哈德斯通
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HADSTO CUTTING TOOLS CATALOGUE

2024-2025

Zhuzhou Huarui Precision Cutting Tools Co., Ltd.

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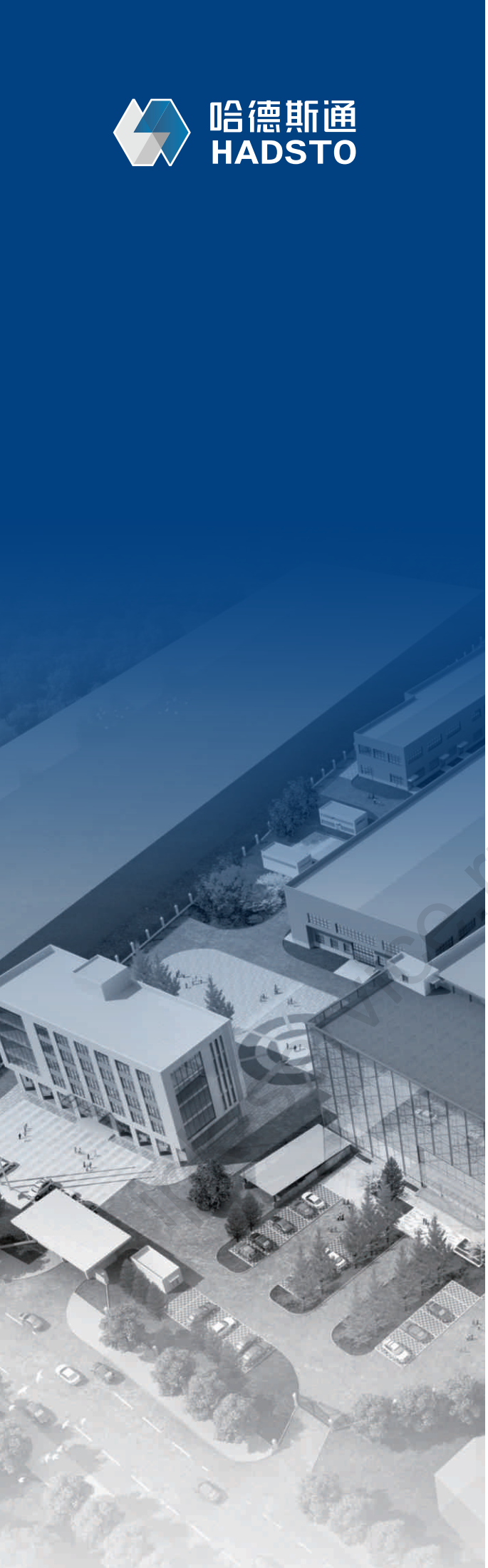


About Us

Zhuzhou Huarui Precision Cutting Tools Co., Ltd. (Stock code: 688059) was established in March 2007 with a registered capital of RMB 61.61 million.

After many years in business, we have become a top-tier cutting tool provider in China and have gained a good reputation in other parts of the world. As of now, we are a supplier to companies that are renowned internationally like Hyundai, Linamar, Cummins, Foxconn, FAW-Volkswagen, SANY, ISUZU etc.

Huareal is mainly engaged in the research, manufacturing, and sales of turning, drilling, and milling tools. HADSTO is an exclusive brand under our company's umbrella.

Our company is dedicated to developing the correct substrate material, chip breaker geometries, and various coatings to enhance the machining processes for the automobile, aerospace, rail traffic, precision mold, general machinery, and engineering machinery industries.

Content

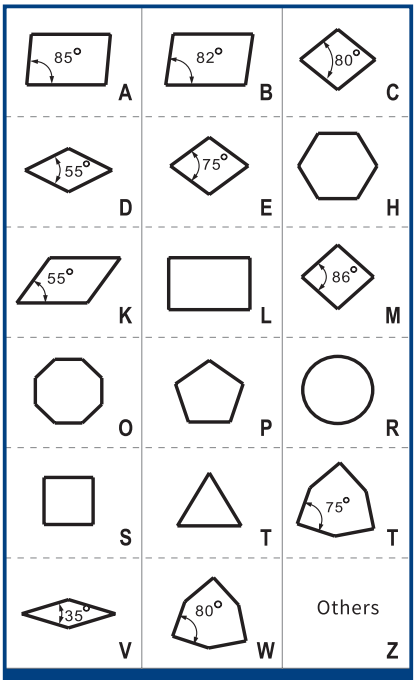
A. General Turning

B. Indexable Milling/Drilling

C. Parting, Grooving and Threading

D. Solid Carbide Cutting Tools

General Turning Inserts Code Key



Shape code

Code	Hole	Chipbreaker	Insert section	Code	Hole	Chipbreaker	Insert section
B	Yes	N/A	>65°	N	N/A	N/A	
H	Yes	Single-sided	>65°	R	N/A	Single-sided	
C	Yes	N/A	>65°	F	N/A	Double-sided	
J	Yes	Double-sided	>65°	A	Yes	N/A	
W	Yes	N/A	≤65°	M	Yes	Single-sided	
T	Yes	Single-sided	≤65°	G	Yes	Double-sided	
Q	Yes	N/A	≤65°	X	---	---	special
U	Yes	Double-sided	≤65°				

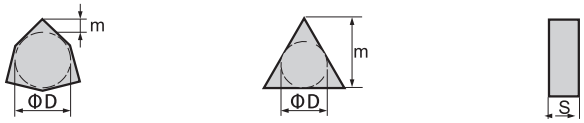
Chipbreaker and clamping form

C N M G

Major clearance angle

Code	Clearance angle	Code	Clearance angle
A	3°	B	5°
C	7°	D	15°
E	20°	F	25°
G	30°	N	0°
P	11°	O	Others

Tolerance (mm)



Class	Corner height (m)	Inscribed circle (ΦD)	Thickness (S)
A	±0.005	±0.025	±0.025
F	±0.005	±0.013	±0.025
C	±0.013	±0.025	±0.025
H	±0.013	±0.013	±0.025
E	±0.025	±0.025	±0.025
G	±0.025	±0.025	±0.13
J	±0.005	±0.05-±0.13	±0.025
K	±0.013	±0.05-±0.13	±0.025
L	±0.025	±0.05-±0.13	±0.025
M	±0.08-±0.18	±0.05-±0.13	±0.13
N	±0.08-±0.18	±0.05-±0.13	±0.025
U	±0.13-±0.38	±0.08-±0.25	±0.13

◆ Tolerance requirements M-class (Distinguished by shape and inscribed circle size)
◆ Corner height (m) tolerance

Inscribed circle	Regular triangle	Square	80° rhombus	55° rhombus	35° rhombus	Circular
6.35	±0.08	±0.08	±0.08	±0.11	±0.16	---
9.525	±0.08	±0.08	±0.08	±0.11	±0.16	---
12.7	±0.13	±0.13	±0.13	±0.15	---	---
15.875	±0.15	±0.15	±0.15	±0.18	---	---
19.05	±0.15	±0.15	±0.15	±0.18	---	---
25.4	---	±0.18	---	---	---	---

◆ Inscribed circle (ΦD) tolerance

Inscribed circle	Regular triangle	Square	80° rhombus	55° rhombus	35° rhombus	Circular
6.35	±0.05	±0.05	±0.05	±0.05	±0.05	---
9.525	±0.05	±0.05	±0.05	±0.05	±0.05	±0.05
12.7	±0.08	±0.08	±0.08	±0.08	---	±0.08
15.875	±0.10	±0.10	±0.10	±0.10	---	±0.10
19.05	±0.10	±0.10	±0.10	±0.10	---	±0.10
25.4	---	±0.13	---	---	---	±0.13

Inscribed circle diameter (mm)	C	D	R	S	T	V	W	K
32.00			32					
31.75			31					
25.40			25	25				
25.00	25	25	25					
20.00			20					
19.05	19		19	19	33			
16.00		19	16					
15.875	16		15	16	27			
12.70	12	15	12	12	22	22	08	
12.00			12					
10.00			10					
9.525	09	11	09	09	16	16	06	16
8.00			08					
6.35	06	07			11	11		
6.00			06					
5.56					09			
5.50			05					
3.97					06			

Insert shape

Cutting edge length

Code	Thickness (mm)
12	12.70
10	11.11
T9	9.72
09	9.52
07	7.94
T6	6.75
06	6.35
T5	5.95
05	5.56
T4	4.96
04	4.76
T3	3.97
03	3.18
T2	2.58
02	2.38
T1	1.98
01	1.59
T0	0.99
00	0.79

Insert thickness

12 04 08 - GT (ISO)

4 3 2 (inch)

Inscribed circle

Code	Inscribed circle diameter (mm)
2	6.35
3	9.525
4	12.7
5	15.875
6	19.05
8	25.4

Thickness

Code	Thickness (mm)
2	3.18
3	4.76
4	6.35
5	7.94
6	9.52

Corner radius

Code	Corner radius(mm)
0	0.2
1	0.4
2	0.8
3	1.2
4	1.6
5	2.0
6	2.4

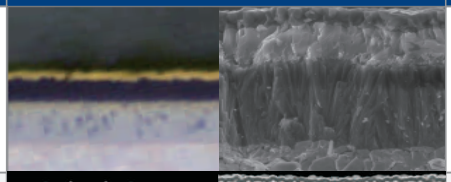
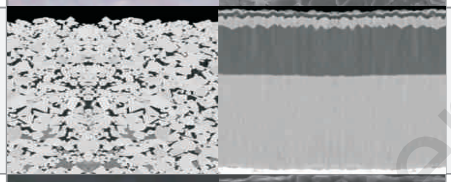
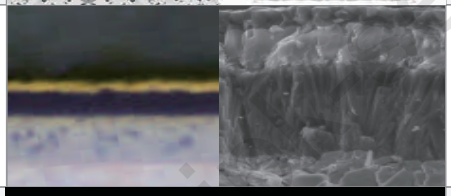
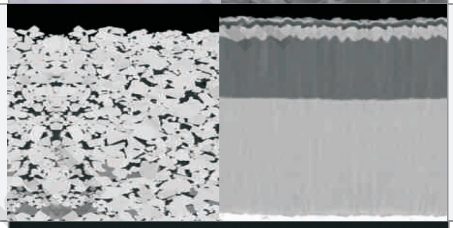
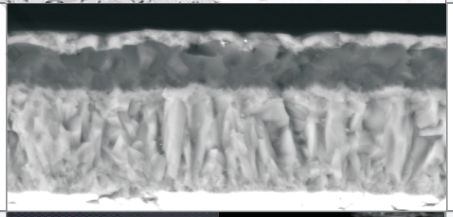
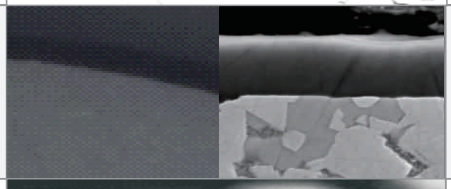
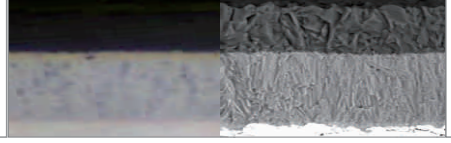
Corner radius code

Code	Corner radius (mm)
00	No fillet
02	0.2
04	0.4
08	0.8
12	1.2
16	1.6
20	2.0
24	2.4
32	3.2
X	Others
Insert diameter Mo (Metric)	Round insert

Chipbreaker code

GT	MT	M
		
BF	**BM**	**BR**
		
All-round chipbreaker	**GZ**	**GX**
		

Grade Code Key

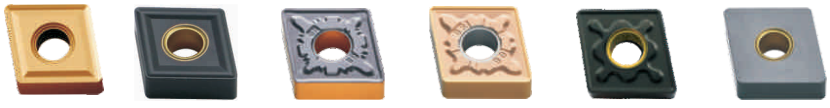
Grade	Coating					
	Type	Color	Image	Composition	Thickness	
HS8115	CVD	Black& Yellow		TiN+MT -TiCN+Al_2O_3 +TiN	Thick	
HS8215	CVD	Black& Yellow		TiN+MT -TiCN+Al_2O_3 +TiN	Thick	
HS8125	CVD	Black& Yellow		TiN+MT -TiCN+Al_2O_3 +TiN	Thick	
HS8225	CVD	Black& Yellow		TiN+MT -TiCN+Al_2O_3 +TiN	Thick	
HS7120	CVD	Yellow		TiN+MT -TiCN+Al_2O_3 +TiN	Thin	
HS7125	PVD	Ash Black		AlTiN	Thin	
HS7225	PVD	Reddish Bronze		TiAlSiN	Thin	
HS6115	CVD	Black		TiN+MT -TiCN+Al_2O_3	Thick+	
HS6120	CVD	Light Yellow		TiN+MT -TiCN+Al_2O_3	Thick+	

Characteristics	ISO	Abrasiveness ◄► Toughness 01 05 10 15 20 25 30 35 40 45
Suitable for steel turning under stable working condition	P10~P20	
Suitable for light intermittent and continuous machining of steel.High wear resistance.	P05~P20	
Suitable for intermittent machining and continuous machining of steel.	P15~P30	
Preferred grade for steel turning;Suitable for intermittent and continuous machining of steel,strong universality.	P15~P35	
Suitable grade for roughing and semi-finishing stainless steel at high speed.	M15-M30	
Suitable grade for intermittent machining and continuous machining of stainless steel	P15~P30 M15~M30 K15~K30	
Optimal grade for stainless steel turning	P15-P30 M15-M30	
Positive turning grade for ductile iron and grey cast iron	K10-K20	
Optimal grade for ductile iron and grey cast iron turning	K10-K20	

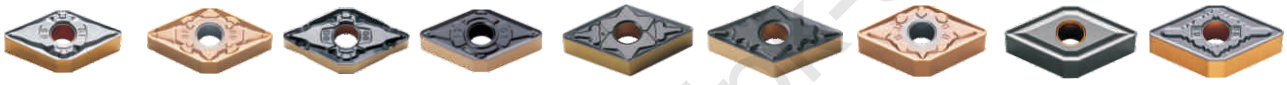
Overview of General Turning Inserts Type

• Negative Rake Inserts

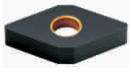
CNMG*-GF | CNMG*-BF | CNMG*-GQ | CNMG*-GT | CNMG*-MT | CNMG*-HQ | CNMG*-M | CNMG*-BM | CNMG*-MA



CNMG*-MS | CNMG* | CNMG*-GR | CNMG*-BR | CNMG*-GH | CNMA*



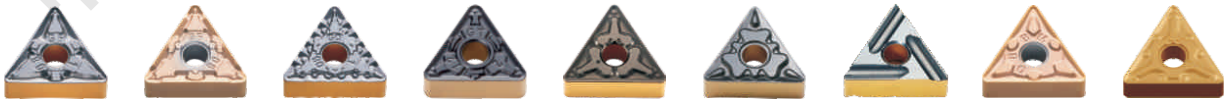
DNMG*-GF | DNMG*-BF | DNMG*-GQ | DNMG*-GT | DNMG*-MT | DNMG*-HQ | DNMG*-BM | DNMG* | DNMG*-GR



DNMA*

SNMG*-GF | SNMG*-BF | SNMG*-GQ | SNMG*-GT | SNMG*-MT | SNMG*-HQ | SNMG*-M | SNMG*-BM | SNMG*-MA

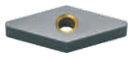
SNMG*-MS | SNMG* | SNMG*-GR | SNMG*-BR | SNMA*



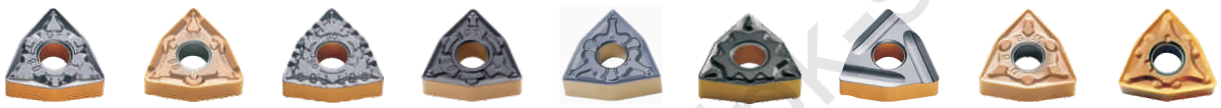
TNMG*-GF | TNMG*-BF | TNMG*-GQ | TNMA*-GT | TNMG*-MT | TNMG*-HQ | TNMG*-M | TNMG*-BM | TNMG*-MA

TNMG*-MS | TNMG*-MQ | TNMG*-S | TNMG* | TNMG*-GR | TNMG*-BR | TNMA*

VNMG*-GF VNMG*-BF VNMG*-GQ VNMG*-GT VNMG*-MT VNMG*-HQ VNMG*-BM VNMG*



VNMA*



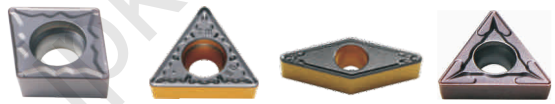
WNMG*-GF WNMG*-BF WNMG*-GQ WNMG*-GT WNMG*-MT WNMG*-HQ WNMG*-M WNMG*-BM WNMG*-MA

WNMG*-MS WNMG*-MQ WNMG* WNMG*-GR WNMG*-BR WNMG*-GH WNMA*

Heavy Turning

CNMM*-GZ CNMM*-GX SNMM*-GZ SNMM*-GX

Positive Rake Inserts



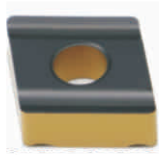
*-MP *-TM *-HQ 无代号

Profiling

RCMX* RCMX*-MR

Overview of general turning inserts

Usage	Tolerance	Chipbreaker	Shape	Features
For finishing	M	GF		**Recommended chipbreaker for finishing of P-type material** ◆ Extra-large positive rake angle, less cutting resistance. ◆ Positive cutting inclination angle can well control chip flow direction. ◆ The two-stage chip breaking table ensures good chip breaking even at small cutting depth.
		BF		**Recommended chipbreaker for finishing of M-type material** ◆ Sharp cutting edge, less cutting resistance. ◆ Good chip disposal performance even at small cutting depth.
For semi-finishing	M	GQ		**Semi-finishing of P-type material** ◆ It is suitable for finishing to semi-finishing of P-type material. ◆ Good chip removal performance with high versatility.
		GT		**Semi-finishing of P-type material** ◆ It is suitable for finishing to semi-finishing of P-type material. ◆ The cutting edge is designed for both sharpness and strength. ◆ Good chip removal performance with high versatility. ◆ The variable rake angle design combined with spherical chip-breaking grooves can adapt to a wider range of machining applications.
		MT		**Semi-finishing of P-type material** ◆ The design of the cutting edge with a +6°rake angle, rake angle and a large arc smooth transition with the rake face ensures smooth chip flow. ◆ High strength of cutting edge and strong versatility.

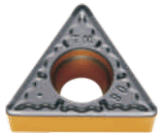
Usage	Tolerance	Chipbreaker	Shape	Features
For semi-finishing	M	HQ		**Semi-finishing of P-type material** ◆ Finishing & Semi-finishing groove type ◆ Three-dimensional rake angle and double convex point design for good cutting results.
		R/L-M		**Semi-finishing of P-type material** ◆ Light, smooth and fast cutting, suitable for medium and low speed with poor rigidity occasions . ◆ The cutting edge has reliable safety. ◆ Smooth chip breaking and high versatility.
		BM		**Recommended chipbreaker for semi-finishing of stainless steel** ◆ Sharp cutting edge, less cutting resistance, good chip disposal performance even at small cutting depth. ◆ The micro-passivated cutting edge reduces the formation of build-up edge.
		MA		**Semi-finishing of M-type material** ◆ Suitable for machining P&M-type material. ◆ The cutting edge has high strength and is capable of withstanding general impact processing situations .
		MS		**Semi-finishing of M-type material** ◆ It has strong versatility in processing stainless steel, soft steel and difficult-to-machine materials. ◆ Sharp edges and light cutting make it suitable for rough and finish machining at lower speeds.

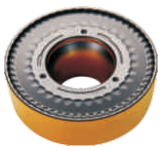
Overview of general turning inserts

Usage	Tolerance	Chipbreaker	Shape	Features
For semi-finishing	M	MQ		**Semi-finishing of M-type material** ◆ Large rake angle design, low cutting resistance, excellent chip control ability. ◆ Suitable for semi-finishing machining of stainless steel, heat-resistant alloys, titanium alloys and othermaterials
		R/L-S		**Semi-finishing of M-type material** ◆ M-type material roughing and semi-finishing grooves, double-sided chip breaking grooves, sharp cutting edges and wide chip breaking grooves. ◆ Suitable for the machining of stainless steel, soft steel, difficult-to-machine materials at low speeds. ◆ Recommended cutting parameters: ap:0.8~4.5, f_n:0.15~0.35
		All-round		**General machining chipbreaker** ◆ Double-sided chipbreaker, especially suitable for K-type material machining. ◆ Recommended cutting parameters: ap: 1.50~6.00mm, f_n: 0.24~0.5mm/r
For finishing	M	GR		**Recommended chipbreaker for roughing of P-type material** ◆ Chipbreaking table with raised corner can effectively control the chip flow direction at small cutting depth; ◆ With a large rake angle and wide chamfer, both insert strength and sharpness are ensured; ◆ Double-sided groove is more cost-effective with good chip removal performance and enhanced versatility; ◆ It is suitable for roughing and semi-finishing of light-load cutting.
		BR		**Recommended chipbreaker for roughing of M-type material** ◆ Even edge passivation; ◆ Optimized chipbreaker convex plate; ◆ With firm cutting chamfer and land, it is capable of intermittent and heavy finishing; ◆ Large chip space enable it to achieve roughing and high feed finishing.

Usage	Tolerance	Chipbreaker	Shape	Features
For finishing	M	GH		**Finishing of K-type material** ◆ The combination of wide edge and wide chip-breaking groove can realize high feed processing. Suitable for interrupted turning. ◆ Recommended cutting parameters: ap: 1.50~6.00, f_n: 0.24~0.6
		No slots		**Finishing of brittle materials & hard materials** ◆ High structural strength, good fit with the tool holder, more suitable for unstable cutting of cast iron.
For heavy machining	M	GZ		**Heavy machining chipbreaker for P-type material** ◆ The unique chipbreaker convex plate design on the rake face reduces the chip contact area at large cutting depth and provides excellent chip control. ◆ The sharp cutting edge can effectively reduce the cutting force.
		GX		**Heavy machining chipbreaker for P-type material** ◆ The variable chamfer design and special chipbreaker provide excellent chip control. ◆ The strong cutting edge can bear great impact.

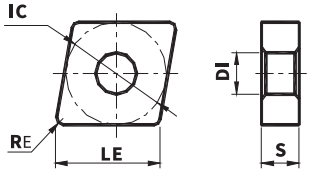
Overview of general turning inserts

Usage	Tolerance	Chipbreaker	Shape	Features
For finishing	M	MP		◆ Positive rake angle inserts exhibit excellent comprehensive performance in internal hole turning operations. ◆ Excellent chip control ability under a wide range of cutting conditions. ◆ Good versatility, suitable for a variety of processed materials.
For semi-finishing	M	TM		**General chipbreaker for semi-finshing** ◆ It's suitable for internal or external semi-finishing of steel, stainless steel and cast iron
		HQ		◆ Three-dimensional rake angle and double convex point design for good cutting results.
		No Code		◆ Striking a balance between edge strength and sharpness. ◆ Suitable for versatile machining of materials such as steel, cast iron, and stainless steel.

Usage	Tolerance	Chipbreaker	Shape	Features
Profiling insert	M	All-round chipbreaker		◆ With high strength, the cutting edge secures high safety and is the first choice for rough profiling. ◆ It is suitable for train wheel turning.
		MR		◆ Large chip-breaking space prevents chip blockage during large cutting depth machining. ◆ The small pit group improves the chip machining performance during small cutting depth machining. ◆ It is suitable for train wheel turning.

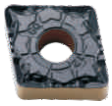
80°CN□□

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

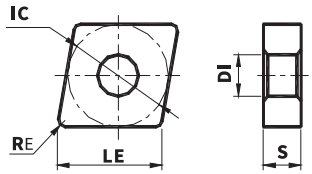
P	Steel	●	●	◕ ⌗	◕ ⌗					
M	Stainless steel					◕ ⌗			◕	◕
K	Cast iron						◕	◕		
N	Non-ferrous metal									
S	Heat resistant super alloys Titanium alloy									

Processing	Insert shape	Type	Dimension (mm)					CVD							PVD	
			LE	IC	S	DI	RE	HS8115	HS8215	HS8125	HS8225	HS7120	HS6115	HS6120	HS7125	HS7225
Finishing		CNMG120404-GF	12.9	12.7	4.76	5.16	0.4	★	★	★	★					
		CNMG120408-GF	12.9	12.7	4.76	5.16	0.8	★	★	★	★					
Finishing		CNMG120404-BF	12.9	12.7	4.76	5.16	0.4								★	★
		CNMG120408-BF	12.9	12.7	4.76	5.16	0.8								★	★
Semi-finishing		CNMG120408-GQ	12.9	12.7	4.76	5.16	0.8	★	★	★	★					
		CNMG120412-GQ	12.9	12.7	4.76	5.16	1.2	★	★	★	★					
Semi-finishing		CNMG120404-GT	12.9	12.7	4.76	5.16	0.4	★	★	★	★					
		CNMG120408-GT	12.9	12.7	4.76	5.16	0.8	★	★	★	★					
		CNMG120412-GT	12.9	12.7	4.76	5.16	1.2	★	★	★	★					
Semi-finishing		CNMG120404-MT	12.9	12.7	4.76	5.16	0.4	★	★	★	★					
		CNMG120408-MT	12.9	12.7	4.76	5.16	0.8	★	★	★	★					
		CNMG120412-MT	12.9	12.7	4.76	5.16	1.2	★	★	★	★					
Semi-finishing		CNMG120404HQ	12.9	12.7	4.76	5.16	0.4	★	★	★	★					
		CNMG120408HQ	12.9	12.7	4.76	5.16	0.8	★	★	★	★					
Semi-finishing		CNMG120404R-M	12.9	12.7	4.76	5.16	0.4	★	★	★	★					
		CNMG120404L-M	12.9	12.7	4.76	5.16	0.4	★	★	★	★					
		CNMG120408R-M	12.9	12.7	4.76	5.16	0.8	★	★	★	★					
		CNMG120408L-M	12.9	12.7	4.76	5.16	0.8	★	★	★	★					
Semi-finishing		CNMG120404-BM	12.9	12.7	4.76	5.16	0.4					☆			★	★
		CNMG120408-BM	12.9	12.7	4.76	5.16	0.8					☆			★	★
		CNMG120412-BM	12.9	12.7	4.76	5.16	1.2					☆			★	★

★ Recommended grade ☆ Available grade

80°CN□□

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

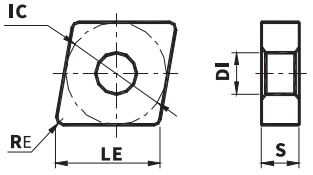
P	Steel	●	●	◕ ⌗	◕ ⌗					
M	Stainless steel					◕ ⌗			● ◕	● ◕
K	Cast iron						● ◕	● ◕		
N	Non-ferrous metal									
S	Heat resistant super alloys Titanium alloy									

Processing	Insert shape	Type	Dimension (mm)					CVD							PVD	
			LE	IC	S	DI	RE	HS8115	HS8215	HS8125	HS8225	HS7120	HS6115	HS6120	HS7125	HS7225
Semi-finishing		CNMG120404-MA	12.9	12.7	4.76	5.16	0.4								★	★
		CNMG120408-MA	12.9	12.7	4.76	5.16	0.8								★	★
Semi-finishing		CNMG120404-MS	12.9	12.7	4.76	5.16	0.4								★	★
		CNMG120408-MS	12.9	12.7	4.76	5.16	0.8								★	★
Cast iron machining		CNMG120404	12.9	12.7	4.76	5.16	0.4							★		
		CNMG120408	12.9	12.7	4.76	5.16	0.8							★		
		CNMG120412	12.9	12.7	4.76	5.16	1.2							★		
		CNMG120416	12.9	12.7	4.76	5.16	1.6							★		
		CNMG160608	16.1	15.875	6.35	6.35	0.8							★		
		CNMG160612	16.1	15.875	6.35	6.35	1.2							★		
		CNMG160616	16.1	15.875	6.35	6.35	1.6							★		
		CNMG190612	19.3	19.05	6.35	7.94	1.2							★		
		CNMG190616	19.3	19.5	6.35	7.94	1.6							★		

★ Recommended grade ☆ Available grade

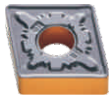
80°CN□□

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

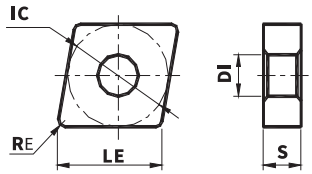
P	Steel	●	●	◕ ⌗	◕ ⌗					
M	Stainless steel					◕ ⌗			◕	◕
K	Cast iron						◕	◕		
N	Non-ferrous metal									
S	Heat resistant super alloys Titanium alloy									

Processing	Insert shape	Type	Dimension (mm)					CVD							PVD	
			LE	IC	S	DI	RE	HS8115	HS8215	HS8125	HS8225	HS7120	HS6115	HS6120	HS7125	HS7225
Roughing		CNMG120408-GR	12.9	12.7	4.76	5.16	0.8	★	★	★	★					
		CNMG120412-GR	12.9	12.7	4.76	5.16	1.2	★	★	★	★					
		CNMG190608-GR	19.3	19.05	6.35	7.94	0.8				★					
		CNMG190612-GR	19.3	19.05	6.35	7.94	1.2				★					
		CNMG190616-GR	19.3	19.05	6.35	7.94	1.6				★					
Roughing		CNMG120408-BR	12.9	12.7	4.76	5.16	0.8								★	★
		CNMG120412-BR	12.9	12.7	4.76	5.16	1.2								★	★
		CNMG190616-BR	19.3	19.05	6.35	7.94	1.6								★	★
Roughing		CNMG120408-GH	12.9	12.7	4.76	5.16	0.8							★		
		CNMG120412-GH	12.9	12.7	4.76	5.16	1.2							★		
Roughing		CNMG120404	12.9	12.7	4.76	5.16	0.4							★		
		CNMA120408	12.9	12.7	4.76	5.16	0.8							★		
		CNMA120412	12.9	12.7	4.76	5.16	1.2							★		
		CNMA120416	12.9	12.7	4.76	5.16	1.6							★		
		CNMA160608	16.1	15.875	6.35	6.35	0.8							★		
		CNMA160612	16.1	15.875	6.35	6.35	1.2							★		
		CNMA160616	16.1	15.875	6.35	6.35	1.6							★		
		CNMA190612	19.3	19.05	6.35	7.94	1.2							★		
		CNMA190616	19.3	19.05	6.35	7.94	1.6							★		
Heavy machining		CNMM190608-GZ	19.3	19.05	6.35	7.94	0.8				★					
		CNMM190612-GZ	19.3	19.05	6.35	7.94	1.2				★					
		CNMM190616-GZ	19.3	19.05	6.35	7.94	1.6				★					
		CNMM190624-GZ	19.3	19.05	6.35	7.94	2.4				★					
		CNMM250924-GZ	25.19	25.4	9.525	9.12	2.4				★					
		CNMM250932-GZ	25.19	25.4	9.525	9.12	3.2				★					

★ Recommended grade ☆ Available grade

80°CN□□

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

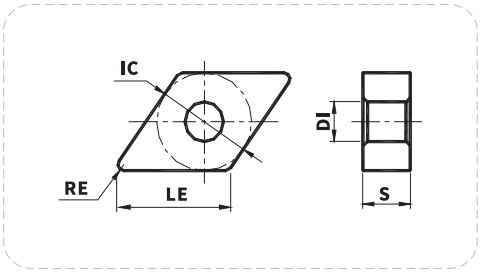
P	Steel	●	●	◕ ⌗	◕ ⌗					
M	Stainless steel					◕ ⌗			● ◕	● ◕
K	Cast iron						● ◕	● ◕		
N	Non-ferrous metal									
S	Heat resistant super alloys Titanium alloy									

Processing	Insert shape	Type	Dimension (mm)					CVD							PVD	
			LE	IC	S	DI	RE	HS8115	HS8215	HS8125	HS8225	HS7120	HS6115	HS6120	HS7125	HS7225
Heavy machining		CNMM190608-GX	19.3	19.05	6.35	7.94	0.8				★					
		CNMM190612-GX	19.3	19.05	6.35	7.94	1.2				★					
		CNMM190616-GX	19.3	19.05	6.35	7.94	1.6				★					
		CNMM190624-GX	19.3	19.05	6.35	7.94	2.4				★					
		CNMM250716-GX	25.19	25.4	7.94	9.12	1.6				★					
		CNMM250724-GX	25.19	25.4	7.94	9.12	2.4				★					
		CNMM250916-GX	25.19	25.4	9.525	9.12	1.6				★					
		CNMM250924-GX	25.19	25.4	9.525	9.12	2.4				★					
		CNMM250932-GX	25.19	25.4	9.525	9.12	3.2				★					

★ Recommended grade ☆ Available grade

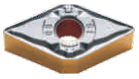
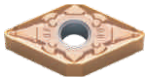
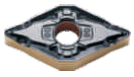
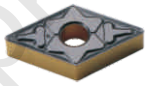
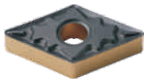
55°DN□□

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

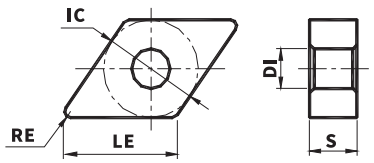
P	Steel	●	●	◕ ⌗	◕ ⌗					
M	Stainless steel					◕ ⌗			● ◕	● ◕
K	Cast iron						● ◕	● ◕		
N	Non-ferrous metal									
S	Heat resistant super alloys Titanium alloy									

Processing	Insert shape	Type	Dimension (mm)					CVD							PVD	
			LE	IC	S	DI	RE	HS8115	HS8215	HS8125	HS8225	HS7120	HS6115	HS6120	HS7125	HS7225
Finishing		DNMG150404-GF	15.5	12.7	4.76	5.16	0.4	★	★	★	★					
		DNMG150408-GF	15.5	12.7	4.76	5.16	0.8	★	★	★	★					
		DNMG150604-GF	15.5	12.7	6.35	5.16	0.4	★	★	★	★					
		DNMG150608-GF	15.5	12.7	6.35	5.16	0.8	★	★	★	★					
Semi-finishing																
		DNMG150404-BF	15.5	12.7	4.76	5.16	0.4								★	★
		DNMG150408-BF	15.5	12.7	4.76	5.16	0.8								★	★
Semi-finishing		DNMG150404-GQ	15.5	12.7	4.76	5.16	0.4	★	★	★	★					
		DNMG150408-GQ	15.5	12.7	4.76	5.16	0.8	★	★	★	★					
		DNMG150604-GQ	15.5	12.7	6.35	5.16	0.4	★	★	★	★					
		DNMG150608-GQ	15.5	12.7	6.35	5.16	0.8	★	★	★	★					
Semi-finishing		DNMG150404-GT	15.5	12.7	4.76	5.16	0.4	★	★	★	★					
		DNMG150408-GT	15.5	12.7	4.76	5.16	0.8	★	★	★	★					
		DNMG150412-GT	15.5	12.7	4.76	5.16	1.2	★	★	★	★					
		DNMG150604-GT	15.5	12.7	6.35	5.16	0.4	★	★	★	★					
		DNMG150608-GT	15.5	12.7	6.35	5.16	0.8	★	★	★	★					
		DNMG150612-GT	15.5	12.7	6.35	5.16	1.2	★	★	★	★					
Semi-finishing		DNMG150404-MT	15.5	12.7	4.76	5.16	0.4	★	★	★	★					
		DNMG150408-MT	15.5	12.7	4.76	5.16	0.8	★	★	★	★					
		DNMG150412-MT	15.5	12.7	4.76	5.16	1.2	★	★	★	★					
		DNMG150604-MT	15.5	12.7	6.35	5.16	0.4	★	★	★	★					
		DNMG150608-MT	15.5	12.7	6.35	5.16	0.8	★	★	★	★					
		DNMG150612-MT	15.5	12.7	6.35	5.16	1.2	★	★	★	★					
Semi-finishing																
		DNMG150404-HQ	15.5	12.7	4.76	5.16	0.4	★	★	★	★					
		DNMG150408-HQ	15.5	12.7	4.76	5.16	0.8	★	★	★	★					

★ Recommended grade ☆ Available grade

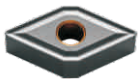
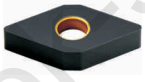
55°DN□□

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

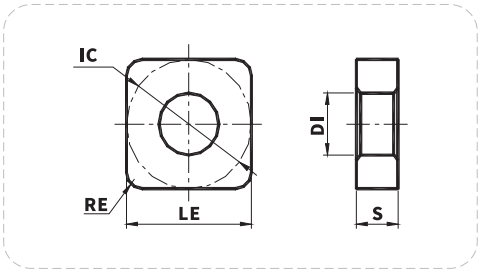
P	Steel	●	●	◕ ⌗	◕ ⌗					
M	Stainless steel					◕ ⌗			● ◕	● ◕
K	Cast iron						● ◕	● ◕		
N	Non-ferrous metal									
S	Heat resistant super alloys Titanium alloy									

Processing	Insert shape	Type	Dimension (mm)					CVD							PVD	
			LE	IC	S	DI	RE	HS8115	HS8215	HS8125	HS8225	HS7120	HS6115	HS6120	HS7125	HS7225
Semi-finishing		DNMG150404-BM	15.5	12.7	4.76	5.16	0.4					☆			★	★
		DNMG150408-BM	15.5	12.7	4.76	5.16	0.8					☆			★	★
		DNMG150412-BM	15.5	12.7	4.76	5.16	1.2					☆			★	★
		DNMG150604-BM	15.5	12.7	6.35	5.16	0.4					☆			★	★
		DNMG150608-BM	15.5	12.7	6.35	5.16	0.8					☆			★	★
		DNMG150612-BM	15.5	12.7	6.35	5.16	1.2					☆			★	★
Cast iron machining		DNMG150404	15.5	12.7	4.76	5.16	0.4							★		
		DNMG150408	15.5	12.7	4.76	5.16	0.8							★		
		DNMG150412	15.5	12.7	4.76	5.16	1.2							★		
		DNMG150604	15.5	12.7	6.35	5.16	0.4							★		
		DNMG150608	15.5	12.7	6.35	5.16	0.8							★		
		DNMG150612	15.5	12.7	6.35	5.16	1.2							★		
Roughing																
		DNMG150608-GR	15.5	12.7	6.35	5.16	0.8	★	★	★	★					
		DNMG150612-GR	15.5	12.7	6.35	5.16	1.2	★	★	★	★					
Cast iron machining		DNMA150404	15.5	12.7	4.76	5.16	0.4							★		
		DNMA150408	15.5	12.7	4.76	5.16	0.8							★		
		DNMA150412	15.5	12.7	4.76	5.16	1.2							★		
		DNMA150604	15.5	12.7	6.35	5.16	0.4							★		
		DNMA150608	15.5	12.7	6.35	5.16	0.8							★		
		DNMA150612	15.5	12.7	6.35	5.16	1.2							★		

★ Recommended grade ☆ Available grade

90°SN□□

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

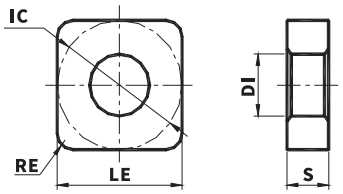
P	Steel	●	●	◕ ⌗	◕ ⌗					
M	Stainless steel					◕ ⌗			◕	◕
K	Cast iron						◕	◕		
N	Non-ferrous metal									
S	Heat resistant super alloys Titanium alloy									

