

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

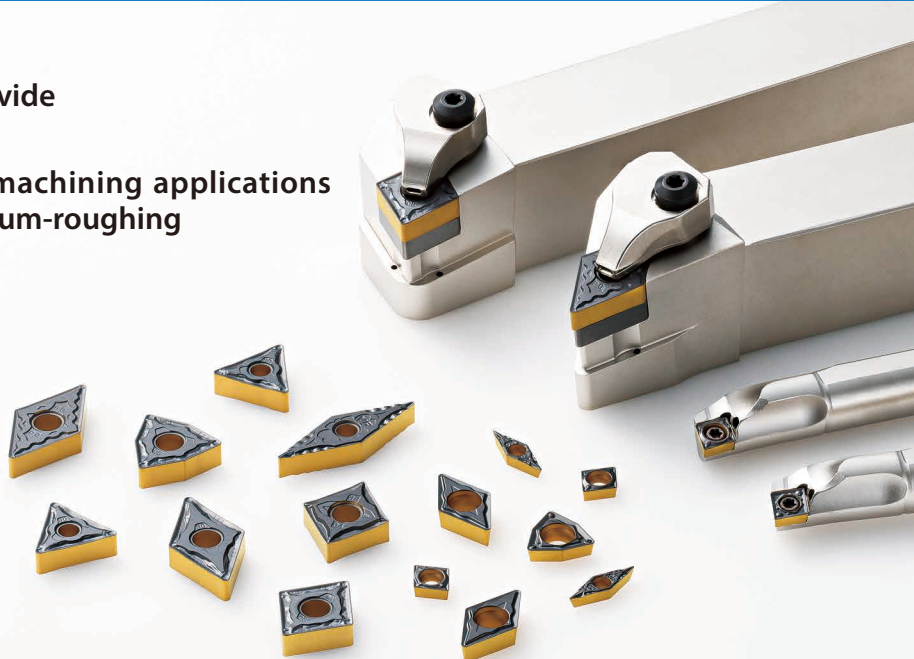
## CA115P

**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

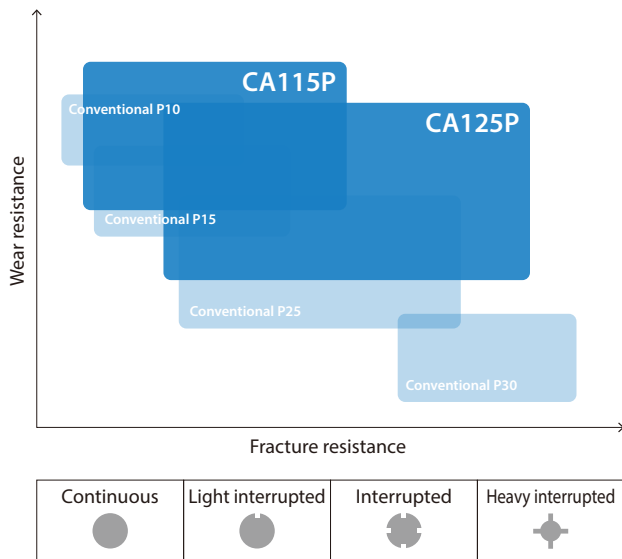
Unique design covers a wide range of machining applications  
Maintains excellent chip control



# 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 :  
Vc = 200 m/min, ap = 0.5 mm  
f = 0.3 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

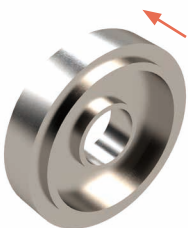
Competitor B 100 pcs/corner

Cutting Conditions :  
Vc = 210 m/min, ap = 0.5 mm  
f = 0.35 mm/rev, Wet DNMG150408PQ

(User evaluation)

### 3 Automotive parts SCM420H

Good  
Edge condition

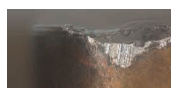


CA125P provides stable machining without chipping even after reaching the end of estimated tool life.

Edge condition



CA125P



Competitor C

Cutting Conditions :  
Vc = 160 m/min, ap = 1.0 mm  
f = 0.32 mm/rev, Wet CNMG120412PG  
Tool life : 100 pcs/corner

(User evaluation)

### 4 Automotive parts Non-tempered steel

Tool life  
1.4 times



CA125P shows 1.4 times longer tool life than competitor D.

Number of parts

CA125P 80 pcs/corner

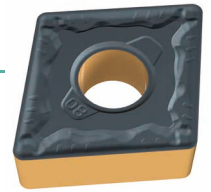
Competitor D 55 pcs/corner

Cutting Conditions :  
Vc = 160 m/min, ap = 0.2 mm  
f = 0.32 mm/rev, Wet CNMG120408PG

(User evaluation)

## Solution

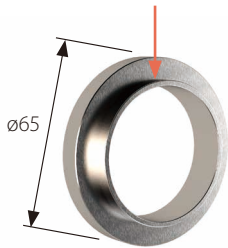
## New PMG Chipbreaker provides up to 4 times longer tool life



### 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

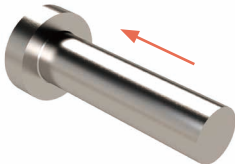
Cutting Conditions :  
Vc = 160 m/min, ap = 1.0 mm  
f = 0.37 mm/rev, Wet WNMG080408PMG

(User evaluation)

### 9 Bolt SCM440H

**Good**  
Edge condition

CA125P has better chipping resistance against competitor I.



