



MFPN

45° Milling with Double-sided 10-edge Inserts



Reduced Chattering with a Low Cutting Force Design

Economical 10-edge Insert

Low Cutting Force due to Curved Cutting Edge Design

Suppresses Fracturing with Dual Angle Edge Design



PR18 Series Inserts with MEGACOAT
NANO EX Coating Technology

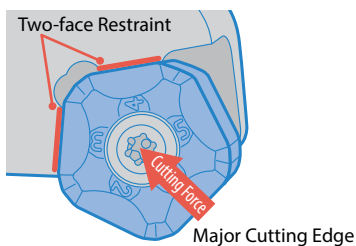


MFPN

Reduced Chattering with a Low Cutting Force Design and Excellent Fracture Resistance
Economical 10-edge Inserts

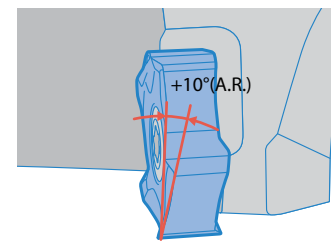
1 Economical 10-edge Inserts

Pentagonal double-sided inserts provide excellent stability and stable machining at high feed rates

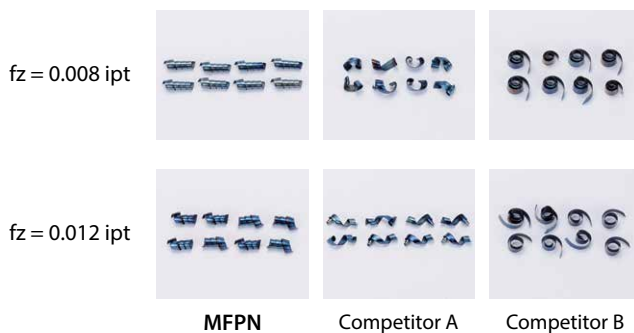


2 Resists Chattering

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

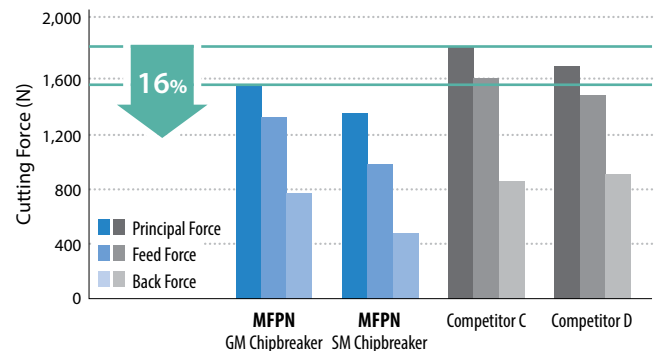


Chip Evacuation (In-house Evaluation)



Cutting Conditions: $V_c = 490$ sfm, $f_z = 0.008 - 0.012$ ipt, D.O.C. $\times$ ae = $0.118'' \times 4.331''$
Workpiece: 1049

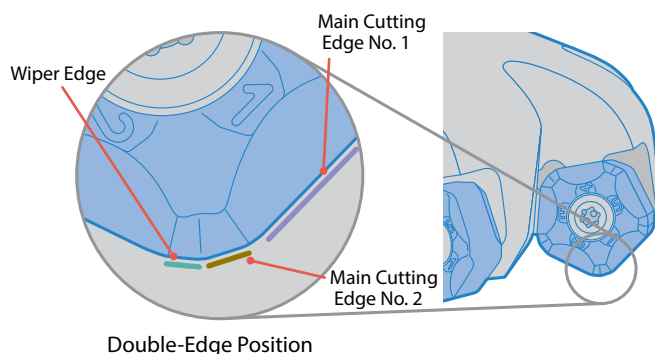
Cutting Force Comparison (In-house Evaluation)



Cutting Conditions: $V_c = 490$ sfm, $f_z = 0.004$ ipt, D.O.C. $\times$ ae = $0.197'' \times 4.134''$
Workpiece: 1049

3 Fracture Resistance

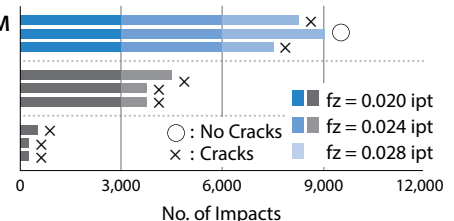
Double-edge position reduces impact load and controls vibration when exiting the workpiece



PNMU1205ANER-GM (PR1225)

Competitor E (PVD Negative Insert)

Competitor F (PVD Negative Insert)



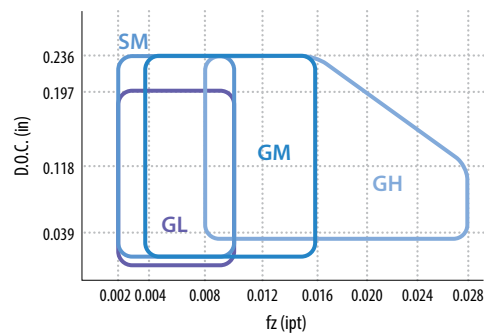
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Various Chipbreakers for a Wide Range of Applications

