



Double-sided 6-edge Insert, Low Cutting Force 90° Cutter

MFWN

Newly Developed Mill

Milling Solutions

- **6 Advantages** for High Efficiency Milling
- Extended Tool Life by New **MEGACOAT NANO** Technology



Economical **6-edge Insert**
Tough Cutting Edge due to
Thick Edge Design

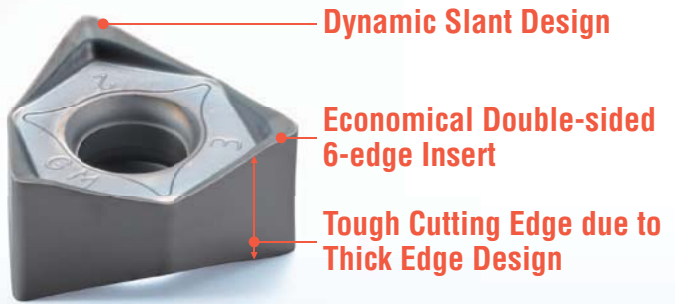


ADVANCING PRODUCTIVITY

- KYOCERA, Contributing To Advancing Productivity -

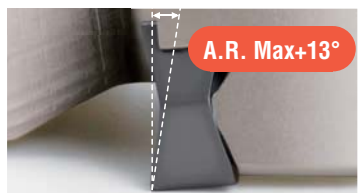
6 Advantages

Double-sided, 6-edge Insert, 90° Cutters Low Cutting Force and Reduced Chattering

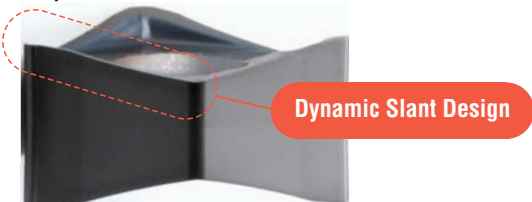


Advantage 1 Sharp Cutting due to Low Cutting Force

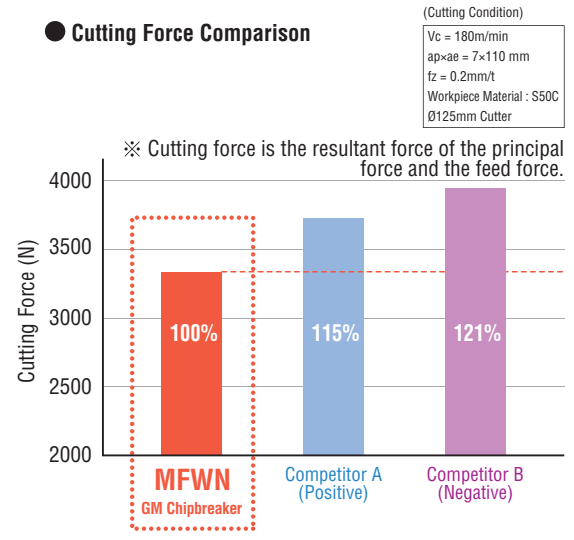
● Low cutting force due to large rake angle



● Dynamic Slant Design reduces shock when the cutting edge enters the workpiece



● Cutting Force Comparison



(Internal Evaluation)

