3.52	
NO. 10-24 UNC	3.91	3.91	
NO. 12-24 UNC	4.51	4.57	
1/4-20 UNC	5.25	5.25	5.25
5/16-18 UNC	6.64	6.72	6.72
3/8-16 UNC	8.06	8.15	8.15
7/16-14 UNC	9.40	9.50	9.50
1/2-13 UNC	10.8	11.0	11.0
9/16-12 UNC	12.3	12.3	12.3
5/8-24 UNC	13.6	13.8	13.8
3/4-11 UNC	16.6	16.8	16.8
7/8-10 UNC	19.5	19.6	19.6
1-9 UNC	22.3	22.5	22.5
1 1/8-8 UNC	25.0	25.2	25.2
1 1/4-7 UNC	28.2	28.4	28.4
1 3/8-7 UNC	30.8	31.0	31.0
1 1/2-6 UNC	34.0	34.2	34.2
1 3/4-6 UNC	39.5	39.8	39.8
2-5 UNC	45.3	45.3	45.3
2 1/4-4 1/2 UNC	51.7	51.7	51.7
2 1/2-4 1/2 UNC	57.3	57.3	57.3
2 3/4-4 UNC	63.7	63.7	63.7
3-4 UNC	70.0	70.0	70.0
3 1/4-4UNC	76.4	76.4	76.4
3 1/2-4UNC	82.7	82.7	82.7
3 3/4-4UNC	89.1	89.1	89.1
4-4 UNC	95.4	95.4	95.1

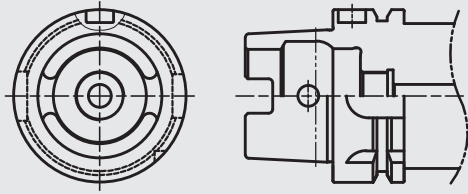
NATIONAL PIPE THREAD mm

THREAD SIZE	NPT		NPS	NPTF		NPSF
	WITH REAMER	WITHOUT REAMER		WITH REAMER	WITHOUT REAMER	
1/6-27	6.10	6.25	6.35	5.94	6.15	6.25
1/8-27	8.33	8.43	8.74	8.33	8.43	8.25
1/4-18	10.72	11.11	11.13	10.72	11.11	11.11
3/8-18	14.29	14.29	14.68	14.29	14.29	14.68
1/2-14	17.46	17.86	18.26	17.46	17.86	17.86
3/4-14	22.62	22.02	22.42	22.62	23.02	23.42
1-11 1/2	28.58	28.97	29.36	38.58	28.97	29.37
1 1/4-11 1/2	37.31	37.70	38.10	37.31	37.70	
1 1/2-11 1/2	43.66	44.05	44.45	43.26	43.66	
2-11 1/2	55.56	55.96	56.36	55.17	55.56	
2 1/2-8	65.88	66.68	67.45	65.48	66.28	

[DIN69893 HSK Tooling System]

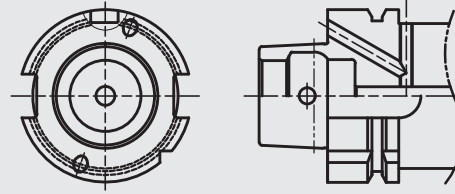
DIN69893-1, ISO 12164-1 : 2001

DIN69893 HSK Tooling System A Type



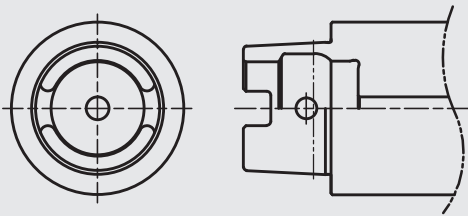
- Application : For Machining Centers.
- Torque transmission with drive keys on the taper.
- 2U-grooves for ATC, Positioning notch.

