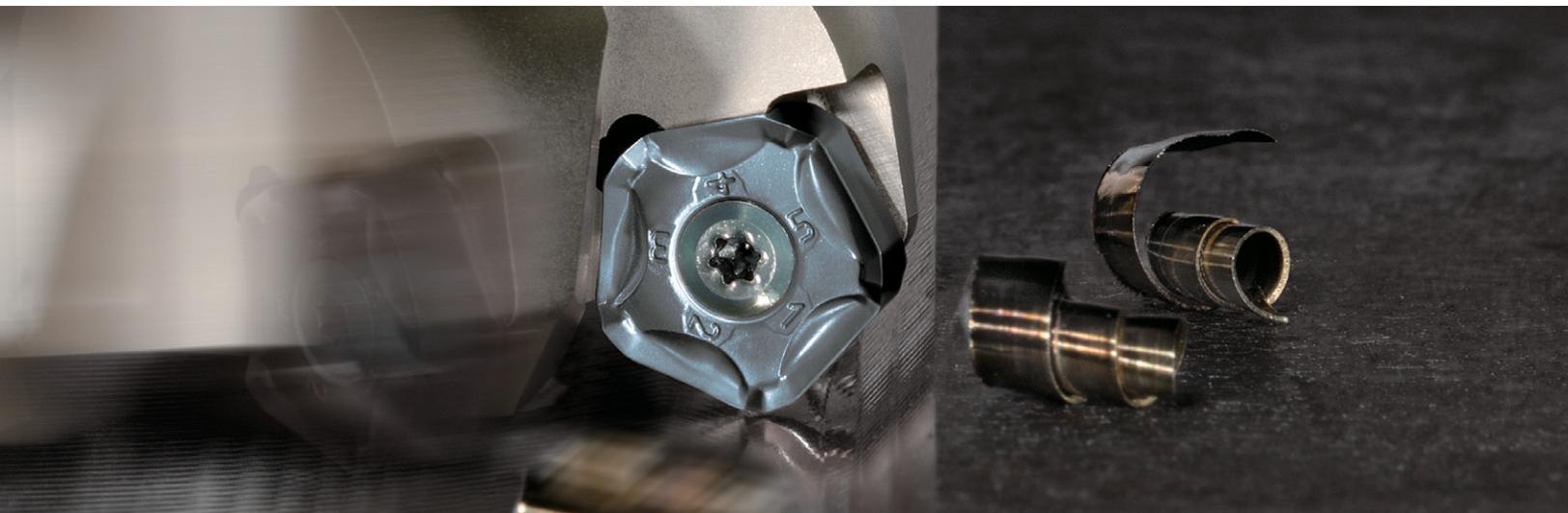




MFPN

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

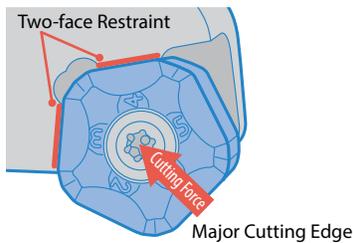


MFPN

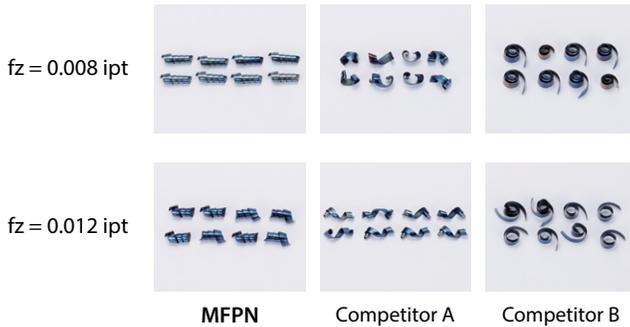
Reduced Chattering with a Low Cutting Force Design and Excellent Fracture Resistance
Economical 10-edge Inserts

1 Economical 10-edge Inserts

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



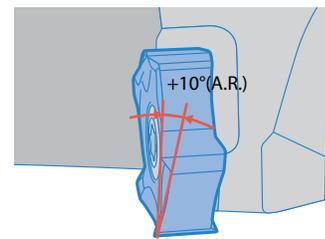
Chip Evacuation (In-house Evaluation)



