

New CVD Coated Carbide Grade for Steel

CA115P/CA125P

NEW**Longer tool life in various steel machining environments**

New coating and carbide substrate provide
excellent wear and fracture resistance

Longer tool life for a wide range of machining applications
Introducing PMG Chipbreaker for medium-roughing

CA115P

**Releasing
June 2023**

Continuous to light interrupted machining
Highly-efficient machining

CA125P

Continuous to heavy interrupted machining
General purpose



New CVD Coated Carbide Grade for Steel

CA115P/CA125P

The new standard for steel machining. Longer tool life in a wide range of machining environments
Expanded lineup of chipbreakers for steel machining in various applications

CA115P/CA125P drastically extends tool life

- Cost savings
- Reduced downtime
- Reduced inventory needed on hand
- Consistent machining quality
- Line automation and labor savings
- Promotes a carbon neutral society by reducing the amount of waste

Advancing technologies improve tool longevity

Advanced technology

New coating & New carbide substrate



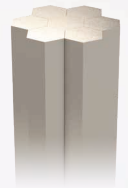
Black & Gold
Excellent wear and fracture resistance



Innovative Layering Technology

Ultra-uniform alumina layering

Proprietary crystal forming technology
Achieving significant crystal growth uniformity and direction
Reduces crater wear and extends tool life



New development

PMG Chipbreaker for Medium-Roughing

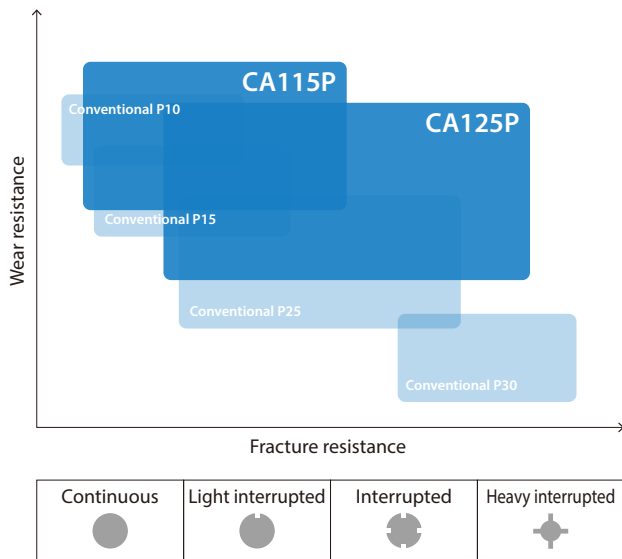
Unique design covers a wide range of machining applications
Maintains excellent chip control



1

Extended tool life in a wide variety of applications

Application Map



CA115P

Releasing
June 2023

Continuous-light interrupted machining of steel

For high-efficient machining
with wear and chipping resistance

CA125P

Continuous-heavy interrupted steel machining

First recommendation for steel machining
High versatility

Solution

Long tool life in various machining environments from roughing to finishing

1 Shaft S43C

**Good
Edge condition**
CA125P maintained stability and achieved
less wear than competitor A.

Edge condition



CA125P



Competitor A

Cutting Conditions :
 $V_c = 200 \text{ m/min}$, $a_p = 0.5 \text{ mm}$
 $f = 0.3 \text{ mm/rev}$, Wet DNMG150408PP
 Tool life : 150 pcs/corner

(User evaluation)

2 Sleeve HMM45

Tool life

2 times
CA115P provides 2 times longer tool life
than competitor B and maintained better
edge wear.

Number of parts

CA115P 200 pcs/corner

Competitor B 100 pcs/corner

Cutting Conditions :
 $V_c = 210 \text{ m/min}$, $a_p = 0.5 \text{ mm}$
 $f = 0.35 \text{ mm/rev}$, Wet DNMG150408PQ

(User evaluation)

3 Automotive parts SCM420H

**Good
Edge condition**
CA125P provides stable machining
without chipping even after reaching
the end of estimated tool life.

Edge condition



CA125P



Competitor C

Cutting Conditions :
 $V_c = 160 \text{ m/min}$, $a_p = 1.0 \text{ mm}$
 $f = 0.32 \text{ mm/rev}$, Wet CNMG120412PG
 Tool life : 100 pcs/corner

(User evaluation)

4 Automotive parts Non-tempered steel

1.4 times
CA125P shows 1.4 times longer tool life
than competitor D.

Number of parts

CA125P 80 pcs/corner

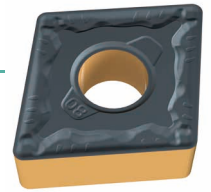
Competitor D 55 pcs/corner

Cutting Conditions :
 $V_c = 160 \text{ m/min}$, $a_p = 0.2 \text{ mm}$
 $f = 0.32 \text{ mm/rev}$, Wet CNMG120408PG

(User evaluation)

Solution

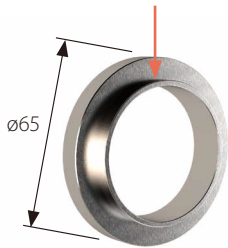
New PMG Chipbreaker provides up to 4 times longer tool life



5 Nut S45C

Tool life
↑
4 times

CA115P provides 4 times longer tool life than competitor E. The amount of wear after machining is also comparable.



Number of parts

CA115P 1,440 pcs/corner

Competitor E 360 pcs/corner

Cutting Conditions :
Vc = 190 m/min, ap = 1.3 mm
f = 0.2 mm/rev, Wet CNMG120408PMG

(User evaluation)

6 Gear S35C

Tool life
↑
2 times

CA125P shows 2 times longer tool life than competitor F for stable machining even in interrupted machining sections.



Number of parts

CA125P 200 pcs/corner

Competitor F 100 pcs/corner

Cutting Conditions :
Vc = 260 m/min, ap = 1.5 mm
f = 0.3 mm/rev, Wet CNMG120412PMG

(User evaluation)

7 Bearing SCM415

Good
Edge condition

CA125P maintained machining without fractures compared to competitor G, which was damaged frequently during machining.



CA125P



Competitor G

Cutting Conditions :
Vc = 270 m/min, ap = 1.3 mm
f = 0.25 mm/rev, Wet WNMG080408PMG
Tool life : 300 pcs/corner

(User evaluation)

8 Yoke S45C

Tool life
↑
2 times

CA125P shows 2 times longer tool life than competitor H.



Number of parts

CA125P 100 pcs/corner

Competitor H 50 pcs/corner

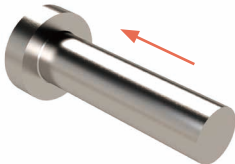
Cutting Conditions :
Vc = 160 m/min, ap = 1.0 mm
f = 0.37 mm/rev, Wet WNMG080408PMG

(User evaluation)

9 Bolt SCM440H

Good
Edge condition

CA125P has better chipping resistance against competitor I.



CA125P



Competitor I

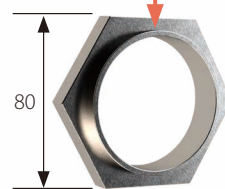
Cutting Conditions :
Vc = 200 m/min, ap = 2.0 mm
f = 0.3 mm/rev, Wet TNMG160408PMG
Tool life : 130 pcs/corner

(User evaluation)

10 Nut S45C

Tool life
↑
2 times

CA125P shows 2 times longer tool life than competitor J due to improved wear resistance.



Number of parts

CA125P 720 pcs/corner

Competitor J 360 pcs/corner

Cutting Conditions :
Vc = 200 m/min, ap = 2.2 mm
f = 0.2 mm/rev, Wet WNMG080408PMG

(User evaluation)



2

Newly developed proprietary coating and carbide substrate with superior wear and fracture resistance.