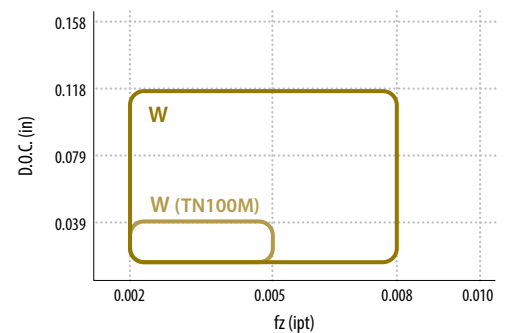
Four unique chipbreakers and a wiper insert cover a wide range of milling applications

Chipbreaker	Applications	Shape
GM	General	
SM	Low Cutting Force	
GH	Heavy Milling	
GL	Surface Finish Oriented	
W	Wiper Insert for Finishing	

Recommended Chipbreaker Applications



Recommended Wiper Insert Applications



For How to Use Wiper Inserts See [Page 10](#)

Next-generation PVD coating for milling **NEW**

PR18 Series

Kyocera's Nano Layer Coating Technology
Longer Tool Life with Next-generation Coating for Milling



For steel, stainless steel and cast iron ■ ■ ■

PR1825/PR1835/PR1810 New development MEGACOAT NANO EX

PR1825

P

PR1835

M

PR1810

K

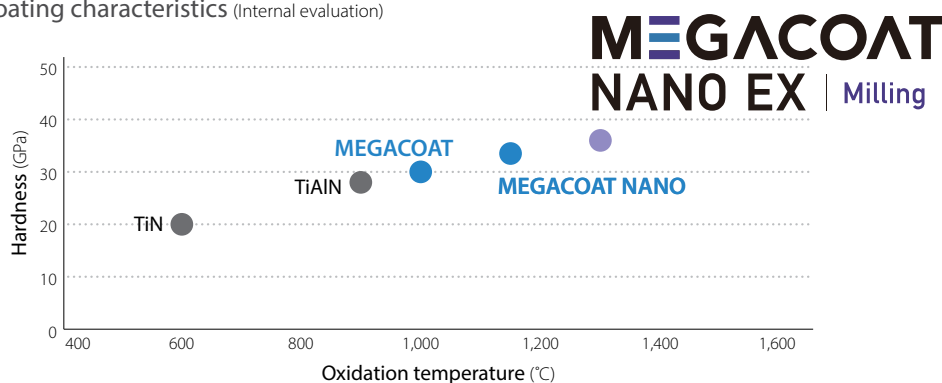
For Steel (Wear resistance oriented)

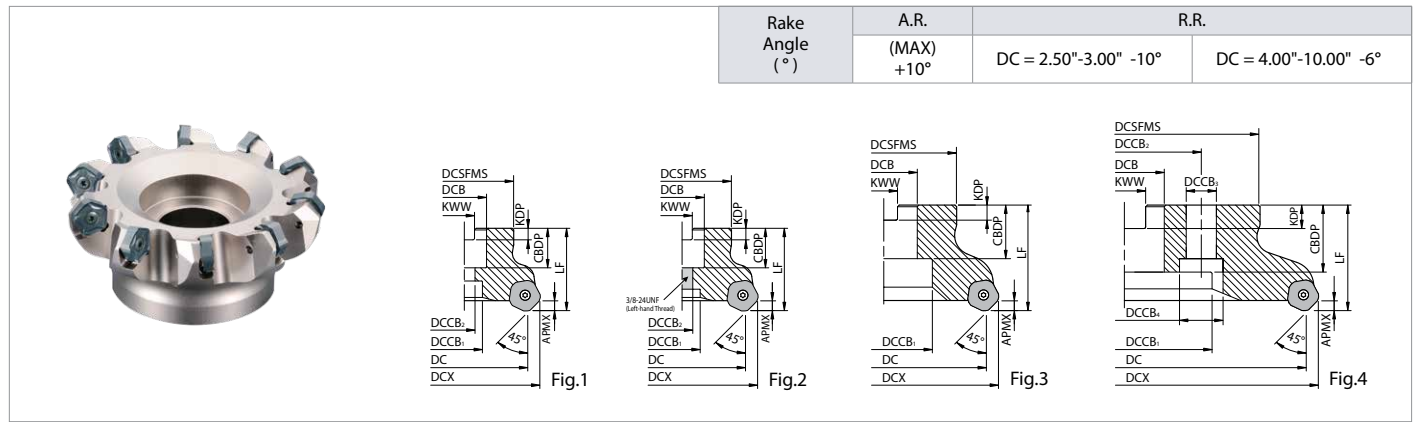
For Steel (Stability oriented)
1st Recommendation for stainless steel

For Cast iron

Workpiece	P Steel					M Stainless steel					K Cast iron				
ISO	01	10	20	30	40	01	10	20	30	40	01	10	20	30	40
Grade	Wear resistance oriented PR1825					1st Recommendation PR1835					1st Recommendation PR1810				
	Stability oriented PR1835														

Coating characteristics (Internal evaluation)





Face Mill Dimensions (Inch Size)