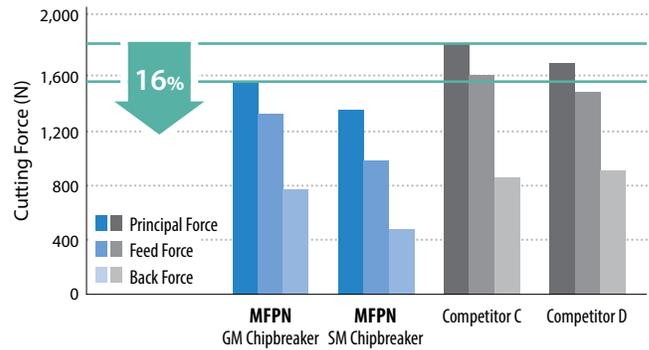
Cutting Conditions: $V_c = 490$ sfm, $f_z = 0.008 - 0.012$ ipt, D.O.C. \times ae = $0.118'' \times 4.331''$
Workpiece: 1049

2 Resists Chattering

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



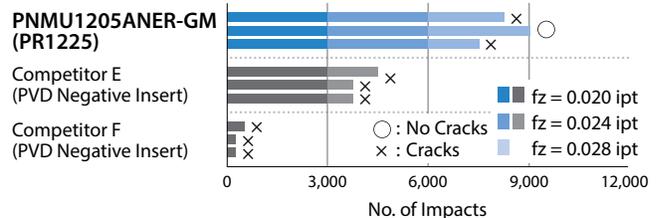
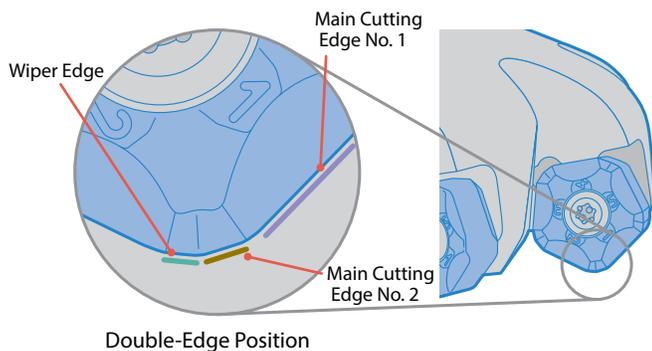
Cutting Force Comparison (In-house Evaluation)



Cutting Conditions: $V_c = 490$ 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

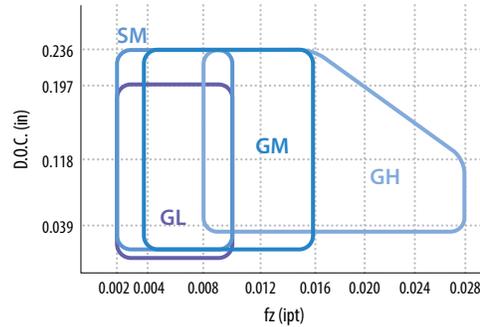


4 Various Chipbreakers for a Wide Range of Applications

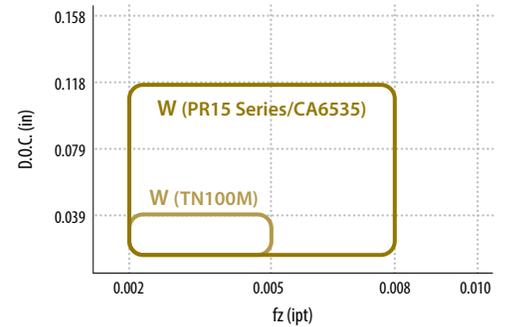
Four unique chipbreakers and a wiper insert cover a wide range of milling applications

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

Recommended Chipbreaker Applications



Recommended Wiper Insert Applications



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

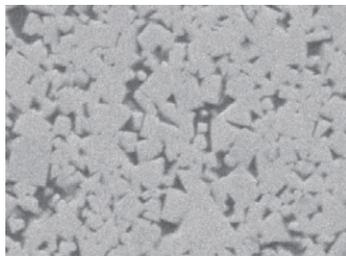
PR1535 MEGACOAT NANO

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

1 23% Improved Fracture Toughness

An increase in cobalt content yields a substrate with greater toughness. Fracture toughness values are improved by 23% over previous grades.