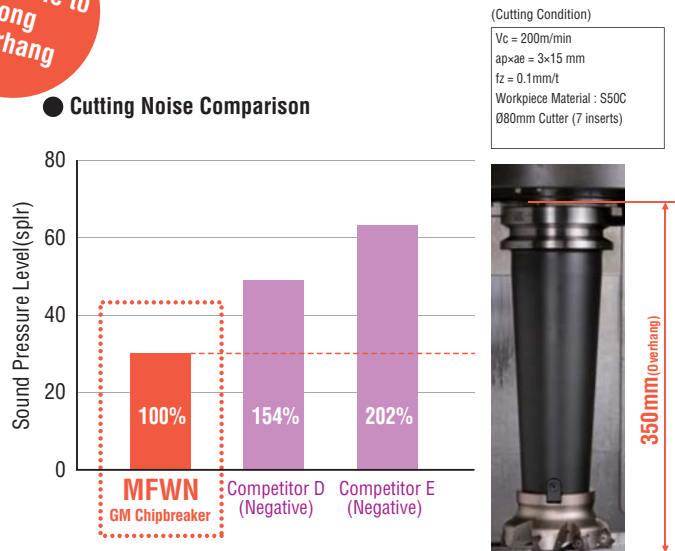
Advantage 2 Reduced Chattering

Applicable to long overhang

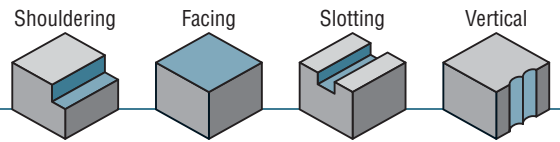
● Surface Roughness Comparison



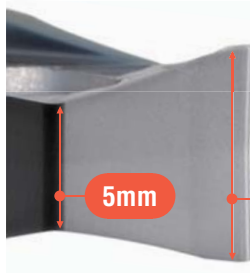
● Cutting Noise Comparison



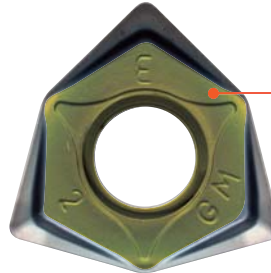
(Internal Evaluation)



Advantage 3 Superior Fracture Resistance due to Thick Edge Design



Cutting Edge Thickness: 8.5~5mm



Stable Clamping with the Optimum Insert Face Design

● Fracture Resistance Comparison



Advantage 4 Neutral Inserts

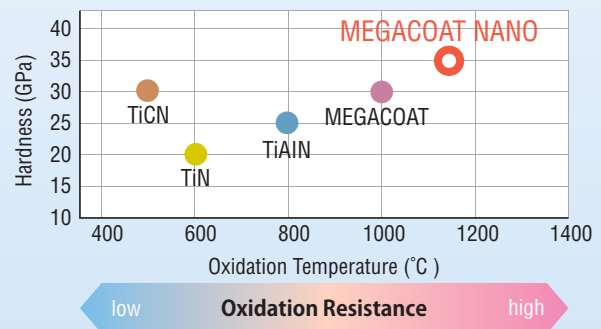
Available for Vertical Machining as well as Facing
 Neutral Inserts are used by left-hand cutters (custom order)



Can be used for a wide range of applications

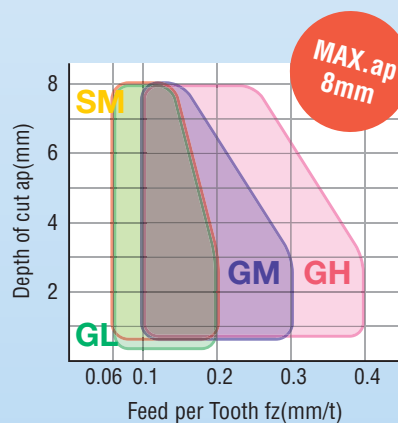
Advantage 5 Extended Tool Life by New MEGACOAT NANO Technology

PR1525 is for steel and stainless steel, and PR1510 is for cast iron
 Prevents wear and fracture with high hardness (35GPa) and superior oxidation resistance (oxidation temperature: 1,150°C)



Advantage 6 4 Chipbreakers for Various Applications

Chipbreaker	Application	Shape
GM	General Purpose	
SM	Low Cutting Force	
GH	Heavy Milling	
GL	Surface-Finish Oriented	

