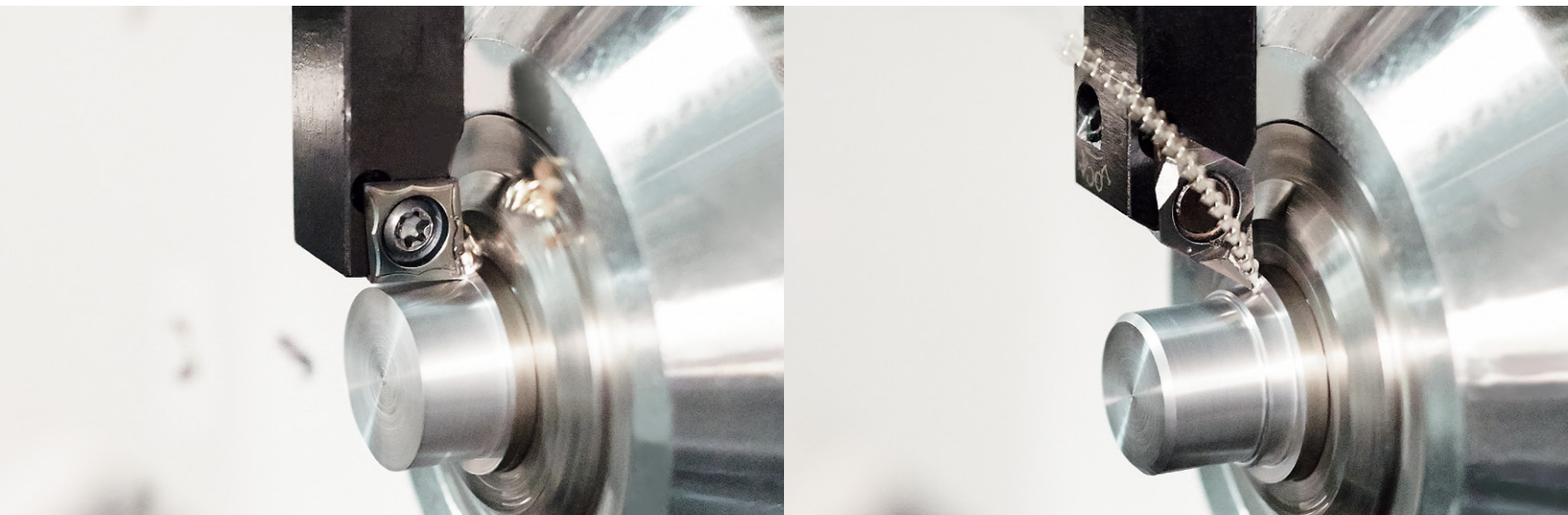




Molded Sharp Edge

Chipbreaker Series for Small Parts Machining

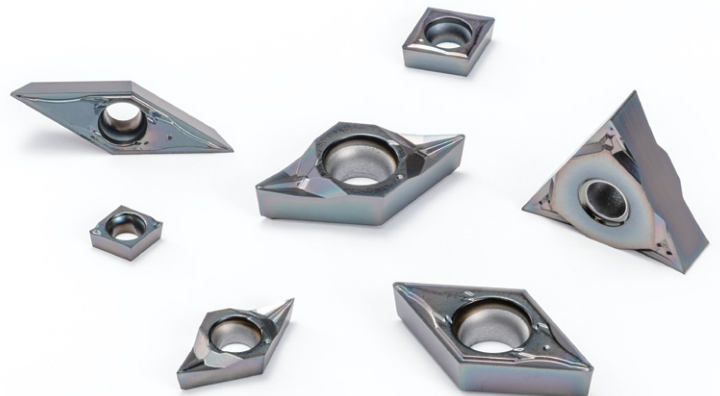


Introducing PR1535 for Long Tool Life and Stable Machining of Stainless Steel

Large Lineup to Solve Common Chip Control Problems

Positive and Negative Inserts Available

High Precision with Periphery Grinding and Sharp Edge Specification



Molded Sharp Edge

Chipbreaker Series for Small Parts Machining

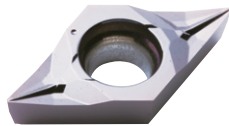
Large Lineup to Solve Common Chip Control Problems
 Long Tool Life and Stable Machining with Grade PR1535

