



Indexable Finishing Ball End Mill

Vol 2

# OSG PHOENIX<sup>®</sup> PFB



For more information  
scan the QR code to  
visit:  
[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**

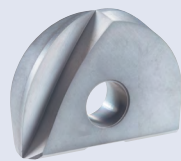
**Superior Surface Finishing and Long Tool Life**

**High Insert Accuracy & Repeatability**

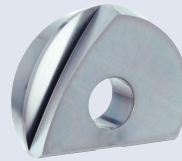
±6µm radius precision (±10µm for PFB-D) and high precision mounting of the insert into the body enables a superior milling surface and long tool life.

**Excellent Cutting Edge Sharpness**

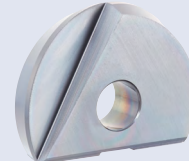
Full Radius and Spiral Edge form provide a strong insert with excellent sharpness.



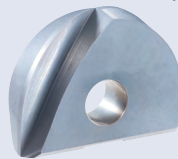
Spiral



Spiral (Full Radius)



Straight (Full Radius)

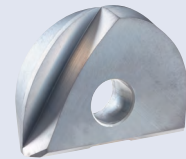


Spiral (Strengthened Edge)



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

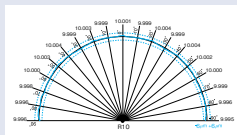
- Specialized cutting edge shape for cast iron, ductile cast iron, and hardened steel.
- Improved resistance to chipping and breakage by special edge treatment.
- High insert radius precision ( $\pm 6\mu\text{m}$ ).

### 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

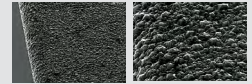
- The effective cutting edge has a 220° angle for undercut milling.
- The 220° cutting edge reduces chatter on vertical walls and produces improved surface finishes.
- High insert radius precision ( $\pm 6\mu\text{m}$ ).

### 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.

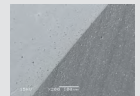


### XP6703 Grade

- 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

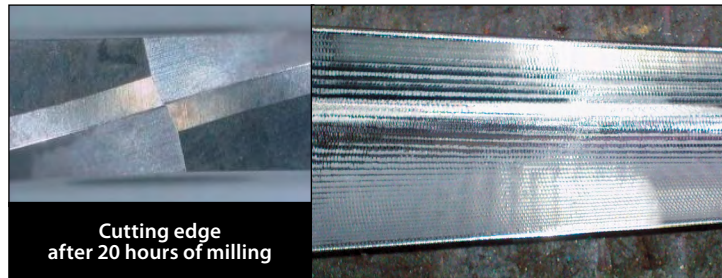
Time	70 minutes		140 minutes	
Milling Length	4,000 in		8,000 in	
PFB				
	Wear Amount (in)	0.0012	0.0011	0.0016
Competitor				
	Wear Amount (in)	0.0012	0.0013	0.0027

## 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

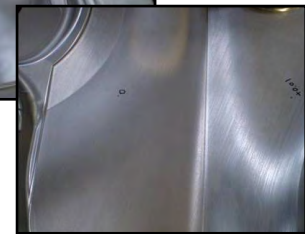
Cutting Edge Wear After 300 Inches			
PFB	Competitor A	Competitor B	Competitor C
Flank Wear: 0.002"	Flank Wear: 0.004"	Flank Wear: 0.004"	Flank Wear: 0.004"

## 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

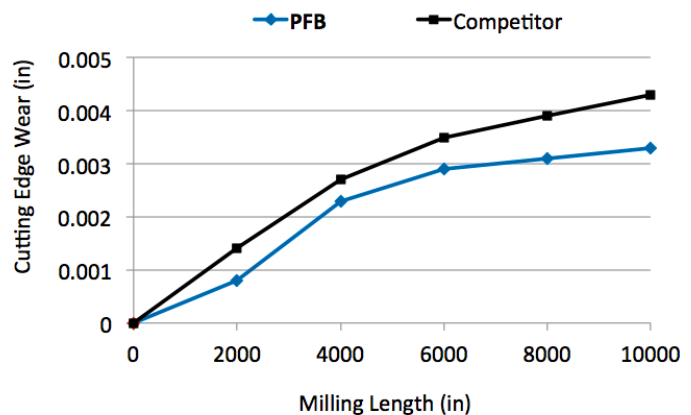
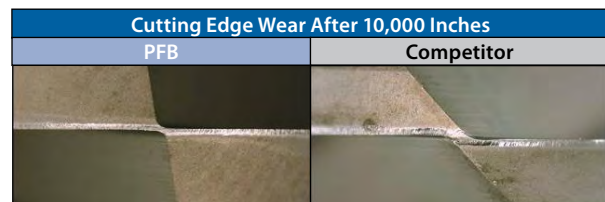


## Long Tool Life in Ductile Cast Iron

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

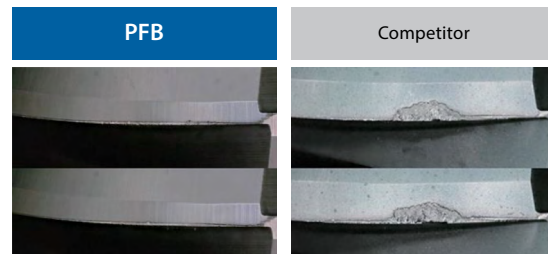


## Excellent Durability in High-Hardness Steels

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

OSG PHOENIX<sup>®</sup> PFB SA



<b>SPEED FEED</b> 18-19	<b>INSERTS</b> 12-16	<b>ACCS.</b> 17	<b>STEEL</b>	<b>CARBIDE</b>	<b>2 FLUTE</b>	<b>PACKED</b> 1 PIECE
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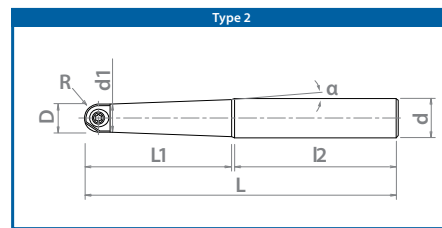
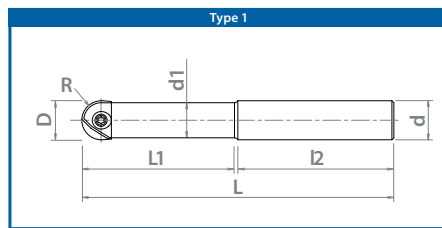
Steel Shank