High Toughness Carbide Base Material

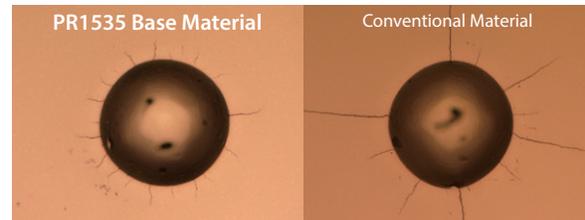


23%
Fracture
Toughness

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)

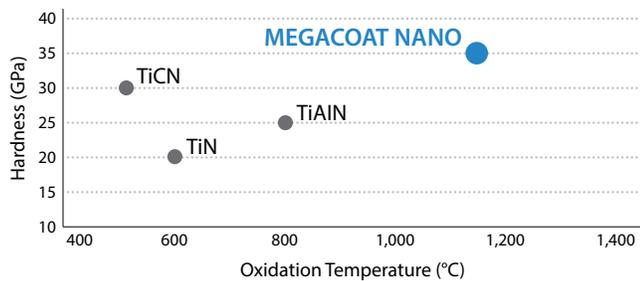


Short Cracks
(High Impact Improvement)

Long Cracks

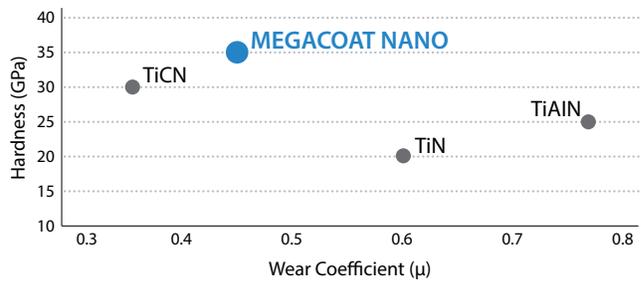
**Shock
Resistance**

Coating Properties (Abrasion Resistance)



Low Oxidation Resistance High

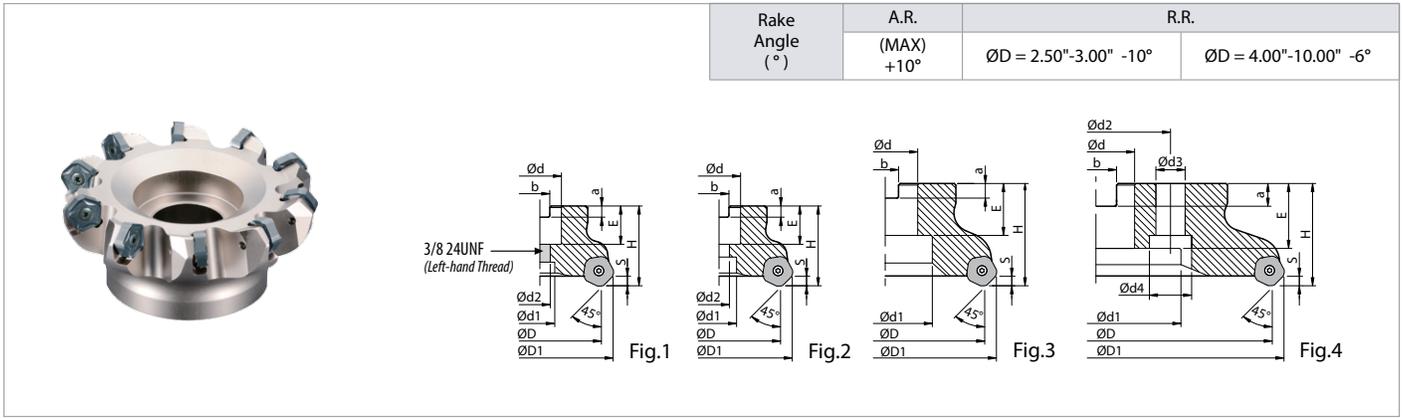
Coating Properties (Deposition Resistance)



High Deposition Resistance Low

Achieves long tool life with the combination of a tough substrate and a special Nano coating layer

Stable machining with excellent wear resistance



Face Mill Dimensions (Inch Size)

