



# SUMITOMO

CARBIDE - CBN - DIAMOND

# *PWS Series*



High Performance Milling Systems

*High efficiency shoulder mill for steel,  
stainless steel & cast iron materials*

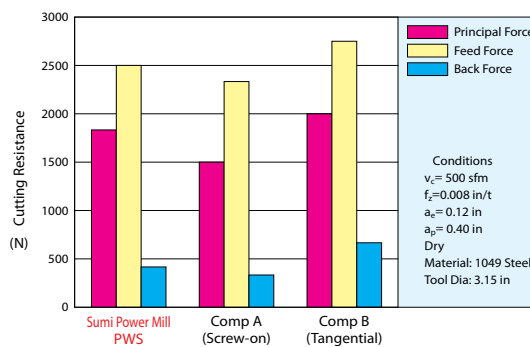
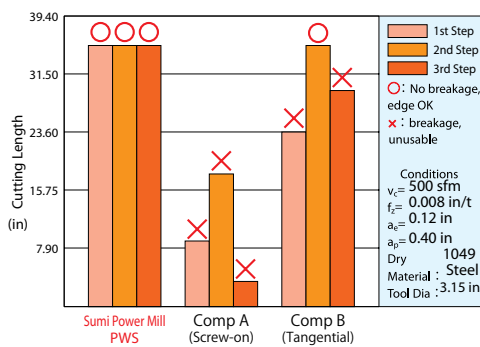




## Features & Benefits

- Highly reliable shoulder mill tangentially mounted for never-before-possible cutting edge strength and sharp cutting edges.
- Tangentially mounted inserts for outstanding cutting edge strength combined with optimized breaker for excellent edge sharpness and cutting ability.
- New ACP and ACK milling grades are used to meet the needs of various types of work material
- Serrated insert design created with high-precision molding technology provides stable milling, even in applications with large tool overhang

## Performance



## Performance Comparison

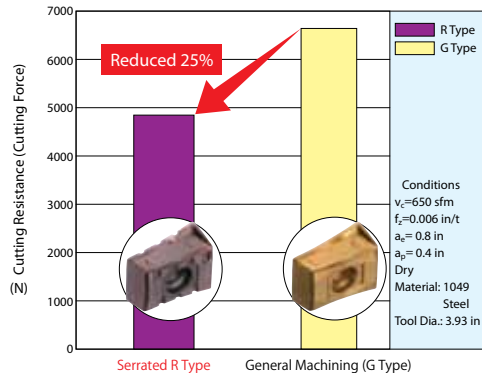
### Serrated R Type Inserts

### General Purpose G Type Inserts

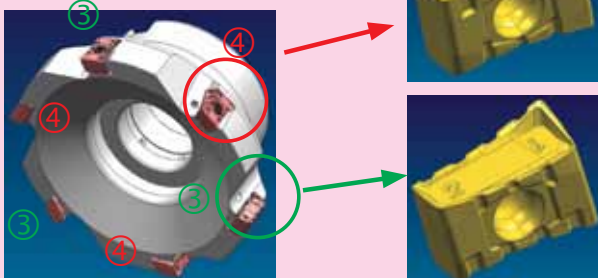


### Comparison of Cutting Forces

Reduced cutting force and excellent vibration resistance!



### Caution when using Serrated R Type Inserts



#### 1) Installation Precautions

When using R type serrated indexable inserts, attach them so the serrated grooves alternate as shown in the image to the left.

#### 2) Cutting Condition Precautions

When set up as shown in the image to the left, the feed rate per tooth is doubled compared to that when attaching the same-shaped inserts on all teeth. This means that feed adjustments should be made so the upper feed limit is as shown below.

$$f_z = 0.010 \text{ IPT}$$

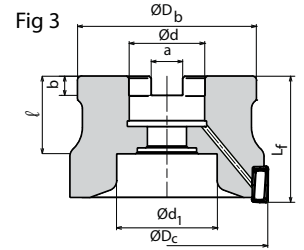
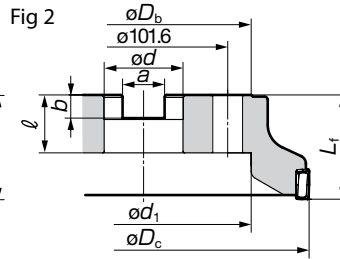
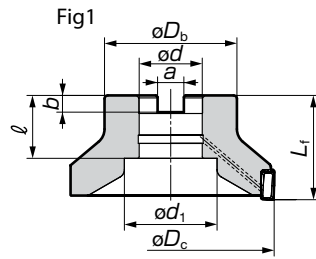
Example: Use at  $f_z = 0.008$  IPT

Feed when all teeth are normal

Feed when serrated **0.016 IPT**

Any incorrect use of insert may damage tools.





