

THE NEW VALUE FRONTIER



Milling with double sided  
10-edge inserts | **MFPN**

# MFPN



Reduced chattering with low cutting force design

Economical 10-edge insert

Low cutting force due to curved cutting edge design

Suppresses fracturing with dual angle edge design



**NEW**

TN620M  
Cermet for milling



**NEW**

MFPN66  
66° cutting angle



Highly efficient cutter with a 66° cutting edge angle

# MFPN66



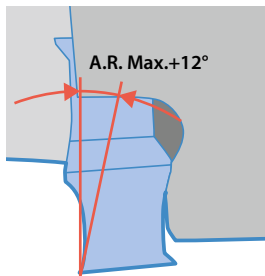
Economical inserts with 10 cutting edges. Reduces chattering with low cutting force design  
Reduces cutting costs when machining auto parts and other general purpose machining applications

## 1 Economical inserts with 10 cutting edges For low to medium depth of cut

Cost reduction in various applications from general parts to automotive parts machining

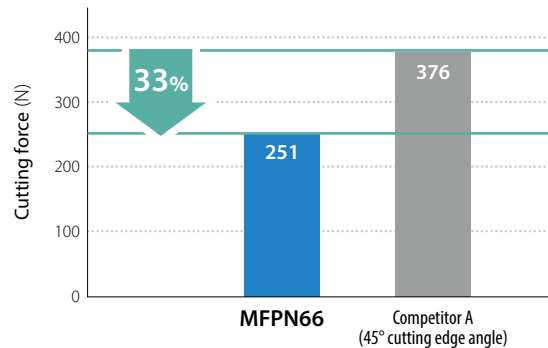
## 2 Reduces chattering with low cutting force design For stainless steel machining

Suppresses vibration for excellent surface finish with 66° cutting edge angle



Helical edge with A.R. Max. +12°

Cutting force comparison (Internal evaluation)



Thrust force is cutting resistance.

Cutting conditions: Vc = 200 m/min, fz = 0.15 mm/t, ap = 3 mm  
Cutting dia. ø63 workpiece: C50

## 3 Long tool life with MEGACOAT NANO coating technology Insert lineup also contains cermet grade for better surface finish

### Cermet for milling TN620M



1st recommendation  
(General purpose)  
GM chipbreaker



Tough edge  
GH chipbreaker



For stainless steel machining  
SM chipbreaker



Excellent wear resistance and adhesion resistance  
High quality surface finish

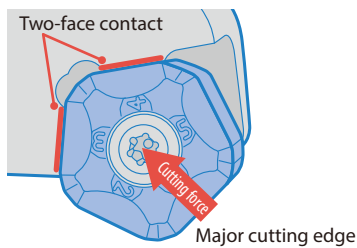
45° milling with double sided 10-edge inserts

# MFPN45

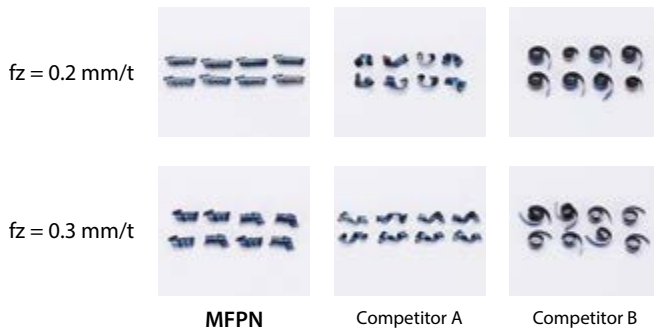
Reduced chattering with a low cutting force design and excellent fracture resistance  
Economical 10-edge insert

## 1 Economical 10-edge insert

Pentagonal double-sided inserts provide excellent stability  
Stable machining at high feed machining



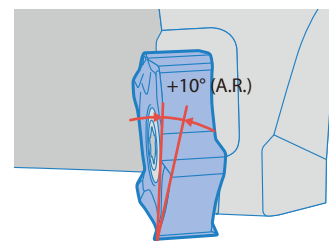
Chip evacuation (In-house evaluation)



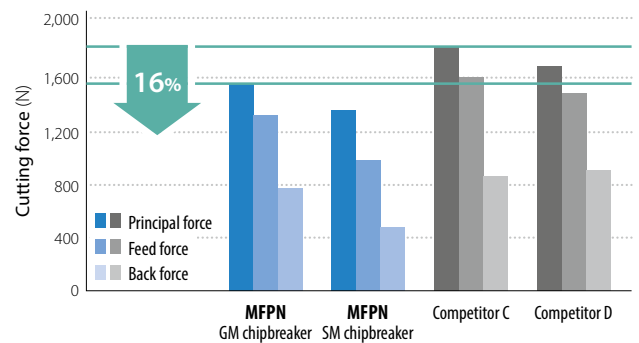
Cutting conditions:  $V_c = 150$  m/min,  $f_z = 0.2 - 0.3$  mm/t,  $a_p \times a_e = 3 \times 110$  mm  
Workpiece: C50

## 2 Resists chattering

Low cutting forces due to curved cutting edge with a high axial rake angle (max. 10°)



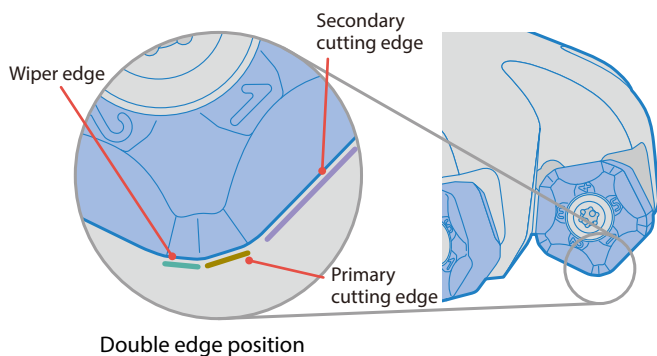
Cutting force comparison (In-house evaluation)