Carbide Shank

EDP Number	Designation	Body Type	Type	Dia.		Corner Radius	Neck Dia.	Neck Length	Overall Length	Shank Dia.	Shank Length	Taper Angle	L/D Ratio	Applicable Insert
				D (Inch)	R (Inch)	d1 (Inch)	L1 (Inch)	L (Inch)	d (Inch)	I2 (Inch)	α (°)			
52100000	PFB-R0250SA0250-S325	Cylindrical Shank Steel	1	0.250	0.125	0.226	0.625	3.250	0.250	2.625	0	2.5	PFB0250	
52100026	PFB-R0250SA0250-S375	Cylindrical Shank Steel	1	0.250	0.125	0.226	1.125	3.750	0.250	2.625	0	4.5	PFB0250	
52100027	PFB-R0250TPA0375-S375	Cylindrical Shank Steel	2	0.250	0.125	0.226	1.125	3.750	0.375	2.581	2	4.5	PFB0250	
52100028	PFB-R0250TPA0375-S425	Cylindrical Shank Steel	2	0.250	0.125	0.226	1.500	4.250	0.375	2.697	1	6.0	PFB0250	
52100001	PFB-R0375SA0375-S550	Cylindrical Shank Steel	1	0.375	0.188	0.336	1.687	5.500	0.375	3.813	0	4.5	PFB0375	
52100029	PFB-R0375SA0375-S400	Cylindrical Shank Steel	1	0.375	0.188	0.336	0.937	4.000	0.375	3.063	0	2.5	PFB0375	
52100030	PFB-R0375TPA0500-S500	Cylindrical Shank Steel	2	0.375	0.188	0.336	1.687	5.000	0.500	3.276	2	4.5	PFB0375	
52100031	PFB-R0375TPA0500-S550	Cylindrical Shank Steel	2	0.375	0.188	0.336	2.250	5.500	0.500	3.200	1	6.0	PFB0375	
52100002	PFB-R0500SA0500-S550	Cylindrical Shank Steel	1	0.500	0.250	0.461	2.250	5.500	0.500	3.250	0	4.5	PFB0500	
52100032	PFB-R0500SA0500-S450	Cylindrical Shank Steel	1	0.500	0.250	0.461	1.250	4.500	0.500	3.250	0	2.5	PFB0500	
52100033	PFB-R0500TPA0625-S550	Cylindrical Shank Steel	2	0.500	0.250	0.461	2.250	5.500	0.625	3.229	2	4.5	PFB0500	
52100034	PFB-R0500TPA0625-S650	Cylindrical Shank Steel	2	0.500	0.250	0.461	3.000	6.500	0.625	3.461	1	6.0	PFB0500	
52100003	PFB-R0625SA0625-S550	Cylindrical Shank Steel	1	0.625	0.313	0.546	2.500	5.500	0.625	3.000	0	4.0	PFB0625	
52100035	PFB-R0625SA0625-S500	Cylindrical Shank Steel	1	0.625	0.313	0.546	1.562	5.000	0.625	3.438	0	2.5	PFB0625	
52100036	PFB-R0625TPA0750-S600	Cylindrical Shank Steel	2	0.625	0.313	0.546	2.812	6.000	0.750	3.181	2	4.5	PFB0625	
52100037	PFB-R0625TPA0750-S700	Cylindrical Shank Steel	2	0.625	0.313	0.546	3.750	7.000	0.750	3.222	1	6.0	PFB0625	
52100004	PFB-R0750SA0750-S600	Cylindrical Shank Steel	1	0.750	0.375	0.671	3.000	6.000	0.750	3.000	0	4.0	PFB0750	
52100038	PFB-R0750SA0750-S550	Cylindrical Shank Steel	1	0.750	0.375	0.671	1.875	5.500	0.750	3.625	0	2.5	PFB0750	
52100039	PFB-R0750TPA1000-S650	Cylindrical Shank Steel	2	0.750	0.375	0.671	3.375	6.500	1.000	3.072	2	4.5	PFB0750	
52100040	PFB-R0750TPA1000-S800	Cylindrical Shank Steel	2	0.750	0.375	0.671	4.500	8.000	1.000	3.420	1	6.0	PFB0750	
52100005	PFB-R1000SA1000-S650	Cylindrical Shank Steel	1	1.000	0.500	0.882	3.000	6.500	1.000	3.500	0	3.0	PFB1000	
52100041	PFB-R1000SA1000-S750	Cylindrical Shank Steel	1	1.000	0.500	0.882	4.000	7.500	1.000	3.500	0	4.0	PFB1000	
52100042	PFB-R1000TPA1250-S800	Cylindrical Shank Steel	2	1.000	0.500	0.882	4.500	8.000	1.250	3.477	2	4.5	PFB1000	
52100043	PFB-R1000TPA1250-S950	Cylindrical Shank Steel	2	1.000	0.500	0.882	6.000	9.500	1.250	3.442	1	6.0	PFB1000	
52100016	PFB-R1250SA1250-S700	Cylindrical Shank Steel	1	1.250	0.625	1.132	3.750	7.000	1.250	3.250	0	3.0	PFB1250	
52100044	PFB-R1250SA1250-S850	Cylindrical Shank Steel	1	1.250	0.625	1.132	5.000	8.500	1.250	3.500	0	4.0	PFB1250	
52100045	PFB-R1250TPA1500-S900	Cylindrical Shank Steel	2	1.250	0.625	1.132	5.625	9.000	1.500	3.344	2	4.5	PFB1250	
52100046	PFB-R1250TPA1500-S1100	Cylindrical Shank Steel	2	1.250	0.625	1.132	7.500	11.000	1.500	3.425	1	6.0	PFB1250	
52100020	PFB-R0250SA0250-S325CS	Cylindrical Shank Short Carbide	1	0.250	0.125	0.226	0.625	3.250	0.250	2.625	0	2.5	PFB0250	
52100021	PFB-R0375SA0375-S400CS	Cylindrical Shank Short Carbide	1	0.375	0.188	0.336	0.937	4.000	0.375	3.063	0	2.5	PFB0375	
52100022	PFB-R0500SA0500-S450CS	Cylindrical Shank Short Carbide	1	0.500	0.250	0.461	1.250	4.500	0.500	3.250	0	2.5	PFB0500	
52100023	PFB-R0625SA0625-S550CS	Cylindrical Shank Short Carbide	1	0.625	0.313	0.546	1.562	5.500	0.625	3.938	0	2.5	PFB0625	
52100024	PFB-R0750SA0750-S600CS	Cylindrical Shank Short Carbide	1	0.750	0.375	0.671	1.875	6.000	0.750	4.125	0	2.5	PFB0750	
52100025	PFB-R1000SA1000-S650CS	Cylindrical Shank Short Carbide	1	1.000	0.500	0.882	2.500	6.500	1.000	4.000	0	2.5	PFB1000	
52100017	PFB-R1250SA1250-S700CS	Cylindrical Shank Short Carbide	1	1.250	0.625	1.132	3.125	7.000	1.250	3.875	0	2.5	PFB1250	
52100047	PFB-R0250SA0250-L400CS	Cylindrical Shank Long Carbide	1	0.250	0.125	0.226	1.250	4.000	0.250	2.750	0	5.0	PFB0250	
52100048	PFB-R0250TPA0375-L425CS	Cylindrical Shank Long Carbide	2	0.250	0.125	0.226	1.500	4.250	0.375	2.697	1	6.0	PFB0250	
52100006	PFB-R0375SA0375-L550CS	Cylindrical Shank Long Carbide	1	0.375	0.188	0.336	1.875	5.500	0.375	3.625	0	5.0	PFB0375	

● Stocked ○ Available Upon Request; MOQ May Apply ▲ Globally Stocked



CONTINUED ➔

P	M	K	N	S	H
Steel	Stainless Steel	Cast Iron	Non-Ferrous	HRSA	Hardened Steel
○	○	○	○	○	○

Material recommendation based on inserts compatible with this tool body.

○ Good ○ Best





## List 52100 (Continued)



<b>SPEED FEED</b>	<b>INSERTS</b>	<b>ACCS.</b>	<b>STEEL</b>	<b>CARBIDE</b>	<b>2 FLUTE</b>	<b>PACKED 1 PIECE</b>
18-19	12-16	17				

OSG PHOENIX<sup>®</sup> PFB SA



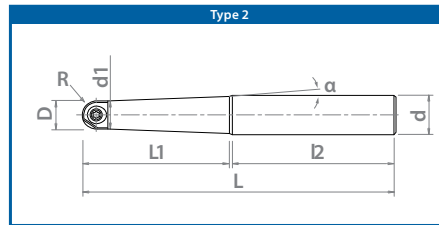
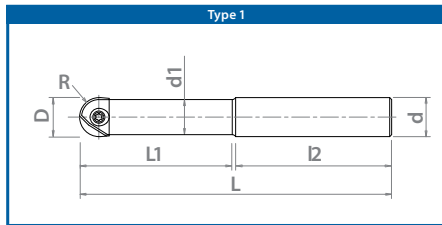
Steel Shank