**CA125P**



Competitor I

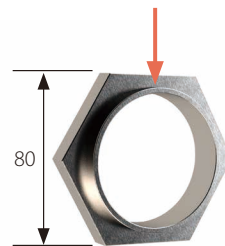
Cutting Conditions :  
Vc = 200 m/min, ap = 2.0 mm  
f = 0.3 mm/rev, Wet TNMG160408PMG  
Tool life : 130 pcs/corner

(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

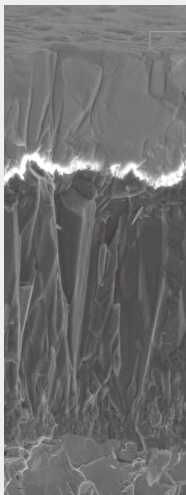
\*March 2023, by Kyocera research

## Black & Gold

### Rake face

Suppresses crater wear and fracturing

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

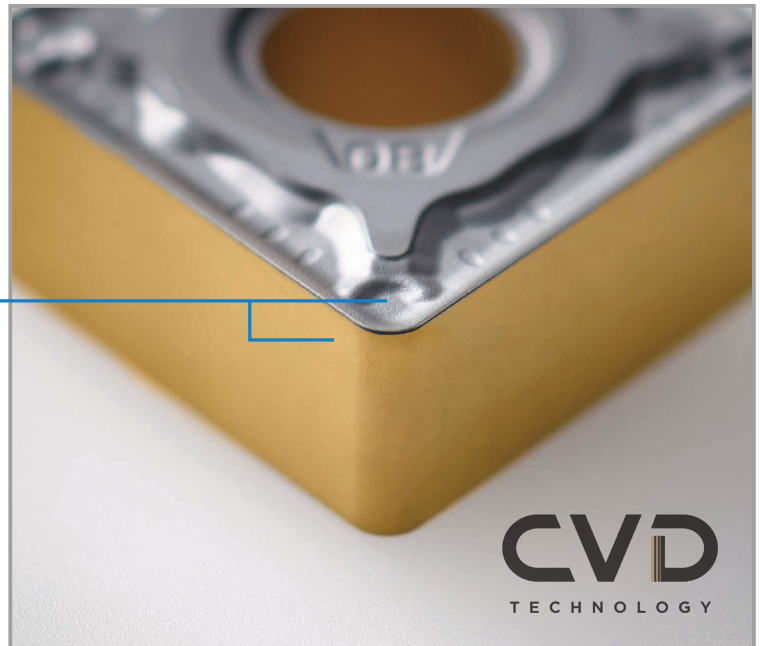


Surface treatment

Highly uniform alumina layer

Unique TiCN layer

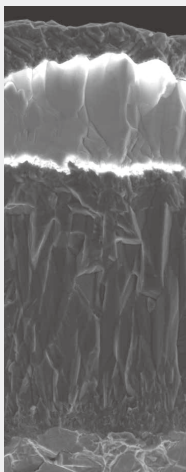
New carbide substrate



### Flank face

Improved wear resistance

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



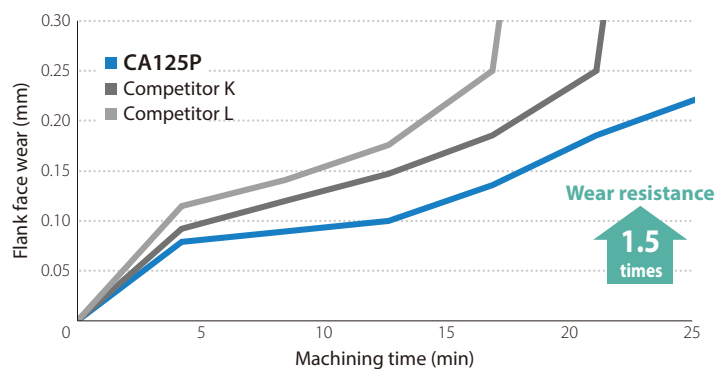
High hardness surface layer

Highly uniform alumina layer

Unique TiCN layer

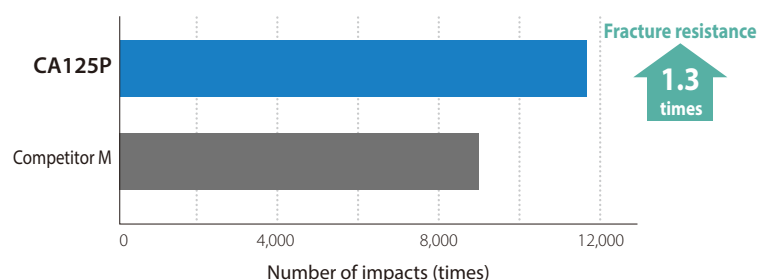
New carbide substrate

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

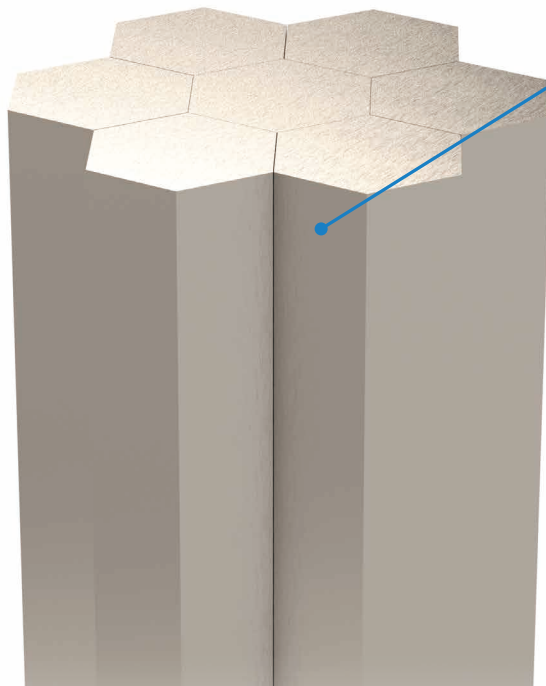
Fracture resistance comparison (Internal evaluation) Interrupted machining  $n = 3$  mean



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

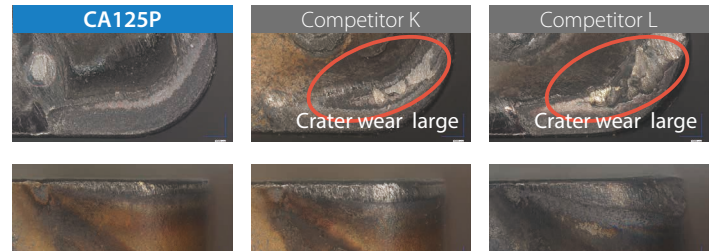
New crystal control technology provides industry-leading  $\text{Al}_2\text{O}_3$  orientation

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

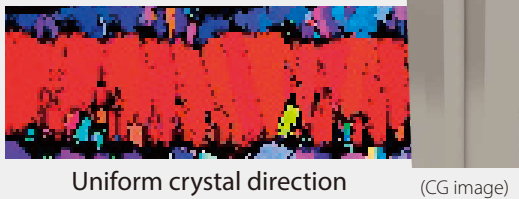


Cutting Conditions :  $V_c = 300$  m/min,  $a_p = 1.5$  mm,  $f = 0.3$  mm/rev, Wet Workpiece : SCM435