Processing	Insert shape	Type	Dimension (mm)					CVD							PVD	
			LE	IC	S	DI	RE	HS8115	HS8215	HS8125	HS8225	HS7120	HS6115	HS6120	HS7125	HS7225
Finishing		SNMG120404-GF	12.7	12.7	4.76	5.16	0.4	★	★	★	★					
		SNMG120408-GF	12.7	12.7	4.76	5.16	0.8	★	★	★	★					
Finishing		SNMG120404-BF	12.7	12.7	4.76	5.16	0.4								★	★
		SNMG120408-BF	12.7	12.7	4.76	5.16	0.8								★	★
Semi-finishing		SNMG120412-GQ	12.7	12.7	4.76	5.16	1.2	★	★	★	★					
Semi-finishing		SNMG120404-GT	12.7	12.7	4.76	5.16	0.4	★	★	★	★					
		SNMG120408-GT	12.7	12.7	4.76	5.16	0.4	★	★	★	★					
		SNMG120412-GT	12.7	12.7	4.76	5.16	0.8	★	★	★	★					
Semi-finishing		SNMG120404-MT	12.7	12.7	4.76	5.16	0.4	★	★	★	★					
		SNMG120408-MT	12.7	12.7	4.76	5.16	0.8	★	★	★	★					
Semi-finishing		SNMG120404HQ	12.7	12.7	4.76	5.16	0.4	★	★	★	★					
Semi-finishing		SNMG120404R-M	12.7	12.7	4.76	5.16	0.4	★	★	★	★					
		SNMG120404L-M	12.7	12.7	4.76	5.16	0.4	★	★	★	★					
		SNMG120408R-M	12.7	12.7	4.76	5.16	0.8	★	★	★	★					
		SNMG120408L-M	12.7	12.7	4.76	5.16	0.8	★	★	★	★					
Semi-finishing		SNMG120404-BM	12.7	12.7	4.76	5.16	0.4					☆			★	★
		SNMG120408-BM	12.7	12.7	4.76	5.16	0.8					☆			★	★
		SNMG120412-BM	12.7	12.7	4.76	5.16	1.2					☆			★	★

★ Recommended grade ☆ Available grade

90°SN□□

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

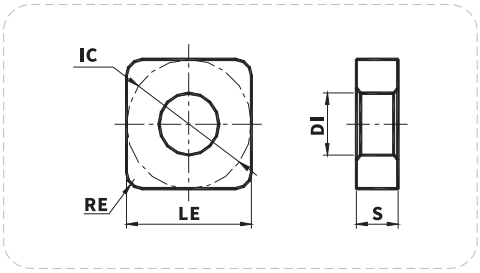
P	Steel	●	●	◕ ⌗	◕ ⌗					
M	Stainless steel					◕ ⌗			● ◕	● ◕
K	Cast iron						● ◕	● ◕		
N	Non-ferrous metal									
S	Heat resistant super alloys Titanium alloy									

Processing	Insert shape	Type	Dimension (mm)					CVD							PVD	
			LE	IC	S	DI	RE	HS8115	HS8215	HS8125	HS8225	HS7120	HS6115	HS6120	HS7125	HS7225
Semi-finishing		SNMG120404-MA	12.7	12.7	4.76	5.16	0.4								★	★
		SNMG120408-MA	12.7	12.7	4.76	5.16	0.8								★	★
Semi-finishing		SNMG120408-MS	12.7	12.7	4.76	5.16	0.8								★	★
Cast iron machining		SNMG120404	12.7	12.7	4.76	5.16	0.4							★		
		SNMG120408	12.7	12.7	4.76	5.16	0.8							★		
		SNMG120412	12.7	12.7	4.76	5.16	1.2							★		
		SNMG150608	15.875	15.875	6.35	6.35	0.8							★		
		SNMG150612	15.875	15.875	6.35	6.35	1.2							★		
		SNMG150616	15.875	15.875	6.35	6.35	1.6							★		
		SNMG190612	19.05	19.05	6.35	7.94	1.2							★		
		SNMG190616	19.05	19.05	6.35	7.94	1.6							★		

★ Recommended grade ☆ Available grade

90°SN□□

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

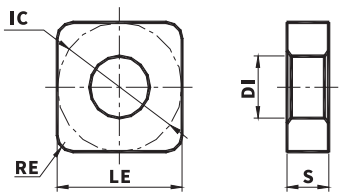
P	Steel	●	●	◕ ⌗	◕ ⌗					
M	Stainless steel					◕ ⌗			● ◕	● ◕
K	Cast iron						● ◕	● ◕		
N	Non-ferrous metal									
S	Heat resistant super alloys Titanium alloy									

Processing	Insert shape	Type	Dimension (mm)					CVD							PVD	
			LE	IC	S	DI	RE	HS8115	HS8215	HS8125	HS8225	HS7120	HS6115	HS6120	HS7125	HS7225
Roughing		SNMG120408-GR	12.7	12.7	4.76	5.16	0.8	★	★	★	★					
		SNMG120412-GR	12.7	12.7	4.76	5.16	1.2	★	★	★	★					
		SNMG190608-GR	19.05	19.05	6.35	7.94	0.8				★					
		SNMG190612-GR	19.05	19.05	6.35	7.94	1.2				★					
		SNMG190616-GR	19.05	19.05	6.35	7.94	1.6				★					
Roughing																
		SNMG120408-BR	12.7	12.7	4.76	5.16	0.8								★	★
		SNMG120412-BR	12.7	12.7	4.76	5.16	1.2								★	★
Cast iron machining		SNMA120404	12.7	12.7	4.76	5.16	0.4							★		
		SNMA120408	12.7	12.7	4.76	5.16	0.8							★		
		SNMA120412	12.7	12.7	4.76	5.16	1.2							★		
		SNMA150608	15.875	15.875	6.35	6.35	0.8							★		
		SNMA150612	15.875	15.875	6.35	6.35	1.2							★		
		SNMA150616	15.875	15.875	6.35	6.35	1.6							★		
		SNMA190612	19.05	19.05	6.35	7.94	1.2							★		
		SNMA190616	19.05	19.05	6.35	7.94	1.6							★		
Heavy machining		SNMM190608-GZ	19.05	19.05	6.35	7.94	0.8				★					
		SNMM190612-GZ	19.05	19.05	6.35	7.94	1.2				★					
		SNMM190616-GZ	19.05	19.05	6.35	7.94	1.6				★					
		SNMM190624-GZ	19.05	19.05	6.35	7.94	2.4				★					
		SNMM250924-GZ	25.4	25.4	9.525	9.12	2.4				★					
		SNMM250932-GZ	25.4	25.4	9.525	9.12	3.2				★					

★ Recommended grade ☆ Available grade

90°SN□□

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

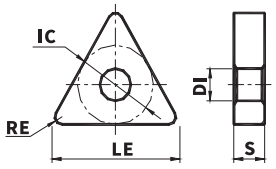
P	Steel	●	●	◕ ⌗	◕ ⌗					
M	Stainless steel					◕ ⌗			● ◕	● ◕
K	Cast iron						● ◕	● ◕		
N	Non-ferrous metal									
S	Heat resistant super alloys Titanium alloy									

Processing	Insert shape	Type	Dimension (mm)					CVD							PVD	
			LE	IC	S	DI	RE	HS8115	HS8215	HS8125	HS8225	HS7120	HS6115	HS6120	HS7125	HS7225
Heavy machining		SNMM190608-GX	19.05	19.05	6.35	7.94	0.8				★					
		SNMM190612-GX	19.05	19.05	6.35	7.94	1.2				★					
		SNMM190616-GX	19.05	19.05	6.35	7.94	1.6				★					
		SNMM190624-GX	19.05	19.05	6.35	7.94	2.4				★					
		SNMM250716-GX	25.4	25.4	7.94	9.12	1.6				★					
		SNMM250724-GX	25.4	25.4	7.94	9.12	2.4				★					
		SNMM250732-GX	25.4	25.4	7.94	9.12	3.2				★					
		SNMM250916-GX	25.4	25.4	9.525	9.12	1.6				★					
		SNMM250924-GX	25.4	25.4	9.525	9.12	2.4				★					
		SNMM250932-GX	25.4	25.4	9.525	9.12	3.2				★					

★ Recommended grade ☆ Available grade

60°TN□□

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

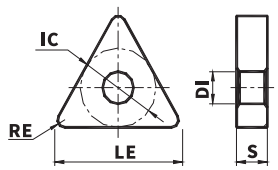
P	Steel	●	●	◕ ⌗	◕ ⌗					
M	Stainless steel					◕ ⌗			◕	◕
K	Cast iron						◕	◕		
N	Non-ferrous metal									
S	Heat resistant super alloys Titanium alloy									

Processing	Insert shape	Type	Dimension (mm)					CVD							PVD	
			LE	IC	S	DI	RE	HS8115	HS8215	HS8125	HS8225	HS7120	HS6115	HS6120	HS7125	HS7225
Finishing		TNMG160404-GF	16.5	9.525	4.76	3.81	0.4	★	★	★	★					
		TNMG160408-GF	16.5	9.525	4.76	3.81	0.8	★	★	★	★					
Finishing		TNMG160404-BF	16.5	9.525	4.76	3.81	0.4								★	★
		TNMG160408-BF	16.5	9.525	4.76	3.81	0.8								★	★
Semi-finishing		TNMG160404-GQ	16.5	9.525	4.76	3.81	0.4	★	★	★	★					
		TNMG160408-GQ	16.5	9.525	4.76	3.81	0.8	★	★	★	★					
		TNMG160412-GQ	16.5	9.525	4.76	3.81	1.2	★	★	★	★					
Semi-finishing		TNMG160404-GT	16.5	9.525	4.76	3.81	0.4	★	★	★	★					
		TNMG160408-GT	16.5	9.525	4.76	3.81	0.8	★	★	★	★					
		TNMG160412-GT	16.5	9.525	4.76	3.81	1.2	★	★	★	★					
Semi-finishing		TNMG160404-MT	16.5	9.525	4.76	3.81	0.4	★	★	★	★					
		TNMG160408-MT	16.5	9.525	4.76	3.81	0.8	★	★	★	★					
		TNMG160412-MT	16.5	9.525	4.76	3.81	1.2	★	★	★	★					
Semi-finishing		TNMG160404HQ	16.5	9.525	4.76	3.81	0.4	★	★	★	★					
		TNMG160408HQ	16.5	9.525	4.76	3.81	0.8	★	★	★	★					
Semi-finishing		TNMG160404R-M	16.5	9.525	4.76	3.81	0.4	★	★	★	★					
		TNMG160404L-M	16.5	9.525	4.76	3.81	0.4	★	★	★	★					
		TNMG160408R-M	16.5	9.525	4.76	3.81	0.8	★	★	★	★					
		TNMG160408L-M	16.5	9.525	4.76	3.81	0.8	★	★	★	★					

★ Recommended grade ☆ Available grade

60°TN□□

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

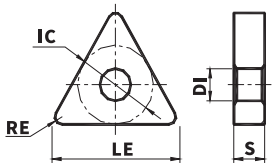
P	Steel	●	●	◕ ⌗	◕ ⌗					
M	Stainless steel					◕ ⌗			● ◕	● ◕
K	Cast iron						● ◕	● ◕		
N	Non-ferrous metal									
S	Heat resistant super alloys Titanium alloy									

Processing	Insert shape	Type	Dimension (mm)					CVD							PVD	
			LE	IC	S	DI	RE	HS8115	HS8215	HS8125	HS8225	HS7120	HS6115	HS6120	HS7125	HS7225
Semi-finishing		TNMG160404-BM	16.5	9.525	4.76	3.81	0.4					☆			★	★
		TNMG160408-BM	16.5	9.525	4.76	3.81	0.8					☆			★	★
		TNMG160412-BM	16.5	9.525	4.76	3.81	1.2					☆			★	★
Semi-finishing		TNMG160404-MA	16.5	9.525	4.76	3.81	0.4								★	★
		TNMG160408-MA	16.5	9.525	4.76	3.81	0.8								★	★
Semi-finishing		TNMG160404-MS	16.5	9.525	4.76	3.81	0.4								★	★
		TNMG160408-MS	16.5	9.525	4.76	3.81	0.8								★	★
Semi-finishing		TNMG160404MQ	16.5	9.525	4.76	3.81	0.4								★	★
		TNMG160408MQ	16.5	9.525	4.76	3.81	0.8								★	★
Semi-finishing		TNMG160404L-S	16.5	9.525	4.76	3.81	0.4								★	★
		TNMG160404R-S	16.5	9.525	4.76	3.81	0.4								★	★
		TNMG160408L-S	16.5	9.525	4.76	3.81	0.8								★	★
		TNMG160408R-S	16.5	9.525	4.76	3.81	0.8								★	★

★ Recommended grade ☆ Available grade

60°TN□□

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

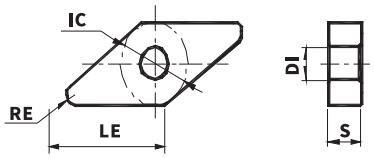
P	Steel	●	●	◕ ⌗	◕ ⌗					
M	Stainless steel					◕ ⌗			● ◕	● ◕
K	Cast iron						● ◕	● ◕		
N	Non-ferrous metal									
S	Heat resistant super alloys Titanium alloy									

Processing	Insert shape	Type	Dimension (mm)					CVD						PVD	
			LE	IC	S	DI	RE	HS8115	HS8215	HS8125	HS8225	HS7120	HS6115	HS6120	HS7125	HS7225
Cast iron machining		TNMG160404	16.5	9.525	4.76	3.81	0.4							★		
		TNMG160408	16.5	9.525	4.76	3.81	0.8							★		
		TNMG160412	16.5	9.525	4.76	3.81	1.2							★		
		TNMG220408	22	12.7	4.76	5.16	0.8							★		
		TNMG220412	22	12.7	4.76	5.16	1.2							★		
		TNMG220416	22	12.7	4.76	5.16	1.6							★		
Roughing																
		TNMG160408-GR	16.5	9.525	4.76	3.81	0.8	★	★	★	★					
		TNMG160412-GR	16.5	9.525	4.76	3.81	1.2	★	★	★	★					
Roughing																
		TNMG160408-BR	16.5	9.525	4.76	3.81	0.8								★	★
		TNMG160412-BR	16.5	9.525	4.76	3.81	1.2								★	★
Cast iron machining		TNMA160404	16.5	9.525	4.76	3.81	0.4							★		
		TNMA160408	16.5	9.525	4.76	3.81	0.8							★		
		TNMA160412	16.5	9.525	4.76	3.81	1.2							★		
		TNMA220408	22	12.7	4.76	5.16	0.8							★		
		TNMA220412	22	12.7	4.76	5.16	1.2							★		
		TNMA220416	22	12.7	4.76	5.16	1.6							★		

★ Recommended grade ☆ Available grade

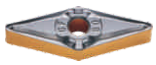
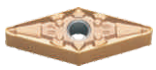
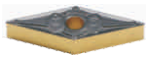
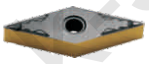
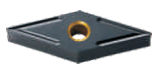
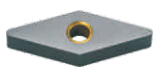
35°VN□□

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

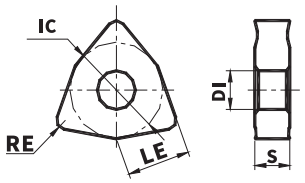
P	Steel	●	●	◕ ⌗	◕ ⌗					
M	Stainless steel					◕ ⌗			● ◕	● ◕
K	Cast iron						● ◕	● ◕		
N	Non-ferrous metal									
S	Heat resistant super alloys Titanium alloy									

Processing	Insert shape	Type	Dimension (mm)					CVD							PVD	
			LE	IC	S	DI	RE	HS8115	HS8215	HS8125	HS8225	HS7120	HS6115	HS6120	HS7125	HS7225
Finishing		VNMG160404-GF	16.6	9.525	4.76	3.81	0.4	★	★	★	★					
		VNMG160408-GF	16.6	9.525	4.76	3.81	0.8	★	★	★	★					
Finishing		VNMG160404-BF	16.6	9.525	4.76	3.81	0.4								★	★
		VNMG160408-BF	16.6	9.525	4.76	3.81	0.8								★	★
Semi-finishing		VNMG160404-GQ	16.6	9.525	4.76	3.81	0.4	★	★	★	★					
		VNMG160408-GQ	16.6	9.525	4.76	3.81	0.8	★	★	★	★					
		VNMG160412-GQ	16.6	9.525	4.76	3.81	1.2	★	★	★	★					
Semi-finishing		VNMG160404-GT	16.6	9.525	4.76	3.81	0.4	★	★	★	★					
		VNMG160408-GT	16.6	9.525	4.76	3.81	0.8	★	★	★	★					
		VNMG160412-GT	16.6	9.525	4.76	3.81	1.2	★	★	★	★					
Semi-finishing		VNMG160404-MT	16.6	9.525	4.76	3.81	0.4	★	★	★	★					
		VNMG160408-MT	16.6	9.525	4.76	3.81	0.8	★	★	★	★					
		VNMG160412-MT	16.6	9.525	4.76	3.81	1.2	★	★	★	★					
Semi-finishing		VNMG160404HQ	16.6	9.525	4.76	3.81	0.4	★	★	★	★					
		VNMG160408HQ	16.6	9.525	4.76	3.81	0.8	★	★	★	★					
Semi-finishing		VNMG160404-BM	16.6	9.525	4.76	3.81	0.4					☆			★	★
		VNMG160408-BM	16.6	9.525	4.76	3.81	0.4					☆			★	★
		VNMG160412-BM	16.6	9.525	4.76	3.81	0.8					☆			★	★
Cast iron machining		VNMG160404	16.5	9.525	4.76	3.81	0.4							★		
		VNMG160408	16.5	9.525	4.76	3.81	0.8							★		
Cast iron machining		VNMA160404	16.6	9.525	4.76	3.81	0.4							★		
		VNMA160408	16.6	9.525	4.76	3.81	0.8							★		

★ Recommended grade ☆ Available grade

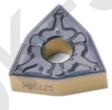
80°WN□□

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

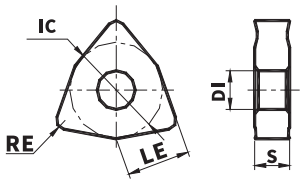
P	Steel	●	●	◕ ⌗	◕ ⌗				
M	Stainless steel					◕ ⌗			● ◕	● ◕
K	Cast iron						● ◕	● ◕		
N	Non-ferrous metal									
S	Heat resistant super alloys Titanium alloy									

Processing	Insert shape	Type	Dimension (mm)					CVD							PVD	
			LE	IC	S	DI	RE	HS8115	HS8215	HS8125	HS8225	HS7120	HS6115	HS6120	HS7125	HS7225
Finishing		WNMG060408-GF	6.6	9.525	4.76	3.81	0.8	★	★	★	★					
		WNMG080404-GF	8.7	12.7	4.76	5.16	0.4	★	★	★	★					
		WNMG080408-GF	8.7	12.7	4.76	5.16	0.8	★	★	★	★					
Finishing		WNMG080404-BF	8.7	12.7	4.76	5.16	0.4								★	★
		WNMG080408-BF	8.7	12.7	4.76	5.16	0.8								★	★
Semi-finishing		WNMG080404-GQ	8.7	12.7	4.76	5.16	0.4	★	★	★	★					
		WNMG080408-GQ	8.7	12.7	4.76	5.16	0.8	★	★	★	★					
		WNMG080412-GQ	8.7	12.7	4.76	5.16	1.2	★	★	★	★					
Semi-finishing		WNMG080404-GT	8.7	12.7	4.76	5.16	0.4	★	★	★	★					
		WNMG080408-GT	8.7	12.7	4.76	5.16	0.8	★	★	★	★					
		WNMG080404-GT	8.7	12.7	4.76	5.16	1.2	★	★	★	★					
Semi-finishing		WNMG080404-MT	8.7	12.7	4.76	5.16	0.4	★	★	★	★					
		WNMG080408-MT	8.7	12.7	4.76	5.16	0.8	★	★	★	★					
		WNMG080412-MT	8.7	12.7	4.76	5.16	1.2	★	★	★	★					
Semi-finishing		WNMG080404HQ	8.7	12.7	4.76	5.16	0.4	★	★	★	★					
		WNMG080408HQ	8.7	12.7	4.76	5.16	0.8	★	★	★	★					
Semi-finishing		WNMG080404R-M	8.7	12.7	4.76	5.16	0.4	★	★	★	★					
		WNMG080404L-M	8.7	12.7	4.76	5.16	0.4	★	★	★	★					
		WNMG080408R-M	8.7	12.7	4.76	5.16	0.8	★	★	★	★					
		WNMG080408L-M	8.7	12.7	4.76	5.16	0.8	★	★	★	★					

★ Recommended grade ☆ Available grade

80°WN□□

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

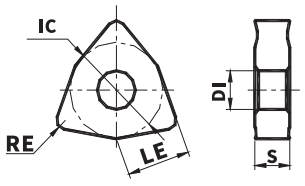
P	Steel	●	●	◕ ⌗	◕ ⌗					
M	Stainless steel					◕ ⌗			● ◕	● ◕
K	Cast iron						● ◕	● ◕		
N	Non-ferrous metal									
S	Heat resistant super alloys Titanium alloy									

Processing	Insert shape	Type	Dimension (mm)					CVD							PVD	
			LE	IC	S	DI	RE	HS8115	HS8215	HS8125	HS8225	HS7120	HS6115	HS6120	HS7125	HS7225
Semi-finishing		WNMG06T312-BM	6.6	9.525	3.97	3.81	1.2					☆			★	★
		WNMG060412-BM	6.6	9.525	4.76	3.81	1.2					☆			★	★
		WNMG080404-BM	8.7	12.7	4.76	5.16	0.4					☆			★	★
		WNMG080408-BM	8.7	12.7	4.76	5.16	0.8					☆			★	★
		WNMG080412-BM	8.7	12.7	4.76	5.16	1.2					☆			★	★
Semi-finishing		WNMG080404-MA	8.7	12.7	4.76	5.16	0.4								★	★
		WNMG080408-MA	8.7	12.7	4.76	5.16	0.8								★	★
Semi-finishing		WNMG080404-MS	8.7	12.7	4.76	5.16	0.4								★	★
		WNMG080408-MS	8.7	12.7	4.76	5.16	0.8								★	★
Semi-finishing		WNMG080404MQ	8.7	12.7	4.76	5.16	0.4								★	★
		WNMG080408MQ	8.7	12.7	4.76	5.16	0.8								★	★

★ Recommended grade ☆ Available grade

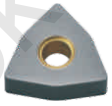
80°WN□□

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

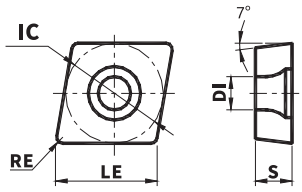
P	Steel	●	●	◕ ⌗	◕ ⌗					
M	Stainless steel					◕ ⌗			● ◕	● ◕
K	Cast iron						● ◕	● ◕		
N	Non-ferrous metal									
S	Heat resistant super alloys Titanium alloy									

Processing	Insert shape	Type	Dimension (mm)					CVD							PVD	
			LE	IC	S	DI	RE	HS8115	HS8215	HS8125	HS8225	HS7120	HS6115	HS6120	HS7125	HS7225
Cast iron machining		WNMG080404	8.7	12.7	4.76	5.16	0.4							★		
		WNMG080408	8.7	12.7	4.76	5.16	0.8							★		
		WNMG080412	8.7	12.7	4.76	5.16	1.2							★		
Roughing		WNMG080408-GR	8.7	12.7	4.76	5.16	0.8	★	★	★	★					
		WNMG080412-GR	8.7	12.7	4.76	5.16	1.2	★	★	★	★					
Roughing		WNMG080408-BR	8.7	12.7	4.76	5.16	0.8								★	★
		WNMG080412-BR	8.7	12.7	4.76	5.16	1.2								★	★
Roughing		WNMG080408-GH	8.7	12.7	4.76	5.16	0.8							★		
		WNMG080412-GH	8.7	12.7	4.76	5.16	1.2							★		
Roughing		WNMA060404	6.6	9.525	4.76	3.81	0.4							★		
		WNMA060408	6.6	9.525	4.76	3.81	0.8							★		
		WNMA080404	8.7	12.7	4.76	5.16	0.4							★		
		WNMA080408	8.7	12.7	4.76	5.16	0.8							★		
		WNMA080412	8.7	12.7	4.76	5.16	1.2							★		
		WNMA080416	8.7	12.7	4.76	5.16	1.6							★		

★ Recommended grade ☆ Available grade

80°CC□□

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

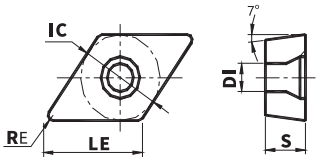
P	Steel	●	●	◕ ⌗	◕ ⌗					
M	Stainless steel					◕ ⌗			● ◕	● ◕
K	Cast iron						● ◕	● ◕		
N	Non-ferrous metal									
S	Heat resistant super alloys Titanium alloy									

Processing	Insert shape	Type	Dimension (mm)					CVD							PVD	
			LE	IC	S	DI	RE	HS8115	HS8215	HS8125	HS8225	HS7120	HS6115	HS6120	HS7125	HS7225
Finishing		CCMT060204-MP	6.4	6.35	2.38	2.8	0.4	★	★	★	★				★	★
		CCMT060208-MP	6.4	6.35	2.38	2.8	0.8	★	★	★	★				★	★
		CCMT09T302-MP	9.7	9.525	3.97	4.4	0.2	★	★	★	★				★	★
		CCMT09T304-MP	9.7	9.525	3.97	4.4	0.4	★	★	★	★				★	★
		CCMT09T308-MP	9.7	9.525	3.97	4.4	0.8	★	★	★	★				★	★
		CCMT120404-MP	12.9	12.7	4.76	5.56	0.4	★	★	★	★				★	★
		CCMT120408-MP	12.9	12.7	4.76	5.56	0.8	★	★	★	★				★	★
Semi-finishing		CCMT060204-TM	6.4	6.35	2.38	2.8	0.4	★	★	★	★		★		★	★
		CCMT060208-TM	6.4	6.35	2.38	2.8	0.8	★	★	★	★		★		★	★
		CCMT09T304-TM	9.7	9.525	3.97	4.4	0.4	★	★	★	★		★		★	★
		CCMT09T308-TM	9.7	9.525	3.97	4.4	0.8	★	★	★	★		★		★	★
		CCMT120404-TM	12.9	12.7	4.76	5.56	0.4	★	★	★	★		★		★	★
		CCMT120408-TM	12.9	12.7	4.76	5.56	0.8	★	★	★	★		★		★	★
		CCMT120412-TM	12.9	12.7	4.76	5.56	1.2	★	★	★	★		★		★	★

★ Recommended grade ☆ Available grade

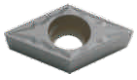
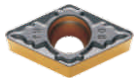
55°DC□□

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

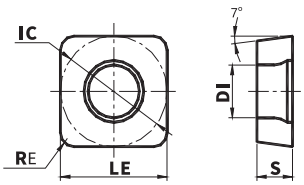
P	Steel	●	●	◕ ⌗	◕ ⌗					
M	Stainless steel					◕ ⌗			● ◕	● ◕
K	Cast iron						● ◕	● ◕		
N	Non-ferrous metal									
S	Heat resistant super alloys Titanium alloy									

Processing	Insert shape	Type	Dimension (mm)					CVD							PVD	
			LE	IC	S	DI	RE	HS8115	HS8215	HS8125	HS8225	HS7120	HS6115	HS6120	HS7125	HS7225
Finishing		DCMT070204-MP	7.8	6.35	2.38	2.8	0.4	★	★	★	★				★	★
		DCMT11T304-MP	11.6	9.525	3.97	4.4	0.4	★	★	★	★				★	★
		DCMT11T308-MP	11.6	9.525	3.97	4.4	0.8	★	★	★	★				★	★
Semi-finishing		DCMT070204-TM	7.8	6.35	2.38	2.8	0.4	★	★	★	★		★		★	★
		DCMT070208-TM	7.8	6.35	2.38	2.8	0.8	★	★	★	★		★		★	★
		DCMT11T304-TM	11.6	9.525	3.97	4.4	0.4	★	★	★	★		★		★	★
		DCMT11T308-TM	11.6	9.525	3.97	4.4	0.8	★	★	★	★		★		★	★
		DCMT11T312-TM	11.6	9.525	3.97	4.4	1.2	★	★	★	★		★		★	★

★ Recommended grade ☆ Available grade

90°SC□□

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

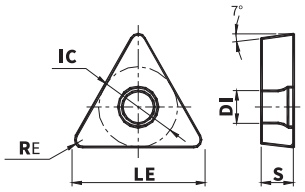
P	Steel	●	●	◕ ⌗	◕ ⌗					
M	Stainless steel					◕ ⌗			● ◕	● ◕
K	Cast iron						● ◕	● ◕		
N	Non-ferrous metal									
S	Heat resistant super alloys Titanium alloy									

Processing	Insert shape	Type	Dimension (mm)					CVD							PVD	
			LE	IC	S	DI	RE	HS8115	HS8215	HS8125	HS8225	HS7120	HS6115	HS6120	HS7125	HS7225
Finishing																
		SCMT09T304-MP	9.525	9.525	3.97	4.4	0.4	★	★	★	★				★	★
		SCMT09T308-MP	9.525	9.525	3.97	4.4	0.8	★	★	★	★				★	★
Roughing		SCMT09T304-TM	9.525	9.525	3.97	4.4	0.4	★	★	★	★		★		★	★
		SCMT09T308-TM	9.525	9.525	3.97	4.4	0.8	★	★	★	★		★		★	★
		SCMT120404-TM	12.7	12.7	4.76	5.56	0.4	★	★	★	★		★		★	★
		SCMT120408-TM	12.7	12.7	4.76	5.56	0.8	★	★	★	★		★		★	★
		SCMT120412-TM	12.7	12.7	4.76	5.56	1.2	★	★	★	★		★		★	★

★ Recommended grade ☆ Available grade

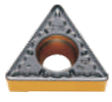
60°TC□□

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

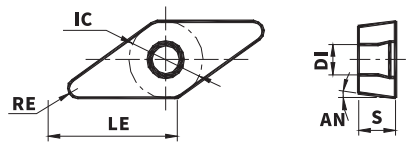
P	Steel	●	●	◕ ⌗	◕ ⌗				
M	Stainless steel					◕ ⌗			● ◕	● ◕
K	Cast iron						● ◕	● ◕		
N	Non-ferrous metal									
S	Heat resistant super alloys Titanium alloy									

Processing	Insert shape	Type	Dimension (mm)					CVD							PVD	
			LE	IC	S	DI	RE	HS8115	HS8215	HS8125	HS8225	HS7120	HS6115	HS6120	HS7125	HS7225
Finishing		TCMT16T304-MP	16.5	9.525	3.97	4.4	0.4	★	★	★	★				★	★
		TCMT16T308-MP	16.5	9.525	3.97	4.4	0.8	★	★	★	★				★	★
Semi-finishing		TCMT110204-TM	11	6.35	2.38	2.8	0.4	★	★	★	★		★		★	★
		TCMT110208-TM	11	6.35	2.38	2.8	0.8	★	★	★	★		★		★	★
		TCMT16T304-TM	16.5	9.525	3.97	4.4	0.4	★	★	★	★		★		★	★
		TCMT16T308-TM	16.5	9.525	3.97	4.4	0.8	★	★	★	★		★		★	★
		TCMT16T312-TM	16.5	9.525	3.97	4.4	1.2	★	★	★	★		★		★	★
Semi-finishing		TCMT090204	9.7	5.56	2.38	2.8	0.4	★	★	★	★				★	★
		TCMT110202	11	6.35	2.38	2.8	0.2	★	★	★	★				★	★
		TCMT110204	11	6.35	2.38	2.8	0.4	★	★	★	★				★	★
		TCMT110208	11	6.35	2.38	2.8	0.8	★	★	★	★				★	★
		TCMT16T304	16.5	9.525	3.97	4.4	0.4	★	★	★	★				★	★
		TCMT16T308	16.5	9.525	3.97	4.4	0.8	★	★	★	★				★	★

★ Recommended grade ☆ Available grade

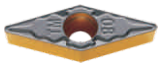
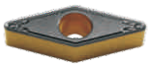
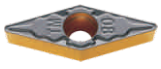
35°VB/VC□□

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

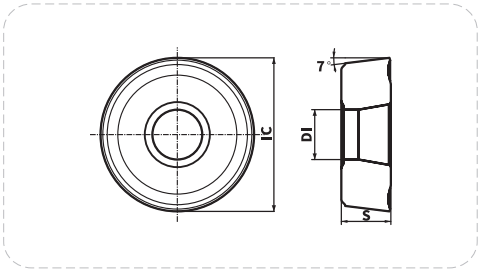
P	Steel	●	●	◕ ⌗	◕ ⌗					
M	Stainless steel					◕ ⌗			● ◕	● ◕
K	Cast iron						● ◕	● ◕		
N	Non-ferrous metal									
S	Heat resistant super alloys Titanium alloy									

Processing	Insert shape	Type	Dimension (mm)						CVD							PVD	
			LE	IC	S	DI	RE	AN	HS8115	HS8215	HS8125	HS8225	HS7120	HS6115	HS6120	HS7125	HS7225
Semi-finishing		VBMT110304-TM	11	6.35	3.18	2.8	0.4	5°	★	★	★	★		★		★	★
		VBMT110308-TM	11	6.35	3.18	2.8	0.8	5°	★	★	★	★		★		★	★
		VBMT160404-TM	16.5	9.525	4.76	4.4	0.4	5°	★	★	★	★		★		★	★
		VBMT160408-TM	16.5	9.525	4.76	4.4	0.8	5°	★	★	★	★		★		★	★
		VBMT160412-TM	16.5	9.525	4.76	4.4	1.2	5°	★	★	★	★		★		★	★
Semi-finishing																	
		VBMT110304HQ	11	6.35	3.18	2.8	0.4	5°	★	★	★	★				★	★
		VBMT110308HQ	11	6.35	3.18	2.8	0.8	5°	★	★	★	★				★	★
Semi-finishing																	
		VCMT110304-TM	11	6.35	3.18	2.8	0.4	7°	★	★	★	★		★		★	★
		VCMT110308-TM	11	6.35	3.18	2.8	0.8	7°	★	★	★	★		★		★	★
		VCMT160404-TM	16.5	9.525	4.76	4.4	0.4	7°	★	★	★	★		★		★	★
		VCMT160408-TM	16.5	9.525	4.76	4.4	0.8	7°	★	★	★	★		★		★	★
		VCMT160412-TM	16.5	9.525	4.76	4.4	1.2	7°	★	★	★	★		★		★	★

★ Recommended grade ☆ Available grade

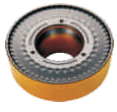
Profile turning insert

Working condition: ● Stable ◕ Average ⌗ Tough



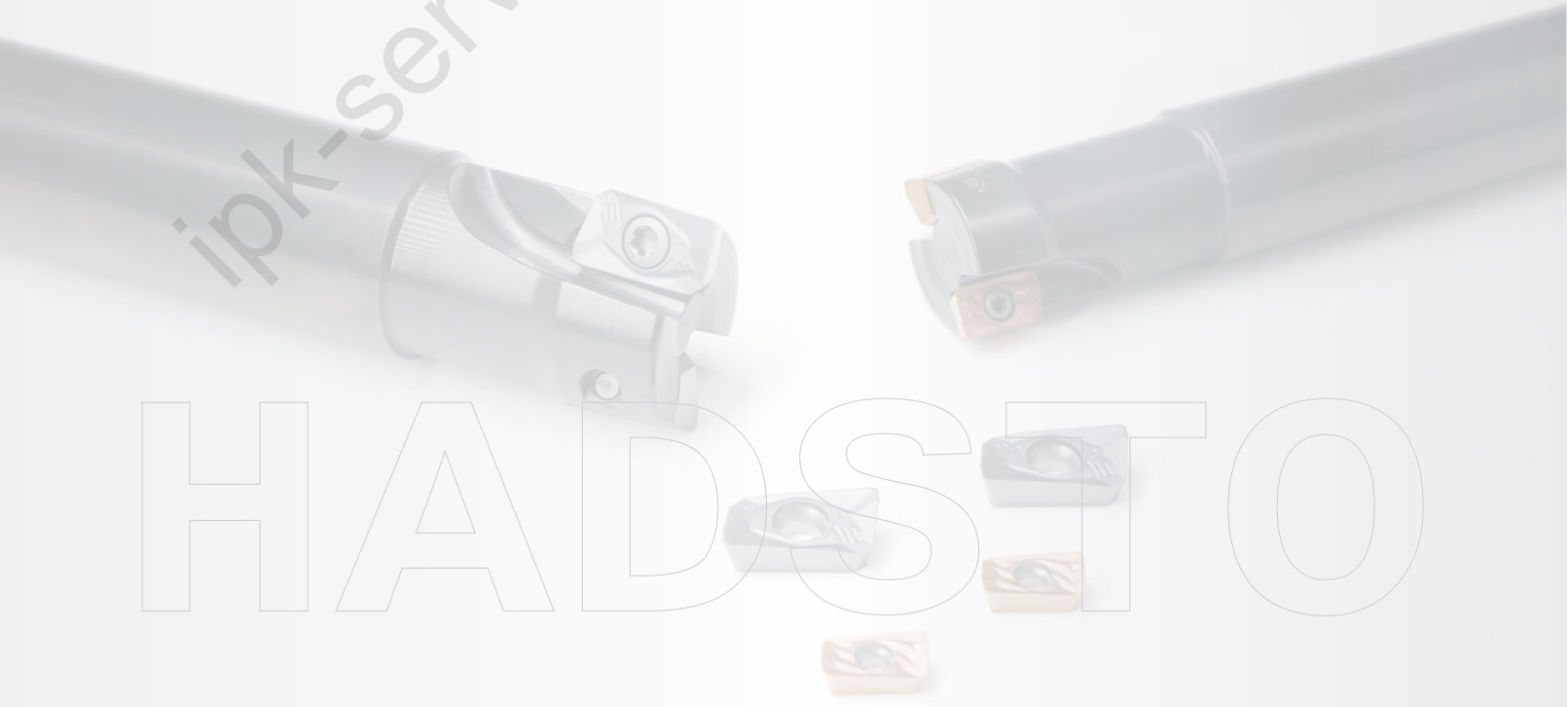
Workpiece material

P	Steel	●	●	◕ ⌗	◕ ⌗				
M	Stainless steel					◕ ⌗			● ◕	● ◕
K	Cast iron						● ◕	● ◕		
N	Non-ferrous metal									
S	Heat resistant super alloys Titanium alloy									

Processing	Insert shape	Type	Dimension (mm)			CVD							PVD	
			IC	S	DI	HS8115	HS8215	HS8125	HS8225	HS7120	HS6115	HS6120	HS7125	HS7225
Profiling		RCMX1003MO	10	3.18	3.6				★					
		RCMX1204MO	12	4.76	4.4				★					
		RCMX1606MO	16	6.35	5.5				★					
		RCMX2006MO	20	6.35	6.5				★					
		RCMX2507MO	25	7.94	7.2				★					
		RCMX3209MO	32	9.525	9.5				★					
Profiling		RCMX1606MO-MR	16	6.35	5.5				★					
		RCMX2006MO-MR	20	6.35	6.5				★					
		RCMX2507MO-MR	25	7.94	7.2				★					

