



Indexable Finishing Ball End Mill

Vol 1

# OSG PHOENIX<sup>®</sup> PFB



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[osgtool.com/pfb](http://osgtool.com/pfb)

## PHOENIX® PFB

PHOENIX® PFB is a versatile series of high precision indexable finish ball nose end mills for superior surface finishing and excellent tool life.



For more information use your phone to scan the QR code to the right and visit: [osgtool.com/pfb](http://osgtool.com/pfb)



### List Numbers

52100 - PHOENIX® PFB SA (Inch)  
 78014 - PHOENIX® PFB SS (MM)  
 52604 - PHOENIX® PFB ASF (Inch)  
 78114 - PHOENIX® PFB SF (mm)  
 78PFB - PHOENIX® PFB Inserts  
 7808H - PHOENIX® PFB Accessories

### Size Range

0.250"-1.250"  
 6mm-32mm  
 0.375"-1.000"  
 10mm-30mm

### Primary Applications

- Profile milling, contouring, and 3D milling
- Finishing operations requiring excellent surface quality

## Features & Product Solutions

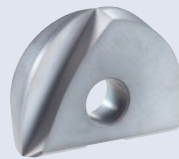
### Superior Surface Finishing and Long Tool Life

#### High Insert Accuracy & Repeatability

±6µm radius precision (±10µm for PFB-D) and high precision mounting of the insert into the body enables a superior milling surface and long tool life.

#### Excellent Cutting Edge Sharpness

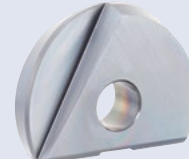
Full Radius and Spiral Edge form provide a strong insert with excellent sharpness.



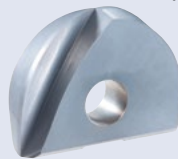
Spiral



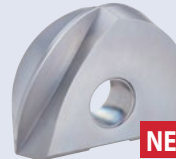
Spiral (Full Radius)



Straight (Full Radius)

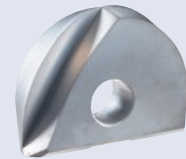


Spiral (Strengthened Edge)



Spiral (High Hardness)

**NEW!**



Spiral (Diamond Coated)

### Steel & Carbide Body Variety

Steel shank achieves superior cost performance when working with relatively short projection lengths.

Carbide shank inhibits chattering and produces high quality surface finishes when machining with long projection lengths.



Steel Shank



Carbide Shank

# PFB Insert Variety

## Options for Every Application

### PFB-Q-ST

- Sharp but rigid cutting edge
- Excellent chipping resistance
- High insert radius precision ( $\pm 6\mu\text{m}$ )

### PFB-D

- Employs a spiral edge form for outstanding sharpness.
- Amazing durability when machining graphite, copper, aluminum, MMC, and carbon fiber composite!
- High insert radius precision ( $\pm 6\mu\text{m}$ ).

### PFB-HH

- Specialized cutting edge shape for high hardness steel.
- Improved rigidity and resistance to chipping by special edge treatment.
- High insert radius precision ( $\pm 6\mu\text{m}$ ).

### PFB-SH

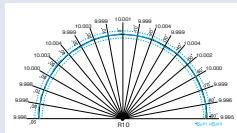
- Specialized cutting edge shape for cast iron, ductile cast iron, and hardened steel.
- Improved resistance to chipping and breakage by special edge treatment.
- High insert radius precision ( $\pm 6\mu\text{m}$ ).

### PFB-Q-SP

- Straight cutting edge shape for stainless steel and HRSA.
- Improved rigidity and resistance to chipping by special edge treatment.
- High insert radius precision ( $\pm 6\mu\text{m}$ ).

### PFB-SP

- Spiral edge form handles a wide range of work materials.
- High insert radius precision ( $\pm 6\mu\text{m}$ ).



### PFB-Q

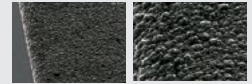
- The effective cutting edge has a 220° angle for undercut milling.
- The 220° cutting edge reduces chatter on vertical walls and produces improved surface finishes.
- High insert radius precision ( $\pm 6\mu\text{m}$ ).

### XP2225 Grade

- Excellent heat resistance
- Exceptional performance in stainless steel & HRSA

### XC4505 Grade

- Utilizes a special carbide substrate for diamond coating.
- A sharp edge is attained through the combination of our high-level grinding techniques and leading diamond coating technology.



### XP6703 Grade

- Highly wear resistant carbide substrate.
- Superior wear resistant and heat resistant coating.
- Excellent surface smoothness from post-processing.

### XP3310 Grade

- Highly wear resistant carbide substrate.
- Utilizes a coating with excellent heat resistance and wear resistance.



### XP2225 Grade

- Highly wear resistant carbide substrate.
- Excellent heat resistant coating.
- Exceptional durability in stainless steel and HRSA.

### XP3320 Grade

- A carbide substrate with a superior balance of wear resistance and anti-chipping properties.
- Oxidation temperature of 1300°C
- Surface hardness 3500 HV
- Capable of long tool life during high speed, high-efficiency machining.

### XP3225 Grade

- Stable machining is possible in a wide range of cutting conditions.
- Especially good performance in stainless steel and carbon steel.

## Wear Comparison Test

### SUH600 Steel

Tool	PFB-R200SS20-S160
Insert (Grade)	PFB200-SP (XP3320)
Workpiece	Blade Sample Model
Work Material	SUH600 Steel
Overall Length	4.331 in
Cutting Speed	308 SFM (1500 RPM)
Feed	78.74 IPM (0.026 ipt)
Milling Method	Profile Milling
Depth of Cut	Aa = 0.008 in, Ar = 0.039 in
Coolant	Water Soluble
Machine	Vertical Machining Center

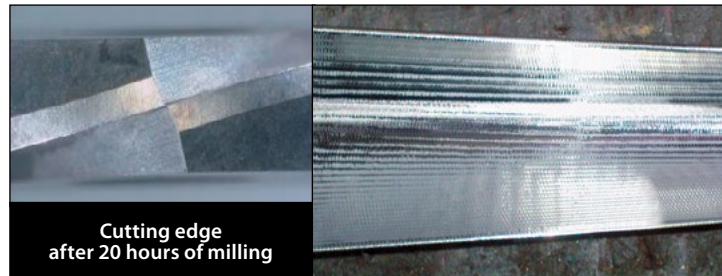
Time	70 minutes		140 minutes	
Milling Length	4,000 in		8,000 in	
PFB				
	Wear Amount (in)	0.0012	0.0011	0.0016
Competitor				
	Wear Amount (in)	0.0012	0.0013	0.0027

## Finishing Milling in Stainless Steel

### SUS410J1 Equivalent

The amount of flank wear after 20 hours of milling was 0.0008 in. The machined face was smooth and bright during the operation.