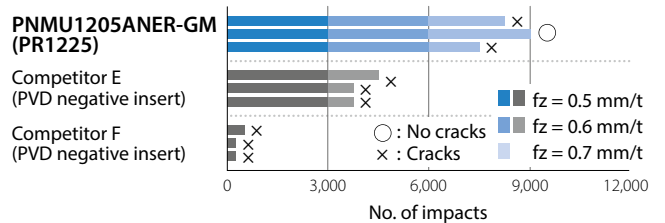
Cutting conditions:  $V_c = 150$  m/min,  $f_z = 0.1$  mm/t,  $a_p \times a_e = 5 \times 105$  mm  
Workpiece: C50

## 3 Fracture resistance

Double edge position reduces impact load and controls vibration when entering the workpiece



Fracture resistance comparison (In-house evaluation)



Cutting conditions:  $V_c = 100$  m/min,  $f_z = 0.5 - 0.7$  mm/t,  $a_p \times a_e = 2 \times 100$  mm  
(Workpiece with 20 mm width slot) Workpiece: 42CrMo4 (38 - 42 HS)

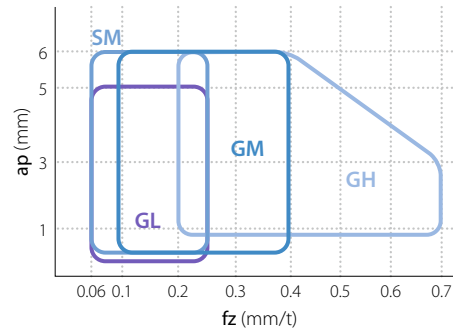
# 4

## Various chipbreakers for a wide range of applications

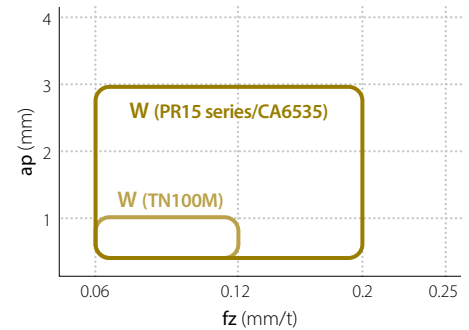
Four unique chipbreakers and a wiper insert cover a wide range of milling applications

Chipbreaker	Applications	Shape
GM	General	
SM	Low cutting force	
GH	Heavy milling	
GL	Surface finish oriented	
W	Wiper insert for finishing	

Chipbreaker recommended applications



Wiper insert recommended applications



For how to use wiper insert, see page 7

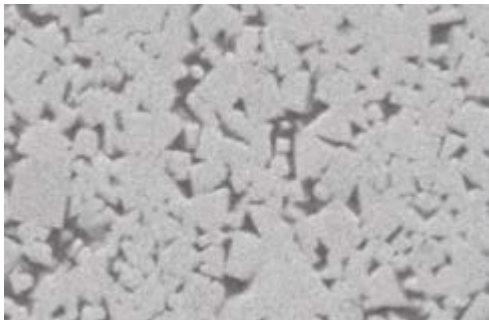
## MEGACOAT NANO PR1535

Fracture resistant with a tough substrate and high heat-resistant coating  
Stable machining of general steel, mold steel, and difficult-to-cut materials

### 1 Toughening by a new cobalt mixing ratio

\*In-house evaluation

High toughness carbide base material



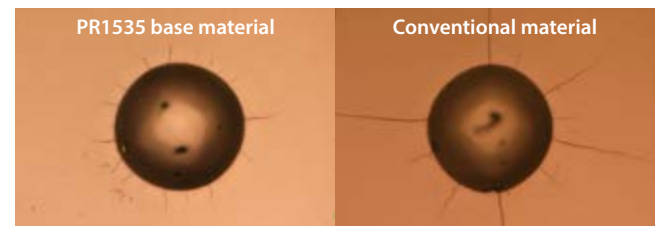
↑  
23%  
Fracture toughness\*

### 2 Stability Improvement

The coarse grain structure and uniform particle size correspond to improved heat resistance, with conductivity values decreased by 11%. The uniform structure also reduces crack propagation.

Cracking comparison by diamond indenter (In-house evaluation)

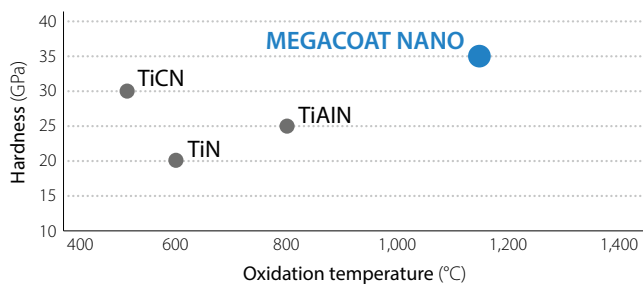
↑  
Shock resistance



Short cracks

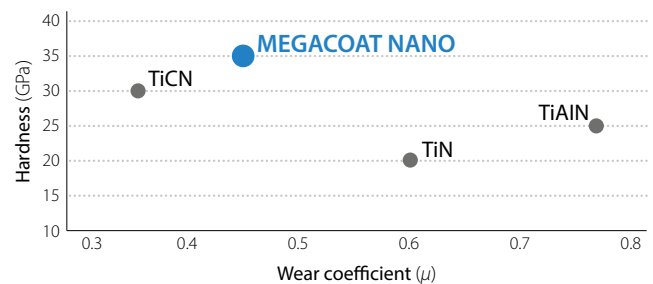
Long cracks

Coating properties (Abrasion resistance)