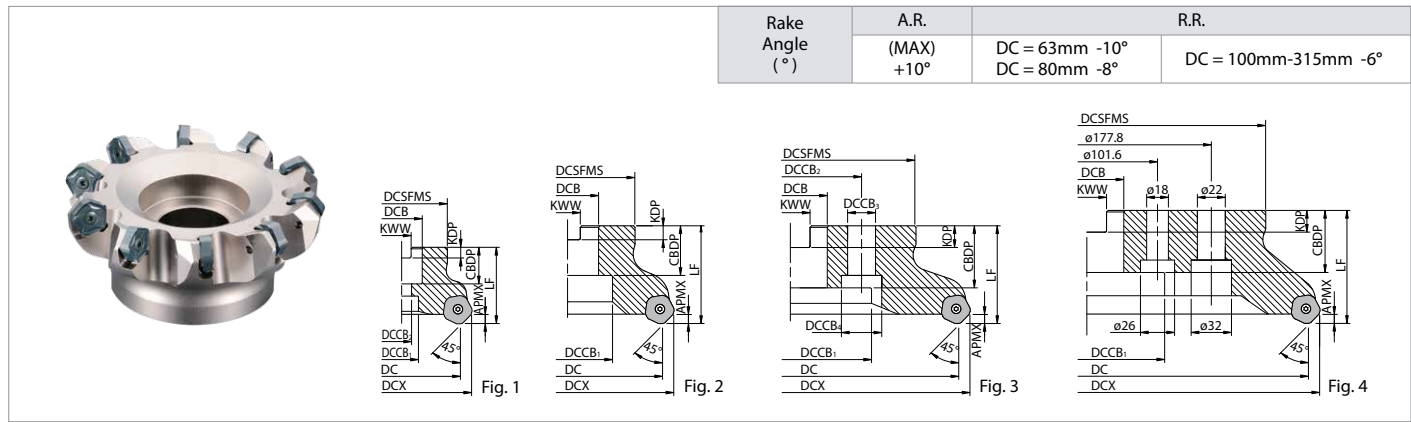
Part Number			Stock	No. of Inserts	Dimensions (in)												Drawing	Weight (kg)	Shim
					DC	DCX	DCSFMS	DCB	DCCB1	DCCB2	LF	CBDP	KDP	KWW	DCCB3	DCCB4			
Coarse Pitch	MFPN	452500R-4T	●	4	2.500	2.815	1.890	0.750	0.669	0.433	1.575	0.750	0.187	0.313	-	-	Fig.1	0.5	✓
		453000R-5T	●	5	3.000	3.315	2.283	1.000	0.866	0.551	1.969	1.063	0.236	0.375	-	-	Fig.1	1.1	
		454000R-6T	●	6	4.000	4.315	2.756	1.500	2.047	-	1.969	1.142	0.394	0.625	-	-	Fig.3	1.4	
		455000R-7T	●	7	5.000	5.315	3.425	1.500	2.283	-	2.480	1.417	0.394	0.625	-	-	Fig.3	2.6	
		456000R-8T	●	8	6.000	6.315	4.016	2.000	2.835	-	2.480	1.496	0.433	0.750	-	-	Fig.3	3.8	
		458000R-10T	●	10	8.000	8.315	5.591	2.500	3.937	4.000	2.480	1.575	0.551	1.000	0.709	1.024	Fig.4	6.6	
		4510000R-12T	●	12	10.000	10.315	5.591	2.500	3.937	4.000	2.480	1.575	0.551	1.000	0.709	1.024	Fig.4	9.3	
Fine Pitch	MFPN	452000R-4T	●	4	2.000	2.315	1.750	0.750	-	3/8-24UNF	1.969	0.830	0.187	0.313	-	-	Fig.2	0.3	×
		452500R-5T	●	5	2.500	2.815	1.890	0.750	0.669	0.433	1.575	0.750	0.187	0.313	-	-	Fig.1	0.5	
		453000R-6T	●	6	3.000	3.315	2.283	1.000	0.866	0.551	1.969	1.063	0.236	0.375	-	-	Fig.1	1.1	
		454000R-8T	●	8	4.000	4.315	2.756	1.500	2.047	-	1.969	1.142	0.394	0.625	-	-	Fig.3	1.3	
		455000R-10T	●	10	5.000	5.315	3.425	1.500	2.283	-	2.480	1.417	0.394	0.625	-	-	Fig.3	2.6	
		456000R-12T	●	12	6.000	6.315	4.016	2.000	2.835	-	2.480	1.496	0.433	0.750	-	-	Fig.3	3.9	
		458000R-14T	●	14	8.000	8.315	5.591	2.500	3.937	4.000	2.480	1.575	0.551	1.000	0.709	1.024	Fig.4	6.6	
		4510000R-16T	●	16	10.000	10.315	5.591	2.500	3.937	4.000	2.480	1.575	0.551	1.000	0.709	1.024	Fig.4	9.3	
Extra-Fine Pitch	MFPN	452500R-6T	●	6	2.500	2.815	1.890	0.750	0.669	0.433	1.575	0.750	0.187	0.313	-	-	Fig.1	0.5	×
		453000R-8T	●	8	3.000	3.315	2.283	1.000	0.866	0.551	1.969	1.063	0.236	0.375	-	-	Fig.1	1.1	
		454000R-10T	●	10	4.000	4.315	2.756	1.500	2.047	-	1.969	1.142	0.394	0.625	-	-	Fig.3	1.3	
		455000R-13T	●	13	5.000	5.315	3.425	1.500	2.283	-	2.480	1.417	0.394	0.625	-	-	Fig.3	2.6	
		456000R-16T	●	16	6.000	6.315	4.016	2.000	2.835	-	2.480	1.496	0.433	0.750	-	-	Fig.3	3.9	