DIN69893 HSK Tooling System B Type



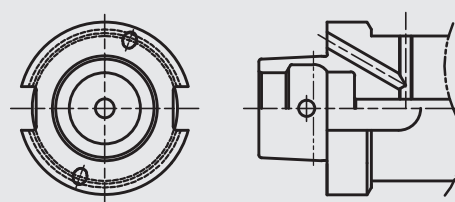
- Application : For Machining Centers, milling machines lathes.
- Flange through coolant feed or through coolant feed by coolant tube.
- Torque transmission by U-groove on the flange
- Positioning notch

DIN69893 HSK Tooling System C Type



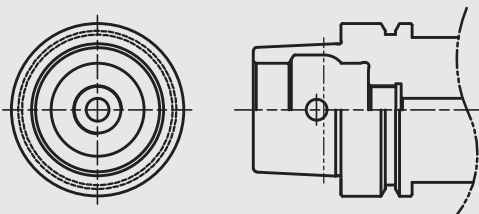
- Application : Transfer lines and special purpose machines without ATC.
- Torque transmission with drive keys on the taper.

DIN69893 HSK Tooling System D Type



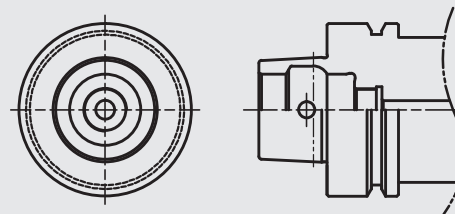
- Application : Transfer lines and special purpose machines without ATC.
- Large flange diameter
- Flange through coolant feed.
- Torque transmission by U-groove on the flange.

DIN69893 HSK Tooling System E Type



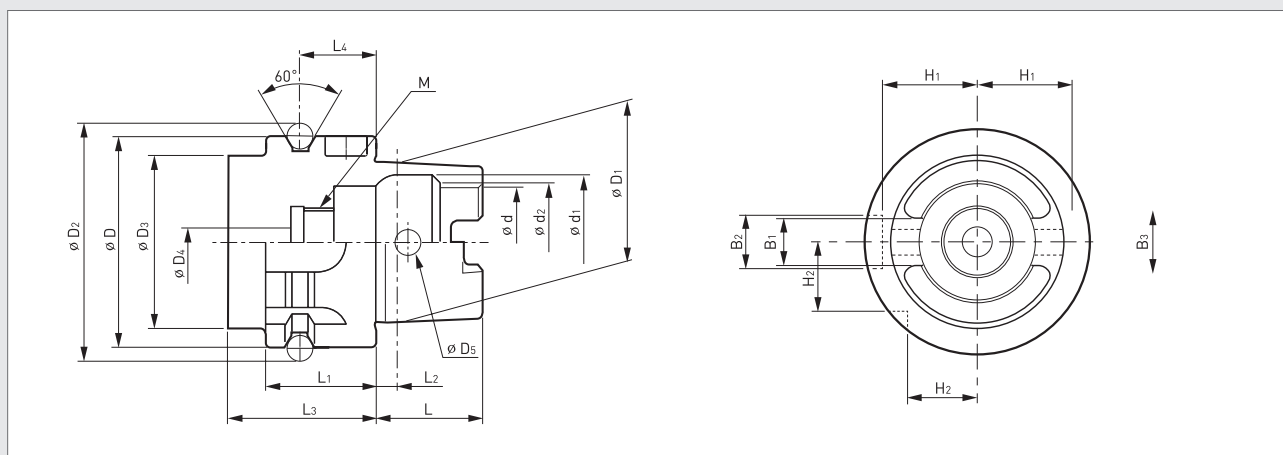
- Application : High speed machining centers and wood milling machines.
- Torque transmission by friction
- Complete symmetrical shape without drive keys.

DIN69893 HSK Tooling System F Type



- Application : High speed machining centers and wood milling machines.
- Large flange diameter.

