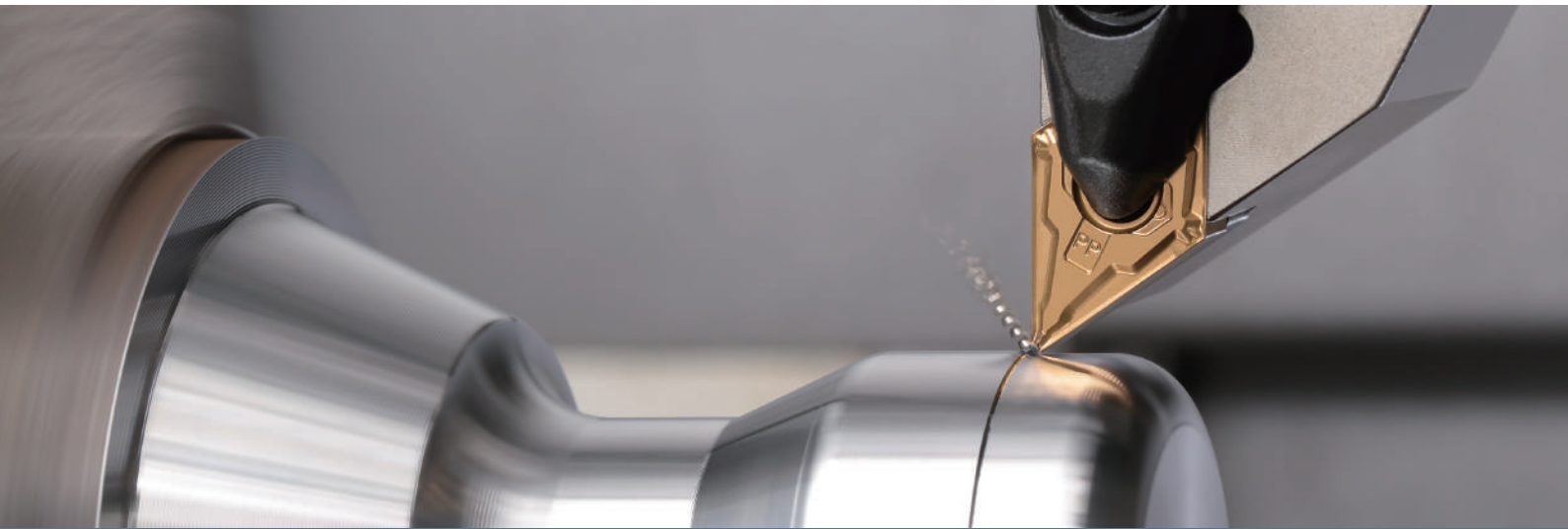


New Grade for Finishing

**CCX** 



Kyocera's New Insert Grade Technology for High-Speed Finishing and Remarkably Long Tool Life

Newly Developed Unique Cermet Base Material with Thin CVD Coating

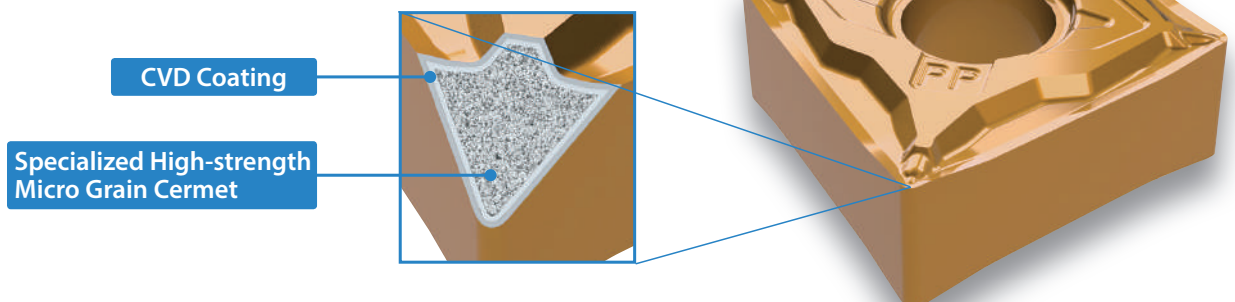
Greater Productivity with High Speed Finishing

(Recommended Cutting Conditions for Low Carbon Steel : Max. 800m/min)

Wide Range of Cutting Speeds Available from General to High Speed Machining

Excellent Wear Resistance Provides Long Tool Life for Low Carbon Steel,  
General Steel and Cast Iron Machining

Positive Inserts Added to the Lineup



New Grade for Finishing

# CCX

Kyocera's New Insert Grade Technology. Applicable to a Wide Range of Cutting Conditions from General to High Speed Machining. Maintains Long Tool Life in Soft Steel, General Steel and Cast Iron Machining