Tool	PFB-R120SS12-LL160CS
Insert (Grade)	PFB120-Q (XP3225)
Workpiece	Turbine Blade
Work Material	SUS410J1 Equivalent
Cutting Speed	393 SFM (3185 RPM)
Feed	75.24 IPM (0.012 ipt)
Milling Method	Profile Milling
Depth of Cut	Aa = 0.005 in, Ar = 0.027 in
Coolant	Non-Water Soluble
Machine	Vertical Machining Center



## Long Tool Life in Titanium

### Ti-6Al-4V

After machining 300 inches in Titanium Alloy, PFB showed half the flank wear of the competitor's tools.

Tool	ø20mm PFB-R200SS20-S160
Insert (Grade)	ø20mm PFB200-SP (XP3320)
Work Material	Ti-6Al-4V
Cutting Speed	58 SFM (280 RPM)
Feed	1.95 IPM (0.0035 ipt)
Depth of Cut	Aa = 0.012 in, Ar = 0.008 in
Coolant	Water Soluble
Machine	Vertical Machining Center

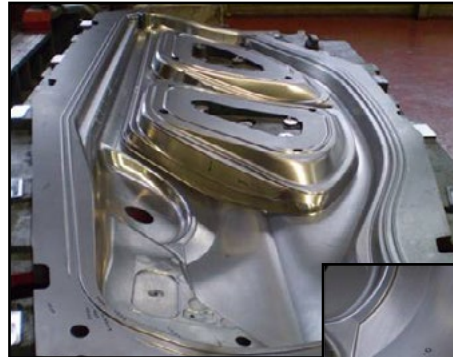
Cutting Edge Wear After 300 Inches			
PFB	Competitor A	Competitor B	Competitor C
Flank Wear: 0.002"	Flank Wear: 0.004"	Flank Wear: 0.004"	Flank Wear: 0.004"

## Long Tool Life in Ductile Cast Iron

### GGG70L

After over 50 hours of machining, PFB was able to maintain the required part accuracy and surface finish, and the cutting edge showed normal wear and no chipping.

Tool	ø30mm PFB-R300SS32-S170
Insert (Grade)	ø30mm PFB300-SH (XP3310)
Work Material	GGG70L
Cutting Speed	1,856 SFM (6,000 RPM)
Feed	220.5 IPM (0.018 ipt)
Depth of Cut	Aa = 0.007 in, Ar = 0.020 in
Coolant	Air
Machine	Double Column MC

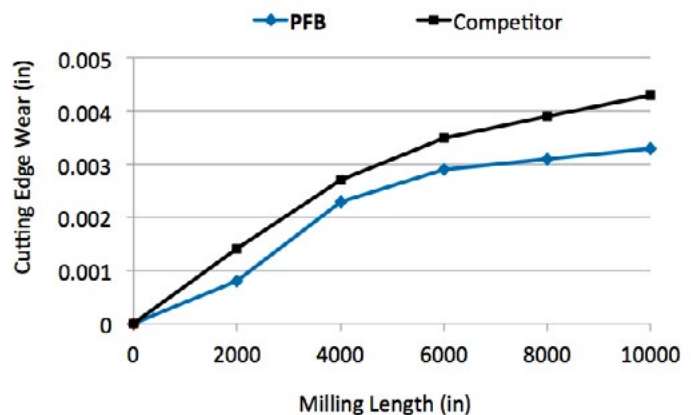


## Long Tool Life in Ductile Cast Iron

### GGG70L

After over 50 hours of machining, PFB was able to maintain the required part accuracy and surface finish, and the cutting edge showed normal wear and no chipping..



Tool	ø10mm PFB-R100SS10-S130
Insert (Grade)	ø10mm PFB100-D (XC4505)
Work Material	EX-70
Cutting Speed	619 SFM (6,000 RPM)
Feed	47.2 IPM (0.004 ipt)
Depth of Cut	Aa = 0.197 in, Ar = 0.197 in
Coolant	Air
Machine	Vertical Machining Center



## Excellent Durability in High-Hardness Steels

SKD11 (60HRC)

Tool	Ø20mm PFB-R200SS20-L180CS
Insert (Grade)	Ø20mm PFB200-HH (XP6703)
Work Material	SKD11 (60HRC)
Cutting Speed	656 SFM (3184 RPM)
Feed	50.1 IPM (0.008 ipt)
Depth of Cut	Aa = 0.008 in, Ar = 0.012 in
Coolant	Air
Machine	Horizontal Machining Center



	Milling Length (m)					
	200	400	600	800	1,000	1,200
<b>PFB</b>						
Competitor						



## Finishing of Turbine Blade with XP2225

SUS430

Tool	Ø16mm PFB-R160SF8	Competitor
Insert (Grade)	Ø16mm PFB160-Q-ST (XP2225)	Coated Carbide Insert
Work Material	430 Stainless Steel	
Cutting Speed	1377 SFM (8350 RPM)	
Feed	263.3 IPM (0.016 ipt)	
Depth of Cut	Aa = 0.008 in, Ar = 0.020 in	
Coolant	Water Soluble	
Machine	5-Axis Machine	

	The number of turbine blade			
	10	20	30	40
<b>PFB</b>				
Competitor				

Achieved high-speed milling without chipping by the newly designed cutting geometry.

Durability has also greatly increased due to the new material grade.



## Machining Graphite Electrode with PFB-D

SUS430

Tool	Ø16mm PFB-R160SS16-LL200CS	Ø8mm PFB-R080SS08-LL140CS
Insert (Grade)	Ø16mm PFB160-D (XC4505)	Ø8mm PFB080-D (XC4505)
Work Material	Graphite	
Overhang Length	120mm (7.5xD)	110mm (13.75xD)
Cutting Speed	1312 SFM (8000 RPM)	328 SFM (4000 RPM)
Feed	316.0 IPM (0.020 ipt)	85.0 IPM (0.011 ipt)
Depth of Cut	Aa = 0.315 in, Ar = 0.472 in	Aa = 0.012 in, Ar = 0.009 in
Coolant	None	
Machine	Vertical Machining Center	



## List 52100

PFB SA (Inch)



SPEED FEED  
P15

Recommended Materials: p15  
Accessories & Inserts: p11-13  
Effective Cutting Diameter & Recommended Width of Cut: p13-14



Steel Shank

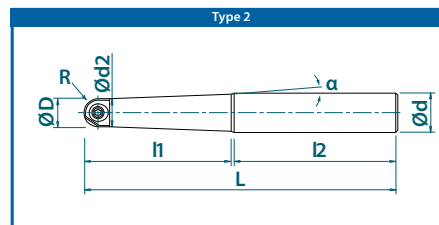
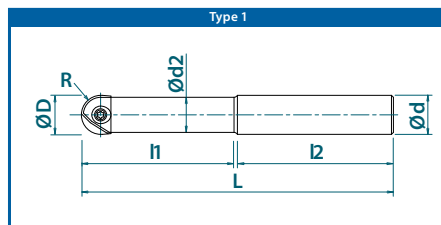