- 1 Excellent Chip Control in a Wide Range of Machining Applications
- 2 High Precision with Periphery Grinding and Sharp Edge Specification
- 3 Anti-welding Properties with Improved Mirror Surface Finish

Low Cutting Force Chipbreakers

SK Chipbreaker: For Low Cutting Force Finishing

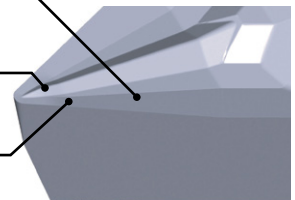
D.O.C. : 0.020" to 0.118"
 The molded chipbreaker addresses both sharpness and chip control



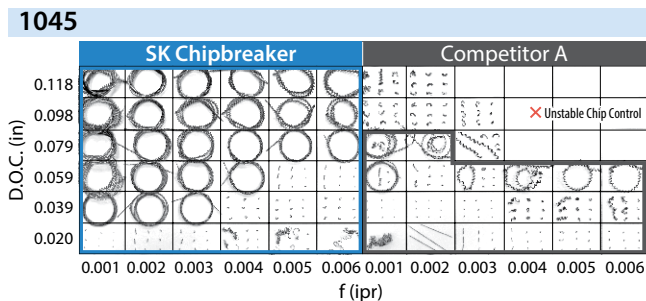
Stable chip evacuation due to large slits and large rake angle

Chip control is improved in small depths of cut due to chipbreaker projecting to the corner tip

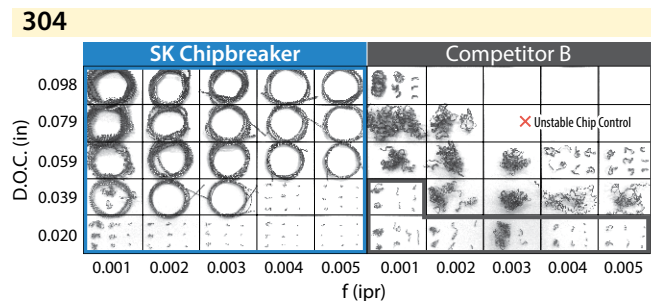
The cutting force is reduced as the cutting blade is lowered towards the center of the workpiece



Chip Control Comparison (In-house Evaluation)



Cutting Conditions: Vc = 330 sfm, wet, DCGT32505



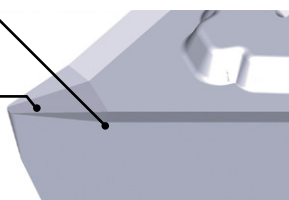
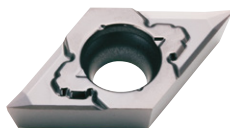
Cutting Conditions: Vc = 330 sfm, wet, DCGT32505

CK Chipbreaker: Low Cutting Force for General Purpose

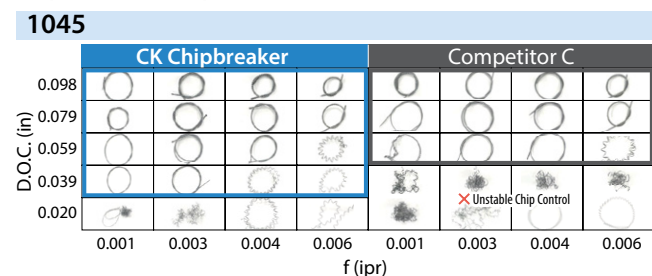
D.O.C. : 0.039" to 0.098"
 Smooth Chip Evacuation with a Large Rake Angle

The cutting force is reduced as the cutting blade is lowered towards the center of the workpiece

A large rake angle reduces cutting forces and maintains stable chip evacuation



Chip Control Comparison (In-house Evaluation)



Cutting Conditions: Vc = 330 sfm, wet, CCGT32505

Chip Control Oriented

GQ Chipbreaker: for Small to Large D.O.C.