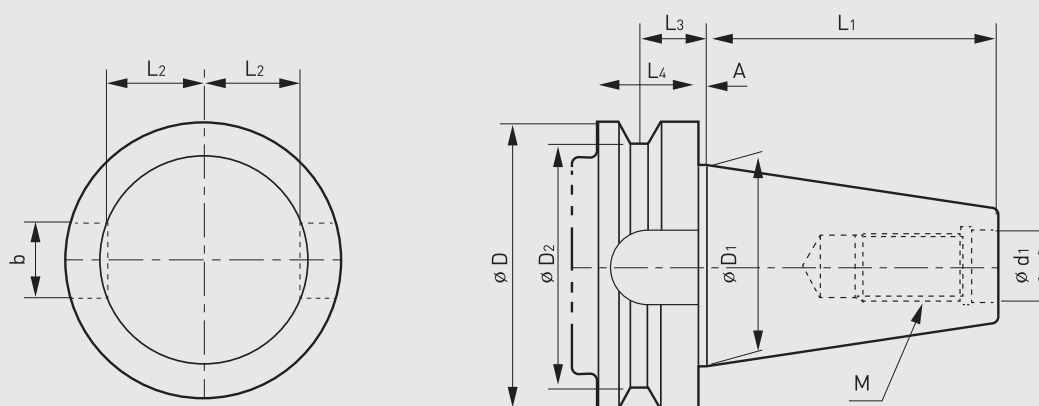
[HSK Shank DIN 69893-1, ISO 12164-1 : 2001]



TAPER	D	D1	D2	D3	D4	D5	L	L1	L2	L3	L4
HSK 40A	40	30	45.00	34	5.0	4.6	20	20	4.0	35	16
HSK 50A	50	38	59.30	42	6.8	6.0	25	26	5.0	42	18
HSK 63A	63	48	72.30	53	8.4	7.5	32	26	6.3	42	18
HSK 100A	100	75	109.75	85	12.0	12.0	50	29	10.0	45	20

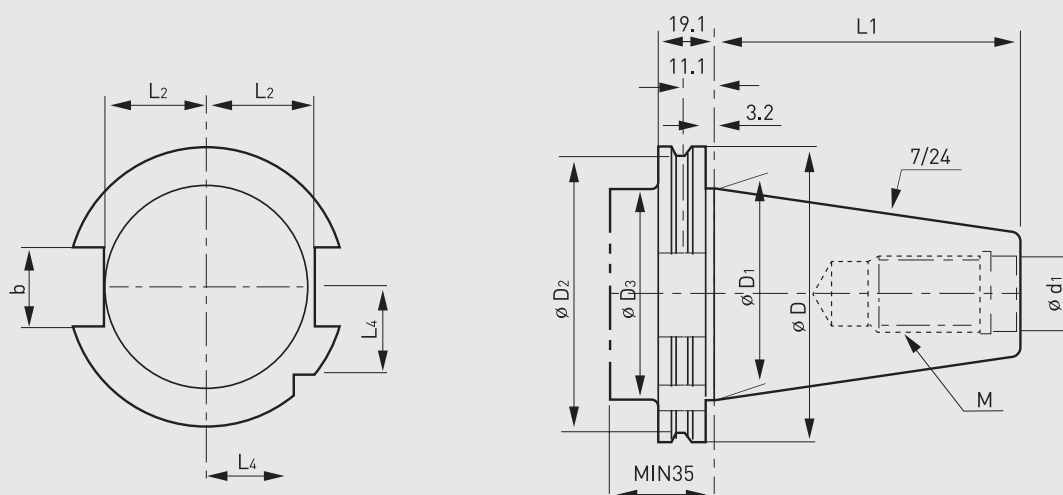
TAPER	D	D1	D2	B1	B2	B3	H1	H2	M
HSK 40A	21	25.5	23	8.05	11	9	17.0	12.0	M12 1.0
HSK 50A	26	32.0	29	10.54	14	12	21.0	15.5	M16 1.0
HSK 63A	34	40.0	37	12.54	18	16	26.5	20.0	M18 1.0
HSK 100A	53	63.0	58	20.02	22	20	44.0	31.5	M24 1.5

[Bottle Grip Taper MAS403-BT]



