KYOCERA

Stainless Steel & Heat-Resistant Alloys

Carbide Turning Solutions

Specialized Turning Solutions for Stainless Steel and HRSA Applications

PR1535 MEGACOAT NANO
PR1325 MEGACOAT
PR1310 MEGACOAT
PR1305 MEGACOAT

PR1225 MEGACOAT
PR1125 PVD Coated Carbide
CA6515 CVD Coated Carbide
CA6525 CVD Coated Carbide

PR1535 MEGACOAT NANO

Stable Machining of Difficult-to-cut Materials

For Heat-Resistant Alloy, Titanium Alloy, and Stainless Steel

1 23% Improved Fracture Toughness

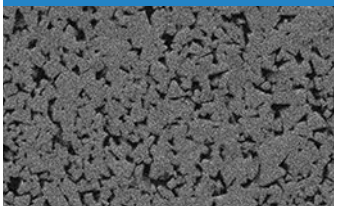
An increase in cobalt content yields a substrate with greater toughness.
Fracture toughness values are improved by 23% over previous grades.

2 Stability Improvement

Features

- 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

High Toughness Carbide Base Material



Cracking Comparison by Diamond Indentor

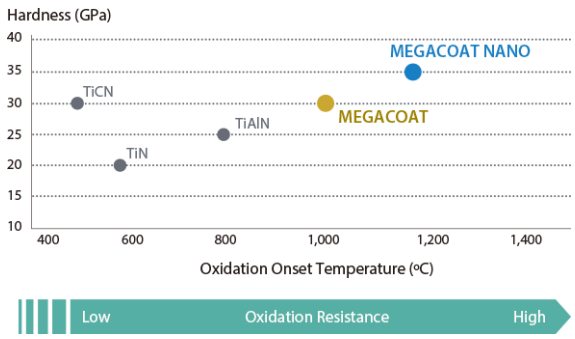
Long Cracks

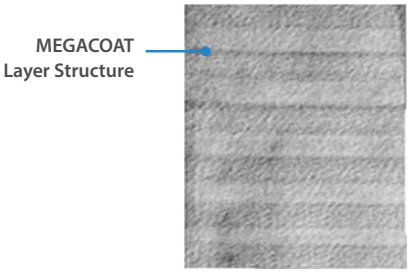
Short Cracks
(High Impact Improvement)

3 MEGACOAT NANO Coating Technology

Stabilized turning operations and long tool life with Kyocera's special nano coating layer.

MEGACOAT NANO protects against wear and fractureing with its high hardness (35GPa) and superior oxidation resistance (oxidation temperature: 1,150˚C).



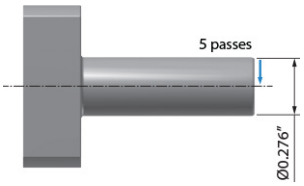


Case Studies

Ni-base Heat Resistant Alloy

Bolt

Vc = 165 sfm
D.O.C. = 0.118"
0.008 ipr
Wet
CNMG432MS PR1535



*Interrupted machining when approaching

Tool Life

PR1535 — **80** pcs/edge — Tool Life 2.5 Times

Competitor A
PVD COATED CARBIDE — **30** pcs/edge

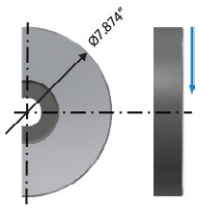
PR1535 (MS chipbreaker) shows 2.6 times longer tool life compared to Competitor A (PVD Coated Carbide).

(User Evaluation)

Ni-base Heat Resistant Alloy

Aircraft Parts

Vc = 165 sfm
D.O.C. = 0.020"
0.004 ipr
Wet
CNMG432MU PR1535



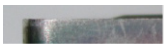
Fracture Resistance

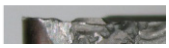
PR1535 — **1** pc/edge — Tool Life Better Wear

Competitor B
PVD COATED CARBIDE — **1** pc/edge

PR1535-MU Chipbreaker realized the stable machining by preventing the fracture at scaling and interrupted cutting compared with Competitor B (PVD coated).

(User Evaluation)

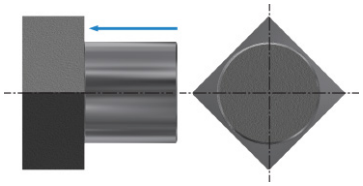

PR1535


Competitor B

304 Stainless Steel

Square Bar

Vc = 330 sfm
D.O.C. = 0.079"
0.008 ipr
Wet
CNMG432MS PR1535


2.756" Square Bar

Tool Life

PR1535 — **50** pcs/edge — Tool Life 5 Times

Competitor C
CVD COATED CARBIDE — **10** pcs/edge

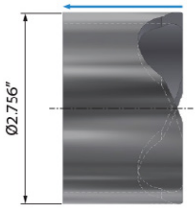
Competitor C fractured due to heavy interrupted machining. PR1535 (MS chipbreaker) shows 5 times longer tool life compared to Competitor C (CVD Coated Carbide).

(User Evaluation)

304 Stainless Steel

Lens Tube

Vc = 395 sfm
D.O.C. = 0.039"
0.006 ipr
Wet
CNMG432MS PR1535



Tool Life

PR1535 — **80** pcs/edge — Tool Life 2.6 Times

Competitor D
PVD COATED CARBIDE — **30** pcs/edge

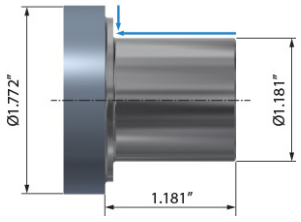
In heavy interrupted machining PR1535 (MS chipbreaker) shows 2.6 times longer tool life compared to Competitor D (PVD Coated Carbide).

(User Evaluation)

304 Stainless Steel

Seat

Vc = 330 sfm
D.O.C. = 0.059"
0.006 ipr
Wet
CNMG432MS PR1535



Tool Life

PR1535 — **30** pcs/edge — Tool Life 6 Times

Competitor E
CVD COATED CARBIDE — **5** pcs/edge

PR1535 (MS chipbreaker) shows 6 times longer tool life compared to Competitor E (CVD Coated Carbide).

(User Evaluation)

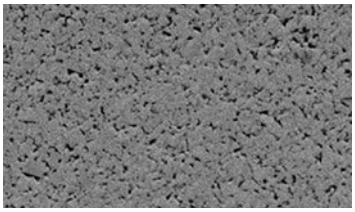
PR13^{05} / PR13^{10} / PR13^{25} MEGACOAT

Grades for Heat-Resistant Alloys

PVD Coated Carbide for Nickel-based, Iron-based, and Cobalt-based Heat-Resistant Alloys

1 Special Carbide Substrates

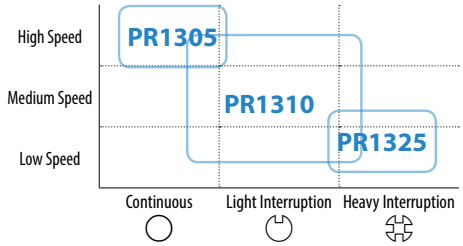
The PR13-Series grades for heat-resistant alloys have excellent fracture resistance and stabilization.



A uniform grain structure provides superior thermal shock resistance and hardness stability

Insert Grade	Application
PR1305	Continuous / Finishing
PR1310	Mid to High-Speed Machining / Light Interruption
PR1325	Interrupted / Roughing

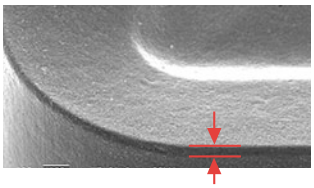
PR13-Series Application Range



2 Low Cutting Forces for Reduced Chattering Improve Performance

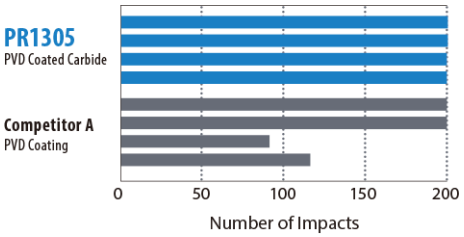
The Fine Edge Treatment (FET) edge preparation of the PR13-Series improves cutting edge condition and wear resistance.

Large rake angle and minimal honing controls burrs and notching and improves surface finish



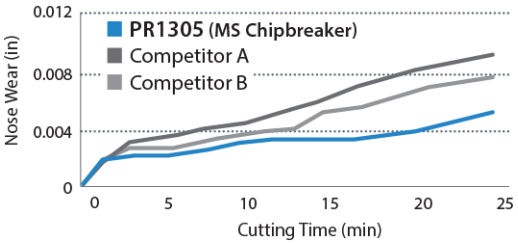
Improved cutting edge condition by Fine Edge Treatment (FET) technology

PR1305 Cutting Performance



Interrupted (External) - Internal Evaluation
Cutting Conditions: Vc = 150 sfm, D.O.C. = 0.010", f = 0.006 ipr,
Workpiece Material: Inconel 718, Insert: CNMG432MS PR1305

PR1305 Wear Resistance

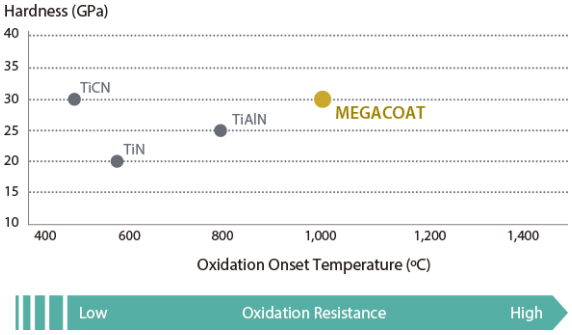


Continuous (External) - Internal Evaluation
Cutting Conditions: Vc = 150 sfm, D.O.C. = 0.010", f = 0.006 ipr,
Workpiece Material: Inconel 718, Insert: CNMG432MS PR1305

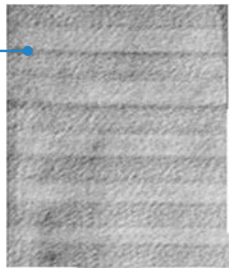
3 MEGACOAT Coating Technology

Stabilized turning operations and long tool life with Kyocera's special MEGACOAT coating layer.