Optimized coating properties on rake and flank faces provides wear resistance and fracture resistance

The industry's most uniform alumina film* reduces crater wear

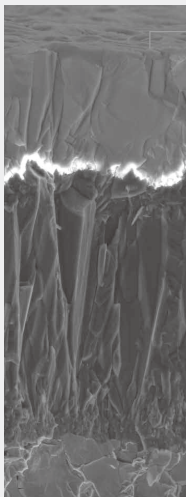
*March 2023, by Kyocera research

Black & Gold

Rake face

Suppresses crater wear and fracturing

- New surface treatment technology improves fracture resistance
- Highly uniform alumina layer reduces wear

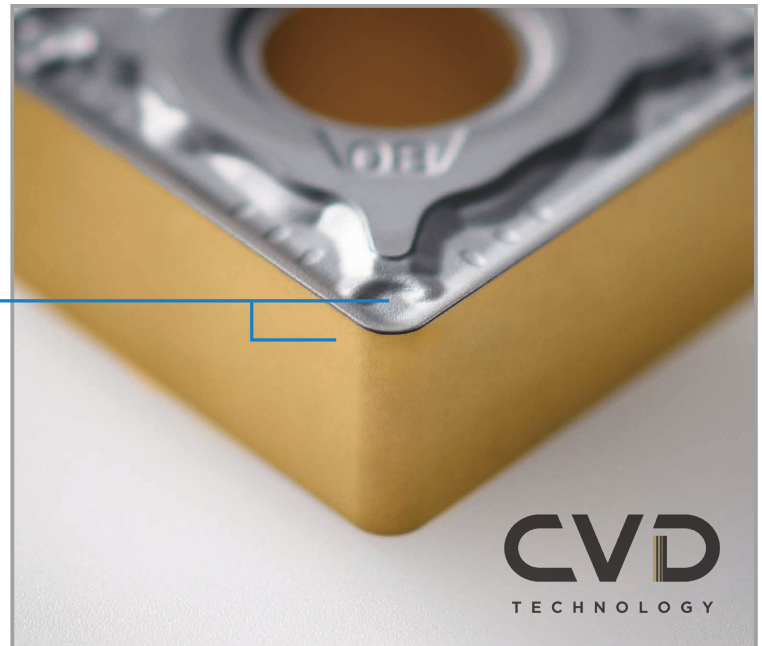


Surface treatment

Highly uniform alumina layer

Unique TiCN layer

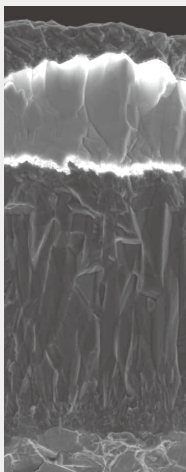
New carbide substrate



Flank face

Improved wear resistance

- High hardness surface layer suppresses abrasion
- Uniform alumina layer reduces wear
- Easy to see edge defects with golden surface



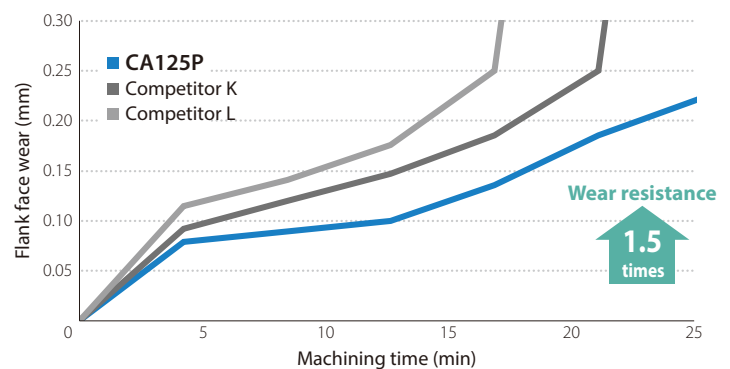
High hardness surface layer

Highly uniform alumina layer

Unique TiCN layer

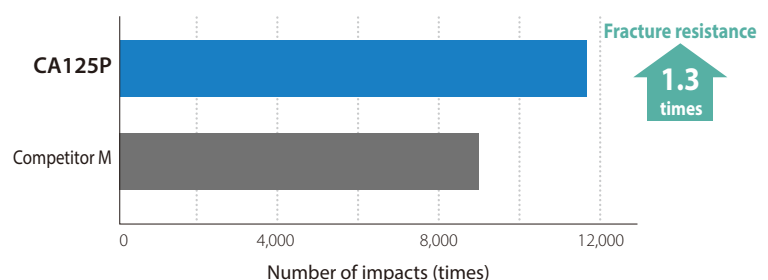
New carbide substrate

Wear resistance comparison (Internal evaluation)



Cutting Conditions : $V_c = 300$ m/min, $a_p = 1.5$ mm, $f = 0.3$ mm/rev, Wet Workpiece : SCM435

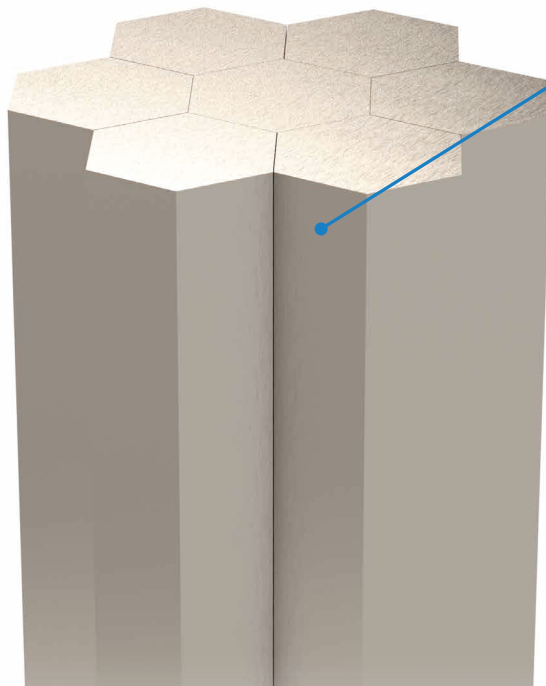
Fracture resistance comparison (Internal evaluation) Interrupted machining $n = 3$ mean



Cutting Conditions : $V_c = 300$ m/min, $a_p = 1.5$ mm, $f = 0.35$ mm/rev, Wet Workpiece : S45C (4 grooves)

Highly uniform alumina layer

Excellent wear resistance due to the most uniform crystal orientation in the industry. *



Alumina film crystal structure (CG image)

Uniform crystal orientation

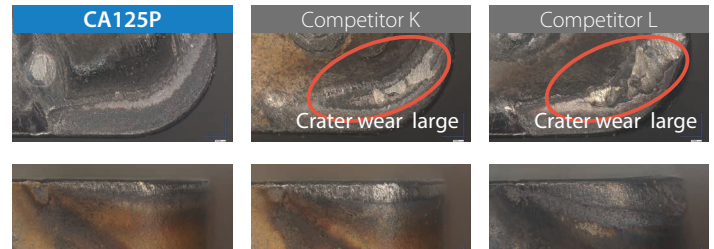
New crystal control technology provides industry-leading Al_2O_3 orientation

Comparison of cutting edge conditions (Internal evaluation)

After machining for 16.9 minutes

Improved wear resistance

Reduces crater wear and external abrasion caused by chip scraping



Cutting Conditions : $V_c = 300$ m/min, $a_p = 1.5$ mm, $f = 0.3$ mm/rev, Wet Workpiece : SCM435

*March 2023, by Kyocera research

Crystal orientation analysis (EBSD pattern)

A higher percentage of red indicates a more uniform growth pattern

CA125P



Uniform crystal direction

(CG image)

Conventional A



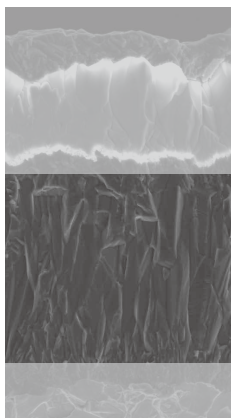
Nonuniform crystal orientation

(CG image)

Unique TiCN layer

Proper TiCN particle size with proprietary crystal control technology
Greatly improved chipping resistance

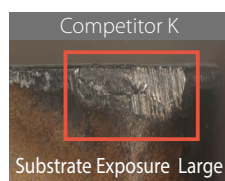
TiCN layer (CA125P)