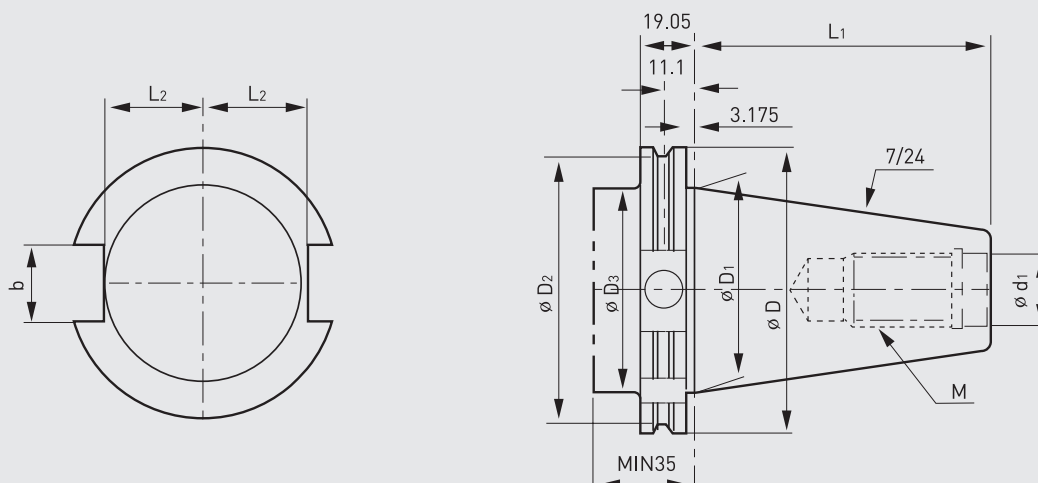
TAPER	D	D1	D2	d1	L1	L2	L3	L4	A	B	M
BT30	46	31.75	38	12.5	48.4	13.6	13.6	20	2	16.1	M12 1.75
BT40	63	44.45	53	17	65.4	16.6	16.6	25	2	16.1	M16 2
BT50	100	69.85	85	25	101.8	23.2	23.2	35	3	25.7	M24 3
BT60	155	107.95	135	31	161.8	28.2	28.2	45	3	25.7	M30 3.5

[DIN 69871-1 A/B, 7388/1 : 1983(E)]



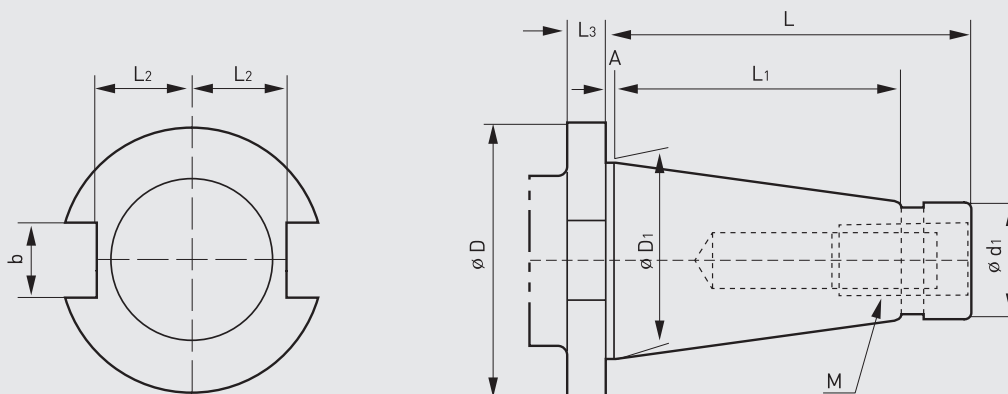
TAPER	D	D1	D2	d1	L1	L2	L3	L4	A	B	M
SK30	50	31.75	44.3	45	13	47.8	16.4	19	15	16.1	M12 1.75
SK40	63.55	44.45	56.25	50	17	68.4	22.8	25	18.5	16.1	M16 2.0
SK50	97.5	69.85	91.25	80	25	101.75	35.5	37.7	30	25.7	M24 3.0

[CAT Shank (ANSI/ASME B5.50-1985)]