MEGACOAT NANO protects against wear and fracturing with its high hardness (30GPa) and superior oxidation resistance (oxidation temperature: 1,000˚C).



MEGACOAT Layer Structure



Case Studies

INCONEL® 718

Aircraft Parts (Ring)

Vc = 125 sfm
D.O.C. = 0.039"
0.008 ipr
Wet
CNMG432TK PR1305

Tool Life

PR1305 **10 pcs/edge** — Tool Life: Better Wear

Competitor A **10 pcs/edge**

After 10 pieces, the PR1305 insert showed better wear resistance than Competitor A which allowed for continued machining.

(User Evaluation)

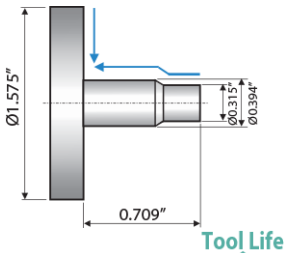
PR1305

Competitor B

INCONEL® 718

Stator

Vc = 125 sfm
D.O.C. = 0.020"
0.008 ipr
Wet
WNMG432MU PR1310



Tool Life

PR1305 **30-40 pcs/edge** — Tool Life: 2X

Competitor B **15-20 pcs/edge**

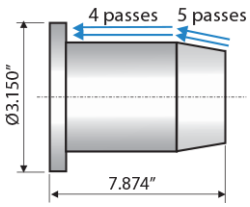
Kyocera showed 2 times longer tool life than Competitor B.

(User Evaluation)

316L SS

Aircraft Parts (Nozzle)

Vc = 300 sfm
D.O.C. = 0.049 ~ 0.079"
0.005 ipr
Wet
CNMG432MU PR1310



Tool Life

PR1310 **+5 pcs/edge** — Tool Life: 5X

Competitor C **1 pcs/edge**

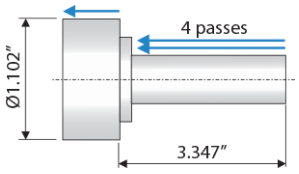
Kyocera showed 5 times longer tool life than Competitor C.

(User Evaluation)

316L SS

Valve

Vc = 650 sfm
D.O.C. = 0.098"
0.010 ipr
Wet
CNMG432MS PR1310



Tool Life

PR1310 **110-125 pcs/edge** — Tool Life: 2X

Competitor D **60 pcs/edge**

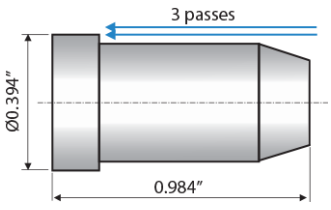
Kyocera showed 2 times longer tool life than Competitor D

(User Evaluation)

INCONEL® 625

Aircraft Parts

Vc = 125 sfm
D.O.C. = 0.063"
0.006 ipr
Wet
CNMG432MS PR1310



Tool Life

PR1310 **8 pcs/edge** — Tool Life: 2X

Competitor E **4-5 pcs/edge**

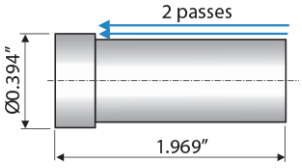
Kyocera showed up to 2 times longer tool life than Competitor E

(User Evaluation)

INCONEL® 718

Square Bar

Vc = 75 sfm
D.O.C. = 0.049"
0.009 ipr
Wet
CNMG432MS PR1325



Tool Life

PR1325 **25 pcs/edge** — Tool Life: +4X

Competitor F **6 pcs/edge**

Kyocera showed 4 times longer tool life than Competitor F

(User Evaluation)

PR1225 MEGACOAT

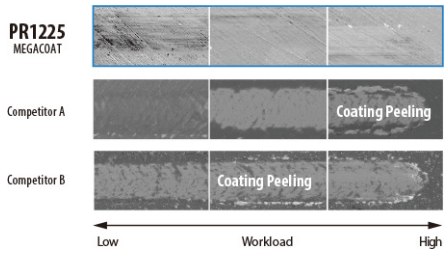
Stainless Steel Machining

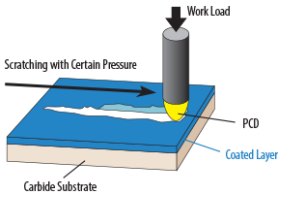
Maintains Sharp Cutting Edges with its High Bonding Strength

1 High Bonding Strength

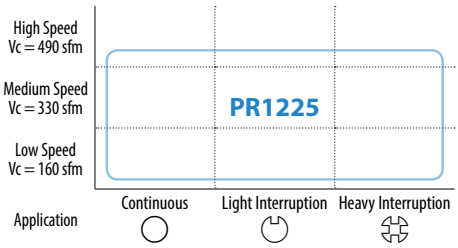
The high bonding strength of MEGACOAT technology provides the coating stability required for stainless steel machining.

PR1225 Wear Comparison





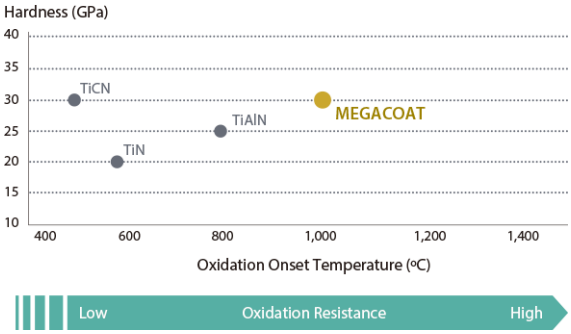
PR1225 Application Range

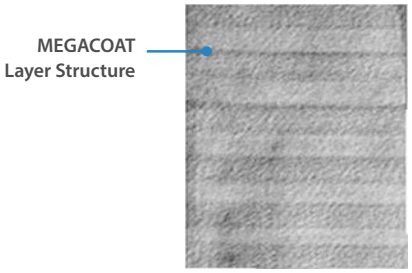


2 MEGACOAT Coating Technology

Stabilized turning operation and long tool life with Kyocera's special MEGACOAT coating layer.

MEGACOAT NANO protects against wear and fracture with its high hardness (30GPa) and superior oxidation resistance (oxidation temperature: 1,000˚C).



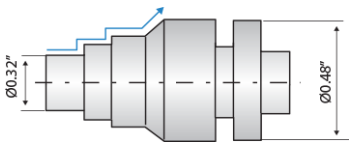


Case Studies

Flange

304 SS

Vc = 280 sfm
D.O.C. = ~0.060"
0.008 ~ 0.002 ipr
Wet
DCGT32505MFP-GQ PR1225



Tool Life

PR1225	14,500 pcs/edge	Tool Life 3.6 Times
Competitor A PVD COATED CARBIDE (Molded Chipbreaker)	4,000 pcs/edge	

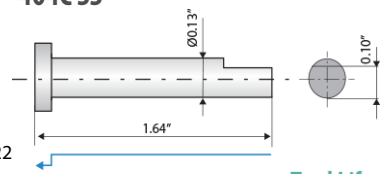
PR1225 increased 3.6 times as many workpieces, compared to Competitor A

(User Evaluation)

Clutch Shaft

404C SS

Vc = 200 sfm
D.O.C. = 0.020 ~ 0.051"
0.001 ipr
Wet
CCGT215013MFR-U PR122



Tool Life

PR1225	400-450 pcs/edge	Tool Life 1.5 Times
Competitor B PVD COATED CARBIDE (Ground Chipbreaker)	250-300 pcs/edge	

Partially interrupted cut due to pre-machined flat on the OD. PR1225 increased 1.5 times as many workpieces, compared to Competitor B

(User Evaluation)

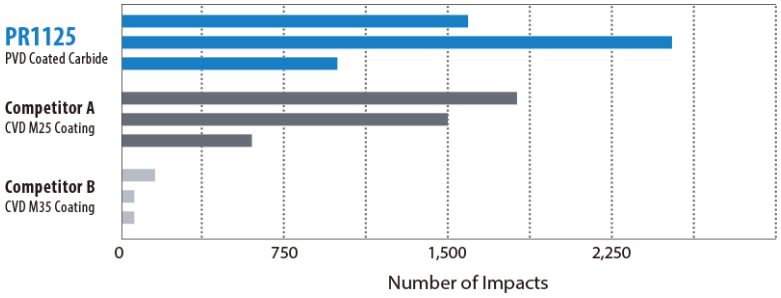
PR1125 PVD Coated Carbide

Stainless Steel, Heat-Resistant Steel, and General Steel

Thin Fine TiAlN Coating Provides High Toughness While Preventing Fracturing

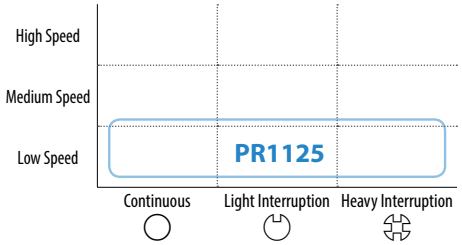
1 Stable Machining Performance

PR1125 Cutting Performance



Cutting Conditions: Vc = 330 sfm, D.O.C. = 0.06", f = 0.012 ipr, Wet
Workpiece Material: 304 SS, Insert: CNMG432 PR1125, 4 Grooves

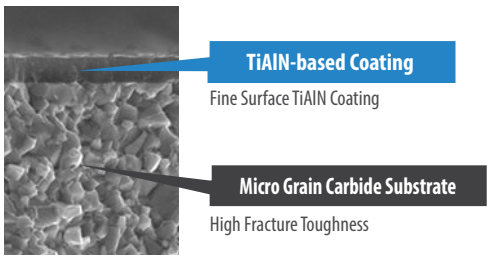
PR1125 Application Range

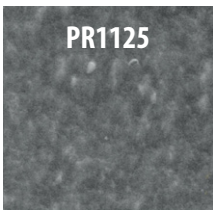


2 TiAlN Coating

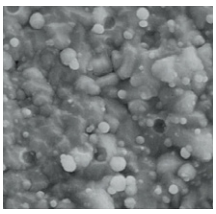
Excellent fracture toughness and machining stability.

