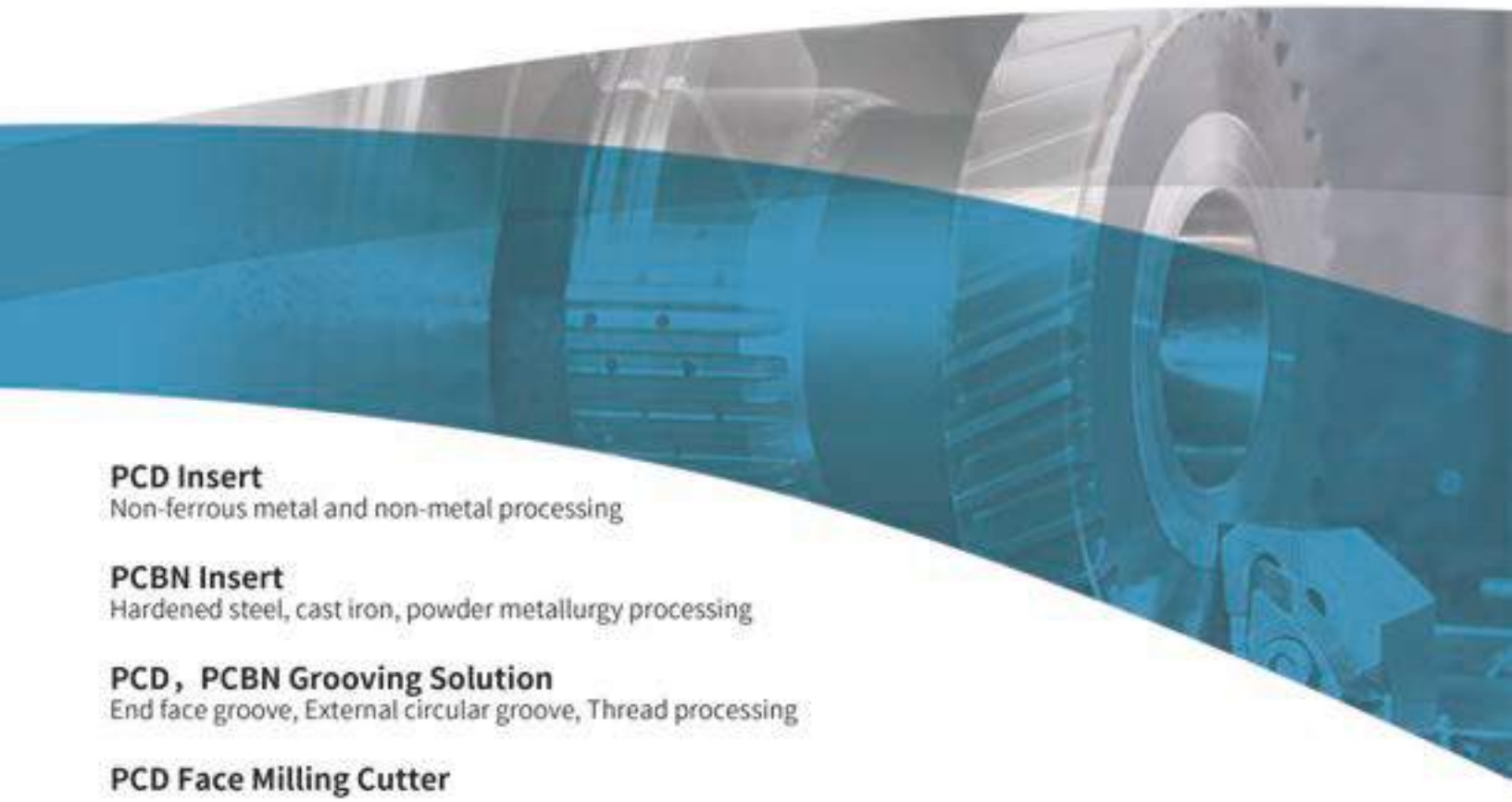
WORLDIA

SHAPING YOUR WORLD
WITH DIAMOND

Superhard Cutting Tools

WCB-N1V15 EN



PCD Insert
Non-ferrous metal and non-metal processing

PCBN Insert
Hardened steel, cast iron, powder metallurgy processing

PCD，PCBN Grooving Solution
End face groove, External circular groove, Thread processing

PCD Face Milling Cutter

PCD Non-standard Tools

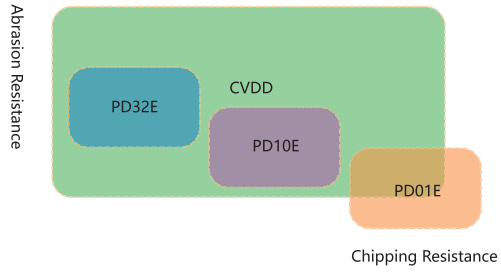
Solid Carbide Cutting Tools

WWW.WORLDIA-TOOLS.COM

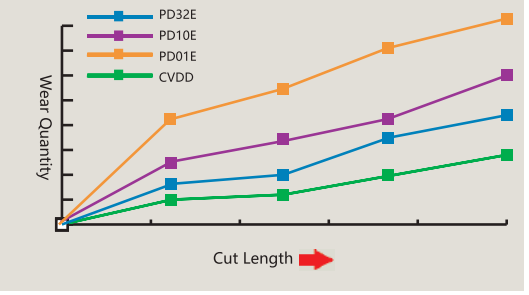
Introduction

Material	Grade size(μm)	Feature	Application
PD01E	1	PD01E fine grain size PCD material(1μm) is suitable for mirror finishing applications.Its high impart resistance and high abrasive resistance are no less than that of rough grade of PCD .	PD01E has excellent chip resistance is suitable for the roughing and interrupt cutting aluminium alloys. This grade is also commonly used for non-ferrous finishing applications. Other successful applications include machining of wood, MDF.
PD10E	10	PD10E is the universal grade in the market. It's the first choice for many applications where a good balance of toughness and wear resistance are required.	This grade is commonly used for non-ferrous finishing applications. Other successful applications include machining of wood, MDF.The machining of low-medium content silicon aluminium alloys, carbide, hard rubber, graphite and so on.
PD32E	2~30	PD32E has a unique combination of wear resistance, edge strength and edge quality. It contains a carefully selected mix of micron diamond (between 2 - 30 μm). The combination of these particle sizes and a specifically developed high pressure sintering process produces a structure with extreme abrasion resistance and good thermal stability.	Application areas include the machining of abrasive workpieces such as MMC, high silicon aluminium alloys as well as for the machining of carbide and carbide, hard rubber, graphite and other applications.
CVDD	—	CVDD is a pure diamond material of extreme abrasion resistance without binder, its hardness and thermal conductivity is higher than PCD. It has less coefficient of friction and more chemical stability, faster cutting speed can be achieved.	Application areas include the machining of abrasive workpieces such as MMC, high silicon aluminium alloys as well as for the machining of carbide, hard rubber,graphite and other applications.

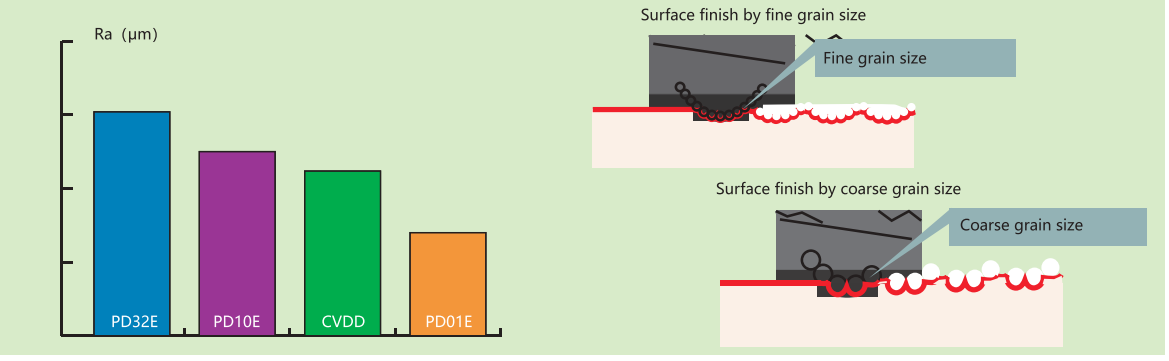
Micro-Structure of PCD Materials



Differences in Abrasive-resistance Among Various Grade of PCD Materials



PCD Grain Size Affects Roughness of Workpiece's Surface

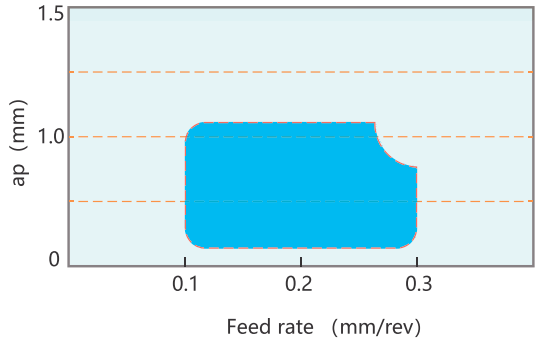


(Effect of grain size on finish machining surface)

■PCD Insert with chip-breaker(CBC1)

Excellent chip breaking in finishing machining

Scope of Application



Material: A6061

Cutting conditions: Vc=400m/min f=0.1mm/rev ap=0.2mm

Insert type: CCGW09T308

Material: A6061

Cutting conditions: Vc=400m/min f=0.1mm/rev ap=0.5mm

Insert type: CCGW09T308

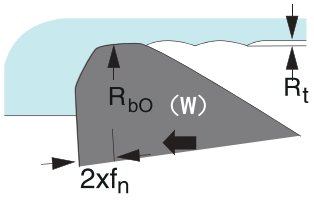
■PCD Wiper Insert(WG)

Improve the quality of workpiece surface or processing efficiency

Effect of Wiper Insert

With the same R_t,

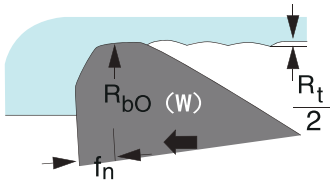
Wiper inserts increase double feed rate($2xf_n$).



High Efficiency

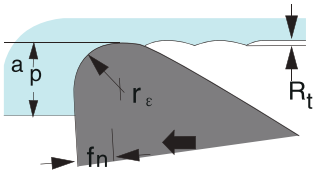
Under the same f_n,

Wiper inserts improve the surface quality($\frac{R_t}{2}$).



High Quality Surface

Standard corner radius



WORLDIA® Coding Rule of PCD Inserts

	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰
ISO	C	C	G	W	09	T3	04	1	N	P	00	P	07	CB	ST	30	S
ANSI	C	C	G	W	3	(2.5)	1	1	N	P	00	P	07	CB	ST	30	S

1 Shape

H	120°		C	80°
O	135°		D	55°
P	108°		E	75°
R			M	86°
S	90°		V	35°
T	60°		W	80°
			L	90°
			A	85°
			B	82°
			K	55°

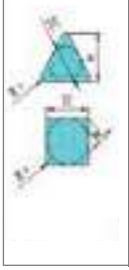
2 Clearance Angle

A		E		P	
B		F		O	
C		G			
D		N			

4 Standard, Chipbreaker

N	G	B
R	W	H
F	T	C
A	Q	J
M	U	Other X

3 Tolerance-ISO Tolerance-ANSI



Code	inch(mm)			Code	inch		
	m	s	IC		m	ic	s
C	±0.013	±0.025	±0.025	C	±.0005	±.001	±.001
H	±0.013	±0.025	±0.013	H	±.0005	±.0005	±.001
E	±0.025	±0.025	±0.025	E	±.001	±.001	±.001
G	±0.025	±0.13	±0.025	G	±.001	±.001	±.005
K	±0.013	±0.025	±0.05~±0.13	K	±.0005	±.002-.005	±.001
M	±0.08~±0.18	±0.13	±0.05~±0.13	M	±.002-.005	±.002-.005	±.005
U	±0.13~±0.38	±0.13	±0.08~±0.25	U	±.005-.012	±.005-.010	±.005

5 Inscribed Circle Dia.

ISO								ANSI	
								Code	IC Size
C	D	R	S	T	V	W	mm		inch
S4	04	03	03	06	-	-	3.97	(1.2)	5/32
04	05	04	04	08	08	S3	4.76	(1.5)	3/16
05	06	05	05	09	09	03	5.56	(1.8)	7/32
-	-	06	-	-	-	-	6	-	-
06	07	06	06	11	11	04	6.35	2	1/4
08	09	07	07	13	13	05	7.94	(2.5)	5/16
-	-	08	-	-	-	-	8	-	-
09	11	09	09	16	16	06	9.525	3	3/8
-	-	10	-	-	-	-	10	-	-
-	-	12	-	-	-	-	12	-	-
12	15	12	12	22	22	08	12.7	4	1/2
16	19	15	15	27	27	10	15.875	5	5/8
-	-	16	-	-	-	-	16	-	-
19	23	19	19	33	33	13	19.05	6	3/4
-	-	20	-	-	-	-	20	-	-
22	27	22	22	38	38	15	22.225	7	7/8
-	-	25	-	-	-	-	25	-	-
25	31	25	25	44	44	17	25.4	8	1
32	38	31	31	54	54	21	31.75	10	1-1/4
-	-	32	-	-	-	-	32	-	-

6 Thickness

ISO		ANSI	
Code	Size	Code	Size
S	mm	S	inch
01	1.59	1	1/16
02	2.38	(1.5)	3/32
T2	2.78	-	-
03	3.18	2	1/8
T3	3.97	(2.5)	5/32
04	4.76	3	3/16
05	5.56	(3.5)	7/32
06	6.35	4	1/4
07	7.94	5	5/16
09	9.525	6	3/8

7 Nose radius

ISO		ANSI	
Code	Size	Code	Size
Rε	mm	Rε	inch
00		00	.000
003	0.03	(0.1)	.001
01	0.1	(0.2)	.004
02	0.2	(0.5)	.008
04	0.4	1	1/64
08	0.8	2	1/32
12	1.2	3	3/64
16	1.6	4	1/16
20	2.0	5	5/64
24	2.4	6	3/32
28	2.8	7	7/64
32	3.2	8	1/8
M0		0	circular

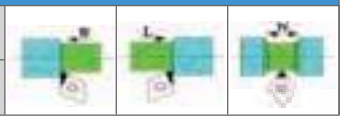
WORLDIA® Coding Rule of PCD Inserts

8 Edges

Code	1	2	3	4	6	8
notes	1 edge	2 edges	3 edges	4 edges	6 edges	8 edges

9 Cutting Direction

Code	R	L	N			
notes	R	L	N			



10 Rake Angle Description

P		M
Positive Rake Angle		Negative Rake Angle
0°	α	α

11 Rake Angle degree

Code	α	00	03	05	10
Size	°	0	3	5	10

12 Clearance Angle Description

P
Positive Clearance Angle
M
Negative Clearance Angle

13 Clearance Angle degree

Code	β	00	01	02	03	05	07	11	15	20	25	30	35
Size	°	0	1	2	3	5	7	11	15	20	25	30	35

14 Insert type

SF	SW	SL	SS	CB	CS
Full Face	Solid Tipped Corners	Solid Tipped Corner	Solid PCD	Standard Tipped Corners	Standard Full Edge

15 Cutting Edge Design

ST	WG	WG00	CBC1	——
Nose Radius	Wiper	0°Wiper	C1 Chip Breaker	——

16 Cutting Edge Length

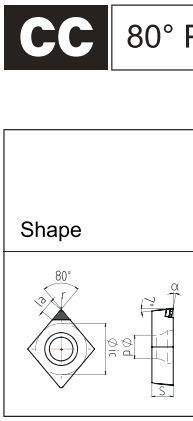
Code	25	30	35	40	45	···
Nose Radius	2.8	3.0	3.5	4.0	4.5	···

17 Surface Treatment

S	Uncoated		

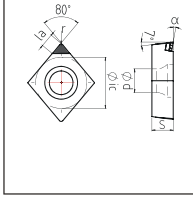
Specifications of Standard PCD Insert

CC 80° PCD Positive Inserts



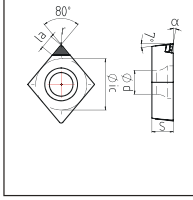
Shape	ISO	ANSI	Dimensions in mm						N			
			ic	Ød	s	α	r	la	PD01E	PD10E	PD32E	CVDD
	CCGW060202-1N P00P07	CCGW2(1.5)(0.5)-1N P00P07	6.35	2.8	2.38	0°	0.2	2.5	●	●	●	●
	CCGT060202-1N P05P07	CCGT2(1.5)(0.5)-1N P05P07				5°	0.2		●	●	●	●
	CCGT060202-1N P10P07	CCGT2(1.5)(0.5)-1N P10P07				10°	0.2		●	●	●	●
	CCGW060204-1N P00P07	CCGW2(1.5)1-1N P00P07				0°	0.4		●	●	●	●
	CCGT060204-1N P05P07	CCGT2(1.5)1-1N P05P07				5°	0.4		●	●	●	●
	CCGT060204-1N P10P07	CCGT2(1.5)1-1N P10P07				10°	0.4		●	●	●	●

CC 80° PCD Positive Inserts



Shape	ISO	ANSI	Dimensions in mm						N			
			ic	Ød	s	α	r	la	PD01E	PD10E	PD32E	CVDD
	CCGW09T302-1N P00P07	CCGW2(1.5)(0.5)-1N P00P07	9.525	4.4	3.97	0°	0.2	2.5	●	●	●	●
	CCGT09T302-1N P05P07	CCGT2(1.5)(0.5)-1N P05P07				5°	0.2		●	●	●	●
	CCGT09T302-1N P10P07	CCGT2(1.5)(0.5)-1N P10P07				10°	0.2		●	●	●	●
	CCGW09T304-1N P00P07	CCGW2(1.5)1-1N P00P07				0°	0.4		●	●	●	●
	CCGT09T304-1N P05P07	CCGT2(1.5)1-1N P05P07				5°	0.4		●	●	●	●
	CCGT09T304-1N P10P07	CCGT2(1.5)1-1N P10P07				10°	0.4		●	●	●	●
	CCGW09T308-1N P00P07	CCGW2(1.5)2-1N P00P07				0°	0.8		●	●	●	●
	CCGT09T308-1N P05P07	CCGT2(1.5)2-1N P05P07				5°	0.8		●	●	●	●
	CCGT09T308-1N P10P07	CCGT2(1.5)2-1N P10P07				10°	0.8		●	●	●	●

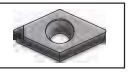
CC 80° PCD Positive Inserts

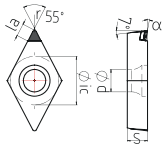


Shape	ISO	ANSI	Dimensions in mm						N			
			ic	Ød	s	α	r	la	PD01E	PD10E	PD32E	CVDD
	CCGW120402-1N P00P07	CCGW43(0.5)-1N P00P07	12.7	5.5	4.76	0°	0.2	2.5	●	●	●	●
	CCGT120402-1N P05P07	CCGT43(0.5)-1N P05P07				5°	0.2		●	●	●	●
	CCGT120402-1N P10P07	CCGT43(0.5)-1N P10P07				10°	0.2		●	●	●	●
	CCGW120404-1N P00P07	CCGW431-1N P00P07				0°	0.4		●	●	●	●
	CCGT120404-1N P05P07	CCGT431-1N P05P07				5°	0.4		●	●	●	●
	CCGT120404-1N P10P07	CCGT431-1N P10P07				10°	0.4		●	●	●	●
	CCGW120408-1N P00P07	CCGW432-1N P00P07				0°	0.8		●	●	●	●
	CCGT120408-1N P05P07	CCGT432-1N P05P07				5°	0.8		●	●	●	●
	CCGT120408-1N P10P07	CCGT432-1N P10P07				10°	0.8		●	●	●	●

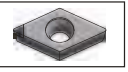
Specifications of Standard PCD Insert

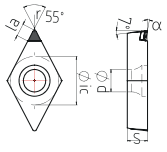
DC 55° PCD Positive Inserts



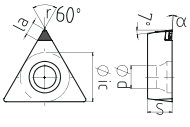
Shape	ISO	ANSI	Dimensions in mm						N			
			ic	Ød	s	α	r	la	PD01E	PD10E	PD32E	CVDD
	DCGW070202-1N P00P07	DCGW2(1.5)(0.5)-1N P00P07	6.35	2.8	2.38	0°	0.2	2.5	●	●	●	●
	DCGT070202-1N P05P07	DCGT2(1.5)(0.5)-1N P05P07				5°	0.2		●	●	●	●
	DCGT070202-1N P10P07	DCGT2(1.5)(0.5)-1N P10P07				10°	0.2		●	●	●	●
	DCGW070204-1N P00P07	DCGW2(1.5)1-1N P00P07				0°	0.4		●	●	●	●
	DCGT070204-1N P05P07	DCGT2(1.5)1-1N P05P07				5°	0.4		●	●	●	●
	DCGT070204-1N P10P07	DCGT2(1.5)1-1N P10P07				10°	0.4		●	●	●	●
	DCGW070208-1N P00P07	DCGW2(1.5)2-1N P00P07				0°	0.8		●	●	●	●
	DCGT070208-1N P05P07	DCGT2(1.5)2-1N P05P07				5°	0.8		●	●	●	●
	DCGT070208-1N P10P07	DCGT2(1.5)2-1N P10P07				10°	0.8		●	●	●	●

DC 55° PCD Positive Inserts



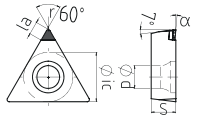
Shape	ISO	ANSI	Dimensions in mm						N			
			ic	Ød	s	α	r	la	PD01E	PD10E	PD32E	CVDD
	DCGW11T302-1N P00P07	DCGW3(2.5)(0.5)-1N P00P07	9.525	4.4	3.97	0°	0.2	2.5	●	●	●	●
	DCGT11T302-1N P05P07	DCGT3(2.5)(0.5)-1N P05P07				5°	0.2		●	●	●	●
	DCGT11T302-1N P10P07	DCGT3(2.5)(0.5)-1N P10P07				10°	0.2		●	●	●	●
	DCGW11T304-1N P00P07	DCGW3(2.5)1-1N P00P07				0°	0.4		●	●	●	●
	DCGT11T304-1N P05P07	DCGT3(2.5)1-1N P05P07				5°	0.4		●	●	●	●
	DCGT11T304-1N P10P07	DCGT3(2.5)1-1N P10P07				10°	0.4		●	●	●	●
	DCGW11T308-1N P00P07	DCGW3(2.5)2-1N P00P07				0°	0.8		●	●	●	●
	DCGT11T308-1N P05P07	DCGT3(2.5)2-1N P05P07				5°	0.8		●	●	●	●
	DCGT11T308-1N P10P07	DCGT3(2.5)2-1N P10P07				10°	0.8		●	●	●	●

TC 60° PCD Positive Inserts

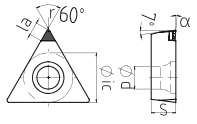
Shape	ISO	ANSI	Dimensions in mm						N			
			ic	Ød	s	α	r	la	PD01E	PD10E	PD32E	CVDD
	TCGW080202-1N P00P07	TCGW(1.5)(1.5)(0.5)-1N P00P07	4.76	2.4	2.38	0°	0.2	2.5	●	●	●	●
	TCGT080202-1N P05P07	TCGT(1.5)(1.5)(0.5)-1N P05P07				5°	0.2		●	●	●	●
	TCGT080202-1N P10P07	TCGT(1.5)(1.5)(0.5)-1N P10P07				10°	0.2		●	●	●	●
	TCGW080204-1N P00P07	TCGW(1.5)(1.5)1-1N P00P07				0°	0.4		●	●	●	●
	TCGT080204-1N P05P07	TCGT(1.5)(1.5)1-1N P05P07				5°	0.4		●	●	●	●
	TCGT080204-1N P10P07	TCGT(1.5)(1.5)1-1N P10P07				10°	0.4		●	●	●	●
	TCGW080208-1N P00P07	TCGW(1.5)(1.5)2-1N P00P07				0°	0.8		●	●	●	●
	TCGT080208-1N P05P07	TCGT(1.5)(1.5)2-1N P05P07				5°	0.8		●	●	●	●
	TCGT080208-1N P10P07	TCGT(1.5)(1.5)2-1N P10P07				10°	0.8		●	●	●	●

Specifications of Standard PCD Insert

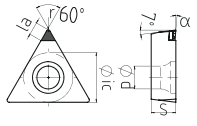
TC 60° PCD Positive Inserts

Shape	ISO	ANSI	Dimensions in mm						N			
			ic	Ød	s	α	r	la	PD01E	PD10E	PD32E	CVDD
	TCGW110302-1N P00P07	TCGW22(0.5)-1N P00P07	6.35	2.8	3.18	0°	0.2	2.5	●	●	●	●
	TCGT110302-1N P05P07	TCGT22(0.5)-1N P05P07				5°	0.2		●	●	●	●
	TCGT110302-1N P10P07	TCGT22(0.5)-1N P10P07				10°	0.2		●	●	●	●
	TCGW110304-1N P00P07	TCGW22(0.5)-1N P00P07				0°	0.4		●	●	●	●
	TCGT110304-1N P05P07	TCGT22(0.5)-1N P05P07				5°	0.4		●	●	●	●
	TCGT110304-1N P10P07	TCGT22(0.5)-1N P10P07				10°	0.4		●	●	●	●
	TCGW110308-1N P00P07	TCGW222-1N P00P07				0°	0.8		●	●	●	●
	TCGT110308-1N P05P07	TCGT222-1N P05P07				5°	0.8		●	●	●	●
	TCGT110308-1N P10P07	TCGT222-1N P10P07				10°	0.8		●	●	●	●

TC 60° PCD Positive Inserts

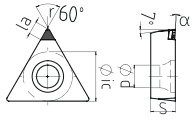
Shape	ISO	ANSI	Dimensions in mm						N			
			ic	Ød	s	α	r	la	PD01E	PD10E	PD32E	CVDD
	TCGW160402-1N P00P07	TCGW33(0.5)-1N P00P07	9.525	4.4	4.76	0°	0.2	2.5	●	●	●	●
	TCGT160402-1N P05P07	TCGT33(0.5)-1N P05P07				5°	0.2		●	●	●	●
	TCGT160402-1N P10P07	TCGT33(0.5)-1N P10P07				10°	0.2		●	●	●	●
	TCGW160404-1N P00P07	TCGW33(0.5)-1N P00P07				0°	0.4		●	●	●	●
	TCGT160404-1N P05P07	TCGT33(0.5)-1N P05P07				5°	0.4		●	●	●	●
	TCGT160404-1N P10P07	TCGT33(0.5)-1N P10P07				10°	0.4		●	●	●	●
	TCGW160408-1N P00P07	TCGW332-1N P00P07				0°	0.8		●	●	●	●
	TCGT160408-1N P05P07	TCGT332-1N P05P07				5°	0.8		●	●	●	●
	TCGT160408-1N P10P07	TCGT332-1N P10P07				10°	0.8		●	●	●	●

TP 60° PCD Positive Inserts

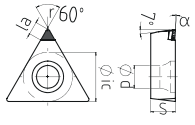
Shape	ISO	ANSI	Dimensions in mm						N			
			ic	Ød	s	α	r	la	PD01E	PD10E	PD32E	CVDD
	TPGW080202-1N P00P11	TPGW(1.5)(1.5)(0.5)-1N P00P11	4.76	2.4	2.38	0°	0.2	2.5	●	●	●	●
	TPGT080202-1N P05P11	TPGT(1.5)(1.5)(0.5)-1N P05P11				5°	0.2		●	●	●	●
	TPGT080202-1N P10P11	TPGT(1.5)(1.5)(0.5)-1N P10P11				10°	0.2		●	●	●	●
	TPGW080204-1N P00P11	TPGW(1.5)(1.5)1-1N P00P11				0°	0.4		●	●	●	●
	TPGT080204-1N P05P11	TPGT(1.5)(1.5)1-1N P05P11				5°	0.4		●	●	●	●
	TPGT080204-1N P10P11	TPGT(1.5)(1.5)1-1N P10P11				10°	0.4		●	●	●	●
	TPGW080208-1N P00P11	TPGW(1.5)(1.5)2-1N P00P11				0°	0.8		●	●	●	●
	TPGT080208-1N P05P11	TPGT(1.5)(1.5)2-1N P05P11				5°	0.8		●	●	●	●
	TPGT080208-1N P10P11	TPGT(1.5)(1.5)2-1N P10P11				10°	0.8		●	●	●	●

Specifications of Standard PCD Insert

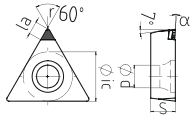
TP 60° PCD Positive Inserts

Shape	ISO	ANSI	Dimensions in mm						N			
			ic	Ød	s	α	r	la	PD01E	PD10E	PD32E	CVDD
	TPGW110302-1N P00P11	TPGW22(0.5)-1N P00P11	6.35	3.3	3.18	0°	0.2	2.5	●	●	●	●
	TPGT110302-1N P05P11	TPGT22(0.5)-1N P05P11				5°	0.2		●	●	●	●
	TPGT110302-1N P10P11	TPGT22(0.5)-1N P10P11				10°	0.2		●	●	●	●
	TPGW110304-1N P00P11	TPGW221-1N P00P11				0°	0.4		●	●	●	●
	TPGT110304-1N P05P11	TPGT221-1N P05P11				5°	0.4		●	●	●	●
	TPGT110304-1N P10P11	TPGT221-1N P10P11				10°	0.4		●	●	●	●
	TPGW110308-1N P00P11	TPGW222-1N P00P11				0°	0.8		●	●	●	●
	TPGT110308-1N P05P11	TPGT222-1N P05P11				5°	0.8		●	●	●	●
	TPGT110308-1N P10P11	TPGT222-1N P10P11				10°	0.8		●	●	●	●

TP 60° PCD Positive Inserts

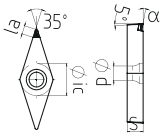
Shape	ISO	ANSI	Dimensions in mm						N			
			ic	Ød	s	α	r	la	PD01E	PD10E	PD32E	CVDD
	TPGW160302-1N P00P11	TPGW32(0.5)-1N P00P11	9.525	4.4	3.18	0°	0.2	2.5	●	●	●	●
	TPGT160302-1N P05P11	TPGT32(0.5)-1N P05P11				5°	0.2		●	●	●	●
	TPGT160302-1N P10P11	TPGT32(0.5)-1N P10P11				10°	0.2		●	●	●	●
	TPGW160304-1N P00P11	TPGW321-1N P00P11				0°	0.4		●	●	●	●
	TPGT160304-1N P05P11	TPGT321-1N P05P11				5°	0.4		●	●	●	●
	TPGT160304-1N P10P11	TPGT321-1N P10P11				10°	0.4		●	●	●	●
	TPGW160308-1N P00P11	TPGW322-1N P00P11				0°	0.8		●	●	●	●
	TPGT160308-1N P05P11	TPGT322-1N P05P11				5°	0.8		●	●	●	●
	TPGT160308-1N P10P11	TPGT322-1N P10P11				10°	0.8		●	●	●	●

TP 60° PCD Positive Inserts

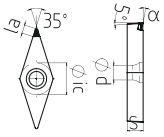
Shape	ISO	ANSI	Dimensions in mm						N			
			ic	Ød	s	α	r	la	PD01E	PD10E	PD32E	CVDD
	TPGW160402-1N P00P11	TPGW33(0.5)-1N P00P11	9.525	4.4	4.76	0°	0.2	2.5	●	●	●	●
	TPGT160402-1N P05P11	TPGT33(0.5)-1N P05P11				5°	0.2		●	●	●	●
	TPGT160402-1N P10P11	TPGT33(0.5)-1N P10P11				10°	0.2		●	●	●	●
	TPGW160404-1N P00P11	TPGW331-1N P00P11				0°	0.4		●	●	●	●
	TPGT160404-1N P05P11	TPGT331-1N P05P11				5°	0.4		●	●	●	●
	TPGT160404-1N P10P11	TPGT331-1N P10P11				10°	0.4		●	●	●	●
	TPGW160408-1N P00P11	TPGW332-1N P00P11				0°	0.8		●	●	●	●
	TPGT160408-1N P05P11	TPGT332-1N P05P11				5°	0.8		●	●	●	●
	TPGT160408-1N P10P11	TPGT332-1N P10P11				10°	0.8		●	●	●	●

Specifications of Standard PCD Insert

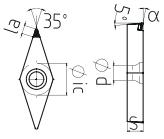
VB 35° PCD Positive Inserts

Shape	ISO	ANSI	Dimensions in mm						N			
			ic	Ød	s	α	r	la	PD01E	PD10E	PD32E	CVDD
	VBGW110302-1N P00P05	VBGW22(0.5)-1N P00P05	6.35	2.8	3.18	0°	0.2	3.0	●	●	●	●
	VBGT110302-1N P05P05	VBGT22(0.5)-1N P05P05				5°	0.2		●	●	●	●
	VBGT110302-1N P10P05	VBGT22(0.5)-1N P10P05				10°	0.2		●	●	●	●
	VBGW110304-1N P00P05	VBGW221-1N P00P05				0°	0.4		●	●	●	●
	VBGT110304-1N P05P05	VBGT221-1N P05P05				5°	0.4		●	●	●	●
	VBGT110304-1N P10P05	VBGT221-1N P10P05				10°	0.4		●	●	●	●
	VBGW110308-1N P00P05	VBGW222-1N P00P05				0°	0.8		●	●	●	●
	VBGT110308-1N P05P05	VBGT222-1N P05P05				5°	0.8		●	●	●	●
	VBGT110308-1N P10P05	VBGT222-1N P10P05				10°	0.8		●	●	●	●

VB 35° PCD Positive Inserts

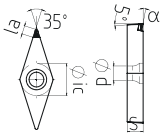
Shape	ISO	ANSI	Dimensions in mm						N			
			ic	Ød	s	α	r	la	PD01E	PD10E	PD32E	CVDD
	VBGW160402-1N P00P05	VBGW33(0.5)-1N P00P05	9.525	4.4	4.76	0°	0.2	3.0	●	●	●	●
	VBGT160402-1N P05P05	VBGT33(0.5)-1N P05P05				5°	0.2		●	●	●	●
	VBGT160402-1N P10P05	VBGT33(0.5)-1N P10P05				10°	0.2		●	●	●	●
	VBGW160404-1N P00P05	VBGW331-1N P00P05				0°	0.4		●	●	●	●
	VBGT160404-1N P05P05	VBGT331-1N P05P05				5°	0.4		●	●	●	●
	VBGT160404-1N P10P05	VBGT331-1N P10P05				10°	0.4		●	●	●	●
	VBGW160408-1N P00P05	VBGW332-1N P00P05				0°	0.8		●	●	●	●
	VBGT160408-1N P05P05	VBGT332-1N P05P05				5°	0.8		●	●	●	●
	VBGT160408-1N P10P05	VBGT332-1N P10P05				10°	0.8		●	●	●	●

VC 35° PCD Positive Inserts

Shape	ISO	ANSI	Dimensions in mm						N			
			ic	Ød	s	α	r	la	PD01E	PD10E	PD32E	CVDD
	VCGW110302-1N P00P07	VCGW22(0.5)-1N P00P07	6.35	2.8	3.18	0°	0.2	3.0	●	●	●	●
	VCGT110302-1N P05P07	VCGT22(0.5)-1N P05P07				5°	0.2		●	●	●	●
	VCGT110302-1N P10P07	VCGT22(0.5)-1N P10P07				10°	0.2		●	●	●	●
	VCGW110304-1N P00P07	VCGW221-1N P00P07				0°	0.4		●	●	●	●
	VCGT110304-1N P05P07	VCGT221-1N P05P07				5°	0.4		●	●	●	●
	VCGT110304-1N P10P07	VCGT221-1N P10P07				10°	0.4		●	●	●	●
	VCGW110308-1N P00P07	VCGW222-1N P00P07				0°	0.8		●	●	●	●
	VCGT110308-1N P05P07	VCGT222-1N P05P07				5°	0.8		●	●	●	●
	VCGT110308-1N P10P07	VCGT222-1N P10P07				10°	0.8		●	●	●	●

Specifications of Standard PCD Insert

VC 35° PCD Positive Inserts 

									N			
			ic	Ød	s	α	r	la	PD01E	PD10E	PD32E	CVDD
	VCGW160402-1N P00P07	VCGW33(0.5)-1N P00P07	9.525	4.4	4.76	0°	0.2	3.0	●	●	●	●
	VCGT160402-1N P05P07	VCGT33(0.5)-1N P05P07				5°	0.2		●	●	●	●
	VCGT160402-1N P10P07	VCGT33(0.5)-1N P10P07				10°	0.2		●	●	●	●
	VCGW160404-1N P00P07	VCGW331-1N P00P07				0°	0.4		●	●	●	●
	VCGT160404-1N P05P07	VCGT331-1N P05P07				5°	0.4		●	●	●	●
	VCGT160404-1N P10P07	VCGT331-1N P10P07				10°	0.4		●	●	●	●
	VCGW160408-1N P00P07	VCGW332-1N P00P07				0°	0.8		●	●	●	●
	VCGT160408-1N P05P07	VCGT332-1N P05P07				5°	0.8		●	●	●	●
	VCGT160408-1N P10P07	VCGT332-1N P10P07				10°	0.8		●	●	●	●

PCBN INSERT

For Cast Iron,Hardened Steel,Powder

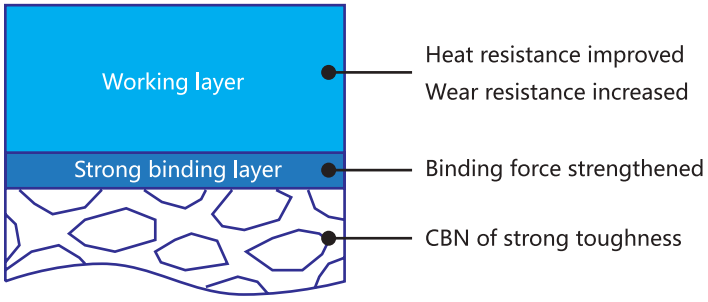
WORLDIA® Coated PCBN Insert

■Film features

C_2

The film is applicable for continuous, light and heavily interrupted processing of hardened steel with excellent universal performance.

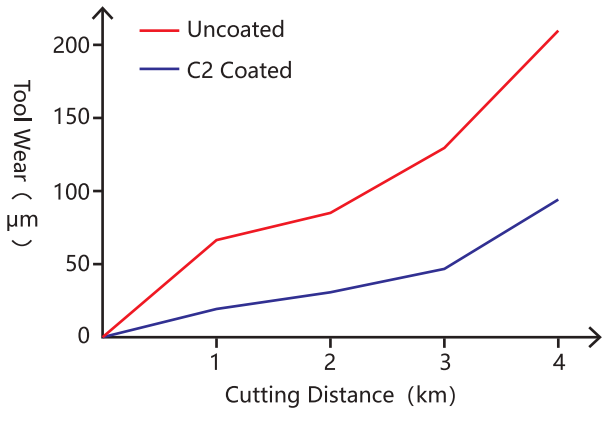
■CBN Basic material and film structure



■Recommended Cutting conditions

Workpiece Material	Cutting Data Recommendations				
	PCBN Grades	Cutting Speed（m/min）	Cutting Depth（mm）	Feed Rate（mm/r）	Characteristics
H	PNH0120	180(150-250)	0.1(0.05-0.3)	0.03-0.2	Continue Cutting
	PNH1020	150(80-230)	0.1(0.05-0.5)	0.05-0.25	Light Interrupt
	PNH2018	100(50-150)	0.1(0.05-0.5)	0.05-0.3	Interrupt
	PNH3019	100(50-150)	0.1(0.05-0.5)	0.05-0.3	Heavy Interrupt

■Cutting performance




Uncoated Insert


Coated Insert

Material: GCr15 HRC58-62°

Tool: CNGA120408-2N SLST22C2 S0102510

Cutting Data: Vc=150m/min f=0.1mm/rev ap=0.15mm

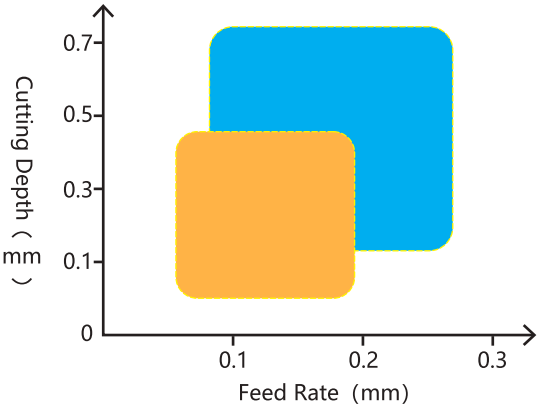
WORLDIA® Coated PCBN Insert

■Chip-breaker PCBN Insert

CBRB/CBC1

Two types of chip breaker，Suitable for hardened steel processing, cutting depth : 0.1~1mm. Excellent chip breaking performance can be achieved.

■Application



CBC1

CBRB

■Cutting performance

CBC1

Material：Hardened Steel　HRC60-65°

Tool：CNGM120408-2N SLCBC122C2

Cutting Data：Vc=150m/min　f=0.12mm/rev　ap=0.15mm

CBRB

Material：20CrMoTi　HRC58°

Tool：DNGM150408-2N SLCBRB30C2

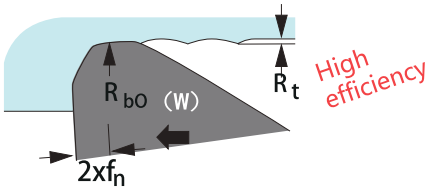
Cutting Data：Vc=160m/min　f=0.15mm/rev　ap=0.4mm

■Wiper PCBN inserts

Wiper PCBN inserts could improve high quality surface and high efficiency compare with standard nose radius.

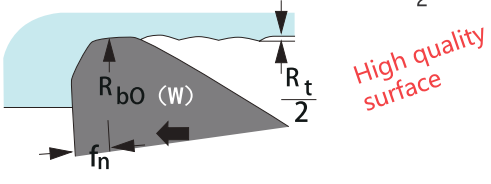
With the same R_t,

Wiper inserts increase double feed rate($2xf_n$).

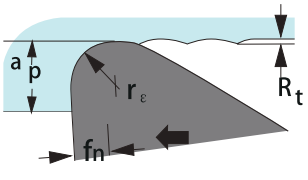


Under the same f_n,

Wiper inserts improve the surface quality($\frac{R_t}{2}$).



Standard nose radius.



- Wiper PCBN inserts must match with right type of holder.
- Wiper PCBN inserts with high cutting resistance are suitable for high rigidity machine tool and workpiece.

WORLDIA® PCBN Material Introduction

■Cast Iron Machining

Workpiece Material	WORLDIA PCBN Grades	Content	PCBN Grade	Hardness	Characteristics
K	PNK0117	85~90	5	3700~3900	Extreme abrasion resistance
	PNK0119	90~95	2	3700~3900	Excellent impact resistance and abrasion resistance
	PNK0121	60~70	2	2700~2900	Excellent toughness
	PNK3017	85~90	1	3700~3900	Combination of abrasion resistance and impact resistance

■Cutting Data Recommendations

PCBN Grade	Cutting Condition Recommendations		
	Cutting Speed (m/min)	Feed Rate (mm/r)	Cutting Depth (mm)
PNK0110	300 450 800 1200	0.1 0.15 0.2 0.5	Continue machining gray iron
PNK0118	300 450 800 1200	0.1 0.15 0.2 0.5	Continue and light continue machining gray iron
PNK0122	200 350 450 500	0.1 0.2 0.3	Continue and interrupt machining cast iron
PNK3014	300 450 800 1200	0.1 0.15 0.2 0.5	Heavy interrupt machining gray iron

WORLDIA® PCBN Material Introduction

■Power metallurgy

Workpiece Material	WORLDIA PCBN Grades	Content	PCBN Grade	Hardness	Characteristics
S	PNS0115	85~90	5	3700~3900	Extreme abrasion resistance
	PNS0119	90~95	2	3700~3900	Excellent impact resistance and abrasion resistance
	PNS0121	60~70	2	2700~2900	Excellent toughness
	PNS2019	85~90	1	3700~3900	Combination of abrasion resistance and impact resistance

■Cutting Data Recommendations

PCBN Grade	Cutting Condition Recommendations		
	Cutting Speed（m/min）	Feed Rate（mm/r）	Cutting Depth（mm）
PNS0115	300 450 800 1200	0.1 0.15 0.2 0.5	Continuous machining of powder metallurgy
PNS0119	300 450 800 1200	0.1 0.15 0.2 0.5	Continuous and lightly interrupted machining of powder metallurgy
PNS0121	100 150 500 800	0.1 0.2 0.3	Continuous and interrupted machining of hard-to-work powder metallurgy
PNS2019	300 450 800 1200	0.1 0.15 0.2 0.5	Strongly interrupted machining of powder metallurgy

Rule of Mini Solid Insert Code

ISO

C	C	M	W	09	T3	04	1	N	S	010	20	05	CB	ST	30	S	PNH0119
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

ANSI

C	C	M	W	3	(2.5)	1	1	N	S	010	20	05	CB	ST	30	S	PNH0119
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

1 Shape

H	120°		C	80°
O	135°		D	55°
P	108°		E	75°
R			M	86°
S	90°		V	35°
T	60°		W	80°
			L	90°
			A	85°
			B	82°
			K	55°

2 Clearance Angle

A	E	P
B	F	O
C	G	
D	N	

4 Standard,Chipbreaker

N	G	B
R	W	H
F	T	C
A	Q	J
M	U	Othe X

3 Tolerance-ISO Tolerance-ANSI

Code	Tolerance(mm)			Code	inch		
	m	s	IC		m	ic	s
C	±0.013	±0.025	±0.025	C	±.0005	±.001	±.001
H	±0.013	±0.025	±0.013	H	±.0005	±.0005	±.001
E	±0.025	±0.025	±0.025	E	±.001	±.001	±.001
G	±0.025	±0.13	±0.025	G	±.001	±.001	±.005
K	±0.013	±0.025	±0.05~±0.13	K	±.0005	±.002-.005	±.001
M	±0.08~±0.18	±0.13	±0.05~±0.13	M	±.002-.005	±.002-.005	±.005
U	±0.13~±0.38	±0.13	±0.08~±0.25	U	±.005-.012	±.005-.010	±.005

5 Inscribed Circle Dia.

ISO								ANSI	
Length of Cutting Edge							IC Dia.	Code	IC Size
C	D	R	S	T	V	W	mm		inch
S4	04	03	03	06	-	-	3.97	(1.2)	5/32
04	05	04	04	08	08	S3	4.76	(1.5)	3/16
05	06	05	05	09	09	03	5.56	(1.8)	7/32
-	-	06	-	-	-	-	6	-	-
06	07	06	06	11	11	04	6.35	2	1/4
08	09	07	07	13	13	05	7.94	(2.5)	5/16
-	-	08	-	-	-	-	8	-	-
09	11	09	09	16	16	06	9.525	3	3/8
-	-	10	-	-	-	-	10	-	-
-	-	12	-	-	-	-	12	-	-
12	15	12	12	22	22	08	12.7	4	1/2
16	19	15	15	27	27	10	15.875	5	5/8
-	-	16	-	-	-	-	16	-	-
19	23	19	19	33	33	13	19.05	6	3/4
-	-	20	-	-	-	-	20	-	-
22	27	22	22	38	38	15	22.225	7	7/8
-	-	25	-	-	-	-	25	-	-
25	31	25	25	44	44	17	25.4	8	1
32	38	31	31	54	54	21	31.75	10	1-1/4
-	-	32	-	-	-	-	32	-	-

6 Thickness

ISO		ANSI	
Code	Size	Code	Size
S	mm	S	inch
01	1.59	1	1/16
02	2.38	(1.5)	3/32
T2	2.78	-	-
03	3.18	2	1/8
T3	3.97	(2.5)	5/32
04	4.76	3	3/16
05	5.56	(3.5)	7/32
06	6.35	4	1/4
07	7.94	5	5/16
09	9.525	6	3/8

7 Nose radius

ISO		ANSI	
Code	Size	Code	Size
Rε	mm	Rε	inch
00		00	.000
003	0.03	(0.1)	.001
01	0.1	(0.2)	.004
02	0.2	(0.5)	.008
04	0.4	1	1/64
08	0.8	2	1/32
12	1.2	3	3/64
16	1.6	4	1/16
20	2.0	5	5/64
24	2.4	6	3/32
28	2.8	7	7/64
32	3.2	8	1/8
M0		0	circular

Rule of Mini Solid Insert Code

8 Edges

Code	1	2	3	4	6	8
notes	1 edge	2 edges	3 edges	4 edges	6 edges	8 edges

9 Cutting Direction

Code	R	L	N
notes	R	L	N

10 Cutting Edge Design

E	T	S	F
Honed	Chamfered	Chamfered+Honed	Sharp Edge

11 Chamfered Width

Code	000	005	010	015	020	030
Size	-	0.05	0.1	0.15	0.2	0.3

12 Chamfered Angle

Code	α	00	10	15	20	25	30	35	45
Size	°	-	10	15	20	25	30	35	45

13 Honed Size

Code	00	02	05	10	20	30
Size	-	0.002	0.005	0.01	0.02	0.03

14 Insert type

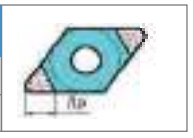
SF	SL	SS	CB	CS	SWW	SWU
Full Face	Solid Tipped Corner	Solid CBN	Standard Tipped Corners	Standard Full Edge	Solid Tipped Corners Type 'W'	Solid Tipped Corners Type 'U'

15 Cutting Edge Design

ST	WG	CB
Nose Radius	Wiper	Chip Breaker

16 Cutting Edge Length

Code	Ap	22	25	28	30	40
Size		2.2	2.5	2.8	3.0	4.0

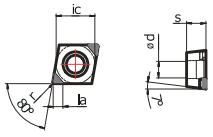


17 Surface Treatment

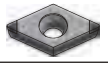
S	Uncoated	C1	Coated
			R & D

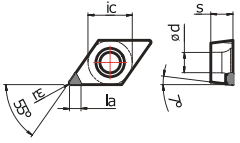
PCBN insert specifications

CC 80° Positive Mini Type PCBN Inserts

Shape	ISO	ANSI	Dimensions in mm					WORLDIA PCBN Grades					
			ic	Ød	s	r	la	PNS2007	PNK3003	PNK0117	PNH2018	PNH1020	PNH0120
	CCGW060202-2N	CCGW2(1.5)(0.5)-2N	6.35	2.8	2.38	0.2	2.2	●	●	●	●	●	●
	CCGW060204-2N	CCGW2(1.5)1-2N	6.35	2.8	2.38	0.4	2.2	●	●	●	●	●	●
	CCGW060208-2N	CCGW2(1.5)2-2N	6.35	2.8	2.38	0.8	2.2	●	●	●	●	●	●
	CCGW09T302-2N	CCGW3(2.5)(0.5)-2N	9.525	4.4	3.97	0.2	2.2	●	●	●	●	●	●
	CCGW09T304-2N	CCGW3(2.5)1-2N	9.525	4.4	3.97	0.4	2.2	●	●	●	●	●	●
	CCGW09T308-2N	CCGW3(2.5)2-2N	9.525	4.4	3.97	0.8	2.2	●	●	●	●	●	●
	CCGW120402-2N	CCGW43(0.5)-2N	12.7	5.5	4.46	0.2	2.2	●	●	●	●	●	●
	CCGW120404-2N	CCGW431-2N	12.7	5.5	4.46	0.4	2.2	●	●	●	●	●	●
	CCGW120408-2N	CCGW432-2N	12.7	5.5	4.46	0.8	2.2	●	●	●	●	●	●
	CCGW120412-2N	CCGW433-2N	12.7	5.5	4.46	1.2	2.2	●	●	●	●	●	●

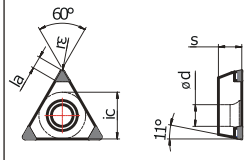
DC 55° Positive Mini Type PCBN Inserts



Shape	ISO	ANSI	Dimensions in mm					WORLDIA PCBN Grades					
			ic	Ød	s	r	la	PNS2007	PNK3003	PNK0117	PNH2018	PNH1020	PNH0120
	DCGW070202-2N	DCGW2(1.5)(0.5)-2N	6.35	2.8	2.38	0.2	2.2	●	●	●	●	●	●
	DCGW070204-2N	DCGW2(1.5)1-2N	6.35	2.8	2.38	0.4	2.2	●	●	●	●	●	●
	DCGW070208-2N	DCGW2(1.5)2-2N	6.35	2.8	2.38	0.8	2.2	●	●	●	●	●	●
	DCGW11T302-2N	DCGW3(2.5)(0.5)-2N	9.525	4.4	3.97	0.2	2.2	●	●	●	●	●	●
	DCGW11T304-2N	DCGW3(2.5)1-2N	9.525	4.4	3.97	0.4	2.2	●	●	●	●	●	●
	DCGW11T308-2N	DCGW3(2.5)2-2N	9.525	4.4	3.97	0.8	2.2	●	●	●	●	●	●
	DCGW11T312-2N	DCGW3(2.5)3-2N	9.525	4.4	3.97	1.2	2.2	●	●	●	●	●	●
	CCGW120402-2N	CCGW43(0.5)-2N	12.7	5.5	4.46	0.2	2.2	●	●	●	●	●	●
	CCGW120404-2N	CCGW431-2N	12.7	5.5	4.46	0.4	2.2	●	●	●	●	●	●
	CCGW120408-2N	CCGW432-2N	12.7	5.5	4.46	0.8	2.2	●	●	●	●	●	●
	CCGW120412-2N	CCGW433-2N	12.7	5.5	4.46	1.2	2.2	●	●	●	●	●	●

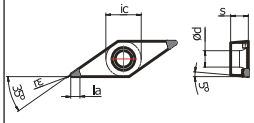
PCBN insert specifications

TP 60° Positive Mini Type PCBN Inserts 

Shape	ISO	ANSI	Dimensions in mm					WORLDIA PCBN Grades					
			ic	Ød	s	r	la	PNS2007	PNK3003	PNK0117	PNH2018	PNH1020	PNH0120
	TPGW080202-3N	TPGW(1.5)(1.5)(0.5)-3N	4.76	2.4	2.38	0.2	2.2	●	●	●	●	●	●
	TPGW080204-3N	TPGW(1.5)(1.5)1-3N	4.76	2.4	2.38	0.4	2.2	●	●	●	●	●	●
	TPGW090202-3N	TPGW(1.8)(1.5)(0.5)-3N	5.56	2.5/2.8	2.38	0.2	2.2	●	●	●	●	●	●
	TPGW090204-3N	TPGW(1.8)(1.5)1-3N	5.56	2.5/2.8	2.38	0.4	2.2	●	●	●	●	●	●
	TPGW090208-3N	TPGW(1.8)(1.5)2-3N	5.56	2.5/2.8	2.38	0.8	2.2	●	●	●	●	●	●
	TPGW110302-3N	TPGW22(0.5)-3N	6.35	2.8	3.18	0.2	2.2	●	●	●	●	●	●
	TPGW110304-3N	TPGW221-3N	6.35	2.8	3.18	0.4	2.2	●	●	●	●	●	●
	TPGW160302-3N	TPGW32(0.5)-3N	9.525	4.4	3.18	0.2	2.2	●	●	●	●	●	●
	TPGW160304-3N	TPGW321-3N	9.525	4.4	3.18	0.4	2.2	●	●	●	●	●	●
	TPGW160308-3N	TPGW322-3N	9.525	4.4	3.18	0.8	2.2	●	●	●	●	●	●
	TPGW160402-3N	TPGW33(0.5)-3N	9.525	4.4	4.76	0.2	2.2	●	●	●	●	●	●
	TPGW160404-3N	TPGW331-3N	9.525	4.4	4.76	0.4	2.2	●	●	●	●	●	●
	TPGW160408-3N	TPGW332-3N	9.525	4.4	4.76	0.8	2.2	●	●	●	●	●	●