Edge condition comparison

(Internal evaluation)

After machining 70 mm



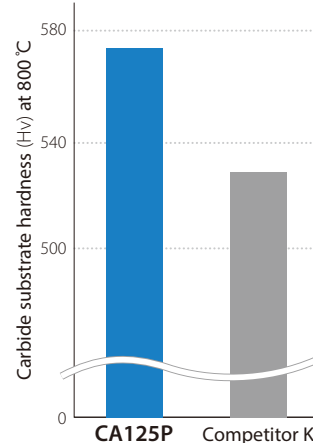
Cutting Conditions : $V_c = 250$ m/min
 $a_p = 1.0$ mm, $f = 0.4$ mm/rev
 $L = 1.0$ mm, Wet, Workpiece : SUJ2

New carbide substrate

Improved resistance to plastic deformation with an increased temperature strength

Comparison of carbide substrate hardness

(Internal evaluation)



Edge condition comparison

(Internal evaluation)



Cutting Conditions : $V_c = 300$ m/min
 $a_p = 1.0$ mm, $f = 0.4$ mm/rev
Dry, Workpiece : SCM435

3

A large variety of chipbreakers cover a wide range of machining applications and conditions

New lineup with expanded PMG Chipbreakers for medium machining to roughing
Covers a wide area from finishing to roughing

Negative Type

Smart chipbreaker P series for steel machining

PP

For finishing
Low resistance



PQ

For finishing-medium
Sharpness and strength



PMG NEW

For medium-roughing
Covers a wide range of machining areas



PG

For medium-roughing
Stability-oriented

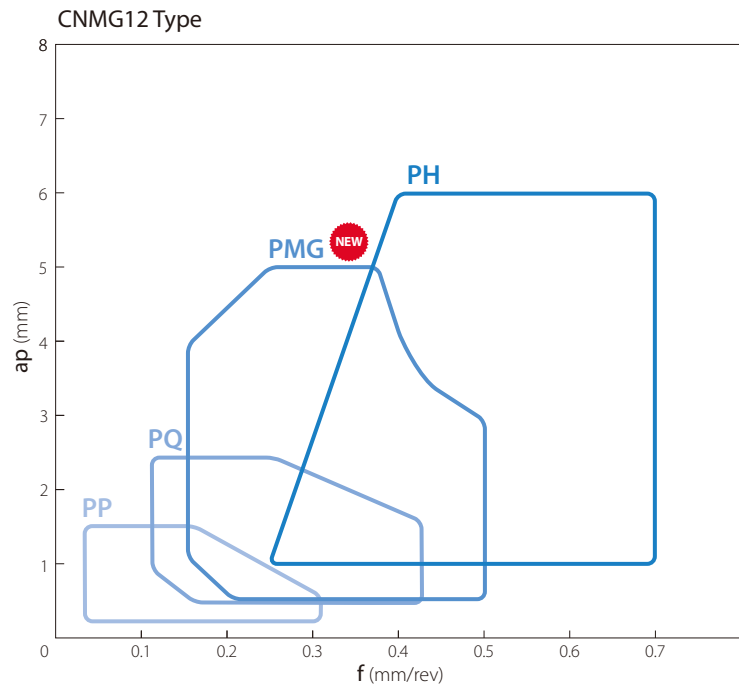


PH

For roughing
Tough edge design



Applicable Chipbreaker Range (ap indicates radius)



Positive Type

For finishing

PP

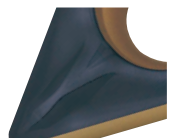
High reliability
Improving the productivity of finishing



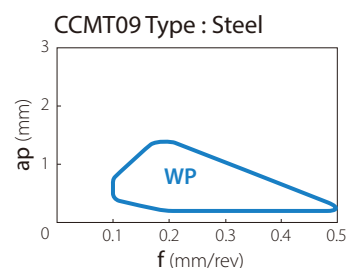
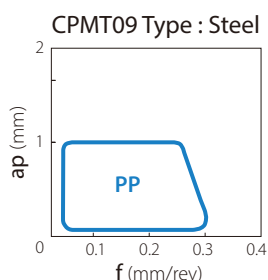
Wiper insert

WP

Newly designed wiper edge geometry
High productivity



Applicable Chipbreaker Range (ap indicates radius)



For medium-roughing

PMG Chipbreaker NEW

Covers a wide range of machining applications from medium machining to roughing

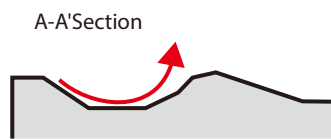
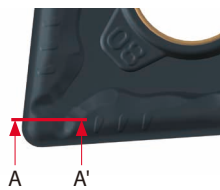
Excellent wear resistance with low cutting force design. Reduces chip shape inconsistencies and improves tool life

Step breaker structure

Suppresses chip entanglement during large D.O.C. machining with a gently rising surface

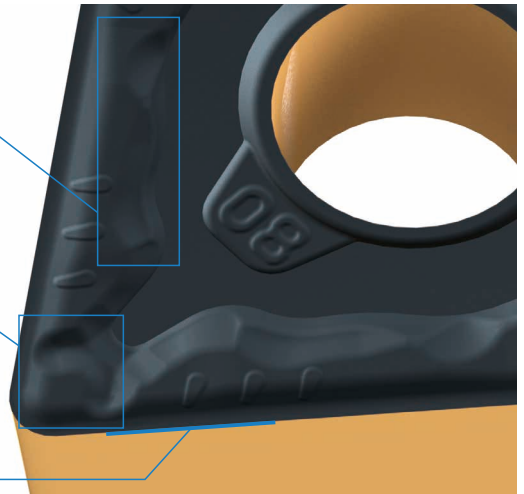
Circle Dot

Control chips during small D.O.C. machining



High Rake Perimeter

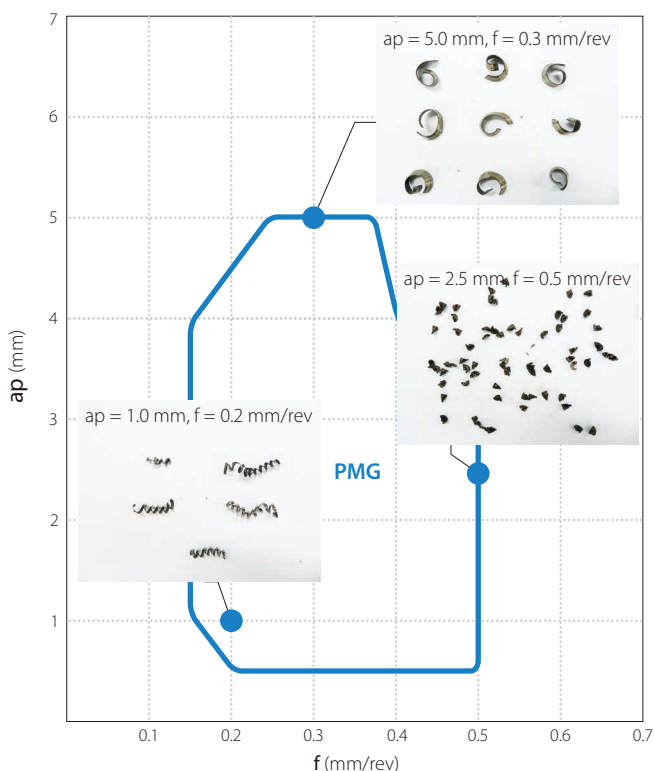
Low resistance design suppresses rake face temperature rise
Reduces chipbreakers wear and chip shape changes



Excellent chip control

Good chip control in a wide range of machining areas

Applicable Chipbreaker Range



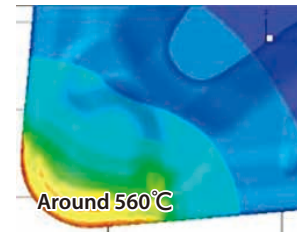
Cutting Conditions : $V_c = 300$ m/min, $a_p = 0.5 \sim 5.0$ mm, $f = 0.1 \sim 0.5$ mm/rev
Workpiece : SCr420 CNMG120408PMG