Low cutting resistance and reduced adhesion and edge buildup.





Fine Surface Coat



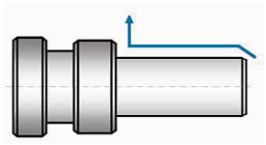
Conventional PVD Coating

Case Studies

Shaft

316 SS

Vc = 350 sfm
D.O.C. = 0.039 ~ 0.059"
0.005 ipr
Wet
CNMG431MQ PR1125



Tool Life

		Tool Life
PR1125	350 pcs/edge	50 More
Competitor A	300 pcs/edge	

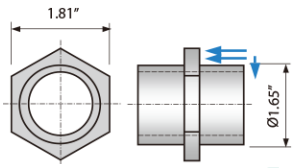
MQ chipbreaker (PR1125) produced 50 more pieces per edge.

(User Evaluation)

Connector

303 SS

Vc = 325 ~ 400 sfm
D.O.C. = 0.06 ~ 0.08"
0.005 ~ 0.006 ipr
Wet
CNMG432MS PR1125



Tool Life

		Tool Life
PR1125	180 pcs/edge	50% Longer
Competitor B	120 pcs/edge	

Kyocera's CVD coating lasts 50% longer than Competitor B.

(User Evaluation)

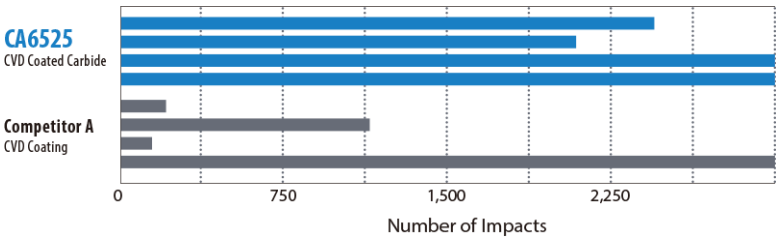
CA6515 / CA6525 CVD Coated Carbide

Stainless Steel, Heat Resistant Steel, and General Steel

CVD Coated Carbide with Thin Ultra-fine TiCN Coating

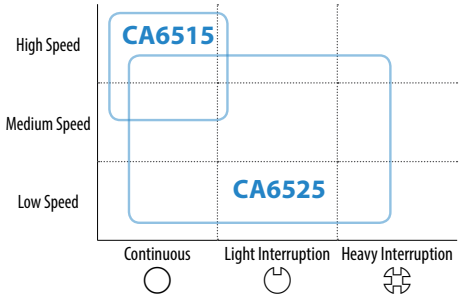
1 Stable Machining Performance

CA6525 Cutting Performance



Cutting Conditions: Vc = 330 sfm, D.O.C. = 0.02", f = 0.012 ipr, Wet
Workpiece Material: 304 SS, Insert: CNMG432 PR1125, 4 Grooves

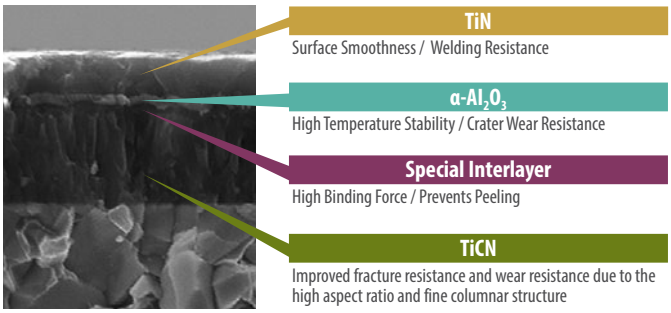
Grade Application Range



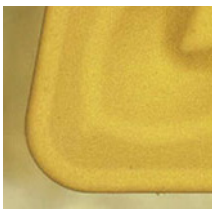
2 TiCN Coating

Excellent fracture toughness and machining stability.

Low cutting resistance and reduced adhesion and edge buildup.



Bright Gold Coating

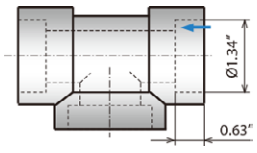


Conventional CVD Coating

Case Studies

Connector

316 SS



Vc = 400 sfm
D.O.C. = ~0.08"
0.008 ipr
Wet
CNMG432MS CA6525

Tool Life

CA6525 580 pcs/edge

Tool Life +190%

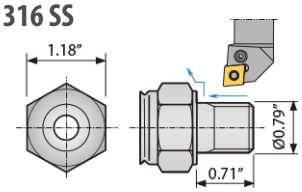
Competitor A 200 pcs/edge

Compared to Competitor A's coated grade, the MS chipbreaker (CA6525) shows good chip evacuation and wear resistance while improving the tool life by almost 200%.

(User Evaluation)

Nozzle

316 SS



Vc = 400 sfm
D.O.C. = 0.010"
0.006 ipr
Wet
CNMG432MS CA6525

Tool Life

CA6525 30 pcs/edge

Tool Life 2 Times

Competitor B 15 pcs/edge

Kyocera's tool life is two times longer than Competitor B with improved chip evacuation.

(User Evaluation)

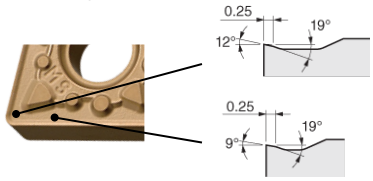
Chipbreakers

Negative and Positive Insert Chipbreakers for Various Applications

Negative Inserts

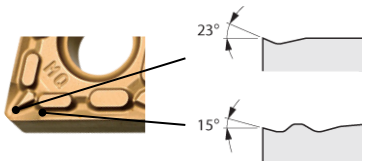
MS Chipbreaker

- First recommendation for medium to roughing
- Positive land
- Tough cutting edge
- Good chip control



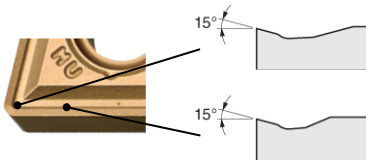
MQ Chipbreaker

- For finishing to medium
- Large rake angle with circular edge line
- Low cutting force and good chip control



MU Chipbreaker

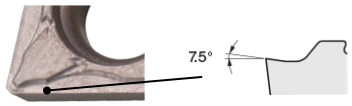
- For medium to roughing
- Large rake angle and low cutting resistance
- Reduces notching and burrs



Positive Inserts

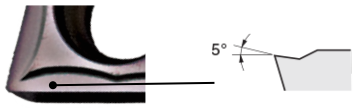
GF Chipbreaker

- First recommendation for semi-finish to finish turning of small diameter workpieces
- Polished surface reduces chip adhesion



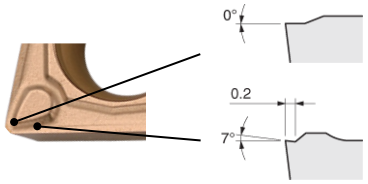
GQ Chipbreaker

- First recommendation for rough to semi-finish turning of small diameter workpieces
- Polished surface reduces chip adhesion



MQ Chipbreaker

- First recommendation for semi-finish to finish boring
- Helps reduce or eliminate burrs
- Low cutting force design



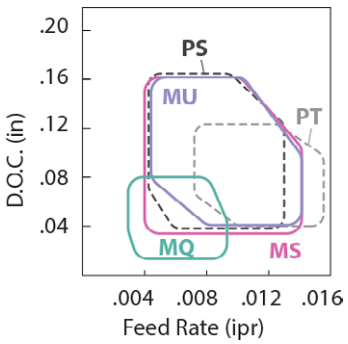
Sharp Edge

Minimally Honed Edge

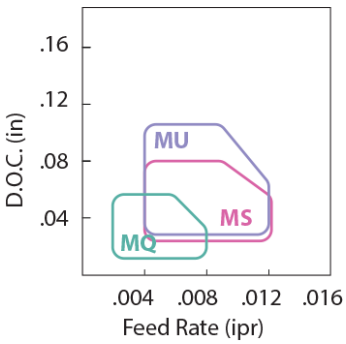
Chipbreaker Application Range

Negative Inserts

(Stainless Steel)

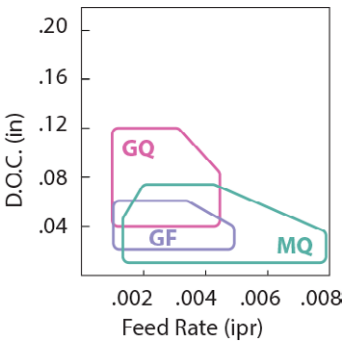


(Heat Resistant Alloys)



Positive Inserts

(Stainless Steel)