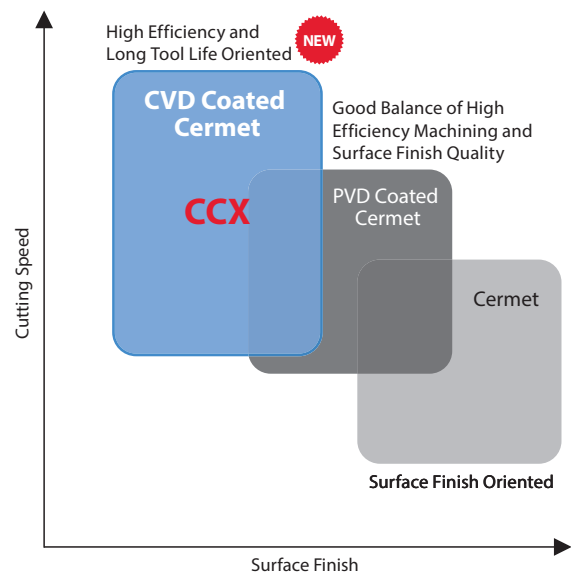
## 1 Excellent High Speed Finishing Leads to Greater Productivity

Superior wear resistance with unique cermet grade and thickened CVD coating  
Finishing available at a higher speed range

Wide range of cutting speeds from general to high speed provides long tool life in finishing applications



CVD Cermet Application Map (image)



## CCX Application Examples

Great performance in continuous to light interruption finishing applications

- Cutting with coolant is recommended
- Recommended ap is 1.0 mm or less

Long tool life in high speed machining of soft steel and general steel

Long tool life for cast iron finishing



Recommended Cutting Conditions Vc : 300-600-800 (m/min)

Recommended Cutting Conditions Vc : 200-300-400 (m/min)

Recommended Cutting Conditions Vc : 150-250-300 (m/min)

## 2 Combination of Cermet and a CVD Coating Provides High Speed Machining for Better Productivity

Newly developed unique cermet grade with thick CVD coating which is difficult to accomplish using conventional technology

High speed machining and long tool life with superior wear and chipping resistance

### Thickened CVD Coated Cermet

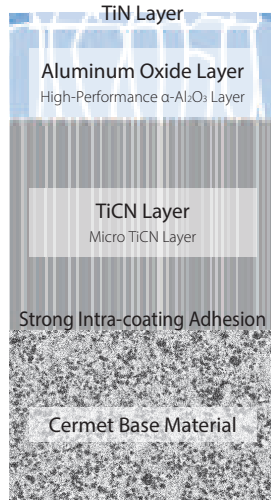
Improved wear resistance with thicker coating than PVD

Al<sub>2</sub>O<sub>3</sub> layer provides excellent crater wear resistance

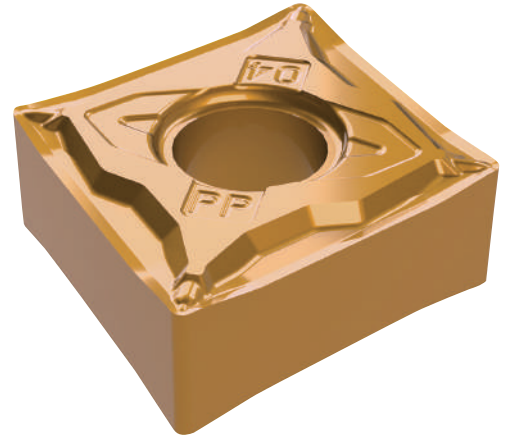
### Newly Developed Unique Cermet Grade

Specialized high-strength micro grain cermet including a high metal content binder phase

High wear and fracture resistance



CCX Image

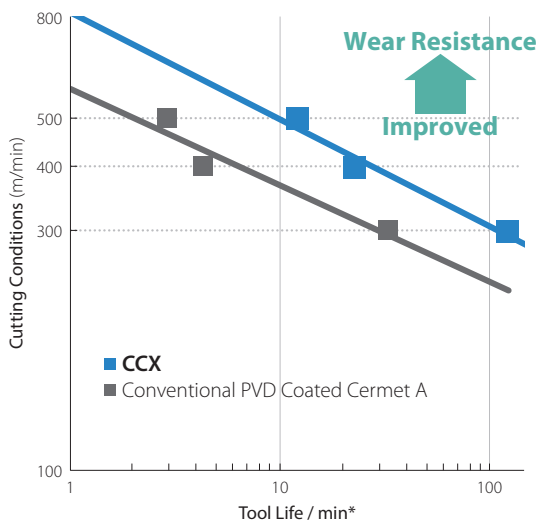


## Wear Resistance

Shows greater strength and wear resistance in a wide range of cutting speeds from general to high speed machining

V-T Diagram (Internal Evaluation)

\*Tool life (min) : Edge wear amount 0.1mm (Logarithmic chart)



Cutting Edge (Vc=500m/min : After Machining 12.4 min)

CCX



Conventional PVD Coated Cermet A



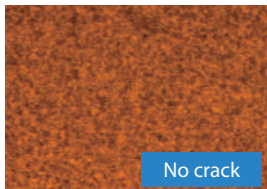
Cutting Conditions : Vc = 300 / 400 / 500 m/min, ap = 0.5 mm, f = 0.2 mm/rev, Wet CNMG120408 Type Workpiece : SCM435