### PWS Cutter Bodies - Standard Pitch - Inch

Catalog Number	Stock	Dimensions								# of Teeth	Weight (lbs)	Fig.
		$\phi D_c$	$\phi D_b$	$L_f$	$\phi d$	$\phi d_1$	a	b	$\ell$			
PWS42000R	●	2.000	1.750	1.750	0.750	0.609	0.313	0.190	1.020	3	0.90	1
PWS43000R	●	3.000	2.250	1.750	1.000	0.797	0.375	0.220	1.020	5	2.10	1
PWS44000R-1.25	●	4.000	2.870	2.000	1.250	1.000	0.500	0.280	1.020	6	5.29	1
PWS44000R-1.50	●	4.000	3.540	2.500	1.500	2.000	0.625	0.380	2.400	6	5.40	3
PWS45000R	●	5.000	3.750	2.500	1.500	2.000	0.625	0.380	1.535	7	5.29	1
PWS46000R	●	6.000	4.380	2.500	1.500	2.000	0.625	0.380	1.535	8	8.81	1
PWS48000R	●	8.000	5.118	2.500	2.500	-	1.000	0.560	1.594	10	14.33	2
PWS410000R	●	10.000	7.087	2.756	2.500	-	1.000	0.560	1.594	12	27.11	2

### PWS Cutter Bodies - Fine Pitch - Inch

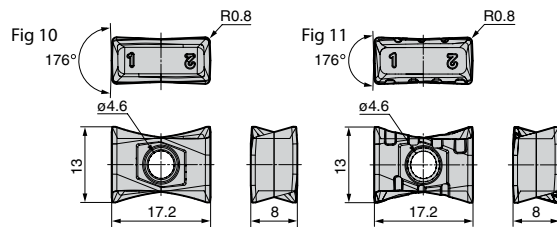
Catalog Number	Stock	Dimensions								# of Teeth	Weight (lbs)	Fig.
		$\phi D_c$	$\phi D_b$	$L_f$	$\phi d$	$\phi d_1$	a	b	$\ell$			
PWSF42000R	●	2.000	1.750	1.750	0.750	0.609	0.313	0.190	1.020	5	0.90	1
PWSF43000R	●	3.000	2.250	1.750	1.000	0.797	0.375	0.220	1.020	7	1.95	1
PWSF44000R-1.25	●	4.000	2.870	2.000	1.250	1.000	0.500	0.280	1.020	9	5.07	1
PWSF44000R-1.50	●	4.000	3.540	2.500	1.500	2.000	0.625	0.380	2.400	9	5.10	3
PWSF45000R	●	5.000	3.750	2.500	1.500	2.000	0.625	0.380	1.535	10	5.07	1
PWSF46000R	●	6.000	4.380	2.500	1.500	2.000	0.625	0.380	1.535	13	8.59	1
PWSF48000R	●	8.000	5.118	2.500	2.500	-	1.000	0.560	1.594	16	14.10	2
PWSF410000R	●	10.000	7.087	2.756	2.500	-	1.000	0.560	1.594	20	26.90	2

\*Cutters with sizes of  $\phi 8.000$  inches or above come with seats (no coolant holes). Inserts are not included.

### Inserts

P Steel M Stainless Steel K Cast Iron N Non-ferrous S Super Alloy H Hardened Material

Grade		Coated Carbide					Application	Fig.
Application		P	M	K	N	S		
High speed/Light		●						
General Purpose		●	●	●				
Roughing		●	●	●				
Catalog Number		ACP100	ACP200	ACP300	ACK200	ACK300		
LNMX170808PNSR-L	●	●	●	●	●	●	Light Cut 10	
LNMX170808PNSR-G	●	●	●	●	●	●	General Purpose 10	
LNMX170808PNSR-R	●	●	●	●	●	●	Heavy Cut 11	