Shape	Part Number		I.C.	Thickness	Hole	Corner-R (rε)	PR1535	PR1325	PR1310	PR1305	PR1225	PR1125	CA6515	CA6525
			Dimensions (in)				Grade							
 Finishing-Medium	CNMG	431HQ	1/2	3/16	0.203	1/64							●	●
		432HQ	1/2	3/16	0.203	1/32						●	●	○
		433HQ	1/2	3/16	0.203	3/64						●	●	●
NEW  Medium - Roughing	CNMG	431PG	1/2	3/16	0.203	1/64	●							
		432PG	1/2	3/16	0.203	1/32	●							
		433PG	1/2	3/16	0.203	3/64	●							
 Medium-Roughing	CNMG	431PS	1/2	3/16	0.203	1/64						●	●	●
		432PS	1/2	3/16	0.203	1/32						●	●	●
		433PS	1/2	3/16	0.203	3/64						●	●	●
		434PS	1/2	3/16	0.203	1/16								●
	CNMG	543PS	5/8	1/4	0.250	3/64							●	●
		544PS	5/8	1/4	0.250	1/16							●	●
 Medium-Roughing / High Feed Rate	CNMG	432PT	1/2	3/16	0.203	1/32							●	●
		433PT	1/2	3/16	0.203	3/64							●	●
	CNMG	543PT	5/8	1/4	0.250	3/64								●
		544PT	5/8	1/4	0.250	1/16							●	●
 Roughing	CNMG	431	1/2	3/16	0.203	1/64						○	●	○
		432	1/2	3/16	0.203	1/32						●	●	●
		433	1/2	3/16	0.203	3/64						○	●	●
	CNMG	643	3/4	1/4	0.312	3/64						●		
NEW  Finishing-Medium Sharp Edge / Polished	CNGG	4305MFP-SK	1/2	3/16	0.203	<0.008	○				●			
		431MFP-SK	1/2	3/16	0.203	<1/64	○				●			
 Medium-Roughing Sharp Edge / Polished	CNGG	431FP-TK	1/2	3/16	0.203	1/64	○				●			
		432FP-TK	1/2	3/16	0.203	1/32	○				●			
 Medium-Roughing	CNMG	431TK	1/2	3/16	0.203	1/64		○	●	●		●	●	○
		432TK	1/2	3/16	0.203	1/32		●	●	●		●	●	●
 Finishing-Medium	CNMG	432HU	1/2	3/16	0.203	1/32						●		
		433HU	1/2	3/16	0.203	3/64						●	●	
 Finishing-Medium	CNMG	431MQ	1/2	3/16	0.203	1/64	●	●	●	●		●	●	●
		432MQ	1/2	3/16	0.203	1/32	●	●	●	●		●	●	●
 Medium-Roughing	CNMG	431MS	1/2	3/16	0.203	1/64	●	●	●	●			●	●
		432MS	1/2	3/16	0.203	1/32	●	●	●	●		●	●	●
		433MS	1/2	3/16	0.203	3/64	●	●	●	●		●	●	●
		434MS	1/2	3/16	0.203	1/16		●	●	●		●	●	●
 Medium-Roughing	CNMG	431MU	1/2	3/16	0.203	1/64	●	●	●	●		●	●	●
		432MU	1/2	3/16	0.203	1/32	●	●	●			●	●	●
		433MU	1/2	3/16	0.203	3/64	●					●	●	●
	CNMG	542MU	5/8	1/4	0.250	1/32						○	○	●
		543MU	5/8	1/4	0.250	3/64		●	●			○	○	○
		544MU	5/8	1/4	0.250	1/16		●	●			○	○	○
	CNMG	643MU	3/4	1/4	5/16	3/64		●	●					
		644MU	3/4	1/4	5/16	1/16		●	●					

Shape	Part Number		I.C.	Thickness	Hole	Corner-R (rε)	PR1535	PR1325	PR1310	PR1305	PR1225	PR1125	CA6515	CA6525
			Dimensions (in)				Grade							
 Medium-Roughing	CNMG	431TK	1/2	3/16	0.203	1/64		○	●	●		●	●	○
		432TK	1/2	3/16	0.203	1/32		●	●	●		●	●	●
 Finishing-Medium	DNMG	431HQ	1/2	3/16	0.203	1/64						●	●	●
		432HQ	1/2	3/16	0.203	1/32						●	●	●
	DNMG	441HQ	1/2	1/4	0.203	1/64						○	○	
		442HQ	1/2	1/4	0.203	1/32						○	○	
NEW  Medium-Roughing	DNMG	431PG	1/2	3/16	0.203	1/64	●							
		432PG	1/2	3/16	0.203	1/32	●							
		433PG	1/2	3/16	0.203	3/64	●							
	DNMG	441PG	1/2	1/4	0.203	1/64	●							
		442PG	1/2	1/4	0.203	1/32	●							
		443PG	1/2	1/4	0.203	3/64	●							
 Medium-Roughing	DNMG	431PS	1/2	3/16	0.203	1/64						●	○	●
		432PS	1/2	3/16	0.203	1/32						●		●
		433PS	1/2	3/16	0.203	3/64							○	●
	DNMG	441PS	1/2	1/4	0.203	1/64						○		
		442PS	1/2	1/4	0.203	1/32						○		○
		443PS	1/2	1/4	0.203	3/64							●	●
 Finishing	DNMG	431GU	1/2	3/16	0.203	1/64							●	●
		432GU	1/2	3/16	0.203	1/32							●	●
	DNMG	442GU	1/2	1/4	0.203	1/32								●
NEW  Finishing-Medium Sharp Edge / Polished	DNGG	4305MFP-SK	1/2	3/16	0.203	0.008	○				●			
		431MFP-SK	1/2	3/16	0.203	1/64	○				●			
 Medium-Roughing Sharp Edge / Polished	DNGG	431FP-TK	1/2	3/16	0.203	1/64	○				●			
		432FP-TK	1/2	3/16	0.203	1/32	○				●			
 Medium-Roughing	DNMG	431TK	1/2	3/16	0.203	1/64		●	●	●		●	●	
		432TK	1/2	3/16	0.203	1/32		●	●	●		●	●	●
	DNMG	441TK	1/2	1/4	0.203	1/64		○	○	○		○	●	
		442TK	1/2	1/4	0.203	1/32		○	○	○		○	●	
 Finishing-Medium	DNMG	431MQ	1/2	3/16	0.203	1/64	●	●	●	●		●	●	●
		432MQ	1/2	3/16	0.203	1/32	●	●	●	●		●	●	●
	DNMG	441MQ	1/2	1/4	0.203	1/64	○	○	○	○			●	
		442MQ	1/2	1/4	0.203	1/32	○	○	○	○			●	●
 Medium-Roughing	DNMG	431MS	1/2	3/16	0.203	1/64	●	●	●	●		●	●	●
		432MS	1/2	3/16	0.203	1/32	●	●	●	●		●	●	●
		433MS	1/2	3/16	0.203	3/64	●	●	●	●		●	●	●
	DNMG	441MS	1/2	1/4	0.203	1/64	○	○	○	○		○		
		442MS	1/2	1/4	0.203	1/32	○	○	○	○		○	●	
		443MS	1/2	1/4	0.203	3/64	○	○	○	○		●	●	●
 Medium-Roughing	DNMG	431MU	1/2	3/16	0.203	1/64	●		●	●		●	○	●
		432MU	1/2	3/16	0.203	1/32	●	●	●	●		●	●	●
	DNMG	441MU	1/2	1/4	0.203	1/64	○	○	○	○		○		
		442MU	1/2	1/4	0.203	1/32	○	○	○	○		○		●
 Finishing-Roughing	SNMG	432HQ	1/2	3/16	0.203	1/32							●	●
NEW  Medium-Roughing	SNMG	432PG	1/2	3/16	0.203	1/32	●							
		433PG	1/2	3/16	0.203	3/64	●							

● : U.S. Stock Ⓡ : U.S. Stock (R-hand Only) Ⓛ : U.S. Stock (L-hand Only)

○ : World Express (Shipping: 7-10 Business Days) Ⓡ : World Express (R-hand Only) Ⓛ : World Express (L-hand Only)

Negative Inserts

Shape	Part Number		Dimensions (in) I.C.	Thickness	Hole	Corner-R (rε)	Grade PR1535	PR1325	PR1310	PR1305	PR1225	PR1125	CA6515	CA6525
 Medium-Roughing	SNMG	432PS	1/2	3/16	0.203	1/32						●	●	●
		433PS	1/2	3/16	0.203	3/64						●	●	●
		434PS	1/2	3/16	0.203	1/16						○	●	●
 Medium-Roughing / High Feed Rate	SNMG	432PT	1/2	3/16	0.203	1/32							●	●
		433PT	1/2	3/16	0.203	3/64							○	○
 Roughing	SNMG	432	1/2	3/16	0.203	1/32						○	●	●
		433	1/2	3/16	0.203	3/64						○		
	SNMG	643	3/4	1/4	0.312	3/64						●		
 Finishing-Medium	SNMG	431MQ	1/2	3/16	0.203	1/64		○	○	○		●	●	●
		432MQ	1/2	3/16	0.203	1/32		○	○	○		●	●	●
 Medium-Roughing	SNMG	431MS	1/2	3/16	0.203	1/64		○	○	○			●	○
		432MS	1/2	3/16	0.203	1/32	●	○	○	○		●	●	●
		433MS	1/2	3/16	0.203	3/64	●	○	○	○		●	●	●
		434MS	1/2	3/16	0.203	1/16		○	○	○		●	●	●
 Medium-Roughing	SNMG	643MU	3/4	1/4	5/16	3/64								
		644MU	3/4	1/4	5/16	1/16								
 Finishing-Medium	TNMG	331HQ	3/8	3/16	0.150	1/64						○	●	●
		332HQ	3/8	3/16	0.150	1/32						○	●	●
NEW  Medium-Roughing	TNMG	331PG	3/8	3/16	0.150	1/64	●							
		332PG	3/8	3/16	0.150	1/32	●							
		333PG	3/8	3/16	0.150	3/64	●							
 Medium-Roughing	TNMG	331PS	3/8	3/16	0.150	1/64						○	○	●
		332PS	3/8	3/16	0.150	1/32						●	●	●
		333PS	3/8	3/16	0.150	3/64							●	●
	TNMG	432PS	1/2	3/16	0.203	1/32							●	●
		433PS	1/2	3/16	0.203	3/64							○	●
 Roughing	TNMG	331	3/8	3/16	0.150	1/64						○	○	○
		332	3/8	3/16	0.150	1/32						○	○	○
		333	3/8	3/16	0.150	3/64							●	●
 Finishing	TNMG	331GU	3/8	3/16	0.150	1/32							●	●
		332GU	3/8	3/16	0.150	3/64							○	●
 Medium-Roughing	TNMG	332HU	3/8	3/16	0.150	1/64							●	●
		333HU	3/8	3/16	0.150	1/32								●
NEW  Finishing-Medium Sharp Edge / Polished	TNGG	3302MFP-SK	3/8	3/16	0.150	<0.004	○				●			
		3305MFP-SK	3/8	3/16	0.150	<0.008	○				●			
		331MFP-SK	3/8	3/16	0.150	<1/64	○				●			
 Medium-Roughing Sharp Edge / Polished	TNGG	331FP-TK	3/8	3/16	0.150	1/64	○				●			
		332FP-TK	3/8	3/16	0.150	1/32	○				●			