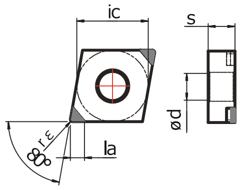
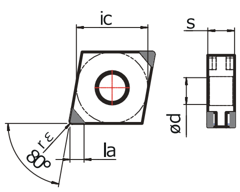
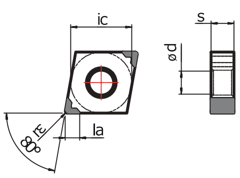
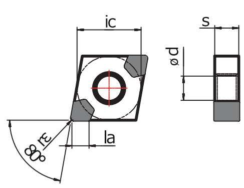
PCBN insert specifications

VC 35° Positive Mini Type PCBN Inserts

Shape	ISO	ANSI	Dimensions in mm					WORLDIA PCBN Grades					
			ic	Ød	s	r	la	PNS2007	PNK3003	PNK0117	PNH2018	PNH1020	PNH0120
	VBGW110302-2N	VBGW22(0.5)-2N	6.35	2.8	3.18	0.2	2.2	●	●	●	●	●	●
	VBGW110304-2N	VBGW221-2N	6.35	2.8	3.18	0.4	2.2	●	●	●	●	●	●
	VBGW110308-2N	VBGW222-2N	6.35	2.8	3.18	0.8	2.2	●	●	●	●	●	●
	VBGW160402-2N	VBGW33(0.5)-2N	9.525	4.4	4.76	0.2	2.2	●	●	●	●	●	●
	VBGW160404-2N	VBGW331-2N	9.525	4.4	4.76	0.4	2.2	●	●	●	●	●	●
	VBGW160408-2N	VBGW332-2N	9.525	4.4	4.76	0.8	2.2	●	●	●	●	●	●
	VBGW160412-2N	VBGW333-2N	9.525	4.4	4.76	1.2	2.2	●	●	●	●	●	●
	VCGW080202-2N	VCGW(1.5)(1.5)(0.5)-2N	6.35	2.3	2.38	0.2	2.2	●	●	●	●	●	●
	VCGW080204-2N	VCGW(1.5)(1.5)1-2N	6.35	2.3	2.38	0.4	2.2	●	●	●	●	●	●
	VCGW080208-2N	VCGW(1.5)(1.5)2-2N	6.35	2.3	2.38	0.8	2.2	●	●	●	●	●	●
	VCGW110302-2N	VCGW22(0.5)-2N	6.35	2.8	3.18	0.2	2.2	●	●	●	●	●	●
	VCGW110304-2N	VCGW221-2N	6.35	2.8	3.18	0.4	2.2	●	●	●	●	●	●
	VCGW110308-2N	VCGW222-2N	6.35	2.8	3.18	0.8	2.2	●	●	●	●	●	●
	VCGW160402-2N	VCGW33(0.5)-2N	9.525	4.4	4.76	0.2	2.2	●	●	●	●	●	●
	VCGW160404-2N	VCGW331-2N	9.525	4.4	4.76	0.4	2.2	●	●	●	●	●	●
	VCGW160408-2N	VCGW332-2N	9.525	4.4	4.76	0.8	2.2	●	●	●	●	●	●

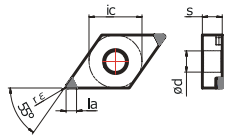
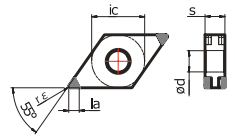
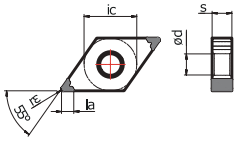
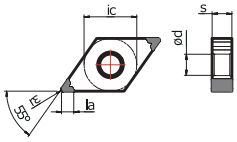
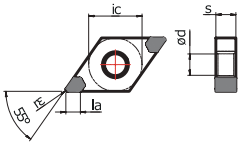
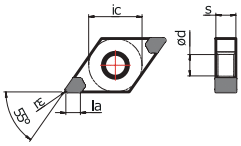
PCBN insert specifications

CN 80°Negative Mini Type/ Mini Solid Type/ Heavy Cutting Type PCBN Inserts

Shape	ISO	ANSI	Dimensions in mm					WORLDIA PCBN Grades					
			ic	Ød	s	r	la	PNS2007	PNK3003	PNK0117	PNH2018	PNH1020	PNH0120
	CNGA120402-2N	CNGA43(0.5)-2N	12.7	5.16	4.76	0.2	2.2	●	●	●	●	●	●
	CNGA120404-2N	CNGA431-2N	12.7	5.16	4.76	0.4	2.2	●	●	●	●	●	●
	CNGA120408-2N	CNGA432-2N	12.7	5.16	4.76	0.8	2.2	●	●	●	●	●	●
	CNGA120412-2N	CNGA433-2N	12.7	5.16	4.76	1.2	2.2	●	●	●	●	●	●
	CNGA120402-4N	CNGA43(0.5)-4N	12.7	5.16	4.76	0.2	2.2	●	●	●	●	●	●
	CNGA120404-4N	CNGA431-4N	12.7	5.16	4.76	0.4	2.2	●	●	●	●	●	●
	CNGA120408-4N	CNGA432-4N	12.7	5.16	4.76	0.8	2.2	●	●	●	●	●	●
	CNGA120412-4N	CNGA433-4N	12.7	5.16	4.76	1.2	2.2	●	●	●	●	●	●
	CNGA120402-4N	CNGA43(0.5)-4N	12.7	5.16	4.76	0.2	2.2	●	●	●	●	●	●
	CNGA120404-4N	CNGA431-4N	12.7	5.16	4.76	0.4	2.2	●	●	●	●	●	●
	CNGA120408-4N	CNGA432-4N	12.7	5.16	4.76	0.8	2.2	●	●	●	●	●	●
	CNGA120412-4N	CNGA433-4N	12.7	5.16	4.76	1.2	2.2	●	●	●	●	●	●
	CNGA120402-4N	CNGA43(0.5)-4N	12.7	5.16	4.76	0.2	2.2	●	●	●	●	●	●
	CNGA120404-4N	CNGA431-4N	12.7	5.16	4.76	0.4	2.2	●	●	●	●	●	●
	CNGA120408-4N	CNGA432-4N	12.7	5.16	4.76	0.8	2.2	●	●	●	●	●	●
	CNGA120412-4N	CNGA433-4N	12.7	5.16	4.76	1.2	2.2	●	●	●	●	●	●

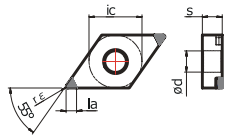
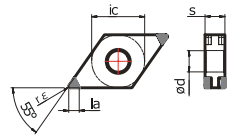
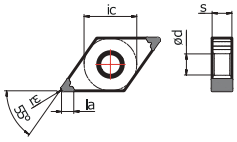
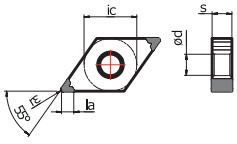
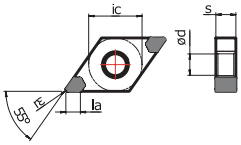
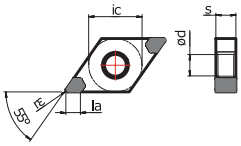
PCBN insert specifications

DN 55°Negative Mini Type/ Mini Solid Type/ Heavy Cutting Type PCBN Inserts

Shape	ISO	ANSI	Dimensions in mm					WORLDIA PCBN Grades					
			ic	Ød	s	r	la	PNS2007	PNK3003	PNK0117	PNH2018	PNH1020	PNH0120
	DNGA150602-2N	DNGA44(0.5)-2N	12.7	5.16	6.35	0.2	2.2	●	●	●	●	●	●
	DNGA150604-2N	DNGA441-2N	12.7	5.16	6.35	0.4	2.2	●	●	●	●	●	●
	DNGA150608-2N	DNGA442-2N	12.7	5.16	6.35	0.8	2.2	●	●	●	●	●	●
	DNGA150612-2N	DNGA443-2N	12.7	5.16	6.35	1.2	2.2	●	●	●	●	●	●
	DNGA150602-4N	DNGA44(0.5)-4N	12.7	5.16	6.35	0.2	2.2	●	●	●	●	●	●
	DNGA150604-4N	DNGA441-4N	12.7	5.16	6.35	0.4	2.2	●	●	●	●	●	●
	DNGA150608-4N	DNGA442-4N	12.7	5.16	6.35	0.8	2.2	●	●	●	●	●	●
	DNGA150612-4N	DNGA443-4N	12.7	5.16	6.35	1.2	2.2	●	●	●	●	●	●
	DNGA150402-4N	DNGA43(0.5)-4N	12.7	5.16	4.76	0.2	2.2	●	●	●	●	●	●
	DNGA150404-4N	DNGA431-4N	12.7	5.16	4.76	0.4	2.2	●	●	●	●	●	●
	DNGA150408-4N	DNGA432-4N	12.7	5.16	4.76	0.8	2.2	●	●	●	●	●	●
	DNGA150412-4N	DNGA433-4N	12.7	5.16	4.76	1.2	2.2	●	●	●	●	●	●
	DNGA150602-4N	DNGA43(0.5)-4N	12.7	5.16	6.35	0.2	2.2	●	●	●	●	●	●
	DNGA150604-4N	DNGA441-4N	12.7	5.16	6.35	0.4	2.2	●	●	●	●	●	●
	DNGA150608-4N	DNGA442-4N	12.7	5.16	6.35	0.8	2.2	●	●	●	●	●	●
	DNGA150612-4N	DNGA443-4N	12.7	5.16	6.35	1.2	2.2	●	●	●	●	●	●
	DNGA150402-4N	DNGA43(0.5)-4N	12.7	5.16	4.76	0.2	2.2	●	●	●	●	●	●
	DNGA150404-4N	DNGA431-4N	12.7	5.16	4.76	0.4	2.2	●	●	●	●	●	●
	DNGA150408-4N	DNGA432-4N	12.7	5.16	4.76	0.8	2.2	●	●	●	●	●	●
	DNGA150412-4N	DNGA433-4N	12.7	5.16	4.76	1.2	2.2	●	●	●	●	●	●
	DNGA150602-4N	DNGA43(0.5)-4N	12.7	5.16	6.35	0.2	2.2	●	●	●	●	●	●
	DNGA150604-4N	DNGA431-4N	12.7	5.16	6.35	0.4	2.2	●	●	●	●	●	●
	DNGA150608-4N	DNGA432-4N	12.7	5.16	6.35	0.8	2.2	●	●	●	●	●	●
	DNGA150612-4N	DNGA433-4N	12.7	5.16	6.35	1.2	2.2	●	●	●	●	●	●

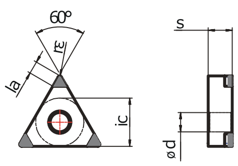
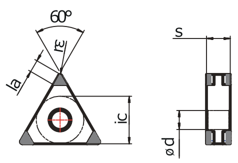
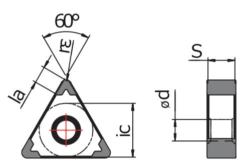
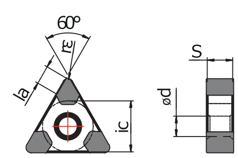
PCBN insert specifications

DN 55°Negative Mini Type/ Mini Solid Type/ Heavy Cutting Type PCBN Inserts

Shape	ISO	ANSI	Dimensions in mm					WORLDIA PCBN Grades					
			ic	Ød	s	r	la	PNS2007	PNK3003	PNK0117	PNH2018	PNH1020	PNH0120
	DNGA150602-2N	DNGA44(0.5)-2N	12.7	5.16	6.35	0.2	2.2	●	●	●	●	●	●
	DNGA150604-2N	DNGA441-2N	12.7	5.16	6.35	0.4	2.2	●	●	●	●	●	●
	DNGA150608-2N	DNGA442-2N	12.7	5.16	6.35	0.8	2.2	●	●	●	●	●	●
	DNGA150612-2N	DNGA443-2N	12.7	5.16	6.35	1.2	2.2	●	●	●	●	●	●
	DNGA150602-4N	DNGA44(0.5)-4N	12.7	5.16	6.35	0.2	2.2	●	●	●	●	●	●
	DNGA150604-4N	DNGA441-4N	12.7	5.16	6.35	0.4	2.2	●	●	●	●	●	●
	DNGA150608-4N	DNGA442-4N	12.7	5.16	6.35	0.8	2.2	●	●	●	●	●	●
	DNGA150612-4N	DNGA443-4N	12.7	5.16	6.35	1.2	2.2	●	●	●	●	●	●
	DNGA150402-4N	DNGA43(0.5)-4N	12.7	5.16	4.76	0.2	2.2	●	●	●	●	●	●
	DNGA150404-4N	DNGA431-4N	12.7	5.16	4.76	0.4	2.2	●	●	●	●	●	●
	DNGA150408-4N	DNGA432-4N	12.7	5.16	4.76	0.8	2.2	●	●	●	●	●	●
	DNGA150412-4N	DNGA433-4N	12.7	5.16	4.76	1.2	2.2	●	●	●	●	●	●
	DNGA150602-4N	DNGA43(0.5)-4N	12.7	5.16	6.35	0.2	2.2	●	●	●	●	●	●
	DNGA150604-4N	DNGA441-4N	12.7	5.16	6.35	0.4	2.2	●	●	●	●	●	●
	DNGA150608-4N	DNGA442-4N	12.7	5.16	6.35	0.8	2.2	●	●	●	●	●	●
	DNGA150612-4N	DNGA443-4N	12.7	5.16	6.35	1.2	2.2	●	●	●	●	●	●
	DNGA150402-4N	DNGA43(0.5)-4N	12.7	5.16	4.76	0.2	2.2	●	●	●	●	●	●
	DNGA150404-4N	DNGA431-4N	12.7	5.16	4.76	0.4	2.2	●	●	●	●	●	●
	DNGA150408-4N	DNGA432-4N	12.7	5.16	4.76	0.8	2.2	●	●	●	●	●	●
	DNGA150412-4N	DNGA433-4N	12.7	5.16	4.76	1.2	2.2	●	●	●	●	●	●
	DNGA150602-4N	DNGA43(0.5)-4N	12.7	5.16	6.35	0.2	2.2	●	●	●	●	●	●
	DNGA150604-4N	DNGA431-4N	12.7	5.16	6.35	0.4	2.2	●	●	●	●	●	●
	DNGA150608-4N	DNGA432-4N	12.7	5.16	6.35	0.8	2.2	●	●	●	●	●	●
	DNGA150612-4N	DNGA433-4N	12.7	5.16	6.35	1.2	2.2	●	●	●	●	●	●

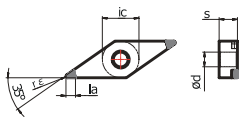
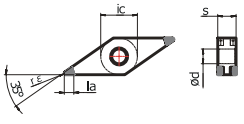
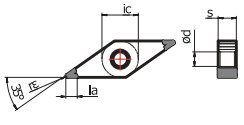
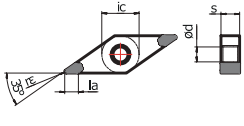
PCBN insert specifications

TN 60°Negative Mini Type/ Mini Solid Type/ Heavy Cutting Type PCBN Inserts

Shape	ISO	ANSI	Dimensions in mm					WORLDIA PCBN Grades					
			ic	Ød	s	r	la	PNS2007	PNK3003	PNK0117	PNH2018	PNH1020	PNH0120
	TNGA160402-3N	TNGA33(0.5)-3N	9.525	3.81	4.76	0.2	2.2	●	●	●	●	●	●
	TNGA160404-3N	TNGA331-3N	9.525	3.81	4.76	0.4	2.2	●	●	●	●	●	●
	TNGA160408-3N	TNGA332-3N	9.525	3.81	4.76	0.8	2.2	●	●	●	●	●	●
	TNGA160412-3N	TNGA333-3N	9.525	3.81	4.76	1.2	2.2	●	●	●	●	●	●
	TNGA160402-6N	TNGA33(0.5)-6N	9.525	3.81	4.76	0.2	2.2	●	●	●	●	●	●
	TNGA160404-6N	TNGA331-6N	9.525	3.81	4.76	0.4	2.2	●	●	●	●	●	●
	TNGA160408-6N	TNGA332-6N	9.525	3.81	4.76	0.8	2.2	●	●	●	●	●	●
	TNGA160412-6N	TNGA333-6N	9.525	3.81	4.76	1.2	2.2	●	●	●	●	●	●
	TNGA160402-6N	TNGA33(0.5)-6N	9.525	3.81	4.76	0.2	2.2	●	●	●	●	●	●
	TNGA160404-6N	TNGA331-6N	9.525	3.81	4.76	0.4	2.2	●	●	●	●	●	●
	TNGA160408-6N	TNGA332-6N	9.525	3.81	4.76	0.8	2.2	●	●	●	●	●	●
	TNGA160412-6N	TNGA333-6N	9.525	3.81	4.76	1.2	2.2	●	●	●	●	●	●
	TNGA160402-6N	TNGA33(0.5)-6N	9.525	3.81	4.76	0.2	2.2	●	●	●	●	●	●
	TNGA160404-6N	TNGA331-6N	9.525	3.81	4.76	0.4	2.2	●	●	●	●	●	●
	TNGA160408-6N	TNGA332-6N	9.525	3.81	4.76	0.8	2.2	●	●	●	●	●	●
	TNGA160412-6N	TNGA333-6N	9.525	3.81	4.76	1.2	2.2	●	●	●	●	●	●

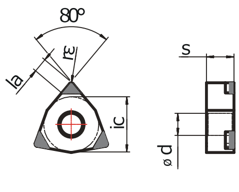
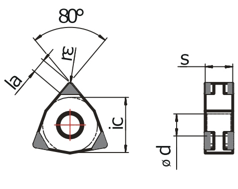
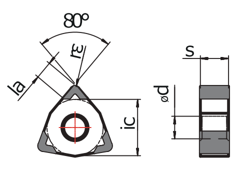
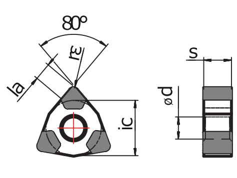
PCBN insert specifications

VN 35°Negative Mini Type/ Mini Solid Type/ Heavy Cutting Type PCBN Inserts

Shape	ISO	ANSI	Dimensions in mm					WORLDIA PCBN Grades					
			ic	Ød	s	r	la	PNS2007	PNK3003	PNK0117	PNH2018	PNH1020	PNH0120
	VNGA160402-2N	VNGA33(0.5)-2N	9.525	3.81	4.76	0.2	2.2	●	●	●	●	●	●
	VNGA160404-2N	VNGA331-2N	9.525	3.81	4.76	0.4	2.2	●	●	●	●	●	●
	VNGA160408-2N	VNGA332-2N	9.525	3.81	4.76	0.8	2.2	●	●	●	●	●	●
	VNGA160412-2N	VNGA333-2N	9.525	3.81	4.76	1.2	2.2	●	●	●	●	●	●
	VNGA160402-4N	VNGA33(0.5)-4N	9.525	3.81	4.76	0.2	2.2	●	●	●	●	●	●
	VNGA160404-4N	VNGA331-4N	9.525	3.81	4.76	0.4	2.2	●	●	●	●	●	●
	VNGA160408-4N	VNGA332-4N	9.525	3.81	4.76	0.8	2.2	●	●	●	●	●	●
	VNGA160412-4N	VNGA333-4N	9.525	3.81	4.76	1.2	2.2	●	●	●	●	●	●
	VNGA160402-4N	VNGA33(0.5)-4N	9.525	3.81	4.76	0.2	2.2	●	●	●	●	●	●
	VNGA160404-4N	VNGA341-4N	9.525	3.81	4.76	0.4	2.2	●	●	●	●	●	●
	VNGA160408-4N	VNGA342-4N	9.525	3.81	4.76	0.8	2.2	●	●	●	●	●	●
	VNGA160412-4N	VNGA343-4N	9.525	3.81	4.76	1.2	2.2	●	●	●	●	●	●
	VNGA160402-4N	VNGA33(0.5)-4N	9.525	3.81	4.76	0.2	2.2	●	●	●	●	●	●
	VNGA160404-4N	VNGA331-4N	9.525	3.81	4.76	0.4	2.2	●	●	●	●	●	●
	VNGA160408-4N	VNGA332-4N	9.525	3.81	4.76	0.8	2.2	●	●	●	●	●	●
	VNGA160412-4N	VNGA333-4N	9.525	3.81	4.76	1.2	2.2	●	●	●	●	●	●

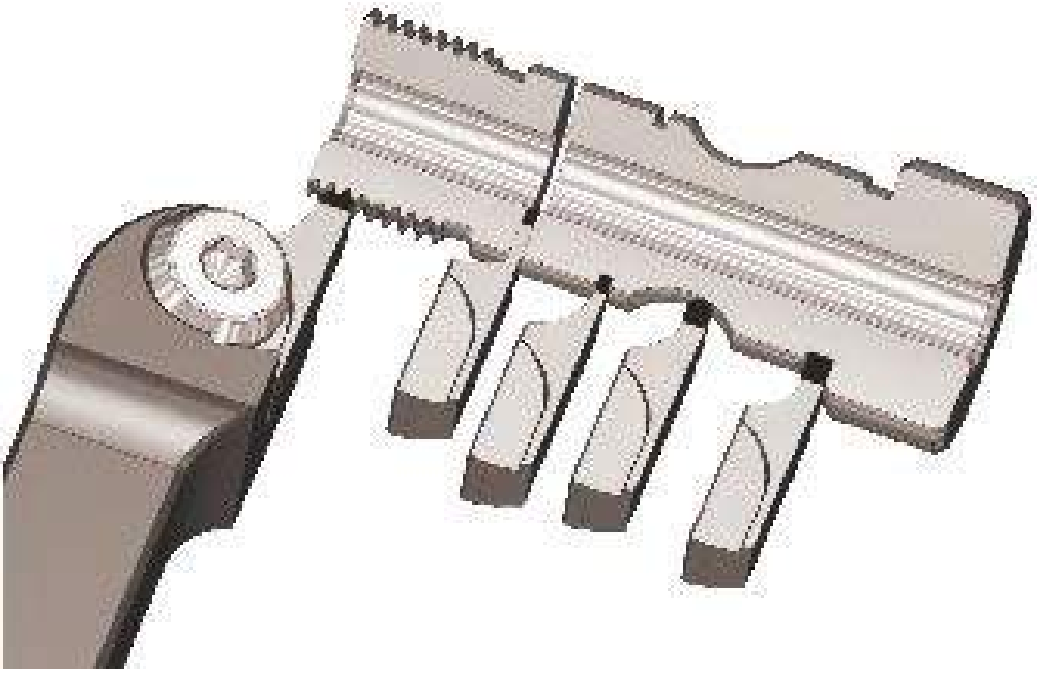
PCBN insert specifications

WN 80°Negative Mini Type/ Mini Solid Type/ Heavy Cutting Type PCBN Inserts

Shape	ISO	ANSI	Dimensions in mm					WORLDIA PCBN Grades					
			ic	Ød	s	r	la	PNS2007	PNK3003	PNK0117	PNH2018	PNH1020	PNH0120
	WNGA080402-3N	WNGA43(0.5)-3N	12.7	5.16	4.76	0.2	2.2	●	●	●	●	●	●
	WNGA080404-3N	WNGA431-3N	12.7	5.16	4.76	0.4	2.2	●	●	●	●	●	●
	WNGA080408-3N	WNGA432-3N	12.7	5.16	4.76	0.8	2.2	●	●	●	●	●	●
	WNGA080412-3N	WNGA433-3N	12.7	5.16	4.76	1.2	2.2	●	●	●	●	●	●
	WNGA080402-6N	WNGA43(0.5)-6N	12.7	5.16	4.76	0.2	2.2	●	●	●	●	●	●
	WNGA080404-6N	WNGA431-6N	12.7	5.16	4.76	0.4	2.2	●	●	●	●	●	●
	WNGA080408-6N	WNGA432-6N	12.7	5.16	4.76	0.8	2.2	●	●	●	●	●	●
	WNGA080412-6N	WNGA433-6N	12.7	5.16	4.76	1.2	2.2	●	●	●	●	●	●
	WNGA080402-6N	WNGA43(0.5)-6N	12.7	5.16	4.76	0.2	2.2	●	●	●	●	●	●
	WNGA080404-6N	WNGA431-6N	12.7	5.16	4.76	0.4	2.2	●	●	●	●	●	●
	WNGA080408-6N	WNGA432-6N	12.7	5.16	4.76	0.8	2.2	●	●	●	●	●	●
	WNGA080412-6N	WNGA433-6N	12.7	5.16	4.76	1.2	2.2	●	●	●	●	●	●
	WNGA080402-6N	WNGA43(0.5)-6N	12.7	5.16	4.76	0.2	2.2	●	●	●	●	●	●
	WNGA080404-6N	WNGA431-6N	12.7	5.16	4.76	0.4	2.2	●	●	●	●	●	●
	WNGA080408-6N	WNGA432-6N	12.7	5.16	4.76	0.8	2.2	●	●	●	●	●	●
	WNGA080412-6N	WNGA433-6N	12.7	5.16	4.76	1.2	2.2	●	●	●	●	●	●

WORLDIA PRODUCT CATALOGUE

Grooving Solutions



Standard type code of External grooving solution

Standard grooving Inserts

①	②	③		④	⑤	⑥	⑦
GTI	S	R/L	-	W300	T400	R040	P00
Groove turning inserts	Standard Inserts	Assemble with Right-hand /Left -hand Toolholders		Main cutting edge width 3.0	Max Cutting depth 4.0	Blade nose radius angle 0.4	Rake angle 0°

Cut-off blades

①	②	③		④	⑤	⑥	⑦
GTI	O	R/L	-	W200	T650	R020	P00
Groove turning inserts	Cut-off inserts	Assemble with Right-hand /Left -hand Toolholders		Main cutting edge width 2.0	Max Cutting depth 6.5	Blade nose radius angle 0.2	Rake angle 0°

Circlip grooving Inserts

①	②	③		④	⑤	⑥
GTI	R	R/L	-	W195	T400	R020
Groove turning inserts	Specialized groove	Assemble with Right-hand /Left -hand Toolholders		Main cutting edge width 1.95	Max Cutting depth 4.0	Blade nose radius angle 0.2

End face ring grooving inserts

①	②	③		④	⑤	⑥		⑦	⑧
GTI	E	R/L	-	W300	T850	R020	-	B060	S040
Groove turning inserts	End face ring groove	Assemble with Right-hand /Left -hand Toolholders		Main cutting edge width 3.0	Max Cutting depth 8.5	Blade nose radius angle 0.2		Bigger OD Φ60	Smaller OD Φ40

Contour cutting Inserts

①	②	③		④	⑤	⑥
GTI	C	R/L	-	R200	T400	P00
Groove turning inserts	Contour cutting Inserts	Assemble with Right-hand /Left -hand Toolholders		Main cutting edge width 2.0	Max Cutting depth 4.0	Rake angle 0°

Metric thread cutting Inserts

①	②	③		④	⑤	⑥
GTI	T	R/L	-	M60	P100	
Groove turning inserts	Threading Inserts	Assemble with Right-hand /Left -hand Toolholders		Metric 60°	Thread Pitch 1.0mm	Without Wiper
						⑥ R
						With Wiper

Inch thread cutting Inserts

①	②	③		④	⑤	⑥
GTI	T	R/L	-	I55	N11	
Groove turning inserts	Threading Inserts	Assemble with Right-hand /Left -hand Toolholders		Inch 55°	11 teeth per inch	Without Wiper
						R
						With Wiper

Groove turning Toolholders

①	②		③	④
GTH	R/L	-	C91	S2020
Groove turning Toolholders	Cutting Direction: Right-hand direction Left-hand direction		Shank tool cutting edge angle 91°	Direction of toolholders: b=20 h=20

Standard type code of External grooving solution (supplement)

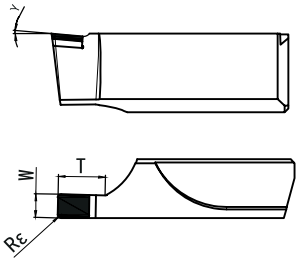
S Edge chamfering + honing	010 Chamfer width 0.1	20 Chamfer angle 20°	05 Rounding R0.005	-	PN210-A Tool nose material
T Edge chamfering	010 Chamfer width 0.1	20 Chamfer angle 20°		-	PN210-A Tool nose material
E Edge honing	05 Rounding R0.005			-	PN210-A Tool nose material
F Edge sharpness				-	PD203-A Tool nose material

GTIS Standard Grooving inserts

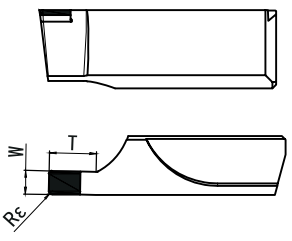
① GTI	② S	③ R/L	–	④ W300	⑤ T400	⑥ R040	⑦ P00
Groove turning inserts	Standard Inserts	Assemble with Right-hand /Left -hand Toolholders		Main cutting edge width 3.0	Max Cutting depth 4.0	Blade nose radius angle 0.4	Rake angle 0°

■ Fig: Right hand

■ Material: PCD



■ Material: PCD
PCBN



■ Allowable feed direction Traversing cutting

Right hand

Left hand

Material group	N			H			K		
Classification of usage	○	◔	✣	○	◔	✣	○	◔	✣
Cutting edge treatment	F	F	F	E20	T01020	S0102505	F	S0101505	S0102005

Right hand inserts						WORLDIA PCD			WORLDIA PCBN					
No.	Type	W	T	Rε	γ°	PD302	PD305	PD205	PN210	PN208	PN208	PN209	PN404	PN306
1	GTISR–W300T500R020P00	3	5	0.2	0		▲	▲	▲	▲	▲	▲		▲
2	GTISR–W350T500R020P00	3.5	5	0.2	5	▲	△							
3	GTISR–W400T500R040P00	4	5	0.4	0		▲	▲	▲	▲	▲	▲		▲
4	GTISR–W450T500R040P00	4.5	5	0.4	5	▲	△							
5	GTISL–W300T500R020P00	3	5	0.2	0		▲	▲	▲	▲	▲	▲	▲	▲
6	GTISL–W350T500R020P00	3.5	5	0.2	5	▲	△							
7	GTISL–W400T500R040P00	4	5	0.4	0		▲	▲	▲	▲	▲	▲	▲	▲
8	GTISL–W450T500R040P00	4.5	5	0.4	5	▲	△							
Left hand inserts						WORLDIA PCD			WORLDIA PCBN					
No.	Type	W	T	Rε	γ°	PD302	PD305	PD205	PN210	PN208	PN208	PN209	PN404	PN306
1	GTISR–W300T500R020P00	3	5	0.2	0		▲	▲	▲	▲	▲	▲		▲
2	GTISR–W350T500R020P00	3.5	5	0.2	5	▲	△							
3	GTISR–W400T500R040P00	4	5	0.4	0		▲	▲	▲	▲	▲	▲		▲
4	GTISR–W450T500R040P00	4.5	5	0.4	5	▲	△							
5	GTISL–W300T500R020P00	3	5	0.2	0		▲	▲	▲	▲	▲	▲	▲	▲
6	GTISL–W350T500R020P00	3.5	5	0.2	5	▲	△							
7	GTISL–W400T500R040P00	4	5	0.4	0		▲	▲	▲	▲	▲	▲	▲	▲
8	GTISL–W450T500R040P00	4.5	5	0.4	5	▲	△							

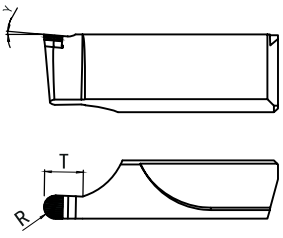
Note: ▲First Choice △ Second Choice

GTIR Contour cutting Inserts

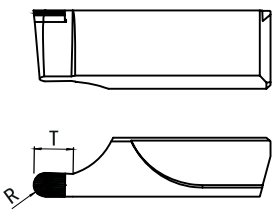
① GTI	② C	③ R/L	—	④ R200	⑤ T400	⑥ P00
Groove turning inserts	Contour cutting Inserts	Assemble with Right-hand /Left -hand Toolholders		Main cutting edge width 2.0	Max Cutting depth 4.0	Rake angle 0°

■ Fig: Right hand

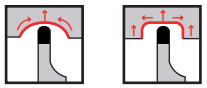
■ Material: PCD



■ Material: PCD
PCBN



■ Allowable feed direction



Left hand /Right hand

Material group	N			H			K		
Classification of usage	○	◔	✣	○	◔	✣	○	◔	✣
Cutting edge treatment	F	F	F	E20	T01020	S0102505	F	S0101505	S0102005

Right hand inserts					WORLDIA PCD			WORLDIA PCBN					
No.	Type	W	T	Y°	PD302	PD305	PD205	PN210	PN208	PN208	PN209	PN404	PN306
1	GTICR–R150T500P00	1.5	5	0		▲	▲	▲	▲	▲	▲		
2	GTICR–R150T500P05	1.5	5	5	▲	△							
3	GTICR–R125T500P00	1.25	5	0		▲	▲	▲	▲	▲	▲		
4	GTICR–R125T500P05	1.25	5	5	▲	△							
5	GTICR–R150T500P00	1.5	5	0		▲	▲	▲	▲	▲	▲		
6	GTICR–R150T500P05	1.5	5	5	▲	△							
7	GTICR–R175T500P00	1.75	5	0		▲	▲	▲	▲	▲	▲		
8	GTICR–R175T500P05	1.75	5	5	▲	△							
9	GTICR–R200T500P00	2	5	0		▲	▲	▲	▲	▲	▲	▲	▲
10	GTICR–R200T500P05	2	5	5	▲	△							
11	GTICR–R250T500P00	2.5	5	0		▲	▲	▲	▲	▲	▲	▲	▲
12	GTICR–R250T500P05	2.5	5	5	▲	△							
13	GTICR–R300T500P00	3	5	0		▲	▲	▲	▲	▲	▲	▲	▲
14	GTICR–R300T500P05	3	5	5	▲	△							
Left hand inserts					WORLDIA PCD			WORLDIA PCBN					
No.	Type	W	T	Y°	PD302	PD305	PD205	PN210	PN208	PN208	PN209	PN404	PN306
1	GTICL–R150T500P00	1.5	5	0		▲	▲	▲	▲	▲	▲		
2	GTICL–R150T500P05	1.5	5	5	▲	△							
3	GTICL–R125T500P00	1.25	5	0		▲	▲	▲	▲	▲	▲		
4	GTICL–R125T500P05	1.25	5	5	▲	△							
5	GTICL–R150T500P00	1.5	5	0		▲	▲	▲	▲	▲	▲		
6	GTICL–R150T500P05	1.5	5	5	▲	△							
7	GTICL–R175T500P00	1.75	5	0		▲	▲	▲	▲	▲	▲		
8	GTICL–R175T500P05	1.75	5	5	▲	△							
9	GTICL–R200T500P00	2	5	0		▲	▲	▲	▲	▲	▲	▲	▲
10	GTICL–R200T500P05	2	5	5	▲	△							
11	GTICL–R250T500P00	2.5	5	0		▲	▲	▲	▲	▲	▲	▲	▲
12	GTICL–R250T500P05	2.5	5	5	▲	△							
13	GTICL–R300T500P00	3	5	0		▲	▲	▲	▲	▲	▲	▲	▲
14	GTICL–R300T500P05	3	5	5	▲	△							

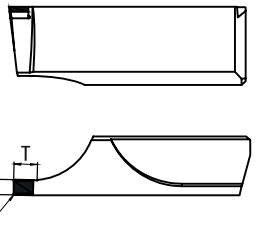
Note: ▲First Choice △ Second Choice

GTIR Circlip Grooving Inserts

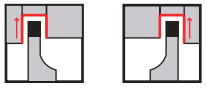
① GTI	② R	③ R/L	–	④ W195	⑤ T400	⑥ R020
Groove turning inserts	Specialized groove	Assemble with Right-hand /Left -hand Toolholders		Main cutting edge width 1.95	Max Cutting depth 4.0	Blade nose radius angle 0.2

■ Fig: Right hand

■ Material: PCD
PCBN



■ Allowable feed direction



Material group	N			H			K		
Classification of usage	○	⌐	⌐	○	⌐	⌐	○	⌐	⌐
Cutting edge treatment	F	F	F	E20	T01020	S0102505	F	S0101505	S0102005

Right hand inserts					WORLDIA PCD			WORLDIA PCBN					
No.	Type	W	T	Rε	PD302	PD305	PD205	PN210	PN208	PN208	PN209	PN404	PN306
1	GTIRR–W140T400R020	1.4	2	0.2	▲	▲	▲	▲	▲	▲		▲	
2	GTIRR–W170T400R020	1.7	3	0.2	▲	▲	▲	▲	▲	▲		▲	
3	GTIRR–W195T400R020	1.95	3	0.2	▲	▲	▲	▲	▲	▲		▲	
4	GTIRR–W225T500R020	2.25	3	0.2	▲	▲	▲	▲	▲	▲		▲	
Left hand inserts					WORLDIA PCD			WORLDIA PCBN					
No.	Type	W	T	Rε	PD302	PD305	PD205	PN210	PN208	PN208	PN209	PN404	PN306
1	GTIRL–W140T400R020	1.4	2	0.2	▲	▲	▲	▲	▲	▲		▲	
2	GTIRL–W170T400R020	1.7	3	0.2	▲	▲	▲	▲	▲	▲		▲	
3	GTIRL–W195T400R020	1.95	3	0.2	▲	▲	▲	▲	▲	▲		▲	
4	GTIRL–W225T500R020	2.25	3	0.2	▲	▲	▲	▲	▲	▲		▲	

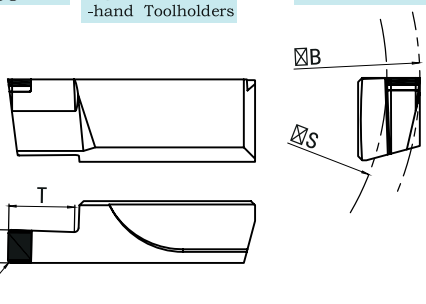
Note: ▲First Choice △ Second Choice

GTIE End face ring grooving inserts

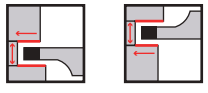
① GTI	② E	③ R/L	–	④ W300	⑤ T850	⑥ R020	–	⑦ B060	⑧ S040
Groove turning inserts	End face ring groove	Assemble with Right-hand /Left -hand Toolholders		Main cutting edge width 3.0	Max Cutting depth 8.5	Blade nose radius angle 0.2		Bigger OD Φ60	Smaller OD Φ40

■ Fig: Right hand

■ Material: PCD
PCBN



■ Allowable feed direction



Material group	N			H			K		
Classification of usage	○	⌐	⌐	○	⌐	⌐	○	⌐	⌐
Cutting edge treatment	F	F	F	E20	T01020	S0102505	F	S0101505	S0102005

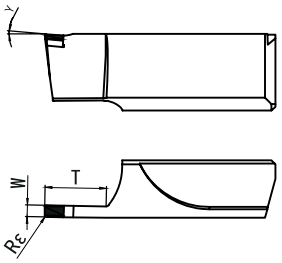
■ So customers need place order according to above mentioned specifiation patern based on actual requirement.
Example: Intended part’s material is cast iron, continuous cutting, the ring groove bigger outter OD on the part’s end face is Φ45.5, smaller Inner OD is Φ38, depth of groove is 5, bottom R angle of groove is Max0.4.
Namely the specification is GTIEL–W300T700R020–B045S038–F–PN306–A

GTIO Cut-off Inserts

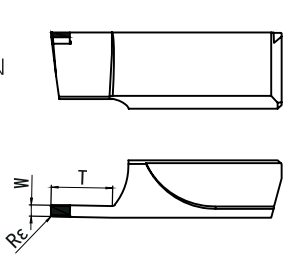
① GTI	② O	③ R/L	–	④ W200	⑤ T650	⑥ R020	⑦ P00
Groove turning inserts	Cut-off inserts	Assemble with Right-hand /Left -hand Toolholders		Main cutting edge width 2.0	Max Cutting depth 6.5	Blade nose radius angle 0.2	Rake angle 0°

■ Fig: Right hand

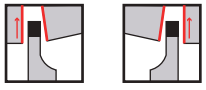
■ Material: PCD



■ Material: PCD
PCBN



■ Allowable feed direction



Right hand Left hand

Material group	N			H			K		
Classification of usage	○	◔	✣	○	◔	✣	○	◔	✣
Cutting edge treatment	F	F	F	E20	T01020	S0102505	F	S0101505	S0102005

Right hand inserts						WORLDIA PCD			WORLDIA PCBN					
No.	Type	W	T	Rε	γ°	PD302	PD305	PD205	PN210	PN208	PN208	PN209	PN404	PN306
1	GTIOR–W150T700R020P00	1.5	7	0.2	0		△	▲	▲	▲	▲	▲	▲	
2	GTIOR–W150T700R020P05	1.5	7	0.2	5	▲	▲							
3	GTIOR–W200T700R020P00	2	7	0.2	0		△	▲	▲	▲	▲	▲	▲	
4	GTIOR–W200T700R020P05	2	7	0.2	5	▲	▲							
5	GTIOR–W250T850R020P00	2.5	8.5	0.2	0		△	▲	▲	▲	▲	▲	▲	
6	GTIOR–W250T850R020P05	2.5	8.5	0.2	5	▲	▲							
7	GTIOR–W300T850R020P00	3	8.5	0.2	0		△	▲	▲	▲	▲	▲	▲	
8	GTIOR–W300T850R020P05	3	8.5	0.2	5	▲	▲							
Left hand inserts						WORLDIA PCD			WORLDIA PCBN					
No.	Type	W	T	Rε	γ°	PD302	PD305	PD205	PN210	PN208	PN208	PN209	PN404	PN306
1	GTIOL–W150T700R020P00	1.5	7	0.2	0		△	▲	▲	▲	▲	▲	▲	
2	GTIOL–W150T700R020P05	1.5	7	0.2	5	▲	▲							
3	GTIOL–W200T700R020P00	2	7	0.2	0		△	▲	▲	▲	▲	▲	▲	
4	GTIOL–W200T700R020P05	2	7	0.2	5	▲	▲							
5	GTIOL–W250T850R020P00	2.5	8.5	0.2	0		△	▲	▲	▲	▲	▲	▲	
6	GTIOL–W250T850R020P05	2.5	8.5	0.2	5	▲	▲							
7	GTIOL–W300T850R020P00	3	8.5	0.2	0		△	▲	▲	▲	▲	▲	▲	
8	GTIOL–W300T850R020P05	3	8.5	0.2	5	▲	▲							

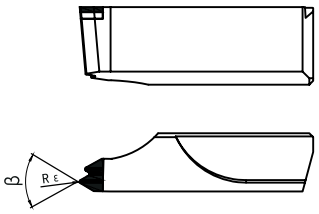
Note: ▲First Choice △ Second Choice

GTIT Metric Threading Inserts

①	②	③		④	⑤	⑥
GTI	T	R/L	—	M60	P100	Without Wiper
Groove turning inserts	Threading Inserts	Assemble with Right-hand /Left -hand Toolholders		Metric 60°	Thread Pitch 1.0mm	⑥ R With Wiper

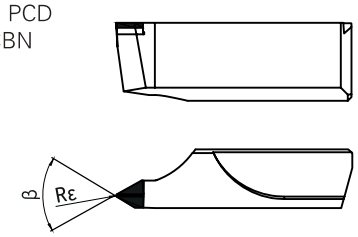
■ Fig:Right–hand inserts with wiper

■ Material: PCD

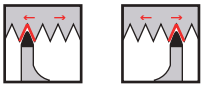


■ Fig: Right–hand inserts without wiper

■ Material: PCD
PCBN



■ Allowable feed direction



Right hand Left hand

Material group	N			H			K		
Classification of usage									
Cutting edge treatment	F	F	F	E20	T01020	S0102505	F	S0101505	S0102005

Right hand inserts					WORLDIA PCD			WORLDIA PCBN					
No.	Type	P	A	Rε	PD302	PD305	PD205	PN210	PN208	PN208	PN209	PN404	PN306
1	GTITR–M60P050	0.50	60	0.06	▲			▲			▲		
2	GTITR–M60P075	0.75	60	0.09	▲			▲			▲		
3	GTITR–M60P100	1.00	60	0.12	▲			▲			▲		
4	GTITR–M60P125	1.25	60	0.15	▲			▲			▲		
5	GTITR–M60P150	1.50	60	0.18	▲			▲			▲		
6	GTITR–M60P175	1.75	60	0.21	▲			▲			▲		
7	GTITR–M60P200	2.00	60	0.25	▲	▲		▲			▲		
8	GTITR–M60P200R	2.00	60	0.25	▲	▲		▲			▲		
9	GTITR–M60P250	2.50	60	0.31	▲	▲		▲			▲		
10	GTITR–M60P250R	2.50	60	0.31	▲	▲		▲			▲		
11	GTITR–M60P300	3.00	60	0.37	▲	▲		▲			▲		
12	GTITR–M60P300R	3.00	60	0.37	▲	▲		▲			▲		
Left hand inserts					WORLDIA PCD			WORLDIA PCBN					
No.	Type	P	A	Rε	PD302	PD305	PD205	PN210	PN208	PN208	PN209	PN404	PN306
1	GTITL–M60P050	0.50	60	0.06	▲			▲			▲		
2	GTITL–M60P075	0.75	60	0.09	▲			▲			▲		
3	GTITL–M60P100	1.00	60	0.12	▲			▲			▲		
4	GTITL–M60P125	1.25	60	0.15	▲			▲			▲		
5	GTITL–M60P150	1.50	60	0.18	▲			▲			▲		
6	GTITL–M60P175	1.75	60	0.21	▲			▲			▲		
7	GTITL–M60P200	2.00	60	0.25	▲	▲		▲			▲		
8	GTITL–M60P200R	2.00	60	0.25	▲	▲		▲			▲		
9	GTITL–M60P250	2.50	60	0.31	▲	▲		▲			▲		
10	GTITL–M60P250R	2.50	60	0.31	▲	▲		▲			▲		
11	GTITL–M60P300	3.00	60	0.37	▲	▲		▲			▲		
12	GTITL–M60P300R	3.00	60	0.37	▲	▲		▲			▲		

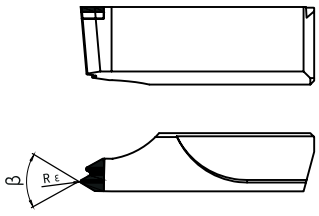
Note: ▲First Choice △ Second Choice

GTIT Inch Threading Inserts

①	②	③		④	⑤	⑥
GTI	T	R/L	–	I55	N11	Without Wiper
Groove turning inserts	Threading Inserts	Assemble with Right-hand /Left -hand Toolholders		Inch 55°	11 teeth per inch	R With Wiper

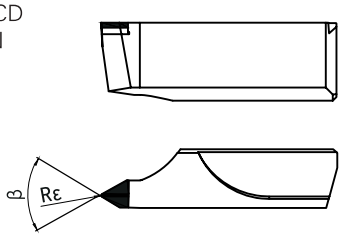
■ Fig:Right–hand inserts with wiper

■ Material： PCD



■ Fig: Right–hand inserts without wiper

■ Material： PCD
PCBN



■ Allowable feed direction

Right hand

Left hand

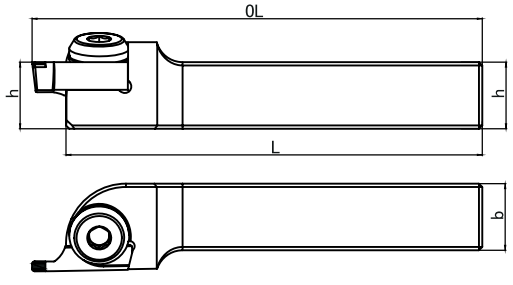
Material group	N			H			K		
Classification of usage	○	◔	✣	○	◔	✣	○	◔	✣
Cutting edge treatment	F	F	F	E20	T01020	S0102505	F	S0101505	S0102005

Right hand inserts					WORLDIA PCD			WORLDIA PCBN					
No.	Type	N	A	Rε	PD302	PD305	PD205	PN210	PN208	PN208	PN209	PN404	PN306
1	GTITR–I55N28	28	55	0.12	▲			▲			▲		
2	GTITR–I55N19	19	55	0.18	▲			▲			▲		
3	GTITR–I55N14	14	55	0.25	▲			▲			▲		
4	GTITR–I55N14R	14	55	0.25	▲			▲			▲		
5	GTITR–I55N11	11	55	0.32	▲			▲			▲		
6	GTITR–I55N11R	11	55	0.32	▲			▲			▲		
Left hand inserts					WORLDIA PCD			WORLDIA PCBN					
No.	Type	N	A	Rε	PD302	PD305	PD205	PN210	PN208	PN208	PN209	PN404	PN306
1	GTITR–I55N28	28	55	0.12	▲			▲			▲		
2	GTITR–I55N19	19	55	0.18	▲			▲			▲		
3	GTITR–I55N14	14	55	0.25	▲			▲			▲		
4	GTITR–I55N14R	14	55	0.25	▲			▲			▲		
5	GTITR–I55N11	11	55	0.32	▲			▲			▲		
6	GTITR–I55N11R	11	55	0.32	▲			▲			▲		

Note: ▲First Choice △ Second Choice

Groove turning Toolholders

①	②		③	④
GTH	R/L	–	C91	S2020
Groove turning Toolholders	Cutting Direction: Right-hand direction Left-hand direction		Shank tool cutting edge angle 91°	Direction of toolholders: b=20 h=20



■ Fig： Right hand

Specification of toolholders

No.	Type	b	h	L	OL
1	GTHR–C91S2020	20	20	125	135
2	GTHL–C91S2020	20	20	125	135
3	GTHR–C91S2525	25	25	150	160
4	GTHL–C91S2525	25	25	150	160

WORLDIA PCD/PCBN FACE MILLING CUTTERS

Face milling/Shoulder Milling

PCD Material Introduction

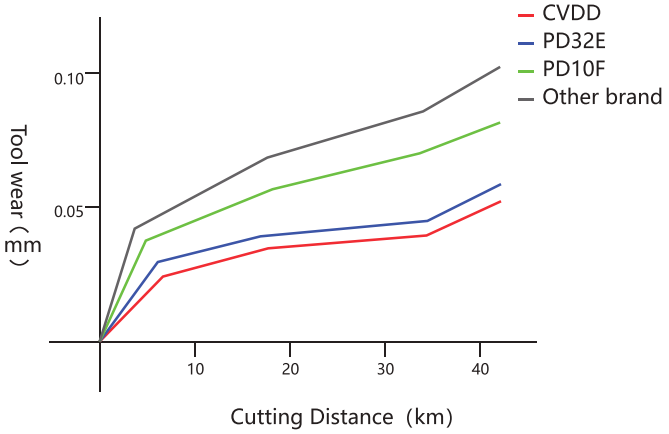
Introduction

Material	Grade size(μm)	Feature	Application
PD01E	1	PD01E fine grain size PCD material(1μm) is suitable for mirror finishing applications.Its high impart resistance and high abrasive resistance are no less than that of rough grade of PCD .	PD01E has excellent chip resistance is suitable for the roughing and interrupt cutting aluminium alloys. This grade is also commonly used for non-ferrous finishing applications. Other successful applications include machining of wood, MDF.
PD10E	10	PD10E is the universal grade in the market. It's the first choice for many applications where a good balance of toughness and wear resistance are required.	This grade is commonly used for non-ferrous finishing applications. Other successful applications include machining of wood, MDF.The machining of low-medium content silicon aluminium alloys, carbide, hard rubber, graphite and so on.
PD32E	2~30	PD32E has a unique combination of wear resistance, edge strength and edge quality. It contains a carefully selected mix of micron diamond (between 2 - 30 μm). The combination of these particle sizes and a specifically developed high pressure sintering process produces a structure with extreme abrasion resistance and good thermal stability.	Application areas include the machining of abrasive workpieces such as MMC, high silicon aluminium alloys as well as for the machining of carbide and carbide, hard rubber,graphite and other applications.
CVDD	—	CVDD is a pure carbon material without binder, which is extreme abrasion resistance and good thermal suitability. Due to its Perfect cutting edge suitable for applications where mirror finishes are required.	Application areas include the machining of abrasive workpieces such as MMC, high silicon aluminium alloys as well as for the machining of carbide, hard rubber,graphite and other applications.

Material performance

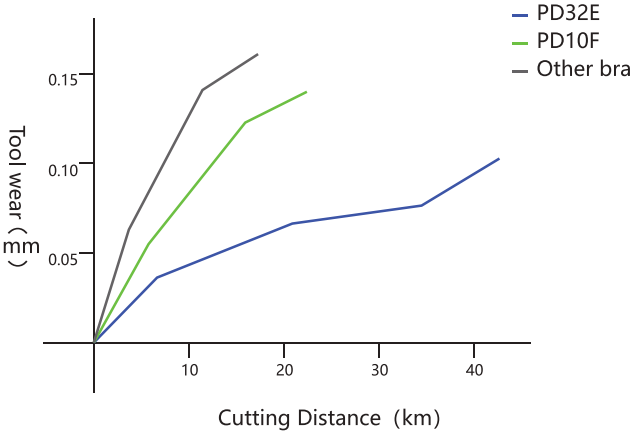
Continue cutting AL-25%Si

Vc=3927m/min f=0.1mm/r
ap=0.2mm



Continue cutting Al-20%SiC

Vc=3500m/min f=0.2mm/r
ap=0.18mm



WORLDIA® FMP-BE Indexable Face Milling Cutters for Consistent High Precision and High Speed Machining

Main Application:

WORLDIA® FMP-BE milling cutters with indexable inserts for milling of non ferrous material. Used for roughing and finishing operation to ensure the economical solution over the others. WORLDIA® FMP-BE face milling cutters are the first choice for end user to maintain quality standards with the high chip removal.

