

CA5 Series

CVD Coated Grade for Steel

New coated grade CA5 series for longer tool life and stable machining



High speed and longer tool life

NEW CA510

Continuous to light interrupted machining

CA515

General use

CA525

Heavy interrupted machining and high feed rate

NEW CA530

NEW
Negative type for Medium-Roughing
PG Chipbreaker

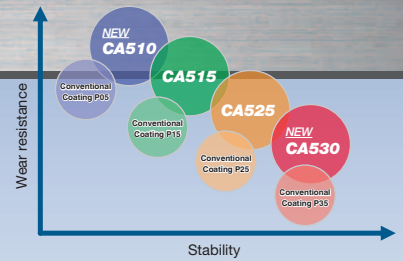
NEW
Positive type for finishing
PP Chipbreaker



ADVANCING PRODUCTIVITY

- KYOCERA, Contributing To Advancing Productivity -

CA5 Series



Productivity innovation in steel machining
 by **CA5 series** and **P series** chipbreaker!!



Advanced CVD coating new ERA of CRIOS Technology



Kyocera's unique crystal control technology and coating adhesion lead CVD coating to the next level

Longer tool life

Control α -Al₂O₃ crystal growth for improved wear and fracture resistance



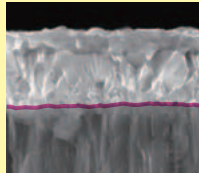
CRIOS Technology



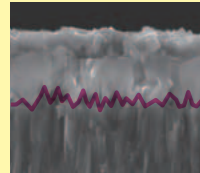
Conventional

Prevent peeling of layer

Optimized interface improves film adhesion by 40%



CRIOS Technology



Conventional

Control Chipping

Higher film strength and fracture resistance by high aspect ratio TiCN



TiCN layer
Carbide substrate

CRIOS Technology

"CRIOS Technology" is Kyocera's original CVD coating technology.

New carbide substrate

- Special carbide substrate with deformation resistance at high temperature (10% improved hardness at high temperature)
- Suitable for high efficiency machining

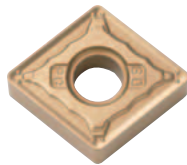


Special carbide substrate

P series PP/PQ/PG Chipbreaker Negative type PG Chipbreaker and Positive type PP Chipbreaker are newly available

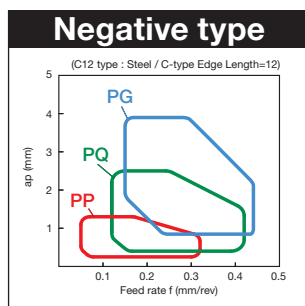
NEW

For Medium-Roughing PG Chipbreaker



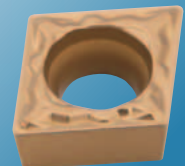
Wide chip control range

- Stable machining with good balance of edge sharpness and strength
- Prevent chip entangle at high feed rate
Good chip control even at low feed rate

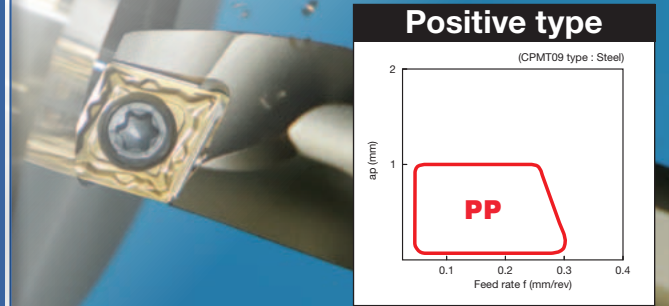


NEW

Positive type PP Chipbreaker



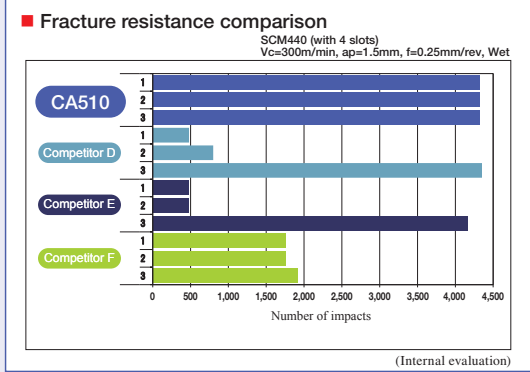
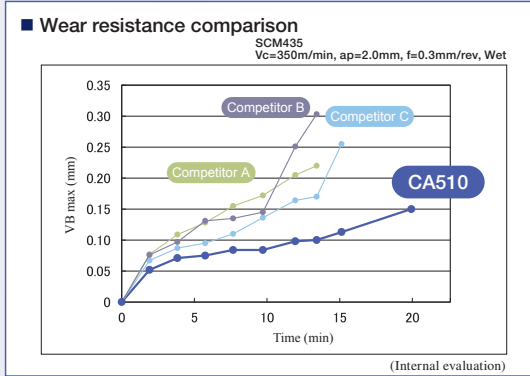
Improve finishing productivity with high reliability



High speed and longer tool life

CA510

- Special substrate with thermal deformation resistance along with a thick and tough coating film provide high wear resistance
- Application: High speed and high efficiency steel machining

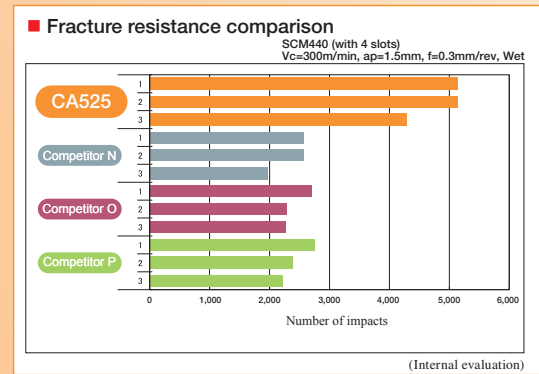
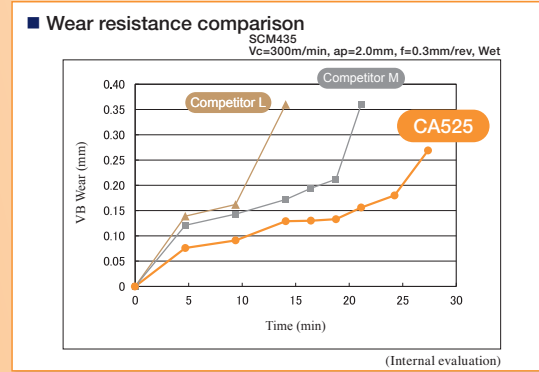


1st Recommendation

General use

CA525

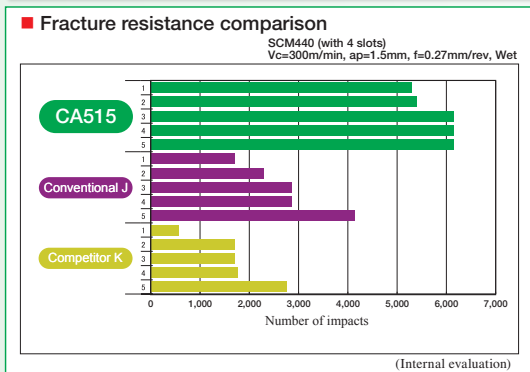
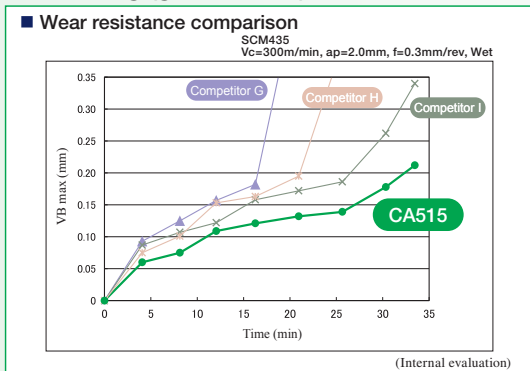
- Special substrate and tough coating film provide high wear and fracture resistance
- Application: 1st recommendation for steel machining