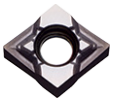
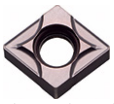
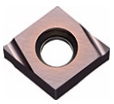
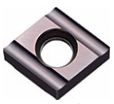
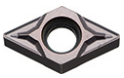
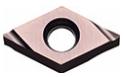
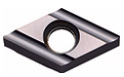
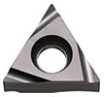
Shape	Part Number		Dimensions (in) I.C.	Thickness	Hole	Corner-R (rε)	Grade PR1535	PR1325	PR1310	PR1305	PR1225	PR1125	CA6515	CA6525
 Medium-Roughing Sharp Edge / Polished	TNGG	331-TK	3/8	3/16	0.150	1/64			●	●				
		332-TK	3/8	3/16	0.150	1/32			●	●				
 Medium-Roughing	TNMG	331TK	3/8	3/16	0.150	1/64						○	○	○
		332TK	3/8	3/16	0.150	1/32						●	○	●
 Finishing-Medium	TNMG	331MQ	3/8	3/16	0.150	1/64	●	●	●	●		●	●	●
		332MQ	3/8	3/16	0.150	1/32	●	●		●		●	●	●
 Medium-Roughing	TNMG	331MS	3/8	3/16	0.150	1/64	●	●	●	●		●	○	○
		332MS	3/8	3/16	0.150	1/32	●	●	●	●		●	○	●
		333MS	3/8	3/16	0.150	3/64	●	●	●	●		●	●	○
 Medium-Roughing	TNMG	331MU	3/8	3/16	0.150	1/64	●	●	●	●			●	○
		332MU	3/8	3/16	0.150	1/32	●	●	●	●			○	●
 Medium-Roughing	TNMG	331 R/L -ST	3/8	3/16	0.150	1/64						Ⓡ	○	Ⓡ
		332 R/L -ST	3/8	3/16	0.150	1/32						○	○	○
 Finishing Surface Roughness Oriented	TNGG	3305 R/L -S	3/8	3/16	0.150	0.008	○					○		
		331 R/L -S	3/8	3/16	0.150	1/64	○					●		
		332 R/L -S	3/8	3/16	0.150	1/32	○					●		
 Medium-Roughing Low Cutting Force	TNGG	331 R/L -25R	3/8	3/16	0.150	1/64						Ⓡ		
		332 R/L -25R	3/8	3/16	0.150	1/32						●		
 Roughing	VNMG	331	3/8	3/16	0.150	1/64							●	●
		332	3/8	3/16	0.150	1/32							●	●
 Finishing	VNMG	331GU	3/8	3/16	0.150	1/64								●
		332GU	3/8	3/16	0.150	1/32							●	○
NEW  Finishing-Medium Sharp Edge / Polished	VNGG	3305MFP-SK	3/8	3/16	0.150	<0.008	○				●			
		331MFP-SK	3/8	3/16	0.150	<1/64	○				●			
 Finishing-Medium	VNMG	331MQ	3/8	3/16	0.150	1/64		●	●	●		●	●	●
		332MQ	3/8	3/16	0.150	1/32		○	●	●		●	●	●
 Medium-Roughing	VNMG	331MS	3/8	3/16	0.150	1/64		●	●	●		●	●	●
		332MS	3/8	3/16	0.150	1/32		●	●	●		●	●	●
		333MS	3/8	3/16	0.150	3/64		●	●	●		●	●	○
 Medium-Roughing	VNMG	331MU	3/8	3/16	0.150	1/64		●	○			●	●	●
		332MU	3/8	3/16	0.150	1/32		●	●	●		●	○	●

● : U.S. Stock Ⓡ : U.S. Stock (R-hand Only) Ⓛ : U.S. Stock (L-hand Only)
○ : World Express (Shipping: 7-10 Business Days) Ⓡ : World Express (R-hand Only) Ⓛ : World Express (L-hand Only)

Negative Inserts WN

Shape	Part Number		Dimensions (in) I.C.	Thickness	Hole	Corner-R (rε)	Grade PR1535	PR1325	PR1310	PR1305	PR1225	PR1125	CA6515	CA6525
 Finishing-Medium	WNMG	431HQ	1/2	3/16	0.203	1/64						●	●	●
		432HQ	1/2	3/16	0.203	1/32						●	●	●
NEW  Medium-Roughing	WNMG	431PG	1/4	3/16	0.203	1/64	●							
		432PG	1/4	3/16	0.203	1/32	●							
		433PG	1/4	3/16	0.203	3/64	●							
 Medium-Roughing	WNMG	431PS	1/2	3/16	0.203	1/64						●	●	●
		432PS	1/2	3/16	0.203	1/32						○	●	●
		433PS	1/2	3/16	0.203	3/64								●
 Roughing	WNMG	431	1/2	3/16	0.203	1/64						○	●	○
		432	1/2	3/16	0.203	1/32						○	●	●
		433	1/2	3/16	0.203	3/64						○		●
 Finishing	WNMG	431GU	1/2	3/16	0.203	1/64							●	●
		432GU	1/2	3/16	0.203	1/32								●
 Medium-Roughing	WNMG	432HU	1/2	3/16	0.203	1/32							●	○
		433HU	1/2	3/16	0.203	3/64							●	●
 Medium-Roughing	WNMG	431TK	1/2	3/16	0.203	1/64		●	●	●		●	●	○
		432TK	1/2	3/16	0.203	1/32		●	●	●		●	●	●
 Finishing-Medium	WNMG	431MQ	1/2	3/16	0.203	1/64	●	●	●	●		●	●	●
		432MQ	1/2	3/16	0.203	1/32	●	●	●	●		●	●	●
 Medium-Roughing	WNMG	431MS	1/2	3/16	0.203	1/64	●	●	●	●		●	○	●
		432MS	1/2	3/16	0.203	1/32	●	●	●	●		●	●	●
		433MS	1/2	3/16	0.203	3/64	●	●	●	●		●	●	○
 Medium-Roughing	WNMG	431MU	1/2	3/16	0.203	1/64	●	●	●	●		●	○	●
		432MU	1/2	3/16	0.203	1/32	●	●		●		●	●	●

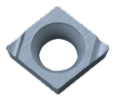
Double-Sided Inserts CN / DN / TN

Shape	Part Number		Dimensions (in) I.C.	Thickness	Hole	Corner-R (rε)	Grade PR1535	PR1325	PR1310	PR1305	PR1225	PR1125	CA6515	CA6525
 Finishing-Medium Sharp Edge / Polished	CNGU	24202MFP-SK	0.295	1/8	0.142	<0.004	○				●			
		24205MFP-SK	0.295	1/8	0.142	<0.008	○				●			
 Medium-Roughing With Honing	CNMU	24205E-GK	0.295	1/8	0.142	<0.008	○				●			
		2421E-GK	0.295	1/8	0.142	1/64	○				●			
 Finishing Sharp Edge	CNGU	242013MFR-F	0.295	1/8	0.142	<0.002					●			
		24202MFR-F	0.295	1/8	0.142	<0.004	○				●			
		24205MFR-F	0.295	1/8	0.142	<0.008	○				●			
		2421MFR-F	0.295	1/8	0.142	<1/64	○				●			
 Low Feed Sharp Edge	CNGU	242013MFR-U	0.295	1/8	0.142	<0.002					●			
		24202MFR-U	0.295	1/8	0.142	<0.004	○				●			
		24205MFR-U	0.295	1/8	0.142	<0.008	○				●			
		2421MFR-U	0.295	1/8	0.142	<1/64	○				●			
 Finishing-Medium Sharp Edge / Polished	DNGU	22202MFP-SK	0.276	1/8	0.142	<0.004	○				●			
		22205MFP-SK	0.276	1/8	0.142	<0.008	○				●			
		2221MFP-SK	0.276	1/8	0.142	<1/64	○				●			
 Medium - Roughing Honed Edge	DNMU	22205E-GK	0.276	1/8	0.142	0.008	○				●			
		2221E-GK	0.276	1/8	0.142	1/64	○				●			
 Finishing Sharp Edge	DNGU	222013MFR-F	0.276	1/8	0.142	<0.002					●			
		22202MFR-F	0.276	1/8	0.142	<0.004	○				●			
		22205MFR-F	0.276	1/8	0.142	<0.008	○				●			
		2221MFR-F	0.276	1/8	0.142	<1/64	○				●			
 Low Feed Sharp Edge	DNGU	222013MFR-U	0.276	1/8	0.142	<0.002					●			
		22202MFR-U	0.276	1/8	0.142	<0.004	○				●			
		22205MFR-U	0.276	1/8	0.142	<0.008	○				●			
		2221MFR-U	0.276	1/8	0.142	<1/64	○				●			
 Finishing Sharp Edge	TNGU	182013MFR-F	0.219	1/8	0.118	<0.002					●			
		18202MFR-F	0.219	1/8	0.118	<0.004	○				●			
		18205MFR-F	0.219	1/8	0.118	<0.008	○				●			
		1821MFR-F	0.219	1/8	0.118	<1/64	○				●			
 Low Feed Sharp Edge	TNGU	182013MFR-U	0.219	1/8	0.118	<0.002					●			
		18202MFR-U	0.219	1/8	0.118	<0.004	○				●			
		18205MFR-U	0.219	1/8	0.118	<0.008	○				●			
		1821MFR-U	0.219	1/8	0.118	<1/64	○				●			

● : U.S. Stock Ⓡ : U.S. Stock (R-hand Only) Ⓛ : U.S. Stock (L-hand Only)
○ : World Express (Shipping: 7-10 Business Days) Ⓡ : World Express (R-hand Only) Ⓛ : World Express (L-hand Only)