Carbide Shank

EDP Number	Designation	Body Type	Type	Dia.		Corner Radius	Neck Dia.	Neck Length	Overall Length	Shank Dia.	Shank Length	Taper Angle	L/D Ratio	Applicable Insert
				D (Inch)	R (Inch)	d1 (Inch)	L1 (Inch)	L (Inch)	d (Inch)	l2 (Inch)	α (°)			
52100049	PFB-R0375TPA0500-L550CS	Cylindrical Shank Long Carbide	2	0.375	0.188	0.336	2.250	5.500	0.500	3.200	1	6.0	PFB0375	
52100007	PFB-R0500SA0500-L550CS	Cylindrical Shank Long Carbide	1	0.500	0.250	0.461	2.500	5.500	0.500	3.000	0	5.0	PFB0500	
52100050	PFB-R0500TPA0625-L650CS	Cylindrical Shank Long Carbide	2	0.500	0.250	0.461	3.000	6.500	0.625	3.461	1	6.0	PFB0500	
52100008	PFB-R0625SA0625-L650CS	Cylindrical Shank Long Carbide	1	0.625	0.313	0.546	3.125	6.500	0.625	3.375	0	5.0	PFB0625	
52100051	PFB-R0625TPA0750-L700CS	Cylindrical Shank Long Carbide	2	0.625	0.313	0.546	3.750	7.000	0.750	3.222	1	6.0	PFB0625	
52100009	PFB-R0750SA0750-L700CS	Cylindrical Shank Long Carbide	1	0.750	0.375	0.671	3.750	7.000	0.750	3.250	0	5.0	PFB0750	
52100052	PFB-R0750TPA1000-L800CS	Cylindrical Shank Long Carbide	2	0.750	0.375	0.671	4.500	8.000	1.000	3.420	1	6.0	PFB0750	
52100010	PFB-R1000SA1000-L800CS	Cylindrical Shank Long Carbide	1	1.000	0.500	0.882	4.500	8.000	1.000	3.500	0	4.5	PFB1000	
52100053	PFB-R1000TPA1250-L950CS	Cylindrical Shank Long Carbide	2	1.000	0.500	0.882	6.000	9.500	1.250	3.442	1	6.0	PFB1000	
52100018	PFB-R1250SA1250-L900CS	Cylindrical Shank Long Carbide	1	1.250	0.625	1.132	5.625	9.000	1.250	3.375	0	4.5	PFB1250	
52100054	PFB-R1250TPA1500-L1100CS	Cylindrical Shank Long Carbide	2	1.250	0.625	1.132	7.500	11.000	1.500	3.425	1	6.0	PFB1250	
52100055	PFB-R0250SA0250-LL450CS	Cylindrical Shank Extra-Long Carbide	1	0.250	0.125	0.226	1.750	4.500	0.250	2.750	0	7.0	PFB0250	
52100056	PFB-R0250TPA0375-LL475CS	Cylindrical Shank Extra-Long Carbide	2	0.250	0.125	0.226	2.000	4.750	0.375	2.690	1	8.0	PFB0250	
52100011	PFB-R0375SA0375-LL650CS	Cylindrical Shank Extra-Long Carbide	1	0.375	0.188	0.336	2.625	6.500	0.375	3.875	0	7.0	PFB0375	
52100057	PFB-R0375TPA0500-LL650CS	Cylindrical Shank Extra-Long Carbide	2	0.375	0.188	0.336	3.000	6.500	0.500	3.440	1	8.0	PFB0375	
52100012	PFB-R0500SA0500-LL700CS	Cylindrical Shank Extra-Long Carbide	1	0.500	0.250	0.461	3.500	7.000	0.500	3.500	0	7.0	PFB0500	
52100058	PFB-R0500TPA0625-LL750CS	Cylindrical Shank Extra-Long Carbide	2	0.500	0.250	0.461	4.000	7.500	0.625	3.448	1	8.0	PFB0500	
52100013	PFB-R0625SA0625-LL750CS	Cylindrical Shank Extra-Long Carbide	1	0.625	0.313	0.546	3.750	7.500	0.625	3.750	0	6.0	PFB0625	
52100059	PFB-R0625TPA0750-LL825CS	Cylindrical Shank Extra-Long Carbide	2	0.625	0.313	0.546	5.000	8.250	0.750	3.206	1	8.0	PFB0625	
52100014	PFB-R0750SA0750-LL900CS	Cylindrical Shank Extra-Long Carbide	1	0.750	0.375	0.671	4.500	9.000	0.750	4.500	0	6.0	PFB0750	
52100060	PFB-R0750TPA1000-LL950CS	Cylindrical Shank Extra-Long Carbide	2	0.750	0.375	0.671	6.000	9.500	1.000	3.401	1	8.0	PFB0750	
52100015	PFB-R1000SA1000-LL1050CS	Cylindrical Shank Extra-Long Carbide	1	1.000	0.500	0.882	5.500	10.500	1.000	5.000	0	5.5	PFB1000	
52100061	PFB-R1000TPA1250-LL1150CS	Cylindrical Shank Extra-Long Carbide	2	1.000	0.500	0.882	8.000	11.500	1.250	3.416	1	8.0	PFB1000	
52100019	PFB-R1250SA1250-LL1200CS	Cylindrical Shank Extra-Long Carbide	1	1.250	0.625	1.132	6.875	12.000	1.250	5.125	0	5.5	PFB1250	
52100062	PFB-R1250TPA1500-LL1350CS	Cylindrical Shank Extra-Long Carbide	2	1.250	0.625	1.132	10.000	13.500	1.500	3.392	1	8.0	PFB1250	

● Stocked ○ Available Upon Request; MOQ May Apply ▲ Globally Stocked



P	M	K	N	S	H
Steel	Stainless Steel	Cast Iron	Non-Ferrous	HRSA	Hardened Steel
○	○	○	○	○	○

Material recommendation based on inserts compatible with this tool body.

○ Good ○ Best



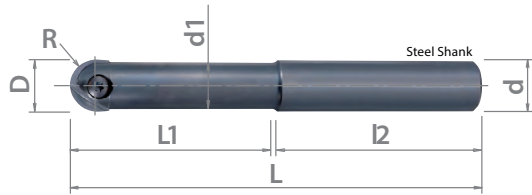


## List 78014

OSG PHOENIX® PFB SS



<b>SPEED FEED</b>	<b>INSERTS</b>	<b>ACCS.</b>	<b>STEEL</b>	<b>CARBIDE</b>	<b>2 FLUTE</b>	<b>PACKED</b>
18-19	12-16	17				1 PIECE