Carbide Shank

EDP No.	Body Type	Designation	Type	Tool Dia.	Tool Radius	Overall Length	Neck Length	Taper	L/D Ratio	No. of Teeth	Shank Dia.	Shank Length	Neck Dia.	
				D	R	L	l1	α°	d		l2	d2		
52100000	Cylindrical Shank Steel	PFB-R0250SA0250-S325	1	0.250	0.1250	3.250	0.625	0	2.5	2	0.250	2.625	0.226	
52100026		PFB-R0250SA0250-S375	1	0.250	0.1250	3.750	1.125	0	4.5	2	0.250	2.625	0.226	
52100027		PFB-R0250TPA0375-S375	2	0.250	0.1250	3.750	1.125	2	4.5	2	0.375	2.581	0.226	
52100028		PFB-R0250TPA0375-S425	2	0.250	0.1250	4.250	1.500	1	6	2	0.375	2.697	0.226	
52100029		PFB-R0375SA0375-S400	1	0.375	0.1875	4.000	0.937	0	2.5	2	0.375	3.063	0.336	
52100001		PFB-R0375SA0375-S550	1	0.375	0.1875	5.500	1.687	0	4.5	2	0.375	3.813	0.336	
52100030		PFB-R0375TPA0500-S500	2	0.375	0.1875	5.000	1.687	2	4.5	2	0.500	3.276	0.336	
52100031		PFB-R0375TPA0500-S550	2	0.375	0.1875	5.500	2.250	1	6	2	0.500	3.200	0.336	
52100032		PFB-R0500SA0500-S450	1	0.500	0.2500	4.500	1.250	0	2.5	2	0.500	3.250	0.461	
52100002		PFB-R0500SA0500-S550	1	0.500	0.2500	5.500	2.250	0	4.5	2	0.500	3.250	0.461	
52100033		PFB-R0500TPA0625-S550	2	0.500	0.2500	5.500	2.250	2	4.5	2	0.625	3.229	0.461	
52100034		PFB-R0500TPA0625-S650	2	0.500	0.2500	6.500	3.000	1	6	2	0.625	3.461	0.461	
52100035		PFB-R0625SA0625-S500	1	0.625	0.3125	5.000	1.562	0	2.5	2	0.625	3.438	0.546	
52100003		PFB-R0625SA0625-S550	1	0.625	0.3125	5.500	2.500	0	4	2	0.625	3.000	0.546	
52100036		PFB-R0625TPA0750-S600	2	0.625	0.3125	6.000	2.812	2	4.5	2	0.750	3.181	0.546	
52100037		PFB-R0625TPA0750-S700	2	0.625	0.3125	7.000	3.750	1	6	2	0.750	3.222	0.546	
52100038		PFB-R0750SA0750-S550	1	0.750	0.3750	5.500	1.875	0	2.5	2	0.750	3.625	0.671	
52100004		PFB-R0750SA0750-S600	1	0.750	0.3750	6.000	3.000	0	4	2	0.750	3.000	0.671	
52100039		PFB-R0750TPA1000-S650	2	0.750	0.3750	6.500	3.375	2	4.5	2	1.000	3.072	0.671	
52100040		PFB-R0750TPA1000-S800	2	0.750	0.3750	8.000	4.500	1	6	2	1.000	3.420	0.671	
52100005		PFB-R1000SA1000-S650	1	1.000	0.5000	6.500	3.000	0	3	2	1.000	3.500	0.882	
52100041		PFB-R1000SA1000-S750	1	1.000	0.5000	7.500	4.000	0	4	2	1.000	3.500	0.882	
52100042		PFB-R1000TPA1250-S800	2	1.000	0.5000	8.000	4.500	2	4.5	2	1.250	3.477	0.882	
52100043		PFB-R1000TPA1250-S950	2	1.000	0.5000	9.500	6.000	1	6	2	1.250	3.442	0.882	
52100016		PFB-R1250SA1250-S700	1	1.250	0.6250	7.000	3.750	0	3	2	1.250	3.250	1.132	
52100044		PFB-R1250SA1250-S850	1	1.250	0.6250	8.500	5.000	0	4	2	1.250	3.500	1.132	
52100045		PFB-R1250TPA1500-S900	2	1.250	0.6250	9.000	5.625	2	4.5	2	1.500	3.344	1.132	
52100046		PFB-R1250TPA1500-S1100	2	1.250	0.6250	11.000	7.500	1	6	2	1.500	3.425	1.132	
52100020		Cylindrical Shank Short Carbide	PFB-R0250SA0250-S325CS	1	0.250	0.1250	3.250	0.625	0	2.5	2	0.250	2.625	0.226
52100021			PFB-R0375SA0375-S400CS	1	0.375	0.1875	4.000	0.937	0	2.5	2	0.375	3.063	0.336
52100022	PFB-R0500SA0500-S450CS		1	0.500	0.2500	4.500	1.250	0	2.5	2	0.500	3.250	0.461	
52100023	PFB-R0625SA0625-S550CS		1	0.625	0.3125	5.500	1.562	0	2.5	2	0.625	3.938	0.546	
52100024	PFB-R0750SA0750-S600CS		1	0.750	0.3750	6.000	1.875	0	2.5	2	0.750	4.125	0.671	
52100025	PFB-R1000SA1000-S650CS		1	1.000	0.5000	6.500	2.500	0	2.5	2	1.000	4.000	0.882	
52100017	PFB-R1250SA1250-S700CS		1	1.250	0.6250	7.000	3.125	0	2.5	2	1.250	3.875	1.132	

Packed: 1 pc.

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## List 52100 (Continued)

PFB SA (Inch)



**SPEED FEED**  
P15

Recommended Materials: p15  
Accessories & Inserts: p11-13  
Effective Cutting Diameter & Recommended Width of Cut: p13-14



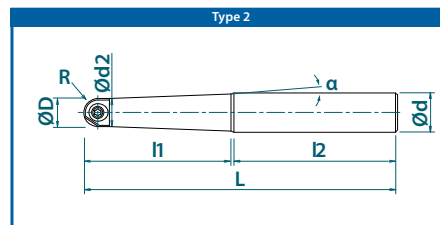
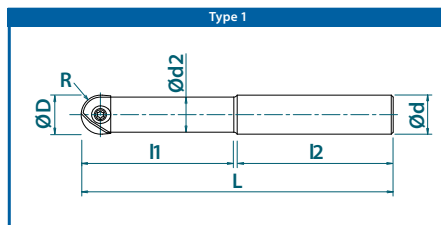
Steel Shank