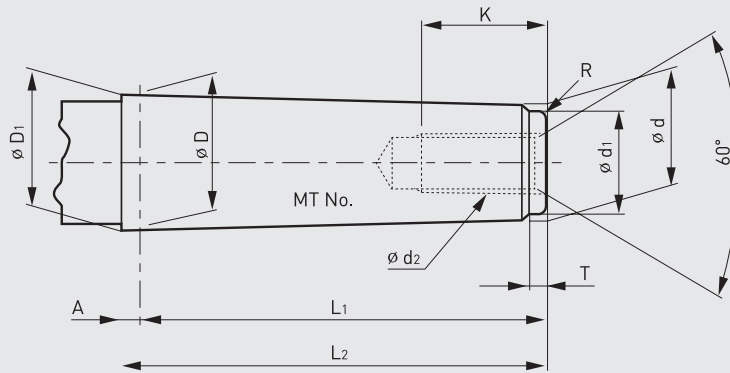
TAPER	D	D1	D2	D3	d1	L1	L2	L3	B	M
CAT30	50	31.75	44.3	31.75	13	47.625	16.25	18.67	16.1	UNC1/2-13
CAT40	63.55	44.45	56.25	44.45	17	68.25	22.60	25	16.1	UNC5/8-11
CAT50	97.5	69.85	91.25	70.1	25	101.6	35.3	37.7	25.7	UNC1-18
CAT60	155	107.95	135.26	32	161.8	161.93	54	59.3	25.7	UNC C1,1/4-7

[DIN 2080, JIS B 6101, ISO 297 : 1988(E)]



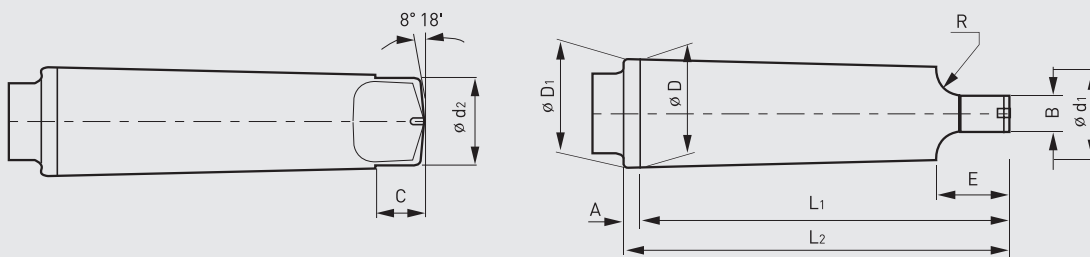
TAPER	D	D1	d1	L	L1	L2	L3	A	B	M
NT30	46	31.75	17.4	68.4	48.4	16.2	10	1.6	16.1	1/2-13UNC
NT40	63	44.45	25.3	93.4	65.4	22.5	10	1.6	16.1	UNC5/8-11
NT50	100	69.85	39.6	126.8	101.8	35.3	12	3.2	25.7	UNC1-18
NT60	155	107.95	60.2	206.8	161.8	60	15	3.2	25.7	UNC C1, 1/4-7

[Morse Taper - Screw Type]



TAPER	TAPER	TAPER ANGLE	D	A	D1	d	L1	L2	d1	d2	K	T	R
MT0	1/19.212	1°29'27"	9.045	3	9.201	6.442	5	53	6.4	-	-	4	0.2
MT1	1/20.047	1°25'43"	12.065	3.5	12.065	9.396	53.5	57	9.4	M6	16	5	0.2
MT2	1/20.020	1°25'50"	17.780	5	17.780	14.583	6	69	14.6	M10	24	5	0.2
MT3	1/19.922	1°26'16"	23.825	5	23.825	19.759	8	86	19.8	M12	28	7	0.6
MT4	1/19.254	1°29'15"	31.267	6.5	31.267	25.943	102.5	109	25.9	M16	32	9	1
MT5	1/19.002	1°30'26"	44.399	6.5	44.399	37.584	129.5	136	37.6	M20	40	9	2.5
MT6	1/19.180	1°29'36"	63.348	8	63.348	53.859	18	190	53.9	M24	50	12	4
MT7	1/19.231	1°29'22"	83.058	10	83.058	70.058	25	260	70.0	M33	80	18.5	5