Continuous to light interrupted machining

CA515

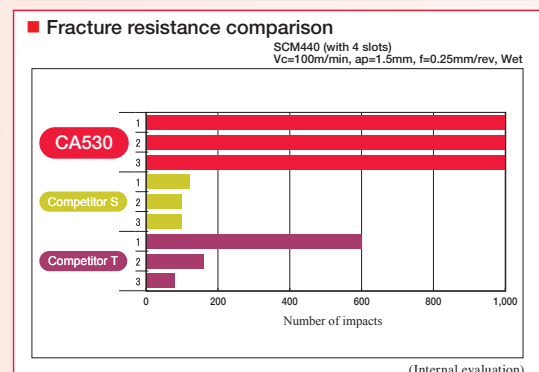
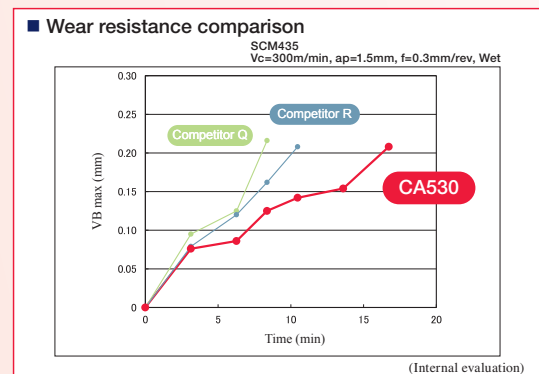
- Special substrate and tough coating film provide thermal deformation and high wear resistance
- Application: For continuous to light interrupted steel machining (general use)



Heavy interrupted and high feed rate

CA530

- Special tough substrate and tough coating film provide high stability and wear resistance
- Application: General to heavy interrupted machining (stability oriented)



CA5 series High performance

Hot rolled steel	
<ul style="list-style-type: none"> ·Automotive parts ·Vc=500m/min ·ap=0.7mm ·f=0.3mm/rev ·Wet ·CNMG120408PG 	
CA510	100 pcs/edge
Competitor U (CVD Coated)	75 pcs/edge
<p>·CA510 achieves 1.3 times longer tool life than Competitor U (CVD).</p> <p>(Evaluation by the user)</p>	

S35C (Carbon steel)	
<ul style="list-style-type: none"> ·Automotive parts ·Vc=300m/min ·ap=1.0mm ·f=0.3mm/rev ·Wet ·DNMG150408PQ 	
CA510	200 pcs/edge
Competitor V (CVD Coated)	150 pcs/edge
<p>·CA510 achieves 1.3 times longer tool life than Competitor V (CVD).</p> <p>(Evaluation by the user)</p>	

SCM440 (Alloy steel)	
<ul style="list-style-type: none"> ·Cover ·Vc=140~150m/min ·ap=3.0~3.5mm ·f=0.35~0.4mm/rev ·Wet ·CNMG120408PT 	
CA515	10 pcs/edge
Competitor W (CVD Coated)	7 pcs/edge
<p>·CA515 achieves 1.4 times longer tool life than Competitor W (CVD).</p> <p>(Evaluation by the user)</p>	

SCr415H (Alloy steel)	
<ul style="list-style-type: none"> ·Gear ·Vc=380m/min ·ap=1.5~2.0mm ·f=0.3~0.4mm/rev ·Wet ·WNMG080408PQ 	
CA515	430 pcs/edge
Competitor X (CVD Coated)	380 pcs/edge
<p>·CA515 achieves longer tool life than Competitor X (CVD).</p> <p>(Evaluation by the user)</p>	

SS400 (Rolled steel)	
<ul style="list-style-type: none"> ·Machine part ·Vc=170m/min ·ap=0.8mm ·f=0.2mm/rev ·Wet ·CNMG120408PQ 	
CA525	1,400 pcs/edge and more
Competitor Y (CVD Coated) Molded Chipbreaker	800-1,000 pcs/edge
<p>·CA525 achieves 1.4 times longer tool life than Competitor Y (CVD).</p> <p>·Smooth chip control.</p> <p>(Evaluation by the user)</p>	

SCM420 (Alloy steel)	
<ul style="list-style-type: none"> ·Shaft ·Vc=120m/min ·ap=2.0mm ·f=0.25mm/rev ·Dry ·TNMG160408R-ST 	
CA525	10 pcs/edge
Competitor Z (CVD Coated)	2 pcs/edge
<p>·CA525 achieves 5 times longer tool life than Competitor Z (CVD).</p> <p>(Evaluation by the user)</p>	

Case of Various case Studies !!

S45C (Carbon steel)	
<ul style="list-style-type: none"> ·Shaft ·Vc=250m/min ·ap=3.0mm ·f=0.3mm/rev ·Wet ·CNMG120408PS 	
CA525	10 pcs/edge
Competitor a (CVD Coated) Competitor b (PVD Coated)	a: 6 pcs/edge b: Instant breakage
·CA525 achieves 1.6 times longer tool life than Competitor a (CVD). ·Competitor b's PVD carbide could not complete any piece before brakage.	
(Evaluation by the user)	

SCM420 (Alloy steel)	
<ul style="list-style-type: none"> ·Flange shaft ·Vc=260~280m/min ·ap=0.6mm ·f=0.3~0.5mm/rev ·Wet ·CNMG120408PQ 	
CA525	180 pcs/edge
Competitor c (CVD Coated)	150 pcs/edge
·CA525 achieves 1.2 times longer tool life than Competitor c (CVD).	
(Evaluation by the user)	

S45C (Carbon steel)	
<ul style="list-style-type: none"> ·Shaft ·Vc=100m/min ·ap=2.0~4.0mm ·f=0.4mm/rev ·Wet ·WNMG080408PS 	
CA525	70 pcs/edge
Conventional d (CVD Coated)	40 pcs/edge
·CA525 achieves 1.7 times longer tool life than Conventional d (CVD).	
(Evaluation by the user)	

SCr420 (Alloy steel)	
<ul style="list-style-type: none"> ·Shaft ·Vc=90m/min ·ap=2.0~3.0mm ·f=0.32mm/rev ·Wet ·WNMG080408PS 	
CA525	260 pcs/edge
Conventional e (CVD Coated)	190 pcs/edge
·CA525 achieves 1.3 times longer tool life than Conventional e (CVD).	
(Evaluation by the user)	

SCr420H (Alloy steel)	
<ul style="list-style-type: none"> ·Gear ·Vc=180m/min ·ap=2.0mm ·f=0.2mm/rev ·Wet ·DNMG150404CQ 	
CA530	10 pcs/edge
Competitor f (CVD Coated)	3-8 pcs/edge
·CA530 achieves average 1.25 times longer tool life than Competitor f (CVD).	
(Evaluation by the user)	

13Cr (Stainless steel)	
<ul style="list-style-type: none"> ·Machine parts ·Vc=100m/min ·ap=2.0mm ·f=0.4mm/rev ·Wet ·SNMG120412PH 	
CA530	9 pcs/edge
Competitor g (CVD Coated)	5 pcs/edge
·CA530 achieves 1.8 times longer tool life than Competitor g (CVD). ·Improved machining efficiency by 1.1 times.	
(Evaluation by the user)	

NEW

For Finishing

Improve steel finishing productivity with high reliability

PP Chipbreaker

Stable machining by resolving problems in boring, such as productivity decrease caused by entangled chip

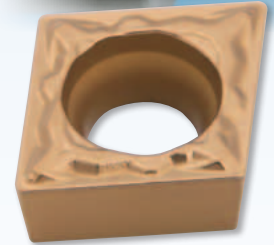
Features

- Stable chip control in steel finishing
- High efficiency and stable tool life in high feed machining, by special edge design with sharpness and strength

Highly stable cutting edge design

⇒ Suitable shape for controlling the edge stress and heat generation

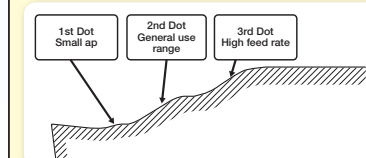
Stable performance with superior edge strength



Composite-dot Chipbreaker

⇒ Multi-dot design with different functions
⇒ Controls chip's curling condition and flow direction depending on the cutting conditions and workpiece materials

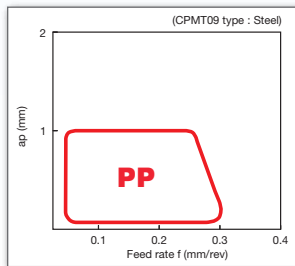
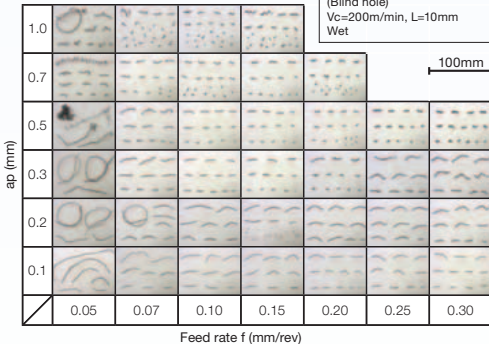
Stable chip control in any feed rate and workpiece materials