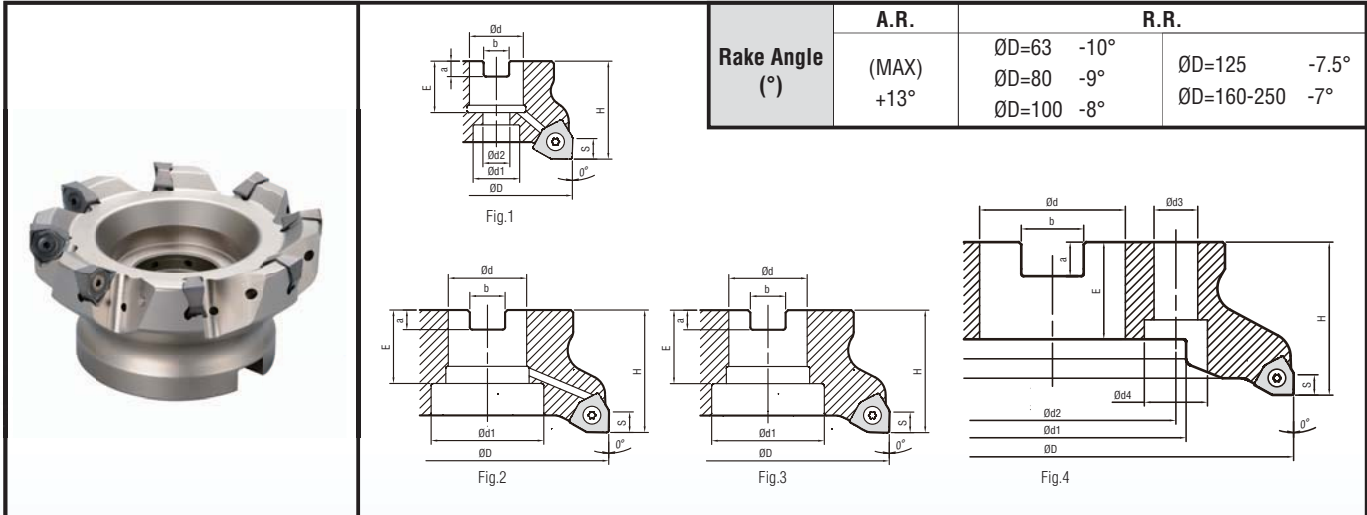


Smooth Chip Evacuation



Properly curled chips
 (photo taken by a high speed camera.)