WORLDIA FMP-BE Indexable Face Milling Cutters for Consistent High Precision and High Speed Machining

Main Application:

In different industries application, many small-sized machines are used to processing aluminum case body. These machines have high precision spindles that can be worked at extremely high speed. They are not designed for high torque and normally the maximum tool weight is loaded with 3kg.WORLDIA developed light weight milling tools that precisely meet these requirements.

Innovative double metal design with light weight and high strength performance, all face milling cutters from diameters 80mm to 160mm can be mounted on the same milling holder. Even the face milling cutter of diameter 160mm with the BT30 adaptor, the total weight does not exceed 3kg.

WORLDIA FMP-BE Face Milling Cutters with Indexable Inserts

Customized design

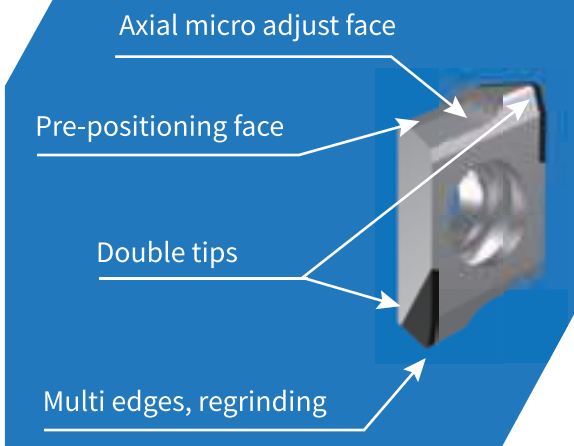
Main Applications:

Used for complex structure, and special requirements for tool diameter, length or rigidity,

Used for flexibly machining for cavity, shoulder and end face.

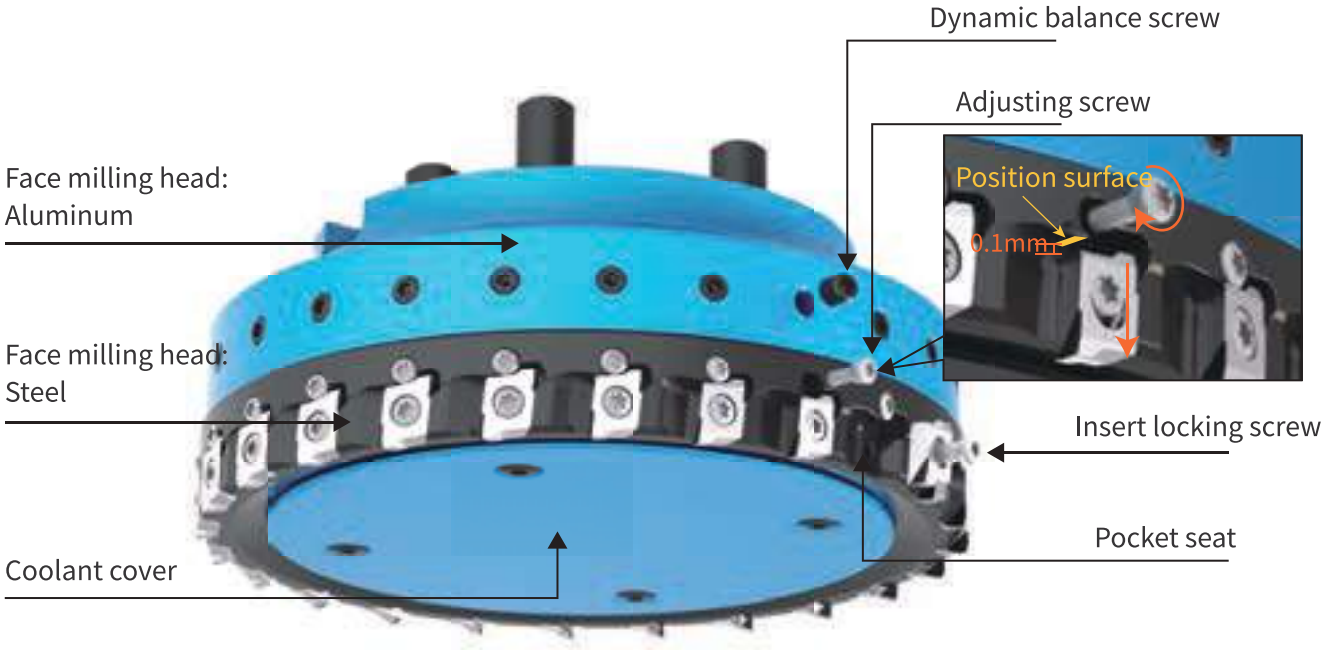
WORLDIA FMP-BE PCD Face Milling Features

- "Aluminum Alloy-Steel" double metal design, the aluminum center reduces the weight, while the hardened steel outer ring increases the rigidity speed and feeds.
- The double metal design makes the tooling lifetime several times longer than other aluminum face milling cutter.
- High-precision pocket seat keeps 0.02mm axial runout without insert adjustment.
- It can be easily adjusted to 2μm axial run out within 0.1mm range.
- Inserts are designed by variety of Kr, could meet different application of end milling and shoulder milling.
- The positioning surface and Flank face separated design, keep the positioning surface effectiveness when we do relap or retip.
- Two cutting edges design and retip service which could help our customers reduce their cost.
- Rough and finish in one tool.

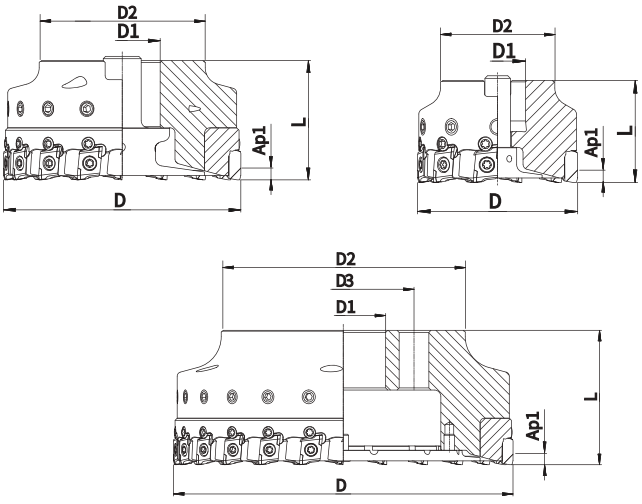


Insert structure details

WORLDIA FMP-BE PCD Face Milling Structures Detail



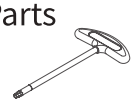
Shell Face Milling Cutters and Specifications



ISO

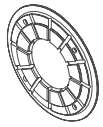
Specification	System code	D	D1	D2	D3	L	Ap1 max	Z	Kg	max RPM	Material
FMP040SA16-BE12-06	040401060013	40	16	36	—	40	11	6	0.36	40000	Steel
FMP050SA22-BE12-08	040401060005	50	22	45	—	40	11	8	0.55	35100	Steel
FMP063SA22-BE12-10	040401060006	63	22	45	—	40	11	10	0.75	30200	Steel
FMP080SA27-BE12-12	040401060007	80	27	50	—	50	11	12	0.96	27500	Steel+aluminium
FMP100SB32-BE12-16	040401060008	100	32	70	—	50	11	16	1.45	23800	Steel+aluminium
FMP125SB40-BE12-20	040401060009	125	40	90	—	63	11	20	2.40	19100	Steel+aluminium
FMP160SC40-BE12-24	040401060010	160	40	115	66.7	63	11	24	3.00	14900	Steel+aluminium
FMP200SC60-BE12-30	040401060011	200	60	150	101.6	63	11	30	4.25	11900	Steel+aluminium
FMP250SC60-BE12-36	040401060012	250	60	200	101.6	63	11	36	6.50	9550	Steel+aluminium

Spare Parts



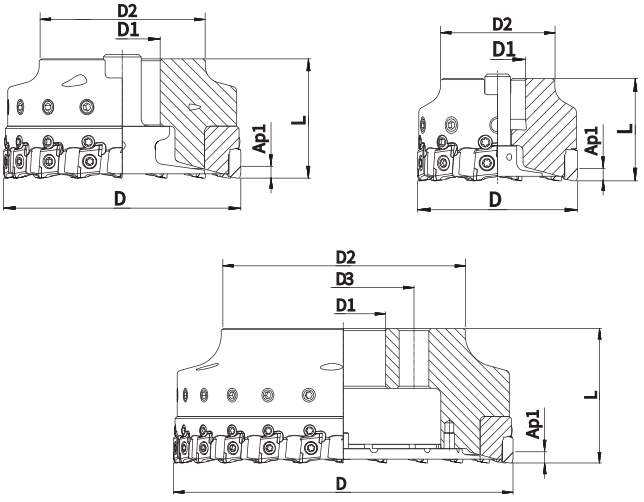






D1	Wrench	Insert screw	Adjusting screw	Dynamic balance screw	Coolant lock screw	Coolant lock screw	Coolant shower plate
40	15IP	S40120J	S30110G	M6*0.75	FMP040SA16-BE12-06.02	—	—
50	15IP	S40120J	S30110G	M6*0.75	FMP050SA22-BE12-08.02	—	—
63	15IP	S40120J	S30110G	M6*0.75	FMP063SA22-BE12-10.02	—	—
80	15IP	S40120J	S30110G	M6*0.75	FMP080SA27-BE12-12.03	—	—
100	15IP	S40120J	S30110G	M6*0.75	—	FMP100SB32-BE12-16.03	—
125	15IP	S40120J	S30110G	M6*0.75	—	FMP125SB40-BE12-20.03	—
160	15IP	S40120J	S30110G	M6*0.75	—	—	FMP160SC40-BE12-24.03
200	15IP	S40120J	S30110G	M6*0.75	—	—	FMP200SC60-BE12-30.03
250	15IP	S40120J	S30110G	M6*0.75	—	—	FMP250SC60-BE12-36.03

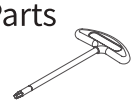
Shell Face Milling Cutters and Specifications



JIS

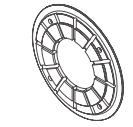
Specification	System code	D	D1	D2	D3	L	Ap1 max	Z	Kg	max RPM	Material
FMP040SA16-BE12-06	040401060013	40	16	36	—	40	11	6	0.36	40000	Steel
FMP050SA22-BE12-08	040401060005	50	22	45	—	40	11	8	0.55	35100	Steel
FMP063SA22-BE12-10	040401060006	63	22	45	—	40	11	10	0.75	30200	Steel
FMP080SA25.4-BE12-12	040401060033	80	25.4	50	—	50	11	12	0.84	27500	Steel+aluminium
FMP100SB31.75-BE12-16	040401060034	100	31.75	60	—	50	11	16	1.25	23800	Steel+aluminium
FMP125SB38.1-BE12-20	040401060035	125	38.1	80	—	63	11	20	2.15	19100	Steel+aluminium
FMP160SC50.8-BE12-24	040401060036	160	50.8	100		63	11	24	2.7	14900	Steel+aluminium
FMP200SC47.625-BE12-30		200	47.625	150	101.6	63	11	30		11900	Steel+aluminium
FMP250SC47.625-BE12-36		250	47.625	200	101.6	63	11	36		9550	Steel+aluminium

Spare Parts



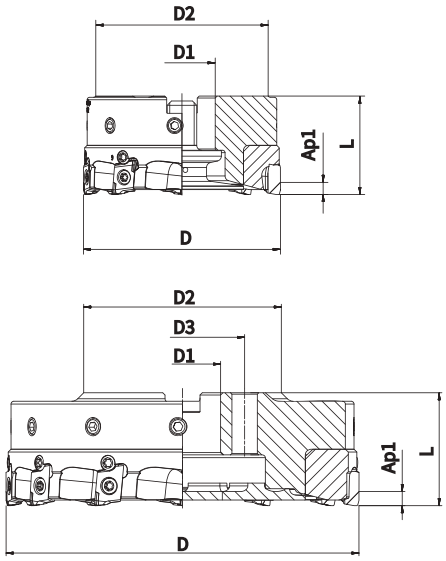






D1	Wrench	Insert screw	Adjusting screw	Dynamic balance screw	Coolant lock screw	Coolant lock screw	Coolant shower plate
40	15IP	S40120J	S30110G	M6*0.75	FMP040SA16-BE12-06.02	—	—
50	15IP	S40120J	S30110G	M6*0.75	FMP050SA22-BE12-08.02	—	—
63	15IP	S40120J	S30110G	M6*0.75	FMP063SA22-BE12-10.02	—	—
80	15IP	S40120J	S30110G	M6*0.75	FMP080SA25.4-BE12-12.03	—	—
100	15IP	S40120J	S30110G	M6*0.75	—	FMP100SB31.75-BE12-16.03	—
125	15IP	S40120J	S30110G	M6*0.75	—	FMP125SB38.1-BE12-20.03	—
160	15IP	S40120J	S30110G	M6*0.75	—	—	FMP160SC50.8-BE12-24.03
200	15IP	S40120J	S30110G	M6*0.75	—	—	FMP200SC47.625-BE12-30.03
250	15IP	S40120J	S30110G	M6*0.75	—	—	FMP250SC47.625-BE12-36.03

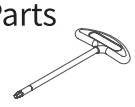
Light Weight Shell Face Milling Cutters Specifications



ISO

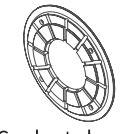
Specification	System code	D	D1	D2	D3	L	Ap1 max	Z	Kg	max RPM	Material
FMP080SB27-BE12-08	040401060029	80	27	70	—	40	11	8	0.78	27500	Steel+aluminium
FMP100SB27-BE12-08	040401060028	100	27	70	—	40	11	8	1.12	23800	Steel+aluminium
FMP125SC27-BE12-12	040401060027	125	27	70	54	40	11	12	1.43	19100	Steel+aluminium
FMP160SC27-BE12-12	040401060026	160	27	70	54	40	11	12	2.00	14900	Steel+aluminium

Spare Parts



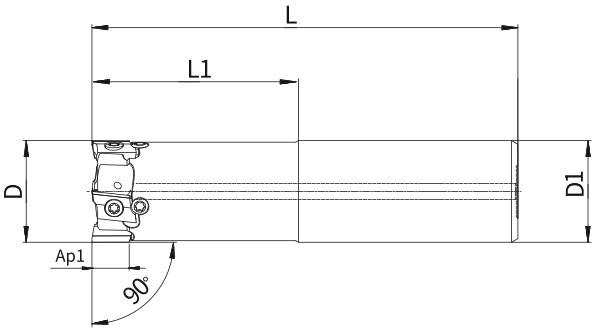






D1	Wrench	Insert screw	Adjusting screw	Dynamic balance screw	Coolant lock screw	Coolant lock screw	Coolant shower plate
80	15IP	S40120J	S30110G	M6*0.75	—	FMP080SB27-BE12-08.03	—
100	15IP	S40120J	S30110G	M6*0.75	—	FMP100SB27-BE12-08.03	—
125	15IP	S40120J	S30110G	M6*0.75	—	—	FMP125SC27-BE12-12.03
160	15IP	S40120J	S30110G	M6*0.75	—	—	FMP160SC27-BE12-12.03

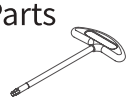
Parallel Shank Milling Cutters Specifications



ISO

Specification	System code	D	D1	D2	L	L1	Ap1 max	Z	Kg	max RPM	Material
FMP025CS25-BE12-03	040401060015	25	25	—	130	50	11	3	0.50	25000	Steel
FMP032CS32-BE12-04	040401070005	32	32	—	130	50	11	4	0.80	25000	Steel

Spare Parts



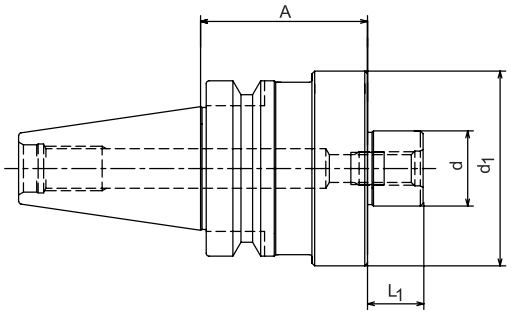
D	Wrench	Insert screw	Adjusting screw
25	15IP	S40090J	S30110G
32	15IP	S40090J	S30110G

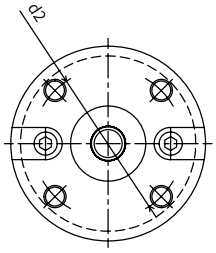
Milling Adaptors

BT

JIS B 6339

Internal Coolant



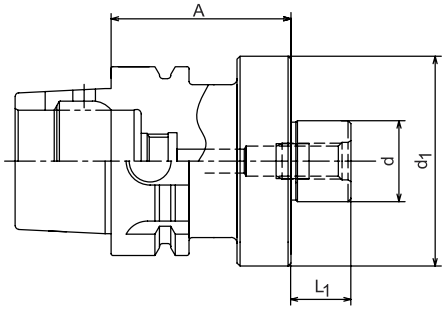


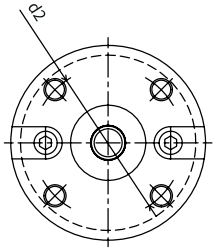
Specification	System code	d	d1	d2	L1	A	Kg
BT30-FMC16-045		16	34	—	17	45	0.60
BT30-FMC22-045	040401070007	22	45	—	18	45	0.70
BT30-FMC27-045	040401070008	27	70	—	20	45	1.10
BT40-FMC22-060	040401070009	22	45	—	18	60	1.50
BT40-FMC27-060	040401070010	27	70	—	20	60	2.00
BT40-FMC32-060	040401070011	32	85	—	22	60	2.40
BT40-FMB40F-060	040401070002	40	85	66.7	26	60	2.60
BT50-FMB40F-075	040401070013	40	110	66.7	26	75	6.70
BT50-FMB60-075	040401070014	60	140	101.6	25	75	8.50

HSK

DIN 69893

Internal Coolant





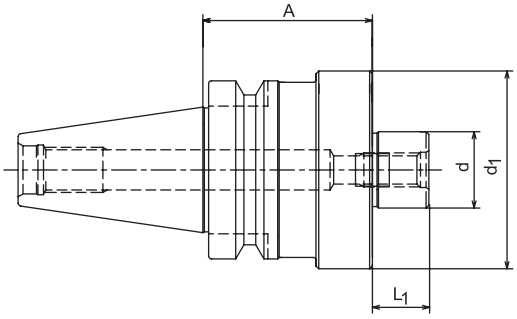
Specification	System code	d	d1	d2	L1	A	Kg
HSK63A-FMC22-060	040401070015	22	45	—	18	60	1.10
HSK63A-FMC27-060	040401070016	27	70	—	20	60	1.50
HSK63A-FMC32-060	040401070017	32	85	—	22	60	1.80
HSK63A-FMB40F-060	040401070018	40	85	66.7	26	60	1.80
HSK100A-FMB40F-075	040401070019	40	110	66.7	26	75	4.80
HSK100A-FMB60-075	040401070020	60	140	101.6	25	75	6.80

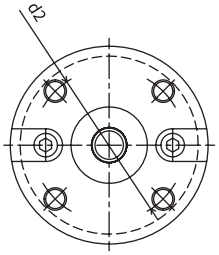
Light Weight Milling Adaptors

BT

JIS B 6339

Internal Coolant



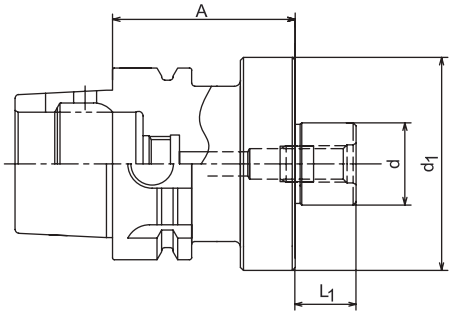


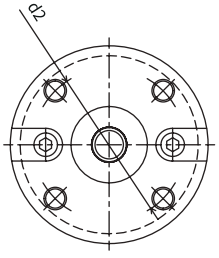
Specification	System code	d	d1	d2	L1	A	Kg
BT30-FMC27F-035	040401070040	27	70	54	20	35	0.90
BT40-FMC27F-060	040401070042	27	70	54	20	60	2.00

HSK

DIN 69893

Internal Coolant





Specification	System code	d	d1	d2	L1	A	Kg
HSK63A-FMC27F-060	040401070041	27	70	54	20	60	1.50

Inserts Nomenclature

B	E	H	W	12	04	E	Z	F	R	1	-	WG
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪		⑫

①

Shape		
Code	Shape	
O	Octagonal	
S	Square	
T	Triangle	
C	Diamond 80°	
M	Diamond 86°	
B	Diamond 82°	
R	Round	
X	Special	—
W	Wiper	—

②

Clearance angle	
Code	Clearance Angle
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°
Z	Other clearance angle

③

Tolerance			
Code	Nose Height m (mm)	Inscribed Circle Diameter &D1(mm)	Tolerance S1(mm)
A	±0.005	±0.025	±0.025
C	±0.013	±0.025	±0.025
E	±0.025	±0.025	±0.025
H	±0.013	±0.013	±0.025
K*	±0.013	±0.05—±0.15	±0.025
M*	±0.08—±0.18	±0.05—±0.15	±0.13
N*	±0.08—±0.18	±0.05—±0.15	±0.025

*standard for no lapping on the side face.

④

Chip breaker and Fixing type				
Code	Bore	Shape of Bore	Chip Breaker	Shape
W	With Bore	Cylindrical Bore + Single Side (40°—60°)	Without	
T	With Bore		Single	
B	With Bore	Cylindrical Bore + Single Side (70°—90°)	Without	
N	Without	—	Without	
R	Without	—	Single	
X	—	—	—	Special

Inserts Nomenclature

B	E	H	W	12	04	E	Z	F	R	1	-	WG
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪		⑫

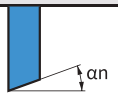
⑤

Inscribed circle Dia.				
Code				Inscribed Circle (mm)
R	C	S	T	
	06	06	11	6.35
	08	07	13	7.94
	09	09	16	9.525
10				10.00
12				12.00
	12	12	22	12.70
	16	15	27	15.875
20				20.00

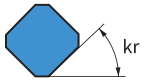
⑥

Thickness	
	
Code	Thickness (mm)
03	3.18
T3	3.97
04	4.76

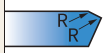
⑧

Clearance angle of wiper	
	
Code	Clearance angle of wiper
D	15°
E	20°
F	25°
G	30°
Z	Other Angle

⑦

Tool cutting edge angle	
	
Code	Tool cutting edge angle
A	45°
E	75°
P	90°
Z	Other Angle

⑨

Cutting edge design	
Code	Cutting Edge Design
E	 Honed
F	 Sharp Edge
T	 Chamfered
S	 Chamfered + Honed
Z	 Chamfered

⑩

Cutting direction	
Code	Cutting Direction
L	Left Hand
N	Left& Rright
R	Right Hand

⑪

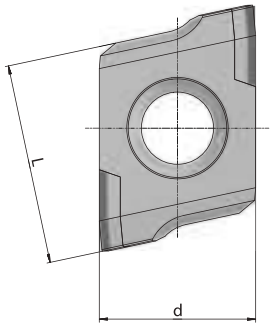
Edges	
Code	Edges
1	1 edge
2	2 edge
4	4 edge

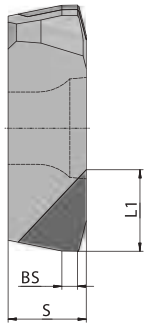
⑫

Cutting edge design		
WG	UW	PT
Wiper	Universal Wiper	PT edge

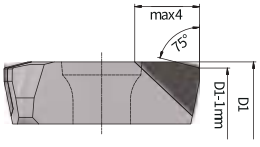
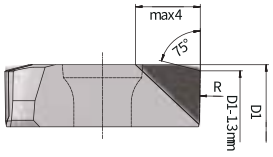
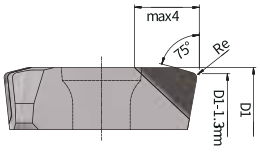
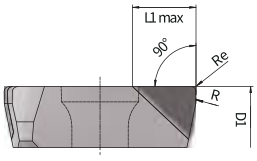
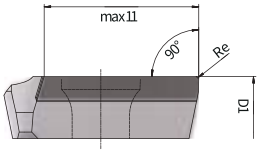
Milling Inserts Specifications

Insert are designed by variety of Kr, could meet different application of end milling and shoulder milling.





Specifications

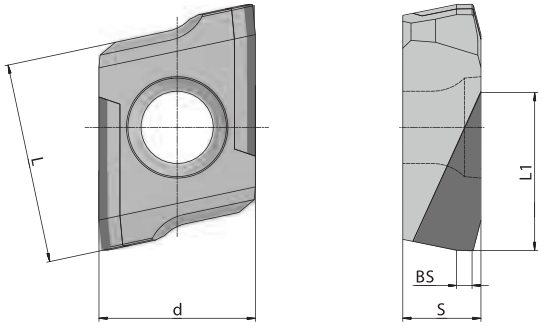
Figure	Specification	Z	L	d	S	BS	L1	R	N PD01F	N PD10E	N PD32E	N CVDD
Standard 	BEHW1204EZFR1	1										
	BEHW1204EZFR2	2	12.20	9.525	4.76	1	4	—	○	●	○	○
	BEHW1204EZFR1B	1										
Wiper 	BEHW1204EZFR1-WG	1										
	BEHW1204EZFR2-WG	2	12.20	9.525	4.76	4	4	—	○	●	○	○
	BEHW1204EZFR1B-WG	1										
Corner edge 	BEHW1204EZFR1-PT	1										
	BEHW1204EZFR2-PT	2	12.20	9.525	4.76	—	4	0.4	○	●	○	○
	BEHW1204EZFR1B-PT	1										
Popular wiper 	BEHW1204PZFR1-UW	1										
	BEHW1204PZFR2-UW	2	12.20	9.525	4.76	1.5	4	0.4	○	●	○	○
	BEHW1204PZFR1B-UW	1										
straight edge 	BEHW1204PZFR1	1	12.20	9.525	4.76	1.5	11	0.4	○	●	○	○
	BEHW1204PZFR1B	1										

● In stock ○ Tailor-made

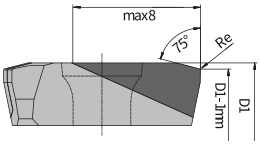
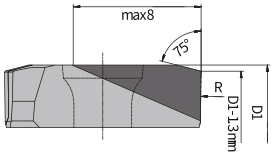
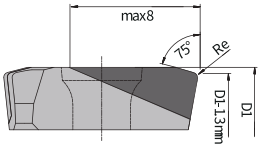
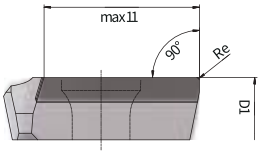
Note: BEHW1204***R1B is suitable for milling cutter with the diameter below 40mm.

Milling Inserts (Heavy cutting) Specifications

Inserts are designed by variety of Kr could meet different application of end milling and shoulder milling.



Specifications

Figure	Specification	Z	L	d	S	BS	L1	R	N			
									PD01F	PD10E	PD32E	CVDD
Standard 	BEHW1204EZTR1	1	12.20	9.525	4.76	1	8	0.4	○	●	○	○
	BEHW1204EZTR2	2										
	BEHW1204EZTR1B	1										
Wiper 	BEHW1204EZTR1-WG	1	12.20	9.525	4.76	4	8	—	○	●	○	○
	BEHW1204EZTR2-WG	2										
	BEHW1204EZTR1B-WG	1										
Sharp corner 	BEHW1204EZTR1-PT	1	12.20	9.525	4.76	—	8	0.4	○	●	○	○
	BEHW1204EZTR2-PT	2										
	BEHW1204EZTR1B-PT	1										
Right-angle 	BEHW1204PZTR1	1	12.20	9.525	4.76	1	11	0.8	○	●	○	○
	BEHW1204PZTR1B	1										

● In stock ○ Tailor-made

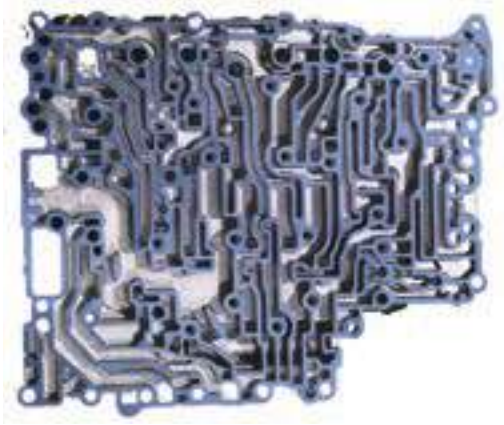
Note: BEHW1204***R1B is suitable for milling cutter with the diameter below 40mm.

Case Studies

Material：AlSi7Mg
Tool：FMP200SC60-BE12-30 D=200 Z=30
Cutting Data：ap=0.5mm Vc=3800m/min n=6050 f=2.25mm/r fz=0.075mm/Z

Material：AlSi7Mg
Tool：FMP125SB40-BE12-20 D=125 Z=20
Cutting Data：ap=7mm Vc=3927m/min n=10000 f=1mm/r fz=0.05mm/Z

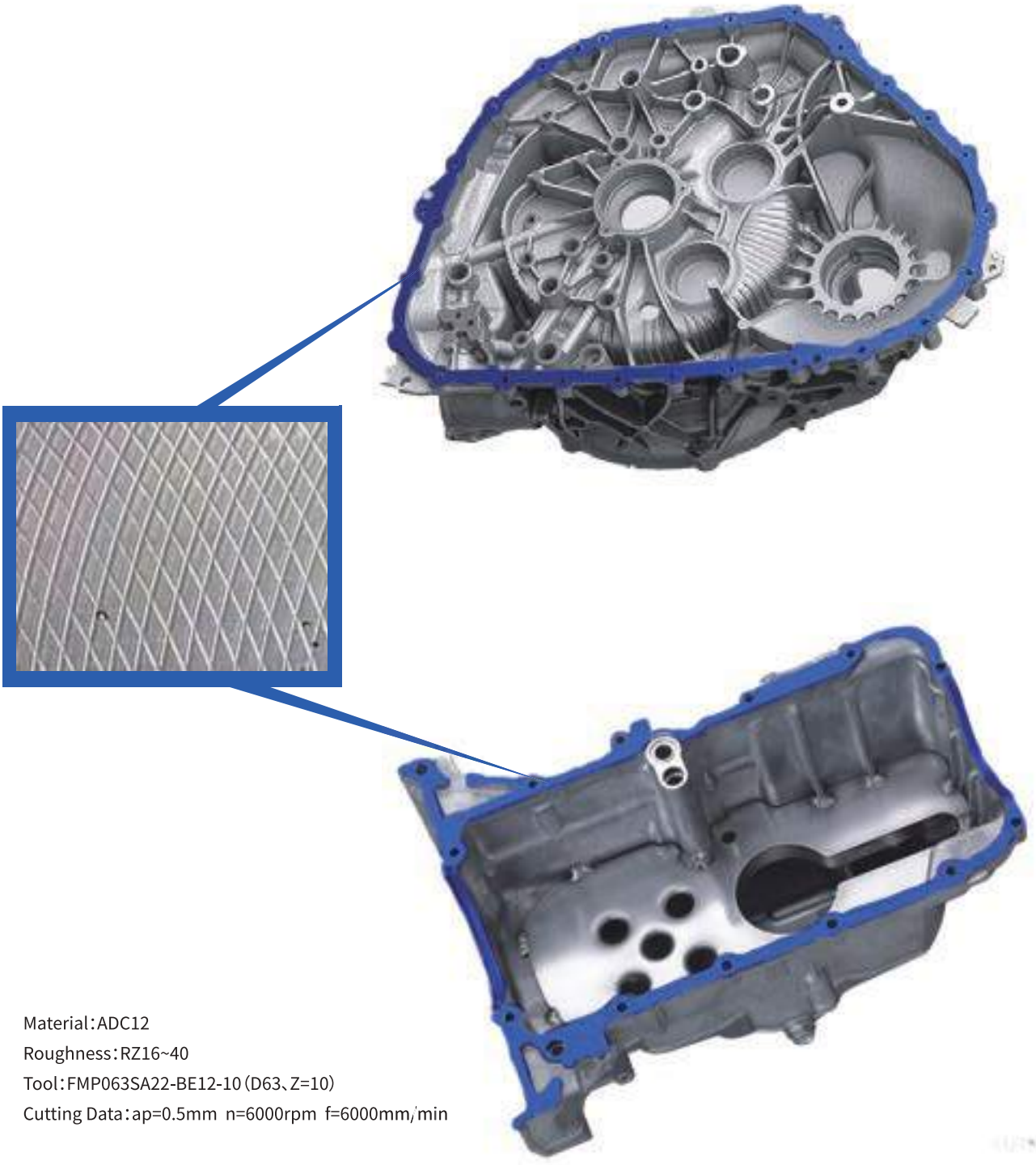
Material：Aluminum + Gray Iron
Tool：FMP200SC60-BE12-30 D=200 Z=30
Cutting Data：ap=0.5mm Vc=785m/min n=1250 f=1.44mm/r fz=0.048mm/Z



Material：ADC12
Tool：FMP230SC40-BE12-30 D=230 Z=30
Cutting Data：ap=0.2mm Vc=2746m/min n=3800 f=1.5mm/r fz=0.05mm/Z

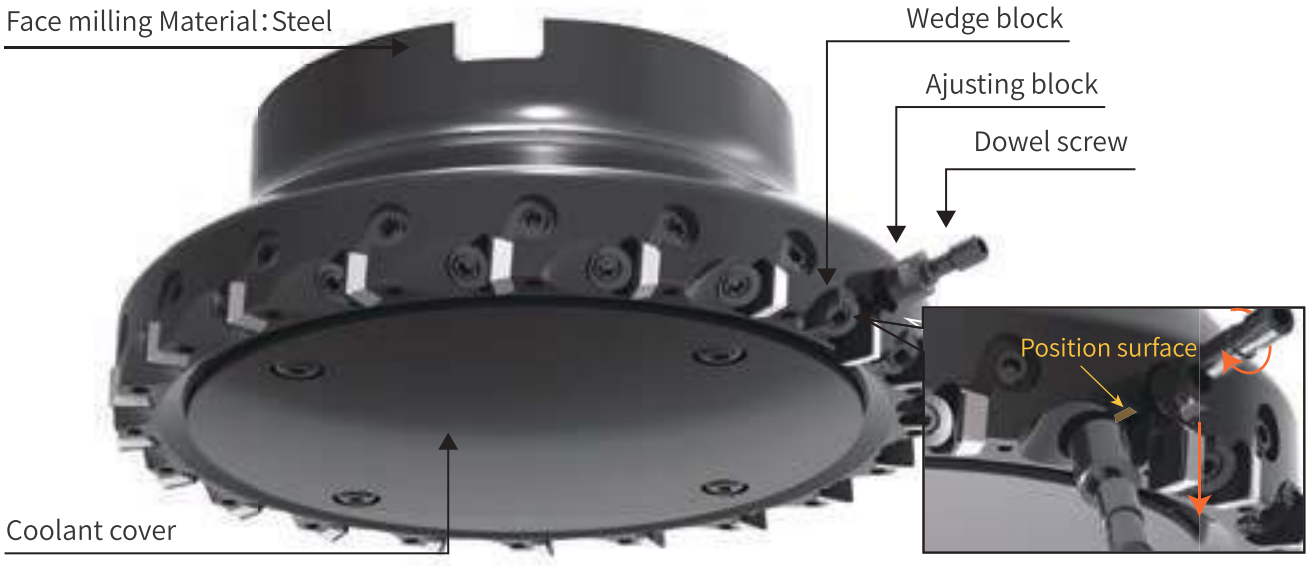
Case Studies——Hatching Milling

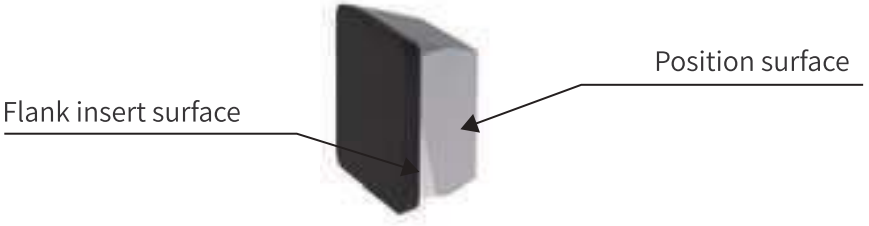
Material：AlSi10Mg
Roughness：Rz8~16
Tool：FMP063SA22-BE12-10（D63、Z=10）
Cutting Data：ap=1mm n=9600rpm f=8500mm/min



Material：ADC12
Roughness：RZ16~40
Tool：FMP063SA22-BE12-10（D63、Z=10）
Cutting Data：ap=0.5mm n=6000rpm f=6000mm/min

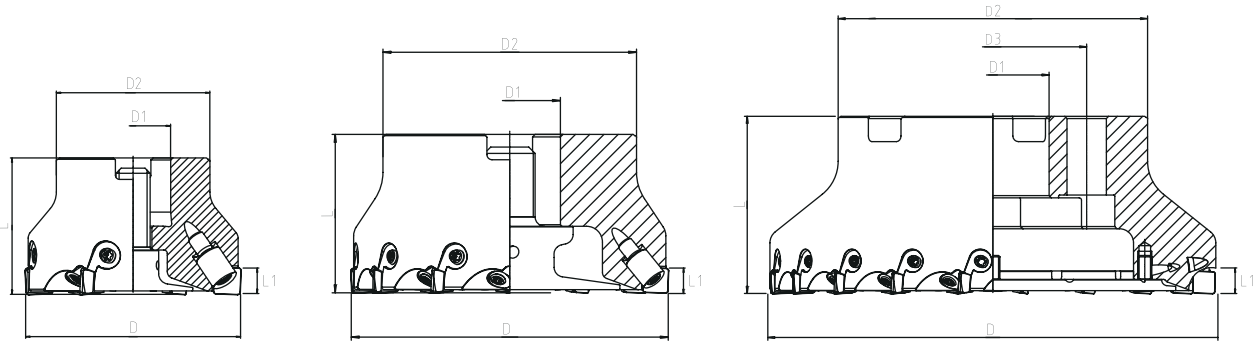
Structure Details of WORLDIA FMP-SD Indexable Face Milling Cutters





WORLDIA FMP-SD Indexable Face Milling Cutters Specifications

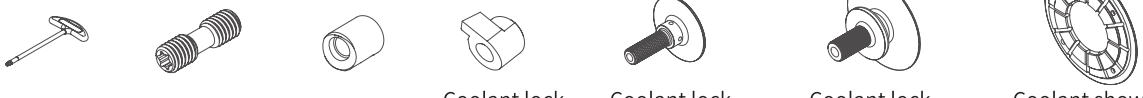
WORLDIA PCBN Indexable Face Milling Cutters used for face milling cast iron.



Specifications

Type	Inventory Code	D	D1	D2	D3	L	L1	Z	Kg	max RPM
FMP050SA22-SD07-05	040401060023	50	22	45	—	40	7.94	5	0.40	9500
FMP063SA22-SD07-08	040401060022	63	22	45	—	40	7.94	8	0.60	7500
FMP080SA27-SD07-10	040401060021	80	27	60	—	50	7.94	10	1.20	6000
FMP100SB32-SD07-12	040401060020	100	32	80	—	50	7.94	12	1.90	4700
FMP125SB40-SD07-16	040401060019	125	40	90	—	63	7.94	16	3.20	3800
FMP160SC40-SD07-20	040401060018	160	40	110	66.7	63	7.94	20	4.50	3000
FMP200SC60-SD07-24	040401060017	200	60	150	101.6	63	7.94	24	6.80	2300
FMP250SC60-SD07-32	040401060016	250	60	200	101.6	63	7.94	32	11.6	1900

Spare Parts



D	Wrench	Dowel screw	Wedge block	Coolant lock screw	Coolant lock screw	Coolant lock screw	Coolant shower plate
50	15IP	M5*20	FMPSD07.01	FMPSD07.02	FMP050SA22-SD07-05.02	—	—
63	15IP	M5*20	FMPSD07.01	FMPSD07.02	FMP063SA22-SD07-08.02	—	—
80	15IP	M5*20	FMPSD07.01	FMPSD07.02	FMP080SA27-SD07-10.02	—	—
100	15IP	M5*20	FMPSD07.01	FMPSD07.02	—	FMP100SB32-SD07-12.02	—
125	15IP	M5*20	FMPSD07.01	FMPSD07.02	—	FMP125SB40-SD07-16.02	—
160	15IP	M5*20	FMPSD07.01	FMPSD07.02	—	—	FMP160SC40-SD07-20.02
200	15IP	M5*20	FMPSD07.01	FMPSD07.02	—	—	FMP200SC60-SD07-24.02
250	15IP	M5*20	FMPSD07.01	FMPSD07.02	—	—	FMP250SC60-SD07-30.02

Coding Rules of PCBN Milling Inserts

S	D	H	N	07	T3	EP 08	F	R	4	-	WG
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩		⑪

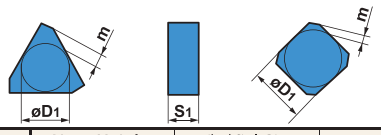
① Shape

Code	Shape	
O	Octagonal	
S	Square	
T	Triangle	
C	Diamond 80°	
M	Diamond 86°	
B	Diamond 82°	
R	Round	
X	Special	—
W	Wiper	—

② Clearance angle

Code	Clearance Angle
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°
O	Other clearance angle
X	Other clearance angle

③ Tolerance



Code	Nose Height m (mm)	Inscribed Circle Diameter &D1(mm)	Tolerance S1(mm)
A	±0.005	±0.025	±0.025
C	±0.013	±0.025	±0.025
E	±0.025	±0.025	±0.025
H	±0.013	±0.013	±0.025
K*	±0.013	±0.05—±0.15	±0.025
M*	±0.08—±0.18	±0.05—±0.15	±0.13
N*	±0.08—±0.18	±0.05—±0.15	±0.025

*standard for no lapping on the side face.

④ Chip breaker and Fixing type

Code	Bore	Shape of Bore	Chip Breaker	Shape
W	With Bore	Cylindrical Bore + Single Side (40°—60°)	Without	
T	With Bore		Single	
B	With Bore	Cylindrical Bore + Single Side (70°—90°)	Without	
N	Without	—	Without	
R	Without	—	Single	
X	—	—	—	Special

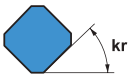
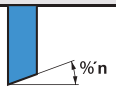
Coding Rules of PCBN Milling Inserts

S	D	H	N	07	T3	EP 08	F	R	4	-	WG
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩		⑪

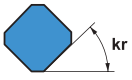
⑤

Inscribed circle Dia.				
Code				Inscribed Circle (mm)
R	C	S	T	
	06	06	11	6.35
	08	07	13	7.94
	09	09	16	9.525
10				10.00
12				12.00
	12	12	22	12.70
	16	15	27	15.875
20				20.00

⑥

Tip radius			
			
Code	Mark	Code	Mark
00	0.0	08	0.8
02	0.2	12	1.2
04	0.4	16	1.6
Tool cutting edgeangle		Clearance angle of wiper	
			
Code	Mark	Code	Mark
A	45°	D	15°
E	75°	E	20°
P	90°	F	25°
Z	Other	G	30°
		Z	Other

⑦

Tool cutting edgeangle	
	
Code	Tool cutting edgeangle
A	45°
E	75°
P	90°
Z	Other Angle

⑨

Cutting edge design	
Code	Cutting Edge Design
E	 Honed
F	 Sharp Edge
T	 Chamfered
S	 Chamfered + Honed
Z	 Chamfered

⑩

Cutting direction	
Code	Cutting Direction
L	Left Hand
N	Left& Rright
R	Right Hand

⑪

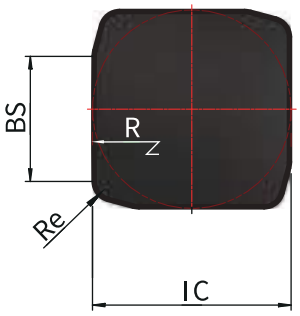
Edges	
Code	Edges
1	1 edge
2	2 edge
4	4 edge

⑫

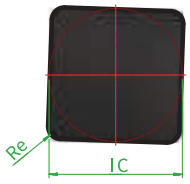
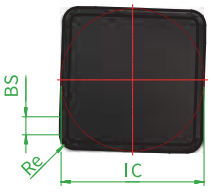
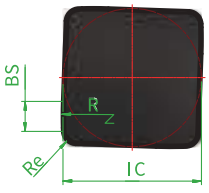
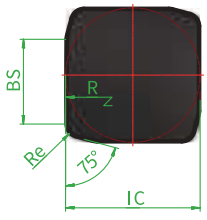
Cutting edge design		
WG	UW	PT
Wiper	Universal Wiper	PT edge

WORLDIA Milling Inserts Specifications

Inserts are designed by variety of Kr, could meet different application of end milling and shoulder milling.



Specificaitons

Diagram	Type Code	Z	IC	S	BS	Re	K PNK3003
Drift angle 	SDHN07T308	4	7.94	3.97	—	0.8	●
Standard 	SDHN07T3PPSR4	4	7.94	3.97	1.5	0.8	●
General 	SDHN07T3PPSR4-UW	4	7.94	3.97	1.5	0.8	●
Wiper 	SDHN07T3EPSR4-WG	4	7.94	3.97	5	0.8	●

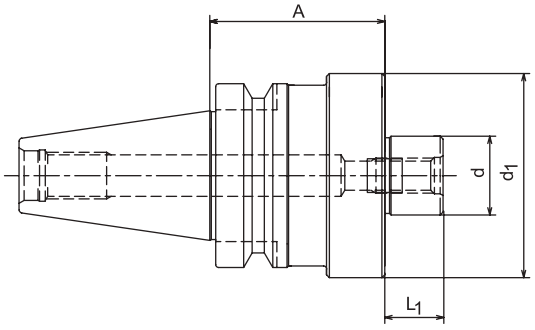
● In stock ○ Make-to-order

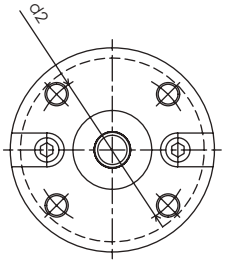
Milling Adaptors

BT

JIS B 6339

Center cooling



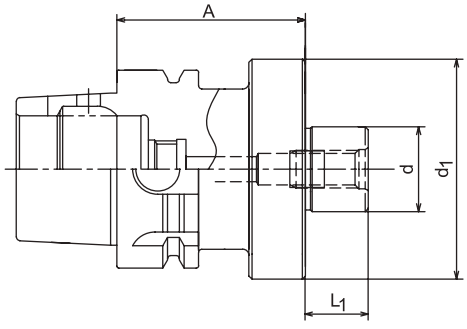


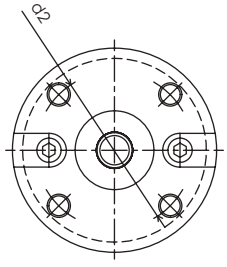
Type	Inventory code	d	d1	d2	L1	A	Kg
BT30-FMC22-045	040401070007	22	45	—	18	45	0.70
BT30-FMC27-045	040401070008	27	70	—	20	45	1.10
BT40-FMC22-060	040401070009	22	45	—	18	60	1.50
BT40-FMC27-060	040401070010	27	70	—	20	60	2.00
BT40-FMC32-060	040401070011	32	85	—	22	60	2.40
BT40-FMB40-060	040401070002	40	85	—	26	60	2.60
BT40-XMC40-060	040401070021	40	108	66.7	26	60	3.01
BT50-FMB40F-075	040401070013	40	110	66.7	26	75	6.70
BT50-FMB60-075	040401070014	60	140	101.6	25	75	8.50

HSK

JIS B 6339

Center cooling



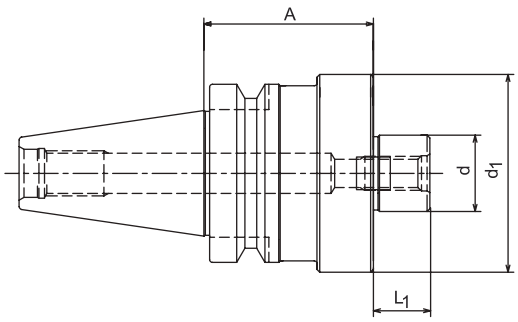


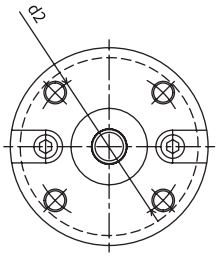
Type	Inventory code	D	D1	D2	L1	A	Kg
HSK63A-FMC22-060	040401070015	22	45	—	18	60	1.10
HSK63A-FMC27-060	040401070016	27	70	—	20	60	1.50
HSK63A-FMC32-060	040401070017	32	85	—	22	60	1.80
HSK63A-FMB40-060	040401070018	40	85	—	26	60	1.80
HSK63A-XMC40-060	040401070022	40	108	66.7	26	60	2.10
HSK100A-FMB40F-075	040401070019	40	110	66.7	26	75	4.80
HSK100A-FMB60-075	040401070020	60	140	101.6	25	75	6.80

Light Weight Milling Adaptors

BT

JIS B 6339 | Internal Coolant

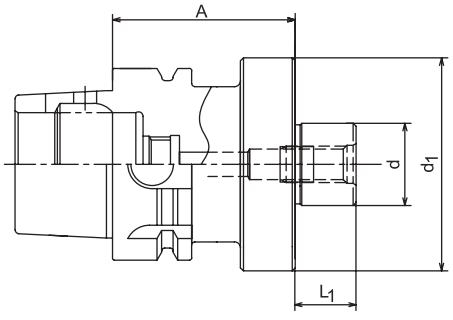


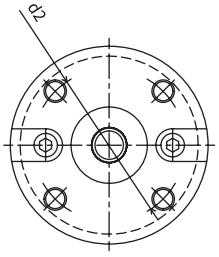


Specification	System code	d	d1	d2	L1	A	Kg
BT30-FMC27F-035	040401070040	27	70	54	20	35	0.90
BT40-FMC27F-060	040401070042	27	70	54	20	60	2.00

HSK

DIN 69893 | Internal Coolant

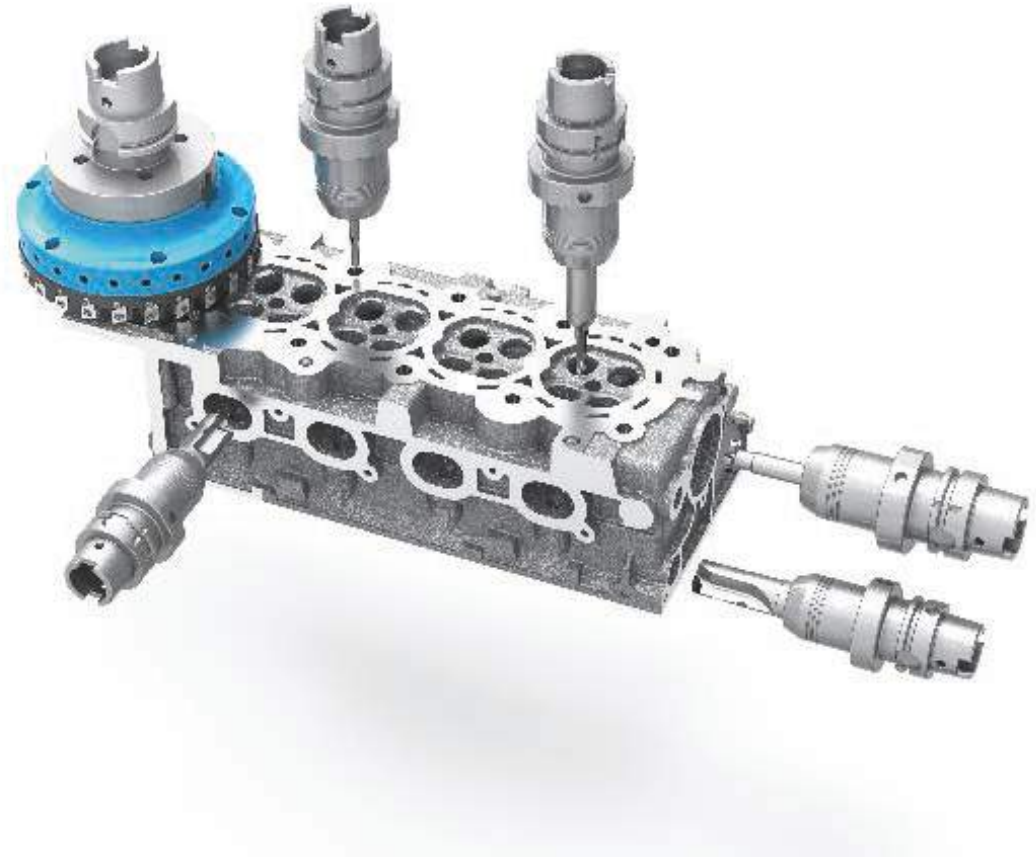




Specification	System code	d	d1	d2	L1	A	Kg
HSK63A-FMC27F-060	040401070041	27	70	54	20	60	1.50

WORLDIA
PCD NON-STANDARD TOOLS

For Auto Parts



WORLDIA® Specialty Tools Introduction

Products category:

1. Rotating tools: High-precision PCD/PCBN reamers, drill reamers, boring tools, end mills, profile cutters and etc.
2. Interchangeable: Welding/Integrated boring inserts, profile milling inserts, thread Inserts, roller inserts, planer tool;
3. Turning: Profile turning tools, internal/external groove cutters, thread turning tools:
4. Wear-resistant: high-precision PCD supportor, wear-resistant coupling, grinding wheel dresser.

Applications:

1. Processing of related parts and components in the automotive industry such as engines, wheel hubs, and brake disc;
2. Processing of key components in 3C industry, such as mobile phones, notebooks and tablet computers;
3. Processing of cast aluminum/cast iron such as air conditioner compressor housings and drive motors;
4. Processing of composite materials;
5. Processing of non-ferrous products such as resins, rubber, plastics, and semiconductors;
6. Processing of couplings, wear parts and etc. used in the oil drilling industry;
7. Processing of furniture, crafts and other wood-working industry.