Dimension APMX is 0.236" for GM, SM, GH Chipbreakers, 0.197" for GL Chipbreaker, and 0.118" for W Chipbreaker

● : Standard Stock

Spare Parts See [Page 6](#)

Applicable Inserts See [Page 8](#)



Face Mill Dimensions (Metric Size)

Part Number			Stock		No. of Inserts	Dimensions (mm)												DCCB3	DCCB4	Drawing	Weight (kg)	Shim
			R	L		DC	DCX	DCSFMS	DCB	DCCB1	DCCB2	LF	CBDP	KDP	KWW							
Inch Bore Dia.	Coarse Pitch	MFPN 45080 ^R L-5T	●	●	5	80	93	60	1.000"	22	13.0	50	1.063"	0.236"	0.375"	-	-	Fig.1	1.1	✓		
		45100 ^R L-6T	●	●	6	100	113	70	1.250"	48	-	50	1.260"	0.315"	0.500"			Fig.2	1.4			
		45125 ^R L-7T	●	●	7	125	138	87	1.500"	58	-	63	1.417"	0.394"	0.625"			Fig.2	2.6			
		45160 ^R L-8T	●	●	8	160	173	102	2.000"	72	-	63	1.496"	0.433"	0.750"			Fig.2	4.0			
		45200R-10T	●		10	200	213	142	1.875"	110	4.000"	63	1.575"	0.551"	1.000"			Fig.3	6.7			
		45250R-12T	●		12	250	263	142	1.875"	110	4.000"	63	1.575"	0.551"	1.000"			Fig.3	9.4			
	Fine Pitch	MFPN 45080R-6T	●		6	80	93	60	1.000"	22	13.0	50	1.063"	0.236"	0.375"	-	-	Fig.1	1.1	×		
		45100R-8T	●		8	100	113	70	1.250"	48	-	50	1.260"	0.315"	0.500"			Fig.2	1.4			
		45125R-10T	●		10	125	138	87	1.500"	58	-	63	1.417"	0.394"	0.625"			Fig.2	2.7			
		45160R-12T	●		12	160	173	102	2.000"	72	-	63	1.496"	0.433"	0.750"			Fig.2	4.0			
		45200R-14T	●		14	200	213	142	1.875"	110	4.000"	63	1.575"	0.551"	1.000"			Fig.3	6.9			
		45250R-16T	●		16	250	263	142	1.875"	110	4.000"	63	1.575"	0.551"	1.000"			Fig.3	9.6			
	Extra-Fine Pitch	MFPN 45080R-8T	●		8	80	93	60	1.000"	22	13.0	50	1.063"	0.236"	0.375"	-	-	Fig.1	1.1	×		
		45100R-10T	●		10	100	113	70	1.250"	48	-	50	1.260"	0.315"	0.500"			Fig.2	1.3			
		45125R-13T	●		13	125	138	87	1.500"	58	-	63	1.417"	0.394"	0.625"			Fig.2	2.7			
		45160R-16T	●		16	160	173	102	2.000"	72	-	63	1.496"	0.433"	0.750"			Fig.2	4.0			
		45200R-18T	●		18	200	213	142	1.875"	110	4.000"	63	1.575"	0.551"	1.000"			Fig.3	6.9			
		45250R-20T	●		20	250	263	142	1.875"	110	4.000"	63	1.575"	0.551"	1.000"			Fig.3	6.9			
Metric Bore Dia.	Coarse Pitch	MFPN 45063R-4T-M	●		4	63	76	47	22	19	11.0	40	21	6.3	10.4	-	-	Fig.1	0.5	✓		
		45080R-5T-M	●		5	80	93	60	27	22	13.0	50	24	7.0	12.4			Fig.1	1.1			
		45100R-6T-M	●		6	100	113	70	32	48	-	50	30	8.0	14.4			Fig.2	1.4			
		45125R-7T-M	●		7	125	138	87	40	58	-	63	32	9.0	16.4			Fig.2	2.6			
		45160R-8T-M	●		8	160	173	102	40	68	66.7	63	32	9.0	16.4			Fig.3	3.8			
		45200R-10T-M	●		10	200	213	142	60	110	101.6	63	40	14.0	25.7			Fig.3	6.4			
		45250R-12T-M	●		12	250	263	142	60	110	101.6	63	40	14.0	25.7			Fig.3	9.1			
		45315R-14T-M	□		14	315	328	220	60	110	-	80	40	14.0	25.7			Fig.1	21.3			
	Fine Pitch	MFPN 45063R-5T-M	●		5	63	76	47	22	19	11.0	40	21	6.3	10.4	-	-	Fig.1	0.5	×		
		45080R-6T-M	●		6	80	93	60	27	22	13.0	50	24	7.0	12.4			Fig.2	1.0			
		45100R-8T-M	●		8	100	113	70	32	48	-	50	30	8.0	14.4			Fig.2	1.4			
		45125R-10T-M	●		10	125	138	87	40	58	-	63	32	9.0	16.4			Fig.3	2.5			
		45160R-12T-M	●		12	160	173	102	40	68	66.7	63	32	9.0	16.4			Fig.3	3.8			
		45200R-14T-M	●		14	200	213	142	60	110	101.6	63	40	14.0	25.7			Fig.3	6.5			
		45250R-16T-M	●		16	250	263	142	60	110	101.6	63	40	14.0	25.7			Fig.1	9.1			
	Extra-Fine Pitch	MFPN 45063R-6T-M	●		6	63	76	47	22	19	11.0	40	21	6.3	10.4	-	-	Fig.1	0.5	×		
		45080R-8T-M	●		8	80	93	60	27	22	13.0	50	24	7.0	12.4			Fig.2	1.1			
		45100R-10T-M	●		10	100	113	70	32	48	-	50	30	8.0	14.4			Fig.2	1.3			
45125R-13T-M		●		13	125	138	87	40	58	-	63	32	9.0	16.4	Fig.2			2.6				