Low Oxidation resistance High

Coating properties (Deposition resistance)

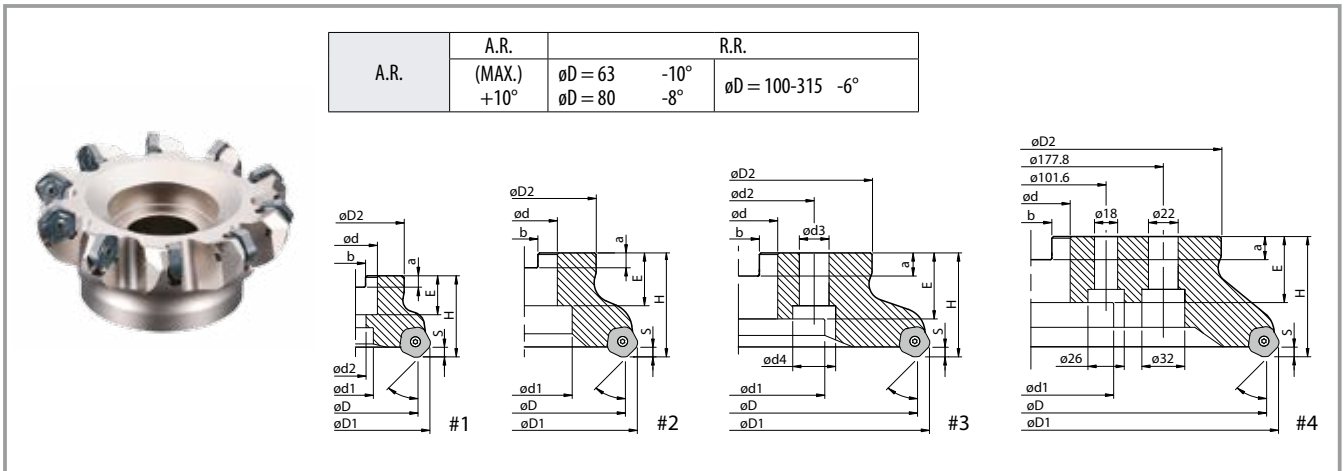


High Deposition resistance Low

Achieve long tool life with the combination of a tough substrate and a special nano coating layer.

Stable machining with excellent wear resistance.

# Face mill MFPN45



## Toolholder dimensions

Description	Availability	No. of inserts	Dimensions (mm)											Shape	Weight (kg)	Shim		
			øD	øD1	øD2	ød	ød1	ød2	H	E	a	b	ød3				ød4	
Coarse pitch	MFPN 45063R-4T-M	●	4	63	76	47	22	19	11	40	21	6.3	10.4			#1	0.5	Yes
	MFPN 45080R-5T-M	●	5	80	93	60	27	22	13	50	24	7	12.4			#1	1.1	
	MFPN 45100R-6T-M	●	6	100	113	70	32	48			30	8	14.4				#2	
	MFPN 45125R-7T-M	●	7	125	138	87	40	58		63	32	9	16.4			#3		
	MFPN 45160R-8T-M	●	8	160	173	102		68	66.7						14		20	
	MFPN 45200R-10T-M	●	10	200	213	142	60	110	101.6	63	40	14	25.7	18	26	#3	6.4	
	MFPN 45250R-12T-M	●	12	250	263												9.1	
MFPN 45315R-14T-M	MTO	14	315	328	220				80						#4	21.3		
Fine pitch	MFPN 45063R-5T-M	●	5	63	76	47	22	19	11	40	21	6.3	10.4			#1	0.5	No
	MFPN 45080R-6T-M	●	6	80	93	60	27	22	13	50	24	7	12.4			#1	1.0	
	MFPN 45100R-8T-M	●	8	100	113	70	32	48			30	8	14.4				#2	
	MFPN 45125R-10T-M	●	10	125	138	87	40	58		63	32	9	16.4			#3		
	MFPN 45160R-12T-M	●	12	160	173	102		68	66.7						14		20	
	MFPN 45200R-14T-M	●	14	200	213	142	60	110	101.6	63	40	14	25.7	18	26	#3	6.5	
	MFPN 45250R-16T-M	●	16	250	263												9.1	
MFPN 45315R-18T-M	MTO	18	315	328	220				80						#4	21.7		
Extra fine pitch	MFPN 45063R-6T-M	●	6	63	76	47	22	19	11	40	21	6.3	10.4			#1	0.5	No
	MFPN 45080R-8T-M	●	8	80	93	60	27	22	13	50	24	7	12.4			#1	1.1	
	MFPN 45100R-10T-M	●	10	100	113	70	32	48			30	8	14.4				#2	
	MFPN 45125R-13T-M	●	13	125	138	87	40	58		63	32	9	16.4			#3		
	MFPN 45160R-16T-M	●	16	160	173	102		68	66.7						14		20	
	MFPN 45200R-18T-M	●	18	200	213	142	60	110	101.6	63	40	14	25.7	18	26	#3	6.6	
	MFPN 45250R-20T-M	●	20	250	263												9.3	

Dimension S: 6 mm (GM, SM, GH chipbreakers), 5 mm (GL chipbreaker), 3 mm (W chipbreaker: PR15 series)