WORLDIA® Specialty Tools Introduction

Equipment for specialty tools:

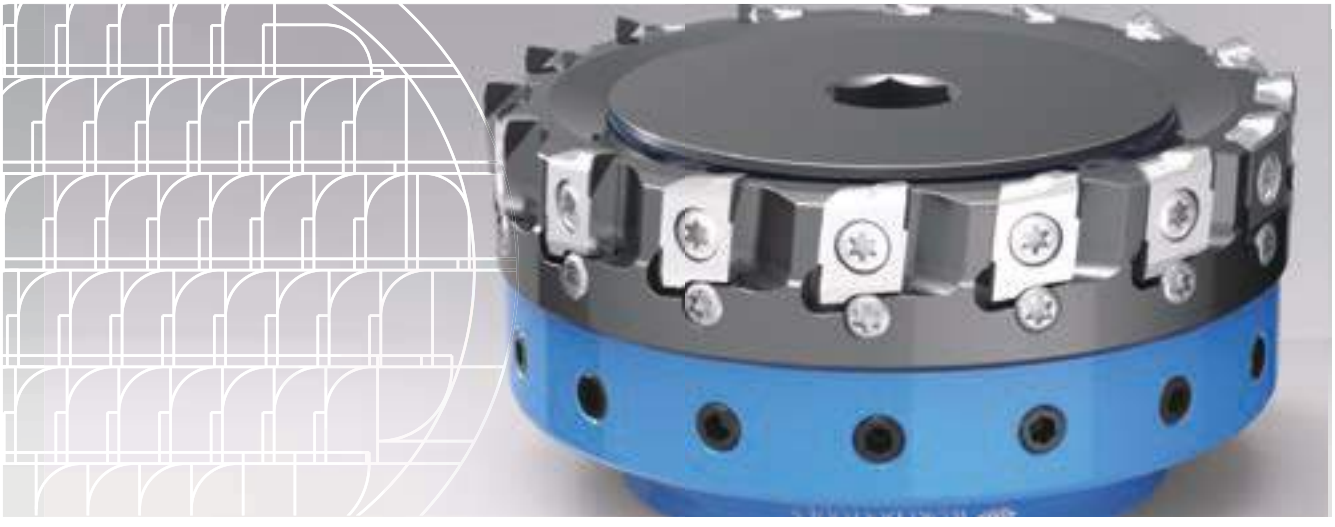
FANUC six-axis high-precision WEDM mainly undertakes the machining of specialty tools such as PCD/PCBN reamers, milling cutters and profile cutters. With the stable performance and reliable accuracy, the machine can keep higher edge and surface quality.

DMG high-precision laser cutting machine mainly undertakes the processing of specialty tools such as PCD/PCBN/CVD, which can ensure high processing precision and good appearance,especially in processing of PCD reamer chip breaker.

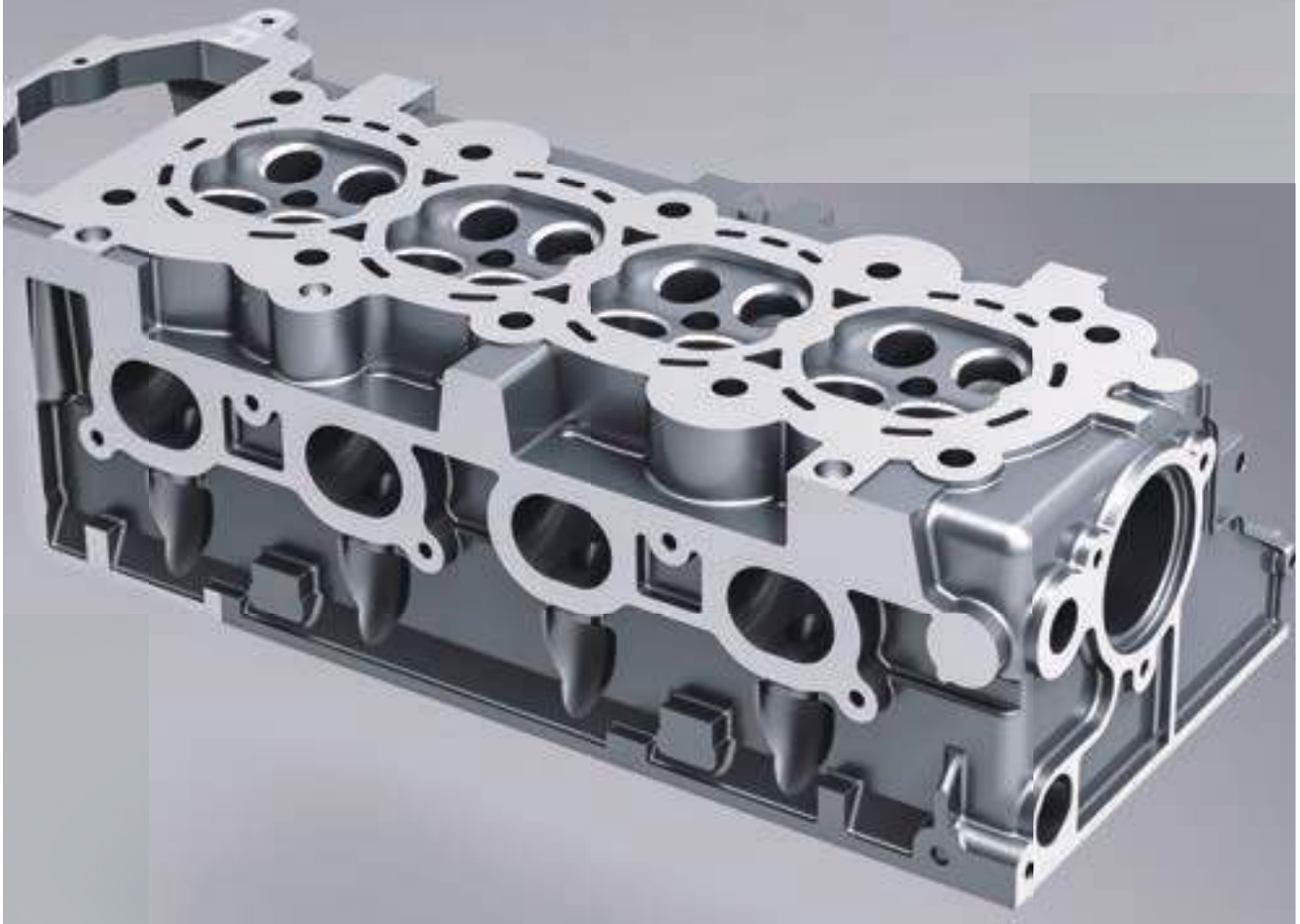
The Zoller pre-setting tools can pre-adjust, measure and manage all kinds of cutting tools conveniently and quickly. The equipment is equipped with HEIDENHAIN grating scales. The measurement data is accurate, repeatable and stable in reproducibility.

Z-MIKE laser diameter measuring instrument can collect measurement data automatically, process scientifically, calculate fast with stable measurement accuracy and high efficient measurement.

Haimer balance instrument can carry out single-side and double-side dynamic balance correction on the tool holder. It can achieve the accuracy of micron-level clamping by using laser marking and automatic positioning. The minimum measuring accuracy can be 0.5gmm, the calculation is accurate, and the operation is easy and quick.



PCD NON-STANDARD TOOLS
For Auto Parts



Cylinder Head

Face Milling Cutter

S=12000r/min
fz=0.05mm/z

Side and face milling

S=6000r/min
fz=0.03mm/z

Step Drilling Reamer

S=5500r/min
fz=0.12mm/z

End milling reamer

S=4000r/min
fz=0.03mm/z

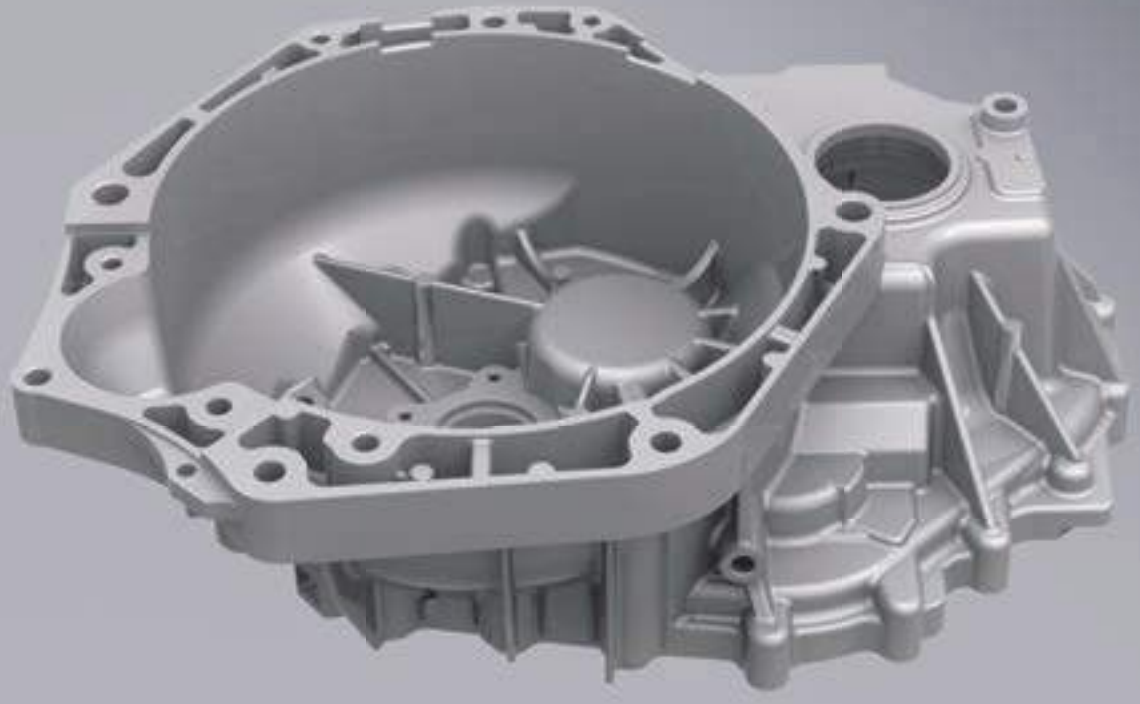
Step Reamer

S=5500r/min
fz=0.05mm/z

Step Reamer

S=3500r/min
fz=0.02mm/z

PCD NON-STANDARD TOOLS
For Auto Parts



Clutch Housing

Face Milling Cutter

S=6000r/min
fz=0.03mm/z

Step boring cutter

S=4000r/min
fz=0.10mm/z

Step Reamer

S=5500r/min
fz=0.12mm/z

Guide bar boring cutter

S=2200r/min
fz=0.08mm/z

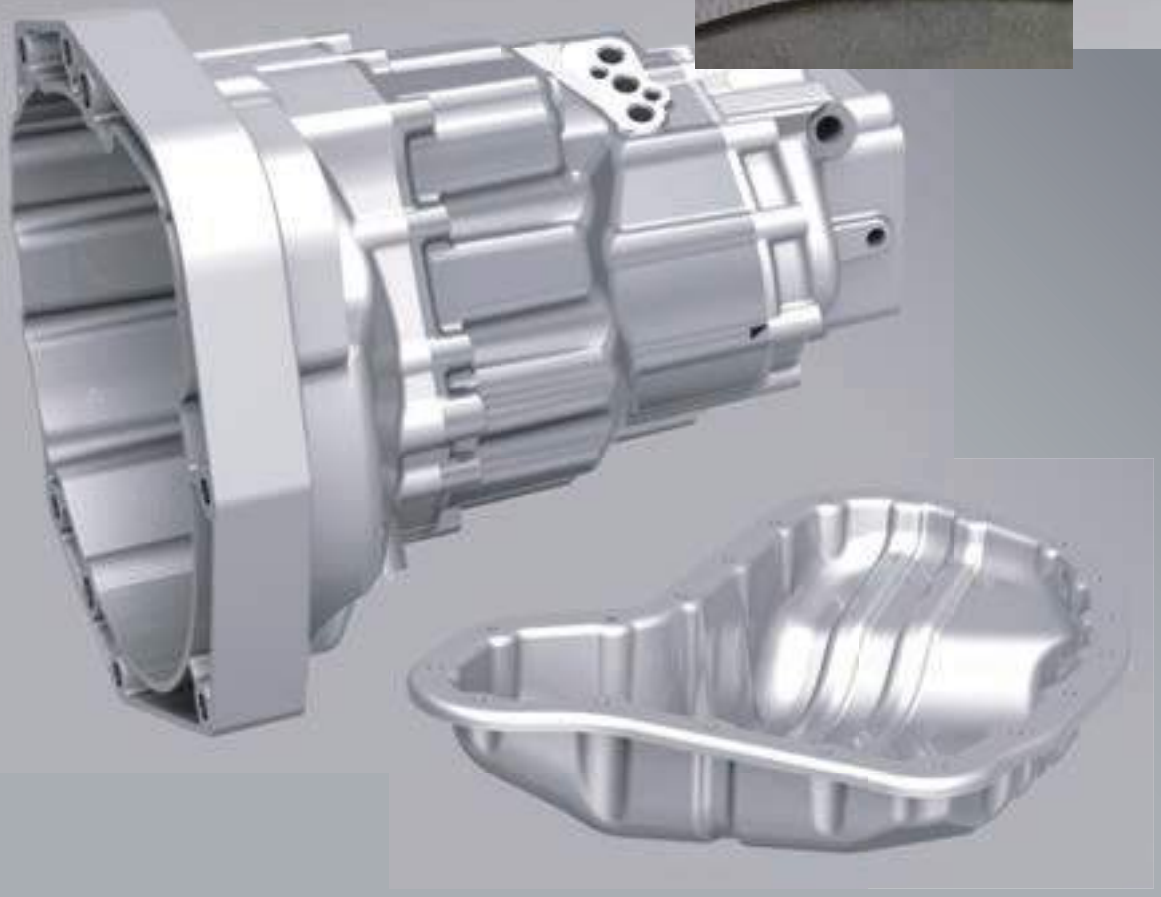
Forming milling cutter

S=6500r/min
fz=0.15mm/z

Combination boring cutter

S=3500r/min
fz=0.08mm/z

PCD NON-STANDARD TOOLS
For Auto Parts



Gear-box/Oil Pan

Face Milling Cutter

S=6000r/min
fz=0.03mm/z

Step reamer

S=12000r/min
fz=0.05mm/z

Shell milling reamers

S=3500r/min
fz=0.02mm/z

Step reamer

S=4000r/min
fz=0.04mm/z

Multi-Edge End Mill

S=5500r/min
fz=0.05mm/z

PCD NON-STANDARD TOOLS
For Auto Parts

Steering Gear

Step Drilling Reamer

S=4500r/min
fz=0.03mm/z

Multi step reamer

S=4000r/min
fz=0.08mm/z

Reverse chamfering milling cutter

S=3500r/min
fz=0.06mm/z

Multi step grooving milling cutter

S=3500r/min
fz=0.03mm/z

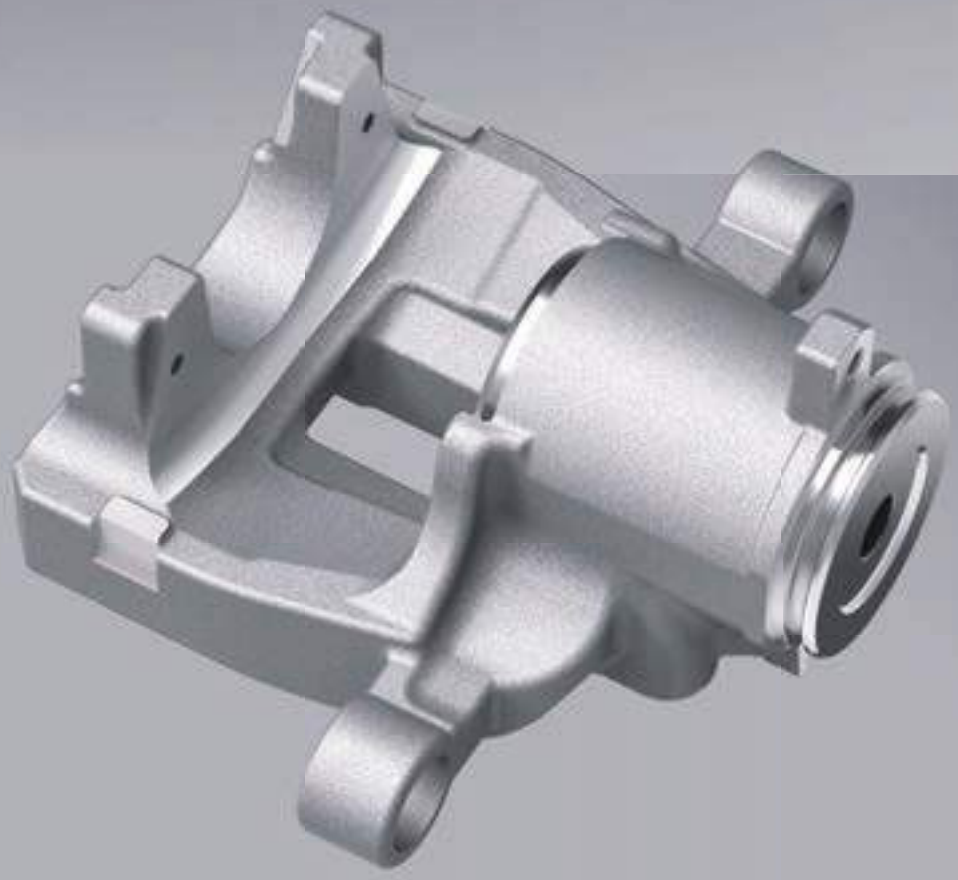
One step reamer

S=3500r/min
fz=0.1mm/z

Shell Milling Cutter

S=3500r/min
fz=0.055mm/z

PCD NON-STANDARD TOOLS
For Auto Parts



Brake Caliper

Side and face milling cutter

S=4500r/min
fz=0.035mm/z

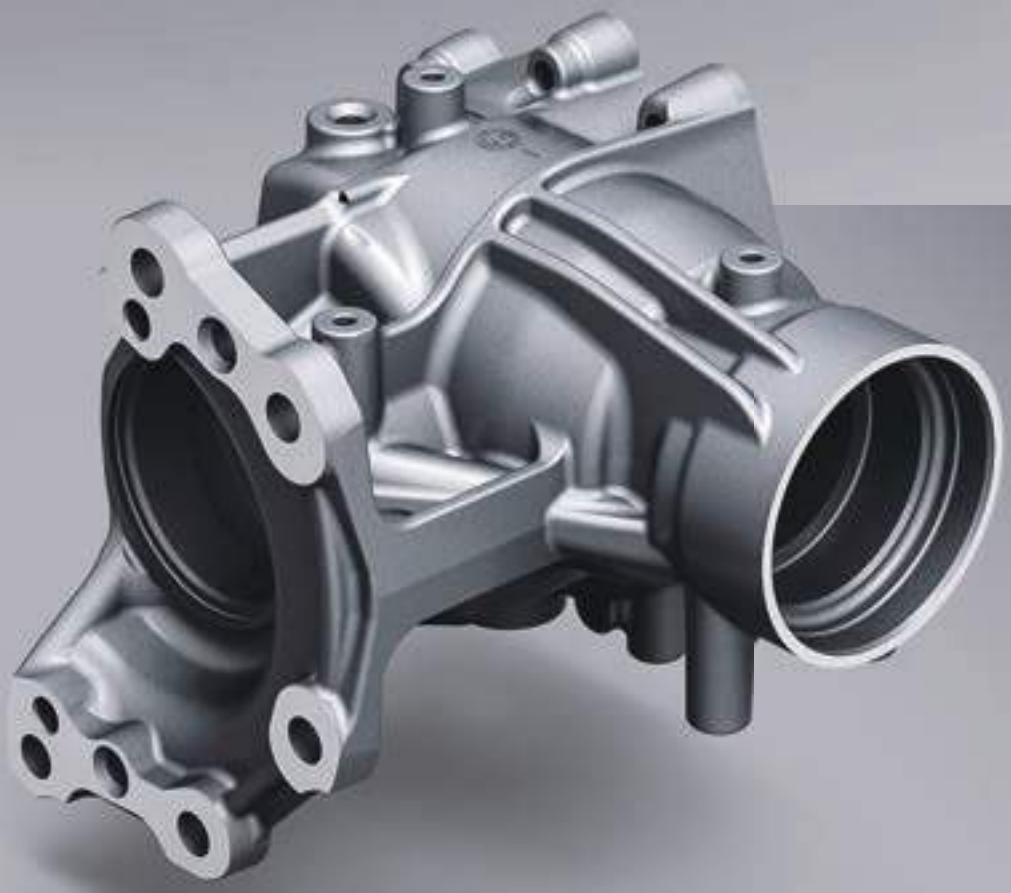
Grooving cutter

S=6500r/min
fz=0.045mm/z

Shell milling grooving cutter

S=6000r/min
fz=0.05mm/z

PCD NON-STANDARD TOOLS
For Auto Parts



Throttle Valve

Forming milling cutter

S=3500r/min
fz=0.045mm/z

Step Drilling Reamer

S=3600r/min
fz=0.015mm/z

Side milling cutter

S=4000r/min
fz=0.055mm/z

Step Drilling Reamer

S=3750r/min
fz=0.025mm/z

Step Reamer

S=4200r/min
fz=0.015mm/z

Throttle Valve

Dense-tooth multi step reamer

S=8000r/min
fz=0.05mm/z

Deep-hole drilling reamer

S=3500r/min
fz=0.012mm/z

Adjustable precision boring cutter

S=5500r/min
fz=0.05mm/z

PCD NON-STANDARD TOOLS
For Auto Parts

Steering Knuckles

Rough&finish drilling Reamer

S=5500r/min
fz=0.09mm/z

Step finish boring cutter

S=2500r/min
fz=0.10mm/z

Interchangeable rough boring cutter

S=1800r/min
fz=0.15mm/z

Contour milling cutter

S=3300r/min
fz=0.05mm/z

Step Reamer

S=4200r/min
fz=0.015mm/z

Steering Knuckles

4-layer milling cutter

S=3500r/min
fz=0.16mm/z

Solid spherical concave milling cutter

S=6000r/min
fz=0.10mm/z

side and face milling cutter

S=2600r/min
fz=0.08mm/z

End mill

S=6500r/min
fz=0.08mm/z

PCD NON-STANDARD TOOLS
For Auto Parts

Turbocharger

Profile contour milling cutter

S=8000r/min
fz=0.15mm/z

Taper milling cutter

S=6000r/min
fz=0.08mm/z

Forming drill

S=4500r/min
fz=0.10mm/z

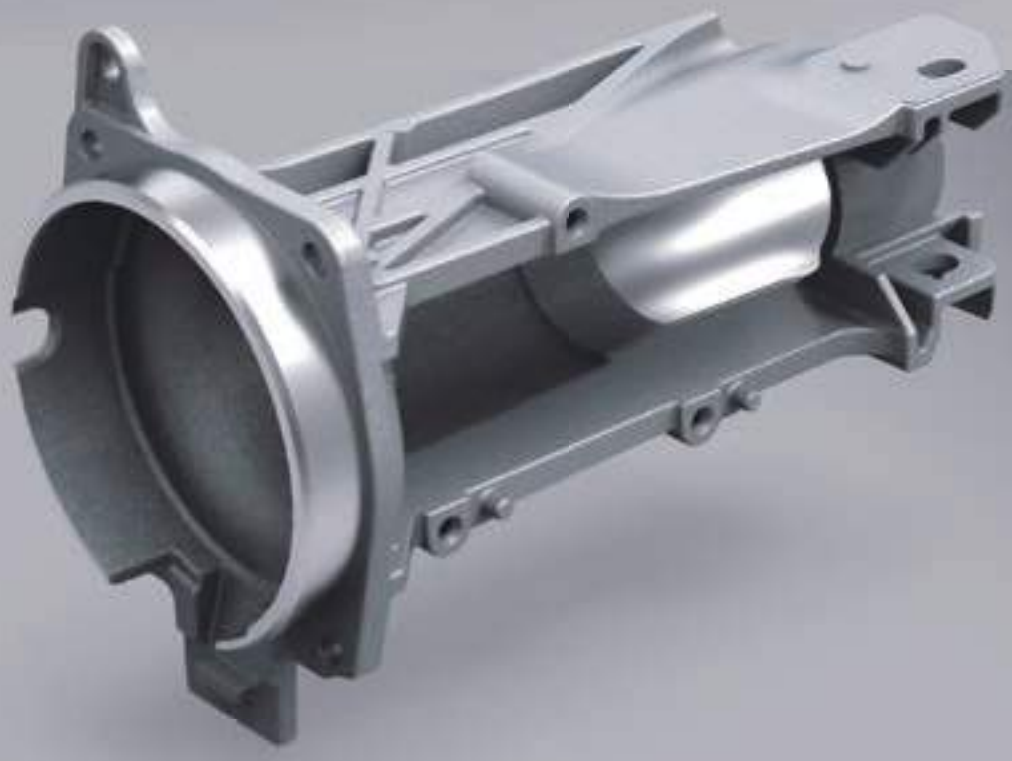
Forming shell milling cutter

S=4200r/min
fz=0.13mm/z

Step drilling r

S=4000r/min
fz=0.10mm/z

PCD NON-STANDARD TOOLS
For Auto Parts



Aluminium Products

Reverse milling cutter

S=8000r/min
fz=0.05mm/z

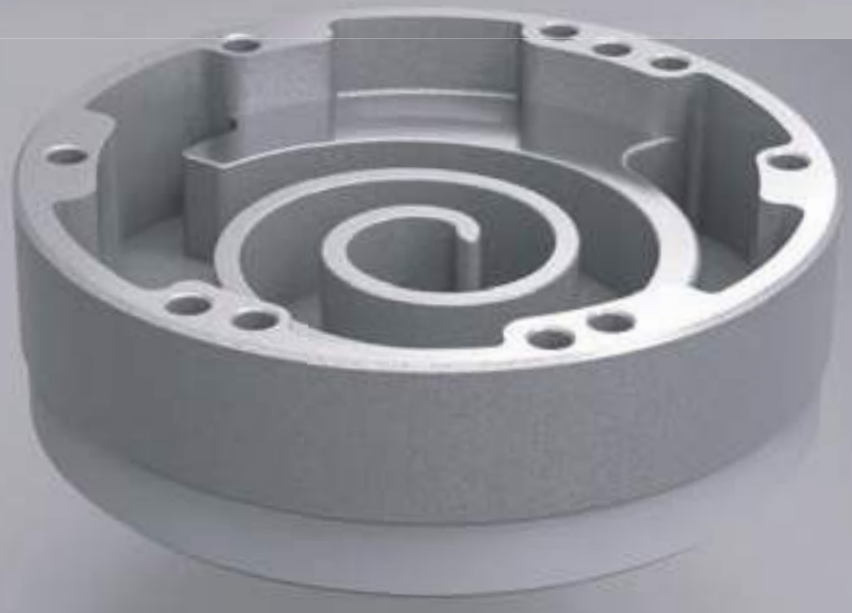
Adjustable precision boring cutter

S=8000r/min
fz=0.035mm/z

Side and face milling cutter

S=8000r/min
fz=0.065mm/z

PCD NON-STANDARD TOOLS
For Auto Parts



Scroll Plate

Drilling Reamer

S=4500r/min
fz=0.05mm/z

Side milling cutter

S=39800r/min
fz=0.10mm/z

Helical milling cutter

S=39800r/min
fz=0.05mm/z

PCD NON-STANDARD TOOLS
For Auto Parts

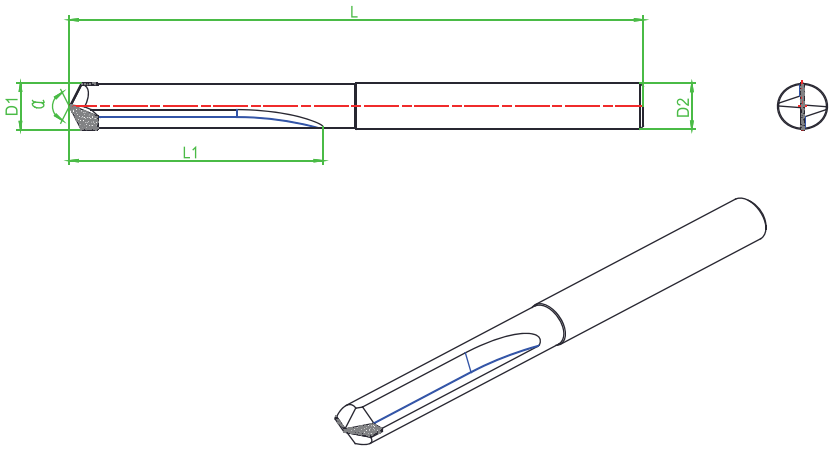
Slotted helical milling cutter

S=6000r/min
fz=0.15mm/z

Slotless helical milling cutter

S=8000r/min
fz=0.12mm/z

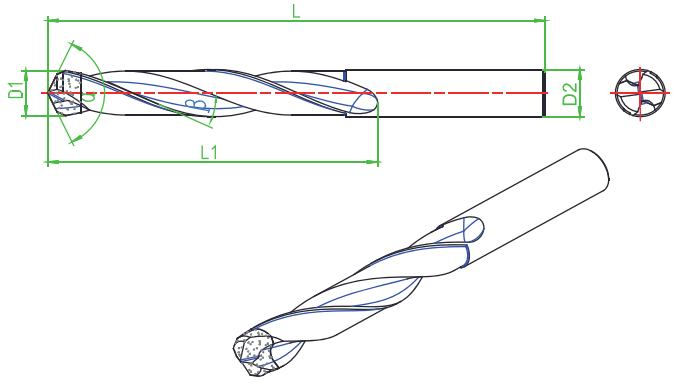
Specialty Cutters For Composite Materials



PCD Straight flute drill – Metric

Type	Specification	D1	L1	D2	L	α	Material
RD1CR00SW-121R	D4*25*SD4*SL65	4	25	4	65	130°	PCD
RD1CR00SW-121R	D5*25*SD6*SL65	5	25	6	65	130°	PCD
RD1CR00SW-121R	D6*25*SD6*SL65	6	25	6	65	130°	PCD
RD1CR00SW-121R	D8*35*SD8*SL82	8	35	8	82	130°	PCD
RD1CR00SW-121R	D10*35*SD10*SL82	10	35	10	82	130°	PCD
RD1CR00SW-121R	D12*35*SD12*SL82	12	35	12	82	130°	PCD
RD1CR00SW-121R	D14*45*SD14*SL108	14	45	14	108	130°	PCD
RD1CR00SW-121R	D16*45*SD16*SL108	16	45	16	108	130°	PCD
RD1CR00SW-121R	D18*45*SD18*SL108	18	45	18	108	130°	PCD
RD1CR00SW-121R	D20*50*SD20*SL108	20	50	20	108	130°	PCD

Customized size



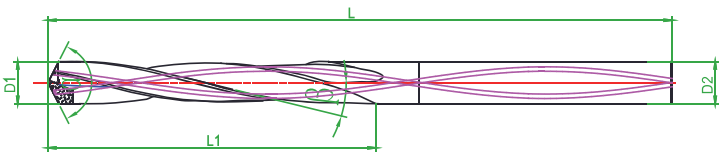
Workpiece

PCD Solid Drill——Metric

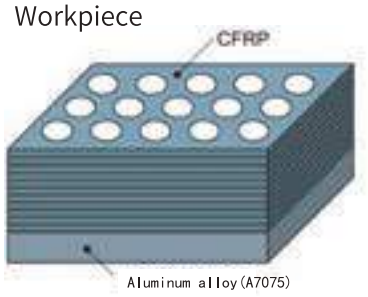
Type	Specification	D1	L1	D2	L	α	β	Material
RD1CR00SW-121R	D2.5*25*SD4*SL57	2.5	25	4	57	130°	30°	PCD
RD1CR00SW-121R	D3.0*25*SD4*SL57	3.0	25	4	57	130°	30°	PCD
RD1CR00SW-121R	D3.5*25*SD4*SL57	3.5	25	4	57	130°	30°	PCD
RD1CR00SW-121R	D4.0*25*SD4*SL57	4.0	25	4	57	130°	30°	PCD
RD1CR00SW-121R	D4.5*30*SD6*SL68	4.5	30	6	68	130°	30°	PCD
RD1CR00SW-121R	D5.0*30*SD6*SL68	5.0	30	6	68	130°	30°	PCD
RD1CR00SW-121R	D5.5*30*SD6*SL68	5.5	30	6	68	130°	30°	PCD
RD1CR00SW-121R	D6.0*30*SD6*SL68	6.0	30	6	68	130°	30°	PCD
RD1CR00SW-121R	D6.5*35*SD8*SL86	6.5	35	8	86	130°	30°	PCD
RD1CR00SW-121R	D7.0*35*SD8*SL86	7.0	35	8	86	130°	30°	PCD
RD1CR00SW-121R	D7.5*35*SD8*SL86	7.5	35	8	86	130°	30°	PCD
RD1CR00SW-121R	D8.0*35*SD8*SL86	8.0	35	8	86	130°	30°	PCD

Customized size

Specialty Cutters For Composite Materials



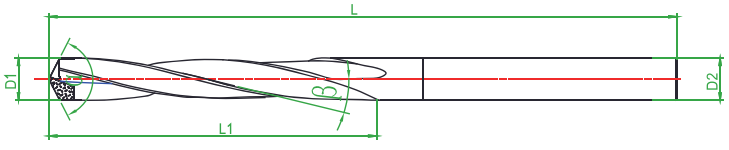
Workpiece



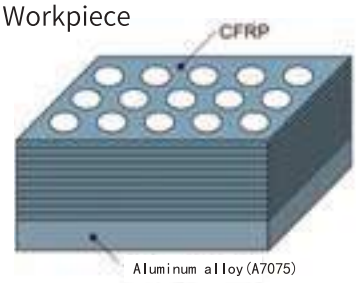
PCD twist drill-- Metric(with internal coolant)

Type	Specification	D1	L1	D2	L	α	β	Material
RD1CRAMSW-121R	D4*25*SD4*SL65	4	25	4	65	130°	15°	PCD
RD1CRAMSW-121R	D5*25*SD6*SL65	5	25	6	65	130°	15°	PCD
RD1CRAMSW-121R	D6*25*SD6*SL65	6	25	6	65	130°	15°	PCD
RD1CRAMSW-121R	D8*35*SD8*SL82	8	35	8	82	130°	15°	PCD
RD1CRAMSW-121R	D10*35*SD10*SL82	10	35	10	82	130°	15°	PCD
RD1CRAMSW-121R	D12*35*SD12*SL82	12	35	12	82	130°	15°	PCD
RD1CRAMSW-121R	D14*45*SD14*SL108	14	45	14	108	130°	15°	PCD
RD1CRAMSW-121R	D16*45*SD16*SL108	16	45	16	108	130°	15°	PCD
RD1CRAMSW-121R	D18*45*SD18*SL108	18	45	18	108	130°	15°	PCD
RD1CRAMSW-121R	D20*50*SD20*SL108	20	50	20	108	130°	15°	PCD

Customized size



Workpiece

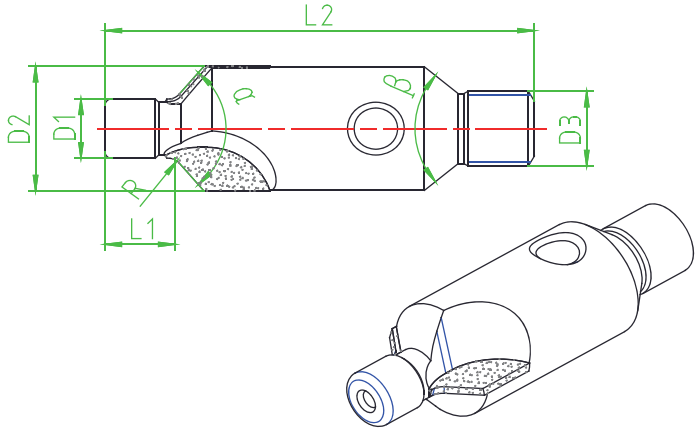


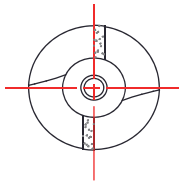
PCD double angle twist drill-- Metric（without internal cold）

Type	Specification	D1	L1	D2	L	α	β	Material
RD1CR00SW-121R	D4*25*SD4*SL65	4	25	4	65	130°	15°	PCD
RD1CR00SW-121R	D5*25*SD6*SL65	5	25	6	65	130°	15°	PCD
RD1CR00SW-121R	D6*25*SD6*SL65	6	25	6	65	130°	15°	PCD
RD1CR00SW-121R	D8*35*SD8*SL82	8	35	8	82	130°	15°	PCD
RD1CR00SW-121R	D10*35*SD10*SL82	10	35	10	82	130°	15°	PCD
RD1CR00SW-121R	D12*35*SD12*SL82	12	35	12	82	130°	15°	PCD
RD1CR00SW-121R	D14*45*SD14*SL108	14	45	14	108	130°	15°	PCD
RD1CR00SW-121R	D16*45*SD16*SL108	16	45	16	108	130°	15°	PCD
RD1CR00SW-121R	D18*45*SD18*SL108	18	45	18	108	130°	15°	PCD
RD1CR00SW-121R	D20*50*SD20*SL108	20	50	20	108	130°	15°	PCD

Customized size

Specialty Cutters For Composite Materials





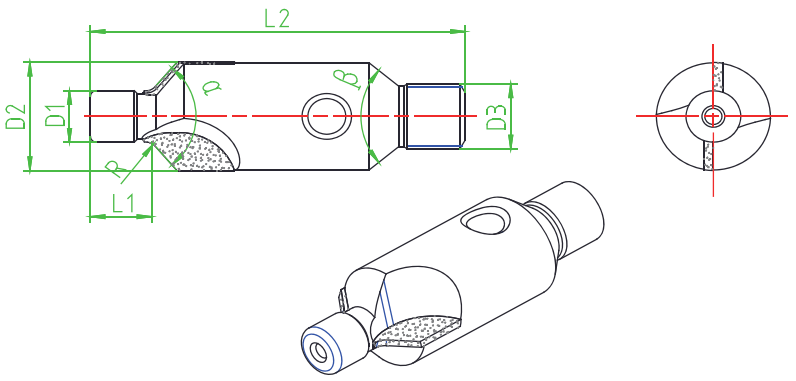
Workpiece

PCD socket drill-- Metric

Type	Specification	D1	L1	D2	α	L2	β	D3	R	Z	Material
RP1TRRSPC-122R	D4.14*7.5*D10-A100*36	4.140	7.5	10	100°	36	120°	1/4--28	0.9	2	PCD
RP1TRRSPC-122R	D4.14*7.5*D10-A130*36	4.140	7.5	10	130°	36	120°	1/4--28	0.6	2	PCD
RP1TRRSPC-122R	D4.8*7.5*D10-A100*36.58	4.800	7.5	10	100°	36.58	120°	1/4--28	0.9	2	PCD
RP1TRRSPC-122R	D4.8*7.5*D10-A130*36.58	4.800	7.5	10	130°	36.58	120°	1/4--28	0.6	2	PCD
RP1TRRSPC-122R	D5.53*7.5*D10-A100*36.58	5.530	7.5	10	100°	36.58	120°	1/4--28	0.9	2	PCD
RP1TRRSPC-122R	D5.53*7.5*D10-A130*36.58	5.530	7.5	10	130°	36.58	120°	1/4--28	0.6	2	PCD
RP1TRRSPC-122R	D6.32*7.5*D14-A100*37.82	6.320	7.5	14	100°	37.82	120°	1/4--28	0.9	2	PCD
RP1TRRSPC-122R	D6.32*7.5*D14-A130*37.82	6.320	7.5	14	130°	37.82	120°	1/4--28	0.6	2	PCD
RP1TRRSPC-122R	D7.91*7.5*D18-A100*39.73	7.910	7.5	18	100°	39.73	120°	1/4--28	1.15	2	PCD
RP1TRRSPC-122R	D7.91*7.5*D18-A130*39.73	7.910	7.5	18	130°	39.73	120°	1/4--28	0.9	2	PCD
RP1TRRSPC-122R	D9.5*8.5*D20-A100*49.5	9.500	8.5	20	100°	49.5	120°	3/4--24	1.15	2	PCD
RP1TRRSPC-122R	D9.5*8.5*D20-A130*49.5	9.500	8.5	20	130°	49.5	120°	3/4--24	0.9	2	PCD
RP1TRRSPC-122R	D11.09*8.5*D23-A100*51	11.090	8.5	23	100°	51	120°	3/4--24	1.4	2	PCD
RP1TRRSPC-122R	D11.09*8.5*D23-A130*51	11.090	8.5	23	130°	51	120°	3/4--24	1.2	2	PCD
RP1TRRSPC-122R	D12.68*8.5*D26-A100*49	12.680	8.5	26	100°	49	120°	3/4--24	1.4	2	PCD
RP1TRRSPC-122R	D12.68*8.5*D26-A130*49	12.680	8.5	26	130°	49	120°	3/4--24	1.2	2	PCD

Customized size

Specialty Cutters For Composite Materials

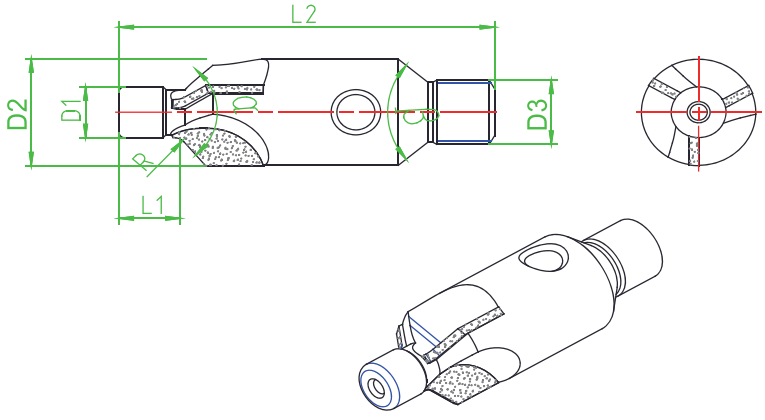


Workpiece

PCD socket drill—Imperial

Type	Specification	D1	L1	D2	α	L2	β	D3	R	Z	Material
RP1TRRSPC-122R	D4.8*7.62*D9.525-A100*25.4	4.800	7.62	9.525	100°	25.4	120°	1/4--28	1	2	PCD
RP1TRRSPC-122R	D6.299*15.24*D13.97-A100*38.1	6.299	15.24	13.970	100°	38.1	120°	1/4--28	1	2	PCD
RP1TRRSPC-122R	D6.578*7.62*D13.97-A130*25.4	6.578	7.62	13.970	130°	25.4	120°	1/4--28	1	2	PCD
RP1TRRSPC-122R	D9.525*7.62*D22.225-A100*38.1	9.525	7.62	22.225	100°	38.1	120°	3/8--24	1	2	PCD
RP1TRRSPC-122R	D9.525*7.62*D22.225-A130*38.1	9.525	7.62	22.225	130°	38.1	120°	3/8--24	1	2	PCD
RP1TRRSPC-122R	D7.925*7.62*D22.225-A130*38.1	7.925	7.62	22.225	130°	38.1	120°	3/8--24	1	2	PCD
RP1TRRSPC-122R	D7.925*7.62*D22.225-A100*38.1	7.925	7.62	22.225	100°	38.1	120°	3/8--24	1	2	PCD

Customized size



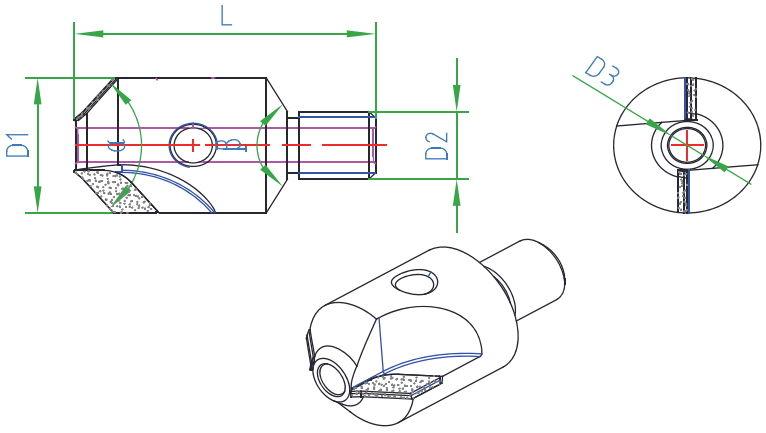
Workpiece

PCD socket drill--Imperial

Type	Specification	D1	L1	D2	α	L2	β	D3	R	Z	Material
RP1TRRSPC-133R	D4.8*7.62*D9.525-A100*25.4	4.800	7.62	9.525	100°	25.4	120°	1/4--28	1	3	PCD
RP1TRRSPC-133R	D6.299*15.24*D13.97-A100*38.1	6.299	15.24	13.970	100°	38.1	120°	1/4--28	1	3	PCD
RP1TRRSPC-133R	D6.578*7.62*D13.97-A130*25.4	6.578	7.62	13.970	130°	25.4	120°	1/4--28	1	3	PCD
RP1TRRSPC-133R	D9.525*7.62*D22.225-A100*38.1	9.525	7.62	22.225	100°	38.1	120°	3/8--24	1	3	PCD
RP1TRRSPC-133R	D9.525*7.62*D22.225-A130*38.1	9.525	7.62	22.225	130°	38.1	120°	3/8--24	1	3	PCD
RP1TRRSPC-133R	D7.925*7.62*D22.225-A130*38.1	7.925	7.62	22.225	130°	38.1	120°	3/8--24	1	3	PCD
RP1TRRSPC-133R	D7.925*7.62*D22.225-A100*38.1	7.925	7.62	22.225	100°	38.1	120°	3/8--24	1	3	PCD

Customized size

Specialty Cutters For Composite Materials



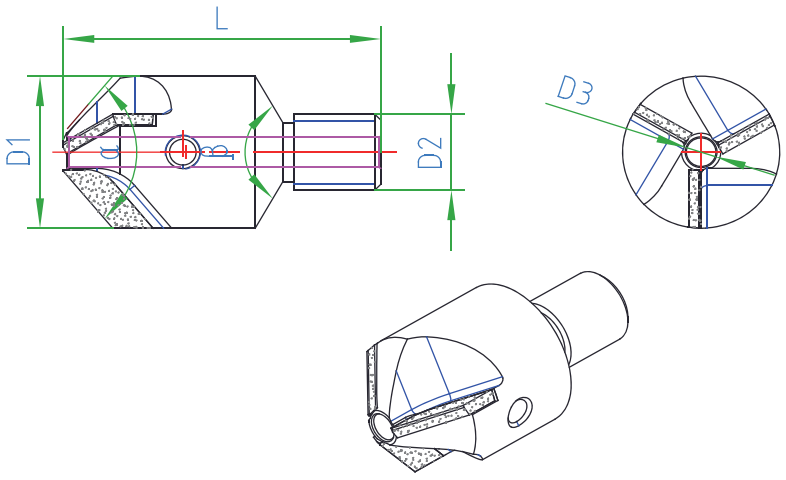
Workpiece

PCD socket drill with pin hole–Imperial

Type	Specification	D1	D3	α	L	D2	β	Z	Material
RP1TR00PC-122R	D10*D2-A100*28	10	2	100°	28	1/4-28 UNF	120°	2	PCD
RP1TR00PC-122R	D10*D2.5-A100*28	10	2.5	100°	28	1/4-28 UNF	120°	2	PCD
RP1TR00PC-122R	D10*D3-A100*28	10	3	100°	28	1/4-28 UNF	120°	2	PCD
RP1TR00PC-122R	D10*D3.5-A100*28	10	3.5	100°	28	1/4-28 UNF	120°	2	PCD
RP1TR00PC-122R	D14*D2.5-A100*28	14	2.5	100°	28	1/4-28 UNF	120°	2	PCD
RP1TR00PC-122R	D14*D3-A100*28	14	3	100°	28	1/4-28 UNF	120°	2	PCD
RP1TR00PC-122R	D14*D3.5-A100*28	14	3.5	100°	28	1/4-28 UNF	120°	2	PCD
RP1TR00PC-122R	D14*D4-A100*28	14	4	100°	28	1/4-28 UNF	120°	2	PCD
RP1TR00PC-122R	D17*D3-A100*28	17	3	100°	28	1/4-28 UNF	120°	2	PCD
RP1TR00PC-122R	D17*D3.5-A100*28	17	3.5	100°	28	1/4-28 UNF	120°	2	PCD
RP1TR00PC-122R	D17*D4-A100*28	17	4	100°	28	1/4-28 UNF	120°	2	PCD
RP1TR00PC-122R	D17*D5-A100*28	17	5	100°	28	1/4-28 UNF	120°	2	PCD
RP1TR00PC-122R	D21*D3.5-A100*28	21	3.5	100°	28	1/4-28 UNF	120°	2	PCD
RP1TR00PC-122R	D21*D4-A100*28	21	4	100°	28	1/4-28 UNF	120°	2	PCD
RP1TR00PC-122R	D21*D5-A100*28	21	5	100°	28	1/4-28 UNF	120°	2	PCD
RP1TR00PC-122R	D22.225*D6-A100*28	22.225	6	100°	28	1/4-28 UNF	120°	2	PCD
RP1TR00PC-122R	D25.4*D6-A100*28	25.4	6	100°	28	1/4-28 UNF	120°	2	PCD
RP1TR00PC-122R	D28.575*D6-A100*28	28.575	6	100°	28	1/4-28 UNF	120°	2	PCD
RP1TR00PC-122R	D31.75*D6-A100*28	31.75	6	100°	28	1/4-28 UNF	120°	2	PCD
RP1TR00PC-122R	D34.925*D6-A100*28	34.925	6	100°	28	1/4-28 UNF	120°	2	PCD
RP1TR00PC-122R	D38.1*D6-A100*28	38.1	6	100°	28	1/4-28 UNF	120°	2	PCD

Customized size

Specialty Cutters For Composite Materials



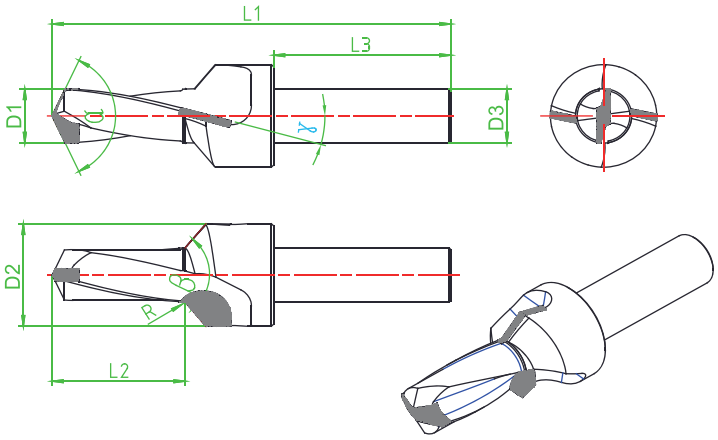
Workpiece

PCD socket drill with pin hole--Imperial

Type	Specification	D1	D3	α	L	D2	β	Z	Material
RP1TR00PC-133R	D10*D2-A100*28	10	2	100°	28	1/4-28 UNF	120°	3	PCD
RP1TR00PC-133R	D10*D2.5-A100*28	10	2.5	100°	28	1/4-28 UNF	120°	3	PCD
RP1TR00PC-133R	D10*D3-A100*28	10	3	100°	28	1/4-28 UNF	120°	3	PCD
RP1TR00PC-133R	D10*D3.5-A100*28	10	3.5	100°	28	1/4-28 UNF	120°	3	PCD
RP1TR00PC-133R	D14*D2.5-A100*28	14	2.5	100°	28	1/4-28 UNF	120°	3	PCD
RP1TR00PC-133R	D14*D3-A100*28	14	3	100°	28	1/4-28 UNF	120°	3	PCD
RP1TR00PC-133R	D14*D3.5-A100*28	14	3.5	100°	28	1/4-28 UNF	120°	3	PCD
RP1TR00PC-133R	D14*D4-A100*28	14	4	100°	28	1/4-28 UNF	120°	3	PCD
RP1TR00PC-133R	D17*D3-A100*28	17	3	100°	28	1/4-28 UNF	120°	3	PCD
RP1TR00PC-133R	D17*D3.5-A100*28	17	3.5	100°	28	1/4-28 UNF	120°	3	PCD
RP1TR00PC-133R	D17*D4-A100*28	17	4	100°	28	1/4-28 UNF	120°	3	PCD
RP1TR00PC-133R	D17*D5-A100*28	17	5	100°	28	1/4-28 UNF	120°	3	PCD
RP1TR00PC-133R	D21*D3.5-A100*28	21	3.5	100°	28	1/4-28 UNF	120°	3	PCD
RP1TR00PC-133R	D21*D4-A100*28	21	4	100°	28	1/4-28 UNF	120°	3	PCD
RP1TR00PC-133R	D21*D5-A100*28	21	5	100°	28	1/4-28 UNF	120°	3	PCD
RP1TR00PC-133R	D22.225*D6-A100*28	22.225	6	100°	28	1/4-28 UNF	120°	3	PCD
RP1TR00PC-133R	D25.4*D6-A100*28	25.4	6	100°	28	1/4-28 UNF	120°	3	PCD
RP1TR00PC-133R	D28.575*D6-A100*28	28.575	6	100°	28	1/4-28 UNF	120°	3	PCD
RP1TR00PC-133R	D31.75*D6-A100*28	31.75	6	100°	28	1/4-28 UNF	120°	3	PCD
RP1TR00PC-133R	D34.925*D6-A100*28	34.925	6	100°	28	1/4-28 UNF	120°	3	PCD
RP1TR00PC-133R	D38.1*D6-A100*28	38.1	6	100°	28	1/4-28 UNF	120°	3	PCD

Customized size

Specialty Cutters For Composite Materials

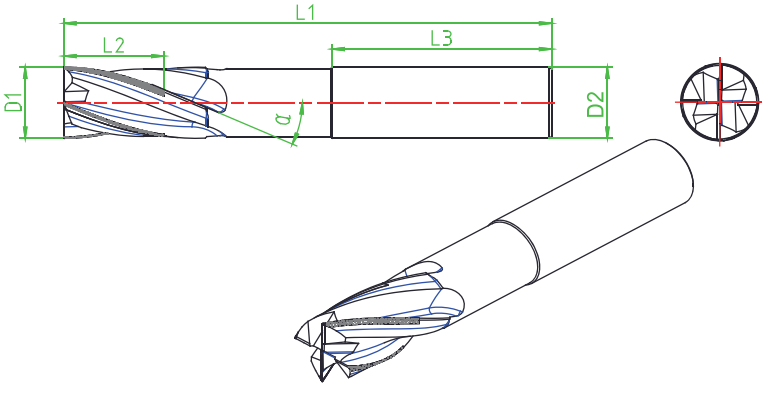


Workpiece

PCD twist drill countersink -- Metric(US/Imperial standard, refer to Conversion Table at Page 45)

Type	Specification	D1	L2	D2	D3	L1	α	β	γ	L3	Z	Material
RD1CR00SW-122R	D4*30*D10*SD8*SL90	4	30	10	8	90	120°	100°	15°	40	2	PCD
RD1CR00SW-122R	D5*30*D12*SD10*SL90	5	30	12	10	90	120°	100°	15°	40	2	PCD
RD1CR00SW-122R	D6*30*D14*SD12*SL90	6	30	14	12	90	120°	100°	15°	40	2	PCD
RD1CR00SW-122R	D8*30*D18*SD16*SL90	8	30	18	16	90	120°	100°	15°	40	2	PCD
RD1CR00SW-122R	D10*30*D20*SD18*SL90	10	30	20	18	90	120°	100°	15°	40	2	PCD
RD1CR00SW-122R	D12*30*D22*SD20*SL90	12	30	22	20	90	120°	100°	15°	40	2	PCD