Dimension APMX is 0.236" for GM, SM, GH Chipbreakers, 0.197" for GL Chipbreaker, and 0.118" for W Chipbreaker

● : Standard Stock
□ : Made to Order / Quoted Item

Spare Parts See [Page 6](#)

Applicable Inserts See [Page 8](#)

Spare Parts

Inch Size Face Mill Spare Parts

Part Number		Insert Screw	Wrench		Shim	Shim Screw	Wrench	Anti-Seize Compound	Arbor Bolt	Mounting Screw
			TTW ^{*1}	DTM						
Coarse Pitch	MFPN 452500R-4T	SB-50140TR	TTW-15 (TT-15)	-	MFPN-45	SPW-7050	LW-5	P-37	HH3/8-1.25	-
	453000R-5T									
	454000R-6T									
	4510000R-12T									
Fine Pitch	MFPN 452000R-4T	SB-50140TR	TTW-15 (TT-15)	-	-	-	-	P-37	-	XNS610 ^{*2}
	452500R-5T									
	453000R-6T									
	454000R-8T									
Extra-Fine Pitch	MFPN 452500R-6T	SB-40140TRN	-	DTM-15	-	-	-	P-37	HH3/8-1.25	-
	453000R-8T									
	454000R-10T									
	456000R-16T									

Coat Anti-Seize Compound (P-37) thinly on portion of taper and thread prior to installation.

Recommended Cutting Conditions See [Page 9](#)

^{*1} TTW-15 wrenches will replace older TT-15 wrenches. Either model is compatible. ^{*2} Differential screw (3/8-24UNF)

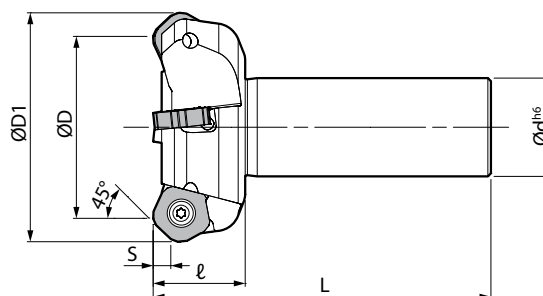
Metric Size Face Mill Spare Parts

Part Number		Insert Screw	Wrench		Shim	Shim Screw	Wrench	Anti-Seize Compound	Arbor Bolt	Mounting Screw
			TTW ^{*1}	DTM						
Coarse Pitch	MFPN 45063R-4T-M	SB-50140TR	TTW-15 (TT-15)	-	MFPN-45	SPW-7050	LW-5	P-37	HH10 × 30	-
	45080 ^{PH} -5T-(M)									
	45100 ^{PH} -6T-(M)									
	45315R-14T-(M)									
Fine Pitch	MFPN 45063R-5T-M	SB-50140TR	TTW-15 (TT-15)	-	-	-	-	P-37	HH10 × 30	-
	45080R-6T-(M)									
	45100R-8T-(M)									
	45315R-18T-(M)									
Extra-Fine Pitch	MFPN 45063R-6T-M	SB-40140TRN	-	DTM-15	-	-	-	P-37	HH10 × 30	-
	45080R-8T-(M)									
	45100R-10T-(M)									
	45125R-13T-(M)									

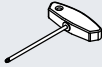
Coat Anti-Seize Compound (P-37) thinly on portion of taper and thread prior to installation.

Recommended Cutting Conditions See [Page 9](#)

^{*1} TTW-15 wrenches will replace older TT-15 wrenches. Either model is compatible.



End Mill Dimensions

Part Number		Stock	Unit	No. of Inserts	Dimensions						Rake Angle (°)		Spare Parts		
					DC	DCX	DCON	LF	LH	APMX	A.R. (Max)	R.R.	Insert Screw	Wrench*1	Anti-Seize Compound
															
Weldon Shank	MFPN 452000R-W125-3T	●	inch	3	2.00	2.31	1.25	3.60	1.18	0.236 (0.197)	+10°	-12°	SB-50140TR	TTW-15 (TT-15)	P-37
	452500R-W125-4T	●		4	2.50	2.81						-10°			
	453000R-W125-5T	●		5	3.00	3.31									
Cylindrical Shank	MFPN 45050R-S32-3T	●	mm	3	50	63	32	110	30	6 (5)	+10°	-12°	SB-50140TR	TTW-15 (TT-15)	P-37
	45063R-S32-4T	●		4	63	76						-10°			
	45080R-S32-5T	●		5	80	93									

● : Standard Stock

Coat Anti-Seize Compound (P-37) thinly on portion of taper and thread prior to installation.