MFWN90 Face Mill



Toolholder Dimensions

Description			Stock	No. of Inserts	Dimension (mm)										Drawing	Weight (kg)	Shim	Coolant Hole	
					ØD	Ød	Ød1	Ød2	H	E	a	b	Ød3	Ød4					
Bore Dia. Inch Spec	Coarse Pitch	MFWN 90080R-4T	●	4	80	25.4	20	13	50	27	6	9.5	-	-	Fig.1	1.0	Yes	-	
		MFWN 90100R-5T	●	5	100	31.75	46	34		8	12.7	Fig.2			1.3				
		MFWN 90125R-6T	●	6	125	38.1	55	63	38	10	15.9	Fig.3			2.6				
		MFWN 90160R-8T	●	8	160	50.8	72			11	19.1	Fig.4			3.9				
		MFWN 90200R-10T	●	10	200	47.625	110	101.6	40	14	25.4	18			26	Fig.4			6.3
		MFWN 90250R-12T	●	12	250											Fig.4			8.7
	Fine Pitch	MFWN 90080R-5T	●	5	80	25.4	20	13	50	27	6	9.5	-	-	Fig.1	1.0	-	Yes	
		MFWN 90100R-7T	●	7	100	31.75	46	34		8	12.7	Fig.2			1.4				
		MFWN 90125R-8T	●	8	125	38.1	55	63	38	10	15.9	Fig.3			2.7				
		MFWN 90160R-10T	●	10	160	50.8	72			11	19.1	Fig.4			4.0				
		MFWN 90200R-12T	●	12	200	47.625	110	101.6	40	14	25.4	18			26	Fig.4			6.6
	MFWN 90250R-14T	●	14	250	Fig.4								8.9						
	Extra Fine Pitch	MFWN 90080R-7T	●	7	80	25.4	20	13	50	27	6	9.5	-	-	Fig.1	1.1	-	Yes	
		MFWN 90100R-9T	●	9	100	31.75	46	34		8	12.7	Fig.2			1.3				
		MFWN 90125R-12T	●	12	125	38.1	55	63	38	10	15.9	Fig.3			2.7				
MFWN 90160R-14T		●	14	160	50.8	72	11			19.1	Fig.4	4.1							
MFWN 90200R-16T		●	16	200	47.625	110	101.6	40	14	25.4	18	26			Fig.4	6.7			
MFWN 90250R-18T		●	18	250											Fig.4	9.1			
Metric	Coarse Pitch	MFWN 90063R-3T-M	●	3	63	22	19	11	40	21	6.3	10.4	-	-	Fig.1	0.5	Yes	-	
		MFWN 90080R-4T-M	●	4	80	27	20	13	50	24	7	12.4			Fig.2	1.0			
		MFWN 90100R-5T-M	●	5	100	32	46	63		33	9	16.4			14	20			Fig.2
		MFWN 90125R-6T-M	●	6	125	40	55		32										9
		MFWN 90160R-8T-M	●	8	160	68	66.7	63	40	14	25.7	18			26	Fig.4			3.8
		MFWN 90200R-10T-M	●	10	200	60	110									101.6			Fig.4
		MFWN 90250R-12T-M	●	12	250	Fig.4	8.4												
	Fine Pitch	MFWN 90063R-4T-M	●	4	63	22	19	11	40	21	6.3	10.4	-	-	Fig.1	0.5	-	Yes	
		MFWN 90080R-5T-M	●	5	80	27	20	13	50	24	7	12.4			Fig.2	1.0			
		MFWN 90100R-7T-M	●	7	100	32	46	63		33	9	16.4			14	20			Fig.2
		MFWN 90125R-8T-M	●	8	125	40	55		32										9
		MFWN 90160R-10T-M	●	10	160	68	66.7	63	40	14	25.7	18			26	Fig.4			3.9
		MFWN 90200R-12T-M	●	12	200	60	110									101.6			Fig.4
		MFWN 90250R-14T-M	●	14	250	Fig.4	8.7												
	Extra Fine Pitch	MFWN 90063R-5T-M	●	5	63	22	19	11	40	21	6.3	10.4	-	-	Fig.1	0.5	-	Yes	
		MFWN 90080R-7T-M	●	7	80	27	20	13	50	24	7	12.4			Fig.2	1.1			
		MFWN 90100R-9T-M	●	9	100	32	46	63		33	9	16.4			14	20			Fig.2
		MFWN 90125R-12T-M	●	12	125	40	55		32										9
		MFWN 90160R-14T-M	●	14	160	68	66.7	63	40	14	25.7	18			26	Fig.4			3.9
		MFWN 90200R-16T-M	●	16	200	60	110									101.6			Fig.4
		MFWN 90250R-18T-M	●	18	250	Fig.4	8.8												

※ Dimension S: 8mm (GM, SM, GH, GL Chipbreakers)

● : Std. Stock

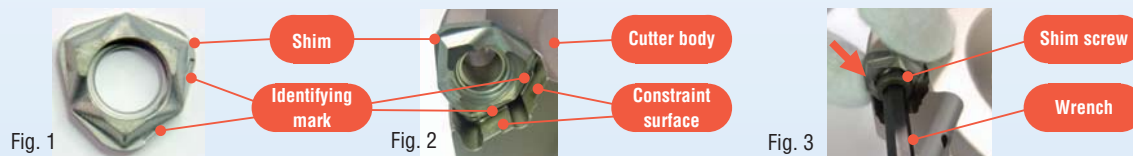
Description		Spare Parts										
		Clamp Screw	Wrench		Shim	Shim Screw	Wrench	Anti-seize Compound	Mounting bolt			
			TT	DTM								
Coarse Pitch	MFWN 90063R-3T-M	SB-50140TR	TT-15	-	MFWN-90	SPW-7050	LW-5	MP-1	HH10×30			
	MFWN 90080R-4T-(M)								HH12×40			
	MFWN 90100R-5T-(M)								Recommended torque for insert clamp 4.2N·m	-	Recommended torque for shim clamp 6.0N·m	-
	90250R-12T-(M)											
Fine Pitch	MFWN 90063R-4T-M	SB-50140TR	TT-15	-	-	-	-	MP-1	HH10×30			
	MFWN 90080R-5T-(M)								HH12×40			
	MFWN 90100R-7T-(M)								Recommended torque for insert clamp 4.2N·m	-	-	-
	90250R-14T-(M)											
Extra Fine Pitch	MFWN 90063R-5T-M	SB-50140TR	TT-15	-	-	-	-	MP-1	HH10×30			
	MFWN 90080R-7T-(M)	SB-40140TRN	-	DTM-15					HH12×40			
	MFWN 90100R-9T-(M)	Recommended torque for insert clamp 3.5N·m	-	-					-			
	90250R-18T-(M)											