Customized size



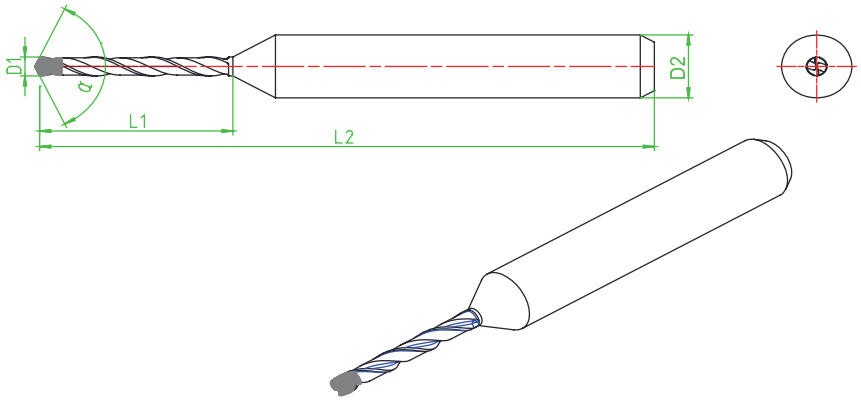
Workpiece

PCD spiral milling cutter -- Metric(US/Imperial standard, refer to Conversion Table at Page 45)

Type	Specification	D1	L2	D2	L1	L4	α	Z	Material
RE1CR00SW-144R	D6*20*SD6*SL80	6	20	6	80	45	15° /30°	4	PCD
RE1CR00SW-144R	D8*20*SD8*SL80	8	20	8	80	45	15° /30°	4	PCD
RE1CR00SW-144R	D10*20*SD10*SL80	10	20	10	80	45	15° /30°	4	PCD
RE1CR00SW-144R	D12*20*SD12*SL100	12	20	12	100	45	15° /30°	4	PCD
RE1CR00SW-144R	D14*20*SD16*SL100	14	20	16	100	45	15° /30°	4	PCD
RE1CR00SW-144R	D16*20*SD16*SL100	16	20	16	100	45	15° /30°	4	PCD
RE1CR00SW-144R	D20*25*SD20*SL110	20	25	20	110	50	15° /30°	4	PCD

Customized size

Specialty Cutters For Composite Materials



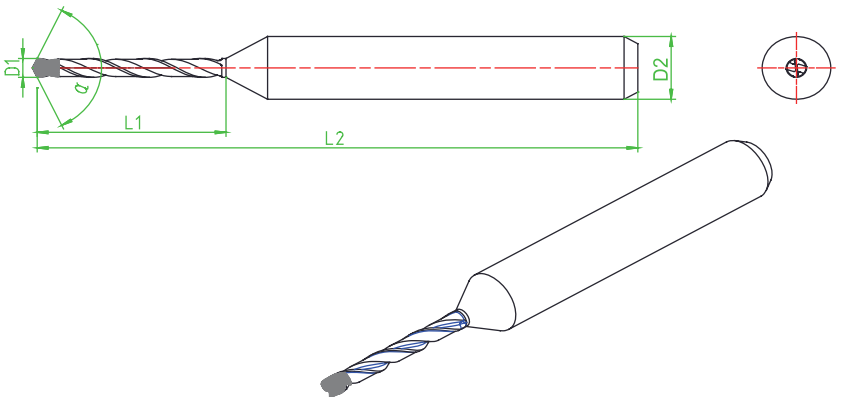
Workpiece

PCD ultra-small drill--Imperial

Type	Specification	D1	L1	D2	L2	α	Material
RD1CR00SW-122R	D0.40*8*SD3.175*SL38	0.40	8	3.175	38	130°	PCD
RD1CR00SW-122R	D0.45*8*SD3.175*SL38	0.45	8	3.175	38	130°	PCD
RD1CR00SW-122R	D0.50*8*SD3.175*SL38	0.50	8	3.175	38	130°	PCD
RD1CR00SW-122R	D0.55*8*SD3.175*SL38	0.55	8	3.175	38	130°	PCD
RD1CR00SW-122R	D0.60*8*SD3.175*SL38	0.60	8	3.175	38	130°	PCD
RD1CR00SW-122R	D0.65*8*SD3.175*SL38	0.65	8	3.175	38	130°	PCD
RD1CR00SW-122R	D0.70*8*SD3.175*SL38	0.70	8	3.175	38	130°	PCD
RD1CR00SW-122R	D0.75*8*SD3.175*SL38	0.75	8	3.175	38	130°	PCD
RD1CR00SW-122R	D0.80*8*SD3.175*SL38	0.80	8	3.175	38	130°	PCD
RD1CR00SW-122R	D0.85*8*SD3.175*SL38	0.85	8	3.175	38	130°	PCD
RD1CR00SW-122R	D0.90*8*SD3.175*SL38	0.90	8	3.175	38	130°	PCD
RD1CR00SW-122R	D0.95*8*SD3.175*SL38	0.95	8	3.175	38	130°	PCD
RD1CR00SW-122R	D1.0*8*SD3.175*SL38	1.00	8	3.175	38	130°	PCD
RD1CR00SW-122R	D1.1*11*SD3.175*SL38	1.10	11	3.175	38	130°	PCD
RD1CR00SW-122R	D1.2*11*SD3.175*SL38	1.20	11	3.175	38	130°	PCD
RD1CR00SW-122R	D1.3*11*SD3.175*SL38	1.30	11	3.175	38	130°	PCD
RD1CR00SW-122R	D1.4*11*SD3.175*SL38	1.40	11	3.175	38	130°	PCD
RD1CR00SW-122R	D1.5*11*SD3.175*SL38	1.50	11	3.175	38	130°	PCD
RD1CR00SW-122R	D1.6*11*SD3.175*SL38	1.60	11	3.175	38	130°	PCD
RD1CR00SW-122R	D1.7*11*SD3.175*SL38	1.70	11	3.175	38	130°	PCD
RD1CR00SW-122R	D1.8*11*SD3.175*SL38	1.80	11	3.175	38	130°	PCD
RD1CR00SW-122R	D1.9*11*SD3.175*SL38	1.90	11	3.175	38	130°	PCD
RD1CR00SW-122R	D2.0*11*SD3.175*SL38	2.00	11	3.175	38	130°	PCD
RD1CR00SW-122R	D2.1*11*SD3.175*SL38	2.10	11	3.175	38	130°	PCD
RD1CR00SW-122R	D2.2*11*SD3.176*SL38	2.20	11	3.175	38	130°	PCD
RD1CR00SW-122R	D2.3*11*SD3.175*SL38	2.30	11	3.175	38	130°	PCD
RD1CR00SW-122R	D2.4*11*SD3.175*SL38	2.40	11	3.175	38	130°	PCD
RD1CR00SW-122R	D2.5*11*SD3.175*SL38	2.50	11	3.175	38	130°	PCD

Customized size

Specialty Cutters For Composite Materials



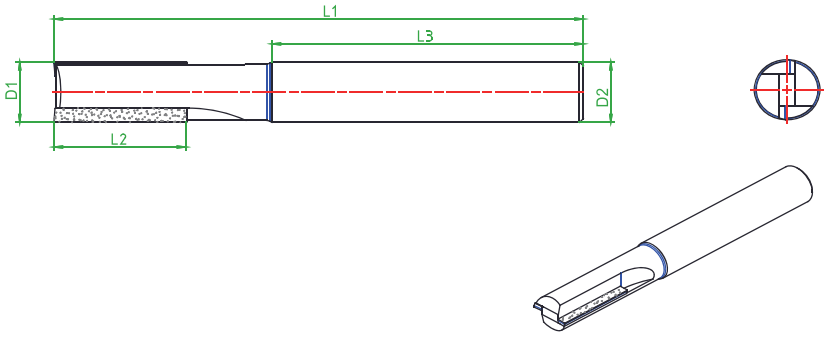
Workpiece

PCD ultra-small drill--Metric(US/Imperial standard, refer to Conversion Table at Page 45)

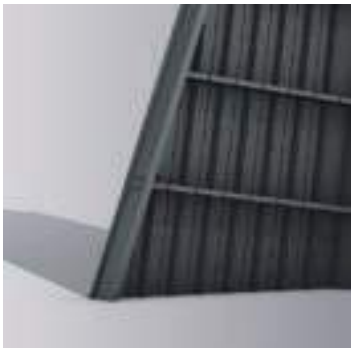
Type	Specification	D1	L1	D2	L2	α	Material
RD1CR00SW-122R	D0.40*8*SD4*SL38	0.40	8	4	38	130°	PCD
RD1CR00SW-122R	D0.45*8*SD4*SL38	0.45	8	4	38	130°	PCD
RD1CR00SW-122R	D0.50*8*SD4*SL38	0.50	8	4	38	130°	PCD
RD1CR00SW-122R	D0.55*8*SD4*SL38	0.55	8	4	38	130°	PCD
RD1CR00SW-122R	D0.60*8*SD4*SL38	0.60	8	4	38	130°	PCD
RD1CR00SW-122R	D0.65*8*SD4*SL38	0.65	8	4	38	130°	PCD
RD1CR00SW-122R	D0.70*8*SD4*SL38	0.70	8	4	38	130°	PCD
RD1CR00SW-122R	D0.75*8*SD4*SL38	0.75	8	4	38	130°	PCD
RD1CR00SW-122R	D0.80*8*SD4*SL38	0.80	8	4	38	130°	PCD
RD1CR00SW-122R	D0.85*8*SD4*SL38	0.85	8	4	38	130°	PCD
RD1CR00SW-122R	D0.90*8*SD4*SL38	0.90	8	4	38	130°	PCD
RD1CR00SW-122R	D0.95*8*SD4*SL38	0.95	8	4	38	130°	PCD
RD1CR00SW-122R	D1.0*8*SD4*SL38	1.00	8	4	38	130°	PCD
RD1CR00SW-122R	D1.1*11*SD4*SL38	1.10	11	4	38	130°	PCD
RD1CR00SW-122R	D1.2*11*SD4*SL38	1.20	11	4	38	130°	PCD
RD1CR00SW-122R	D1.3*11*SD4*SL38	1.30	11	4	38	130°	PCD
RD1CR00SW-122R	D1.4*11*SD4*SL38	1.40	11	4	38	130°	PCD
RD1CR00SW-122R	D1.5*11*SD4*SL38	1.50	11	4	38	130°	PCD
RD1CR00SW-122R	D1.6*11*SD4*SL38	1.60	11	4	38	130°	PCD
RD1CR00SW-122R	D1.7*11*SD4*SL38	1.70	11	4	38	130°	PCD
RD1CR00SW-122R	D1.8*11*SD4*SL38	1.80	11	4	38	130°	PCD
RD1CR00SW-122R	D1.9*11*SD4*SL38	1.90	11	4	38	130°	PCD
RD1CR00SW-122R	D2.0*11*SD4*SL38	2.00	11	4	38	130°	PCD
RD1CR00SW-122R	D2.1*11*SD4*SL38	2.10	11	4	38	130°	PCD
RD1CR00SW-122R	D2.2*11*SD4*SL38	2.20	11	4	38	130°	PCD
RD1CR00SW-122R	D2.3*11*SD4*SL38	2.30	11	4	38	130°	PCD
RD1CR00SW-122R	D2.4*11*SD4*SL38	2.40	11	4	38	130°	PCD
RD1CR00SW-122R	D2.5*11*SD4*SL38	2.50	11	4	38	130°	PCD

Customized size

Specialty Cutters For Composite Materials



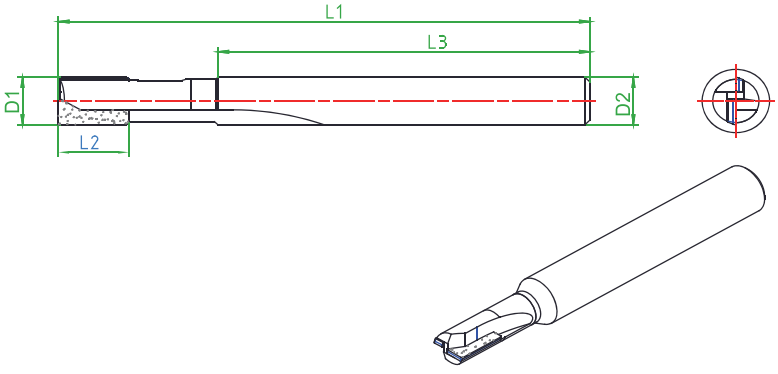
Workpiece



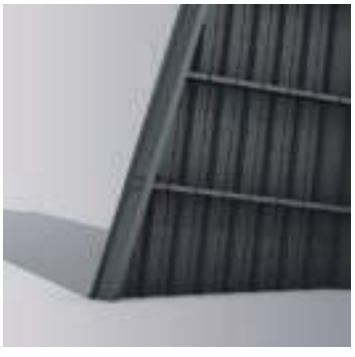
PCD milling cutter(not over center)–Imperial

Type	Specification	D1	L2	D2	L1	L3	Z	Material
RE1CR0000-122R	D4.76*6.35*SD4.76*SL52	4.760	6.35	4.760	52	35	2	PCD
RE1CR0000-122R	D6.35*12.7*SD6.35*SL63.5	6.350	12.7	6.350	63.5	37	2	PCD
RE1CR0000-122R	D9.525*19.05*SD9.525*SL101.6	9.525	19.05	9.525	101.6	61	2	PCD
RE1CR0000-122R	D12.7*25.4*SD12.7*SL102	12.700	25.4	12.700	102	61	2	PCD
RE1CR0000-122R	D19.05*25.4*SD19.05*SL102	19.050	25.4	19.050	102	61	2	PCD

Customized size



Workpiece

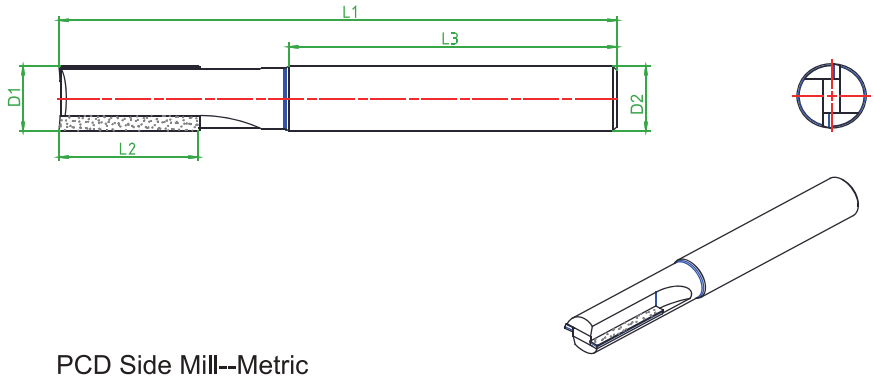


PCD milling cutter(over center)–Imperial

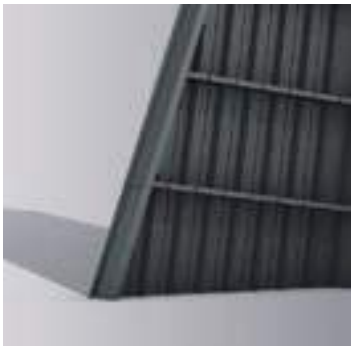
Type	Specification	D1	L2	D2	L1	L3	Z	Material
RE1CR00CC-122R	D4.76*6.35*SD4.76*SL52	4.760	6.35	4.760	52	35	2	PCD
RE1CR00CC-122R	D6.35*12.7*SD6.35*SL63.5	6.350	12.7	6.350	63.5	37	2	PCD
RE1CR00CC-122R	D9.525*19.05*SD9.525*SL101.6	9.525	19.05	9.525	101.6	61	2	PCD
RE1CR00CC-122R	D12.7*25.4*SD12.7*SL102	12.700	25.4	12.700	102	61	2	PCD
RE1CR00CC-122R	D19.05*25.4*SD19.05*SL102	19.050	25.4	19.050	102	61	2	PCD

Customized size

Specialty Cutters For Composite Materials



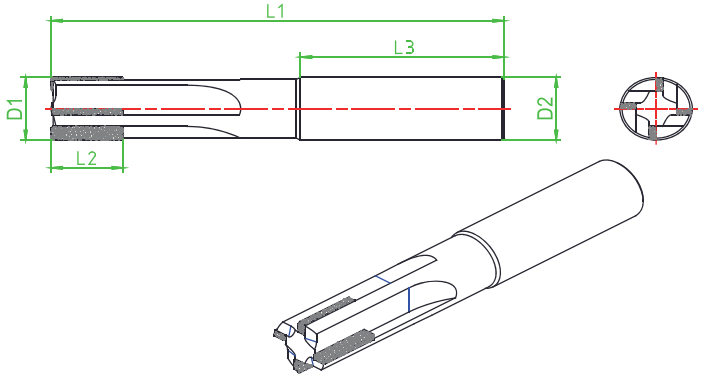
Workpiece



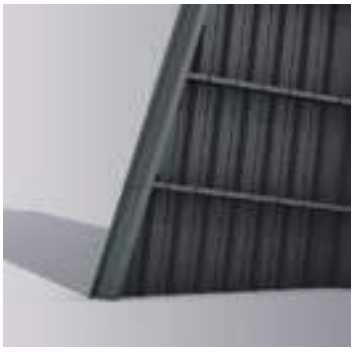
PCD Side Mill--Metric

Type	Specification	D1	L2	D2	L1	L3	Z	Material
RE1CR0000-122R	D6*9*SD6*SL50	6	9	6	50	30	2	PCD
RE1CR0000-122R	D8*12*SD8*SL60	8	12	8	60	30	2	PCD
RE1CR0000-122R	D10*15*SD10*SL80	10	15	10	80	45	2	PCD
RE1CR0000-122R	D12*18*SD12*SL100	12	18	12	100	45	2	PCD
RE1CR0000-122R	D16*25*SD16*SL110	16	25	16	110	55	2	PCD

Customized size



Workpiece

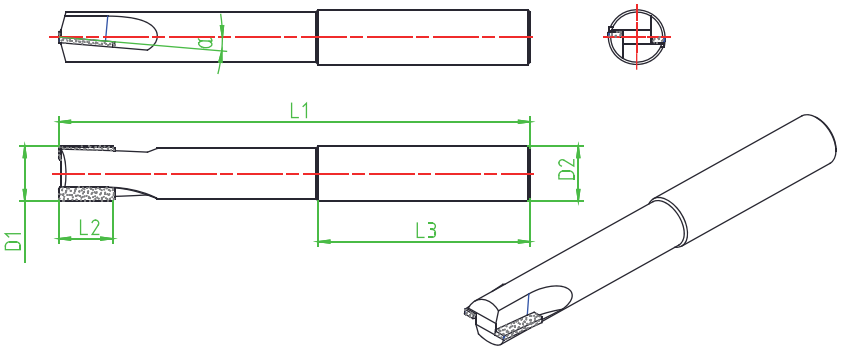


PCD Side Mill--Metric

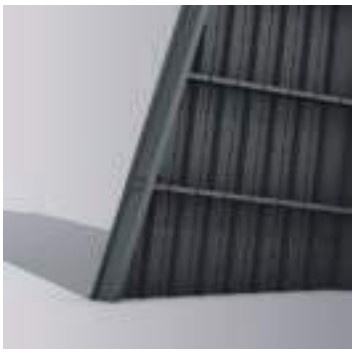
Type	Specification	D1	L2	D2	L1	L3	Z	Material
RE1CR0000-144R	D10*15*SD10*SL80	10	15	10	80	45	4	PCD
RE1CR0000-144R	D12*18*SD12*SL100	12	18	12	100	45	4	PCD
RE1CR0000-144R	D16*25*SD16*SL110	16	25	16	110	55	4	PCD
RE1CR0000-144R	D18*25*SD18*SL110	18	25	18	110	55	4	PCD
RE1CR0000-144R	D20*30*SD20*SL110	20	30	20	110	55	4	PCD

Customized size

Specialty Cutters For Composite Materials



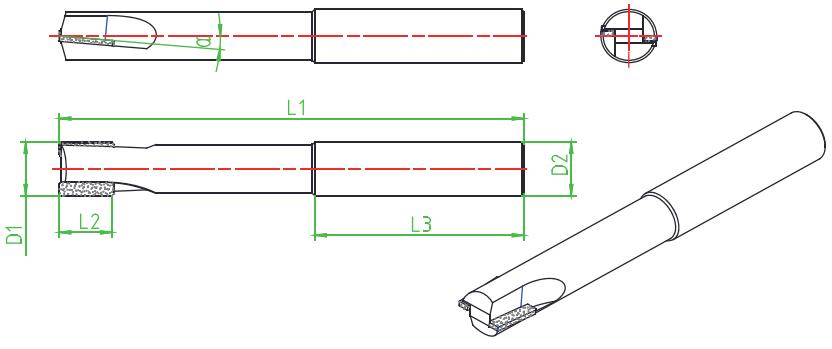
Workpiece



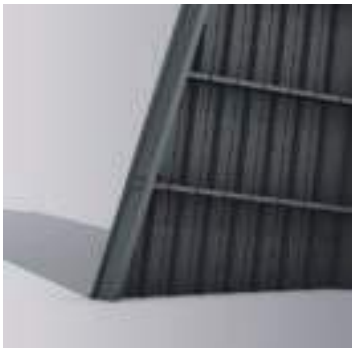
PCD Side Mill--Imperial

Type	Specification	D1	L2	D2	L1	L3	Z	α	Material
RE1CR0000-122R	D4.76*6.35*SD4.76*SL52	4.760	6.35	4.760	52	35	2	5°	PCD
RE1CR0000-122R	D6.35*12.7*SD6.35*SL63.5	6.350	12.7	6.350	63.5	37	2	5°	PCD
RE1CR0000-122R	D9.525*19.05*SD9.525*SL101.6	9.525	19.05	9.525	101.6	61	2	5°	PCD
RE1CR0000-122R	D12.7*25.4*SD12.7*SL102	12.700	25.4	12.700	102	61	2	5°	PCD
RE1CR0000-122R	D19.05*25.4*SD19.05*SL102	19.050	25.4	19.050	102	61	2	5°	PCD

Customized size



Workpiece

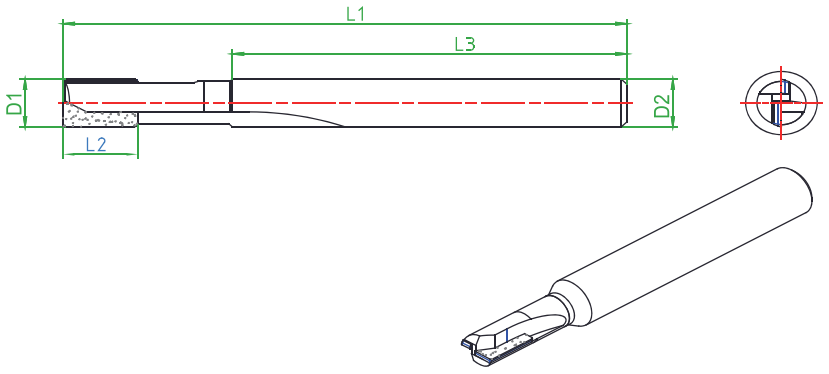


PCD Side Mill--Metric

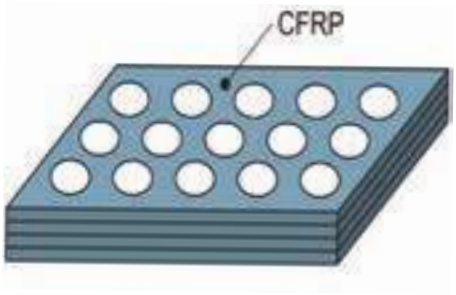
Type	Specification	D1	L2	D2	L1	L3	Z	α	Material
RE1CR0000-122R	D6*9*SD6*SL50	6	9	6	50	30	2	5°	PCD
RE1CR0000-122R	D8*12*SD8*SL60	8	12	8	60	30	2	5°	PCD
RE1CR0000-122R	D10*15*SD10*SL80	10	15	10	80	45	2	5°	PCD
RE1CR0000-122R	D12*18*SD12*SL100	12	18	12	100	45	2	5°	PCD
RE1CR0000-122R	D16*25*SD16*SL110	16	25	16	110	55	2	5°	PCD

Customized size

Specialty Cutters For Composite Materials



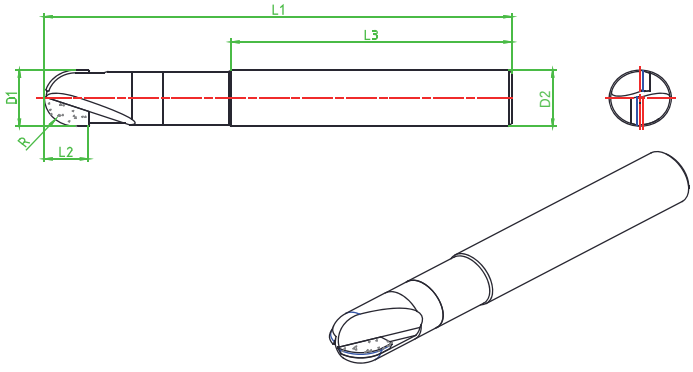
Workpiece



PCD End Mill--Metric

Type	Specification	D1	L2	D2	L1	L3	Z	Material
RE1CR00CC-122R	D6*9*SD6*SL50	6	9	6	50	30	2	PCD
RE1CR00CC-122R	D8*12*SD8*SL60	8	12	8	60	30	2	PCD
RE1CR00CC-122R	D10*15*SD10*SL80	10	15	10	80	45	2	PCD
RE1CR00CC-122R	D12*18*SD12*SL100	12	18	12	100	45	2	PCD
RE1CR00CC-122R	D16*25*SD16*SL110	16	25	16	110	55	2	PCD

Customized size



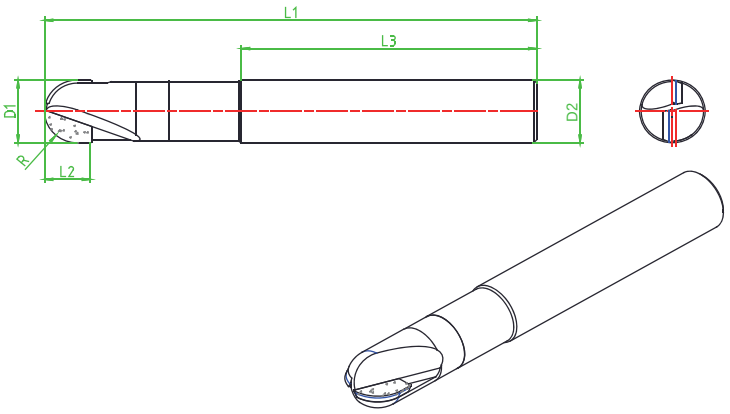
Workpiece

PCD ball nose mill-- Metric

Type	Specification	D1	L2	D2	L1	R	L3	Z	Material
RE1CR00CC-122R	D4*6*SD4*SL45	4	6	4	45	2	35	2	PCD
RE1CR00CC-122R	D6*9*SD6*SL50	6	9	6	50	3	35	2	PCD
RE1CR00CC-122R	D8*12*SD8*SL60	8	12	8	60	4	35	2	PCD
RE1CR00CC-122R	D10*15*SD10*SL70	10	15	10	70	5	40	2	PCD
RE1CR00CC-122R	D12*18*SD12*SL80	12	18	12	80	6	45	2	PCD

Customized size

Specialty Cutters For Composite Materials

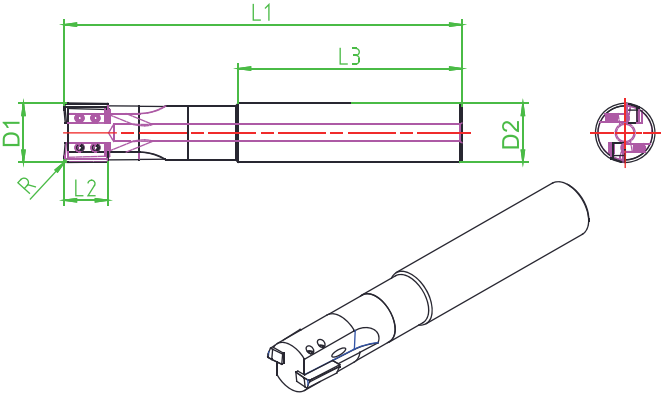


Workpiece

PCD ball nose mill--Imperial

Type	Specification	D1	L2	D2	L1	R	L3	Z	Material
RE1CR00CC-122R	D4.76*6.35*SD4.76*SL50	4.760	6.35	4.76	50	2.38	30	2	PCD
RE1CR00CC-122R	D6.35*9.525*SD6.35*SL60	6.350	9.525	6.35	60	3.18	35	2	PCD
RE1CR00CC-122R	D9.525*12.7*SD9.525*SL70	9.525	12.7	9.525	70	4.76	40	2	PCD
RE1CR00CC-122R	D12.7*14.7*SD12.7*SL80	12.700	14.7	12.7	80	6.35	45	2	PCD
RE1CR00CC-122R	D19.05*20.4*SD19.05*SL90	19.050	20.4	19.05	90	9.53	45	2	PCD

Customized size

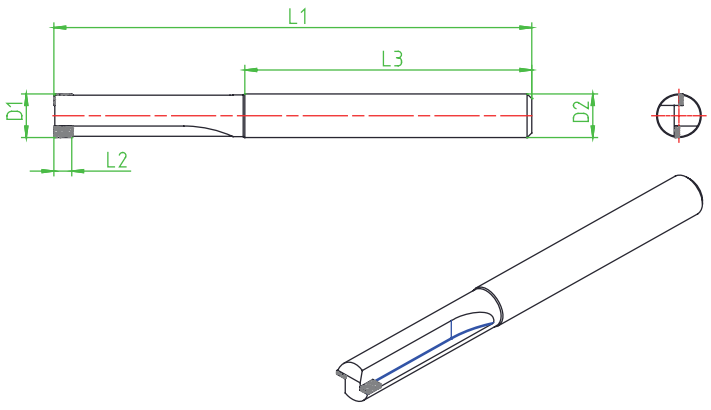


PCD quick change milling cutter-- Metric

Type	Specification	D1	L2	D2	L1	L3	R	α	Z	Material
RR1CR00SW-122R	D12*8*SD12*SL80	12	8	12	80	45	0.4	3°	2	PCD
RR1CR00SW-122R	D14*10*SD16*SL90	14	10	16	90	45	0.4	3°	2	PCD
RR1CR00SW-122R	D16*10*SD16*SL100	16	10	16	100	45	0.4	3°	2	PCD
RR1CR00SW-122R	D18*12*SD20*SL120	18	12	20	120	45	0.4	3°	2	PCD
RR1CR00SW-122R	D20*12*SD20*SL120	20	12	20	120	45	0.4	3°	2	PCD
RR1CR00SW-122R	D25*12*SD25*SL150	25	12	25	150	45	0.4	3°	2	PCD
RR1CR00SW-122R	D32*12*SD32*SL150	32	12	32	150	45	0.4	3°	2	PCD

Customized size

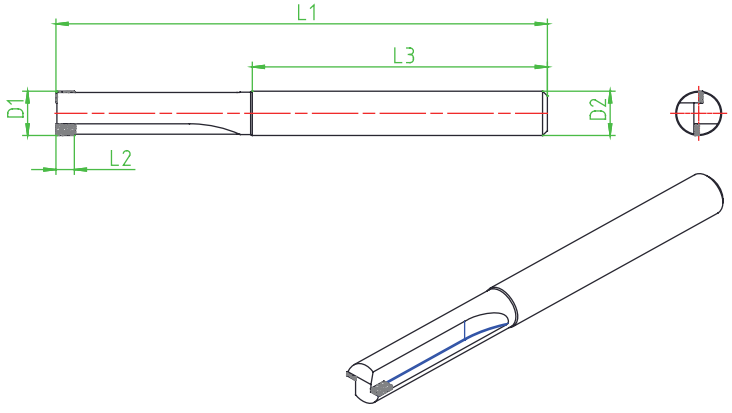
Specialty Cutters For Composite Materials



CVD Side Mill--Imperial

Type	Specification	D1	L2	D2	L1	L3	Z	Material
RE1CR0000-122R	D4.76*4.76*SD4.76*SL52	4.760	4.76	4.760	52	35	2	CVDD
RE1CR0000-122R	D6.35*6.35*SD6.35*SL63.5	6.350	6.35	6.350	63.5	37	2	CVDD
RE1CR0000-122R	D9.525*6.35*SD9.525*SL101.6	9.525	6.35	9.525	101.6	61	2	CVDD
RE1CR0000-122R	D12.7*6.35*SD12.7*SL102	12.700	6.35	12.700	102	60	2	CVDD
RE1CR0000-122R	D15.875*6.35*SD19.05*SL102	15.875	6.35	19.050	102	61	2	CVDD

Customized size



CVD Side Mil--Metric

Type	Specification	D1	L2	D2	L1	L3	Z	Material
RE1CR0000-122R	D6*4*SD6*SL50	6	4	6	50	30	2	CVDD
RE1CR0000-122R	D8*6*SD8*SL60	8	6	8	60	30	2	CVDD
RE1CR0000-122R	D10*6*SD10*SL80	10	6	10	80	45	2	CVDD
RE1CR0000-122R	D12*6*SD12*SL100	12	6	12	100	45	2	CVDD
RE1CR0000-122R	D16*6*SD16*SL110	16	6	16	110	55	2	CVDD

Customized size

Worldia® Specialty Tools Business Scope

1. Design and produce PCD/PCBN reamer, milling cutter and specialty tools products according to customer drawings;
2. According to customer requirements, undertake the design, production and technical service of the entire set of tools programs;
3. Replace the original cutters to help customers optimize the existing cutter program to meet the needs of improving life and reducing costs;
4. Regrinding and retipping for PCD/PCBN specialty tools

Worldia® After-sales Service and Customer Service

Pre-sale service

Provide pre-sale services including conduct technical investigations on the customer's processing conditions like workpiece materials, tooling fixtures, production cycle, machine tool parameters, and provide feasibility solutions for the optimization and upgrade of the original products;

After-sales service

Provide after-sale technical services and technical following-up for product performance, meet customer processing requirements with higher dimensional accuracy, better processing performance, longer service life, and faster production cycle.

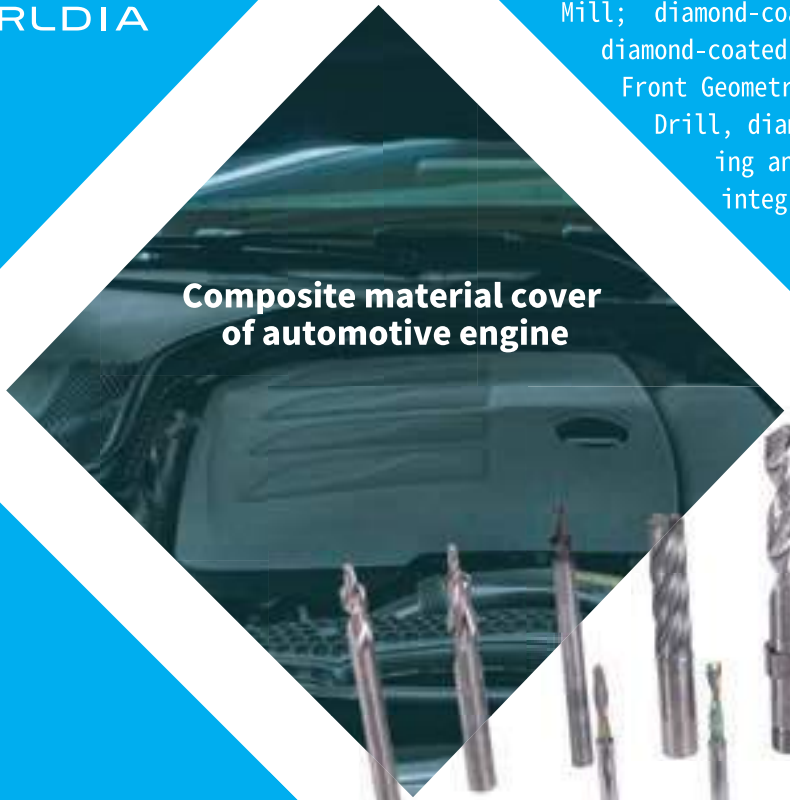
WORLDIA SOLID CARBIDE CUTTING TOOLS (ISO)

WORLDIA

01

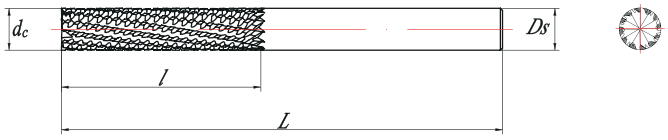
Tools used to process composite materials

Mainly include diamond-coated Multi-flute End Mill; diamond-coated Cross-edge End mill; diamond-coated Herringbone End Mill, Front Geometry Drill, Three-point Drill, diamond-coated Drilling and Countersink integration tools, etc.



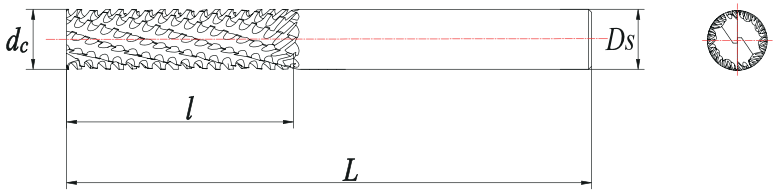
Tools For Composite Material

Multi-flute End Mill



Blade diameter dc / mm	Blade length l/mm	Total length L/mm	Shank diameter Ds / mm	Number of blades Z	End tooth type	Coating type
4	12	62	4	6	None/End Mill/Drill	None/Diamond
6	18	62	6	8	None/End Mill/Drill	None/Diamond
6.35	18	62	6.35	8	None/End Mill/Drill	None/Diamond
8	25	78	8	10	None/End Mill/Drill	None/Diamond
9.525	25	78	9.525	12	None/End Mill/Drill	None/Diamond
10	25	78	10	12	None/End Mill/Drill	None/Diamond
12	25	78	12	14	None/End Mill/Drill	None/Diamond
12.7	25	78	12.7	14	None/End Mill/Drill	None/Diamond

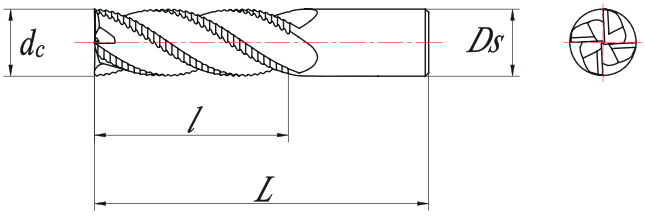
Cross-edge End Mill



Blade diameter dc / mm	Blade length l/mm	Total length L/mm	Shank diameter Ds / mm	End tooth type	Coating type
4	12	62	4	None/End Mill/Drill	None/Diamond
6	18	62	6	None/End Mill/Drill	None/Diamond
6.35	19.1	50.8	6.35	None/End Mill/Drill	None/Diamond
8	25	78	8	None/End Mill/Drill	None/Diamond
9.525	25	78	9.525	None/End Mill/Drill	None/Diamond
10	25	78	10	None/End Mill/Drill	None/Diamond
12	25	78	12	None/End Mill/Drill	None/Diamond
12.7	25	78	12.7	None/End Mill/Drill	None/Diamond

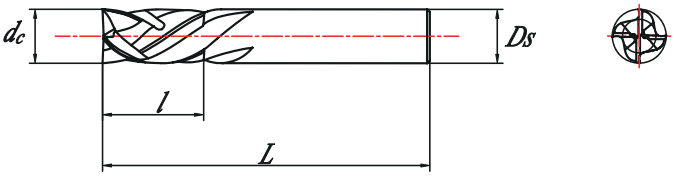
Tools For Composite Material

Roughing End Mill



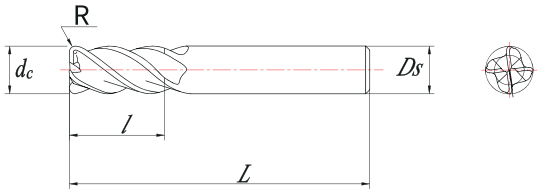
Blade diameter *dc / mm*	Blade length *l/mm*	Total length *L/mm*	Shank diameter *Ds / mm*	Coating type
4	12	62	4	None/Diamond
6	18	62	6	None/Diamond
6.35	18	62	6.35	None/Diamond
8	25	78	8	None/Diamond
9.525	25	78	9.525	None/Diamond
10	25	78	10	None/Diamond
12	25	78	12	None/Diamond
12.7	25	78	12.7	None/Diamond

Herringbone End Mill



Blade diameter *dc / mm*	Blade length *l/mm*	Total length *L/mm*	Shank diameter *Ds / mm*	Blade length *l1(0.7d)/mm*	Coating type
6	18	62	6	4.2	None/Diamond
6.35	18	62	6.35	4.5	None/Diamond
8	25	78	8	5.6	None/Diamond
9.525	25	78	9.525	6.7	None/Diamond
10	25	78	10	7	None/Diamond
12	25	78	12	8.4	None/Diamond
12.7	25	78	12.7	8.9	None/Diamond

Carbide End Mill-R



Blade diameter *dc / mm*	Fillet *R*	Blade length *l/mm*	Total length *L/mm*	Shank diameter *Ds / mm*	Coating type
4	0.4	12	62	4	None/Diamond
4	0.7	12	62	4	None/Diamond
6	0.4	18	62	6	None/Diamond
6	1	18	62	6	None/Diamond
6.35	0.4	18	62	6.35	None/Diamond
6.35	1	18	62	6.35	None/Diamond
8	0.4	25	78	8	None/Diamond
8	1	25	78	8	None/Diamond
9.525	0.4	25	78	9.525	None/Diamond
9.525	1	25	78	9.525	None/Diamond
10	0.4	25	78	10	None/Diamond
10	1	25	78	10	None/Diamond
12	0.4	25	78	12	None/Diamond
12	1	25	78	12	None/Diamond
12.7	0.4	25	78	12.7	None/Diamond
12.7	1	25	78	12.7	None/Diamond

Cutting parameters

CFRP

CFRP、CFRP/Al、CFRP/Ti						
Mill method	Mill Slot (ae=dc, ap≦dc)		Copy Milling (ae≦0.5dc, ap≦1.5dc)			
	Vc=120m/min		Vc=150m/min		Vc=250m/min	
dc(mm)	n(rpm)	Fr(mm/r)	n(rpm)	Fr(mm/r)	n(rpm)	Fr(mm/r)
1	38217	0.035	47771	0.035	79618	0.077
1.2	31847	0.04	39809	0.04	66348	0.088
1.5	25478	0.044	31847	0.044	53079	0.097
1.8	21231	0.044	26539	0.044	44232	0.097
2	19108	0.045	23885	0.045	39809	0.099
2.5	15287	0.05	19108	0.05	31847	0.11
3	12739	0.06	15924	0.06	26539	0.132
4	9554	0.08	11943	0.08	19904	0.176
6	6369	0.11	7962	0.11	13270	0.242
6.35	6018	0.12	7523	0.12	12538	0.264
8	4777	0.23	5971	0.23	9952	0.506
9.525	4012	0.31	5015	0.31	8359	0.682
10	3822	0.35	4777	0.35	7962	0.77
12	3185	0.44	3981	0.44	6635	0.968
12.7	3009	0.48	3761	0.48	6269	1.056

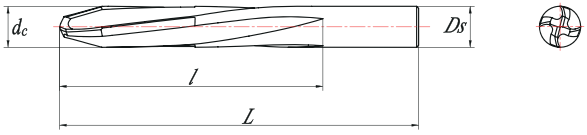
GFRP

GFRP、GFRP/Al、GFRP/Ti						
Mill method	Mill Slot (ae=dc, ap≦dc)		Copy Milling (ae≦0.5dc, ap≦1.5dc)		High speed milling (ae≦0.05dc, ap≦2dc)	
	Vc=120m/min		Vc=150m/min		Vc=250m/min	
dc(mm)	n(rpm)	Fr(mm/r)	n(rpm)	Fr(mm/r)	n(rpm)	Fr(mm/r)
1	31847	0.035	38217	0.035	63694	0.077
1.2	26539	0.04	31847	0.04	53079	0.088
1.5	21231	0.044	25478	0.044	42463	0.097
1.8	17693	0.044	21231	0.044	35386	0.097
2	15924	0.045	19108	0.045	31847	0.099
2.5	12739	0.05	15287	0.05	25478	0.11
3	10616	0.06	12739	0.06	21231	0.132
4	7962	0.08	9554	0.08	15924	0.176
6	5308	0.11	6369	0.11	10616	0.242
6.35	5015	0.12	6018	0.12	10031	0.264
8	3981	0.23	4777	0.23	7962	0.506
9.525	3344	0.31	4012	0.31	6687	0.682
10	3185	0.35	3822	0.35	6369	0.77
12	2654	0.44	3185	0.44	5308	0.968
12.7	2508	0.48	3009	0.48	5015	1.056

The above cutting parameter table is for reference only. The default is dry cutting conditions. If there is coolant, the cutting parameters can be appropriately increased.The types,structures and on-site cutting conditions of different composite materials require appropriate adjustments to the cutting parameters.Fine finishing usually requires a reduction in feed speed and depth of cut.When the cutting temperature is too high and the composite resin has melted or damaged, the speed should be reduced. When the material is stratified, the feed rate should be reduced.

Tools For Composite Material

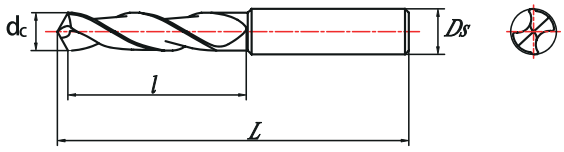
Front Geometry Drill



Blade diameter dc / mm	Blade length l/mm	Total length L/mm	Shank diameter Ds / mm	Coating type
3.26	36	76.2	3.26	None/Diamond
3.57	36	76.2	3.57	None/Diamond
3.97	36	76.2	3.97	None/Diamond
4.04	36	76.2	4.04	None/Diamond
4.06	36	76.2	4.06	None/Diamond
4.76	36	76.2	4.76	None/Diamond
4.91	36	76.2	4.91	None/Diamond

Blade diameter dc / mm	Blade length l/mm	Total length L/mm	Shank diameter Ds / mm	Coating type
5.11	36	76.2	5.11	None/Diamond
5.56	36	76.2	5.56	None/Diamond
5.94	36	76.2	5.94	None/Diamond
6.35	36	76.2	6.35	None/Diamond
7.94	48	101.6	7.94	None/Diamond
9.53	48	101.6	9.53	None/Diamond

General Twist Drill



Blade diameter dc / mm	Blade length l/mm	Total length L/mm	Shank diameter Ds / mm	Coating type
3	26	65	4	None/Diamond
3.1	26	65	4	None/Diamond
3.2	26	65	4	None/Diamond
3.3	26	65	4	None/Diamond
3.4	30	65	4	None/Diamond
3.5	30	65	4	None/Diamond
3.6	30	65	4	None/Diamond
3.7	30	65	4	None/Diamond
3.8	33	65	4	None/Diamond
3.9	33	65	4	None/Diamond
4	33	65	4	None/Diamond

Blade diameter dc / mm	Blade length l/mm	Total length L/mm	Shank diameter Ds / mm	Coating type
4.1	33	65	5	None/Diamond
4.2	33	65	5	None/Diamond
4.3	36	80	5	None/Diamond
4.4	36	80	5	None/Diamond
4.5	36	80	5	None/Diamond
4.6	36	80	5	None/Diamond
4.7	36	80	5	None/Diamond
4.8	36	80	5	None/Diamond
4.9	36	80	5	None/Diamond
5	40	80	5	None/Diamond
5.1	40	80	6	None/Diamond

Tools For Composite Material

Blade diameter dc / mm	Blade length l/mm	Total length L/mm	Shank diameter Ds / mm	Coating type
5.2	40	80	6	None/Diamond
5.3	40	80	6	None/Diamond
5.4	40	80	6	None/Diamond
5.5	40	80	6	None/Diamond
5.6	40	80	6	None/Diamond
5.7	40	80	6	None/Diamond
5.8	40	80	6	None/Diamond
5.9	40	80	6	None/Diamond
6	40	80	6	None/Diamond
6.1	45	80	7	None/Diamond
6.2	45	80	7	None/Diamond
6.3	45	80	7	None/Diamond
6.4	45	80	7	None/Diamond
6.5	45	80	7	None/Diamond
6.6	45	80	7	None/Diamond
6.7	45	80	7	None/Diamond
6.8	45	80	7	None/Diamond
6.9	45	80	7	None/Diamond
7	45	80	7	None/Diamond
7.1	48	96	8	None/Diamond
7.2	48	96	8	None/Diamond
7.3	48	96	8	None/Diamond
7.4	48	96	8	None/Diamond
7.5	48	96	8	None/Diamond
7.6	48	96	8	None/Diamond
7.7	48	96	8	None/Diamond
7.8	48	96	8	None/Diamond
7.9	48	96	8	None/Diamond
8	48	96	9	None/Diamond
8.1	48	96	9	None/Diamond
8.2	48	96	9	None/Diamond
8.3	48	96	9	None/Diamond
8.4	48	96	9	None/Diamond
8.5	48	96	9	None/Diamond
8.6	48	96	9	None/Diamond
8.7	48	96	9	None/Diamond

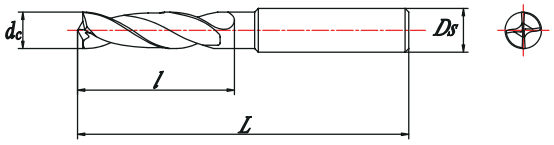
Blade diameter dc / mm	Blade length l/mm	Total length L/mm	Shank diameter Ds / mm	Coating type
8.8	48	96	9	None/Diamond
8.9	48	96	9	None/Diamond
9	48	96	9	None/Diamond
9.1	50	100	10	None/Diamond
9.2	50	100	10	None/Diamond
9.3	50	100	10	None/Diamond
9.4	50	100	10	None/Diamond
9.5	50	100	10	None/Diamond
9.6	50	100	10	None/Diamond
9.7	50	100	10	None/Diamond
9.8	50	100	10	None/Diamond
9.9	50	100	10	None/Diamond
10	50	100	10	None/Diamond
10.1	55	105	11	None/Diamond
10.2	55	105	11	None/Diamond
10.3	55	105	11	None/Diamond
10.4	55	105	11	None/Diamond
10.5	55	105	11	None/Diamond
10.6	55	105	11	None/Diamond
10.7	55	105	11	None/Diamond
10.8	55	105	11	None/Diamond
10.9	55	105	11	None/Diamond
11	55	105	11	None/Diamond
11.1	55	105	12	None/Diamond
11.2	55	105	12	None/Diamond
11.3	55	105	12	None/Diamond
11.4	55	105	12	None/Diamond
11.5	55	105	12	None/Diamond
11.6	55	105	12	None/Diamond
11.7	55	105	12	None/Diamond
11.8	55	105	12	None/Diamond
11.9	55	105	12	None/Diamond
12	55	105	12	None/Diamond
12.1	60	108	13	None/Diamond
12.2	60	108	13	None/Diamond
12.3	60	108	13	None/Diamond

Tools For Composite Material

Blade diameter dc / mm	Blade length l/mm	Total length L/mm	Shank diameter Ds / mm	Coating type
12.4	60	108	13	None/Diamond
12.5	60	108	13	None/Diamond
12.6	60	108	13	None/Diamond
12.7	60	108	13	None/Diamond

Blade diameter dc / mm	Blade length l/mm	Total length L/mm	Shank diameter Ds / mm	Coating type
12.8	60	108	13	None/Diamond
12.9	60	108	13	None/Diamond
13	60	108	13	None/Diamond

Three-point Drill



Blade diameter dc / mm	Blade length l/mm	Total length L/mm	Shank diameter Ds / mm	Coating type
3	26	65	4	None/Diamond
3.1	26	65	4	None/Diamond
3.2	26	65	4	None/Diamond
3.3	26	65	4	None/Diamond
3.4	30	65	4	None/Diamond
3.5	30	65	4	None/Diamond
3.6	30	65	4	None/Diamond
3.7	30	65	4	None/Diamond
3.8	33	65	4	None/Diamond
3.9	33	65	4	None/Diamond
4	33	65	4	None/Diamond
5.2	40	80	6	None/Diamond
5.3	40	80	6	None/Diamond
5.4	40	80	6	None/Diamond
5.5	40	80	6	None/Diamond
5.6	40	80	6	None/Diamond
5.7	40	80	6	None/Diamond
5.8	40	80	6	None/Diamond
5.9	40	80	6	None/Diamond
6	40	80	6	None/Diamond
6.1	45	80	7	None/Diamond
6.2	45	80	7	None/Diamond

Blade diameter dc / mm	Blade length l/mm	Total length L/mm	Shank diameter Ds / mm	Coating type
4.1	33	65	5	None/Diamond
4.2	33	65	5	None/Diamond
4.3	36	80	5	None/Diamond
4.4	36	80	5	None/Diamond
4.5	36	80	5	None/Diamond
4.6	36	80	5	None/Diamond
4.7	36	80	5	None/Diamond
4.8	36	80	5	None/Diamond
4.9	36	80	5	None/Diamond
5	40	80	5	None/Diamond
5.1	40	80	6	None/Diamond
8.8	48	96	9	None/Diamond
8.9	48	96	9	None/Diamond
9	48	96	9	None/Diamond
9.1	50	100	10	None/Diamond
9.2	50	100	10	None/Diamond
9.3	50	100	10	None/Diamond
9.4	50	100	10	None/Diamond
9.5	50	100	10	None/Diamond
9.6	50	100	10	None/Diamond
9.7	50	100	10	None/Diamond
9.8	50	100	10	None/Diamond

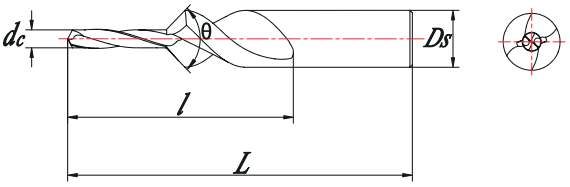
Tools For Composite Material

Blade diameter *dc / mm*	Blade length *l/mm*	Total length *L/mm*	Shank diameter *Ds / mm*	Coating type
6.3	45	80	7	None/Diamond
6.4	45	80	7	None/Diamond
6.5	45	80	7	None/Diamond
6.6	45	80	7	None/Diamond
6.7	45	80	7	None/Diamond
6.8	45	80	7	None/Diamond
6.9	45	80	7	None/Diamond
7	45	80	7	None/Diamond
7.1	48	96	8	None/Diamond
7.2	48	96	8	None/Diamond
7.3	48	96	8	None/Diamond
7.4	48	96	8	None/Diamond
7.5	48	96	8	None/Diamond
7.6	48	96	8	None/Diamond
7.7	48	96	8	None/Diamond
7.8	48	96	8	None/Diamond
7.9	48	96	8	None/Diamond
8	48	96	9	None/Diamond
8.1	48	96	9	None/Diamond
8.2	48	96	9	None/Diamond
8.3	48	96	9	None/Diamond
8.4	48	96	9	None/Diamond
8.5	48	96	9	None/Diamond
8.6	48	96	9	None/Diamond
8.7	48	96	9	None/Diamond
12.4	60	108	13	None/Diamond
12.5	60	108	13	None/Diamond
12.6	60	108	13	None/Diamond
12.7	60	108	13	None/Diamond

Blade diameter *dc / mm*	Blade length *l/mm*	Total length *L/mm*	Shank diameter *Ds / mm*	Coating type
9.9	50	100	10	None/Diamond
10	50	100	10	None/Diamond
10.1	55	105	11	None/Diamond
10.2	55	105	11	None/Diamond
10.3	55	105	11	None/Diamond
10.4	55	105	11	None/Diamond
10.5	55	105	11	None/Diamond
10.6	55	105	11	None/Diamond
10.7	55	105	11	None/Diamond
10.8	55	105	11	None/Diamond
10.9	55	105	11	None/Diamond
11	55	105	11	None/Diamond
11.1	55	105	12	None/Diamond
11.2	55	105	12	None/Diamond
11.3	55	105	12	None/Diamond
11.4	55	105	12	None/Diamond
11.5	55	105	12	None/Diamond
11.6	55	105	12	None/Diamond
11.7	55	105	12	None/Diamond
11.8	55	105	12	None/Diamond
11.9	55	105	12	None/Diamond
12	55	105	12	None/Diamond
12.1	60	108	13	None/Diamond
12.2	60	108	13	None/Diamond
12.3	60	108	13	None/Diamond
12.8	60	108	13	None/Diamond
12.9	60	108	13	None/Diamond
13	60	108	13	None/Diamond

Tools For Composite Material

Drilling and Countersink integration



Blade diameter dc / mm	Angle θ	Blade length l/mm	Total length L/mm	Shank diameter Ds / mm	Coating type
3.6	90°	14	95	8	None/Diamond
3.6	120°	5	79	10	None/Diamond
4.1	90°	5	79	10	None/Diamond
4.1	90°	8	79	10	None/Diamond
4.1	90°	10	79	10	None/Diamond
4.1	100°	6	79	10	None/Diamond
4.1	100°	18	95	8	None/Diamond
4.1	120°	7	79	10	None/Diamond
5	120°	8	79	10	None/Diamond
5.05	100°	18	85	10	None/Diamond
5.1	100°	18	95	8	None/Diamond

Blade diameter dc / mm	Angle θ	Blade length l/mm	Total length L/mm	Shank diameter Ds / mm	Coating type
4.15	100°	11	100	10	None/Diamond
4.2	100°	6	79	10	None/Diamond
4.2	100°	7	79	10	None/Diamond
4.2	130°	6	79	10	None/Diamond
4.86	100°	18	100	10	None/Diamond
5	100°	8	79	10	None/Diamond
5	100°	10	79	10	None/Diamond
5	100°	25	90	10	None/Diamond
5.1	130°	6	79	10	None/Diamond
6.1	100°	17	102	10	None/Diamond

Special size and British system Drill can be customized according to customer needs;
Drilling and countersinking are completed at one time, greatly improving the efficiency of hole making;
Can be used for hole making equipment such as ADU, CNC, robotic drilling and riveting systems;
Straight shank or threaded shank can be used;
The grooves of the drill and countersink can be designed with internal cooling for air cooling or minimal lubrication;
It can be used to process aluminum, composite materials or composite/aluminum, composite/composite, aluminum/aluminum, composite/titanium alloy and other laminated holes.