PP

CPMT090304PP

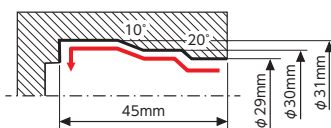
SCM415
(Blind hole)
Vc=200m/min, L=10mm
Wet



Chip Evacuation Comparison

PP Chipbreaker breaks chips and controls entangled chip

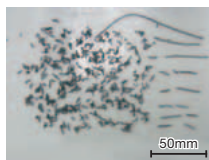
SCM415 Vc=200m/min,
ap=0.3mm, f=0.15mm/rev
DCMT11T304 Type
A20R-SDUCR11-27AE
Wet (Internal coolant)



PP Chipbreaker



No chip remains after machining



50mm

Competitor h



Chips remain in the hole



50mm

(Internal evaluation)

Chip Control Performance

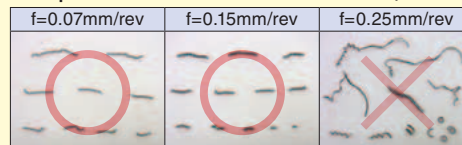
PP Chipbreaker covers a wide range of feed rate

PP Chipbreaker



PP Chipbreaker controls chips stability at high feed rate.

Competitor i



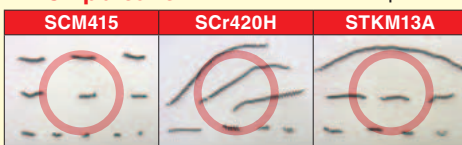
Competitor i cannot control chips stability when increase the feed rate.

SCM415 (Blind hole),
Wet (Internal coolant)
Vc=200m/min, ap=0.3mm,
f=0.07-0.25mm/rev
CCMT09T304 Type

○: Good △: OK ×: Bad

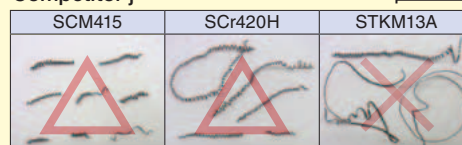
PP Chipbreaker covers a wide range of workpiece materials

PP Chipbreaker



PP Chipbreaker controls chips stability from general steel to soft steel.

Competitor j



Competitor j generates unstable chips during soft steel machining.

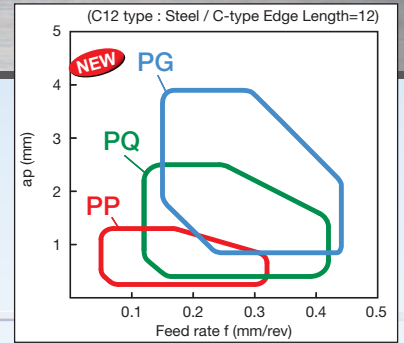
Various work materials,
Wet (Internal coolant)
Vc=200m/min, ap=0.3mm,
f=0.20mm/rev
CCMT09T304 Type

○: Good △: OK ×: Bad

(Internal evaluation)

Negative type

Chipbreaker for steel machining



PP / PQ / PG Chipbreaker improves steel machining

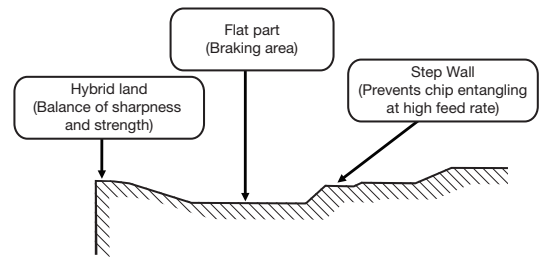
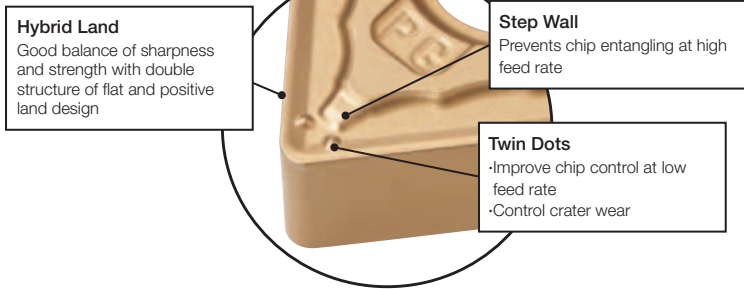
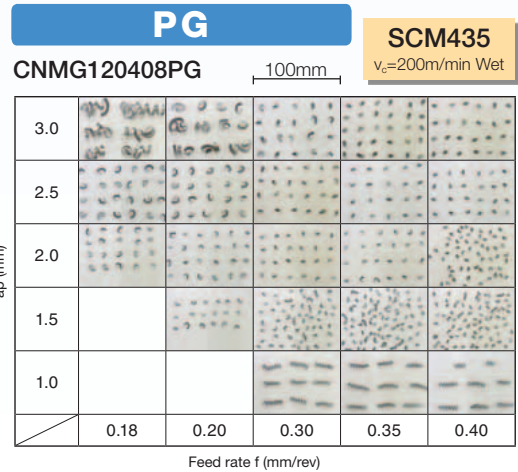
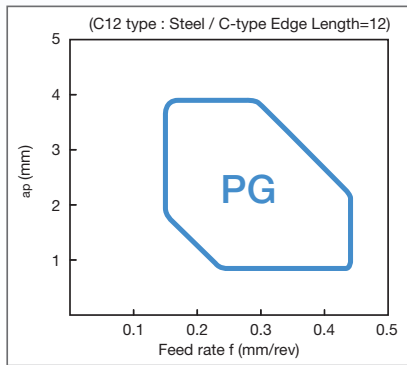
NEW For Medium - Roughing Stable machining with wide chip control range

PG Chipbreaker



Features

- Stable machining with good balance of edge sharpness and strength
- Prevent chip entangle at high feed rate. Good chip control even at low feed rate



Case Studies

SCM435 (Alloy steel)	
·Joint ·Vc=280m/min ·ap=3.0mm ·f=0.25mm/rev ·Wet ·CNMG120408PG	
CA525	400 more than pcs/edge
Competitor k (CVD Coated)	350 pcs/edge
·CA525 achieves 1.2 times longer tool life than Competitor k (CVD). ·PG Chipbreaker stabilized the chip condition and prevented burr formation. Good surface finish. (Evaluation by the user)	

Wear Resistance Comparison

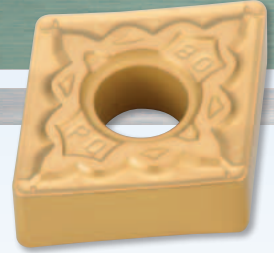
SCM435 Vc=300m/min ap=2.0 mm f=0.3mm/rev Wet				
Time (min)	14 min	20 min	26 min	
CNMG120408PG (CA525)				
Competitor l				Stop cutting due to fracture
Competitor m				Stop cutting due to fracture

(Internal evaluation)

For Finishing-Medium

Prevents chip entanglement and reduces cutting force at high feed cutting

PQ Chipbreaker

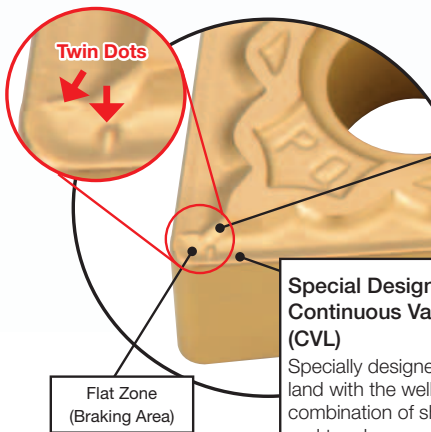
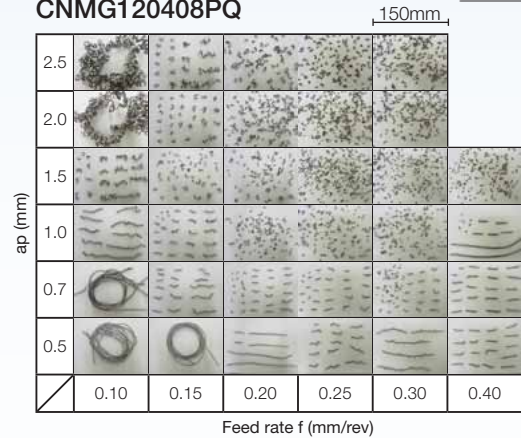