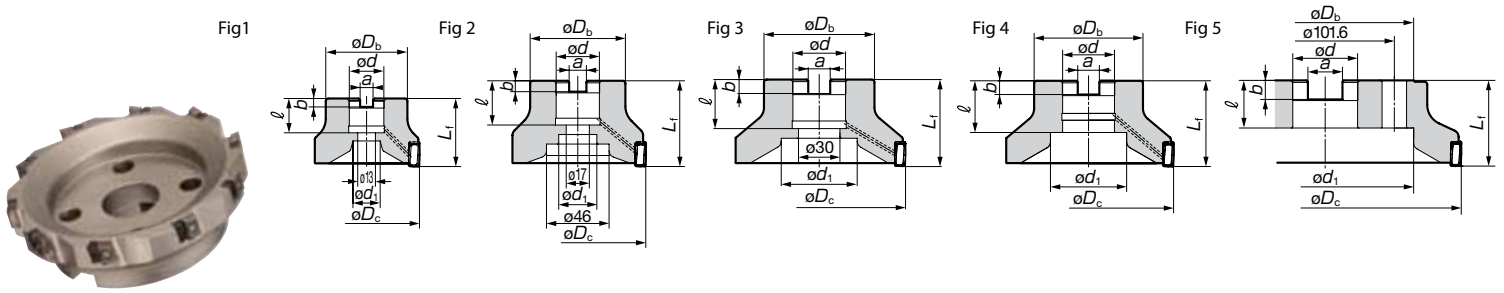


### Recommended Cutting Conditions

ISO	Work Material	Hardness	Cutting Speed $v_c$ (sfm) Min - Max	Feed Rate $f_z$ (ipt) Min - Max	Recommended Grade
P	Carbon Steel	180-280HB	500 - 1,500	0.004 - 0.014	ACP200
	Alloy Steel	180-280HB	330 - 815	0.004 - 0.001	ACP200
M	Stainless Steel	-	330 - 650	0.006 - 0.001	ACP300
K	Cast Iron/Ductile Cast Iron	250HB	330 - 815	0.004 - 0.014	ACK200

NOTE: The cutting conditions above are a guide. Actual Conditions will need to be adjusted according to machine rigidity, work clamp rigidity, cutting depth and other factors.



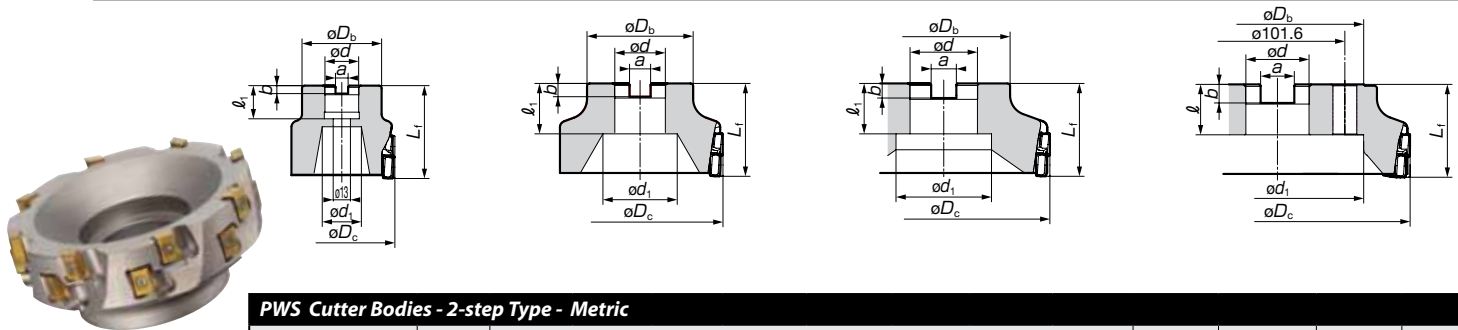


**PWS Cutter Bodies - Standard Pitch - Metric**

Catalog Number	Stock	Dimensions								# of Teeth	Weight (kg)	Fig.
		$\phi D_c$	$\phi D_b$	$L_f$	$\phi d$	$\phi d_1$	a	b	$\ell$			
PWS 4080R	●	80	60	50	25.4	20	9.5	6	25	4	1.0	1
PWS 4100R	●	100	70	63	31.75	28	12.7	8	32.5	6	1.8	2
PWS 4125R	●	125	80	63	38.1	55	15.9	10	35.5	6	2.4	3
PWS 4160R	●	160	100	63	50.8	72	19.0	11	38	8	4.0	4
PWS 4200R	●	200	130	63	50.8	130	25.4	14	35	10	6.5	5
PWS 4250R	●	250	130	63	50.8	160	25.4	14	35	12	12.3	5