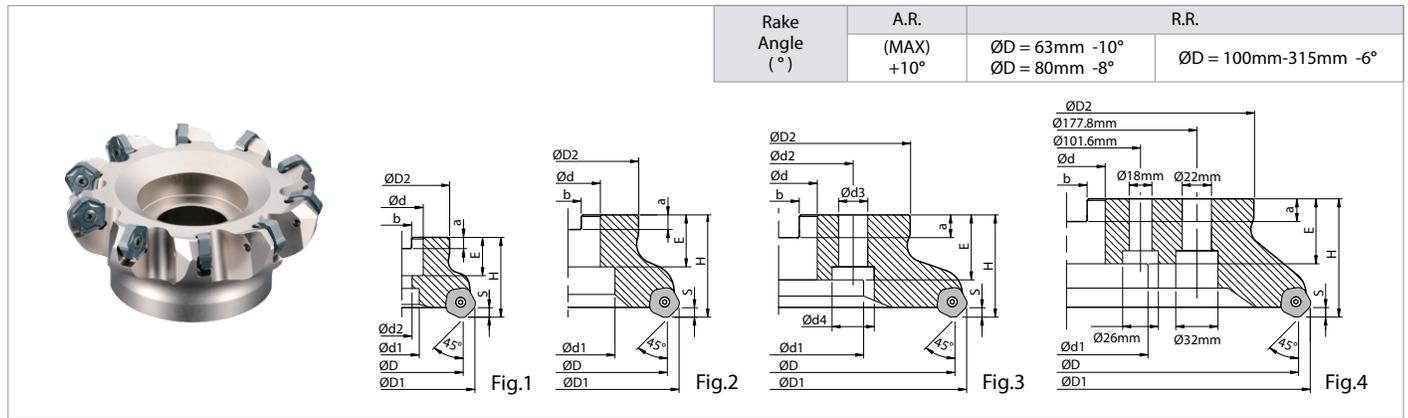
Part Number	Stock	No. of Inserts	Dimensions (in)												Drawing	Weight (kg)	Shim
			ØD	ØD1	Ød	Ød1	Ød2	H	E	a	b	Ød3	Ød4				
Coarse Pitch	MFPN 452500R-4T	●	4	2.500	3.012	0.750	0.669	0.433	1.575	0.750	0.187	0.313	-	-	Fig.2	0.5	
	453000R-5T	●	5	3.000	3.512	1.000	0.866	0.551	1.969	1.063	0.236	0.375	-	-	Fig.2	1.1	
	454000R-6T	●	6	4.000	4.512	1.500	2.047	-	1.969	1.142	0.394	0.625	-	-	Fig.3	1.4	
	455000R-7T	●	7	5.000	5.512	1.500	2.283	-	2.480	1.417	0.394	0.625	-	-	Fig.3	2.6	✓
	456000R-8T	●	8	6.000	6.512	2.000	2.835	-	2.480	1.496	0.433	0.750	-	-	Fig.3	3.8	
	458000R-10T	●	10	8.000	8.512	2.500	3.937	4.000	2.480	1.575	0.551	1.000	0.709	1.024	Fig.4	6.6	
	451000R-12T	●	12	10.000	10.512	2.500	3.937	4.000	2.480	1.575	0.551	1.000	0.709	1.024	Fig.4	9.3	
Fine Pitch	NEW MFPN 452000R-4T	●	4	2.000	2.310	0.750	-	3/8-24UNF	1.969	0.830	0.187	0.313	-	-	Fig.1	0.3	
	452500R-5T	●	5	2.500	3.012	0.750	0.669	0.433	1.575	0.750	0.187	0.313	-	-	Fig.2	0.5	
	453000R-6T	●	6	3.000	3.512	1.000	0.866	0.551	1.969	1.063	0.236	0.375	-	-	Fig.2	1.1	
	454000R-8T	●	8	4.000	4.512	1.500	2.047	-	1.969	1.142	0.394	0.625	-	-	Fig.3	1.3	
	455000R-10T	●	10	5.000	5.512	1.500	2.283	-	2.480	1.417	0.394	0.625	-	-	Fig.3	2.6	×
	456000R-12T	●	12	6.000	6.512	2.000	2.835	-	2.480	1.496	0.433	0.750	-	-	Fig.3	3.9	
	458000R-14T	●	14	8.000	8.512	2.500	3.937	4.000	2.480	1.575	0.551	1.000	0.709	1.024	Fig.4	6.6	
	451000R-16T	●	16	10.000	10.512	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	3.012	0.750	0.669	0.433	1.575	0.750	0.187	0.313	-	-	Fig.2	0.5	
	453000R-8T	●	8	3.000	3.512	1.000	0.866	0.551	1.969	1.063	0.236	0.375	-	-	Fig.2	1.1	
	454000R-10T	●	10	4.000	4.512	1.500	2.047	-	1.969	1.142	0.394	0.625	-	-	Fig.3	1.3	
	455000R-13T	●	13	5.000	5.512	1.500	2.283	-	2.480	1.417	0.394	0.625	-	-	Fig.3	2.6	×
	456000R-16T	●	16	6.000	6.512	2.000	2.835	-	2.480	1.496	0.433	0.750	-	-	Fig.3	3.9	
	458000R-18T	●	18	8.000	8.512	2.500	3.937	4.000	2.480	1.575	0.551	1.000	0.709	1.024	Fig.4	6.6	
	451000R-20T	●	20	10.000	10.512	2.500	3.937	4.000	2.480	1.575	0.551	1.000	0.709	1.024	Fig.4	9.3	