Features

- Stable chip control in a wide range of feed rates from finishing to medium realized by newly developed "Flat Zone" (Braking Area) and 2-steps rising smooth wall
- Twin dots on the cutting edge provide smooth chip control at low a_p and high feed turning and facing
- Special designed Continuous Variable Land (CVL) with a well-balanced edge sharpness and toughness

PQ **SCM435**
Vc=200m/min Wet

CNMG120408PQ



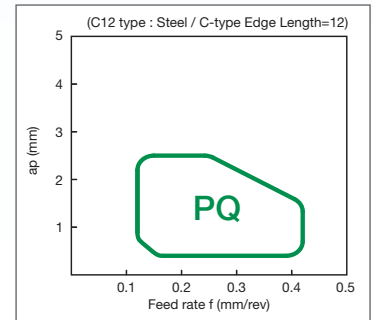
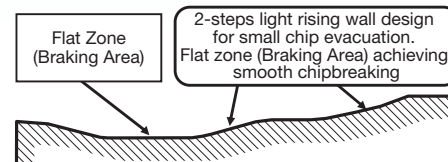
2-step Smart Wall (2-step rising smooth surface)

2-steps light rising smooth wall design prevents damage dots at high feed cutting and provides excellent chip control in a wide range applications

Special Designed Continuous Variable Land (CVL)

Specially designed positive land with the well-balanced combination of sharpness and toughness

• Chipbraking efficiency for a wide range of applications



Case Studies (Chip Control Comparison)

Automotive part (S45C)

Competitor n

PQ Chipbreaker

DNMG150408PQ
Vc=200m/min
ap=0.5-1.2mm
f=0.3mm/rev
Wet

PQ Chipbreaker prevents chip entanglement and minimizes breakage
(Evaluation by the user)

Automotive part (S45C)

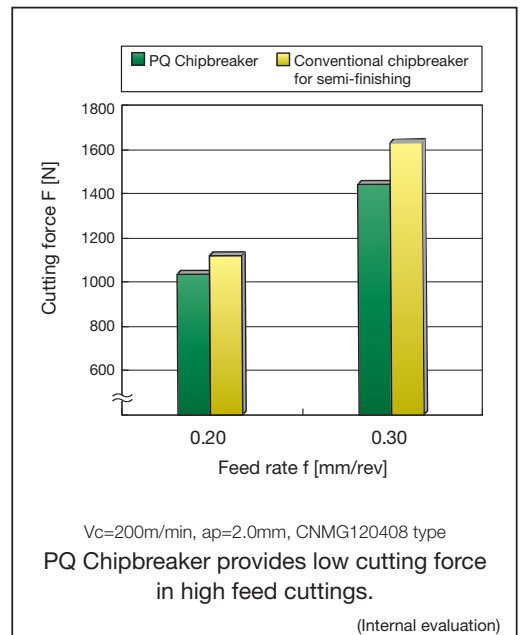
Competitor o

PQ Chipbreaker

WNMG080408PQ
Vc=250m/min
ap=1.0mm
f=0.3mm/rev
Wet

With Competitor o, chips were entangled in the turret and the process was interrupted frequently, but PQ Chipbreaker break chips into small pieces and improve productivity
(Evaluation by the user)

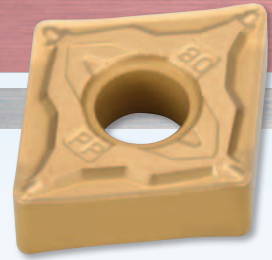
Cutting Force



For Finishing

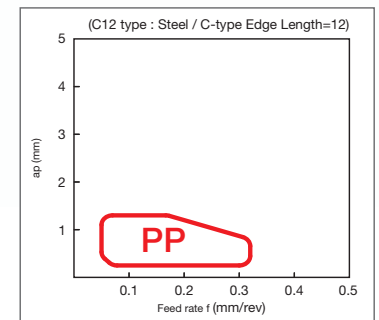
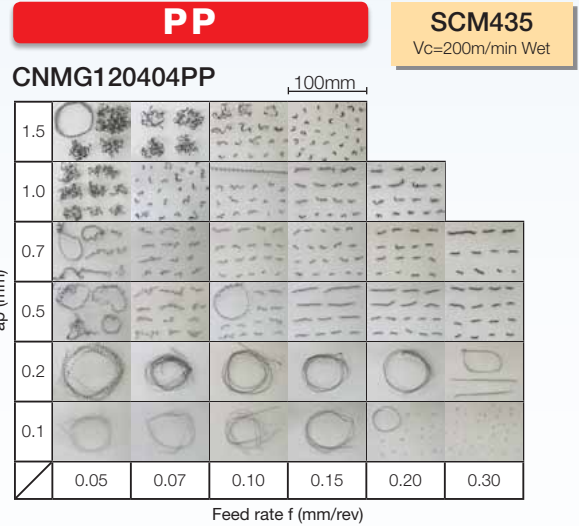
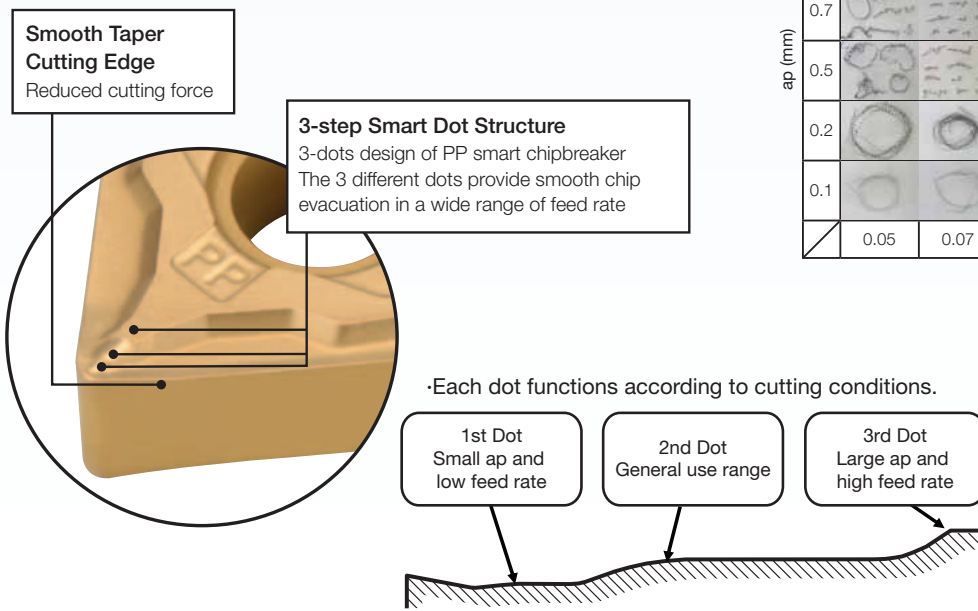
Solution for chip entanglement in small ap or high feed machining

PP Chipbreaker



Features

- 3-dots design of PP smart chipbreaker is suitable for a wide range of feed rate in steel finishing
- Smooth Taper Cutting Edge reduces cutting force
- Corner-R(r_ϵ) 0.2mm-1.2mm are available

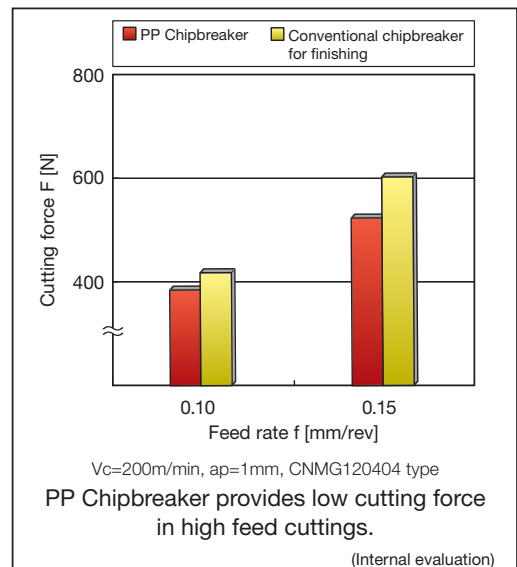


Case Studies (Chip Control Comparison)


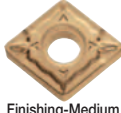
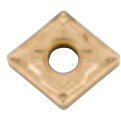
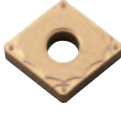
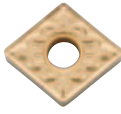