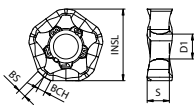
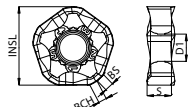
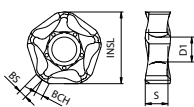
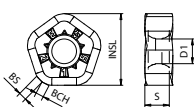
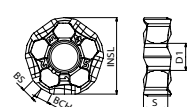
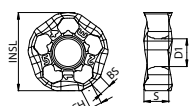
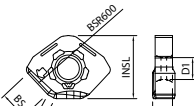
Dimension APMX is 0.236" (6mm) for GM, SM, GH Chipbreakers, 0.197" (5mm) for GL Chipbreaker, and 0.118" (3mm) for W Chipbreaker

*1 TTW-15 wrenches will replace older TT-15 wrenches. Either model is compatible.

Applicable Inserts See [Page 8](#)

Recommended Cutting Conditions See [Page 9](#)

Applicable Inserts

Usage Classification		P	Carbon Steel / Alloy Steel									★	☆		★	☆			■		
			Mold Steel									★	☆		★	☆			■		
★ Roughing / 1st Choice ☆ Roughing / 2nd Choice ■ Finishing / 1st Choice □ Finishing / 2nd Choice (When hardness is under 45HRC)		M	Austenitic Stainless Steel									☆	☆		☆	★					
			Martensitic Stainless Steel							★			☆			☆					
			Precipitation Hardened Stainless Steel										★			★					
		K	Gray Cast Iron								★				★						
			Ductile Cast Iron								★				★						
		S	Heat Resistant Alloy (Ni-base)								★			☆				☆			
			Titanium Alloy (Ti-6Al-4V)															★			
H	Hardened Materials																★				
Insert		Description	Dimensions (in)					CVD	NEW MEGACOAT NANO EX				MEGACOAT NANO			MEGA COAT HARD	Cermet				
			INSL	S	D1	BCH	BS	CA6535	PR1810	PR1825	PR1835	PR1510	PR1525	PR1535	PR015S	TN100M	TN620M				
 General		PNMU 1205ANER-GM						●	●	●	●	●	●	●				●			
 General		PNMU 1205ANEL-GM	0.704	0.219	0.244	0.079	0.079	●	●	●	●	●	●	●				●			
 Low Cutting Force		PNMU 1205ANER-SM						●	●	●	●	●	●	●							
 Tough Edge (Heavy Milling)		PNMU 1205ANER-GH	0.708	0.243	0.244	0.079	0.079	●	●	●	●	●	●	●	●						
 Surface Finish Oriented (Precision Class)		PNEU 1205ANER-GL						●	●	●	●	●	●	●				●			
			0.689	0.219	0.244	0.106	0.106														
 Surface Finish Oriented (Precision Class)		PNEU 1205ANEL-GL						●	●	●	●	●	●	●				●			
 Wiper Insert (2-edge)		PNEU 1205ANER-W	0.703	0.219	0.244	0.091	0.319	●	●	●	●	●	●	●			●	●			

● : Standard Stock

Recommended Cutting Conditions See [Page 9](#)