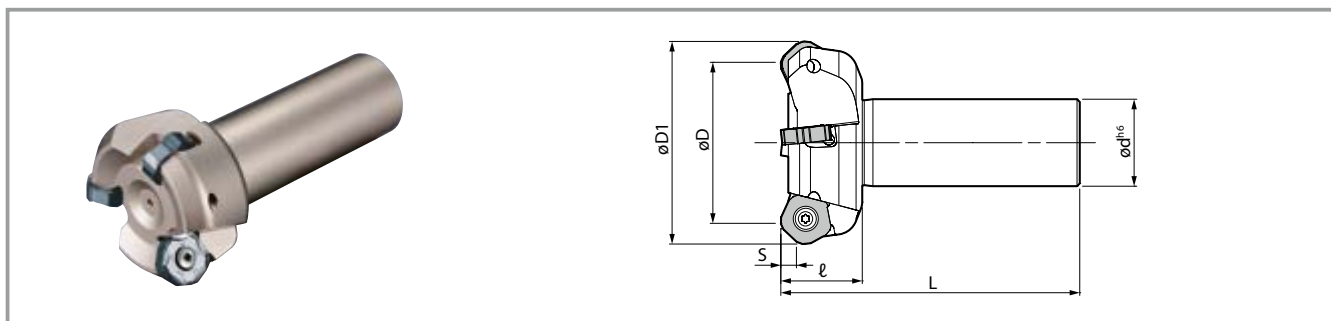
● : Available  
MTO: Made-To-Order

## Spare parts MFPN45

Description		Clamp screw	Wrench		Shim	Shim screw	Wrench	Anti-Seize compound	Mounting bolt
			TT	DTM					
Coarse pitch	MFPN 45063R-4T-M	SB-50140TR	TTW-15	—	MFPN-45	SPW-7050	LW-5	P-37	HH10 × 30
	MFPN 45080R/L-5T-(M)								HH12 × 35
	MFPN 45100R/L-6T-(M) ? 45315R-14T-(M)								Recommended torque for insert clamp 4.2 N · m
Fine pitch	MFPN 45063R-5T-M	SB-50140TR	TTW-15	—	—	—	—	P-37	HH10 × 30
	MFPN 45080R-6T-(M)								HH12 × 35
	MFPN 45100R-8T-(M) ? 45315R-18T-(M)								Recommended torque for insert clamp 4.2 N · m
Extra fine pitch	MFPN 45063R-6T-M	SB-40140TRN	—	DTM-15	—	—	—	P-37	HH10 × 30
	MFPN 45080R-8T-(M)								HH12 × 35
	MFPN 45100R-10T-(M) ? 45250R-20T-(M)								Recommended torque for insert clamp 3.5 N · m

Coat anti-seize compound (MP-1) thinly on portion of taper and thread prior to installation.

## End mill MFPN45



### Toolholder dimensions

Description	Availability	No. of inserts	Dimensions (mm)						A.R.		Spare parts		
			øD	øD1	ød	L	l	S	A.R. (MAX.)	R.R.	Clamp screw	Wrench	Anti-Seize compound
MFPN 45050R-S32-3T	●	3	50	63	32	110	30	6	+10°	-12°	SB-50140TR	TTW-15	P-37
45063R-S32-4T	●	4	63	76									
45080R-S32-5T	●	5	80	93									

Dimension S: 6 mm (GM, SM, GH chipbreakers), 5 mm (GL chipbreaker), 3 mm (W chipbreaker: PR15 series)

Coat anti-seize compound (MP-1) thinly on portion of taper and thread prior to installation.

● : Available

## Recommended chipbreaker

Cutter type	GM	SM (GL)	GH
Coarse pitch (with shim)	○	○	○
Fine pitch (without shim)	○	○	△ (Recommended under fz = 0.4 mm/t)
Extra fine pitch (without shim)	○	○	Not recommended

## Applicable insert MFPN45

Classification of usage	P	Steel	■		☆	★		☆									
		Die steel	■		☆	★		☆									
★ : Roughing / 1st choice ☆ : Roughing / 2nd choice ■ : Finishing / 1st choice □ : Finishing / 2nd choice (In case hardness is under 45HRC)	M	Austenitic stainless steel			★	☆		☆									
		Martensitic stainless steel		★	☆												
		Precipitation hardened stainless steel			★												
	K	Gray cast iron						★	☆								
		Nodular cast iron						★	☆								
	N	Non-ferrous metals															
	S	Ni-base heat-resistant alloy (Inconel® 718, etc.)		★	☆				☆								
		Titanium alloy			★				☆								
	H	High hardness steel						□									
	Insert	Description	Dimensions (mm)					Cermets	CVD coated carbide	MEGACOAT NANO			MEGACOAT				
A			T	ød	X	Z	TN100M			CA6535	PR1535	PR1525	PR1510	PR1225	PR1210		
		PNMU 1205ANER-GM	17.88	5.56	6.2	2.0	2.0	●	●	●	●	●	●	●			
General		PNMU 1205ANEL-GM						●	●	●	●	●	●	●	●	●	●
		PNMU 1205ANER-SM						●	●	●	●	●	●	●	●	●	●
Low cutting force		PNMU 1205ANER-GH						●	●	●	●	●	●	●	●	●	●
		PNEU 1205ANER-GL	17.51	5.56	6.2	2.7	2.7	●	●	●	●	●	●	●			
Tough edge (Heavy milling)		PNEU 1205ANEL-GL						●	●	●	●	●	●	●	●	●	
		PNEU 1205ANER-W	17.85			2.3	8.1	●	●	●	●	●	●	●			
Surface finish oriented (Precision class)																	
Surface finish oriented (Precision class)																	
Wiper insert (2-edge)																	