<p>Automotive part (SCM420)</p> <p>CNMG120408PP Vc=350m/min ap=0.3mm f=0.3mm/rev Wet</p>	<p>Competitor p</p>	<p>PP Chipbreaker</p> <p>PP Chipbreaker prevents chip entanglement and provides stable machining (Evaluation by the user)</p>
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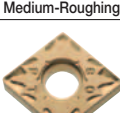

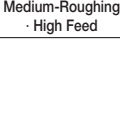
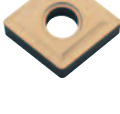

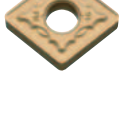
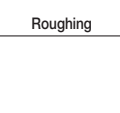





<p>Automotive part (SCr420H)</p> <p>CNMG120408PP Vc=200m/min ap=0.2-0.3mm f=0.2-0.3mm/rev Wet</p>	<p>Competitor q</p>	<p>PP Chipbreaker</p> <p>PP Chipbreaker prevents chip entanglement and provides stable machining (Evaluation by the user)</p>
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Cutting Force

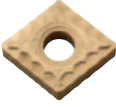



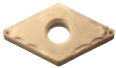






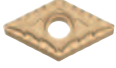











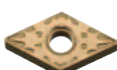





■ Stock Items (Negative)

Shape	Description	Dimension (mm)				CVD Coated Carbide			
		I.C.	Thickness	Hole	Corner-R (rε)	CA510	CA515	CA525	CA530
	CNMG 120404WP 120408WP	12.70	4.76	5.16	0.4	●	●	●	●
					0.8	●	●	●	●
	CNMG 120404WQ 120408WQ 120412WQ	12.70	4.76	5.16	0.4	●	●	●	●
					0.8	●	●	●	●
					1.2	●	●	●	●
	CNMG 120402PP 120404PP 120408PP 120412PP	12.70	4.76	5.16	0.2	●	●	●	●
					0.4	●	●	●	●
					0.8	●	●	●	●
					1.2	●	●	●	●
					0.8	●	●	●	●
	CNMG 120402GP 120404GP 120408GP	12.70	4.76	5.16	0.2	●	●	●	●
					0.4	●	●	●	●
					0.8	●	●	●	●
	CNMG 120404PQ 120408PQ 120412PQ	12.70	4.76	5.16	0.4	●	●	●	●
					0.8	●	●	●	●
					1.2	●	●	●	●
	CNMG 090404HQ 090408HQ	9.525	4.76	3.81	0.4	●	●	●	●
					0.8	●	●	●	●
	CNMG 120404HQ 120408HQ 120412HQ	12.70	4.76	5.16	0.4	●	●	●	●
					0.8	●	●	●	●
					1.2	●	●	●	●
	CNMG 120404CQ 120408CQ 120412CQ	12.70	4.76	5.16	0.4	●	●	●	●
					0.8	●	●	●	●
					1.2	●	●	●	●
	CNMG 160608CQ 160612CQ	15.875	6.35	6.35	0.8	●	●	●	●
					1.2	●	●	●	●
	CNMG 120408CJ 120412CJ	12.70	4.76	5.16	0.8	●	●	●	●
					1.2	●	●	●	●
	CNMG 160612CJ 160616CJ	15.875	6.35	6.35	1.2	●	●	●	●
					1.6	●	●	●	●
	CNMG 090404GS 090408GS	9.525	4.76	3.81	0.4	●	●	●	●
					0.8	●	●	●	●
	CNMG 120404GS 120408GS 120412GS	12.70	4.76	5.16	0.4	●	●	●	●
					0.8	●	●	●	●
					1.2	●	●	●	●
	CNMG 120404PG 120408PG 120412PG 120416PG	12.70	4.76	5.16	0.4	●	●	●	●
					0.8	●	●	●	●
					1.2	●	●	●	●
					1.6	●	●	●	●

Shape	Description	Dimension (mm)				CVD Coated Carbide			
		I.C.	Thickness	Hole	Corner-R (rε)	CA510	CA515	CA525	CA530
	CNMG 120404PS 120408PS 120412PS 120416PS	12.70	4.76	5.16	0.4	●	●	●	●
					0.8	●	●	●	●
					1.2	●	●	●	●
					1.6	●	●	●	●
	CNMG 160612PS 160616PS	15.875	6.35	6.35	1.2	●	●	●	●
					1.6	●	●	●	●
	CNMG 120408PT 120412PT	12.70	4.76	5.16	0.8	●	●	●	●
					1.2	●	●	●	●
	CNMG 160608PT 160612PT 160616PT	15.875	6.35	6.35	0.8	●	●	●	●
					1.2	●	●	●	●
					1.6	●	●	●	●
					1.6	●	●	●	●
	CNMG 120408GT 120412GT	12.70	4.76	5.16	0.8	●	●	●	●
					1.2	●	●	●	●
	CNMG 120404 120408 120412	12.70	4.76	5.16	0.4	●	●	●	●
					0.8	●	●	●	●
					1.2	●	●	●	●
	CNMG 160608 160612	15.875	6.35	6.35	0.8			●	●
					1.2			●	●
					1.2			●	●
	CNMG 190612 190616	19.05	6.35	7.94	1.2	●	●	●	●
					1.6	●	●	●	●
					1.6	●	●	●	●
	CNMG 120408PH 120412PH 120416PH	12.70	4.76	5.16	0.8	●	●	●	●
					1.2	●	●	●	●
					1.6	●	●	●	●
	CNMG 160608PH 160612PH 160616PH	15.875	6.35	6.35	0.8	●	●	●	●
					1.2	●	●	●	●
					1.6	●	●	●	●
	CNMG 190608PH 190612PH 190616PH 190624PH	19.05	6.35	7.94	0.8	●	●	●	●
					1.2	●	●	●	●
					1.6	●	●	●	●
					2.4	●	●	●	●
	CNMM 120408PX 120412PX 120416PX	12.70	4.76	5.16	0.8	●	●	●	●
					1.2	●	●	●	●
					1.6	●	●	●	●
	CNMM 160608PX 160612PX 160616PX	15.875	6.35	6.35	0.8	●	●	●	●
					1.2	●	●	●	●
					1.6	●	●	●	●
	CNMM 190608PX 190612PX 190616PX 190624PX	19.05	6.35	7.94	0.8	●	●	●	●
					1.2	●	●	●	●
					1.6	●	●	●	●
					2.4	●	●	●	●
	CNMG 120404XP 120408XP	12.70	4.76	5.16	0.4	●	●	●	●
					0.8	●	●	●	●


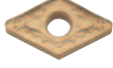







●: Std. Item








Shape	Description	Dimension (mm)				CVD Coated Carbide			
		I.C.	Thickness	Hole	Corner-R (r _c)	CA510	CA515	CA525	CA530
 Low Carbon Steel Medium Cutting	CNCM 120404XQ 120408XQ	12.70	4.76	5.16	0.4	●	●	●	●
					0.8	●	●	●	●
 Low Carbon Steel Roughing	CNCM 120408XS	12.70	4.76	5.16	0.8	●	●	●	●
 Finishing	DNMG 150402PP 150404PP 150408PP 150412PP	12.70	4.76	5.16	0.2	●	●	●	●
					0.4	●	●	●	●
					0.8	●	●	●	●
					1.2	●	●	●	●
 Finishing	DNMG 150602PP 150604PP 150608PP 150612PP	12.70	6.35	5.16	0.2	●	●	●	●
					0.4	●	●	●	●
					0.8	●	●	●	●
					1.2	●	●	●	●
 Finishing	DNMG 110404GP 110408GP	9.525	4.76	3.81	0.4	●	●	●	●
					0.8	●	●	●	●
 Finishing	DNMG 150402GP 150404GP 150408GP	12.70	4.76	5.16	0.2	●	●	●	●
					0.4	●	●	●	●
					0.8	●	●	●	●
 Finishing-Medium	DNMG 150404PQ 150408PQ 150412PQ	12.70	4.76	5.16	0.4	●	●	●	●
					0.8	●	●	●	●
					1.2	●	●	●	●
 Finishing-Medium	DNMG 150604PQ 150608PQ 150612PQ	12.70	6.35	5.16	0.4	●	●	●	●
					0.8	●	●	●	●
					1.2	●	●	●	●
 Finishing-Medium	DNMG 110402HQ 110404HQ	9.525	4.76	3.81	0.2	●	●	●	●
					0.4	●	●	●	●
					0.8	●	●	●	●
 Finishing-Medium	DNMG 150404HQ 150408HQ 150412HQ	12.70	4.76	5.16	0.4	●	●	●	●
					0.8	●	●	●	●
					1.2	●	●	●	●
 Finishing-Medium	DNMG 150604HQ 150608HQ 150612HQ	12.70	6.35	5.16	0.4	●	●	●	●
					0.8	●	●	●	●
					1.2	●	●	●	●
 Finishing-Medium Up Facing	DNMG 150404CQ 150408CQ 150412CQ	12.70	4.76	5.16	0.4	●	●	●	●
					0.8	●	●	●	●
					1.2	●	●	●	●
 Finishing-Medium Up Facing	DNMG 150604CQ 150608CQ 150612CQ	12.70	6.35	5.16	0.4	●	●	●	●
					0.8	●	●	●	●
					1.2	●	●	●	●