Recommended Cutting Conditions ★ 1st Recommendation ☆ 2nd Recommendation

Chipbreaker	Workpiece	Feed fz (ipt) () : TN620M	Recommended Insert Grade (Vc: sfm)								
			Cermet	MEGACOAT NANO EX			MEGACOAT NANO (MEGACOAT)			MEGACOAT HARD	CVD
			TN620M	PR1810	PR1825	PR1835	PR1535	PR1525 (PR1225)	PR1510 (PR1210)	PR015S	CA6535
GM	Carbon Steel	0.004 - 0.008 - 0.016 (0.002 - 0.005 - 0.008)	★ 660 - 820 - 980	-	★ 390 - 590 - 820	☆ 390 - 590 - 820	☆ 390 - 590 - 820	★ 390 - 590 - 820	-	-	-
	Alloy Steel	0.004 - 0.008 - 0.016 (0.002 - 0.005 - 0.008)	★ 590 - 720 - 820	-	★ 330 - 520 - 720	☆ 330 - 520 - 720	☆ 330 - 520 - 720	★ 330 - 520 - 720	-	-	-
	Mold Steel	0.004 - 0.008 - 0.014 (0.002 - 0.003 - 0.006)	★ 490 - 590 - 720	-	★ 260 - 460 - 590	☆ 260 - 460 - 590	☆ 260 - 460 - 590	★ 260 - 460 - 590	-	-	-
	Austenitic Stainless Steel	0.004 - 0.008 - 0.016	-	-	☆ 330 - 520 - 660	☆ 330 - 520 - 660	☆ 330 - 520 - 660	☆ 330 - 520 - 660	-	-	-
	Martensitic Stainless Steel	0.004 - 0.008 - 0.016	-	-	-	☆ 490 - 660 - 820	☆ 490 - 660 - 820	-	-	-	☆ 590 - 790 - 980
	Precipitation Hardened Stainless Steel	0.004 - 0.008 - 0.012	-	-	-	★ 300 - 390 - 490	★ 300 - 390 - 490	-	-	-	-
	Gray Cast Iron	0.004 - 0.008 - 0.016	-	★ 390 - 590 - 820	-	-	-	-	★ 390 - 590 - 820	-	-
	Nodular Cast Iron	0.004 - 0.008 - 0.014	-	★ 330 - 490 - 660	-	-	-	-	★ 330 - 490 - 660	-	-
	Ni-base Heat-Resistant Alloy	0.004 - 0.005 - 0.008	-	-	-	☆ 70 - 100 - 160	☆ 70 - 100 - 160	-	-	-	★ 70 - 100 - 160
SM *(GL)	Carbon Steel	0.002 - 0.005 - 0.010 (0.002 - 0.004 - 0.006)	★ 660 - 820 - 980	-	☆ 390 - 590 - 820	☆ 390 - 590 - 820	☆ 390 - 590 - 820	☆ 390 - 590 - 820	-	-	-
	Alloy Steel	0.002 - 0.005 - 0.010 (0.002 - 0.004 - 0.006)	★ 590 - 720 - 820	-	☆ 330 - 520 - 720	☆ 330 - 520 - 720	☆ 330 - 520 - 720	☆ 330 - 520 - 720	-	-	-
	Mold Steel	0.002 - 0.004 - 0.008 (0.002 - 0.003 - 0.005)	★ 490 - 590 - 720	-	☆ 260 - 460 - 590	☆ 260 - 460 - 590	☆ 260 - 460 - 590	☆ 260 - 460 - 590	-	-	-
	Austenitic Stainless Steel	0.002 - 0.005 - 0.010	-	-	☆ 330 - 520 - 660	☆ 330 - 520 - 660	☆ 330 - 520 - 660	☆ 330 - 520 - 660	-	-	-
	Martensitic Stainless Steel	0.002 - 0.005 - 0.010	-	-	-	☆ 490 - 660 - 820	☆ 490 - 660 - 820	-	-	-	★ 590 - 790 - 980
	Precipitation Hardened Stainless Steel	0.002 - 0.005 - 0.010	-	-	-	☆ 300 - 390 - 490	☆ 300 - 390 - 490	-	-	-	-
	Gray Cast Iron	0.002 - 0.005 - 0.010	-	☆ 390 - 590 - 820	-	-	-	-	☆ 390 - 590 - 820	-	-
	Nodular Cast Iron	0.002 - 0.004 - 0.008	-	☆ 330 - 490 - 660	-	-	-	-	☆ 330 - 490 - 660	-	-
	Ni-base Heat-Resistant Alloy	0.002 - 0.004 - 0.006	-	-	-	☆ 70 - 100 - 160	☆ 70 - 100 - 160	-	-	-	☆ 70 - 100 - 160
	Titanium Alloy	0.002 - 0.003 - 0.006	-	-	-	★ 130 - 200 - 260	★ 130 - 200 - 260	-	-	-	-
GH	Carbon Steel	0.008 - 0.016 - 0.028	-	-	☆ 390 - 590 - 820	☆ 390 - 590 - 820	☆ 390 - 590 - 820	☆ 390 - 590 - 820	-	-	-
	Alloy Steel	0.008 - 0.016 - 0.024	-	-	☆ 330 - 520 - 720	☆ 330 - 520 - 720	☆ 330 - 520 - 720	☆ 330 - 520 - 720	-	-	-
	Mold Steel	0.008 - 0.014 - 0.020	-	-	☆ 260 - 460 - 590	☆ 260 - 460 - 590	☆ 260 - 460 - 590	☆ 260 - 460 - 590	-	-	-
	Austenitic Stainless Steel	0.008 - 0.012 - 0.016	-	-	☆ 330 - 520 - 660	☆ 330 - 520 - 660	☆ 330 - 520 - 660	☆ 330 - 520 - 660	-	-	-
	Martensitic Stainless Steel	0.008 - 0.012 - 0.016	-	-	-	☆ 490 - 660 - 820	☆ 490 - 660 - 820	-	-	-	☆ 590 - 790 - 980
	Precipitation Hardened Stainless Steel	0.008 - 0.012 - 0.016	-	-	-	☆ 300 - 390 - 490	☆ 300 - 390 - 490	-	-	-	-
	Gray Cast Iron	0.008 - 0.016 - 0.028	-	☆ 390 - 590 - 820	-	-	-	-	☆ 390 - 590 - 820	-	-
	Nodular Cast Iron	0.008 - 0.014 - 0.020	-	☆ 330 - 490 - 660	-	-	-	-	☆ 330 - 490 - 660	-	-
	Ni-base Heat-Resistant Alloy	0.008 - 0.012 - 0.016	-	-	-	☆ 70 - 100 - 160	☆ 70 - 100 - 160	-	-	-	☆ 70 - 100 - 160
	Hardened Materials (≤ 60 HRC)	0.002 - 0.004 - 0.008	-	-	-	-	-	-	-	★ 160 - 260 - 330	-

The numbers in bold font represent the center value of the recommended cutting conditions. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.