## Chipping Resistance

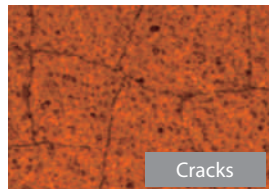
Great chipping resistance with specialized high-strength micro grain base material and the compressive residual stress of a CVD coating layer

Surface Condition after the CVD Coating (Internal Evaluation)

CCX

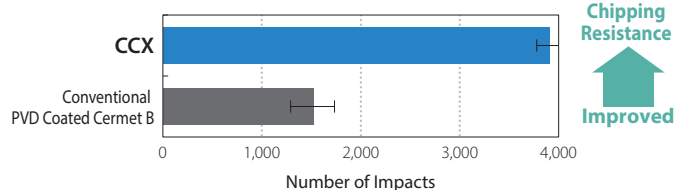


CVD Coated Carbide



Strong compressive residual stress prevents cracks from occurring

Chipping Resistance Comparison (Internal Evaluation)



Cutting Conditions : Vc = 300 m/min, ap = 0.5 mm, f = 0.3 mm/rev, n = 3, Wet CNMG120408 Type Workpiece : S45C (with 4 Slots)

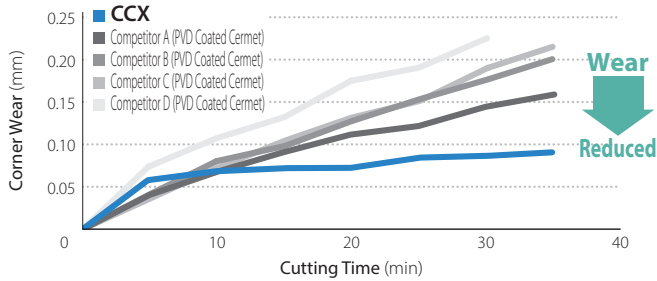
# 3

## Superior Wear Resistance to PVD Coated Cermets

**Alloy Steel (SCM435) High Speed Comparison : Vc = 400 m/min**

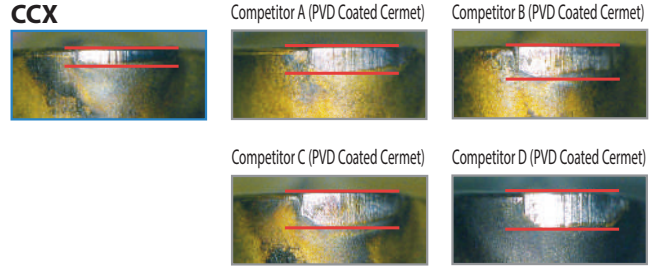
**CCX provided better tool life than competitor's CVD cermets by greatly reducing the amount of wear**

Wear Resistance Comparison (Internal Evaluation)



Cutting Conditions : Vc = 400 m/min, ap = 0.3 mm, f = 0.12 mm/rev, Wet CNMG120408 Type External Turning

Cutting Edge (After Machining 35 min)

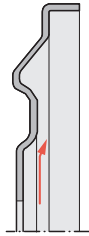


\*Picture shows 30 min after machining due to a large amount of wear.

### Case Studies

#### Cover SAPH440

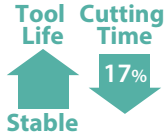
Vc = 540 m/min  
ap = 0.4 mm  
f = 0.25 mm/rev  
Wet  
TNMG160408PQ CCX



Tool Life

**CCX (CVD Coated Cermet) 210 pcs/edge (Stable)**

**Competitor E (CVD Coated Carbide) 200 pcs/edge (Unstable)**

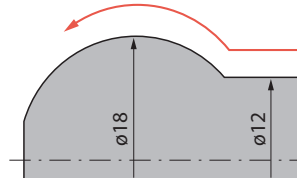


Shortened cutting time with 1.3x faster cutting speed  
Stable machining of 210 pcs per edge with improved tool life

(User evaluation)

#### Pin S48C etc.

Vc = 125~180 m/min  
ap = ~1.0 mm  
f = 0.18 mm/rev  
Wet  
VNMG160408VF CCX



Tool Life

**CCX (CVD Coated Cermet) 1,200 pcs/edge (Stable)**

**Conventional C (PVD Coated Cermet) 500 pcs/edge (Unstable)**

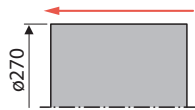


Increased the number of parts produced by 2.4 times than the conventional PVD cermet  
Stable part production

(User evaluation)

#### Cylinder S35C

Vc = 270 m/min  
ap = 0.2 mm  
f = 0.18mm/rev  
Wet  
TNMG160404PP CCX



Efficiency

**CCX (CVD Coated Cermet) Vc=270m/min**

**Competitor F (PVD Coated Cermet) Vc=160m/min**

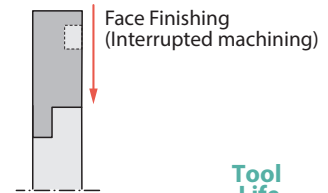


1.6x Shortened cutting time with faster cutting speed  
Longer tool life by 5.0 times than the competitor F