★ Recommended grade ☆ Available grade

Indexable Milling/Drilling



Code key of indexable milling inserts

Shape code

A (85°)	B (82°)	C (80°)
D (55°)	E (75°)	H
K (55°)	L	M (86°)
O	P	R
S	T	T (75°)
V (35°)	W (80°)	Z Code

Chipbreaker and clamping form

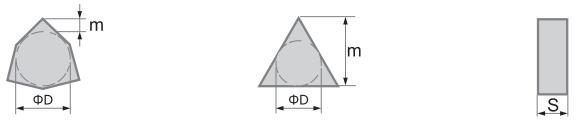
	Hole	Chipbreaker	Insert section		Hole	Chipbreaker	Insert section
B	Yes	N/A	>65°	N	N/A	N/A	
H	Yes	Single-sided	>65°	R	N/A	Single-sided	
C	Yes	N/A	>65°	F	N/A	Double-sided	
J	Yes	Double-sided	>65°	A	Yes	N/A	
W	Yes	N/A	≤65°	M	Yes	Single-sided	
T	Yes	Single-sided	≤65°	G	Yes	Double-sided	
Q	Yes	N/A	≤65°	X	---	---	special
U	Yes	Double-sided	≤65°				

A P M T

Major clearance angle

Code	Clearance angle	Code	Clearance angle
A	3°	B	5°
C	7°	D	15°
E	20°	F	25°
G	30°	N	0°
P	11°	O	Others

Tolerance (mm)



Class	Corner height (m)	Inscribed circle (ΦD)	Thickness (S)
A	±0.005	±0.025	±0.025
F	±0.005	±0.013	±0.025
C	±0.013	±0.025	±0.025
H	±0.013	±0.013	±0.025
E	±0.025	±0.025	±0.025
G	±0.025	±0.025	±0.13
J	±0.005	±0.05-±0.13	±0.025
K	±0.013	±0.05-±0.13	±0.025
L	±0.025	±0.05-±0.13	±0.025
M	±0.08-±0.18	±0.05-±0.13	±0.13
N	±0.08-±0.18	±0.05-±0.13	±0.025
U	±0.13-±0.38	±0.08-±0.25	±0.13

◆Tolerance requirements M-class (Distinguished by shape and inscribed circle size)
◆Corner height (m) tolerance

Inscribed circle	Regular triangle	Square	80° Rhombus	55° Rhombus	35° Rhombus	Circular
6.35	±0.08	±0.08	±0.08	±0.11	±0.16	---
9.525	±0.08	±0.08	±0.08	±0.11	±0.16	---
12.7	±0.13	±0.13	±0.13	±0.15	---	---
15.875	±0.15	±0.15	±0.15	±0.18	---	---
19.05	±0.15	±0.15	±0.15	±0.18	---	---
25.4	---	±0.18	---	---	---	---

◆Inscribed circle (ΦD) tolerance

Inscribed circle	Regular triangle	Square	80° Rhombus	55° Rhombus	35° Rhombus	Circular
6.35	±0.05	±0.05	±0.05	±0.05	±0.05	---
9.525	±0.05	±0.05	±0.05	±0.05	±0.05	±0.05
12.7	±0.08	±0.08	±0.08	±0.08	---	±0.08
15.875	±0.10	±0.10	±0.10	±0.10	---	±0.10
19.05	±0.10	±0.10	±0.10	±0.10	---	±0.10
25.4	---	±0.13	---	---	---	±0.13

Inscribed circle diameter (mm)	C	D	R	S	T	V	W	K
32.00			32					
31.75			31					
25.40			25	25				
25.00	25	25	25					
20.00			20					
19.05	19		19	19	33			
16.00		19	16					
15.875	16		15	16	27			
12.70	12	15	12		22	22	08	
12.00			12					
10.00			10					
9.525	09	11	09	19	16	16	06	16
8.00			08					
6.35	06	07			11	11		
6.00			06					
5.56					09			
5.50			05					
3.97					06			

Insert shape

Cutting edge length

Code	Thickness (mm)
12	12.70
10	11.11
T9	9.72
09	9.52
07	7.94
T6	6.75
06	6.35
T5	5.95
05	5.56
T4	4.96
04	4.76
T3	3.97
03	3.18
T2	2.58
02	2.38
T1	1.98
01	1.59
T0	0.99
00	0.79

Insert thickness

16 05 PD E R - FM

Wiper

A	45°	A	3°
D	60°	B	5°
E	75°	C	7°
F	85°	D	15°
P	90°	E	20°
Z	Others	F	25°
		G	30°
		N	0°
		P	11°
		Z	Others

Cutting edge form

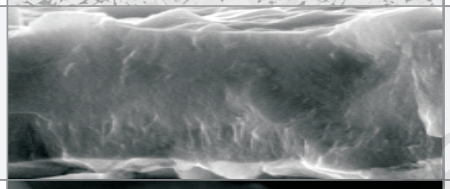
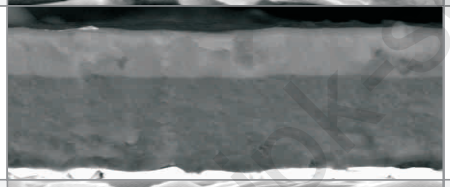
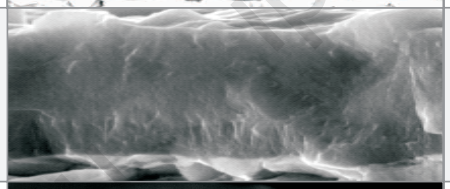
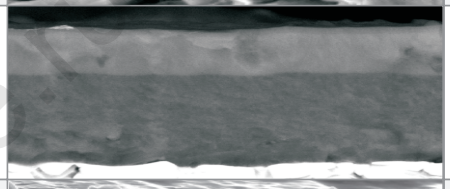
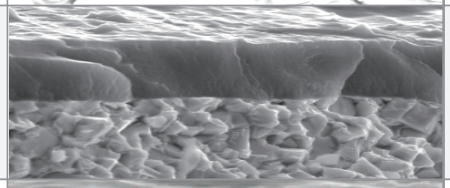
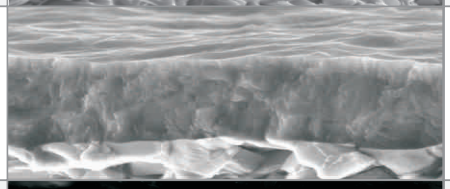
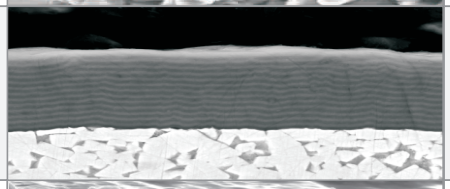
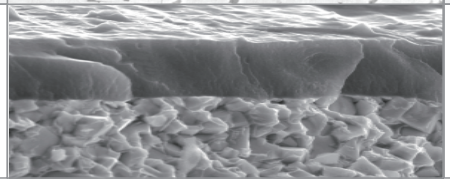
	a	b	
F	0-5°	0-0.10	K (or not marked)
E	1-10°	1-0.15	P
	2-15°	2-0.20	
T	3-20°	3-0.25	W
	4-25°	4-0.30	
S	5-30°	5-0.35	Q
	1-10°	6-0.40	
	1-10°	7-0.45	

Chipbreaker code

Cutting direction

Code	Direction
R	Right
L	Left
N	Two-way

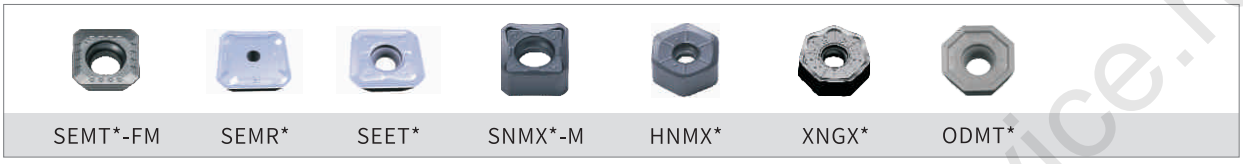
Indexable milling insert grade overview

Grade	Coating					
	Type	Color	Image	Composition	Thickness	
HS6130	CVD	Black& Yellow		TiN+MT-TiCN +Al_2O_3	Thick	
HS5115	PVD	Reddish Bronze		TiAlN+CrAlN +TiSiN	Thin	
HS5210	PVD	Rainbow		AlTiN+TiSiN	Thin	
HS5120	PVD	Reddish Bronze		TiAlN+CrAlN +TiSiN	Thin	
HS5220	PVD	Bronze		AlTiN+TiSiN	Thin	
HS5130	PVD	Ash		AlTiN	Thin	
HS5131	PVD	Yellow		AlTiN	Thin	
HS5231	PVD	Bronze		AlTiN	Thin	
HS530	PVD	Ash		AlTiN/AlCrN	Thin	

Characteristics	ISO	Abrasiveness ← → Toughness 01 05 10 15 20 25 30 35 40 45
Optimal grade for machining cast iron. Suitable for semi-finishing and roughing P&K-type material	P15-P30 K25-K35	
Suitable for milling of materials with high-hardness	P15-P30 M15-M30 K15-K30	
A brand new generation of milling grades, the preferred grade for high hardness material milling. Suitable for milling of high hardness materials with HRC50-65	P05-P15 M05-M15 K10-K20	
Suitable for general milling of steel, stainless steel, cast iron and other materials, especially suitable for milling of materials with a hardness of HRC35-50	P20-P30 M20-M30 K20-K30	
A brand new generation of milling grades for versatile milling of P, M, K and other materials, specially suitable for hardness HRC40-50	P15-P25 M15-M25 K20-K30	
The preferred grades for universal milling of steel, stainless steel, cast iron and other materials, and the first choice for milling conditions	P20-P35 M20-M35 K20-K35	
Universal drilling grades for materials such as steel, stainless steel, cast iron	P20-P35 M20-M35 K20-K35	
Preferred grades for drilling operations	P20-P35 M20-M35 K20-K35	
Specific milling grades for soft steel and stainless steel	P30-P40 M30-M40	

Overview of indexable milling/drilling inserts

- Face milling tool series



- Square shoulder milling tool series

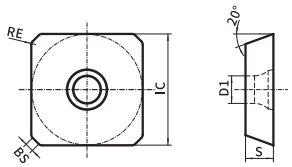
- Profile milling tool series

- High feed milling tool series

- Short hole drilling inserts

Face milling inserts

Working condition: ● Stable ◕ Average ⌗ Tough



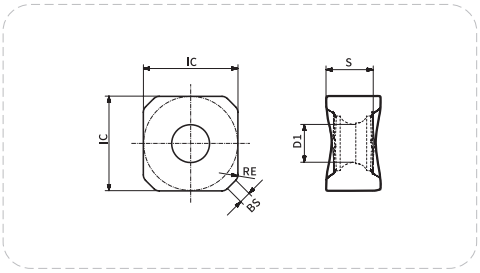
Workpiece material										
P	Steel	●	●	●	◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	◕
M	Stainless steel		●		◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	◕
K	Cast iron	● ◕	●	●	◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	
N	Non-ferrous metal									
S	Heat resistant super alloys Titanium alloy									

Insert shape	Type	Dimension (mm)			CVD	PVD							
		IC	S	DI	HS6130	HS5115	HS5210	HS5120	HS5220	HS5130	HS5131	HS5231	HS530
													
	SEMT1204AFTN-FM	12.7	5.5	5.5				★		★			
	SEMT13T3AGTN-FM	13.4	3.27	4.1				★		★			
													
	SEMR1203AFTN	12.62	3.34	2.5				★		★			
													
	SEET13T3-GM	13.4	4.1	4.1				★		★			

★ Recommended grade ☆ Available grade

Face milling inserts

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

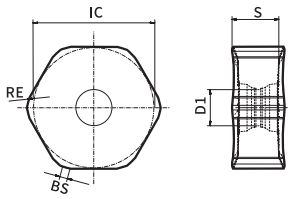
P	Steel	●	●	●	◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	◕
M	Stainless steel		●		◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	◕
K	Cast iron	● ◕	●	●	◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	
N	Non-ferrous metal									
S	Heat resistant super alloys Titanium alloy									

Insert shape	Type	Dimension (mm)				CVD	PVD							
		IC	S	DI	RE	HS6130	HS5115	HS5210	HS5120	HS5220	HS5130	HS5131	HS5231	HS530
	SNMX1205ANN-M	12.7	6	6	0.8	★			★		★			
	SNMX120512-M	12.7	6	6	1.2	★			★		★			
	SNGX1205ZNN-M	12.7	6	6	0.8	★			★		★			

★ Recommended grade ☆ Available grade

Face milling inserts

Working condition: ● Stable ◕ Average ⌗ Tough



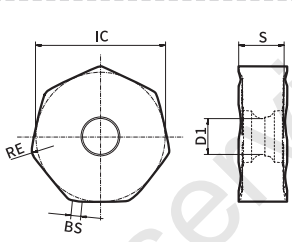
Workpiece material

P	Steel	●	●	●	◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	◕
M	Stainless steel		●		◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	◕
K	Cast iron	● ◕	●	●	◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	
N	Non-ferrous metal									
S	Heat resistant super alloys Titanium alloy									

Insert shape	Type	Dimension (mm)				CVD	PVD							
		IC	S	DI	RE	HS6130	HS5115	HS5210	HS5120	HS5220	HS5130	HS5131	HS5231	HS530
														
	HNMX0906ANSN-M	16.5	4.9	4.9	1.2	★			★		★			
	HNMX0906ANSN-R	16.5	4.9	4.9	1.2	★			★		★			

★ Recommended grade ☆ Available grade

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

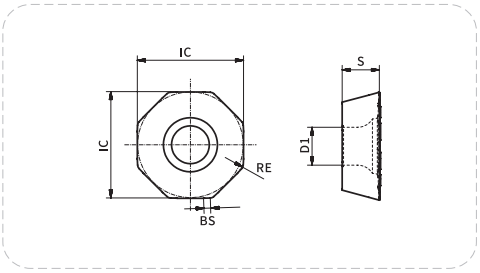
P	Steel	●	●	●	◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	◕
M	Stainless steel		●		◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	◕
K	Cast iron	● ◕	●	●	◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	
N	Non-ferrous metal									
S	Heat resistant super alloys Titanium alloy									

Insert shape	Type	Dimension (mm)				CVD	PVD							
		IC	S	DI	RE	HS6130	HS5115	HS5210	HS5120	HS5220	HS5130	HS5131	HS5231	HS530
														
	XNGX0705ANN-R	14.5	4	4	0.8	★			★		★			
	XNMX0705ANN-M	14.5	4	4	0.8	★			★		★			
	XNMX070508-M	14.5	4	4	0.8	★			★		★			

★ Recommended grade ☆ Available grade

Face milling inserts

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

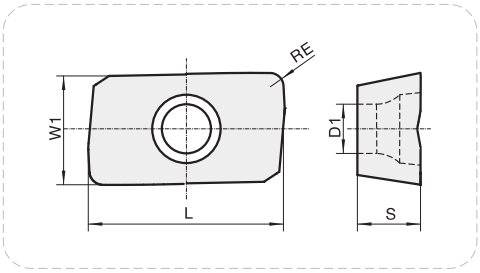
P	Steel	●	●	●	◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	◕
M	Stainless steel		●		◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	◕
K	Cast iron	● ◕	●	●	◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	
N	Non-ferrous metal									
S	Heat resistant super alloys Titanium alloy									

Insert shape	Type	Dimension (mm)				CVD	PVD							
		IC	S	DI	RE	HS6130	HS5115	HS5210	HS5120	HS5220	HS5130	HS5131	HS5231	HS530
														
	ODMT050408-M	12.7	4.76	4.4	0.8				★		★			
	ODMT060508-R	15.875	5.5	5.5	0.8				★		★			

★ Recommended grade ☆ Available grade

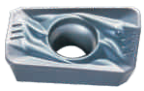
Square shoulder milling

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

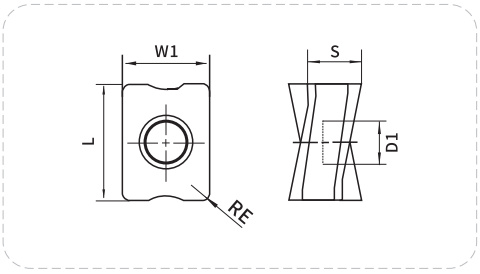
P	Steel	●	●	●	◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	◕
M	Stainless steel		●		◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	◕
K	Cast iron	● ◕	●	●	◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	
N	Non-ferrous metal									
S	Heat resistant super alloys Titanium alloy									

Insert shape	Type	Dimension (mm)						CVD	PVD						
		L	W1	S	DI	RE	APMX	HS6130	HS5115	HS5210	HS5120	HS5220	HS5130	HS5131	HS5231	HS530
	APMT1135PDER-FM	11.3	6.25	3.5	2.8	0.8	9.5		★	★	★	★	★			★
	APMT1604PDER-FM	17.25	9.22	4.76	4.4	0.8	14.5	★	★	★	★	★	★			★
	APMT1605PDER-FM	17.42	9.33	5.22	4.5	0.8	14.5	★	★	★	★	★	★			★

★ Recommended grade ☆ Available grade

Square shoulder milling

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

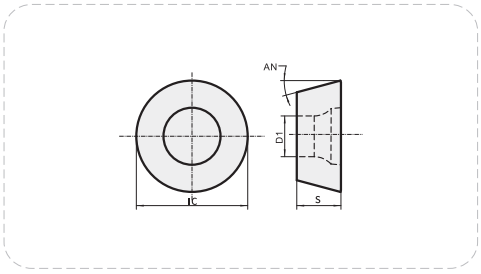
P	Steel	●	●	●	◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	◕
M	Stainless steel		●		◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	◕
K	Cast iron	● ◕	●	●	◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	
N	Non-ferrous metal									
S	Heat resistant super alloys Titanium alloy									

Insert shape	Type	Dimension (mm)					CVD	PVD							
		L	W1	S	DI	RE	HS6130	HS5115	HS5210	HS5120	HS5220	HS5130	HS5131	HS5231	HS530
															
	LNGX120508ER-M	11.1	9.5	5.78	4.5	0.8				★		★			

★ Recommended grade ☆ Available grade

Profile milling

Working condition: ● Stable ◕ Average ⌗ Tough



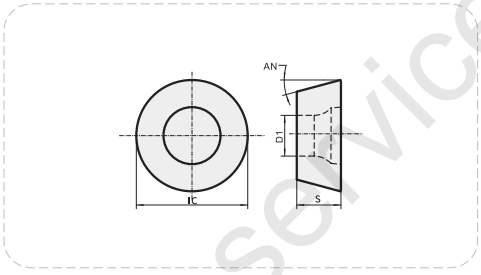
Workpiece material

P	Steel	●	●	●	◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	◕
M	Stainless steel		●		◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	◕
K	Cast iron	● ◕	●	●	◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	
N	Non-ferrous metal									
S	Heat resistant super alloys Titanium alloy									

Insert shape	Type	Dimension (mm)					CVD	PVD							
		IC	S	DI	AN	APMX	HS6130	HS5115	HS5210	HS5120	HS5220	HS5130	HS5131	HS5231	HS530
	RDMW0802MO-FM	8	2.38	3.4	15°	4		★	★	★	★	★			
	RDMW1003MO-FM	10	3.18	4.4	15°	5		★	★	★	★	★			
	RDMW10T3MO-FM	10	3.97	4.4	15°	5		★	★	★	★	★			
	RDMW1204MO-FM	12	4.76	4.4	15°	6		★	★	★	★	★			
	RDMW12T3MO-FM	12	3.97	4.4	15°	6		★	★	★	★	★			
	RDMW1605MO-FM	16	5.56	5.5	15°	8		★	★	★	★	★			

★ Recommended grade ☆ Available grade

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

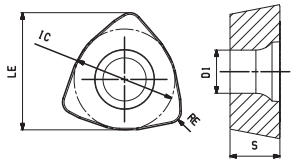
P	Steel	●	●	●	◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	◕
M	Stainless steel		●		◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	◕
K	Cast iron	● ◕	●	●	◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	
N	Non-ferrous metal									
S	Heat resistant super alloys Titanium alloy									

Insert shape	Type	Dimension (mm)					CVD	PVD							
		IC	S	DI	AN	APMX	HS6130	HS5115	HS5210	HS5120	HS5220	HS5130	HS5131	HS5231	HS530
	RPMT08T2MO-FM	8	2.78	3.4	11°	4		★	★	★	★	★			★
	RPMT1003MO-FM	10	3.18	4.5	11°	5		★	★	★	★	★			★
	RPMT10T3MO-FM	10	3.97	4.4	11°	5		★	★	★	★	★			★
	RPMT1204MO-FM	12	4.76	4.4	11°	6		★	★	★	★	★			★
	RPMW1003MO-FM	10	3.18	4.5	11°	5		★	★	★	★	★			★

★ Recommended grade ☆ Available grade

Millings with high feed

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

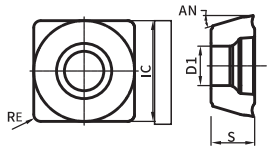
P	Steel	●	●	●	◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	◕
M	Stainless steel		●		◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	◕
K	Cast iron	● ◕	●	●	◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	
N	Non-ferrous metal									
S	Heat resistant super alloys Titanium alloy									

Insert shape	Type	Dimension (mm)					CVD	PVD							
		IC	S	DI	RE	APMX	HS6130	HS5115	HS5210	HS5120	HS5220	HS5130	HS5131	HS5231	HS530
	WDMT080520ZTR-GM	12.9	5.5	5	2	0.7				★		★			★
	WPMT080615ZSR	12.8	6.3	5.5	1.5	0.7				★		★			★

★ Recommended grade ☆ Available grade

Short Hole Drilling Inserts

Short hole drilling inserts



Working condition: ● Stable ◕ Average ⌗ Tough

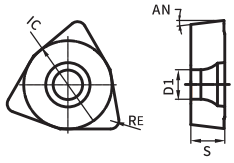
Workpiece material

P	Steel	●	●	●	◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	◕
M	Stainless steel		●		◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	◕
K	Cast iron	● ◕	●	●	◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	
N	Non-ferrous metal									
S	Heat resistant super alloys Titanium alloy									

Insert shape	Type	Dimension (mm)					CVD	PVD							
		IC	S	RE	DI	AN	HS6130	HS5115	HS5210	HS5120	HS5220	HS5130	HS5131	HS5231	HS530
	SPMG050204DG	5	2.38	0.4	2.25	14°							★	★	
	SPMG060204DG	6	2.38	0.4	2.61	14°							★	★	
	SPMG07T308DG	7.94	3.97	0.8	2.85	15.5°							★	★	
	SPMG090408DG	9.8	4.3	0.8	1.05	17.5°							★	★	
	SPMG110408DG	11.5	4.8	0.8	4.5	16.5°							★	★	

★ Recommended grade ☆ Available grade

Short hole drilling inserts



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material										
P	Steel	●	●	●	◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	◕
M	Stainless steel		●		◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	◕
K	Cast iron	● ◕	●	●	◕	◕	◕ ⌗	◕ ⌗	◕ ⌗	
N	Non-ferrous metal									
S	Heat resistant super alloys Titanium alloy									

Insert shape	Type	Dimension (mm)					CVD	PVD							
		IC	S	RE	DI	AN	HS6130	HS5115	HS5210	HS5120	HS5220	HS5130	HS5131	HS5231	HS530
	WCMX030204	5.56	2.38	0.4	2.55	7°							★	★	
	WCMX030208	5.56	2.38	0.8	2.55	7°							★	★	
	WCMX040204	6.35	2.38	0.4	2.8	7°							★	★	
	WCMX040208	6.35	2.38	0.8	2.8	7°							★	★	
	WCMX050308	7.94	3.18	0.8	3.2	7°							★	★	
	WCMX06T308	9.525	3.97	0.8	3.7	7°							★	★	
	WCMX080412	12.7	4.76	1.2	4.3	7°							★	★	
	WCMX030208FN	5.56	2.38	0.8	2.55	7°							★	★	
	WCMX040208FN	6.35	2.38	0.8	2.8	7°							★	★	
	WCMX050308FN	7.94	3.18	0.8	3.2	7°							★	★	
	WCMX06T308FN	9.525	3.97	0.8	3.7	7°							★	★	
	WCMX080412FN	12.7	4.76	1.2	4.3	7°							★	★	

★ Recommended grade ☆ Available grade

Parting,Grooving and Threading

Parting and Grooving Inserts

Threading

Grade of Parting and Grooving Inserts

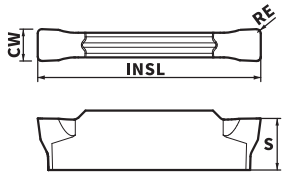
Grade	Coating	Application recommended
HS6115	CVD	Preferred grades for gray iron and ductile iron processing
HS7125	PVD	The second choice of stainless steel for parting and grooving; Suitable for medium and low speed parting and grooving of steel and cast iron parts.
HS7225	PVD	Optimal grade for grooving and parting stainless steel.
HS8123	CVD	Applicable to stable working conditions for finishing of steel parts
HS8133	CVD	Optimal grade for steel parting and grooving, strong versatile.
HS8225	CVD	Upgraded grade for steel parting and grooving.

Chipbreaker Overview

Processing	Tolerance	Chipbreaker	Insert shape	Features
Parting and grooving	M	G		◆ Special chipbreaker for parting and grooving, stable control of chip flow.
Parting and grooving	M	M		◆ Meet the needs of various machining operations such as parting, grooving, and turning, with highstrength and sharpness.
Grooving and plunge turning	M	T		◆ The special design of the flank surface of cutting tool structure reduces cutting resistance and chip vibration, resulting in excellent surface quality after machining. ◆ Special cutting edge design, effectively ensure the chip breaking effect, can realize horizontal turning.
Parting and grooving	M	No Code		◆ Large rake angle design, light and fast chip removal, small vibration, especially suitable for cutting conditions with low cutting speed and insufficient rigidity.
Parting and grooving	M	/		◆ Single-headed parting&grooving inserts with high edge strength, suitable for cutting and deep groove processing of steel and stainless steel materials.
Parting and grooving	M	/		◆ Parting and grooving universal inserts can realize external round parting and grooving, end face grooving, internal hole grooving and other processing.

Parting and grooving insert

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

P	Steel	◕ ⌗	●	◕ ⌗					
M	Stainless steel					◕ ⌗	◕ ⌗		
K	Cast iron				◕				
N	Non-ferrous metal								
S	Heat resistant super alloys Titanium alloy								

Processing	Insert shape	Type	Dimension (mm)				CVD				PVD			
			INSL	CW	S	RE	HS8225	HS8123	HS8133	HS6115	HS7125	HS7225	HS5125	HS5225
Parting and grooving		MGMN150-G	16	1.5	4	0.15	★	☆	★	★	★	★		
		MGMN200-G	16	2	4	0.2	★	☆	★	★	★	★		
		MGMN250-G	18.5	2.5	4.5	0.2	★	☆	★	★	★	★		
		MGMN300-G	21	3	5.6	0.3	★	☆	★	★	★	★		
Parting and grooving		MGMN200-M	16	2	4	0.2	★	☆	★	★	★	★		
		MGMN250-M	18.5	2.5	4.5	0.2	★	☆	★	★	★	★		
		MGMN300-M	21	3	5.6	0.4	★	☆	★	★	★	★		
		MGMN400-M	21	4	5.8	0.4	★	☆	★	★	★	★		
		MGMN500-M	26	5	5.8	0.8	★	☆	★	★	★	★		
		MGMN600-M	26	6	5.9	0.8	★	☆	★	★	★	★		
Grooving and plunge turning		MGMN200-T	16	2	3.55	0.2	★	☆	★	★	★	★		
		MGMN250-T	18.5	2.5	4.5	0.2	★	☆	★	★	★	★		
		MGMN300-T	21	3	4.86	0.4	★	☆	★	★	★	★		
		MGMN350-T	21	3.5	4.86	0.4	★	☆	★	★	★	★		
		MGMN400-T	21	4	4.86	0.4	★	☆	★	★	★	★		
		MGMN500-T	26	5	5.8	0.8	★	☆	★	★	★	★		
Parting and grooving		MGMN200	16	2	3.55	0.2					★	★		
		MGMN300	21	3	4.86	0.4					★	★		
		MGMN400	21	4	4.86	0.4					★	★		
		MGMN500	26	5	5.8	0.8					★	★		
Profiling		MRMN200-M	16	2	3.5	1	★	☆	★	★	★	★		
		MRMN250-M	18.5	2.5	3.9	1.25	★	☆	★	★	★	★		
		MRMN300-M	21	3	4.8	1.5	★	☆	★	★	★	★		
		MRMN400-M	21	4	4.8	2	★	☆	★	★	★	★		
		MRMN500-M	26	5	5.8	2.5	★	☆	★	★	★	★		
		MRMN600-M	26	6	5.9	2.5	★	☆	★	★	★	★		
Parting		SP200	9.3	2		0.2		☆	★		☆	★		
		SP300	11.3	3		0.2		☆	★		☆	★		
		SP400	11.3	4		0.25		☆	★		☆	★		
		SP600	11.4	6		0.35		☆	★		☆	★		
Parting and grooving		TDC2	20	2	3.9	0.2			★			★		
		TDC3	20	3	4.2	0.2			★			★		
		TDC4	20	4	4.2	0.3			★			★		
		TDC5	25	5	5	0.3			★			★		

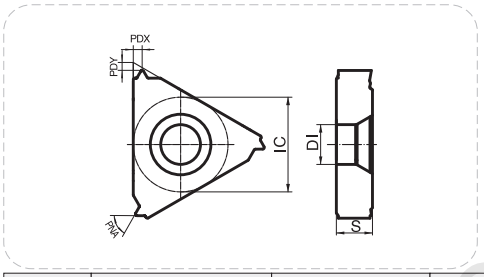
★ Recommended grade ☆ Available grade

Threading

Grade of Thread Inserts

Grade	Coating	characteristic	Recommendation
HS5125	PVD	Special mixing ratios of ingredients have effectively improved the overall performance of the matrix, enhancing its flexural strength and resistance to heat-induced cracks.	Preferred grade for thread processing.
HS5225	PVD	Unique matrix with excellent tool tip and cutting edge processing technology; With the latest nano coating containing Si, the insert is guaranteed to have high hardness, high wear resistance and sharp properties.	Special grades for stainless steel processing.

ISO metric 60° thread



Working condition: ● Stable ◕ Average ⌗ Tough

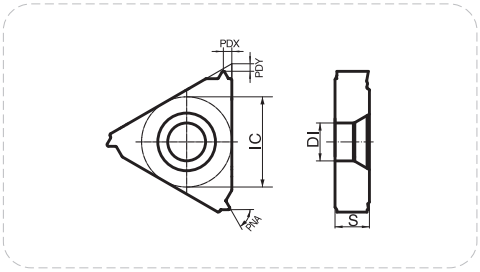
Workpiece material									
P	Steel							◕	◕
M	Stainless steel							◕	◕
K	Cast iron								
N	Non-ferrous metal								
S	Heat resistant super alloys Titanium alloy								

Processing	Insert shape	Type	Pitch/ number of teeth	Dimension (mm)						CVD				PVD			
				IC	PDX	PDY	S	DI	PNA	HS8225	HS8123	HS8133	HS6115	HS7125	HS7225	HS5125	HS5225
External threading		16ER100ISO	1.00	9.525	0.7	0.7	3.52	4.0	60°							★	★
		16ER125ISO	1.25	9.525	0.9	0.8	3.52	4.0	60°							★	★
		16ER150ISO	1.50	9.525	1.0	0.8	3.52	4.0	60°							★	★
		16ER175ISO	1.75	9.525	1.2	0.9	3.52	4.0	60°							★	★
		16ER200ISO	2.00	9.525	1.3	1.0	3.52	4.0	60°							★	★
		16ER250ISO	2.50	9.525	1.5	1.2	3.52	4.0	60°							★	★
		16ER300ISO	3.00	9.525	1.6	1.3	3.52	4.0	60°							★	★
		22ER350ISO	3.50	12.700	2.3	1.6	4.65	5.0	60°							★	★
		22ER400ISO	4.00	12.700	2.3	1.6	4.65	5.0	60°							★	★
		22ER450ISO	4.50	12.700	2.4	1.7	4.65	5.0	60°							★	★
		22ER500ISO	5.00	12.700	2.4	1.7	4.65	5.0	60°							★	★
		22ER550ISO	5.50	12.700	2.5	1.6	4.65	5.0	60°							★	★
		22ER600ISO	6.00	12.700	2.7	1.7	4.65	5.0	60°							★	★

★ Recommended grade ☆ Available grade

ISO metric 60° thread

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

P	Steel							◕	◕
M	Stainless steel							◕	◕
K	Cast iron								
N	Non-ferrous metal								
S	Heat resistant super alloys Titanium alloy								

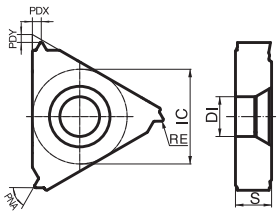
Processing	Insert shape	Type	Pitch/ number of teeth	Dimension (mm)						CVD				PVD			
				IC	PDX	PDY	S	DI	PNA	HS8225	HS8123	HS8133	HS6115	HS7125	HS7225	HS5125	HS5225
Internal threading		11IR100ISO	1.00	6.35	0.7	0.7	3.05	3.2	60°							★	★
		11IR125ISO	1.25	6.35	0.9	0.8	3.05	3.2	60°							★	★
		11IR150ISO	1.50	6.35	1.0	0.8	3.05	3.2	60°							★	★
		16IR100ISO	1.00	9.525	0.7	0.7	3.52	4.0	60°							★	★
		16IR125ISO	1.25	9.525	0.9	0.8	3.52	4.0	60°							★	★
		16IR150ISO	1.50	9.525	1.0	0.8	3.52	4.0	60°							★	★
		16IR175ISO	1.75	9.525	1.2	0.9	3.52	4.0	60°							★	★
		16IR200ISO	2.00	9.525	1.3	1.0	3.52	4.0	60°							★	★
		16IR250ISO	5.50	9.525	1.5	1.1	3.52	4.0	60°							★	★
		16IR300ISO	3.00	9.525	1.5	1.1	3.52	4.0	60°							★	★
		22IR350ISO	3.50	12.700	2.3	1.6	4.65	5.0	60°							★	★
		22IR400ISO	4.00	12.700	2.3	1.6	4.65	5.0	60°							★	★
		22IR450ISO	4.50	12.700	2.4	1.6	4.65	5.0	60°							★	★
		22IR500ISO	5.00	12.700	2.4	1.6	4.65	5.0	60°							★	★
		22IR550ISO	5.50	12.700	2.5	1.6	4.65	5.0	60°							★	★
		22IR600ISO	6.00	12.700	2.5	1.8	4.65	5.0	60°							★	★

★ Recommended grade ☆ Available grade

哈德斯通 HADSTO

Universal thread

Working condition: ● Stable ◕ Average ⌗ Tough



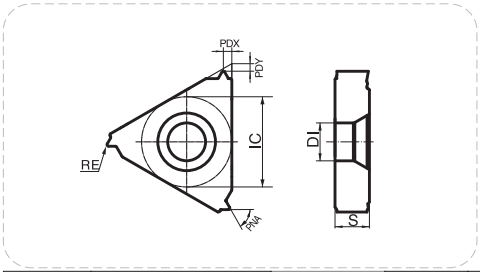
Workpiece material									
P	Steel							◕	◕
M	Stainless steel							◕	◕
K	Cast iron								
N	Non-ferrous metal								
S	Heat resistant super alloys Titanium alloy								

Processing	Insert shape	Type	Pitch/ number of teeth	Dimension (mm)							CVD				PVD			
				IC	PDX	PDY	S	RE	DI	PNA	HS8225	HS8123	HS8133	HS6115	HS7125	HS7225	HS5125	HS5225
External threading		16ERA55	0.5–1.5	9.525	0.9	0.8	3.52	0.05	4.0	55°							★	★
		16ERG55	1.75–3.0	9.525	1.7	1.2	3.52	0.23	4.0	55°							★	★
		16ERAG55	0.5–3.0	9.525	1.7	1.2	3.52	0.06	4.0	55°							★	★
		22ERN55	3.5–5.0	12.700	2.5	1.7	4.65	0.51	5.0	55°							★	★
		16ERA60	0.5–1.5	9.525	0.9	0.8	3.52	0.06	4.0	60°							★	★
		16ERG60	1.75–3.0	9.525	1.7	1.2	3.52	0.18	4.0	60°							★	★
		16ERAG60	0.5–3.0	9.525	1.7	1.2	3.52	0.07	4.0	60°							★	★
		22ERN60	3.5–5.0	12.700	2.5	1.7	4.65	0.51	5.0	60°							★	★

★ Recommended grade ☆ Available grade

Universal thread

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

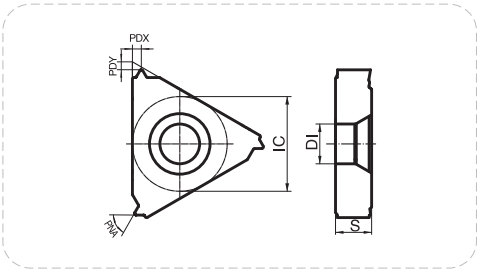
P	Steel							◕	◕
M	Stainless steel							◕	◕
K	Cast iron								
N	Non-ferrous metal								
S	Heat resistant super alloys Titanium alloy								

Processing	Insert shape	Type	Pitch/ number of teeth	Dimension (mm)							CVD				PVD			
				IC	PDX	PDY	S	RE	DI	PNA	HS8225	HS8123	HS8133	HS6115	HS7125	HS7225	HS5125	HS5225
Internal threading		11IRA55	0.5–1.5	6.350	0.9	0.8	3.05	0.05	3.2	55°							★	★
		16IRA55	0.5–1.5	9.525	0.9	0.8	3.52	0.05	4.0	55°							★	★
		16IRG55	1.75–3.0	9.525	1.7	1.2	3.52	0.21	4.0	55°							★	★
		16IRAG55	0.5–3.0	9.525	1.7	1.2	3.52	0.06	4.0	55°							★	★
		22IRN55	3.5–5.0	12.700	2.5	1.7	4.65	0.26	5.0	55°							★	★
		11IRA60	0.5–1.5	6.350	0.9	0.8	3.05	0.05	3.2	60°							★	★
		16IRA60	0.5–1.5	9.525	0.9	0.8	3.52	0.05	4.0	60°							★	★
		16IRG60	1.75–3.0	9.525	1.7	1.2	3.52	0.10	4.0	60°							★	★
		16IRAG60	0.5–3.0	9.525	1.7	1.2	3.52	0.08	4.0	60°							★	★
		22IRN60	3.5–5.0	12.700	2.5	1.7	4.65	0.26	5.0	60°							★	★

★ Recommended grade ☆ Available grade

Whiteworth thread

Working condition: ● Stable ◕ Average ⌗ Tough



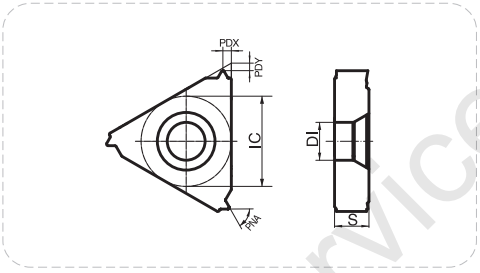
Workpiece material

P	Steel									◕	◕				
M	Stainless steel									◕	◕				
K	Cast iron														
N	Non-ferrous metal														
S	Heat resistant super alloys Titanium alloy														