Positive Inserts

Shape	Part Number	I.C.	Thickness	Hole	Angle	Corner-R (rε)	PR1535	PR1325	PR1310	PR1305	PR1225	PR1125	CA6515	CA6525
		Dimensions (in)					Grade							
 Minute D.O.C. Sharp Edge / Polished	CCGT 110902MP-CF	0.138	0.055	0.075	7°	<0.004	○				●			
	110905MP-CF	0.138	0.055	0.075	7°	<0.008	○				●			
	CCGT 141102MP-CF	0.169	0.071	0.091	7°	<0.004	○				●			
	141105MP-CF	0.169	0.071	0.091	7°	<0.008	○				●			
 Finishing Sharp Edge / Polished	CCGT 21502MFP-GF	1/4	3/32	0.110	7°	<0.004	○				●			
	21505MFP-GF	1/4	3/32	0.110	7°	<0.008	○				●			
	2151MFP-GF	1/4	3/32	0.110	7°	<1/64	○				●			
	CCGT 32502MFP-GF	3/8	5/32	0.173	7°	<0.004	○				●			
	32505MFP-GF	3/8	5/32	0.173	7°	<0.008	○				●			
	3251MFP-GF	3/8	5/32	0.173	7°	<1/64	○				●			
NEW  Finishing Sharp Edge / Polished	CCGT 21502MFP-SK	1/4	3/32	0.110	7°	<0.004	○				○			
	21505MFP-SK	1/4	3/32	0.110	7°	<0.008	○				○			
	2151MFP-SK	1/4	3/32	0.110	7°	<1/64	○				○			
	CCGT 32502MFP-SK	3/8	5/32	0.173	7°	<0.004	○				○			
	32505MFP-SK	3/8	5/32	0.173	7°	<0.008	○				○			
	3251MFP-SK	3/8	5/32	0.173	7°	<1/64	○				○			
NEW  Finishing Sharp Edge / Polished	CCGT 21502MP-CK	1/4	3/32	0.110	7°	<0.004	○				●			
	21505MP-CK	1/4	3/32	0.110	7°	<0.008	○				●			
	CCGT 32502MP-CK	3/8	5/32	0.173	7°	<0.004	○				●			
	32505MP-CK	3/8	5/32	0.173	7°	<0.008	○				●			
 Finishing-Medium Sharp Edge / Polished	CCGT 21502MFP-GQ	1/4	3/32	0.110	7°	<0.004	○				●			
	21505MFP-GQ	1/4	3/32	0.110	7°	<0.008	○				●			
	2151MFP-GQ	1/4	3/32	0.110	7°	<1/64	○				●			
	CCGT 32502MFP-GQ	3/8	5/32	0.173	7°	<0.004	○				●			
	32505MFP-GQ	3/8	5/32	0.173	7°	<0.008	○				●			
	3251MFP-GQ	3/8	5/32	0.173	7°	<1/64	○				●			
NEW  Finishing	CCMT 21505PP	1/4	3/32	0.110	7°	0.008	○				○			
	2151PP	1/4	3/32	0.110	7°	1/64	○				○			
	CCMT 32505PP	3/8	5/32	0.173	7°	0.008	○				○			
	3251PP	3/8	5/32	0.173	7°	1/64	○				○			
	3252PP	3/8	5/32	0.173	7°	1/32	○				○			
 Finishing-Medium	CCMT 21505GK	1/4	3/32	0.110	7°	0.008	○					●	●	●
	2151GK	1/4	3/32	0.110	7°	1/64	○					●	●	●
	CCMT 32505GK	3/8	5/32	0.173	7°	0.008	○					●	●	●
	3251GK	3/8	5/32	0.173	7°	1/64	○					●	●	●
	CCMT 431GK	1/2	3/16	0.217	7°	1/64						●	●	●
	432GK	1/2	3/16	0.217	7°	1/32						●	●	●
	433GK	1/2	3/16	0.217	7°	3/64						●	●	●
 Finishing-Medium	CCMT 21505HQ	1/4	3/32	0.110	7°	0.008	○					●	●	●
	2151HQ	1/4	3/32	0.110	7°	1/64	○					●	●	●
	CCMT 32505HQ	3/8	5/32	0.173	7°	0.008	○					●	●	●
	3251HQ	3/8	5/32	0.173	7°	1/64	○					●	●	●
	3252HQ	3/8	5/32	0.173	7°	1/32	○					●	●	●
 Medium	CCMT 3252	3/8	5/32	0.173	7°	1/32	○					●	●	●
 Medium / Sharp Edge	CCGT 215013MF	1/4	3/32	0.110	7°	<0.002	○				●			
	21502MF	1/4	3/32	0.110	7°	<0.004	○				●			
	21505MF	1/4	3/32	0.110	7°	<0.008	○				●			
	2151MF	1/4	3/32	0.110	7°	<1/64	○				●			
	CCGT 325013MF	3/8	5/32	0.173	7°	<0.002	○				●			
	32502MF	3/8	5/32	0.173	7°	<0.004	○				●			
	32505MF	3/8	5/32	0.173	7°	<0.008	○				●			
	3251MF	3/8	5/32	0.173	7°	<1/64	○				●			

Shape	Part Number	I.C.	Thickness	Hole	Angle	Corner-R (rε)	PR1535	PR1325	PR1310	PR1305	PR1225	PR1125	CA6515	CA6525
		Dimensions (in)					Grade							
 Finishing-Medium	CCMT 3251MQ	3/8	5/32	0.173	7°	1/64		●	●	●		○	○	○
	3252MQ	3/8	5/32	0.173	7°	1/32		●	●	●		○	○	○
 Finishing / Super Fine Sharp Edge / Precision	CCET 1109013M$^{R}_{L}$-FSF	0.138	0.055	0.075	7°	<0.002					●			
	110902M$^{R}_{L}$-FSF	0.138	0.055	0.075	7°	<0.004					●			
	110905M$^{R}_{L}$-FSF	0.138	0.055	0.075	7°	<0.008					●			
	11091M$^{R}_{L}$-FSF	0.138	0.055	0.075	7°	<1/64					●			
	CCET 1411013M$^{R}_{L}$-FSF	0.169	0.071	0.091	7°	<0.002					●			
	141102M$^{R}_{L}$-FSF	0.169	0.071	0.091	7°	<0.004					●			
	141105M$^{R}_{L}$-FSF	0.169	0.071	0.091	7°	<0.008					●			
	14111M$^{R}_{L}$-FSF	0.169	0.071	0.091	7°	<1/64					●			
 Finishing Sharp Edge	CCGT 1109013M$^{R}_{L}$-F	0.138	0.055	0.075	7°	<0.002					●			
	110902M$^{R}_{L}$-F	0.138	0.055	0.075	7°	<0.004					●			
	110905M$^{R}_{L}$-F	0.138	0.055	0.075	7°	<0.008					●			
	11091M$^{R}_{L}$-F	0.138	0.055	0.075	7°	<1/64					●			
	CCGT 1411013M$^{R}_{L}$-F	0.169	0.071	0.091	7°	<0.002					●			
	141102M$^{R}_{L}$-F	0.169	0.071	0.091	7°	<0.004					●			
	141105M$^{R}_{L}$-F	0.169	0.071	0.091	7°	<0.008					●			
	14111M$^{R}_{L}$-F	0.169	0.071	0.091	7°	<1/64					●			
 Low Feed / Super Fine Sharp Edge / Precision	CCET 215013MF$^{R}_{L}$-USF	1/4	3/32	0.110	7°	<0.002					●			
	21502MF$^{R}_{L}$-USF	1/4	3/32	0.110	7°	<0.004					●			
	21505MF$^{R}_{L}$-USF	1/4	3/32	0.110	7°	<0.008					●			
	CCET 325013MF$^{R}_{L}$-USF	3/8	5/32	0.173	7°	<0.002					●			
	32502MF$^{R}_{L}$-USF	3/8	5/32	0.173	7°	<0.004					●			
	32505MF$^{R}_{L}$-USF	3/8	5/32	0.173	7°	<0.008					●			
 Low Feed Sharp Edge	CCGT 215013MF$^{R}_{L}$-U	1/4	3/32	0.110	7°	<0.002					●			
	21502MF$^{R}_{L}$-U	1/4	3/32	0.110	7°	<0.004					●			
	21505MF$^{R}_{L}$-U	1/4	3/32	0.110	7°	<0.008					●			
	2151MF$^{R}_{L}$-U	1/4	3/32	0.110	7°	<1/64					●			
	CCGT 325013MF$^{R}_{L}$-U	3/8	5/32	0.173	7°	<0.002					●			
	32502MF$^{R}_{L}$-U	3/8	5/32	0.173	7°	<0.004					●			
	32505MF$^{R}_{L}$-U	3/8	5/32	0.173	7°	<0.008					●			
	3251MF$^{R}_{L}$-U	3/8	5/32	0.173	7°	<1/64					●			
NEW  Low Feed Sharp Edge	CCET 215013MF$^{R}_{L}$-J	1/4	3/32	0.110	7°	<0.004	Ⓡ				Ⓡ			
	21502MF$^{R}_{L}$-J	1/4	3/32	0.110	7°	<0.008	○				●			
	21505MF$^{R}_{L}$-J	1/4	3/32	0.110	7°	<1/64	○				●			
	CCET 32502MF$^{R}_{L}$-J	3/8	5/32	0.173	7°	<0.004	○				●			
	32505MF$^{R}_{L}$-J	3/8	5/32	0.173	7°	<0.008	○				●			
	3251MF$^{R}_{L}$-J	3/8	5/32	0.173	7°	<1/64	○				●			
NEW  Finishing	CPMT 251505PP	5/16	3/32	0.138	11°	0.008	○				○			
	25151PP	5/16	3/32	0.138	11°	1/64	○				○			
	CPMT 3205PP	3/8	1/8	0.173	11°	0.008	○				○			
	321PP	3/8	1/8	0.173	11°	1/64	○				○			
	322PP	3/8	1/8	0.173	11°	1/32	○				○			
 Finishing-Medium	CPMH 25151HQ	5/16	3/32	0.138	11°	1/64	○					●	●	●
	25152HQ	5/16	3/32	0.138	11°	1/32	○					●	●	●
	CPMH 321HQ	3/8	1/8	0.177	11°	1/64	○					●	●	●
	322HQ	3/8	1/8	0.177	11°	1/32	○					●	●	●
 Medium	CPMH 25151	5/16	3/32	0.138	11°	1/64	○					●	●	●
	25152	5/16	3/32	0.138	11°	1/32	○					●	●	●
	CPMH 321	3/8	1/8	0.177	11°	1/64	○					●	●	●
	322	3/8	1/8	0.177	11°	1/32	○					●	●	●