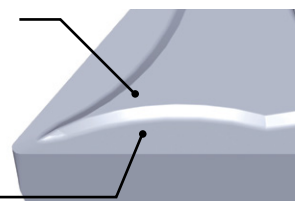
D.O.C. : 0.031" to 0.197" (Steel)
 0.031" to 0.118" (Stainless Steel)
 For a Wide Range of Applications



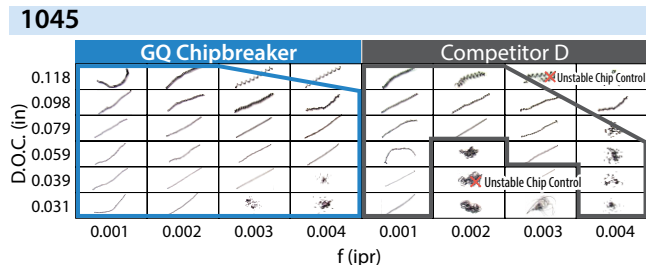
Low cutting force design with a small chipbreaker step

Good chip control in small depths of cut due to the breaker dot projecting to the cutting edge

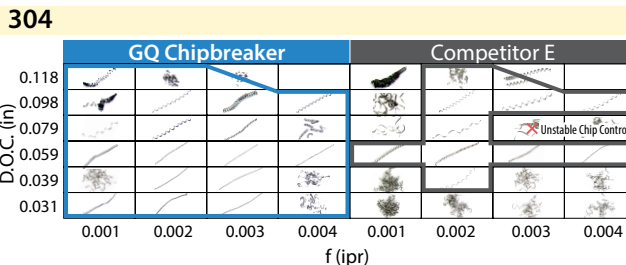
Wide range of acceptable chip control is achieved due to advanced chip breaker design



Chip Control Comparison (In-house Evaluation)



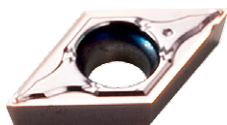
Cutting Conditions: Vc = 330 sfm, wet, DCGT32505



Cutting Conditions: Vc = 80 m/min, wet, DCGT32505

GF Chipbreaker: For Finishing

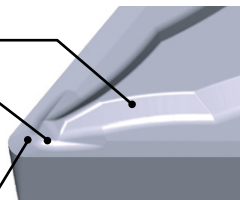
D.O.C. : 0.010" to 0.049"
 Controlled Chips During Finishing



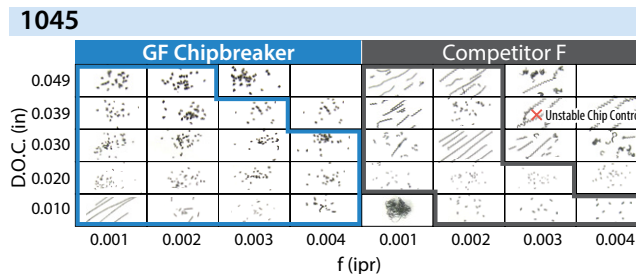
High Slope Recedes Away from the Cutting Edge
 ⇒ Minimizes Chip Clogging

Improved Sharpness with Large Rake Angle

Chipbreaker Dot Extended to the Cutting Edge
 ⇒ Divides the Chips into Smaller Pieces



Chip Control Comparison (In-house Evaluation)



Cutting Conditions: Vc = 330 sfm, wet, DCGT32505

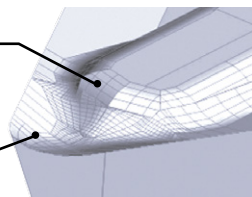
CF Chipbreaker: for Minute D.O.C.