EDP Number	Designation	Body Type	Dia.	Corner Radius	Neck Dia.	Neck Length	Overall Length	Shank Dia.	Shank Length	L/D Ratio	Applicable Insert
			D (mm)	R (mm)	d1 (mm)	L1 (mm)	L (mm)	d (mm)	L2 (mm)		
7801400	PFB-R080SS08-S120	Cylindrical Shank Steel	8.00	4.00	7.00	36.00	120.00	8.00	84.00	4.5	PFB080
7801401	PFB-R100SS10-S130	Cylindrical Shank Steel	10.00	5.00	9.00	45.00	130.00	10.00	85.00	4.5	PFB100
7801402	PFB-R120SS12-S130	Cylindrical Shank Steel	12.00	6.00	11.00	54.00	130.00	12.00	76.00	4.5	PFB120
7801403	PFB-R160SS16-S140	Cylindrical Shank Steel	16.00	8.00	14.00	64.00	140.00	16.00	76.00	4.0	PFB160
7801404	PFB-R200SS20-S160	Cylindrical Shank Steel	20.00	10.00	18.00	80.00	160.00	20.00	80.00	4.0	PFB200
7801405	PFB-R250SS25-S160	Cylindrical Shank Steel	25.00	12.50	22.00	75.00	160.00	25.00	85.00	3.0	PFB250
7801406	PFB-R300SS32-S170	Cylindrical Shank Steel	30.00	15.00	27.00	90.00	170.00	32.00	80.00	3.0	PFB300
7801407	PFB-R320SS32-S180	Cylindrical Shank Steel	32.00	16.00	29.00	96.00	180.00	32.00	84.00	3.0	PFB320
7801429	PFB-R060SS06-S80CS	Cylindrical Shank Short Carbide	6.00	3.00	5.40	15.00	80.00	6.00	65.00	2.5	PFB060 / PFB070
7801430	PFB-R080SS08-S100CS	Cylindrical Shank Short Carbide	8.00	4.00	7.00	20.00	100.00	8.00	80.00	2.5	PFB080
7801431	PFB-R100SS10-S100CS	Cylindrical Shank Short Carbide	10.00	5.00	9.00	25.00	100.00	10.00	75.00	2.5	PFB100
7801432	PFB-R120SS12-S110CS	Cylindrical Shank Short Carbide	12.00	6.00	11.00	30.00	110.00	12.00	80.00	2.5	PFB120
7801433	PFB-R160SS16-S140CS	Cylindrical Shank Short Carbide	16.00	8.00	14.00	40.00	140.00	16.00	100.00	2.5	PFB160
7801434	PFB-R200SS20-S160CS	Cylindrical Shank Short Carbide	20.00	10.00	18.00	50.00	160.00	20.00	110.00	2.5	PFB200
7801435	PFB-R250SS25-S160CS	Cylindrical Shank Short Carbide	25.00	12.50	22.00	62.50	160.00	25.00	97.50	2.5	PFB250
7801436	PFB-R300SS32-S170CS	Cylindrical Shank Short Carbide	30.00	15.00	27.00	75.00	170.00	32.00	95.00	2.5	PFB300
7801437	PFB-R320SS32-S180CS	Cylindrical Shank Short Carbide	32.00	16.00	29.00	80.00	180.00	32.00	100.00	2.5	PFB320
7801439	PFB-R060SS06-L100CS	Cylindrical Shank Long Carbide	6.00	3.00	5.40	30.00	100.00	6.00	70.00	5.0	PFB060 / PFB070
7801440	PFB-R080SS08-L120CS	Cylindrical Shank Long Carbide	8.00	4.00	7.00	40.00	120.00	8.00	80.00	5.0	PFB080
7801441	PFB-R100SS10-L130CS	Cylindrical Shank Long Carbide	10.00	5.00	9.00	50.00	130.00	10.00	80.00	5.0	PFB100
7801442	PFB-R120SS12-L140CS	Cylindrical Shank Long Carbide	12.00	6.00	11.00	60.00	140.00	12.00	80.00	5.0	PFB120
7801443	PFB-R160SS16-L160CS	Cylindrical Shank Long Carbide	16.00	8.00	14.00	72.00	160.00	16.00	88.00	4.5	PFB160
7801444	PFB-R200SS20-L180CS	Cylindrical Shank Long Carbide	20.00	10.00	18.00	90.00	180.00	20.00	90.00	4.5	PFB200
7801445	PFB-R250SS25-L200CS	Cylindrical Shank Long Carbide	25.00	12.50	22.00	100.00	200.00	25.00	100.00	4.0	PFB250
7801446	PFB-R300SS32-L220CS	Cylindrical Shank Long Carbide	30.00	15.00	27.00	120.00	220.00	32.00	100.00	4.0	PFB300
7801447	PFB-R320SS32-L230CS	Cylindrical Shank Long Carbide	32.00	16.00	29.00	128.00	230.00	32.00	102.00	4.0	PFB320
7801419	PFB-R060SS06-LL120CS	Cylindrical Shank Extra-Long Carbide	6.00	3.00	5.40	42.00	120.00	6.00	78.00	7.0	PFB060 / PFB070
7801420	PFB-R080SS08-LL140CS	Cylindrical Shank Extra-Long Carbide	8.00	4.00	7.00	56.00	140.00	8.00	84.00	7.0	PFB080
7801421	PFB-R100SS10-LL150CS	Cylindrical Shank Extra-Long Carbide	10.00	5.00	9.00	70.00	150.00	10.00	80.00	7.0	PFB100
7801422	PFB-R120SS12-LL160CS	Cylindrical Shank Extra-Long Carbide	12.00	6.00	11.00	84.00	160.00	12.00	76.00	7.0	PFB120
7801423	PFB-R160SS16-LL200CS	Cylindrical Shank Extra-Long Carbide	16.00	8.00	14.00	96.00	200.00	16.00	104.00	6.0	PFB160
7801424	PFB-R200SS20-LL240CS	Cylindrical Shank Extra-Long Carbide	20.00	10.00	18.00	120.00	240.00	20.00	120.00	6.0	PFB200
7801425	PFB-R250SS25-LL260CS	Cylindrical Shank Extra-Long Carbide	25.00	12.50	22.00	137.50	260.00	25.00	122.50	5.5	PFB250
7801426	PFB-R300SS32-LL290CS	Cylindrical Shank Extra-Long Carbide	30.00	15.00	27.00	165.00	290.00	32.00	125.00	5.5	PFB300
7801427	PFB-R320SS32-LL300CS	Cylindrical Shank Extra-Long Carbide	32.00	16.00	29.00	176.00	300.00	32.00	124.00	5.5	PFB320

● Stocked ○ Available Upon Request; MOQ May Apply ▲ Globally Stocked



### DESIGNATION EXPLANATION

**PFB-R 080 SS 08-S 120 (CS)**



Full Detail on Pages 1524 in Tooling Solutions V1

P	M	K	N	S	H
Steel	Stainless Steel	Cast Iron	Non-Ferrous	HRSA	Hardened Steel
○	○	○	○	○	○

Material recommendation based on inserts compatible with this tool body.

○ Good ○ Best

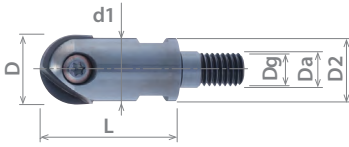


## List 52604

OSG PHOENIX<sup>®</sup> PFB ASF, Screw Fit Head



<b>SPEED FEED</b> 18-19	<b>INSERTS</b> 12-16	<b>ACCS.</b> 17	<b>STEEL</b>	<b>CARBIDE</b>	<b>2 FLUTE</b>	<b>PACKED</b> 1 PIECE
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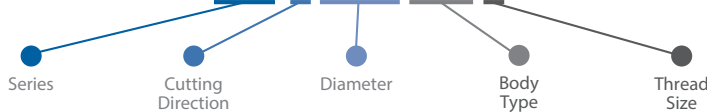
EDP Number	Designation	Diameter		Corner Radius	Neck Diameter	Pilot Diameter	Thread Size	Flange Diameter		Overall Length	Spanner Wrench	Applicable Insert
		D (Inch)	R (Inch)	d1 (Inch)	Da (Inch)	Dg (mm)	D2 (Inch)	L (Inch)				
52604000	● PFB-R0375ASF6	0.375	0.188	0.354	0.256	M6	0.354	1.024	7	PFB0375		
52604001	● PFB-R0500ASF6	0.500	0.250	0.433	0.256	M6	0.433	1.024	7	PFB0500		
52604002	● PFB-R0625ASF8	0.625	0.313	0.551	0.335	M8	0.571	1.260	10	PFB0625		
52604003	● PFB-R0750ASF10	0.750	0.375	0.709	0.413	M10	0.709	1.496	14	PFB0750		
52604004	● PFB-R1000ASF12	1.000	0.500	0.866	0.492	M12	0.906	1.496	17	PFB1000		

● Stocked ○ Available Upon Request; MOQ May Apply ▲ Globally Stocked



### DESIGNATION EXPLANATION

**PFB-R 0375 ASF 6**



Full Detail on Pages 1524 in Tooling Solutions V1

P	M	K	N	S	H
Steel	Stainless Steel	Cast Iron	Non-Ferrous	HRSA	Hardened Steel
○	○	○	○	○	○

Material recommendation based on inserts compatible with this tool body.

○ Good ○ Best

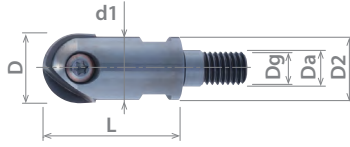


## List 78114

OSG PHOENIX<sup>®</sup> PFB SF, Screw Fit Head



<b>SPEED FEED</b> 18-19	<b>INSERTS</b> 12-16	<b>ACCS.</b> 17	<b>STEEL</b>	<b>CARBIDE</b>	<b>2 FLUTE</b>	<b>PACKED</b> 1 PIECE
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EDP Number	Designation	Diameter		Corner Radius	Neck Diameter	Pilot Diameter	Thread Size	Flange Diameter	Overall Length	Spanner Wrench	Applicable Insert
		D (mm)	R (mm)	d1 (mm)	Da (mm)	Dg (mm)	D2 (mm)	L (mm)			
7801490	▲ PFB-R100SF6	10.00	5.00	9.00	6.50	M6	9.00	26.00	7	PFB100	
7801491	▲ PFB-R120SF6	12.00	6.00	11.00	6.50	M6	11.00	26.00	7	PFB120	
7801492	▲ PFB-R160SF8	16.00	8.00	14.00	8.50	M8	14.50	32.00	10	PFB160	
7801493	▲ PFB-R200SF10	20.00	10.00	18.00	10.50	M10	18.00	38.00	14	PFB200	
7801494	▲ PFB-R250SF12	25.00	12.50	22.00	12.50	M12	23.00	38.00	17	PFB250	
7801495	▲ PFB-R300SF16	30.00	15.00	27.00	17.00	M16	28.00	43.00	22	PFB300	

● Stocked ○ Available Upon Request; MOQ May Apply ▲ Globally Stocked



## DESIGNATION EXPLANATION

**PFB-R 100 SF 6**



Full Detail on Pages 1524 in Tooling Solutions V1

P	M	K	N	S	H
Steel	Stainless Steel	Cast Iron	Non-Ferrous	HRSA	Hardened Steel
○	○	○	○	○	○

Material recommendation based on inserts compatible with this tool body.