Dimension S is 0.236" for GM, SM, GH Chipbreakers, 0.197" for GL Chipbreaker, and 0.118" for W Chipbreaker: PR15 Series

● : U.S. Stock

Spare Parts See [Page 6](#)

Applicable Inserts See [Page 8](#)



Face Mill Dimensions (Metric Size)

	Part Number	Stock		No. of Inserts	Dimensions (in)										Drawing	Weight (kg)	Shim			
		R	L		ØD	ØD1	ØD2	Ød	Ød1	Ød2	H	E	a	b				Ød3	Ød4	
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"	18	26	Fig.3	6.7	
		45250R-12T	○		12	250	263	142	1.875"	110	4.000"	63	1.575"	0.551"	1.000"	18	26	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"	18	26	Fig.3	6.9	
		45250R-16T	○		16	250	263	142	1.875"	110	4.000"	63	1.575"	0.551"	1.000"	18	26	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"	18	26	Fig.3	6.9		
	45250R-20T	○		20	250	263	142	1.875"	110	4.000"	63	1.575"	0.551"	1.000"	18	26	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	14	20	Fig.3	3.8	
		45200R-10T-M	○		10	200	213	142	60	110	101.6	63	40	14.0	25.7	18	26	Fig.3	6.4	
		45250R-12T-M	○		12	250	263	142	60	110	101.6	63	40	14.0	25.7	18	26	Fig.3	9.1	
		45315R-14T-M	□		14	315	328	220	60	110	-	80	40	14.0	25.7	-	-	Fig.4	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.1	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.2	2.5	
		45160R-12T-M	○		12	160	173	102	40	68	66.7	63	32	9.0	16.4	14	20	Fig.3	3.8	
		45200R-14T-M	○		14	200	213	142	60	110	101.6	63	40	14.0	25.7	18	26	Fig.3	6.5	
		45250R-16T-M	○		16	250	263	142	60	110	101.6	63	40	14.0	25.7	18	26	Fig.3	9.1	
		45315R-14T-M	□		14	315	328	220	60	110	-	80	40	14.0	25.7	-	-	Fig.4	21.3	
	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.1	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		
45160R-16T-M		○		16	160	173	102	40	68	66.7	63	32	9.0	16.4	14	20	Fig.3	3.9		
45200R-18T-M		○		18	200	213	142	60	110	101.6	63	40	14.0	25.7	18	26	Fig.3	6.6		

Dimension S is 6mm for GM, SM, GH Chipbreakers, 5mm for GL Chipbreaker, and 3mm for W Chipbreaker: PR15 Series

○ : World Express (Shipping: 7-10 Business Days)