\*March 2023, by Kyocera research

Crystal orientation analysis (EBSD pattern) A higher percentage of red indicates a more uniform growth pattern

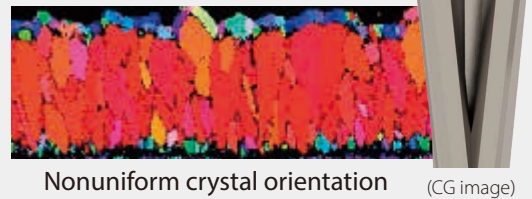
#### CA125P



Uniform crystal direction

(CG image)

#### Conventional A



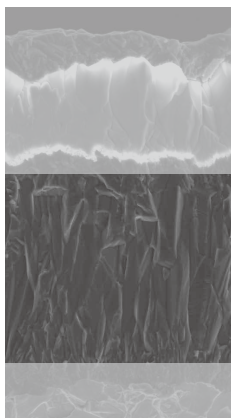
Nonuniform crystal orientation

(CG image)

### Unique TiCN layer

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

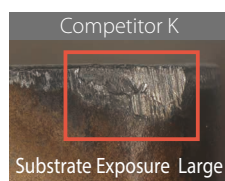
#### TiCN layer (CA125P)



#### Edge condition comparison

(Internal evaluation)

After machining 70 mm



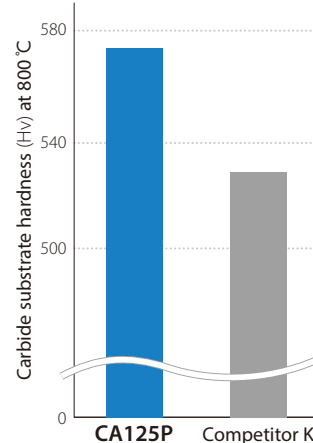
Cutting Conditions :  $V_c = 250$  m/min  
 $a_p = 1.0$  mm,  $f = 0.4$  mm/rev  
 $L = 1.0$  mm, Wet, Workpiece : SUJ2

### 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

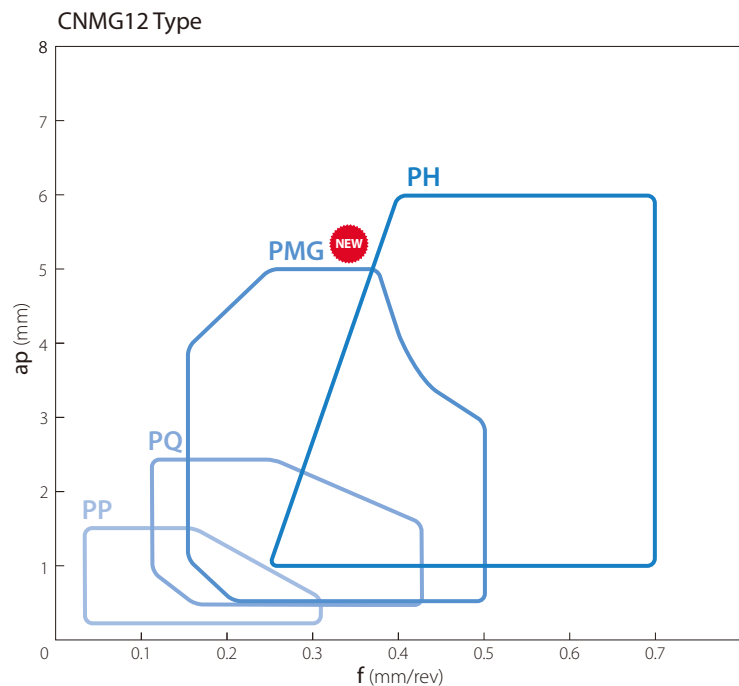


#### PH

For roughing  
Tough edge design



#### Applicable Chipbreaker Range (ap indicates radius)



### Positive Type

For finishing

#### PP

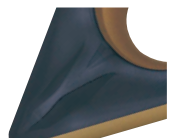
High reliability  
Improving the productivity of finishing



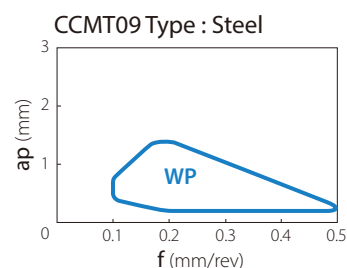
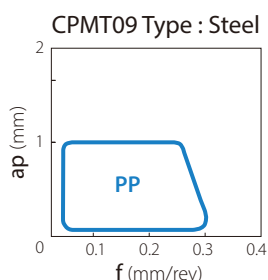
Wiper insert

#### 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

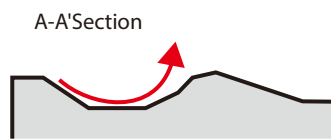
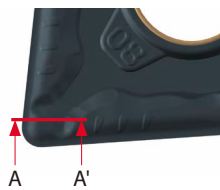
Excellent wear resistance with low cutting force design. Reduces chip shape inconsistencies and improves tool life