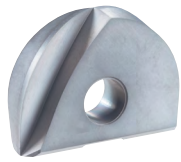
○ Good ○ Best



## List 78PFB

PACKED  
1 PIECE

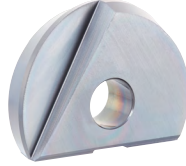
### OSG PHOENIX® PFB INSERTS



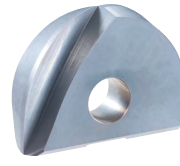
Spiral



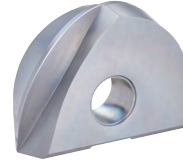
Spiral (Full Radius)



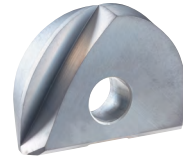
Straight (Full Radius)



Spiral (Strengthened Edge)



Spiral (High Hardness)



Spiral (Diamond Coated)

EDP Number	Designation	Type	Specification	Number of Cutting Edges	Range	Insert Size				Grade
						$\alpha$ (°)	D (Inch)	R (Inch)	T (Inch)	
52101020	● PFB0250A-SP	1	Spiral	2	180	0.250	0.125	2.00	5.18	XP3225
52101021	● PFB0375A-SP	1	Spiral	2	180	0.375	0.188	2.60	8.50	XP3225
52101022	● PFB0500A-SP	1	Spiral	2	180	0.500	0.250	3.00	10.00	XP3225
52101023	● PFB0625A-SP	1	Spiral	2	180	0.625	0.313	4.00	12.00	XP3225
52101024	● PFB0750A-SP	1	Spiral	2	180	0.750	0.375	5.00	15.00	XP3225
52101025	● PFB1000A-SP	1	Spiral	2	180	1.000	0.500	6.00	18.50	XP3225
52101026	● PFB1250A-SP	1	Spiral	2	180	1.250	0.625	7.00	23.50	XP3225
52101010	● PFB0250A-SP	1	Spiral	2	180	0.250	0.125	2.00	5.18	XP3320
52101011	● PFB0375A-SP	1	Spiral	2	180	0.375	0.188	2.60	8.50	XP3320
52101012	● PFB0500A-SP	1	Spiral	2	180	0.500	0.250	3.00	10.00	XP3320
52101013	● PFB0625A-SP	1	Spiral	2	180	0.625	0.313	4.00	12.00	XP3320
52101014	● PFB0750A-SP	1	Spiral	2	180	0.750	0.375	5.00	15.00	XP3320
52101015	● PFB1000A-SP	1	Spiral	2	180	1.000	0.500	6.00	18.50	XP3320
52101016	● PFB1250A-SP	1	Spiral	2	180	1.250	0.625	7.00	23.50	XP3320
52101040	● PFB0250A-Q	2	Spiral (Full Radius)	2	220	0.250	0.125	2.00	5.18	XP3225
52101041	● PFB0375A-Q	2	Spiral (Full Radius)	2	220	0.375	0.188	2.60	8.50	XP3225
52101042	● PFB0500A-Q	2	Spiral (Full Radius)	2	220	0.500	0.250	3.00	10.00	XP3225
52101043	● PFB0625A-Q	3	Spiral (Full Radius)	2	220	0.625	0.313	4.00	12.00	XP3225
52101044	● PFB0750A-Q	3	Spiral (Full Radius)	2	220	0.750	0.375	5.00	15.00	XP3225
52101045	● PFB1000A-Q	3	Spiral (Full Radius)	2	220	1.000	0.500	6.00	18.50	XP3225
52101046	● PFB1250A-Q	3	Spiral (Full Radius)	2	220	1.250	0.625	7.00	23.50	XP3225
52101051	● PFB0375A-Q-ST	2	Straight (Full Radius)	2	200	0.375	0.188	2.60	8.50	XP2225
52101052	● PFB0500A-Q-ST	2	Straight (Full Radius)	2	200	0.500	0.250	3.00	10.00	XP2225
52101053	● PFB0625A-Q-ST	3	Straight (Full Radius)	2	220	0.625	0.313	4.00	12.00	XP2225
52101054	● PFB0750A-Q-ST	3	Straight (Full Radius)	2	220	0.750	0.375	5.00	15.00	XP2225
52101055	● PFB1000A-Q-ST	3	Straight (Full Radius)	2	220	1.000	0.500	6.00	18.50	XP2225
52101056	● PFB1250A-Q-ST	3	Straight (Full Radius)	2	220	1.250	0.625	7.00	23.50	XP2225
52101030	● PFB0250A-SH	2	Spiral (Reinforced Edge)	2	220	0.250	0.125	2.00	5.18	XP3310
52101031	● PFB0375A-SH	1	Spiral (Reinforced Edge)	2	180	0.375	0.188	2.60	8.50	XP3310
52101032	● PFB0500A-SH	1	Spiral (Reinforced Edge)	2	180	0.500	0.250	3.00	10.00	XP3310
52101033	● PFB0625A-SH	1	Spiral (Reinforced Edge)	2	180	0.625	0.313	4.00	12.00	XP3310
52101034	● PFB0750A-SH	1	Spiral (Reinforced Edge)	2	180	0.750	0.375	5.00	15.00	XP3310
52101035	● PFB1000A-SH	1	Spiral (Reinforced Edge)	2	180	1.000	0.500	6.00	18.50	XP3310
52101036	● PFB1250A-SH	1	Spiral (Reinforced Edge)	2	180	1.250	0.625	7.00	23.50	XP3310
52101060	● PFB0375A-HH	1	Spiral (Reinforced Edge)	2	180	0.375	0.188	2.60	8.50	XP6703
52101061	● PFB0500A-HH	1	Spiral (Reinforced Edge)	2	180	0.500	0.250	3.00	10.00	XP6703
52101062	● PFB0625A-HH	1	Spiral (Reinforced Edge)	2	180	0.625	0.313	4.00	12.00	XP6703
52101063	● PFB0750A-HH	1	Spiral (Reinforced Edge)	2	180	0.750	0.375	5.00	15.00	XP6703
52101064	● PFB1000A-HH	1	Spiral (Reinforced Edge)	2	180	1.000	0.500	6.00	18.50	XP6703
52101000	● PFB0250A-D	2	Spiral (Diamond Coated)	2	220	0.250	0.125	2.00	5.18	XC4505
52101001	● PF80375A-D	1	Spiral (Diamond Coated)	2	180	0.375	0.188	2.60	8.50	XC4505
52101002	● PFB0500A-D	1	Spiral (Diamond Coated)	2	180	0.500	0.250	3.00	10.00	XC4505

● Stocked ○ Available Upon Request; MOQ May Apply ▲ Globally Stocked





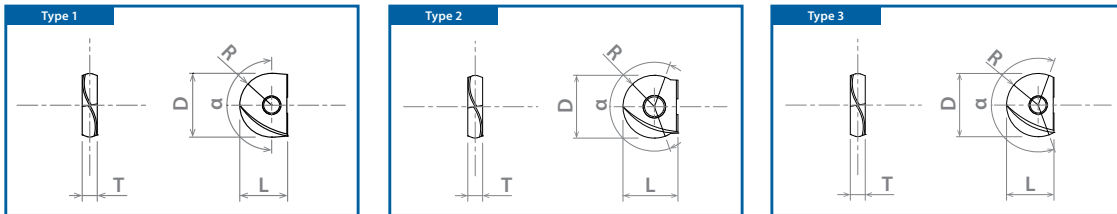
# List 78PFB (Continued)