● : Available

## Reference for selecting a face mill and insert suitable for each milling purpose

Milling purpose	Face mill type			Chipbreaker				
	Coarse pitch	Fine pitch	Extra fine pitch	GM	SM	GH	GL	W
General milling for steel and alloy steel		○		○				
Steel and alloy steel (to prevent chattering due to low rigidity machine or poor clamping power)	○				○			
Productivity oriented (Running cost decrease; over ap = 4 mm, over fz = 0.35 mm/t)	○					○		
Surface finish oriented	○	○					○	○
General milling for stainless steel		○			○			
Stainless steel (to prevent chattering due to low rigidity machine or poor clamping power)	○				○			
Cast iron (for processing efficiency improvement)			○	○				
Cast iron (Over ap = 4 mm, over fz = 0.35 mm/t)	○					○		
Improved surface finish in high efficiency milling		○	○					○

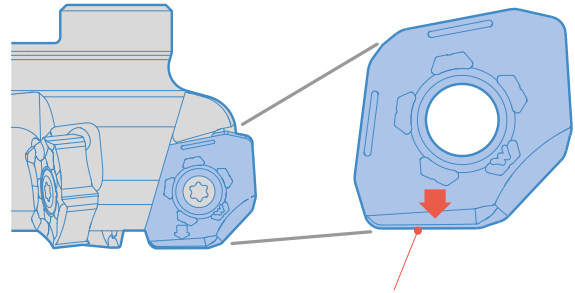
## How to use wiper inserts on MFPN45

1. Please only use one wiper insert per cutter. If you use more than 2 wiper inserts on one cutter, the workpiece surface may become smeared.
2. Combination of wiper insert with other chipbreakers.
3. Use tool presetter for measuring protrusion amount of wiper edge. Recommended protrusion amount: 0.1 mm.

Chipbreaker	GM	SM	W
Combination			
Recommended combination	○		○
Recommended combination		○	○

Using GH + W and GL + W are NOT recommended.

## How to attach wiper inserts on the MFPN45 cutter



The down arrow symbol (↓) indicates the wiper cutting edge. When mounting inserts, make sure that the arrow points downward.

## Improved surface finish with wiper insert

Chipbreaker combination	Insert	Surface finish	Workpiece surface
MFPN wiper insert PR1525 (PNMU-GM...9 inserts) (PNEU-W...1 inserts)		Ra = 0.48 μm Rz = 3.39 μm	 Shiny surface
MFPN GL chipbreaker PR1225 (PNEU-GL...10 inserts)		Ra = 2.50 μm Rz = 11.41 μm	 Shiny surface

MFPN45125R-10T (10 inserts). Cutting conditions:  $V_c = 200 \text{ m/min}^{-1}$  ( $n = 510 \text{ min}^{-1}$ ),  $f_z = 0.2 \text{ mm/t}$  ( $V_f = 1,020 \text{ mm/min}$ ),  $a_p \times a_e = 3 \times 100 \text{ mm}$ , dry, workpiece: 17Cr3  
Results above are from an internal evaluation. The surface roughness also depends on the workpiece, cutting conditions or conditions according to the actual machining situation. When the surface roughness is unstable, please set the cutting speed higher, the feed rate lower, or use a wiper insert (TN100M).

## How to mount inserts

1. Be sure to remove dust and chips from the insert mounting pocket.
2. After applying anti-seize compound on portion of taper and thread, while pressing the insert against the pocket wall, insert the screw into the hole of the insert and tighten the screw with appropriate torque. See #1 and #2. Recommended tightening torque ⇒ The torque for coarse pitch and fine pitch (using M5 screw) is 4.2 N · m. The torque for extra fine pitch (using M4 screw) is 3.5 N · m.
3. After tightening the screw, make sure that there is no clearance between the insert seat surface and the bearing surface of the holder and between the insert side surfaces and the pocket wall of the holder.
4. To change the cutting edge of the insert, turn the insert counterclockwise (see #3). Insert corner identification number is stamped on the top surface of insert with the exception of the SM chipbreaker (#4).



#1



#2



#3



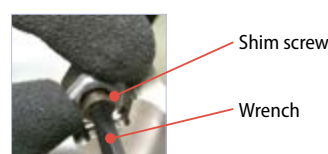
#4

## How to replace a shim (for coarse pitch)

1. Be sure to remove dust and chips from the insert mounting pocket.
2. The shim must be mounted in the proper direction. While aligning the surface of the shim with the mark on it to the corresponding pocket wall (see #5) and lightly pressing the shim toward the pocket wall, insert the screw into the hole of the shim and tighten it (see #6). When tightening the screw, make sure that the screw is vertical to the bearing surface. Recommended torque is 6.0 N · 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 according to the above steps.