Processing	Insert shape	Type	Pitch/ number of teeth	Dimension (mm)						CVD				PVD			
				IC	PDX	PDY	S	DI	PNA	HS8225	HS8123	HS8133	HS6115	HS7125	HS7225	HS5125	HS5225
External threading		16ER8W	8	9.525	1.5	1.2	3.52	4.0	55°							★	★
		16ER11W	11	9.525	1.5	1.1	3.52	4.0	55°							★	★
		16ER12W	12	9.525	1.4	1.1	3.52	4.0	55°							★	★
		16ER14W	14	9.525	1.2	1.0	3.52	4.0	55°							★	★
		16ER19W	19	9.525	1.0	0.8	3.52	4.0	55°							★	★

★ Recommended grade ☆ Available grade

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

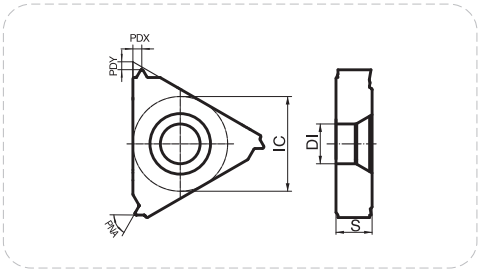
P	Steel									◕	◕				
M	Stainless steel									◕	◕				
K	Cast iron														
N	Non-ferrous metal														
S	Heat resistant super alloys Titanium alloy														

Processing	Insert shape	Type	Pitch/ number of teeth	Dimension (mm)						CVD				PVD			
				IC	PDX	PDY	S	DI	PNA	HS8225	HS8123	HS8133	HS6115	HS7125	HS7225	HS5125	HS5225
Internal threading		16IR8W	8	9.525	1.5	1.2	3.52	4.0	55°							★	★
		16IR11W	11	9.525	1.5	1.1	3.52	4.0	55°							★	★
		16IR12W	12	9.525	1.4	1.1	3.52	4.0	55°							★	★
		16IR14W	14	9.525	1.2	1.0	3.52	4.0	55°							★	★
		16IR19W	19	9.525	1.0	0.8	3.52	4.0	55°							★	★

★ Recommended grade ☆ Available grade

UN united thread

Working condition: ● Stable ◕ Average ⌗ Tough

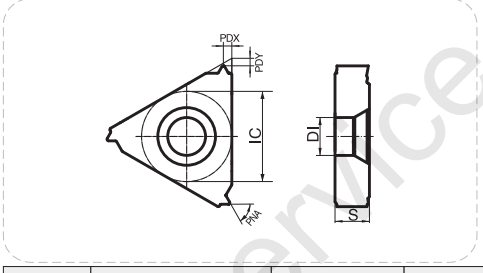


Workpiece material	P	Steel	◕	◕
	M	Stainless steel	◕	◕
	K	Cast iron		
	N	Non-ferrous metal		
	S	Heat resistant super alloys Titanium alloy		

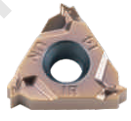
Processing	Insert shape	Type	Pitch/ number of teeth	Dimension (mm)						CVD				PVD			
				IC	PDX	PDY	S	DI	PNA	HS8225	HS8123	HS8133	HS6115	HS7125	HS7225	HS5125	HS5225
External threading		16ER8UN	8	9.525	1.7	1.2	3.52	4.0	60°							★	★
		16ER12UN	12	9.525	1.4	1.1	3.52	4.0	60°							★	★
		16ER14UN	14	9.525	1.2	1.0	3.52	4.0	60°							★	★
		16ER16UN	16	9.525	1.1	0.9	3.52	4.0	60°							★	★
		16ER18UN	18	9.525	1.1	0.8	3.52	4.0	60°							★	★
		16ER20UN	20	9.525	1.1	0.8	3.52	4.0	60°							★	★

★ Recommended grade ☆ Available grade

Working condition: ● Stable ◕ Average ⌗ Tough



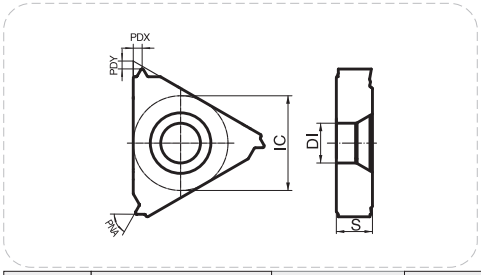
Workpiece material	P	Steel	◕	◕
	M	Stainless steel	◕	◕
	K	Cast iron		
	N	Non-ferrous metal		
	S	Heat resistant super alloys Titanium alloy		

Processing	Insert shape	Type	Pitch/ number of teeth	Dimension (mm)						CVD				PVD			
				IC	PDX	PDY	S	DI	PNA	HS8225	HS8123	HS8133	HS6115	HS7125	HS7225	HS5125	HS5225
Internal threading		16IR8UN	8	9.525	1.7	1.2	3.52	4.0	60°							★	★
		16IR12UN	12	9.525	1.4	1.1	3.52	4.0	60°							★	★
		16IR14UN	14	9.525	1.2	1.0	3.52	4.0	60°							★	★
		16IR16UN	16	9.525	1.1	0.9	3.52	4.0	60°							★	★
		16IR18UN	18	9.525	1.1	0.8	3.52	4.0	60°							★	★
		16IR20UN	20	9.525	1.1	0.8	3.52	4.0	60°							★	★

★ Recommended grade ☆ Available grade

BSPT

Working condition: ● Stable ◕ Average ⌗ Tough

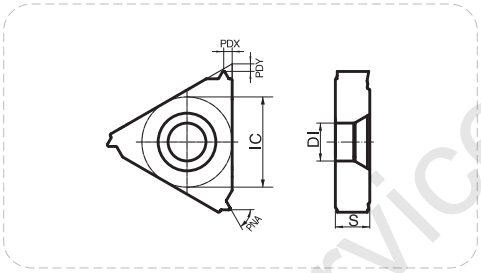


Workpiece material									
P	Steel							◕	◕
M	Stainless steel							◕	◕
K	Cast iron								
N	Non-ferrous metal								
S	Heat resistant super alloys Titanium alloy								

Processing	Insert shape	Type	Pitch/ number of teeth	Dimension (mm)						CVD				PVD			
				IC	PDX	PDY	S	DI	PNA	HS8225	HS8123	HS8133	HS6115	HS7125	HS7225	HS5125	HS5225
External threading		16ER11BSPT	11	9.525	1.5	1.1	3.52	4.0	55°							★	★
		16ER14BSPT	14	9.525	1.2	1.0	3.52	4.0	55°							★	★
		16ER19BSPT	19	9.525	0.9	0.8	3.52	4.0	55°							★	★

★ Recommended grade ☆ Available grade

Working condition: ● Stable ◕ Average ⌗ Tough



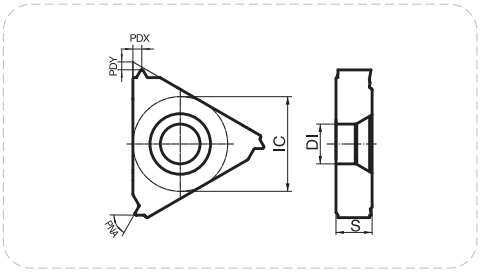
Workpiece material									
P	Steel							◕	◕
M	Stainless steel							◕	◕
K	Cast iron								
N	Non-ferrous metal								
S	Heat resistant super alloys Titanium alloy								

Processing	Insert shape	Type	Pitch/ number of teeth	Dimension (mm)						CVD				PVD			
				IC	PDX	PDY	S	DI	PNA	HS8225	HS8123	HS8133	HS6115	HS7125	HS7225	HS5125	HS5225
Internal threading		16IR11BSPT	11	9.525	1.5	1.1	3.52	4.0	55°							★	★
		16IR14BSPT	14	9.525	1.2	1.0	3.52	4.0	55°							★	★
		16IR19BSPT	19	9.525	0.9	0.8	3.52	4.0	55°							★	★

★ Recommended grade ☆ Available grade

NPT

Working condition: ● Stable ◕ Average ⌗ Tough



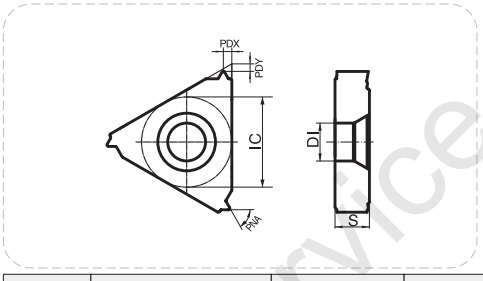
Workpiece material

P	Steel							◕	◕
M	Stainless steel							◕	◕
K	Cast iron								
N	Non-ferrous metal								
S	Heat resistant super alloys Titanium alloy								

Processing	Insert shape	Type	Pitch/ number of teeth	Dimension (mm)						CVD				PVD			
				IC	PDX	PDY	S	DI	PNA	HS8225	HS8123	HS8133	HS6115	HS7125	HS7225	HS5125	HS5225
External threading		16ER115NPT	11.5	9.525	1.5	1.1	3.52	4.0	60°							★	★
		16ER14NPT	14.0	9.525	1.2	0.9	3.52	4.0	60°							★	★
		16ER18NPT	18.0	9.525	1.0	0.8	3.52	4.0	60°							★	★

★ Recommended grade ☆ Available grade

Working condition: ● Stable ◕ Average ⌗ Tough



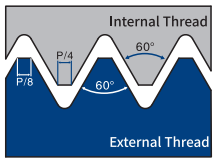
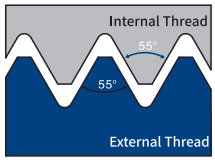
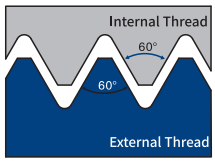
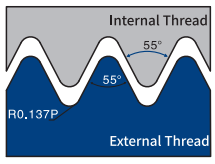
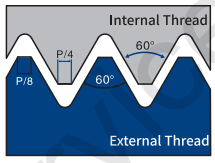
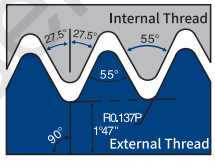
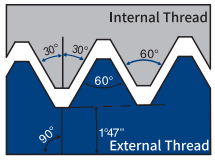
Workpiece material

P	Steel							◕	◕
M	Stainless steel							◕	◕
K	Cast iron								
N	Non-ferrous metal								
S	Heat resistant super alloys Titanium alloy								

Processing	Insert shape	Type	Pitch/ number of teeth	Dimension (mm)						CVD				PVD			
				IC	PDX	PDY	S	DI	PNA	HS8225	HS8123	HS8133	HS6115	HS7125	HS7225	HS5125	HS5225
Internal threading		16IR115NPT	11.5	9.525	1.5	1.1	3.52	4.0	60°							★	★
		16IR14NPT	14.0	9.525	1.2	0.9	3.52	4.0	60°							★	★
		16IR18NPT	18.0	9.525	1.0	0.8	3.52	4.0	60°							★	★

★ Recommended grade ☆ Available grade

Overview of Threading

Industry	Diagram	Thread Type	Thread	Shape	Pitch	Tooth number
General Industry		ISO Metric Thread	ISO Metric 60 Thread		1–6	4–25
General Industry		Universal Thread	55 Universal Pitch Thread		0.5–5	5–51
			60 Universal Pitch Thread			
General Industry		Whitworth Thread	W			8–28
Aerospace Industry Equipment		UN Thread	UN			5–28
Pipe thread for gas, heating and tap water faucets		BSPT	BSPT			11–28
For pipeline connected with gas and tap water faucets		NPT	NPT			8–27

Solid Carbide Cutting Tools

Solid Carbide End Mills

Solid Carbide Drills

Solid Carbide End Mills

Code Key Of Solid Carbide End Mills

TB	4	S	1000	R0500	B	L	G	-	4
①	②	③	④	⑤	⑥	⑦	⑧		⑨

① Product series	
M	Micro mills
B	Basic type
P	High performance type
X	Special type

② Number of edges	
2	Two flutes
3	Three flutes
4	Four flutes
...	

③ Length	
S	Short
L	Long
E	Extra long
P	Necking

④ Tool diameter	
10 00	Φ10mm
Default	Ball nose mill

⑤ Corner radius	
R05 00	R5.0mm
Default	Flat end mill

⑥ Tool type	
default	Flat end
	Radius
B	Ball nose
W	Corrugated edge

⑦ Helical angle	
L	Little helical angle
N	Normal helical angle
H	Large helical angle
O	Special helical angle

⑧ Application fields	
G	General
M	Stainless steel machining
N	Aluminum alloy machining
S	High-temp alloy and titanium alloy machining
H	High hardness material machining

⑨ shank diameter	
4	shank diameter 4mm

Overview of solide carbide end mills

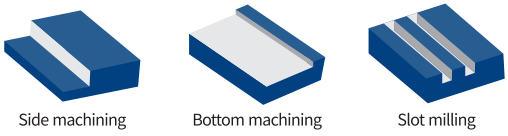
Lineup	Shape	Number of Tooth	Model	Size range	Workpiece												
					P			M	K	N		S		H			
					Carbon steel	Alloy steel	High-alloyed steel and tool steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	Hardened steel			
														< 54HRC	54--60 HRC	> 60HRC
Basic mill	Flat	2	TB2S···LG	Φ3—Φ20	☀	☀	☀	☼	☀			☼	☼	☼		
			TB2L···LG	Φ3—Φ20	☀	☀	☀	☼	☀			☼	☼	☼		
		3	TB3S···NG	Φ3—Φ20	☀	☀	☀	☼	☀			☼	☼	☼		
			TB3L···NG	Φ3—Φ20	☀	☀	☀	☼	☀			☼	☼	☼		
		4	TB4S···LG	Φ1—Φ20	☀	☀	☀	☼	☀			☼	☼	☼		
			TB4L···LG	Φ3—Φ20	☀	☀	☀	☼	☀			☼	☼	☼		
			TB4S···HG	Φ1—Φ20	☀	☀	☀	☼	☀			☼	☼	☼		
			TB4L···HG	Φ3—Φ20	☀	☀	☀	☼	☀			☼	☼	☼		
		6	TB6S···HG	Φ6—Φ20	☀	☀	☀	☼	☀			☼	☼	☼		
			TB6L···HG	Φ6—Φ20	☀	☀	☀	☼	☀			☼	☼	☼		
	Radius	2	TB2S···R···LG	Φ3—Φ12	☀	☀	☀	☼	☀			☼	☼	☼		
		4	TB4S···R···LG	Φ3—Φ12	☀	☀	☀	☼	☀			☼	☼	☼		
	Ball nose	2	TB2S···BLG	Φ1—Φ20	☀	☀	☀	☼	☀			☼	☼	☼	☼	
			TB2L···BLG	Φ2—Φ20	☀	☀	☀	☼	☀			☼	☼	☼	☼	
		4	TB4S···BLG	Φ3—Φ20	☀	☀	☀	☼	☀			☼	☼	☼		
			TB4L···BLG	Φ3—Φ20	☀	☀	☀	☼	☀			☼	☼	☼		
	Aluminum alloy mill	2	TB2S···HN	Φ1—Φ20						☼	☀					
		2	TB2L···HN	Φ3—Φ20						☼	☀					
		3	TB3S···HN	Φ1—Φ20						☼	☀					
		3	TB3L···HN	Φ3—Φ20						☼	☀					
		2	TB2S···BLN	Φ2—Φ12						☼	☀					
High performance mill	Flat	4	TP4S···LG	Φ1—Φ20	☀	☀	☀	☼	☀			☼	☼	☼		
			TP4P···LG	Φ6—Φ20	☀	☀	☀	☼	☀			☼	☼	☼		
			TP4S···NG	Φ1—Φ20	☀	☀	☀	☼	☀			☼	☼	☼		
			TP4P···NG	Φ6—Φ20	☀	☀	☀	☼	☀			☼	☼	☼		
			TP4S···NS	Φ1—Φ20	☼	☼	☼	☀				☀	☀			
			TP4P···NS	Φ6—Φ20	☼	☼	☼	☀				☀	☀			
			TP4S···HH	Φ1—Φ20	☼	☼	☼									
			TP4P···HH	Φ6—Φ20	☼	☼	☼									
	Radius		TP4S···R···LG	Φ3—Φ20	☀	☀	☀	☼				☼	☼			
			TP4P···R···LG	Φ6—Φ20	☀	☀	☀	☼				☼	☼			
			TP4S···R···NG	Φ3—Φ20	☀	☀	☀	☼				☼	☼			
			TP4P···R···NG	Φ6—Φ20	☀	☀	☀	☼				☼	☼			
			TP4S···R···NS	Φ3—Φ20	☼	☼	☼	☀				☀	☀			
			TP4P···R···NS	Φ6—Φ20	☼	☼	☼	☀				☀	☀			
			TP4S···R···HH	Φ3—Φ20	☼	☼	☼		☼					☀	☀	☀
			TP4P···R···HH	Φ6—Φ20	☼	☼	☼		☼					☀	☀	☀
	Ball nose	2	TP2S···BLG	Φ1—Φ20	☀	☀	☀	☀	☀					☼		
			TP2S···BLH	Φ1—Φ20	☼	☼	☼	☼	☼			☼	☼	☀	☀	☀
			TP2P···BLG	Φ1—Φ20	☀	☀	☀	☀	☀			☼	☼	☼	☼	
			TP2P···BLH	Φ1—Φ20	☼	☼	☼		☼					☀	☀	☀
		4	TP4S···BNS	Φ3—Φ20	☼	☼	☼	☀				☀	☀			

☀ Fit well ☼ Applicable

TB Series--Basic end mills

Two-flute flat end mill (short flute structure)

TB2S···LG



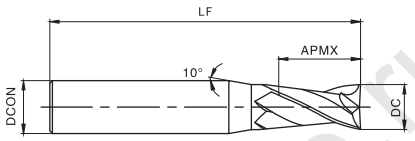


Figure 1

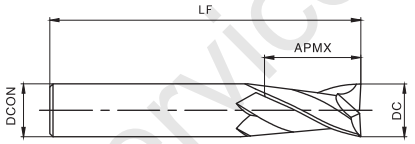
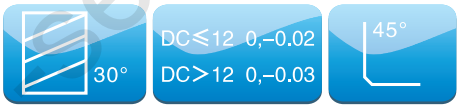


Figure 2



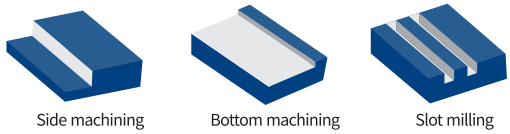
Type	Dimension (mm)					Pattern	Inventory
	DC	DCON	APMX	LF	ZEFP		
TB2S0300LG–4	3.0	4	8	50	2	Figure 1	●
TB2S0350LG–4	3.5	4	10	50	2	Figure 1	○
TB2S0400LG–4	4.0	4	11	50	2	Figure 2	●
TB2S0300LG	3.0	6	8	50	2	Figure 1	○
TB2S0350LG	3.5	6	10	50	2	Figure 1	●
TB2S0400LG	4.0	6	11	50	2	Figure 1	○
TB2S0450LG	4.5	6	11	50	2	Figure 1	●
TB2S0500LG	5.0	6	13	50	2	Figure 1	●
TB2S0550LG	5.5	6	16	50	2	Figure 1	●
TB2S0600LG	6.0	6	16	50	2	Figure 2	○
TB2S0700LG	7.0	8	20	60	2	Figure 1	●
TB2S0800LG	8.0	8	20	60	2	Figure 2	●
TB2S0900LG	9.0	10	22	75	2	Figure 1	●
TB2S1000LG	10.0	10	25	75	2	Figure 2	●
TB2S1200LG	12.0	12	30	75	2	Figure 2	●
TB2S1400LG	14.0	14	32	75	2	Figure 2	●
TB2S1600LG	16.0	16	45	100	2	Figure 2	●
TB2S1800LG	18.0	18	45	100	2	Figure 2	●
TB2S2000LG	20.0	20	45	100	2	Figure 2	●

●Standing inventory ○Make-to-order

TB Series--Basic end mills

Two-flute flat end mill (long flute structure)

TB2L···LG



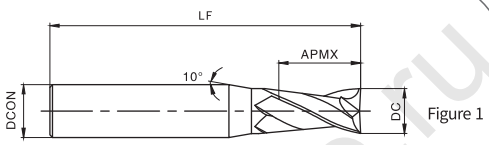


Figure 1

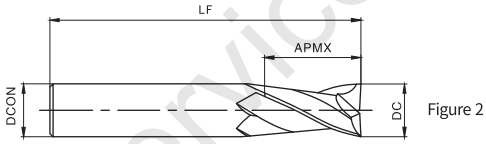
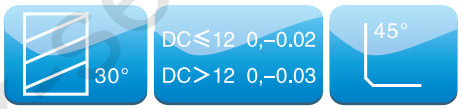


Figure 2



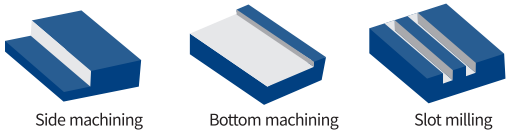
Type	Dimension (mm)					Pattern	Inventory
	DC	DCON	APMX	LF	ZEFP		
TB2L0300LG–4	3.0	4	12	75	2	Figure 1	●
TB2L0400LG–4	4.0	4	15	75	2	Figure 2	○
TB2L0300LG	3.0	6	12	75	2	Figure 1	○
TB2L0400LG	4.0	6	15	75	2	Figure 1	●
TB2L0500LG	5.0	6	20	75	2	Figure 1	●
TB2L0600LG	6.0	6	20	75	2	Figure 2	●
TB2L0800LG	8.0	8	25	100	2	Figure 2	●
TB2L1000LG	10.0	10	30	100	2	Figure 2	●
TB2L1200LG	12.0	12	35	100	2	Figure 2	●
TB2L1400LG	14.0	14	40	100	2	Figure 2	●
TB2L1600LG	16.0	16	50	150	2	Figure 2	●
TB2L2000LG	20.0	20	55	150	2	Figure 2	●

●Standing inventory ○Make-to-order

TB Series--Basic end mills

Three-flute flat end mill (short flute structure)

TB3S···NG



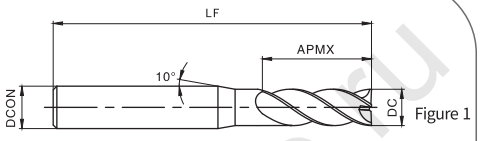


Figure 1

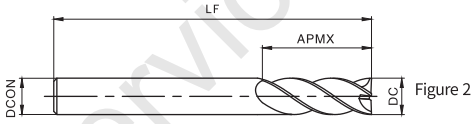
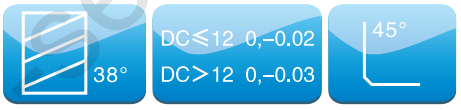


Figure 2



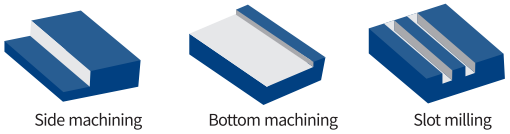
Type	Dimension (mm)					Pattern	Inventory
	DC	DCON	APMX	LF	ZEFP		
TB3S0300NG–4	3.0	4	8	50	3	Figure 1	●
TB3S0350NG–4	3.5	4	10	50	3	Figure 1	○
TB3S0400NG–4	4.0	4	11	50	3	Figure 2	●
TB3S0300NG	3.0	6	8	50	3	Figure 1	○
TB3S0350NG	3.5	6	10	50	3	Figure 1	●
TB3S0400NG	4.0	6	11	50	3	Figure 1	○
TB3S0450NG	4.5	6	11	50	3	Figure 1	●
TB3S0500NG	5.0	6	13	50	3	Figure 1	○
TB3S0550NG	5.5	6	16	50	3	Figure 1	●
TB3S0600NG	6.0	6	16	50	3	Figure 2	○
TB3S0700NG	7.0	8	20	60	3	Figure 1	●
TB3S0800NG	8.0	8	20	60	3	Figure 2	●
TB3S0900NG	9.0	10	22	75	3	Figure 1	●
TB3S1000NG	10.0	10	25	75	3	Figure 2	●
TB3S1200NG	12.0	12	30	75	3	Figure 2	●
TB3S1400NG	14.0	14	32	75	3	Figure 2	●
TB3S1600NG	16.0	16	45	100	3	Figure 2	●
TB3S1800NG	18.0	18	45	100	3	Figure 2	●
TB3S2000NG	20.0	20	45	100	3	Figure 2	●

● Standing inventory ○ Make-to-order

TB Series--Basic end mills

Three-flute flat end mill (long flute structure)

TB3L···NG



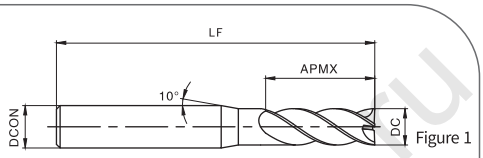


Figure 1

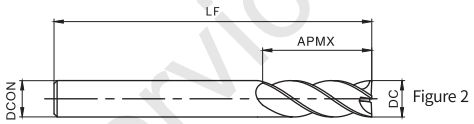
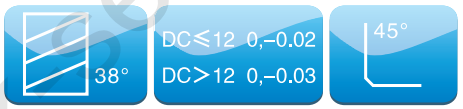


Figure 2



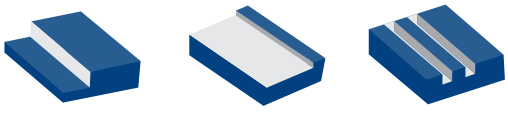
Type	Dimension (mm)					Pattern	Inventory
	DC	DCON	APMX	LF	ZEFP		
TB3L0300NG–4	3.0	4	12	75	3	Figure 1	●
TB3L0400NG–4	4.0	4	15	75	3	Figure 2	●
TB3L0300NG	3.0	6	12	75	3	Figure 1	○
TB3L0400NG	4.0	6	15	75	3	Figure 1	●
TB3L0500NG	5.0	6	20	75	3	Figure 1	●
TB3L0600NG	6.0	6	20	75	3	Figure 2	●
TB3L0800NG	8.0	8	25	100	3	Figure 2	●
TB3L1000NG	10.0	10	30	100	3	Figure 2	○
TB3L1200NG	12.0	12	35	100	3	Figure 2	●
TB3L1400NG	14.0	14	40	100	3	Figure 2	●
TB3L1600NG	16.0	16	50	150	3	Figure 2	●
TB3L2000NG	20.0	20	55	150	3	Figure 2	●

●Standing inventory ○Make-to-order

TB Series--Basic end mills

Four-flute flat end mill (short flute structure, small helical angle)

TB4S···LG



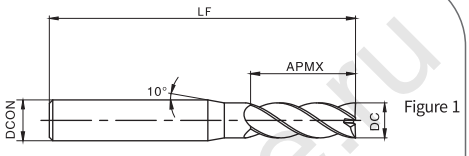


Figure 1

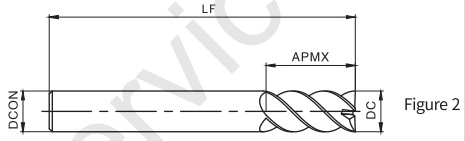
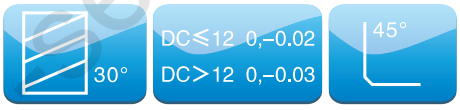


Figure 2



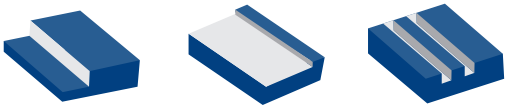
Type	Dimension (mm)					Pattern	Inventory
	DC	DCON	APMX	LF	ZEFP		
TB4S0100LG–4	1.0	4	3	50	4	Figure 1	●
TB4S0150LG–4	1.5	4	4	50	4	Figure 1	○
TB4S0200LG–4	2.0	4	6	50	4	Figure 1	●
TB4S0250LG–4	2.5	4	8	50	4	Figure 1	●
TB4S0300LG–4	3.0	4	8	50	4	Figure 1	●
TB4S0350LG–4	3.5	4	10	50	4	Figure 1	●
TB4S0400LG–4	4.0	4	11	50	4	Figure 2	●

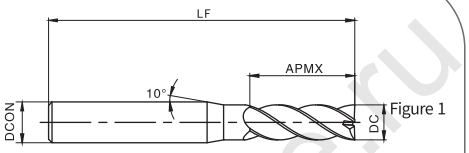
●Standing inventory ○Make-to-order

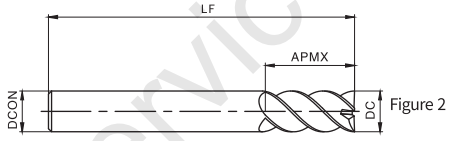
TB Series--Basic end mills

Four-flute flat end mill (short flute structure, small helical angle)

TB4S···LG







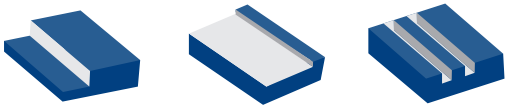
Type	Dimension (mm)					Pattern	Inventory
	DC	DCON	APMX	LF	ZEFP		
TB4S0100LG	1.0	6	3	50	4	Figure 1	●
TB4S0150LG	1.5	6	4	50	4	Figure 1	○
TB4S0200LG	2.0	6	6	50	4	Figure 1	●
TB4S0250LG	2.5	6	8	50	4	Figure 1	○
TB4S0300LG	3.0	6	8	50	4	Figure 1	●
TB4S0350LG	3.5	6	10	50	4	Figure 1	○
TB4S0400LG	4.0	6	11	50	4	Figure 1	●
TB4S0450LG	4.5	6	11	50	4	Figure 1	○
TB4S0500LG	5.0	6	13	50	4	Figure 1	●
TB4S0550LG	5.5	6	16	50	4	Figure 1	○
TB4S0600LG	6.0	6	16	50	4	Figure 2	●
TB4S0700LG	7.0	8	20	60	4	Figure 1	○
TB4S0800LG	8.0	8	20	60	4	Figure 2	●
TB4S0900LG	9.0	10	22	75	4	Figure 1	○
TB4S1000LG	10.0	10	25	75	4	Figure 2	●
TB4S1100LG	11.0	12	26	75	4	Figure 1	●
TB4S1200LG	12.0	12	30	75	4	Figure 2	●
TB4S1400LG	14.0	14	32	75	4	Figure 2	●
TB4S1600LG	16.0	16	45	100	4	Figure 2	●
TB4S1800LG	18.0	18	45	100	4	Figure 2	●
TB4S2000LG	20.0	20	45	100	4	Figure 2	●

●Standing inventory ○Make-to-order

TB Series--Basic end mills

Four-flute flat end mill (long flute structure, small helical angle)

TB4L···LG



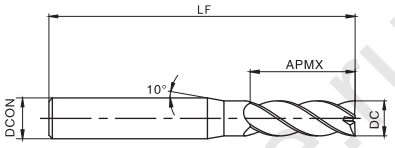


Figure 1

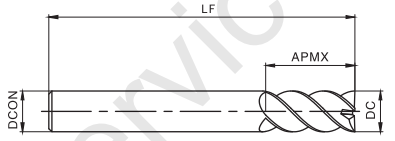
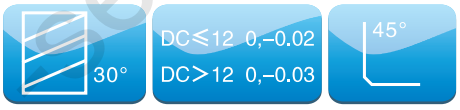


Figure 2



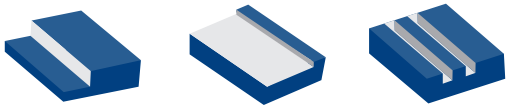
Type	Dimension (mm)					Pattern	Inventory
	DC	DCON	APMX	LF	ZEFP		
TB4L0300LG–4	3.0	4	12	75	4	Figure 1	●
TB4L0400LG–4	4.0	4	15	75	4	Figure 2	○
TB4L0300LG	3.0	6	12	75	4	Figure 1	●
TB4L0400LG	4.0	6	15	75	4	Figure 1	●
TB4L0500LG	5.0	6	20	75	4	Figure 1	●
TB4L0600LG	6.0	6	20	75	4	Figure 2	●
TB4L0800LG	8.0	8	25	100	4	Figure 2	●
TB4L1000LG	10.0	10	30	100	4	Figure 2	○
TB4L1200LG	12.0	12	35	100	4	Figure 2	●
TB4L1400LG	14.0	14	40	100	4	Figure 2	●
TB4L1600LG	16.0	16	50	150	4	Figure 2	●
TB4L2000LG	20.0	20	55	150	4	Figure2	●

●Standing inventory ○Make-to-order

TB Series--Basic end mills

Four-flute flat end mill (short flute structure, large helical angle)

TB4S···HG



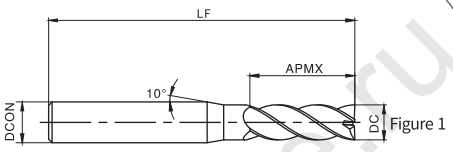


Figure 1

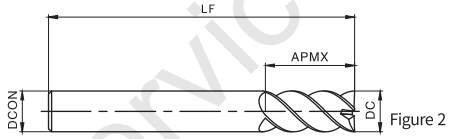


Figure 2

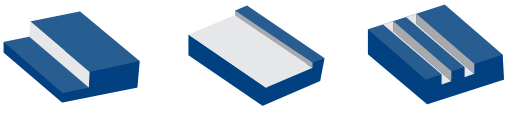
Type	Dimension (mm)					Pattern	Inventory
	DC	DCON	APMX	LF	ZEFP		
TB4S0100HG–4	1.0	4	3	50	4	Figure 1	●
TB4S0150HG–4	1.5	4	4	50	4	Figure 1	●
TB4S0200HG–4	2.0	4	6	50	4	Figure 1	●
TB4S0250HG–4	2.5	4	8	50	4	Figure 1	●
TB4S0300HG–4	3.0	4	8	50	4	Figure 1	●
TB4S0350HG–4	3.5	4	10	50	4	Figure 1	●
TB4S0400HG–4	4.0	4	11	50	4	Figure 2	●

● Standing inventory ○ Make-to-order

TB Series--Basic end mills

Four-flute flat end mill (short flute structure, large helical angle)

TB4S···HG



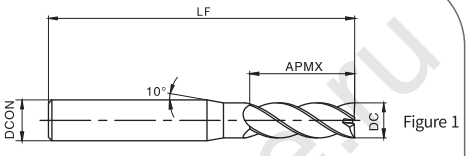


Figure 1

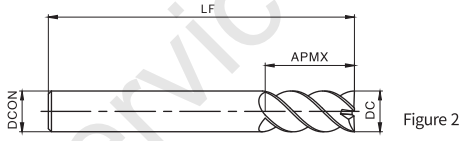
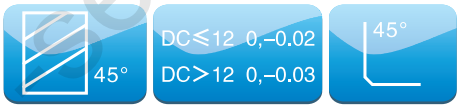


Figure 2



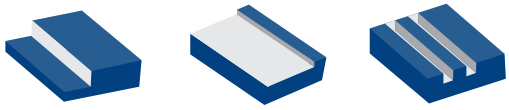
Type	Dimension (mm)					Pattern	Inventory
	DC	DCON	APMX	LF	ZEFP		
TB4S0100HG	1.0	6	3	50	4	Figure 1	●
TB4S0150HG	1.5	6	4	50	4	Figure 1	○
TB4S0200HG	2.0	6	6	50	4	Figure 1	●
TB4S0250HG	2.5	6	8	50	4	Figure 1	○
TB4S0300HG	3.0	6	8	50	4	Figure 1	●
TB4S0350HG	3.5	6	10	50	4	Figure 1	○
TB4S0400HG	4.0	6	11	50	4	Figure 1	●
TB4S0450HG	4.5	6	11	50	4	Figure 1	○
TB4S0500HG	5.0	6	13	50	4	Figure 1	●
TB4S0550HG	5.5	6	16	50	4	Figure 1	○
TB4S0600HG	6.0	6	16	50	4	Figure 2	●
TB4S0700HG	7.0	8	20	60	4	Figure 1	●
TB4S0800HG	8.0	8	20	60	4	Figure 2	●
TB4S0900HG	9.0	10	22	75	4	Figure 1	●
TB4S1000HG	10.0	10	25	75	4	Figure 2	●
TB4S1100HG	11.0	12	26	75	4	Figure 1	●
TB4S1200HG	12.0	12	30	75	4	Figure 2	●
TB4S1400HG	14.0	14	32	75	4	Figure 2	●
TB4S1600HG	16.0	16	45	100	4	Figure 2	●
TB4S1800HG	18.0	18	45	100	4	Figure 2	●
TB4S2000HG	20.0	20	45	100	4	Figure 2	●

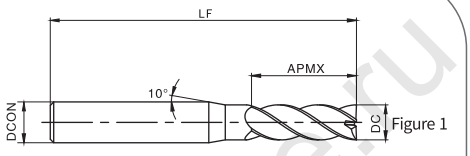
●Standing inventory ○Make-to-order

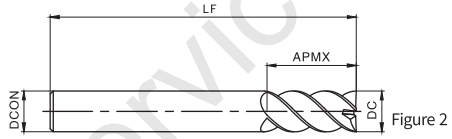
TB Series--Basic end mills

Four-flute flat end mill (long flute structure, large helical angle)

TB4L···HG







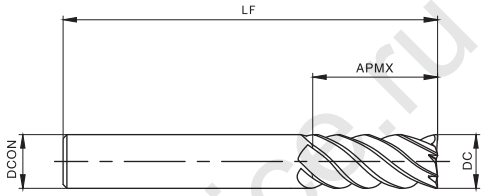
Type	Dimension (mm)					Pattern	Inventory
	DC	DCON	APMX	LF	ZEFP		
TB4L0300HG–4	3.0	4	12	75	4	Figure 1	●
TB4L0400HG–4	4.0	4	15	75	4	Figure 2	●
TB4L0300HG	3.0	6	12	75	4	Figure 1	●
TB4L0400HG	4.0	6	15	75	4	Figure 1	●
TB4L0500HG	5.0	6	20	75	4	Figure 1	●
TB4L0600HG	6.0	6	20	75	4	Figure 2	●
TB4L0800HG	8.0	8	25	100	4	Figure 2	●
TB4L1000HG	10.0	10	30	100	4	Figure 2	●
TB4L1200HG	12.0	12	35	100	4	Figure 2	●
TB4L1400HG	14.0	14	40	100	4	Figure 2	●
TB4L1600HG	16.0	16	50	150	4	Figure 2	●
TB4L2000HG	20.0	20	55	150	4	Figure 2	●

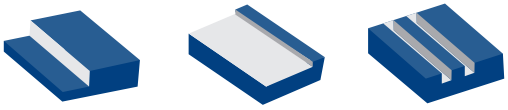
●Standing inventory ○Make-to-order

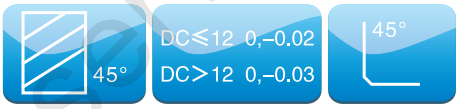
TB Series--Basic end mills

Six-flute flat end mill (short flute structure)

TB6S···HG







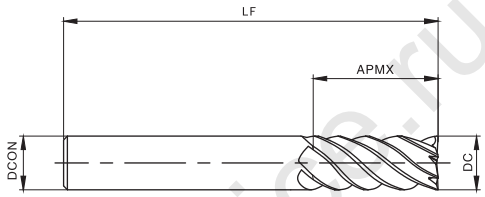
Type	Dimension (mm)					Inventory
	DC	DCON	APMX	LF	ZEFP	
TB6S0600HG	6.0	6	18	60	6	●
TB6S0800HG	8.0	8	20	60	6	●
TB6S1000HG	10.0	10	30	75	6	●
TB6S1200HG	12.0	12	32	75	6	●
TB6S1600HG	16.0	16	40	100	6	●
TB6S2000HG	20.0	20	45	100	6	●