D.O.C. : 0.0008" to 0.0079"
 Excellent Chip Formation in Small Depths of Cut

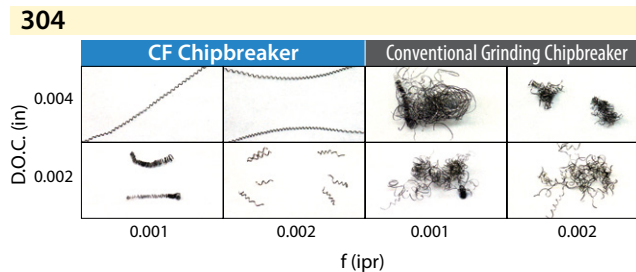


Properly Curled Chips with Special Dot Design

Large Rake Angle Improves Sharpness
 Suppresses Burr Formation and Clouding by Preventing Welding onto the Insert



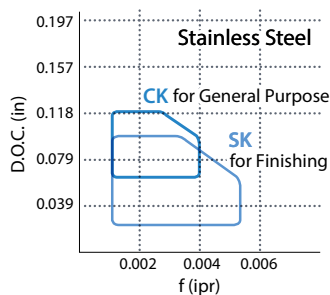
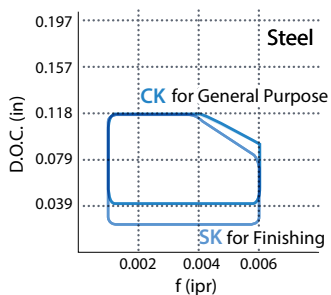
Chip Control Comparison (In-house Evaluation)



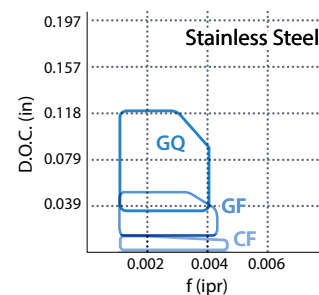
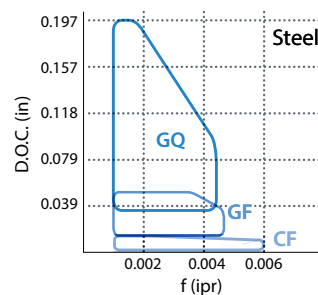
Cutting Conditions: Vc = 330 sfm, Wet, CCGT110905

Chipbreaker Application Maps

Low Cutting Force Oriented



Chip Control Oriented

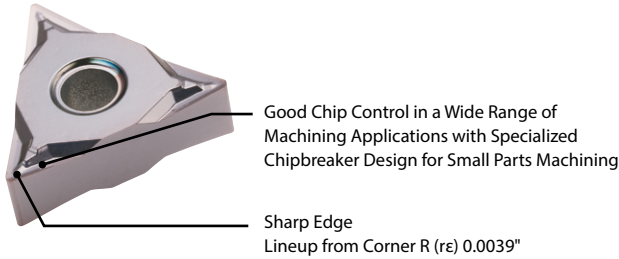


Negative Inserts for Small Parts Machining Optimal for Workpieces $\varnothing 0.630$ " or Larger

SK Chipbreaker: For Finishing to Medium Machining

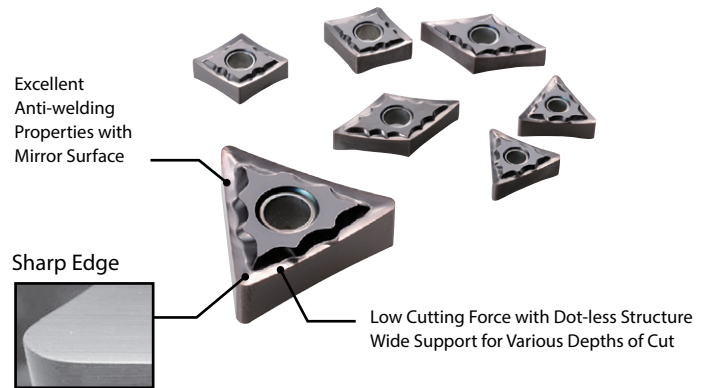
Chipbreaker for Sharpness and Chip Control