□ : 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
		TT	DTM						
Coarse Pitch MFPN 452500R-4T 453000R-5T 454000R-6T ~ 4510000R-12T	SB-50140TR	TT-15		MFPN-45	SPW-7050	LW-5	P-37	HH3/8-1.25	-
	Recommended Torque for Insert Screw 4.2 Nm		-	Recommended Torque for Shim Screw 6.0 Nm				HH1/2-1.25	
								-	
Fine Pitch MFPN 452000R-4T 452500R-5T 453000R-6T 454000R-8T ~ 4510000R-16T	SB-50140TR	TT-15		-	-	-	P-37	-	XNS610*2
	Recommended Torque for Insert Screw 4.2 Nm		-					HH3/8-1.25	-
								HH1/2-1.25	
								-	
Extra-Fine Pitch MFPN 452500R-6T 453000R-8T 454000R-10T ~ 4510000R-20T	SB-40140TRN	-	DTM-15	-	-	-	P-37	HH3/8-1.25	
	Recommended Torque for Insert Screw 3.5 Nm							HH1/2-1.25	
								-	

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

Recommended Cutting Conditions See [Page 9](#)

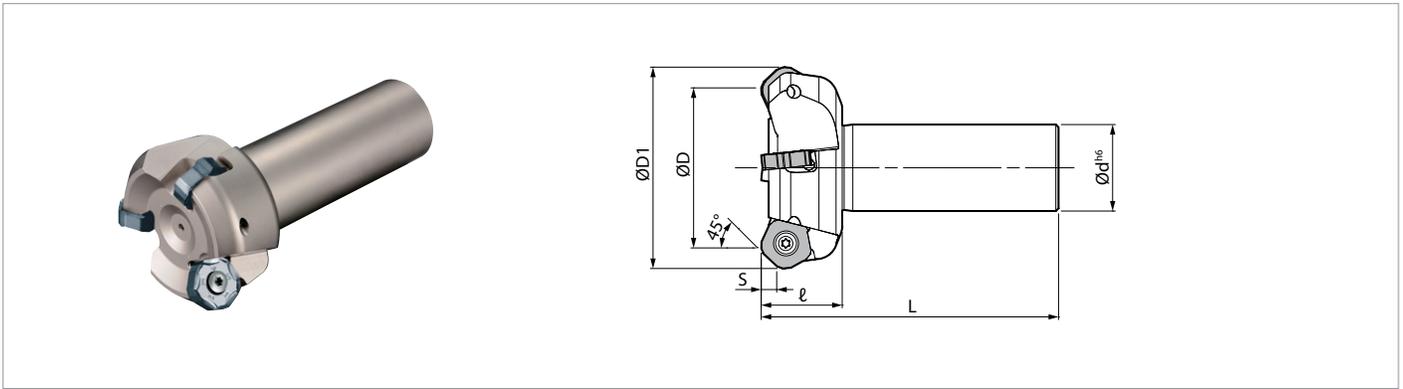
*2 Differential screw (3/8-24UNF)

Metric Size Face Mill Spare Parts

Part Number	Insert Screw	Wrench		Shim	Shim Screw	Wrench	Anti-Seize Compound	Arbor Bolt	Mounting Screw
		TT	DTM						
Coarse Pitch MFPN 45063R-4T-M 45080 ^{PH} -5T-(M) 45100 ^{PH} -6T-(M) ~ 45315R-14T-(M)	SB-50140TR	TT-15		MFPN-45	SPW-7050	LW-5	P-37	HH10 × 30	-
	Recommended Torque for Insert Screw 4.2 Nm		-	Recommended Torque for Shim Screw 6.0 Nm				HH12 × 35	
								-	
Fine Pitch MFPN 45063R-5T-M 45080R-6T-(M) 45100R-8T-(M) ~ 45315R-18T-(M)	SB-50140TR	TT-15		-	-	-	P-37	HH10 × 30	-
	Recommended Torque for Insert Screw 4.2 Nm		-					HH12 × 35	
								-	
Extra-Fine Pitch MFPN 45063R-6T-M 45080R-8T-(M) 45100R-10T-(M) ~ 45250R-20T-(M)	SB-40140TRN	-	DTM-15	-	-	-	P-37	HH10 × 30	-
	Recommended Torque for Insert Screw 3.5 Nm							HH12 × 35	
								-	

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

Recommended Cutting Conditions See [Page 9](#)