OSG PHOENIX® PFB INSERTS

PACKED  
1 PIECE

EDP Number	Designation	Type	Specification	Number of Cutting Edges	Range	Insert Size				Grade
						$\alpha$ (°)	D (Inch)	R (Inch)	T (Inch)	
52101003	PF80625A-D	1	Spiral (Diamond Coated)	2	180	0.625	0.313	4.00	12.00	XC4505
52101004	PFB0750A-D	1	Spiral (Diamond Coated)	2	180	0.750	0.375	5.00	15.00	XC4505
52101005	PFB1000A-D	1	Spiral (Diamond Coated)	2	180	1.000	0.500	6.00	18.50	XC4505
52101006	PFB1250A-D	1	Spiral (Diamond Coated)	2	180	1.250	0.625	7.00	23.50	XC4505

● Stocked ○ Available Upon Request; MOQ May Apply ▲ Globally Stocked



## DESIGNATION EXPLANATION

**PFB 0250 A-SP XP3225**



Full Detail on Pages 1522-1523 in Tooling Solutions V1

CONTINUED ➔

Insert Grade	P	M	K	N	S	H
	Steel	Stainless Steel	Cast Iron	Non-Ferrous	HRSA	Hardened Steel
XC4505				⊙		
XP2225	○	⊙			⊙	○
XP3225	⊙	○		⊙	○	
XP3310			⊙			⊙
XP3320	○	○	○		○	○
XP6703	○		○			⊙

XP3225 best recommended for aluminum & copper alloy applications.  
XC4505 best recommended for graphite & CFRP applications.

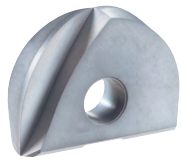
○ Good ⊙ Best



# List 78PFB (Continued)

PACKED  
1 PIECE

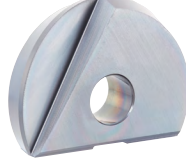
OSG PHOENIX® PFB INSERTS



Spiral



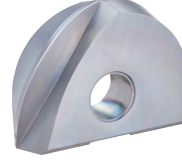
Spiral (Full Radius)



Straight (Full Radius)



Spiral (Strengthened Edge)



Spiral (High Hardness)



Spiral (Diamond Coated)

EDP Number	Designation	Type	Specification	Number of Cutting Edges	Range	Insert Size				Grade
						$\alpha$ (°)	D (mm)	R (mm)	T (mm)	
7820030	● PFB080-SP	1	Spiral	2	180	8.00	4.00	2.40	7.00	XP3225
7820031	● PFB100-SP	1	Spiral	2	180	10.00	5.00	2.60	8.50	XP3225
7820032	● PFB120-SP	1	Spiral	2	180	12.00	6.00	3.00	10.00	XP3225
7820033	● PFB160-SP	1	Spiral	2	180	16.00	8.00	4.00	12.00	XP3225
7820034	● PFB200-SP	1	Spiral	2	180	20.00	10.00	5.00	15.00	XP3225
7820035	● PFB250-SP	1	Spiral	2	180	25.00	12.50	6.00	18.50	XP3225
7820036	● PFB300-SP	1	Spiral	2	180	30.00	15.00	7.00	22.50	XP3225
7820010	● PFB080-SP	1	Spiral	2	180	8.00	4.00	2.40	7.00	XP3320
7820011	● PFB100-SP	1	Spiral	2	180	10.00	5.00	2.60	8.50	XP3320
7820012	● PFB120-SP	1	Spiral	2	180	12.00	6.00	3.00	10.00	XP3320
7820013	● PFB160-SP	1	Spiral	2	180	16.00	8.00	4.00	12.00	XP3320
7820014	● PFB200-SP	1	Spiral	2	180	20.00	10.00	5.00	15.00	XP3320
7820015	● PFB250-SP	1	Spiral	2	180	25.00	12.50	6.00	18.50	XP3320
7820016	● PFB300-SP	1	Spiral	2	180	30.00	15.00	7.00	22.50	XP3320
7820048	● PFB060-Q	2	Spiral (Full Radius)	2	220	6.00	3.00	2.00	5.00	XP3225
7820049	● PFB070-Q	2	Spiral (Full Radius)	2	220	7.00	3.50	2.00	5.50	XP3225
7820050	● PFB080-Q	2	Spiral (Full Radius)	2	220	8.00	4.00	2.40	7.00	XP3225
7820051	● PFB100-Q	2	Spiral (Full Radius)	2	220	10.00	5.00	2.60	8.50	XP3225
7820052	● PFB120-Q	2	Spiral (Full Radius)	2	220	12.00	6.00	3.00	10.00	XP3225
7820053	● PFB160-Q	3	Spiral (Full Radius)	2	220	16.00	8.00	4.00	12.00	XP3225
7820054	● PFB200-Q	3	Spiral (Full Radius)	2	220	20.00	10.00	5.00	15.00	XP3225
7820055	● PFB250-Q	3	Spiral (Full Radius)	2	220	25.00	12.50	6.00	18.50	XP3225
7820056	● PFB300-Q	3	Spiral (Full Radius)	2	220	30.00	15.00	7.00	22.50	XP3225
7820060	● PFB080-Q-ST	2	Straight (Full Radius)	2	200	8.00	4.00	2.40	7.00	XP2225
7820061	● PFB100-Q-ST	2	Straight (Full Radius)	2	200	10.00	5.00	2.60	8.50	XP2225
7820062	● PFB120-Q-ST	2	Straight (Full Radius)	2	200	12.00	6.00	3.00	10.00	XP2225
7820063	● PFB160-Q-ST	3	Straight (Full Radius)	2	220	16.00	8.00	4.00	12.00	XP2225
7820064	● PFB200-Q-ST	3	Straight (Full Radius)	2	220	20.00	10.00	5.00	15.00	XP2225
7820065	● PFB250-Q-ST	3	Straight (Full Radius)	2	220	25.00	12.50	6.00	18.50	XP2225
7820066	● PFB300-Q-ST	3	Straight (Full Radius)	2	220	30.00	15.00	7.00	22.50	XP2225
7820039	● PFB060-SH	2	Spiral (Reinforced Edge)	2	220	6.00	3.00	2.00	5.00	XP3310
7820040	● PFB080-SH	1	Spiral (Reinforced Edge)	2	180	8.00	4.00	2.40	7.00	XP3310
7820041	● PFB100-SH	1	Spiral (Reinforced Edge)	2	180	10.00	5.00	2.60	8.50	XP3310
7820042	● PFB120-SH	1	Spiral (Reinforced Edge)	2	180	12.00	6.00	3.00	10.00	XP3310
7820043	● PFB160-SH	1	Spiral (Reinforced Edge)	2	180	16.00	8.00	4.00	12.00	XP3310
7820044	● PFB200-SH	1	Spiral (Reinforced Edge)	2	180	20.00	10.00	5.00	15.00	XP3310
7820045	● PFB250-SH	1	Spiral (Reinforced Edge)	2	180	25.00	12.50	6.00	18.50	XP3310
7820046	● PFB300-SH	1	Spiral (Reinforced Edge)	2	180	30.00	15.00	7.00	22.50	XP3310
7820047	● PFB320-SH	1	Spiral (Reinforced Edge)	2	180	32.00	16.00	7.00	23.50	XP3310
7820107	● PFB100-HH	1	Spiral (Reinforced Edge)	2	180	10.00	5.00	2.60	8.50	XP6703
7820108	● PFB120-HH	1	Spiral (Reinforced Edge)	2	180	12.00	6.00	3.00	10.00	XP6703
7820109	● PFB160-HH	1	Spiral (Reinforced Edge)	2	180	16.00	8.00	4.00	12.00	XP6703
7820110	● PFB200-HH	1	Spiral (Reinforced Edge)	2	180	20.00	10.00	5.00	15.00	XP6703
7820111	● PFB250-HH	1	Spiral (Reinforced Edge)	2	180	25.00	12.50	6.00	18.50	XP6703
7820112	● PFB300-HH	1	Spiral (Reinforced Edge)	2	180	30.00	15.00	7.00	22.50	XP6703
7820113	● PFB320-HH	1	Spiral (Reinforced Edge)	2	180	32	16	7	23.5	XP6703
7820018	● PFB060-D	2	Spiral (Diamond Coated)	2	220	6.00	3.00	2.00	5.00	XC4505
7820019	● PFB070-D	2	Spiral (Diamond Coated)	2	220	7.00	3.50	2.00	5.50	XC4505
7820020	● PFB080-D	1	Spiral (Diamond Coated)	2	180	8.00	4.00	2.40	7.00	XC4505
7820021	● PFB100-D	1	Spiral (Diamond Coated)	2	180	10.00	5.00	2.60	8.50	XC4505
7820022	● PFB120-D	1	Spiral (Diamond Coated)	2	180	12.00	6.00	3.00	10.00	XC4505
7820023	● PFB160-D	1	Spiral (Diamond Coated)	2	180	16.00	8.00	4.00	12.00	XC4505
7820024	● PFB200-D	1	Spiral (Diamond Coated)	2	180	20.00	10.00	5.00	15.00	XC4505