※ Coat Anti-seize Compound (MP-1) thinly on a portion of taper and thread when insert is fixed.

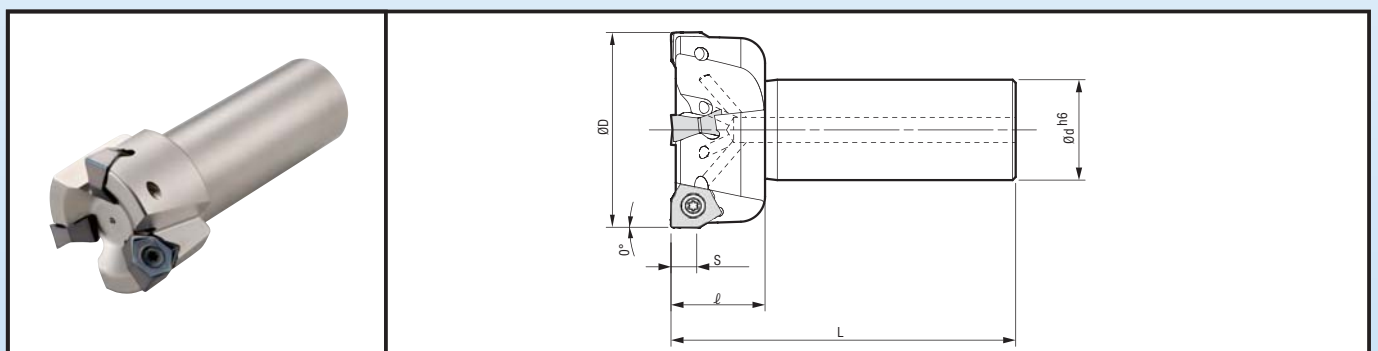
Recommended Cutting Conditions → P6

How to replace a shim (for coarse pitch)

1. Make sure to remove dust and chips from the insert mounting pocket.
2. The shim must be mounted in the proper direction. Align the identifying marks on the surface of the shim to the corresponding constraint surface (see Fig. 1) and lightly press the shim toward the constraint surface (see Fig. 2), insert the screw into the hole of the shim and tighten (See Fig. 3). When tightening the screw, make sure that the screw is vertical to the bearing surface (See Fig. 3). Recommended torque is 6.0N·m.
3. After tightening the screw, make sure that there is no clearance between the shim seat surface and the bearing surface. If there is any clearance, remove the shim and mount it again by following the above steps.



MFWN90 End Mill (with coolant hole)




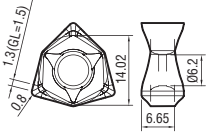



Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)					Rake Angle (°)		Coolant Hole	Spare Parts		
			ØD	Ød	L	ℓ	S	A.R. (MAX)	R.R.		Clamp Screw	Wrench	Anti-seize Compound
MFWN 90050R-S32-3T	●	3	50	32	110	30	8	+13°	-12°	Yes	SB-50140TR	TT-15	MP-1
90063R-S32-4T	●	4	63										
90080R-S32-5T	●	5	80								Recommended torque 4.2·Nm		

※Coat Anti-seize Compound (MP-1) thinly on a portion of taper and thread when insert is fixed.