Achieves longer tool life

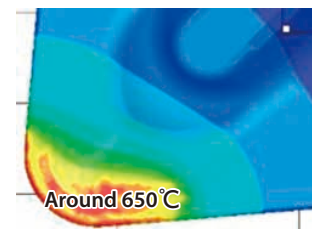
Suppresses rise in rake face temperature. Reduces crater wear

Edge temperature simulation comparison (Internal evaluation)

PMG Chipbreaker



Conventional B



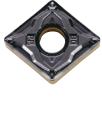
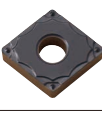
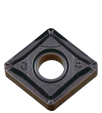
Cutting Conditions : $V_c = 270$ m/min, $a_p = 1.5$ mm, $f = 0.3$ mm/rev
Workpiece : SCM430

Consistent, small, and even chip shapes

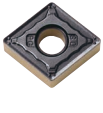
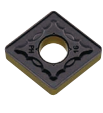
Chip shape

	PMG Chipbreaker		Conventional B
Initial machining		Initial machining	
After 27.2 min machining		After 25.0 min machining	

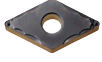
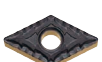
Cutting Conditions : $V_c = 300$ m/min, $a_p = 1.5$ mm, $f = 0.3$ mm/rev
Wet (External coolant) Workpiece : SCM435 WNMG080408PMG

Shape		Description	Dimensions (mm)				CA115P	CA125P
			I.C.	Thickness	Hole Diameter	Corner R (RE)		
Wiper Edge		CNMG 120404WF	12.70	4.76	5.16	0.4	●	●
		120408WF				0.8	●	●
Wiper Edge		CNMG 120404WP	12.70	4.76	5.16	0.4	●	●
		120408WP				0.8	●	●
Wiper Edge		CNMG 120404WE	12.70	4.76	5.16	0.4	●	●
		120408WE				0.8	●	●
		120412WE				1.2	●	●
Wiper Edge		CNMG 120404WQ	12.70	4.76	5.16	0.4	●	●
		120408WQ				0.8	●	●
		120412WQ				1.2	●	●
Finishing		CNMG 120402PP	12.70	4.76	5.16	0.2	●	●
		120404PP				0.4	●	●
		120408PP				0.8	●	●
		120412PP				1.2	●	●
Finishing		CNMG 120402GP	12.70	4.76	5.16	0.2	●	●
		120404GP				0.4	●	●
		120408GP				0.8	●	●
Finishing-Medium		CNMG 120404PQ	12.70	4.76	5.16	0.4	●	●
		120408PQ				0.8	●	●
		120412PQ				1.2	●	●
Finishing-Medium		CNMG 090404HQ	9.525	4.76	3.81	0.4	●	●
		090408HQ				0.8	●	●
		CNMG 120404HQ	12.70	4.76	5.16	0.4	●	●
		120408HQ				0.8	●	●
		120412HQ				1.2	●	●
Finishing-Medium / Up Facing		CNMG 120404CQ	12.70	4.76	5.16	0.4	●	●
		120408CQ				0.8	●	●
		120412CQ				1.2	●	●
		CNMG 160608CQ	15.875	6.35	6.35	0.8	●	●
		160612CQ				1.2	●	●
Finishing-Medium / Up Facing		CNMG 120408CJ	12.70	4.76	5.16	0.8	●	●
		120412CJ				1.2	●	●
		CNMG 160612CJ	15.875	6.35	6.35	1.2	●	●
		160616CJ				1.6	●	●
Medium-Roughing		CNMG 120404PMG	12.70	4.76	5.16	0.4	●	●
		120408PMG				0.8	●	●
		120412PMG				1.2	●	●
		120416PMG				1.6	●	●
		CNMG 160608PMG	15.875	6.35	6.35	0.8	●	●
		160612PMG				1.2	●	●
		160616PMG				1.6	●	●
Medium-Roughing (Continuous)		CNMG 090404GS	9.525	4.76	3.81	0.4	●	●
		090408GS				0.8	●	●

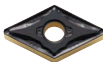
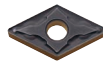
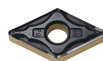
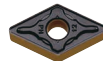
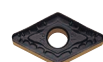
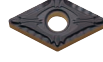
● : Standard Stock

Shape		Description	Dimensions (mm)				CA115P	CA125P
			I.C.	Thickness	Hole Diameter	Corner R (RE)		
Medium-Roughing (Intermittent)		CNMG 120404PG	12.70	4.76	5.16	0.4	●	●
		120408PG				0.8	●	●
		120412PG				1.2	●	●
		120416PG				1.6	●	●
Roughing		CNMG 120404	12.70	4.76	5.16	0.4	●	●
		120408				0.8	●	●
		120412				1.2	●	●
		CNMG 160608	15.875	6.35	6.35	0.8	●	●
		160612				1.2	●	●
		CNMG 190612	19.05	6.35	7.94	1.2	●	●
		190616				1.6	●	●
Roughing		CNMG 120408PH	12.70	4.76	5.16	0.8	●	●
		120412PH				1.2	●	●
		120416PH				1.6	●	●
		CNMG 160608PH	15.875	6.35	6.35	0.8	●	●
		160612PH				1.2	●	●
		160616PH				1.6	●	●
		CNMG 190608PH	19.05	6.35	7.94	0.8	●	●
		190612PH				1.2	●	●
		190616PH				1.6	●	●
		190624PH				2.4	●	●
Single Sided Roughing / High Feed		CNMM 120408PX	12.70	4.76	5.16	0.8	●	●
		120412PX				1.2	●	●
		120416PX				1.6	●	●
		CNMM 160608PX	15.875	6.35	6.35	0.8	●	●
		160612PX				1.2	●	●
		160616PX				1.6	●	●
		CNMM 190608PX	19.05	6.35	7.94	0.8	●	●
		190612PX				1.2	●	●
		190616PX				1.6	●	●
		190624PX				2.4	●	●
Low Carbon Steel		CNMG 120404XP	12.70	4.76	5.16	0.4	●	●
		120408XP				0.8	●	●
Low Carbon Steel		CNMG 120404XQ	12.70	4.76	5.16	0.4	●	●
		120408XQ				0.8	●	●
Low Carbon Steel		CNMG 120408XS	12.70	4.76	5.16	0.8	●	●

● : Standard Stock

Shape	Description	Dimensions (mm)				CA115P	CA125P
		I.C.	Thickness	Hole Diameter	Corner R (RE)		
Wiper Edge  Finishing	DNMX 150404WF	12.70	4.76	5.16	0.4	●	●
	150408WF				0.8	●	●
	150412WF				1.2	●	●
	DNMX 150604WF	12.70	6.35	5.16	0.4	●	●
	150608WF				0.8	●	●
	150612WF				1.2	●	●
Finishing 	DNMG 150402PP	12.70	4.76	5.16	0.2	●	●
	150404PP				0.4	●	●
	150408PP				0.8	●	●
	150412PP				1.2	●	●
	DNMG 150602PP	12.70	6.35	5.16	0.2	●	●
	150604PP				0.4	●	●
	150608PP				0.8	●	●
	150612PP				1.2	●	●
Finishing 	DNMG 110404GP	9.525	4.76	3.81	0.4	●	●
	110408GP				0.8	●	●
	DNMG 150402GP	12.70	4.76	5.16	0.2	●	●
	150404GP				0.4	●	●
	150408GP				0.8	●	●
	150412GP				1.2	●	●
Finishing-Medium 	DNMG 150404PQ	12.70	4.76	5.16	0.4	●	●
	150408PQ				0.8	●	●
	150412PQ				1.2	●	●
	DNMG 150604PQ	12.70	6.35	5.16	0.4	●	●
	150608PQ				0.8	●	●
	150612PQ				1.2	●	●
Finishing-Medium 	DNMG 110402HQ	9.525	4.76	3.81	0.2	●	●
	110404HQ				0.4	●	●
	DNMG 150404HQ	12.70	4.76	5.16	0.4	●	●
	150408HQ				0.8	●	●
	150412HQ				1.2	●	●
	DNMG 150604HQ	12.70	6.35	5.16	0.4	●	●
	150608HQ				0.8	●	●
	150612HQ				1.2	●	●
Finishing-Medium / Up Facing 	DNMG 150404CQ	12.70	4.76	5.16	0.4	●	●
	150408CQ				0.8	●	●
	150412CQ				1.2	●	●
	DNMG 150604CQ	12.70	6.35	5.16	0.4	●	●
	150608CQ				0.8	●	●
	150612CQ				1.2	●	●
Finishing-Medium / Up Facing 	DNMG 150408CJ	12.70	4.76	5.16	0.8	●	●
	150412CJ				1.2	●	●
	DNMG 150608CJ	12.70	6.35	5.16	0.8	●	●
	150612CJ				1.2	●	●