#5



#6



# Recommended cutting conditions MFPN45 ★ 1st recommendation ☆ 2nd recommendation

Insert	Workpiece	Recommended feed (fz: mm/t)	Recommended insert grade (Vc: m/min)			
			MEGACOAT NANO (MEGACOAT)			CVD coated carbide
			PR1535	PR1525 (PR1225)	PR1510 (PR1210)	CA6535
GM	Carbon steel	0.1 – 0.2 – 0.4	☆ 120 – 180 – 250	★ 120 – 180 – 250	—	—
	Alloy steel	0.1 – 0.2 – 0.4	☆ 100 – 160 – 220	★ 100 – 160 – 220	—	—
	Die steel	0.1 – 0.2 – 0.35	★ 80 – 140 – 180	★ 80 – 140 – 180	—	—
	Austenitic stainless steel	0.1 – 0.2 – 0.4	☆ 100 – 160 – 200	☆ 100 – 160 – 200	—	—
	Martensitic stainless steel	0.1 – 0.2 – 0.4	☆ 150 – 200 – 250	—	—	☆ 180 – 240 – 300
	Precipitation hardened stainless steel	0.1 – 0.2 – 0.3	★ 90 – 120 – 150	—	—	—
	Gray cast iron	0.1 – 0.2 – 0.4	—	—	★ 120 – 180 – 250	—
	Nodular cast iron	0.1 – 0.2 – 0.35	—	—	★ 100 – 150 – 200	—
SM *(GL)	Ni-base heat-resistant alloy (Inconel® 718, etc.)	0.1 – 0.12 – 0.2	☆ 20 – 30 – 50	—	—	★ 20 – 30 – 50
	Carbon steel	0.06 – 0.12 – 0.25	☆ 120 – 180 – 250	☆ 120 – 180 – 250	—	—
	Alloy steel	0.06 – 0.12 – 0.25	☆ 100 – 160 – 220	☆ 100 – 160 – 220	—	—
	Die steel	0.06 – 0.1 – 0.2	☆ 80 – 140 – 180	☆ 80 – 140 – 180	—	—
	Austenitic stainless steel	0.06 – 0.12 – 0.25	★ 100 – 160 – 200	☆ 100 – 160 – 200	—	—
	Martensitic stainless steel	0.06 – 0.12 – 0.25	☆ 150 – 200 – 250	—	—	★ 180 – 240 – 300
	Precipitation hardened stainless steel	0.06 – 0.12 – 0.25	☆ 90 – 120 – 150	—	—	—
	Gray cast iron	0.06 – 0.12 – 0.25	—	—	☆ 120 – 180 – 250	—
GH	Nodular cast iron	0.06 – 0.1 – 0.2	—	—	☆ 100 – 150 – 200	—
	Ni-base heat-resistant alloy (Inconel® 718, etc.)	0.06 – 0.1 – 0.15	☆ 20 – 30 – 50	—	—	☆ 20 – 30 – 50
	Titanium alloy	0.06 – 0.08 – 0.15	★ 40 – 60 – 80	—	—	—
	Carbon steel	0.2 – 0.4 – 0.7	☆ 120 – 180 – 250	☆ 120 – 180 – 250	—	—
	Alloy steel	0.2 – 0.4 – 0.6	☆ 100 – 160 – 220	☆ 100 – 160 – 220	—	—
	Die steel	0.2 – 0.35 – 0.5	☆ 80 – 140 – 180	☆ 80 – 140 – 180	—	—
	Austenitic stainless steel	0.2 – 0.3 – 0.4	☆ 100 – 160 – 200	☆ 100 – 160 – 200	—	—
	Martensitic stainless steel	0.2 – 0.3 – 0.4	☆ 150 – 200 – 250	—	—	☆ 180 – 240 – 300
GH	Precipitation hardened stainless steel	0.2 – 0.3 – 0.4	☆ 90 – 120 – 150	—	—	—
	Gray cast iron	0.2 – 0.4 – 0.7	—	—	☆ 120 – 180 – 250	—
	Nodular cast iron	0.2 – 0.35 – 0.5	—	—	☆ 100 – 150 – 200	—
	Ni-base heat-resistant alloy (Inconel® 718, etc.)	0.2 – 0.3 – 0.4	☆ 20 – 30 – 50	—	—	☆ 20 – 30 – 50

The number in bold font is recommended starting conditions. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation

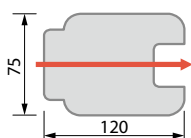
\* GL chipbreaker is recommended for surface finish-oriented application

GH chipbreaker is suitable for fine pitch cutter (fz ≤ 0.4 mm/t). It is not recommended for extra fine pitch cutter.

## Case studies

### Construction machine part 42CrMo4

Vc = 250 m/min  
 ap × ae = 2 × 3 × 75 mm  
 fz = 0.15 mm/t  
 Vf = 900 mm/min  
 Dry  
 MFPN4580R-6T (6 inserts)  
 PNMU1205ANER-SM (PR1225)



Chip removal rate

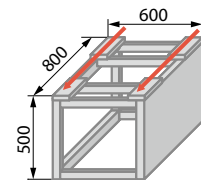
**PR1225** **202 cc/min**

Competitor G **94 cc/min**

MFPN cutter improved machining efficiency 2.1 times of the competitor E without changing spindle load. MFPN cutter was very stable at the entrance and exit of the workpiece. It controls chatter and remains stable even with low rigid machine. (User evaluation)

### Case X5CrNi1810

Vc = 90 m/min  
 ap × ae = 0.4 × 50 mm  
 fz = 0.19 mm/t  
 Vf = 410 mm/min  
 Dry  
 MFPN45080R-6T (6 inserts)  
 PNMU1205ANER-SM (PR1225)