(User evaluation)

#### Wheel FC250

Vc = 450 m/min  
ap = 0.2 mm  
f = 0.18 mm/rev  
Wet  
WNMG080412HQ CCX



Tool Life

**CCX (CVD Coated Cermet) 270 pcs/edge**

**Competitor G (Ceramic) 110 pcs/edge**

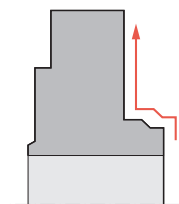


Longer tool life in cast iron machining by 2.5 times than the competitor ceramic insert G  
Ensures lower tooling cost

(User evaluation)

#### Hubs S45C

Vc = 290 m/min  
ap = 0.15 mm  
f = 0.27 mm/rev  
Wet  
VNMG160404PQ CCX

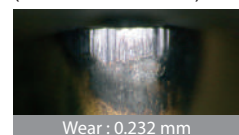


Cutting Edge (After Machining 320 pcs)

**CCX (CVD Coated Cermet)**













**Conventional D (PVD Coated Cermet)**














Reduced amount of wear by about 50% of conventional PVD cermet in the same conditions

(User evaluation)













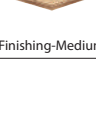
## Stock Items (Negative)









| Shape   | Description   | Dimensions (mm) |           |               |              | CVD Coated Cermet |   |
|---|---|-----------------|-----------|---------------|--------------|-------------------|---|
|   |   | I.C.            | Thickness | Hole Diameter | Corner R(RE) | CCX               |   |
|    | CNMG 120402PP   | 12.70           | 4.76      | 5.16          | 0.2          | ●                 |   |
|   | 120404PP  |                 |           |               | 0.4          | ●                 |   |
|   | 120408PP  |                 |           |               | 0.8          | ●                 |   |
|   | 120412PP  |                 |           |               | 1.2          | ●                 |   |
|    | CNMG 120404PQ   | 12.70           | 4.76      | 5.16          | 0.4          | ●                 |   |
|   | 120408PQ  |                 |           |               | 0.8          | ●                 |   |
|   | 120412PQ  |                 |           |               | 1.2          | ●                 |   |
|    | 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          | ●                 |   |
|    | CNMG 120404XF   | 12.70           | 4.76      | 5.16          | 0.4          | ●                 |   |
|   | 120408XF  |                 |           |               | 0.8          | ●                 |   |
|   | CNMG 120404XP   | 12.70           | 4.76      | 5.16          | 0.4          | ●                 |   |
|   | 120408XP  |                 |           |               | 0.8          | ●                 |   |
|  | CNMG 120404XQ   | 12.70           | 4.76      | 5.16          | 0.4          | ●                 |   |
|   | 120408XQ  |                 |           |               | 0.8          | ●                 |   |
|  | CNMG 120404   | 12.70           | 4.76      | 5.16          | 0.4          | ●                 |   |
|   | 120408  |                 |           |               | 0.8          | ●                 |   |
|   | 120412  |                 |           |               | 1.2          | ●                 |   |
|  | CNMA 120404   | 12.70           | 4.76      | 5.16          | 0.4          | ●                 |   |
|   | 120408  |                 |           |               | 0.8          | ●                 |   |
|  | 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          | ●                 |   |
|   |  | 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          | ●                 |   |

| Shape   | Description   | Dimensions (mm) |           |               |              | CVD Coated Cermet |   |
|---|---|-----------------|-----------|---------------|--------------|-------------------|---|
|   |   | I.C.            | Thickness | Hole Diameter | Corner R(RE) | CCX               |   |
|    | 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             |           |               |              | ●                 |   |
|    | DNMG 150404XF   | 12.70           | 4.76      | 5.16          | 0.4          | ●                 |   |
|   | 150408XF  |                 |           |               | 0.8          | ●                 |   |
|   | DNMG 150404XP   | 12.70           | 4.76      | 5.16          | 0.4          | ●                 |   |
|   | 150408XP  |                 |           |               | 0.8          | ●                 |   |
|   | DNMG 150604XP   | 12.70           | 6.35      | 5.16          | 0.4          | ●                 |   |
| 150608XP  | 0.8   |                 |           |               | ●            |                   |   |
|  | DNMG 150404XQ   | 12.70           | 4.76      | 5.16          | 0.4          | ●                 |   |
|   | 150408XQ  |                 |           |               | 0.8          | ●                 |   |
|  | DNMG 150408   | 12.70           | 4.76      | 5.16          | 0.8          | ●                 |   |
|   | DNMA 150408   |                 |           |               | 0.8          | ●                 |   |
|  | SNMG 120404PQ   | 12.70           | 4.76      | 5.16          | 0.4          | ●                 |   |
|   | 120408PQ  |                 |           |               | 0.8          | ●                 |   |
|  | SNMG 120404HQ   | 12.70           | 4.76      | 5.16          | 0.4          | ●                 |   |
|   | 120408HQ  |                 |           |               | 0.8          | ●                 |   |
|   | 120412HQ  |                 |           |               | 1.2          | ●                 |   |
|  | SNMG 120408XP   | 12.70           | 4.76      | 5.16          | 0.8          | ●                 |   |
|   | SNMG 120408XQ   |                 |           |               | 0.8          | ●                 |   |
|  | SNMG 120408XS   | 12.70           | 4.76      | 5.16          | 0.8          | ●                 |   |
|   | SNMG 120408   |                 |           |               | 0.8          | ●                 |   |
|  | SNMG 120408   | 12.70           | 4.76      | 5.16          | 0.8          | ●                 |   |
|   | SNMG 120408   |                 |           |               | 0.8          | ●                 |   |