Carbide Shank

EDP No.	Body Type	Designation	Type	Tool Dia. (inch)		Overall Length (inch)	Neck Length (inch)	Taper	L/D Ratio	No. of Teeth	Shank Dia. (inch)		Neck Dia. (inch)
				D	R						d	l2	
52100047	Cylindrical Shank Long Carbide	PFB-R0250SA0250-L400CS	1	0.250	0.1250	4.000	1.250	0	5	2	0.250	2.750	0.226
52100048		PFB-R0250TPA0375-L425CS	2	0.250	0.1250	4.250	1.500	1	6	2	0.375	2.697	0.226
52100006		PFB-R0375SA0375-L550CS	1	0.375	0.1875	5.500	1.875	0	5	2	0.375	3.625	0.336
52100049		PFB-R0375TPA0500-L550CS	2	0.375	0.1875	5.500	2.250	1	6	2	0.500	3.200	0.336
52100007		PFB-R0500SA0500-L550CS	1	0.500	0.2500	5.500	2.500	0	5	2	0.500	3.000	0.461
52100050		PFB-R0500TPA0625-L650CS	2	0.500	0.2500	6.500	3.000	1	6	2	0.625	3.461	0.461
52100008		PFB-R0625SA0625-L650CS	1	0.625	0.3125	6.500	3.125	0	5	2	0.625	3.375	0.546
52100051		PFB-R0625TPA0750-L700CS	2	0.625	0.3125	7.000	3.750	1	6	2	0.750	3.222	0.546
52100009		PFB-R0750SA0750-L700CS	1	0.750	0.3750	7.000	3.750	0	5	2	0.750	3.250	0.671
52100052		PFB-R0750TPA1000-L800CS	2	0.750	0.3750	8.000	4.500	1	6	2	1.000	3.420	0.671
52100010		PFB-R1000SA1000-L800CS	1	1.000	0.5000	8.000	4.500	0	4.5	2	1.000	3.500	0.882
52100053		PFB-R1000TPA1250-L950CS	2	1.000	0.5000	9.500	6.000	1	6	2	1.250	3.442	0.882
52100018		PFB-R1250SA1250-L900CS	1	1.250	0.6250	9.000	5.625	0	4.5	2	1.250	3.375	1.132
52100054		PFB-R1250TPA1500-L1100CS	2	1.250	0.6250	11.000	7.500	1	6	2	1.500	3.425	1.132
52100055	Cylindrical Shank Extra-Long Carbide	PFB-R0250SA0250-LL450CS	1	0.250	0.1250	4.500	1.750	0	7	2	0.250	2.750	0.226
52100056		PFB-R0250TPA0375-LL475CS	2	0.250	0.1250	4.750	2.000	0.5	8	2	0.375	2.690	0.226
52100011		PFB-R0375SA0375-LL650CS	1	0.375	0.1875	6.500	2.625	0	7	2	0.375	3.875	0.336
52100057		PFB-R0375TPA0500-LL650CS	2	0.375	0.1875	6.500	3.000	0.5	8	2	0.500	3.440	0.336
52100012		PFB-R0500SA0500-LL700CS	1	0.500	0.2500	7.000	3.500	0	7	2	0.500	3.500	0.461
52100058		PFB-R0500TPA0625-LL750CS	2	0.500	0.2500	7.500	4.000	0.5	8	2	0.625	3.448	0.461
52100013		PFB-R0625SA0625-LL750CS	1	0.625	0.3125	7.500	3.750	0	6	2	0.625	3.750	0.546
52100059		PFB-R0625TPA0750-LL825CS	2	0.625	0.3125	8.250	5.000	0.5	8	2	0.750	3.206	0.546
52100014		PFB-R0750SA0750-LL900CS	1	0.750	0.3750	9.000	4.500	0	6	2	0.750	4.500	0.671
52100060		PFB-R0750TPA1000-LL950CS	2	0.750	0.3750	9.500	6.000	0.5	8	2	1.000	3.401	0.671
52100015		PFB-R1000SA1000-LL1050CS	1	1.000	0.5000	10.500	5.500	0	5.5	2	1.000	5.000	0.882
52100061		PFB-R1000TPA1250-LL1150CS	2	1.000	0.5000	11.500	8.000	0.5	8	2	1.250	3.416	0.882
52100019	PFB-R1250SA1250-LL1200CS	1	1.250	0.6250	12.000	6.875	0	5.5	2	1.250	5.125	1.132	
52100062	PFB-R1250TPA1500-LL1350CS	2	1.250	0.6250	13.500	10.000	0.5	8	2	1.500	3.392	1.132	

Packed: 1 pc.





# List 78014

PFB SS (Metric)

**SPEED FEED**  
P15

Recommended Materials: p15  
Accessories & Inserts: p11-13  
Effective Cutting Diameter & Recommended Width of Cut: p13-14



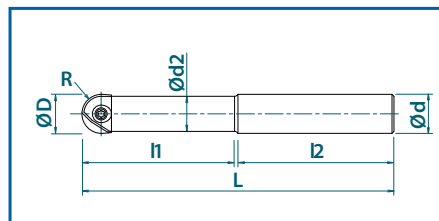
Steel Shank



Carbide Shank

EDP No.	Body Type	Designation	Tool Dia.	Tool Radius	Overall Length	Neck Length	L/D Ratio	No. of Teeth	Shank Dia.	Shank Length	Neck Dia.	
			(mm)	(mm)	(mm)	(mm)			(mm)	(mm)	(mm)	(mm)
			D	R	L	l1				d	l2	d2
7801400	Cylindrical Shank Steel	PFB-R080SS08-S120	8	4	120	36	4.5	2	8	84	7	
7801401		PFB-R100SS10-S130	10	5	130	45	4.5	2	10	85	9	
7801402		PFB-R120SS12-S130	12	6	130	54	4.5	2	12	76	11	
7801403		PFB-R160SS16-S140	16	8	140	65	4	2	16	76	14	
7801404		PFB-R200SS20-S160	20	10	160	80	4	2	20	80	18	
7801405		PFB-R250SS25-S160	25	12.5	160	75	3	2	25	85	22	
7801406		PFB-R300SS32-S170	30	15	170	90	3	2	32	80	27	
7801407		PFB-R320SS32-S180	32	16	180	96	3	2	32	84	29	
7801429	Cylindrical Shank Short Carbide	PFB-R060SS06-S80CS	6	3	80	15	2.5	2	6	65	5.4	
7801430		PFB-R080SS08-S100CS	8	4	100	20	2.5	2	8	80	7	
7801431		PFB-R100SS10-S100CS	10	5	100	25	2.5	2	10	75	9	
7801432		PFB-R120SS12-S110CS	12	6	110	30	2.5	2	12	80	11	
7801433		PFB-R160SS16-S140CS	16	8	140	40	2.5	2	16	100	14	
7801434		PFB-R200SS20-S160CS	20	10	160	50	2.5	2	20	110	18	
7801435		PFB-R250SS25-S160CS	25	12.5	160	62.5	2.5	2	25	97.5	22	
7801436		PFB-R300SS32-S170CS	30	15	170	75	2.5	2	32	95	27	
7801437	PFB-R320SS32-S180CS	32	16	180	80	2.5	2	32	100	29		
7801439	Cylindrical Shank Long Carbide	PFB-R060SS06-L100CS	6	3	100	30	5.0	2	6	70	5.4	
7801440		PFB-R080SS08-L120CS	8	4	120	40	5.0	2	8	80	7	
7801441		PFB-R100SS10-L130CS	10	5	130	50	5.0	2	10	80	9	
7801442		PFB-R120SS12-L140CS	12	6	140	60	5.0	2	12	80	11	
7801443		PFB-R160SS16-L160CS	16	8	160	72	4.5	2	16	88	14	
7801444		PFB-R200SS20-L180CS	20	10	180	90	4.5	2	20	90	18	
7801445		PFB-R250SS25-L200CS	25	12.5	200	100	4	2	25	100	22	
7801446		PFB-R300SS32-L220CS	30	15	220	120	4	2	32	100	27	
7801447	PFB-R320SS32-L230CS	32	16	230	128	4	2	32	102	29		
7801419	Cylindrical Shank Extra-Long Carbide	PFB-R060SS06-LL120CS	6	3	120	42	7	2	6	78	5.4	
7801420		PFB-R080SS08-LL140CS	8	4	140	56	7	2	8	84	7	
7801421		PFB-R100SS10-LL150CS	10	5	150	70	7	2	10	80	9	
7801422		PFB-R120SS12-LL160CS	12	6	160	84	7	2	12	76	11	
7801423		PFB-R160SS16-LL200CS	16	8	200	96	6	2	16	104	14	
7801424		PFB-R200SS20-LL240CS	20	10	240	120	6	2	20	120	18	
7801425		PFB-R250SS25-LL260CS	25	12.5	260	137.5	5.5	2	25	122.5	22	
7801426		PFB-R300SS32-LL290CS	30	15	290	165	5.5	2	32	125	27	
7801427	PFB-R320SS32-LL300CS	32	16	300	176	5.5	2	32	124	29		