NEW VNGG33 Type Added to the Lineup

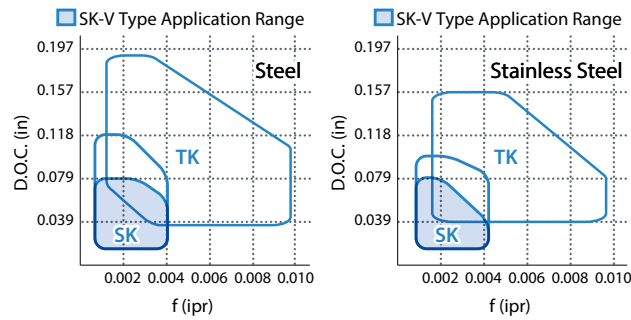


TK Chipbreaker: For Medium to Roughing

Chipbreaker with Low Cutting Force Design for a Wide Range of Machining Applications



Chipbreaker Map



Fully Flush Cutting Edge Holder Design

Positive Insert Holders



Negative Insert Holders



Application Maps

Steel

High Speed (Vc = 490 to 660 sfm)	PR1425		
Medium Speed (Vc = 250 to 490 sfm)	PR1225		PR1535
Low Speed (Vc = 250 sfm and Lower)	PR930		PR1535
	Continuous	Light Interrupted	Heavy Interrupted

1st Recommendation: PR1425

High Reliability in Light Interrupted Cuts: PR1535

Stable Machining at Low to Medium Speeds: PR1225

Stable Machining at Low Speeds: PR930

Stainless Steel

High Speed (Vc = 410 sfm and Higher)	PR1425		
Medium Speed (Vc = 160 to 410 sfm)	PR1225		PR1535
Low Speed (Vc = 160 sfm and Lower)	PR930		PR1535
	Continuous	Light Interrupted	Heavy Interrupted

1st Recommendation: PR1535

Stable Machining at Low to Medium Speeds: PR1225

Longer Tool Life at High Speeds: PR1425

Longer Tool Life at Low Speeds: PR930

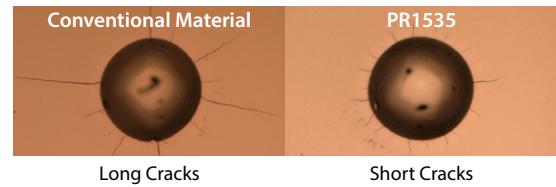
MEGACOAT NANO PR1535

The combination of a tough substrate and special nano layer coating enables long tool life and stable machining of stainless steel.

- 1 An increase in cobalt content yields a substrate with greater toughness. Fracture toughness values are improved by 23% over previous grades
- 2 The coarse grain structure and uniform particle size correspond to improved heat resistance, with conductivity values decreased by 11%
- 3 MEGACOAT NANO for Long Tool Life and Stable Machining

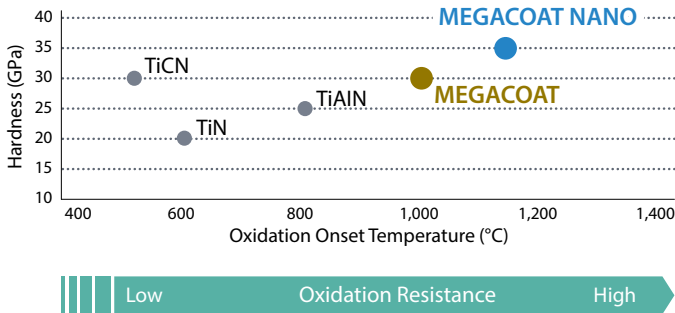
↑
23%
Fracture
Toughness

Cracking Comparison by Diamond Indenter (In-house Evaluation)