● : Standard Stock

Shape	Description	Dimensions (mm)				CA115P	CA125P
		I.C.	Thickness	Hole Diameter	Corner R (RE)		
Medium-Roughing 	DNMG 150404PMG	12.70	4.76	5.16	0.4	●	●
	150408PMG				0.8	●	●
	150412PMG				1.2	●	●
	150416PMG				1.6	●	●
	DNMG 150604PMG	12.70	6.35	5.16	0.4	●	●
	150608PMG				0.8	●	●
	150612PMG				1.2	●	●
	150616PMG				1.6	●	●
Medium-Roughing (Continuous) 	DNMG 110404GS	9.525	4.76	3.81	0.4	●	●
	110408GS				0.8	●	●
Medium-Roughing (Interruption) 	DNMG 150404PG	12.70	4.76	5.16	0.4	●	●
	150408PG				0.8	●	●
	150412PG				1.2	●	●
	150416PG				1.6	●	●
	DNMG 150604PG	12.70	6.35	5.16	0.4	●	●
	150608PG				0.8	●	●
	150612PG				1.2	●	●
	150616PG				1.6	●	●
Roughing 	DNMG 150404	12.70	4.76	5.16	0.4	●	●
	150408				0.8	●	●
	DNMG 150608	12.70	6.35	5.16	0.8	●	●
	150612				1.2	●	●
Roughing 	DNMG 150408PH	12.70	4.76	5.16	0.8	●	●
	150412PH				1.2	●	●
	150416PH				1.6	●	●
	DNMG 150608PH	12.70	6.35	5.16	0.8	●	●
	150612PH				1.2	●	●
	150616PH				1.6	●	●
Single Sided Roughing / High Feed 	DNMM 150408PX	12.70	4.76	5.16	0.8	●	●
	150412PX				1.2	●	●
	150416PX				1.6	●	●
	DNMM 150608PX	12.70	6.35	5.16	0.8	●	●
	150612PX				1.2	●	●
	150616PX				1.6	●	●
Low Carbon Steel Finishing 	DNMG 150404XP	12.70	4.76	5.16	0.4	●	●
	150408XP				0.8	●	●
Low Carbon Steel Medium 	DNMG 150404XQ	12.70	4.76	5.16	0.4	●	●
	150408XQ				0.8	●	●
Low Carbon Steel Roughing 	DNMG 150408XS	12.70	4.76	5.16	0.8	●	●

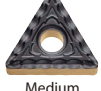
● : Standard Stock

Shape	Description	Dimensions (mm)				CA115P	CA125P
		I.C.	Thickness	Hole Diameter	Corner R (RE)		
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	12.70	4.76	5.16	0.4	●	●
	120408PQ				0.8	●	●
	120412PQ				1.2	●	●
Finishing-Medium	 SNMG 120404HQ	12.70	4.76	5.16	0.4	●	●
	120408HQ				0.8	●	●
	120412HQ				1.2	●	●
Medium-Roughing	 SNMG 120408PMG	12.70	4.76	5.16	0.8	●	●
	120412PMG				1.2	●	●
	120416PMG				1.6	●	●
Medium-Roughing (Interruption)	 SNMG 120408PG	12.70	4.76	5.16	0.8	●	●
	120412PG				1.2	●	●
	120416PG				1.6	●	●
Roughing	 SNMG 090304	9.525	3.18	3.81	0.4	●	●
	090308				0.8	●	●
	 SNMG 120408	12.70	4.76	5.16	0.8	●	●
	120412				1.2	●	●
Roughing	 SNMG 120408PH	12.70	4.76	5.16	0.8	●	●
	120412PH				1.2	●	●
	 SNMG 150612PH	15.875	6.35	6.35	1.2	●	●
	150616PH				1.6	●	●
Roughing / High Feed	 SNMM 120408PX	12.70	4.76	5.16	0.8	●	●
	120412PX				1.2	●	●
	 SNMM 150612PX	15.875	6.35	6.35	1.2	●	●
	150616PX				1.6	●	●
Single Sided	 SNMM 190612PX	19.05	6.35	7.94	1.2	●	●
	190616PX				1.6	●	●
	 SNMM 190624PX	19.05	6.35	7.94	2.4	●	●
Low Carbon Steel	 SNMG 120408XP	12.70	4.76	5.16	0.8	●	●
Low Carbon Steel	 SNMG 120408XQ	12.70	4.76	5.16	0.8	●	●
Low Carbon Steel	 SNMG 120408XS	12.70	4.76	5.16	0.8	●	●

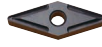
● : Standard Stock

Shape	Description	Dimensions (mm)				CA115P	CA125P
		I.C.	Thickness	Hole Diameter	Corner R (RE)		
Wiper Edge	 TNMX 160404WF	9.525	4.76	3.81	0.4	●	●
	160408WF				0.8	●	●
	160412WF				1.2	●	●
Finishing	 TNMG 160402PP	9.525	4.76	3.81	0.2	●	●
	160404PP				0.4	●	●
	160408PP				0.8	●	●
Finishing	 TNMG 160412PP	9.525	4.76	3.81	1.2	●	●
Finishing	 TNMG 160402GP	9.525	4.76	3.81	0.2	●	●
	160404GP				0.4	●	●
	160408GP				0.8	●	●
Finishing-Medium	 TNMG 160404PQ	9.525	4.76	3.81	0.4	●	●
	160408PQ				0.8	●	●
	160412PQ				1.2	●	●
Finishing-Medium	 TNMG 110404HQ	6.35	4.76	2.26	0.4	●	●
	110408HQ				0.8	●	●
	 TNMG 160404HQ	9.525	4.76	3.81	0.4	●	●
	160408HQ				0.8	●	●
Finishing-Medium / Up Facing	 TNMG 160412HQ	9.525	4.76	3.81	1.2	●	●
	 TNMG 160404CQ	9.525	4.76	3.81	0.4	●	●
	160408CQ				0.8	●	●
Finishing-Medium / Up Facing	 TNMG 160412CQ	9.525	4.76	3.81	1.2	●	●
	 TNMG 220408CQ	12.70	4.76	5.16	0.8	●	●
	220412CQ				1.2	●	●
Medium-Roughing	 TNMG 160404PMG	9.525	4.76	3.81	0.4	●	●
	160408PMG				0.8	●	●
	 TNMG 160412PMG	9.525	4.76	3.81	1.2	●	●
Medium-Roughing	 TNMG 220404PMG	12.70	4.76	5.16	0.4	●	●
	220408PMG				0.8	●	●
	 TNMG 220412PMG	12.70	4.76	5.16	1.2	●	●
	220416PMG				1.6	●	●
Medium-Roughing (Continuous)	 TNMG 110404GS	6.35	4.76	2.26	0.4	●	●
	110408GS				0.8	●	●
Medium-Roughing (Interruption)	 TNMG 160404PG	9.525	4.76	3.81	0.4	●	●
	160408PG				0.8	●	●
	160412PG				1.2	●	●
Roughing	TNMG 160404	9.525	4.76	3.81	0.4	●	●
	160408				0.8	●	●
	TNMG 160412	12.70	4.76	5.16	1.2	●	●
	220408				0.8	●	●
Roughing	TNMG 220412	12.70	4.76	5.16	1.2	●	●