Cutting Parameters

Work Material	CFRP、CFRP/Al		
Outside Diameter dc/ (mm)	Cutting Speed Vc/ (m/min)	Rotating Speed n/ (rpm)	Feed Rate Fr/ (mm/r)
3	60～120	9600	0.03～0.05
4		7300	
5		5800	0.05～0.1
6		4900	
7		4200	
8		3700	
9		3300	
10		3000	
11		2700	
12		2500	
13		2300	

Tools For Composite Material

Other Special Tools

Threaded Shank Front Geometry Drill

Threaded Shank General Drill

According to customer needs, we can use our proprietary tool research and development technology experience to carry out unique research and development in terms of tool material selection, tool geometry design, passivation polishing technology, coating technology, etc. Develop special composite material processing tools that meet customer requirements.

Blades/Impellers/Casings

AVIATION PARTS AND COMPONENTS

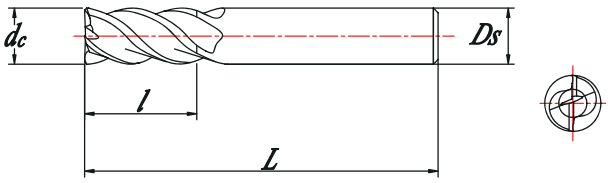
02

Tools for aeroengine parts

It mainly includes parts such as blades, impellers, casings, and seals on aero engines.The materials are mainly titanium alloy, high temperature alloy, stainless steel, aluminum alloy, etc.

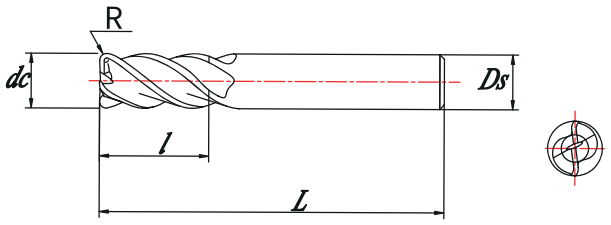
Processing tools mainly include flat-end milling cutters, round-nose milling cutters, ball-end milling cutters, taper ball-end milling cutters, and other drills and reamers.

2 Flute Carbide End Mill



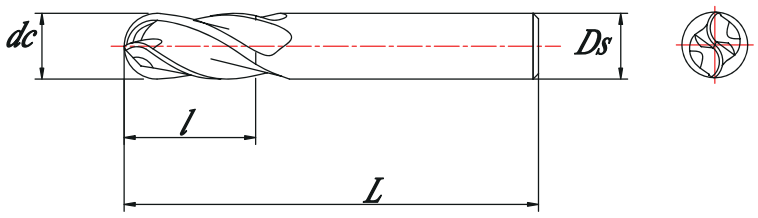
Blade diameter dc / mm	Blade length l/mm	Total length L/mm	Shank diameter Ds / mm	NOTE
3	6	50	3	
3	9	60	6	
3	12	50	3	
3	25	80	3	
4	8	50	4	
4	12	70	6	
4	14	50	4	
4	25	75	4	
5	10	50	6	
5	16	50	6	
5	25	75	6	
6	12	50	6	
6	15	80	6	
6	19	60	6	
6	25	63	6	
8	12	50	8	
8	20	63	8	
8	20	89	8	
8	25	75	8	
10	16	60	10	
10	22	75	10	
10	25	105	10	
10	38	100	10	
12	19	63	12	
12	25	75	12	
12	30	110	12	
12	50	100	12	
12	75	150	12	

2 Flute Carbide End Mill-R



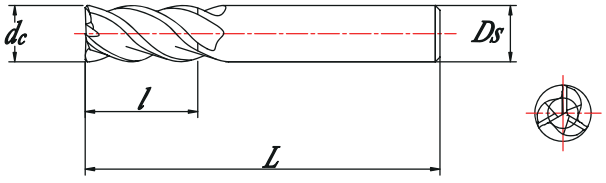
Blade diameter *dc / mm*	Fillet *R*	Blade length *l/mm*	Total length *L/mm*	Shank diameter *Ds / mm*	*NOTE*
6	0.25	19	63	6	
6	0.5	19	63	6	
6	0.75	19	63	6	
6	1	19	63	6	
8	0.5	20	63	8	
8	0.75	20	63	8	
8	1	20	63	8	
8	1.5	20	63	8	
8	2	20	63	8	
10	0.5	22	80	8	
10	1	22	80	9	
10	1.5	22	80	10	
10	2	22	80	10	
12	0.5	25	80	10	
12	1	25	80	10	
12	1.5	25	80	10	
12	2	25	80	12	

2 Flute Carbide Ball End Mill



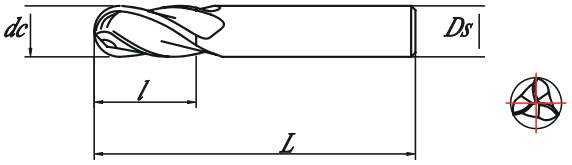
Blade diameter *dc / mm*	Blade length *l/mm*	Total length *L/mm*	Shank diameter *Ds / mm*	*NOTE*
3	6	50	3	
3	9	60	6	
3	12	50	3	
3	25	80	3	
4	8	50	4	
4	12	70	6	
4	14	50	4	
4	25	75	4	
5	10	50	6	
5	16	50	6	
5	25	75	6	
6	12	50	6	
6	15	80	6	
6	19	60	6	
6	25	63	6	
8	12	50	8	
8	20	63	8	
8	20	89	8	
8	25	75	8	
10	16	60	10	
10	22	75	10	
10	25	105	10	
10	38	100	10	
12	19	63	12	
12	25	75	12	
12	30	110	12	
12	50	100	12	
12	75	150	12	

3 Flute Carbide End Mill



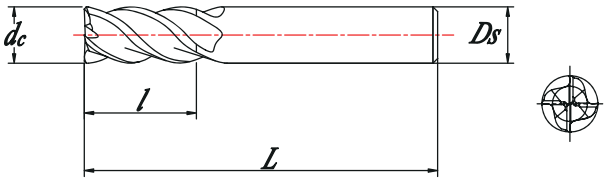
Blade diameter dc / mm	Blade length l/mm	Total length L/mm	Shank diameter Ds / mm	NOTE
3	6	50	3	
3	9	60	6	
3	12	50	3	
3	25	80	3	
4	8	50	4	
4	12	70	6	
4	14	50	4	
4	25	75	4	
5	10	50	6	
5	16	50	6	
5	25	75	6	
6	12	50	6	
6	15	80	6	
6	19	60	6	
6	25	63	6	
8	12	50	8	
8	20	63	8	
8	20	89	8	
8	25	75	8	
10	16	60	10	
10	22	75	10	
10	25	105	10	
10	38	100	10	
12	19	63	12	
12	25	75	12	
12	30	110	12	
12	50	100	12	
12	75	150	12	

3 Flute Carbide Ball End Mill



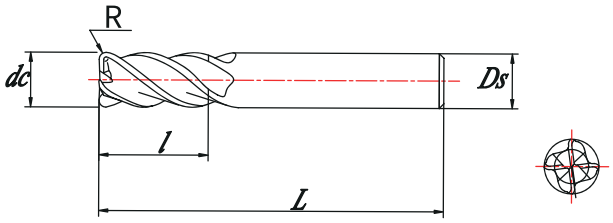
Blade diameter *dc / mm*	Blade length *l/mm*	Total length *L/mm*	Shank diameter *Ds / mm*	*NOTE*
3	6	50	3	
3	9	60	6	
3	12	50	3	
3	25	80	3	
4	8	50	4	
4	12	70	6	
4	14	50	4	
4	25	75	4	
5	10	50	6	
5	16	50	6	
5	25	75	6	
6	12	50	6	
6	15	80	6	
6	19	60	6	
6	25	63	6	
8	12	50	8	
8	20	63	8	
8	20	89	8	
8	25	75	8	
10	16	60	10	
10	22	75	10	
10	25	105	10	
10	38	100	10	
12	19	63	12	
12	25	75	12	
12	30	110	12	
12	50	100	12	
12	75	150	12	

4 Flute Carbide End Mill



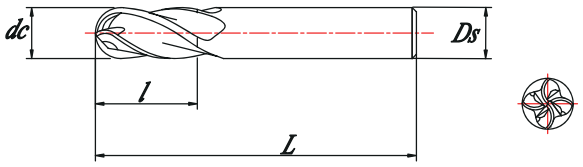
Blade diameter *dc / mm*	Blade length *l/mm*	Total length *L/mm*	Shank diameter *Ds / mm*	*NOTE*
3	6	50	3	
3	9	60	6	
3	12	50	3	
3	25	80	3	
4	8	50	4	
4	12	70	6	
4	14	50	4	
4	25	75	4	
5	10	50	6	
5	16	50	6	
5	25	75	6	
6	12	50	6	
6	15	80	6	
6	19	60	6	
6	25	63	6	
8	12	50	8	
8	20	63	8	
8	20	89	8	
8	25	75	8	
10	16	60	10	
10	22	75	10	
10	25	105	10	
10	38	100	10	
12	19	63	12	
12	25	75	12	
12	30	110	12	
12	50	100	12	
12	75	150	12	

4 Flute Carbide End Mill-R



Blade diameter dc / mm	Fillet R	Blade length l/mm	Total length L/mm	Shank diameter Ds / mm	NOTE
6	0.25	19	63	6	
6	0.5	19	63	6	
6	0.75	19	63	6	
6	1	19	63	6	
8	0.5	20	63	8	
8	0.75	20	63	8	
8	1	20	63	8	
8	1.5	20	63	8	
8	2	20	63	8	
10	0.5	22	80	8	
10	1	22	80	9	
10	1.5	22	80	10	
10	2	22	80	10	
12	0.5	25	80	10	
12	1	25	80	10	
12	1.5	25	80	10	
12	2	25	80	12	

4 Flute Carbide Ball End Mill



Blade diameter dc / mm	Blade length l/mm	Total length L/mm	Shank diameter Ds / mm	NOTE
3	6	50	3	
3	9	60	6	
3	12	50	3	
3	25	80	3	
4	8	50	4	
4	12	70	6	
4	14	50	4	
4	25	75	4	
5	10	50	6	
5	16	50	6	
5	25	75	6	
6	12	50	6	
6	15	80	6	
6	19	60	6	
6	25	63	6	
8	12	50	8	
8	20	63	8	
8	20	89	8	
8	25	75	8	
10	16	60	10	
10	22	75	10	
10	25	105	10	
10	38	100	10	
12	19	63	12	
12	25	75	12	
12	30	110	12	
12	50	100	12	
12	75	150	12	

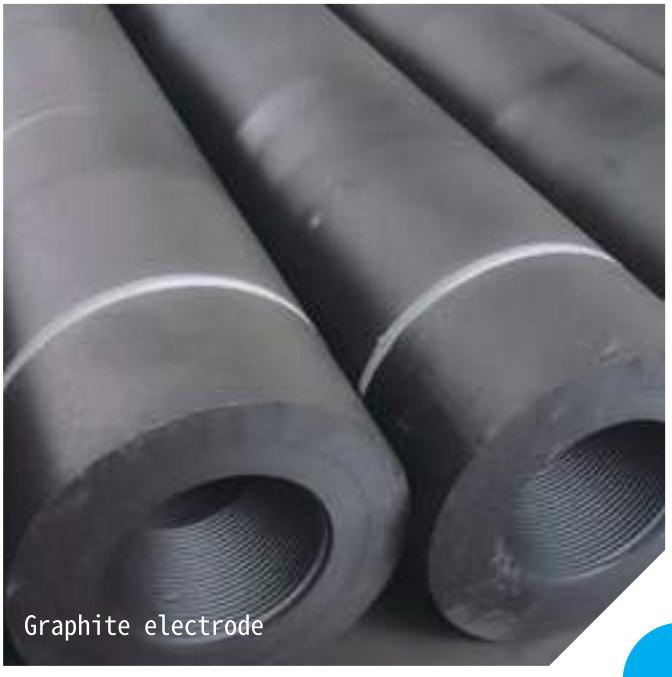
Including automobile engine cylinder blocks, cylinder heads, steering gears, connecting rods, steering knuckles and other parts. The materials involve ductile iron, gray cast iron, steel, aluminum alloy, etc.
According to customer needs, we can use our proprietary tool development technology experience to develop special tools that meet customer requirements in terms of tool material selection, tool geometric design, passivation and polishing technology, coating technology, etc.
The main processing tools include ordinary twist drills, shaped step drills, shaped reamers, corresponding drills and reamers with internal cooling function and other flat end milling cutters, round end milling cutters and ball end milling cutters. Please refer to page 36-40 for details.

03

Special tools for automotive parts

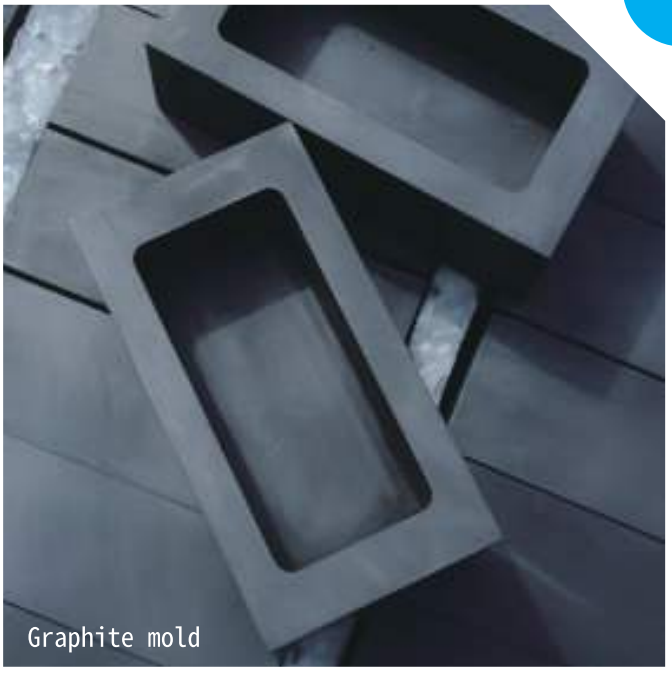
04 Tools for graphite

Mainly include diamond coated tools for processing graphite molds and graphite electrodes.

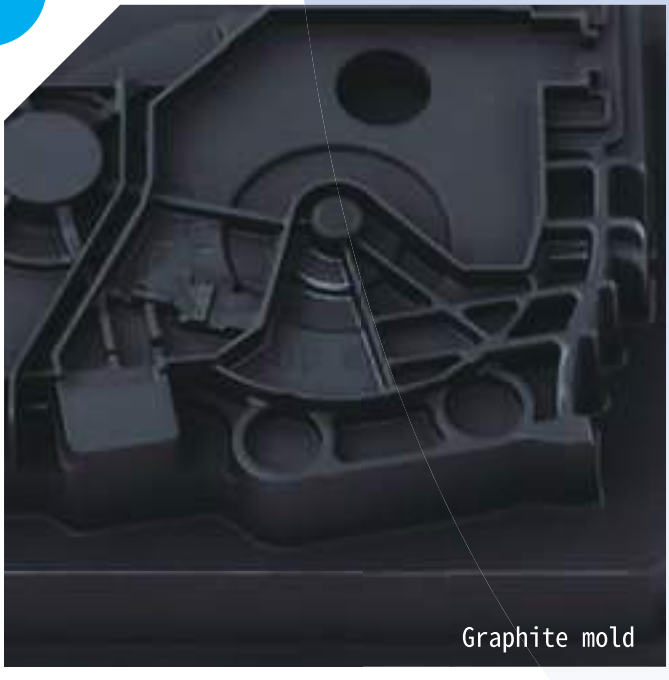


Graphite electrode

Diamond coated tools

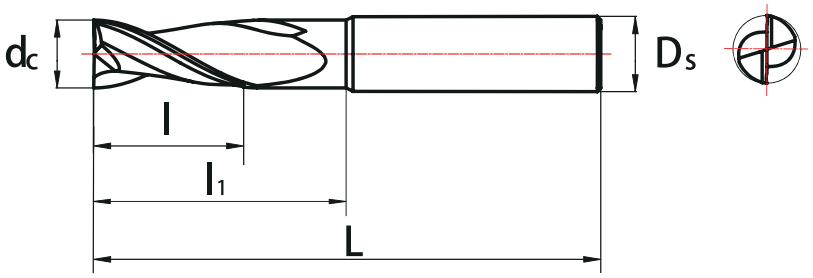


Graphite mold



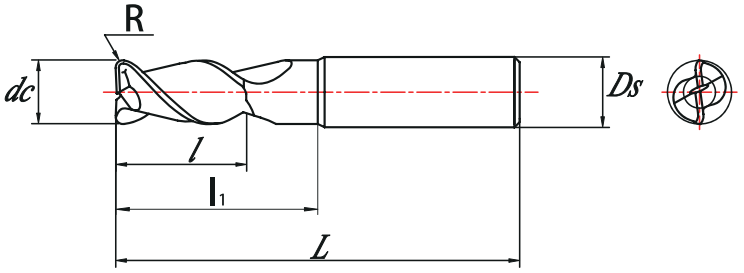
Graphite mold

2 Flute Carbide End Mill



Blade diameter *dc / mm*	Blade length *l/mm*	Effective length l_1 */mm*	Total length *L/mm*	Shank diameter *Ds / mm*	Coating type
3	9	/	50	6	Diamond
3	12	/	80	4	Diamond
3	12	20	80	4	Diamond
3	12	25	80	4	Diamond
3	12	30	80	4	Diamond
3	12	40	80	4	Diamond
4	12	/	50	6	Diamond
4	16	/	80	4	Diamond
5	15	/	64	6	Diamond
5	20	/	105	6	Diamond
6	18	/	64	6	Diamond
6	25	/	105	6	Diamond
6	25	/	150	6	Diamond
8	24	/	75	8	Diamond
8	25	40	150	8	Diamond
10	25	/	81	10	Diamond
10	25	50	160	10	Diamond
12	25	/	81	12	Diamond
12	25	60	160	12	Diamond

2 Flute Carbide End Mill

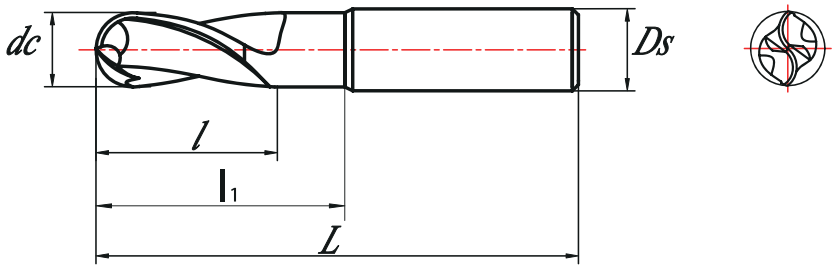


Blade diameter *dc / mm*	Fillet radius *R*	Blade length *l/mm*	Effective length l_1 */mm*	Total length *L/mm*	Shank diameter *Ds / mm*	Coating type
3	0.3	4	/	82	4	Diamond
3	0.3	4	10	82	4	Diamond
3	0.3	4	20	82	4	Diamond
3	0.3	4	30	82	4	Diamond
3	0.3	4	40	82	4	Diamond
3	0.5	4	/	82	4	Diamond
3	0.5	4	10	82	4	Diamond
3	0.5	4	20	82	4	Diamond
3	0.5	4	30	82	4	Diamond
3	0.5	4	40	82	4	Diamond
3	1	4	/	82	4	Diamond
3	1	4	10	82	4	Diamond
3	1	4	20	82	4	Diamond
3	1	4	30	82	4	Diamond
3	1	4	40	82	4	Diamond
4	0.2	5	/	82	4	Diamond
4	0.2	5	15	82	4	Diamond
4	0.2	5	25	82	4	Diamond
4	0.2	5	40	82	4	Diamond
4	0.5	5	/	82	4	Diamond
4	0.5	5	15	82	4	Diamond
4	0.5	5	25	82	4	Diamond
4	0.5	5	40	82	4	Diamond
4	1	5	/	82	4	Diamond
4	1	5	15	82	4	Diamond
4	1	5	25	82	4	Diamond
4	1	5	40	82	4	Diamond
5	0.2	6	/	105	6	Diamond

Tools For Graphite

Blade diameter *dc / mm*	Fillet radius *R*	Blade length *l/mm*	Effective length l_1 */mm*	Total length *L/mm*	Shank diameter *Ds / mm*	Coating type
5	0.2	6	15	105	6	Diamond
5	0.2	6	30	105	6	Diamond
5	0.2	6	50	105	6	Diamond
5	0.5	6	/	105	6	Diamond
5	0.5	6	15	105	6	Diamond
5	0.5	6	30	105	6	Diamond
5	0.5	6	50	105	6	Diamond
6	0.2	7	/	105	6	Diamond
6	0.2	7	20	105	6	Diamond
6	0.2	7	30	105	6	Diamond
6	0.2	7	50	105	6	Diamond
6	0.5	7	/	105	6	Diamond
6	0.5	7	20	105	6	Diamond
6	0.5	7	30	105	6	Diamond
6	0.5	7	50	105	6	Diamond
6	1	7	/	105	6	Diamond
6	1	7	20	105	6	Diamond
6	1	7	30	105	6	Diamond
6	1	7	50	105	6	Diamond

2 Flute Carbide Ball End Mill

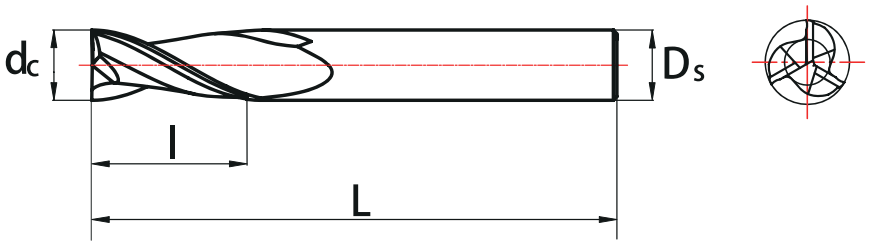


Blade diameter *dc / mm*	Blade length *l/mm*	Effective length l_1 */mm*	Total length *L/mm*	Shank diameter *Ds / mm*	Coating type
3	8	15	105	3	Diamond
3	8	/	62	4	Diamond
3	8	15	105	4	Diamond
3	8	20	105	4	Diamond
3	8	25	105	4	Diamond
3	8	30	105	4	Diamond

Tools For Graphite

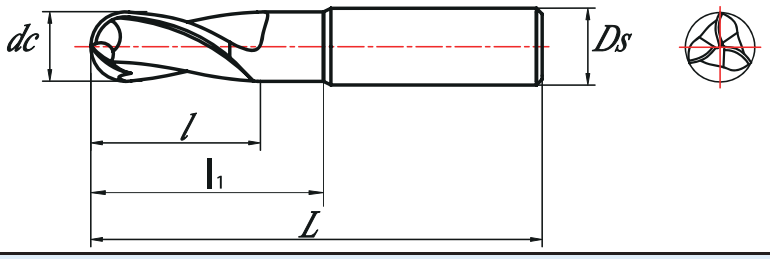
Blade diameter *dc / mm*	Blade length *l/mm*	Effective length l_1 */mm*	Total length *L/mm*	Shank diameter *Ds / mm*	Coating type
3	8	35	105	4	Diamond
3	8	40	105	4	Diamond
3	8	50	105	4	Diamond
3	8	60	105	4	Diamond
4	16	/	62	4	Diamond
4	16	/	82	4	Diamond
4	16	30	82	4	Diamond
4	16	/	105	4	Diamond
4	16	40	105	4	Diamond
4	16	/	135	4	Diamond
4	16	40	135	4	Diamond
4	16	/	160	4	Diamond
4	16	50	160	4	Diamond
5	16	20	105	6	Diamond
6	16	25	82	6	Diamond
6	16	25	105	6	Diamond
6	16	40	105	6	Diamond
6	16	30	160	6	Diamond
6	16	50	160	6	Diamond
8	20	30	82	8	Diamond
8	20	30	105	8	Diamond
8	20	40	105	8	Diamond
8	20	50	160	8	Diamond
8	20	40	205	8	Diamond
10	22	40	82	10	Diamond
10	22	35	105	10	Diamond
10	22	50	105	10	Diamond
10	22	60	160	10	Diamond
10	22	50	200	10	Diamond
12	25	50	105	12	Diamond
12	25	50	160	12	Diamond
12	25	60	205	12	Diamond

3 Flute Carbide End Mill



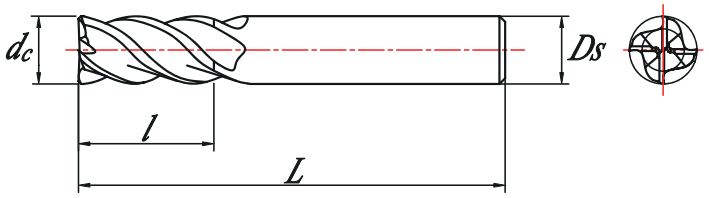
Blade diameter *dc / mm*	Blade length *l/mm*	Total length *L/mm*	Shank diameter *Ds / mm*	Coating type
3	9	54	6	Diamond
3	15	64	3	Diamond
3	15	64	4	Diamond
4	12	54	6	Diamond
4	20	82	4	Diamond
6	18	64	6	Diamond
6	25	105	6	Diamond
6	25	150	6	Diamond
8	24	75	8	Diamond
8	35	105	8	Diamond
8	35	162	8	Diamond
10	25	81	10	Diamond
10	40	105	10	Diamond
10	50	162	10	Diamond
12	25	81	12	Diamond
12	45	105	12	Diamond
12	55	162	12	Diamond

3 Flute Carbide Ball End Mill



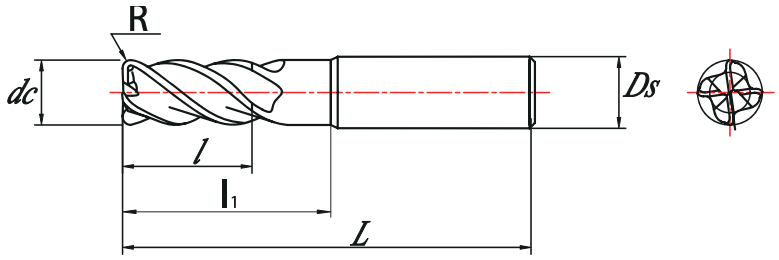
Blade diameter *dc / mm*	Blade length *l/mm*	Effective length *l_1 /mm*	Total length *L/mm*	Shank diameter *Ds / mm*	Coating type
3	8	15	105	3	Diamond
3	8	/	62	4	Diamond
3	8	15	105	4	Diamond
3	8	20	105	4	Diamond
3	8	30	105	4	Diamond
3	8	40	105	4	Diamond
3	8	50	105	4	Diamond
4	16	/	82	4	Diamond
4	16	30	82	4	Diamond
4	16	/	105	4	Diamond
4	16	40	105	4	Diamond
4	16	/	135	4	Diamond
4	16	40	135	4	Diamond
6	16	25	105	6	Diamond
6	16	40	105	6	Diamond
6	16	30	160	6	Diamond
6	16	50	160	6	Diamond
8	20	30	82	8	Diamond
8	20	30	105	8	Diamond
8	20	40	105	8	Diamond
8	20	50	160	8	Diamond
8	20	40	205	8	Diamond
10	22	40	82	10	Diamond
10	22	35	105	10	Diamond
10	22	50	105	10	Diamond
10	22	60	160	10	Diamond
10	22	50	200	10	Diamond
12	25	50	105	12	Diamond
12	25	50	160	12	Diamond
12	25	60	205	12	Diamond

4 Flute Carbide End Mill



Blade diameter *dc / mm*	Blade length *l/mm*	Total length *L/mm*	Shank diameter *Ds / mm*	Coating type
3	9	54	6	Diamond
3	15	64	3	Diamond
3	15	64	4	Diamond
4	12	54	6	Diamond
4	20	82	4	Diamond
6	18	64	6	Diamond
6	25	105	6	Diamond
6	25	150	6	Diamond
8	24	75	8	Diamond
8	35	105	8	Diamond
8	35	162	8	Diamond
10	25	81	10	Diamond
10	40	105	10	Diamond
10	50	162	10	Diamond
12	25	81	12	Diamond
12	45	105	12	Diamond
12	55	162	12	Diamond

4 Flute Carbide End Mill-R

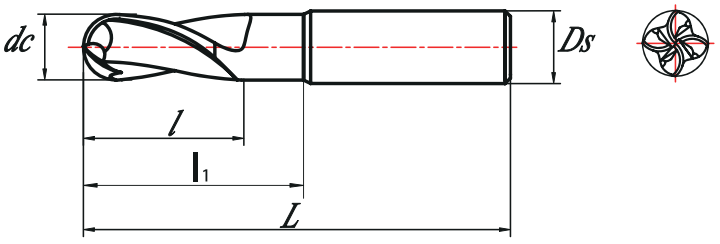


Blade diameter *dc / mm*	Fillet radius *R*	Blade length *l/mm*	Effective length *l1 /mm*	Total length *L/mm*	Shank diameter *Ds / mm*	Coating type
3	0.3	4	/	82	4	Diamond
3	0.3	4	10	82	4	Diamond
3	0.3	4	20	82	4	Diamond
3	0.3	4	30	82	4	Diamond
3	0.3	4	40	82	4	Diamond
3	0.5	4	/	82	4	Diamond
3	0.5	4	10	82	4	Diamond
3	0.5	4	20	82	4	Diamond
3	0.5	4	30	82	4	Diamond
3	0.5	4	40	82	4	Diamond
3	1	4	/	82	4	Diamond
3	1	4	10	82	4	Diamond
3	1	4	20	82	4	Diamond
3	1	4	30	82	4	Diamond
3	1	4	40	82	4	Diamond
4	0.3	6	20	105	4	Diamond
4	0.5	6	20	105	4	Diamond
4	1	6	20	105	4	Diamond
6	0.3	9	25	105	6	Diamond
6	0.5	9	25	105	6	Diamond
6	0.5	9	30	150	6	Diamond
6	1	9	25	105	6	Diamond
6	1	9	30	150	6	Diamond
8	0.3	12	30	105	8	Diamond
8	0.5	12	30	105	8	Diamond
8	0.5	12	40	150	8	Diamond
8	1	12	30	105	8	Diamond
8	1	12	40	150	8	Diamond

Tools For Graphite

Blade diameter *dc / mm*	Fillet radius *R*	Blade length *l/mm*	Effective length l_1 */mm*	Total length *L/mm*	Shank diameter *Ds / mm*	Coating type
10	0.5	15	35	105	10	Diamond
10	0.5	15	45	162	10	Diamond
10	1	15	35	105	10	Diamond
10	1	15	45	162	10	Diamond
12	0.5	18	40	105	12	Diamond
12	0.5	18	45	162	12	Diamond
12	1	18	40	105	12	Diamond
12	1	18	45	162	12	Diamond

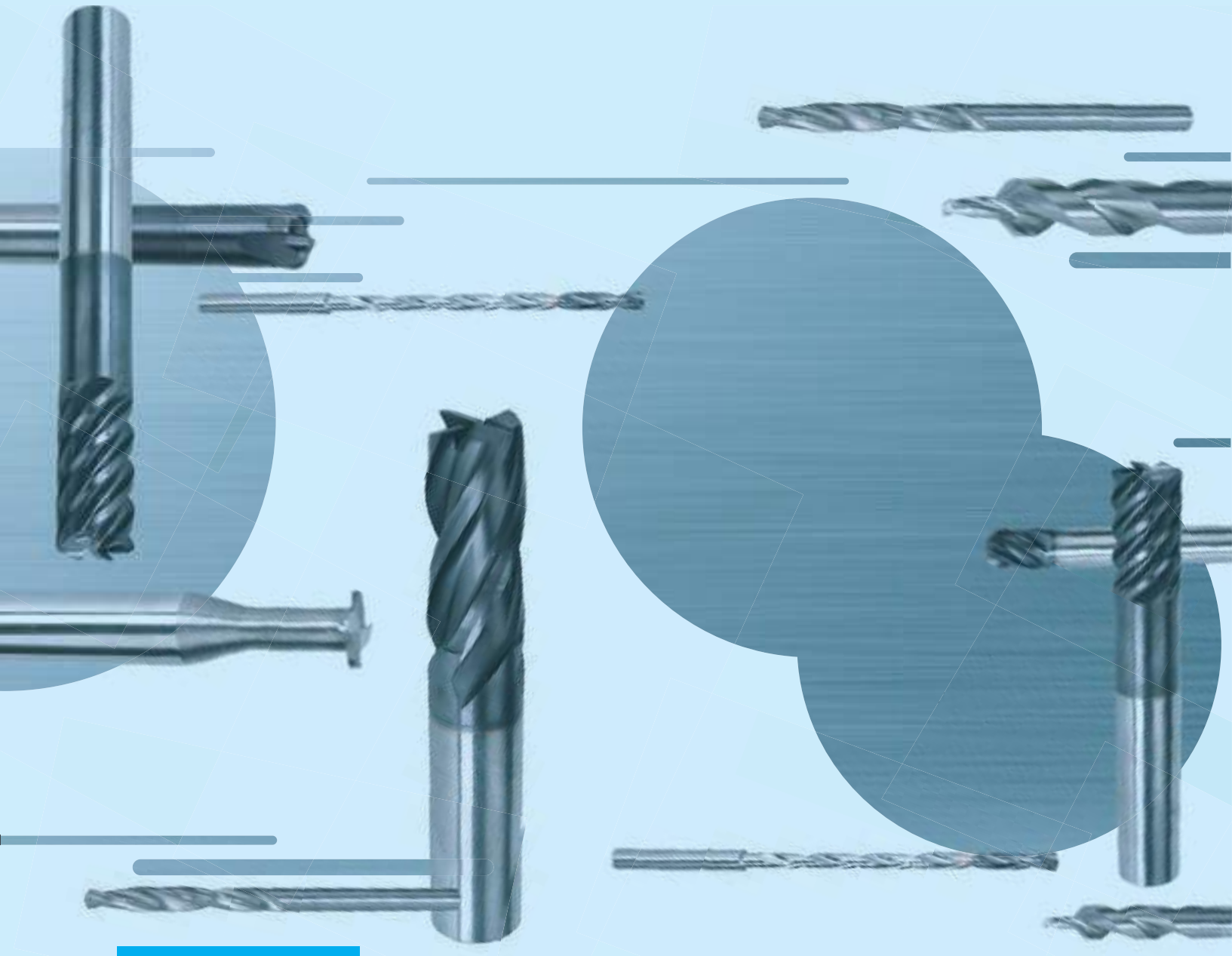
4 Flute Carbide Ball End Mill



Blade diameter *dc / mm*	Blade length *l/mm*	Effective length l_1 */mm*	Total length *L/mm*	Shank diameter *Ds / mm*	Coating type
3	8	15	105	3	Diamond
3	8	/	62	4	Diamond
3	8	15	105	4	Diamond
3	8	20	105	4	Diamond
3	8	30	105	4	Diamond
3	8	40	105	4	Diamond
3	8	50	105	4	Diamond
4	16	/	82	4	Diamond
4	16	30	82	4	Diamond
4	16	/	105	4	Diamond
4	16	40	105	4	Diamond
4	16	/	135	4	Diamond
4	16	40	135	4	Diamond
6	16	25	105	6	Diamond
6	16	40	105	6	Diamond
6	16	30	160	6	Diamond
6	16	50	160	6	Diamond

Tools For Graphite

Blade diameter *dc / mm*	Blade length *l/mm*	Effective length l_1 */mm*	Total length *L/mm*	Shank diameter *Ds / mm*	Coating type
38	20	30	82	8	Diamond
8	20	30	105	8	Diamond
8	20	40	105	8	Diamond
8	20	50	160	8	Diamond
8	20	40	205	8	Diamond
10	22	40	82	10	Diamond
10	22	35	105	10	Diamond
10	22	50	105	10	Diamond
10	22	60	160	10	Diamond
10	22	50	200	10	Diamond
12	25	50	105	12	Diamond
12	25	50	160	12	Diamond
12	25	60	205	12	Diamond



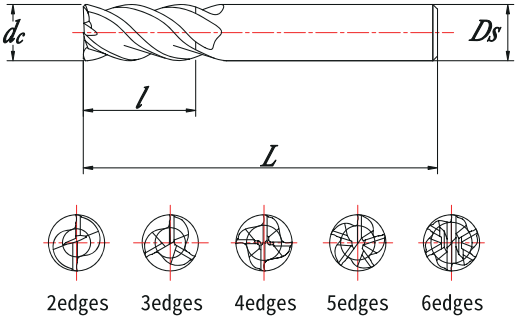
05

Other types of special tools

According to customer needs, we can use our proprietary tool research and development technology experience to conduct unique research and development in terms of tool material selection, tool geometry design, passivation polishing technology, coating technology, etc. Developed solid carbide non-standard tools that meet customer requirements, including flat-end milling cutters, round-nose milling cutters, ball-end milling cutters, taper ball-end milling cutters, rough milling cutters, drills, reamers, etc.

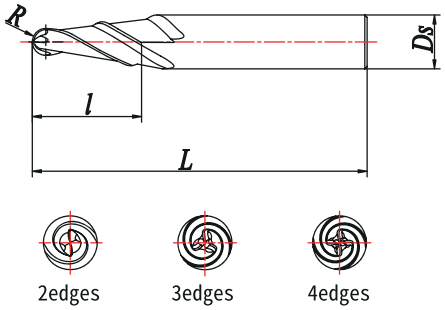
Other Types Of Special Tools

Carbide End Mill



materials suitable for processing	Carbon steel, stainless steel, cast iron, titanium alloy, aluminum alloy, high temperature alloy, non-metallic materials, etc.
Milling form	Side milling, shoulder milling, cavity milling, etc.
Blade diameter dc (mm)	3～32
Blade length (l mm)	5～100
Total length L (mm)	38～200
Shank diameter Ds (mm)	4～32
Handle form	Cylindrical shank, side fixed shank
Number of blades	2 edge, 3 edge, 4 edge, 5 edge, 6 edge, 8 edge
coating	TiN, TiAlN, AlCrN, AlTiN-based, DLC, diamond coating, etc.
other	The blade can be designed to shrink, avoid air, taper, etc.

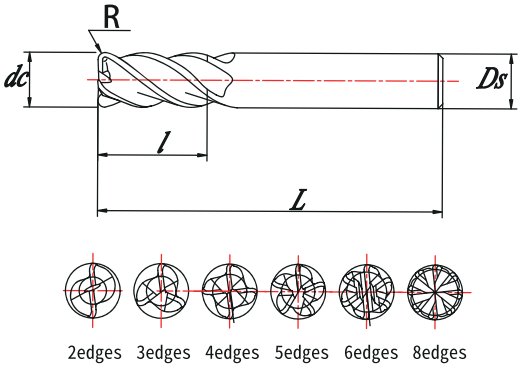
Taper ball end mill



Materials suitable for processing	Stainless steel, titanium alloy, aluminum alloy, high temperature alloy
Milling form	Side milling, end milling, etc.
R value (mm)	0.8～6
Taper (half side)	1°～9°
Blade length (l mm)	10～100
Total length L (mm)	50～150
Shank diameter Ds (mm)	6～20
Handle form	Cylindrical shank
Number of blades	2-edge, 3-edge, 4-edge
coating	TiN, TiAlN, AlCrN, AlTiN-based, DLC, diamond coating, etc.
other	

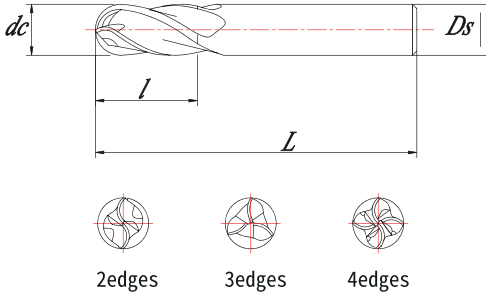
Other Types Of Special Tools

Carbide End Mill-R



Materials suitable for processing	Carbon steel, stainless steel, cast iron, titanium alloy, aluminum alloy, high temperature alloy, non-metallic materials, etc.
Milling form	Side milling, slot milling, ramp milling, cavity milling, etc.
Blade diameter dc (mm)	3～32
R value	0.2～6
Blade length (l mm)	5～100
Total length L (mm)	38～200
Shank diameter Ds (mm)	4～32
Handle form	Cylindrical shank, side fixed shank
Number of blades	2 edge, 3 edge, 4 edge, 5 edge, 6 edge, 8 edge
coating	TiN, TiAlN, AlCrN, AlTiN-based, DLC, diamond coating, etc.
other	The blade can be designed to shrink, avoid air, taper, etc.

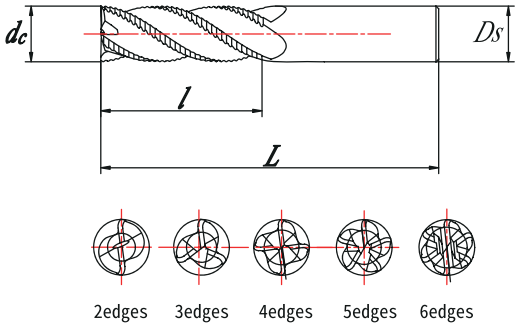
Carbide Ball End Mill



Materials suitable for processing	Carbon steel, stainless steel, cast iron, titanium alloy, aluminum alloy, high temperature alloy, non-metallic materials, etc.
Milling form	Face milling, profile milling, etc.
Blade diameter dc (mm)	3～32
Blade length (l mm)	5～100
Total length L (mm)	38～200
Shank diameter Ds (mm)	4～32
Handle form	Cylindrical shank, side fixed shank
Number of blades	2-edge, 3-edge, 4-edge
coating	TiN, TiAlN, AlCrN, AlTiN-based, DLC, diamond coating, etc.
other	The blade can be designed to shrink, avoid air, taper, etc.

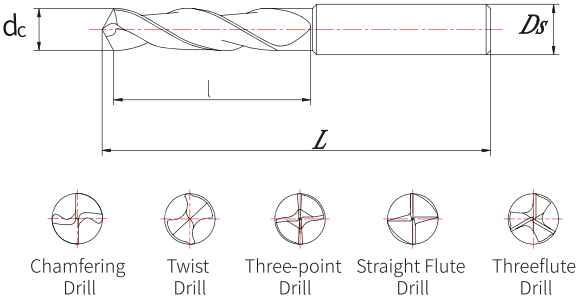
Other Types Of Special Tools

Roughing End Mill



Materials suitable for processing	Carbon steel, stainless steel, cast iron, titanium alloy, aluminum alloy, high temperature alloy, non-metallic materials, etc.
Milling form	Side milling, slot milling, etc.
Blade diameter dc (mm)	6～32
Blade length (l mm)	5～100
Total length L (mm)	50～200
Shank diameter Ds (mm)	6～32
Handle form	Cylindrical shank, side fixed shank
Number of blades	2 edge, 3 edge, 4 edge, 5 edge, 6 edge
coating	TiN, TiAlN, AlCrN, AlTiN-based, DLC, diamond coating, etc.
other	The blade can be designed to shrink, avoid air, taper, etc.

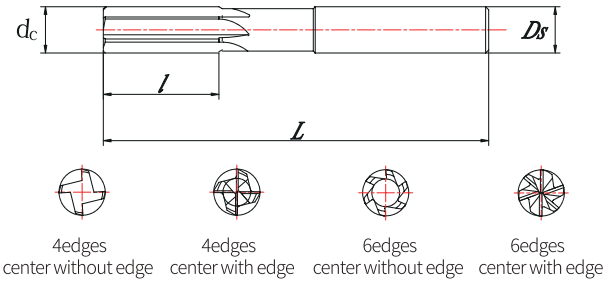
Drill



Materials suitable for processing	Carbon steel, stainless steel, cast iron, titanium alloy, aluminum alloy, high temperature alloy, non-metallic materials, etc.
Blade diameter dc (mm)	3～32
Slot length (l mm)	10～100
Total length L (mm)	60～200
Shank diameter Ds (mm)	4～32
Cooling form	Internal cooling, external cooling
Handle form	Cylindrical shank, side fixed shank
Drill bit form	Chamfer drill, twist drill, three-point drill, straight flute drill, three-edge drill
coating	TiN, TiAlN, AlCrN, AlTiN-based, DLC, diamond coating, etc.
other	The blade can be designed to shrink, avoid air, etc.

Other Types Of Special Tools

Reamer



Materials suitable for processing	Carbon steel, stainless steel, cast iron, titanium alloy, aluminum alloy, high temperature alloy, non-metallic materials, etc.
Blade diameter dc (mm)	3～20
Slot length (l mm)	5～30
Total length L (mm)	60～150
Shank diameter Ds (mm)	4～20
Cooling form	Internal cooling, external cooling
Handle form	Cylindrical shank
Reamer form	4 blades, 6 blades, etc.
coating	TiAlN, AlCrN-based, AlTiN-based, DLC
other	The blade can be designed to shrink, avoid air, etc.

Ceramic Tools

Compared with cemented carbide tools, ceramic tools are more resistant to high temperatures and can achieve dry cutting, which not only saves costs but also is environmentally friendly;Good oxidation resistance makes it possible to realize high-speed cutting and improve production efficiency; Ceramic tools do not need coating, and can be used directly after CNC grinding.

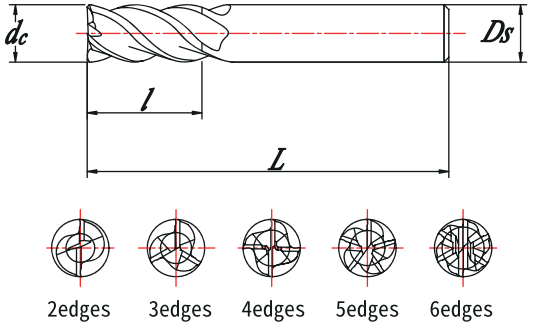
Cermet End Mill

The friction coefficient of the cermet end mill is small, and it is easier to achieve higher surface quality when cutting steel parts.

Sialon ceramic End Mill

The excellent Sialon ceramic materials, special groove and edge design ensure that Sialon ceramic end mill have extremely high wear resistance and can maintain high-strength continuous cutting under high temperature conditions.The cutting tool has good red and hard performance and is suitable for efficient rough machining of high-temperature alloy materials. Compared with cemented carbide tools, the cutting efficiency of Sialon ceramic end mill can be increased by more than 10 times.

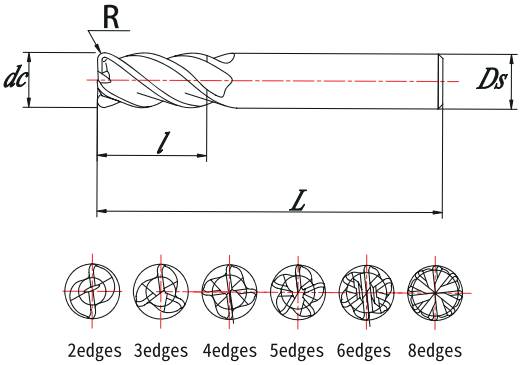
Cermet End Mill



Materials suitable for processing	Carbon steel, stainless steel
Milling form	Side milling, shoulder milling, cavity milling, etc.
Blade diameter dc (mm)	3～32
Blade length (l mm)	5～100
Total length L (mm)	38～200
Shank diameter Ds (mm)	4～32
Handle form	Cylindrical shank
Number of blades	2 edge, 3 edge, 4 edge, 5 edge, 6 edge
other	The blade can be designed to shrink, avoid air, taper, etc.

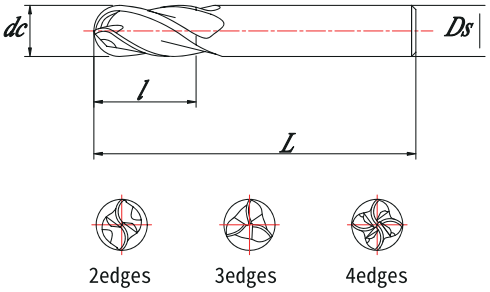
Other Types Of Special Tools

Cermet End Mill-R



Materials suitable for processing	Carbon steel, stainless steel
Milling form	Side milling, shoulder milling, cavity milling, etc.
Blade diameter dc (mm)	3～32
R value	0.2～6
Blade length (l mm)	5～100
Total length L (mm)	38～200
Shank diameter Ds (mm)	4～32
Handle form	Cylindrical shank
Number of blades	2 edge, 3 edge, 4 edge, 5 edge, 6 edge, 8 edge
other	The blade can be designed to shrink, avoid air, taper, etc.

Cermet Ball End Mill

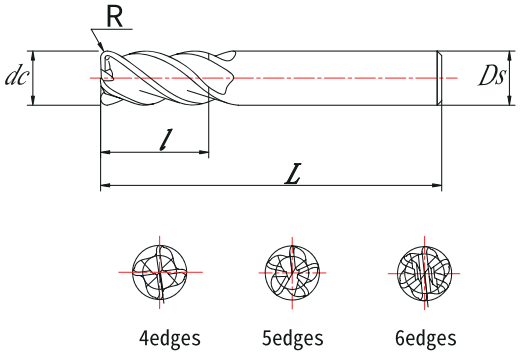


Materials suitable for processing	Carbon steel, stainless steel
Milling form	Side milling, shoulder milling, cavity milling, etc.
Blade diameter dc (mm)	3-32
Blade length (l mm)	5-100
Total length L (mm)	38-200
Shank diameter Ds (mm)	4-32
Handle form	Cylindrical shank
Number of blades	2-edge, 3-edge, 4-edge
other	The blade can be designed to shrink, avoid air, taper, etc.

Sialon ceramic End Mill

The excellent Sialon ceramic materials, special groove and edge design ensure that Sialon ceramic end mill have extremely high wear resistance and can maintain high-strength continuous cutting under high temperature conditions.The cutting tool has good red and hard performance and is suitable for efficient rough machining of high-temperature alloy materials. Compared with cemented carbide tools, the cutting efficiency of Sialon ceramic end mill can be increased by more than 10 times.

Sialon ceramic End Mill-R



Materials suitable for processing	Superalloy
Milling form	Side milling, shoulder milling, cavity milling, etc.
Blade diameter dc (mm)	8～20
R value	0.5～6
Blade length (l mm)	5～20
Total length L (mm)	60～120
Shank diameter Ds (mm)	8～20
Number of blades	4-edge, 5-edge, 6-edge
other	The blade can be designed to shrink, avoid air, taper, etc.

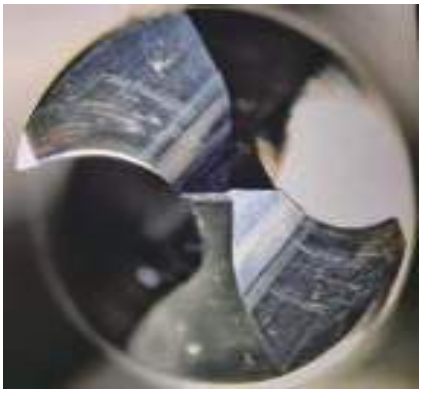
Other Types Of Special Tools

Other

06

Tool grinding

We imported five-axis CNC tool grinder, universal tool grinder, tool post-processing equipment, Zoller tool detector and other equipment,
According to different customer cutting conditions and tools, a complete tool grinding standard has been established, which can realize the re-grinding and repairing of standard and special carbide end mill, drills, and reamers.The performance of the original new tool can be achieved at the first grinding, and the delivery time is usually about 3 to 5 working days.