● : Std. Stock

Applicable Inserts

<p>★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (For hardness under 45HRC)</p>	P	Carbon Steel / Alloy Steel	★	
		Mold Steel	★	
	M	Stainless Steel	★	
	K	Gray Cast Iron		★
		Nodular Cast Iron		★
	N	Non-ferrous Metals		
	S	Heat-resistant Alloys	★	
		Titanium Alloys		★
H	Hard Materials	□		
Insert		Description	MEGACOAT NANO	
			PR1525	PR1510
		WNMU 080608EN-GM	●	●
		WNMU 080608EN-SM	●	●
		WNMU 080608EN-GH	●	●
		WNEU 080608EN-GL	●	●

● : Std. Stock

How to mount an insert

1. Make sure to remove dust and chips from the insert mounting pocket.
2. After applying anti-seize compound on portion of a taper and the thread, attach the screw to the front end of the wrench. While lightly pressing the insert against the constraint surface, put the screw into the hole of the insert and tighten down. (See Fig. 1)
3. When tightening the screw, make sure that the wrench is parallel to the screw. Remember that the screw hole of the holder for extra fine pitch is inclined toward the bearing surface. (See Fig. 2 and Fig. 3)
4. Be careful not to use excessive torque when tightening the screw. The recommended torque is 4.2N·m for M5 screw (SB-50140TR) and 3.5N·m for M4 screw (SB-40140TRN).
5. After tightening the screw, make sure that there is no clearance between the insert seat surface and the bearing surface of the holder or between the insert side surfaces and the constraint surface of the holder. If there is any clearance, remove the insert and mount it again by following the above steps.
6. To change the cutting edge of the insert, turn the insert counterclockwise. (See Fig. 4) The insert corner identification number is stamped on the top surface of the insert.



Fig. 1

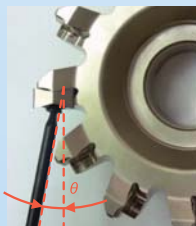


Fig. 2



Fig. 3



Fig. 4

Case Studies

FC300	
<ul style="list-style-type: none"> Machine Part Vc=170m/min ap×ae=2.5×130mm fz=0.183mm/t (Vf=500mm/min) Wet MFWN90160R-8T (8 inserts) WNMU080608ER-GM (PR1510) 	
PR1510	Chip Removal Rate = 163cc/min
Competitor A (Positive Cutter)	Chip Removal Rate = 68cc/min
<p>Competitor A performed cutting under low cutting conditions since the workpiece was slipping due to unstable chucking. With MFWN, stable cutting was possible at higher cutting conditions.</p>	
(Evaluation by user)	

FC250	
<ul style="list-style-type: none"> Frame Vc=150m/min ap×ae=4×160mm fz=0.24mm/t (Vf=715mm/min) Dry MFWN90160R-10T (10 inserts) WNMU080608ER-GM (PR1510) 	
PR1510	Chip Removal Rate = 458cc/min
Competitor B (Negative Cutter / Vertical inserts)	Chip Removal Rate = 282cc/min
<p>While Competitor B could not improve the cutting conditions due to chattering, MFWN achieved a 160% improvement with NO chattering.</p>	
(Evaluation by user)	

Manganese steel	
<ul style="list-style-type: none"> Construction equipment's part Vc=150m/min ap×ae=1×100mm fz=0.2mm/t (Vf=668mm/min) Dry MFWN90100R-7T (7 inserts) WNMU080608ER-GM (PR1525) 	
PR1525	Tool Life: 2 pcs/edge
Competitor C (Negative Cutter / Vertical inserts)	Tool Life: 1 pc/edge
<p>Even though the long overhang of the workpiece made working unstable, MFWN doubled tool life and improved efficiency by 150%.</p>	
(Evaluation by user)	

SS400	
<ul style="list-style-type: none"> Machine Part Vc=226m/min ap×ae=1.5×80mm fz=0.16mm/t (Vf=1,000mm/min) Dry MFWN90080R-7T (7 inserts) WNMU080608ER-GM (PR1525) 	
PR1525	Tool Life: 3 pcs/edge
Competitor D (Positive Cutter)	Tool Life: 1 pc/edge
<p>MFWN tripled tool life under the same cutting conditions as Competitor D.</p>	
(Evaluation by user)	

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