● : Standard Stock











## Stock Items (Negative)

| Shape<br>Handed Insert<br>shows Right-hand  | Description        | Dimensions (mm) |           |                  |                 | CVD Coated<br>Cermet |  |
|---|--------------------|-----------------|-----------|------------------|-----------------|----------------------|--|
|   |                    | I.C.            | Thickness | Hole<br>Diameter | Corner<br>R(RE) | CCX                  |  |
| <br>Finishing                                | TNMG 160402PP      | 9.525           | 4.76      | 3.81             | 0.2             | ●                    |  |
|   | 160404PP           |                 |           |                  | 0.4             | ●                    |  |
|   | 160408PP           |                 |           |                  | 0.8             | ●                    |  |
|   | 160412PP           |                 |           |                  | 1.2             | ●                    |  |
| <br>Finishing-Medium                         | TNMG 160404PQ      | 9.525           | 4.76      | 3.81             | 0.4             | ●                    |  |
|   | 160408PQ           |                 |           |                  | 0.8             | ●                    |  |
|   | 160412PQ           |                 |           |                  | 1.2             | ●                    |  |
|   |                    |                 |           |                  |                 |                      |  |
| <br>Finishing-Medium                         | TNMG 110404HQ      | 6.35            | 4.76      | 2.26             | 0.4             | ●                    |  |
|   | 110408HQ           |                 |           |                  | 0.8             | ●                    |  |
|   | TNMG 160404HQ      | 9.525           | 4.76      | 3.81             | 0.4             | ●                    |  |
|   | 160408HQ           |                 |           |                  | 0.8             | ●                    |  |
|   | 160412HQ           |                 |           |                  | 1.2             | ●                    |  |
|   |                    |                 |           |                  |                 |                      |  |
| <br>Finishing / Small ap                     | TNMG 160404XF      | 9.525           | 4.76      | 3.81             | 0.4             | ●                    |  |
|   | 160408XF           |                 |           |                  | 0.8             | ●                    |  |
| <br>Low Carbon Steel / Finishing            | TNMG 160404XP      | 9.525           | 4.76      | 3.81             | 0.4             | ●                    |  |
|   | 160408XP           |                 |           |                  | 0.8             | ●                    |  |
| <br>Low Carbon Steel / Medium cutting      | TNMG 160404XQ      | 9.525           | 4.76      | 3.81             | 0.4             | ●                    |  |
|   | 160408XQ           |                 |           |                  | 0.8             | ●                    |  |
| <br>for Cast Iron                          | TNMG 160404        | 9.525           | 4.76      | 3.81             | 0.4             | ●                    |  |
|   | 160408             |                 |           |                  | 0.8             | ●                    |  |
| <br>for Cast Iron<br>(Without Chipbreaker) | TNMA 160404        | 9.525           | 4.76      | 3.81             | 0.4             | ●                    |  |
|   | 160408             |                 |           |                  | 0.8             | ●                    |  |
| <br>Finishing                              | VNMG 160402PP      | 9.525           | 4.76      | 3.81             | 0.2             | ●                    |  |
|   | 160404PP           |                 |           |                  | 0.4             | ●                    |  |
|   | 160408PP           |                 |           |                  | 0.8             | ●                    |  |
|   | 160412PP           |                 |           |                  | 1.2             | ●                    |  |
| <br>Finishing-Medium                       | VNMG 160404 R/L-VC | 9.525           | 4.76      | 3.81             | 0.4             | ●                    |  |
|   | 160408 R/L-VC      |                 |           |                  | 0.8             | ●                    |  |
|   | 160412 R/L-VC      |                 |           |                  | 1.2             | ●                    |  |
| <br>Finishing-Medium                       | VNMG 160404PQ      | 9.525           | 4.76      | 3.81             | 0.4             | ●                    |  |
|   | 160408PQ           |                 |           |                  | 0.8             | ●                    |  |
|   | 160412PQ           |                 |           |                  | 1.2             | ●                    |  |
| <br>Finishing-Medium                       | VNMG 160404HQ      | 9.525           | 4.76      | 3.81             | 0.4             | ●                    |  |
|   | 160408HQ           |                 |           |                  | 0.8             | ●                    |  |
|   | 160412HQ           |                 |           |                  | 1.2             | ●                    |  |
| <br>Finishing-Medium                       | VNMG 160404VF      | 9.525           | 4.76      | 3.81             | 0.4             | ●                    |  |
|   | 160408VF           |                 |           |                  | 0.8             | ●                    |  |