## Step breaker structure

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

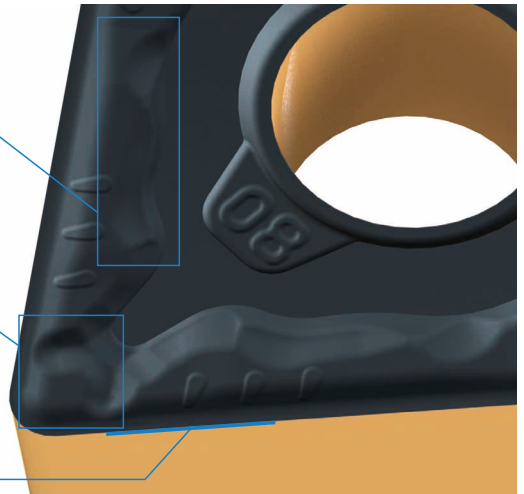
## Circle Dot

Control chips during small D.O.C. machining



## High Rake Perimeter

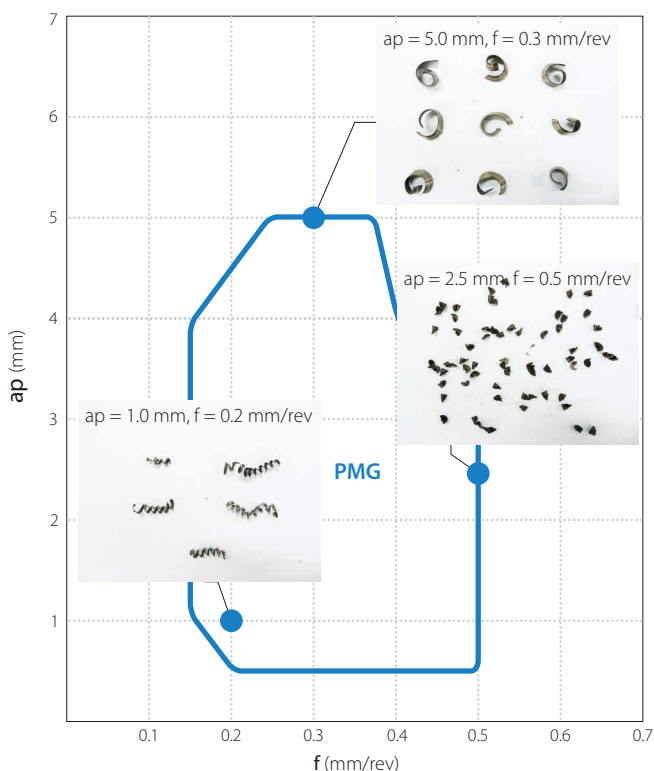
Low resistance design suppresses rake face temperature rise  
Reduces chipbreakers wear and chip shape changes



## Excellent chip control

Good chip control in a wide range of machining areas

### Applicable Chipbreaker Range



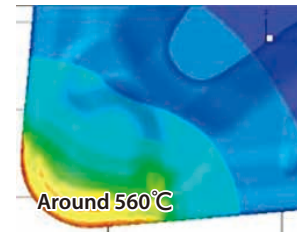
Cutting Conditions :  $V_c = 300$  m/min,  $a_p = 0.5 \sim 5.0$  mm,  $f = 0.1 \sim 0.5$  mm/rev  
Workpiece : SCr420 CNMG120408PMG

## Achieves longer tool life

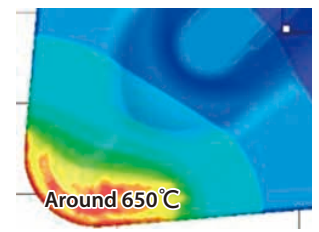
Suppresses rise in rake face temperature. Reduces crater wear

### Edge temperature simulation comparison (Internal evaluation)

#### PMG Chipbreaker



#### Conventional B



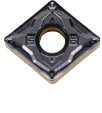
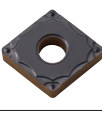
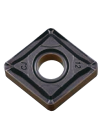
Cutting Conditions :  $V_c = 270$  m/min,  $a_p = 1.5$  mm,  $f = 0.3$  mm/rev  
Workpiece : SCM430

### Consistent, small, and even chip shapes

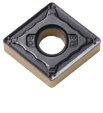
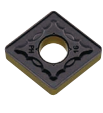
#### Chip shape

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

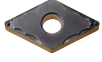
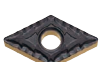
Cutting Conditions :  $V_c = 300$  m/min,  $a_p = 1.5$  mm,  $f = 0.3$  mm/rev  
Wet (External coolant) Workpiece : SCM435 WNMG080408PMG

| 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           | ●      | ●      |

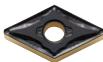
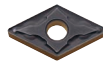
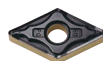
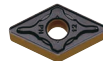
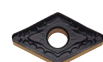
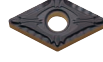
● : Standard Stock

| 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           | ●      | ●      |
|                                   |                                                                                     |               |                 |           |               |               |        |        |
|                                   |                                                                                     | CNMG 120408PH | 12.70           | 4.76      | 5.16          | 0.8           | ●      | ●      |
|                                   |                                                                                     | 120412PH      |                 |           |               | 1.2           | ●      | ●      |
|                                   |                                                                                     | 120416PH      |                 |           |               | 1.6           | ●      | ●      |
| Roughing                          |    | 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           | ●      | ●      |
|                                   |                                                                                     |               |                 |           |               |               |        |        |
|                                   |                                                                                     | CNMM 120408PX | 12.70           | 4.76      | 5.16          | 0.8           | ●      | ●      |
|                                   |                                                                                     | 120412PX      |                 |           |               | 1.2           | ●      | ●      |
|                                   |                                                                                     | 120416PX      |                 |           |               | 1.6           | ●      | ●      |
| Single Sided Roughing / High Feed |    | 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           | ●      | ●      |
|                                   |                                                                                     |               |                 |           |               |               |        |        |
|                                   |                                                                                     | CNMG 120404XP | 12.70           | 4.76      | 5.16          | 0.4           | ●      | ●      |
|                                   |                                                                                     | 120408XP      |                 |           |               | 0.8           | ●      | ●      |
| Low Carbon Steel                  |    |               |                 |           |               |               |        |        |
|                                   |                                                                                     |               |                 |           |               |               |        |        |
| 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<br><br>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<br>                      | 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<br>                     | 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<br>             | 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<br>             | 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<br> | 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<br> | 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<br>                     | 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)<br>        | DNMG 110404GS  | 9.525           | 4.76      | 3.81          | 0.4           | ●      | ●      |
|                                                                                                                          | 110408GS       |                 |           |               | 0.8           | ●      | ●      |
| Medium-Roughing (Interruption)<br>      | 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<br>                          | 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<br>                          | 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<br> | 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<br>Finishing<br>     | DNMG 150404XP  | 12.70           | 4.76      | 5.16          | 0.4           | ●      | ●      |
|                                                                                                                          | 150408XP       |                 |           |               | 0.8           | ●      | ●      |
| Low Carbon Steel<br>Medium<br>        | DNMG 150404XQ  | 12.70           | 4.76      | 5.16          | 0.4           | ●      | ●      |
|                                                                                                                          | 150408XQ       |                 |           |               | 0.8           | ●      | ●      |
| Low Carbon Steel<br>Roughing<br>      | DNMG 150408XS  | 12.70           | 4.76      | 5.16          | 0.8           | ●      | ●      |