Shape	Description	Dimension (mm)				CVD Coated Carbide			
		I.C.	Thickness	Hole	Corner-R (r _c)	CA510	CA515	CA525	CA530
 Finishing-Medium Up Facing	DNMG 150408CJ 150412CJ	12.70	4.76	5.16	0.8	●	●	●	●
					1.2	●	●	●	●
 Finishing-Medium Up Facing	DNMG 150608CJ 150612CJ	12.70	6.35	5.16	0.8	●	●	●	●
					1.2	●	●	●	●
 Medium-Roughing	DNMG 110404GS 110408GS	9.525	4.76	3.81	0.4	●	●	●	●
					0.8	●	●	●	●
	DNMG 150404GS 150408GS 150412GS	12.70	4.76	5.16	0.4	●	●	●	●
					0.8	●	●	●	●
 Medium-Roughing	DNMG 150604GS 150608GS	12.70	6.35	5.16	0.4		●	●	
					0.8		●	●	
 Medium-Roughing	DNMG 150404PG 150408PG 150412PG 150416PG	12.70	4.76	5.16	0.4	●	●	●	●
					0.8	●	●	●	●
					1.2	●	●	●	●
 Medium-Roughing	DNMG 150604PG 150608PG 150612PG 150616PG	12.70	6.35	5.16	0.4	●	●	●	●
					0.8	●	●	●	●
					1.2	●	●	●	●
 Medium-Roughing	DNMG 150404PS 150408PS 150412PS	12.70	4.76	5.16	0.4	●	●	●	●
					0.8	●	●	●	●
					1.2	●	●	●	●
 Medium-Roughing	DNMG 150604PS 150608PS 150612PS 150616PS	12.70	6.35	5.16	0.4	●	●	●	●
					0.8	●	●	●	●
					1.2	●	●	●	●
 Medium-Roughing High Feed	DNMG 150408PT 150412PT	12.70	4.76	5.16	0.8	●	●	●	●
					1.2	●	●	●	●
 Medium-Roughing High Feed	DNMG 150608PT 150612PT	12.70	6.35	5.16	0.8	●	●	●	●
					1.2	●	●	●	●
 Medium-Roughing High Feed	DNMG 150408GT 150412GT	12.70	4.76	5.16	0.8	●	●	●	●
					1.2	●	●	●	●
 Medium-Roughing High Feed	DNMG 150608GT 150612GT	12.70	6.35	5.16	0.8	●	●	●	●
					1.2	●	●	●	●
 Roughing	DNMG 150404 150408	12.70	4.76	5.16	0.4	●	●	●	●
					0.8	●	●	●	●
 Roughing	DNMG 150608 150612	12.70	6.35	5.16	0.8	●	●	●	●
					1.2	●	●	●	●










●: Std. Item


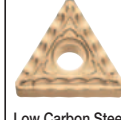


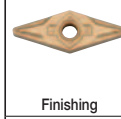
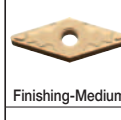


■ Stock Items (Negative)

Shape	Description	Dimension (mm)				CVD Coated Carbide			
		I.C.	Thickness	Hole	Corner-R (rε)	CA510	CA515	CA525	CA530
 Roughing	DNMG 150408PH 150412PH 150416PH	12.70	4.76	5.16	0.8 1.2 1.6	●	●	●	●
	DNMG 150608PH 150612PH 150616PH	12.70	6.35	5.16	0.8 1.2 1.6	●	●	●	●
 Single Sided Roughing · High Feed	DNMM 150408PX 150412PX 150416PX	12.70	4.76	5.16	0.8 1.2 1.6			●	●
	DNMM 150608PX 150612PX 150616PX	12.70	6.35	5.16	0.8 1.2 1.6	●	●	●	●
 Low Carbon Steel Finishing	DNMG 150404XP 150408XP	12.70	4.76	5.16	0.4 0.8	●	●	●	●
 Low Carbon Steel Medium Cutting	DNMG 150404XQ 150408XQ	12.70	4.76	5.16	0.4 0.8	●	●	●	●
 Low Carbon Steel Roughing	DNMG 150408XS	12.70	4.76	5.16	0.8	●	●	●	●
 Medium-Roughing	RNMG 090300	9.525	3.18	3.81	-	●	●	●	●
	RNMG 120400	12.70	4.76	5.16	-	●	●	●	●
	RNMG 150600	15.875	6.35	6.35	-			●	●
 Finishing-Medium	SNMG 120404PQ 120408PQ 120412PQ	12.70	4.76	5.16	0.4 0.8 1.2	●	●	●	●
	SNMG 120404HQ 120408HQ 120412HQ	12.70	4.76	5.16	0.4 0.8 1.2	●	●	●	●
		12.70	4.76	5.16	0.4 0.8 1.2	●	●	●	●
12.70		4.76	5.16	0.8 1.2 1.6	●	●	●	●	
 Medium-Roughing	SNMG 120408PG 120412PG 120416PG	12.70	4.76	5.16	0.8 1.2 1.6	●	●	●	●
 Medium-Roughing	SNMG 120408PS 120412PS 120416PS	12.70	4.76	5.16	0.8 1.2 1.6	●	●	●	●
	SNMG 120408PT 120412PT	12.70	4.76	5.16	0.8 1.2	●	●	●	●
		12.70	4.76	5.16	0.8 1.2	●	●	●	●

Shape	Description	Dimension (mm)				CVD Coated Carbide			
		I.C.	Thickness	Hole	Corner-R (rε)	CA510	CA515	CA525	CA530
 Roughing	SNMG 090304 090308	9.525	3.18	3.81	0.4 0.8			●	●
	SNMG 120408 120412 120416	12.70	4.76	5.16	0.8 1.2 1.6	●	●	●	●
 Roughing	SNMG 120408PH 120412PH 120416PH	12.70	4.76	5.16	0.8 1.2 1.6	●	●	●	●
	SNMG 150612PH 150616PH	15.875	6.35	6.35	1.2 1.6	●	●	●	●
	SNMG 190612PH 190616PH	19.05	6.35	7.94	1.2 1.6			●	●
 Single Sided Roughing · High Feed	SNMM 120408PX 120412PX 120416PX	12.70	4.76	5.16	0.8 1.2 1.6	●	●	●	●
	SNMM 150612PX 150616PX	15.875	6.35	6.35	1.2 1.6			●	●
	SNMM 190612PX 190616PX	19.05	6.35	7.94	1.2 1.6	●	●	●	●
 Low Carbon Steel Finishing	SNMG 120408XP	12.70	4.76	5.16	0.8	●	●	●	●
	SNMG 120408XQ 120408XS	12.70	4.76	5.16	0.8	●	●	●	●
		12.70	4.76	5.16	0.8	●	●	●	●
 Low Carbon Steel Medium Cutting	SNMG 120408XQ 120408XS	12.70	4.76	5.16	0.8	●	●	●	●
	SNMG 120408XP 120408XQ	12.70	4.76	5.16	0.8	●	●	●	●
		12.70	4.76	5.16	0.8	●	●	●	●
 Finishing	TNMG 160402PP 160404PP 160408PP 160412PP	9.525	4.76	3.81	0.2 0.4 0.8 1.2	●	●	●	●
	TNMG 160402GP 160404GP 160408GP	9.525	4.76	3.81	0.2 0.4 0.8	●	●	●	●
		9.525	4.76	3.81	0.2 0.4 0.8 1.2	●	●	●	●
 Finishing-Medium	TNMG 110404HQ 110408HQ	6.35	4.76	2.26	0.4 0.8	●	●	●	●
	TNMG 160404HQ 160408HQ 160412HQ	9.525	4.76	3.81	0.4 0.8 1.2	●	●	●	●