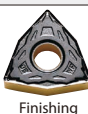
● : Standard Stock

Shape Handed insert shows Right-hand	Description	Dimensions (mm)				CA115P	CA125P
		I.C.	Thickness	Hole Diameter	Corner R (RE)		
Roughing	 TNMG 160408PH	9.525	4.76	3.81	0.8	●	●
	160412PH				1.2	●	●
	TNMG 220408PH	12.70	4.76	5.16	0.8	●	●
	220412PH				1.2	●	●
	220416PH				1.6	●	●
Single Sided Roughing / High-Feed	 TNMM 160408PX	9.525	4.76	3.81	0.8	●	●
	160412PX				1.2	●	●
	TNMM 220408PX	12.70	4.76	5.16	0.8	●	●
	220412PX				1.2	●	●
	220416PX				1.6	●	●
Low Carbon Steel Finishing	 TNMG 160404XP	9.525	4.76	3.81	0.4	●	●
	160408XP				0.8	●	●
Low Carbon Steel Medium	 TNMG 160404XQ	9.525	4.76	3.81	0.4	●	●
	160408XQ				0.8	●	●
Low Carbon Steel Roughing	 TNMG 160408XS	9.525	4.76	3.81	0.8	●	●
Medium-Roughing	 TNMG 160404 R/L-ST	9.525	4.76	3.81	0.4	●	●
	160408 R/L-ST				0.8	●	●

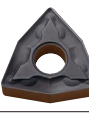
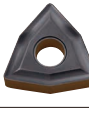
● : Standard Stock

Shape Handed insert shows Right-hand	Description	Dimensions (mm)				CA115P	CA125P
		I.C.	Thickness	Hole Diameter	Corner R (RE)		
Finishing	 VNMG 160402PP	9.525	4.76	3.81	0.2	●	●
	160404PP				0.4	●	●
	160408PP				0.8	●	●
	160412PP				1.2	●	●
Finishing	 VNMG 160402GP	9.525	4.76	3.81	0.2	●	●
	160404GP				0.4	●	●
	160408GP				0.8	●	●
Finishing-Medium	 VNMG 160404 R/L-VC	9.525	4.76	3.81	0.4	●	●
	160408 R/L-VC				0.8	●	●
	160412 R/L-VC				1.2	●	●
Finishing-Medium	 VNMG 160404VF	9.525	4.76	3.81	0.4	●	●
	160408VF				0.8	●	●
	160412VF				1.2	●	●
Finishing-Medium	 VNMG 160404PQ	9.525	4.76	3.81	0.4	●	●
	160408PQ				0.8	●	●
	160412PQ				1.2	●	●
Finishing-Medium	 VNMG 160404HQ	9.525	4.76	3.81	0.4	●	●
	160408HQ				0.8	●	●
	160412HQ				1.2	●	●
Roughing	 VNMG 160404	9.525	4.76	3.81	0.4	●	●
	160408				0.8	●	●

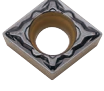
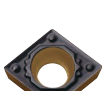
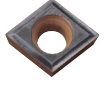
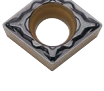
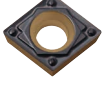
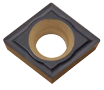
● : Standard Stock

Shape		Description	Dimensions (mm)				CA115P	CA125P
			I.C.	Thickness	Hole Diameter	Corner R (RE)		
Wiper Edge 	Finishing	WNMG 080404WF	12.70	4.76	5.16	0.4	●	●
		080408WF				0.8	●	●
Wiper Edge 	Finishing	WNMG 080404WP	12.70	4.76	5.16	0.4	●	●
		080408WP				0.8	●	●
Wiper Edge 	Finishing-Medium	WNMG 080404WE	12.70	4.76	5.16	0.4	●	●
		080408WE				0.8	●	●
		080412WE				1.2	●	●
Wiper Edge 	Finishing-Medium	WNMG 080404WQ	12.70	4.76	5.16	0.4	●	●
		080408WQ				0.8	●	●
		080412WQ				1.2	●	●
Finishing 		WNMG 080402PP	12.70	4.76	5.16	0.2	●	●
		080404PP				0.4	●	●
		080408PP				0.8	●	●
		080412PP				1.2	●	●
Finishing-Medium 		WNMG 080404PQ	12.70	4.76	5.16	0.4	●	●
		080408PQ				0.8	●	●
		080412PQ				1.2	●	●
Finishing-Medium 		WNMG 06T304HQ	9.525	3.97	3.81	0.4	●	●
		06T308HQ				0.8	●	●
		WNMG 060404HQ	9.525	4.76	3.81	0.4	●	●
		060408HQ				0.8	●	●
		WNMG 080404HQ	12.70	4.76	5.16	0.4	●	●
		080408HQ				0.8	●	●
		080412HQ				1.2	●	●
Finishing-Medium / Up Facing 		WNMG 080404CQ	12.70	4.76	5.16	0.4	●	●
		080408CQ				0.8	●	●
		080412CQ				1.2	●	●
Finishing-Medium / Up Facing 		WNMG 080408CJ	12.70	4.76	5.16	0.8	●	●
		080412CJ				1.2	●	●

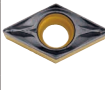
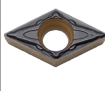
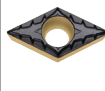
● : Standard Stock

Shape		Description	Dimensions (mm)				CA115P	CA125P
			I.C.	Thickness	Hole Diameter	Corner R (RE)		
Medium-Roughing 		WNMG 080404PMG	12.70	4.76	5.16	0.4	●	●
		080408PMG				0.8	●	●
		080412PMG				1.2	●	●
		080416PMG				1.6	●	●
Medium-Roughing (Continuous) 		WNMG 060404GS	9.525	4.76	3.81	0.4	●	●
		060408GS				0.8	●	●
Medium-Roughing (Interruption) 		WNMG 080404PG	12.70	4.76	5.16	0.4	●	●
		080408PG				0.8	●	●
		080412PG				1.2	●	●
		080416PG				1.6	●	●
Roughing 		WNMG 080404	12.70	4.76	5.16	0.4	●	●
		080408				0.8	●	●
		080412				1.2	●	●
Roughing 		WNMG 080408PH	12.70	4.76	5.16	0.8	●	●
		080412PH				1.2	●	●
Low Carbon Steel 	Finishing	WNMG 080404XP	12.70	4.76	5.16	0.4	●	●
		080408XP				0.8	●	●
Low Carbon Steel 	Medium	WNMG 080404XQ	12.70	4.76	5.16	0.4	●	●
		080408XQ				0.8	●	●
Low Carbon Steel 	Roughing	WNMG 080408XS	12.70	4.76	5.16	0.8	●	●