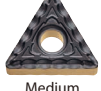
● : Standard Stock

| Shape                                                                               | Description    | Dimensions (mm) |           |               |               | CA115P | CA125P |
|-------------------------------------------------------------------------------------|----------------|-----------------|-----------|---------------|---------------|--------|--------|
|                                                                                     |                | I.C.            | Thickness | Hole Diameter | Corner R (RE) |        |        |
|    | RNMG 090300    | 9.525           | 3.18      | 3.81          | —             | ●      | ●      |
|                                                                                     | RNMG 120400    | 12.70           | 4.76      | 5.16          | —             | ●      | ●      |
|                                                                                     | RNMG 150600    | 15.875          | 6.35      | 6.35          | —             | ●      | ●      |
|    | SNMG 120404PQ  | 12.70           | 4.76      | 5.16          | 0.4           | ●      | ●      |
|                                                                                     | 120408PQ       |                 |           |               | 0.8           | ●      | ●      |
|                                                                                     | 120412PQ       |                 |           |               | 1.2           | ●      | ●      |
|    | SNMG 120404HQ  | 12.70           | 4.76      | 5.16          | 0.4           | ●      | ●      |
|                                                                                     | 120408HQ       |                 |           |               | 0.8           | ●      | ●      |
|                                                                                     | 120412HQ       |                 |           |               | 1.2           | ●      | ●      |
|    | SNMG 120408PMG | 12.70           | 4.76      | 5.16          | 0.8           | ●      | ●      |
|                                                                                     | 120412PMG      |                 |           |               | 1.2           | ●      | ●      |
|                                                                                     | 120416PMG      |                 |           |               | 1.6           | ●      | ●      |
|    | SNMG 120408PG  | 12.70           | 4.76      | 5.16          | 0.8           | ●      | ●      |
|                                                                                     | 120412PG       |                 |           |               | 1.2           | ●      | ●      |
|                                                                                     | 120416PG       |                 |           |               | 1.6           | ●      | ●      |
|   | 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           | ●      | ●      |
|  | SNMG 120408PH  | 12.70           | 4.76      | 5.16          | 0.8           | ●      | ●      |
|                                                                                     | 120412PH       |                 |           |               | 1.2           | ●      | ●      |
|                                                                                     | 120416PH       |                 |           |               | 1.6           | ●      | ●      |
|                                                                                     | SNMG 150612PH  | 15.875          | 6.35      | 6.35          | 1.2           | ●      | ●      |
|                                                                                     | 150616PH       |                 |           |               | 1.6           | ●      | ●      |
|                                                                                     | SNMG 190612PH  | 19.05           | 6.35      | 7.94          | 1.2           | ●      | ●      |
|  | SNMM 120408PX  | 12.70           | 4.76      | 5.16          | 0.8           | ●      | ●      |
|                                                                                     | 120412PX       |                 |           |               | 1.2           | ●      | ●      |
|                                                                                     | 120416PX       |                 |           |               | 1.6           | ●      | ●      |
|                                                                                     | SNMM 150612PX  | 15.875          | 6.35      | 6.35          | 1.2           | ●      | ●      |
|                                                                                     | 150616PX       |                 |           |               | 1.6           | ●      | ●      |
|                                                                                     | SNMM 190612PX  | 19.05           | 6.35      | 7.94          | 1.2           | ●      | ●      |
|                                                                                     | 190616PX       |                 |           |               | 1.6           | ●      | ●      |
|                                                                                     | 190624PX       |                 |           |               | 2.4           | ●      | ●      |
|  | SNMG 120408XP  | 12.70           | 4.76      | 5.16          | 0.8           | ●      | ●      |
|  | SNMG 120408XQ  | 12.70           | 4.76      | 5.16          | 0.8           | ●      | ●      |
|  | SNMG 120408XS  | 12.70           | 4.76      | 5.16          | 0.8           | ●      | ●      |

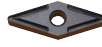
● : Standard Stock

| Shape                                                                               | Description    | Dimensions (mm) |           |               |               | CA115P | CA125P |
|-------------------------------------------------------------------------------------|----------------|-----------------|-----------|---------------|---------------|--------|--------|
|                                                                                     |                | I.C.            | Thickness | Hole Diameter | Corner R (RE) |        |        |
|    | TNMX 160404WF  | 9.525           | 4.76      | 3.81          | 0.4           | ●      | ●      |
|                                                                                     | 160408WF       |                 |           |               | 0.8           | ●      | ●      |
|                                                                                     | 160412WF       |                 |           |               | 1.2           | ●      | ●      |
|    | TNMG 160402PP  | 9.525           | 4.76      | 3.81          | 0.2           | ●      | ●      |
|                                                                                     | 160404PP       |                 |           |               | 0.4           | ●      | ●      |
|                                                                                     | 160408PP       |                 |           |               | 0.8           | ●      | ●      |
|                                                                                     | 160412PP       |                 |           |               | 1.2           | ●      | ●      |
|    | TNMG 160402GP  | 9.525           | 4.76      | 3.81          | 0.2           | ●      | ●      |
|                                                                                     | 160404GP       |                 |           |               | 0.4           | ●      | ●      |
|                                                                                     | 160408GP       |                 |           |               | 0.8           | ●      | ●      |
|    | TNMG 160404PQ  | 9.525           | 4.76      | 3.81          | 0.4           | ●      | ●      |
|                                                                                     | 160408PQ       |                 |           |               | 0.8           | ●      | ●      |
|                                                                                     | 160412PQ       |                 |           |               | 1.2           | ●      | ●      |
|    | 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           | ●      | ●      |
|  | TNMG 160404CQ  | 9.525           | 4.76      | 3.81          | 0.4           | ●      | ●      |
|                                                                                     | 160408CQ       |                 |           |               | 0.8           | ●      | ●      |
|                                                                                     | 160412CQ       |                 |           |               | 1.2           | ●      | ●      |
|  | TNMG 220408CQ  | 12.70           | 4.76      | 5.16          | 0.8           | ●      | ●      |
|                                                                                     | 220412CQ       |                 |           |               | 1.2           | ●      | ●      |
|  | TNMG 160404PMG | 9.525           | 4.76      | 3.81          | 0.4           | ●      | ●      |
|                                                                                     | 160408PMG      |                 |           |               | 0.8           | ●      | ●      |
|                                                                                     | 160412PMG      |                 |           |               | 1.2           | ●      | ●      |
|                                                                                     | TNMG 220404PMG | 12.70           | 4.76      | 5.16          | 0.4           | ●      | ●      |
|                                                                                     | 220408PMG      |                 |           |               | 0.8           | ●      | ●      |
|                                                                                     | 220412PMG      |                 |           |               | 1.2           | ●      | ●      |
|  | TNMG 110404GS  | 6.35            | 4.76      | 2.26          | 0.4           | ●      | ●      |
|                                                                                     | 110408GS       |                 |           |               | 0.8           | ●      | ●      |
|  | TNMG 160404PG  | 9.525           | 4.76      | 3.81          | 0.4           | ●      | ●      |
|                                                                                     | 160408PG       |                 |           |               | 0.8           | ●      | ●      |
|                                                                                     | 160412PG       |                 |           |               | 1.2           | ●      | ●      |
|  | TNMG 160404    | 9.525           | 4.76      | 3.81          | 0.4           | ●      | ●      |
|                                                                                     | 160408         |                 |           |               | 0.8           | ●      | ●      |
|                                                                                     | 160412         |                 |           |               | 1.2           | ●      | ●      |
|                                                                                     | TNMG 220408    | 12.70           | 4.76      | 5.16          | 0.8           | ●      | ●      |
|                                                                                     | 220412         |                 |           |               | 1.2           | ●      | ●      |