[List of Taper Morse Taper tang Type]



TAPER	TAPER	TAPER ANGLE	D	A	D1	d1	L1	L2	d2	B	C	E	R	r
MT0	1/19.212	1°29'27"	9.045	3	9.201	6.104	56.5	59.5	6.0	3.9	6.5	10.5	4	1
MT1	1/20.047	1°25'43"	12.065	3.5	12.065	8.972	62.0	65.5	8.7	5.2	8.5	13.5	5	1.2
MT2	1/20.020	1°25'50"	17.780	5	17.780	14.034	75.0	80.0	13.5	6.3	10	1	6	1.6
MT3	1/19.922	1°26'16"	23.825	5	23.825	19.107	94.0	99.0	18.5	7.9	13	2	7	2
MT4	1/19.254	1°29'15"	31.267	6.5	31.267	25.164	117.5	124.0	24.5	11.9	16	2	8	2.5
MT5	1/19.002	1°30'26"	44.399	6.5	44.399	36.531	149.5	156.0	35.7	15.9	19	2	1	3
MT6	1/19.180	1°29'36"	63.348	8	63.348	52.399	210.0	218.0	51.0	19.0	27	4	1	4
MT7	1/19.231	1°29'22"	83.058	10	83.058	68.186	286.0	296.0	66.8	28.6	35	5	1	5

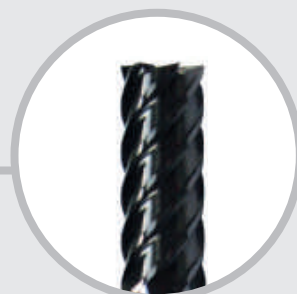
[Available product to re-grind]