Before grinding

After grinding

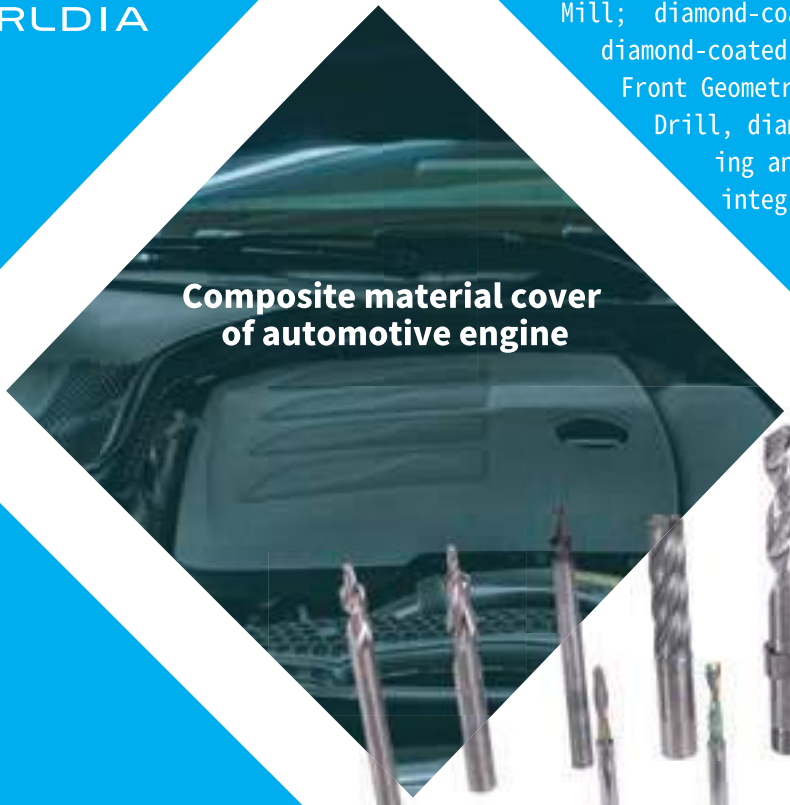
WORLDIA SOLID CARBIDE CUTTING TOOLS (ANSI)

WORLDIA

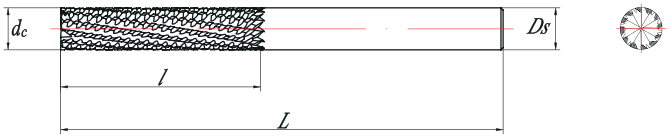
01

Tools used to process composite materials

Mainly include diamond-coated Multi-flute End Mill; diamond-coated Cross-edge End mill; diamond-coated Herringbone End Mill, Front Geometry Drill, Three-point Drill, diamond-coated Drilling and Countersink integration tools, etc.



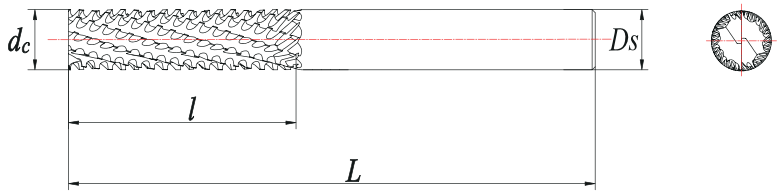
Multi-flute End Mill



Unit: inch

cutter diameter dc	cutter length l	length L	Shank diameter Ds	Cutter of number Z	Cutter type	Coating type
0.157	0.47	1.57	0.16	6	None/End Mill/Drill	None/Diamond
0.236	0.708	2.440	0.236	8	None/End Mill/Drill	None/Diamond
0.25	0.708	2.440	0.25	8	None/End Mill/Drill	None/Diamond
0.315	0.984	2.440	0.315	10	None/End Mill/Drill	None/Diamond
0.375	0.984	2.440	0.375	12	None/End Mill/Drill	None/Diamond
0.393	0.984	2.440	0.393	12	None/End Mill/Drill	None/Diamond
0.472	0.984	3.070	0.472	14	None/End Mill/Drill	None/Diamond
0.50	0.984	3.070	0.50	14	None/End Mill/Drill	None/Diamond

Cross-edge End Mill

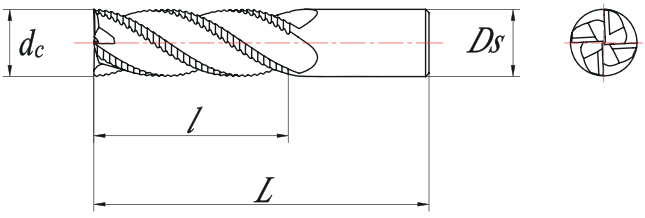


Unit: inch

cutter diameter dc	cutter length l	length L	Shank diameter Ds	Cutter of number Z	Cutter type	Coating type
0.157	0.472	1.574	0.157	6	None/End Mill/Drill	None/Diamond
0.236	0.708	2.440	0.236	8	None/End Mill/Drill	None/Diamond
0.25	0.708	2.440	0.250	8	None/End Mill/Drill	None/Diamond
0.315	0.984	2.440	0.315	10	None/End Mill/Drill	None/Diamond
0.375	0.984	2.440	0.375	12	None/End Mill/Drill	None/Diamond
0.393	0.984	2.440	0.393	12	None/End Mill/Drill	None/Diamond
0.472	0.984	3.070	0.472	14	None/End Mill/Drill	None/Diamond
0.500	0.984	3.070	0.500	14	None/End Mill/Drill	None/Diamond

Tools For Composite Material

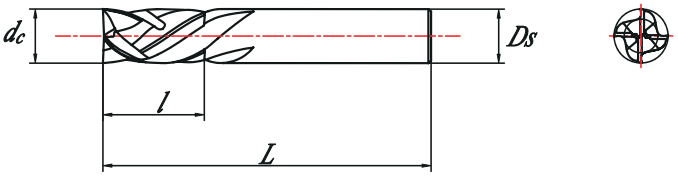
Roughing End Mill



Unit: inch

cutter diameter dc	cutter length l	length L	Shank diameter Ds	Cutter of number Z	Coating type
0.157	0.472	1.574	0.157	6	None/Diamond
0.236	0.708	2.440	0.236	8	None/Diamond
0.25	0.708	2.440	0.250	8	None/Diamond
0.315	0.984	2.440	0.315	10	None/Diamond
0.375	0.984	2.440	0.375	12	None/Diamond
0.393	0.984	2.440	0.393	12	None/Diamond
0.472	0.984	3.070	0.472	14	None/Diamond
0.500	0.984	3.070	0.500	14	None/Diamond

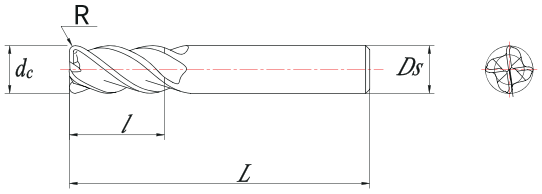
Herringbone End Mill



Unit: inch

Blade diameter dc	Blade length l	Blade length l_1	Total length L	Shank diameter Ds	Blade length l1(0.7d)	Coating type
0.236	0.708	0.165	2.440	0.236	8	None/Diamond
0.250	0.708	0.177	2.440	0.250	8	None/Diamond
0.315	0.984	0.220	2.440	0.315	10	None/Diamond
0.375	0.984	0.236	2.440	0.375	12	None/Diamond
0.393	0.984	0.275	2.440	0.393	12	None/Diamond
0.472	0.984	0.330	3.070	0.472	14	None/Diamond
0.500	0.984	0.350	3.070	0.500	14	None/Diamond

Carbide End Mill-R



Unit: inch

Blade diameter dc	Fillet R	Blade length l	Total length L	Shank diameter Ds	Cutter of number Z	Coating type
0.157	0.016	0.472	1.575	0.157	4	None/Diamond
0.157	0.027	0.472	1.575	0.157	4	None/Diamond
0.236	0.016	0.708	2.440	2.236	8	None/Diamond
0.236	0.039	0.708	2.440	0.236	8	None/Diamond
0.250	0.016	0.708	2.440	0.250	8	None/Diamond
0.250	0.039	0.708	2.440	0.250	8	None/Diamond
0.315	0.016	0.708	2.440	0.315	10	None/Diamond
0.315	0.39	0.708	2.440	0.315	10	None/Diamond
0.375	0.016	0.984	2.440	0.375	12	None/Diamond
0.375	0.039	0.984	2.440	0.375	12	None/Diamond
0.393	0.016	0.984	2.440	0.393	12	None/Diamond
0.393	0.039	0.984	2.440	0.393	12	None/Diamond
0.472	0.016	0.984	3.071	0.472	14	None/Diamond
0.472	0.039	0.984	3.071	0.742	14	None/Diamond
0.500	0.016	0.984	3.071	0.500	14	None/Diamond
0.500	0.039	0.984	3.071	0.500	14	None/Diamond

Cutting parameters

CFRP

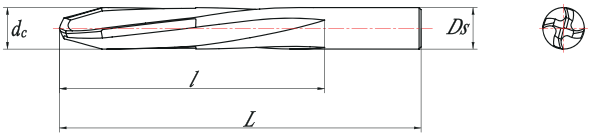
CFRP、CFRP/Al、CFRP/Ti						
Mill method	Mill Slot (ae=dc, ap≦dc)		Copy Milling (ae≦0.5dc, ap≦1.5dc)			
	Vc=4724.4in/min		Vc=5905.5in/min		Vc=9842.5in/min	
dc	n(rpm)	Fr(in/r)	n(rpm)	Fr(in/r)	n(rpm)	Fr(in/r)
0.039	38217	0.0014	47771	0.0014	79618	0.0030
0.047	31847	0.0016	39809	0.0016	66348	0.0035
0.059	25478	0.0017	31847	0.0017	53079	0.0038
0.071	21231	0.0017	26539	0.0017	44232	0.0038
0.079	19108	0.0018	23885	0.0018	39809	0.0039
0.098	15287	0.0020	19108	0.0020	31847	0.0043
0.118	12739	0.0024	15924	0.0024	26539	0.0052
0.154	9554	0.0031	11943	0.0031	19904	0.0069
0.236	6369	0.0043	7962	0.0043	13270	0.0095
0.250	6018	0.0047	7523	0.0047	12538	0.0104
0.315	4777	0.0091	5971	0.0091	9952	0.0199
0.375	4012	0.0122	5015	0.0122	8359	0.0269
0.394	3822	0.0138	4777	0.0138	7962	0.0303
0.472	3185	0.0173	3981	0.0173	6635	0.0381
0.500	3009	0.0189	3761	0.0189	6269	0.0416

GFRP

GFRP、GFRP/Al、GFRP/Ti						
Mill method	Mill Slot (ae=dc, ap≦dc)		Copy Milling (ae≦0.5dc, ap≦1.5dc)		High speed milling (ae≦0.05dc, ap≦2dc)	
	Vc=39374in/min		Vc=4724.4/min		Vc=7874in/min	
dc	n(rpm)	Fr(in/r)	n(rpm)	Fr(in/r)	n(rpm)	Fr(in/r)
0.039	31847	0.0014	38217	0.0014	63694	0.0030
0.047	26539	0.0016	31847	0.0016	53079	0.0035
0.059	21231	0.0017	25478	0.0017	42463	0.0038
0.071	17693	0.0017	21231	0.0017	35386	0.0038
0.079	15924	0.0018	19108	0.0018	31847	0.0039
0.098	12739	0.0020	15287	0.0020	25478	0.0043
0.118	10616	0.0024	12739	0.0024	21231	0.0052
0.157	7962	0.0031	9554	0.0031	15924	0.0069
0.236	5308	0.0043	6369	0.0043	10616	0.0095
0.250	5015	0.0047	6018	0.0047	10031	0.0104
0.315	3981	0.0091	4777	0.0091	7962	0.0199
0.375	3344	0.0122	4012	0.0122	6687	0.0269
0.394	3185	0.0138	3822	0.0138	6369	0.0303
0.472	2654	0.0173	3185	0.0173	5308	0.0381
0.500	2508	0.0189	3009	0.0189	5015	0.0416

The above cutting parameter table is for reference only. The default is dry cutting conditions. If there is coolant, the cutting parameters can be appropriately increased.The types,structures and on-site cutting conditions of different composite materials require appropriate adjustments to the cutting parameters.Fine finishing usually requires a reduction in feed speed and depth of cut.When the cutting temperature is too high and the composite resin has melted or damaged, the speed should be reduced. When the material is stratified, the feed rate should be reduced.

Front Geometry Drill

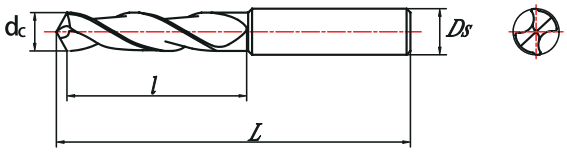


Unit: inch

Blade diameter dc	Blade length l	Total length L	Shank diameter	Coating type
0.128	1.417	3.00	0.128	None/Diamond
0.141	1.417	3.00	0.141	None/Diamond
0.156	1.417	3.00	0.156	None/Diamond
0.159	1.417	3.00	0.159	None/Diamond
0.187	1.417	3.00	0.187	None/Diamond
0.193	1.417	3.00	0.193	None/Diamond
0.201	1.417	3.00	0.201	None/Diamond

Blade diameter dc	Blade length l	Total length L	Shank diameter Ds	Coating type
0.219	1.417	3.00	0.219	None/Diamond
0.233	1.417	3.00	0.234	None/Diamond
0.250	1.417	3.00	0.250	None/Diamond
0.313	1.890	4.00	0.313	None/Diamond
0.397	1.890	4.00	0.375	None/Diamond

General Twist Drill



Unit: inch

Blade diameter	Blade length	Total length	Shank diameter	Coating type
0.118	0.787	2.441	0.157	None/Diamond
0.122	0.787	2.441	0.157	None/Diamond
0.126	0.787	2.441	0.157	None/Diamond
0.130	0.787	2.598	0.157	None/Diamond
0.134	0.787	2.598	0.157	None/Diamond
0.138	0.787	2.598	0.157	None/Diamond
0.141	0.787	2.598	0.157	None/Diamond
0.146	0.787	2.598	0.157	None/Diamond
0.149	0.866	2.598	0.157	None/Diamond
0.153	0.866	2.598	0.157	None/Diamond
0.157	0.945	2.598	0.157	None/Diamon d

Blade diameter dc	Blade length l	Total length L	Shank diameter Ds	Coating type
0.161	0.945	2.598	0.197	None/Diamond
0.165	0.945	2.598	0.197	None/Diamond
0.169	0.945	2.756	0.197	None/Diamond
0.173	1.024	2.756	0.197	None/Diamond
0.177	1.024	2.756	0.197	None/Diamond
0.181	1.024	2.756	0.197	None/Diamond
0.185	1.102	3.150	0.197	None/Diamond
0.189	1.102	3.150	0.197	None/Diamond
0.193	1.102	3.150	0.197	None/Diamond
0.197	1.181	3.150	0.197	None/Diamond
0.201	1.181	3.150	0.236	None/Diamond

Tools For Composite Material

Blade diameter	Blade length	Total length	Shank diameter	Coating type
0.204	1.181	3.150	0.236	None/Diamond
0.209	1.181	3.150	0.236	None/Diamond
0.213	1.260	3.150	0.236	None/Diamond
0.216	1.260	3.150	0.236	None/Diamond
0.220	1.2598	3.1496	0.236	None/Diamond
0.224	1.3386	3.1496	0.236	None/Diamond
0.228	1.339	3.150	0.236	None/Diamond
0.232	1.339	3.150	0.236	None/Diamond
0.236	1.417	3.150	0.236	None/Diamond
0.240	1.417	3.150	0.275	None/Diamond
0.244	1.417	3.150	0.275	None/Diamond
0.248	1.417	3.150	0.275	None/Diamond
0.251	1.496	3.150	0.275	None/Diamond
0.256	1.496	3.150	0.275	None/Diamond
0.260	1.496	3.150	0.275	None/Diamond
0.263	1.575	3.150	0.275	None/Diamond
0.268	1.575	3.150	0.275	None/Diamond
0.271	1.575	3.150	0.275	None/Diamond
0.275	1.654	3.150	0.275	None/Diamond
0.279	1.654	3.780	0.315	None/Diamond
0.283	1.654	3.780	0.315	None/Diamond
0.287	1.654	3.780	0.315	None/Diamond
0.291	1.732	3.780	0.315	None/Diamond
0.295	1.732	3.780	0.315	None/Diamond
0.299	1.732	3.780	0.315	None/Diamond
0.303	1.811	3.780	0.315	None/Diamond
0.307	1.811	3.780	0.315	None/Diamond
0.311	1.811	3.780	0.315	None/Diamond
0.315	1.890	3.780	0.354	None/Diamond
0.319	1.890	3.780	0.354	None/Diamond
0.322	1.890	3.780	0.354	None/Diamond
0.327	1.890	3.780	0.354	None/Diamond
0.331	1.890	3.780	0.354	None/Diamond
0.335	1.890	3.780	0.354	None/Diamond
0.338	1.890	3.780	0.354	None/Diamond
0.342	1.890	3.780	0.354	None/Diamond

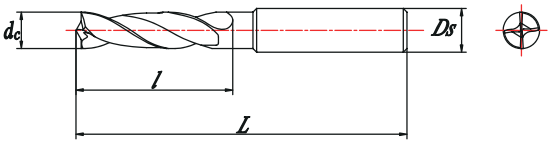
Blade diameter *dc*	Blade length *l*	Total length *L*	Shank diameter *Ds*	Coating type
0.346	1.890	3.780	0.354	None/Diamond
0.350	1.890	3.780	0.354	None/Diamond
0.354	1.890	3.780	0.354	None/Diamond
0.358	1.969	3.937	0.394	None/Diamond
0.362	1.969	3.937	0.394	None/Diamond
0.366	1.969	3.937	0.394	None/Diamond
0.370	1.969	3.937	0.394	None/Diamond
0.374	1.969	3.937	0.394	None/Diamond
0.378	1.969	3.937	0.394	None/Diamond
0.382	1.969	3.937	0.394	None/Diamond
0.386	1.969	3.937	0.394	None/Diamond
0.390	1.969	3.937	0.394	None/Diamond
0.393	1.969	3.937	0.394	None/Diamond
0.398	2.165	4.134	0.433	None/Diamond
0.401	2.165	4.134	0.433	None/Diamond
0.405	2.165	4.134	0.433	None/Diamond
0.409	2.165	4.134	0.433	None/Diamond
0.413	2.165	4.134	0.433	None/Diamond
0.417	2.165	4.134	0.433	None/Diamond
0.421	2.165	4.134	0.433	None/Diamond
0.425	2.165	4.134	0.433	None/Diamond
0.429	2.165	4.134	0.433	None/Diamond
0.433	2.165	4.134	0.433	None/Diamond
0.437	2.165	4.134	0.472	None/Diamond
0.441	2.165	4.134	0.472	None/Diamond
0.445	2.165	4.134	0.472	None/Diamond
0.449	2.165	4.134	0.472	None/Diamond
0.452	2.165	4.134	0.472	None/Diamond
0.453	2.165	4.134	0.472	None/Diamond
0.460	2.165	4.134	0.472	None/Diamond
0.464	2.165	4.134	0.472	None/Diamond
0.468	2.165	4.134	0.472	None/Diamond
0.472	2.165	4.134	0.472	None/Diamond
0.476	2.362	4.252	0.512	None/Diamond
0.480	2.362	4.252	0.512	None/Diamond
0.484	2.362	4.252	0.512	None/Diamond

Tools For Composite Material

Blade diameter dc	Blade length l	Total length L	Shank diameter Ds	Coating type
0.488	2.362	4.252	0.512	None/Diamond
0.492	2.362	4.252	0.512	None/Diamond
0.496	2.362	4.252	0.512	None/Diamond
0.500	2.362	4.252	0.512	None/Diamond

Blade diameter dc	Blade length l	Total length L	Shank diameter Ds	Coating type
0.503	2.362	4.252	0.512	None/Diamond
0.508	2.362	4.252	0.512	None/Diamond
0.512	2.362	4.252	0.512	None/Diamond

Three-point Drill



Unit: inch

Blade diameter dc	Blade length l	Total length L	Shank diameter Ds	Coating type
0.118	0.787	2.441	0.157	None/Diamond
0.122	0.787	2.441	0.157	None/Diamond
0.126	0.787	2.441	0.157	None/Diamond
0.130	0.787	2.598	0.157	None/Diamond
0.134	0.787	2.598	0.157	None/Diamond
0.138	0.787	2.598	0.157	None/Diamond
0.141	0.787	2.598	0.157	None/Diamond
0.145	0.787	2.598	0.157	None/Diamond
0.150	0.787	2.598	0.157	None/Diamond
0.153	0.787	2.598	0.157	None/Diamond
0.157	0.945	2.598	0.157	None/Diamond
0.161	0.945	2.598	0.197	None/Diamond
0.165	0.945	2.598	0.197	None/Diamond
0.169	0.945	2.756	0.197	None/Diamond
0.173	0.945	2.756	0.197	None/Diamond
0.177	1.024	2.756	0.197	None/Diamond
0.181	1.024	2.756	0.197	None/Diamond
0.185	1.024	2.756	0.197	None/Diamond
0.189	1.102	2.756	0.197	None/Diamond
0.192	1.102	2.756	0.197	None/Diamond
0.197	1.181	3.150	0.197	None/Diamond
0.201	1.181	3.150	0.157	None/Diamond

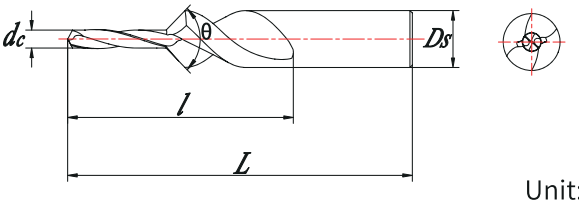
Blade diameter dc	Blade length l	Total length L	Shank diameter Ds	Coating type
0.205	1.181	3.150	0.157	None/Diamond
0.209	1.575	3.150	0.157	None/Diamond
0.213	1.181	3.150	0.157	None/Diamond
0.216	1.181	3.150	0.157	None/Diamond
0.220	1.181	3.150	0.157	None/Diamond
0.224	1.260	3.150	0.157	None/Diamond
0.228	1.260	3.150	0.157	None/Diamond
0.232	1.260	3.150	0.157	None/Diamond
0.236	1.339	3.150	0.236	None/Diamond
0.240	1.339	3.150	0.276	None/Diamond
0.244	1.339	3.150	0.276	None/Diamond
0.248	1.339	3.150	0.276	None/Diamond
0.252	1.417	3.150	0.276	None/Diamond
0.256	1.417	3.150	0.276	None/Diamond
0.260	1.417	3.150	0.276	None/Diamond
0.264	1.417	3.150	0.276	None/Diamond
0.268	1.417	3.150	0.276	None/Diamond
0.272	1.417	3.150	0.276	None/Diamond
0.275	1.496	3.150	0.276	None/Diamond
0.279	1.496	3.780	0.315	None/Diamond
0.283	1.496	3.780	0.315	None/Diamond
0.287	1.496	3.780	0.315	None/Diamond

Tools For Composite Material

Blade diameter *dc*	Blade length *l*	Total length *L*	Shank diameter *Ds*	Coating type
0.291	1.496	3.780	0.315	None/Diamond
0.295	1.575	3.780	0.315	None/Diamond
0.299	1.575	3.780	0.315	None/Diamond
0.303	1.575	3.780	0.315	None/Diamond
0.307	1.575	3.780	0.315	None/Diamond
0.311	1.575	3.780	0.315	None/Diamond
0.315	1.732	3.780	0.354	None/Diamond
0.319	1.732	3.780	0.354	None/Diamond
0.323	1.732	3.780	0.354	None/Diamond
0.327	1.732	3.780	0.354	None/Diamond
0.331	1.811	3.780	0.354	None/Diamond
0.335	1.811	3.780	0.354	None/Diamond
0.338	1.811	3.780	0.354	None/Diamond
0.342	1.890	3.780	0.354	None/Diamond
0.346	1.890	3.780	0.354	None/Diamond
0.350	1.890	3.780	0.354	None/Diamond
0.354	1.890	3.780	0.354	None/Diamond
0.358	1.969	3.937	0.394	None/Diamond
0.362	1.969	3.937	0.394	None/Diamond
0.366	1.969	3.937	0.394	None/Diamond
0.370	1.969	3.937	0.394	None/Diamond
0.374	1.969	3.937	0.394	None/Diamond
0.378	1.969	3.937	0.394	None/Diamond
0.382	1.969	3.937	0.394	None/Diamond
0.386	1.969	3.937	0.394	None/Diamond
0.390	1.969	3.937	0.394	None/Diamond
0.394	1.969	3.937	0.394	None/Diamond
0.397	2.165	4.134	0.433	None/Diamond
0.402	2.165	4.134	0.433	None/Diamond
0.405	2.165	4.134	0.433	None/Diamond
0.409	2.165	4.134	0.433	None/Diamond
0.413	2.165	4.134	0.433	None/Diamond
0.417	2.165	4.134	0.433	None/Diamond
0.421	2.165	4.134	0.433	None/Diamond
0.425	2.165	4.134	0.433	None/Diamond
0.429	2.165	4.134	0.433	None/Diamond
0.433	2.165	4.134	0.433	None/Diamond
0.437	2.165	4.134	0.472	None/Diamond
0.441	2.165	4.134	0.472	None/Diamond
0.445	2.165	4.134	0.472	None/Diamond
0.449	2.165	4.134	0.472	None/Diamond
0.453	2.165	4.134	0.472	None/Diamond
0.456	2.165	4.134	0.472	None/Diamond
0.461	2.165	4.134	0.472	None/Diamond
0.464	2.165	4.134	0.472	None/Diamond
0.468	2.165	4.134	0.472	None/Diamond
0.472	2.165	4.134	0.472	None/Diamond
0.476	2.362	4.252	0.512	None/Diamond
0.480	2.362	4.252	0.512	None/Diamond
0.484	2.362	4.252	0.512	None/Diamond
0.488	2.362	4.252	0.512	None/Diamond
0.492	2.362	4.252	0.512	None/Diamond
0.496	2.362	4.252	0.512	None/Diamond
0.500	2.362	4.252	0.512	None/Diamond
0.504	2.362	4.252	0.512	None/Diamond
0.508	2.362	4.252	0.512	None/Diamond
0.512	2.362	4.252	0.512	None/Diamond

Tools For Composite Material

Drilling and Countersink integration



Unit: inch

Blade diameter dc	Angle θ	Blade length l	Total length L	Shank diameter Ds	Coating type
0.142	90°	0.551	3.740	0.315	None/Diamond
0.142	120°	0.197	3.110	0.394	None/Diamond
0.161	90°	0.197	3.110	0.394	None/Diamond
0.161	90°	0.315	3.110	0.394	None/Diamond
0.161	90°	0.394	3.110	0.394	None/Diamond
0.161	100°	0.236	3.110	0.394	None/Diamond
0.161	100°	0.709	3.740	0.315	None/Diamond
0.161	120°	0.276	3.110	0.394	None/Diamond
0.163	100°	0.433	3.937	0.394	None/Diamond
0.165	100°	0.236	3.110	0.394	None/Diamond
0.165	100°	0.276	3.110	0.394	None/Diamond
0.165	130°	0.236	3.110	0.394	None/Diamond
0.191	100°	0.709	3.937	0.394	None/Diamond
0.197	100°	0.315	3.110	0.394	None/Diamond
0.197	100°	0.394	3.110	0.394	None/Diamond
0.197	100°	0.984	3.543	0.394	None/Diamond
0.197	120°	0.315	3.110	0.394	None/Diamond
0.199	100°	0.709	3.346	0.394	None/Diamond
0.201	100°	0.709	3.740	0.315	None/Diamond
0.201	130°	0.236	3.110	0.394	None/Diamond
0.240	100°	0.669	4.016	0.394	None/Diamond

Special size and British system Drill can be customized according to customer needs;
Drilling and countersinking are completed at one time, greatly improving the efficiency of hole making;
Can be used for hole making equipment such as ADU, CNC, robotic drilling and riveting systems;
Straight shank or threaded shank can be used;
The grooves of the drill and countersink can be designed with internal cooling for air cooling or minimal lubrication;
It can be used to process aluminum, composite materials or composite/aluminum, composite/composite, aluminum/aluminum, composite/titanium alloy and other laminated holes.

Cutting Parameters

Work Material	CFRP、CFRP/Al		
Outside Diameter dc	Cutting Speed Vc/ (in/min)	Rotating Speed n/ (rpm)	Feed Rate Fr/ (in/r)
0.118	2362.2～4724.4	9600	0.0012～0.0020
0.157		7300	
0.197		5800	0.0020～0.004
0.236		4900	
0.276		4200	
0.315		3700	
0.354		3300	
0.394		3000	
0.433		2700	
0.472		2500	
0.512		2300	

Other Special Tools

Threaded Shank Front Geometry Drill

Threaded Shank General Drill

According to customer needs, we can use our proprietary tool research and development technology experience to carry out unique research and development in terms of tool material selection, tool geometry design, passivation polishing technology, coating technology, etc. Develop special composite material processing tools that meet customer requirements.

Blades/Impellers/Casings

AVIATION PARTS AND COMPONENTS

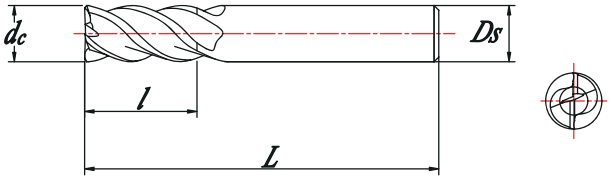
02

Tools for aeroengine parts

It mainly includes parts such as blades, impellers, casings, and seals on aero engines.The materials are mainly titanium alloy, high temperature alloy, stainless steel, aluminum alloy, etc.

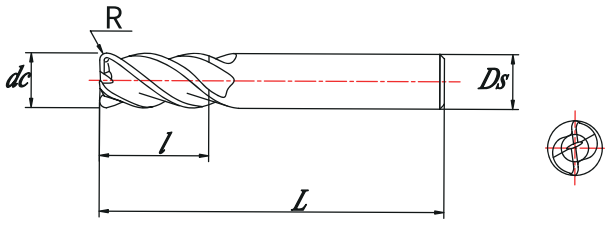
Processing tools mainly include flat-end milling cutters, round-nose milling cutters, ball-end milling cutters, taper ball-end milling cutters, and other drills and reamers.

2 Flute Carbide End Mill



Blade diameter *dc*	Blade length *l*	Total length *L*	Shank diameter *Ds*	*NOTE*
0.118	0.236	1.969	0.118	
0.118	0.354	2.362	0.236	
0.118	0.472	1.969	0.118	
0.118	0.984	3.150	0.118	
0.157	0.315	1.969	0.157	
0.157	0.472	2.756	0.236	
0.157	0.551	1.969	0.157	
0.157	0.984	2.953	0.157	
0.197	0.394	1.969	0.236	
0.197	0.630	1.969	0.236	
0.197	0.984	2.953	0.236	
0.236	0.472	1.969	0.236	
0.236	0.591	3.150	0.236	
0.236	0.748	2.362	0.236	
0.236	0.984	2.480	0.236	
0.315	0.472	1.969	0.315	
0.315	0.787	2.480	0.315	
0.315	0.787	3.504	0.315	
0.315	0.984	2.953	0.315	
0.394	0.630	2.362	0.394	
0.394	0.866	2.953	0.394	
0.394	0.984	4.134	0.394	
0.394	1.496	3.937	0.394	
0.472	0.748	2.480	0.472	
0.472	0.984	2.953	0.472	
0.472	1.181	4.331	0.472	
0.472	1.969	3.937	0.472	
0.472	2.953	5.906	0.472	

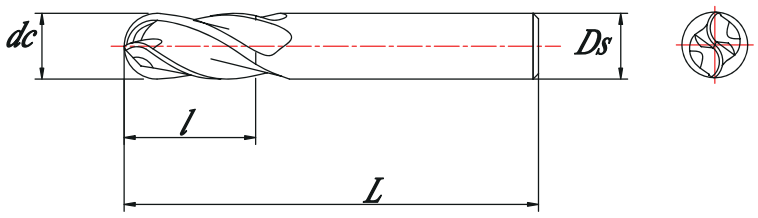
2 Flute Carbide End Mill-R



Unit: inch

Blade diameter *dc*	Fillet *R*	Blade length *l*	Total length *L*	Shank diameter *Ds*	*NOTE*
0.236	0.010	0.748	2.480	0.236	
0.236	0.020	0.748	2.480	0.236	
0.236	0.030	0.748	2.480	0.236	
0.236	0.039	0.748	2.480	0.236	
0.315	0.020	0.787	2.480	0.315	
0.315	0.030	0.787	2.480	0.315	
0.315	0.039	0.787	2.480	0.315	
0.315	0.059	0.787	2.480	0.315	
0.315	0.079	0.787	2.480	0.315	
0.394	0.020	0.866	3.150	0.315	
0.394	0.039	0.866	3.150	0.354	
0.394	0.059	0.866	3.150	0.394	
0.394	0.079	0.866	3.150	0.394	
0.472	0.020	0.984	3.150	0.394	
0.472	0.039	0.984	3.150	0.394	
0.472	0.059	0.984	3.150	0.394	
0.472	0.079	0.984	3.150	0.472	

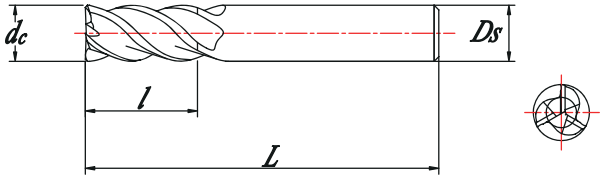
2 Flute Carbide Ball End Mill



Unit: inch

Blade diameter *dc*	Blade length *l*	Total length *L*	Shank diameter *Ds*	*NOTE*
0.118	0.236	1.969	0.118	
0.118	0.354	2.362	0.236	
0.118	0.472	1.969	0.118	
0.118	0.984	3.150	0.118	
0.157	0.315	1.969	0.157	
0.157	0.472	2.756	0.236	
0.157	0.551	1.969	0.157	
0.157	0.984	2.953	0.157	
0.197	0.394	1.969	0.236	
0.197	0.630	1.969	0.236	
0.197	0.984	2.953	0.236	
0.236	0.472	1.969	0.236	
0.236	0.591	3.150	0.236	
0.236	0.748	2.362	0.236	
0.236	0.984	2.480	0.236	
0.315	0.472	1.969	0.315	
0.315	0.787	2.480	0.315	
0.315	0.787	3.504	0.315	
0.315	0.984	2.953	0.315	
0.394	0.630	2.362	0.394	
0.394	0.866	2.953	0.394	
0.394	0.984	4.134	0.394	
0.394	1.496	3.937	0.394	
0.472	0.748	2.480	0.472	
0.472	0.984	2.953	0.472	
0.472	1.181	4.331	0.472	
0.472	1.969	3.937	0.472	
0.472	2.953	5.906	0.472	

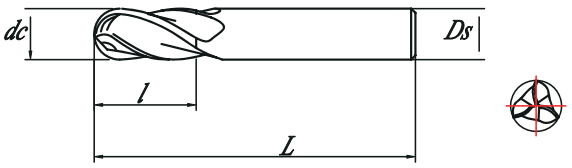
3 Flute Carbide End Mill



Unit: inch

Blade diameter *dc*	Blade length *l*	Total length *L*	Shank diameter *Ds*	*NOTE*
0.118	0.236	1.969	0.118	
0.118	0.354	2.362	0.236	
0.118	0.472	1.969	0.118	
0.118	0.984	3.150	0.118	
0.157	0.315	1.969	0.157	
0.157	0.472	2.756	0.236	
0.157	0.551	1.969	0.157	
0.157	0.984	2.953	0.157	
0.197	0.394	1.969	0.236	
0.197	0.630	1.969	0.236	
0.197	0.984	2.953	0.236	
0.236	0.472	1.969	0.236	
0.236	0.591	3.150	0.236	
0.236	0.748	2.362	0.236	
0.236	0.984	2.480	0.236	
0.315	0.472	1.969	0.315	
0.315	0.787	2.480	0.315	
0.315	0.787	3.504	0.315	
0.315	0.984	2.953	0.315	
0.394	0.630	2.362	0.394	
0.394	0.866	2.953	0.394	
0.394	0.984	4.134	0.394	
0.394	1.496	3.937	0.394	
0.472	0.748	2.480	0.472	
0.472	0.984	2.953	0.472	
0.472	1.181	4.331	0.472	
0.472	1.969	3.937	0.472	
0.472	2.953	5.906	0.472	

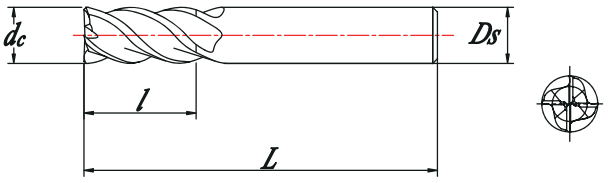
3 Flute Carbide Ball End Mill



Unit: inch

Blade diameter dc	Blade length l	Total length L	Shank diameter Ds	NOTE
0.118	0.236	1.969	0.118	
0.118	0.354	2.362	0.236	
0.118	0.472	1.969	0.118	
0.118	0.984	3.150	0.118	
0.157	0.315	1.969	0.157	
0.157	0.472	2.756	0.236	
0.157	0.551	1.969	0.157	
0.157	0.984	2.953	0.157	
0.197	0.394	1.969	0.236	
0.197	0.630	1.969	0.236	
0.197	0.984	2.953	0.236	
0.236	0.472	1.969	0.236	
0.236	0.591	3.150	0.236	
0.236	0.748	2.362	0.236	
0.236	0.984	2.480	0.236	
0.315	0.472	1.969	0.315	
0.315	0.787	2.480	0.315	
0.315	0.787	3.504	0.315	
0.315	0.984	2.953	0.315	
0.394	0.630	2.362	0.394	
0.394	0.866	2.953	0.394	
0.394	0.984	4.134	0.394	
0.394	1.496	3.937	0.394	
0.472	0.748	2.480	0.472	
0.472	0.984	2.953	0.472	
0.472	1.181	4.331	0.472	
0.472	1.969	3.937	0.472	
0.472	2.953	5.906	0.472	

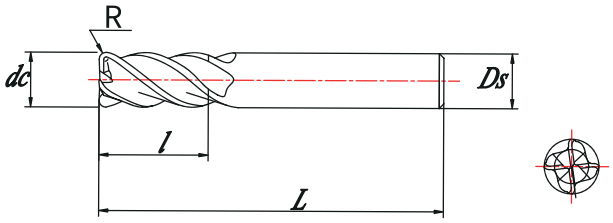
4 Flute Carbide End Mill



Unit: inch

Blade diameter *dc*	Blade length *l*	Total length *L*	Shank diameter *Ds*	*NOTE*
0.118	0.236	1.969	0.118	
0.118	0.354	2.362	0.236	
0.118	0.472	1.969	0.118	
0.118	0.984	3.150	0.118	
0.157	0.315	1.969	0.157	
0.157	0.472	2.756	0.236	
0.157	0.551	1.969	0.157	
0.157	0.984	2.953	0.157	
0.197	0.394	1.969	0.236	
0.197	0.630	1.969	0.236	
0.197	0.984	2.953	0.236	
0.236	0.472	1.969	0.236	
0.236	0.591	3.150	0.236	
0.236	0.748	2.362	0.236	
0.236	0.984	2.480	0.236	
0.315	0.472	1.969	0.315	
0.315	0.787	2.480	0.315	
0.315	0.787	3.504	0.315	
0.315	0.984	2.953	0.315	
0.394	0.630	2.362	0.394	
0.394	0.866	2.953	0.394	
0.394	0.984	4.134	0.394	
0.394	1.496	3.937	0.394	
0.472	0.748	2.480	0.472	
0.472	0.984	2.953	0.472	
0.472	1.181	4.331	0.472	
0.472	1.969	3.937	0.472	
0.472	2.953	5.906	0.472	

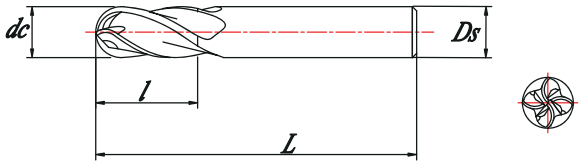
4 Flute Carbide End Mill-R



Unit: inch

Blade diameter *dc*	Fillet *R*	Blade length *l*	Total length *L*	Shank diameter *Ds*	*NOTE*
0.236	0.010	0.748	2.480	0.236	
0.236	0.020	0.748	2.480	0.236	
0.236	0.030	0.748	2.480	0.236	
0.236	0.039	0.748	2.480	0.236	
0.315	0.020	0.787	2.480	0.315	
0.315	0.030	0.787	2.480	0.315	
0.315	0.039	0.787	2.480	0.315	
0.315	0.059	0.787	2.480	0.315	
0.315	0.079	0.787	2.480	0.315	
0.394	0.020	0.866	3.150	0.315	
0.394	0.039	0.866	3.150	0.354	
0.394	0.059	0.866	3.150	0.394	
0.394	0.079	0.866	3.150	0.394	
0.472	0.020	0.984	3.150	0.394	
0.472	0.039	0.984	3.150	0.394	
0.472	0.059	0.984	3.150	0.394	
0.472	0.079	0.984	3.150	0.472	

4 Flute Carbide Ball End Mill



Unit: inch

Blade diameter *dc*	Blade length *l*	Total length *L*	Shank diameter *Ds*	*NOTE*
0.118	0.236	1.969	0.118	
0.118	0.354	2.362	0.236	
0.118	0.472	1.969	0.118	
0.118	0.984	3.150	0.118	
0.157	0.315	1.969	0.157	
0.157	0.472	2.756	0.236	
0.157	0.551	1.969	0.157	
0.157	0.984	2.953	0.157	
0.197	0.394	1.969	0.236	
0.197	0.630	1.969	0.236	
0.197	0.984	2.953	0.236	
0.236	0.472	1.969	0.236	
0.236	0.591	3.150	0.236	
0.236	0.748	2.362	0.236	
0.236	0.984	2.480	0.236	
0.315	0.472	1.969	0.315	
0.315	0.787	2.480	0.315	
0.315	0.787	3.504	0.315	
0.315	0.984	2.953	0.315	
0.394	0.630	2.362	0.394	
0.394	0.866	2.953	0.394	
0.394	0.984	4.134	0.394	
0.394	1.496	3.937	0.394	
0.472	0.748	2.480	0.472	
0.472	0.984	2.953	0.472	
0.472	1.181	4.331	0.472	
0.472	1.969	3.937	0.472	
0.472	2.953	5.906	0.472	

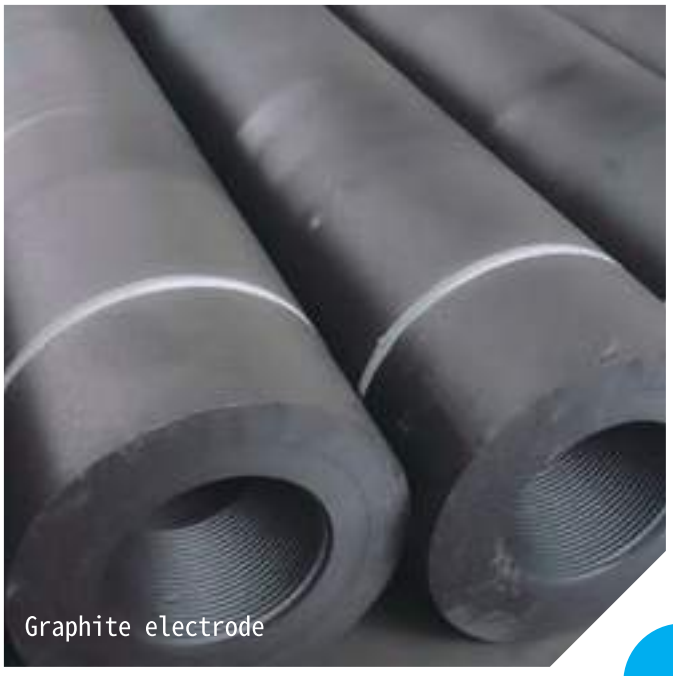
Including automobile engine cylinder blocks, cylinder heads, steering gears, connecting rods, steering knuckles and other parts. The materials involve ductile iron, gray cast iron, steel, aluminum alloy, etc.
According to customer needs, we can use our proprietary tool development technology experience to develop special tools that meet customer requirements in terms of tool material selection, tool geometric design, passivation and polishing technology, coating technology, etc.
The main processing tools include ordinary twist drills, shaped step drills, shaped reamers, corresponding drills and reamers with internal cooling function and other flat end milling cutters, round end milling cutters and ball end milling cutters. Please refer to page 36-40 for details.

03

Special tools for automotive parts

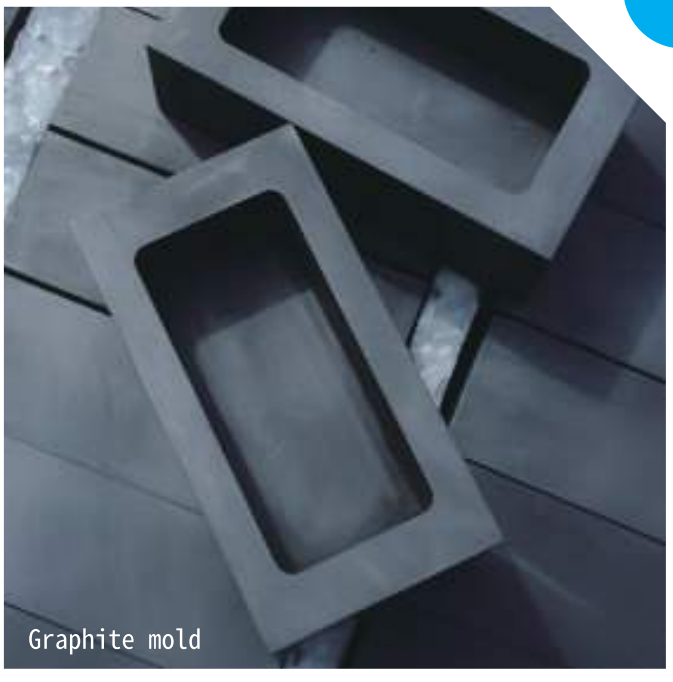
04 Tools for graphite

Mainly include diamond coated tools for processing graphite molds and graphite electrodes.



Graphite electrode

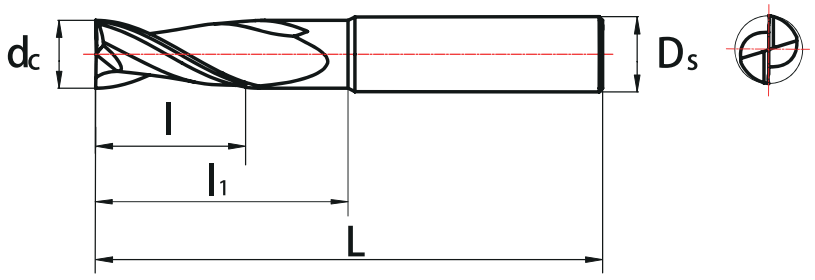
Diamond coated tools



Graphite mold

Graphite mold

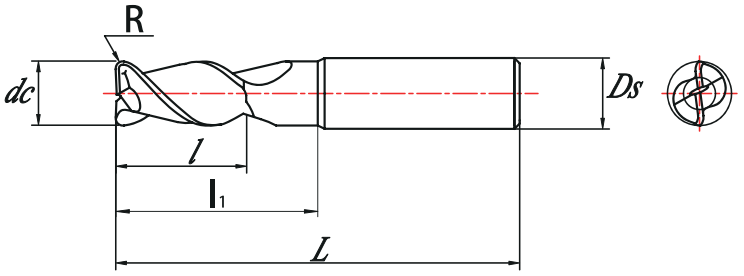
2 Flute Carbide End Mill



Unit: inch

Blade diameter *dc*	Blade length *l*	Effective length l_1	Total length *L*	Shank diameter *Ds*	Coating type
0.118	0.354	/	1.969	0.236	Diamond
0.118	0.472	/	3.150	0.157	Diamond
0.118	0.472	0.787	3.150	0.157	Diamond
0.118	0.472	0.984	3.150	0.157	Diamond
0.118	0.472	1.181	3.150	0.157	Diamond
0.118	0.472	1.575	3.150	0.157	Diamond
0.157	0.472	/	1.969	0.236	Diamond
0.157	0.630	/	3.150	0.157	Diamond
0.197	0.591	/	2.520	0.236	Diamond
0.197	0.787	/	4.134	0.236	Diamond
0.236	0.709	/	2.520	0.236	Diamond
0.236	0.984	/	4.134	0.236	Diamond
0.236	0.984	/	5.906	0.236	Diamond
0.315	0.945	/	2.953	0.315	Diamond
0.315	0.984	1.575	5.906	0.315	Diamond
0.394	0.984	/	3.189	0.394	Diamond
0.394	0.984	1.969	6.299	0.394	Diamond
0.472	0.984	/	3.189	0.472	Diamond
0.118	0.984	2.362	6.299	0.472	Diamond

2 Flute Carbide End Mill



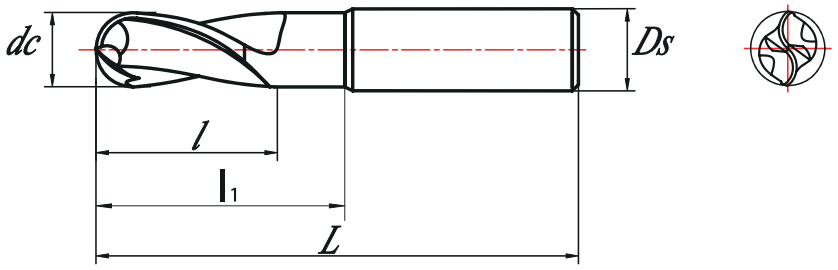
Unit: inch

Blade diameter *dc*	Fillet radius *R*	Blade length *l*	Effective length l_1	Total length *L*	Shank diameter *Ds*	Coating type
0.118	0.3	0.157	/	3.228	0.157	Diamond
0.118	0.3	0.157	0.394	3.228	0.157	Diamond
0.118	0.3	0.157	0.787	3.228	0.157	Diamond
0.118	0.3	0.157	1.181	3.228	0.157	Diamond
0.118	0.3	0.157	1.575	3.228	0.157	Diamond
0.118	0.5	0.157	/	3.228	0.157	Diamond
0.118	0.5	0.157	0.394	3.228	0.157	Diamond
0.118	0.5	0.157	0.787	3.228	0.157	Diamond
0.118	0.5	0.157	1.181	3.228	0.157	Diamond
0.118	0.5	0.157	1.575	3.228	0.157	Diamond
0.118	1	0.157	/	3.228	0.157	Diamond
0.118	1	0.157	0.394	3.228	0.157	Diamond
0.118	1	0.157	0.787	3.228	0.157	Diamond
0.118	1	0.157	1.181	3.228	0.157	Diamond
0.118	1	0.157	1.575	3.228	0.157	Diamond
0.157	0.2	0.197	/	3.228	0.157	Diamond
0.157	0.2	0.197	0.591	3.228	0.157	Diamond
0.157	0.2	0.197	0.984	3.228	0.157	Diamond
0.157	0.2	0.197	1.575	3.228	0.157	Diamond
0.157	0.5	0.197	/	3.228	0.157	Diamond
0.157	0.5	0.197	0.591	3.228	0.157	Diamond
0.157	0.5	0.197	0.984	3.228	0.157	Diamond
0.157	0.5	0.197	1.575	3.228	0.157	Diamond
0.157	1	0.197	/	3.228	0.157	Diamond
0.157	1	0.197	0.591	3.228	0.157	Diamond
0.157	1	0.197	0.984	3.228	0.157	Diamond
0.157	1	0.197	1.575	3.228	0.157	Diamond
0.197	0.2	0.236	/	4.134	0.236	Diamond

Tools For Graphite

Blade diameter *dc*	Fillet radius *R*	Blade length *l*	Effective length l_1	Total length *L*	Shank diameter *Ds*	Coating type
0.197	0.2	0.236	0.591	3.228	0.236	Diamond
0.197	0.008	0.236	1.181	4.134	0.236	Diamond
0.197	0.008	0.236	1.969	4.134	0.236	Diamond
0.197	0.020	0.236	/	4.134	0.236	Diamond
0.197	0.020	0.236	0.591	4.134	0.236	Diamond
0.197	0.020	0.236	1.181	4.134	0.236	Diamond
0.197	0.020	0.236	1.969	4.134	0.236	Diamond
0.236	0.008	0.276	/	4.134	0.236	Diamond
0.236	0.008	0.276	0.787	4.134	0.236	Diamond
0.236	0.008	0.276	1.181	4.134	0.236	Diamond
0.236	0.008	0.276	1.969	4.134	0.236	Diamond
0.236	0.020	0.276	/	4.134	0.236	Diamond
0.236	0.020	0.276	0.787	4.134	0.236	Diamond
0.236	0.020	0.276	1.181	4.134	0.236	Diamond
0.236	0.020	0.276	1.969	4.134	0.236	Diamond
0.236	0.039	0.276	/	4.134	0.236	Diamond
0.236	0.039	0.276	0.787	4.134	0.236	Diamond
0.236	0.039	0.276	1.181	4.134	0.236	Diamond
0.236	0.039	0.276	1.969	4.134	0.236	Diamond

2 Flute Carbide Ball End Mill



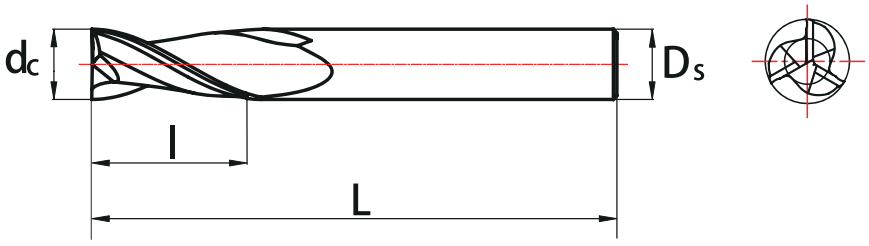
Unit: inch

Blade diameter *dc*	Blade length *l*	Effective length l_1	Total length *L*	Shank diameter *Ds*	Coating type
0.118	0.315	0.591	4.134	0.118	Diamond
0.118	0.315	/	2.441	0.157	Diamond
0.118	0.315	0.591	4.134	0.157	Diamond
0.118	0.315	0.787	4.134	0.157	Diamond
0.118	0.315	0.984	4.134	0.157	Diamond
0.118	0.315	1.181	4.134	0.157	Diamond