↑
Shock
Resistance

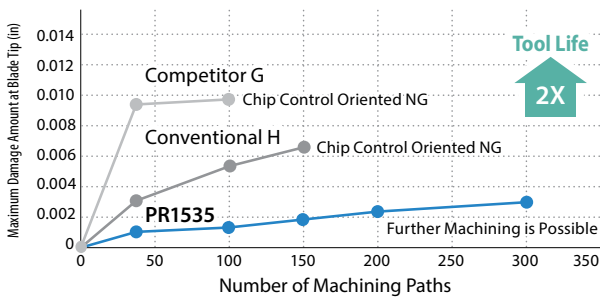
Coating Properties



MEGACOAT Laminate Base Layer Structure

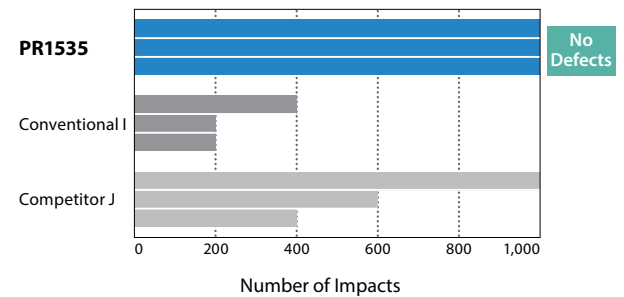
PR1535 is a good solution for unstable conditions such as early fracturing and variable tool life during steel machining

Abrasion Resistance Evaluation (In-house Evaluation)



Cutting Conditions: $n = 1,273$ rpm ($V_c = 260$ sfm), $f = 0.001$ ipr, Wet (Oil-based)
Workpiece: 304 (Ø0.787")

Defect Resistance Comparison (In-house Evaluation)



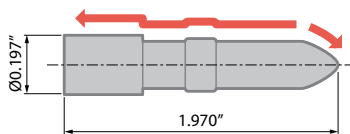
Cutting Conditions: $V_c = 260$ sfm, $f = 0.005$ ipr, Wet (Water-soluble)
Workpiece: 304 (Ø1.97", 0.394" Groove Width 4 Pieces)

The PR1535 lineup development includes grinding chipbreaker, cut-off, and back-turning

Case Studies

Pin S17400

$V_c = \sim 180$ sfm
($n = 3,600$ rpm)
D.O.C. = 0.004"~0.028"
 $f = 0.0012$ ipr
Wet (Oil-based)
DCGT32505MFP-GQ
PR1535



Number of Processes

GQ Chipbreaker (PR1535)

1,600 pcs/corner

↑
1.3X
Tool Life

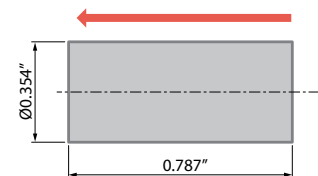
Competitor K

1,200 pcs/corner

Competitor K had unstable tool life due to sudden defects.
GQ chipbreaker (PR1535) is capable of stable machining without defects, with tool life improved to 1.3 times. (User Evaluation)

Valve 440C

$V_c = 330$ sfm
($n = 3,600$ rpm)
D.O.C. = 0.004"
 $f = 0.0024$ ipr
Wet (Oil-based)
DCGT32505MFP-SK
PR1535



Number of Processes

SK Chipbreaker (PR1535)

600 pcs/corner









↑
1.3X
Tool Life










Competitor L

450 pcs/corner

SK Chipbreaker (PR1535) Tool Life 1.3 times. (User Evaluation)