● : U.S. Stock Ⓡ : U.S. Stock (R-hand Only) Ⓛ : U.S. Stock (L-hand Only)
○ : World Express (Shipping: 7-10 Business Days) Ⓡ : World Express (R-hand Only) Ⓛ : World Express (L-hand Only)

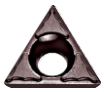
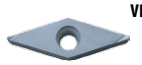
Shape	Part Number	I.C.	Thickness	Hole	Angle	Corner-R (rε)	PR1535	PR1325	PR1310	PR1305	PR1225	PR1125	CA6515	CA6525
	DCGT 21502MP-CF	1/4	3/32	0.110	7°	<0.004	○				●			
Minute D.O.C. Sharp Edge / Polished	**21505MP-CF**	1/4	3/32	0.110	7°	<0.008	○				●			
	DCGT 32502MP-CF	3/8	5/32	0.173	7°	<0.004	○				●			
	32505MP-CF	3/8	5/32	0.173	7°	<0.008	○				●			
	DCGT 21502MFP-GF	1/4	3/32	0.110	7°	<0.004	○				●			
	21505MFP-GF	1/4	3/32	0.110	7°	<0.008	○				●			
Finishing Sharp Edge / Polished	**2151MFP-GF**	1/4	3/32	0.110	7°	<1/64	○				●			
	DCGT 32502MFP-GF	3/8	5/32	0.173	7°	<0.004	○				●			
	32505MFP-GF	3/8	5/32	0.173	7°	<0.008	○				●			
	3251MFP-GF	3/8	5/32	0.173	7°	<1/64	○				●			
	DCGT 21502MFP-SK	1/4	3/32	0.110	7°	<0.004	○				○			
NEW	**21505MFP-SK**	1/4	3/32	0.110	7°	<0.008	○				○			
Finishing-Medium Sharp Edge / Polished	**2151MFP-SK**	1/4	3/32	0.110	7°	<1/64	○				○			
	DCGT 32502MFP-SK	3/8	5/32	0.173	7°	<0.004	○				●			
	32505MFP-SK	3/8	5/32	0.173	7°	<0.008	○				○			
	3251MFP-SK	3/8	5/32	0.173	7°	<1/64	○				○			
	DCGT 21502MP-CK	1/4	3/32	0.110	7°	<0.004	○				●			
	21505MP-CK	1/4	3/32	0.110	7°	<0.008	○				●			
Finishing Sharp Edge / Polished	**DCGT 32502MP-CK**	3/8	5/32	0.173	7°	<0.004	○				●			
	32505MP-CK	3/8	5/32	0.173	7°	<0.008	○				●			
	DCGT 21502MFP-GQ	1/4	3/32	0.110	7°	<0.004	○				●			
	21505MFP-GQ	1/4	3/32	0.110	7°	<0.008	○				●			
	2151MFP-GQ	1/4	3/32	0.110	7°	<1/64	○				●			
Finishing-Medium Sharp Edge / Polished	**DCGT 32502MFP-GQ**	3/8	5/32	0.173	7°	<0.004	○				●			
	32505MFP-GQ	3/8	5/32	0.173	7°	<0.008	○				●			
	3251MFP-GQ	3/8	5/32	0.173	7°	<1/64	○				●			
	DCMT 21505PP	1/4	3/32	0.110	7°	0.008	○				○			
NEW	**2151PP**	1/4	3/32	0.110	7°	1/64	○				○			
	DCMT 32505PP	3/8	5/32	0.173	7°	0.008	○				○			
Finishing	**3251PP**	3/8	5/32	0.173	7°	1/64	○				○			
	3252PP	3/8	5/32	0.173	7°	1/32	○				○			
	DCMT 21505GK	1/4	3/32	0.110	7°	0.008	○						●	●
	2151GK	1/4	3/32	0.110	7°	1/64	○					●	●	○
	2152GK	1/4	3/32	0.110	7°	1/32	○					●	●	●
Finishing-Medium	**DCMT 32505GK**	3/8	5/32	0.173	7°	0.008	○					●	●	●
	3251GK	3/8	5/32	0.173	7°	1/64	○					●	●	○
	3252GK	3/8	5/32	0.173	7°	1/32	○					●	○	●
	DCMT 2151HQ	1/4	3/32	0.110	7°	1/64	○					●	●	●
	2152HQ	1/4	3/32	0.110	7°	1/32	○					●	●	●
	DCMT 32505HQ	3/8	5/32	0.173	7°	0.008	○					●	●	●
Finishing-Medium	**3251HQ**	3/8	5/32	0.173	7°	1/64	○					●	●	●
	3252HQ	3/8	5/32	0.173	7°	1/32	○					●	●	●
	DCGT 215013MF	1/4	3/32	0.110	7°	<0.002	○				●			
	21502MF	1/4	3/32	0.110	7°	<0.004	○				●			
	21505MF	1/4	3/32	0.110	7°	<0.008	○				●			
	2151MF	1/4	3/32	0.110	7°	<1/64	○				●			
Medium Sharp Edge	**DCGT 325013MF**	3/8	5/32	0.173	7°	<0.002	○				●			
	32502MF	3/8	5/32	0.173	7°	<0.004	○				●			
	32505MF	3/8	5/32	0.173	7°	<0.008	○				●			
	3251MF	3/8	5/32	0.173	7°	<1/64	○				●			

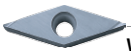
Shape	Part Number	I.C.	Thickness	Hole	Angle	Corner-R (rε)	PR1535	PR1325	PR1310	PR1305	PR1225	PR1125	CA6515	CA6525
	DCMT 21505MQ	1/4	3/32	0.110	7°	0.008		●				○	○	○
Finishing-Medium	**2151MQ**	1/4	3/32	0.110	7°	1/64		●				○	○	○
	DCMT 32505MQ	3/8	5/32	0.173	7°	0.008						○	○	○
	3251MQ	3/8	5/32	0.173	7°	1/64		●	●	●		○	○	○
	DCET 215013MR/L-FSF	1/4	3/32	0.110	7°	<0.002					●			
	21502MR/L-FSF	1/4	3/32	0.110	7°	<0.004					●			
	21505MR/L-FSF	1/4	3/32	0.110	7°	<0.008					●			
	2151MR/L-FSF	1/4	3/32	0.110	7°	<1/64					●			
Finishing / Super Fine Sharp Edge / Precision	**DCET 325013MR/L-FSF**	3/8	5/32	0.173	7°	<0.002					●			
	32502MR/L-FSF	3/8	5/32	0.173	7°	<0.004					●			
	32505MR/L-FSF	3/8	5/32	0.173	7°	<0.008					●			
	3251MR/L-FSF	3/8	5/32	0.173	7°	<1/64					●			
	DCGT 215013MR/L-F	1/4	3/32	0.110	7°	<0.002					●			
	21502MR/L-F	1/4	3/32	0.110	7°	<0.004					●			
	21505MR/L-F	1/4	3/32	0.110	7°	<0.008					●			
	2151MR/L-F	1/4	3/32	0.110	7°	<1/64					●			
Finishing Sharp Edge	**DCGT 325013MR/L-F**	3/8	5/32	0.173	7°	<0.002					●			
	32502MR/L-F	3/8	5/32	0.173	7°	<0.004					●			
	32505MR/L-F	3/8	5/32	0.173	7°	<0.008					●			
	3251MR/L-F	3/8	5/32	0.173	7°	<1/64					●			
	DCET 215013MFR/L-USF	1/4	3/32	0.110	7°	<0.004					●			
	21502MFR/L-USF	1/4	3/32	0.110	7°	<0.008					●			
	21505MFR/L-USF	1/4	3/32	0.110	7°	<1/64					●			
Low Feed / Super Fine Sharp Edge / Precision	**DCET 325013MFR/L-USF**	3/8	5/32	0.173	7°	<0.002					●			
	32502MFR/L-USF	3/8	5/32	0.173	7°	<0.004					●			
	32505MFR/L-USF	3/8	5/32	0.173	7°	<0.008					●			
	DCGT 215013MFR/L-U	1/4	3/32	0.110	7°	<0.002					●			
	21502MFR/L-U	1/4	3/32	0.110	7°	<0.004					Ⓡ			
	21505MFR/L-U	1/4	3/32	0.110	7°	<0.008					●			
	2151MFR/L-U	1/4	3/32	0.110	7°	<1/64					●			
Low Feed Sharp Edge	**DCGT 325013MFR/L-U**	3/8	5/32	0.173	7°	<0.002					●			
	32502MFR/L-U	3/8	5/32	0.173	7°	<0.004					●			
	32505MFR/L-U	3/8	5/32	0.173	7°	<0.008					●			
	3251MFR/L-U	3/8	5/32	0.173	7°	<1/64					●			
	DCET 325013MFR/L-JSF	3/8	5/32	0.173	7°	<0.002					●			
	32502MFR/L-JSF	3/8	5/32	0.173	7°	<0.004					●			
Low Feed / Super Fine Sharp Edge / Precision	**32505MFR/L-JSF**	3/8	5/32	0.173	7°	<0.008					●			
NEW	**DCET 215013MFR/L-J**	1/4	3/32	0.110	7°	<0.002	Ⓡ				Ⓡ			
	21502MFR/L-J	1/4	3/32	0.110	7°	<0.004	○				●			
Low Feed Sharp Edge	**21505MFR/L-J**	1/4	3/32	0.110	7°	<0.008	○				●			
	DCGT 325013MFR/L-J	3/8	5/32	0.173	7°	<0.002					●			
	32502MFR/L-J	3/8	5/32	0.173	7°	<0.004					●			
Low Feed Sharp Edge	**32505MFR/L-J**	3/8	5/32	0.173	7°	<0.008					●			
	3251MFR/L-J	3/8	5/32	0.173	7°	<1/64					●			
	RCMX 1003M0	0.394	1/8	0.142	7°	-								○
Medium	**RCMX 1204M0**	0.472	3/16	0.165	7°	-								○
	SPMR 321	3/8	1/8	-	11°	1/64						●		●
	322	3/8	1/8	-	11°	1/32						●		●
	SPMR 421	1/2	1/8	-	11°	1/64						●		●
Medium	**422**	1/2	1/8	-	11°	1/32						●		●