Tools For Graphite

Blade diameter *dc*	Blade length *l*	Effective length l_1	Total length *L*	Shank diameter *Ds*	Coating type
0.118	0.315	1.378	4.134	0.157	Diamond
0.118	0.315	1.575	4.134	0.157	Diamond
0.118	0.315	1.969	4.134	0.157	Diamond
0.118	0.315	2.362	4.134	0.157	Diamond
0.157	0.630	/	2.441	0.157	Diamond
0.157	0.630	/	3.228	0.157	Diamond
0.157	0.630	1.181	3.228	0.157	Diamond
0.157	0.630	/	4.134	0.157	Diamond
0.157	0.630	1.575	4.134	0.157	Diamond
0.157	0.630	/	5.315	0.157	Diamond
0.157	0.630	1.575	5.315	0.157	Diamond
0.157	0.630	/	6.299	0.157	Diamond
0.157	0.630	1.969	6.299	0.157	Diamond
0.197	0.630	0.787	4.134	0.236	Diamond
0.236	0.630	0.984	3.228	0.236	Diamond
0.236	0.630	0.984	4.134	0.236	Diamond
0.236	0.630	1.575	4.134	0.236	Diamond
0.236	0.630	1.181	6.299	0.236	Diamond
0.236	0.630	1.969	6.299	0.236	Diamond
0.315	0.787	1.181	3.228	0.315	Diamond
0.315	0.787	1.181	4.134	0.315	Diamond
0.315	0.787	1.575	4.134	0.315	Diamond
0.315	0.787	1.969	6.299	0.315	Diamond
0.315	0.787	1.575	8.071	0.315	Diamond
0.394	0.866	1.575	3.228	0.394	Diamond
0.394	0.866	1.378	4.134	0.394	Diamond
0.394	0.866	1.969	4.134	0.394	Diamond
0.394	0.866	2.362	6.299	0.394	Diamond
0.394	0.866	1.969	7.874	0.394	Diamond
0.472	0.984	1.969	4.134	0.472	Diamond
0.472	0.984	1.969	6.299	0.472	Diamond
0.472	0.984	2.362	8.071	0.472	Diamond

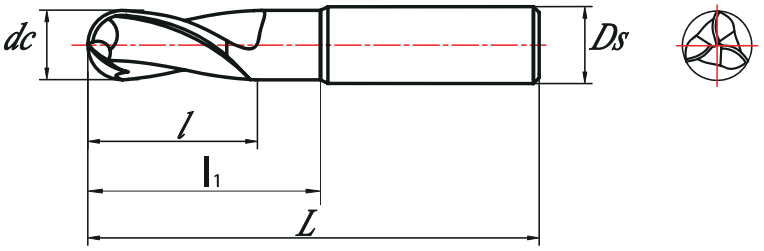
3 Flute Carbide End Mill



Unit: inch

Blade diameter *dc*	Blade length *l*	Total length *L*	Shank diameter *Ds*	Coating type
0.118	0.354	2.126	0.236	Diamond
0.118	0.591	2.520	0.118	Diamond
0.118	0.591	2.520	0.157	Diamond
0.157	0.472	2.126	0.236	Diamond
0.157	0.787	3.228	0.157	Diamond
0.236	0.709	2.520	0.236	Diamond
0.236	0.984	4.134	0.236	Diamond
0.236	0.984	5.906	0.236	Diamond
0.315	0.945	2.953	0.315	Diamond
0.315	1.378	4.134	0.315	Diamond
0.315	1.378	6.378	0.315	Diamond
0.394	0.984	3.189	0.394	Diamond
0.394	1.575	4.134	0.394	Diamond
0.394	1.969	6.378	0.394	Diamond
0.472	0.984	3.189	0.472	Diamond
0.472	1.772	4.134	0.472	Diamond
0.472	2.165	6.378	0.472	Diamond

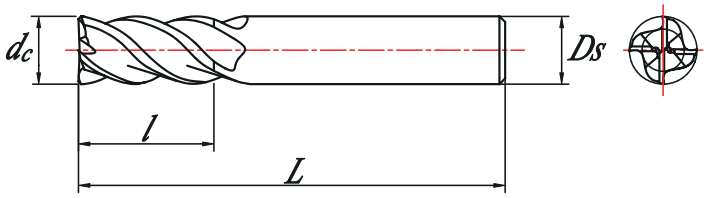
3 Flute Carbide Ball End Mill



Unit: inch

Blade diameter *dc*	Blade length *l*	Effective length l_1	Total length *L*	Shank diameter *Ds*	Coating type
0.118	0.315	0.591	4.134	0.118	Diamond
0.118	0.315	/	2.441	0.157	Diamond
0.118	0.315	0.591	4.134	0.157	Diamond
0.118	0.315	0.787	4.134	0.157	Diamond
0.118	0.315	1.181	4.134	0.157	Diamond
0.118	0.315	1.575	4.134	0.157	Diamond
0.118	0.315	1.969	4.134	0.157	Diamond
0.157	0.630	/	3.228	0.157	Diamond
0.157	0.630	1.181	3.228	0.157	Diamond
0.157	0.630	/	4.134	0.157	Diamond
0.157	0.630	1.575	4.134	0.157	Diamond
0.157	0.630	/	5.315	0.157	Diamond
0.157	0.630	1.575	5.315	0.157	Diamond
0.236	0.630	0.984	4.134	0.236	Diamond
0.236	0.630	1.575	4.134	0.236	Diamond
0.236	0.630	1.181	6.299	0.236	Diamond
0.236	0.630	1.969	6.299	0.236	Diamond
0.315	0.787	1.181	3.228	0.315	Diamond
0.315	0.787	1.181	4.134	0.315	Diamond
0.315	0.787	1.575	4.134	0.315	Diamond
0.315	0.787	1.969	6.299	0.315	Diamond
0.315	0.787	1.575	8.071	0.315	Diamond
0.394	0.866	1.575	3.228	0.394	Diamond
0.394	0.866	1.378	4.134	0.394	Diamond
0.394	0.866	1.969	4.134	0.394	Diamond
0.394	0.866	2.362	6.299	0.394	Diamond
0.394	0.866	1.969	7.874	0.394	Diamond
0.472	0.984	1.969	4.134	0.472	Diamond
0.472	0.984	1.969	6.299	0.472	Diamond
0.472	0.984	2.362	8.071	0.472	Diamond

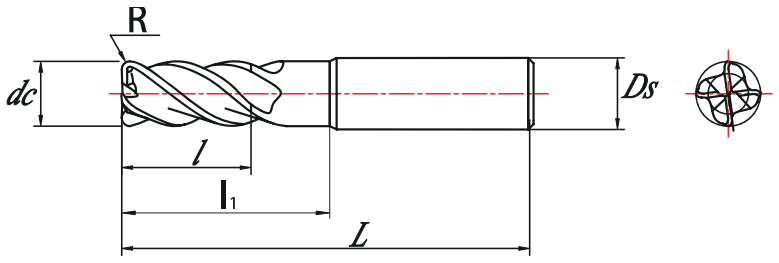
4 Flute Carbide End Mill



Unit: inch

Blade diameter *dc*	Blade length *l*	Total length *L*	Shank diameter *Ds*	Coating type
0.118	0.354	2.126	0.236	Diamond
0.118	0.591	2.520	0.118	Diamond
0.118	0.591	2.520	0.157	Diamond
0.157	0.472	2.126	0.236	Diamond
0.157	0.787	3.228	0.157	Diamond
0.236	0.709	2.520	0.236	Diamond
0.236	0.984	4.134	0.236	Diamond
0.236	0.984	5.906	0.236	Diamond
0.315	0.945	2.953	0.315	Diamond
0.315	1.378	4.134	0.315	Diamond
0.315	1.378	6.378	0.315	Diamond
0.394	0.984	3.189	0.394	Diamond
0.394	1.575	4.134	0.394	Diamond
0.394	1.969	6.378	0.394	Diamond
0.472	0.984	3.189	0.472	Diamond
0.472	1.772	4.134	0.472	Diamond
0.472	2.165	6.378	0.472	Diamond

4 Flute Carbide End Mill-R



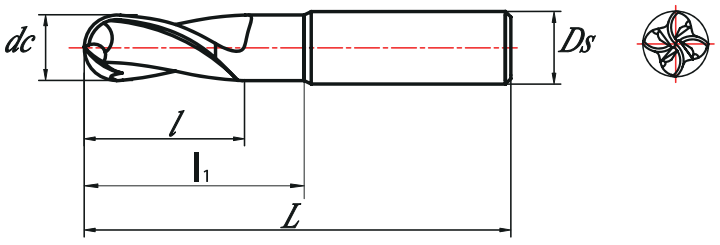
Unit: inch

Blade diameter *dc*	Fillet radius *R*	Blade length *l*	Effective length l_1	Total length *L*	Shank diameter *Ds*	Coating type
0.118	0.012	0.157	/	3.228	0.157	Diamond
0.118	0.012	0.157	0.394	3.228	0.157	Diamond
0.118	0.012	0.157	0.787	3.228	0.157	Diamond
0.118	0.012	0.157	1.181	3.228	0.157	Diamond
0.118	0.012	0.157	1.575	3.228	0.157	Diamond
0.118	0.020	0.157	/	3.228	0.157	Diamond
0.118	0.020	0.157	0.394	3.228	0.157	Diamond
0.118	0.020	0.157	0.787	3.228	0.157	Diamond
0.118	0.020	0.157	1.181	3.228	0.157	Diamond
0.118	0.020	0.157	1.575	3.228	0.157	Diamond
0.118	0.039	0.157	/	3.228	0.157	Diamond
0.118	0.039	0.157	0.394	3.228	0.157	Diamond
0.118	0.039	0.157	0.787	3.228	0.157	Diamond
0.118	0.039	0.157	1.181	3.228	0.157	Diamond
0.118	0.039	0.157	1.575	3.228	0.157	Diamond
0.157	0.012	0.236	0.787	4.134	0.157	Diamond
0.157	0.020	0.236	0.787	4.134	0.157	Diamond
0.157	0.039	0.236	0.787	4.134	0.157	Diamond
0.236	0.012	0.354	0.984	4.134	0.236	Diamond
0.236	0.020	0.354	0.984	4.134	0.236	Diamond
0.236	0.020	0.354	1.181	5.906	0.236	Diamond
0.236	0.039	0.354	0.984	4.134	0.236	Diamond
0.236	0.039	0.354	1.181	5.906	0.236	Diamond
0.315	0.012	0.472	1.181	4.134	0.315	Diamond
0.315	0.020	0.472	1.181	4.134	0.315	Diamond
0.315	0.020	0.472	1.575	5.906	0.315	Diamond
0.315	0.039	0.472	1.181	4.134	0.315	Diamond
0.315	0.039	0.472	1.575	5.906	0.315	Diamond

Tools For Graphite

Blade diameter *dc*	Fillet radius *R*	Blade length *l*	Effective length l_1	Total length *L*	Shank diameter *Ds*	Coating type
0.394	0.020	0.591	1.378	4.134	0.394	Diamond
0.394	0.020	0.591	1.772	6.378	0.394	Diamond
0.394	0.039	0.591	1.378	4.134	0.394	Diamond
0.394	0.039	0.591	1.772	6.378	0.394	Diamond
0.472	0.020	0.709	1.575	4.134	0.472	Diamond
0.472	0.020	0.709	1.772	6.378	0.472	Diamond
0.472	0.039	0.709	1.575	4.134	0.472	Diamond
0.472	0.039	0.709	1.772	6.378	0.472	Diamond

4 Flute Carbide Ball End Mill

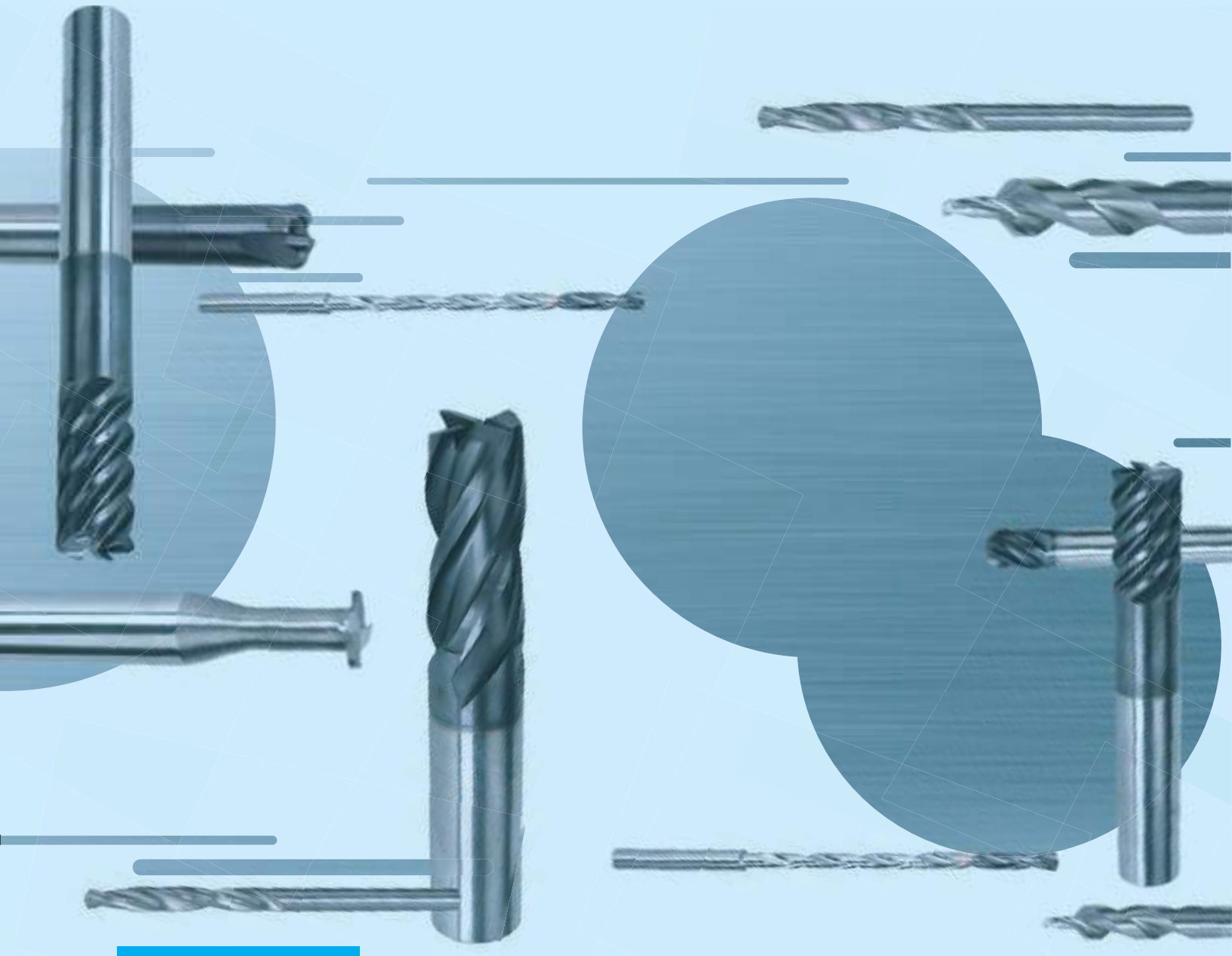


Unit: inch

Blade diameter *dc*	Blade length *l*	Effective length l_1	Total length *L*	Shank diameter *Ds*	Coating type
0.118	0.315	0.591	4.134	0.118	Diamond
0.118	0.315	/	2.441	0.157	Diamond
0.118	0.315	0.591	4.134	0.157	Diamond
0.118	0.315	0.787	4.134	0.157	Diamond
0.118	0.315	1.181	4.134	0.157	Diamond
0.118	0.315	1.575	4.134	0.157	Diamond
0.118	0.315	1.969	4.134	0.157	Diamond
0.157	0.630	/	3.228	0.157	Diamond
0.157	0.630	1.181	3.228	0.157	Diamond
0.157	0.630	/	4.134	0.157	Diamond
0.157	0.630	1.575	4.134	0.157	Diamond
0.157	0.630	/	5.315	0.157	Diamond
0.157	0.630	1.575	5.315	0.157	Diamond
0.236	0.630	0.984	4.134	0.236	Diamond
0.236	0.630	1.575	4.134	0.236	Diamond
0.236	0.630	1.181	6.299	0.236	Diamond
0.236	0.630	1.969	6.299	0.236	Diamond

Tools For Graphite

Blade diameter *dc*	Blade length *l*	Effective length l_1	Total length *L*	Shank diameter *Ds*	Coating type
0.315	0.787	1.181	3.228	0.315	Diamond
0.315	0.787	1.181	4.134	0.315	Diamond
0.315	0.787	1.575	4.134	0.315	Diamond
0.315	0.787	1.969	6.299	0.315	Diamond
0.315	0.787	1.575	8.071	0.315	Diamond
0.394	0.866	1.575	3.228	0.394	Diamond
0.394	0.866	1.378	4.134	0.394	Diamond
0.394	0.866	1.969	4.134	0.394	Diamond
0.394	0.866	2.362	6.299	0.394	Diamond
0.394	0.866	1.969	7.874	0.394	Diamond
0.472	0.984	1.969	4.134	0.472	Diamond
0.472	0.984	1.969	6.299	0.472	Diamond
0.472	0.984	2.362	8.071	0.472	Diamond



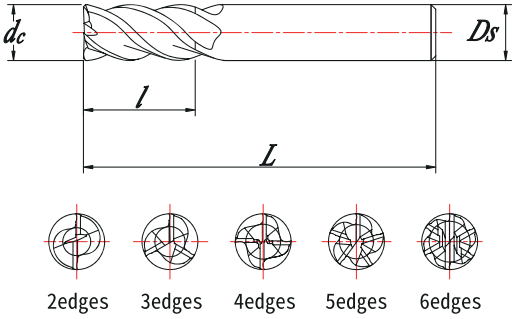
05

Other types of special tools

According to customer needs, we can use our proprietary tool research and development technology experience to conduct unique research and development in terms of tool material selection, tool geometry design, passivation polishing technology, coating technology, etc. Developed solid carbide non-standard tools that meet customer requirements, including flat-end milling cutters, round-nose milling cutters, ball-end milling cutters, taper ball-end milling cutters, rough milling cutters, drills, reamers, etc.

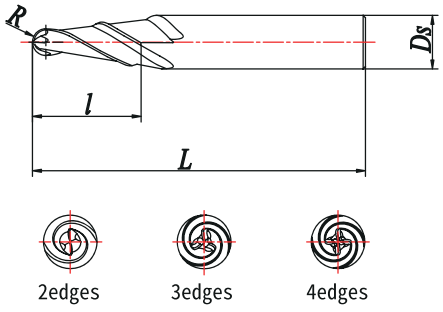
Other Types Of Special Tools

Carbide End Mill



materials suitable for processing	Carbon steel, stainless steel, cast iron, titanium alloy, aluminum alloy, high temperature alloy, non-metallic materials, etc.
Milling form	Side milling, shoulder milling, cavity milling, etc.
Blade diameter dc	0.118-1.260
Blade length (l)	0.197-3.937
Total length L	1.496-7.874
Shank diameter Ds	0.157-1.260
Handle form	Cylindrical shank, side fixed shank
Number of blades	2 edge, 3 edge, 4 edge, 5 edge, 6 edge, 8 edge
coating	TiN, TiAlN, AlCrN, AlTiN-based, DLC, diamond coating, etc.
other	The blade can be designed to shrink, avoid air, taper, etc.

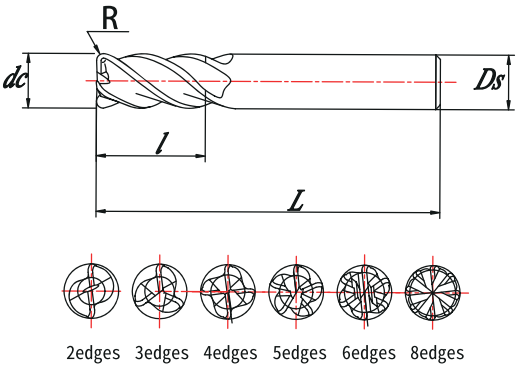
Taper ball end mill



Materials suitable for processing	Stainless steel, titanium alloy, aluminum alloy, high temperature alloy
Milling form	Side milling, end milling, etc.
R value	0.0314-0.236
Taper (half side)	1°～9°
Blade length (l)	0.394-3.937
Total length L	1.968-5.906
Shank diameter Ds	0.236-0.787
Handle form	Cylindrical shank
Number of blades	2-edge, 3-edge, 4-edge
coating	TiN, TiAlN, AlCrN, AlTiN-based, DLC, diamond coating, etc.
other	

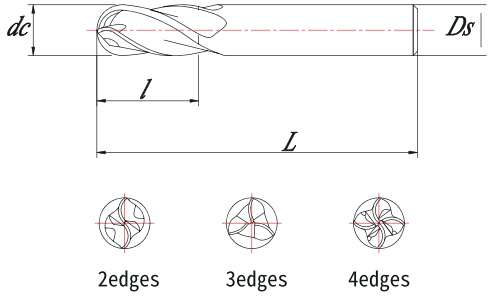
Other Types Of Special Tools

Carbide End Mill-R



Materials suitable for processing	Carbon steel, stainless steel, cast iron, titanium alloy, aluminum alloy, high temperature alloy, non-metallic materials, etc.
Milling form	Side milling, slot milling, ramp milling, cavity milling, etc.
Blade diameter dc	0.118-1.260
R value	0.0078-0.236
Blade length (l)	0.197-3.937
Total length L	1.496-7.874
Shank diameter Ds	0.157-1.260
Handle form	Cylindrical shank, side fixed shank
Number of blades	2 edge, 3 edge, 4 edge, 5 edge, 6 edge, 8 edge
coating	TiN, TiAlN, AlCrN, AlTiN-based, DLC, diamond coating, etc.
other	The blade can be designed to shrink, avoid air, taper, etc.

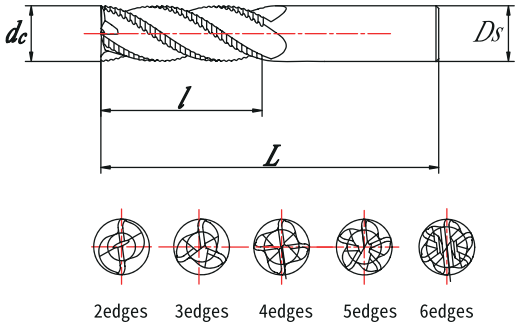
Carbide Ball End Mill



Materials suitable for processing	Carbon steel, stainless steel, cast iron, titanium alloy, aluminum alloy, high temperature alloy, non-metallic materials, etc.
Milling form	Face milling, profile milling, etc.
Blade diameter dc	0.118-1.260
Blade length (l)	0.197-3.937
Total length L	1.496-7.874
Shank diameter Ds	0.157-1.260
Handle form	Cylindrical shank, side fixed shank
Number of blades	2-edge, 3-edge, 4-edge
coating	TiN, TiAlN, AlCrN, AlTiN-based, DLC, diamond coating, etc.
other	The blade can be designed to shrink, avoid air, taper, etc.

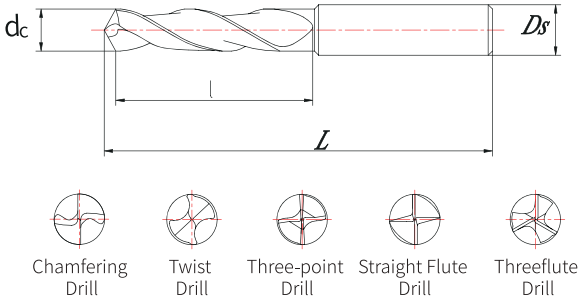
Other Types Of Special Tools

Roughing End Mill



Materials suitable for processing	Carbon steel, stainless steel, cast iron, titanium alloy, aluminum alloy, high temperature alloy, non-metallic materials, etc.
Milling form	Side milling, slot milling, etc.
Blade diameter dc	0.236-1.260
Blade length (l)	0.197-3.937
Total length L	1.967-7.874
Shank diameter Ds	0.236-1.260
Handle form	Cylindrical shank, side fixed shank
Number of blades	2 edge, 3 edge, 4 edge, 5 edge, 6 edge
coating	TiN, TiAlN, AlCrN, AlTiN-based, DLC, diamond coating, etc.
other	The blade can be designed to shrink, avoid air, taper, etc.

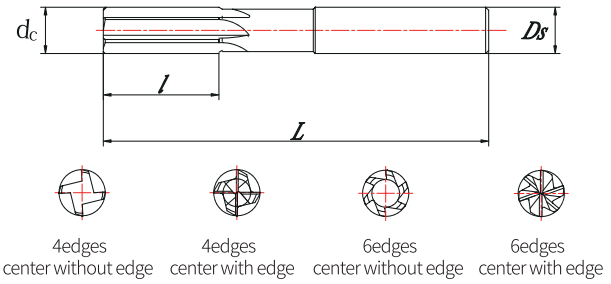
Drill



Materials suitable for processing	Carbon steel, stainless steel, cast iron, titanium alloy, aluminum alloy, high temperature alloy, non-metallic materials, etc.
Blade diameter dc	0.118-1.260
Slot length (l)	0.394-3.937
Total length L	2.362-7.874
Shank diameter Ds	0.157-1.260
Cooling form	Internal cooling, external cooling
Handle form	Cylindrical shank, side fixed shank
Drill bit form	Chamfer drill, twist drill, three-point drill, straight flute drill, three-edge drill
coating	TiN, TiAlN, AlCrN, AlTiN-based, DLC, diamond coating, etc.
other	The blade can be designed to shrink, avoid air, etc.

Other Types Of Special Tools

Reamer



Materials suitable for processing	Carbon steel, stainless steel, cast iron, titanium alloy, aluminum alloy, high temperature alloy, non-metallic materials, etc.
Blade diameter dc	0.118-0.787
Slot length (l)	0.197-1.181
Total length L	2.362-5.905
Shank diameter Ds	0.157-0.787
Cooling form	Internal cooling, external cooling
Handle form	Cylindrical shank
Reamer form	4 blades, 6 blades, etc.
coating	TiAlN, AlCrN-based, AlTiN-based, DLC
other	The blade can be designed to shrink, avoid air, etc.

Ceramic Tools

Compared with cemented carbide tools, ceramic tools are more resistant to high temperatures and can achieve dry cutting, which not only saves costs but also is environmentally friendly;Good oxidation resistance makes it possible to realize high-speed cutting and improve production efficiency; Ceramic tools do not need coating, and can be used directly after CNC grinding.

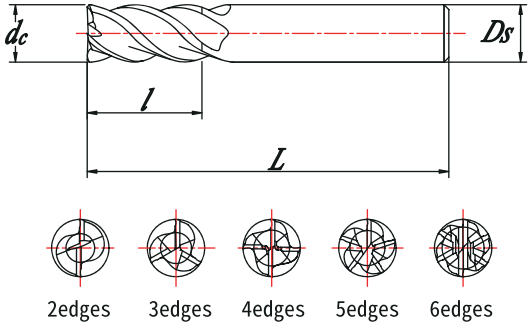
Cermet End Mill

The friction coefficient of the cermet end mill is small, and it is easier to achieve higher surface quality when cutting steel parts.

Sialon ceramic End Mill

The excellent Sialon ceramic materials, special groove and edge design ensure that Sialon ceramic end mill have extremely high wear resistance and can maintain high-strength continuous cutting under high temperature conditions.The cutting tool has good red and hard performance and is suitable for efficient rough machining of high-temperature alloy materials. Compared with cemented carbide tools, the cutting efficiency of Sialon ceramic end mill can be increased by more than 10 times.

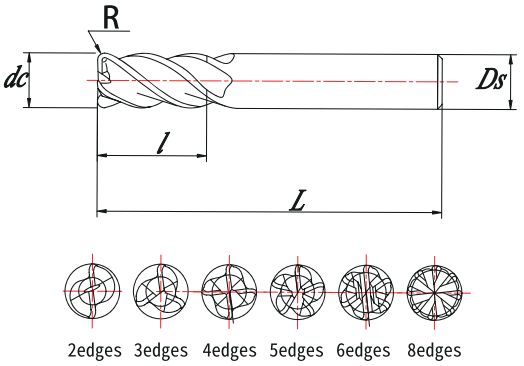
Cermet End Mill



Materials suitable for processing	Carbon steel, stainless steel
Milling form	Side milling, shoulder milling, cavity milling, etc.
Blade diameter dc	0.118-1.260
Blade length (l)	0.197-3.937
Total length L	1.496-7.874
Shank diameter Ds	0.157-1.260
Handle form	Cylindrical shank
Number of blades	2 edge, 3 edge, 4 edge, 5 edge, 6 edge
other	The blade can be designed to shrink, avoid air, taper, etc.

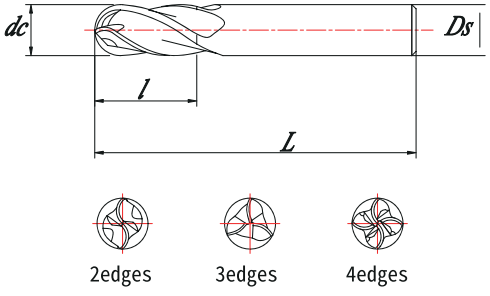
Other Types Of Special Tools

Cermet End Mill-R



Materials suitable for processing	Carbon steel, stainless steel
Milling form	Side milling, shoulder milling, cavity milling, etc.
Blade diameter dc	0.118-1.260
R value	0.0078-0.236
Blade length (l)	0.197-3.937
Total length L	1.496-7.874
Shank diameter Ds	0.157-1.260
Handle form	Cylindrical shank
Number of blades	2 edge, 3 edge, 4 edge, 5 edge, 6 edge, 8 edge
other	The blade can be designed to shrink, avoid air, taper, etc.

Cermet Ball End Mill

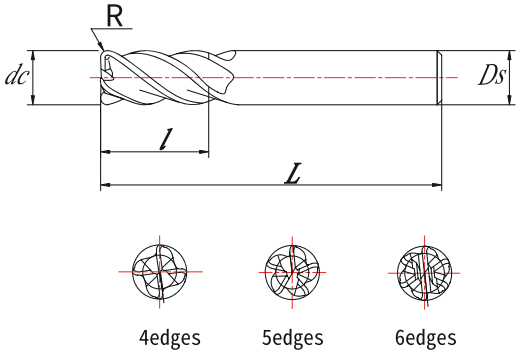


Materials suitable for processing	Carbon steel, stainless steel
Milling form	Side milling, shoulder milling, cavity milling, etc.
Blade diameter dc	0.118-1.260
Blade length (l)	0.197-3.937
Total length L	1.496-7.874
Shank diameter Ds	0.157-1.260
Handle form	Cylindrical shank
Number of blades	2-edge, 3-edge, 4-edge
other	The blade can be designed to shrink, avoid air, taper, etc.

Sialon ceramic End Mill

The excellent Sialon ceramic materials, special groove and edge design ensure that Sialon ceramic end mill have extremely high wear resistance and can maintain high-strength continuous cutting under high temperature conditions.The cutting tool has good red and hard performance and is suitable for efficient rough machining of high-temperature alloy materials. Compared with cemented carbide tools, the cutting efficiency of Sialon ceramic end mill can be increased by more than 10 times.

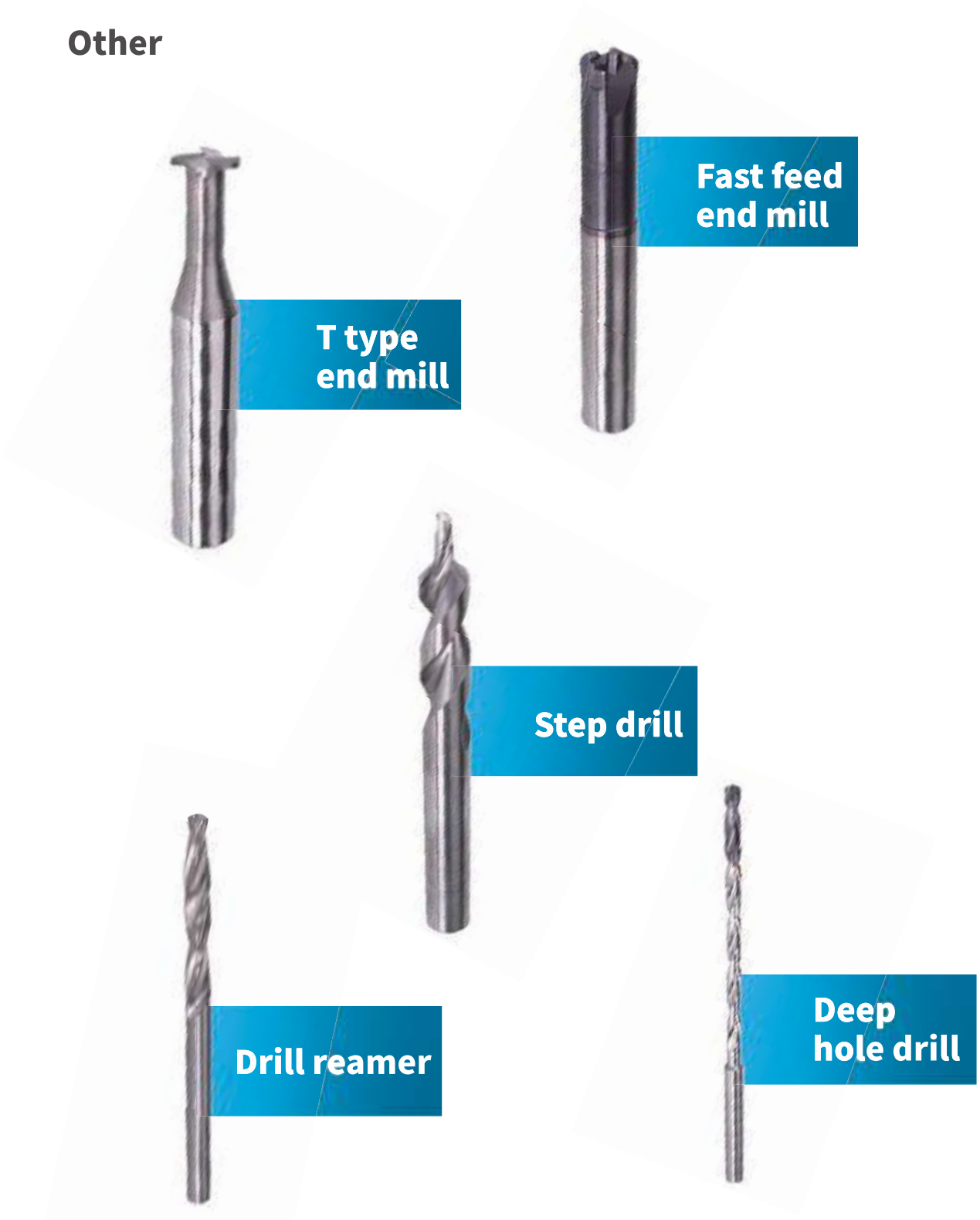
Sialon ceramic End Mill-R



Materials suitable for processing	Superalloy
Milling form	Side milling, shoulder milling, cavity milling, etc.
Blade diameter dc	0.315-0.787
R value	0.0197-0.236
Blade length (l)	0.197-0.787
Total length L	2.392-4.724
Shank diameter Ds	0.315-0.787
Number of blades	4-edge, 5-edge, 6-edge
other	The blade can be designed to shrink, avoid air, taper, etc.

Other Types Of Special Tools

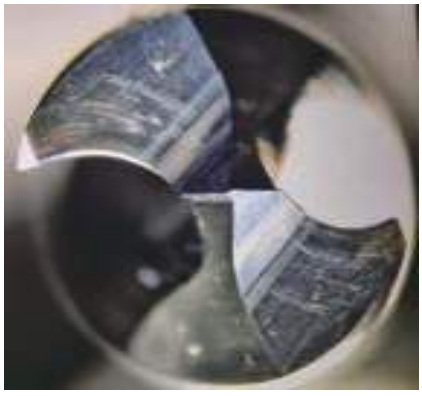
Other



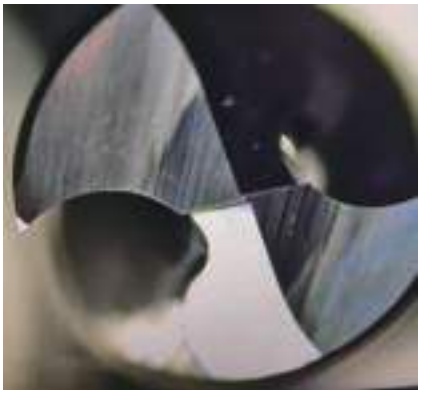
06

Tool grinding

We imported five-axis CNC tool grinder, universal tool grinder, tool post-processing equipment, Zoller tool detector and other equipment,
According to different customer cutting conditions and tools, a complete tool grinding standard has been established, which can realize the re-grinding and repairing of standard and special carbide end mill, drills, and reamers.The performance of the original new tool can be achieved at the first grinding, and the delivery time is usually about 3 to 5 working days.



Before grinding



After grinding

Company Profile

Beijing Worldia Diamond Tools Co., Ltd. was founded in 2006 and was listed on the Science and Technology Innovation Board of the Shanghai Stock Exchange on July 22, 2019, stock abbreviation: Woerde, stock code: 688028. It is a high-tech enterprise engaged in R&D, production and sales of high-precision super-hard tools and super-hard materials.

Distribution of Factory in Northern & Southern China

Langfang Factory

Jiaxing Factory

More Than 136 Patents

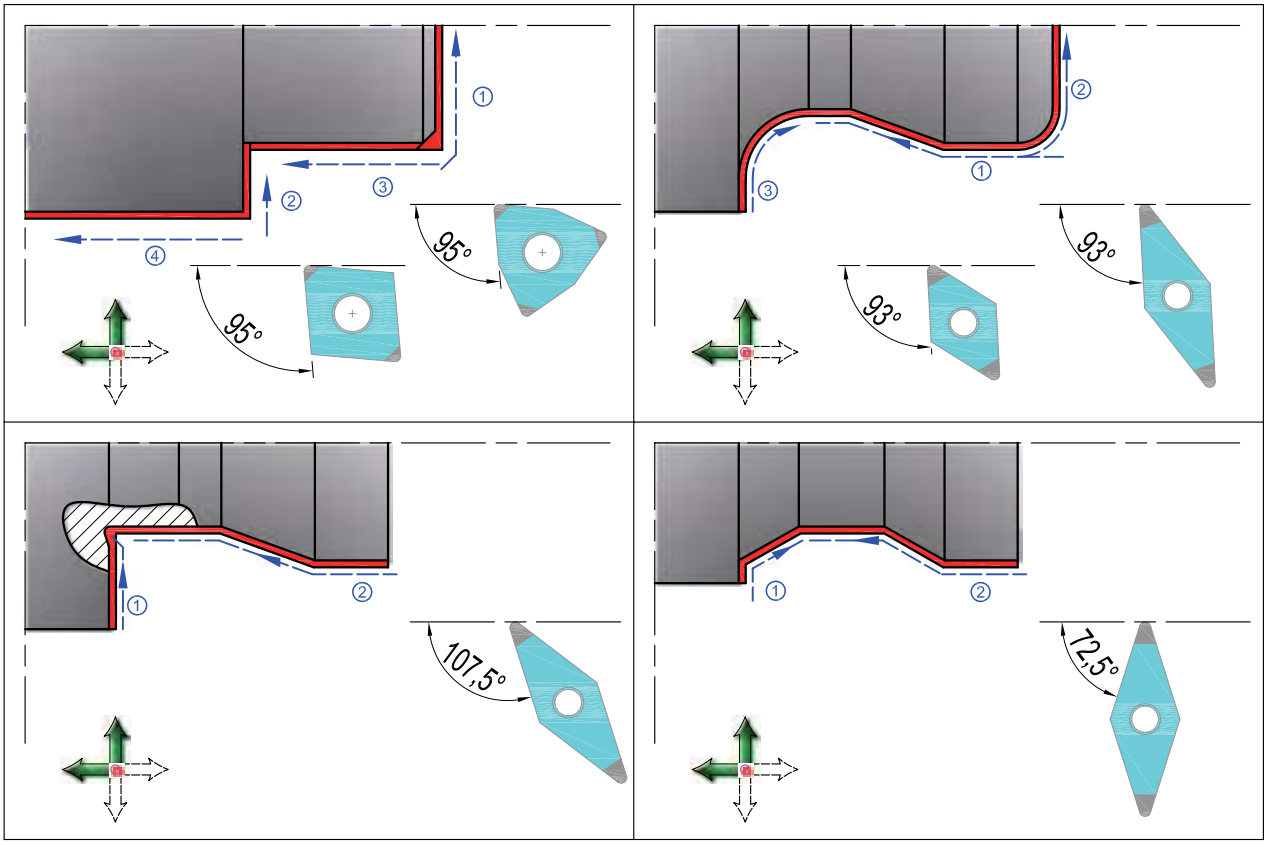
Processing Equipment

AGATHON

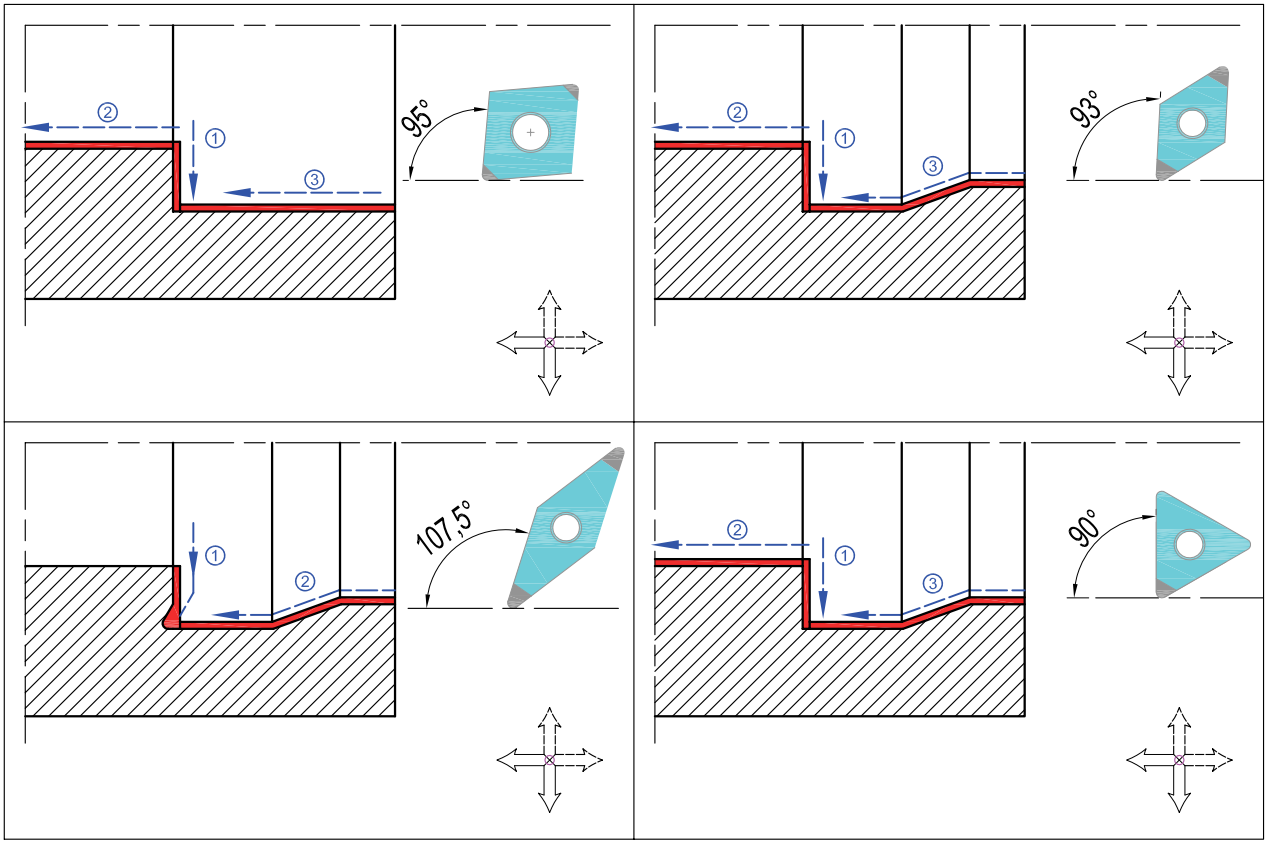
Inspection Equipment

Cutting Direction Recommendation

External machining



Internal machining



Cutting parameter Recommendation

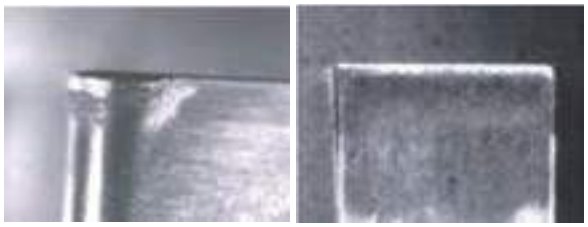
■ The appropriate cutting speed,vc(mm/min), nose radius,cutting depth,ap(mm) in different workpiece hardness can be selected by means of tables below.

Continuous cutting hard steel data tables.

(HRC)	Vc(m/min)	r (mm)	ap(mm)				
			0.1	0.2	0.3	0.4	0.5
			f(mm/rev)≦				
45～48	280	0.4	0.27	0.21	0.18	0.18	----
		0.8	0.38	0.29	0.23	0.22	0.20
		1.2	0.45	0.32	0.27	0.23	0.22
		1.6	0.50	0.36	0.31	0.27	0.25
48～52	240	0.4	0.24	0.18	0.16	0.16	----
		0.8	0.34	0.26	0.21	0.19	0.18
		1.2	0.40	0.29	0.24	0.21	0.19
		1.6	0.45	0.32	0.27	0.24	0.22
52～56	200	0.4	0.21	0.16	0.14	0.14	----
		0.8	0.30	0.22	0.18	0.17	0.15
		1.2	0.35	0.25	0.21	0.18	0.17
		1.6	0.39	0.28	0.24	0.21	0.20
56～60	160	0.4	0.18	0.14	0.12	0.12	----
		0.8	0.26	0.20	0.16	0.15	0.13
		1.2	0.31	0.22	0.18	0.16	0.15
		1.6	0.34	0.25	0.21	0.18	0.17
60～64	140	0.4	0.15	0.11	0.10	0.10	----
		0.8	0.22	0.16	0.13	0.12	0.11
		1.2	0.26	0.18	0.15	0.13	0.12
		1.6	0.28	0.20	0.17	0.15	0.14

Troubleshooting Recommendations

■ Flank Ware



Reason: Cutting speed is too fast
Lower wear resistance of material
Feed rate is too low
Solution: Reduce cutting speed
Select a higher abrasion resistance material
Adjust the cutting speed and depth of cut (Increase feed)

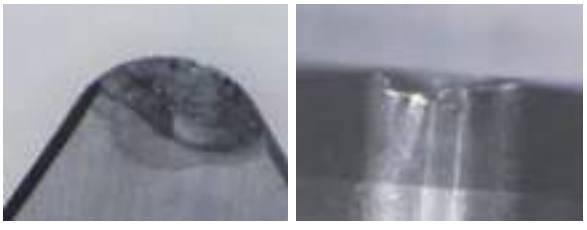
■ Crater Wear

Reason: The work piece is too hard
Vibration
High speed or great depth of cut
Interrupt cutting
Damaged by chips
Solution: Reduce cutting speed
Select a higher abrasion resistance material
Adjust the cutting speed and depth of cut (Increase feed)

■ Notch Ware

Reason：High cutting speed or big feed
Low material of wear resistance
Shortage of coolant
Solution：Reduce cutting speed / feed
Increase coolant and pressure, optimized coolant supply
Select a higher abrasion resistance material

■ Chipping



Reason：Too high pressure on the inserts
Lack of stability
Nose radius too small
Cutting edge damaged
Solution: Select a higher abrasion resistance material
Use inserts with chamfer
Increase cutting edge honed

Nose Radius, Feed Rate Against Surface Finish

■ Nose radius, feed rate against surface finish

The table below gives recommended maximum feed rates to achieve a special Ra. Value.

h=rε-(rε2-(0.5×f)2)0.5

h is Scallop Height, Ra=(0.25~0.33)h， so

fmax=(Ra×rε/50)1/2

Nose radius(mm)	Surface finish Ra value(μm)					
	0.2	0.4	0.8	1.6	3.2	6.4
	feed （mm/rev） rate≦					
0.2	0.028	0.040	0.057	0.080	0.113	0.160
0.4	0.040	0.057	0.080	0.113	0.160	0.226
0.8	0.057	0.080	0.113	0.160	0.226	0.320
1.2	0.069	0.098	0.139	0.196	0.277	0.392
1.6	0.080	0.113	0.160	0.226	0.320	0.453
2.4	0.098	0.139	0.196	0.277	0.392	0.554

Spindle Speed Recommendation

■ Spindle speed recommendation

Vc(m/min)	Workpiece/Tool Holer Diameter （mm）													
	12	16	20	25	32	50	63	80	100	125	160	175	200	250
80	2123	1592	1274	1019	796	510	404	318	255	204	159	146	127	102
90	2389	1791	1433	1146	896	573	455	358	287	229	179	164	143	115
100	2654	1990	1592	1274	995	637	506	398	318	255	199	182	159	127
110	2919	2189	1752	1401	1095	701	556	438	350	280	219	200	175	140
120	3185	2389	1911	1529	1194	764	607	478	382	306	239	218	191	153
140	3715	2787	2229	1783	1393	892	708	557	446	357	279	255	223	178
160	4246	3185	2548	2038	1592	1019	809	637	510	408	318	291	255	204
180	4777	3583	2866	2293	1791	1146	910	717	573	459	358	328	287	229
200	5308	3981	3185	2548	1990	1274	1011	796	637	510	398	364	318	255
220	5839	4379	3503	2803	2189	1401	1112	876	701	561	438	400	350	280
240	6369	4777	3822	3057	2389	1529	1213	955	764	611	478	437	382	306
260	6900	5175	4140	3312	2588	1656	1314	1035	828	662	518	473	414	331
280	7431	5573	4459	3567	2787	1783	1415	1115	892	713	557	510	446	357
300		5971	4777	3822	2986	1911	1517	1194	955	764	597	546	478	382
400						2548	2022	1592	1274	1019	796	728	637	510
600						3822	3033	2389	1911	1529	1194	1092	955	764
800						5096	4044	3185	2548	2038	1592	1456	1274	1019
1000						6369	5055	3981	3185	2548	1990	1820	1592	1274

IT Standard Tolerance

■ IT standard tolerance

The ISO-basic tolerances (International Tolerance Grades, or, “IT”) which apply to all linear sizes (external and internal sizes, diameters,lengths, widths and thicknesses). An IT-grade number establishes the magnitude of the tolerance zone, while the tolerance position letter determines where the tolerance zone is in relation to the zero line.

(mm)+A7:V34		IT01	IT0	IT1	IT2	IT3	IT4	IT5	IT6	IT7	IT8	IT9	IT10	IT11	IT12	IT13	IT14	IT15	IT16	IT17	IT18
>	≦	(μm)													(mm)						
---	3	0.3	0.5	0.8	1.2	2	3	4	6	10	14	25	40	60	0.1	0.14	0.25	0.4	0.6	1	1.4
3	6	0.4	0.6	1	1.5	2.5	4	5	8	12	18	30	48	75	0.12	0.18	0.3	0.48	0.75	1.2	1.8
6	10	0.4	0.6	1	1.5	2.5	4	6	9	15	22	36	58	90	0.15	0.22	0.36	0.58	0.9	1.5	2.2
10	18	0.5	0.8	1.2	2	3	5	8	11	18	27	43	700	110	0.18	0.27	0.43	0.7	1.1	1.8	2.7
18	30	0.6	1	1.5	2.5	4	6	9	13	21	33	52	84	130	0.21	0.33	0.52	1.84	1.3	2.1	3.3
30	50	0.6	1	1.5	2.5	4	7	11	16	25	39	62	100	160	0.25	0.39	0.62	1	1.6	2.5	3.9
50	80	0.8	1.2	2	3	5	8	13	19	30	46	74	120	190	0.3	0.46	0.74	1.2	1.9	3	4.6
80	120	1.5	2.5	4	6	10	15	22	35	54	87	140	220	350	0.54	0.87	1.4	2.2	3.5	5.4	
120	180	1.2	2	3.5	5	8	12	18	25	40	63	100	160	250	0.4	0.63	1	1.6	2.5	4	6.3
180	250	2	3	4.5	7	10	14	20	29	46	72	115	185	290	0.46	0.72	1.15	1.85	2.9	4.6	7.2
250	315	2.5	4	6	8	12	16	23	32	52	81	130	210	320	0.52	0.81	1.3	2.1	3.2	5.2	8.1
315	400	3	5	7	9	13	18	25	36	57	89	140	230	360	0.57	0.89	1.4	2.3	3.6	5.7	8.9
400	500	4	6	8	10	15	20	27	40	63	97	155	250	400	0.63	0.97	1.55	2.5	4	6.3	9.7
500	630	4.5	6	9	11	16	22	30	44	70	110	175	280	440	0.7	1.75	2.8	4.4	7	11	
630	800	5	7	10	13	18	25	35	50	80	125	200	320	500	0.8	1.25	2	3.2	5	8	12.5
800	1000	5.5	8	11	15	21	29	40	56	90	140	230	360	560	0.9	1.4	2.3	3.6	5.6	9	14
1000	1250	6.5	9	13	18	24	34	46	66	105	165	260	420	660	1.05	1.65	2.6	4.2	6.6	10.5	16.5
1250	1600	8	11	15	21	29	40	54	78	125	195	310	500	780	1.25	1.95	3.1	5	7.8	12.5	19.5
1600	2000	9	13	18	25	35	48	65	92	150	230	370	600	920	1.5	2.3	3.7	6	9.2	15	23
2000	2500	11	15	22	30	41	57	77	110	175	280	440	700	1100	1.75	2.8	4.4	7	11	17.5	28
2500	3150	13	18	26	36	50	69	93	135	210	330	540	860	1350	2.1	3.3	5.4	8.6	13.5	21	33
3150	4000	16	23	33	45	60	84	115	165	260	410	660	1050	1650	2.6	4.1	6.6	10.5	16.5	26	41
4000	5000	20	28	40	55	74	100	140	200	320	500	800	1300	2000	3.2	5	8	13	20	32	50
5000	6300	25	35	49	67	92	125	170	250	400	620	980	1550	2500	4	6.2	9.8	15.5	25	40	62
6300	8000	31	43	62	84	115	155	215	310	490	760	1200	1950	3100	4.9	7.6	12	19.5	31	49	76
8000	10000	38	53	76	105	140	195	270	380	600	940	1500	2400	3800	6	9.4	15	24	38	60	94

WORLDIA

SHAPING YOUR WORLD
WITH DIAMOND

www.worldia-tools.com

Tel.: +86-10-58411388 Fax: +86-10-58411388-8027

Address: No.2 Industry Road,Dachang Chaobaihe Industrial Park,
Langfang City,Hebei Province 065300,China
Address: No.1136, Bazi Road,Gaozhao Steet, Xiuzhou District,
Jiaxing City, Zhejiang Province, 314032, China.

E-mail: info@worldia-tools.com