Positive Inserts






Insert Left-hand Shown for inserts with Angles	Part Number	Dimensions (in)					NEW			
		I.C.	Thickness	Hole	Corner-R (re)	Relief Angle	PR1535	PR1425	PR1225	PDL025
Minute D.O.C. 	CCGT 110902MP-CF	0.138	0.055	0.075	<0.004	7°	○	●	●	○
	110905MP-CF				<0.008		○	●	●	○
	CCGT 141102MP-CF	0.169	0.071	0.091	<0.004	7°	○	●	○	○
	141105MP-CF				<0.008		○	●	●	●
Finishing 	CCGT 21502MFP-GF	1/4	3/32	0.110	<0.004	7°	○	●	●	○
	21505MFP-GF				<0.008		○	●	●	○
	2151MFP-GF				<1/64		○	●	●	○
	CCGT 32502MFP-GF	3/8	5/32	0.173	<0.004	7°	○	●	●	○
	32505MFP-GF				<0.008		○	●	●	○
	3251MFP-GF				<1/64		○	●	●	○
Finishing 	CCGT 21502MFP-SK	1/4	3/32	0.110	<0.004	7°	○	○	●	●
	21505MFP-SK				<0.008		○	●	●	○
	2151MFP-SK				<1/64		○	●	●	○
	CCGT 32502MFP-SK	3/8	5/32	0.173	<0.004	7°	○	●	●	○
	32505MFP-SK				<0.008		○	●	●	○
	3251MFP-SK				<1/64		○	●	●	○
General Purpose 	CCGT 21502MP-CK	1/4	3/32	0.110	<0.004	7°	○	○	○	●
	21505MP-CK				<0.008		○	○	○	●
	CCGT 32502MP-CK	3/8	5/32	0.173	<0.004	7°	○	●	○	●
	32505MP-CK				<0.008		○	●	●	○
Finishing-Medium 	CCGT 21502MFP-GQ	1/4	3/32	0.110	<0.004	7°	○	○	●	○
	21505MFP-GQ				<0.008		○	●	●	○
	2151MFP-GQ				<1/64		○	●	●	○
	CCGT 32502MFP-GQ	3/8	5/32	0.173	<0.004	7°	○	●	●	○
	32505MFP-GQ				<0.008		○	●	●	○
	3251MFP-GQ				<1/64		○	●	●	○
Minute D.O.C. 	DCGT 21502MP-CF	1/4	3/32	0.110	<0.004	7°	○	○	○	●
	21505MP-CF				<0.008		○	○	○	○
	DCGT 32502MP-CF	3/8	5/32	0.173	<0.004	7°	○	●	○	○
	32505MP-CF				<0.008		○	●	○	○
Finishing 	DCGT 21502MFP-GF	1/4	3/32	0.110	<0.004	7°	○	○	●	○
	21505MFP-GF				<0.008		○	●	●	○
	2151MFP-GF				<1/64		○	○	●	○
	DCGT 32502MFP-GF	3/8	5/32	0.173	<0.004	7°	○	●	●	○
	32505MFP-GF				<0.008		○	●	●	○
	3251MFP-GF				<1/64		○	●	●	○
Finishing 	DCGT 21502MFP-SK	1/4	3/32	0.110	<0.004	7°	○	○	●	●
	21505MFP-SK				<0.008		○	●	●	○
	2151MFP-SK				<1/64		○	●	●	○
	DCGT 32502MFP-SK	3/8	5/32	0.173	<0.004	7°	○	●	●	○
	32505MFP-SK				<0.008		○	●	●	○
	3251MFP-SK				<1/64		○	●	●	○

Insert Left-hand Shown for inserts with Angles	Part Number	Dimensions (in)					NEW			
		I.C.	Thickness	Hole	Corner-R (re)	Relief Angle	PR1535	PR1425	PR1225	PDL025
General Purpose 	DCGT 21502MP-CK	1/4	3/32	0.110	<0.004	7°	○	○	●	●
	21505MP-CK				<0.008		○	●	●	○
	DCGT 32502MP-CK	3/8	5/32	0.173	<0.004	7°	○	●	●	○
	32505MP-CK				<0.008		○	●	●	○
Finishing-Medium 	DCGT 21502MFP-GQ	1/4	3/32	0.110	<0.004	7°	○	○	●	○
	21505MFP-GQ				<0.008		○	●	●	○
	2151MFP-GQ				<1/64		○	●	●	○
	DCGT 32502MFP-GQ	3/8	5/32	0.173	<0.004	7°	○	●	●	○
	32505MFP-GQ				<0.008		○	●	●	○
	3251MFP-GQ				<1/64		○	●	●	○
Minute D.O.C. 	TBGT 12102MP-CF	5/32	1/16	0.091	<0.004	5°	○	○	●	○
	12105MP-CF				<0.008		○	●	○	○
Minute D.O.C. 	TPGT 151502MP-CF	3/16	3/32	0.091	<0.004	11°	○	○	○	○
	151505MP-CF				<0.008		○	●	○	○
Minute D.O.C. 	TPGT 181502MP-CF	7/32	3/32	0.118	<0.004	11°	○	○	○	○
	181505MP-CF				<0.008		○	○	○	○
Minute D.O.C. 	VPGT 2202MP-CF	1/4	1/8	0.110	<0.004	11°	○	○	●	○
	2205MP-CF				<0.008		○	●	○	○
Finishing 	VPGT 2202MFP-GF	1/4	1/8	0.110	<0.004	11°	○	●	●	○
	2205MFP-GF				<0.008		○	●	○	○
General Purpose 	VPGT 151502MP-CK	3/16	3/32	0.091	<0.004	11°	○	○	●	○
	151505MP-CK				<0.008		○	○	○	○
	VPGT 2202MP-CK	1/4	1/8	0.110	<0.004	11°	○	●	●	○
	2205MP-CK				<0.008		○	●	○	○
Minute D.O.C. 	WBGT 12102MP ^{PL} -CF	5/32	1/16	0.091	<0.004	5°	○	●	○	○
	12105MP ^{PL} -CF				<0.008		○	●	○	○