Packed: 1 pc.



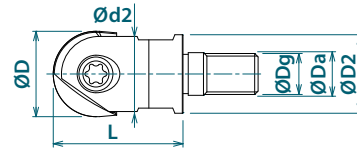
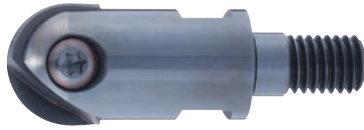
## List 52604

PFB ASF (Inch)



**SPEED FEED**  
P15

Recommended Materials: p15  
Accessories & Inserts: p11-13  
Effective Cutting Diameter & Recommended Width of Cut: p13-14



EDP No.	Body Type	Designation	Tool Dia. (inch)	No. of Teeth	Pilot Dia. (inch)	Thread Dia. (mm)	Overall Length (inch)	Head Dia. (inch)	Flange Dia. (inch)	Wrench Size	Applicable Insert
			D		Da	Dg	L	d2	D2		
52604000	Screw Fit Head	PFB-R0375ASF6	0.375	2	0.256	M6	1.024	0.354	0.354	7	PFB...
52604001		PFB-R0500ASF6	0.500	2	0.256	M6	1.024	0.433	0.433	7	
52604002		PFB-R0625ASF8	0.625	2	0.335	M8	1.260	0.551	0.571	10	
52604003		PFB-R0750ASF10	0.750	2	0.413	M10	1.496	0.709	0.709	14	
52604004		PFB-R1000ASF12	1.000	2	0.492	M12	1.496	0.866	0.906	17	

Packed: 1 pc.



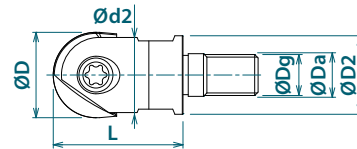
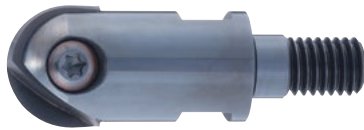
## List 78114

PFB SF (Metric)



**SPEED FEED**  
P15

Recommended Materials: p15  
Accessories & Inserts: p11-13  
Effective Cutting Diameter & Recommended Width of Cut: p13-14



EDP No.	Body Type	Designation	Tool Dia. (mm)	No. of Teeth	Pilot Dia. (mm)	Thread Dia. (mm)	Overall Length (mm)	Head Dia. (mm)	Flange Dia. (mm)	Wrench Size	Applicable Insert
			D		Da	Dg	L	d2	D2		
7801490	Screw Fit Head	PFB-R100SF6	10	2	6.5	M6	26	9	9.0	7	PFB...
7801491		PFB-R120SF6	12	2	6.5	M6	26	11	11	7	
7801492		PFB-R160SF8	16	2	8.5	M8	32	14	14.5	10	
7801493		PFB-R200SF10	20	2	10.5	M10	38	18	18	14	
7801494		PFB-R250SF12	25	2	12.5	M12	38	22	23	17	
7801495		PFB-R300SF16	30	2	17	M16	43	27	28	22	

Packed: 1 pc.

**This item is stocked overseas. Please contact OSG for availability and delivery.**



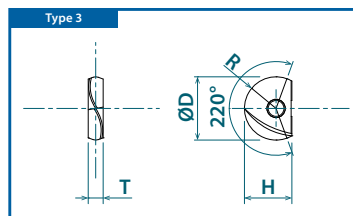
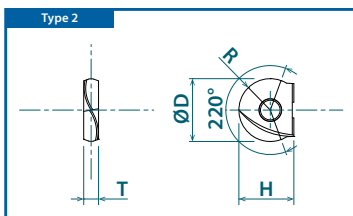
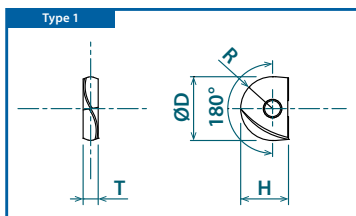
# List 78PFB

PFB Inserts (Inch)