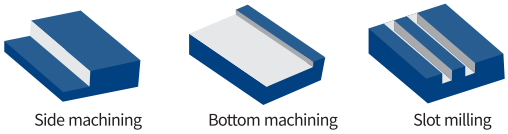
●Standing inventory ○Make-to-order

TB Series--Basic end mills

Six-flute flat end mill (long flute structure)

TB6L···HG





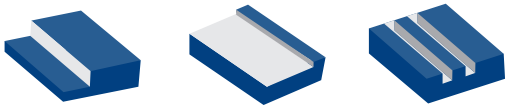
Type	Dimension (mm)					Inventory
	DC	DCON	APMX	LF	ZEFP	
TB6L0600HG	6.0	6	24	75	6	●
TB6L0800HG	8.0	8	32	75	6	●
TB6L1000HG	10.0	10	40	100	6	●
TB6L1200HG	12.0	12	45	100	6	●
TB6L1600HG	16.0	16	64	150	6	●
TB6L2000HG	20.0	20	75	150	6	●

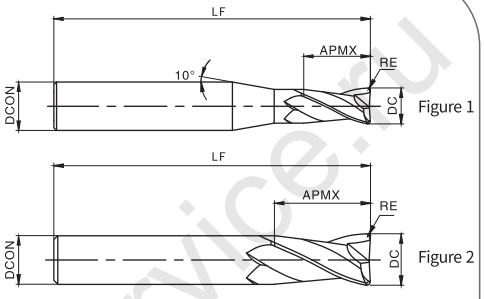
●Standing inventory ○Make-to-order

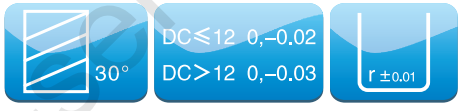
TB Series--Basic end mills

Two-flute R end mill (short flute structure)

TB2S···R···LG







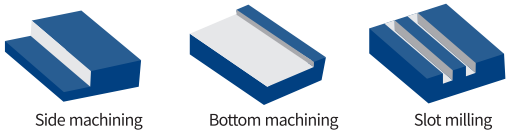
Type	Dimension (mm)						Pattern	Inventory
	DC	DCON	APMX	LF	RE	ZEFP		
TB2S0300R0020LG–4	3.0	4	8	50	0.2	2	Figure 1	●
TB2S0300R0030LG–4	3.0	4	8	50	0.3	2	Figure 1	●
TB2S0300R0050LG–4	3.0	4	8	50	0.5	2	Figure 1	●
TB2S0400R0020LG–4	4.0	4	11	50	0.2	2	Figure 2	●
TB2S0400R0030LG–4	4.0	4	11	50	0.3	2	Figure 2	●
TB2S0400R0050LG–4	4.0	4	11	50	0.5	2	Figure 2	●
TB2S0400R0100LG–4	4.0	4	11	50	1.0	2	Figure 2	●
TB2S0300R0020LG	3.0	6	8	50	0.2	2	Figure 1	●
TB2S0300R0030LG	3.0	6	8	50	0.3	2	Figure 1	○
TB2S0300R0050LG	3.0	6	8	50	0.5	2	Figure 1	●
TB2S0400R0020LG	4.0	6	11	50	0.2	2	Figure 1	●
TB2S0400R0030LG	4.0	6	11	50	0.3	2	Figure 1	○
TB2S0400R0050LG	4.0	6	11	50	0.5	2	Figure 1	●
TB2S0400R0100LG	4.0	6	11	50	1.0	2	Figure 1	●
TB2S0500R0030LG	5.0	6	13	50	0.3	2	Figure 1	○
TB2S0500R0050LG	5.0	6	13	50	0.5	2	Figure 1	●
TB2S0500R0100LG	5.0	6	13	50	1.0	2	Figure 1	●
TB2S0600R0030LG	6.0	6	16	50	0.3	2	Figure 2	○
TB2S0600R0050LG	6.0	6	16	50	0.5	2	Figure 2	●
TB2S0600R0100LG	6.0	6	16	50	1.0	2	Figure 2	●
TB2S0800R0030LG	8.0	8	20	60	0.3	2	Figure 2	○
TB2S0800R0050LG	8.0	8	20	60	0.5	2	Figure 2	●
TB2S0800R0100LG	8.0	8	20	60	1.0	2	Figure 2	●
TB2S1000R0050LG	10.0	10	25	75	0.5	2	Figure 2	●
TB2S1000R0100LG	10.0	10	25	75	1.0	2	Figure 2	●
TB2S1000R0150LG	10.0	10	25	75	1.5	2	Figure 2	●
TB2S1000R0200LG	10.0	10	25	75	2.0	2	Figure 2	●
TB2S1200R0050LG	12.0	12	30	75	0.5	2	Figure 2	●
TB2S1200R0100LG	12.0	12	30	75	1.0	2	Figure 2	●
TB2S1200R0150LG	12.0	12	30	75	1.5	2	Figure 2	●
TB2S1200R0200LG	12.0	12	30	75	2.0	2	Figure 2	●

●Standing inventory ○Make-to-order

TB Series--Basic end mills

Four-flute R end mill (short flute structure)

TB4S···R···LG



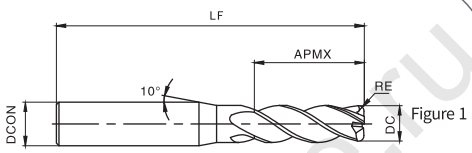


Figure 1

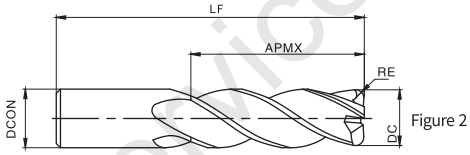


Figure 2

Type	Dimension (mm)						Pattern	Inventory
	DC	DCON	APMX	LF	RE	ZEFP		
TB4S0300R0020LG-4	3.0	4	8	50	0.2	4	Figure 1	●
TB4S0400R0030LG-4	4.0	4	10	50	0.3	4	Figure 2	○
TB4S0400R0050LG-4	4.0	4	10	50	0.5	4	Figure 2	●
TB4S0300R0020LG	3.0	6	8	50	0.2	4	Figure 1	●
TB4S0400R0030LG	4.0	6	10	50	0.3	4	Figure 1	●
TB4S0400R0050LG	4.0	6	10	50	0.5	4	Figure 1	●
TB4S0500R0050LG	5.0	6	13	50	0.5	4	Figure 1	●
TB4S0500R0100LG	5.0	6	13	50	1.0	4	Figure 1	●
TB4S0600R0050LG	6.0	6	16	50	0.5	4	Figure 2	●
TB4S0600R0100LG	6.0	6	16	50	1.0	4	Figure 2	●
TB4S0800R0050LG	8.0	8	20	60	0.5	4	Figure 2	●
TB4S0800R0100LG	8.0	8	20	60	1.0	4	Figure 2	●
TB4S1000R0050LG	10.0	10	25	75	0.5	4	Figure 2	●
TB4S1000R0100LG	10.0	10	25	75	1.0	4	Figure 2	●
TB4S1000R0200LG	10.0	10	25	75	2.0	4	Figure 2	●
TB4S1000R0300LG	10.0	10	25	75	3.0	4	Figure 2	●
TB4S1200R0050LG	12.0	12	30	75	0.5	4	Figure 2	●
TB4S1200R0100LG	12.0	12	30	75	1.0	4	Figure 2	●
TB4S1200R0200LG	12.0	12	30	75	2.0	4	Figure 2	●
TB4S1200R0300LG	12.0	12	30	75	3.0	4	Figure 2	●

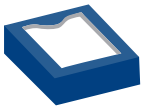
●Standing inventory ○Make-to-order

TB Series--Basic end mills

Two-flute ball nose end mill (short flute structure)

TB2S···BLG


Profile machining


Cavity machining


Slot machining

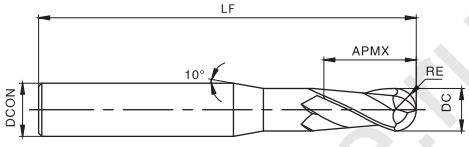


Figure 1

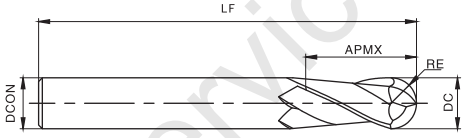
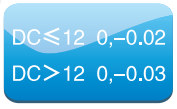


Figure 2



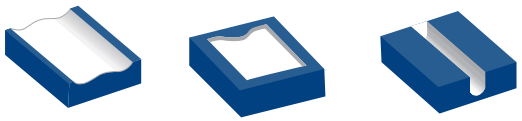
Type	Dimension (mm)						Pattern	Inventory
	DC	DCON	APMX	LF	RE	ZEFP		
TB2SR0050BLG–4	1.0	4	2	50	0.5	2	Figure 1	●
TB2SR0075BLG–4	1.5	4	3	50	0.75	2	Figure 1	●
TB2SR0100BLG–4	2.0	4	4	50	1.0	2	Figure 1	●
TB2SR0125BLG–4	2.5	4	5	50	1.25	2	Figure 1	●
TB2SR0150BLG–4	3.0	4	6	50	1.5	2	Figure 1	●
TB2SR0175BLG–4	3.5	4	8	50	1.75	2	Figure 1	●
TB2SR0200BLG–4	4.0	4	8	50	2.0	2	Figure 2	●
TB2SR0050BLG	1.0	6	2	50	0.5	2	Figure 1	●
TB2SR0075BLG	1.5	6	3	50	0.75	2	Figure 1	●
TB2SR0100BLG	2.0	6	4	50	1.0	2	Figure 1	●
TB2SR0125BLG	2.5	6	5	50	1.25	2	Figure 1	●
TB2SR0150BLG	3.0	6	6	50	1.5	2	Figure 1	●
TB2SR0175BLG	3.5	6	8	50	1.75	2	Figure 1	●
TB2SR0200BLG	4.0	6	8	50	2.0	2	Figure 1	●
TB2SR0250BLG	5.0	6	10	50	2.5	2	Figure 1	●
TB2SR0275BLG	5.5	6	12	50	2.75	2	Figure 1	●
TB2SR0300BLG	6.0	6	12	50	3.0	2	Figure 2	●
TB2SR0350BLG	7.0	8	14	60	3.5	2	Figure 1	●
TB2SR0400BLG	8.0	8	16	60	4.0	2	Figure 2	●
TB2SR0450BLG	9.0	10	18	75	4.5	2	Figure 1	●
TB2SR0500BLG	10.0	10	20	75	5.0	2	Figure 2	●
TB2SR0600BLG	12.0	12	24	75	6.0	2	Figure 2	●
TB2SR0700BLG	14.0	14	28	75	7.0	2	Figure 2	●
TB2SR0800BLG	16.0	16	32	100	8.0	2	Figure 2	●
TB2SR1000BLG	20.0	20	40	100	10.0	2	Figure 2	●

●Standing inventory ○Make-to-order

TB Series--Basic end mills

Two-flute ball nose end mill (long flute structure)

TB2L···BLG



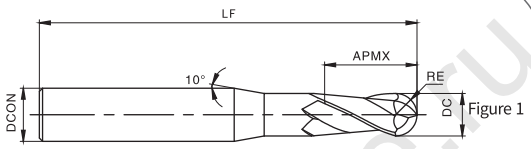


Figure 1

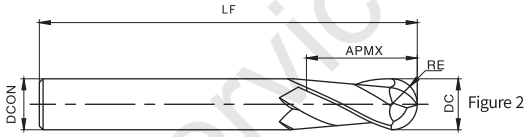


Figure 2

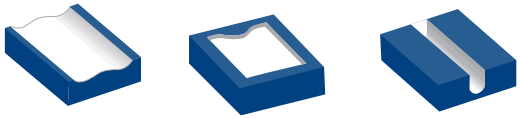
Type	Dimension (mm)						Pattern	Inventory
	DC	DCON	APMX	LF	RE	ZEFP		
TB2LR0100BLG-4	2.0	4	4	75	1.0	2	Figure 1	●
TB2LR0125BLG-4	2.5	4	5	75	1.25	2	Figure 1	●
TB2LR0150BLG-4	3.0	4	6	75	1.5	2	Figure 1	●
TB2LR0175BLG-4	3.5	4	8	75	1.75	2	Figure 1	●
TB2LR0200BLG-4	4.0	4	8	75	2.0	2	Figure 2	●
TB2LR0100BLG	2.0	6	4	75	1.0	2	Figure 1	●
TB2LR0125BLG	2.5	6	5	75	1.25	2	Figure 1	●
TB2LR0150BLG	3.0	6	6	75	1.5	2	Figure 1	●
TB2LR0175BLG	3.5	6	8	75	1.75	2	Figure 1	●
TB2LR0200BLG	4.0	6	8	75	2.0	2	Figure 1	●
TB2LR0250BLG	5.0	6	10	75	2.5	2	Figure 1	●
TB2LR0275BLG	5.5	6	12	75	2.75	2	Figure 1	●
TB2LR0300BLG	6.0	6	12	75	3.0	2	Figure 2	●
TB2LR0350BLG	7.0	8	14	75	3.5	2	Figure 1	●
TB2LR0400BLG	8.0	8	16	100	4.0	2	Figure 2	●
TB2LR0450BLG	9.0	10	18	100	4.5	2	Figure 1	●
TB2LR0500BLG	10.0	10	20	100	5.0	2	Figure 2	●
TB2LR0600BLG	12.0	12	24	100	6.0	2	Figure 2	●
TB2LR0700BLG	14.0	14	28	100	7.0	2	Figure 2	●
TB2LR0800BLG	16.0	16	32	150	8.0	2	Figure 2	●
TB2LR1000BLG	20.0	20	40	150	10.0	2	Figure 2	●

●Standing inventory ○Make-to-order

TB Series--Basic end mills

Four-flute ball nose end mill (short flute structure)

TB4S···BLG



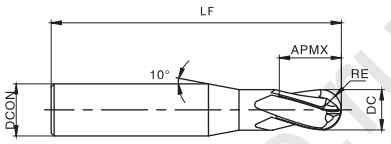


Figure 1

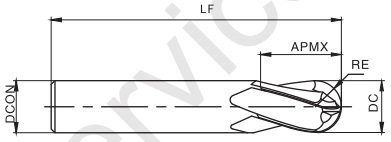
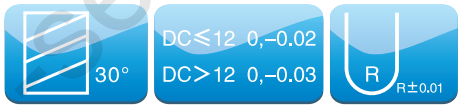


Figure 2



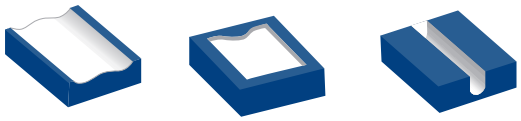
Type	Dimension (mm)						Pattern	Inventory
	DC	DCON	APMX	LF	RE	ZEFP		
TB4SR0150BLG–4	3.0	4	6	50	1.5	4	Figure 1	●
TB4SR0200BLG–4	4.0	4	8	50	2.0	4	Figure 2	○
TB4SR0150BLG	3.0	6	6	50	1.5	4	Figure 1	○
TB4SR0200BLG	4.0	6	8	50	2.0	4	Figure 1	●
TB4SR0250BLG	5.0	6	10	50	2.5	4	Figure 1	●
TB4SR0300BLG	6.0	6	12	50	3.0	4	Figure 2	●
TB4SR0400BLG	8.0	8	16	60	4.0	4	Figure 2	●
TB4SR0500BLG	10.0	10	20	75	5.0	4	Figure 2	●
TB4SR0600BLG	12.0	12	24	75	6.0	4	Figure 2	●
TB4SR0800BLG	16.0	16	32	100	8.0	4	Figure 2	●
TB4SR1000BLG	20.0	20	40	100	10.0	4	Figure 2	●

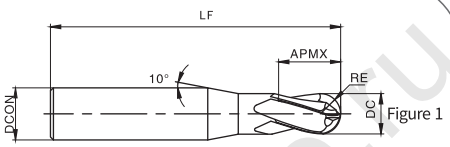
●Standing inventory ○Make-to-order

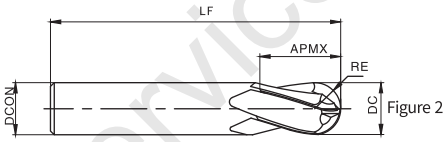
TB Series--Basic end mills

Four-flute ball nose end mill (long flute structure)

TB4L···BLG







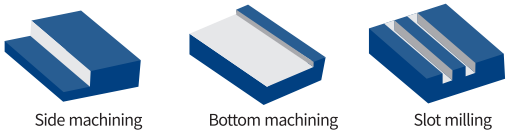
Type	Dimension (mm)						Pattern	Inventory
	DC	DCON	APMX	LF	RE	ZEFP		
TB4LR0150BLG–4	3.0	4	6	75	1.5	4	Figure 1	●
TB4LR0200BLG–4	4.0	4	8	75	2.0	4	Figure 2	○
TB4LR0150BLG	3.0	6	6	75	1.5	4	Figure 1	○
TB4LR0200BLG	4.0	6	8	75	2.0	4	Figure 1	●
TB4LR0250BLG	5.0	6	10	75	2.5	4	Figure 1	●
TB4LR0300BLG	6.0	6	12	75	3.0	4	Figure 2	●
TB4LR0400BLG	8.0	8	16	100	4.0	4	Figure 2	●
TB4LR0500BLG	10.0	10	20	100	5.0	4	Figure 2	●
TB4LR0600BLG	12.0	12	24	100	6.0	4	Figure 2	●
TB4LR0800BLG	16.0	16	32	150	8.0	4	Figure 2	●
TB4LR1000BLG	20.0	20	40	150	10.0	4	Figure 2	●

●Standing inventory ○Make-to-order

TB Series--Basic end mills

Two-flute flat end mill (aluminum alloy machining)

TB2S···HN



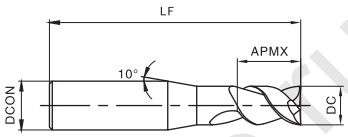


Figure 1

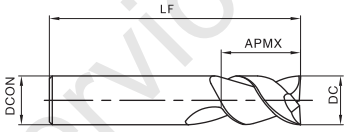


Figure 2

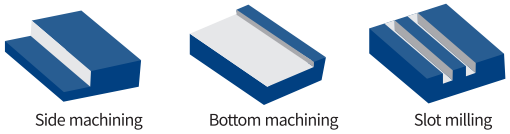
Type	Dimension (mm)					Pattern	Inventory
	DC	DCON	APMX	LF	ZEFP		
TB2S0100HN–4	1.0	4	3	50	2	Figure 1	●
TB2S0150HN–4	1.5	4	4	50	2	Figure 1	●
TB2S0200HN–4	2.0	4	6	50	2	Figure 1	●
TB2S0250HN–4	2.5	4	7	50	2	Figure 1	●
TB2S0300HN–4	3.0	4	9	50	2	Figure 1	●
TB2S0400HN–4	4.0	4	12	50	2	Figure 2	●
TB2S0300HN	3.0	6	9	50	2	Figure 1	●
TB2S0400HN	4.0	6	12	50	2	Figure 1	○
TB2S0500HN	5.0	6	15	50	2	Figure 1	○
TB2S0600HN	6.0	6	18	60	2	Figure 2	●
TB2S0800HN	8.0	8	20	60	2	Figure 2	●
TB2S1000HN	10.0	10	30	75	2	Figure 2	●
TB2S1200HN	12.0	12	32	75	2	Figure 2	●
TB2S1600HN	16.0	16	45	100	2	Figure 2	●
TB2S2000HN	20.0	20	45	100	2	Figure 2	●

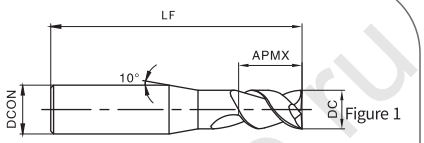
●Standing inventory ○Make-to-order

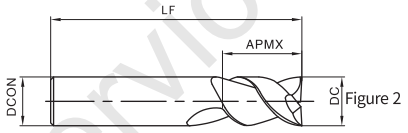
TB Series--Basic end mills

Two-flute flat end mill (aluminum alloy machining)

TB2L···HN







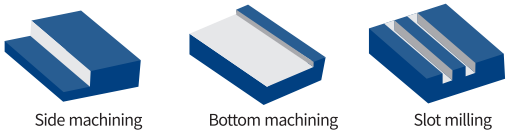
Type	Dimension (mm)					Pattern	Inventory
	DC	DCON	APMX	LF	ZEFP		
TB2L0300HN–4	3.0	4	12	60	2	Figure 1	●
TB2L0400HN–4	4.0	4	16	60	2	Figure 2	○
TB2L0300HN	3.0	6	12	60	2	Figure 1	○
TB2L0400HN	4.0	6	16	60	2	Figure 1	●
TB2L0500HN	5.0	6	20	60	2	Figure 1	●
TB2L0600HN	6.0	6	25	75	2	Figure 2	●
TB2L0800HN	8.0	8	32	75	2	Figure 2	●
TB2L1000HN	10.0	10	45	100	2	Figure 2	●
TB2L1200HN	12.0	12	45	100	2	Figure 2	●
TB2L1600HN	16.0	16	65	150	2	Figure 2	●
TB2L2000HN	20.0	20	75	150	2	Figure 2	●

●Standing inventory ○Make-to-order

TB Series--Basic end mills

Three-flute flat end mill (aluminum alloy machining)

TB3S···HN



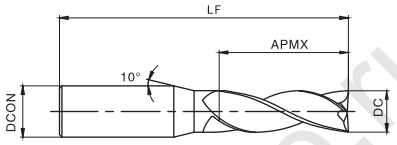


Figure 1

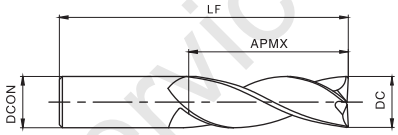


Figure 2

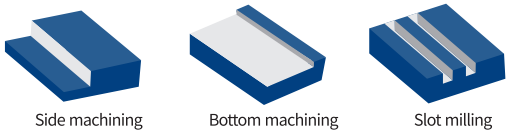
Type	Dimension (mm)					Pattern	Inventory
	DC	DCON	APMX	LF	ZEFP		
TB3S0100HN–4	1.0	4	3	50	3	Figure 1	●
TB3S0150HN–4	1.5	4	4	50	3	Figure 1	●
TB3S0200HN–4	2.0	4	6	50	3	Figure 1	●
TB3S0250HN–4	2.5	4	7	50	3	Figure 1	●
TB3S0300HN–4	3.0	4	9	50	3	Figure 1	●
TB3S0400HN–4	4.0	4	12	50	3	Figure 2	●
TB3S0300HN	3.0	6	9	50	3	Figure 1	●
TB3S0400HN	4.0	6	12	50	3	Figure 1	○
TB3S0500HN	5.0	6	15	50	3	Figure 1	○
TB3S0600HN	6.0	6	18	60	3	Figure 2	●
TB3S0800HN	8.0	8	20	60	3	Figure 2	●
TB3S1000HN	10.0	10	30	75	3	Figure 2	●
TB3S1200HN	12.0	12	32	75	3	Figure 2	●
TB3S1600HN	16.0	16	45	100	3	Figure 2	●
TB3S2000HN	20.0	20	45	100	3	Figure 2	●

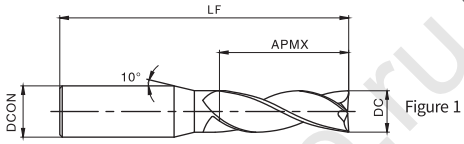
●Standing inventory ○Make-to-order

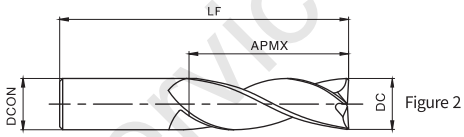
TB Series--Basic end mills

Three-flute flat end mill (aluminum alloy machining)

TB3L···HN







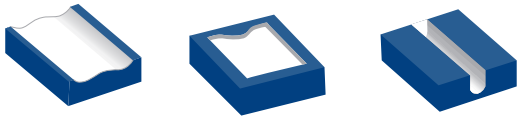
Type	Dimension (mm)					Pattern	Inventory
	DC	DCON	APMX	LF	ZEFP		
TB3L0300HN–4	3.0	4	12	60	3	Figure 1	●
TB3L0400HN–4	4.0	4	16	60	3	Figure 2	○
TB3L0300HN	3.0	6	12	60	3	Figure 1	○
TB3L0400HN	4.0	6	16	60	3	Figure 1	●
TB3L0500HN	5.0	6	20	60	3	Figure 1	●
TB3L0600HN	6.0	6	25	75	3	Figure 2	●
TB3L0800HN	8.0	8	32	75	3	Figure 2	●
TB3L1000HN	10.0	10	45	100	3	Figure 2	●
TB3L1200HN	12.0	12	45	100	3	Figure 2	●
TB3L1600HN	16.0	16	65	150	3	Figure 2	●
TB3L2000HN	20.0	20	75	150	3	Figure 2	●

●Standing inventory ○Make-to-order

TB Series--Basic end mills

Two-flute ball nose end mill (aluminum alloy machining)

TB2S···BLN



Profile machining　Cavity machining　Slot machining

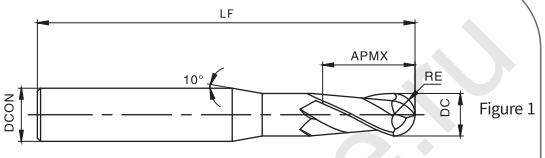


Figure 1

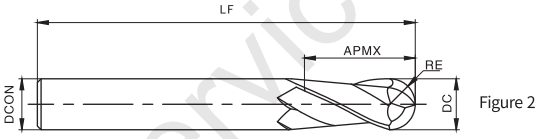
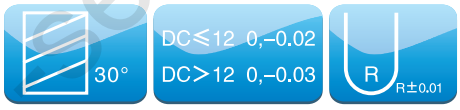


Figure 2



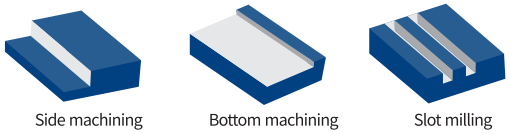
Type	Dimension (mm)						Pattern	Inventory
	DC	DCON	APMX	LF	RE	ZEFP		
TB2SR0100BLN	2.0	6	4	60	1.0	2	Figure 1	●
TB2SR0150BLN	3.0	6	6	60	1.5	2	Figure 2	○
TB2SR0200BLN	4.0	6	8	60	2.0	2	Figure 1	○
TB2SR0250BLN	5.0	6	10	60	2.5	2	Figure 1	●
TB2SR0300BLN	6.0	6	12	60	3.0	2	Figure 1	●
TB2SR0400BLN	8.0	8	16	75	4.0	2	Figure 1	●
TB2SR0500BLN	10.0	10	20	75	5.0	2	Figure 1	●
TB2SR0600BLN	12.0	12	24	75	6.0	2	Figure 1	●

●Standing inventory　○Make-to-order

TP Series--High performance end mills

Four-flute flat end mill (short flute structure)

TP4S···LG



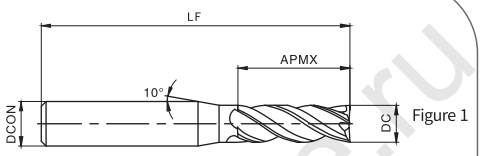


Figure 1

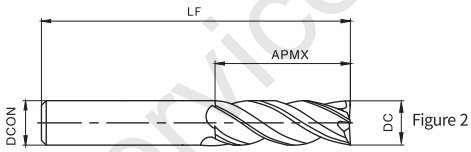


Figure 2

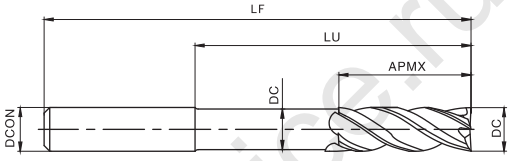
Type	Dimension (mm)					Pattern	Inventory
	DC	DCON	APMX	LF	ZEFP		
TP4S0100LG-4	1.0	4	3	50	4	Figure 1	●
TP4S0150LG-4	1.5	4	4	50	4	Figure 1	○
TP4S0200LG-4	2.0	4	6	50	4	Figure 1	●
TP4S0250LG-4	2.5	4	8	50	4	Figure 1	○
TP4S0300LG-4	3.0	4	8	50	4	Figure 1	●
TP4S0350LG-4	3.5	4	10	50	4	Figure 1	○
TP4S0400LG-4	4.0	4	11	50	4	Figure 2	●
TP4S0100LG	1.0	6	3	50	4	Figure 1	●
TP4S0150LG	1.5	6	4	50	4	Figure 1	○
TP4S0200LG	2.0	6	6	50	4	Figure 1	●
TP4S0250LG	2.5	6	8	50	4	Figure 1	○
TP4S0300LG	3.0	6	8	50	4	Figure 1	●
TP4S0350LG	3.5	6	10	50	4	Figure 1	○
TP4S0400LG	4.0	6	11	50	4	Figure 1	●
TP4S0450LG	4.5	6	11	50	4	Figure 1	○
TP4S0500LG	5.0	6	13	50	4	Figure 1	●
TP4S0550LG	5.5	6	16	50	4	Figure 1	○
TP4S0600LG	6.0	6	16	50	4	Figure 2	●
TP4S0700LG	7.0	8	20	50	4	Figure 1	●
TP4S0800LG	8.0	8	20	60	4	Figure 2	●
TP4S0900LG	9.0	10	22	75	4	Figure 1	●
TP4S1000LG	10.0	10	25	75	4	Figure 2	●
TP4S1100LG	11.0	12	26	75	4	Figure 1	●
TP4S1200LG	12.0	12	30	75	4	Figure 2	●
TP4S1400LG	14.0	14	32	75	4	Figure 2	●
TP4S1600LG	16.0	16	45	100	4	Figure 2	●
TP4S1800LG	18.0	18	45	100	4	Figure 2	●
TP4S2000LG	20.0	20	45	100	4	Figure 2	●

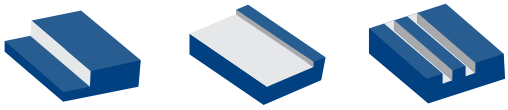
●Standing inventory ○Make-to-order

TP Series--High performance end mills

Four-flute flat end mill (necking structure)

TP4P···LG





Side machining　Bottom machining　Slot milling

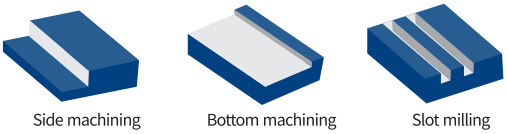
Type	Dimension (mm)							Inventory
	DC	DCON	APMX	LU	DN	LF	ZEFP	
TP4P0600LG	6.0	6	9	30	5.8	75	4	●
TP4P0800LG	8.0	8	12	40	7.8	100	4	●
TP4P1000LG	10.0	10	15	50	9.6	100	4	●
TP4P1200LG	12.0	12	18	50	11.5	100	4	●
TP4P1600LG	16.0	16	24	50	15.5	150	4	●
TP4P2000LG	20.0	20	30	60	19.5	150	4	●

●Standing inventory　○Make-to-order

TP Series--High performance end mills

Four-flute flat end mill (short flute structure)

TP4S···NG



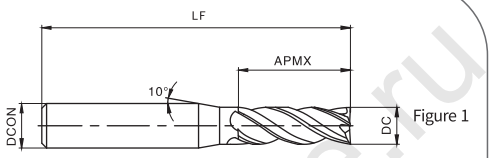


Figure 1

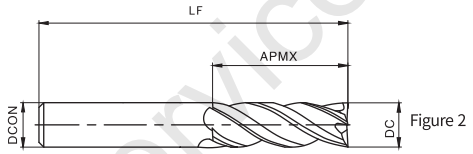


Figure 2

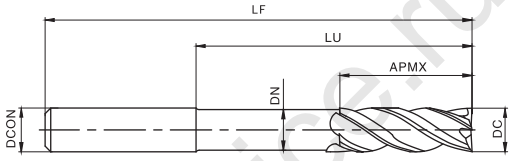
Type	Dimension (mm)					Pattern	Inventory
	DC	DCON	APMX	LF	ZEFP		
TP4S0100NG-4	1.0	4	3	50	4	Figure 1	●
TP4S0150NG-4	1.5	4	4	50	4	Figure 1	○
TP4S0200NG-4	2.0	4	6	50	4	Figure 1	●
TP4S0250NG-4	2.5	4	8	50	4	Figure 1	○
TP4S0300NG-4	3.0	4	8	50	4	Figure 1	●
TP4S0350NG-4	3.5	4	10	50	4	Figure 1	○
TP4S0400NG-4	4.0	4	11	50	4	Figure 2	●
TP4S0100NG	1.0	6	3	50	4	Figure 1	●
TP4S0150NG	1.5	6	4	50	4	Figure 1	○
TP4S0200NG	2.0	6	6	50	4	Figure 1	●
TP4S0250NG	2.5	6	8	50	4	Figure 1	○
TP4S0300NG	3.0	6	8	50	4	Figure 1	●
TP4S0350NG	3.5	6	10	50	4	Figure 1	○
TP4S0400NG	4.0	6	11	50	4	Figure 1	●
TP4S0450NG	4.5	6	11	50	4	Figure 1	○
TP4S0500NG	5.0	6	13	50	4	Figure 1	●
TP4S0550NG	5.5	6	16	50	4	Figure 1	○
TP4S0600NG	6.0	6	16	50	4	Figure 2	●
TP4S0700NG	7.0	8	20	60	4	Figure 1	●
TP4S0800NG	8.0	8	20	60	4	Figure 2	●
TP4S0900NG	9.0	10	22	75	4	Figure 1	●
TP4S1000NG	10.0	10	25	75	4	Figure 2	●
TP4S1100NG	11.0	12	26	75	4	Figure 1	●
TP4S1200NG	12.0	12	30	75	4	Figure 2	●
TP4S1400NG	14.0	14	32	75	4	Figure 2	●
TP4S1600NG	16.0	16	45	100	4	Figure 2	●
TP4S1800NG	18.0	18	45	100	4	Figure 2	●
TP4S2000NG	20.0	20	45	100	4	Figure 2	●

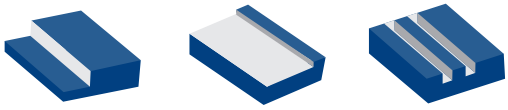
●Standing inventory ○Make-to-order

TP Series--High performance end mills

Four-flute flat end mill (necking structure)

TP4P···NG





Type	Dimension (mm)							Inventory
	DC	DCON	APMX	LU	DN	LF	ZEFP	
TP4P0600NG	6.0	6	9	30	5.8	75	4	●
TP4P0800NG	8.0	8	12	40	7.8	100	4	●
TP4P1000NG	10.0	10	15	50	9.6	100	4	●
TP4P1200NG	12.0	12	18	50	11.5	100	4	●
TP4P1600NG	16.0	16	24	50	15.5	150	4	●
TP4P2000NG	20.0	20	30	60	19.5	150	4	●

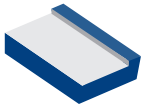
●Standing inventory ○Make-to-order

TP Series--High performance end mills

Four-flute flat end mill (short flute structure)

TP4S···NS

Side machining



Bottom machining

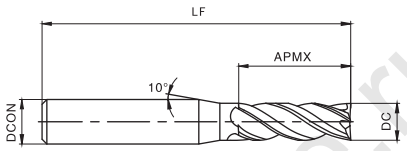


Figure 1

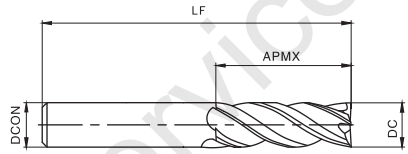
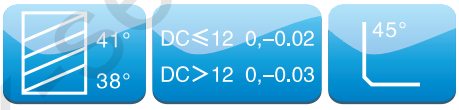


Figure 2



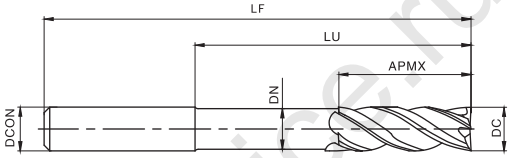
Type	Dimension (mm)					Pattern	Inventory
	DC	DCON	APMX	LF	ZEFP		
TP4S0100NS-4	1.0	4	3	50	4	Figure 1	●
TP4S0150NS-4	1.5	4	4	50	4	Figure 1	○
TP4S0200NS-4	2.0	4	6	50	4	Figure 1	●
TP4S0250NS-4	2.5	4	8	50	4	Figure 1	○
TP4S0300NS-4	3.0	4	8	50	4	Figure 1	●
TP4S0350NS-4	3.5	4	10	50	4	Figure 1	○
TP4S0400NS-4	4.0	4	11	50	4	Figure 2	●
TP4S0100NS	1.0	6	3	50	4	Figure 1	●
TP4S0150NS	1.5	6	4	50	4	Figure 1	○
TP4S0200NS	2.0	6	6	50	4	Figure 1	●
TP4S0250NS	2.5	6	8	50	4	Figure 1	○
TP4S0300NS	3.0	6	8	50	4	Figure 1	●
TP4S0350NS	3.5	6	10	50	4	Figure 1	○
TP4S0400NS	4.0	6	11	50	4	Figure 1	●
TP4S0450NS	4.5	6	11	50	4	Figure 1	○
TP4S0500NS	5.0	6	13	50	4	Figure 1	●
TP4S0550NS	5.5	6	16	50	4	Figure 1	○
TP4S0600NS	6.0	6	16	50	4	Figure 2	●
TP4S0700NS	7.0	8	20	50	4	Figure 1	●
TP4S0800NS	8.0	8	20	60	4	Figure 2	●
TP4S0900NS	9.0	10	22	75	4	Figure 1	●
TP4S1000NS	10.0	10	25	75	4	Figure 2	●
TP4S1100NS	11.0	12	26	75	4	Figure 1	●
TP4S1200NS	12.0	12	30	75	4	Figure 2	●
TP4S1400NS	14.0	14	32	75	4	Figure 2	●
TP4S1600NS	16.0	16	45	100	4	Figure 2	●
TP4S1800NS	18.0	18	45	100	4	Figure 2	●
TP4S2000NS	20.0	20	45	100	4	Figure 2	●

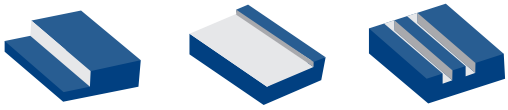
●Standing inventory ○Make-to-order

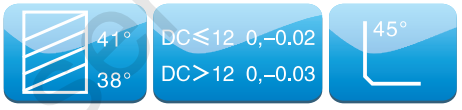
TP Series--High performance end mills

Four-flute flat end mill (necking structure)

TP4P···NS







Type	Dimension (mm)							Inventory
	DC	DCON	APMX	LU	DN	LF	ZEFP	
TP4P0600NS	6.0	6	9	30	5.8	75	4	●
TP4P0800NS	8.0	8	12	40	7.8	100	4	●
TP4P1000NS	10.0	10	15	50	9.6	100	4	●
TP4P1200NS	12.0	12	18	50	11.5	100	4	●
TP4P1600NS	16.0	16	24	50	15.5	150	4	●
TP4P2000NS	20.0	20	30	60	19.5	150	4	●

●Standing inventory ○Make-to-order

TP Series--High performance end mills

Four-flute flat end mill (short flute structure)