End Mill Dimensions

Part Number	Stock	Unit	No. of Inserts	Dimensions						Rake Angle (°)		Spare Parts			
				ØD	ØD1	Ød	L	ℓ	S	A.R. (Max)	R.R.	Insert Screw	Wrench	Anti-Seize Compound	
Weldon Shank MFPN 452000R-W125-3T	●	inch	3	2.00	2.31	1.25	3.60	1.18	0.23 (0.19)	+10°	-12°	SB-50140TR	TTW-15	P-37	
	MFPN 452500R-W125-4T		●	4	2.50						2.81				-10°
	MFPN 453000R-W125-5T		●	5	3.00						3.31				-8°
Cylindrical Shank MFPN 45050R-S32-3T	○	mm	3	50	63	32	110	30	6 (5)	+10°	-12°	SB-50140TR	TTW-15	P-37	
	MFPN 45063R-S32-4T		○	4	63						76				-10°
	MFPN 45080R-S32-5T		○	5	80						93				-8°

● : U.S. Stock ○ : World Express (Shipping: 7-10 Business Days)
 Coat Anti-Seize Compound (P-37) thinly on portion of taper and thread prior to installation.
 Dimension S is 0.236" (6mm) for GM, SM, GH Chipbreakers, 0.197" (5mm) for GL Chipbreaker, and 0.118" (3mm) for W Chipbreaker: PR15 Series

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)					Cermet TN100M	CVD Coated Carbide CA6535	MEGACOAT NANO			MEGACOAT	
			A	T	Ød	X	Z			PR1535	PR1525	PR1510	PR1225	PR1210
		PNMU 1205ANER-GM							○	●	●	●	●	●
		PNMU 1205ANEL-GM	0.704	0.219					○	○	○	○		
		PNMU 1205ANER-SM				0.079	0.079		○	●	●	●	●	●
		PNMU 1205ANER-GH	0.708	0.243	0.244				○	○	●	●	●	●
		PNEU 1205ANER-GL				0.689			○	●	●	●	●	●
		PNEU 1205ANEL-GL		0.219					○	○	○	●		
		PNEU 1205ANER-W	0.703				0.091	0.319	●	○	○	●	●	

● : U.S. Stock ○ : World Express (Shipping: 7-10 Business Days)
Recommended Cutting Conditions See [Page 9](#)