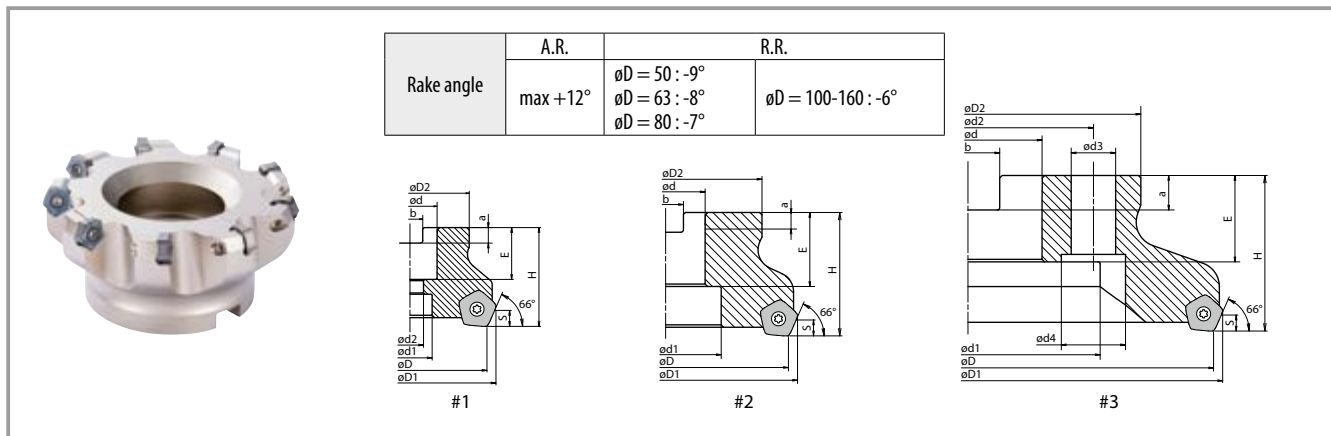
Machining efficiency

**PR1225** **1.5 pcs/corner**

Competitor H (for roughing) **1 pcs/corner**

Even when the cutting depth, cutting speed and feed rate cannot be raised due to the low rigidity of a workpiece, MFPN face mill enables stable milling without chattering and also has an improved tool life of 1.5 times. (User evaluation)

# Face mill MFPN66



## Toolholder dimensions

	Availability	No. of inserts	Dimensions (mm)													Shape	Weight (kg)	Shim
			$\phi D$	$\phi D1$	$\phi D2$	$\phi d$	$\phi d1$	$\phi d2$	H	E	a	b	$\phi d3$	$\phi d4$				
Fine pitch	MFPN 66050R-4T-M-G	●	4	50	58	48	22	18	11	40	21	6.3	10.4	—	—	#1	0.3	No
	MFPN 66063R-5T-M-G	●	5	63	71												18	
	MFPN 66080R-6T-M-G	●	6	80	88	70	27	20	13	50	24	7	12.4			#2	1.2	
	MFPN 66100R-7T-M-G	●	7	100	107	78	32	45	30								8	
	MFPN 66125R-9T-M-G	●	9	125	132	89	40	55	—	63	33	9	16.4			#3	2.8	
	MFPN 66160R-11T-M-G	●	11	160	167												14	
Extra fine pitch	MFPN 66050R-5T-M-G	●	5	50	58	48	22	18	11	40	21	6.3	10.4	—	—	#1	0.4	No
	MFPN 66063R-7T-M-G	●	7	63	71												18	
	MFPN 66080R-9T-M-G	●	9	80	88	70	27	20	13	50	24	7	12.4			#2	1.2	
	MFPN 66100R-11T-M-G	●	11	100	107	78	32	45	30								8	
	MFPN 66125R-13T-M-G	●	13	125	132	89	40	55	—	63	33	9	16.4			#3	3	
	MFPN 66160R-15T-M-G	●	15	160	167												14	

Dimension 5: 5 mm

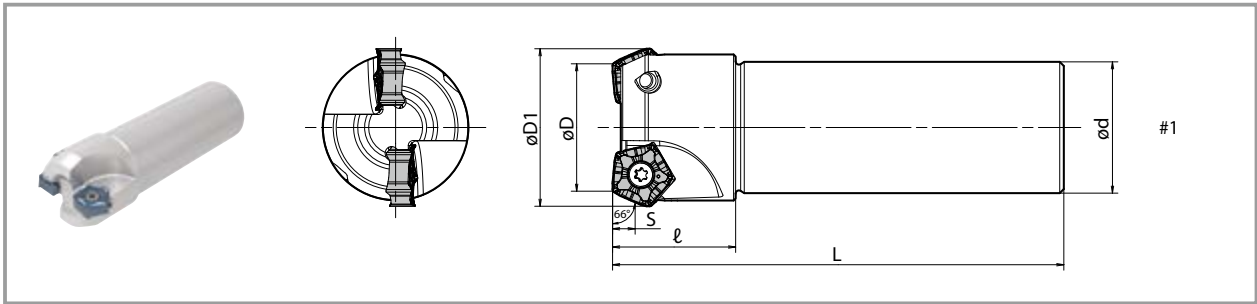
● : Available

## Spare parts MFPN66

Description		Clamp screw	Wrench	Anti-Seize compound	Arbor bolt	
Fine pitch	MFPN 66050R-4T-M-G	SB-4090TRP	DTPM-15	P-37	HH10×30	
	MFPN 66063R-5T-M-G				HH10×30	
	MFPN 66080R-6T-M-G				HH12×35	
	MFPN 66100R-7T-M-G				Recommended torque for insert clamp 3.5 N·m	—
	MFPN 66125R-9T-M-G					—
	MFPN 66160R-11T-M-G					—
Extra fine pitch	MFPN 66050R-5T-M-G	SB-4090TRP	DTPM-15	P-37	HH10×30	
	MFPN 66063R-7T-M-G				HH10×30	
	MFPN 66080R-9T-M-G				HH12×35	
	MFPN 66100R-11T-M-G				Recommended torque for insert clamp 3.5 N·m	—
	MFPN 66125R-13T-M-G					—
	MFPN 66160R-15T-M-G					—

Coat anti-seize compound thinly on portion of taper and thread prior to installation.