| Shape   | Description   | Dimensions (mm) |           |                  |                 | CVD Coated<br>Cermet |  |
|---|---------------|-----------------|-----------|------------------|-----------------|----------------------|--|
|   |               | I.C.            | Thickness | Hole<br>Diameter | Corner<br>R(RE) | CCX                  |  |
| <br>for Cast Iron                            | VNMG 160408   | 9.525           | 4.76      | 3.81             | 0.8             | ●                    |  |
| <br>Finishing                                | WNMG 080402PP | 12.70           | 4.76      | 5.16             | 0.2             | ●                    |  |
|   | 080404PP      |                 |           |                  | 0.4             | ●                    |  |
|   | 080408PP      |                 |           |                  | 0.8             | ●                    |  |
|   | 080412PP      |                 |           |                  | 1.2             | ●                    |  |
| <br>Finishing-Medium                         | WNMG 080404PQ | 12.70           | 4.76      | 5.16             | 0.4             | ●                    |  |
|   | 080408PQ      |                 |           |                  | 0.8             | ●                    |  |
| <br>Finishing-Medium                         | WNMG 060404HQ | 9.525           | 4.76      | 3.81             | 0.4             | ●                    |  |
|   | 060408HQ      |                 |           |                  | 0.8             | ●                    |  |
|   | WNMG 080404HQ | 12.70           | 4.76      | 5.16             | 0.4             | ●                    |  |
|   | 080408HQ      |                 |           |                  | 0.8             | ●                    |  |
|   | 080412HQ      |                 |           |                  | 1.2             | ●                    |  |
| <br>Low Carbon Steel / Finishing            | WNMG 080404XP | 12.70           | 4.76      | 5.16             | 0.4             | ●                    |  |
|   | 080408XP      |                 |           |                  | 0.8             | ●                    |  |
| <br>Low Carbon Steel / Medium cutting      | WNMG 080404XQ | 12.70           | 4.76      | 5.16             | 0.4             | ●                    |  |
|   | 080408XQ      |                 |           |                  | 0.8             | ●                    |  |
| <br>for Cast Iron                          | WNMG 080408   | 12.70           | 4.76      | 5.16             | 0.8             | ●                    |  |
|   |               |                 |           |                  |                 |                      |  |
| <br>for Cast Iron<br>(Without Chipbreaker) | WNMA 080408   | 12.70           | 4.76      | 5.16             | 0.8             | ●                    |  |
|   |               |                 |           |                  |                 |                      |  |