Recommended Cutting Conditions ★ 1st Recommendation ☆ 2nd Recommendation

Insert	Workpiece	Recommended Feed (fz: ipt)	Recommended Insert Grade (Vc: sfm)			
			MEGACOAT NANO (MEGACOAT)			CVD Coated Carbide
			PR1535	PR1525 (PR1225)	PR1510 (PR1210)	CA6535
GM	Carbon Steel	0.004 - 0.008 - 0.016	☆ 390 - 590 - 820	★ 390 - 590 - 820	-	-
	Alloy Steel	0.004 - 0.008 - 0.016	☆ 330 - 520 - 720	★ 330 - 520 - 720	-	-
	Mold Steel	0.004 - 0.008 - 0.014	★ 260 - 460 - 590	★ 260 - 460 - 590	-	-
	Austenitic Stainless Steel	0.004 - 0.008 - 0.016	☆ 330 - 520 - 660	☆ 330 - 520 - 660	-	-
	Martensitic Stainless Steel	0.004 - 0.008 - 0.016	☆ 490 - 660 - 820	-	-	☆ 590 - 790 - 980
	Precipitation Hardened Stainless Steel	0.004 - 0.008 - 0.012	★ 300 - 390 - 490	-	-	-
	Gray Cast Iron	0.004 - 0.008 - 0.016	-	-	★ 390 - 590 - 820	-
	Nodular Cast Iron	0.004 - 0.008 - 0.014	-	-	★ 330 - 490 - 660	-
	Ni-base Heat-Resistant Alloy (Inconel®718, etc.)	0.004 - 0.005 - 0.008	☆ 70 - 100 - 160	-	-	★ 70 - 100 - 160
SM *(GL)	Carbon Steel	0.002 - 0.005 - 0.010	☆ 390 - 590 - 820	☆ 390 - 590 - 820	-	-
	Alloy Steel	0.002 - 0.005 - 0.010	☆ 330 - 520 - 720	☆ 330 - 520 - 720	-	-
	Mold Steel	0.002 - 0.004 - 0.008	☆ 260 - 460 - 590	☆ 260 - 460 - 590	-	-
	Austenitic Stainless Steel	0.002 - 0.005 - 0.010	★ 330 - 520 - 660	☆ 330 - 520 - 660	-	-
	Martensitic Stainless Steel	0.002 - 0.005 - 0.010	☆ 490 - 660 - 820	-	-	★ 590 - 790 - 980
	Precipitation Hardened Stainless Steel	0.002 - 0.005 - 0.010	☆ 300 - 390 - 490	-	-	-
	Gray Cast Iron	0.002 - 0.005 - 0.010	-	-	☆ 390 - 590 - 820	-
	Nodular Cast Iron	0.002 - 0.004 - 0.008	-	-	☆ 330 - 490 - 660	-
	Ni-base Heat-Resistant Alloy (Inconel®718, etc.)	0.002 - 0.004 - 0.006	☆ 70 - 100 - 160	-	-	☆ 70 - 100 - 160
	Titanium Alloy	0.002 - 0.003 - 0.006	★ 130 - 200 - 260	-	-	-
GH	Carbon Steel	0.008 - 0.016 - 0.028	☆ 390 - 590 - 820	☆ 390 - 590 - 820	-	-
	Alloy Steel	0.008 - 0.016 - 0.024	☆ 330 - 520 - 720	☆ 330 - 520 - 720	-	-
	Mold Steel	0.008 - 0.014 - 0.020	☆ 260 - 460 - 590	☆ 260 - 460 - 590	-	-
	Austenitic Stainless Steel	0.008 - 0.012 - 0.016	☆ 330 - 520 - 660	☆ 330 - 520 - 660	-	-
	Martensitic Stainless Steel	0.008 - 0.012 - 0.016	☆ 490 - 660 - 820	-	-	☆ 590 - 790 - 980
	Precipitation Hardened Stainless Steel	0.008 - 0.012 - 0.016	☆ 300 - 390 - 490	-	-	-
	Gray Cast Iron	0.008 - 0.016 - 0.028	-	-	☆ 390 - 590 - 820	-
	Nodular Cast Iron	0.008 - 0.014 - 0.020	-	-	☆ 330 - 490 - 660	-
	Ni-base Heat-Resistant Alloy (Inconel®718, etc.)	0.008 - 0.012 - 0.016	☆ 70 - 100 - 160	-	-	☆ 70 - 100 - 160

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.

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

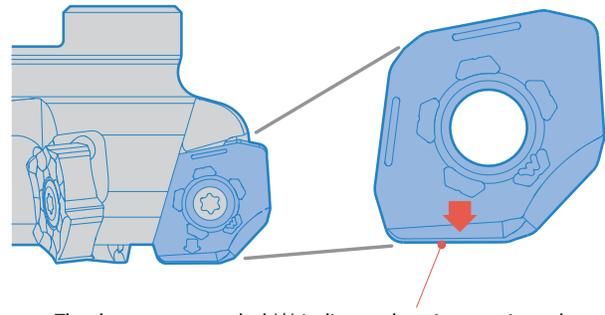
1. Please only use one wiper insert per cutter
(If you use more than 2 wiper inserts on one cutter, the workpiece surface may become smeared)
2. Combination of Wiper Insert with Other Chipbreakers

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)

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.

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 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.

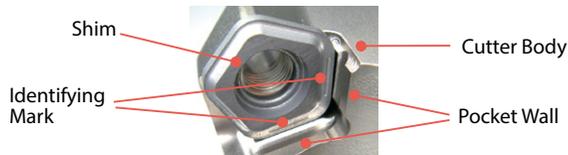


Fig. 5



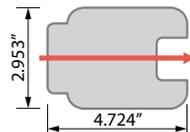
Fig. 6

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.

Case Studies

Construction Machine Part 4140H

Vc = 820 sfm
 D.O.C. x ae = 0.079" ~ 0.118" x 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

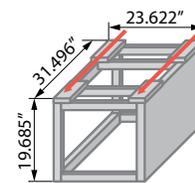
94 cc/min

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. x ae = 0.016" x 1.969"
 fz = 0.008 ipt
 (Vf = 16.142 ipm)
 Dry
 MFPN453000R-6T (6 Inserts)
 PNMU1205ANER-SM (PR1225)



Machining Efficiency

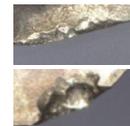
PR1225

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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