● : Standard Stock

Shape	Description	Dimensions (mm)				Relief Angle	CA115P	CA125P
		I.C.	Thickness	Hole Diameter	Corner R (RE)			
Wiper Edge  Finishing	CCMT 060202WP	6.35	2.38	2.8	0.2	7°	●	●
	060204WP				0.4		●	●
	060208WP				0.8		●	●
	CCMT 09T302WP	9.525	3.97	4.4	0.2	7°	●	●
	09T304WP				0.4		●	●
	09T308WP				0.8		●	●
Finishing 	CCMT 060202PP	6.35	2.38	2.8	0.2	7°	●	●
	060204PP				0.4		●	●
	CCMT 09T302PP	9.525	3.97	4.4	0.2	7°	●	●
	09T304PP				0.4		●	●
	09T308PP				0.8		●	●
Finishing-Medium 	CCMT 060202GK	6.35	2.38	2.8	0.2	7°	●	●
	060204GK				0.4		●	●
	CCMT 09T302GK	9.525	3.97	4.4	0.2	7°	●	●
	09T304GK				0.4		●	●
	CCMT 120404GK	12.70	4.76	5.5	0.4	7°	●	●
	120408GK				0.8		●	●
	120412GK				1.2		●	●
Finishing-Medium 	CCMT 060202HQ	6.35	2.38	2.8	0.2	7°	●	●
	060204HQ				0.4		●	●
	CCMT 09T302HQ	9.525	3.97	4.4	0.2	7°	●	●
	09T304HQ				0.4		●	●
	09T308HQ				0.8		●	●
Medium 	CCMT 09T308	9.525	3.97	4.4	0.8	7°	●	●
Finishing 	CPMT 080202PP	7.94	2.38	3.3	0.2	11°	●	●
	080204PP				0.4		●	●
	CPMT 090302PP	9.525	3.18	4.4	0.2	11°	●	●
	090304PP				0.4		●	●
	090308PP				0.8		●	●
Finishing 	CPMT 080204GP	7.94	2.38	3.3	0.4	11°	●	●
	CPMT 090304GP				0.4		●	●
	090308GP				0.8		●	●
Finishing-Medium 	CPMH 080204HQ	7.94	2.38	3.5	0.4	11°	●	●
	080208HQ				0.8		●	●
	CPMH 090304HQ	9.525	3.18	4.5	0.4	11°	●	●
	090308HQ				0.8		●	●
Medium 	CPMH 080204	7.94	2.38	3.5	0.4	11°	●	●
	080208				0.8		●	●
	CPMH 090304	9.525	3.18	4.5	0.4	11°	●	●
	090308				0.8		●	●
Low Carbon Steel Finishing 	CPMT 080204XP	7.94	2.38	3.3	0.4	11°	●	●
	CPMT 090304XP				0.4		●	●
	090308XP				0.8		●	●
Low Carbon Steel Finishing-Medium 	CPMT 090304XQ	9.525	3.18	4.4	0.4	11°	●	●
	090308XQ				0.8		●	●

● : Standard Stock

Shape	Description	Dimensions (mm)				Relief Angle	CA115P	CA125P
		I.C.	Thickness	Hole Diameter	Corner R (RE)			
Wiper Edge  Finishing	DCMX 070202WP	6.35	2.38	2.8	0.2	7°	●	●
	070204WP				0.4		●	●
	070208WP				0.8		●	●
	DCMX 11T302WP	9.525	3.97	4.4	0.2	7°	●	●
	11T304WP				0.4		●	●
	11T308WP				0.8		●	●
Finishing 	DCMT 070202PP	6.35	2.38	2.8	0.2	7°	●	●
	070204PP				0.4		●	●
	DCMT 11T302PP	9.525	3.97	4.4	0.2	7°	●	●
	11T304PP				0.4		●	●
	11T308PP				0.8		●	●
Finishing 	DCMT 070202GP	6.35	2.38	2.8	0.2	7°	●	●
	070204GP				0.4		●	●
	DCMT 11T304GP	9.525	3.97	4.4	0.4	7°	●	●
	11T308GP				0.8		●	●
Finishing-Medium 	DCMT 070202GK	6.35	2.38	2.8	0.2	7°	●	●
	070204GK				0.4		●	●
	070208GK				0.8		●	●
Finishing-Medium 	DCMT 11T302GK	9.525	3.97	4.4	0.2	7°	●	●
	11T304GK				0.4		●	●
	11T308GK				0.8		●	●
Finishing-Medium 	DCMT 070202HQ	6.35	2.38	2.8	0.2	7°	●	●
	070204HQ				0.4		●	●
	070208HQ				0.8		●	●
Low Carbon Steel Finishing 	DCMT 11T302HQ	9.525	3.97	4.4	0.2	7°	●	●
	11T304HQ				0.4		●	●
	11T308HQ				0.8		●	●
Low Carbon Steel Finishing-Medium 	DCMT 070204XP	6.35	2.38	2.8	0.4	7°	●	●
	DCMT 11T302XP				0.2		●	●
	11T304XP				0.4		●	●
	11T308XP				0.8		●	●
Low Carbon Steel Finishing-Medium 	DCMT 11T304XQ	9.525	3.97	4.4	0.4	7°	●	●
	11T308XQ				0.8		●	●

● : Standard Stock

Shape	Description	Dimensions (mm)				Relief Angle	CA115P	CA125P
		I.C.	Thickness	Hole Diameter	Corner R (RE)			
Medium	 RCMX 1003M0	10.0	3.18	3.6	—	7°	●	●
	RCMX 1204M0	12.0	4.76	4.2	—		●	●
Finishing-Medium	 SCMT 09T304HQ	9.525	3.97	4.4	0.4	7°	●	●
	09T308HQ				0.8		●	●
Medium	 SPMR 090304	9.525	3.18	—	0.4	11°	●	●
	090308				0.8		●	●
	SPMR 120304	12.7	3.18	—	0.4	11°	●	●
	120308				0.8		●	●
Finishing	 TBMT 060102DP	3.97	1.59	2.3	0.2	5°	●	●
	060104DP				0.4		●	●
Wiper Edge	 TCMX 090204WP	5.56	2.38	2.5	0.4	7°	●	●
	Finishing							
Finishing-Medium	 TCMT 110204HQ	6.35	2.38	2.8	0.4	7°	●	●
	110208HQ				0.8		●	●
Wiper Edge	 TPMX 090202WP	5.56	2.38	2.8	0.2	11°	●	●
	090204WP				0.4		●	●
	090208WP				0.8		●	●
	 TPMX 110302WP	6.35	3.18	3.3	0.2	11°	●	●
	110304WP				0.4		●	●
	110308WP				0.8		●	●
Finishing	 TPMT 090202PP	5.56	2.38	2.8	0.2	11°	●	●
	090204PP				0.4		●	●
	 TPMT 110302PP	6.35	3.18	3.3	0.2	11°	●	●
	110304PP				0.4		●	●
Finishing	 TPMT 110308PP	6.35	3.18	3.3	0.8	11°	●	●
							●	●
	 TPMT 090204GP	5.56	2.38	2.8	0.4	11°	●	●
	TPMT 110304GP	6.35	3.18	3.3	0.4	11°	●	●
	110308GP				0.8		●	●
	TPMT 160304GP	9.525	3.18	4.4	0.4	11°	●	●

● : Standard Stock

Shape	Description	Dimensions (mm)				Relief Angle	CA115P	CA125P
		I.C.	Thickness	Hole Diameter	Corner R (RE)			
Finishing-Medium	 TPMT 090202HQ	5.56	2.38	2.8	0.2	11°	●	●
	090204HQ				0.4		●	●
	 TPMT 110302HQ	6.35	3.18	3.3	0.2	11°	●	●
	110304HQ				0.4		●	●
	110308HQ				0.8		●	●
	 TPMT 160304HQ	9.525	3.18	4.4	0.4	11°	●	●
	160308HQ				0.8		●	●
Low Carbon Steel	 TPMT 090204XP	5.56	2.38	2.8	0.4	11°	●	●
	TPMT 110304XP	6.35	3.18	3.3	0.4	11°	●	●
	110308XP				0.8		●	●
	 TPMT 160304XP	9.525	3.18	4.4	0.4	11°	●	●
	160308XP				0.8		●	●
Low Carbon Steel	 TPMT 110304XQ	6.35	3.18	3.3	0.4	11°	●	●
	110308XQ				0.8		●	●
	 TPMT 160304XQ	9.525	3.18	4.4	0.4	11°	●	●
	160308XQ				0.8		●	●
Finishing	 TPMR 160304GP	9.525	3.18	—	0.4	11°	●	●
Finishing-Medium	 TPMR 110304HQ	6.35	3.18	—	0.4	11°	●	●
	110308HQ				0.8		●	●
	 TPMR 160304HQ	9.525	3.18	—	0.4	11°	●	●
	160308HQ				0.8		●	●
Medium	 TPMR 110304	6.35	3.18	—	0.4	11°	●	●
	110308				0.8		●	●
	 TPMR 160304	9.525	3.18	—	0.4	11°	●	●
	160308				0.8		●	●