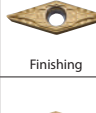


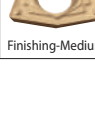
● : Standard Stock

| Shape<br><small>Handed Insert<br/>shows Right-hand</small>  | Description   | Dimensions (mm) |           |                  |                 |                 | CVD Coated<br>Cermets |
|---|---------------|-----------------|-----------|------------------|-----------------|-----------------|-----------------------|
|   |               | I.C.            | Thickness | Hole<br>Diameter | Corner<br>R(RE) | Relief<br>Angle |                       |
| <br>Finishing                              | CCMT 060202PP | 6.35            | 2.38      | 2.8              | 0.2             | 7°              | ●                     |
|   | 060204PP      |                 |           |                  | 0.4             |                 | ●                     |
|   | CCMT 09T302PP | 9.525           | 3.97      | 4.4              | 0.2             | 7°              | ●                     |
|   | 09T304PP      |                 |           |                  | 0.4             |                 | ●                     |
|   | 09T308PP      |                 |           |                  | 0.8             |                 | ●                     |
| <br>Finishing-Medium                       | CCMT 060202GK | 6.35            | 2.38      | 2.8              | 0.2             | 7°              | ●                     |
|   | 060204GK      |                 |           |                  | 0.4             |                 | ●                     |
|   | CCMT 09T302GK | 9.525           | 3.97      | 4.4              | 0.2             | 7°              | ●                     |
|   | 09T304GK      |                 |           |                  | 0.4             |                 | ●                     |
|   | CCMT 120404GK | 12.70           | 4.76      | 5.5              | 0.4             | 7°              | ●                     |
|   | 120408GK      |                 |           |                  | 0.8             |                 | ●                     |
| <br>Finishing-Medium                       | CCMT 060202HQ | 6.35            | 2.38      | 2.8              | 0.2             | 7°              | ●                     |
|   | 060204HQ      |                 |           |                  | 0.4             |                 | ●                     |
|   | CCMT 09T302HQ | 9.525           | 3.97      | 4.4              | 0.2             | 7°              | ●                     |
|   | 09T304HQ      |                 |           |                  | 0.4             |                 | ●                     |
|   | 09T308HQ      |                 |           |                  | 0.8             |                 | ●                     |
| <br>Medium Cutting                        | CCMT 09T308   | 9.525           | 3.97      | 4.4              | 0.8             | 7°              | ●                     |
|   |               |                 |           |                  |                 |                 |                       |
| <br>Finishing                            | CPMT 080202PP | 7.94            | 2.38      | 3.3              | 0.2             | 11°             | ●                     |
|   | 080204PP      |                 |           |                  | 0.4             |                 | ●                     |
|   | CPMT 090302PP | 9.525           | 3.18      | 4.4              | 0.2             | 11°             | ●                     |
|   | 090304PP      |                 |           |                  | 0.4             |                 | ●                     |
|   | 090308PP      |                 |           |                  | 0.8             |                 | ●                     |
| <br>Finishing-Medium                     | CPMH 080204HQ | 7.94            | 2.38      | 3.5              | 0.4             | 11°             | ●                     |
|   | 080208HQ      |                 |           |                  | 0.8             |                 | ●                     |
|   | CPMH 090304HQ | 9.525           | 3.18      | 4.5              | 0.4             | 11°             | ●                     |
|   | 090308HQ      |                 |           |                  | 0.8             |                 | ●                     |
| <br>Medium Cutting                       | 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             |                 | ●                     |
| <br>Low Carbon Steel /<br>Finishing      | 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             |                 | ●                     |
| <br>Low Carbon Steel /<br>Medium cutting | CPMT 090304XQ | 9.525           | 3.18      | 4.4              | 0.4             | 11°             | ●                     |
|   | 090308XQ      |                 |           |                  | 0.8             |                 | ●                     |
| <br>Finishing                            | DCMT 070202PP | 6.35            | 2.38      | 2.8              | 0.2             | 7°              | ●                     |
|   | 070204PP      |                 |           |                  | 0.4             |                 | ●                     |
|   | DCMT 11T302PP | 9.525           | 3.97      | 4.4              | 0.2             | 7°              | ●                     |
|   | 11T304PP      |                 |           |                  | 0.4             |                 | ●                     |
|   | 11T308PP      |                 |           |                  | 0.8             |                 | ●                     |
| <br>Finishing-Medium                     | 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             |                 | ●                     |

| Shape<br><small>Handed Insert<br/>shows Right-hand</small>  | Description   | Dimensions (mm) |           |                  |                 |                 | CVD Coated<br>Cermets |
|---|---------------|-----------------|-----------|------------------|-----------------|-----------------|-----------------------|
|   |               | I.C.            | Thickness | Hole<br>Diameter | Corner<br>R(RE) | Relief<br>Angle |                       |
| <br>Finishing-Medium                     | 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           |                 |           |                  | ●               |                 |                       |
| <br>Medium Cutting                       | DCMT 11T308   | 9.525           | 3.97      | 4.4              | 0.8             | 7°              | ●                     |
|   |               |                 |           |                  |                 |                 |                       |
| <br>Low Carbon Steel /<br>Finishing      | 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           |                 |           |                  | ●               |                 |                       |
| <br>Low Carbon Steel /<br>Medium cutting | DCMT 11T304XQ | 9.525           | 3.97      | 4.4              | 0.4             | 7°              | ●                     |
|   | 11T308XQ      |                 |           |                  | 0.8             |                 | ●                     |
| <br>Without Chipbreaker                 | SPMN 120312   | 12.7            | 3.18      | -                | 1.2             | 11°             | ●                     |
|   |               |                 |           |                  |                 |                 |                       |
| <br>Finishing                          | TBMT 060102DP | 3.97            | 1.59      | 2.3              | 0.2             | 5°              | ●                     |
|   | 060104DP      |                 |           |                  | 0.4             |                 | ●                     |
| <br>Finishing-Medium                   | TCMT 090202HQ | 5.56            | 2.38      | 2.5              | 0.2             | 7°              | ●                     |
|   | 090204HQ      |                 |           |                  | 0.4             |                 | ●                     |
|   | TCMT 110202HQ | 6.35            | 2.38      | 2.8              | 0.2             | 7°              | ●                     |
|   | 110204HQ      |                 |           |                  | 0.4             |                 | ●                     |
|   | 110208HQ      |                 |           |                  | 0.8             |                 | ●                     |
| TCMT 16T304HQ   | 9.525         | 3.97            | 4.4       | 0.4              | 7°              | ●               |                       |
| 16T308HQ  |               |                 |           | 0.8              |                 | ●               |                       |
| 16T312HQ  |               |                 |           | 1.2              |                 | ●               |                       |
| <br>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             |                 | ●                     |
| 110308PP  | 0.8           |                 |           |                  | ●               |                 |                       |
| <br>Finishing-Medium                   | TPMT 090202HQ | 5.56            | 2.38      | 2.8              | 0.2             | 11°             | ●                     |
|   | 090204HQ      |                 |           |                  | 0.4             |                 | ●                     |
|   | TPMT 110302HQ | 6.35            | 3.18      | 3.3              | 0.2             | 11°             | ●                     |
|   | 110304HQ      |                 |           |                  | 0.4             |                 | ●                     |
|   | 110308HQ      |                 |           |                  | 0.8             |                 | ●                     |
| TPMT 160302HQ   | 9.525         | 3.18            | 4.4       | 0.2              | 11°             | ●               |                       |
| 160304HQ  |               |                 |           | 0.4              |                 | ●               |                       |
| 160308HQ  |               |                 |           | 0.8              |                 | ●               |                       |
| <br>Low Carbon Steel /<br>Finishing    | TPMT 110304XP | 6.35            | 3.18      | 3.3              | 0.4             | 11°             | ●                     |
|   | 110308XP      |                 |           |                  | 0.8             |                 | ●                     |
|   | TPMT 160304XP | 9.525           | 3.18      | 4.4              | 0.4             | 11°             | ●                     |
|   | 160308XP      |                 |           |                  | 0.8             |                 | ●                     |