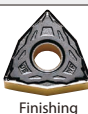
● : Standard Stock

| Shape<br>Handed insert shows<br>Right-hand | Description                                                                         | Dimensions (mm) |           |               |               | CA115P | CA125P |
|--------------------------------------------|-------------------------------------------------------------------------------------|-----------------|-----------|---------------|---------------|--------|--------|
|                                            |                                                                                     | I.C.            | Thickness | Hole Diameter | Corner R (RE) |        |        |
| Roughing                                   |    | 9.525           | 4.76      | 3.81          | 0.8           | ●      | ●      |
|                                            |                                                                                     |                 |           |               | 1.2           | ●      | ●      |
|                                            | TNMG 220408PH                                                                       | 12.70           | 4.76      | 5.16          | 0.8           | ●      | ●      |
|                                            |                                                                                     |                 |           |               | 1.2           | ●      | ●      |
|                                            |                                                                                     |                 |           |               | 1.6           | ●      | ●      |
| Single Sided<br>Roughing / High-Feed       |    | 9.525           | 4.76      | 3.81          | 0.8           | ●      | ●      |
|                                            |                                                                                     |                 |           |               | 1.2           | ●      | ●      |
|                                            | TNMM 220408PX                                                                       | 12.70           | 4.76      | 5.16          | 0.8           | ●      | ●      |
|                                            |                                                                                     |                 |           |               | 1.2           | ●      | ●      |
|                                            |                                                                                     |                 |           |               | 1.6           | ●      | ●      |
| Low Carbon Steel<br>Finishing              |    | 9.525           | 4.76      | 3.81          | 0.4           | ●      | ●      |
|                                            |                                                                                     |                 |           |               | 0.8           | ●      | ●      |
| Low Carbon Steel<br>Medium                 |    | 9.525           | 4.76      | 3.81          | 0.4           | ●      | ●      |
|                                            |                                                                                     |                 |           |               | 0.8           | ●      | ●      |
| Low Carbon Steel<br>Roughing               |   | 9.525           | 4.76      | 3.81          | 0.8           | ●      | ●      |
| Medium-Roughing                            |  | 9.525           | 4.76      | 3.81          | 0.4           | ●      | ●      |
|                                            |                                                                                     |                 |           |               | 0.8           | ●      | ●      |

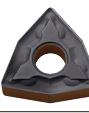
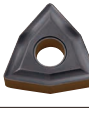
● : Standard Stock

| Shape<br>Handed insert shows<br>Right-hand | Description                                                                         | Dimensions (mm) |           |               |               | CA115P | CA125P |
|--------------------------------------------|-------------------------------------------------------------------------------------|-----------------|-----------|---------------|---------------|--------|--------|
|                                            |                                                                                     | I.C.            | Thickness | Hole Diameter | Corner R (RE) |        |        |
| Finishing                                  |    | 9.525           | 4.76      | 3.81          | 0.2           | ●      | ●      |
|                                            |                                                                                     |                 |           |               | 0.4           | ●      | ●      |
|                                            |                                                                                     |                 |           |               | 0.8           | ●      | ●      |
|                                            |                                                                                     |                 |           |               | 1.2           | ●      | ●      |
| Finishing                                  |    | 9.525           | 4.76      | 3.81          | 0.2           | ●      | ●      |
|                                            |                                                                                     |                 |           |               | 0.4           | ●      | ●      |
|                                            |                                                                                     |                 |           |               | 0.8           | ●      | ●      |
| Finishing-Medium                           |    | 9.525           | 4.76      | 3.81          | 0.4           | ●      | ●      |
|                                            |                                                                                     |                 |           |               | 0.8           | ●      | ●      |
|                                            |                                                                                     |                 |           |               | 1.2           | ●      | ●      |
| Finishing-Medium                           |    | 9.525           | 4.76      | 3.81          | 0.4           | ●      | ●      |
|                                            |                                                                                     |                 |           |               | 0.8           | ●      | ●      |
|                                            |                                                                                     |                 |           |               | 1.2           | ●      | ●      |
| Finishing-Medium                           |    | 9.525           | 4.76      | 3.81          | 0.4           | ●      | ●      |
|                                            |                                                                                     |                 |           |               | 0.8           | ●      | ●      |
|                                            |                                                                                     |                 |           |               | 1.2           | ●      | ●      |
| Finishing-Medium                           |   | 9.525           | 4.76      | 3.81          | 0.4           | ●      | ●      |
|                                            |                                                                                     |                 |           |               | 0.8           | ●      | ●      |
|                                            |                                                                                     |                 |           |               | 1.2           | ●      | ●      |
| Roughing                                   |  | 9.525           | 4.76      | 3.81          | 0.4           | ●      | ●      |
|                                            |                                                                                     |                 |           |               | 0.8           | ●      | ●      |

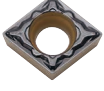
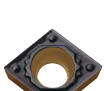
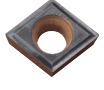
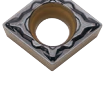
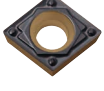
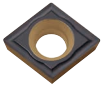
● : Standard Stock