Insert that has corner R(re) dimension expressed with "less than" sign (ex. <0.004, <0.008, etc.) indicates models with minus tolerance for corner R(re)

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

Negative Inserts

Insert Right-hand Shown for inserts with Angles	Part Number	Dimensions (in)				PR1535	PR1425	PR1225
		I.C.	Thickness	Hole	Corner-R (rε)			
Finishing-Medium  Sharp Edge / Mirror Surface Finish	CNGG 4305MFP-SK	1/2	3/16	0.203	<0.008	○	●	○
	431MFP-SK				<1/64	○	○	○
Medium-Roughing  Sharp Edge / Mirror Surface Finish	CNGG 431FP-TK	1/2	3/16	0.203	1/64	○	●	●
	432FP-TK				1/32	○	●	●
Finishing-Medium  Sharp Edge / Mirror Surface Finish	DNGG 4305MFP-SK	1/2	3/16	0.203	<0.008	○	●	●
	431MFP-SK				<1/64	○	●	●
Medium-Roughing  Sharp Edge / Mirror Surface Finish	DNGG 431FP-TK	1/2	3/16	0.203	1/64	○	●	●
	432FP-TK				1/32	○	●	●
Finishing-Medium  Sharp Edge / Mirror Surface Finish	TNGG 3302MFP-SK	3/8	3/16	0.150	<0.004	○	○	○
	3305MFP-SK				<0.008	○	○	●
	331MFP-SK				<1/64	○	○	○

Insert that has corner R(rε) dimension expressed with "less than" sign
(ex. <0.004, <0.008, etc.) indicates models with minus tolerance for corner R(rε)
Cermet inserts, (TN610, TN620, PV710, PV720), are not sharp edge inserts (R honing)

Insert Right-hand Shown for inserts with Angles	Part Number	Dimensions (in)				PR1535	PR1425	PR1225	TN610	TN620	PV710	PV720
		I.C.	Thickness	Hole	Corner-R (rε)							
Medium-Roughing  Sharp Edge / Mirror Surface Finish	TNGG 331FP-TK	3/8	3/16	0.150	1/64	○	○	●				
	332FP-TK				1/32	○	●	○				
Finishing-Medium  Sharp Edge / Mirror Surface Finish	VNGG 3305MFP-SK	3/8	3/16	0.150	<0.008	○	●	●				
	331MFP-SK				<1/64	○	●	●				
Finishing-Medium  Sharp Edge / Mirror Surface Finish	VNGG 3305M-SK	3/8	3/16	0.150	0.008				○	○	○	○
	331M-SK				1/64				○	○	○	○
Finishing  Sharp Edge	TNGG 3305 ^{R/L} -S	3/8	3/16	0.150	0.008	○	Ⓢ					
	331 ^{R/L} -S				1/64	○	Ⓢ					
	332 ^{R/L} -S				1/32	○	○					

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



KYOCERA Precision Tools

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Hendersonville, NC 28792
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Technical Support | 800.823.7284 - Option 2



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