**PWS Cutter Bodies - Fine Pitch - Metric**

Catalog Number	Stock	Dimensions								# of Teeth	Weight (kg)	Fig.
		$\phi D_c$	$\phi D_b$	$L_f$	$\phi d$	$\phi d_1$	a	b	$\ell$			
PWSF4080R	●	80	60	50	25.4	20	9.5	6	25	6	0.9	1
PWSF4100R	●	100	70	63	31.75	28	12.7	8	32.5	8	1.7	2
PWSF4125R	●	125	80	63	38.1	55	15.9	10	35.5	8	2.3	3
PWSF4160R	●	160	100	63	50.8	72	19.0	11	38	10	3.9	4
PWSF4200R	●	200	130	63	50.8	130	25.4	14	35	12	6.4	5
PWSF4250R	●	250	130	63	50.8	160	25.4	14	35	14	12.2	5



**PWS Cutter Bodies - 2-step Type - Metric**

Catalog Number	Stock	Dimensions								# of Teeth	Effective Teeth	Weight	Fig.
		$\phi D_c$	$\phi D_b$	$L_f$	$\phi d$	$\phi d_1$	a	b	$\ell$				
PWSR4080R		80	60	70	25.4	29.5	9.5	6	25	8	4	0.9	1
PWSR4100R		100	70	70	31.75	46	12.7	8	32	12	6	1.7	2
PWSR4125R		125	80	70	38.1	56	15.9	10	38	12	6	2.3	3
PWSR4160R		160	100	70	50.8	72	19.0	11	38	16	8	3.9	4
PWSR4200R		200	130	70	50.8	160	25.4	14	38	20	10	6.4	5

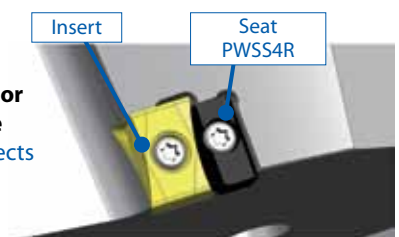
\*Cutters with sizes of  $\phi 200$  or above come with seats (no coolant holes). Inserts are not included. Please use JIS B1176 hexagonal bolt ( $\phi 80$ : M12x30 to 35mm,  $\phi 100$ : M16x40 to 45mm) for securing  $\phi 80/\phi 100$  cutter to the arbor.

**Spare Parts**

Seat Screw	Wrench	Anti-seize Paste	Seat*	Recommended Tightening Torque
BFTX0412IP	TRDR15IP	SUMI-P	PWSS4R	

\*Included with  $\phi 200$ mm or larger

**Large diameter ( $\phi 200$  or above) body structure**  
 Safety seat design protects body







# SUMITOMO

**CARBIDE - CBN - DIAMOND**

## **Sumitomo Electric Carbide, Inc.**

### **Headquarters**

1001 Business Center Drive  
Mount Prospect, IL 60056-2181  
P.O. Box 545, Mt. Prospect, IL 60056-0545  
Phone: (800) 950-5202  
Phone: (847) 635-0044  
Fax: (847) 635-7866  
<http://www.sumicarbide.com>

### **Detroit Branch**

14496 Sheldon Road #230  
Plymouth, MI 48170  
Phone: (800) 239-5177  
Phone: (734) 451-0200  
Fax: (734) 451-5338

### **Sumitomo Electric Tool Engineering Center**

5637 S. Westridge Drive  
New Berlin, WI 53151  
Phone: (800) 950-5202

### **Huntsville Branch**

6700 Odyssey Drive  
Suite 211  
Huntsville, AL 35806  
Phone: (256) 971-1203  
Fax: (256) 971-1205

### **Cincinnati Branch**

4450 Carver Woods Drive  
Cincinnati, OH 45242-5545  
Phone: (800) 879-1887  
Phone: (513) 891-4000  
Fax: (513) 794-2911

### **Torrance Branch**

21241 South Western Avenue  
Suite 120  
Torrance, CA 90501  
Phone: (800) 950-5202  
Fax: (310) 782-0211

### **Sumicarbide Canada, Inc.**

2600 Skymark Avenue  
Building 6, Suite 103  
Mississauga, ON L4W 5B2  
Canada  
Phone: (905) 282-9986  
Fax: (905) 282-9984