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

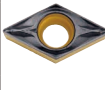
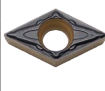
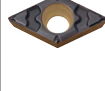
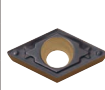
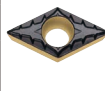
● : Standard Stock

| Shape                                                                                                               | Description                                           | Dimensions (mm) |           |               |                          | CA115P           | CA125P           |
|---------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|-----------------|-----------|---------------|--------------------------|------------------|------------------|
|                                                                                                                     |                                                       | I.C.            | Thickness | Hole Diameter | Corner R (RE)            |                  |                  |
| Medium-Roughing<br>                | WNMG 080404PMG<br>080408PMG<br>080412PMG<br>080416PMG | 12.70           | 4.76      | 5.16          | 0.4<br>0.8<br>1.2<br>1.6 | ●<br>●<br>●<br>● | ●<br>●<br>●<br>● |
| Medium-Roughing (Continuous)<br>   | WNMG 060404GS<br>060408GS                             | 9.525           | 4.76      | 3.81          | 0.4<br>0.8               | ●<br>●           | ●<br>●           |
| Medium-Roughing (Interruption)<br> | WNMG 080404PG<br>080408PG<br>080412PG<br>080416PG     | 12.70           | 4.76      | 5.16          | 0.4<br>0.8<br>1.2<br>1.6 | ●<br>●<br>●<br>● | ●<br>●<br>●<br>● |
| Roughing<br>                       | WNMG 080404<br>080408<br>080412                       | 12.70           | 4.76      | 5.16          | 0.4<br>0.8<br>1.2        | ●<br>●<br>●      | ●<br>●<br>●      |
| Roughing<br>                      | WNMG 080408PH<br>080412PH                             | 12.70           | 4.76      | 5.16          | 0.8<br>1.2               | ●<br>●           | ●<br>●           |
| Low Carbon Steel<br>             | WNMG 080404XP<br>080408XP                             | 12.70           | 4.76      | 5.16          | 0.4<br>0.8               | ●<br>●           | ●<br>●           |
| Low Carbon Steel<br>             | WNMG 080404XQ<br>080408XQ                             | 12.70           | 4.76      | 5.16          | 0.4<br>0.8               | ●<br>●           | ●<br>●           |
| Low Carbon Steel<br>             | 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<br><br>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<br>                              | 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<br>                       | 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<br>                     | 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<br>                               | CCMT 09T308   | 9.525           | 3.97      | 4.4           | 0.8           | 7°           | ●      | ●      |
| Finishing<br>                            | 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<br>                            | CPMT 080204GP | 7.94            | 2.38      | 3.3           | 0.4           | 11°          | ●      | ●      |
|                                                                                                                             | CPMT 090304GP | 9.525           | 3.18      | 4.4           | 0.4           | 11°          | ●      | ●      |
|                                                                                                                             | 090308GP      |                 |           |               | 0.8           |              | ●      | ●      |
| Finishing-Medium<br>                     | 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<br>                               | 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<br>Finishing<br>        | CPMT 080204XP | 7.94            | 2.38      | 3.3           | 0.4           | 11°          | ●      | ●      |
|                                                                                                                             | CPMT 090304XP | 9.525           | 3.18      | 4.4           | 0.4           | 11°          | ●      | ●      |
|                                                                                                                             | 090308XP      |                 |           |               | 0.8           |              | ●      | ●      |
| Low Carbon Steel<br>Finishing-Medium<br> | 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<br><br>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<br>                              | 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<br>                              | 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<br>                      | DCMT 070202GK | 6.35            | 2.38      | 2.8           | 0.2           | 7°           | ●      | ●      |
|                                                                                                                             | 070204GK      |                 |           |               | 0.4           |              | ●      | ●      |
|                                                                                                                             | 070208GK      |                 |           |               | 0.8           |              | ●      | ●      |
|                                                                                                                             | DCMT 11T302GK | 9.525           | 3.97      | 4.4           | 0.2           | 7°           | ●      | ●      |
|                                                                                                                             | 11T304GK      |                 |           |               | 0.4           |              | ●      | ●      |
|                                                                                                                             | 11T308GK      |                 |           |               | 0.8           |              | ●      | ●      |
| Finishing-Medium<br>                     | DCMT 070202HQ | 6.35            | 2.38      | 2.8           | 0.2           | 7°           | ●      | ●      |
|                                                                                                                             | 070204HQ      |                 |           |               | 0.4           |              | ●      | ●      |
|                                                                                                                             | 070208HQ      |                 |           |               | 0.8           |              | ●      | ●      |
|                                                                                                                             | DCMT 11T302HQ | 9.525           | 3.97      | 4.4           | 0.2           | 7°           | ●      | ●      |
|                                                                                                                             | 11T304HQ      |                 |           |               | 0.4           |              | ●      | ●      |
|                                                                                                                             | 11T308HQ      |                 |           |               | 0.8           |              | ●      | ●      |
| Low Carbon Steel<br>Finishing<br>        | DCMT 070204XP | 6.35            | 2.38      | 2.8           | 0.4           | 7°           | ●      | ●      |
|                                                                                                                             | DCMT 11T302XP | 9.525           | 3.97      | 4.4           | 0.2           | 7°           | ●      | ●      |
|                                                                                                                             | 11T304XP      |                 |           |               | 0.4           |              | ●      | ●      |
|                                                                                                                             | 11T308XP      |                 |           |               | 0.8           |              | ●      | ●      |
| Low Carbon Steel<br>Finishing-Medium<br> | 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           |              | ●      | ●      |
|                  | Finishing                                                                                         |                 |           |               |               |              |        |        |
| Finishing        |  TPMX 110302WP | 6.35            | 3.18      | 3.3           | 0.2           | 11°          | ●      | ●      |
|                  | 110304WP                                                                                          |                 |           |               | 0.4           |              | ●      | ●      |
|                  | 110308WP                                                                                          |                 |           |               | 0.8           |              | ●      | ●      |
|                  | Finishing                                                                                         |                 |           |               |               |              |        |        |
| 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 | 9.525           | 3.18      | 4.4           | 0.8           | 11°          | ●      | ●      |
|                  | TPMT 090204GP                                                                                     |                 |           |               | 0.4           |              | ●      | ●      |
|                  | TPMT 110304GP                                                                                     |                 |           |               | 0.4           |              | ●      | ●      |
|                  | 110308GP                                                                                          |                 |           |               | 0.8           |              | ●      | ●      |
| Finishing        |  TPMT 160304GP | 9.525           | 3.18      | 4.4           | 0.4           | 11°          | ●      | ●      |
|                  | TPMT 160304GP                                                                                     |                 |           |               | 0.4           |              | ●      | ●      |