● Stocked ○ Available Upon Request; MOQ May Apply ▲ Globally Stocked



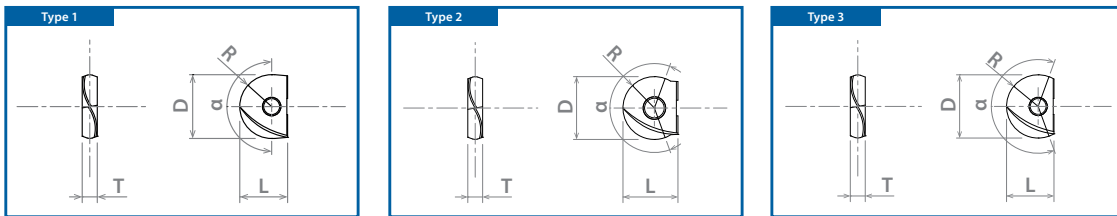
# List 78PFB (Continued)

OSG PHOENIX® PFB INSERTS

PACKED  
1 PIECE

EDP Number	Designation	Type	Specification	Number of Cutting Edges	Range	Insert Size				Grade
					$\alpha$ (°)	D (mm)	R (mm)	T (mm)	L (Inch)	
7820025	● PFB250-D	1	Spiral (Diamond Coated)	2	180	25.00	12.50	6.00	18.50	XC4505
7820026	● PFB300-D	1	Spiral (Diamond Coated)	2	180	30.00	15.00	7.00	22.50	XC4505

● Stocked ○ Available Upon Request; MOQ May Apply ▲ Globally Stocked



## DESIGNATION EXPLANATION

**PFB 0250 A-SP XP3225**



Full Detail on Pages 1522-1523 in Tooling Solutions V1

CONTINUED ▶

Insert Grade	P	M	K	N	S	H
	Steel	Stainless Steel	Cast Iron	Non-Ferrous	HRSA	Hardened Steel
XC4505				○		
XP2225	○	○			○	○
XP3225	○	○		○	○	
XP3310			○			○
XP3320	○	○	○		○	○
XP6703	○		○			○

XP3225 best recommended for aluminum & copper alloy applications.  
XC4505 best recommended for graphite & CFRP applications.

○ Good ○ Best



# List 78PFB (Continued)

PACKED  
1 PIECE

OSG PHOENIX® PFB INSERTS



Barrel Type  
Type 4

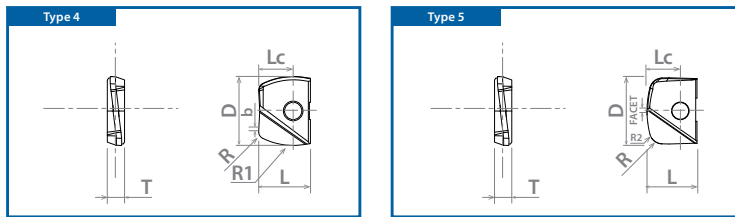


Lens Type  
Type 5

EDP Number	Designation	Type	Specification	Number of Cutting Edges	Insert Size									Grade
					D (mm)	R (mm)	R1 (mm)	R2 (mm)	T (mm)	b (mm)	Facet (mm)	Lc (mm)	L (Inch)	
7820071	PFB100R150-BR-ST	4	Multi-Purpose	2	10.00	1.00	15.00	-	2.60	0.30	-	5.00	8.50	XP3225
7820072	PFB120R180-BR-ST	4	Multi-Purpose	2	12.00	1.00	18.00	-	3.00	0.30	-	6.00	10.00	XP3225
7820073	PFB160R240-BR-ST	4	Multi-Purpose	2	16.00	2.00	24.00	-	4.00	0.50	-	8.00	12.00	XP3225
7820074	PFB200R300-BR-ST	4	Multi-Purpose	2	20.00	2.00	30.00	-	5.00	0.50	-	10.00	15.00	XP3225
7820075	PFB250R375-BR-ST	4	Multi-Purpose	2	25.00	2.50	37.50	-	6.00	0.50	-	12.50	18.50	XP3225
7820076	PFB320R480-BR-ST	4	Multi-Purpose	2	32.00	3.00	48.00	-	7.00	0.50	-	16.00	23.50	XP3225
7820081	PFB100R150-BR-SH	4	Reinforced Edge	2	10.00	1.00	15.00	-	2.60	0.30	-	5.00	8.50	XP3310
7820082	PFB120R180-BR-SH	4	Reinforced Edge	2	12.00	1.00	18.00	-	3.00	0.30	-	6.00	10.00	XP3310
7820083	PFB160R240-BR-SH	4	Reinforced Edge	2	16.00	2.00	24.00	-	4.00	0.50	-	8.00	12.00	XP3310
7820084	PFB200R300-BR-SH	4	Reinforced Edge	2	20.00	2.00	30.00	-	5.00	0.50	-	10.00	15.00	XP3310
7820085	PFB250R375-BR-SH	4	Reinforced Edge	2	25.00	2.50	37.50	-	6.00	0.50	-	12.50	18.50	XP3310
7820086	PFB320R480-BR-SH	4	Reinforced Edge	2	32.00	3.00	48.00	-	7.00	0.50	-	16.00	23.50	XP3310
7820091	PFB100R150-LZ-ST	5	Multi-Purpose	2	10.00	1.00	-	15.00	2.60	-	0.75	3.30	8.50	XP3225
7820092	PFB120R180-LZ-ST	5	Multi-Purpose	2	12.00	1.00	-	18.00	3.00	-	0.75	4.00	10.00	XP3225
7820093	PFB160R240-LZ-ST	5	Multi-Purpose	2	16.00	2.00	-	24.00	4.00	-	1.00	5.30	12.00	XP3225
7820094	PFB200R300-LZ-ST	5	Multi-Purpose	2	20.00	2.00	-	30.00	5.00	-	1.75	6.70	15.00	XP3225
7820095	PFB250R375-LZ-ST	5	Multi-Purpose	2	25.00	2.50	-	37.50	6.00	-	1.75	8.30	18.50	XP3225
7820096	PFB320R480-LZ-ST	5	Multi-Purpose	2	32.00	3.00	-	48.00	7.00	-	2.00	10.70	23.50	XP3225
7820101	PFB100R150-LZ-SH	5	Reinforced Edge	2	10.00	1.00	-	15.00	2.60	-	0.75	3.30	8.50	XP3310
7820102	PFB120R180-LZ-SH	5	Reinforced Edge	2	12.00	1.00	-	18.00	3.00	-	0.75	4.00	10.00	XP3310
7820103	PFB160R240-LZ-SH	5	Reinforced Edge	2	16.00	2.00	-	24.00	4.00	-	1.00	5.30	12.00	XP3310
7820104	PFB200R300-LZ-SH	5	Reinforced Edge	2	20.00	2.00	-	30.00	5.00	-	1.75	6.70	15.00	XP3310
7820105	PFB250R375-LZ-SH	5	Reinforced Edge	2	25.00	2.50	-	37.50	6.00	-	1.75	8.30	18.50	XP3310
7820106	PFB320R480-LZ-SH	5	Reinforced Edge	2	32.00	3.00	-	48.00	7.00	-	2.00	10.70	23.50	XP3310

● Stocked ○ Available Upon Request; MOQ May Apply ▲ Globally Stocked

PXI



## DESIGNATION EXPLANATION

**PFB 100 R150-BR-ST XP3225**



Full Detail on Pages 1522-1523 in Tooling Solutions V1

Insert Grade	P	M	K	N	S	H
	Steel	Stainless Steel	Cast Iron	Non-Ferrous	HRSA	Hardened Steel
XC4505				○		
XP2225	○	○			○	○
XP3225	○	○		○	○	
XP3310			○			○
XP3320	○	○	○		○	○
XP6703	○		○			○

XP3225 best recommended for aluminum & copper alloy applications.  
XC4505 best recommended for graphite & CFRP applications.