*GL chipbreaker is recommended when finish is a priority

*When using GH chipbreaker for fine pitch cutters, recommended feed is $fz \leq 0.016$ ipt. GH chipbreaker is not recommended for extra fine pitch cutter.

Applicable Chipbreaker

Cutter	Chipbreaker		
	GM	SM (GL)	GH
Coarse Pitch (with Shim)	✓	✓	✓
Fine Pitch (without Shim)	✓	✓	✓ (fz ≤ 0.016 ipt Recommended)
Extra Fine Pitch (without Shim)	✓	✓	Not Recommended

Face Mill and Insert Selection Guide

Purpose	Cutter			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 (D.O.C. ≥ 0.158" fz ≥ 0.014 ipt)	✓					✓		
Surface Roughness Oriented	✓	✓					✓	✓
General Milling for Stainless Steel		✓			✓			
Stainless Steel (to prevent chattering due to low rigidity machine or poor clamping power)	✓				✓			
Cast Iron Milling (Improved Efficiency)			✓	✓				
Cast Iron (D.O.C. ≥ 0.158" fz ≥ 0.014 ipt)	✓					✓		
Improved Surface Finish in High Efficiency Milling		✓	✓					✓

How to Use Wiper Inserts

- 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

Chipbreaker Combination	GM	SM	W
Recommended Combination	✓		✓
Recommended Combination		✓	✓

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

- 3. Use tool presetter for measuring protrusion amount of wiper edge. (Recommended protrusion amount: 0.1 mm)

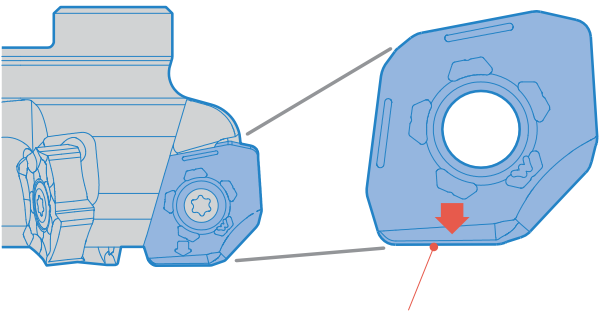
Improved Surface Finish with Wiper Insert

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: Vc = 660 sfm (n = 510 rpm), fz = 0.008 ipt (Vf = 40.157 ipm), D.O.C. × ae = 0.118" × 3.937", Dry Workpiece: Structural Steel

Results above are from an internal evaluation. The surface roughness also depends on the workpiece, cutting conditions, or situation of each user.
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 Wiper Insert on MFPN Cutter



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

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 Fig. 1 and Fig. 2.

The recommended torque for coarse pitch and fine pitch (using M5 screw) is 4.2 Nm. The recommended torque for extra fine pitch (using M4 screw) is 3.5 Nm.



Fig. 1



Fig. 2



Fig. 3

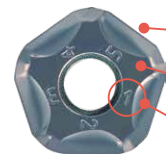


Fig. 4

Side Surface of Insert
Top Surface of Insert
Insert Corner Identification Number

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 Fig. 3). Insert corner identification number is stamped on the top surface of insert with the exception of the SM chipbreaker (Fig. 4).

How to Replace 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 Fig. 5) and lightly pressing the shim toward the pocket wall, insert the screw into the hole of the shim and tighten it (see Fig. 6). When tightening the screw, make sure that the screw is vertical to the bearing surface. Recommended torque is 6.0Nm.



Fig. 5



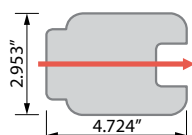
Fig. 6

Shim Screw
Wrench

Case Studies

Construction Machine Part 4140H

Vc = 820 sfm
D.O.C. $\times$ ae = 0.079" $\sim$ 0.118" $\times$ 2.953"
fz = 0.006 ipt
(Vf = 35.433 ipm)
Dry
MFPN453000R-6T (6 Inserts)
PNMU1205ANER-SM (PR1225)



Chip Removal Rate

PR1225

202 cc/min

Machining Efficiency
2.1x

Competitor G

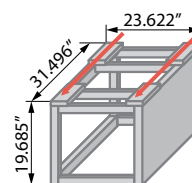
94 cc/min

MFPN cutter improved machining efficiency 2.1 times that of Competitor E without changing spindle load.
MFPN cutter was very stable at the entrance and exit of the workpiece. It remained stable even with a low rigidity machine.

(User Evaluation)

Case 304

Vc = 300 sfm
D.O.C. $\times$ ae = 0.016" $\times$ 1.969"
fz = 0.008 ipt
(Vf = 16.142 ipm)
Dry
MFPN453000R-6T (6 Inserts)
PNMU1205ANER-SM (PR1225)



Machining Efficiency

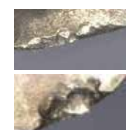
PR1225

1.5 pcs/corner

Tool Life
1.5x

Competitor H
(for Roughing)

1 pcs/corner



Even when the cutting depth, cutting speed, and feed rate could not be raised due to the low rigidity of the workpiece, MFPN face mill achieved stable milling without chattering and also has an improved tool life of 1.5 times.

(User Evaluation)



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