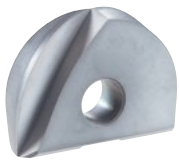
Designation	Type	Specification	No. of Cutting Edges	Range	Insert Size				EDP Number					
					D (inch)	R (inch)	T (mm)	H (mm)	XP3225	XP3310	XP3320	XP2225	XP6703	XC4505
PFB0250A-SP	1	Spiral	2	180°	0.250	0.125	2	5.175	52101020	-	52101010	-	-	-
PFB0375A-SP					0.375	0.1875	2.6	8.5	52101021	-	52101011	-	-	-
PFB0500A-SP					0.500	0.2500	3	10	52101022	-	52101012	-	-	-
PFB0625A-SP					0.625	0.3125	4	12	52101023	-	52101013	-	-	-
PFB0750A-SP					0.750	0.3750	5	15	52101024	-	52101014	-	-	-
PFB1000A-SP					1.000	0.5000	6	18.5	52101025	-	52101015	-	-	-
PFB1250A-SP	2	Spiral (Full Radius)	2	220°	1.250	0.6250	7	23.5	52101026	-	52101016	-	-	-
PFB0250A-Q					0.250	0.125	2	5.175	52101040	-	-	-	-	-
PFB0375A-Q					0.375	0.1875	2.6	8.5	52101041	-	-	-	-	-
PFB0500A-Q					0.500	0.2500	3	10	52101042	-	-	-	-	-
PFB0625A-Q					0.625	0.3125	4	12	52101043	-	-	-	-	-
PFB0750A-Q					0.750	0.3750	5	15	52101044	-	-	-	-	-
PFB1000A-Q	3	Straight (Full Radius)	2	200°	1.000	0.5000	6	18.5	52101045	-	-	-	-	-
PFB1250A-Q					1.250	0.6250	7	23.5	52101046	-	-	-	-	-
PFB0375A-Q-ST					0.375	0.188	3	8.5	-	-	-	52101051	-	-
PFB0500A-Q-ST				0.500	0.250	3	10	-	-	-	52101052	-	-	
PFB0625A-Q-ST				0.625	0.313	4	12	-	-	-	52101053	-	-	
PFB0750A-Q-ST				0.750	0.375	5	15	-	-	-	52101054	-	-	
PFB1000A-Q-ST	2	Spiral (Strengthened Edge)	2	220°	1.000	0.500	6	18.5	-	-	-	52101055	-	-
PFB1250A-Q-ST					1.250	0.625	7	23.5	-	-	-	52101056	-	-
PFB0250A-SH					0.250	0.125	2	5.175	-	52101030	-	-	-	-
PFB0375A-SH					0.375	0.1875	2.6	8.5	-	52101031	-	-	-	-
PFB0500A-SH					0.500	0.2500	3	10	-	52101032	-	-	-	-
PFB0625A-SH					0.625	0.3125	4	12	-	52101033	-	-	-	-
PFB0750A-SH	1	Spiral (High Hardness)	2	180°	0.750	0.3750	5	15	-	52101034	-	-	-	-
PFB1000A-SH					1.000	0.5000	6	18.5	-	52101035	-	-	-	-
PFB1250A-SH					1.250	0.6250	7	23.5	-	52101036	-	-	-	-
PFB0375A-HH					0.375	0.1875	2.6	8.5	-	-	-	52101060	-	-
PFB0500A-HH					0.500	0.2500	3	10	-	-	-	52101061	-	-
PFB0625A-HH					0.625	0.3125	4	12	-	-	-	52101062	-	-
PFB0750A-HH	2	Spiral (Diamond Coated)	2	180°	0.750	0.3750	5	15	-	-	-	52101063	-	-
PFB1000A-HH					1.000	0.5000	6	18.5	-	-	-	52101064	-	-
PFB0250A-D					0.250	1.250	2	5.175	-	-	-	-	-	52101000
PFB0375A-D					0.375	0.1875	2.6	8.5	-	-	-	-	-	52101001
PFB0500A-D					0.500	0.2500	3	10	-	-	-	-	-	52101002
PFB0625A-D					0.625	0.3125	4	12	-	-	-	-	-	52101003
PFB0750A-D	1	Spiral (Diamond Coated)	2	180°	0.750	0.3750	5	15	-	-	-	-	-	52101004
PFB1000A-D					1.000	0.5000	6	18.5	-	-	-	-	-	52101005
PFB1250A-D					1.250	0.6250	7	23.5	-	-	-	-	-	52101006

Packed: 1 pc.



# List 78PFB

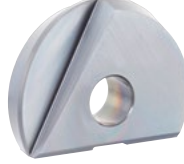
PFB Inserts (Metric)



Spiral



Spiral (Full Radius)



Straight (Full Radius)



Spiral (Strengthened Edge)



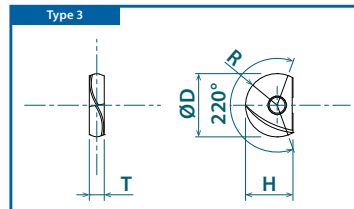
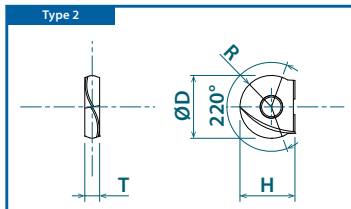
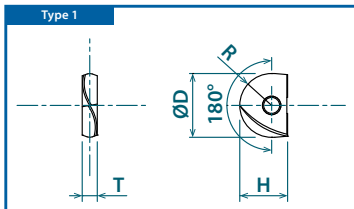
Spiral (High Hardness)



Spiral (Diamond Coated)


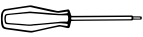
Designation	Type	Specification	No. of Cutting Edges	Range	Insert Size				EDP Number									
					D (mm)	R (mm)	T (mm)	H (mm)	XP3225	XP3310	XP3320	XP2225	XP6703	XC4505				
PFB080-SP	1	Spiral	2	180°	8	4	2.4	7	7820030	-	7820010	-	-	-				
PFB100-SP					10	5	2.6	8.5	7820031	-	7820011	-	-	-				
PFB120-SP					12	6	3	10	7820032	-	7820012	-	-	-				
PFB160-SP					16	8	4	12	7820033	-	7820013	-	-	-				
PFB200-SP					20	10	5	15	7820034	-	7820014	-	-	-				
PFB250-SP					25	12.5	6	18.5	7820035	-	7820015	-	-	-				
PFB300-SP					30	15	7	22.5	7820036	-	7820016	-	-	-				
PFB060-Q	2	Spiral (Full Radius)	2	220°	6	3	2	5	7820048	-	-	-	-	-				
PFB070-Q					7	3.5	2	5.5	7820049	-	-	-	-	-				
PFB080-Q					8	4	2.4	7	7820050	-	-	-	-	-				
PFB100-Q	10				5	2.6	8.5	7820051	-	-	-	-	-					
PFB120-Q	12				6	3	10	7820052	-	-	-	-	-					
PFB160-Q	3							16	8	4	12	7820053	-	-	-	-	-	
PFB200-Q		20	10	5	15	7820054	-	-	-	-	-	-	-					
PFB250-Q		25	12.5	6	18.5	7820055	-	-	-	-	-	-	-					
PFB300-Q					30	15	7	22.5	7820056	-	-	-	-	-				
PFB080-Q-ST	2	Straight (Full Radius)	2	200°	8	4	2.4	7	-	-	-	7820060	-	-				
PFB100-Q-ST					10	5	2.6	8.5	-	-	-	7820061	-	-				
PFB120-Q-ST					12	6	3	10	-	-	-	7820062	-	-				
PFB160-Q-ST	3					220°	16	8	4	12	-	-	-	7820063	-	-		
PFB200-Q-ST				20	10		5	15	-	-	-	7820064	-	-				
PFB250-Q-ST				25	13		6	18.5	-	-	-	7820065	-	-				
PFB300-Q-ST					30	15	7	22.5	-	-	-	7820066	-	-				
PFB060-SH	1	Spiral (Strengthened Edge)	2	180°	6	3	2	5	-	7820039	-	-	-	-	-			
PFB080-SH					8	4	2.4	7	-	7820040	-	-	-	-	-	-	-	
PFB100-SH					10	5	2.6	8.5	-	7820041	-	-	-	-	-	-	-	
PFB120-SH					12	6	3	10	-	7820042	-	-	-	-	-	-	-	
PFB160-SH					16	8	4	12	-	7820043	-	-	-	-	-	-	-	
PFB200-SH					20	10	5	15	-	7820044	-	-	-	-	-	-	-	
PFB250-SH					25	12.5	6	18.5	-	7820045	-	-	-	-	-	-	-	
PFB300-SH					30	15	7	22.5	-	7820046	-	-	-	-	-	-	-	
PFB320-SH					32	16	7	23.5	-	7820047	-	-	-	-	-	-	-	
PFB100-HH					1	Spiral (High Hardness)	2	180°	10	5	2.6	8.5	-	-	-	-	-	7820107
PFB120-HH	12	6	3	10					-	-	-	-	-	-	-	7820108	-	
PFB160-HH	16	8	4	12					-	-	-	-	-	-	-	7820109	-	
PFB200-HH	20	10	5	15					-	-	-	-	-	-	-	7820110	-	
PFB250-HH	25	12.5	6	18.5					-	-	-	-	-	-	-	7820111	-	
PFB300-HH	30	15	7	22.5					-	-	-	-	-	-	-	7820112	-	
PFB320-HH	32	16	7	23.5	-	-	-	-	-	-	-	7820113	-					
PFB060-D	2	Spiral (Diamond Coated)	2	220°	6	3	2	5	-	-	-	-	-	-	7820018			
PFB070-D					7	3.5	2	5.5	-	-	-	-	-	-	-	-	7820019	
PFB080-D	1					180°	8	4	2.4	7	-	-	-	-	-	-	7820020	
PFB100-D				10	5		2.6	8.5	-	-	-	-	-	-	-	-	-	7820021
PFB120-D				12	6		3	10	-	-	-	-	-	-	-	-	-	7820022
PFB160-D				16	8		4	12	-	-	-	-	-	-	-	-	-	7820023
PFB200-D				20	10		5	15	-	-	-	-	-	-	-	-	-	7820024
PFB250-D				25	12.5		6	18.5	-	-	-	-	-	-	-	-	-	7820025
PFB300-D							30	15	7	22.5	-	-	-	-	-	-	7820026	