# End mill MFPN66



## Toolholder dimensions

Description	Availability	No. of inserts	Dimensions (mm)						Rake angle		Spare parts		
			øD	øD1	ød	L	ℓ	S	A.R. (MAX)	R.R	Clamp screw	Wrench	Anti-Seize compound
MFPN 66032R-S32-2T-G	●	2	32	39.5	32	110	30	5	12°	-14°	SB-4090TRP	DTPM-15	P-37
66040R-S32-3T-G	●	3	40	47.5							-12°	Recommended torque for insert clamp 3.5 N·m	

● : Available

## Applicable inserts

Classification of usage											
★ : Roughing / 1st choice ☆ : Roughing / 2nd choice ■ : Finishing / 1st choice □ : Finishing / 2nd choice (In case hardness is under 45HRC)	P	Carbon steel / Alloy steel	☆	★			★				
		Die steel	☆	★			★				
	M	Austenitic stainless steel	★	☆							
		Martensitic stainless steel	★								
		Precipitation hardened stainless steel	★								
	K	Gray cast iron						★			
		Nodular cast iron (FCD)						★			
	N	Non ferrous metals									
	S	Ni-base heat-resistant alloys (Inconel®)	★								
		Titanium alloy	★								
H	High hardness steel						□				
Shape	Description	Dimensions (mm)					MEGACOAT NANO			Cermet	
		A	T	ød	X	Z	rε	PR1535	PR1525	PR1510	TN620M
	PNMU 0905XNER-GM	14.6	5.56	4.7	2	2	0.8	●	●	●	●
	PNMU 0905XNER-SM							●	●	●	
	PNMU 0905XNER-GH							●	●	●	

● : Available

## Applicable chipbreaker

Cutter	Insert		
	GM	SM	GH
Fine pitch	○	○	○
Extra fine pitch	○	○	fz = 0.2 mm/t is recommended

## Recommended cutting conditions MFPN66 ★ 1st recommendation ☆ 2nd recommendation

### Coated carbide

Insert	Workpiece	Feed (fz: mm/t)	Recommended insert grade (Cutting conditions Vc: m/min)		
			MEGACOAT NANO		
			PR1535	PR1525	PR1510
GM	Carbon steel	0.1 – 0.2 – 0.3	☆ 120 – 180 – 250	★ 120 – 180 – 250	—
	Alloy steel	0.1 – 0.2 – 0.3	☆ 100 – 160 – 220	★ 100 – 160 – 220	—
	Die steel	0.1 – 0.18 – 0.25	★ 80 – 140 – 180	★ 80 – 140 – 180	—
	Austenitic stainless steel	0.1 – 0.18 – 0.25	☆ 100 – 150 – 200	☆ 100 – 150 – 200	—
	Martensitic stainless steel	0.1 – 0.18 – 0.25	☆ 100 – 150 – 200	—	—
	Precipitation hardened stainless steel	0.1 – 0.18 – 0.25	★ 90 – 120 – 150	—	—
	Gray cast iron	0.1 – 0.2 – 0.3	—	—	★ 120 – 180 – 250
	Nodular cast iron	0.1 – 0.18 – 0.25	—	—	★ 100 – 150 – 200
	Ni-base heat-resistant alloy (Inconel® etc.)	0.1 – 0.12 – 0.2	☆ 20 – 30 – 50	—	—
SM	Carbon steel	0.06 – 0.12 – 0.2	—	☆ 120 – 180 – 250	—
	Alloy steel	0.06 – 0.12 – 0.2	—	☆ 100 – 160 – 220	—
	Die steel	0.06 – 0.1 – 0.15	—	☆ 80 – 140 – 180	—
	Austenitic stainless steel	0.06 – 0.12 – 0.2	★ 100 – 150 – 200	☆ 100 – 150 – 200	—
	Martensitic stainless steel	0.06 – 0.12 – 0.2	★ 100 – 150 – 200	—	—
	Precipitation hardened stainless steel	0.06 – 0.12 – 0.2	☆ 90 – 120 – 150	—	—
	Gray cast iron	0.06 – 0.12 – 0.2	—	—	☆ 120 – 180 – 250
	Nodular cast iron	0.06 – 0.1 – 0.15	—	—	☆ 100 – 150 – 200
	Ni-base heat-resistant alloy (Inconel®, etc.)	0.06 – 0.08 – 0.15	★ 20 – 30 – 50	—	—
	Titanium alloy	0.06 – 0.08 – 0.15	★ 40 – 60 – 80	—	—
GH*	Carbon steel	0.15 – 0.25 – 0.35	—	☆ 120 – 180 – 250	—
	Alloy steel	0.15 – 0.25 – 0.35	—	☆ 100 – 160 – 220	—
	Die steel	0.1 – 0.2 – 0.3	—	☆ 80 – 140 – 180	—
	Gray cast iron	0.15 – 0.25 – 0.35	—	—	☆ 120 – 180 – 250
	Nodular cast iron	0.1 – 0.2 – 0.3	—	—	☆ 100 – 150 – 200

\*When using GH chipbreaker for fine pitch cutters, recommended feed is fz 0.2 (mm/t)

★ 1st recommendation ☆ 2nd recommendation

### Cermet

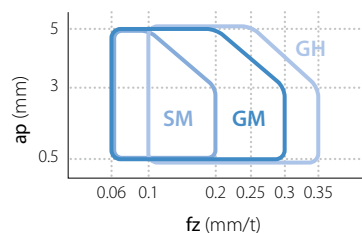
Insert	Workpiece	Feed (fz: mm/t)	Recommended insert grade (Cutting conditions Vc: m/min)
			Cermet
			TN620M
GM	Carbon steel	0.06 – 0.12 – 0.15	★ 200 – 250 – 300
	Alloy steel	0.06 – 0.12 – 0.15	★ 180 – 220 – 250
	Die steel	0.06 – 0.1 – 0.13	★ 150 – 180 – 220

★ 1st recommendation

The number in bold font is recommended starting conditions. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation  
Cutting with coolant is recommended for Ni-base heat resistant alloy and titanium alloy.

## Chipbreaker recommended applications

### Coated carbide



### Cermet