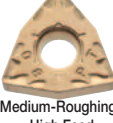

●: Std. Item






Shape Right-hand shown	Description	Dimension (mm)				CVD Coated Carbide			
		I.C.	Thickness	Hole	Corner-R (r _c)	CA510	CA515	CA525	CA530
 Finishing-Medium - Up Facing	TNMG 160404CQ 160408CQ 160412CQ	9.525	4.76	3.81	0.4 0.8 1.2	●	●	●	●
	TNMG 220408CQ 220412CQ	12.70	4.76	5.16	0.8 1.2	●	●	●	●
 Medium-Roughing	TNMG 110404GS 110408GS	6.35	4.76	2.26	0.4 0.8			●	●
	TNMG 160404GS 160408GS	9.525	4.76	3.81	0.4 0.8	●	●	●	●
 Medium-Roughing	TNMG 160404PG 160408PG 160412PG	9.525	4.76	3.81	0.4 0.8 1.2	●	●	●	●
 Medium-Roughing	TNMG 160404PS 160408PS 160412PS	9.525	4.76	3.81	0.4 0.8 1.2	●	●	●	●
	TNMG 220404PS 220408PS 220412PS 220416PS	12.70	4.76	5.16	0.4 0.8 1.2 1.6	●	●	●	●
 Medium-Roughing - High Feed	TNMG 160408PT 160412PT	9.525	4.76	3.81	0.8 1.2	●	●	●	●
 Medium-Roughing - High Feed	TNMG 160408GT 160412GT	9.525	4.76	3.81	0.8 1.2	●	●	●	●
 Roughing	TNMG 160404 160408 160412	9.525	4.76	3.81	0.4 0.8 1.2	●	●	●	●
	TNMG 220408 220412	12.70	4.76	5.16	0.8 1.2	●	●	●	●
 Roughing	TNMG 160408PH 160412PH	9.525	4.76	3.81	0.8 1.2	●	●	●	●
	TNMG 220408PH 220412PH 220416PH	12.70	4.76	5.16	0.8 1.2 1.6	●	●	●	●
 Single Sided Roughing - High Feed	TNMM 160408PX 160412PX	9.525	4.76	3.81	0.8 1.2			●	●
	TNMM 220408PX 220412PX 220416PX	12.70	4.76	5.16	0.8 1.2 1.6			●	●

Shape	Description	Dimension (mm)				CVD Coated Carbide			
		I.C.	Thickness	Hole	Corner-R (r _c)	CA510	CA515	CA525	CA530
 Low Carbon Steel Finishing	TNMG 160404XP 160408XP	9.525	4.76	3.81	0.4 0.8	●	●	●	●
 Low Carbon Steel Medium Cutting	TNMG 160404XQ 160408XQ	9.525	4.76	3.81	0.4 0.8	●	●	●	●
 Low Carbon Steel Roughing	TNMG 160408XS	9.525	4.76	3.81	0.8	●	●	●	●
 Medium-Roughing	TNMG 160404%L-ST 160408%L-ST	9.525	4.76	3.81	0.4 0.8	●	●	●	●
 Finishing	VNMG 160402PP 160404PP 160408PP 160412PP	9.525	4.76	3.81	0.2 0.4 0.8 1.2	●	●	●	●
	VNMG 160402GP 160404GP 160408GP	9.525	4.76	3.81	0.2 0.4 0.8	●	●	●	●
	VNMG 160404VF 160408VF 160412VF	9.525	4.76	3.81	0.4 0.8 1.2	●	●	●	●
	VNMG 160404PQ 160408PQ 160412PQ	9.525	4.76	3.81	0.4 0.8 1.2	●	●	●	●
 Finishing-Medium	VNMG 160404HQ 160408HQ 160412HQ	9.525	4.76	3.81	0.4 0.8 1.2	●	●	●	●
	VNMG 160404 160408	9.525	4.76	3.81	0.4 0.8	●	●	●	●
 Finishing With Wiper Edge	WNMG 080404WP 080408WP	12.70	4.76	5.16	0.4 0.8	●	●	●	●
 Finishing-Medium With Wiper Edge	WNMG 080404WQ 080408WQ 080412WQ	12.70	4.76	5.16	0.4 0.8 1.2	●	●	●	●

●: Std. Item




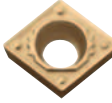
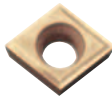


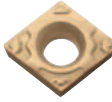
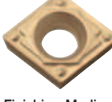
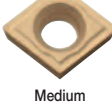




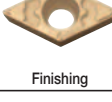
■ Stock Items (Negative)


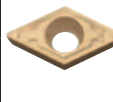
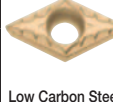







Shape	Description	Dimension (mm)				CVD Coated Carbide			
		I.C.	Thickness	Hole	Corner-R (r _c)	CA510	CA515	CA525	CA530
 Finishing	WNMG 080402PP 080404PP 080408PP 080412PP	12.70	4.76	5.16	0.2 0.4 0.8 1.2	●	●	●	●
 Finishing-Medium	WNMG 080404PQ 080408PQ 080412PQ	12.70	4.76	5.16	0.4 0.8 1.2	●	●	●	●
 Finishing-Medium	WNMG 06T304HQ 06T308HQ	9.525	3.97	3.81	0.4 0.8			●	●
	WNMG 060404HQ 060408HQ	9.525	4.76	3.81	0.4 0.8	●	●	●	●
 Finishing-Medium	WNMG 080404HQ 080408HQ 080412HQ	12.70	4.76	5.16	0.4 0.8 1.2	●	●	●	●
	WNMG 080404CQ 080408CQ 080412CQ	12.70	4.76	5.16	0.4 0.8 1.2	●	●	●	●
 Finishing-Medium · Up Facing	WNMG 080408CJ 080412CJ	12.70	4.76	5.16	0.8 1.2	●	●	●	●
 Medium-Roughing	WNMG 060404GS 060408GS	9.525	4.76	3.81	0.4 0.8	●	●	●	●
	WNMG 080404GS 080408GS 080412GS	12.70	4.76	5.16	0.4 0.8 1.2	●	●	●	●
 Medium-Roughing	WNMG 080404PG 080408PG 080412PG 080416PG	12.70	4.76	5.16	0.4 0.8 1.2 1.6	●	●	●	●
 Medium-Roughing	WNMG 080404PS 080408PS 080412PS 080416PS	12.70	4.76	5.16	0.4 0.8 1.2 1.6	●	●	●	●
 Medium-Roughing · High Feed	WNMG 080408PT 080412PT	12.70	4.76	5.16	0.8 1.2	●	●	●	●
 Medium-Roughing · High Feed	WNMG 080408GT 080412GT	12.70	4.76	5.16	0.8 1.2	●	●	●	●

Shape	Description	Dimension (mm)				CVD Coated Carbide			
		I.C.	Thickness	Hole	Corner-R (r _c)	CA510	CA515	CA525	CA530
 Roughing	WNMG 080404 080408 080412	12.70	4.76	5.16	0.4 0.8 1.2	●	●	●	●
 Roughing	WNMG 080408PH 080412PH	12.70	4.76	5.16	0.8 1.2	●	●	●	●
 Low Carbon Steel Finishing	WNMG 080404XP 080408XP	12.70	4.76	5.16	0.4 0.8	●	●	●	●
 Low Carbon Steel Medium Cutting	WNMG 080404XQ 080408XQ	12.70	4.76	5.16	0.4 0.8	●	●	●	●
 Low Carbon Steel Roughing	WNMG 080408XS	12.70	4.76	5.16	0.8	●	●	●	●

●: Std. Item








■ Stock Items (Positive)

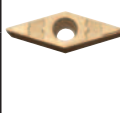
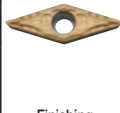
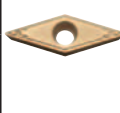
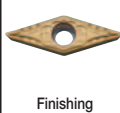
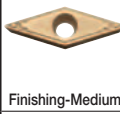
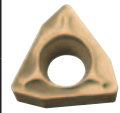