● : U.S. Stock Ⓡ : U.S. Stock (R-hand Only) Ⓛ : U.S. Stock (L-hand Only)

○ : World Express (Shipping: 7-10 Business Days) Ⓡ : World Express (R-hand Only) Ⓛ : World Express (L-hand Only)

Positive Inserts

Shape	Part Number	I.C.	Thickness	Hole	Angle	Corner-R (rε)	PR1535	PR1325	PR1310	PR1305	PR1225	PR1125	CA6515	CA6525
		Dimensions (in)					Grade							
 Minute D.O.C. Sharp Edge / Polished	TBGT 12102MP-CF	5/32	1/16	0.091	5°	<0.004	○				●			
	12105MP-CF	5/32	1/16	0.091	5°	<0.008	○				●			
 Low Feed Sharp Edge	TCGT 1515013MF$^{R}_{L}$U	3/16	3/32	0.091	7°	<0.002					●			
	TCGT 151502MF$^{R}_{L}$-U	3/16	3/32	0.091	7°	<0.004					●			
	151505MF$^{R}_{L}$-U	3/16	3/32	0.091	7°	<0.008					●			
	TCGT 22013MF$^{R}_{L}$-U	1/4	1/8	0.110	7°	<0.002					●			
	2202MF$^{R}_{L}$-U	1/4	1/8	0.110	7°	<0.004					●			
	2205MF$^{R}_{L}$-U	1/4	1/8	0.110	7°	<0.008					●			
	221MF$^{R}_{L}$-U	1/4	1/8	0.110	7°	<1/64					●			
 Minute D.O.C. Sharp Edge / Polished	TPGT 151502MP-CF	3/16	3/32	0.095	11°	<0.004	○				●			
	151505MP-CF	3/16	3/32	0.095	11°	<0.008	○				●			
	TPGT 181502MP-CF	7/32	3/32	0.118	11°	<0.004	○				●			
	181505MP-CF	7/32	3/32	0.118	11°	<0.008	○				●			
NEW  Finishing	TPMT 181505PP	7/32	3/32	0.118	11°	0.008	○				○			
	18151PP	7/32	3/32	0.118	11°	1/64	○				○			
	TPMT 2205PP	1/4	1/8	0.130	11°	0.008	○				○			
	221PP	1/4	1/8	0.130	11°	1/64	○				○			
	222PP	1/4	1/8	0.130	11°	1/32	○				○			
 Finishing-Medium	TPMT 18151HQ	7/32	3/32	0.110	11°	1/64	○					●	●	●
	TPMT 221HQ	1/4	1/8	0.130	11°	1/64	○					●	●	●
	222HQ	1/4	1/8	0.130	11°	1/32	○					●	●	●
	TPMT 321HQ	3/8	1/8	0.173	11°	1/64	○					●	●	●
	322HQ	3/8	1/8	0.173	11°	1/32	○					●	●	●
 Finishing-Medium	TPMR 221HQ	1/4	1/8	-	11°	1/64						●		●
	222HQ	1/4	1/8	-	11°	1/32						○		●
	TPMR 321HQ	3/8	1/8	-	11°	1/64						●		●
	322HQ	3/8	1/8	-	11°	1/32						●		●
 Medium	TPMR 221	1/4	1/8	-	11°	1/64						●		○
	222	1/4	1/8	-	11°	1/32						○		○
	TPMR 321	3/8	1/8	-	11°	1/64						●		○
	322	3/8	1/8	-	11°	1/32						●		●
	VBMT 2205PP	1/4	1/8	0.110	5°	0.2	○				○			
	221PP	1/4	1/8	0.110	5°	1/64	○				○			
NEW  Finishing	222PP	1/4	1/8	0.110	5°	1/32	○				○			
	VBMT 331PP	3/8	3/16	0.173	5°	1/64	○				○			
	332PP	3/8	3/16	0.173	5°	1/32	○				○			
	333PP	3/8	3/16	0.173	5°	3/64	○				○			
	VBMT 221HQ	1/4	1/8	0.110	5°	1/64	○					●	●	●
 Finishing-Medium	222HQ	1/4	1/8	0.110	5°	1/32	○					●	●	●
	VBMT 331HQ	3/8	3/16	0.173	5°	1/64						●	●	●
	332HQ	3/8	3/16	0.173	5°	1/32						●	●	●
 Finishing / Super Fine Sharp Edge / Precision	VBET 22013M$^{R}_{L}$-FSF	1/4	1/8	0.110	5°	<0.002					●			
	2202M$^{R}_{L}$-FSF	1/4	1/8	0.110	5°	<0.004					●			
	2205M$^{R}_{L}$-FSF	1/4	1/8	0.110	5°	<0.008					●			
 Finishing Sharp Edge	VBGT 22013M$^{R}_{L}$-F	1/4	1/8	0.110	5°	<0.002					●			
	2202M$^{R}_{L}$-F	1/4	1/8	0.110	5°	<0.004					●			
	2205M$^{R}_{L}$-F	1/4	1/8	0.110	5°	<0.008					●			

Shape	Part Number	I.C.	Thickness	Hole	Angle	Corner-R (rε)	PR1535	PR1325	PR1310	PR1305	PR1225	PR1125	CA6515	CA6525
		Dimensions (in)					Grade							
 Finishing-Medium	VBGT 22013M$^{R}_{L}$-Y	1/4	1/8	0.110	5°	<0.002					●			
	2202M$^{R}_{L}$-Y	1/4	1/8	0.110	5°	<0.004					●			
	2205M$^{R}_{L}$-Y	1/4	1/8	0.110	5°	<0.008					●			
	221M$^{R}_{L}$-Y	1/4	1/8	0.110	5°	<1/64					●			
	222M$^{R}_{L}$-Y	1/4	1/8	0.110	5°	<1/32					●			
	VBGT 3305M$^{R}_{L}$-Y	3/8	3/16	0.173	5°	<0.008					●			
	331M$^{R}_{L}$-Y	3/8	3/16	0.173	5°	<1/64					●			
	332M$^{R}_{L}$-Y	3/8	3/16	0.173	5°	<1/32					●			
NEW  Finishing	VCMT 151505PP	3/16	3/32	0.091	7°	<0.008	○				○			
	15151PP	3/16	3/32	0.091	7°	1/64	○				○			
	VCMT 331PP	3/8	3/16	0.173	7°	1/64	○				○			
	332PP	3/8	3/16	0.173	7°	1/32	○				○			
 Finishing-Medium	VCMT 15151HQ	3/16	3/32	0.091	7°	1/64	○					●	●	●
	VCMT 332HQ	3/8	3/16	0.173	7°	1/32								●
 Minute D.O.C. Sharp Edge / Polished	VPGT 2202MP-CF	1/4	1/8	0.110	11°	<0.004	○				●			
	2205MP-CF	1/4	1/8	0.110	11°	<0.008	○				●			
 Finishing Sharp Edge / Polished	VPGT 2202MFP-GF	3/8	3/16	0.173	11°	<0.004	○				●			
	2205MFP-GF	3/8	3/16	0.173	11°	<0.008	○				●			
 Finishing Sharp Edge / Polished	VPGT 151502MP-CK	3/16	3/32	0.091	11°	<0.004	○				●			
	151505MP-CK	3/16	3/32	0.091	11°	<0.008	○				●			
	VPGT 2202MP-CK	3/8	3/16	0.173	11°	<0.004	○				●			
	2205MP-CK	3/8	3/16	0.173	11°	<0.008	○				●			
 Finishing / Super Fine Sharp Edge / Precision	VPET 151502M$^{R}_{L}$-FSF	3/16	3/32	0.091	11°	<0.004					●			
	151505M$^{R}_{L}$-FSF	3/16	3/32	0.091	11°	<0.008					●			
	VPET 22013M$^{R}_{L}$-FSF	1/4	1/8	0.110	11°	<0.002					●			
	2202M$^{R}_{L}$-FSF	1/4	1/8	0.110	11°	<0.004					●			
	2205M$^{R}_{L}$-FSF	1/4	1/8	0.110	11°	<0.008					●			
 Low Feed / Super Fine Sharp Edge / Precision	VPET 151502MF$^{R}_{L}$-USF	3/16	3/32	0.091	11°	<0.004					●			
	151505MF$^{R}_{L}$-USF	3/16	3/32	0.091	11°	<0.008					●			
	VPET 22013MF$^{R}_{L}$-USF	1/4	1/8	0.110	11°	<0.002					●			
	2202MF$^{R}_{L}$-USF	1/4	1/8	0.110	11°	<0.004					●			
	2205MF$^{R}_{L}$-USF	1/4	1/8	0.110	11°	<0.008					●			
NEW  Low Feed Sharp Edge	VPET 22013MF$^{R}_{L}$-J	1/4	1/8	0.110	11°	<0.002	Ⓡ				Ⓡ			
	2202MF$^{R}_{L}$-J	1/4	1/8	0.110	11°	<0.004	○				●			
	2205MF$^{R}_{L}$-J	1/4	1/8	0.110	11°	<0.008	○				●			
 Minute D.O.C. Sharp Edge / Polished	WBGT 12102MP$^{R}_{L}$-CF	5/32	1/16	0.091	5°	<0.004	○				●			
	12105MP$^{R}_{L}$-CF	5/32	1/16	0.091	5°	<0.008	○				●			
 Finishing-Medium	WPMT 2151HQ	1/4	3/32	0.110	11°	1/64						●	●	○
	WPMT 321HQ	3/8	1/8	0.173	11°	1/64						●	●	●
	322HQ	3/8	1/8	0.173	11°	1/32						○	●	●

● : U.S. Stock Ⓡ : U.S. Stock (R-hand Only) Ⓛ : U.S. Stock (L-hand Only)
○ : World Express (Shipping: 7-10 Business Days) Ⓡ : World Express (R-hand Only) Ⓛ : World Express (L-hand Only)

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