Packed: 1 pc.



# List 7808H

## PFB Accessories

Appearance	EDP No.	Designation	Applicable Insert		Recommended Tightening Torque
			(inch)	(mm)	
 Clamping Screw	7808124	FS20652RB (Torx 6)	0.250	6-7	0.4 Nm
	7808123	FS25669RB (Torx 7)	-	8	1.0 Nm
	7808117	FS30686RB (Torx 8)	0.375	10	1.2 Nm
	7808118	FS35610RB (Torx 10)	0.500	12	2.0 Nm
	7808119	FS40613RB (Torx 15)	0.625	16	3.0 Nm
	7808120	FS50615RB (Torx 20)	0.750	20	5.0 Nm
	7808121	FS60620RB (Torx 20)	1.000	25	5.0 Nm
	7808122	FS80624RB (Torx 30)	1.250	30-32	6.0 Nm
 Wrench	7808203	T6-D (Torx 6)	0.250	6-7	
	7808204	T7-D (Torx 7)	-	8	
	7808205	T8-D (Torx 8)	0.375	10	
	7808207	T10-D (Torx 10)	0.500	12	
	7808208	T15-D (Torx 15)	0.625	16	
	7808209	T20-D (Torx 20)	0.750-1.000	20-25	
	7808212	T30-T (Torx 30)	1.250	30-32	

Packed: Clamping Screw = 1 pc.; Wrench = 1 pc.  
Note: Wrench sold separately.



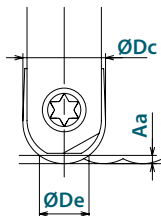
# Effective Cutting Diameter

Depth of Cut Aa	Effective Cutting Diameter (ØDe)																					
	ØDc		ØDc		ØDc		ØDc		ØDc		ØDc		ØDc		ØDc		ØDc		ØDc			
(inch)	(mm)	0.250"	6mm	0.275"	7mm	0.315"	8mm	0.375"	10mm	0.500"	12mm	0.625"	16mm	0.750"	20mm	1.000"	25mm	1.181"	30mm	1.250"	32mm	
0.004	0.1	0.063	1.5	0.063	1.6	0.071	1.8	0.077	2.0	0.089	2.2	0.100	2.5	0.109	2.8	0.126	3.2	0.137	3.5	0.142	3.6	
0.008	0.2	0.088	2.2	0.091	2.3	0.099	2.5	0.108	2.8	0.125	3.1	0.141	3.6	0.154	4.0	0.178	4.5	0.194	4.9	0.197	5.0	
0.012	0.3	0.107	2.6	0.110	2.8	0.121	3.0	0.132	3.4	0.153	3.7	0.172	4.3	0.188	4.9	0.218	5.4	0.237	6.0	0.244	6.2	
0.016	0.4	0.122	3.0	0.130	3.3	0.138	3.5	0.152	3.9	0.176	4.3	0.197	5.0	0.217	5.6	0.251	6.3	0.273	6.9	0.280	7.1	
0.020	0.5	0.136	3.3	0.142	3.6	0.154	3.9	0.169	4.4	0.196	4.8	0.220	5.6	0.242	6.2	0.280	7.0	0.305	7.7	0.311	7.9	
0.031	0.8	0.165	4.1	0.177	4.5	0.188	4.8	0.207	5.4	0.241	6.0	0.271	7.0	0.299	7.8	0.347	8.8	0.378	9.7	0.394	10.0	
0.039	1.0	-	-	-	-	-	-	0.229	6.0	0.268	6.6	0.302	7.7	0.333	8.7	0.387	9.8	0.422	10.8	0.437	11.1	
0.059	1.5	-	-	-	-	-	-	0.273	7.1	0.323	7.9	0.365	9.3	0.404	10.5	0.471	11.9	0.515	13.1	0.531	13.5	
0.079	2.0	-	-	-	-	-	-	-	-	0.365	8.9	0.415	10.6	0.460	12.0	0.539	13.6	0.590	15.0	0.610	15.5	
0.098	2.5	-	-	-	-	-	-	-	-	-	-	0.455	11.6	0.506	13.2	0.595	15.0	0.652	16.6	0.677	17.2	
0.118	3.0	-	-	-	-	-	-	-	-	-	-	-	-	0.546	14.3	0.645	16.2	0.708	18.0	0.736	18.7	
0.138	3.5	-	-	-	-	-	-	-	-	-	-	-	-	0.581	15.2	0.690	17.3	0.759	19.3	0.787	20.0	
0.157	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.728	18.3	0.802	20.4	0.835	21.2	
0.117	4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.706	21.4	0.874	22.2	
0.197	5.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.881	22.3	0.913	23.2	