Shape	Description	Dimension (mm)					CVD Coated Carbide			
		I.C.	Thickness	Hole	Corner-R (r _c)	Relief Angle	CA510	CA515	CA525	CA530
 	CCMT 060202PP 060204PP	6.35	2.38	2.8	0.2 0.4	7°	●	●	●	●
	CCMT 09T302PP 09T304PP 09T308PP	9.525	3.97	4.4	0.2 0.4 0.8	7°	●	●	●	●
	CCMT 060202GK 060204GK	6.35	2.38	2.8	0.2 0.4	7°	●	●	●	●
	CCMT 09T302GK 09T304GK	9.525	3.97	4.4	0.2 0.4	7°	●	●	●	●
	CCMT 120404GK 120408GK 120412GK	12.70	4.76	5.5	0.4 0.8 1.2	7°	●	●	●	●
	CCMT 060202HQ 060204HQ	6.35	2.38	2.8	0.2 0.4	7°	●	●	●	●
	CCMT 09T302HQ 09T304HQ 09T308HQ	9.525	3.97	4.4	0.2 0.4 0.8	7°	●	●	●	●
	CCMT 09T308	9.525	3.97	4.4	0.8	7°	●	●	●	●
 	CPMT 080202PP 080204PP	7.94	2.38	3.3	0.2 0.4	11°	●	●	●	●
	CPMT 090302PP 090304PP 090308PP	9.525	3.18	4.4	0.2 0.4 0.8	11°	●	●	●	●
	CPMT 080204GP	7.94	2.38	3.3	0.4	11°	●	●	●	●
	CPMT 090304GP 090308GP	9.525	3.18	4.4	0.4 0.8	11°	●	●	●	●
	CPMH 080204HQ 080208HQ	7.94	2.38	3.5	0.4 0.8	11°	●	●	●	●
	CPMH 090304HQ 090308HQ	9.525	3.18	4.5	0.4 0.8	11°	●	●	●	●
	CPMH 080204 080208	7.94	2.38	3.5	0.4 0.8	11°	●	●	●	●
	CPMH 090304 090308	9.525	3.18	4.5	0.4 0.8	11°	●	●	●	●
	CPMT 080204XP	7.94	2.38	3.3	0.4	11°	●	●	●	●
	CPMT 090304XP 090308XP	9.525	3.18	4.4	0.4 0.8	11°	●	●	●	●
	CPMT 090304XQ 090308XQ	9.525	3.18	4.4	0.4 0.8	11°	●	●	●	●
 	DCMT 070202PP 070204PP	6.35	2.38	2.8	0.2 0.4	7°	●	●	●	●
	DCMT 11T302PP 11T304PP 11T308PP	9.525	3.97	4.4	0.2 0.4 0.8	7°	●	●	●	●
	DCMT 070202GP 070204GP	6.35	2.38	2.8	0.2 0.4	7°	●	●	●	●
	DCMT 11T304GP 11T308GP	9.525	3.97	4.4	0.4 0.8	7°	●	●	●	●

Shape	Description	Dimension (mm)					CVD Coated Carbide			
		I.C.	Thickness	Hole	Corner-R (r _c)	Relief Angle	CA510	CA515	CA525	CA530
	DCMT 070202GK 070204GK 070208GK	6.35	2.38	2.8	0.2 0.4 0.8	7°	●	●	●	●
	DCMT 11T302GK 11T304GK 11T308GK	9.525	3.97	4.4	0.2 0.4 0.8	7°	●	●	●	●
	DCMT 070202HQ 070204HQ 070208HQ	6.35	2.38	2.8	0.2 0.4 0.8	7°	●	●	●	●
	DCMT 11T302HQ 11T304HQ 11T308HQ	9.525	3.97	4.4	0.2 0.4 0.8	7°	●	●	●	●
	DCMT 070204XP	6.35	2.38	2.8	0.4	7°	●	●	●	●
	DCMT 11T302XP 11T304XP 11T308XP	9.525	3.97	4.4	0.2 0.4 0.8	7°	●	●	●	●
	DCMT 11T304XQ 11T308XQ	9.525	3.97	4.4	0.4 0.8	7°	●	●	●	●
	RCMX 1003M0	10.0	3.18	3.6	-	7°	●	●	●	●
	RCMX 1204M0	12.0	4.76	4.2	-	7°	●	●	●	●
	SCMT 09T304HQ 09T308HQ	9.525	3.97	4.4	0.4 0.8	7°	●	●	●	●
	SPMR 090304 090308	9.525	3.18	-	0.4 0.8	11°	●	●	●	●
	SPMR 120304 120308	12.70	3.18	-	0.4 0.8	11°	●	●	●	●
	TBMT 060102DP 060104DP	3.97	1.59	2.3	0.2 0.4	5°	●	●	●	●
	TCMT 110204HQ 110208HQ	6.35	2.38	2.8	0.4 0.8	7°	●	●	●	●
 	TPMT 090202PP 090204PP	5.56	2.38	2.8	0.2 0.4	11°	●	●	●	●
	TPMT 110302PP 110304PP 110308PP	6.35	3.18	3.3	0.2 0.4 0.8	11°	●	●	●	●

●: Std. Item

■ Stock Items (Positive)

Shape	Description	Dimension (mm)					CVD Coated Carbide			
		I.C.	Thickness	Hole	Corner-R (r _c)	Relief Angle	CA510	CA515	CA525	CA530
	TPMT 090204GP	5.56	2.38	2.8	0.4	11°	●	●	●	●
	TPMT 110304GP 110308GP	6.35	3.18	3.3	0.4 0.8	11°	●	●	●	●
	Finishing TPMT 160304GP	9.525	3.18	4.4	0.4	11°	●	●	●	●
	TPMT 090202HQ 090204HQ	5.56	2.38	2.8	0.2 0.4	11°	●	●	●	●
	TPMT 110302HQ 110304HQ 110308HQ	6.35	3.18	3.3	0.2 0.4 0.8	11°	●	●	●	●
	Finishing-Medium TPMT 160304HQ 160308HQ	9.525	3.18	4.4	0.4 0.8	11°	●	●	●	●
	TPMT 090204XP	5.56	2.38	2.8	0.4	11°	●	●	●	●
	TPMT 110304XP 110308XP	6.35	3.18	3.3	0.4 0.8	11°	●	●	●	●
	Low Carbon Steel Finishing TPMT 160304XP 160308XP	9.525	3.18	4.4	0.4 0.8	11°	●	●	●	●
	TPMT 110304XQ 110308XQ	6.35	3.18	3.3	0.4 0.8	11°	●	●	●	●
	Low Carbon Steel Finishing-Medium TPMT 160304XQ 160308XQ	9.525	3.18	4.4	0.4 0.8	11°	●	●	●	●
	TPMR 160304GP	9.525	3.18	-	0.4	11°	●	●	●	●
	TPMR 110304HQ 110308HQ	6.35	3.18	-	0.4 0.8	11°	●	●	●	●
	Finishing-Medium TPMR 160304HQ 160308HQ	9.525	3.18	-	0.4 0.8	11°	●	●	●	●
	TPMR 110304 110308	6.35	3.18	-	0.4 0.8	11°	●	●	●	●
	Medium TPMR 160304 160308	9.525	3.18	-	0.4 0.8	11°	●	●	●	●

Shape Left-hand shown	Description	Dimension (mm)					CVD Coated Carbide			
		I.C.	Thickness	Hole	Corner-R (r _c)	Relief Angle	CA510	CA515	CA525	CA530
	VBMT 110304GP	6.35	3.18	2.8	0.4	5°	●	●	●	●
	Finishing VBMT 160404GP 160408GP	9.525	4.76	4.4	0.4 0.8	5°	●	●	●	●
	VBMT 110302VF 110304VF 110308VF	6.35	3.18	2.8	0.2 0.4 0.8	5°	●	●	●	●
	Finishing VBMT 160402VF 160404VF 160408VF 160412VF	9.525	4.76	4.4	0.2 0.4 0.8 1.2	5°	●	●	●	●
	VBMT 110304HQ 110308HQ	6.35	3.18	2.8	0.4 0.8	5°	●	●	●	●
	Finishing-Medium VBMT 160404HQ 160408HQ 160412HQ	9.525	4.76	4.4	0.4 0.8 1.2	5°	●	●	●	●
	VCMT 080202VF 080204VF	4.76	2.38	2.3	0.2 0.4	7°	●	●	●	●
	VCMT 080202HQ 080204HQ	4.76	2.38	2.3	0.2 0.4	7°	●	●	●	●
	Finishing-Medium									
	WBMT 060102 ^{R/L} -DP 060104 ^{R/L} -DP	3.97	1.59	2.3	0.2 0.4	5°	L	L	L	L
	Finishing									
	WPMT 110204GP	6.35	2.38	2.8	0.4	11°	●	●	●	●
	Finishing WPMT 160304GP	9.525	3.18	4.4	0.4	11°	●	●	●	●
	WPMT 110202HQ 110204HQ	6.35	2.38	2.8	0.2 0.4	11°	●	●	●	●
	Finishing-Medium WPMT 160304HQ 160308HQ	9.525	3.18	4.4	0.4 0.8	11°	●	●	●	●

●: Std. Item L: L-hand Only

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