● : Standard Stock

| Shape<br><small>Handed Insert shows Right-hand</small>  | Description   | Dimensions (mm) |           |               |              |              | CVD Coated Cermet |
|---|---|-----------------|-----------|---------------|--------------|--------------|-------------------|
|   |   | I.C.            | Thickness | Hole Diameter | Corner R(RE) | Relief Angle |                   |
| <br><small>Low Carbon Steel / Medium cutting</small> | 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          |              | ●                 |
| <br><small>Finishing</small>                         | 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          |              | ●                 |
| <br><small>Finishing</small>                         | 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          |              | ●                 |
|   | <br><small>Finishing-Medium</small> | VBMT 110304HQ   | 6.35      | 3.18          | 2.8          | 0.4          | 5°                |
| 110308HQ  |   | 0.8             |           |               |              | ●            |                   |
| VBMT 160404HQ   |   | 9.525           | 4.76      | 4.4           | 0.4          | 5°           | ●                 |
| 160408HQ  |   |                 |           |               | 0.8          |              | ●                 |
| 160412HQ  |   |                 |           |               | 1.2          |              | ●                 |
|   |   |                 |           |               |              |              |                   |

| Shape<br><small>Handed Insert shows Right-hand</small>  | Description                    | Dimensions (mm) |           |               |              |              | CVD Coated Cermet |
|---|--------------------------------|-----------------|-----------|---------------|--------------|--------------|-------------------|
|   |                                | I.C.            | Thickness | Hole Diameter | Corner R(RE) | Relief Angle |                   |
| <br><small>Finishing</small>         | VCMT 080202PP                  | 4.76            | 2.38      | 2.3           | 0.2          | 7°           | ●                 |
|   | 080204PP                       |                 |           |               | 0.4          |              | ●                 |
|   | VCMT 160404PP                  | 9.525           | 4.76      | 4.4           | 0.4          | 7°           | ●                 |
|   | 160408PP                       |                 |           |               | 0.8          |              | ●                 |
| <br><small>Finishing</small>         | VCMT 080202VF                  | 4.76            | 2.38      | 2.3           | 0.2          | 7°           | ●                 |
|   | 080204VF                       |                 |           |               | 0.4          |              | ●                 |
| <br><small>Finishing-Medium</small>  | VCMT 080202HQ                  | 4.76            | 2.38      | 2.3           | 0.2          | 7°           | ●                 |
|   | 080204HQ                       |                 |           |               | 0.4          |              | ●                 |
| <br><small>Finishing</small>         | WBMT 060102 <sup>R/L</sup> -DP | 3.97            | 1.59      | 2.3           | 0.2          | 5°           | ●                 |
|   | 060104 <sup>R/L</sup> -DP      |                 |           |               | 0.4          |              | ●                 |
|   | WBMT 080202 <sup>R/L</sup> -DP | 4.76            | 2.38      | 2.3           | 0.2          | 5°           | ●                 |
| 080204 <sup>R/L</sup> -DP   | 0.4                            |                 |           |               | ●            |              |                   |
| <br><small>Finishing-Medium</small> | 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

## Recommended Cutting Conditions

| Workpiece         |           | Recommended Cutting Conditions (Vc : m/min) |
|-------------------|-----------|---|
|                   |           | Min. - Recommendation - Max.                |
| Low Carbon Steel  | SAPH etc. | 300 ~ <b>600</b> ~ 800                      |
| Carbon Steel      | S××C      | 200 ~ <b>300</b> ~ 450                      |
| Alloy Steel       | SCM etc.  | 200 ~ <b>300</b> ~ 400                      |
| Gray Cast Iron    | FC        | 300 ~ <b>350</b> ~ 400                      |
| Nodular Cast Iron | FCD       | 150 ~ <b>250</b> ~ 300                      |

- Machining with coolant is recommended. Dry machining is not recommended.
- Great for soft steel materials during low to high speed finishing (continuous~light interruption)
- Not recommended for Roughing (scale removal) and heavy interrupted machining (ap should be ≤ 1 mm)