● : Standard Stock

Shape	Description	Dimensions (mm)				Relief Angle	CA115P	CA125P
		I.C.	Thickness	Hole Diameter	Corner R (RE)			
Finishing	VBMT 110302PP	6.35	3.18	2.8	0.2	5°	●	●
	110304PP				0.4		●	●
	110308PP				0.8		●	●
	VBMT 160404PP	9.525	4.76	4.4	0.4	5°	●	●
	160408PP				0.8		●	●
	160412PP				1.2		●	●
Finishing	VBMT 110304GP	6.35	3.18	2.8	0.4	5°	●	●
	VBMT 160404GP	9.525	4.76	4.4	0.4	5°	●	●
	160408GP				0.8		●	●
Finishing	VBMT 110302VF	6.35	3.18	2.8	0.2	5°	●	●
	110304VF				0.4		●	●
	110308VF				0.8		●	●
	VBMT 160402VF	9.525	4.76	4.4	0.2	5°	●	●
	160404VF				0.4		●	●
	160408VF				0.8		●	●
	160412VF				1.2		●	●
	VBMT 110304HQ	6.35	3.18	2.8	0.4	5°	●	●
	110308HQ				0.8		●	●
Finishing-Medium	VBMT 160404HQ	9.525	4.76	4.4	0.4	5°	●	●
	160408HQ				0.8		●	●
	160412HQ				1.2		●	●
							●	●

● : Standard Stock

Shape	Description	Dimensions (mm)				Relief Angle	CA115P	CA125P
		I.C.	Thickness	Hole Diameter	Corner R (RE)			
Finishing	VCMT 080202PP	4.76	2.38	2.3	0.2	7°	●	●
	080204PP				0.4		●	●
Finishing	VCMT 160404PP	9.525	4.76	4.4	0.4	7°	●	●
	160408PP				0.8		●	●
Finishing	VCMT 080202VF	4.76	2.38	2.3	0.2	7°	●	●
	080204VF				0.4		●	●
Finishing-Medium	VCMT 080202HQ	4.76	2.38	2.3	0.2	7°	●	●
	080204HQ				0.4		●	●
Finishing	WBMT 060102L-DP	3.97	1.59	2.3	0.2	5°	L	L
	060104L-DP				0.4		L	L
	WBMT 080202L-DP	4.76	2.38	2.3	0.2	5°	L	L
	080204L-DP				0.4		L	L
Finishing	WPMT 110204GP	6.35	2.38	2.8	0.4	11°	●	●
	WPMT 160304GP	9.525	3.18	4.4	0.4	11°	●	●
Finishing-Medium	WPMT 110202HQ	6.35	2.38	2.8	0.2	11°	●	●
	110204HQ				0.4		●	●
	WPMT 160304HQ	9.525	3.18	4.4	0.4	11°	●	●
	160308HQ				0.8		●	●

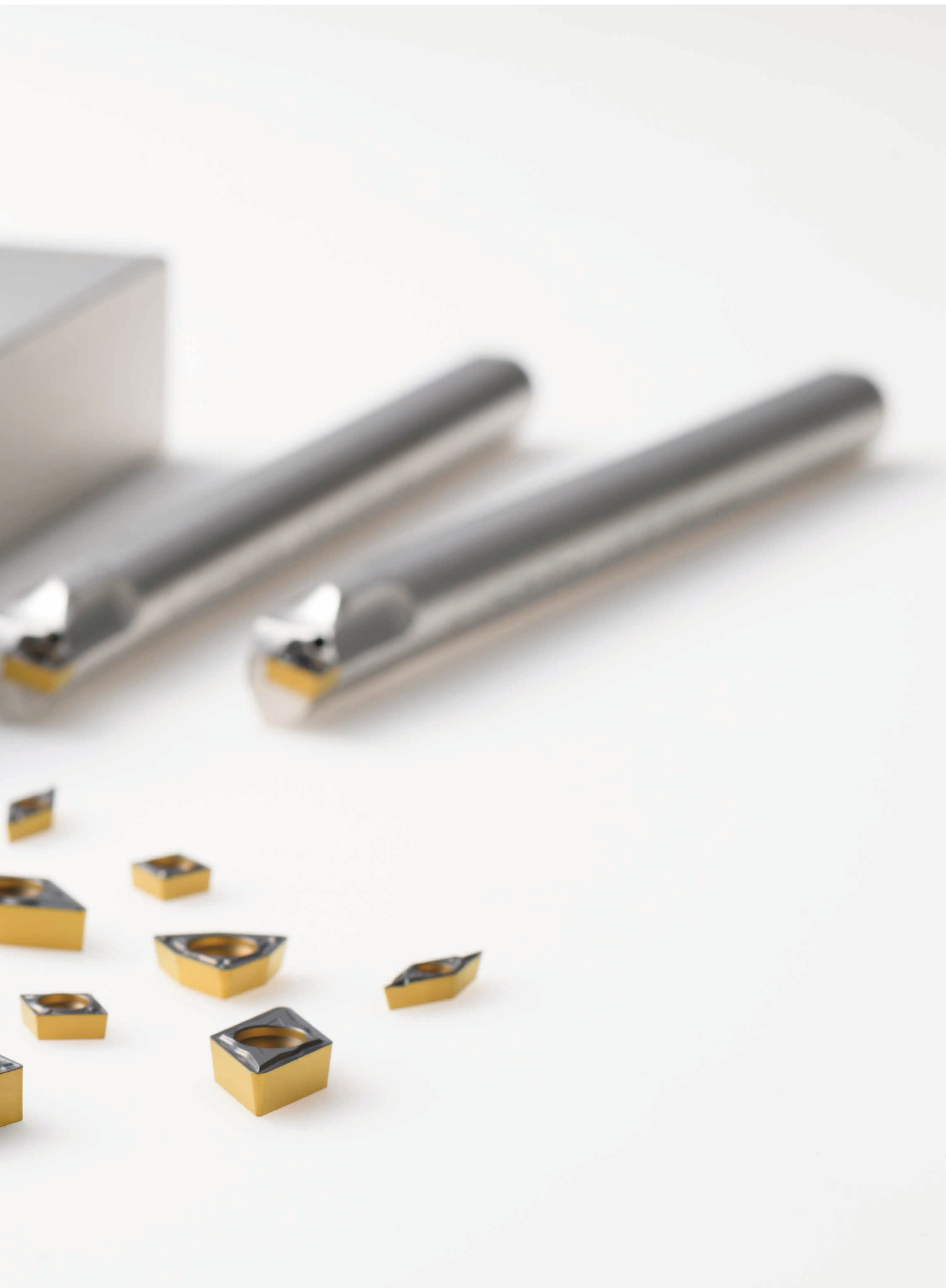
● : Standard Stock
L : Left-hand Only

Recommended Cutting Conditions

Vc (m/min)

		Low Carbon Steel Low Carbon Alloy Steel	Medium Carbon Steel Medium Carbon Alloy Steel	High Carbon Alloy Steel
		150 HB or Below	250 HB or Below	300 HB or Below
CA115P	Negative	150 ~ 300 ~ 400		150 ~ 280 ~ 360
	Positive	120 ~ 240 ~ 320		110 ~ 220 ~ 290
CA125P	Negative	150 ~ 240 ~ 320		150 ~ 220 ~ 280
	Positive	120 ~ 190 ~ 260		110 ~ 170 ~ 230

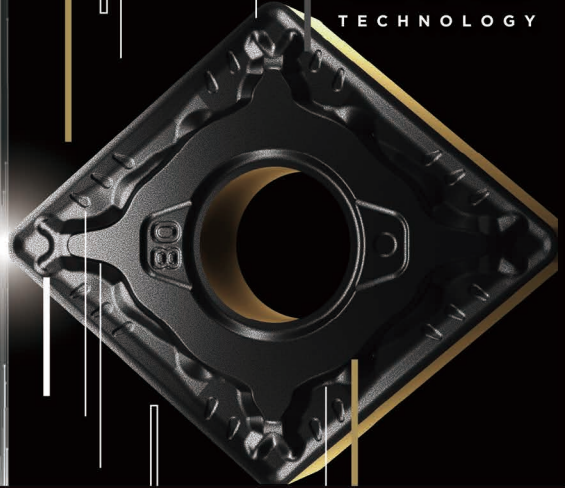




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