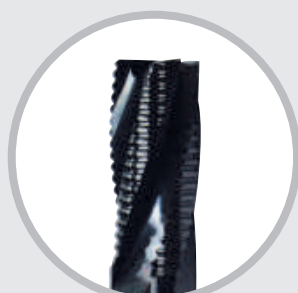
2FLUTE ENDMILL



4FLUTE ENDMILL



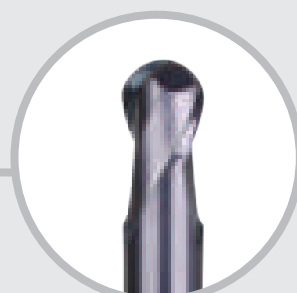
6FLUTE ENDMILL



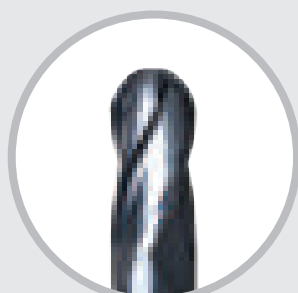
ROUGHING ENDMILL



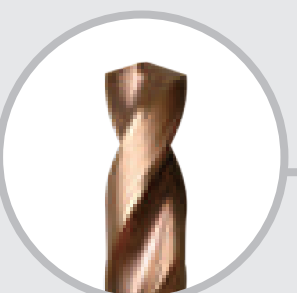
CORNER RADIUS ENDMILL



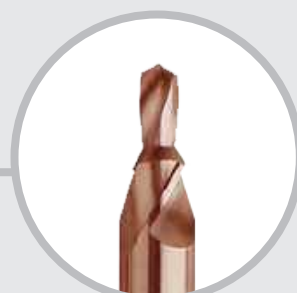
2 FLUTE BALL ENDMILL



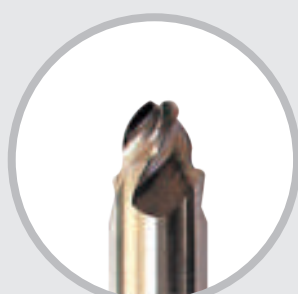
4FLUTE BALL ENDMILL



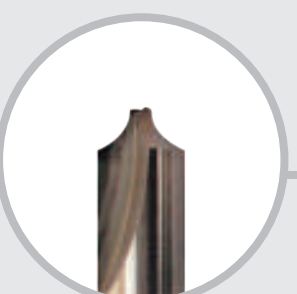
DRILL



STEP DFILL



PROFILE TOOL

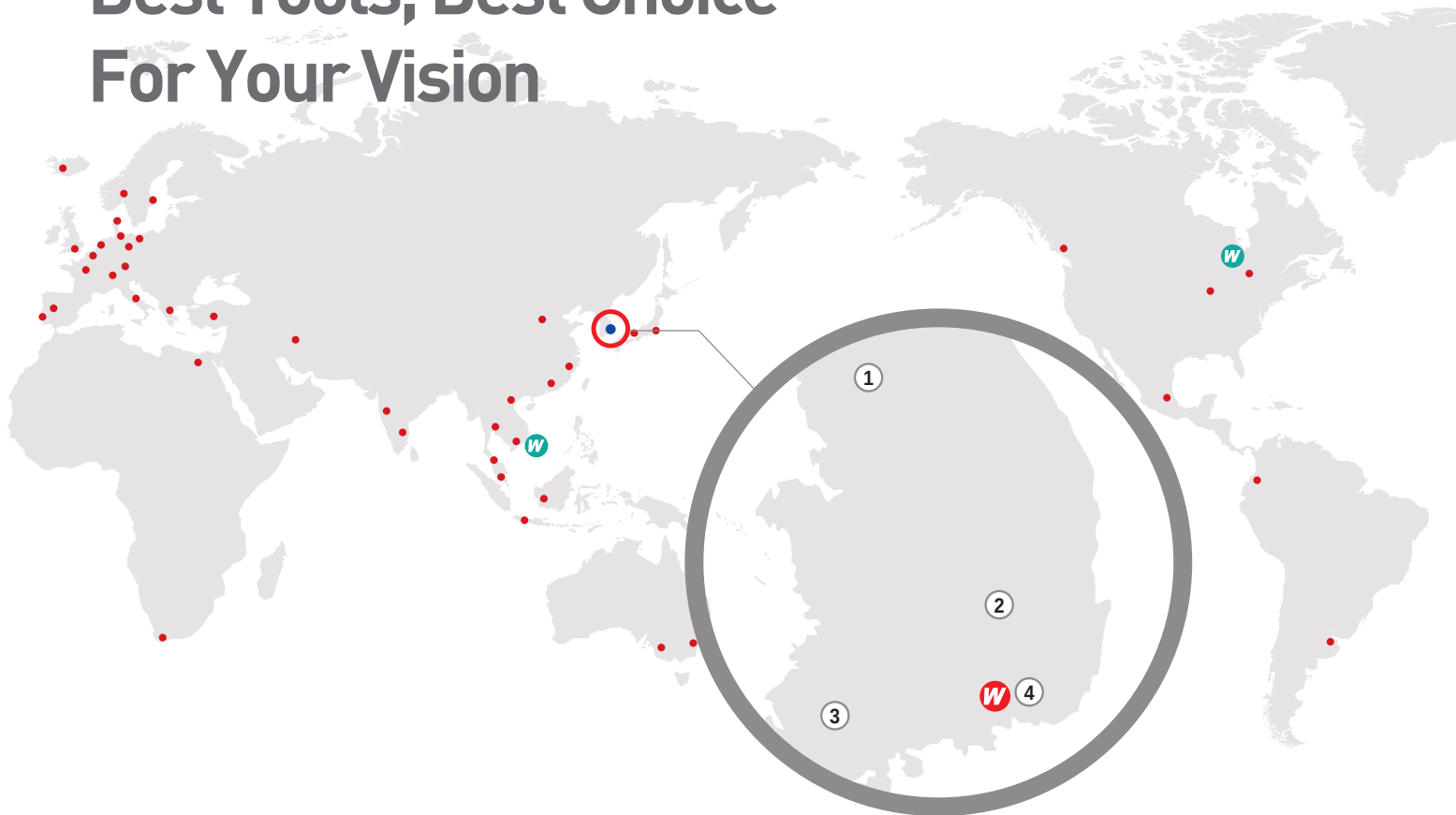


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