TP4S···HH

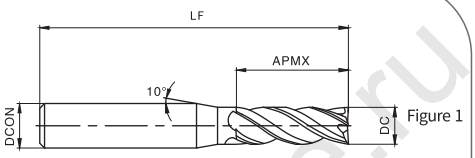


Figure 1

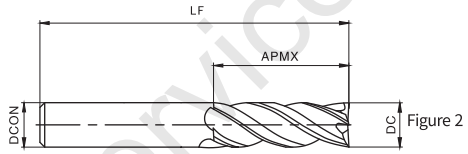
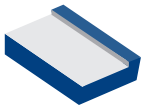
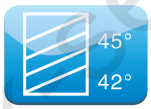


Figure 2


Side machining


Bottom machining



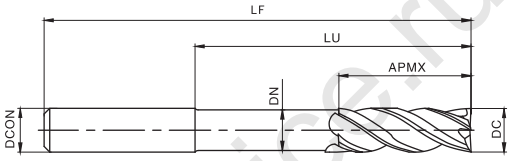
Type	Dimension (mm)					Pattern	Inventory
	DC	DCON	APMX	LF	ZEFP		
TP4S0100HH-4	1.0	4	3	50	4	Figure 1	●
TP4S0150HH-4	1.5	4	4	50	4	Figure 1	○
TP4S0200HH-4	2.0	4	6	50	4	Figure 1	●
TP4S0250HH-4	2.5	4	8	50	4	Figure 1	○
TP4S0300HH-4	3.0	4	8	50	4	Figure 1	●
TP4S0350HH-4	3.5	4	10	50	4	Figure 1	○
TP4S0400HH-4	4.0	4	11	50	4	Figure 2	●
TP4S0100HH	1.0	6	3	50	4	Figure 1	●
TP4S0150HH	1.5	6	4	50	4	Figure 1	○
TP4S0200HH	2.0	6	6	50	4	Figure 1	●
TP4S0250HH	2.5	6	8	50	4	Figure 1	○
TP4S0300HH	3.0	6	8	50	4	Figure 1	●
TP4S0350HH	3.5	6	10	50	4	Figure 1	○
TP4S0400HH	4.0	6	11	50	4	Figure 1	●
TP4S0450HH	4.5	6	11	50	4	Figure 1	○
TP4S0500HH	5.0	6	13	50	4	Figure 1	●
TP4S0550HH	5.5	6	16	50	4	Figure 1	○
TP4S0600HH	6.0	6	16	50	4	Figure 2	●
TP4S0700HH	7.0	8	20	50	4	Figure 1	●
TP4S0800HH	8.0	8	20	60	4	Figure 2	●
TP4S0900HH	9.0	10	22	75	4	Figure 1	●
TP4S1000HH	10.0	10	25	75	4	Figure 2	●
TP4S1100HH	11.0	12	26	75	4	Figure 1	●
TP4S1200HH	12.0	12	30	75	4	Figure 2	●
TP4S1400HH	14.0	14	32	75	4	Figure 2	●
TP4S1600HH	16.0	16	45	100	4	Figure 2	●
TP4S1800HH	18.0	18	45	100	4	Figure 2	●
TP4S2000HH	20.0	20	45	100	4	Figure 2	●

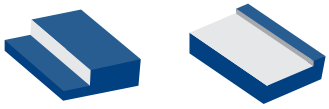
●Standing inventory ○Make-to-order

TP Series--High performance end mills

Four-flute flat end mill (necking structure)

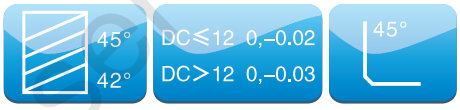
TP4P···HH





Side machining

Bottom machining



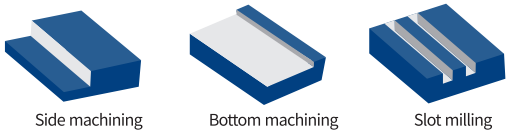
Type	Dimension (mm)							Inventory
	DC	DCON	APMX	LU	DN	LF	ZEFP	
TP4P0600HH	6.0	6	9	30	5.8	75	4	●
TP4P0800HH	8.0	8	12	40	7.8	100	4	●
TP4P1000HH	10.0	10	15	50	9.6	100	4	●
TP4P1200HH	12.0	12	18	50	11.5	100	4	●
TP4P1600HH	16.0	16	24	50	15.5	150	4	●
TP4P2000HH	20.0	20	30	60	19.5	150	4	●

●Standing inventory ○Make-to-order

TP Series--High performance end mills

Four-flute R end mill (short flute structure)

TP4S···R···LG



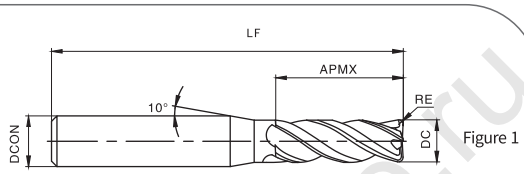


Figure 1

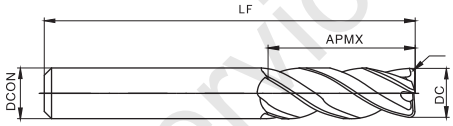


Figure 2

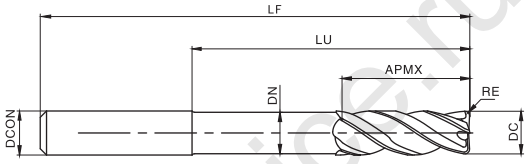
Type	Dimension (mm)						Pattern	Inventory
	DC	DCON	APMX	LF	RE	ZEFP		
TP4S0300R0020LG–4	3.0	4	8	50	0.2	4	Figure 1	●
TP4S0400R0030LG–4	4.0	4	10	50	0.3	4	Figure 2	●
TP4S0400R0050LG–4	4.0	4	10	50	0.5	4	Figure 2	●
TP4S0300R0020LG	3.0	6	8	50	0.2	4	Figure 1	●
TP4S0400R0030LG	4.0	6	10	50	0.3	4	Figure 1	○
TP4S0400R0050LG	4.0	6	10	50	0.5	4	Figure 1	●
TP4S0500R0050LG	5.0	6	13	50	0.5	4	Figure 1	○
TP4S0500R0100LG	5.0	6	13	50	1.0	4	Figure 1	○
TP4S0600R0050LG	6.0	6	16	50	0.5	4	Figure 2	●
TP4S0600R0100LG	6.0	6	16	50	1.0	4	Figure 2	●
TP4S0800R0050LG	8.0	8	20	60	0.5	4	Figure 2	●
TP4S0800R0100LG	8.0	8	20	60	1.0	4	Figure 2	●
TP4S1000R0050LG	10.0	10	25	75	0.5	4	Figure 2	●
TP4S1000R0100LG	10.0	10	25	75	1.0	4	Figure 2	●
TP4S1000R0200LG	10.0	10	25	75	2.0	4	Figure 2	●
TP4S1000R0300LG	10.0	10	25	75	3.0	4	Figure 2	●
TP4S1200R0050LG	12.0	12	30	75	0.5	4	Figure 2	●
TP4S1200R0100LG	12.0	12	30	75	1.0	4	Figure 2	●
TP4S1200R0200LG	12.0	12	30	75	2.0	4	Figure 2	●
TP4S1200R0300LG	12.0	12	30	75	3.0	4	Figure 2	●
TP4S1600R0100LG	16.0	16	45	100	1.0	4	Figure 2	●
TP4S1600R0200LG	16.0	16	45	100	2.0	4	Figure 2	●
TP4S1600R0300LG	16.0	16	45	100	3.0	4	Figure 2	●
TP4S2000R0100LG	20.0	20	45	100	1.0	4	Figure 2	●
TP4S2000R0200LG	20.0	20	45	100	2.0	4	Figure 2	●
TP4S2000R0300LG	20.0	20	45	100	3.0	4	Figure 2	●

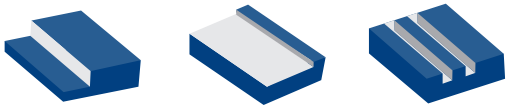
●Standing inventory ○Make-to-order

TP Series--High performance end mills

Four-flute R end mill (necking structure)

TP4P···R···LG





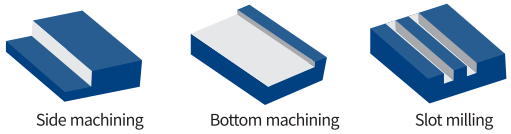
Type	Dimension (mm)								Inventory
	DC	DCON	APMX	LU	DN	LF	RE	ZEFP	
TP4P0600R0050LG	6.0	6	6	18	5.8	75	0.5	4	●
TP4P0600R0100LG	6.0	6	6	18	5.8	75	1.0	4	●
TP4P0800R0050LG	8.0	8	8	24	7.8	100	0.5	4	●
TP4P0800R0100LG	8.0	8	8	24	7.8	100	1.0	4	●
TP4P1000R0050LG	10.0	10	10	30	9.6	100	0.5	4	●
TP4P1000R0100LG	10.0	10	10	30	9.6	100	1.0	4	●
TP4P1000R0200LG	10.0	10	10	30	9.6	100	2.0	4	●
TP4P1200R0050LG	12.0	12	12	36	11.5	100	0.5	4	●
TP4P1200R0100LG	12.0	12	12	36	11.5	100	1.0	4	●
TP4P1200R0200LG	12.0	12	12	36	11.5	100	2.0	4	●
TP4P1600R0100LG	16.0	16	16	40	15.5	150	1.0	4	●
TP4P1600R0200LG	16.0	16	16	40	15.5	150	2.0	4	●

●Standing inventory ○Make-to-order

TP Series--High performance end mills

Four-flute R end mill (short flute structure)

TP4S···R···NG



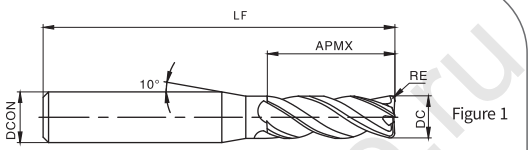


Figure 1

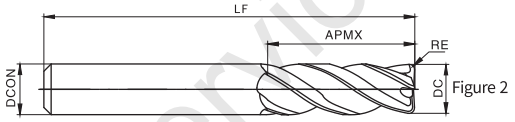


Figure 2

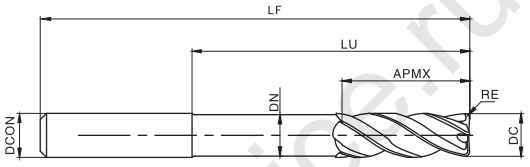
Type	Dimension (mm)						Pattern	Inventory
	DC	DCON	APMX	LF	RE	ZEFP		
TP4S0300R0020NG–4	3.0	4	8	50	0.2	4	Figure 1	●
TP4S0400R0030NG–4	4.0	4	10	50	0.3	4	Figure 2	●
TP4S0400R0050NG–4	4.0	4	10	50	0.5	4	Figure 2	●
TP4S0300R0020NG	3.0	6	8	50	0.2	4	Figure 1	●
TP4S0400R0030NG	4.0	6	10	50	0.3	4	Figure 1	○
TP4S0400R0050NG	4.0	6	10	50	0.5	4	Figure 1	○
TP4S0500R0050NG	5.0	6	13	50	0.5	4	Figure 1	○
TP4S0500R0100NG	5.0	6	13	50	1.0	4	Figure 1	●
TP4S0600R0050NG	6.0	6	16	50	0.5	4	Figure 2	●
TP4S0600R0100NG	6.0	6	16	50	1.0	4	Figure 2	●
TP4S0800R0050NG	8.0	8	20	60	0.5	4	Figure 2	●
TP4S0800R0100NG	8.0	8	20	60	1.0	4	Figure 2	●
TP4S1000R0050NG	10.0	10	25	75	0.5	4	Figure 2	●
TP4S1000R0100NG	10.0	10	25	75	1.0	4	Figure 2	●
TP4S1000R0200NG	10.0	10	25	75	2.0	4	Figure 2	●
TP4S1000R0300NG	10.0	10	25	75	3.0	4	Figure 2	●
TP4S1200R0050NG	12.0	12	30	75	0.5	4	Figure 2	●
TP4S1200R0100NG	12.0	12	30	75	1.0	4	Figure 2	●
TP4S1200R0200NG	12.0	12	30	75	2.0	4	Figure 2	●
TP4S1200R0300NG	12.0	12	30	75	3.0	4	Figure 2	●
TP4S1600R0100NG	16.0	16	45	100	1.0	4	Figure 2	●
TP4S1600R0200NG	16.0	16	45	100	2.0	4	Figure 2	●
TP4S1600R0300NG	16.0	16	45	100	3.0	4	Figure 2	●
TP4S2000R0100NG	20.0	20	45	100	1.0	4	Figure 2	●
TP4S2000R0200NG	20.0	20	45	100	2.0	4	Figure 2	●
TP4S2000R0300NG	20.0	20	45	100	3.0	4	Figure 2	●

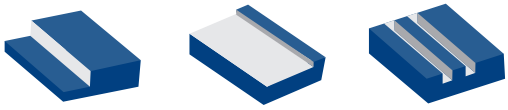
●Standing inventory ○Make-to-order

TP Series--High performance end mills

Four-flute R end mill (necking structure)

TP4P···R···NG





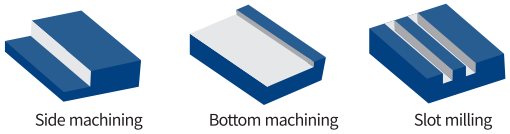
Type	Dimension (mm)								Inventory
	DC	DCON	APMX	LU	DN	LF	RE	ZEFP	
TP4P0600R0050NG	6.0	6	6	18	5.8	75	0.5	4	●
TP4P0600R0100NG	6.0	6	6	18	5.8	75	1.0	4	●
TP4P0800R0050NG	8.0	8	8	24	7.8	100	0.5	4	●
TP4P0800R0100NG	8.0	8	8	24	7.8	100	1.0	4	●
TP4P1000R0050NG	10.0	10	10	30	9.6	100	0.5	4	●
TP4P1000R0100NG	10.0	10	10	30	9.6	100	1.0	4	●
TP4P1000R0200NG	10.0	10	10	30	9.6	100	2.0	4	●
TP4P1200R0050NG	12.0	12	12	36	11.5	100	0.5	4	●
TP4P1200R0100NG	12.0	12	12	36	11.5	100	1.0	4	●
TP4P1200R0200NG	12.0	12	12	36	11.5	100	2.0	4	●
TP4P1600R0100NG	16.0	16	16	40	15.5	150	1.0	4	●
TP4P1600R0200NG	16.0	16	16	40	15.5	150	2.0	4	●

●Standing inventory ○Make-to-order

TP Series--High performance end mills

Four-flute R end mill(short flute structure)

TP4S···R···NS



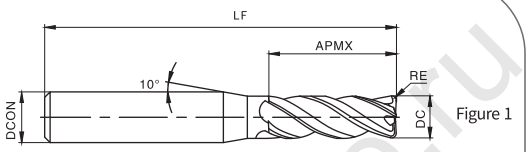


Figure 1

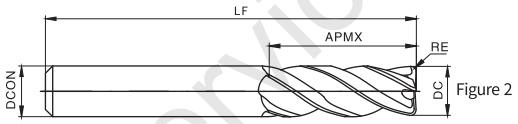


Figure 2

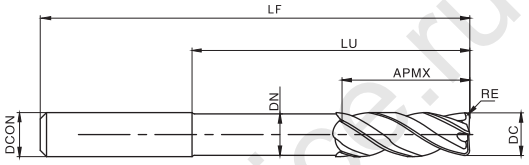
Type	Dimension (mm)						Pattern	Inventory
	DC	DCON	APMX	LF	RE	ZEFP		
TP4S0300R0020NS-4	3.0	4	8	50	0.2	4	Figure 1	●
TP4S0400R0030NS-4	4.0	4	10	50	0.3	4	Figure 2	●
TP4S0400R0050NS-4	4.0	4	10	50	0.5	4	Figure 2	●
TP4S0300R0020NS	3.0	6	8	50	0.2	4	Figure 1	●
TP4S0400R0030NS	4.0	6	10	50	0.3	4	Figure 1	●
TP4S0400R0050NS	4.0	6	10	50	0.5	4	Figure 1	●
TP4S0500R0050NS	5.0	6	13	50	0.5	4	Figure 1	●
TP4S0500R0100NS	5.0	6	13	50	1.0	4	Figure 1	●
TP4S0600R0050NS	6.0	6	16	50	0.5	4	Figure 2	●
TP4S0600R0100NS	6.0	6	16	50	1.0	4	Figure 2	●
TP4S0800R0050NS	8.0	8	20	60	0.5	4	Figure 2	●
TP4S0800R0100NS	8.0	8	20	60	1.0	4	Figure 2	●
TP4S1000R0050NS	10.0	10	25	75	0.5	4	Figure 2	●
TP4S1000R0100NS	10.0	10	25	75	1.0	4	Figure 2	●
TP4S1000R0200NS	10.0	10	25	75	2.0	4	Figure 2	●
TP4S1000R0300NS	10.0	10	25	75	3.0	4	Figure 2	●
TP4S1200R0050NS	12.0	12	30	75	0.5	4	Figure 2	●
TP4S1200R0100NS	12.0	12	30	75	1.0	4	Figure 2	●
TP4S1200R0200NS	12.0	12	30	75	2.0	4	Figure 2	●
TP4S1200R0300NS	12.0	12	30	75	3.0	4	Figure 2	●
TP4S1600R0100NS	16.0	16	45	100	1.0	4	Figure 2	●
TP4S1600R0200NS	16.0	16	45	100	2.0	4	Figure 2	●
TP4S1600R0300NS	16.0	16	45	100	3.0	4	Figure 2	●
TP4S2000R0100NS	20.0	20	45	100	1.0	4	Figure 2	●
TP4S2000R0200NS	20.0	20	45	100	2.0	4	Figure 2	●
TP4S2000R0300NS	20.0	20	45	100	3.0	4	Figure 2	●

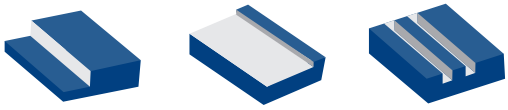
●Standing inventory ○Make-to-order

TP Series--High performance end mills

Four-flute R end mill (necking structure)

TP4P···R···NS





Type	Dimension (mm)								Inventory
	DC	DCON	APMX	LU	DN	LF	RE	ZEFP	
TP4P0600R0050NS	6.0	6	6	18	5.8	75	0.5	4	●
TP4P0600R0100NS	6.0	6	6	18	5.8	75	1.0	4	●
TP4P0800R0050NS	8.0	8	8	24	7.8	100	0.5	4	●
TP4P0800R0100NS	8.0	8	8	24	7.8	100	1.0	4	●
TP4P1000R0050NS	10.0	10	10	30	9.6	100	0.5	4	●
TP4P1000R0100NS	10.0	10	10	30	9.6	100	1.0	4	●
TP4P1000R0200NS	10.0	10	10	30	9.6	100	2.0	4	●
TP4P1200R0050NS	12.0	12	12	36	11.5	100	0.5	4	●
TP4P1200R0100NS	12.0	12	12	36	11.5	100	1.0	4	●
TP4P1200R0200NS	12.0	12	12	36	11.5	100	2.0	4	●
TP4P1600R0100NS	16.0	16	16	40	15.5	150	1.0	4	●
TP4P1600R0200NS	16.0	16	16	40	15.5	150	2.0	4	●

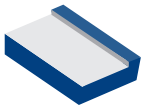
●Standing inventory ○Make-to-order

TP Series--High performance end mills

Four-flute R end mill (short flute structure)

TP4S···R···HH

Side machining



Bottom machining

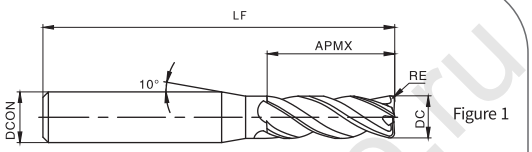


Figure 1

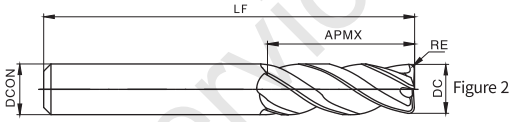


Figure 2

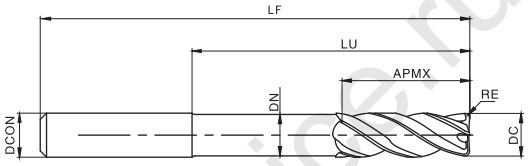
Type	Dimension (mm)						Pattern	Inventory
	DC	DCON	APMX	LF	RE	ZEFP		
TP4S0300R0020HH-4	3.0	4	8	50	0.2	4	Figure 1	●
TP4S0400R0030HH-4	4.0	4	10	50	0.3	4	Figure 2	●
TP4S0400R0050HH-4	4.0	4	10	50	0.5	4	Figure 2	●
TP4S0300R0020HH	3.0	6	8	50	0.2	4	Figure 1	●
TP4S0400R0030HH	4.0	6	10	50	0.3	4	Figure 1	●
TP4S0400R0050HH	4.0	6	10	50	0.5	4	Figure 1	●
TP4S0500R0050HH	5.0	6	13	50	0.5	4	Figure 1	●
TP4S0500R0100HH	5.0	6	13	50	1.0	4	Figure 1	●
TP4S0600R0050HH	6.0	6	16	50	0.5	4	Figure 2	●
TP4S0600R0100HH	6.0	6	16	50	1.0	4	Figure 2	●
TP4S0800R0050HH	8.0	8	20	60	0.5	4	Figure 2	●
TP4S0800R0100HH	8.0	8	20	60	1.0	4	Figure 2	●
TP4S1000R0050HH	10.0	10	25	75	0.5	4	Figure 2	●
TP4S1000R0100HH	10.0	10	25	75	1.0	4	Figure 2	●
TP4S1000R0200HH	10.0	10	25	75	2.0	4	Figure 2	●
TP4S1000R0300HH	10.0	10	25	75	3.0	4	Figure 2	●
TP4S1200R0050HH	12.0	12	30	75	0.5	4	Figure 2	●
TP4S1200R0100HH	12.0	12	30	75	1.0	4	Figure 2	●
TP4S1200R0200HH	12.0	12	30	75	2.0	4	Figure 2	●
TP4S1200R0300HH	12.0	12	30	75	3.0	4	Figure 2	●
TP4S1600R0100HH	16.0	16	45	100	1.0	4	Figure 2	●
TP4S1600R0200HH	16.0	16	45	100	2.0	4	Figure 2	●
TP4S1600R0300HH	16.0	16	45	100	3.0	4	Figure 2	●
TP4S2000R0100HH	20.0	20	45	100	1.0	4	Figure 2	●
TP4S2000R0200HH	20.0	20	45	100	2.0	4	Figure 2	●
TP4S2000R0300HH	20.0	20	45	100	3.0	4	Figure 2	●

●Standing inventory ○Make-to-order

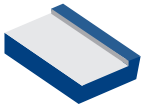
TP Series--High performance end mills

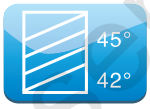
Four-flute R end mill (necking structure)

TP4P···R···HH




Side machining


Bottom machining



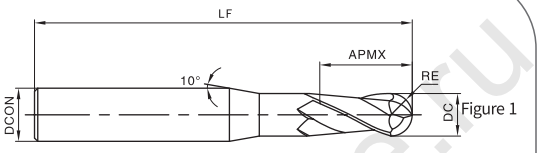
Type	Dimension (mm)								Inventory
	DC	DCON	APMX	LU	DN	LF	RE	ZEFP	
TP4P0600R0050HH	6.0	6	6	18	5.8	75	0.5	4	●
TP4P0600R0100HH	6.0	6	6	18	5.8	75	1.0	4	●
TP4P0800R0050HH	8.0	8	8	24	7.8	100	0.5	4	●
TP4P0800R0100HH	8.0	8	8	24	7.8	100	1.0	4	●
TP4P1000R0050HH	10.0	10	10	30	9.6	100	0.52	4	●
TP4P1000R0100HH	10.0	10	10	30	9.6	100	1.0	4	●
TP4P1000R0200HH	10.0	10	10	30	9.6	100	2.0	4	●
TP4P1200R0050HH	12.0	12	12	36	11.5	100	0.5	4	●
TP4P1200R0100HH	12.0	12	12	36	11.5	100	1.0	4	●
TP4P1200R0200HH	12.0	12	12	36	11.5	100	2.0	4	●
TP4P1600R0100HH	16.0	16	16	40	15.5	150	1.0	4	●
TP4P1600R0200HH	16.0	16	16	40	15.5	150	2.0	4	●

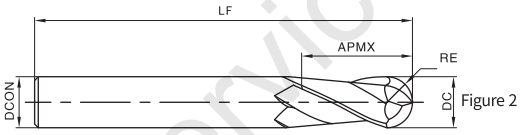
●Standing inventory ○Make-to-order

TP Series--High performance end mills

Two-flute ball nose end mill (short flute structure)

TP2S···BLG





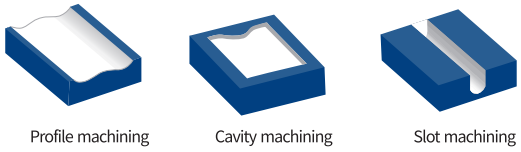
Type	Dimension (mm)						Pattern	Inventory
	DC	DCON	APMX	LF	RE	ZEFP		
TP2SR0050BLG-4	1.0	4	2	50	0.5	2	Figure 1	●
TP2SR0075BLG-4	1.5	4	3	50	0.75	2	Figure 1	●
TP2SR0100BLG-4	2.0	4	4	50	1.0	2	Figure 1	●
TP2SR0125BLG-4	2.5	4	5	50	1.25	2	Figure 1	●
TP2SR0150BLG-4	3.0	4	6	50	1.5	2	Figure 1	●
TP2SR0175BLG-4	3.5	4	8	50	1.75	2	Figure 1	●
TP2SR0200BLG-4	4.0	4	8	50	2.0	2	Figure 2	●
TP2SR0050BLG	1.0	6	2	50	0.5	2	Figure 1	●
TP2SR0075BLG	1.5	6	3	50	0.75	2	Figure 1	●
TP2SR0100BLG	2.0	6	4	50	1.0	2	Figure 1	●
TP2SR0125BLG	2.5	6	5	50	1.25	2	Figure 1	●
TP2SR0150BLG	3.0	6	6	50	1.5	2	Figure 1	●
TP2SR0175BLG	3.5	6	8	50	1.75	2	Figure 1	●
TP2SR0200BLG	4.0	6	8	50	2.0	2	Figure 1	●
TP2SR0250BLG	5.0	6	10	50	2.5	2	Figure 1	●
TP2SR0275BLG	5.5	6	12	50	2.75	2	Figure 1	●
TP2SR0300BLG	6.0	6	12	50	3.0	2	Figure 2	●
TP2SR0350BLG	7.0	8	14	60	3.5	2	Figure 1	●
TP2SR0400BLG	8.0	8	16	60	4.0	2	Figure 2	●
TP2SR0450BLG	9.0	10	18	75	4.5	2	Figure 1	●
TP2SR0500BLG	10.0	10	20	75	5.0	2	Figure 2	●
TP2SR0600BLG	12.0	12	24	75	6.0	2	Figure 2	●
TP2SR0700BLG	14.0	14	28	75	7.0	2	Figure 2	●
TP2SR0800BLG	16.0	16	32	100	8.0	2	Figure 2	●
TP2SR1000BLG	20.0	20	40	100	10.0	2	Figure 2	●

●Standing inventory ○Make-to-order

TP Series--High performance end mills

Two-flute ball nose end mill (short flute structure)

TP2S···BLH



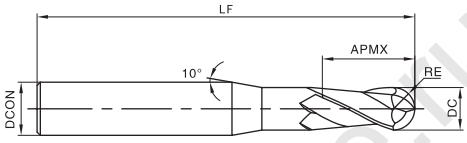


Figure 1

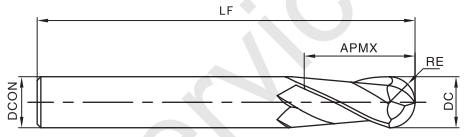
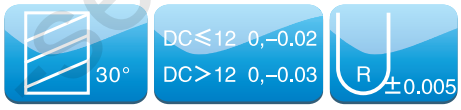


Figure 2



Type	Dimension (mm)						Pattern	Inventory
	DC	DCON	APMX	LF	RE	ZEFP		
TP2SR0050BLH–4	1.0	4	2	50	0.5	2	Figure 1	●
TP2SR0075BLH–4	1.5	4	3	50	0.75	2	Figure 1	●
TP2SR0100BLH–4	2.0	4	4	50	1.0	2	Figure 1	●
TP2SR0125BLH–4	2.5	4	5	50	1.25	2	Figure 1	●
TP2SR0150BLH–4	3.0	4	6	50	1.5	2	Figure 1	●
TP2SR0175BLH–4	3.5	4	8	50	1.75	2	Figure 1	●
TP2SR0200BLH–4	4.0	4	8	50	2.0	2	Figure 2	●
TP2SR0050BLH	1.0	6	2	50	0.5	2	Figure 1	●
TP2SR0075BLH	1.5	6	3	50	0.75	2	Figure 1	●
TP2SR0100BLH	2.0	6	4	50	1.0	2	Figure 1	●
TP2SR0125BLH	2.5	6	5	50	1.25	2	Figure 1	●
TP2SR0150BLH	3.0	6	6	50	1.5	2	Figure 1	●
TP2SR0175BLH	3.5	6	8	50	2.0	2	Figure 1	●
TP2SR0200BLH	4.0	6	8	50	2.0	2	Figure 1	●
TP2SR0250BLH	5.0	6	10	50	2.5	2	Figure 1	●
TP2SR0275BLH	5.5	6	12	50	2.75	2	Figure 1	●
TP2SR0300BLH	6.0	6	12	50	3.0	2	Figure 2	●
TP2SR0350BLH	7.0	8	14	60	3.5	2	Figure 1	●
TP2SR0400BLH	8.0	8	16	60	4.0	2	Figure 2	●
TP2SR0450BLH	9.0	10	18	75	4.5	2	Figure 1	●
TP2SR0500BLH	10.0	10	20	75	5.0	2	Figure 2	●
TP2SR0600BLH	12.0	12	24	75	6.0	2	Figure 2	●
TP2SR0700BLH	14.0	14	28	75	7.0	2	Figure 2	●
TP2SR0800BLH	16.0	16	32	100	8.0	2	Figure 2	●
TP2SR1000BLH	20.0	20	40	100	10.0	2	Figure 2	●

●Standing inventory ○Make-to-order

TP Series--High performance end mills

Two-flute ball nose end mill(necking structure)

TP2P···BLG

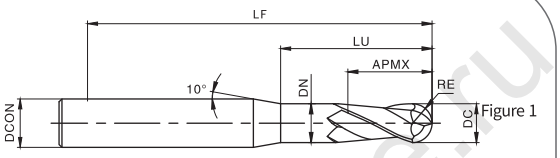


Figure 1

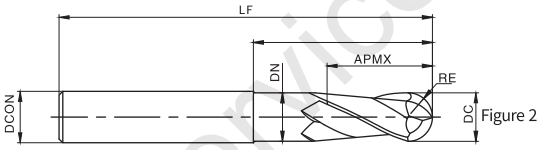
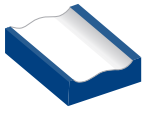
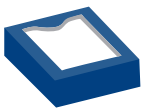


Figure 2



Profile machining



Cavity machining

Slot machining

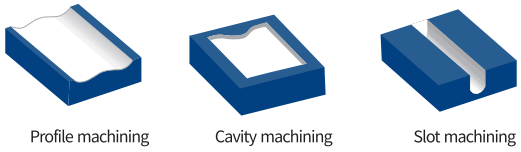
Type	Dimension (mm)								Pattern	Inventory
	DC	DCON	APMX	LU	DN	LF	RE	ZEFP		
TP2PR0050BLG-4	1.0	4	1	2.5	0.95	75	0.5	2	Figure 1	●
TP2PR0075BLG-4	1.5	4	2	3	1.45	75	0.75	2	Figure 1	●
TP2PR0100BLG-4	2.0	4	2	4	1.95	75	1.0	2	Figure 1	●
TP2PR0150BLG-4	3.0	4	3	6	2.85	75	1.5	2	Figure 1	●
TP2PR0200BLG-4	4.0	4	4	8	3.85	75	2.0	2	Figure 2	●
TP2PR0050BLG	1.0	6	1	2.5	0.95	75	0.5	2	Figure 1	●
TP2PR0075BLG	1.5	6	2	3	1.45	75	0.75	2	Figure 1	●
TP2PR0100BLG	2.0	6	2	4	1.95	75	1.0	2	Figure 1	●
TP2PR0150BLG	3.0	6	3	6	2.85	75	1.5	2	Figure 1	●
TP2PR0200BLG	4.0	6	4	8	3.85	75	2.0	2	Figure 1	●
TP2PR0250BLG	5.0	6	5	10	4.85	75	2.5	2	Figure 1	●
TP2PR0300BLG	6.0	6	6	12	5.8	75	3.0	2	Figure 2	●
TP2PR0400BLG	8.0	8	8	16	7.8	100	4.0	2	Figure 2	●
TP2PR0500BLG	10.0	10	10	20	9.6	100	5.0	2	Figure 2	●
TP2PR0600BLG	12.0	12	12	24	11.5	100	6.0	2	Figure 2	●
TP2PR0800BLG	16.0	16	16	32	15.5	150	8.0	2	Figure 2	●
TP2PR1000BLG	20.0	20	20	40	19.5	150	10.0	2	Figure 2	●

●Standing inventory ○Make-to-order

TP Series--High performance end mills

Two-flute ball nose end mill(necking structure)

TP2P···BLH



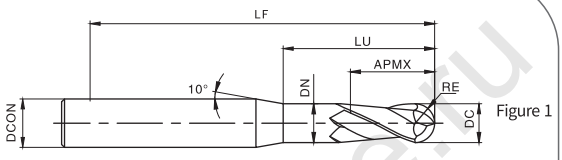


Figure 1

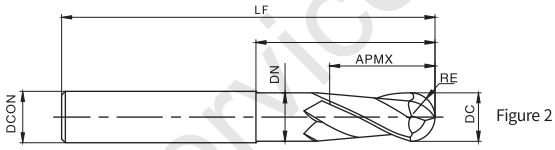
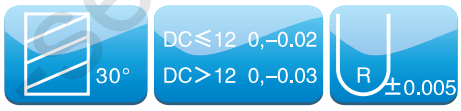


Figure 2



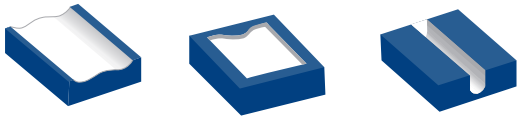
Type	Dimension (mm)								Pattern	Inventory
	DC	DCON	APMX	LU	DN	LF	RE	ZEFP		
TP2PR0050BLH–4	1.0	4	1	2.5	0.95	75	0.5	2	Figure 1	●
TP2PR0075BLH–4	1.5	4	2	3	1.45	75	0.75	2	Figure 1	●
TP2PR0100BLH–4	2.0	4	2	4	1.95	75	1.0	2	Figure 1	●
TP2PR0150BLH–4	3.0	4	3	6	2.85	75	1.5	2	Figure 1	●
TP2PR0200BLH–4	4.0	4	4	8	3.85	75	2.0	2	Figure 2	●
TP2PR0050BLH	1.0	6	1	2.5	0.95	75	0.5	2	Figure 1	●
TP2PR0075BLH	1.5	6	2	3	1.45	75	0.75	2	Figure 1	●
TP2PR0100BLH	2.0	6	2	4	1.95	75	1.0	2	Figure 1	●
TP2PR0150BLH	3.0	6	3	6	2.85	75	1.5	2	Figure 1	●
TP2PR0200BLH	4.0	6	4	8	3.85	75	2.0	2	Figure 1	●
TP2PR0250BLH	5.0	6	5	10	4.85	75	2.5	2	Figure 1	●
TP2PR0300BLH	6.0	6	6	12	5.8	75	3.0	2	Figure 2	●
TP2PR0400BLH	8.0	8	8	16	7.8	100	4.0	2	Figure 2	●
TP2PR0500BLH	10.0	10	10	20	9.6	100	5.0	2	Figure 2	●
TP2PR0600BLH	12.0	12	12	24	11.5	100	6.0	2	Figure 2	●
TP2PR0800BLH	16.0	16	16	32	15.5	150	8.0	2	Figure 2	●
TP2PR1000BLH	20.0	20	20	40	19.5	150	10.0	2	Figure 2	●

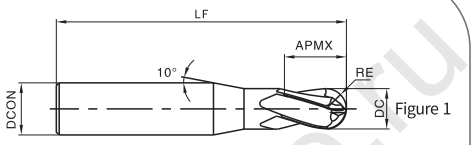
●Standing inventory ○Make-to-order

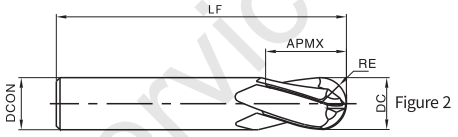
TP Series--High performance end mills

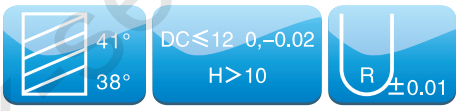
Four-flute ball nose end mill (short flute structure)

TP4S···BNS









Type	Dimension (mm)						Pattern	Inventory
	DC	DCON	APMX	LF	RE	ZEFP		
TP4SR0150BNS-4	3.0	4	6	50	1.5	4	Figure 1	●
TP4SR0200BNS-4	4.0	4	8	50	2.0	4	Figure 2	●
TP4SR0150BNS	3.0	6	6	50	1.5	4	Figure 1	●
TP4SR0200BNS	4.0	6	8	50	2.0	4	Figure 1	●
TP4SR0250BNS	5.0	6	10	50	2.5	4	Figure 1	●
TP4SR0300BNS	6.0	6	12	50	3.0	4	Figure 2	●
TP4SR0400BNS	8.0	8	16	60	4.0	4	Figure 2	●
TP4SR0500BNS	10.0	10	20	75	5.0	4	Figure 2	●
TP4SR0600BNS	12.0	12	24	75	6.0	4	Figure 2	●
TP4SR0700BNS	14.0	14	28	75	7.0	4	Figure 2	●
TP4SR0800BNS	16.0	16	32	100	8.0	4	Figure 2	●
TP4SR0900BNS	18.0	18	36	100	9.0	4	Figure 2	●
TP4SR1000BNS	20.0	20	40	100	10.0	4	Figure 2	●

●Standing inventory ○Make-to-order

Solid Carbide Drills

Code key of solid carbide drills

TBD	03	C	A	1000
①	②	③	④	⑤

① Product series	
BD	Economical
XD	Deep hole type

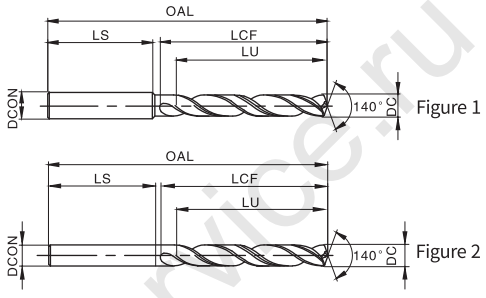
② Length series (length-diameter ratio)	
03	3×D Series
05	5×D Series
08	8×D Series

③ Cooling method	
C	Internal cooling
Default	External cooling

④ Shank form	
A	Straight shank (DIN 6535HA)
B	Whistle notch shank (DIN 6535HE)