Note: Effective cutting diameter is based on cutting depth (Aa)

How to determine effective cutting diameter:

Ex: Dc = 0.500"  
Aa = 0.020"  
De = 2√0.020(0.500-0.020)  
De = 0.196"

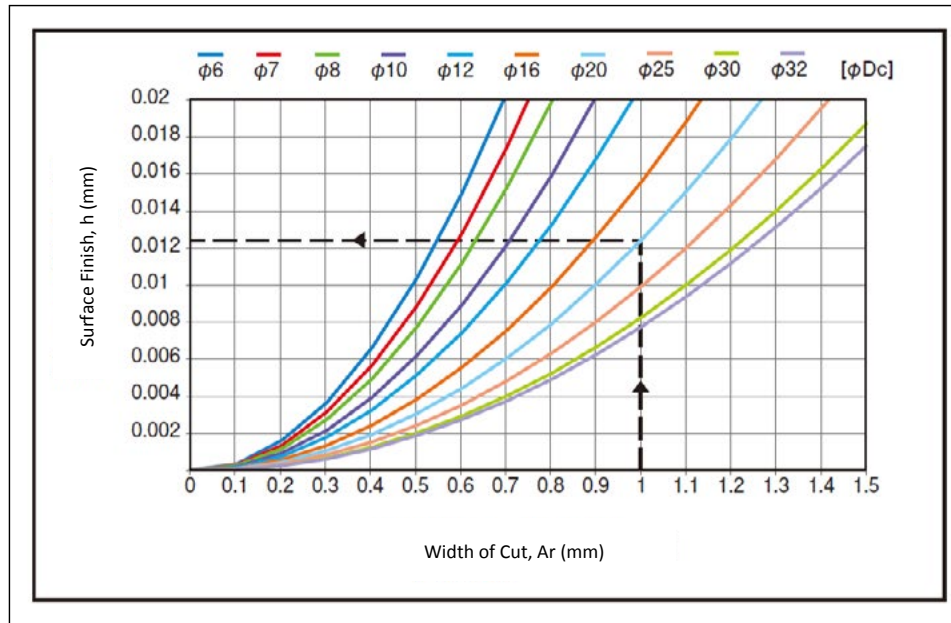
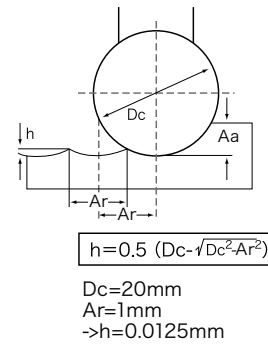


$$De = 2 \sqrt{a_a(D_c - a_a)}$$



# Recommended Width of Cut & Surface Roughness

Tool Dia ØDc		Width of Cut Ar		Surface Finish h	
(inch)	(mm)	(inch)	(mm)	(inch)	(mm)
0.250	6	0.0157	0.4	0.00027	0.007
0.275	7	0.0177	0.45	0.00027	0.007
0.315	8	0.0197	0.5	0.00031	0.008
0.375	10	0.0236	0.6	0.00037	0.009
0.500	12	0.0275	0.7	0.00038	0.010
0.625	16	0.0315	0.8	0.00040	0.010
0.750	20	0.0394	1.0	0.00052	0.012
1.000	25	0.0472	1.2	0.00055	0.014
1.181	30	0.0512	1.3	0.00055	0.014
1.250	32	0.0551	1.4	0.00059	0.015



# Cutting Conditions

	Work Material	Tensile Strength – Hardness	Milling Speed Vc (SFM)	Depth of Cut Aa (in)	Feed Per Tooth fz (in/t)			
					Ø0.236-0.312 (6-8mm)	Ø0.375-0.500 (10-12mm)	Ø0.625-0.750 (16-20mm)	Ø1.000-1.250 (25-32mm)
P	Mild Steels, Carbon Steels (1010, 1018)	~180 HB	985 (655-1310)	0.02Dc	0.0040	0.0047	0.0055	0.0071
	Carbon Steels, Alloy Steels (1050, 4140)	~280 HB	985 (655-1310)	0.02Dc	0.0028	0.0040	0.0047	0.0055
	Die Steels (H13, D2)	~280 HB	820 (495-1150)	0.02Dc	0.0028	0.0040	0.0047	0.0055
M	Stainless Steels (304SS, 420SS)	~250 HB	820 (495-1150)	0.02Dc	0.0028	0.0047	0.0055	0.0067
K	Cast Iron (FC250)	~350 N/mm <sup>2</sup>	1310 (985-1640)	0.02Dc	0.0047	0.0055	0.0071	0.0086
	Ductile Cast Iron (60-40-18)	~600 N/mm <sup>2</sup>	985 (655-1310)	0.02Dc	0.0040	0.0047	0.0055	0.0071
N	Aluminum Alloys (6061, 7075)	~13% Si	1640 (1310-1970)	0.03Dc	0.0047	0.0055	0.0071	0.0086
	Copper Alloys (C1100)	-	985 (655-1310)	0.03Dc	0.0043	0.0051	0.0067	0.0079
	Graphite	-	1640 (1310-1970)	0.03Dc	0.0055	0.0067	0.0083	0.0098
	CFRP	-	1310 (985-1640)	0.03Dc	0.0043	0.0051	0.0067	0.0079
S	Heat Resistant Alloys (Inconel 718)	-	165 (65-260)	0.015Dc	0.0016	0.0020	0.0024	0.0024
	Titanium Alloy (Ti-6Al-4V)	-	295 (130-395)	0.02Dc	0.0024	0.0031	0.0043	0.0051
H	Pre-hardened Steel (P20, Stavax)	40 - 43 HRC	655 (330-985)	0.015Dc	0.0024	0.0028	0.0031	0.0040
	Die Cast Steels (A2, S7)	43 - 48 HRC	590 (295-655)	0.015Dc	0.0020	0.0024	0.0028	0.0028
	Hardened Steels (D2)	50 - 60 HRC	490 (330-820)	0.01Dc	0.0020	0.0024	0.0028	0.0028

# Recommended Materials by Application

Insert Grade	P	M	K	N	S	H
XP3225	⊙	○		⊙*	○	
XP3310			⊙			⊙
XP3320	○	○	○		○	○
XP2225	○	⊙			⊙	○
XP6703	○		○			⊙
XC4505				⊙**		


\*: Best recommended for aluminum & copper alloy applications.

\*\* : Best recommended for graphite & CFRP applications.

○ good ⊙ best



*shaping your dreams*

 **Safe use of cutting tools**

- Use safety cover, safety glasses and safety shoes during operation.
- Do not touch cutting edges with bare hands.
- Do not touch cutting chips with bare hands. Chips will be hot after cutting.
- Stop cutting when the tool becomes dull.
- Stop cutting operation immediately if you hear any abnormal cutting sounds.
- Do not modify tools.
- Please use appropriate tools for the operation. Check dimensions to ensure proper selection.

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