○ Good ○ Best






# List 7808H

OSG PHOENIX® PFB ACCESSORIES

PACKED	PACKED
1 PIECE	10 PIECE

Appearance	EDP No.		Designation	Applicable Cutter		Recommended Tightening Torque
				Inch	mm	
 Clamping Screw	7808124	●	FS20652RB (Torx 6)	PFB SA Ø0.250	PFB SS Ø6-7	0.4 Nm
	7808123	●	FS25669RB (Torx 7)	-	PFB SS Ø8	1.0 Nm
	7808117	●	FS30686RB (Torx 8)	PFB SA/ASF Ø0.375	PFB SS/SF Ø10	1.2 Nm
	7808118	●	FS35610RB (Torx 10)	PFB SA/ASF Ø0.500	PFB SS/SF Ø12	2.0 Nm
	7808119	●	FS40613RB (Torx 15)	PFB SA/ASF Ø0.625	PFB SS/SF Ø16	3.0 Nm
	7808120	●	FS50615RB (Torx 20)	PFB SA/ASF Ø0.750	PFB SS/SF Ø20	5.0 Nm
	7808121	●	FS60620RB (Torx 20)	PFB SA/ASF Ø1.000	PFB SS/SF Ø25	5.0 Nm
	7808122	●	FS80624RB (Torx 30)	PFB SA Ø1.250	PFB SS/SF Ø30-32	6.0 Nm
 Wrench	7808203	●	T6-D (Torx 6)	PFB SA Ø0.250	PFB SS Ø6-7	-
	7808204	●	T7-D (Torx 7)	-	PFB SS Ø8	-
	7808205	●	T8-D (Torx 8)	PFB SA/ASF Ø0.375	PFB SS/SF Ø10	-
	7808207	●	T10-D (Torx 10)	PFB SA/ASF Ø0.500	PFB SS/SF Ø12	-
	7808208	●	T15-D (Torx 15)	PFB SA/ASF Ø0.625	PFB SS/SF Ø16	-
	7808209	●	T20-D (Torx 20)	PFB SA/ASF Ø0.750	PFB SS/SF Ø20-25	-
 T-Handle Wrench	7808212	●	T30-T (Torx 30)	PFB SA Ø1.250	PFB SS/SF Ø30-32	-

● Stocked ○ Available Upon Request; MOQ May Apply ▲ Globally Stocked  
 Note: Wrench sold separately  
 Packed: Clamping Screws = 1 pc.; T-Handle Wrench = 1 pc.; Wrench = 1 pc.



List 52100 - PHOENIX® PFB: SA

List 78014 - PHOENIX® PFB: SS

List 52604 - PHOENIX® PFB: ASF

List 78114 - PHOENIX® PFB: SF

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/mm²	1310 (985-1640)	0.02Dc	0.0047	0.0055	0.0071	0.0086
	Ductile Cast Iron (60-40-18)	~600 N/mm²	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 - 55 HRC	490 (330-820)	0.01Dc	0.0020	0.0024	0.0028	0.0028

## PFB-BR & PFB-LZ Insert Cutting Conditions

Work Material	Tensile Strength - Hardness	Milling Speed Vc (SFM)	Depth of Cut		Feed Per Tooth fz (in/t)			
			Pitch (mm)	Depth of Cut (in)	Ø10-12mm	Ø16-20mm	Ø25-32mm	
P	Mild Steels, Carbon Steels (1010, 1018)	~180 HB	Based on Cusp Height (see chart on next page)	0.0078	0.0078	0.0047	0.0055	0.0071
	Carbon Steels, Alloy Steels (1050, 4140)	~280 HB			0.0078	0.0039	0.0047	0.0055
	Die Steels (H13, D2)	~280 HB			0.0078	0.0039	0.0047	0.0055
M	Stainless Steels (304SS, 420SS)	~250 HB			0.0078	0.0047	0.0055	0.0067
K	Cast Iron (FC250)	~350 N/mm²			0.0078	0.0055	0.0071	0.0087
	Ductile Cast Iron (60-40-18)	~600 N/mm²			0.0078	0.0047	0.0055	0.0071
S	Heat Resistant Alloys (Inconel 718)	-			0.0059	0.0019	0.0024	0.0024
	Titanium Alloy (Ti-6Al-4V)	-			0.0078	0.0031	0.0044	0.0051
H	Pre-hardened Steel (P20, Stavax)	40 - 43 HRC			0.0059	0.0027	0.0031	0.0039
	Die Cast Steels (A2, S7)	43 - 48 HRC	0.0059	0.0024	0.0027	0.0027		
	Hardened Steels (D2)	50 - 55 HRC	0.0039	0.0024	0.0027	0.0027		



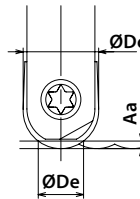
## Effective Cutting Diameter

Depth of Cut Aa		Effective Cutting Diameter (ØDe)																			
		ØDc		ØDc		ØDc		ØDc		ØDc		ØDc		ØDc		ØDc		ØDc			
(inch)	(mm)	0.250"	6mm	0.275"	7mm	0.315"	8 mm	0.375"	10 mm	0.500"	12 mm	0.625"	16 mm	0.750"	20 mm	1.000"	25 mm	1.181"	30 mm	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:

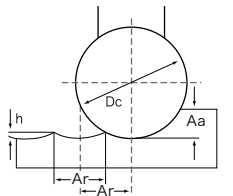
Ex: Dc = 0.500"  
Aa = 0.020"  
De = 2√(0.020(0.500-0.020))  
De = 0.196"



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

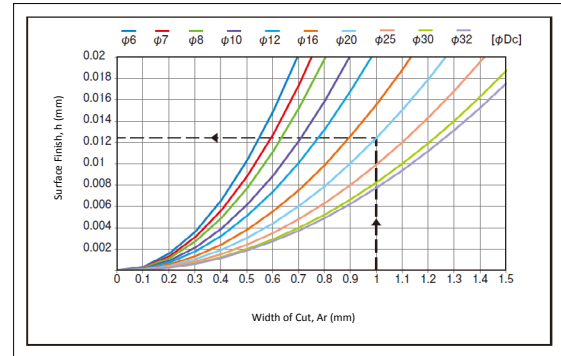
## Recommended Width of Cut & Surface Roughness

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



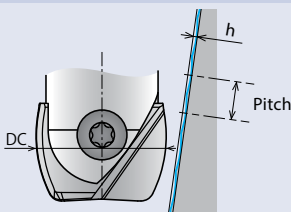
$$h = 0.5 (D_c - \sqrt{D_c^2 - Ar^2})$$

Dc=20mm  
Ar=1mm  
->h=0.0125mm

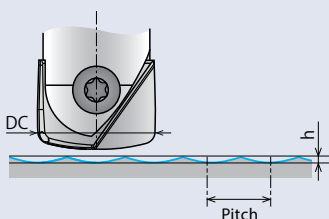


## Theoretical Cusp Height

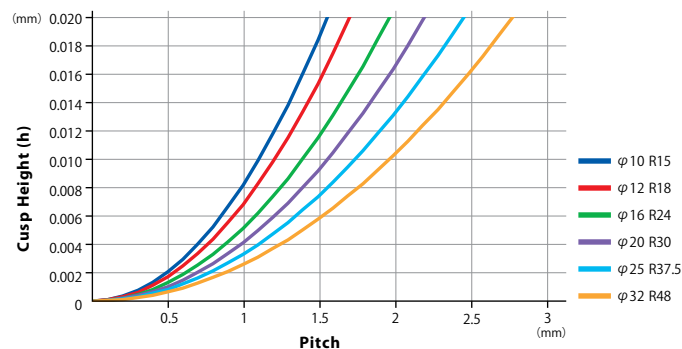
### PFB-BR Barrel Type Tool



### PFB-LZ Lens Type Tool



### Cusp Height and Pitch




$$h = 0.5 \times (2 \times RE_2 - \sqrt{(2 \times RE_2)^2 - P^2})$$

h: Cusp Height P: Pitch RE2: Peripheral Edge R



*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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