⑤ Diameter	
0300	3mm
0600	6mm
1000	10mm
1200	12mm
1600	16mm
2000	20mm

TBD03A Series—Solid carbide drill



Order number	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
TBD03A0300	3.00	6.00	62	20	36	15.0	Figure 1	●
TBD03A0310	3.10	6.00	62	20	36	14.8	Figure 1	●
TBD03A0317	3.17	6.00	62	20	36	14.7	Figure 1	○
TBD03A0320	3.20	6.00	62	20	36	14.6	Figure 1	●
TBD03A0325	3.25	6.00	62	20	36	14.5	Figure 1	○
TBD03A0330	3.30	6.00	62	20	36	14.4	Figure 1	●
TBD03A0340	3.40	6.00	62	20	36	14.3	Figure 1	●
TBD03A0350	3.50	6.00	62	20	36	14.1	Figure 1	●
TBD03A0357	3.57	6.00	62	20	36	14.0	Figure 1	○
TBD03A0360	3.60	6.00	62	20	36	13.9	Figure 1	●
TBD03A0370	3.70	6.00	62	20	36	13.8	Figure 1	●
TBD03A0380	3.80	6.00	66	24	36	17.6	Figure 1	●
TBD03A0390	3.90	6.00	66	24	36	17.4	Figure 1	●
TBD03A0397	3.97	6.00	66	24	36	17.3	Figure 1	○
TBD03A0400	4.00	6.00	66	24	36	17.3	Figure 1	●
TBD03A0410	4.10	6.00	66	24	36	17.1	Figure 1	●
TBD03A0420	4.20	6.00	66	24	36	16.9	Figure 1	●
TBD03A0430	4.30	6.00	66	24	36	16.8	Figure 1	●
TBD03A0437	4.37	6.00	66	24	36	16.6	Figure 1	○
TBD03A0440	4.40	6.00	66	24	36	16.6	Figure 1	●
TBD03A0445	4.45	6.00	66	24	36	16.5	Figure 1	○
TBD03A0450	4.50	6.00	66	24	36	16.4	Figure 1	●
TBD03A0460	4.60	6.00	66	24	36	16.3	Figure 1	●
TBD03A0465	4.65	6.00	66	24	36	16.2	Figure 1	○

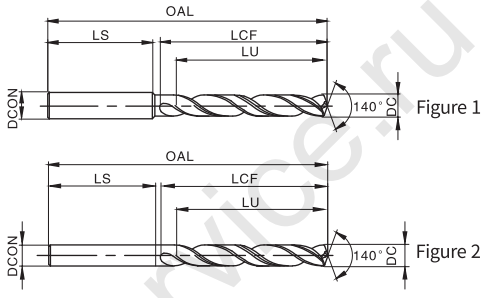
● Standing inventory ○ Make-to-order

TBD03A Series—Solid carbide drill

Order number	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
TBD03A0470	4.70	6.00	66	24	36	16.1	Figure 1	●
TBD03A0476	4.76	6.00	66	28	36	20.0	Figure 1	○
TBD03A0480	4.80	6.00	66	28	36	19.9	Figure 1	●
TBD03A0490	4.90	6.00	66	28	36	19.8	Figure 1	●
TBD03A0500	5.00	6.00	66	28	36	19.6	Figure 1	●
TBD03A0510	5.10	6.00	66	28	36	19.4	Figure 1	●
TBD03A0516	5.16	6.00	66	28	36	19.3	Figure 1	○
TBD03A0520	5.20	6.00	66	28	36	19.3	Figure 1	●
TBD03A0530	5.30	6.00	66	28	36	19.1	Figure 1	●
TBD03A0540	5.40	6.00	66	28	36	18.9	Figure 1	●
TBD03A0550	5.50	6.00	66	28	36	18.7	Figure 1	●
TBD03A0555	5.55	6.00	66	28	36	18.7	Figure 1	○
TBD03A0556	5.56	6.00	66	28	36	18.6	Figure 1	●
TBD03A0560	5.60	6.00	66	28	36	18.6	Figure 1	●
TBD03A0565	5.65	6.00	66	28	36	18.5	Figure 1	●
TBD03A0570	5.70	6.00	66	28	36	18.4	Figure 1	●
TBD03A0575	5.75	6.00	66	28	36	18.3	Figure 1	○
TBD03A0580	5.80	6.00	66	28	36	18.2	Figure 1	●
TBD03A0590	5.90	6.00	66	28	36	18.1	Figure 1	●
TBD03A0595	5.95	6.00	66	28	36	18.0	Figure 1	○
TBD03A0600	6.00	6.00	66	28	36	17.9	Figure 2	●
TBD03A0610	6.10	8.00	79	34	36	23.7	Figure 1	●
TBD03A0620	6.20	8.00	79	34	36	23.6	Figure 1	●
TBD03A0630	6.30	8.00	79	34	36	23.4	Figure 1	●
TBD03A0635	6.35	8.00	79	34	36	23.3	Figure 1	○
TBD03A0640	6.40	8.00	79	34	36	23.2	Figure 1	●
TBD03A0650	6.50	8.00	79	34	36	23.1	Figure 1	●
TBD03A0660	6.60	8.00	79	34	36	22.9	Figure 1	●
TBD03A0670	6.70	8.00	79	34	36	22.7	Figure 1	●
TBD03A0675	6.75	8.00	79	34	36	22.6	Figure 1	○
TBD03A0680	6.80	8.00	79	34	36	22.6	Figure 1	●
TBD03A0690	6.90	8.00	79	34	36	22.4	Figure 1	●
TBD03A0700	7.00	8.00	79	34	36	22.2	Figure 1	●

●Standing inventory ○Make-to-order

TBD03A Series—Solid carbide drill



Order number	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
TBD03A0710	7.10	8.00	79	41	36	29.1	Figure 1	●
TBD03A0714	7.14	8.00	79	41	36	29.0	Figure 1	○
TBD03A0720	7.20	8.00	79	41	36	28.9	Figure 1	●
TBD03A0730	7.30	8.00	79	41	36	28.7	Figure 1	●
TBD03A0740	7.40	8.00	79	41	36	28.6	Figure 1	●
TBD03A0745	7.45	8.00	79	41	36	28.5	Figure 1	○
TBD03A0750	7.50	8.00	79	41	36	28.4	Figure 1	●
TBD03A0754	7.54	8.00	79	41	36	28.3	Figure 1	○
TBD03A0760	7.60	8.00	79	41	36	28.2	Figure 1	●
TBD03A0765	7.65	8.00	79	41	36	28.1	Figure 1	○
TBD03A0770	7.70	8.00	79	41	36	28.0	Figure 1	●
TBD03A0780	7.80	8.00	79	41	36	27.9	Figure 1	●
TBD03A0790	7.90	8.00	79	41	36	27.7	Figure 1	●
TBD03A0794	7.94	8.00	79	41	36	27.6	Figure 1	○
TBD03A0800	8.00	8.00	79	41	36	27.5	Figure 2	●
TBD03A0810	8.10	10.00	89	47	40	33.4	Figure 1	●
TBD03A0820	8.20	10.00	89	47	40	33.2	Figure 1	●
TBD03A0830	8.30	10.00	89	47	40	33.0	Figure 1	●
TBD03A0833	8.33	10.00	89	47	40	33.0	Figure 1	○
TBD03A0840	8.40	10.00	89	47	40	32.9	Figure 1	●
TBD03A0850	8.50	10.00	89	47	40	32.7	Figure 1	●
TBD03A0855	8.55	10.00	89	47	40	32.6	Figure 1	○
TBD03A0860	8.60	10.00	89	47	40	32.5	Figure 1	●
TBD03A0870	8.70	10.00	89	47	40	32.4	Figure 1	●

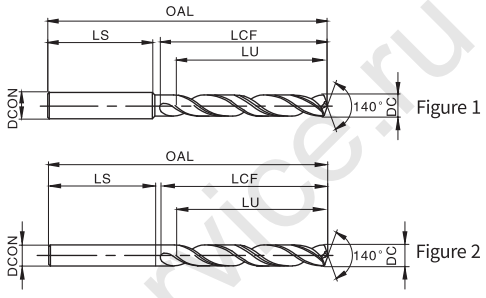
● Standing inventory ○ Make-to-order

TBD03A Series—Solid carbide drill

Order number	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
TBD03A0873	8.73	10.00	89	47	40	32.3	Figure 1	○
TBD03A0880	8.80	10.00	89	47	40	32.2	Figure 1	●
TBD03A0890	8.90	10.00	89	47	40	32.0	Figure 1	●
TBD03A0900	9.00	10.00	89	47	40	31.9	Figure 1	●
TBD03A0905	9.05	10.00	89	47	40	31.8	Figure 1	○
TBD03A0910	9.10	10.00	89	47	40	31.7	Figure 1	●
TBD03A0913	9.13	10.00	89	47	40	31.6	Figure 1	○
TBD03A0920	9.20	10.00	89	47	40	31.5	Figure 1	●
TBD03A0925	9.25	10.00	89	47	40	31.4	Figure 1	○
TBD03A0930	9.30	10.00	89	47	40	31.4	Figure 1	●
TBD03A0940	9.40	10.00	89	47	40	31.2	Figure 1	●
TBD03A0950	9.50	10.00	89	47	40	31.0	Figure 1	●
TBD03A0952	9.52	10.00	89	47	40	31.0	Figure 1	○
TBD03A0955	9.55	10.00	89	47	40	30.9	Figure 1	○
TBD03A0960	9.60	10.00	89	47	40	30.9	Figure 1	●
TBD03A0970	9.70	10.00	89	47	40	30.7	Figure 1	●
TBD03A0980	9.80	10.00	89	47	40	30.5	Figure 1	●
TBD03A0990	9.90	10.00	89	47	40	30.3	Figure 1	●
TBD03A0992	9.92	10.00	89	47	40	30.3	Figure 1	○
TBD03A1000	10.00	10.00	89	47	40	30.2	Figure 2	●
TBD03A1010	10.10	12.00	102	55	45	38.0	Figure 1	●
TBD03A1020	10.20	12.00	102	55	45	37.8	Figure 1	●
TBD03A1030	10.30	12.00	102	55	45	37.7	Figure 1	●
TBD03A1032	10.32	12.00	102	55	45	37.6	Figure 1	○
TBD03A1040	10.40	12.00	102	55	45	37.5	Figure 1	●
TBD03A1050	10.50	12.00	102	55	45	37.3	Figure 1	●
TBD03A1060	10.60	12.00	102	55	45	37.2	Figure 1	●
TBD03A1070	10.70	12.00	102	55	45	37.0	Figure 1	●
TBD03A1072	10.72	12.00	102	55	45	37.0	Figure 1	○
TBD03A1080	10.80	12.00	102	55	45	36.8	Figure 1	●
TBD03A1090	10.90	12.00	102	55	45	36.7	Figure 1	●
TBD03A1100	11.00	12.00	102	55	45	36.5	Figure 1	●
TBD03A1110	11.10	12.00	102	55	45	36.3	Figure 1	●

●Standing inventory ○Make-to-order

TBD03A Series—Solid carbide drill



Order number	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
TBD03A1111	11.11	12.00	102	55	45	36.3	Figure 1	●
TBD03A1120	11.20	12.00	102	55	45	36.2	Figure 1	●
TBD03A1130	11.30	12.00	102	55	45	36.0	Figure 1	●
TBD03A1140	11.40	12.00	102	55	45	35.8	Figure 1	●
TBD03A1150	11.50	12.00	102	55	45	35.7	Figure 1	●
TBD03A1151	11.51	12.00	102	55	45	35.6	Figure 1	○
TBD03A1155	11.55	12.00	102	55	45	35.6	Figure 1	○
TBD03A1160	11.60	12.00	102	55	45	35.5	Figure 1	●
TBD03A1170	11.70	12.00	102	55	45	35.3	Figure 1	●
TBD03A1180	11.80	12.00	102	55	45	35.2	Figure 1	●
TBD03A1190	11.90	12.00	102	55	45	35.0	Figure 1	●
TBD03A1191	11.91	12.00	102	55	45	35.0	Figure 1	○
TBD03A1200	12.00	12.00	102	55	45	34.8	Figure 2	●
TBD03A1210	12.10	14.00	107	60	45	39.6	Figure 1	○
TBD03A1220	12.20	14.00	107	60	45	39.5	Figure 1	○
TBD03A1230	12.30	14.00	107	60	45	39.3	Figure 1	○
TBD03A1240	12.40	14.00	107	60	45	39.1	Figure 1	○
TBD03A1250	12.50	14.00	107	60	45	39.0	Figure 1	●
TBD03A1260	12.60	14.00	107	60	45	38.8	Figure 1	○
TBD03A1270	12.70	14.00	107	60	45	38.6	Figure 1	○
TBD03A1280	12.80	14.00	107	60	45	38.5	Figure 1	○
TBD03A1290	12.90	14.00	107	60	45	38.3	Figure 1	○
TBD03A1300	13.00	14.00	107	60	45	38.1	Figure 1	●
TBD03A1310	13.10	14.00	107	60	45	38.0	Figure 1	○

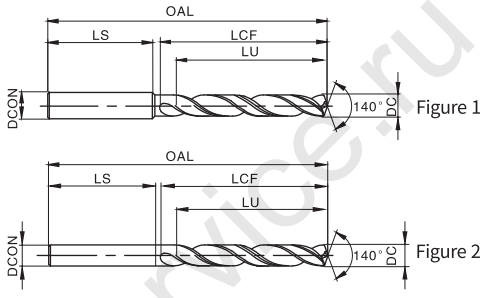
● Standing inventory ○ Make-to-order

TBD03A Series—Solid carbide drill

Order number	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
TBD03A1320	13.20	14.00	107	60	45	37.8	Figure 1	○
TBD03A1330	13.30	14.00	107	60	45	37.6	Figure 1	○
TBD03A1340	13.40	14.00	107	60	45	37.5	Figure 1	○
TBD03A1350	13.50	14.00	107	60	45	37.3	Figure 1	●
TBD03A1355	13.55	14.00	107	60	45	37.2	Figure 1	○
TBD03A1360	13.60	14.00	107	60	45	37.1	Figure 1	○
TBD03A1370	13.70	14.00	107	60	45	37.0	Figure 1	○
TBD03A1380	13.80	14.00	107	60	45	36.8	Figure 1	○
TBD03A1390	13.90	14.00	107	60	45	36.6	Figure 1	○
TBD03A1400	14.00	14.00	107	60	45	36.5	Figure 2	●
TBD03A1410	14.10	16.00	115	65	48	41.3	Figure 1	○
TBD03A1420	14.20	16.00	115	65	48	41.1	Figure 1	○
TBD03A1429	14.29	16.00	115	65	48	41.0	Figure 1	○
TBD03A1430	14.30	16.00	115	65	48	40.9	Figure 1	○
TBD03A1440	14.40	16.00	115	65	48	40.8	Figure 1	○
TBD03A1450	14.50	16.00	115	65	48	40.6	Figure 1	●
TBD03A1460	14.60	16.00	115	65	48	40.4	Figure 1	○
TBD03A1470	14.70	16.00	115	65	48	40.3	Figure 1	○
TBD03A1480	14.80	16.00	115	65	48	40.1	Figure 1	○
TBD03A1490	14.90	16.00	115	65	48	39.9	Figure 1	○
TBD03A1500	15.00	16.00	115	65	48	39.8	Figure 1	●
TBD03A1510	15.10	16.00	115	65	48	39.6	Figure 1	○
TBD03A1520	15.20	16.00	115	65	48	39.4	Figure 1	○
TBD03A1530	15.30	16.00	115	65	48	39.3	Figure 1	○
TBD03A1540	15.40	16.00	115	65	48	39.1	Figure 1	○
TBD03A1550	15.50	16.00	115	65	48	38.9	Figure 1	●
TBD03A1555	15.55	16.00	115	65	48	38.8	Figure 1	○
TBD03A1560	15.60	16.00	115	65	48	38.8	Figure 1	○
TBD03A1570	15.70	16.00	115	65	48	38.6	Figure 1	○
TBD03A1580	15.80	16.00	115	65	48	38.4	Figure 1	○
TBD03A1587	15.87	16.00	115	65	48	38.3	Figure 1	○
TBD03A1590	15.90	16.00	115	65	48	38.3	Figure 1	○
TBD03A1600	16.00	16.00	115	65	48	38.1	Figure 2	●

●Standing inventory ○Make-to-order

TBD03A Series—Solid carbide drill



Order number	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
TBD03A1650	16.50	18.00	123	73	48	45.2	Figure 1	●
TBD03A1690	16.90	18.00	123	73	48	44.6	Figure 1	○
TBD03A1700	17.00	18.00	123	73	48	44.4	Figure 1	●
TBD03A1750	17.50	18.00	123	73	48	43.6	Figure 1	●
TBD03A1755	17.55	18.00	123	73	48	43.5	Figure 1	○
TBD03A1790	17.90	18.00	123	73	48	42.9	Figure 1	○
TBD03A1800	18.00	18.00	123	73	48	42.7	Figure 2	●
TBD03A1830	18.30	20.00	131	79	50	48.2	Figure 1	○
TBD03A1850	18.50	20.00	131	79	50	47.9	Figure 1	●
TBD03A1890	18.90	20.00	131	79	50	47.2	Figure 1	○
TBD03A1900	19.00	20.00	131	79	50	47.0	Figure 1	●
TBD03A1930	19.30	20.00	131	79	50	46.5	Figure 1	○
TBD03A1950	19.50	20.00	131	79	50	46.2	Figure 1	●
TBD03A1955	19.55	20.00	131	79	50	46.1	Figure 1	○
TBD03A1990	19.90	20.00	131	79	50	45.5	Figure 1	○
TBD03A2000	20.00	20.00	131	79	50	45.4	Figure 2	●

●Standing inventory ○Make-to-order

TBD03CA Series—Solid carbide drill

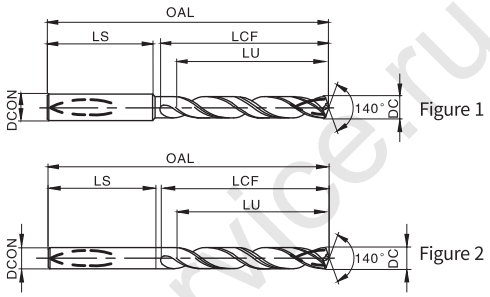


Figure 1

Figure 2

Order number	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
TBD03CA0300	3.00	6.00	62	20	36	15.0	Figure 1	●
TBD03CA0310	3.10	6.00	62	20	36	14.8	Figure 1	●
TBD03CA0317	3.17	6.00	62	20	36	14.7	Figure 1	○
TBD03CA0320	3.20	6.00	62	20	36	14.6	Figure 1	●
TBD03CA0325	3.25	6.00	62	20	36	14.5	Figure 1	○
TBD03CA0330	3.30	6.00	62	20	36	14.4	Figure 1	●
TBD03CA0340	3.40	6.00	62	20	36	14.3	Figure 1	●
TBD03CA0350	3.50	6.00	62	20	36	14.1	Figure 1	●
TBD03CA0357	3.57	6.00	62	20	36	14.0	Figure 1	○
TBD03CA0360	3.60	6.00	62	20	36	13.9	Figure 1	●
TBD03CA0370	3.70	6.00	62	20	36	13.8	Figure 1	●
TBD03CA0380	3.80	6.00	66	24	36	17.6	Figure 1	●
TBD03CA0390	3.90	6.00	66	24	36	17.4	Figure 1	●
TBD03CA0397	3.97	6.00	66	24	36	17.3	Figure 1	○
TBD03CA0400	4.00	6.00	66	24	36	17.3	Figure 1	●
TBD03CA0410	4.10	6.00	66	24	36	17.1	Figure 1	●
TBD03CA0420	4.20	6.00	66	24	36	16.9	Figure 1	●
TBD03CA0430	4.30	6.00	66	24	36	16.8	Figure 1	●
TBD03CA0437	4.37	6.00	66	24	36	16.6	Figure 1	○
TBD03CA0440	4.40	6.00	66	24	36	16.6	Figure 1	●
TBD03CA0445	4.45	6.00	66	24	36	16.5	Figure 1	○
TBD03CA0450	4.50	6.00	66	24	36	16.4	Figure 1	●
TBD03CA0460	4.60	6.00	66	24	36	16.3	Figure 1	●
TBD03CA0465	4.65	6.00	66	24	36	16.2	Figure 1	○

● Standing inventory ○ Make-to-order

TBD03CA Series—Solid carbide drill

Order number	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
TBD03CA0470	4.70	6.00	66	24	36	16.1	Figure 1	●
TBD03CA0476	4.76	6.00	66	28	36	20.0	Figure 1	○
TBD03CA0480	4.80	6.00	66	28	36	19.9	Figure 1	●
TBD03CA0490	4.90	6.00	66	28	36	19.8	Figure 1	●
TBD03CA0500	5.00	6.00	66	28	36	19.6	Figure 1	●
TBD03CA0510	5.10	6.00	66	28	36	19.4	Figure 1	●
TBD03CA0516	5.16	6.00	66	28	36	19.3	Figure 1	○
TBD03CA0520	5.20	6.00	66	28	36	19.3	Figure 1	●
TBD03CA0530	5.30	6.00	66	28	36	19.1	Figure 1	●
TBD03CA0540	5.40	6.00	66	28	36	18.9	Figure 1	●
TBD03CA0550	5.50	6.00	66	28	36	18.7	Figure 1	●
TBD03CA0555	5.55	6.00	66	28	36	18.7	Figure 1	○
TBD03CA0556	5.56	6.00	66	28	36	18.6	Figure 1	●
TBD03CA0560	5.60	6.00	66	28	36	18.6	Figure 1	●
TBD03CA0565	5.65	6.00	66	28	36	18.5	Figure 1	●
TBD03CA0570	5.70	6.00	66	28	36	18.4	Figure 1	●
TBD03CA0575	5.75	6.00	66	28	36	18.3	Figure 1	○
TBD03CA0580	5.80	6.00	66	28	36	18.2	Figure 1	●
TBD03CA0590	5.90	6.00	66	28	36	18.1	Figure 1	●
TBD03CA0595	5.95	6.00	66	28	36	18.0	Figure 1	○
TBD03CA0600	6.00	6.00	66	28	36	17.9	Figure 2	●
TBD03CA0610	6.10	8.00	79	34	36	23.7	Figure 1	●
TBD03CA0620	6.20	8.00	79	34	36	23.6	Figure 1	●
TBD03CA0630	6.30	8.00	79	34	36	23.4	Figure 1	●
TBD03CA0635	6.35	8.00	79	34	36	23.3	Figure 1	○
TBD03CA0640	6.40	8.00	79	34	36	23.2	Figure 1	●
TBD03CA0650	6.50	8.00	79	34	36	23.1	Figure 1	●
TBD03CA0660	6.60	8.00	79	34	36	22.9	Figure 1	●
TBD03CA0670	6.70	8.00	79	34	36	22.7	Figure 1	●
TBD03CA0675	6.75	8.00	79	34	36	22.6	Figure 1	○
TBD03CA0680	6.80	8.00	79	34	36	22.6	Figure 1	●
TBD03CA0690	6.90	8.00	79	34	36	22.4	Figure 1	●
TBD03CA0700	7.00	8.00	79	34	36	22.2	Figure 1	●

●Standing inventory ○Make-to-order

TBD03CA Series—Solid carbide drill

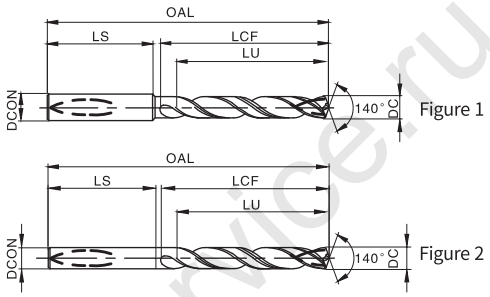


Figure 1

Figure 2

Order number	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
TBD03CA0710	7.10	8.00	79	41	36	29.1	Figure 1	●
TBD03CA0714	7.14	8.00	79	41	36	29.0	Figure 1	○
TBD03CA0720	7.20	8.00	79	41	36	28.9	Figure 1	●
TBD03CA0730	7.30	8.00	79	41	36	28.7	Figure 1	●
TBD03CA0740	7.40	8.00	79	41	36	28.6	Figure 1	●
TBD03CA0745	7.45	8.00	79	41	36	28.5	Figure 1	○
TBD03CA0750	7.50	8.00	79	41	36	28.4	Figure 1	●
TBD03CA0754	7.54	8.00	79	41	36	28.3	Figure 1	○
TBD03CA0760	7.60	8.00	79	41	36	28.2	Figure 1	●
TBD03CA0765	7.65	8.00	79	41	36	28.1	Figure 1	○
TBD03CA0770	7.70	8.00	79	41	36	28.0	Figure 1	●
TBD03CA0780	7.80	8.00	79	41	36	27.9	Figure 1	●
TBD03CA0790	7.90	8.00	79	41	36	27.7	Figure 1	●
TBD03CA0794	7.94	8.00	79	41	36	27.6	Figure 1	○
TBD03CA0800	8.00	8.00	79	41	36	27.5	Figure 2	●
TBD03CA0810	8.10	10.00	89	47	40	33.4	Figure 1	●
TBD03CA0820	8.20	10.00	89	47	40	33.2	Figure 1	●
TBD03CA0830	8.30	10.00	89	47	40	33.0	Figure 1	●
TBD03CA0833	8.33	10.00	89	47	40	33.0	Figure 1	○
TBD03CA0840	8.40	10.00	89	47	40	32.9	Figure 1	●
TBD03CA0850	8.50	10.00	89	47	40	32.7	Figure 1	●
TBD03CA0855	8.55	10.00	89	47	40	32.6	Figure 1	○
TBD03CA0860	8.60	10.00	89	47	40	32.5	Figure 1	●
TBD03CA0870	8.70	10.00	89	47	40	32.4	Figure 1	●

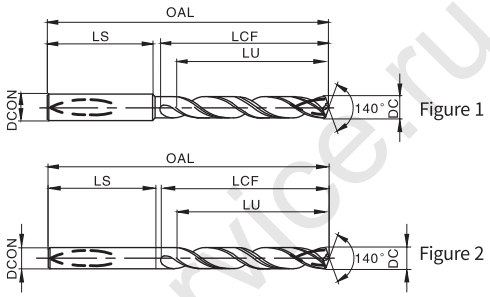
●Standing inventory ○Make-to-order

TBD03CA Series—Solid carbide drill

Order number	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
TBD03CA0873	8.73	10.00	89	47	40	32.3	Figure 1	○
TBD03CA0880	8.80	10.00	89	47	40	32.2	Figure 1	●
TBD03CA0890	8.90	10.00	89	47	40	32.0	Figure 1	●
TBD03CA0900	9.00	10.00	89	47	40	31.9	Figure 1	●
TBD03CA0905	9.05	10.00	89	47	40	31.8	Figure 1	○
TBD03CA0910	9.10	10.00	89	47	40	31.7	Figure 1	●
TBD03CA0913	9.13	10.00	89	47	40	31.6	Figure 1	○
TBD03CA0920	9.20	10.00	89	47	40	31.5	Figure 1	●
TBD03CA0925	9.25	10.00	89	47	40	31.4	Figure 1	○
TBD03CA0930	9.30	10.00	89	47	40	31.4	Figure 1	●
TBD03CA0940	9.40	10.00	89	47	40	31.2	Figure 1	●
TBD03CA0950	9.50	10.00	89	47	40	31.0	Figure 1	●
TBD03CA0952	9.52	10.00	89	47	40	31.0	Figure 1	○
TBD03CA0955	9.55	10.00	89	47	40	30.9	Figure 1	○
TBD03CA0960	9.60	10.00	89	47	40	30.9	Figure 1	●
TBD03CA0970	9.70	10.00	89	47	40	30.7	Figure 1	●
TBD03CA0980	9.80	10.00	89	47	40	30.5	Figure 1	●
TBD03CA0990	9.90	10.00	89	47	40	30.3	Figure 1	●
TBD03CA0992	9.92	10.00	89	47	40	30.3	Figure 1	○
TBD03CA1000	10.00	10.00	89	47	40	30.2	Figure 2	●
TBD03CA1010	10.10	12.00	102	55	45	38.0	Figure 1	●
TBD03CA1020	10.20	12.00	102	55	45	37.8	Figure 1	●
TBD03CA1030	10.30	12.00	102	55	45	37.7	Figure 1	●
TBD03CA1032	10.32	12.00	102	55	45	37.6	Figure 1	○
TBD03CA1040	10.40	12.00	102	55	45	37.5	Figure 1	●
TBD03CA1050	10.50	12.00	102	55	45	37.3	Figure 1	●
TBD03CA1060	10.60	12.00	102	55	45	37.2	Figure 1	●
TBD03CA1070	10.70	12.00	102	55	45	37.0	Figure 1	●
TBD03CA1072	10.72	12.00	102	55	45	37.0	Figure 1	○
TBD03CA1080	10.80	12.00	102	55	45	36.8	Figure 1	●
TBD03CA1090	10.90	12.00	102	55	45	36.7	Figure 1	●
TBD03CA1100	11.00	12.00	102	55	45	36.5	Figure 1	●
TBD03CA1110	11.10	12.00	102	55	45	36.3	Figure 1	●

●Standing inventory ○Make-to-order

TBD03CA Series—Solid carbide drill



Order number	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
TBD03CA1111	11.11	12.00	102	55	45	36.3	Figure 1	●
TBD03CA1120	11.20	12.00	102	55	45	36.2	Figure 1	●
TBD03CA1130	11.30	12.00	102	55	45	36.0	Figure 1	●
TBD03CA1140	11.40	12.00	102	55	45	35.8	Figure 1	●
TBD03CA1150	11.50	12.00	102	55	45	35.7	Figure 1	●
TBD03CA1151	11.51	12.00	102	55	45	35.6	Figure 1	○
TBD03CA1155	11.55	12.00	102	55	45	35.6	Figure 1	○
TBD03CA1160	11.60	12.00	102	55	45	35.5	Figure 1	●
TBD03CA1170	11.70	12.00	102	55	45	35.3	Figure 1	●
TBD03CA1180	11.80	12.00	102	55	45	35.2	Figure 1	●
TBD03CA1190	11.90	12.00	102	55	45	35.0	Figure 1	●
TBD03CA1191	11.91	12.00	102	55	45	35.0	Figure 1	○
TBD03CA1200	12.00	12.00	102	55	45	34.8	Figure 2	●
TBD03CA1210	12.10	14.00	107	60	45	39.6	Figure 1	○
TBD03CA1220	12.20	14.00	107	60	45	39.5	Figure 1	○
TBD03CA1230	12.30	14.00	107	60	45	39.3	Figure 1	○
TBD03CA1240	12.40	14.00	107	60	45	39.1	Figure 1	○
TBD03CA1250	12.50	14.00	107	60	45	39.0	Figure 1	●
TBD03CA1260	12.60	14.00	107	60	45	38.8	Figure 1	○
TBD03CA1270	12.70	14.00	107	60	45	38.6	Figure 1	○
TBD03CA1280	12.80	14.00	107	60	45	38.5	Figure 1	○
TBD03CA1290	12.90	14.00	107	60	45	38.3	Figure 1	○
TBD03CA1300	13.00	14.00	107	60	45	38.1	Figure 1	●
TBD03CA1310	13.10	14.00	107	60	45	38.0	Figure 1	○

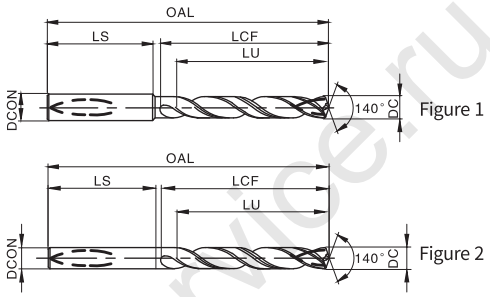
● Standing inventory ○ Make-to-order

TBD03CA Series—Solid carbide drill

Order number	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
TBD03CA1320	13.20	14.00	107	60	45	37.8	Figure 1	○
TBD03CA1330	13.30	14.00	107	60	45	37.6	Figure 1	○
TBD03CA1340	13.40	14.00	107	60	45	37.5	Figure 1	○
TBD03CA1350	13.50	14.00	107	60	45	37.3	Figure 1	●
TBD03CA1355	13.55	14.00	107	60	45	37.2	Figure 1	○
TBD03CA1360	13.60	14.00	107	60	45	37.1	Figure 1	○
TBD03CA1370	13.70	14.00	107	60	45	37.0	Figure 1	○
TBD03CA1380	13.80	14.00	107	60	45	36.8	Figure 1	○
TBD03CA1390	13.90	14.00	107	60	45	36.6	Figure 1	○
TBD03CA1400	14.00	14.00	107	60	45	36.5	Figure 2	●
TBD03CA1410	14.10	16.00	115	65	48	41.3	Figure 1	○
TBD03CA1420	14.20	16.00	115	65	48	41.1	Figure 1	○
TBD03CA1429	14.29	16.00	115	65	48	41.0	Figure 1	○
TBD03CA1430	14.30	16.00	115	65	48	40.9	Figure 1	○
TBD03CA1440	14.40	16.00	115	65	48	40.8	Figure 1	○
TBD03CA1450	14.50	16.00	115	65	48	40.6	Figure 1	●
TBD03CA1460	14.60	16.00	115	65	48	40.4	Figure 1	○
TBD03CA1470	14.70	16.00	115	65	48	40.3	Figure 1	○
TBD03CA1480	14.80	16.00	115	65	48	40.1	Figure 1	○
TBD03CA1490	14.90	16.00	115	65	48	39.9	Figure 1	○
TBD03CA1500	15.00	16.00	115	65	48	39.8	Figure 1	●
TBD03CA1510	15.10	16.00	115	65	48	39.6	Figure 1	○
TBD03CA1520	15.20	16.00	115	65	48	39.4	Figure 1	○
TBD03CA1530	15.30	16.00	115	65	48	39.3	Figure 1	○
TBD03CA1540	15.40	16.00	115	65	48	39.1	Figure 1	○
TBD03CA1550	15.50	16.00	115	65	48	38.9	Figure 1	●
TBD03CA1555	15.55	16.00	115	65	48	38.8	Figure 1	○
TBD03CA1560	15.60	16.00	115	65	48	38.8	Figure 1	○
TBD03CA1570	15.70	16.00	115	65	48	38.6	Figure 1	○
TBD03CA1580	15.80	16.00	115	65	48	38.4	Figure 1	○
TBD03CA1587	15.87	16.00	115	65	48	38.3	Figure 1	○
TBD03CA1590	15.90	16.00	115	65	48	38.3	Figure 1	○
TBD03CA1600	16.00	16.00	115	65	48	38.1	Figure 2	●

●Standing inventory ○Make-to-order

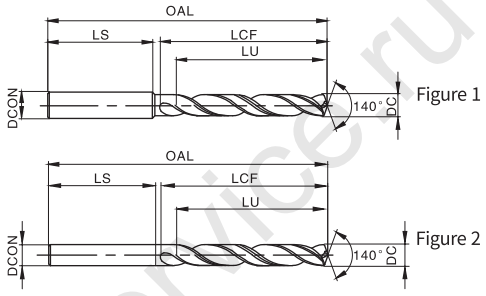
TBD03CA Series—Solid carbide drill



Order number	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
TBD03CA1650	16.50	18.00	123	73	48	45.2	Figure 1	●
TBD03CA1690	16.90	18.00	123	73	48	44.6	Figure 1	○
TBD03CA1700	17.00	18.00	123	73	48	44.4	Figure 1	●
TBD03CA1750	17.50	18.00	123	73	48	43.6	Figure 1	●
TBD03CA1755	17.55	18.00	123	73	48	43.5	Figure 1	○
TBD03CA1790	17.90	18.00	123	73	48	42.9	Figure 1	○
TBD03CA1800	18.00	18.00	123	73	48	42.7	Figure 2	●
TBD03CA1830	18.30	20.00	131	79	50	48.2	Figure 1	○
TBD03CA1850	18.50	20.00	131	79	50	47.9	Figure 1	●
TBD03CA1890	18.90	20.00	131	79	50	47.2	Figure 1	○
TBD03CA1900	19.00	20.00	131	79	50	47.0	Figure 1	●
TBD03CA1930	19.30	20.00	131	79	50	46.5	Figure 1	○
TBD03CA1950	19.50	20.00	131	79	50	46.2	Figure 1	●
TBD03CA1955	19.55	20.00	131	79	50	46.1	Figure 1	○
TBD03CA1990	19.90	20.00	131	79	50	45.5	Figure 1	○
TBD03CA2000	20.00	20.00	131	79	50	45.4	Figure 2	●

●Standing inventory ○Make-to-order

TBD05A Series—Solid carbide drill



Order number	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
TBD05A0300	3.00	6.00	66	28	36	23.0	Figure 1	●
TBD05A0310	3.10	6.00	66	28	36	22.8	Figure 1	●
TBD05A0317	3.17	6.00	66	28	36	22.7	Figure 1	○
TBD05A0320	3.20	6.00	66	28	36	22.6	Figure 1	●
TBD05A0325	3.25	6.00	66	28	36	22.5	Figure 1	○
TBD05A0330	3.30	6.00	66	28	36	22.4	Figure 1	●
TBD05A0340	3.40	6.00	66	28	36	22.3	Figure 1	●
TBD05A0350	3.50	6.00	66	28	36	22.1	Figure 1	●
TBD05A0357	3.57	6.00	66	28	36	22.0	Figure 1	○
TBD05A0360	3.60	6.00	66	28	36	21.9	Figure 1	●
TBD05A0370	3.70	6.00	66	28	36	21.8	Figure 1	●
TBD05A0380	3.80	6.00	74	36	36	29.6	Figure 1	●
TBD05A0390	3.90	6.00	74	36	36	29.4	Figure 1	●
TBD05A0397	3.97	6.00	74	36	36	29.3	Figure 1	○
TBD05A0400	4.00	6.00	74	36	36	29.3	Figure 1	●
TBD05A0410	4.10	6.00	74	36	36	29.1	Figure 1	●
TBD05A0420	4.20	6.00	74	36	36	28.9	Figure 1	●
TBD05A0430	4.30	6.00	74	36	36	28.8	Figure 1	●
TBD05A0437	4.37	6.00	74	36	36	28.6	Figure 1	○
TBD05A0440	4.40	6.00	74	36	36	28.6	Figure 1	●
TBD05A0450	4.50	6.00	74	36	36	28.4	Figure 1	●
TBD05A0460	4.60	6.00	74	36	36	28.3	Figure 1	●
TBD05A0465	4.65	6.00	74	36	36	28.2	Figure 1	●
TBD05A0470	4.70	6.00	74	36	36	28.1	Figure 1	○