● : 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                                                                                          | 9.525           | 3.18      | 4.4           | 0.8           | 11°          | ●      | ●      |
|                  | TPMT 160304HQ                                                                                     |                 |           |               | 0.4           |              | ●      | ●      |
| Low Carbon Steel |  TPMT 160308HQ   |                 |           |               | 0.8           |              | ●      | ●      |
|                  |  TPMT 090204XP   | 5.56            | 2.38      | 2.8           | 0.4           | 11°          | ●      | ●      |
|                  | 110304XP                                                                                          |                 |           |               | 0.4           |              | ●      | ●      |
|                  | 110308XP                                                                                          | 6.35            | 3.18      | 3.3           | 0.8           | 11°          | ●      | ●      |
|                  | TPMT 160304XP                                                                                     |                 |           |               | 0.4           |              | ●      | ●      |
|                  | 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           |              | ●      | ●      |

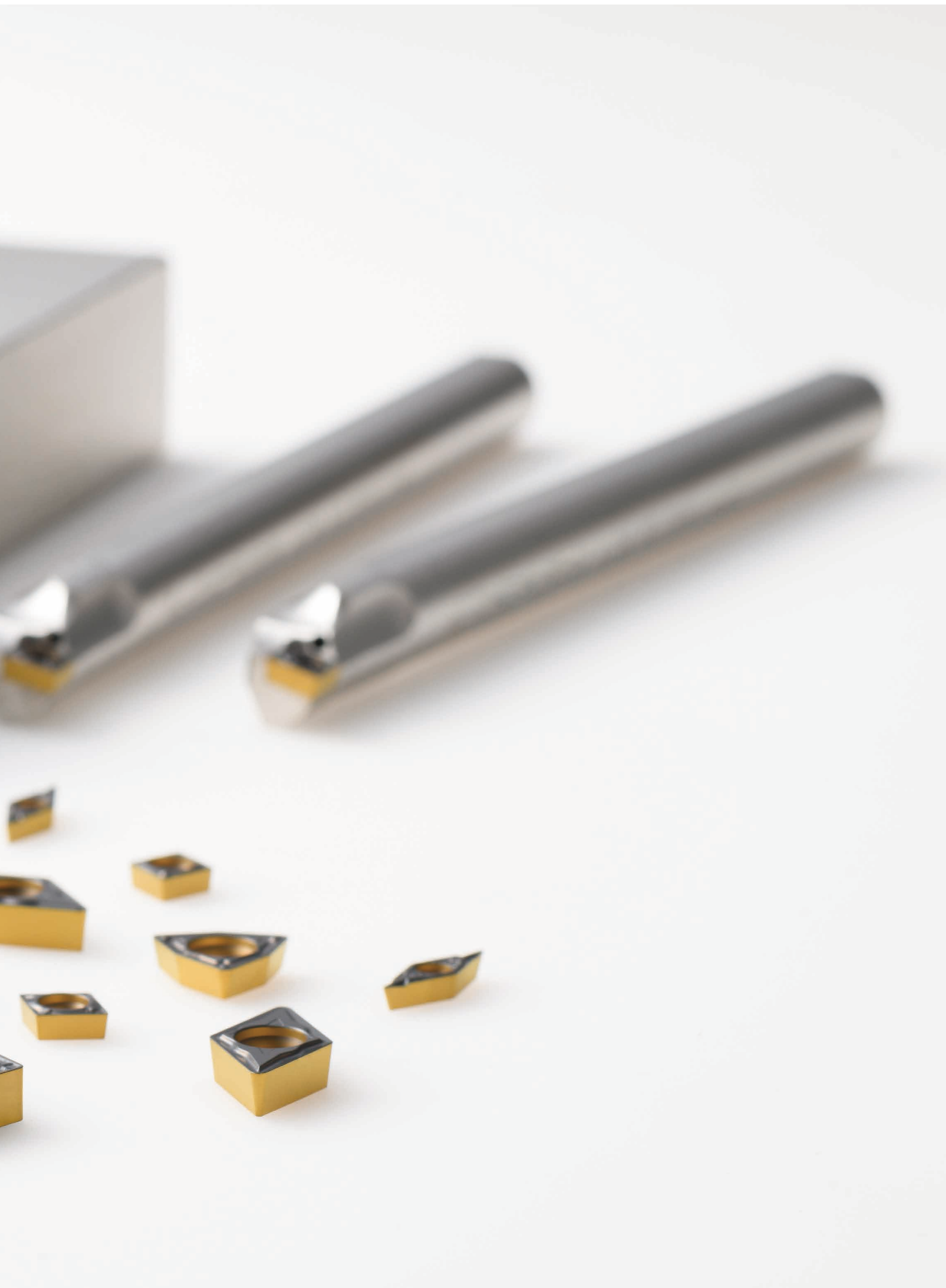
● : Standard Stock  
L : Left-hand Only

## Recommended Cutting Conditions

Vc (m/min)

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

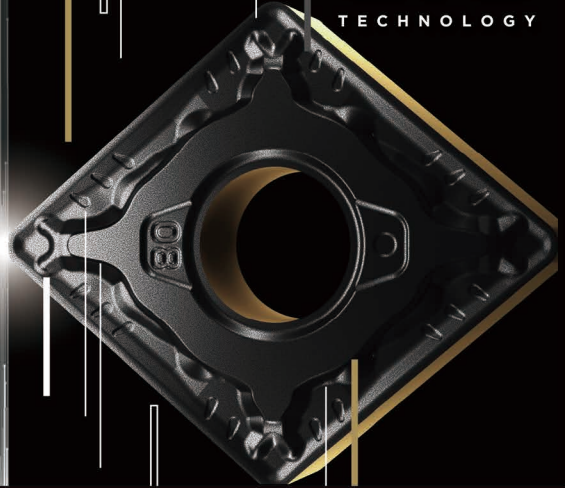




C  
V  
D

Chemical Vapor Deposition

CVD  
TECHNOLOGY



## Achieving Unprecedented Tool Life



P  
V  
D  
Physical Vapor Deposition