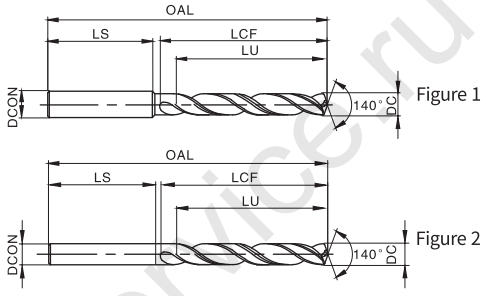
● Standing inventory ○ Make-to-order

TBD05A Series—Solid carbide drill

Order number	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
TBD05A0476	4.76	6.00	82	44	36	36.0	Figure 1	●
TBD05A0480	4.80	6.00	82	44	36	35.9	Figure 1	○
TBD05A0490	4.90	6.00	82	44	36	35.8	Figure 1	●
TBD05A0500	5.00	6.00	82	44	36	35.6	Figure 1	●
TBD05A0510	5.10	6.00	82	44	36	35.4	Figure 1	●
TBD05A0516	5.16	6.00	82	44	36	35.3	Figure 1	●
TBD05A0520	5.20	6.00	82	44	36	35.3	Figure 1	○
TBD05A0530	5.30	6.00	82	44	36	35.1	Figure 1	●
TBD05A0540	5.40	6.00	82	44	36	34.9	Figure 1	●
TBD05A0550	5.50	6.00	82	44	36	34.7	Figure 1	●
TBD05A0555	5.55	6.00	82	44	36	34.7	Figure 1	●
TBD05A0560	5.60	6.00	82	44	36	34.6	Figure 1	○
TBD05A0570	5.70	6.00	82	44	36	34.4	Figure 1	●
TBD05A0580	5.80	6.00	82	44	36	34.2	Figure 1	●
TBD05A0590	5.90	6.00	82	44	36	34.1	Figure 1	●
TBD05A0595	5.95	6.00	82	44	36	34.0	Figure 1	●
TBD05A0600	6.00	6.00	82	44	36	33.9	Figure 2	●
TBD05A0610	6.10	8.00	91	53	36	42.7	Figure 1	●
TBD05A0620	6.20	8.00	91	53	36	42.6	Figure 1	●
TBD05A0630	6.30	8.00	91	53	36	42.4	Figure 1	○
TBD05A0635	6.35	8.00	91	53	36	42.3	Figure 1	●
TBD05A0640	6.40	8.00	91	53	36	42.2	Figure 1	●
TBD05A0650	6.50	8.00	91	53	36	42.1	Figure 1	●
TBD05A0653	6.53	8.00	91	53	36	42.0	Figure 1	●
TBD05A0660	6.60	8.00	91	53	36	41.9	Figure 1	○
TBD05A0670	6.70	8.00	91	53	36	41.7	Figure 1	●
TBD05A0675	6.75	8.00	91	53	36	41.6	Figure 1	●
TBD05A0680	6.80	8.00	91	53	36	41.6	Figure 1	●
TBD05A0690	6.90	8.00	91	53	36	41.4	Figure 1	●
TBD05A0700	7.00	8.00	91	53	36	41.2	Figure 1	●
TBD05A0710	7.10	8.00	91	53	36	41.1	Figure 1	●
TBD05A0714	7.14	8.00	91	53	36	41.0	Figure 1	●
TBD05A0720	7.20	8.00	91	53	36	40.9	Figure 1	●

●Standing inventory ○Make-to-order

TBD05A Series—Solid carbide drill



Order number	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
TBD05A0730	7.30	8.00	91	53	36	40.7	Figure 1	●
TBD05A0740	7.40	8.00	91	53	36	40.6	Figure 1	○
TBD05A0750	7.50	8.00	91	53	36	40.4	Figure 1	●
TBD05A0754	7.54	8.00	91	53	36	40.3	Figure 1	●
TBD05A0760	7.60	8.00	91	53	36	40.2	Figure 1	●
TBD05A0770	7.70	8.00	91	53	36	40.0	Figure 1	○
TBD05A0780	7.80	8.00	91	53	36	39.9	Figure 1	●
TBD05A0790	7.90	8.00	91	53	36	39.7	Figure 1	○
TBD05A0794	7.94	8.00	91	53	36	39.6	Figure 1	●
TBD05A0800	8.00	8.00	91	53	36	39.5	Figure 2	●
TBD05A0810	8.10	10.00	103	61	40	47.4	Figure 1	●
TBD05A0820	8.20	10.00	103	61	40	47.2	Figure 1	●
TBD05A0830	8.30	10.00	103	61	40	47.0	Figure 1	●
TBD05A0833	8.33	10.00	103	61	40	47.0	Figure 1	○
TBD05A0840	8.40	10.00	103	61	40	46.9	Figure 1	●
TBD05A0850	8.50	10.00	103	61	40	46.7	Figure 1	●
TBD05A0860	8.60	10.00	103	61	40	46.5	Figure 1	●
TBD05A0870	8.70	10.00	103	61	40	46.4	Figure 1	●
TBD05A0873	8.73	10.00	103	61	40	46.3	Figure 1	○
TBD05A0880	8.80	10.00	103	61	40	46.2	Figure 1	●
TBD05A0890	8.90	10.00	103	61	40	46.0	Figure 1	●
TBD05A0900	9.00	10.00	103	61	40	45.9	Figure 1	●
TBD05A0910	9.10	10.00	103	61	40	45.7	Figure 1	●
TBD05A0913	9.13	10.00	103	61	40	45.6	Figure 1	●

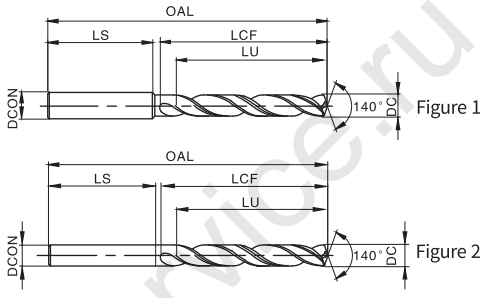
● Standing inventory ○ Make-to-order

TBD05A Series—Solid carbide drill

Order number	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
TBD05A0920	9.20	10.00	103	61	40	45.5	Figure 1	○
TBD05A0925	9.25	10.00	103	61	40	45.4	Figure 1	●
TBD05A0930	9.30	10.00	103	61	40	45.4	Figure 1	●
TBD05A0940	9.40	10.00	103	61	40	45.2	Figure 1	●
TBD05A0950	9.50	10.00	103	61	40	45.0	Figure 1	○
TBD05A0952	9.52	10.00	103	61	40	45.0	Figure 1	●
TBD05A0960	9.60	10.00	103	61	40	44.9	Figure 1	○
TBD05A0970	9.70	10.00	103	61	40	44.7	Figure 1	●
TBD05A0980	9.80	10.00	103	61	40	44.5	Figure 1	○
TBD05A0990	9.90	10.00	103	61	40	44.3	Figure 1	●
TBD05A0992	9.92	10.00	103	61	40	44.3	Figure 1	●
TBD05A1000	10.00	10.00	103	61	40	44.2	Figure 2	●
TBD05A1010	10.10	12.00	118	71	45	54.0	Figure 1	○
TBD05A1020	10.20	12.00	118	71	45	53.8	Figure 1	○
TBD05A1030	10.30	12.00	118	71	45	53.7	Figure 1	●
TBD05A1032	10.32	12.00	118	71	45	53.6	Figure 1	●
TBD05A1040	10.40	12.00	118	71	45	53.5	Figure 1	●
TBD05A1050	10.50	12.00	118	71	45	53.3	Figure 1	●
TBD05A1060	10.60	12.00	118	71	45	53.2	Figure 1	○
TBD05A1070	10.70	12.00	118	71	45	53.0	Figure 1	●
TBD05A1072	10.72	12.00	118	71	45	53.0	Figure 1	●
TBD05A1080	10.80	12.00	118	71	45	52.8	Figure 1	●
TBD05A1090	10.90	12.00	118	71	45	52.7	Figure 1	●
TBD05A1100	11.00	12.00	118	71	45	52.5	Figure 1	●
TBD05A1110	11.10	12.00	118	71	45	52.3	Figure 1	●
TBD05A1111	11.11	12.00	118	71	45	52.3	Figure 1	●
TBD05A1120	11.20	12.00	118	71	45	52.2	Figure 1	●
TBD05A1130	11.30	12.00	118	71	45	52.0	Figure 1	●
TBD05A1140	11.40	12.00	118	71	45	51.8	Figure 1	○
TBD05A1150	11.50	12.00	118	71	45	51.7	Figure 1	●
TBD05A1160	11.60	12.00	118	71	45	51.5	Figure 1	●
TBD05A1170	11.70	12.00	118	71	45	51.3	Figure 1	●
TBD05A1180	11.80	12.00	118	71	45	51.2	Figure 1	●

●Standing inventory ○Make-to-order

TBD05A Series—Solid carbide drill



Order number	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
TBD05A1190	11.90	12.00	118	71	45	51.0	Figure 1	●
TBD05A1191	11.91	12.00	118	71	45	51.0	Figure 1	●
TBD05A1200	12.00	12.00	118	71	45	50.8	Figure 2	●
TBD05A1210	12.10	14.00	124	77	45	56.6	Figure 1	●
TBD05A1220	12.20	14.00	124	77	45	56.5	Figure 1	●
TBD05A1230	12.30	14.00	124	77	45	56.3	Figure 1	○
TBD05A1240	12.40	14.00	124	77	45	56.1	Figure 1	○
TBD05A1250	12.50	14.00	124	77	45	56.0	Figure 1	●
TBD05A1260	12.60	14.00	124	77	45	55.8	Figure 1	●
TBD05A1270	12.70	14.00	124	77	45	55.6	Figure 1	●
TBD05A1280	12.80	14.00	124	77	45	55.5	Figure 1	●
TBD05A1290	12.90	14.00	124	77	45	55.3	Figure 1	○
TBD05A1300	13.00	14.00	124	77	45	55.1	Figure 1	●
TBD05A1310	13.10	14.00	124	77	45	55.0	Figure 1	○
TBD05A1320	13.20	14.00	124	77	45	54.8	Figure 1	○
TBD05A1330	13.30	14.00	124	77	45	54.6	Figure 1	○
TBD05A1340	13.40	14.00	124	77	45	54.5	Figure 1	○
TBD05A1350	13.50	14.00	124	77	45	54.3	Figure 1	●
TBD05A1370	13.70	14.00	124	77	45	54.0	Figure 1	○
TBD05A1380	13.80	14.00	124	77	45	53.8	Figure 1	○
TBD05A1390	13.90	14.00	124	77	45	53.6	Figure 1	○
TBD05A1400	14.00	14.00	124	77	45	53.5	Figure 2	●
TBD05A1410	14.10	16.00	133	83	48	59.3	Figure 1	●
TBD05A1420	14.20	16.00	133	83	48	59.1	Figure 1	○

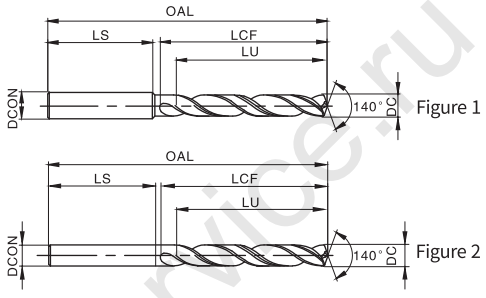
● Standing inventory ○ Make-to-order

TBD05A Series—Solid carbide drill

Order number	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
TBD05A1429	14.29	16.00	133	83	48	59.0	Figure 1	○
TBD05A1430	14.30	16.00	133	83	48	58.9	Figure 1	○
TBD05A1440	14.40	16.00	133	83	48	58.8	Figure 1	○
TBD05A1450	14.50	16.00	133	83	48	58.6	Figure 1	●
TBD05A1460	14.60	16.00	133	83	48	58.4	Figure 1	○
TBD05A1470	14.70	16.00	133	83	48	58.3	Figure 1	○
TBD05A1480	14.80	16.00	133	83	48	58.1	Figure 1	○
TBD05A1490	14.90	16.00	133	83	48	57.9	Figure 1	○
TBD05A1500	15.00	16.00	133	83	48	57.8	Figure 1	●
TBD05A1510	15.10	16.00	133	83	48	57.6	Figure 1	○
TBD05A1520	15.20	16.00	133	83	48	57.4	Figure 1	○
TBD05A1530	15.30	16.00	133	83	48	57.3	Figure 1	○
TBD05A1540	15.40	16.00	133	83	48	57.1	Figure 1	○
TBD05A1550	15.50	16.00	133	83	48	56.9	Figure 1	●
TBD05A1560	15.60	16.00	133	83	48	56.8	Figure 1	○
TBD05A1570	15.70	16.00	133	83	48	56.6	Figure 1	●
TBD05A1580	15.80	16.00	133	83	48	56.4	Figure 1	○
TBD05A1587	15.87	16.00	133	83	48	56.3	Figure 1	○
TBD05A1590	15.90	16.00	133	83	48	56.3	Figure 1	○
TBD05A1600	16.00	16.00	133	83	48	56.1	Figure 2	●
TBD05A1608	16.08	18.00	143	93	48	66.0	Figure 1	○
TBD05A1650	16.50	18.00	143	93	48	65.2	Figure 1	●
TBD05A1667	16.67	18.00	143	93	48	65.0	Figure 1	○
TBD05A1670	16.70	18.00	143	93	48	64.9	Figure 1	○
TBD05A1690	16.90	18.00	143	93	48	64.6	Figure 1	○
TBD05A1700	17.00	18.00	143	93	48	64.4	Figure 1	●
TBD05A1750	17.50	18.00	143	93	48	63.6	Figure 1	○
TBD05A1770	17.70	18.00	143	93	48	63.2	Figure 1	○
TBD05A1786	17.86	18.00	143	93	48	63.0	Figure 1	○
TBD05A1800	18.00	18.00	143	93	48	62.7	Figure 2	●
TBD05A1850	18.50	20.00	153	101	50	69.9	Figure 1	○
TBD05A1870	18.70	20.00	153	101	50	69.5	Figure 1	○
TBD05A1890	18.90	20.00	153	101	50	69.2	Figure 1	●

●Standing inventory ○Make-to-order

TBD05A Series—Solid carbide drill



Order number	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
TBD05A1900	19.00	20.00	153	101	50	69.0	Figure 1	●
TBD05A1905	19.05	20.00	153	101	50	69.0	Figure 1	○
TBD05A1916	19.16	20.00	153	101	50	68.8	Figure 1	○
TBD05A1925	19.25	20.00	153	101	50	68.6	Figure 1	○
TBD05A1930	19.30	20.00	153	101	50	68.5	Figure 1	○
TBD05A1945	19.45	20.00	153	101	50	68.3	Figure 1	○
TBD05A1950	19.50	20.00	153	101	50	68.2	Figure 1	●
TBD05A1970	19.70	20.00	153	101	50	67.9	Figure 1	○
TBD05A1984	19.84	20.00	153	101	50	67.6	Figure 1	○
TBD05A2000	20.00	20.00	153	101	50	67.4	Figure 2	●

●Standing inventory ○Make-to-order

TBD05CA Series—Solid carbide drill

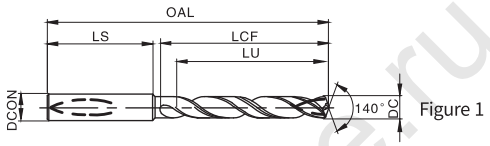


Figure 1

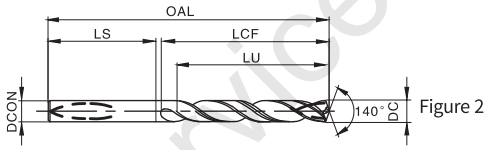


Figure 2

Order number	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
TBD05CA0300	3.00	6.00	66	28	36	23.0	Figure 1	●
TBD05CA0310	3.10	6.00	66	28	36	22.8	Figure 1	●
TBD05CA0317	3.17	6.00	66	28	36	22.7	Figure 1	○
TBD05CA0320	3.20	6.00	66	28	36	22.6	Figure 1	●
TBD05CA0325	3.25	6.00	66	28	36	22.5	Figure 1	○
TBD05CA0330	3.30	6.00	66	28	36	22.4	Figure 1	●
TBD05CA0340	3.40	6.00	66	28	36	22.3	Figure 1	●
TBD05CA0350	3.50	6.00	66	28	36	22.1	Figure 1	●
TBD05CA0357	3.57	6.00	66	28	36	22.0	Figure 1	○
TBD05CA0360	3.60	6.00	66	28	36	21.9	Figure 1	●
TBD05CA0370	3.70	6.00	66	28	36	21.8	Figure 1	●
TBD05CA0380	3.80	6.00	74	36	36	29.6	Figure 1	●
TBD05CA0390	3.90	6.00	74	36	36	29.4	Figure 1	●
TBD05CA0397	3.97	6.00	74	36	36	29.3	Figure 1	○
TBD05CA0400	4.00	6.00	74	36	36	29.3	Figure 1	●
TBD05CA0410	4.10	6.00	74	36	36	29.1	Figure 1	●
TBD05CA0420	4.20	6.00	74	36	36	28.9	Figure 1	●
TBD05CA0430	4.30	6.00	74	36	36	28.8	Figure 1	●
TBD05CA0437	4.37	6.00	74	36	36	28.6	Figure 1	○
TBD05CA0440	4.40	6.00	74	36	36	28.6	Figure 1	●
TBD05CA0450	4.50	6.00	74	36	36	28.4	Figure 1	●
TBD05CA0460	4.60	6.00	74	36	36	28.3	Figure 1	●
TBD05CA0465	4.65	6.00	74	36	36	28.2	Figure 1	●
TBD05CA0470	4.70	6.00	74	36	36	28.1	Figure 1	○

●Standing inventory ○Make-to-order

TBD05CA Series—Solid carbide drill

Order number	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
TBD05CA0476	4.76	6.00	82	44	36	36.0	Figure 1	●
TBD05CA0480	4.80	6.00	82	44	36	35.9	Figure 1	○
TBD05CA0490	4.90	6.00	82	44	36	35.8	Figure 1	●
TBD05CA0500	5.00	6.00	82	44	36	35.6	Figure 1	●
TBD05CA0510	5.10	6.00	82	44	36	35.4	Figure 1	●
TBD05CA0516	5.16	6.00	82	44	36	35.3	Figure 1	●
TBD05CA0520	5.20	6.00	82	44	36	35.3	Figure 1	○
TBD05CA0530	5.30	6.00	82	44	36	35.1	Figure 1	●
TBD05CA0540	5.40	6.00	82	44	36	34.9	Figure 1	●
TBD05CA0550	5.50	6.00	82	44	36	34.7	Figure 1	●
TBD05CA0555	5.55	6.00	82	44	36	34.7	Figure 1	●
TBD05CA0560	5.60	6.00	82	44	36	34.6	Figure 1	○
TBD05CA0570	5.70	6.00	82	44	36	34.4	Figure 1	●
TBD05CA0580	5.80	6.00	82	44	36	34.2	Figure 1	●
TBD05CA0590	5.90	6.00	82	44	36	34.1	Figure 1	●
TBD05CA0595	5.95	6.00	82	44	36	34.0	Figure 1	●
TBD05CA0600	6.00	6.00	82	44	36	33.9	Figure 2	●
TBD05CA0610	6.10	8.00	91	53	36	42.7	Figure 1	●
TBD05CA0620	6.20	8.00	91	53	36	42.6	Figure 1	●
TBD05CA0630	6.30	8.00	91	53	36	42.4	Figure 1	○
TBD05CA0635	6.35	8.00	91	53	36	42.3	Figure 1	●
TBD05CA0640	6.40	8.00	91	53	36	42.2	Figure 1	●
TBD05CA0650	6.50	8.00	91	53	36	42.1	Figure 1	●
TBD05CA0653	6.53	8.00	91	53	36	42.0	Figure 1	●
TBD05CA0660	6.60	8.00	91	53	36	41.9	Figure 1	○
TBD05CA0670	6.70	8.00	91	53	36	41.7	Figure 1	●
TBD05CA0675	6.75	8.00	91	53	36	41.6	Figure 1	●
TBD05CA0680	6.80	8.00	91	53	36	41.6	Figure 1	●
TBD05CA0690	6.90	8.00	91	53	36	41.4	Figure 1	●
TBD05CA0700	7.00	8.00	91	53	36	41.2	Figure 1	●
TBD05CA0710	7.10	8.00	91	53	36	41.1	Figure 1	●
TBD05CA0714	7.14	8.00	91	53	36	41.0	Figure 1	●
TBD05CA0720	7.20	8.00	91	53	36	40.9	Figure 1	●

●Standing inventory ○Make-to-order

TBD05CA Series—Solid carbide drill

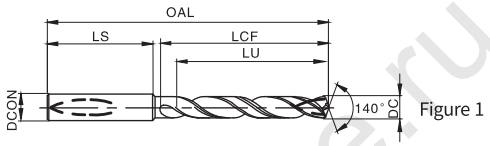


Figure 1

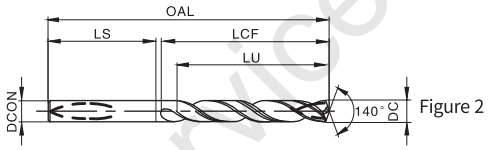


Figure 2

Order number	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
TBD05CA0730	7.30	8.00	91	53	36	40.7	Figure 1	●
TBD05CA0740	7.40	8.00	91	53	36	40.6	Figure 1	○
TBD05CA0750	7.50	8.00	91	53	36	40.4	Figure 1	●
TBD05CA0754	7.54	8.00	91	53	36	40.3	Figure 1	●
TBD05CA0760	7.60	8.00	91	53	36	40.2	Figure 1	●
TBD05CA0770	7.70	8.00	91	53	36	40.0	Figure 1	○
TBD05CA0780	7.80	8.00	91	53	36	39.9	Figure 1	●
TBD05CA0790	7.90	8.00	91	53	36	39.7	Figure 1	○
TBD05CA0794	7.94	8.00	91	53	36	39.6	Figure 1	●
TBD05CA0800	8.00	8.00	91	53	36	39.5	Figure 2	●
TBD05CA0810	8.10	10.00	103	61	40	47.4	Figure 1	●
TBD05CA0820	8.20	10.00	103	61	40	47.2	Figure 1	●
TBD05CA0830	8.30	10.00	103	61	40	47.0	Figure 1	●
TBD05CA0833	8.33	10.00	103	61	40	47.0	Figure 1	○
TBD05CA0840	8.40	10.00	103	61	40	46.9	Figure 1	●
TBD05CA0850	8.50	10.00	103	61	40	46.7	Figure 1	●
TBD05CA0860	8.60	10.00	103	61	40	46.5	Figure 2	●
TBD05CA0870	8.70	10.00	103	61	40	46.4	Figure 1	●
TBD05CA0873	8.73	10.00	103	61	40	46.3	Figure 1	○
TBD05CA0880	8.80	10.00	103	61	40	46.2	Figure 1	●
TBD05CA0890	8.90	10.00	103	61	40	46.0	Figure 1	●
TBD05CA0900	9.00	10.00	103	61	40	45.9	Figure 1	●
TBD05CA0910	9.10	10.00	103	61	40	45.7	Figure 1	●
TBD05CA0913	9.13	10.00	103	61	40	45.6	Figure 1	●

●Standing inventory ○Make-to-order

TBD05CA Series—Solid carbide drill

Order number	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
TBD05CA0920	9.20	10.00	103	61	40	45.5	Figure 1	○
TBD05CA0925	9.25	10.00	103	61	40	45.4	Figure 1	●
TBD05CA0930	9.30	10.00	103	61	40	45.4	Figure 1	○
TBD05CA0940	9.40	10.00	103	61	40	45.2	Figure 1	●
TBD05CA0950	9.50	10.00	103	61	40	45.0	Figure 1	●
TBD05CA0952	9.52	10.00	103	61	40	45.0	Figure 1	●
TBD05CA0960	9.60	10.00	103	61	40	44.9	Figure 1	●
TBD05CA0970	9.70	10.00	103	61	40	44.7	Figure 2	●
TBD05CA0980	9.80	10.00	103	61	40	44.5	Figure 1	○
TBD05CA0990	9.90	10.00	103	61	40	44.3	Figure 1	○
TBD05CA0992	9.92	10.00	103	61	40	44.3	Figure 1	●
TBD05CA1000	10.00	10.00	103	61	40	44.2	Figure 1	●
TBD05CA1010	10.10	12.00	118	71	45	54.0	Figure 1	●
TBD05CA1020	10.20	12.00	118	71	45	53.8	Figure 1	●
TBD05CA1030	10.30	12.00	118	71	45	53.7	Figure 1	○
TBD05CA1032	10.32	12.00	118	71	45	53.6	Figure 1	●
TBD05CA1040	10.40	12.00	118	71	45	53.5	Figure 1	●
TBD05CA1050	10.50	12.00	118	71	45	53.3	Figure 1	●
TBD05CA1060	10.60	12.00	118	71	45	53.2	Figure 1	●
TBD05CA1070	10.70	12.00	118	71	45	53.0	Figure 1	○
TBD05CA1072	10.72	12.00	118	71	45	53.0	Figure 1	●
TBD05CA1080	10.80	12.00	118	71	45	52.8	Figure 1	●
TBD05CA1090	10.90	12.00	118	71	45	52.7	Figure 1	●
TBD05CA1100	11.00	12.00	118	71	45	52.5	Figure 1	●
TBD05CA1110	11.10	12.00	118	71	45	52.3	Figure 1	○
TBD05CA1111	11.11	12.00	118	71	45	52.3	Figure 1	●
TBD05CA1120	11.20	12.00	118	71	45	52.2	Figure 1	●
TBD05CA1130	11.30	12.00	118	71	45	52.0	Figure 1	●
TBD05CA1140	11.40	12.00	118	71	45	51.8	Figure 1	●
TBD05CA1150	11.50	12.00	118	71	45	51.7	Figure 2	○
TBD05CA1160	11.60	12.00	118	71	45	51.5	Figure 1	●
TBD05CA1170	11.70	12.00	118	71	45	51.3	Figure 1	●
TBD05CA1180	11.80	12.00	118	71	45	51.2	Figure 1	●

●Standing inventory ○Make-to-order

TBD05CA Series—Solid carbide drill

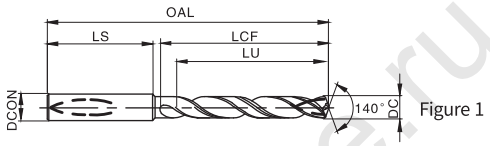


Figure 1

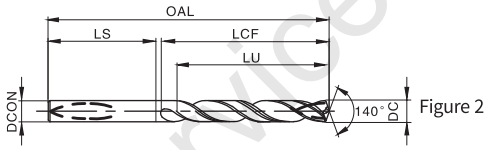


Figure 2

Order number	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
TBD05CA1190	11.90	12.00	118	71	45	51.0	Figure 1	●
TBD05CA1191	11.91	12.00	118	71	45	51.0	Figure 1	●
TBD05CA1200	12.00	12.00	118	71	45	50.8	Figure 2	●
TBD05CA1210	12.10	14.00	124	77	45	56.6	Figure 1	●
TBD05CA1220	12.20	14.00	124	77	45	56.5	Figure 1	●
TBD05CA1230	12.30	14.00	124	77	45	56.3	Figure 1	○
TBD05CA1240	12.40	14.00	124	77	45	56.1	Figure 1	○
TBD05CA1250	12.50	14.00	124	77	45	56.0	Figure 1	●
TBD05CA1260	12.60	14.00	124	77	45	55.8	Figure 1	●
TBD05CA1270	12.70	14.00	124	77	45	55.6	Figure 1	●
TBD05CA1280	12.80	14.00	124	77	45	55.5	Figure 1	●
TBD05CA1290	12.90	14.00	124	77	45	55.3	Figure 1	○
TBD05CA1300	13.00	14.00	124	77	45	55.1	Figure 1	●
TBD05CA1310	13.10	14.00	124	77	45	55.0	Figure 1	○
TBD05CA1320	13.20	14.00	124	77	45	54.8	Figure 1	○
TBD05CA1330	13.30	14.00	124	77	45	54.6	Figure 1	○
TBD05CA1340	13.40	14.00	124	77	45	54.5	Figure 1	○
TBD05CA1350	13.50	14.00	124	77	45	54.3	Figure 1	●
TBD05CA1370	13.70	14.00	124	77	45	54.0	Figure 1	○
TBD05CA1380	13.80	14.00	124	77	45	53.8	Figure 1	○
TBD05CA1390	13.90	14.00	124	77	45	53.6	Figure 1	○
TBD05CA1400	14.00	14.00	124	77	45	53.5	Figure 2	●
TBD05CA1410	14.10	16.00	133	83	48	59.3	Figure 1	●
TBD05CA1420	14.20	16.00	133	83	48	59.1	Figure 1	○

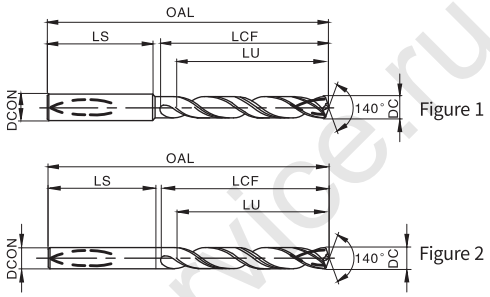
●Standing inventory ○Make-to-order

TBD05CA Series—Solid carbide drill

Order number	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
TBD05CA1429	14.29	16.00	133	83	48	59.0	Figure 1	○
TBD05CA1430	14.30	16.00	133	83	48	58.9	Figure 1	○
TBD05CA1440	14.40	16.00	133	83	48	58.8	Figure 1	○
TBD05CA1450	14.50	16.00	133	83	48	58.6	Figure 1	●
TBD05CA1460	14.60	16.00	133	83	48	58.4	Figure 1	○
TBD05CA1470	14.70	16.00	133	83	48	58.3	Figure 1	○
TBD05CA1480	14.80	16.00	133	83	48	58.1	Figure 1	○
TBD05CA1490	14.90	16.00	133	83	48	57.9	Figure 1	○
TBD05CA1500	15.00	16.00	133	83	48	57.8	Figure 1	●
TBD05CA1510	15.10	16.00	133	83	48	57.6	Figure 1	○
TBD05CA1520	15.20	16.00	133	83	48	57.4	Figure 1	○
TBD05CA1530	15.30	16.00	133	83	48	57.3	Figure 1	○
TBD05CA1540	15.40	16.00	133	83	48	57.1	Figure 1	○
TBD05CA1550	15.50	16.00	133	83	48	56.9	Figure 1	○
TBD05CA1560	15.60	16.00	133	83	48	56.8	Figure 1	○
TBD05CA1570	15.70	16.00	133	83	48	56.6	Figure 1	●
TBD05CA1580	15.80	16.00	133	83	48	56.4	Figure 1	○
TBD05CA1587	15.87	16.00	133	83	48	56.3	Figure 1	○
TBD05CA1590	15.90	16.00	133	83	48	56.3	Figure 1	○
TBD05CA1600	16.00	16.00	133	83	48	56.1	Figure 2	●
TBD05CA1608	16.08	18.00	143	93	48	66.0	Figure 1	○
TBD05CA1650	16.50	18.00	143	93	48	65.2	Figure 1	○
TBD05CA1667	16.67	18.00	143	93	48	65.0	Figure 1	○
TBD05CA1670	16.70	18.00	143	93	48	64.9	Figure 1	○
TBD05CA1690	16.90	18.00	143	93	48	64.6	Figure 1	○
TBD05CA1700	17.00	18.00	143	93	48	64.4	Figure 1	●
TBD05CA1750	17.50	18.00	143	93	48	63.6	Figure 1	○
TBD05CA1770	17.70	18.00	143	93	48	63.2	Figure 1	○
TBD05CA1786	17.86	18.00	143	93	48	63.0	Figure 1	○
TBD05CA1800	18.00	18.00	143	93	48	62.7	Figure 2	●
TBD05CA1850	18.50	20.00	153	101	50	69.9	Figure 1	○
TBD05CA1870	18.70	20.00	153	101	50	69.5	Figure 1	○
TBD05CA1890	18.90	20.00	153	101	50	69.2	Figure 1	●

●Standing inventory ○Make-to-order

TBD05CA Series—Solid carbide drill



Order number	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
TBD05CA1900	19.00	20.00	153	101	50	69.0	Figure 1	●
TBD05CA1905	19.05	20.00	153	101	50	69.0	Figure 1	○
TBD05CA1916	19.16	20.00	153	101	50	68.8	Figure 1	○
TBD05CA1925	19.25	20.00	153	101	50	68.6	Figure 1	○
TBD05CA1930	19.30	20.00	153	101	50	68.5	Figure 1	○
TBD05CA1945	19.45	20.00	153	101	50	68.3	Figure 1	○
TBD05CA1950	19.50	20.00	153	101	50	68.2	Figure 1	●
TBD05CA1970	19.70	20.00	153	101	50	67.9	Figure 1	○
TBD05CA1984	19.84	20.00	153	101	50	67.6	Figure 1	○
TBD05CA2000	20.00	20.00	153	101	50	67.4	Figure 2	●

●Standing inventory ○Make-to-order

TBD08CA Series—Solid carbide drill

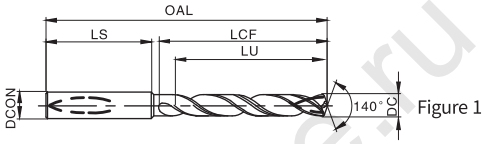


Figure 1

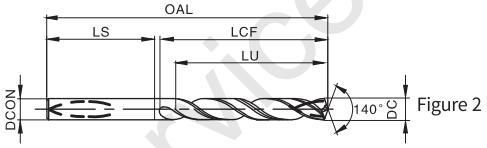


Figure 2

Order number	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
TBD08CA0300	3.00	6.00	70	30	36	25.0	Figure 1	●
TBD08CA0310	3.10	6.00	70	30	36	24.8	Figure 1	●
TBD08CA0317	3.17	6.00	70	30	36	24.7	Figure 1	○
TBD08CA0320	3.20	6.00	70	30	36	24.6	Figure 1	●
TBD08CA0325	3.25	6.00	70	30	36	24.5	Figure 1	○
TBD08CA0330	3.30	6.00	70	30	36	24.4	Figure 1	●
TBD08CA0340	3.40	6.00	75	35.5	36	29.8	Figure 1	●
TBD08CA0350	3.50	6.00	75	35.5	36	29.6	Figure 1	●
TBD08CA0357	3.57	6.00	75	35.5	36	29.5	Figure 1	○
TBD08CA0360	3.60	6.00	75	35.5	36	29.4	Figure 1	●
TBD08CA0370	3.70	6.00	75	35.5	36	29.3	Figure 1	●
TBD08CA0380	3.80	6.00	75	37.5	36	31.1	Figure 1	●
TBD08CA0390	3.90	6.00	75	37.5	36	30.9	Figure 1	●
TBD08CA0397	3.97	6.00	75	37.5	36	30.8	Figure 1	○
TBD08CA0400	4.00	6.00	75	37.5	36	30.8	Figure 1	●
TBD08CA0410	4.10	6.00	75	37.5	36	30.6	Figure 1	●
TBD08CA0420	4.20	6.00	75	37.5	36	30.4	Figure 1	●
TBD08CA0430	4.30	6.00	85	45	36	37.8	Figure 1	●
TBD08CA0437	4.37	6.00	85	45	36	37.6	Figure 1	○
TBD08CA0440	4.40	6.00	85	45	36	37.6	Figure 1	●
TBD08CA0450	4.50	6.00	85	45	36	37.4	Figure 1	○
TBD08CA0460	4.60	6.00	85	45	36	37.3	Figure 1	●
TBD08CA0465	4.65	6.00	85	45	36	37.2	Figure 1	●
TBD08CA0470	4.70	6.00	85	45	36	37.1	Figure 1	○

● Standing inventory ○ Make-to-order

TBD08CA Series—Solid carbide drill

Order number	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
TBD08CA0476	4.76	6.00	90	50	36	42.0	Figure 1	●
TBD08CA0480	4.80	6.00	90	50	36	41.9	Figure 1	○
TBD08CA0490	4.90	6.00	90	50	36	41.8	Figure 1	●
TBD08CA0500	5.00	6.00	90	50	36	41.6	Figure 1	●
TBD08CA0510	5.10	6.00	90	50	36	41.4	Figure 1	●
TBD08CA0516	5.16	6.00	90	50	36	41.3	Figure 1	●
TBD08CA0520	5.20	6.00	90	50	36	41.3	Figure 1	○
TBD08CA0530	5.30	6.00	90	50	36	41.1	Figure 1	●
TBD08CA0540	5.40	6.00	97	57	36	47.9	Figure 1	●
TBD08CA0550	5.50	6.00	97	57	36	47.7	Figure 1	●
TBD08CA0556	5.56	6.00	97	57	36	47.6	Figure 1	●
TBD08CA0570	5.70	6.00	97	57	36	47.4	Figure 1	○
TBD08CA0580	5.80	6.00	97	57	36	47.2	Figure 1	●
TBD08CA0590	5.90	6.00	97	57	36	47.1	Figure 1	●
TBD08CA0595	5.95	6.00	97	57	36	47.0	Figure 1	●
TBD08CA0600	6.00	6.00	97	57	36	46.9	Figure 2	●
TBD08CA0620	6.20	8.00	106	66	36	55.6	Figure 1	○
TBD08CA0630	6.30	8.00	106	66	36	55.4	Figure 1	●
TBD08CA0635	6.35	8.00	106	66	36	55.3	Figure 1	●
TBD08CA0650	6.50	8.00	106	66	36	55.1	Figure 1	●
TBD08CA0653	6.53	8.00	106	66	36	55.0	Figure 1	●
TBD08CA0660	6.60	8.00	106	66	36	54.9	Figure 1	●
TBD08CA0670	6.70	8.00	106	66	36	54.7	Figure 1	●
TBD08CA0675	6.75	8.00	106	66	36	54.6	Figure 1	●
TBD08CA0680	6.80	8.00	106	66	36	54.6	Figure 1	○
TBD08CA0690	6.90	8.00	116	76	36	64.4	Figure 1	●
TBD08CA0700	7.00	8.00	116	76	36	64.2	Figure 1	●
TBD08CA0710	7.10	8.00	116	76	36	64.1	Figure 1	●
TBD08CA0714	7.14	8.00	116	76	36	64.0	Figure 1	●
TBD08CA0720	7.20	8.00	116	76	36	63.9	Figure 1	○
TBD08CA0730	7.30	8.00	116	76	36	63.7	Figure 1	●
TBD08CA0740	7.40	8.00	116	76	36	63.6	Figure 1	●
TBD08CA0750	7.50	8.00	116	76	36	63.4	Figure 1	●

●Standing inventory ○Make-to-order

TBD08CA Series—Solid carbide drill

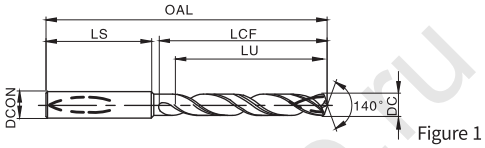


Figure 1

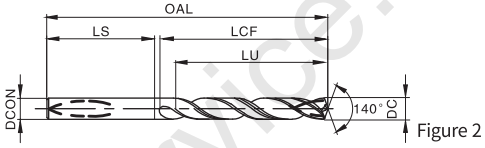


Figure 2

Order number	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
TBD08CA1650	16.50	18.00	223	171	48	143.2	Figure 1	●
TBD08CA1667	16.67	18.00	223	171	48	143.0	Figure 1	○
TBD08CA1700	17.00	18.00	223	171	48	142.4	Figure 1	●
TBD08CA1750	17.50	18.00	223	171	48	141.6	Figure 1	○
TBD08CA1800	18.00	18.00	223	171	48	140.7	Figure 2	●
TBD08CA1850	18.50	20.00	244	190	50	158.9	Figure 1	○
TBD08CA1900	19.00	20.00	244	190	50	158.0	Figure 1	●
TBD08CA1905	19.05	20.00	244	190	50	158.0	Figure 1	○
TBD08CA1950	19.50	20.00	244	190	50	157.2	Figure 1	○
TBD08CA2000	20.00	20.00	244	190	50	156.4	Figure 2	●

●Standing inventory ○Make-to-order

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